2018 NORTH DAKOTA VISION ZERO PLAN

VISION ZERO

Zero fatalities. Zero excuses.

2018
NORTH DAKOTA
VISION ZERO PLAN
STRATEGIC HIGHWAY SAFETY PLAN UPDATE
2018-2023

VISION ZERO

Zero fatalities. Zero excuses.

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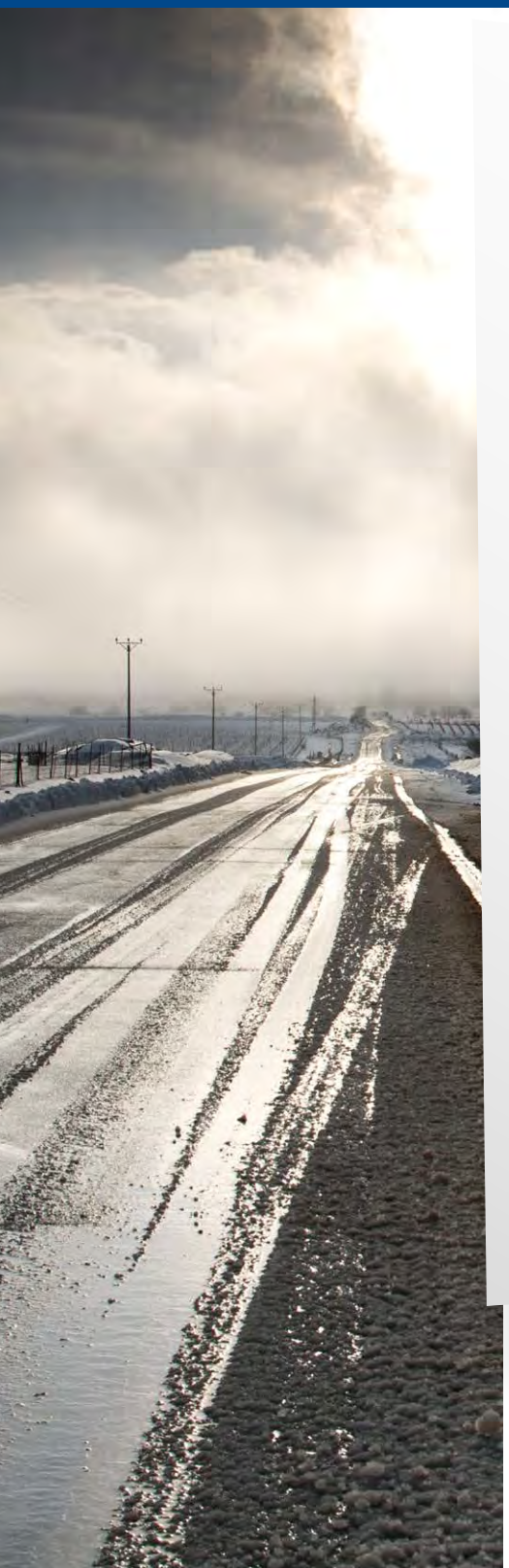
LETTER FROM THE NDDOT DIRECTOR



North Dakota Department of Transportation

Thomas K. Sorel
Director

Doug Burgum
Governor

A Message from the NDDOT Director

Enhancing roadway safety is critical to the health and well-being of the citizens of North Dakota and to others who travel on North Dakota's roads. Safety is a top priority for the North Dakota Department of Transportation (NDDOT) and partners. In January 2018, Governor Doug Burgum, the NDDOT, the North Dakota Department of Health and the North Dakota Highway Patrol launched *Vision Zero*, a strategy to eliminate motor vehicle crash fatalities and serious injuries on North Dakota roads.

To guide *Vision Zero*, we are pleased to share with you the *North Dakota Vision Zero Plan* (Strategic Highway Safety Plan [SHSP] Update, 2018-2023), which will serve as the framework for all agencies and organizations working to achieve North Dakota's *Vision Zero* goal. The plan was developed in partnership with the lead *Vision Zero* agencies and numerous other traffic safety stakeholders in the 4E areas of education, enforcement, engineering and emergency medical services and other disciplines. This plan meets the federal requirements of the SHSP for which the NDDOT has responsibility.

Over the past five years (2013-2017), North Dakota experienced a 22 percent reduction in motor vehicle crash fatalities. But, even one life lost to a motor vehicle crash on North Dakota roads is unacceptable.

Zero fatalities is not impossible, but it will take all of us to get there. The *North Dakota Vision Zero Plan* offers the opportunity for continued progress. Let's work together to achieve the zero goal.

Sincerely,

Thomas K. Sorel
NDDOT Director

NDDOT
North Dakota
Department of Transportation

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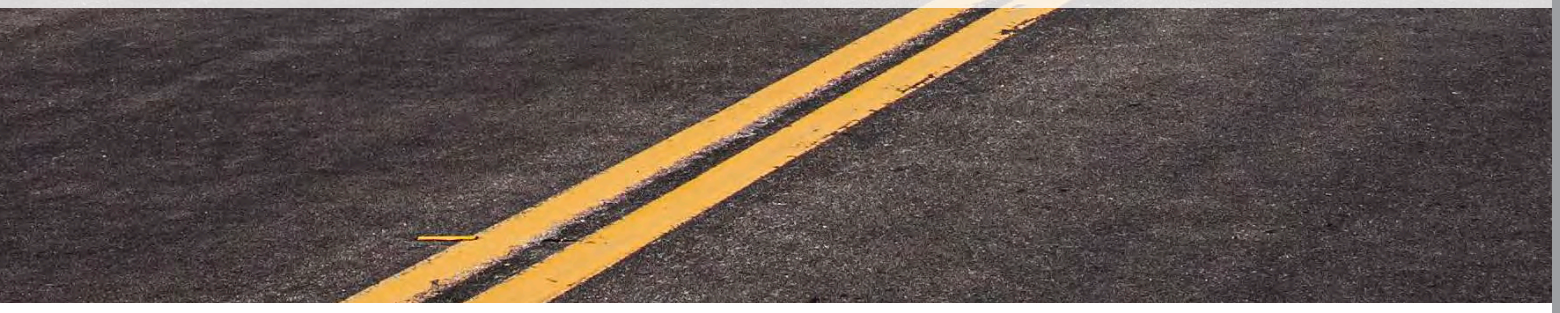
EXECUTIVE SUMMARY



EXECUTIVE SUMMARY

This *Vision Zero Plan* (i.e., Strategic Highway Safety Plan [SHSP] Update, 2018-2023) is the result of a comprehensive and coordinated effort by North Dakota state agencies and more than 200 safety partners representing local and tribal governments and private organizations who are focused on reducing the number of motor vehicle crash fatalities on state and local roadways. This plan is data driven and analysis of North Dakota crash data was used to identify and prioritize crash types, safety strategies, and the types of roadway facilities considered the best candidates for safety investment.

The underlying foundations of this plan include a vision, mission statement, and a short-term goal (NDDOT, 2018a).

> **Vision:** *Establish a culture of personal responsibility where motor vehicle fatalities and serious injuries are recognized as preventable and not tolerated.*

> **Mission:** *Eliminate fatalities and serious injuries caused by motor vehicle crashes.*

> **Short-Term Goal:** *To reduce annual motor vehicle crash fatalities to fewer than 75 by 2025.*

Since 2009, fatalities in North Dakota have declined at a rate of approximately 1% per year. This decline includes the spike in fatalities from 2010 through 2013 that coincides with a period of unprecedented economic development and growth associated with the extraction of crude oil in the northwestern part of the state (Oil-Impact Counties). In response to the increase in traffic volumes and the number of crashes, North Dakota invested in roadway expansion and a variety of low-cost safety strategies in this area. As a result of North Dakota's investment, the number of fatalities has fallen dramatically.

North Dakota's crash data support the adoption of the following Priority Safety Emphasis Areas:

- Lane Departure.
- Intersections.
- Alcohol and/or Drug Related.
- Unbelted Vehicle Occupants.
- Speeding/Aggressive Driving.
- Young Drivers.

North Dakota's current fatality trend (refer to Figure 2-1) is on a downward 1% per year slope that would reach 118 fatalities in 2025. To reach North Dakota's *Vision Zero* interim goal of 75 or fewer by 2025 requires increasing the rate of crash reduction from 1% to approximately 4.6% annually. The Executive Leadership Team believes this can be achieved through implementing new bold and proven safety strategies.

In addition to these Priority Safety Emphasis Areas, North Dakota supports five Other Areas of Emphasis based on the number of serious injuries and increasing crash trends including:

- Heavy Vehicles.
- Older Drivers.
- Pedestrians/Bicyclists.
- Local System Roadways.
- Oil-Impact Counties.

North Dakota's original SHSP was prepared in 2006 and updated in 2013 (CH2M HILL, 2013). Since 2013, North Dakota has focused safety investment on a list of priority safety strategies and has expanded safety investment to implement low-cost strategies along the local road system. The state has seen motor vehicle crash fatalities decline. Example accomplishments of this investment are highlighted below:

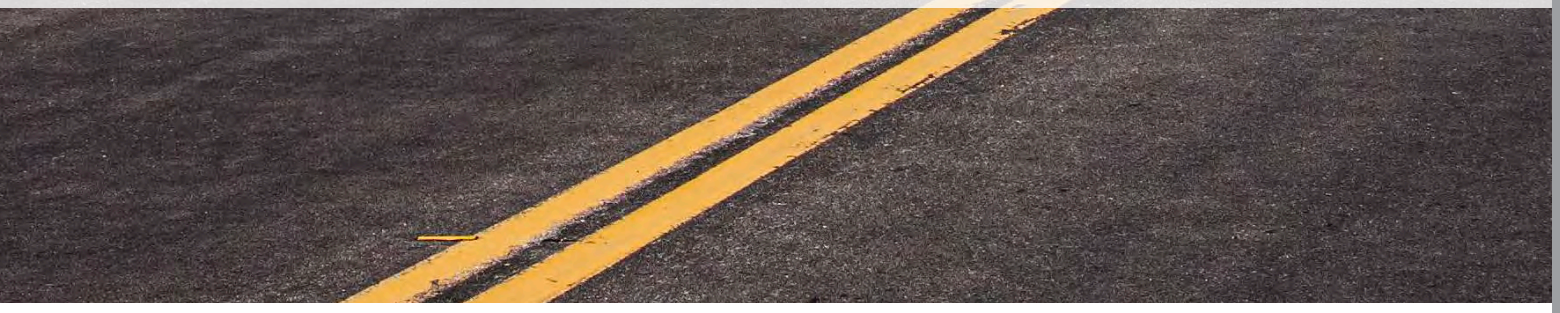
- Local Road Safety Program – North Dakota Department of Transportation (NDDOT) partnered with local agencies across the state to conduct a systemic risk-based evaluation of their systems and identify safety projects for low-cost, proven effective safety strategies at high-risk locations. The state's Highway Safety Improvement Program (HSIP) has gone from very low levels of investment along local roadways to around 50%.
- Enhanced road edges – widespread implementation of rumble strips and wider edge lines along state and county roadways.
- Enhanced horizontal curve delineation – chevron warning signs along rural state, county, and tribal roadways.
- Enhanced intersection recognition – destination lighting at more than 300 rural intersections and upgraded traffic signs and pavement markings at almost 800 rural intersections along state, county, and tribal roadways.
- Enhanced pedestrian safety – countdown pedestrian timers and leading pedestrian intervals at urban signalized intersections.
- Enhanced technical assistance and training for behavioral safety partners – driving under the influence (DUI) training for law enforcement and court personnel and Child Passenger Safety workshops.
- Enhanced high visibility enforcement programs – results of crash analysis were used to better inform selection of times and locations for high visibility enforcement campaigns.
- Continued strengthening of traffic safety policy – strengthened state laws dealing with DUI (sanctions for high blood alcohol content (BAC) offenders and increased jail time for repeat offenders), Child Passenger Safety (requiring children through age 7 be restrained), and Distracted Driving.

This *Vision Zero Plan* builds on these accomplishments by continuing to focus on implementation of evidenced-based infrastructure strategies, such as:

- Rural safety corridors.
- Longitudinal delineators along rural two-lane highways.
- Street lights at rural intersections.
- Reduced conflict intersections along rural expressways.
- Barrier in freeway medians.

This plan also supports enhancing statewide policies addressing driver behavior, such as; enacting a primary seat belt enforcement law, adding ignition interlock to the menu of tools available to address alcohol and/or drug related driving, evidence-based behavioral strategies, and charging higher fines for right-of-way and speeding violations.

SECTION 1
Introduction



SECTION 1

INTRODUCTION

LEADERSHIP STRUCTURE

Success of the North Dakota *Vision Zero Plan* depends, in part, upon an effective leadership structure to facilitate and oversee the development, implementation, monitoring, and updating of the plan.

The *Vision Zero* leadership structure is detailed in Figure 1-1.

Figure 1-1. *Vision Zero* Leadership Structure

EXECUTIVE LEADERSHIP TEAM

The North Dakota *Vision Zero* Executive Leadership Team members provide high-level direction and are responsible for defining priority agency and organization-specific safety initiatives, dedicating and leveraging resources, and providing information and guidance on safety-related efforts to the *Vision* Zero Steering Committee.

The members of the Executive Leadership Team reflect North Dakota's transportation leaders. Their commitment to paving the way for the effective adoption of bold safety strategies and intra- and inter-organizational cooperation is critical to reaching North Dakota's goal of zero motor vehicle crash fatalities and serious injuries. The Executive Leadership Team members are detailed in Table 1-1.

Table 1-1. Executive Leadership Team

Name	Organization	Title
Crosby, R. Blake	North Dakota League of Cities	Executive Director
Davis, Scott	North Dakota Indian Affairs Commission	Executive Director
Nelson, Mark	North Dakota Department of Transportation	Deputy Director Driver and Vehicle Services and Business Operations
Pfennig, Phil Chief	North Dakota Bureau of Criminal Investigation, Office of Attorney General	Chief Agent
Solberg, Brandon	North Dakota Highway Patrol	Colonel
Sorel, Tom	North Dakota Department of Transportation, Governor's Representative for Highway Safety	Director
Traynor, Terry	North Dakota Association of Counties	Executive Director
Tufte, MyLynn	North Dakota Department of Health	State Health Officer
VandeWalle, Gerald	North Dakota Supreme Court	Chief Justice

STEERING COMMITTEE

The North Dakota *Vision Zero* Steering Committee provides input and guidance to plan development, implementation, and monitoring. They also address emphasis area barriers, identify opportunities, and provide recommendations to the Executive Leadership Team.

The Steering Committee members (Table 1-2) serve as key champions of and leaders for the Priority Safety Emphasis Area Teams ensuring broad stakeholder engagement and effective coordination of safety strategy implementation and monitoring.

Table 1-2. Steering Committee

Name	Organization	Title
Benning, Paul	North Dakota Department of Transportation, Local Government Division	Local Government Engineer
Berger, Jane	North Dakota Department of Transportation, Programming Division	Programming Engineer
Birst, Aaron	North Dakota Association of Counties	Traffic Safety Resource Prosecutor
Ferrell, David	Federal Highway Administration, North Dakota Division Office	Safety and Traffic Operations Program Engineer
Foughty, Donovan	Northeast Judicial District (Ramsey County)	District Judge
Gerhart, Michael	North Dakota Motor Carriers Association	Executive Director
Halmrast, Curt	Oakes Ambulance, North Dakota EMS Association, and North Dakota EMS Advisory Council	
Hanson, Carma	Safe Kids Altru Health Systems	Coordinator
Haugland, Paul	Federal Motor Carrier Services Administration, North Dakota Division	State Program Manager
Huseth-Zosel, Andrea	Master of Public Health Program, College of Pharmacy, Nursing and Allied Sciences, North Dakota State University	Research Associate/Lecturer
Jackson, Glenn	North Dakota Department of Transportation, Driver's License Division	Division Director
LaDoucer, Gene	AAA of North Dakota	Senior Public Affairs Representative
McIntosh, Debbie	National Highway Traffic Safety Administration	Regional Program Manager
Moseman, Don	North Dakota Safety Council	Traffic Safety Director
Nelson, David	Northwest Judicial District (Williams County)	District Judge (Retired)
Nikolas-Maier, Nancy	North Dakota Department of Human Services, Aging Services Division	Aging Services Program Administrator
Pettit-Venhuisen, Kristi	Kalash Pettit Attorneys at Law	Traffic Safety Resource Prosecutor
Roark, Lt. Michael	North Dakota Highway Patrol, Safety and Education	Lieutenant
Sagness, Pamela	North Dakota Department of Human Services, Behavioral Health Division	Behavioral Health Division Director
Slag, Mandy	North Dakota Department of Health	Injury Prevention Program Director
Thurn, Carol	North Dakota Department of Transportation, Safety Division	Traffic Safety Manager
Trottier, Ron	Turtle Mountain Band of Chippewa	Tribal Transportation Director
Vachal, Kimberly	Rural Transportation Safety and Security Center, Upper Great Plains Transportation Institute, North Dakota State University	Director
Weigel, Roger	North Dakota Department of Transportation, Design Division	Design Engineer
Wilson, Sandy	North Dakota Department of Transportation, Safety Division	Traffic Safety Manager
Zainhofsky, Scott	North Dakota Department of Transportation, Planning and Asset Management Division	Planning and Asset Management Engineer

SAFETY EMPHASIS AREA TEAMS

The Priority Safety Emphasis Area Teams originate from an analysis of North Dakota's serious crash data that point to the most common types of crashes and contributing factors. The six Emphasis Area Teams reflect the six priority safety emphasis areas of the North Dakota *Vision Zero Plan.* Emphasis Area Teams develop implementation action plans for priority strategies identified in the plan, engage safety partners and stakeholders in implementation, monitor progress, and recommend mid-course strategy changes if interim safety goals are not met.

Safety Emphasis Area Team members (Table 1-3) serve as the front-line, multi-disciplinary team which puts the plan into action. With more clearly defined roles and responsibilities, all safety stakeholders can identify how they can best support implementation efforts.

SHSP Priority Emphasis Areas

* **Lane Departure.**
* **Intersections.**
* **Alcohol and/or Drug Related.**
* **Unbelted Vehicle Occupants.**
* **Speeding/Aggressive Driving.**
* **Young Drivers.**

Table 1-3. Priority Safety Emphasis Area Teams

Priority Emphasis Area	Team Lead	Organization
Lane Departure	Berger, Jane	North Dakota Department of Transportation
Intersections	Berger, Jane	North Dakota Department of Transportation
Alcohol and/or Drug Related	Birst, Aaron	North Dakota Association of Counties
	Pettit-Venhuisen, Kristi	Kalash Pettit Attorneys at Law
Unbelted Vehicle Occupants	Terry Weaver	North Dakota Safety Council
Speeding/Aggressive Driving	Lt. Roark, Michael	North Dakota Highway Patrol, Safety and Education
Young Drivers	LaDoucer, Gene	AAA of North Dakota

SAFETY PARTNERS

Vision Zero brings together a wide range of organizations and individuals under a unified commitment to reduce crash fatalities and serious injuries. In preparation for *Vision Zero Plan* development, two informational webinars and six regional *Vision Zero* workshops were conducted across the state to engage more than 200 safety partners. Stakeholders were from diverse disciplines including education, enforcement, engineering, and emergency medical services (the 4 Es of Safety), the courts, health care, and community safety advocates and provided the critical safety perspectives needed to move Toward Zero Deaths (TZD) and serious injuries on North Dakota roads.

NDDOT is grateful for the active participation of the following partner organizations to develop the *Vision Zero Plan* as well as the diverse safety stakeholders who actively support the plan's implementation.

At a Vision Zero safety workshop in Bismarck, North Dakota, Howard Preston presents on an infrastructure strategy to safety stakeholders.

Participating Organizations

AAA The Auto Club Group

Adams County

AirMed (Sanford Health)

Alexander First Response

Altru Ambulance

City-County Health District

Billings County

Bismarck Burleigh Public Health

Bismarck Police Department

Bismarck-Mandan Metropolitan Planning Organization (MPO)

Bottineau County Emergency Management

Brosz Engineering, Inc.

Burleigh County Sheriff's Department

Burleigh County

Cass County Highway Department

Cass County Sheriff's Office

Cass County State's Attorney's Office

Cavalier County Health District

Central North America Trade Corridor Association – Highway 52

Central Valley Health District

City of Bismarck

City of Dickinson

City of Fargo

City of Grand Forks

City of Mandan

City of Minot

City of Williston

Dickinson Police Department

Dunn County

Fargo Police Department

Fargo-Moorhead Ambulance Service

Fargo-Moorhead Metropolitan Council of Governments

Federal Highway Administration

Federal Motor Carrier Administration

First Care Health Center

Foster County Public Health

Grand Forks County

Grand Forks MPO

Grand Forks Police Department

Houston Engineering Inc.

Jamestown Planning and Zoning

Kalash Pettit Attorneys at Law

Kidder County Ambulance

KLJ

LaMoure County

Mandan Police Department

McKenzie County

McKenzie County Sheriff's Office

McKenzie County State's Attorney

Metro Ambulance

Minnesota Department of Transportation

Minnesota State Patrol

Minnesota Toward Zero Deaths

Minot Air Force Base

Minot Area Chamber of Commerce

Nelson-Griggs District Health Unit

National Highway Traffic Safety Administration-Region 8

North Dakota Active Transportation Alliance

North Dakota Association of Counties

North Dakota Department of Health

North Dakota Department of Human Services

North Dakota Department of Transportation

North Dakota Driver and Traffic Safety Education Association

North Dakota Emergency Medical Service Advisory Committee

North Dakota Highway Patrol

North Dakota Insurance Reserve Fund

North Dakota Indian Affairs Commission

North Dakota League of Cities

North Dakota Legislature

North Dakota Motor Carriers Association

North Dakota Office of Attorney General-Crime Laboratory Division

North Dakota Safety Council

North Dakota State University

North Dakota State University Police

North Dakota Supreme Court

North Dakota Township Officers Association

North Dakota Workforce Safety & Insurance

Northeast Judicial District

Northwest Judicial District

Oakes Ambulance

Ramsey County

Rolette County Public Health District

Safe Kids Grand Forks

State's Attorney's Office

Three Affiliated Tribes Community Health Representative (CHR) Program

Turtle Mountain Band of Chippewa

Ulteig Engineers

University of North Dakota Police Department

North Dakota State University, Upper Great Plains Transportation Institute

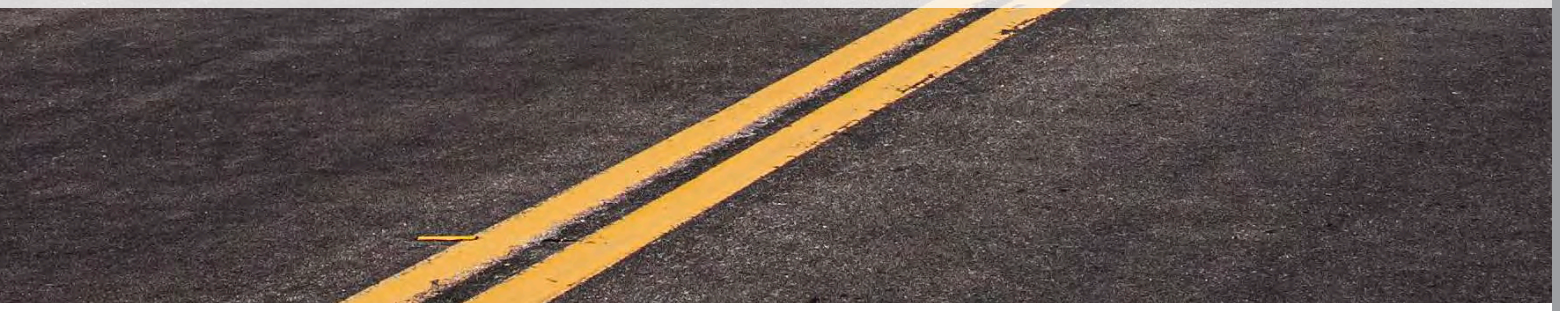
Walsh County Health District

Ward County

Watford City Police

Williston Police Department

SECTION 2
Vision, Mission, and Goals



VISION, MISSION, AND GOALS

SECTION 2

NATIONAL TOWARDS ZERO DEATHS AND NORTH DAKOTA'S *VISION ZERO*

The national TZD strategy and the North Dakota *Vision Zero* program are based on the premise that even one crash-related death is unacceptable. TZD and North Dakota *Vision Zero* share core principles that acknowledge motor vehicle crash deaths are preventable. Human error on the roadway necessitates safeguards to reduce crash fatalities and an interdisciplinary, data-driven approach provides the foundation and diverse perspectives needed to address the complex road safety problem.

The national TZD initiative began in 2009 at a stakeholder workshop to develop a strategic safety plan that evolved into *Toward Zero Deaths: A National Strategy on Highway Safety.* The TZD National Strategy seeks to create a safety culture where drivers reject risky behaviors and all those who are involved in national, state, and local transportation systems incorporate safety into all their decisions (TZD, 2015).

In January 2018, NDDOT, North Dakota Highway Patrol (NDHP), and the North Dakota Department of Health (NDDoH), launched *Vision Zero* to serve as the framework to guide all statewide traffic safety activity, including (but not limited to):

1. Widespread public education/outreach.
2. Working with the legislature to ensure state laws represent best practices in traffic safety.
3. High visibility enforcement of existing laws.
4. Technology advancements.
5. Infrastructure/road safety improvements

Along with the support and action of these lead agencies, private sector stakeholders that share interest in traffic safety are critical partners in *Vision Zero* efforts.

> ***"We can't view traffic safety as solely a government issue. Vision Zero emphasizes motorists' responsibility to drive safely…buckle up, drive sober, pay attention, and obey the law. Prevention of traffic deaths is every North Dakotan's responsibility."***
>
> — Governor Doug Burgum

TZD Toward Zero Deaths®
National Strategy on Highway Safety

State Agencies Partner to Launch Vision Zero Traffic Safety Initiative

> ***"Even one life lost on North Dakota roads is unacceptable. Zero deaths is not an impossible goal, but it will take all of us to get there."***
>
> — Tom Sorel, NDDOT Director

Vision, Mission, and Goals

A key first step in the safety planning process involves identifying the vision, mission, and goals for the reduction in the number of fatalities and serious injuries. North Dakota's adopted vision provides clear strategic direction for the updated plan: *Establish a culture of personal responsibility where motor vehicle fatalities and serious injuries are recognized as preventable and not tolerated.*

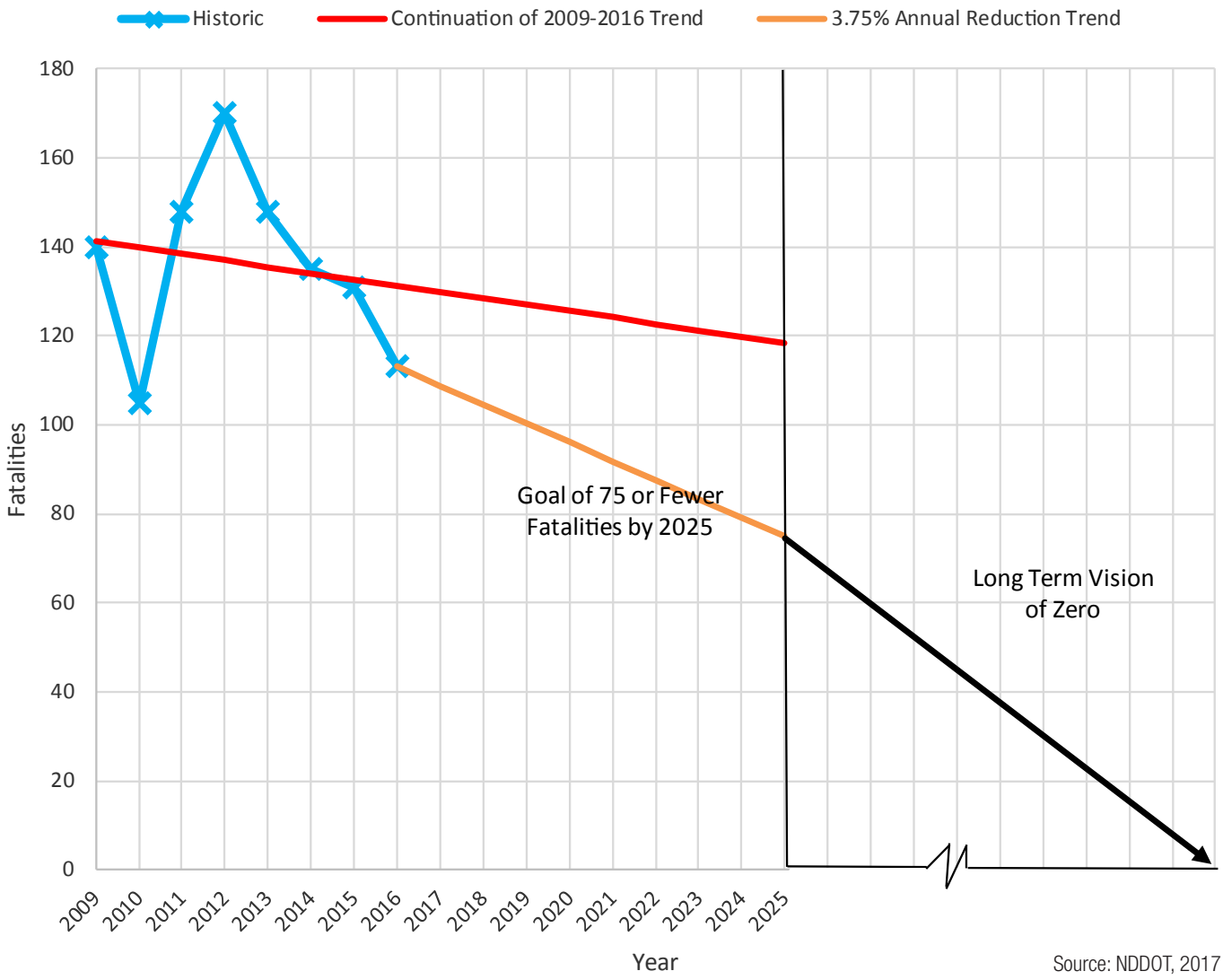
North Dakota's *Vision Zero* mission statement provides insight about how the vision will be achieved: *Eliminate fatalities and serious injuries caused by motor vehicle crashes.*

North Dakota's short-term goal is to reduce annual motor vehicle crash fatalities to fewer than 75 by 2025.

An increase in the rate of reduction of crash-related fatalities requires NDDOT to improve the efficiency of safety investments – implementation of more effective safety strategies, selection of more at-risk locations for safety investments, and adoption of new safety-related policies that are proven to support increased crash reduction.

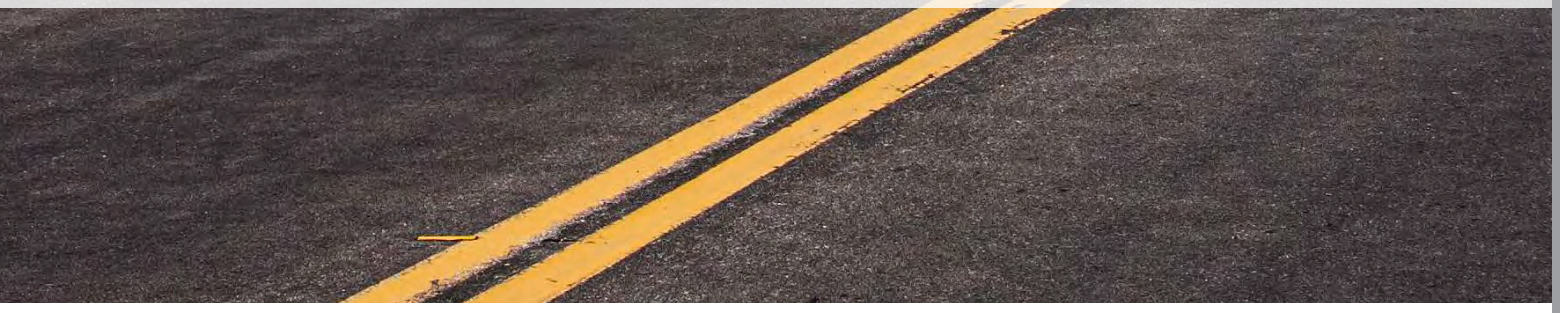
The current fatality trend (Figure 2-1) is on a downward 1% per year slope that would reach 118 fatalities in 2025. To reach North Dakota's goal of fewer than 75 fatalities by 2025 would require increasing the rate of crash reduction from 1% to approximately 4.6% annually. To accomplish this, new bold and proven strategies must be implemented.

Figure 2-1. North Dakota Fatality Trend (with extrapolated line to 75 fatalities in 2025 and then 0)



Source: NDDOT, 2017

SECTION 3
Update Process



SECTION 3

UPDATE PROCESS

VISION ZERO UPDATE PROCESS

The North Dakota *Vision Zero Plan* process builds upon experience gained and lessons learned from previous North Dakota SHSP development efforts. This Section 3 summarizes the background and process overview, federal requirements, safety stakeholder collaboration, and key program accomplishments since the previous 2013 North Dakota SHSP.

BACKGROUND AND PROCESS OVERVIEW

The SHSP is a statewide, data-driven, multiyear safety plan that provides a comprehensive framework for reducing serious crashes. The SHSP is a key requirement of the HSIP, which is a core Federal-aid program to reduce fatalities and serious injuries on all public roads. The NDDOT Safety Division also receives federal funding through the National Highway Traffic Safety Administration (NHTSA) to support driver behavior-related safety strategies to complement the infrastructure-related strategies supported by HSIP funds. Development of North Dakota's SHSP is led by NDDOT in cooperation with local, regional, state, federal, tribal, academic, non-profit, and private-sector safety partners and stakeholders. The SHSP focuses on critical safety needs and guides investment decisions to support strategies or countermeasures proven to save lives.

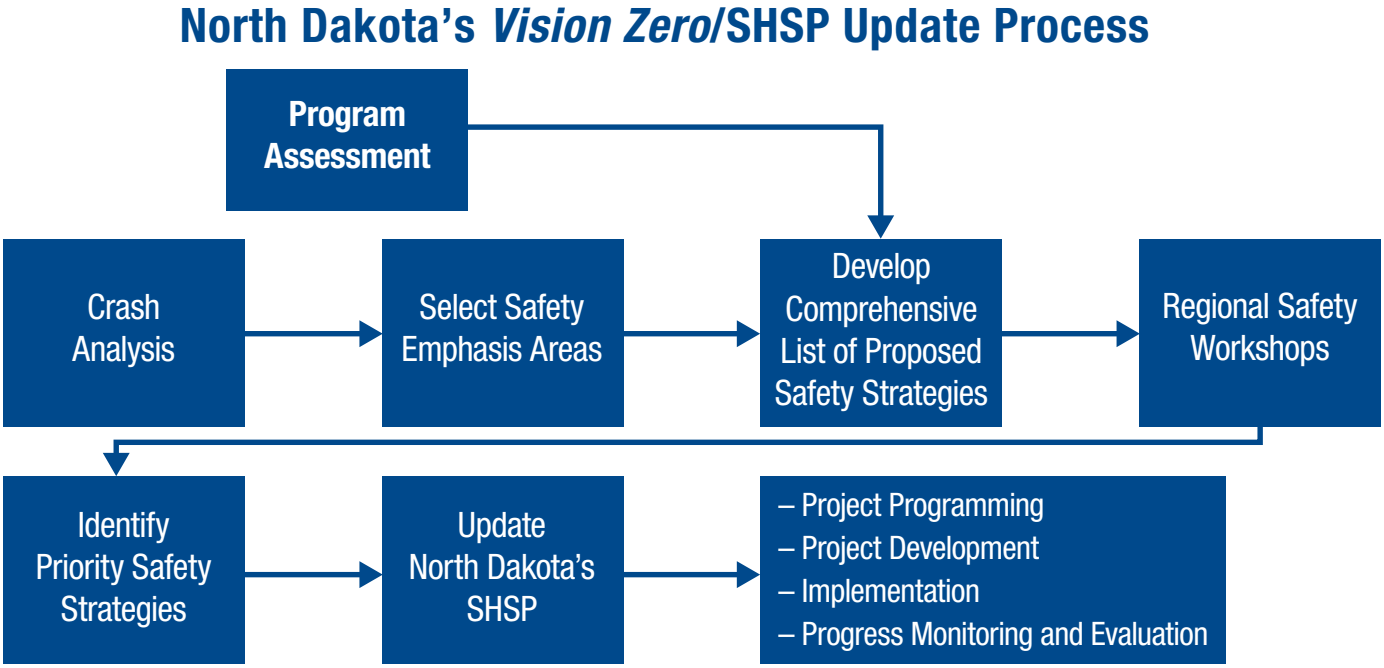
The first North Dakota SHSP was adopted in 2006. Shortly thereafter, North Dakota's 2008 oil boom sparked increases in population, commercial vehicle traffic, and vehicle miles traveled, which culminated in increased motor vehicle crash fatalities. Consequently, the North Dakota SHSP was updated in 2013 (CH2M, 2013) with an intensified commitment to both strengthen safety stakeholder engagement and to further invest in proven, evidence-based safety strategies to reduce North Dakota's serious crashes.

The *Vision Zero Plan* focuses on critical safety needs and guides investment decisions to support strategies or countermeasures that are proven to save lives.

In 2018, the North Dakota *Vision Zero* initiative was launched and the SHSP became the North Dakota *Vision Zero Plan*. The process began with a program assessment of North Dakota's previously implemented infrastructure and driver behavior-related safety countermeasures to gain understanding of their comprehensiveness, how they reflected evidence-based or proven safety approaches, and to identify what changes should be considered during the update process. Figure 3-1 illustrates the core components or overview of North Dakota's SHSP update process.

Image source: https://www.ndstudies.gov/energy. Photo courtesy of Whiting Oil

Figure 3-1. Core Components of North Dakota's 2018 *Vision Zero* Update



A data-driven, collaborative approach supported the above core components and integrated the perspectives of diverse safety stakeholders across the state throughout the plan's update process. This was accomplished through:

- **A comprehensive analysis of North Dakota's crash data** including 5 years (2012-2016) of crash data from state and local road systems, with a focus on the most serious crashes; those that resulted in fatalities and serious injuries. The resulting crash analysis examined the characteristics of the road system to support the prioritization of crash types (emphasis areas where large numbers of crashes represent the greatest opportunity for crash reduction) and facility types (description of the types of roads where the priority crash types are over-represented). Crash data analysis results, together with evidence-based strategy information, supported the selection of priority safety strategies.
- **Early and extensive safety stakeholder outreach and collaboration** including an initial kickoff webinar, crash data webinar, Emphasis Area Team input to initial safety strategies, six regional stakeholder workshops, and a post-regional workshops' *Vision Zero* leadership debriefing on selected priority strategies and interim goals. More specifics on the stakeholder outreach is described later in this section.

FEDERAL REQUIREMENTS

The Federal Fixing America's Surface Transportation or FAST Act continues state SHSP requirements initiated under the Moving Ahead for Progress in the 21st Century (MAP-21) Act. In March 2016, the Federal Highway Administration (FHWA) issued the Strategic Highway Safety Plan (SHSP) Guidance (FHWA, 2016) to further clarify state SHSP requirements. The following summarizes each Federal SHSP requirement and references the corresponding update text.

- **A Consultative Approach:** States must develop their safety plans in consultation with a variety of stakeholders, including state and local; law enforcement, engineering, educators, and emergency responders. Consultation involves active participation by multidisciplinary safety stakeholders and sharing of safety data.

  See pages 3-4 to 3-7 in Section 3 for a detailed description of North Dakota's consultative approach.
- **Coordination with Other Plans:** The SHSP provides strategic direction for state safety plans including HSIP, the Highway Safety Plan, and the Commercial Vehicle Safety Plan and aligns with other long-range transportation and metropolitan plans as well as tribal safety plans, all supporting a performance-based highway safety program.

See page 7-7 in Section 7 for a detailed description of North Dakota's coordination with other plans.

- **Data-Driven Prioritization:** Safety planning reflects a multi-level prioritization exercise that uses the results of analyzing crash data to support:
  - Screening of crash types to identify areas of emphasis.
  - Screening of safety countermeasures or strategies based on documented, proven effectiveness to generate an evidence-based short list of high-priority strategies.
  - Identification of roadway types where implementation of the high-priority safety strategies would be expected to result in the greatest reduction in serious crashes.

  See pages 4-1 and 4-2 in Section 4 for a detailed description of North Dakota's data-driven problem identification.

- **Consideration of Additional Safety Factors:** Additional factors to be considered when defining safety emphasis areas and safety strategies include findings of Road Safety Audits, locations of fatalities and serious injuries, rural road safety, bicycle and pedestrian serious crashes, and the results of systemic risk assessments.

  See pages 4-3 through 4-5 in Section 4 for information on additional safety factors considered for North Dakota.

- **Performance-Based Approach:** SHSP's are required to document the state's adopted performance-based goals including a short-term target and long-term vision (Section 2). In addition, as part of the performance-based program, states are required to set annual safety targets that align with the SHSP's long-term goals.

  These annual targets are established and outlined in North Dakota's annual infrastructure-based HSIP and the behavioral-based Highway Safety Plan, which are aligned with North Dakota's short-term target and long-term vision.

  See pages 2-1 and 2-2 in Section 2 of Vision, Mission, and Goal for a detailed description on North Dakota's performance-based approach.

- **Effective Strategies/Countermeasures:** Priority will be given to safety strategies/countermeasures that have been proven to be effective at reducing crash-related fatalities and serious injuries for the priority safety emphasis areas. Consideration should also be given to low-cost strategies/countermeasures that can be widely deployed at high-risk locations.

  See pages 4-6 and 5-1 through 5-2 in Sections 4 and 5, respectively, for a detailed description of the consideration and selection of effective strategies and countermeasures for North Dakota.

- **Multidisciplinary:** SHSP's must incorporate perspectives from a variety of factors including the 4 Es of safety with applications to infrastructure and driver-behavior emphasis areas and strategies.

  See pages 3-4 and 3-5 in Section 3 for further information regarding North Dakota's approach to obtain multidisciplinary perspectives and input to emphasis area strategies.

- **Special Requirements:** Legislation requires states to address two special rules in SHSP updates: a) define High Risk Rural Roads (HRRR), and b) develop strategies to address older driver and pedestrian safety, if there has been an increase in fatalities and serious injuries to older drivers and pedestrians.

  See page 4-9 in Section 4 for a detailed description of North Dakota's HRRR, Older Driver, and pedestrian safety special requirements.

- **SHSP Evaluation:** States must regularly evaluate their safety programs, using current safety data to confirm the validity of emphasis areas, strategies/countermeasures, and progress toward adopted interim goals. The SHSP must define mechanisms for tracking SHSP implementation and monitoring progress, including an evaluation and update schedule.

  See pages 7-6 and 7-7 in Section 7 for further information of North Dakota's evaluation approach.

- **SHSP Update:** The SHSP must be updated no later than 5-years from the previous approved version and meet update requirements and approvals.

  See pages 3-1 and 3-2 in Section 3 of The Update Process for reference to North Dakota's 2013 and 2018 updates.

- **Approval of SHSP Update:** FHWA Division Office approves the process used to update SHSPs and not specific content. To support FHWA's review, the SHSP must include a chapter/section(s) describing the development process.

  See page 3-2 in Section 3 for a detailed description of the North Dakota's SHSP development process.

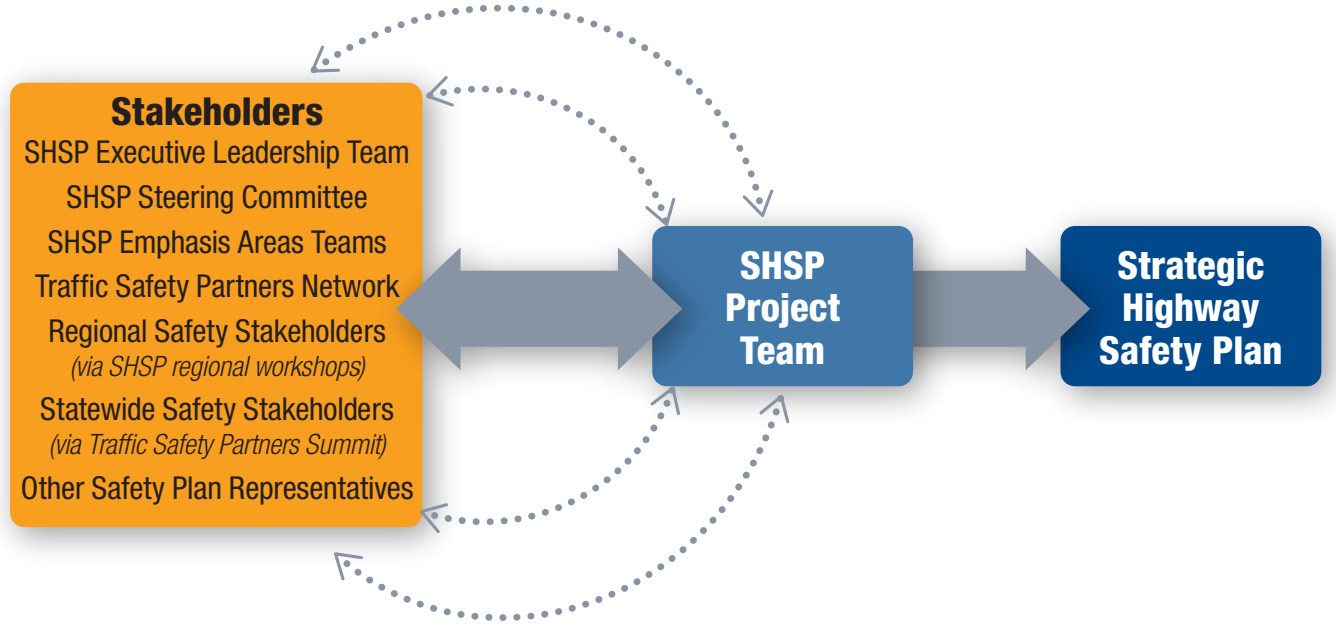
The North Dakota SHSP Update process addresses Federal SHSP requirements as described in the referenced sections.

STAKEHOLDER COLLABORATION – A CONSULTATIVE APPROACH

During planning and development of the *Vision Zero Plan,* a diverse group of safety stakeholders were engaged across the state to provide critical input. Stakeholders included safety stakeholders representing the 4 Es of safety as well as non-traditional partners, such as commercial vehicle representatives, tribal governments, judicial staff, and non-motorist groups. Further, special outreach to local and state elected officials helped to encourage their participation in the *Vision Zero* update process.

Figure 3-2 depicts the structure of the coordination process between stakeholders and *Vision Zero* or SHSP project team. Through a consultative approach and facilitated engagement, participants shared valuable feedback on local application of current safety strategies and their local/regional experiences regarding priority North Dakota safety needs, proven strategies, and best practices to carry forward in the *Vision Zero* update.

Figure 3-2. Structure of the Coordination Process Between Stakeholders and *Vision Zero* or SHSP Project Team



Comprehensive Safety Stakeholders

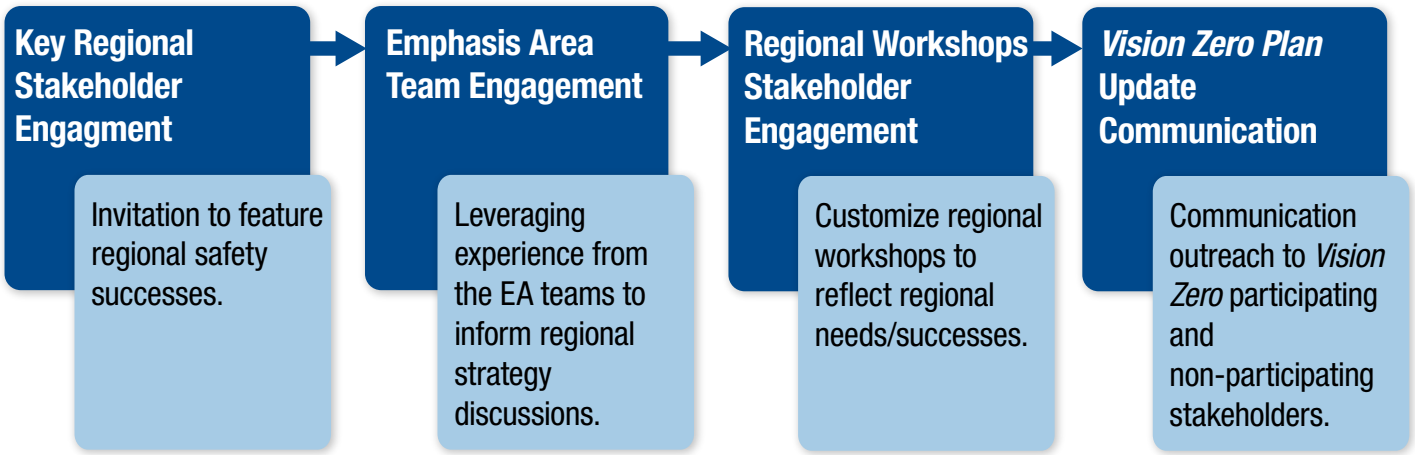
The following stakeholder safety groups represents the agencies and organizations involved in the *Vision Zero* update process:

- Education Institutions and community outreach – state, local.
- Enforcement – state, county, city.
- Engineering – state, county, city, consultants.
- Emergency Medical Services – public, private.
- Federal partners – NHTSA and FHWA.
- Governor's Highway Safety Representative.
- Insurance agencies.
- Supreme Court Chief Justice, District Judges, state and private attorneys/county prosecutors.
- Local community representatives/private citizens.
- Military representative – Air Force.
- Motor Vehicle Administration.
- Non-motorist representation – pedestrian, bicycle and transit.
- Public health and human services staff – state, county, city.
- Elected officials – state, county, city.
- Motor carrier representatives – federal, state.
- Rail representation – Operation Lifesaver.
- Road maintenance – state, county, city.
- Tribal representatives: leadership, transportation, education.
- Traffic safety advocacy groups.
- Transportation Planning – state, regional, MPO, county, city, consultants.

STAKEHOLDER COLLABORATION PROCESS

A cross-section of multidisciplinary stakeholders participated in several outreach events throughout the *Vision Zero Plan* process as illustrated in Figure 3-3. The stakeholders provided valuable guidance to updating the *Vision Zero Plan* through open dialogue at direct in-person meetings, workshops, and webinars. Stakeholder engagement events are described in the following section.

Figure 3-3. Stakeholder Engagement Approach



ENGAGEMENT EVENTS

Several safety stakeholder engagement opportunities were available throughout the *Vision Zero* update process and are detailed below.

***Vision Zero*/SHSP Kickoff Webinar – March 13, 2018**

Members of the *Vision Zero* Executive Leadership Team and the *Vision Zero* Steering Committee were invited to participate in the March 2018 kickoff webinar. The two groups were solicited early in the update process to offer valuable perspectives on the approach and provide recommendations. During the kickoff webinar, participants were debriefed on the update process and federal requirements, the newly launched *Vision Zero* program, and the *Vision Zero* Safety Workshop implementation beginning March through April 2018. Members were invited to provide their perspectives on the *Vision Zero* update process.

Solicitation of *Vision Zero*/SHSP Safety Emphasis Area Team Input

The North Dakota *Vision Zero* Emphasis Area Teams representing the four behavioral and two infrastructure priority safety emphasis areas served a key role throughout the *Vision Zero* update. The Emphasis Area Teams identified priority needs, framed challenges, identified safety strategies, recommended priorities, and will play a central role in strategy implementation.

Prior to the *Vision Zero* safety workshops, leaders of the emphasis area teams (together with NDDOT safety staff) offered their expertise to create initial emphasis area safety strategies based on North Dakota crash data, knowledge of proven safety counter measures, and experience with North Dakota safety culture. Their input on the initial strategies strengthened the statewide context for the regional *Vision Zero* safety workshop discussions, presentations, and materials.

Regional *Vision Zero* One-Day Safety Workshops

North Dakota selected six regional locations across the state to host the one-day safety workshops, as presented in Figure 3-4, which were held in March and April 2018. The primary goals of the *Vision Zero* Safety Workshops were to solicit safety stakeholder input and perspectives and educate stakeholders on proven safety strategies. The regional workshop approach versus a single statewide workshop provided a greater opportunity to gain unique perspectives among regional stakeholders and to help align local needs with statewide safety priorities.

Table 3-1 outlines the dates and locations for each workshop. A copy of the invitation sent to stakeholders is presented in Appendix A.

Workshop Agenda

The six *Vision Zero* Safety Workshops (Figures 3-5 and 3-6) occurred over 7 hours and included the following agenda components (included in Appendix B):

- Foundational presentations on the North Dakota *Vision Zero* initiative and an overview of the North Dakota SHSP/*Vision Zero* background and update process.
- A review of the importance of a data-driven safety approach and an overview of North Dakota's serious crash data and priority emphasis areas.
- Stakeholder discussion of priority regional safety needs and successes.
- Infrastructure and behavioral emphasis area strategy presentation and stakeholder discussions, focusing on proven, evidence-based strategies. Participants had the opportunity to recommend new strategies and modify existing strategies.
- Stakeholder voting on priority safety strategies based on crash data, evidence-based strategies and best practices, multidisciplinary input, and local/regional perspectives.

North Dakota chose a full-group discussion format for infrastructure and behavior-related safety strategies versus a structure using separate breakout discussions for each. The full-group discussion approach promoted cross-education of effective strategies and interdisciplinary discussion offering the sharing of diverse perspectives resulting in a more comprehensive understanding of safety approaches among all stakeholders.

In addition, each workshop provided an opportunity to include local/regional speakers to highlight local safety accomplishments.

Figure 3-4. *Vision Zero* Safety Workshop Locations

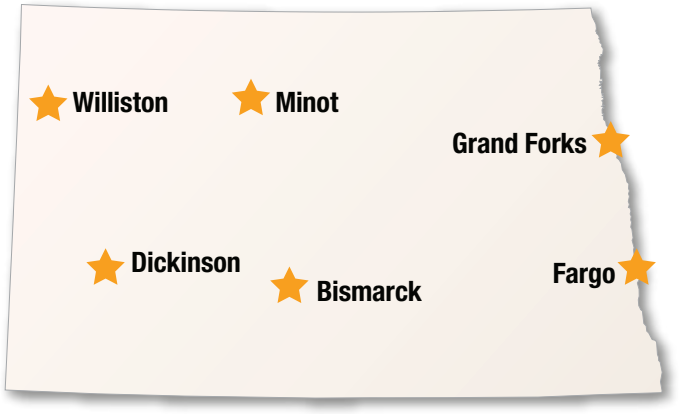


Table 3-1. Date and Locations of Each Regional *Vision Zero* One-Day Safety Workshop

Date	Location
March 21, 2018	Fargo – Fargo Dome
March 22, 2018	Grand Forks – Ramada Grand Forks
April 3, 2018	Minot – Ward County Courthouse
April 4, 2018	Bismarck – Ramkota
April 17, 2018	Dickinson City Hall
April 18, 2018	Williston – Ernie French Center

Figure 3-5. *Vision Zero* Safety Workshop – Grand Forks

Figure 3-6. *Vision Zero* Safety Workshop – Fargo – EA Strategy Voting

Each participant received the following printed supporting material, which are presented in Appendix B:

- *Vision Zero* Safety Workshop agenda.
- Presenter biographies.
- Workshop-specific participant list (not included).
- Workshop presentation.
- Emphasis area table of statewide injuries.
- Emphasis area crash fact sheets (see Appendix C).
- Emphasis area strategy tables.

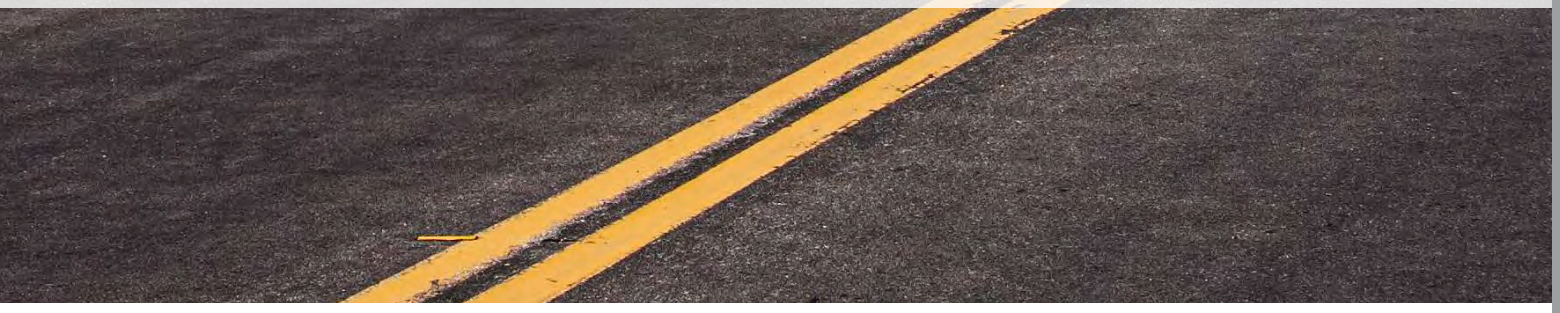
Priority SHSP Safety Strategy Review and Comment

Following the *Vision Zero* Safety Workshops, the *Vision Zero* Executive Leadership Team and Steering Committee members met on May 24, 2018 to review workshop stakeholder discussion and safety strategy input and provide initial comment and feedback on recommended priority safety strategies for each of the six priority emphasis areas. Members were provided one-page summaries of the emphasis areas with highlights of North Dakota crash data analyses, fatalities, and serious injury trends from 2008-2016. The one-page summaries also included the recommended priority safety strategies, reflecting, in part, input from the *Vision Zero* Safety Workshops. The meeting discussion recapped the *Vision Zero* Update process, stakeholder input received, emphasis area priority safety strategies, potential policy-related efforts, and the *Vision Zero* Update interim goal. In addition, *Vision Zero* leadership members were invited to further consider the recommended priority safety strategies and offer additional feedback by June 7, 2018.

STAKEHOLDER PARTICIPATION SUMMARY

Statewide outreach efforts included inviting more than 2,000 stakeholders, of which, more than 200 participated in emphasis area strategy formation, two webinars, six *Vision Zero* Safety Workshops, and priority strategy selection. Stakeholder comments were carefully reviewed and considered for the *Vision Zero* Update. In addition, during the workshops, participants were invited to sign up for North Dakota *Vision Zero* Behavioral Emphasis Area Teams to expand the statewide participation in *Vision Zero* strategy development and implementation. More than 60 additional members were added to the behavioral emphasis area teams, including Young Driver, Unbelted Occupants, Alcohol and/or Drug Use, and Speeding/Aggressive Driving.

SECTION 4
Data-Driven Prioritization



DATA-DRIVEN PRIORITIZATION

SECTION 4

As part of the *Vision Zero Plan's* analytical process, it is essential to use a data-driven approach to determine appropriate candidates for safety investment because, in the absence of data, crash types and roadway facilities could be misconceived as equal candidates for safety investment. Therefore, FHWA requires the *Vision Zero Plan* development process be data driven to avoid misconceptions. Crash type data and roadway system characterization are necessary to support the prioritization that is an integral part of strategic safety planning.

For North Dakota, the crash data analyses involved four steps. The first step includes disaggregating crash types into categories defined by FHWA and then ranking the categories based on the number of fatalities and serious injuries. Since there is not enough safety funding to widely deploy projects that address all crash types, states are encouraged to adopt a short list of safety emphasis areas from among the categories with the greatest number of crashes. Focusing safety investments in the top ranked emphasis areas (those with the greatest number of fatalities and serious injuries) is most likely to result in the greatest opportunity for crash reduction.

The second step is identifying high-priority safety countermeasures/strategies that are linked to specific crash types. The third step is analyzing crash data to identify the types of roadway facilities where the priority crash types occur in the greatest numbers. The fourth and final step is to develop a historic trend of fatalities and serious injuries to indicate the progress North Dakota has made in addressing the number of priority crash types. The trend should also document total fatalities across the country to provide a comparison to nationwide priority crash types.

SAFETY EMPHASIS AREAS

Consistent with FHWA guidance (FHWA, 2016), North Dakota has adopted the number of motor vehicle crash fatalities plus incapacitating injuries (serious injuries) as the safety performance measure underlying the development of this *Vision Zero Plan.* Crash data from the most recent 5-year period (2012-2016) were assembled, analyzed, and disaggregated into four basic categories (Drivers and Passengers, Vulnerable Users, Vehicles, and Infrastructure) and 15 safety emphasis areas (as suggested by FHWA). In addition to disaggregating by emphasis area, serious injuries were disaggregated by state versus local system roadways. The number of injuries documented are greater than the actual number of fatalities and injuries across the state's road system because assigning crashes to these categories involves, in many cases, double or triple counting. For example, a single crash that resulted in an injury to a Young Driver could also have involved Speeding, Unbelted Occupants, and a Lane Departure/Single-Vehicle crash.

The results of the analysis support the adoption of the following as Priority Safety Emphasis Areas:

1. **Lane Departure.**
2. **Intersections.**
3. **Alcohol and/or Drug Related.**
4. **Unbelted Vehicle Occupants.**
5. **Speeding/Aggressive Driving.**
6. **Young Drivers.**

Fact sheets summarizing key information for each adopted Priority Safety Emphasis Area are included in Appendix C.

Based on the number of serious injuries and increasing crash trends, North Dakota supports five Other Areas of Emphasis in addition to the Priority Safety Emphasis Areas including:

1. Heavy Vehicle.
2. Older Drivers.
3. Pedestrians/Bicyclists.
4. Local System Roadways.
5. Oil-Impact Counties.

To gain a better understanding of the relationships among the emphasis areas, further analysis was conducted and the results are in Table 4-1. Key takeaways from this effort include (NDDOT, 2017):

- 42% of serious injuries to Young Drivers are associated with Speeding/Aggressive Driving.
- 48% of serious injuries to Older Drivers are associated with Intersection related crashes.
- 63% of Alcohol and/or Drug related serious injuries involve Unbelted Vehicle Occupants.
- 32% of serious injuries to pedestrians are Alcohol and/or Drug related.
- 54% of serious injuries to bicyclists are Intersection related.
- 30% of serious injuries to motorcyclists are Intersection related.
- 67% of serious injuries associated with Heavy Vehicle crashes occurred in Oil-Impact Counties.
- 49% of serious injuries involving Lane Departure are associated with Speeding/Aggressive Driving.
- 57% of serious injuries associated with Multi-Vehicle Opposing (Head-On) crashes occurred in the Oil-Impact Counties.
- 56% of serious injuries associated with Winter Weather conditions occurred in the Oil-Impact Counties.

As part of the data-driven prioritization process, crash trees were developed to document a disaggregation by state (Figure 4-1) versus local (Figure 4-2) system roadways and urban versus rural areas. Key takeaways from this effort include (NDDOT, 2017):

- A total of 48% of serious injuries occurred on state system roadways and 52% on local system roadways.
- Majority of serious injuries occurred in rural areas (92% on the state system and 67% on the local system).
- The most common type of crash resulting in serious injuries in rural areas on both state and local system roadways is a non-intersection, single-vehicle lane departure, on a tangent (straight) section of road with Unbelted Vehicle Occupants.
- In rural areas, approximately 25% of crashes involving serious injuries occurred in curves and this is considered over-represented based on an estimate that curves make up fewer than 5% of state and local system roadways based on mileage.
- In rural areas, approximately 1% of crashes involving serious injuries are associated with animal hits (primarily deer).
- In urban areas, crashes involving serious injuries are almost evenly divided on state and local systems between intersections and non-intersections.
- In urban areas, approximately 30% of crashes involving serious injuries occurred at intersections with traffic signal control (57% on the state system and 24% on the local system) and this is considered over-represented based on an estimate that signal-controlled intersections make up fewer than 10% of all intersections.

Table 4-1. Safety Emphasis Area Correlation Matrix

The emphasis area matrix is a powerful tool for identifying relationships and correlations between emphasis areas, which can be critical information in selecting appropriate highway safety strategies. It presents a cross table of emphasis area representation, with the column headers on the top of the table representing the *target emphasis area,* and the index headers on the left of the table representing the *related emphasis area.* The cells in the table represent the total percentage of crashes within the target emphasis area which are also identified as being within the related emphasis area. To read the matrix, consider the following

- Identify a target emphasis area from the column headers at the top of the matrix. This emphasis area will be the focus of the analysis.
- Identify a related emphasis area from the index headers at the left of the matrix. This emphasis area will identify a subset of the target emphasis area.
- Identify the cell which is within the selected column and the selected row. The value in this cell indicates the *percent share,* which is the size of the subset of the target emphasis area which the related emphasis area represents.
- Use the identified values to fill in the following sentence *"Of all **target emphasis** area crashes, **percent share** of them also fall within the **related emphasis** area."*

	Young Driver	Older Driver	Speeding/Aggressive Driving	Alcohol and/or Drug Related	Distracted/Asleep/ Fatigued	Unbelted Vehicle Occupants	Pedestrian	Bicyclist	Motorcycle	Heavy Vehicles	Train	Lane Departure: Single-Vehicle	Lane Departure: Multi-Vehicle (Opposing Traffic)	Lane Departure: Multi-Vehicle (Same Direction)	Intersection	Winter Weather	Work Zone	Oil-Impact Counties	Total
Young Driver	-	10.2%	19.6%	13.2%	19.0%	18.1%	25.2%	9.6%	9.1%	10.1%	2.9%	16.8%	20.6%	21.6%	19.5%	13.9%	10.7%	16.5%	18.2%
Older Driver	6.5%	-	7.4%	2.7%	13.4%	8.9%	8.4%	25.0%	11.9%	12.8%	11.8%	5.1%	16.5%	10.8%	19.3%	10.4%	14.7%	8.4%	11.6%
Speeding/Aggressive Driving	42.3%	25.2%	-	51.2%	27.2%	43.3%	23.8%	9.6%	36.3%	36.8%	5.9%	49.1%	25.8%	44.6%	28.3%	62.6%	42.7%	42.6%	39.4%
Alcohol and/or Drug Related	24.0%	7.9%	43.1%	-	16.8%	43.2%	32.2%	7.7%	30.6%	20.0%	5.9%	42.3%	40.0%	23.0%	23.9%	18.0%	30.7%	34.2%	33.1%
Distracted/Asleep/ Fatigued	7.3%	8.1%	4.9%	3.6%	-	6.4%	4.2%	7.7%	2.2%	9.5%	2.9%	7.4%	5.5%	2.7%	5.7%	2.3%	8.0%	6.2%	7.0%
Unbelted Vehicle Occupants	48.3%	37.3%	53.3%	63.3%	44.4%	-	13.3%	28.8%	52.2%	42.1%	67.6%	57.4%	45.5%	33.8%	41.3%	37.6%	54.7%	49.1%	48.5%
Pedestrian	6.0%	3.1%	2.6%	4.2%	2.6%	1.2%	-	0.0%	2.8%	2.3%	0.0%	0.9%	1.0%	0.0%	3.5%	2.7%	10.7%	3.5%	4.3%
Bicyclist	0.8%	3.4%	0.4%	0.4%	1.7%	0.9%	0.0%	-	0.3%	0.5%	0.0%	0.1%	0.2%	1.4%	2.9%	0.2%	2.7%	0.4%	1.6%
Motorcycle	4.8%	10.0%	8.9%	9.0%	3.0%	10.4%	6.3%	1.9%	-	2.5%	0.0%	9.6%	5.0%	17.6%	10.1%	0.0%	12.0%	8.5%	9.7%
Heavy Vehicles	10.1%	20.2%	17.0%	11.0%	24.6%	15.8%	9.8%	5.8%	4.7%	-	29.4%	10.5%	33.3%	36.5%	20.6%	23.1%	18.7%	24.5%	18.2%
Train	0.2%	1.0%	0.2%	0.2%	0.4%	1.4%	0.0%	0.0%	0.0%	1.7%	-	0.0%	0.0%	0.0%	0.0%	0.2%	0.0%	0.7%	1.0%
Lane Departure: Single-Vehicle	40.6%	19.4%	55.0%	56.4%	46.6%	52.2%	9.1%	1.9%	43.4%	25.3%	0.0%	-	5.5%	21.6%	18.3%	41.4%	30.7%	43.4%	44.1%
Lane Departure: Multi-Vehicle (Opposing Traffic)	14.3%	18.1%	8.3%	15.3%	9.9%	11.9%	2.8%	1.9%	6.6%	23.1%	0.0%	1.6%	-	0.0%	10.4%	14.8%	12.0%	14.5%	12.7%
Lane Departure: Multi-Vehicle (Same Direction)	2.7%	2.1%	2.5%	1.6%	0.9%	1.6%	0.0%	1.9%	4.1%	4.5%	0.0%	1.1%	0.0%	-	2.5%	1.9%	1.3%	1.9%	2.2%
Intersection	30.9%	48.3%	20.8%	20.9%	23.3%	24.6%	23.1%	53.8%	30.0%	32.6%	0.0%	12.0%	23.7%	32.4%	-	19.9%	21.3%	27.8%	28.9%
Winter Weather	12.1%	14.4%	25.4%	8.7%	5.2%	12.4%	9.8%	1.9%	0.0%	20.3%	2.9%	15.0%	18.7%	13.5%	11.0%	-	1.3%	17.8%	16.0%
Work Zone	1.3%	2.9%	2.5%	2.1%	2.6%	2.6%	5.6%	3.8%	2.8%	2.3%	0.0%	1.6%	2.2%	1.4%	1.7%	0.2%	-	2.2%	2.3%
Oil-Impact Counties	45.4%	36.2%	54.2%	51.8%	44.4%	50.7%	39.9%	13.5%	43.8%	67.4%	35.3%	49.3%	57.2%	43.2%	48.2%	55.8%	49.3%	-	50.1%

Figure 4-1. North Dakota Statewide Crash Tree/State System

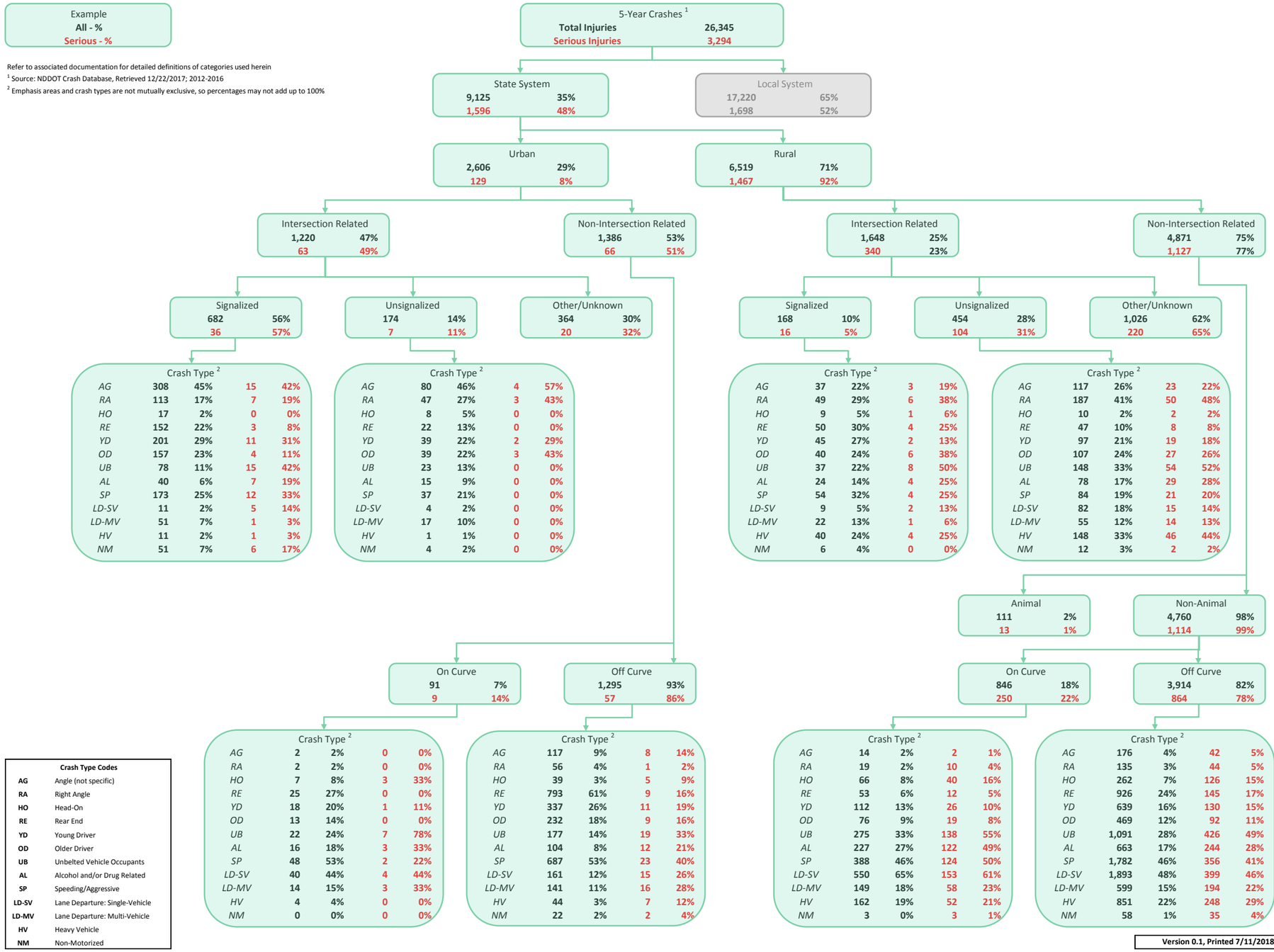
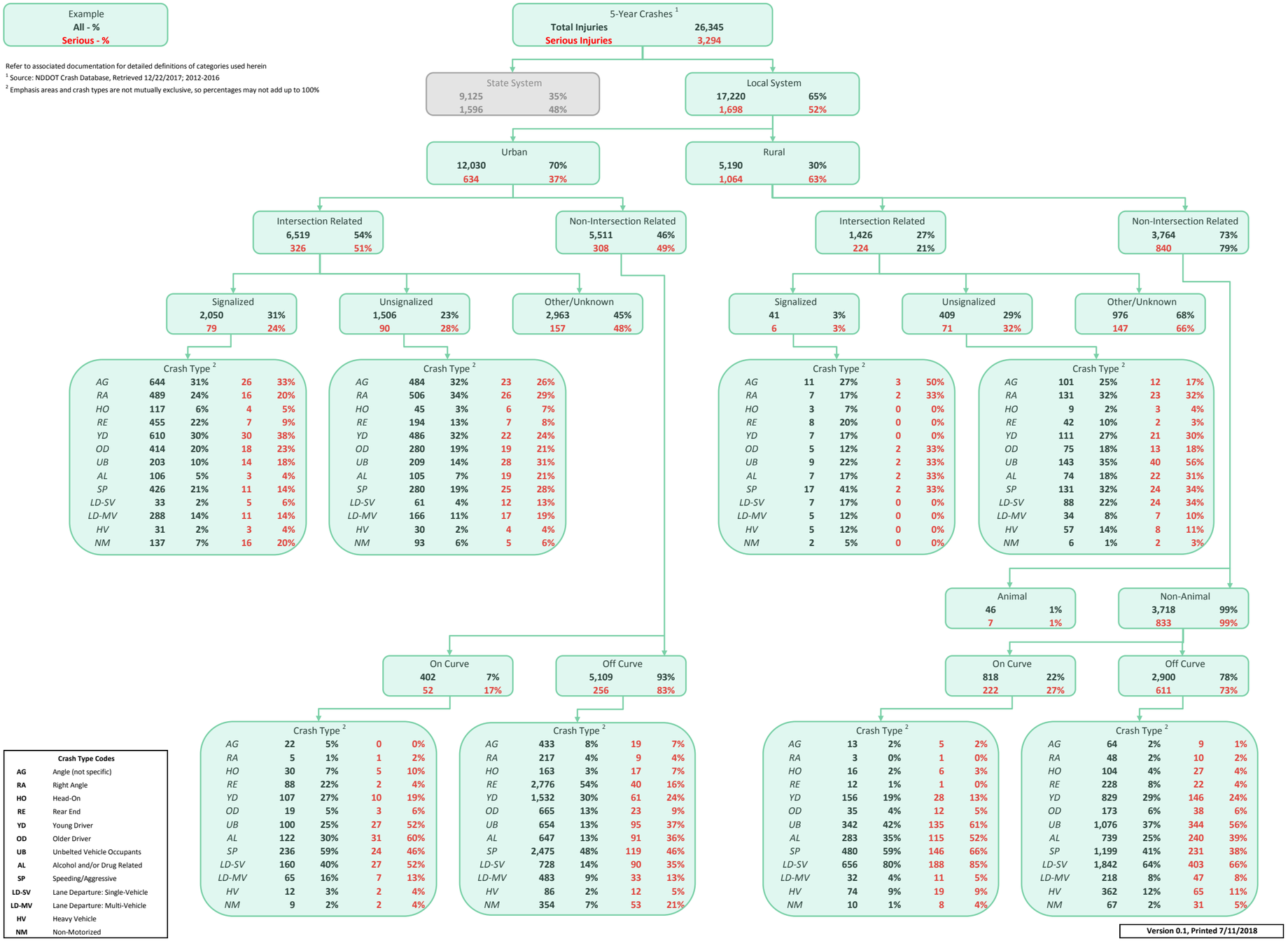


Figure 4-2. North Dakota Statewide Crash Tree/Local System



SAFETY STRATEGIES

Adoption of the six Priority Safety Emphasis Areas and five Other Areas of Emphasis began the prioritization/screening process of safety strategies. The process started with a review of safety research reports including:

- National Cooperative Highway Research Program's (NCHRP's) Report 500 Series (NCHRP, 2017).
- FHWA's Crash Modification Factor (2014).
- *Highway Safety Manual* (MnDOT, 2014).
- NHTSA's Countermeasures that Work (NHTSA, 2015).

Focusing on adopted emphasis areas reduced the number of infrastructure and driver-behavior safety strategies from more than 700 to around 140.

The initial list of infrastructure and driver-behavior-based safety strategies is included in Appendix B. The selected high-priority, evidence-based safety strategies associated with each of the adopted emphasis areas are documented in Chapter 5 of this *Vision Zero Plan* and include:

- Lane Departure.
  - Enhanced road edges.
  - Designating and deploying safety corridors.
- Intersections.
  - Improve intersection recognition by enhancing traffic control devices and adding street lights.
  - Reduce intersection conflicts by implementing design improvements, including roundabouts and Restricted Crossing U-Turns along divided roadways.
  - Address red-light running at urban signalized intersections through confirmation lights and partnerships with local law enforcement.
- Alcohol and/or Drug Use.
  - Implement an ignition interlock program.
  - Enhance alcohol and/or drug related driving detection through expanded enforcement and sobriety checkpoints.
- Unbelted Vehicle Occupants.
  - Enact primary seat belt legislation.
  - Strengthen penalties for lack of seat belt use.
- Speeding/Aggressive Driving.
  - Enact legislation to increase fines for speed violations.
  - Explore pilot automated enforcement projects.
- Young Drivers.
  - Enhanced graduated drivers licensing.
  - Enhanced monitoring of teen driving.

CRASH DATA TRENDS

While 5-years of crash data were sufficient to identify priorities, they were not sufficient to develop trend indicating changes in the number of motor vehicle crash fatalities and serious injuries over time. As a result, the data set was expanded to 8 years (2009-2016) and the results of this effort are documented in Table 4-2 and Figure 4-3. The data indicate the following about crashes in North Dakota during this 9-year period. County fatalities for 2012-2016 are documented in Appendix D.

- An average of 119 fatal crashes per year and 507 serious injury crashes per year.
- An average of 136 fatalities per year and 607 serious injuries per year.

Table 4-2. North Dakota Summary of Injuries versus Crashes by Severity and Year (NDDOT, 2017)

Metric	Severity	Year							
		2009	2010	2011	2012	2013	2014	2015	2016
Crashes	Fatal (K)	116	92	130	147	133	121	111	102
	Serious (K+A)	361	393	536	634	578	544	554	454
	All Severities	17,749	17,132	18,840	18,381	18,989	16,142	15,296	15,187
Injuries	Fatal (K)	140	105	148	170	148	135	131	113
	Serious (K+A)	470	481	610	745	665	653	686	545
	All Severities	4,621	4,784	5,170	5,490	5,524	5,429	5,133	4,769

Figure 4-3. North Dakota Fatality and Serious Injury Trend

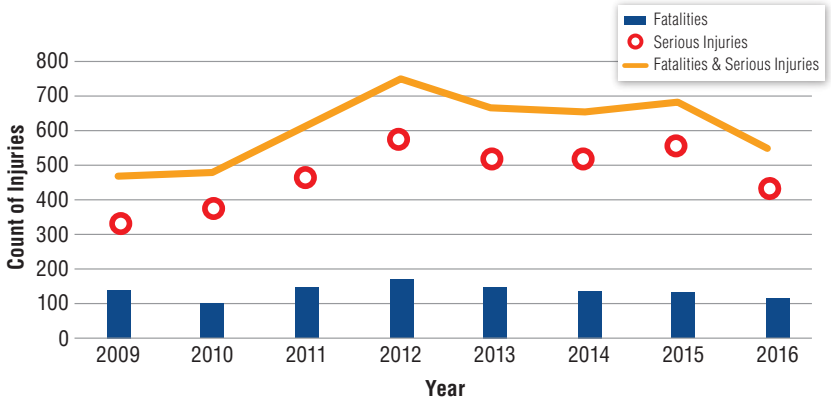


Figure 4-4. North Dakota and National Motor Vehicle Crash Fatalities (NHTSA, 2016; NHTSA, 2017a)

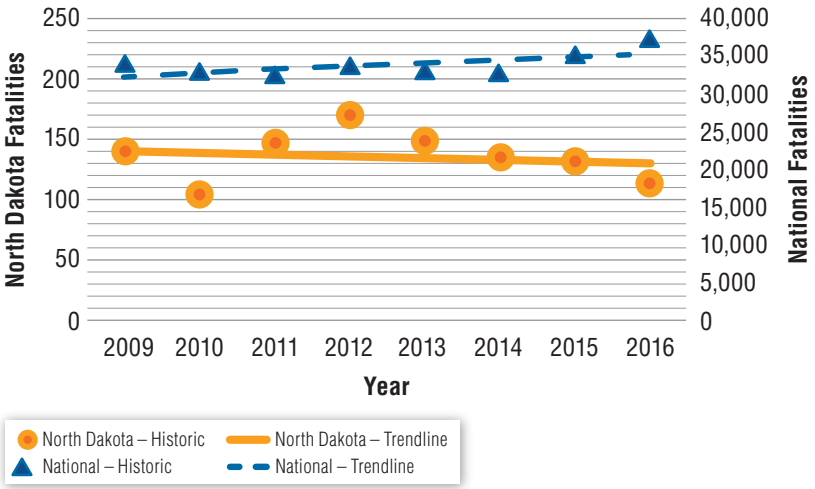
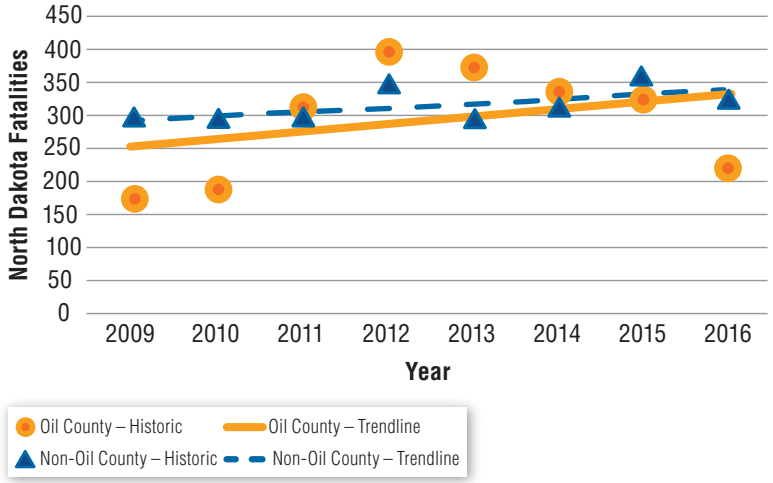


Figure 4-5. North Dakota Serious Injuries by Oil-Producing Counties (NHTSA, 2016; NHTSA, 2017a)



- There are approximately 1.1 fatalities per fatal crash and 1.2 serious injuries per injury crash.
- Fatalities and serious injuries increased from 2009 through 2012 and then decreased to 2016. However, the overall trend shows a decrease of about 1% per year for fatalities and an increase of 4% per year for serious injuries.

North Dakota's fatalities trend is relatively flat, like the national trend (Figure 4-4). However, the exception between the two trends is that the most recent 5 years of fatalities are trending down in North Dakota and are trending up at the national level.

The data-driven analysis determined that serious crashes and the resulting fatalities and injuries were over-represented in the Oil-Impact Counties (the seventeen counties that make up the northwestern portion of North Dakota). These counties have experienced significant growth from a traffic volume and economic development perspective because of activity associated with crude oil extraction from the Bakken Formation. These Oil-Impact Counties saw traffic volumes more than double between 2009 and 2014 and the statewide fraction of serious crashes increased from around 30% to more than 50%.

The Oil-Impact Counties trend since 2009 (Figure 4-5) shows an overall increase of serious injuries of around 8% per year. However, there are two distinctly different patterns. Between 2009 and 2012 serious injuries increased at a rate of 20% per year and between 2012 and 2016 serious injuries decreased at a rate of 14% per year. Since the oil boom began, considerable investment has been made in the area, including expansion of the state's roadway system and implementation of a variety of safety improvements. Since 2012, oil extraction activities have diminished due to the reduction in the worldwide price of crude oil, but it is too soon to tell exactly what is behind the substantial reduction in serious injuries in the Oil-Impact Counties.

Review of North Dakota's annual number of fatalities and serious injuries shows relatively large fluctuations on a year-to-year basis. FHWA encourages states to plot 5-year rolling averages to provide a general trend with additional insight to support the selection of short-term goals for the reduction of serious injuries.

The 5-year rolling average trend of fatalities in North Dakota and nationally (Figure 4-6) shows results similar to those identified on a year-by-year analysis; flat trend with the North Dakota numbers trending slightly down and the national numbers trending slightly up.

Analysis of North Dakota's crash data indicate the following (NDDOT, 2017):

- Among the Priority Safety Emphasis Areas, the trends for Unbelted Occupants, Speeding/Aggressive Driving, Alcohol and/or Drug Related, Intersections, and Young Drivers (Figure 4-7) have decreased between 6% and 11% per year. The trend for Lane Departure is flat (Figure 4-8).
- Among the Other Areas of Emphasis, the trends for Heavy Vehicles, Older Drivers (Figure 4-9), Pedestrians/Bicyclists, Local System Roadways, and Oil-Impact Counties have increased between 1% and 9% per year.

Figure 4-6. North Dakota and National Motor Vehicle Crash Fatalities 5-Year Rolling Average (NHTSA, 2016; NHTSA, 2017a)

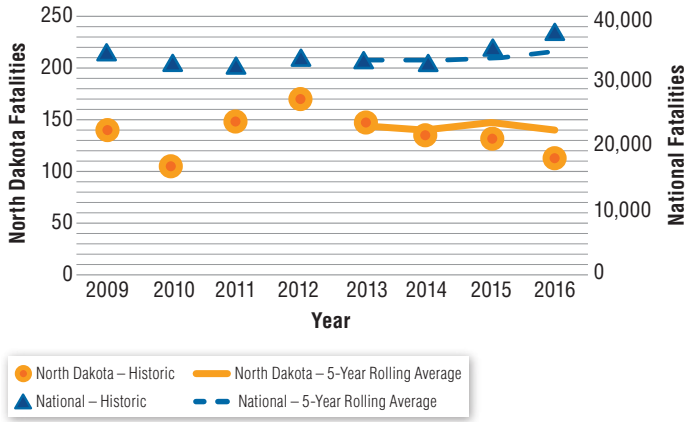


Figure 4-7. Young Driver Trend (NDDOT, 2017)

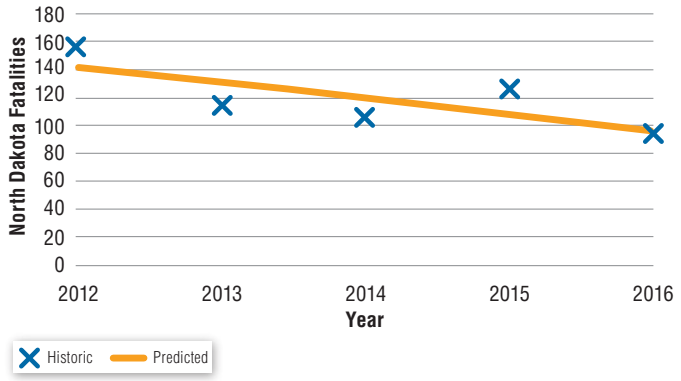


Figure 4-8. Lane Departure – Single-Vehicle Trend (NDDOT, 2017)

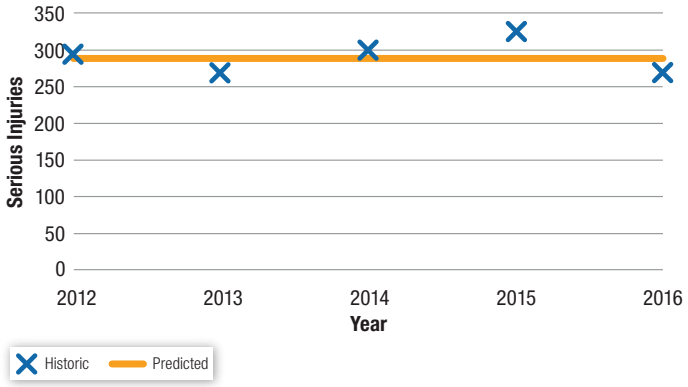
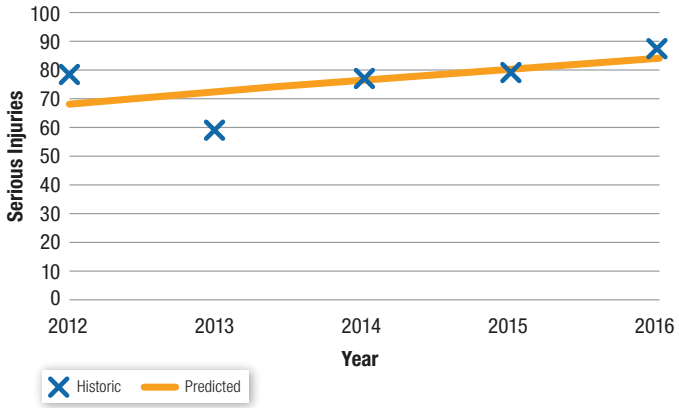


Figure 4-9. Older Driver Trend (NDDOT, 2017)



CRASH AND INJURY RATES

The analytical process includes normalizing the number of fatalities and serious injuries based on the amount of travel across the state and the result is expressed as a rate of fatalities or serious injuries per 100 million vehicle miles traveled (HMVMT). The data reveal a similar pattern for fatalities, serious injuries, the amount of travel across the state and rates. From 2009 to 2012, all statistics increased but by 2016 had dropped back to values that were still somewhat higher than in 2009 for the total number of serious injuries and vehicle miles traveled and somewhat lower than in 2009 for fatalities and serious injury rates (Table 4-3). As was the case for the trends for fatalities and serious injuries, the trend for rates show two different patterns. A distinct increase in rates between 2009 and 2012 followed by a distinct decrease in rates between 2012 and 2016.

Crash and injury rates were also documented for the classes of roadways that define North Dakota's HRRR (Table 4-4). In North Dakota, HRRRs are any roadway functionally classified as a rural collector or rural local road with a crash rate for fatalities and serious injuries that exceeds the statewide average for those facilities or that will likely have increases in traffic volumes that would result in crash rates that exceed the statewide average rates. The average fatality and injury rates (per HMVMT) for rural collectors and rural local roads are 0.83, 2.46, 0.99, and 3.78, respectively.

Table 4-3. Statewide Annual Comparison of Serious Injury Frequency versus Serious Injury Rate (NDDOT, 2017)

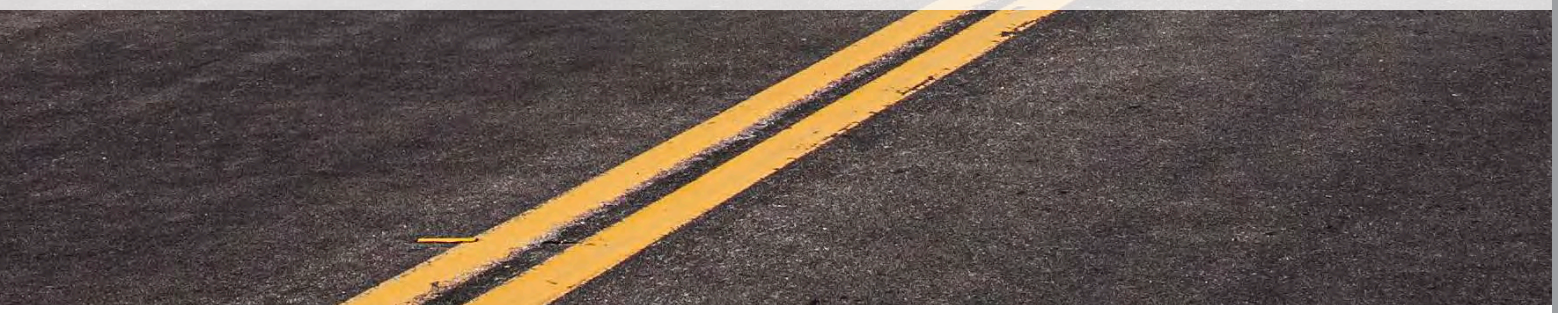
			Year							
			2009	2010	2011	2012	2013	2014	2015	2016
Statewide	Injury Frequency	Fatal (K)	140	105	148	170	148	135	131	113
		Serious (K+A)	470	481	610	745	665	653	686	545
	Injury Rate per HMVMT	Fatal (K)	1.763	1.265	1.615	1.684	1.465	1.294	1.300	1.160
		Serious (K+A)	5.917	5.793	6.655	7.381	6.584	6.257	6.806	5.595
	HMVMT		79.430	83.026	91.663	100.929	100.997	104.366	100.791	97.400

Table 4-4. Injury Rates for High Risk Rural Roads

			Year							
			2009	2010	2011	2012	2013	2014	2015	2016
Rural Collector	Injury Frequency	Fatal (K)	22	6	4	12	8	1	10	5
		Serious (K+A)	34	25	24	31	22	15	36	23
	Injury Rate per HMVMT	Fatal (K)	2.555	0.686	0.378	1.025	0.660	0.078	0.816	0.451
		Serious (K+A)	3.948	2.856	2.269	2.648	1.816	1.166	2.938	2.072
	HMVMT		8.612	8.752	10.578	11.708	12.114	12.867	12.252	11.098
Rural Local Roads	Injury Frequency	Fatal (K)	31	11	12	4	9	9	3	2
		Serious (K+A)	67	50	43	39	44	41	28	12
	Injury Rate per HMVMT	Fatal (K)	3.359	1.188	1.094	0.334	0.748	0.743	0.252	0.172
		Serious (K+A)	7.259	5.399	3.919	3.256	3.658	3.385	2.350	1.030
	HMVMT		9.229	9.261	10.973	11.977	12.029	12.113	11.916	11.655

SECTION 5

Priority Safety Strategies for Safety Emphasis Areas



PRIORITIZING SAFETY STRATEGIES FOR SAFETY EMPHASIS AREAS

SECTION 5

INTRODUCTION

A key part of the data-driven prioritization process for a strategic safety plan is identifying high-priority, evidence-based safety countermeasures/strategies for each adopted safety emphasis area. This approach is based on three important points.

1. Safety countermeasures/strategies are aligned with specific emphasis areas.
2. Safety countermeasures/strategies are not equally effective at reducing crashes. As state's screen for potential countermeasures/strategies, an awareness of historic crash reduction is an important consideration.
3. Experience suggests that developing safety projects from a short list of highly effective strategies is more efficient and effective because there is not enough safety funding for an extensive list of strategies. Therefore, investing in proven, effective strategies will likely result in greater crash reductions.

North Dakota's crash data identified six crash types based on the total number of serious injures (fatalities plus serious injuries) during the 2012-2016 study period. Investment in these priority safety emphasis areas would represent the greatest opportunity for crash reduction. The adopted **Priority Safety Emphasis Areas** are detailed below and are represented in annual averages (NDDOT, 2017):

- Lane Departure (381 serious injuries/year and 58% of serious injury crashes).
- Intersections (191 serious injuries/year and 29% of all serious injury crashes).
- Alcohol and/or Drug Related (218 serious injuries/year and 33% of all serious injury crashes).
- Unbelted Vehicle Occupants (320 serious injuries/year and 48% of all serious injury crashes).
- Speeding/Aggressive Driving (260 serious injuries/year and 39% of all serious injury crashes).
- Young Drivers (120 serious injuries/year and 18% of all serious injury crashes).

The high-priority safety countermeasures/strategies in the following priority safety emphasis areas are the result of a screening process that began with more than 140 strategies from a variety of safety research reports (NCHRP Report 500 Series [2017], FHWA's Crash Modification Factor website [2014], the *Highway Safety Manual* [MnDOT, 2014], and NHTSA's Countermeasures That Work [2015]). These strategies were evaluated based on documented crash reduction, estimated implementation costs, consistency with North Dakota's safety culture, and feedback from approximately 200 North Dakota safety partners that participated in a series of safety workshops conducted around the state.

In addition to the adopted priority safety emphasis areas, North Dakota will focus safety investments on five **Other Areas of Emphasis**, including (NDDOT, 2017):

- Heavy Vehicles (120 serious injuries/year and 18% of all serious injury crashes).
- Older Drivers (76 serious injuries/year and 12% of all serious injury crashes).
- Pedestrians/Bicyclists (39 serious injuries/year and 6% of all serious injury crashes).
- Local System Roadways (340 serious injuries/year and 52% of all serious injury crashes).
- Oil-impact Counties (277 serious injuries/year and 42% of all serious injury crashes).

Heavy Vehicles, Older Drivers, and Pedestrians/Bicyclists were selected for inclusion in this SHSP because even though the number of serious injury crashes did not rise to the level of those associated with the Priority Safety Emphasis Areas, the crash trend are increasing (9% per year, 5% per year, and 4% per year, respectively). Local Road Systems and Oil-impact Counties were selected because the large number of crashes represented an opportunity for reduction and crash characteristics and associated safety countermeasures/strategies could be identified.

LANE DEPARTURE

Lane-departure crashes include single-vehicle run-off-the-road (to the right and left) crashes and multiple vehicle collisions when vehicles wander outside their lane and result in either head-on or side-swipe collisions.

On North Dakota roadways, there were 1,581 serious injury lane-departure crashes resulting in 1,906 serious injuries between 2012 and 2016. This is an average of 381 serious injuries per year and accounted for nearly 58% of serious injury crashes during the 5-year study period (NDDOT, 2017).

Highlights from the most recent data (2012-2016) for lane-departure crashes on North Dakota roadways include (NDDOT, 2017):

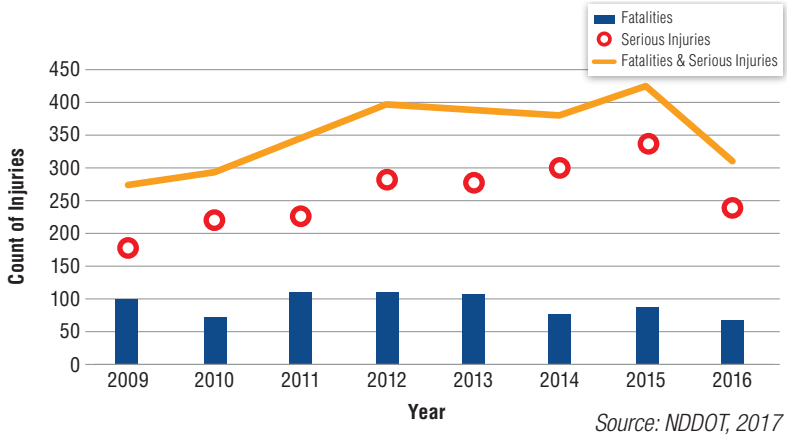
- Majority of these serious injuries occurred on rural (85%), state (46%), and local (39%) road systems.
- Majority of lane-departure serious injuries are from single-vehicle crashes (75%).
- Highway curve serious injuries (26%) are considered over-represented.
- The most harmful events for single-vehicle serious injuries involved overturning/rolling over (72%) and collisions with fixed objects (13%) such as trees, utility/light poles, traffic signs, and mail boxes.
- Male drivers between the age of 20 and 29 were involved in the largest number of serious injury crashes (22%).
- A plurality of Lane Departure serious injuries (31%) occurred during summer months and a majority occurred on dry roads (75%) during daylight conditions (51%).
- Unbelted Drivers and occupants accounted for more than 50% of fatalities and serious injuries.
- Alcohol and/or drug Related driving (41%) and Speeding/ Aggressive driving (40%) were common contributing factors.

Priority Safety Strategies

To increase safety measures to reduce Lane Departure crashes, the following strategies should be implemented:

- Install safety corridors.
- Include longitudinal delineators.
- Embed wet reflective pavement markings.
- Install 6-inch-wide edge lines.
- Install edge and center line rumble strips.
- Add chevrons (curve warning signs).
- Implement shoulder paving (including edge-line rumble strips).
- Median barriers.

Figure 5-1. Lane Departure Fatality and Serious Injury History



Source: NDDOT, 2017

INTERSECTIONS

Between 2012 and 2016, there were 805 serious crashes on North Dakota roadways. These resulted in 953 serious injuries in which the crash occurred at or in relation to an intersection. This is an average of 191 serious injuries per year that accounted for nearly 29% of all serious injuries during the 5-year period. Serious injuries near intersections include multi-vehicle (77%) and single-vehicle (23%) collisions. The most common types of intersection-related multi-vehicle serious injuries result from right-angle crashes (58%) and rear-end crashes (11%) that occur at STOP (23%) and signal-controlled (18%) locations (NDDOT, 2017).

Highlights from the most recent data (2012-2016) include (NDDOT, 2017):

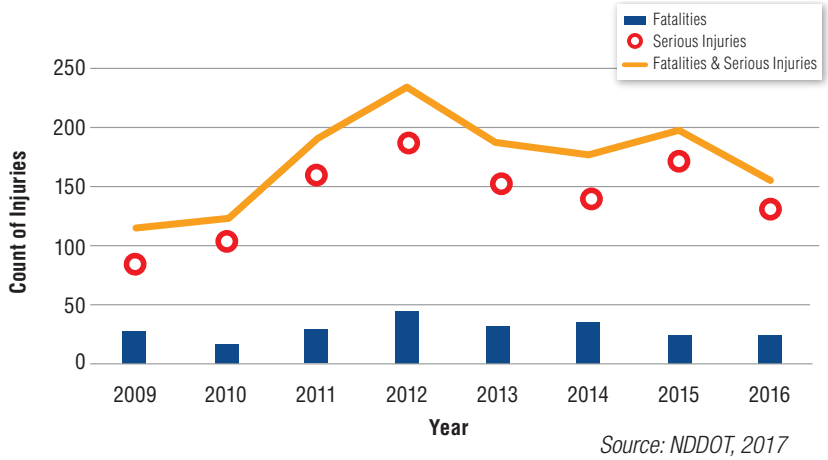
- Majority of these serious injuries occurred on rural (59%), state (36%), and local (23%) road systems.
- Male drivers between the age of 20 and 29 were involved in the largest number of serious injury crashes (17%).
- A plurality of intersection serious injuries occurred during summer months (33%) and a majority occurred on dry roads (80%) during daylight conditions (62%).
- Unbelted drivers and occupants accounted for 41% of fatalities and serious injuries.
- Speeding (28%), alcohol (24%), and failure to yield (22%) were cited as the most common contributing factors.
- The most common type of serious injury at rural STOP controlled intersections results from a right-angle crash where the driver on the minor approach stopped and then pulled into traffic on the major approach (a gap selection issue). The most common type of serious injury at urban signal-controlled intersections results from a right-angle collision where a vehicle ran the red light.

Priority Safety Strategies

To increase safety measures to reduce intersection crashes, the following strategies should be implemented:

- Install roundabouts (instead of traffic signals).
- Install reduced conflict intersections.
- Install street lighting.
- Install rural intersection collision warning systems (RICWS).
- Require confirmation lights on traffic signals to support red-light running enforcement efforts.
- Require access management (near intersections).

Figure 5-2. Intersection Fatality and Serious Injury History



Source: NDDOT, 2017

ALCOHOL AND/OR DRUG USE

Driving while impaired by alcohol and drug use poses a serious threat to drivers who operate vehicles while impaired and other motorists and road users sharing the roadway. In North Dakota, driving under the influence of alcohol and illegal or prescription drugs is a leading contributor to fatal and serious injury crashes. Yet, these types of serious crashes are 100% preventable. Although North Dakota has a general .08 BAC limit for those operating vehicles, drivers can be convicted of drunk driving even when their BAC is under that limit. The average BAC among North Dakota DUI offenders is .17 – one of the highest in the country and is more than twice the legal limit of .08. Despite aggressive DUI safety measures, the alcohol and/or drug-impaired driving problem has proved resistant to change.

On North Dakota roadways, there were 886 serious crashes resulting in 1,091 serious injuries between 2012 and 2016 in which the crash involved alcohol or drugs. This is an average of 218 serious injuries per year and accounted for 33% of all serious injuries during the 5-year study period.

Highlights from the most recent crash data (2012-2016) (NDDOT, 2017) include:

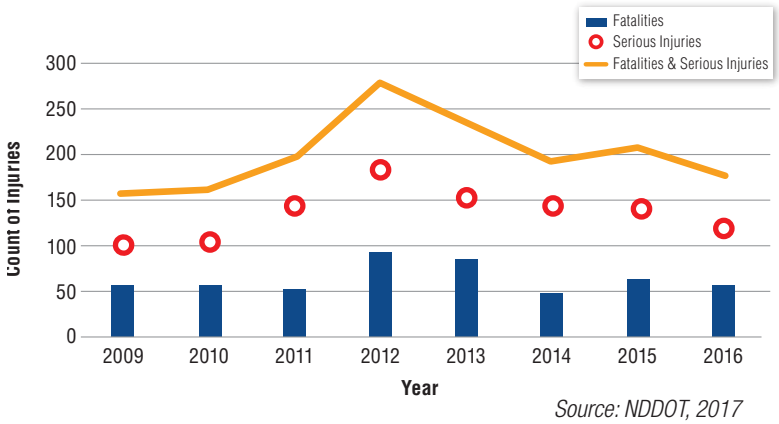
- Most alcohol and/or drug related serious injuries result from single-vehicle type crashes (66%) and most often involved a vehicle rollover (61%).
- Intersection-related angle crashes and head-on crashes account for a large portion of North Dakota's serious injuries (25%) and pose a serious threat to other motorists.
- Younger drivers ages 20 through 29 were at highest risk for an alcohol and/or drug related serious injury at 36%.
- Of the alcohol and/or drug related serious injuries, contributing factors included Unbelted Vehicle Occupants (63%) and Speeding/ Aggressive driving (51%).
- Across all times of day, there is greater risk at night for serious injuries involving alcohol or drugs (66%).

Priority Safety Strategies

To increase safety measures to reduce Alcohol and/or Drug Use related serious injuries, the following strategies should be implemented:

- Implement an ignition interlock program (item requiring legislation to enact law *[Policy]).*
- Strengthen enhanced penalties for high BAC offenders *(Policy).*
- Maintain high visibility sobriety checkpoints.
- Conduct a comprehensive assessment of administrative licensing sanctions for both alcohol and drug-impaired driving.
- Limit the scope of administrative hearings to relevant facts and issues.
- Identify/implement approaches to effectively educate judges on DUI and drug enforcement protocol and importance of prosecuting alcohol and/or drug-impaired cases.
- Expand officer Advanced Roadside Impaired Driving Enforcement (ARIDE) training and officer use of Drug Recognition Experts (DRE).
- Strengthen prosecutor and law enforcement training on investigating and prosecuting alcohol and/or drug-impaired cases.
- Mandate alcohol server training as a condition of alcohol licensure *(Policy).*
- Strengthen highly publicized compliance checks and server training for alcohol retailers and merchants.

Figure 5-3. Alcohol/Drug Related Fatality and Serious Injury History



Source: NDDOT, 2017

UNBELTED VEHICLE OCCUPANTS

Buckling up is the single most effective protective measure in the event of a crash. Seat belts securely restrain occupants within the vehicle's protective cab compartment. When lap and shoulder seat belts are used, the risk of fatal injury to front-seat passenger car occupants is reduced by 45% and the risk of moderate-to-critical injury is reduced by 50%.

Safety benefits are even greater for light-truck occupants, with seat belts reducing fatalities by 60% (Kahane, 2015).

Other seat belt safety facts include (NHTSA, 2016):

- Air bags are designed to work with seat belts, not replace them. Even without an airbag, motorists are safer buckled up than with an airbag and not buckled up; being ejected from a vehicle is nearly always deadly.
- Most fatal crashes happen within 25 miles from home and at speeds of less than 40 mph.
- Incidents involving fire or water account for one-half of 1% of all crashes. Occupants wearing a seat belt have a much greater chance of being conscious and able-bodied to safely escape.

North Dakota's statewide driver and right-front-seat passenger seat belt use is nearly 80% (NDDOT, 2017) and is considerably less than the national average of 90% (NHTSA, 2016). On North Dakota roadways, there were 1,264 serious crashes resulting in 1,599 serious injuries between 2012 and 2016 in which the crash involved an unbelted or improperly restrained occupant. This is an average of 320 serious injuries per year and accounted for nearly half or 49% of all serious injuries during the 5-year study period.

Highlights from the most recent crash data (2012-2016) (NDDOT, 2017) include:

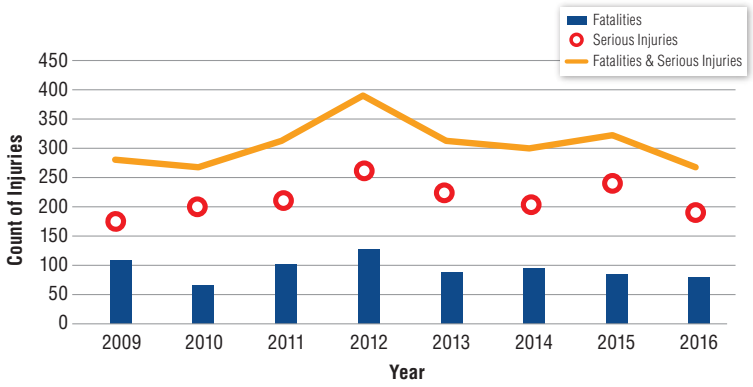
- Most serious injuries involving an unbelted motorist occurred on rural roads (84%) on both the state (46%) and local road (38%) systems.
- Most unbelted serious injuries result from single-vehicle type crashes (60%) and most often involve a vehicle rollover (66%) or an angle crash (20%).
- Younger drivers ages 20 through 29 were at highest risk for an unbelted serious injury at 34%.
- Alcohol and/or drug-impaired drivers are also often unbuckled (43%).

Priority Safety Strategies

To increase safety measures to reduce Unbelted Vehicle Occupant crashes, the following strategies should be implemented:

- Enact primary seat belt legislation that includes primary enforcement of seat belt use for all passengers, of all ages, in all seating positions *(Policy).*
- Enact stronger penalties for lack of seat belt use *(Policy).*
- Conduct outreach to tribal governments to enforce tribal primary seatbelt law and outreach to rural law enforcement to enforce North Dakota's seatbelt law.
- Promote employer and insurance safety programs for non-compliance of belt use.
- Promote statewide education of child restraint best practices.

Figure 5-4. Unbelted Occupants Fatality and Serious Injury History



Source: Kahane, 2015, NDDOT, 2017, NHTSA, 1984, NHTSA, 2016

SPEEDING/AGGRESSIVE DRIVING

Speeding substantially increases the occurrence and seriousness of crashes. Higher speeds result in reducing a driver's response time to avoid a crash, increases the need for greater stopping distance, increases crash impact, and increases the potential for loss of vehicle control. Aggressive drivers most often commit a combination of unsafe traffic offenses such as, exceeding safe speeds for road conditions, following too closely, failing to yield, swerving in and out of traffic, and disregarding traffic controls that endanger themselves, their occupants, and other roadway users. Other risk factors such as alcohol and/or drug use and lack of seat belt restraints are associated with higher percentages of speeding or aggressive driving serious crashes.

On North Dakota roadways, there were 1,071 serious crashes resulting in 1,298 serious injuries between 2012 and 2016 in which the crash involved a speeding or aggressive driver (NDDOT, 2017). This is an average of 260 serious injuries per year and accounted for 39% of all serious injuries during the 5-year study period.

Highlights from the most recent crash data (2012-2016) include (NDDOT, 2017):

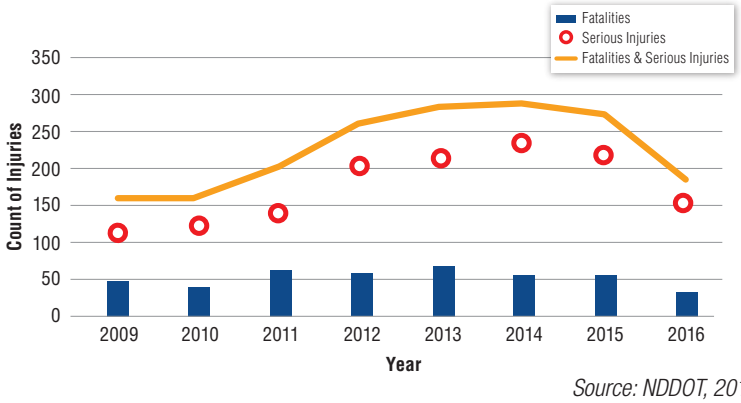
- Most serious injuries involving Speeding/Aggressive Driving occurred on rural roads (80%) on state (44%) and local road (36%) systems.
- Most speed-related serious injuries are single-vehicle type (60%) and most often involved a vehicle rollover (61%).
- Intersection-related angle and rear-end crashes result in a high number of serious injuries (32%) and pose a serious threat to other motorists.
- Younger male drivers ages 20 through 29 were at highest risk for a speed-related crash (29%).
- Of the speed-related serious injuries, contributing factors included Unbelted Vehicle Occupants (53%) and alcohol or drug use (43%).
- Summer months, particularly afternoons and evenings, account for 31% of speed-related serious injuries.

Priority Safety Strategies

To increase safety measures to reduce Speeding/Aggressive Driving crashes, the following strategies should be implemented:

- Increase fines for right-of-way and speed violations and enhance penalties for habitual offenders (item requiring legislation to enact law *[Policy]).*
- Strengthen sustained, well-publicized speed enforcement resulting in greater speed detection and public perceived risk of being stopped and ticketed.
- Implement pilot automated enforcement projects (i.e., work or school zones), coupled with public outreach, and assess impact on aggressive driving and public acceptance *(Policy).*

Figure 5-5. Speeding/Aggressive Driver Fatality and Serious Injury History



Source: NDDOT, 2017

YOUNG DRIVERS

In the United States, the fatal crash rate per mile driven for young drivers 16 to 19 years of age is nearly 3 times the rate for drivers 20 years old and older (Insurance Institute for Highway Safety Highway Loss Data Institute, 2018). Motor vehicle crashes are a leading cause of teen death with the highest risk during the first 6 months of licensure. Young drivers are over-represented in serious crashes because of their lack of maturity leading to risky driving habits and their inexperience in recognizing and skillfully responding to hazards. Young drivers tend to overestimate their driving ability and underestimate the dangers on the road.

On North Dakota roadways, there were 480 serious crashes resulting in 601 serious injuries between 2012 and 2016 in which the crash involved a driver between the ages of 14 and 20. This is an average of 120 serious injuries per year and accounted for nearly 18% of all serious injuries during the 5-year study period.

Highlights from the most recent crash data (2012-2016) (NDDOT, 2017) include:

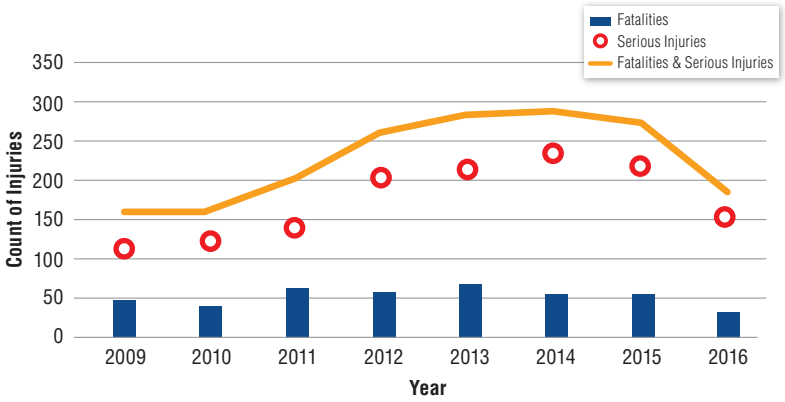
- Majority of serious injuries involving a young driver occurred on rural roads (68%) on state (32%) and local road (36%) systems.
- Half of young driver-related serious injuries are single-vehicle type (51%) and more often involved a vehicle rollover (55%) and an angle crash (27%).
- Young drivers ages 14, 15, 16, and 17 accounted for 38% of young driver serious injuries. Drivers 18, 19, and 20 were involved in the largest number of crashes at 62%.
- Young driver serious injuries more often occurred during the summer months (34%) on dry roads (78%) and during daylight conditions (60%).
- Unbelted occupants (48%), speeding (42%), and driver impairment (24%) were key contributors to the seriousness of young driver injuries.

Priority Safety Strategies

To increase safety measures to reduce Young Driver crashes, the following strategies should be implemented:

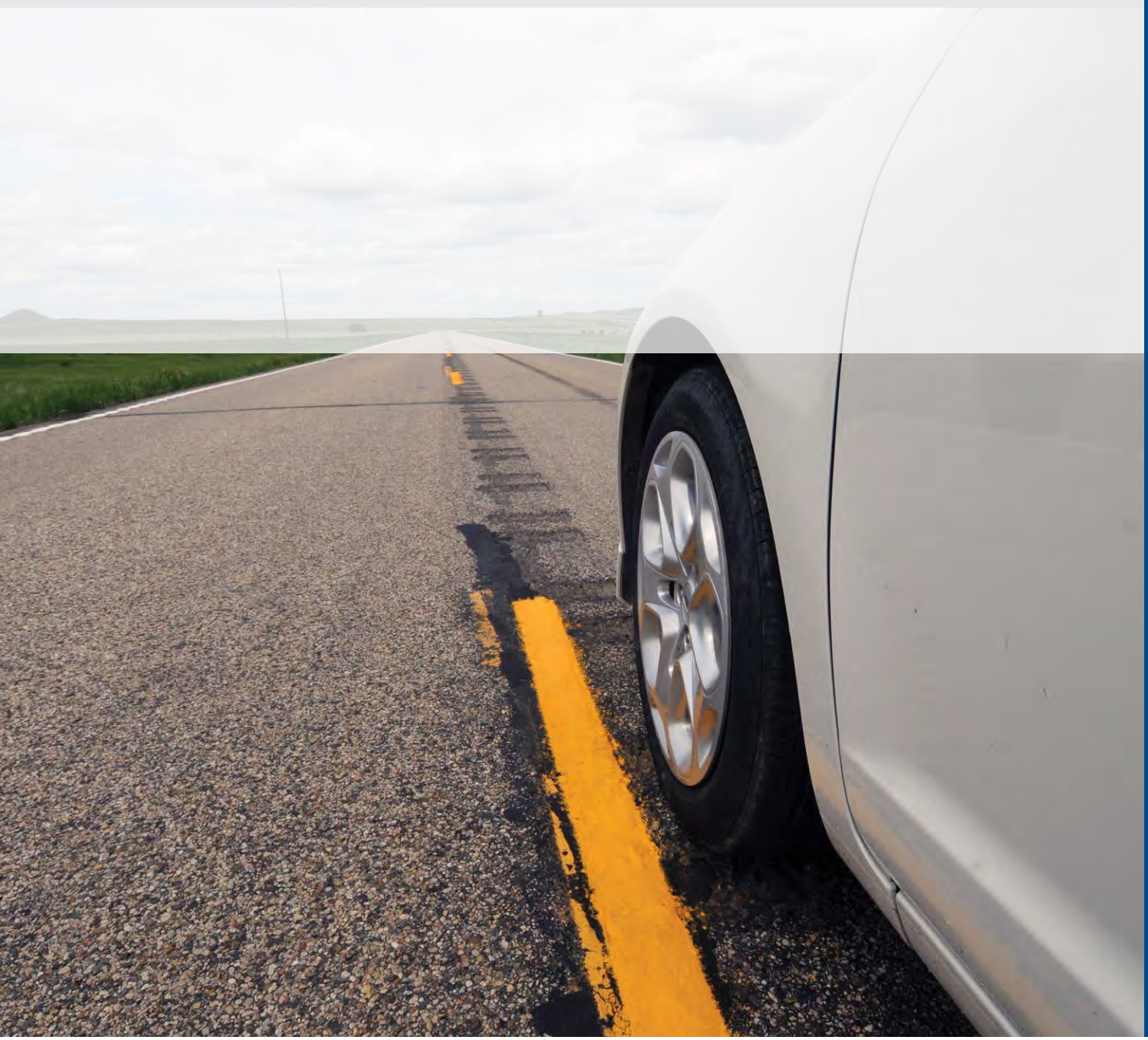
- Enforce seat belt use for all passengers in all seating positions.
- Enact primary seat belt legislation that includes primary enforcement of seat belt use for all passengers, of all ages, in all seating positions *(Policy).*
- Strengthen fines/penalties for speed violations *(Policy).*
- Strengthen enforcement of underage drinking and driving.
- Implement hands-free cell phone law to aid in the detection and enforcement of distracted driving *(Policy).*
- Restrict passengers for 6 months for all novice drivers under the age of 18 *(Policy).*
- Extend nighttime driving restriction to 6 months for all novice drivers under the age of 18 *(Policy).*
- Implement a policy requiring a minimum age of 15 (or 16) for learner's permit *(Policy).*
- Implement a policy requiring a minimum age of 17 to qualify for a full, unrestricted license *(Policy).*
- Require parent education as a driver education classroom component *(Policy).*
- Require classroom education for licensure and incorporate educating novice drivers about driving risks *(Policy).*

Figure 5-6. Young Driver Fatality and Serious Injury History



Source: NDDOT, 2017

Other Areas of Emphasis



HEAVY VEHICLES

Heavy vehicle crashes involve at least one single unit truck, semi-tractor trailer, or a triple combination. Most fatalities resulting from heavy vehicle crashes are the occupants of passenger vehicles due to the difference in the weight of large trucks as well as greater ground clearance, which can result in a smaller vehicle under-riding the truck in a crash. National studies have shown that car drivers are principally at fault in about three-quarters of fatal car-truck crashes (ATA, 2013). Sharing the road can be done safely if motorists drive a safe distance from heavy trucks and account for the breaking, visibility, and maneuverability limitations of large trucks.

Heavy vehicles make up approximately 8% of North Dakota's vehicle registrations. Crashes involving these heavy vehicles result in 120 serious injuries per year, approximately 18% of all serious injuries, and are increasing at a rate of around 9% per year.

Highlights from the most recent data (2012-2016) (NDDOT, 2017) include:

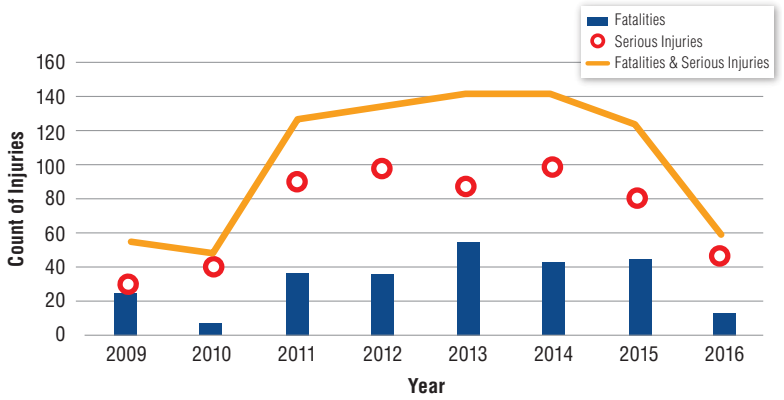
- 75% of serious injuries involving heavy vehicles occur on state system highways versus 48% of all serious injuries.
- From a behavior perspective, drivers involved in a heavy vehicle crash are less likely to be impaired (20% versus 33% overall) or speeding (37% versus 39%), more likely to have been distracted (10% versus 7%), and more likely to be belted (58% versus 51%).
- From an infrastructure perspective, heavy vehicle serious injuries are less likely to be categorized as a single-vehicle Lane Departure (25% versus 44% overall), and more likely to involve multiple vehicles at an intersection (33% versus 29%) or head-on with an opposing vehicle (23% versus 13%).
- 20% of heavy vehicle serious injuries occur during winter weather conditions compared to 16% overall.

Priority Safety Strategies

To increase safety measures to reduce Heavy Vehicle crashes, the following strategies should be implemented:

- Reduce fatigue related crashes by improving the efficiency of existing truck parking spaces and by installing center and edge-line rumble strips.
- Conduct traffic enforcement, coupled with public outreach, with a special focus on higher-risk traffic areas/times, such the oil region, winter driving, and grain harvest season.
- Increase safety awareness of the motoring public, motor carriers, and heavy vehicle drivers through Share the Road Safely/No-Zone education and outreach activities.
- Improve safety through expanded truck maintenance programs, increased driver and vehicle inspections, and post-crash analysis.
- Improve roadway infrastructure for heavy vehicle operation by adding turn lanes at key intersections, developing/deploying rural safety corridors, and installing dynamic intersection warning systems at intersections determined to be at-risk.
- Improve heavy vehicle safety data by increasing the accuracy and completeness of crash reports.
- Improve commercial motor vehicle safety and size and weight compliance by using enhanced screening technologies.

Figure 5-7. Heavy Vehicle Fatality and Serious Injury History



Source: NDDOT, 2017

OLDER DRIVERS

Older drivers include drivers, pedestrians, bicyclists, and motorcyclists that are 65 years and older. Census data indicate that people 65 and older make up approximately 14.5% of North Dakota's population compared to 14.1% nationally.

On North Dakota's roadways, there were 381 serious injuries related to older road user crashes between 2012 and 2016. This is an average of 76 serious injuries per year and accounted for approximately 12% of all serious injuries during the 5-year study period.

Safety research suggests that the aging process affects driver performance in key ways including: reduced visual acuity, increased reaction times, and limitations in judging time and distance.

Literature (NDDOT, 2017) also suggests that Older Drivers tend to be physically frailer and, as a result, crashes more often result in serious injuries for Older Drivers.

Highlights from the most recent data (2012 - 2016) (NDDOT, 2017) for crashes involving older road users on North Dakota's roadways include:

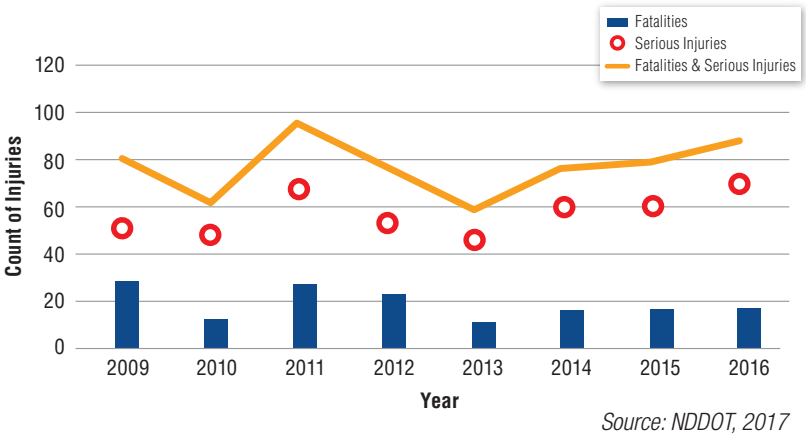
- Majority of the serious injuries from these crashes occurred on the state's system (53%).
- The most common types of serious injuries involving older road users occur at intersections – 48% versus 29% of all serious injuries.
- Older road users are also over-represented in head-on and sideswipe opposite direction crashes (18% versus 13% of all serious injuries) and serious injuries involving bicycles (3% versus 2% of all serious injuries).
- Older road users are under-represented in serious injuries involving Unbelted Vehicle Occupants (37% versus 48% of all serious injuries), Speeding/ Aggressive Driving (25% versus 39% of all serious injuries) and Alcohol and/or Drug Related (8% versus 33% of all serious injuries).

Priority Safety Strategies

To increase safety measures to reduce Older Driver crashes, the following strategies should be implemented:

- Establish a broad-based coalition to address older adults' transportation needs.
- Implement localized license-driver testing to enable older drivers to maintain independent mobility through obtaining a restricted driver's license within their local geographical area.
- Develop informational resource(s) and conduct public outreach for older driver safety; addressing driving skill assessment and screening, educational opportunities, licensing options, and safe mobility alternatives including shared-ride technology applications.
- Establish statewide one-stop, online resource to inform and guide the public on safety screening for law enforcement, family, and physicians to report at-risk drivers; driving skill assessments, educational courses, licensing options, and safe mobility alternatives.

Figure 5-8. Older Driver Fatality and Serious Injury History



Source: NDDOT, 2017

PEDESTRIANS/BICYCLISTS

Pedestrians and bicyclists are considered at-risk road users because of their significant weight disadvantage in encounters with motor vehicles. Pedestrians and bicyclists incurred 195 serious injuries (143 pedestrians and 52 bicyclists) between 2012 and 2016. This is an average of 39 serious injuries per year and accounted for approximately 6% of serious injuries during the 5-year study period.

Highlights from the most recent data (2012-2016) for pedestrian/bicycle crashes include:

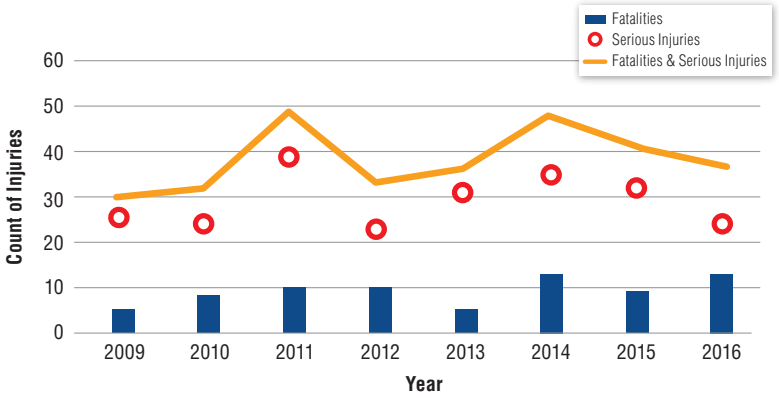
- 56% of serious pedestrian/bike injuries occurred in urban areas.
- 74% of serious pedestrian/bike injuries occurred on local system roadways.
- Approximately 30% of serious pedestrian/bike injuries occurred at intersections (23% for pedestrians and 54% for bicycles).
- 21% of serious pedestrian/bike injuries involved a young driver between 14 to 20 years old compared to 18% of all serious injuries.
- 25% of serious pedestrian/bike injuries were considered alcohol/drug related.
- Teenagers (10-19) and younger adult drivers (20-29) were involved in more than 40% of serious pedestrian/bike injuries.
- Around two-thirds of those involved in serious pedestrian/bike injuries were males.

Priority Safety Strategies

To increase safety measures to reduce Pedestrian/Bicyclist crashes, the following strategies should be implemented:

- Curb Extensions (at urban intersections).
- Median Refuge Islands (at urban intersection and mid-block crossings).
- Road Diets (convert urban 4-lane arterials and collectors to 3-lane facilities).
- Rapid Rectangular Flashing Beacons.
- High-Intensity Activated crossWalK (HAWK) Pedestrian Activated Signals.
- Count Down Timers and Leading Pedestrian Intervals (at traffic signals).
- Adoption and Implementation of Bike Friendly Edge Rumble Strips (periodic gaps in the line of rumbles to allow bikes the opportunity to move from travel lanes to shoulders without traversing any grooves).

Figure 5-9. Pedestrian/Bicyclists Fatality and Serious Injury History



Source: NDDOT, 2017

LOCAL SYSTEM ROADWAYS

Local governments own and operate approximately 100,000 (93%) of the almost 107,000 miles of roads in North Dakota. Crashes along this local system resulted in 1,698 serious injuries between 2012 and 2016. This is an average of 340 per year and accounted for 52% of all serious injury crashes during the 5-year study period (NDDOT, 2017).

Highlights from the most recent data include (NDDOT, 2017):

- 63% of serious injuries on local roads occurred in rural areas.
  - 79% of rural serious injuries were segment related, of which 85% involved single-vehicle run-off-the-road crashes, of which 27% occurred in horizontal curves. Only 1% of serious rural injuries involved hitting wildlife (deer).
  - 21% of rural serious injuries were intersection related. Most occurred at locations with STOP sign control, of which 49% involved a right-angle collision.
  - 37% of serious injuries on local roads occurred in urban areas.
  - 51% of urban serious injuries were intersection related. 24% occurred at locations with traffic signal control, of which 53% involved a right-angle collision.

Priority Safety Strategies

To increase safety measures to reduce Local System Roadway crashes, the following strategies should be implemented:

- Continue to inform local governments of the North Dakota Local Road Safety Plans (LRSP) and educate them on the process to access HSIP funds to advance the LRSP.

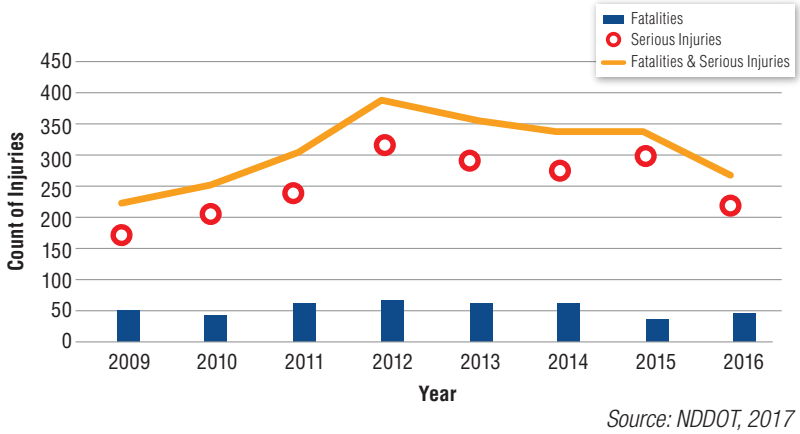
Rural Roads

- Install enhanced edge lines (6 inches and embedded wet-reflective).
- Install intersection street lighting.
- Install chevrons (enhanced curve warning).

Urban Roads

- Install pedestrian enhancements – curb extensions, median refuge islands, countdown timers, and leading pedestrian interval at traffic signals.
- Install confirmation lights at traffic signals (to supplement enhanced enforcement of red-light running).

Figure 5-10. Local System Fatality and Serious Injury History



Source: NDDOT, 2017

Image source: https://www.hdstudios.com/energy/. Photo courtesy of Whiting Oil.

OIL-IMPACT COUNTIES

Seventeen counties comprise the northwest quarter of North Dakota and have experienced significant traffic volume and economic development growth because of the crude oil extraction from the Bakken Formation. In fact, traffic volumes more than doubled between 2008 and 2014 and the statewide fraction of serious injuries increased from around 30% to more than 50% (an annual increase approaching 15% per year). Since 2014, the volume of traffic and the number of serious crashes have decreased but remain well above 2008 values.

Highlights from the most recent data (2012-2016) (NDDOT, 2017) regarding crashes in the Oil-Impact Counties include:

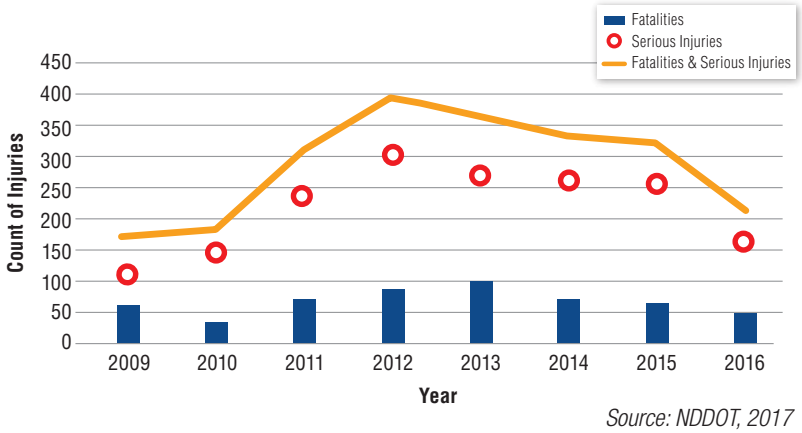
- There were 1,651 serious injuries, an average of 329 per year.
  - These serious injuries represent around 50% of all serious injuries statewide.
- Approximately 67% of all heavy truck-related crashes in North Dakota occurred in the Oil-Impact Counties.
- Crashes categorized as speed related, heavy truck related, Lane Departure, multi-vehicle opposing, and winter weather are above statewide averages.

Priority Safety Strategies

To increase safety measures to reduce crashes in Oil-Impact Counties, the following strategies should be implemented:

- Install left- and right-turn lanes.
- Install street lights at key intersections.
- Install safety corridors.
- Install RICWS.

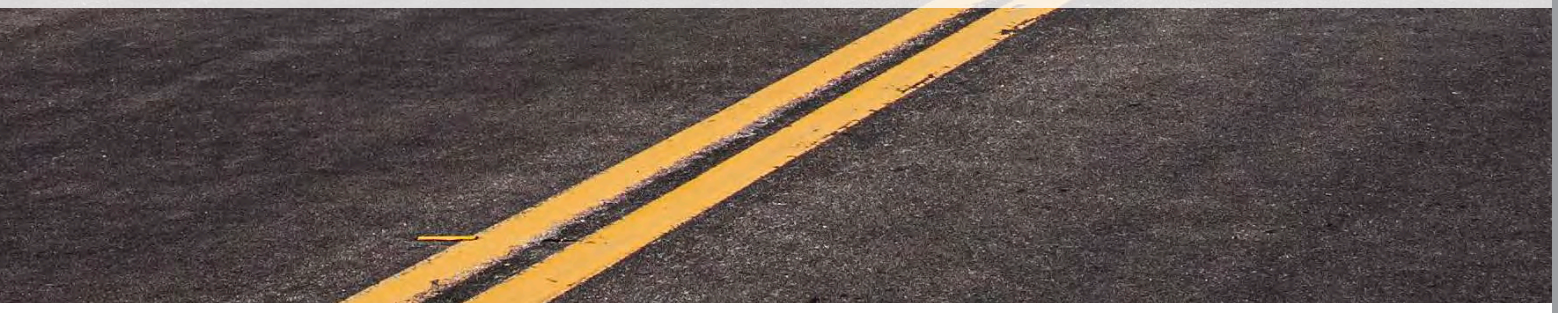
Figure 5-11. Oil-Impact Counties Fatality and Serious Injury History



Source: NDDOT, 2017

SECTION 6

Statewide Policy Directions



SECTION 6

STATEWIDE POLICY DIRECTIONS

Effective traffic safety policy plays a critical role in successfully implementing North Dakota's comprehensive strategy to reach *Vision Zero*. Evidence-based or proven traffic safety laws, backed by consistent, highly visible enforcement and public outreach, is proven to be a strong catalyst for changing high-risk driver behavior, cultural norms, and public perceptions about road safety (World Health Organization, 2013).

Equally important is the public's awareness of and support for traffic laws and regulations intended to keep them and loved ones safe. During the *Vision Zero* safety workshops, North Dakota safety stakeholders and partners from across the state representing multi-disciplinary and multi-jurisdictional perspectives, discussed and identified the following priority legislative/policy-related safety strategies as essential to advancing the *Vision Zero Plan:*

Belt Use

- Enact primary seat belt law.
- Stronger penalties for lack of seat belt use.

Alcohol and/or Drug Related

- Implement an ignition interlock program.
- Strengthen enhanced penalties for high BAC offenders.
- Mandate alcohol server training as a condition of alcohol licensure.

Speed

- Increase fines for speed violations.
- Enhance penalties for habitual speed offenders.
- Implement pilot automated enforcement projects.

Young Drivers

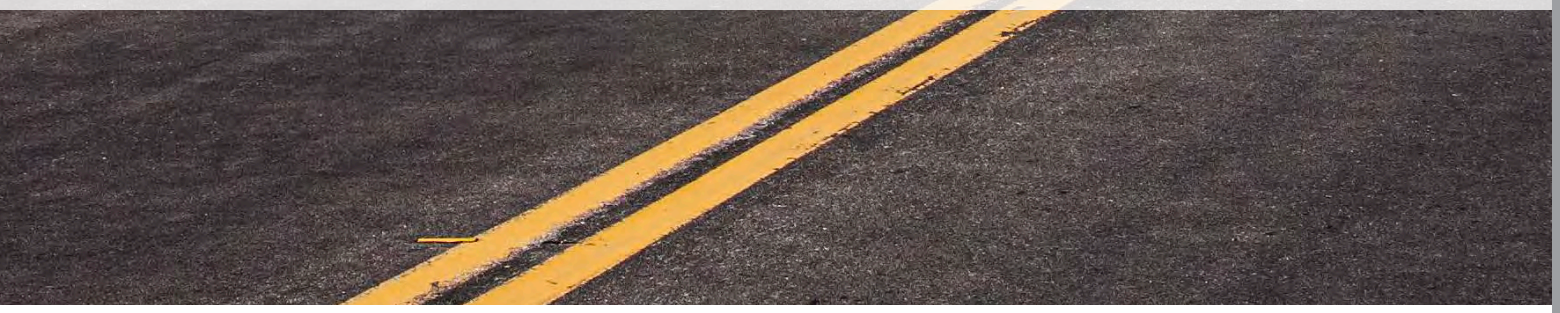
- Hands-free cell phone law to aid in the detection and enforcement of distracted driving.

North Dakota then-Governor Jack Dalrymple signs Impaired Driving Bill (2013)

- Strengthen Graduated Driver Licensing, including:
  - Passenger restriction lasting 6 months for all novice drivers under the age of 18.
  - Extend nighttime driving restriction lasting 6 months for all novice drivers under the age of 18.
  - Minimum age of 15 (or 16) for learner's permit.
  - Minimum age of 17 to qualify for a full, unrestricted license.
  - Require parent education as a driver education classroom component.
  - Require classroom education for licensure.

The NHTSA's study, *A Comparative Analysis of State Traffic Safety Countermeasures and Implications for Progress "Toward Zero Deaths" in the United States* (NHTSA, 2017b), concluded that states that implemented a greater number of the selected, proven behavioral countermeasures or safety strategies had lower fatality rates. More simply, states implementing a greater number of proven strategies, save more lives. North Dakota's Vision Zero Plan incorporates 9 of the 11 NHTSA-selected priority countermeasures; of the 9 strategies included in the *Vision Zero Plan,* 6 are policy-related.

SECTION 7
Implementation and Evaluation



IMPLEMENTATION AND EVALUATION

SECTION

IMPLEMENTATION

Implementation is the foundation for this *Vision Zero Plan* and is the basis of support for the short-term goal of fewer than 75 fatalities by year 2025. Implementation is also integral to the long-term vison of zero crash-related deaths by deployment of evidenced-based strategies for at-risk, serious crash locations and to strengthen statewide policies. To gain a better perspective about implementation, the previous SHSP and annual HSIP (infrastructure projects) and Highway Safety Program (driver-behavior initiatives) reports were reviewed.

The 2013 SHSP (CH2M HILL, 2013) documented infrastructure and driver-behavior priorities, including:

- Infrastructure: Lane departure crashes along rural roadways, rural and urban intersection crashes with a focus on right-angle collisions and an expanded level of safety investment along the state's local system of roadways where one-half of serious crashes occur.
- Driver Behavior: Improved safety partnerships, enhanced technical assistance and training, additional data-driven components to increase the effectiveness of high visibility enforcement campaigns and continued strengthening of the state's traffic safety policy.

Highlights of what North Dakota has accomplished relative to implementation over the past 5 years and the adopted priorities for implementation looking ahead to the next 5 years are included in this section.

Accomplishments – Looking Back

Since the 2013 North Dakota SHSP (CH2M HILL, 2013), North Dakota has successfully reduced fatalities and serious injuries through enhanced existing transportation-safety programs and policy and the implementation of new safety programs. Examples of North Dakota's infrastructure and behavioral-related efforts to improve safety on all public roads follow.

Infrastructure

Highlights of infrastructure-related safety accomplishments include completing the Local Road Safety Program and implementing low-cost safety strategies along road segments, curves, and intersections as well as a select few higher-cost strategies.

Local Road Safety Program. The 2013 SHSP documented that more than one-half of serious crashes in North Dakota occur on the local road system and, historically, there has been little safety project development engagement with local agencies and even less safety investment along the local system. To address these issues, the SHSP committed NDDOT to increasing the level of engagement with local agencies in statewide safety planning and committed to dedicating one-half of the Highway Safety Improvement Funds to local system projects. To that end, NDDOT partnered with the 53 counties (including the 12 largest cities, four Native American reservations, and one national park) to prepare safety studies of their road systems. Safety plans (that included a systemic risk evaluation, system prioritization, and project development) were completed for these local agencies in 2016. Following completion of the individual plans, agencies began submitting projects for HSIP funding using application forms that were prepared and included in each plan. These projects are now being implemented and there is a 50-50 distribution of HSIP funds between the state and local system.

Low cost segment-based safety strategies. Majority of serious injury crashes in North Dakota are in rural areas and the most common type of serious crash is single-vehicle

lane departure. To address these crashes, NDDOT has placed a high-priority on widely deploying low-cost, proven effective safety strategies, including:

- Center, shoulder, and edge rumble strips – center and edge rumble strips have been deployed along the entire rural state system (approximately 6,000 miles) and as part of 11 county and 2 tribal safety projects (that were identified as part of the Local Road Safety Program).
- Enhanced edge lines – 8 counties have implemented projects to install enhanced edge line (6-inch wide edge lines as opposed to the traditional 4-inch lines) along their rural roadways.
- Enhanced horizontal curve delineation – analysis of North Dakota crash data indicates that serious injuries associated with single-vehicle lane departure crashes are over-represented in horizontal curves, as a result, enhanced curve delineation (chevron warning signs, delineators, pavement markings, and shoulder paving/widening) is being implemented at high-priority locations on the state's system as part of 8 districtwide safety projects and on the local system as part of 6 county and 2 tribal safety projects.
- Shoulder drop-offs and clear zones – projects that involve eliminating the drop-off from pavement surface to gravel shoulders and establishing clear zones (obstacle free recovery areas adjacent to the traveled portion of the roadway) are being implemented as part of several county- and tribal-safety projects.

Low cost intersection-based safety strategies. Intersection crashes at both rural and urban intersections have also been a priority for safety investment, including:

- Street lights at rural intersections – NDDOT is in the process of installing destination lighting at 308 rural intersections along state and county systems as part of eight districtwide safety projects. Further installation of street lights at intersections along the local system is being done as part of two county and one tribal safety project.
- Enhanced intersection traffic control devices – providing larger regulatory and warning signs and adding pavement messages and STOP bars is underway at 778 rural intersections along the state's system and this type of work is also being done along the local system as part of 16 county and 3 tribal safety projects.
- Dynamic warning systems – systems that use technology to provide an advanced warning of approaching vehicles at rural intersections have demonstrated an ability to reduce right-angle collisions that cause majority of serious injuries at rural intersections. Rural intersection collision warning systems have been installed at three locations along the state's system.
- Confirmation lights – in urban areas the most common type of crash resulting in serious injuries is a right-angle collision at intersections with traffic signal control, an indication of a problem associated with red-light running. To address this urban problem, three cities have undertaken projects to install confirmation lights, which are small lights added to traffic signal mast arms that help law enforcement be more effective in their efforts to both monitor and tag red-light violators.
- Pedestrian enhancements – the number of serious injuries involving pedestrians in North Dakota is increasing and many of these crashes occur at signal-controlled intersections in urban areas. To address this growing problem, four cities have implemented projects to add count-down pedestrian timers and one city is in the process of adding leading pedestrian intervals to their traffic signal systems. Some cities are implementing advance walk technology.

In addition to these low-cost strategies, NDDOT has also placed a priority on replacing STOP and signal control at 10 identified high volume/crash prone intersections along the state's system with roundabouts. Roundabouts are a high-cost strategy (around $1 to $2 million per intersection), but have been proven effective at virtually eliminating right-angle collisions, which are the cause of majority of serious injuries at these types of intersections.

Behavioral

Highlights of behavioral-related accomplishments include expanded partnerships, safety partner technical assistance and training, expanded high-visibility enforcement, strengthening of traffic safety policies, and behavioral program evaluation.

Expanded, diverse safety partnerships. Since the 2013 SHSP (CH2M HILL, 2013), North Dakota has intentionally and strategically extended the interdisciplinary reach of its safety partners and stakeholders. SHSP implementation efforts require the leadership and engagement of the 4Es of safety. However, successful SHSP implementation extends beyond the traditional 4Es to also include engagement and support of state, local, and tribal partners representing the judicial system, public and private sectors, government agencies, elected officials, employers, community groups, nonprofits and advocacy groups, and the media. In addition, collaborative public-private partnerships can extend beyond the base government resources to improve safety. Since the 2013 SHSP (CH2M HILL, 2013), safety partners

have leveraged financial, staffing, knowledge/expertise, and informational resources to work toward common goals. North Dakota has greatly strengthened and diversified its statewide safety network to include non-traditional safety stakeholders through the following example programming initiatives:

- Traffic Safety (now *Vision Zero*) Partner Network.
- County outreach program.
- SHSP strategy implementation teams.
- LRSP.

Technical assistance and training for behavioral safety partners. North Dakota has bolstered its technical assistance and training so safety partners are equipped to effectively carryout their respective safety roles and serve as champions of the state SHSP initiatives. The NDDOT Safety Division and partners have offered technical assistance and training through statewide conferences/workshops and have provided easy access to a wide range of supporting information and materials through web-based resources and targeted email communication. Training includes, but is not limited to:

- Annual Traffic Safety (now *Vision Zero*) Partner Summit.
- Traffic Safety Resource Prosecutors.
- DUI training for enforcement and court personnel.
- Child Passenger Safety workshops, presentations, and car seat clinics.

Data-driven, high visibility enforcement programs. Cooperative high visibility enforcement (HVE) campaigns bring together state, county, city, university, and tribal law enforcement agencies to offer multiagency, highly visible, saturated enforcement. North Dakota's HVE offer a consistent media messaging that empowers the driving public to make the right choice to drive safely; buckled up, focused, sober, and to drive at safe speeds. Data-driven enforcement and the supporting public outreach campaigns are planned during months, time of day, and at locations and community events that, based on analysis of crash data, are of higher risk for serious crashes. North Dakota has experienced successful declines in motor vehicle crash fatalities since 2012, and the evidence-based, proven approach of HVE campaigns are a cornerstone to continuing this positive safety trend. North Dakota's statewide HVE saturations include:

- *U Drive. U Text. U Pay.* Distracted driving campaigns.
- *Click It or Ticket It* seat belt campaigns.
- *Drive Sober or Get Pulled Over* campaigns.

Continued strengthening of North Dakota traffic safety policy. Public education coupled with strong driving laws supported by enforcement action is the most effective approach to improve driver behavior. Since the 2013 SHSP (CH2M HILL, 2013), North Dakota has made strong advancements in improving traffic safety policy, including:

- Strengthened DUI law through: (1) enhanced sanctions for high BAC DUI offenders; (2) increased jail time for repeat offenders; (3) criminalizing BAC test refusal; (4) mandatory and extended enrollment of repeat offenders in the 24/7 Sobriety Program.
- Strengthened Child Passenger Safety law requiring children to be restrained through age 7.
- Enhanced distracted driving law that strengthens the fine if a driver violating a traffic law is found to impair the safe operation of his/her vehicle.

Supporting strong safety program evaluation. The NDDOT Safety Division and partners have strongly invested in program evaluation to assess behavioral program effectiveness, to monitor progress, and to inform programming decisions. The North Dakota State University Upper Great Plains Transportation Institute is a key provider of evaluation services as well as special NHTSA assessment teams to support North Dakota's behavioral program improvement efforts. NHTSA's guide on behavioral program evaluation, *The Art of Appropriate Evaluation for Highway Safety Program Managers* (1999), outlines five basic methods to measure safety program effects including observational surveys; knowledge, attitude, and awareness surveys; activity records; data records; and media coverage. The *NDDOT Safety Division Annual Report, Fiscal Year 2017* (NDDOT, 2018b) reports on all five measures. The following sampling of evaluation studies provides the needed feedback and data to help inform the NDDOT Safety Division's programming decisions:

- Annual Knowledge, Attitudes, Behaviors, and Beliefs (KABB) survey.
- Annual crash and driver data analysis and performance monitoring.
- 24/7 Sobriety Program evaluation.
- Analysis of DUI arrest and conviction data.
- Annual observational seat belt use survey.
- NHTSA Impaired Driving Assessment.
- NHTSA Occupant Protection Assessment.

IMPLEMENTATION – LOOKING AHEAD

Results of the data-driven prioritization process indicate that from an infrastructure perspective, the primary emphasis be placed on implementing evidence-based strategies intended to mitigate Lane Departure crashes in rural areas and Intersection crashes in rural and urban areas on the state and local system of roadways. The data suggest a secondary emphasis on crashes involving Heavy Vehicles (especially in the Oil-Impact Counties) and Pedestrians/Bicyclists. From a driver-behavior perspective, the primary emphasis is on addressing Unbelted Vehicle Occupants, Speeding/Aggressive Driving, Alcohol and/or Drug Related driving, and Young Drivers with a secondary emphasis on Older Drivers.

North Dakota's Emphasis Area Teams will be instructed to focus their efforts on implementing the following types of evidence-based strategies at high-priority locations identified through crash analysis and systemic risk-based evaluations and determining annual quantities to be deployed (miles of segments to be treated, numbers of intersections, number of training activities, and numbers of high enforcement campaigns) based on budget constraints, partnerships, and overall feasibility. The strategies for the teams to focus on include:

- Lane Departure.
  - Safety corridors along two-lane rural highways; features that would be added in the safety corridors include: longitudinal delineators, enhanced edge lines, enhanced curve warning signs, shoulder paving, destination street lights, and turn lanes at key intersections.
  - Longitudinal delineators.
  - Embedded wet-reflective pavement markings.
  - 6-inch edge lines.
  - Edge and center rumble strips.
  - Shoulder paving.
  - Center buffers (to address head-on crashes).
  - Median barrier (along freeways).
- Intersections.
  - Roundabouts (instead of traffic signals).
  - Reduced conflict intersections.
  - Street lighting.
  - Install dynamic intersection warning systems at rural intersections (RICWS).
  - Confirmation lights (on urban traffic signals to support red-light enforcement).
  - Access management (near intersections).
- Alcohol and/or Drug Related Driving.
  - Implement an ignition inter-lock program.
  - Strengthen enhanced penalties for high BAC offenders.
  - Maintain high visibility sobriety check points.
  - Conduct a comprehensive assessment of administrative licensing sanctions for driving while impaired by alcohol and/or drug related use.
  - Limit the scope of administrative hearings.
  - Identify/implement approaches to more effectively educate judges.
  - Expand ARIDE training.
  - Strengthen prosecutor and law enforcement training.
  - Support mandating alcohol server training as a condition of alcohol licensure.
  - Strengthen highly publicized compliance checks and alcohol server training retailers and merchants.
- Unbelted Vehicle Occupants.
  - Support enacting primary seat belt legislation for all ages.
  - Support enacting higher penalties for lack of seat belt use.
  - Conduct outreach to both tribal and local governments related to improving seat belt usage and enforcement.
  - Promote employer and insurance safety programs for non-compliance of belt use.
  - Promote statewide education of child restraint best practices.
- Speeding/Aggressive Driving.
  - Support increased fines for right-of-way and speed violations and enhance penalties for habitual offenders.
  - Strengthen speed enforcement campaigns.
  - Implement pilot automated enforcement projects (school or work zones) coupled with public outreach.
- Young Drivers.
  - Enforce seat belt use for all passengers.
  - Enact primary seat belt legislation that includes primary enforcement of seat belt use for all passengers, of all ages, in all seating positions

- Strengthen penalties for speed violations.
- Strengthen enforcement of underage drinking and driving.
- Implement hands-free cell phone law.
- Restrict passengers for 6 months for all novice drivers under 18 years of age.
- Extend nighttime driving restriction to 6 months for all novice drivers under 18 years of age.
- Implement a policy requiring a minimum age of 15 for a learner's permit.
- Implement a policy requiring a minimum age of 17 to qualify for a full, unrestricted license.
- Require classroom education for licensure.
- Require parent participation as part of the driver education classroom component.

- Heavy Vehicles.
  - Reduce fatigue-related crashes by improving the efficiency of existing truck parking spaces and by installing center and edge-line rumble strips.
  - Conduct traffic enforcement, coupled with public outreach, with a special focus on higher-risk traffic areas/times, such the oil region, winter driving, and grain harvest season.
  - Increase the safety awareness of the motoring public, motor carriers, and heavy vehicle drivers through Share the Road Safely/No-Zone education and outreach activities.
  - Improve safety through expanded truck maintenance programs, increased driver and vehicle inspections, and post-crash analysis.
  - Improve roadway infrastructure for heavy vehicle operation by adding turn lanes at key intersections, developing/deploying rural safety corridors, and installing dynamic intersection warning systems at intersections determined to be at-risk.
  - Improve heavy vehicle safety data by increasing the accuracy and completeness of crash reports.
  - Improve commercial motor vehicle safety and size and weight compliance through enhanced screening technologies.
- Older Drivers.
  - Establish a coalition to address older driver's transportation needs.
  - Implement localized license-driver testing to enable older drivers to maintain independent mobility through obtaining a restricted license within their geographic area.
  - Develop informational resources and conduct public outreach for older driver safety; addressing driving skill assessment and screening, educational opportunities, licensing options, and safe mobility alternatives including shared-ride technology applications.
  - Establish statewide one-stop online resource to inform and guide the public on safety screening, driving skill assessments, licensing options, and safe mobility alternatives.
- Pedestrians/Bicyclists.
  - Curb extensions and median refuge islands at urban intersections and mid-block crossing locations.
  - Road diets (convert urban four-lane arterials and collectors to three-lane facilities).
  - Dynamic warning devices – Rapid Rectangular Flashing Beacons and HAWK activated signals.
  - Count-down times and leading pedestrian intervals at urban traffic signals.
  - Adopt and implement bike friendly edge rumble strips (periodic gaps in the line of rumbles to allow bicycles the opportunity to move from travel lanes to shoulders without traversing any grooves).
- Local System Roadways
  - Continue to inform local governments of the North Dakota LRSP and educate them on the process to access HSIP funds to advance the LRSP.
  - Rural Roads
    - » Install enhanced edge lines (6 inches and embedded wet-reflective).
    - » Install intersection street lighting.
    - » Install chevrons (enhanced curve warning).
  - Urban Roads
    - » Install pedestrian enhancements – curb extensions, median refuge islands, countdown timers, and leading pedestrian interval at traffic signals.
    - » Install confirmation lights at traffic signals (to supplement enhanced enforcement of red-light running).
- Oil-Impact Counties
  - Install left- and right-turn lanes.
  - Install street lights at key intersections.
  - Install safety corridors.
  - Install rural intersection collision warning systems (RICWS).

Moving *Vision Zero* Forward – Key Examples

As illustrated by the following examples, NDDOT will partner with U.S. Department of Transportation, Federal Aviation Administration, and local communities to achieve *Vision Zero.*

Unmanned Aircraft System Integration Pilot Program. The implementation of new, cutting-edge technology is a critical component of North Dakota's *Vision Zero* strategy. The U.S. Department of Transportation and Federal Aviation Administration awarded the Unmanned Aircraft System Integration Pilot Program to NDDOT in May 2018. As the lead applicant for this program in North Dakota, NDDOT will work with partners and stakeholders to achieve several strategic objectives. A primary objective is integrating UAS or drone use for the safety of the traveling public to achieve *Vision Zero.*

***Vision Zero* Communities.** Over half or 52 percent of North Dakota's fatal and severe injuries occur on its local roads. To accelerate North Dakota's traffic safety efforts, it is imperative that local communities become more engaged in the state's life-saving traffic safety efforts. On August 1, 2018, the NDDOT launched the *Vision Zero* Community Program.

A *Vision Zero* Community agrees to work toward zero motor vehicle crash fatalities and serious injuries in the community through implementing evidence-based strategies proven to reduce motor vehicle crashes including: widespread public education/ outreach; implementing policies that support driver and passenger safety; high visibility enforcement of existing laws; technology advancements; and infrastructure/road safety improvements. The designation allows communities to receive technical assistance and support through the lead *Vision Zero* agencies and other *Vision Zero* partners to achieve the zero goal.

In turn, the *Vision Zero* Update process reviewed and considered the results and outcomes of other state, local, and tribal highway safety plans to inform *Vision Zero* planning and priority strategy selection. For example, the outcomes of the North Dakota LRSPs were considered in establishing *Vision Zero* strategies for high-risk rural segments and intersections to further reduce North Dakota's fatalities and serious injuries.

The intentional alignment of transportation safety plans leverages limited resources and advances the implementation of the overarching *Vision Zero Plan* through safety project prioritization and delivery to move North Dakota toward its vision of zero deaths.

Evaluation

The key to effectively manage safety programs is knowing whether adopted initiatives have been effective and should therefore be continued or whether the initiatives did not achieve desired outcomes and should be modified or discontinued. Evaluation is used to help inform safety program managers about effectiveness.

North Dakota will continue evaluating outcomes on an annual basis. NDDOT will complete a review of crash data, including disaggregation of crashes into emphasis areas and development of trend lines to determine if implementation is driving North Dakota toward the 2025 goal of fewer than 75 motor vehicle crash-related fatalities. In addition, North Dakota will add an output-based component to the annual review process. Outcomes measured in crash reduction only become apparent several years after implementation. It takes time to develop and deploy safety projects and then wait for several years of crash data to accumulate. Still, it may be difficult to determine with a high degree of certainty the effect of investment due to small sample sizes and short time frames. To help safety program managers deal with this challenge and to provide interim checks on progress, Emphasis Area Teams will add an annual review of outputs. The review will assess (1) if the investment funds the deployment of priority strategies and the amount of funding established by the Emphasis Area teams at the beginning of each year and (2) if the distribution of safety funding between emphasis areas and state and local systems is consistent with the adopted objectives.

The results of these outcome and output-based evaluations will guide Emphasis Area Teams and safety program managers relative to establishing investment targets for the following year.

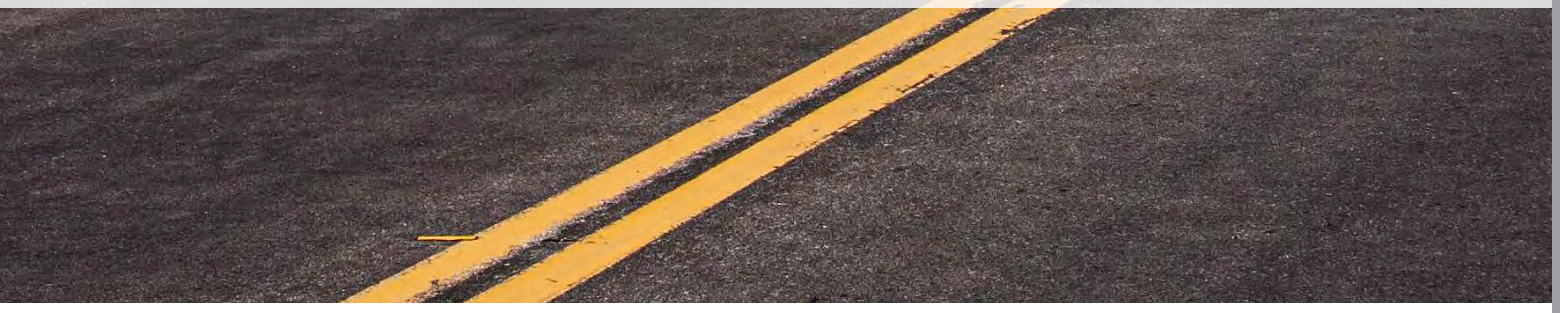
North Dakota is also committed to the ongoing evaluation of behavioral program effectiveness though the continued use of the Annual KABB survey, annual observations of seat belt usage, and participation in NHTSA's program assessments.

The intentional alignment of transportation safety plans leverages limited resources and advances the implementation of the overarching *Vision Zero Plan* through safety project prioritization and delivery to move North Dakota toward its vision of zero deaths.

Vision Zero Plan Coordination with Other Plans

The *Vision Zero Plan* serves as North Dakota's overarching transportation safety plan providing strategic direction for the state's HSIP, HSP, and the Commercial Vehicle Safety Plan (CVSP). The plan's strategic goal, safety priorities, and strategies will be coordinated for alignment during the revisions and updates of these state safety plans as well as the development of the state's long-range statewide strategic transportation plan, *TransAction III;* active and public transportation plan *ND Moves;* North Dakota's Statewide Transportation Improvement Program; and the MPO Transportation Improvement Program. The *Vision Zero* safety priorities and strategies are aligned and the Planning & Asset Management Division, Local Government Division, Programming Division (responsible for the HSIP), Safety Division (responsible for the HSP), and the North Dakota Highway Patrol (responsible for the CVSP) helped to inform the *Vision Zero* planning discussions and resulting safety strategies.

SECTION 8
Conclusion



SECTION 8

CONCLUSION

This *Vision Zero Plan* is the product of a 9-month effort by the Executive Leadership Team, the Steering Committee, Emphasis Area Teams, and the state's safety partners. This plan is data driven and includes input from more than 200 representatives of local governments and private organizations representing the 4 Es of safety.

The Executive Leadership Team recognizes that this updated plan is a necessary part of achieving the short-range goal (fewer than 75 fatalities by the year 2025) and the vision of zero fatalities. However, the current fatality trend of a decrease of 1% per year will not achieve either the short-range goal or the long-term vision of zero fatalities in the near future. Reaching these objectives requires implementation that targets the adopted Priority Safety Emphasis Areas and invests in evidence-based strategies that are deployed at high-priority locations. The Executive Leadership Team also recognizes that current state polices will have to be enhanced to address seat belt usage, Alcohol and/or Drug Related Driving, and Speeding/ Aggressive Driving.

Since the preparation of North Dakota's last safety Plan in 2013, much has been accomplished:

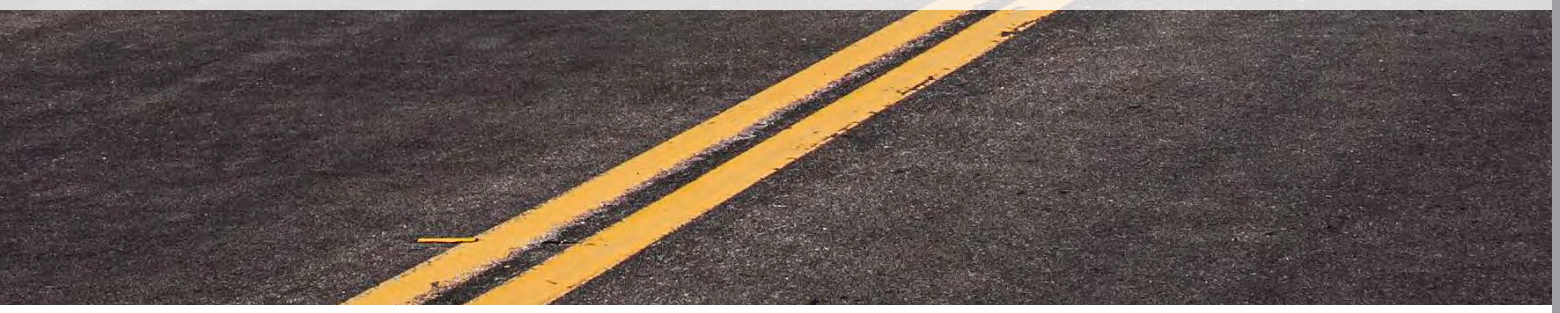
- Safety projects along local road systems have been added to the state's HSIP.
- Proven effective, low-cost strategies have been deployed along rural segment including curves and intersections on state, county, and tribal roadways.
- DUI related training has been provided for law enforcement and county personnel. Child Passenger Safety workshops have been conducted.
- DUI, Child Passenger Safety, and Distracted Driving laws were strengthened.

Over this timeframe, statewide fatalities dropped by more than 20%. However, the Executive Leadership Team also recognizes that relying on what was done in the past will not result in reaching the adopted goals. Achieving the goal will require the implementation of more effective and proven strategies, renewed efforts using new analytical methods to identify high-priority candidate locations for safety investment, and new statewide policies to address our Priority Safety Emphasis Areas. Examples of proven safety strategies and policies for implementation include:

- Deploy rural safety corridors.
- Add delineators along rural, two-lane highways to improve driver navigation.
- Continue to address rural intersections by adding street lights, dynamic warning systems, and roundabouts.
- Address safety at rural intersections by incorporating the design concept of reduced conflict intersections.
- Add barriers in freeway medians to prevent rare but often deadly head-on crashes.
- Improve seat belt usage by supporting enactment of primary seat belt legislation.
- Reduce alcohol and/or drug related driving by supporting the addition of ignition interlocks to the available menu of strategies.
- Increase the deterrence effect of law enforcement by supporting the increase in fines for right-of-way and speeding violations.

It is understood that the update of this plan is an on-going process and the next step is working closely with traffic safety partners to implement and enhance the state's policies and practices that are the key to achieving the desired outcomes of fewer than 75 motor vehicle crash fatalities by 2025 and ultimately getting to zero.

SECTION 9
References and Acronyms



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SECTION 9

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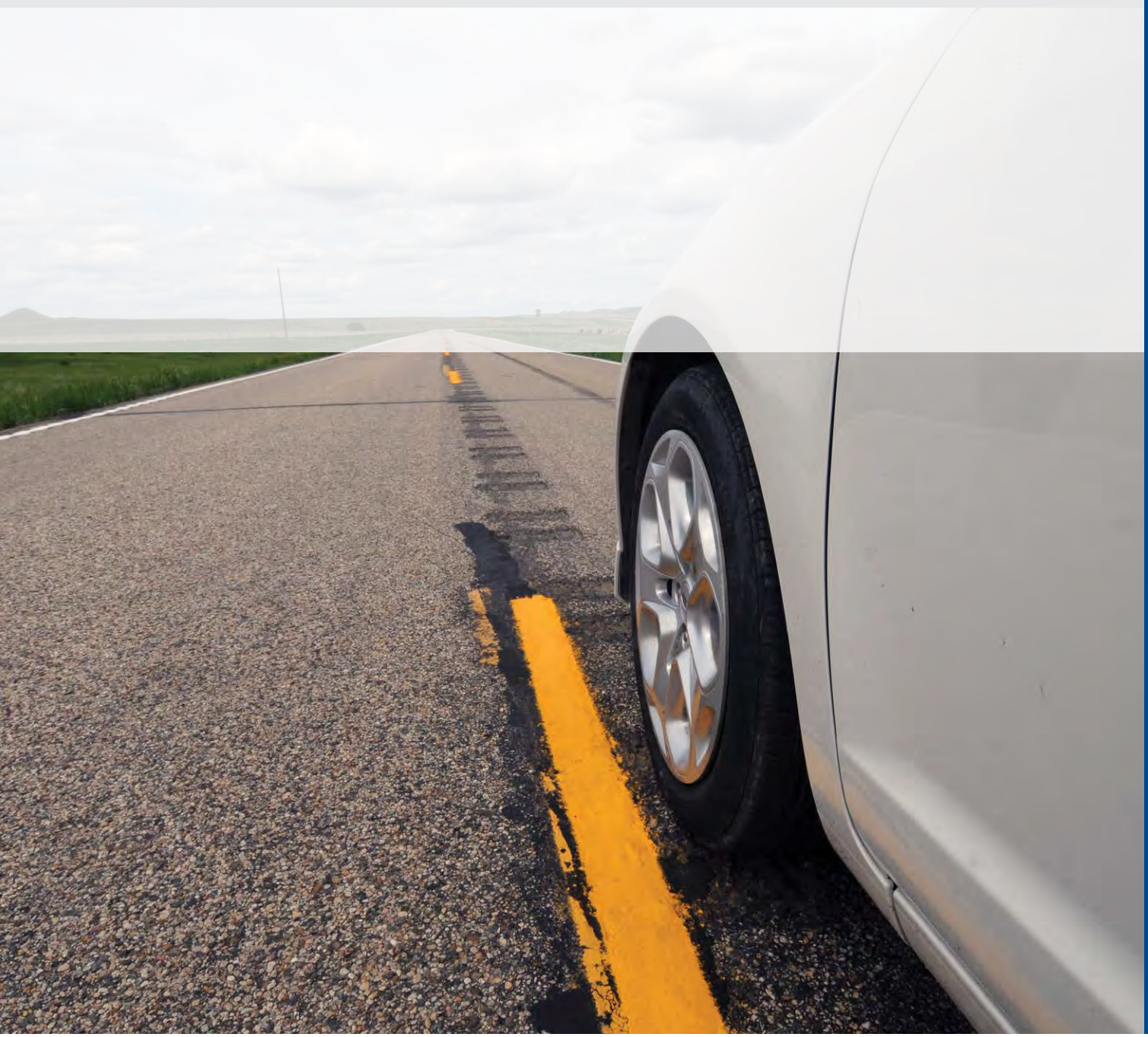
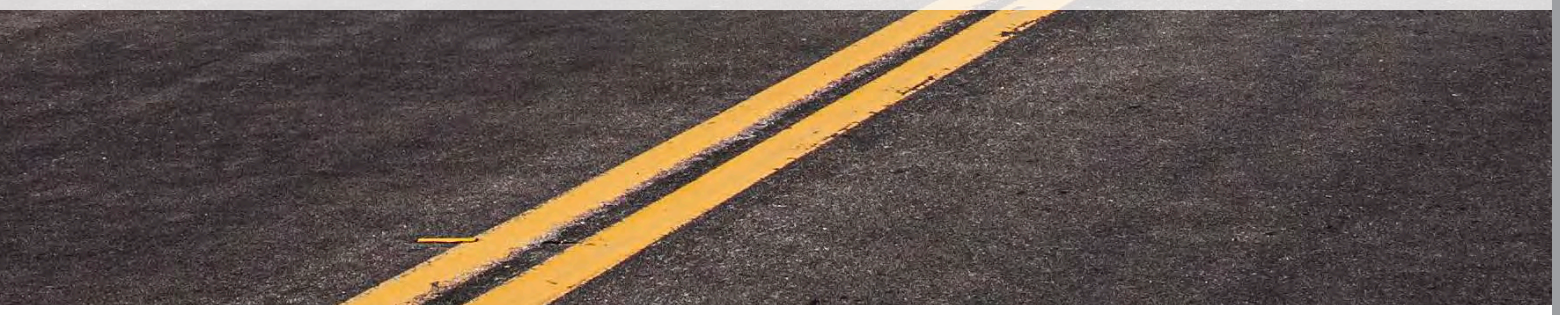
Acronyms



Acronyms

4 Es of Safety	education, enforcement, engineering, and emergency medical services
ARIDE	Advanced Roadside Impaired Driving Enforcement
BAC	blood alcohol content
CVSP	Commercial Vehicle Safety Plan
DRE	Drug Recognition Expert
DUI	driving under the influence
FHWA	Federal Highway Administration
HAWK	High-Intensity Activated crossWalK
HRRR	High Risk Rural Roads
HMVMT	100 million vehicle miles traveled
HSIP	Highway Safety Improvement Program
HVE	high visibility enforcement
KABB	Knowledge, Attitudes, Behaviors, and Beliefs
LRSP	Local Road Safety Plan
MPO	Metropolitan Planning Organization
NCHRP	National Cooperative Highway Research Program
NDDOT	North Dakota Department of Transportation
NDDoH	North Dakota Department of Health
NDHP	North Dakota Highway Patrol
NHTSA	National Highway Traffic Safety Administration
Policy	item requiring legislation to enact law
RICWS	rural intersection collision warning system
SHSP	Strategic Highway Safety Plan
TZD	Towards Zero Deaths

APPENDIX A
Regional *Vision Zero* Workshop Invitation



APPENDIX A

Vision Zero Workshops

Dates & Locations

Wednesday, March 21, 2018
RSVP by March 7
Fargo Dome
1800 North University Dr
Fargo, ND 58102

Thursday, March 22, 2018
RSVP by March 7
Ramada Grand Forks
1205 N 43rd St
Grand Forks, ND 58203

Tuesday, April 3, 2018
RSVP by March 20
Ward County Courthouse
315 3rd St SE
Minot, ND 58701

Wednesday, April 4, 2018
RSVP by March 20
Ramkota
800 S 3rd St
Bismarck, ND 58504

Tuesday, April 17, 2018
RSVP by April 3
Dickinson City Hall
99 2nd St E
Dickinson, ND 58601

Wednesday, April 18, 2018
RSVP by April 3
Ernie French Center
14120 Hwy 2
Williston, ND 55801

Please RSVP using this link:
https://www.surveymonkey.com/r/SHSPWorkshops

The North Dakota Department of Transportation (NDDOT) and partners seek your input to update the North Dakota Vision Zero plan (also known as the North Dakota Strategic Highway Safety Plan [SHSP]), through your participation in one of six upcoming regional *Vision Zero* workshops.

Vision Zero is a multi-agency initiative led by the NDDOT, the North Dakota Department of Health and the North Dakota Highway Patrol. *Vision Zero* is a statewide, interdisciplinary and coordinated approach to road safety involving 4E partners in education, enforcement, engineering and emergency medical services and other public and private sector partners. All partners work together to reduce motor vehicle crash fatalities and serious injuries to zero.

Vision Zero applies proven strategies including: (1) widespread public education/outreach, (2) working with the legislature to ensure state laws represent best practices in traffic safety, (3) high visibility enforcement of existing laws, (4) technology advancements, and (5) infrastructure/road safety improvements. Updating North Dakota's *Vision Zero* plan is a critical step to move toward North Dakota's zero goal.

Each day will begin with registration from 8:00-8:30 am, followed by the *Vision Zero* workshop from 8:30 am-3:30 pm. There will be a break for lunch on your own from 12:00 pm-1:00 pm.

The workshops will provide an overview of the planning process, examine crash data trends in North Dakota, highlight featured safety accomplishments, and most importantly, offer facilitated safety stakeholder dialogue and prioritization of safety strategies for the *Vision Zero* plan.

Included in the online registration is a survey for safety stakeholders to offer key regional traffic safety accomplishments and a suggested spokesperson for potential inclusion in a regional workshop. Please consider what accomplishment(s) may be helpful to feature during one of the safety workshops.

We value your partnership and we hope you will join us to offer your input into this critically important plan to save lives on North Dakota roads.

If you have questions, you may contact me at 701-328-4434 or kamongeon@nd.gov.

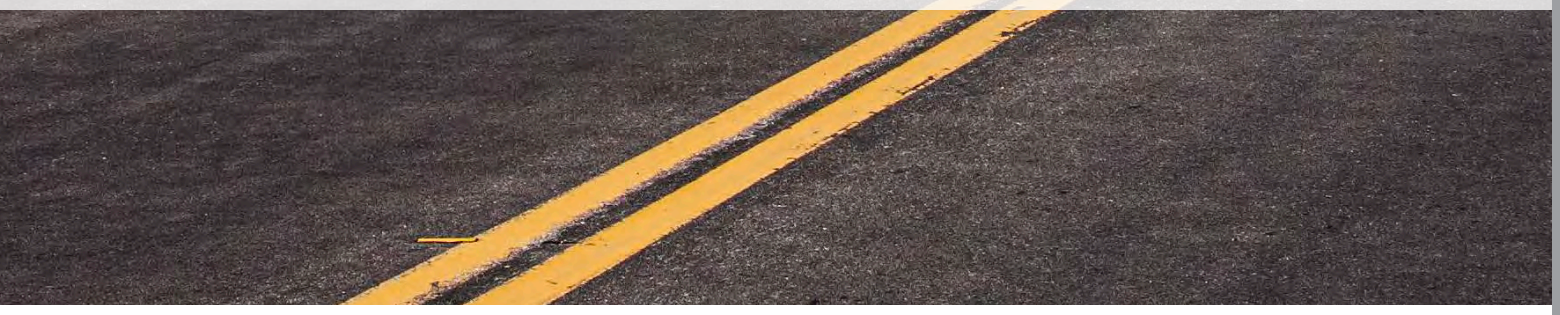
Respectfully,

Karin Mongeon

Safety Division Director
North Dakota Department of Transportation

NDDOT North Dakota Department of Transportation
NORTH DAKOTA DEPARTMENT of HEALTH
NORTH DAKOTA STATE PATROL

APPENDIX B
Regional *Vision Zero* Workshop Materials



APPENDIX B

Vision Zero Workshop –Dickinson, ND
North Dakota Strategic Highway Safety Plan Update
April 17, 2018

WORKSHOP AGENDA

8:00 AM	Registration, Coffee and Networking
8:30 AM	Welcome and Introductions
	North Dakota's Statewide Traffic Safety Initiative – *Vision Zero – Zero Fatalities. Zero Excuses.*
	An Overview of North Dakota's Strategic Highway Safety Plan and Processes
	Stakeholder Discussion: What is important to incorporate in the updated Vision Zero Plan?
9:45 – 10:00 AM	Break (*15 min.)*
	Overview of Severe Crash Data and Identification of Priority Emphasis Areas
	Stakeholder Discussion: North Dakota Safety Strategies: Infrastructure
11:45 – 1:00 PM	Lunch (On Your Own)
	Stakeholder Discussion: North Dakota Safety Strategies Behavioral
2:40 – 3:05 PM	Stakeholder Strategy Prioritization and Break
	Prioritization Debrief
	Workshop Wrap Up: Next Steps and Staying Connected
3:30 PM	Adjourn

Vision Zero Workshops Team Bios

Karin Mongeon, *Safety Division Director (NDDOT)*
kamongeon@nd.gov

Karin Mongeon has been the Safety Division Director for the NDDOT since 2014. Prior to this Karin was the manager of the NDDOT's Traffic Safety Office for eight years. Karin graduated from the University of Mary in Bismarck with a bachelor's degree in nursing. She worked as an oncology nurse before transitioning to state government where she's been responsible for the administration of various public health and human services programs for nearly 20 year

Paul Benning, *Local Government Division Director (NDDOT)*
pbenning@nd.gov

Paul earned his Bachelor of Science degree in Civil Engineering from the North Dakota State University in 1987. He began working fulltime with the NDDOT right after college. During his career, Paul has served the NDDOT in a number of capacities, including his current position as the Director of Local Government. He has been active in helping Local Public Agencies, such as Counties and Cities for nearly 20 years. Paul is a Professional Engineer with a background in statewide county, city, and transit administrative activities.

Jane Berger, *Programming Division Director (NDDOT)*
jberger@nd.gov

Jane Berger is the Programming Division Director for the North Dakota Department of Transportation. She is a registered Professional Engineer and has 19 years of experience at the North Dakota DOT with a background in Traffic Operations, Pavement Management and Project Programming. Jane is a steering committee member for the state Strategic Highway Safety Plan and was a member of the DOT team partnering with local agencies throughout the state to develop Local Road Safety Plans

Bryon Fuchs, *Assistant Local Government Engineer*
blfuchs@nd.gov

Bryon is the Assistant Local Government Engineer for the North Dakota Department of Transportation. He graduated from NDSU and is a Registered Professional Engineer in the State of North Dakota. He is responsible for various funding programs that assist Local Public Agencies (LPA'S) with improving their Transportation Infrastructure (Roads and Bridges), pedestrian and bicycle facilities, access to recreational areas, and Safety Improvement Projects. He is married and has one son.

Shawn Kuntz, *Traffic Operations Engineering Team Lead*
skuntz@nd.gov

Shawn is the Traffic Operations Engineering Team Leader for the NDDOT and a licensed Professional Engineer in North Dakota. Shawn represents North Dakota as a member of the AASHTO Subcommittee on Traffic Engineering. He manages the development and implementation of the Highway Safety Improvement Program in coordination with the Local Road Safety Program and the Strategic Highway Safety Plan.

Vision Zero Workshops Team Bios

Scott Zainhofsky, *Planning/Asset Management Director*
szainhofsky@nd.gov

Scott Zainhofsky is the Planning/Asset Management Division Engineer for the NDDOT. He has been in this position since 2007 and has held several positions both in the central office and a district office of the Department. Currently, Scott has the pleasure of leading a great team whose responsibilities include: long-range and modal planning, service- and asset-related investment analysis, pavement management, infrastructure-data management, rail programs, mapping, and traffic data. He has been a registered Professional Engineer in the state of North Dakota since June 2002 and holds Bachelors and Masters degrees in Civil Engineering from the University of North Dakota.

Howard Preston, *Principal Transportation Engineer* (CH2M now Jacobs)
howard.preston@ch2m.com

Howard Preston is a Principal Transportation Engineer at Jacobs, with more than 30 years of experience in safety improvement projects and safety studies and research. He worked in both public and private sector. He started his career with MnDOT developing MnDOT's highway safety improvement program. After his experience at MnDOT, he worked for private engineering companies where has managed teams of transportation engineers, designers, and planners working on a wide variety of projects. During Howard's career, he has led multiple statewide safety projects and assisted in the development of over 150 safety plans. Howard graduated from Iowa State University with a degree in Civil Engineering and is a registered Professional Engineer.

Cheri Marti, *Driver Behavior Team Lead and Outreach Facilitator* (CH2M now Jacobs)
Cheri.f.marti@gmail.com

Cheri Marti joined CH2M, now Jacobs, as the driver behavior specialist in 2011. Her work with Jacobs supports the driver behavior components and stakeholder engagement for traffic safety planning. Prior to joining Jacobs, Cheri served 4 years as the Minnesota Governor's Representative for Highway Safety and the Director of the Office of Traffic Safety for the Minnesota Department of Public Safety. Highlights of her public service involve strengthening Minnesota traffic safety policy including the passage of Primary Enforcement of Seat Belt Law, DWI Ignition Interlock law, enhanced booster seat and Graduated Drivers License laws, and no text and accessing web while driving law. In addition, she worked to strengthen and provide structure to the nationally recognized Minnesota Toward Zero Deaths Program. Cheri holds a Masters degree in Adult Education and Organization Development from the University of Minnesota.

Renae Kuehl, *Senior Associate* (SRF Consulting Group, Inc)
rkuehl@srfconsulting.com

Renae is a Senior Associate with SRF Consulting Group, and has more than 18 years of traffic, transportation safety, and transportation research related experience. Renae is a registered Professional Engineer and Professional Traffic Operations Engineer. She has a Bachelor of Science degree in Civil Engineering from the University of Minnesota. She has experience with a traffic safety audits, plans and analysis, including statewide safety analysis for state and county roadways.

Vision Zero Workshop

Dickinson: April 17, 2018

Karin Mongeon, NDDOT
Jane Berger, NDDOT
Cheri Marti, Jacobs
Howard Preston, Jacobs

VISION ZERO
Zero fatalities. Zero excuses.

Welcome and Introductions

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SHSP Regional Workshop Goals

1. To deepen safety stakeholder understanding of:
   - North Dakota's Vision Zero initiative and the relationship with the ND SHSP Update.
   - North Dakota's severe crashes, causal factors, and priority safety emphasis areas.
   - Proven traffic safety strategies to reduce severe crashes

2. To solicit stakeholder perspectives of and input to:
   - Safety emphasis area challenges
   - Safety strategies and recommended priorities

3. To expand safety stakeholder engagement in ND SHSP Implementation.

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Workshop Agenda

8:30 AM	Welcome and Introductions
	North Dakota's *Vision Zero* Initiative
	Overview of North Dakota's Strategic Highway Safety Plan
	Stakeholder Discussion: ***What is important to incorporate in the updated Vision Zero Plan?***
10:00	Break
	Overview of Severe Crash Data and Identification of Priority Emphasis Areas
	Stakeholder Discussion: Safety Strategies - **Infrastructure**
11:45 PM	Lunch (on your own)
1:00 PM	Stakeholder Discussion: Safety Strategies - **Behavioral**
	Stakeholder Strategy Prioritization and Break
	Prioritization Debrief
	Workshop Wrap Up: Next Steps and Staying Connected
3:30 PM	Adjourn

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Handout Review

1) Agenda
2) Team Bios
3) Participant List
4) PPT Slides
5) EA Table
6) EA Fact Sheets
7) Lane Departure Strategy Table
8) Unsignalized Intersection Strategy Table
9) Signalized Intersection Strategy Table
10) Impaired Driving Strategy Table
11) Unbelted Strategy Table
12) Young Driver Strategy Table
13) Speed/Aggressive Driving Strategy Table
14) Evaluation Form

Forms available for Law Enforcement POST credits

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Vision Zero Initiative

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Vision Zero Overview

What is Vision Zero?

- The State of North Dakota is calling for an end to motor vehicle crash fatalities and serious injuries through *Vision Zero*.
- Every life matters.
- Crashes are not accidents!
- Crashes are preventable.
  - Ninety-four percent (94%) of motor vehicle crashes are due in part to human error.

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Vision Zero Video

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Why Vision Zero?

- Interdisciplinary effort involving state agencies and public and private sector partners.
- Leadership commitment to a comprehensive, multidisciplinary, aggressive and proactive approach to improving safety.
- Establishes a culture of personal responsibility behind the wheel, where motor vehicle fatalities and serious injuries are recognized as preventable and no longer tolerated as acceptable.

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Vision Zero Overview

Vision Zero applies proven strategies including:

(1) Widespread public education/outreach
(2) Working with the legislature to ensure state laws represent best practices in traffic safety
(3) High visibility enforcement of existing laws
(4) Technology advancements
(5) Infrastructure/road safety improvements

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Technology Advancements Video

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SHSP Relationship

How Will We Achieve Vision Zero?

- Through the North Dakota Strategic Highway Safety Plan (SHSP) and process. An SHSP is:
  - A statewide, coordinated safety plan that provides a comprehensive framework and specific goals and objectives ***to reduce fatalities and serious injuries on all public roads***.
  - A federal requirement (23 U.S.C. § 148) and a major part of the core Highway Safety Improvement Program (HSIP).
- State DOTs are responsible to meet SHSP requirements.

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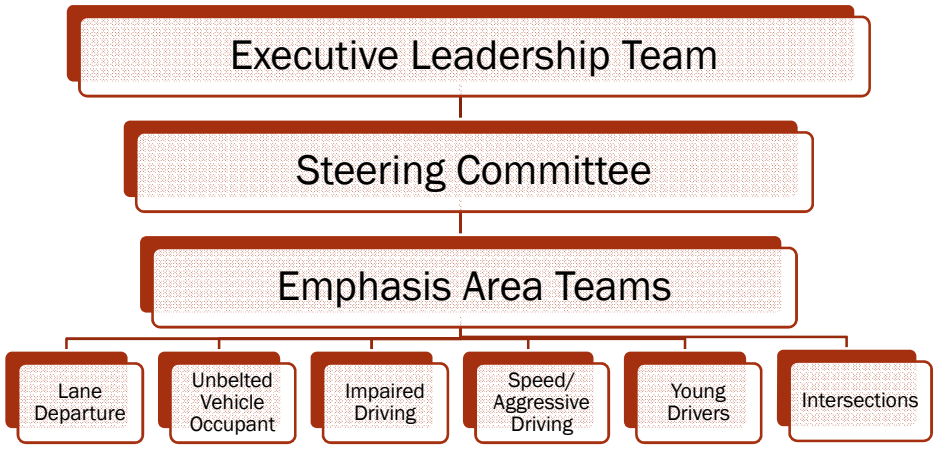
SHSP Structure



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SHSP Emphasis Area Teams

- Establish EA-related goals
- Frame challenges
- Identify safety strategies and recommended priorities
- Identify lead agency/partner for strategy implementation

*Signup sheets to get involved with behavioral EA teams will be passed around

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SHSP Task: Vision Zero Program Framework

Common themes of comprehensive traffic safety programs

- Zero vision and goal setting
- Leadership and safety culture
- Focused safety priorities and strategies
- Supporting program structure
- Key partner/stakeholder engagement and communication
- Technical assistance and training
- Implementation and progress monitoring

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SHSP Update Requirements

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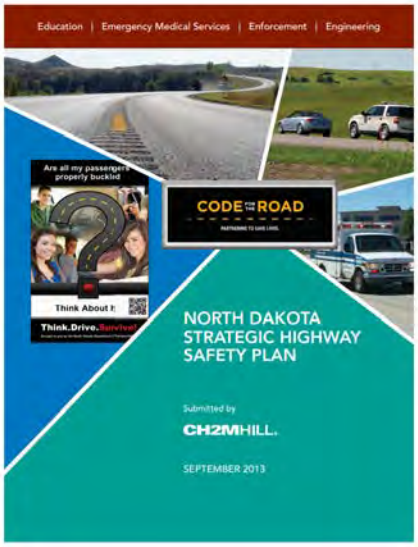
SHSP Update

- North Dakota 2013 SHSP
- States must complete an SHSP update no later than 5 years from the previous approved version.
- SHSP updates must meet the same SHSP requirements and approvals.



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SHSP Update Requirements

Consultative Approach

- Coordination/engagement with a multi-disciplinary group of stakeholders

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SHSP Update Requirements

Data Driven Analytical Process

- Use crash data to support a three-level prioritization exercise across both state and local road systems that identifies/prioritizes Crash Types
- Safety Strategies/Countermeasures & Facility Types (rural vs. urban, state vs. local roads, 2-lane vs. multi-lane roads, conventional roads vs. freeways, etc.)

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SHSP Update Requirements

Performance Based Short Term Goals

- Adoption of performance based goals
  - Number & rate of fatalities, number & rate of serious injuries & number of non-motorized (pedestrians and bicycles) fatalities and serious injuries

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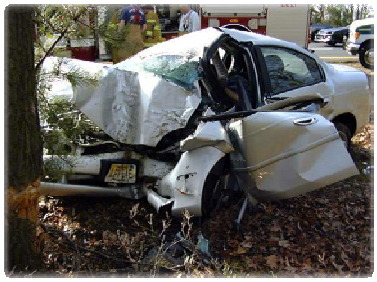
SHSP Update Requirements



Multi-disciplinary

- Address Education, Enforcement, Engineering and Emergency Services

NDDOT
North Dakota Department of Transportation

NORTH DAKOTA DEPARTMENT of HEALTH

NORTH DAKOTA STATE PATROL

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SHSP Update Requirements

Special Requirements

- Define High Risk Rural Roads & develop strategies/countermeasures to address older driver & pedestrian safety

SHSP Update & Approval

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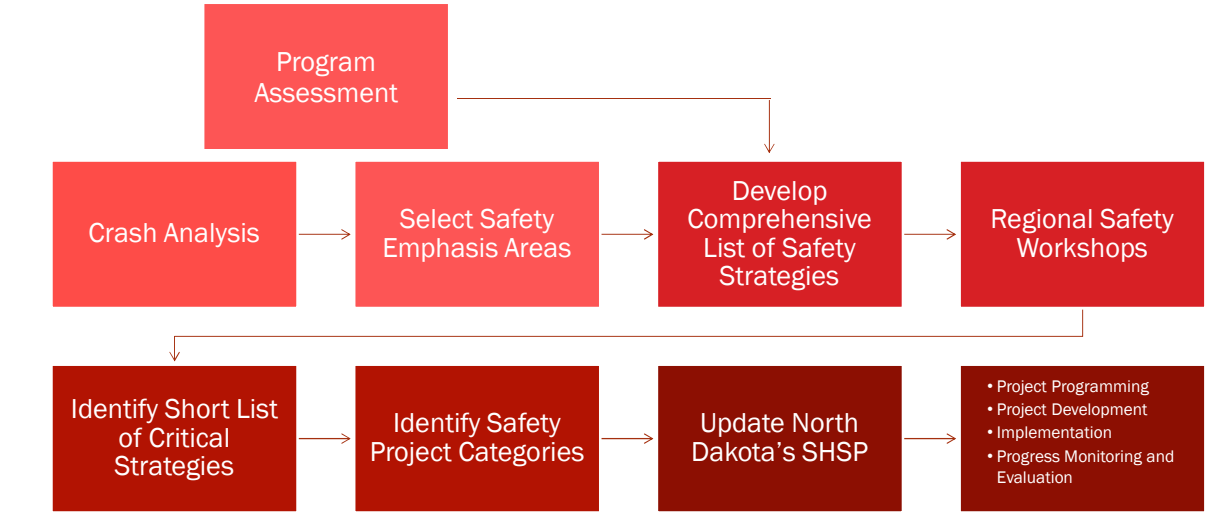
North Dakota's SHSP Process



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2013 SHSP Implementation: Example Highlights

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Strategy Effectiveness

- All safety strategies are NOT equal from the perspective of effectiveness or cost
- Known effectiveness about various safety strategies helps support the identification, prioritization and adoption of the most important strategies as part of the data driven process.

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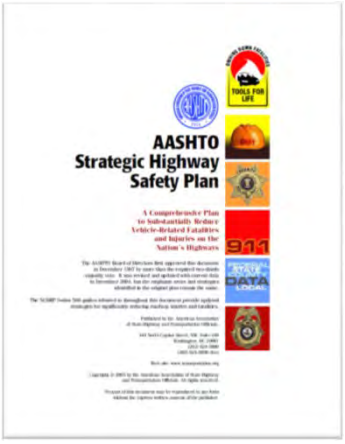
AASHTO Provides National Direction



- Goal of a strategic plan for highway safety is to positively impact the nation's (and state's) present and predicted statistics on vehicular related death and injury
- Use a data driven process
- Published in 2004; implementation is now the focus

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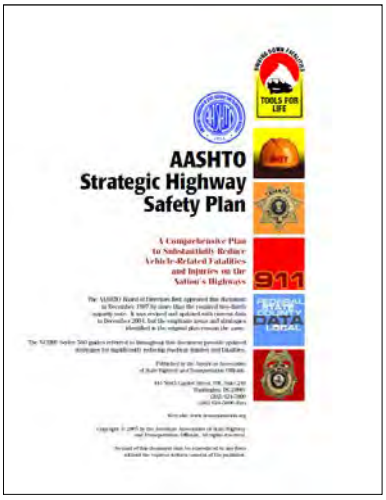
AASHTO's Strategic Highway Safety Plan

- 22 Emphasis Areas ("Goals")
- A "comprehensive approach" to reducing highway fatalities
- To be implemented across all jurisdictions (state, county, municipal, and tribal lands)



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Safety Strategies Overview: *NCHRP Report 500*

- A series of comprehensive guides intended to facilitate agency implementation of SHSP objectives
- Focus is on low-cost, readily implementable strategies
  - Proven Effective
  - Tried
  - Experimental

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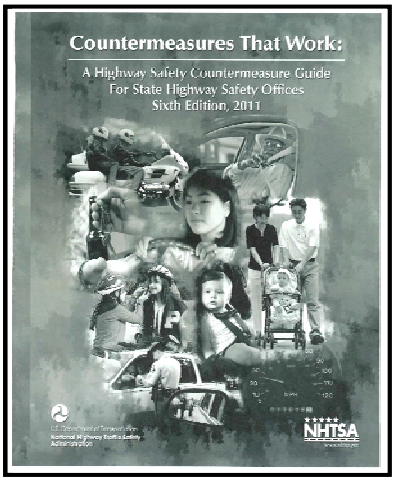
Safety Strategies Overview: *NHTSA's Countermeasures That Work*



- Assists State Highway Safety Offices (SHSOs) in selecting effective, science-based traffic safety countermeasures.
- Summarizes use, effectiveness, costs, and implementation time
- References research summaries & individual studies, highlighting experience and knowledge gained by others

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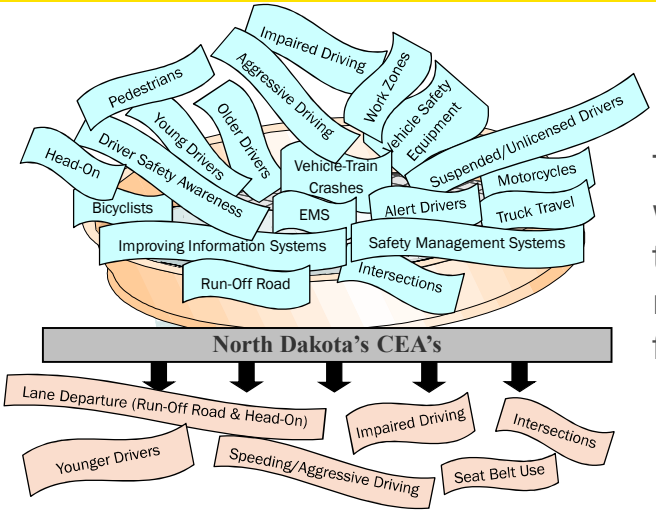
Screening AASHTO's 22 Key Emphasis Areas



The Critical Emphasis Areas will represent the areas with the greatest potential to reduce the number of traffic fatalities in North Dakota.

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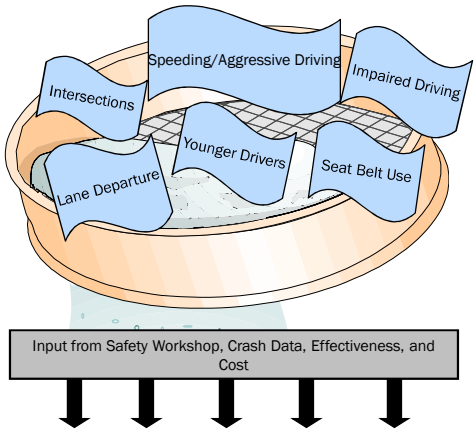
Screening - Initial Strategies

- AASHTO's SHSP, NCHRP Report 500 Implementation Guidelines, NHTSA's *Countermeasures That Work*, and input from Safety Partners.
- The strategies will be screened using:
  - Crash data
  - Effectiveness
  - Cost
  - Input from Safety Workshop
- The Selected Strategies should have the greatest potential to reduce the number of traffic fatalities.



Selected Strategies

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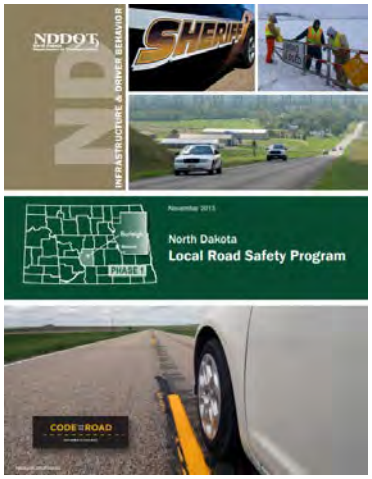
Infrastructure: Local Road Safety Plans

Implementation Highlight

- Recognizing over 50 percent of severe crashes occur on local roads, NDDOT partnered with counties, cities, and tribes to prepare Local Road Safety Plans for each entity
  - Data driven analysis to identify at-risk locations and low-cost systemic safety projects (signing, marking, lighting) for locals to easily submit projects through NDDOT federal Highway Safety Improvement Program.
  - To date 25 counties, 4 major cities, and 3 tribes have participated
  - Approximately $16M in projects programmed



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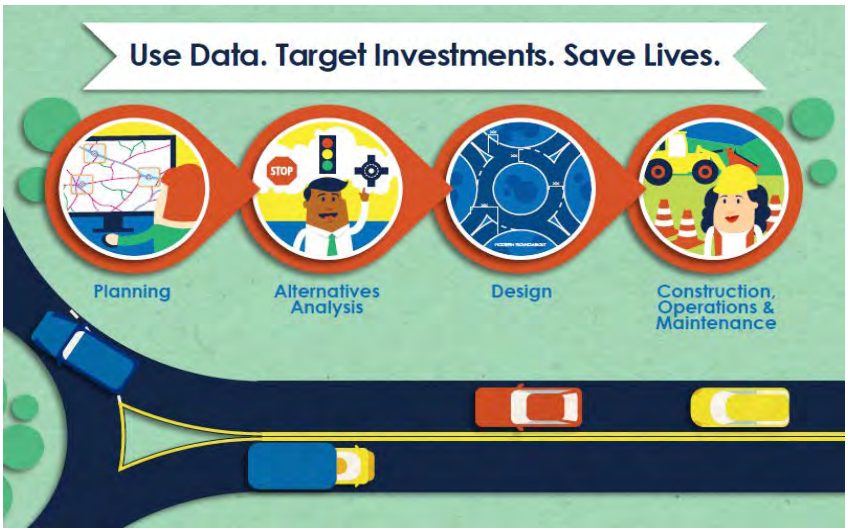
Where can Data-Driven Safety Analysis (DDSA) be applied in the Project Development Process?



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Source: FHWA

What is a Systemic Risk Assessment?

- **Analytical approach** identifies and prioritizes safety deficiencies on roads based on **risk of crash** (vs. density of crashes).
- **Identifies risk factors** based on roadway and traffic characteristics common to locations with fatal and injury crash histories.
- **Prioritizes the road system for safety investment** by documenting the number of risk factors present at each location. The greater the number of risk factors present at any location, the greater the risk and the higher the priority as a candidate for safety investment.
- **Proactive deployment** of safety projects on at-risk locations (vs. reacting to where crashes occur)

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What is the benefit of a systemic process?

- **It works** – it is approved by FHWA as a data-driven process to identify safety improvement projects, including those considered eligible for Highway Safety Improvement Program (HSIP) funding.
- **It leads to implementation** – the process has identified more than $300M of low-cost, local safety improvement projects in Minnesota.
- **It allows agencies to proactively deploy safety projects** on at-risk locations.

With the systemic process, the answer to "*How many people have to die before you do something?*" – is Zero!

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Driver/Passenger Behavior

- Strategies:
  - Education/Outreach
    - Reaching people where they live, work and play
  - Enforcement
  - Engineering
  - Emergency Medical Services
  - Environmental Strategies

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Driver/Passenger Behavior – Implementation Example/Highlight

- Law enforcement conduct 11 high visibility enforcement (HVE) campaigns per year.
  - *Click It or Ticket* – 3 HVE campaigns per year
  - *Drive Sober or Get Pulled Over* – 3 HVE campaigns per year
  - Underage drinking enforcement – 3 HVE campaigns per year
  - *U Drive. U Text. U Pay.* –2 HVE campaigns per year
- Campaigns are coupled with extensive paid, earned and social media.

Click to add text
Click to add text

Goal: To deter high-risk behavior through increased perception of being caught.

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Driver/Passenger Behavior - Implementation Example/Highlight

- Impaired driving HVE media – Taylor Berhow campaign
- Taylor drove after drinking alcohol on October 29, 2011 and killed his three friends. He shares his story to deter others from driving impaired.
- Features TV, radio, digital and social media ads.
- Has had the most extensive reach of any campaign funded to date.

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Driver/Passenger Behavior

ON OCTOBER 29, 2011
IN MANDAN, NORTH DAKOTA
TAYLOR BERHOW CHOSE
TO DRINK AND DRIVE.

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SHSP Stakeholder Engagement

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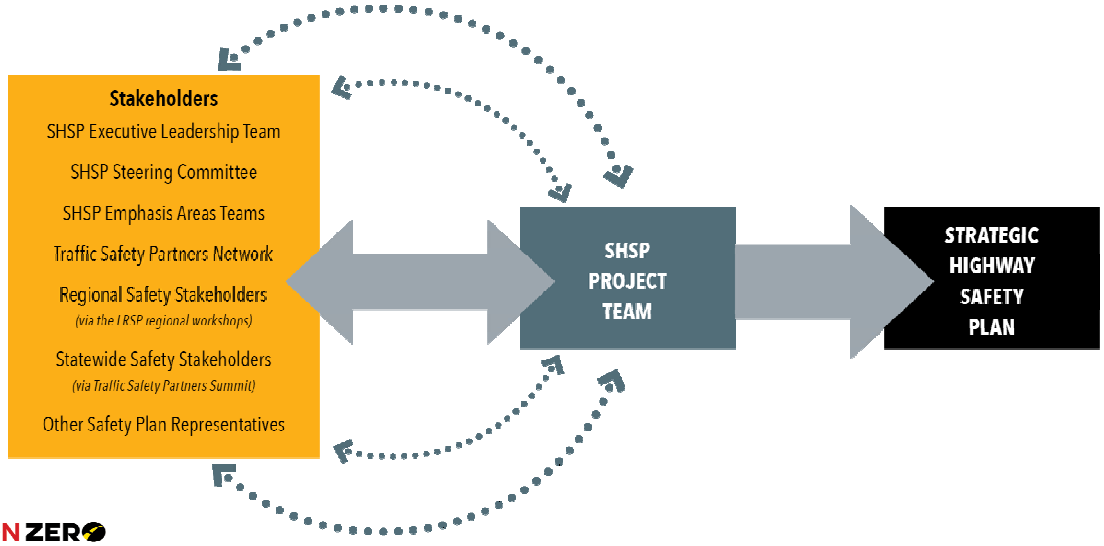
Stakeholder Engagement/Communication



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Regional Workshop Dates/Locations

- Wednesday March 21, 2018
  - Fargo Dome (Fargo)
- Thursday, March 22, 2018
  - Ramada Grand Forks (Grand Forks)
- Tuesday, April 3, 2018
  - Ward County Courthouse (Minot)
- Wednesday, April 4, 2018
  - Ramkota (Bismarck)
- Tuesday, April 17, 2018
  - Dickinson City Hall (Dickinson)
- Wednesday, April 18, 2018
  - Ernie French Center (Williston)

RSVP at https://www.surveymonkey.com/r/SHSPWorkshops

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Profile of Stakeholder Involvement

- Vision Zero Executive Leadership Team and Steering Committee members
- Law Enforcement – State, county, city and tribal
- Health Care
  - NDDoH personnel, emergency medical services providers, public health, etc.
- Elected Officials
  - State legislators, county board members, city council members, auditors, mayors
- Transportation Agency Practitioners
  - NDDOT personnel, county/city engineering, planning and road supervisors
- Motor Carriers
- Tribal Representatives
- Judges and State Attorneys, Prosecutors
- National Parks
- Federal Partners – National Highway Traffic Safety Administration (NHTSA) and Federal Highway Administration (FHWA)
- Education Representatives
  - Vision Zero Partner Network, drivers education instructors, insurance agencies, behavioral health, ND Safety Council, non-motorist groups, etc.

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Stakeholder Discussion: ***What is important to incorporate in the updated Vision Zero strategic safety plan?***

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Overview of Crash Data: Trends and Priority Emphasis Area

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Statewide Priority Emphasis Areas

Statewide Emphasis Area Table

	State System				Local System				Statewide			
	Severe Injuries		All Injuries		Severe Injuries		All Injuries		Severe Injuries		All Injuries	
Emphasis Area	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*
Young Driver	219	13.7%	1,778	19.5%	382	22.5%	4,997	29.0%	601	18.2%	6,775	25.7%
Old Driver	203	12.7%	1,399	15.3%	178	10.5%	2,402	13.9%	381	11.6%	3,801	14.4%
Speeding/Aggressive Driver	611	38.3%	3,656	40.1%	687	40.5%	6,262	36.4%	1,298	39.4%	9,918	37.8%
Alcohol-Related	481	30.1%	1,357	14.9%	610	35.9%	2,494	14.5%	1,091	33.1%	3,851	14.6%
Distracted/Asleep/Fatigued	131	8.2%	976	10.7%	101	5.9%	1,566	9.1%	232	7.0%	2,542	9.6%
Unbelted Occupants	783	49.1%	2,257	24.7%	816	48.1%	3,497	20.3%	1,599	48.5%	5,754	21.8%
Pedestrian	41	2.6%	109	1.2%	102	6.0%	468	2.7%	143	4.3%	577	2.2%
Bicyclist	9	0.6%	66	0.7%	43	2.5%	393	2.3%	52	1.6%	459	1.7%
Motorcycle	118	7.4%	351	3.8%	202	11.9%	786	4.6%	320	9.7%	1,137	4.3%
Heavy Truck	448	28.1%	1,569	17.2%	153	9.0%	849	4.9%	601	18.2%	2,418	9.2%
Train	1	0.1%	4	0.0%	33	1.9%	52	0.3%	34	1.0%	56	0.2%
Lane Departure - Single-Vehicle	631	39.5%	2,915	31.9%	822	48.4%	4,012	23.3%	1,453	44.1%	6,927	26.3%
Lane Departure - Multi-Vehicle (Opposing Traffic)	283	17.7%	850	9.3%	135	8.0%	1,324	7.7%	418	12.7%	2,174	8.3%
Lane Departure - Multi-Vehicle (Same Direction)	39	2.4%	415	4.5%	35	2.1%	485	2.8%	74	2.2%	900	3.4%
Intersection	403	25.3%	2,868	31.4%	550	32.4%	7,945	46.1%	953	28.9%	10,813	41.0%
Winter Weather	182	11.4%	1,181	12.9%	49	2.9%	855	5.0%	231	7.0%	2,036	7.7%
Work Zone	45	2.8%	259	2.8%	30	1.8%	260	1.5%	75	2.3%	519	2.0%
Total	1,596		9,125		1,698		17,220		3,294		26,345	

Note: The table includes crashes from 2012-2016

3/22/2018

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Fatal + Severe Injury Crashes & Rates
State vs. Local

			Analysis Year								
			2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
State	Crash Frequency	*K*	45	72	52	72	83	71	63	77	57
		A	91	97	122	192	201	182	187	195	153
		K+A	136	169	174	264	284	253	250	272	210
	Crash Rate (per MVMT)	*K*	0.009	0.014	0.010	0.012	0.012	0.011	0.009	0.012	0.009
		A	0.019	0.019	0.023	0.032	0.030	0.028	0.028	0.031	0.025
		K+A	0.029	0.033	0.032	0.045	0.043	0.039	0.037	0.043	0.034
	MVMT		4,771	5,083	5,409	5,929	6,669	6,566	6,742	6,383	6,138
Local	Crash Frequency	*K*	51	44	40	58	64	62	58	34	45
		A	149	148	179	214	286	263	236	248	199
		K+A	200	192	219	272	350	325	294	282	244
	Crash Rate (per MVMT)	*K*	0.011	0.009	0.007	0.010	0.010	0.009	0.009	0.005	0.007
		A	0.031	0.029	0.033	0.036	0.043	0.040	0.035	0.039	0.032
		K+A	0.042	0.038	0.040	0.046	0.052	0.049	0.044	0.044	0.040
	MVMT		2,837	2,860	2,893	3,237	3,424	3,534	3,695	3,696	3,602

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Fatal + Severe Injury Crashes & Rates
Rural vs. Urban

			Analysis Year								
			2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
Rural	Crash Frequency	*K*	85	112	83	115	130	122	107	97	92
		A	165	158	198	279	358	330	313	311	232
		K+A	250	270	281	394	488	452	420	408	324
	Crash Rate (per MVMT)	*K*	0.016	0.020	0.014	0.017	0.017	0.016	0.014	0.013	0.013
		A	0.030	0.028	0.033	0.041	0.047	0.043	0.040	0.042	0.033
		K+A	0.046	0.047	0.047	0.058	0.064	0.060	0.053	0.055	0.046
	MVMT		5,426	5,701	5,998	6,799	7,648	7,596	7,869	7,386	7,000
Urban	Crash Frequency	*K*	11	4	9	15	17	11	14	14	10
		A	75	87	103	127	129	115	110	132	120
		K+A	86	91	112	142	146	126	124	146	130
	Crash Rate (per MVMT)	*K*	0.002	0.001	0.002	0.002	0.002	0.001	0.002	0.002	0.001
		A	0.014	0.015	0.017	0.019	0.017	0.015	0.014	0.018	0.017
		K+A	0.016	0.016	0.019	0.021	0.019	0.017	0.016	0.020	0.019
	MVMT		2,182	2,242	2,304	2,367	2,445	2,504	2,567	2,693	2,740

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Fatal + Severe Injury Crashes & Rates
Oil County vs. Non-Oil County

			Analysis Year								
			2008	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*
Oil County	Crash Frequency	*K*	39	47	33	63	83	88	63	53	44
		A	59	83	138	224	261	232	218	206	137
		K+A	98	130	171	287	344	320	281	259	181
	Crash Rate (per MVMT)	*K*	0.019	0.021	0.013	0.019	0.020	0.022	0.015	0.013	0.013
		A	0.028	0.037	0.055	0.067	0.063	0.057	0.050	0.052	0.039
		K+A	0.047	0.057	0.069	0.086	0.083	0.079	0.065	0.065	0.052
	MVMT		2,091	2,270	2,495	3,330	4,126	4,046	4,338	3,984	3,482
Non-Oil County	Crash Frequency	*K*	57	69	59	67	64	45	58	58	58
		A	181	162	163	182	226	213	205	237	215
		K+A	238	231	222	249	290	258	263	295	273
	Crash Rate (per MVMT)	*K*	0.027	0.030	0.024	0.020	0.016	0.011	0.013	0.015	0.017
		A	0.087	0.071	0.065	0.055	0.055	0.053	0.047	0.059	0.062
		K+A	0.114	0.102	0.089	0.075	0.070	0.064	0.061	0.074	0.078
	MVMT		5,516	5,673	5,808	5,836	5,967	6,054	6,099	6,095	6,258

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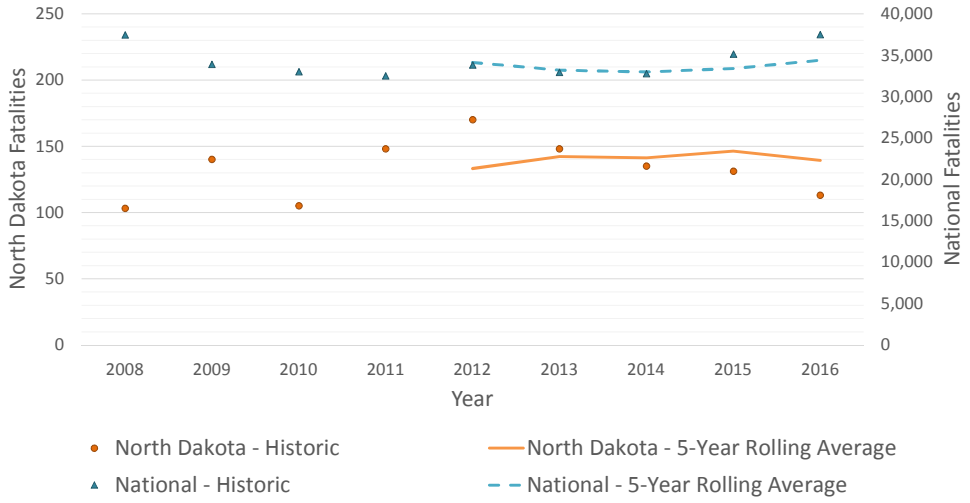
Fatalities (Number of People) –
Statewide vs. National, 5-year Rolling Average



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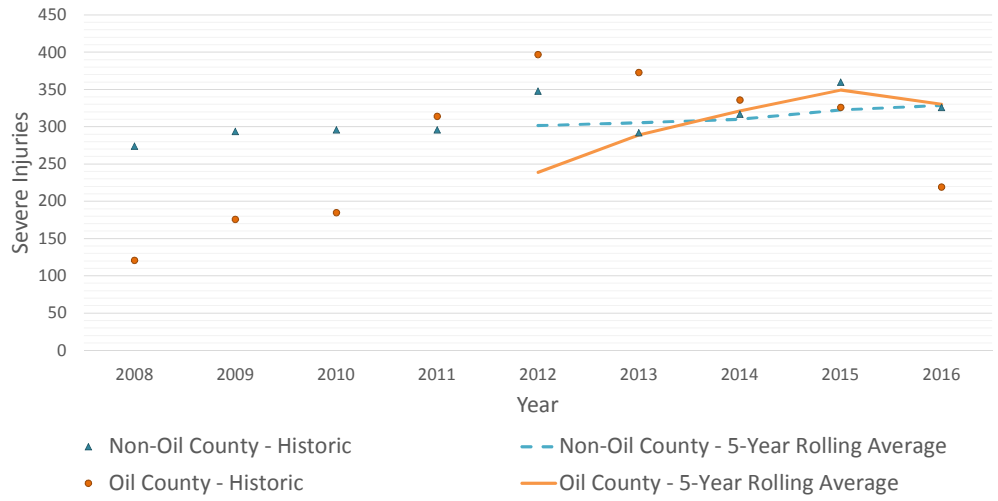
Fatalities and Severe Injuries (Number of People) – Non-Oil County vs. Oil County, 5-year Rolling Average



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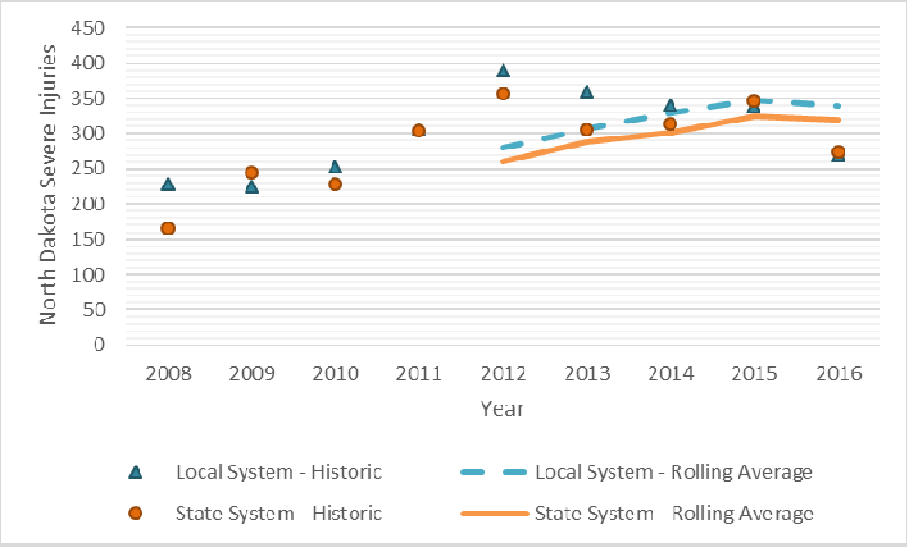
Fatalities and Severe Injuries (Number of People) – Local vs. State System, 5-year Rolling Average



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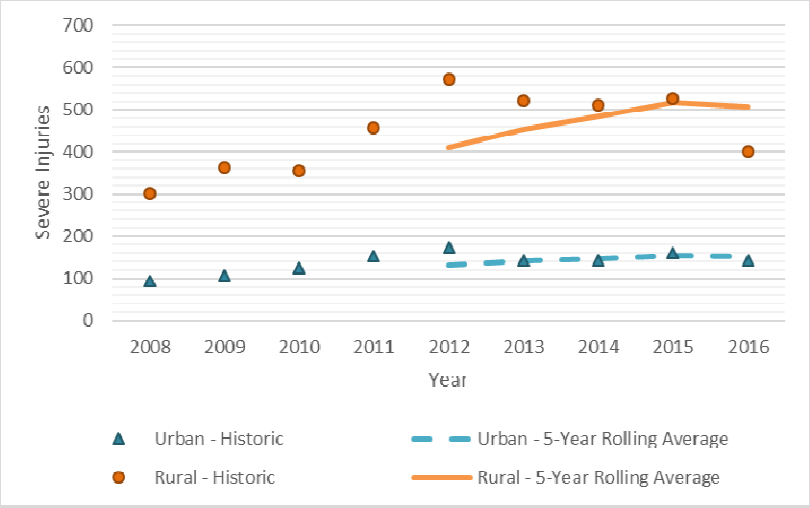
Fatalities and Severe Injuries (Number of People) – Urban vs. Rural, 5-year Rolling Average



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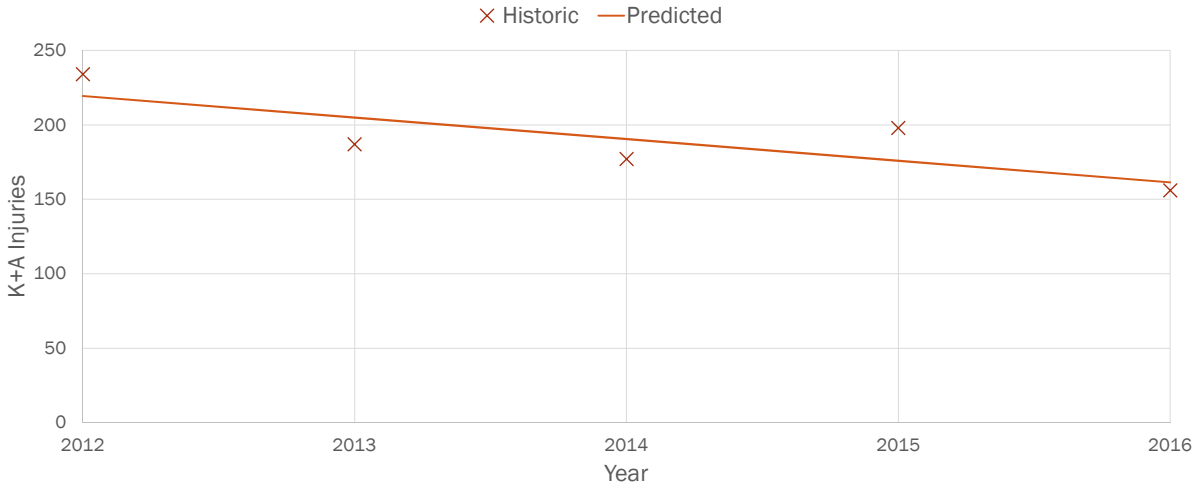
Emphasis Area: *Fatalities and Severe Injuries Intersection Trendline*



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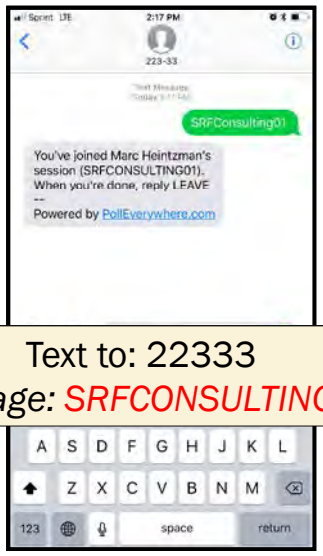
*Example Trendline – all Emphasis Areas are experiencing the same trend

Interact with the Presentation



Text to: 22333
Message: SRFCONSULTING01

Via web browser,
go to:
PollEv.com/srfconsulting01

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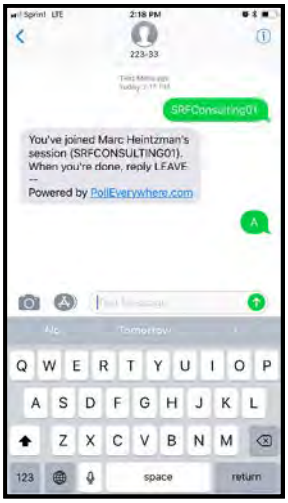
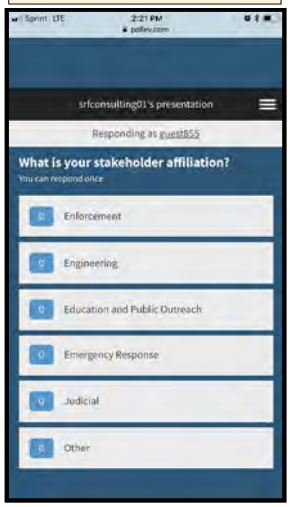
Interact with the Presentation

When texting
a response,
type the letter as seen
on the slide

Text view:



Web Browser view:



When a question is
provided in the
web browser,
check your response

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Infrastructure Safety Strategies: Lane Departure

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Infrastructure Strategies:
Lane Departure – (E1) Safety Corridor

- *US 52 and a couple of other highway corridors with high severe crashes will be identified through review of crash and citation data.*
- *Concept of designating safety corridors*
  - *collaborative approach to bring heightened awareness and focus to safety on specific corridors.*
  - *4 E's*
    - *Enforcement, Education, Engineering, EMS*

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Infrastructure Strategies:
Lane Departure – (E1) Safety Corridor

- *The designated safety corridors may receive:*
  - signage identifying them as safety corridors
  - heightened enforcement of all traffic violations occurring within the corridor
  - application of low cost corridor wide infrastructure safety solutions (may include enhanced signing, pavement marking, lighting, turn lanes, etc)
  - public education about the corridors
- Corridors will be monitored for effectiveness in severe crash reduction and may be undesignated after a period of time.

Crash Reduction Factor
- Experimental

Typical Installation Costs
- Varies ($5000 per mile to ?)

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Infrastructure Strategies:
Lane Departure – (D1) Rural Corridor Delineation

Centerline Rumble Strips

Crash Reduction Factor
- 40% head-on/sideswipe crashes

Typical Installation Costs
- $3,600 per mile

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Infrastructure Strategies:
Lane Departure – (A2) Rural Corridor Delineation

Shoulder/Edgeline Rumble Strips

Crash Reduction Factor
- 20% run off road crashes

Typical Installation Costs
- $5,850 per mile

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Infrastructure Strategies:
Lane Departure – (A3) Rural Corridor Delineation

Delineators

Crash Reduction Factor
- 18% to 34% non-intersection, head-on, run-off-road, sideswipe, nighttime crash types

Typical Installation Costs
- $500 per curve

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Infrastructure Strategies:
Lane Departure – (A6) Rural Corridor Shoulder Improvements

Shoulder Paving

Crash Reduction Factor

- 20% to 30% run-off-the-road crashes (with shoulder rumble) (2' only)

Typical Installation Costs

- $54,000 per mile + $5,850 per mile (for Edge Rumble)

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Infrastructure Strategies:
Lane Departure – (A6) Rural Corridor Shoulder Improvements

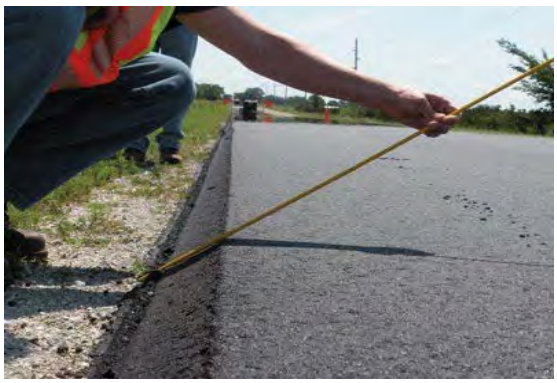
Eliminating Drop Offs

Crash Reduction Factor

- 5% to 10%

Typical Installation Costs

- $10,000 to $20,000 per mile



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Infrastructure Strategies:
Lane Departure – (D2) Center Buffer between Opposing Lanes

Crash Reduction Factor
- 50% for all crashes & 100% for head-on crashes

Typical Installation Costs
- $150,000 to $500,000 per mile

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Infrastructure Strategies:
Lane Departure – (D2) Road Diet (3- and 5-Lane Conversions)

Crash Reduction Factor
- 30% to 50%

Typical Installation Costs
- $48,000 per mile [three-lane]
  - +$54,000 per mile [five-lane]
  - +$36,000 per signalized intersection for updates (for example, loop and signal head placement)

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Infrastructure Safety Strategies
Intersections

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Infrastructure Strategies:
Unsignalized Intersection– (A1 & B6) Access Management

Crash Reduction Factor

- 5% to 31%

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Infrastructure Strategies:
Unsignalized Intersection– (D4) Urbanization (Make it Feel Urban)

Crash Reduction Factor

- Not Available (Tried)

Typical Installation Costs

- $500,000 to $1,000,000 per mile

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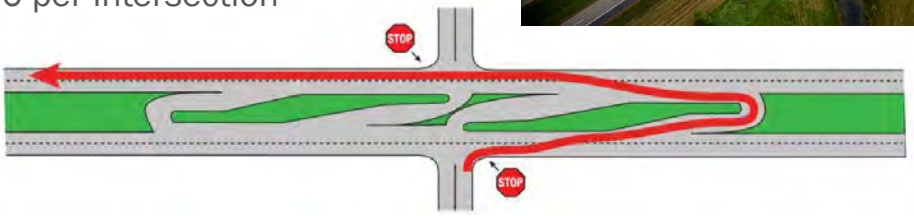
Infrastructure Strategies:
Unsignalized Intersection– (B11) Restricted Crossing U-Turn (RCUT) Intersections

Crash Reduction Factor

- 17% all crashes
- 100% angle crashes

Typical Installation Costs

- $750,000 per intersection



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Infrastructure Strategies:
Unsignalized Intersection– (F1) Roundabouts

Crash Reduction Factor
- 20% to 50% all crashes
- 60% to 90% right-angle crashes

Typical Installation Costs
- $1,000,000 per intersection

ND 22 & ND 200 roundabout in Killdeer, ND

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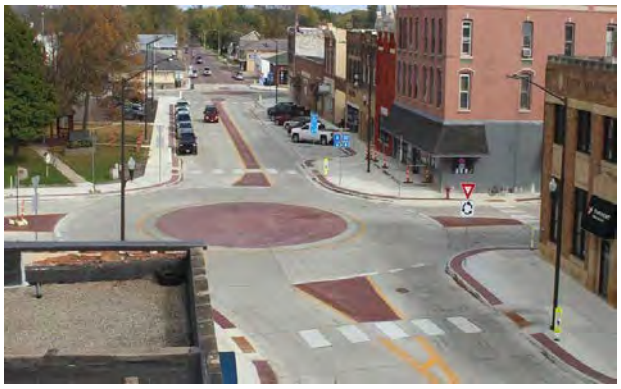
Zero fatalities. Zero excuses.

Infrastructure Strategies:
Unsignalized Intersection (F1) Urban Mini-Roundabout

Crash Reduction Factor
- 20% to 50% all crashes
- 60% to 90% right-angle crashes

Typical Installation Costs
- $40,000 - 500,000



VISION ZERO
Zero fatalities. Zero excuses.

Infrastructure Strategies:

Unsignalized Intersection – (D3) Rural Intersection Conflict Warning System (RICWS)

Crash Reduction Factor

- 50% all crashes
- 75% severe right angle crashes

Typical Installation Costs

- $75,000 to $125,000 per intersection

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Zero fatalities. Zero excuses.

Infrastructure Strategies:

Unsignalized Intersection– (D1) Traffic Calming - **Zig Zag Pavement Markings**

Crash Reduction Factor

- Not Available

Typical Installation Costs

- $2,850

Figure 10. Zig-zag Markings at Belmont Ridge Road

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Infrastructure Safety Strategies
LRSP Projects – Rural and Urban Areas

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Zero fatalities. Zero excuses.

Infrastructure Strategies:
Local Road Safety Program – Priority Safety Strategies

Program Focus: Deployment of proven, effective & low cost strategies

Rural

- Enhanced Edgelines
- Intersection Street Lighting
- Chevrons

Urban

- Traffic Signal Confirmation Lights
- Curb Extensions

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Infrastructure Strategies:
Lane Departure – (A2) LRSP Projects (Rural)

Enhanced Edgelines (6” & 8”)

Crash Reduction Factor

- 10% to 45% all rural serious crashes (6”)

Typical Installation Costs

- $2,000 per mile


Roadway with 4-in edgeline


Roadway with 8-in edgeline

VISION ZERO
Zero fatalities. Zero excuses.

Infrastructure Strategies:
Unsignalized Intersection – (D2) LRSP Projects (Rural)

Intersection Destination Lighting

Crash Reduction Factor

- 25% to 40% of nighttime crashes

Typical Installation Costs

- $10,000 per light

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Zero fatalities. Zero excuses.

Infrastructure Strategies:
Lane Departure – (A3) LRSP Projects (Rural)

Chevrons

Crash Reduction Factor

- 20% to 30%

Typical Installation Costs

- $3,960 per curve

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Infrastructure Strategies:
Signalized Intersection – (E1) LRSP Projects (Urban)

Traffic Signal Confirmation Lights

Crash Reduction Factor

- 25% to 84% in violations
- 9% angle crashes

Typical Installation Costs

- $1,200 per two approaches

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Infrastructure Strategies:
Unsignalized Intersection – (B10) LRSP Projects (Urban)

Curb Extension

Crash Reduction Factor

- Increase in vehicles yielding to pedestrians

Typical Installation Costs

- $ 36,000 per corner

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Behavioral Safety Strategies: Impaired Driving

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Zero fatalities. Zero excuses.

Behavioral Strategies:
North Dakota Impaired Facts

- 33% of severe injuries
- 55% severe injuries, younger drivers age 20-39; 69% male drivers
- 63% of severe crashes unbelted
- 45% of fatalities involve an impaired driver vs. 28% US
- 36% of impaired-driving fatalities involved driver BAC of .15 > vs. 19% US

Good News – ND Impaired-related fatalities declining since 2012

What more will ND do to continue the downward trend line?

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Behavioral Strategies:
Impaired – (A3) Employ alcohol screening and brief interventions in health care settings

Capitalize on the "teachable moment" following a crash

- Patients are screened for alcohol use problems
- Brief interventions counsel patients on alcohol's affect on injury risk & overall health

Proven: Reduces drinking and self-reported drinking and driving

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Zero fatalities. Zero excuses.

Behavioral Strategies:

Impaired - (A4) Mandate alcohol server/seller training as a condition of alcohol licensure.

- Prevent serving/selling to intoxicated or underage customers
- Server/seller training - Sell, prepare, dispense, serve or otherwise deliver alcoholic beverages statewide.

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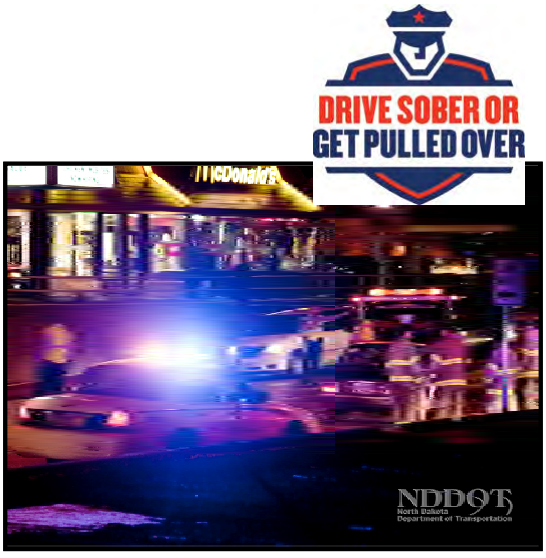
Zero fatalities. Zero excuses.

Behavioral Strategies:

Impaired – (B1) Strengthen public perceived risk of arrest through highly visible enforcement (HVE); (B2) Maintain high visibility sobriety checkpoints

HVE + Checkpoints Goal: Deterrence through raising the perceived risk of arrest

- Highly visible enforcement + strong public outreach
- Multiple jurisdictions, multiple squads
- Paid, earned/free, and social media outreach (pre and post-enforcement)



Proven: Sustained highly visible enforcement or numerous checkpoints reduce alcohol-related fatalities 11% - 20%.

VISION ZERO
Zero fatalities. Zero excuses.

Behavioral Strategies:

Impaired – (C1) Strengthen repeat DUI offender monitoring

ND 24/7 Sobriety Program:

- No alcohol use, no bars, 24/7
- Sobriety testing with law enforcement 2X day, 7 days/week
- Monitoring: Breath testing, SCRAM bracelet, drug patch
- Avoid jail while successfully in the program

Proven: In ND, those successfully completing program, 96.1% did not reoffend.

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Zero fatalities. Zero excuses.

Behavioral Strategies:

Impaired – (C1) Strengthen repeat DUI offender monitoring

ND's Strengthened DUI law:

- Increased fines for DUI convictions
- Increased jail time for second and subsequent DUI offenses
- Requires repeat DUI offenders to participate in ND's 24/7 Sobriety Program for one year

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Zero fatalities. Zero excuses.

Behavioral Strategies:
Impaired – (C2) Expand DUI Courts

Highly intensive supervision for high-risk DUI offenders

- Regular case reviews - judge, prosecutor, probation and treatment
- Regular offender court appearances
- Frequent urine testing
- Random visits from law enforcement
- Treatment required
- Community service

Proven: Reduces re-offense offense by approx. 50%; Georgia study – DUI Court 9% re-offended vs. 24% traditional programs

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Zero fatalities. Zero excuses.

Behavioral Strategies:
Impaired – (C3) Implement an Ignition Interlock Program

Separates the drinking driver from the vehicle

- Analyzes a driver's breath; disables the engine if alcohol detected
- A condition to regain driving privileges
- Provides a pathway for legal driving

Proven: Just released - **IIHS Study: II reduced drunk crash fatalities by 16%. Since 2006 and "All-Offender" law, New Mexico reduced drunk driving fatalities by 22%.**

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Zero fatalities. Zero excuses.

Behavioral Strategies:

Impaired – (C7) Conduct a comprehensive assessment of administrative licensing sanctions for both alcohol and drug-impaired driving.

Swift and certain penalty for DUI vs. lengthy and uncertain outcomes of criminal process

- Administrative license suspension (ALS) or revocation (ALR)
- Automatic sanction for BAC or drug test refusal and BAC test failure
- Arresting officer takes license
- Immediate penalty - no proof of guilt required
- Serves as a strong deterrent

Proven: ALS/ALR has reduced alcohol-related fatal crash involvement by 5%

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Zero fatalities. Zero excuses.

Behavioral Safety Strategies: Occupant Protection/Belt Use

VISION ZERO
Zero fatalities. Zero excuses.

Behavioral Strategies:

Occupant Protection/Belt Use – (A2) Conduct enhanced enforcement and focused public outreach for low belt use communities

- ND unbelted severe injuries = 49%
- Rural Roads: 84%
- Oil Counties: 51%
- Younger motorists: 29% age 20-29
- Native Americans fatalities 2016: 72%

- ND low belt use audiences
- W Region: 74.7% belt use (East: 82.2%)
- Males: 73.5% (Females: 86.1%)
- Males in truck: 68.9% (F in trucks: 83%)
- Rural towns: M - 38.6%, (F – 51.8%)

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Zero fatalities. Zero excuses.

Behavioral Strategies:

Occupant Protection/Belt Use – (A3) Enact primary seat belt legislation that includes primary enforcement of belt use for all passengers in all seating positions

Goal of Primary Belt Law: More North Dakotans buckle up… walk away from a crash

- ND belt use rate = 79.3% (National belt use = 90.1%)
- In ND, **6 out of 10** people killed in a crash **were unbelted**
- When lap/shoulder belts used, fatal injury **reduced by 45-65%**
- Primary Seat Belt Enforcement: 34 states + District of Columbia
- 62% favor primary seat belt law in North Dakota

Proven: In two years, MN primary seat belt law resulted in between 68 and 92 fewer deaths and between 320 and 550 fewer severe injuries.

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Zero fatalities. Zero excuses.

Behavioral Strategies:

Occupant Protection/Belt Use – (A6) Promote peer-to-peer outreach to dispel misperceptions of peer risk taking, particularly in rural communities

- **Key: Using peer influences to shape what behaviors are socially acceptable**
- Correct misperceptions – Educate drivers on peers' "actual" vs. "perceived" risk behavior
  - Perceived: Only 58% of ND survey respondents indicated <u>others</u> use seat belt nearly always/always
  - Actual: Nearly 80% wear their seat belt
- Engage – Give teens responsibility for creating safe driving messages

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Behavioral Strategies:

Occupant Protection/Belt Use – (B2) Conduct high-profile "Child Passenger Safety" inspection clinics. Incorporate assessment of inspection clinics' effectiveness.

North Dakota has an active network of CPS inspection stations

- Located in 35 of ND's 53 counties serving 92% of the population
- Primarily serve **rural** and **Native American** communities
- Over 240 Certified Child Passenger Safety Technicians offering training/assistance

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Behavioral Safety Strategies: Young Driver

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Behavioral Strategies:

Young Driver – (A) Enhance Graduated Driver Licensing

Insurance Institute for Highway Safety - GDL calculator

Estimates the impact of strengthening key graduated driver licensing provisions on fatal crash rates among young drivers for each state.

- **A4** – Min. age of 15 for permit = **13%** reduction in ND fatal crash rate
- **A6** – Implement passenger restrictions: **1** = **7%** reduction in ND fatal rate
  0 = **21%** reduction
- **A8** – Min age of 16 for restricted license = **13%** reduction in ND fatal rate
  Min age of 17 for restricted license = **25%** reduction

http://www.iihs.org/iihs/topics/laws/gdl_calculator?topicName=teenagers

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Behavioral Strategies:

Young Driver - (C1) Require parent education as a driver education classroom component

Parent component helps to actively engage parents and to understand:

- Their role in monitoring/supervising their teen's skill development
- Teen driving risks and
- GDL safety provisions and their role
- How to promote effective communication with their teen

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Behavioral Strategies:

Young Driver – (B4) Enact "hands-free" law to aid enforcement.

- **Hands-Free Law:** 5 states + D.C.; all are **primary enforcement laws**
- Teen drivers age 15-19, 43% text while driving, 61% read texts while driving (Teen Driver Survey, 2012)
- 91% of college students reported to have sent text messages while driving (He et al., 2015).
- Young drivers, aged 18-20, are involved in more crashes involving phone usage while driving, than any other age group (NHTSA).

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Behavioral Strategies:

Young Driver – (C2) Publicize technology solutions to promote safe driving

Younger drivers most at risk - overestimate abilities & underestimate dangers

Technology Examples:

- AT&T's DriveMode (Free): Auto launch; blocks texts, calls, alerts; auto replies, parent notified if disabled (Android and iPhone)
- Cellcontrol ($129.): See above + web access, excessive maneuvers (speed, braking, acceleration), driver performance reports for parental monitoring

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Behavioral Safety Strategies: Speed/Aggressive Driving

VISION ZERO
Zero fatalities. Zero excuses.

Behavioral Strategies:

Speed/Aggressive Driving - (A2) Explore pilot automated enforcement projects, coupled with public outreach; assess impact and public acceptance.

- Create transparent, highly visible, community-supported pilot enforcement projects
- Overwhelming majority support us in construction and school zones
- Solicit public feedback and assess response and crash impact
- Purpose is to augment – not replace – traditional enforcement

Proven: 10-20% reduction in speed-related fatalities

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Behavioral Strategies

Speed/Aggressive Driving - (B1) - Enact strengthened fines and penalties.

- Speed fines in North Dakota are lower than Montana, South Dakota, and Minnesota.
- For high-risk, repeat offenders, most effective penalties are imposed by licensing agency (license suspension/revocation) vs. uncertain court decision.

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Stakeholder Strategy Prioritization

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Prioritization Debrief

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Next Steps

- Vision Zero Workshops
  - ✓ March 21 and 22
  - ✓ April 3 and 4
  - – April 17 and 18
- May 2018 - Workshop input shared with Vision Zero/SHSP Executive and Steering Committees
- July 1, 2018 - Draft Vision Zero plan/SHSP for stakeholder review and comment
- August 1, 2018 – Final Vision Zero plan/SHSP submitted to the Federal Highway Administration (FHWA) North Dakota Division for approval
- October 31, 2018 – Vision Zero Framework
- Stakeholder involvement for plan implementation
- Sign up to be part of an EA team

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Questions?

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Thank you for your participation!

We value your feedback.

Please complete the workshop evaluation – last page in your folder.

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ND Statewide Priority Emphasis Areas

Statewide Emphasis Area Table

Emphasis Area	State System				Local System				Statewide			
	Severe Injuries		All Injuries		Severe Injuries		All Injuries		Severe Injuries		All Injuries	
	Frequency	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*	*Frequency*	*Percentage*
Young Driver	219	13.7%	1,778	19.5%	382	22.5%	4,997	29.0%	601	18.2%	6,775	25.7%
Old Driver	203	12.7%	1,399	15.3%	178	10.5%	2,402	13.9%	381	11.6%	3,801	14.4%
Speeding/Aggressive Driver	611	38.3%	3,656	40.1%	687	40.5%	6,262	36.4%	1,298	39.4%	9,918	37.6%
Alcohol-Related	481	30.1%	1,357	14.9%	610	35.9%	2,494	14.5%	1,091	33.1%	3,851	14.6%
Distracted/Asleep/Fatigued	131	8.2%	976	10.7%	101	5.9%	1,566	9.1%	232	7.0%	2,542	9.6%
Unbelted Occupants	783	49.1%	2,257	24.7%	816	48.1%	3,497	20.3%	1,599	48.5%	5,754	21.8%
Pedestrian	41	2.6%	109	1.2%	102	6.0%	468	2.7%	143	4.3%	577	2.2%
Bicyclist	9	0.6%	66	0.7%	43	2.5%	393	2.3%	52	1.6%	459	1.7%
Motorcycle	118	7.4%	351	3.8%	202	11.9%	786	4.6%	320	9.7%	1,137	4.3%
Heavy Truck	448	28.1%	1,569	17.2%	153	9.0%	849	4.9%	601	18.2%	2,418	9.2%
Train	1	0.1%	4	0.0%	33	1.9%	52	0.3%	34	1.0%	56	0.2%
Lane Departure - Single-Vehicle	631	39.5%	2,915	31.9%	822	48.4%	4,012	23.3%	1,453	44.1%	6,927	26.3%
Lane Departure - Multi-Vehicle (Opposing Traffic)	283	17.7%	850	9.3%	135	8.0%	1,324	7.7%	418	12.7%	2,174	8.3%
Lane Departure - Multi-Vehicle (Same Direction)	39	2.4%	415	4.5%	35	2.1%	485	2.8%	74	2.2%	900	3.4%
Intersection	403	25.3%	2,868	31.4%	550	32.4%	7,945	46.1%	953	28.9%	10,813	41.0%
Winter Weather	182	11.4%	1,181	12.9%	49	2.9%	855	5.0%	231	7.0%	2,036	7.7%
Work Zone	45	2.8%	259	2.8%	30	1.8%	260	1.5%	75	2.3%	519	2.0%
Total	**1,596**		**9,125**		**1,698**		**17,220**		**3,294**		**26,345**	

Note: The table includes crashes from 2012-2016

3/22/2018

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Lane Departure Strategies - *58% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP
A - Keep vehicles from encroaching on the roadside	A1 - Install shoulder rumble strips	Low	Tried	
	A2 - Install edge lines "profile marking", edge line rumble strips, modified shoulder rumble strips, 6-inch edge line, or embedded wet-reflective pavement markings on section with narrow or no paved shoulders	Low	Experimental	X
	A3 - Provide enhanced shoulders, lighting, delineation (for example, Chevrons), or pavement markings for sharp horizontal curves	Low	Tried / Proven	X
	A4 - Provide improved highway geometry for horizontal curves	Moderate	Proven	X
	A5 - Provide skid-resistance pavement surfaces	Moderate	Proven	X
	A6 - Apply shoulder treatments *Eliminate shoulder drop-offs from paved road to unpaved shoulder *Shoulder edge *Widen and/or pave shoulders	Low	Experimental Proven	X
B - Minimize the likelihood of crashing into an object or overturning if the vehicle travels off the shoulder	B1 - Design safer slopes and ditches to prevent rollovers	Moderate	Proven	X
	B2 - Remove/relocate objects in hazardous locations	Moderate to High	Proven	X
C - Reduce the severity of the crash	C1 - Improve design and application of barrier and attenuation systems	Moderate to High	Tried	X
D - Reduce the likelihood of a head-on vehicles collision	D1 - Install centerline rumble strips for two-lane roads	Low	Proven	X
	D2 – Install center buffers between opposing lanes	Moderate to High	Tried	
	D3 - Install cable median barrier for narrow-width medians & multilane roads	Moderate to High	Proven	X
E – Reduce number and severity of crashes	E1 – Designate as Safety Corridor - heightened enforcement PLUS implementation of corridor wide, low-cost infrastructure safety solutions	Moderate to High	Tried	

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Unsignalized Intersection Strategies - *29% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP
A - Improve management of access near unsignalized intersections	A1 - Implement driveway closure/relocations (Access Management)	Moderate	Tried	X
B - Reduce the frequency and severity of intersection conflicts through geometric design improvements	B1 - Provide left-turn lanes at intersections	Moderate	Proven	X
	B2 - Provide offset left-turn lanes at intersections	Moderate to High	Tried	X
	B3 - Provide acceleration lanes at divided highway intersections	Moderate	Tried	X
	B4 - Provide right-turn lanes at intersections	Moderate	Proven	X
	B5 - Provide offset right-turn lanes at intersections	Moderate to High	Tried	X
	B6 - Channelize or close median openings to restrict or eliminate turning maneuvers (Access Management)	Low	Tried	X
	B7 - Close or relocate "high-risk" intersections	High	Tried	X
	B8 - Convert Radial T Intersections	High	Tried	
	B9 - Realign intersection approaches to reduce or eliminate intersection skew	High	Proven	X
	B10 - Improve pedestrian and bicycle facilities to reduce conflicts between motorists and non-motorists (Curb Extensions & Medians)	Moderate	Proven	X
	B11– Convert Divided Intersections to Restricted Crossing U-Turn (RCUT)	Moderate to High	Proven	

Unsignalized Intersection Strategies - *29% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP
C - Improve sight distance at unsignalized intersections	C1 - Clear sight triangle on stop- or yield-controlled approaches to intersections, including snow removal	Low	Tried	X
D - Improve driver awareness of intersections as viewed from the intersection approach	D1 - Improve visibility of intersections by providing enhanced signing, delineation, or pavement markings/messages	Low	Tried	X
	D2 - Improve visibility of intersections by providing appropriate street lighting	Moderate to High	Proven	X
	D3 - Install larger regulatory and warning signs at intersections, including the use of dynamic warning signs at appropriate intersections (LED Stop Signs & Dynamic Intersection Conflict Warning Systems) (Dynamic Speed Feedback Signs)	Low to Moderate	Tried	X
	D4 – Urbanization - Make it feel urban (curb & gutter, street lights, sidewalks, etc.)	Moderate to High	Tried	
F - Choose appropriate intersection traffic control to minimize crash frequency and severity	F1 - Construct roundabouts at appropriate locations	High	Proven	X
	F2 – Convert to All-Way Stop	Low	Tried	

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Zero fatalities. Zero excuses.

Signalized Intersection Strategies - *29% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP
A - Reduce frequency and severity of intersection conflicts through traffic control and operational improvements	A1 - Employ multiphase signal operation (including Flashing Yellow Arrows)	Low	Tried / Proven	X
	A2 - Optimize clearance intervals	Low	Proven	X
	A3 - Restrict or eliminate turning maneuvers (including right turns on red)	Low	Tried	X
	A4 - Employ signal coordination along a corridor or route	Moderate	Proven	X
	A5 - Provide countdown timers, advanced walk phase, and other low-cost pedestrian/bicycle facility improvements	Low	Tried / Proven	X
B - Reduce frequency and severity of intersection conflicts through geometric improvements	B1 - Provide/improve left-turn channelization	Moderate	Proven	X
	B2 - Provide/improve right-turn channelization	Moderate	Proven	X
	B3 - Improve geometry of pedestrian and bicycle facilities	Low	Tried / Proven	X
	B4 – Convert to Signalized Restricted Crossing U-Turn	High	Tried	
	B5 – Convert T Intersections to Continuous Green T	Moderate to High	Tried	
D - Improve driver awareness of intersections and signal control	D1 - Improve visibility of signals (overhead indications, 12" lenses, background shields, LED's) and signs (mast arm mounted street names) at intersections	Low	Tried	X
E - Improve driver compliance with traffic control devices	E1 - Supplement conventional enforcement of red-light running with confirmation lights; include a public information campaign to increase awareness and compliance	Low	Tried	X
F - Improve access management near signalized intersections	F1 - Restrict access to properties using driveway closures or turn restrictions	Low	Tried	X
	F2 - Restrict cross-median access near intersections	Low	Tried	X

VISION ZERO
Zero fatalities. Zero excuses.

Alcohol and/or Drug Related Strategies *- 33% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
A - Reduce excessive drinking and underage drinking	A1 - Conduct highly publicized compliance checks and server training for alcohol retailers and merchants to reduce sales to underage persons.	Low	Tried	X		X	
	A2 - Conduct public outreach on accessible safe-ride alternative transportation services.	Moderate	Tried	X		X	
	A3 - Expand screening and brief interventions (SBI) in emergency settings.	Moderate	Proven			X	
	A4 - Mandate alcohol server training as a condition of alcohol licensure.	Moderate	Tried			X	
B - Strengthen enforcement to improve safety	B1 - Strengthen impaired driving detection and public perceived risk of arrest through sustained, well-publicized, highly visible impaired-driving enforcement, including sobriety checkpoints.	Moderate-High	Proven	X		X	
	B2 - Maintain high visibility sobriety checkpoints to reduce impaired driving.	Moderate-High	Proven			X	
	B3 - Strengthen the use of in-squad cameras to more successfully prosecute DWI arrests.	Moderate	Tried		X		
	B4 - Publicize and enforce zero tolerance laws for drivers under age 21.	Moderate	Proven			X	
	B5 - Expand the use of passive alcohol sensors for enforcement purposes.	Moderate	Tried			X	
	B6 - Identify & address Tribal issues in participating in DUI enforcement activities.	Low	Experimental			X	
	B7 - Develop Tribal-State public safety agreements to provide concurrent jurisdiction with DUI arrest authority.	Low	Tried			X	
	B8 – Expand officer Advanced Roadside Impaired Driving Enforcement (ARIDE) training and officer use of Drug Recognition Experts (DRE) to detect and apprehend drug-impaired drivers.	Medium	Tried			X	
	B9 – Move toward complete testing and reporting of drug testing information on fatality-injured drivers.	Medium	Tried			X	

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Zero fatalities. Zero excuses.

Alcohol and/or Drug Related Strategies - *33% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
C – Prosecute, impose sanctions on, and treat impaired offenders	C1 - Strengthen repeat DWI offender monitoring programs.	High	Proven			X	
	C2 - Expand high-supervision DUI Courts for repeat offenders.	High	Proven			X	
	C3 - Implement an Ignition Interlock program.	Moderate	Proven	X		X	
	C4 - Remove the option for BAC Test refusal by making refusal a criminal offense.	Low	Proven	X	X		
	C5 - Pursue increased penalties for high BAC offenders.	Low	Proven	X		X	
	C6 - Explore limiting the scope of administrative hearings to relevant facts and issues.	Low	Tried				X
	C7 - Conduct a comprehensive assessment of administrative licensing sanctions for both alcohol and drug-impaired driving.	Low	Proven/Tried	X		X	
	C8 - Educate prosecutors and law enforcement on the importance of investigating and prosecuting impaired and drugged-driving cases.	Low	Tried			X	
	C9 - Identify approaches to effectively educate judges on DUI and drug enforcement protocol and the importance of investigating and prosecuting impaired driving cases.	Low	Tried			X	
	C10 – Enhance training for prosecutors in the successful prosecution of drug-impaired drivers.	Low	Tried			X	

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Zero fatalities. Zero excuses.

Unbelted Vehicle Occupants Strategies – *49% of all server injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
A - Maximize use of occupant restraints by all vehicle occupants	A1 - Conduct statewide high visibility and highly publicized targeted enforcement campaigns to maximize belt and child restraint use, including nighttime enforcement.	Moderate-High	Proven	X		X	
	A2 - Conduct enhanced enforcement and focused public outreach for low belt use communities including rural areas and North Dakota's western region as well as low belt use audiences.	Moderate-High	Proven			X	
	A3 - Enact primary seat belt legislation that includes primary enforcement of belt use for all passengers in all seating positions.	Low	Proven	X		X	
	A4 - Strengthen penalties for lack of seat belt use.	Low	Tried	X		X	
	A5 - Conduct targeted and highly publicized enforcement for drivers under 18 at school locations.	Moderate	Proven				X
	A6 - Promote peer-to-peer outreach to dispel misperceptions of peer risk taking, particularly in rural communities.	Low	Proven			X	
	A7 - Conduct enforcement outreach to tribal governments to enforce tribal primary seatbelt law and outreach to rural law enforcement to enforce secondary seatbelt law.	Low	Tried			X	
	A8 - Conduct outreach on unbelted risks and OP benefits to educational institutions including elementary schools in geographical areas with low belt use and tribal colleges.	Moderate	Experimental				X
B - Insure that restraints, especially child and infant restraints, are properly used	B1 - Strengthen child booster safety law for children up to age 8.	Low	Proven		X		
	B2 - Conduct high-profile "Child Passenger Safety" inspection clinics events at multiple community locations to educate on the proper use of restraint devices. Incorporate assessment of inspection clinics' effectiveness to affect proper child restraint.	Low	Proven			X	
	B3 - Promote statewide education for rear-facing child restraint through age 2 and other child restraint best practices (e.g., booster seat until age 9, transport children 12 and younger in the back seat, etc.).	Moderate	Tried			X	

VISION ZERO
Zero fatalities. Zero excuses.

Unbelted Vehicle Occupants Strategies – *49% of all server injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
C - Provide use requirements through alternative sources	C1 - Use employer, insurance or workforce safety programs for non-compliance of belt use polices	Moderate	Tried			X	

VISION ZERO
Zero fatalities. Zero excuses.

Speeding/Aggressive Driving Strategies – *39% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
A - Heighten driver awareness of aggressive driving/speed-related consequences	A1 - Strengthen speed detection and public perceived risk of being stopped and ticketed through sustained, well-publicized speed enforcement.	High	Proven	X		X	
	A2 - Explore pilot automated enforcement projects (i.e., speed cameras in work or school zones, red light running cameras), coupled with public outreach about the projects, to assess impact on aggressive driving and public acceptance.	High	Proven				X
B - Improve efficiency and effectiveness of aggressive driving/speed enforcement efforts	B1 - Enact/support legislation to strengthen penalties such as increased fines for right-of-way and speed violations and enhanced penalties for habitual offenders.	Low	Tried	X		X	
	B2 – Review commercial motor vehicle (CMV) Weigh-in-Motion speed data to determine the need for more focused CMV speed enforcement.	Low	Experimental				X
C - Review crash data	C1 - Analyze data to clearly define aggressive driving and identify factors contributing to aggressive driving.	Low	Tried			X	
D - Set appropriate speed limits	D1 - Install speed signing using variable message signs in school zones.	Low	Tried	X		X	
	D2 – Assess and implement speed limits consistent with the analysis of actual sped profiles and supported by the enforcement of limits.	Low	Proven			X	

VISION ZERO
Zero fatalities. Zero excuses.

Speeding/Aggressive Driving Strategies – *39% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
E - Communicate appropriate speeds through use of traffic control devices	E1 - Implement active speed warning signs, including dynamic message boards at rural to urban transitions.	Low	Tried			X	
	E2 - Use on-pavement measures to communicate the need to reduce speeds.	Moderate	Tried			X	
F - Ensure that roadway design and traffic control elements support appropriate and safe speeds	F1 - Effect safe speed transitions through design elements and on approaches to lower speed areas.	High	Tried			X	
	F2- Increase signage for no-passing zones.	Low	Tried			X	

VISION ZERO
Zero fatalities. Zero excuses.

Young Drivers Strategies - *18% of all severe injuries during 5-year period*

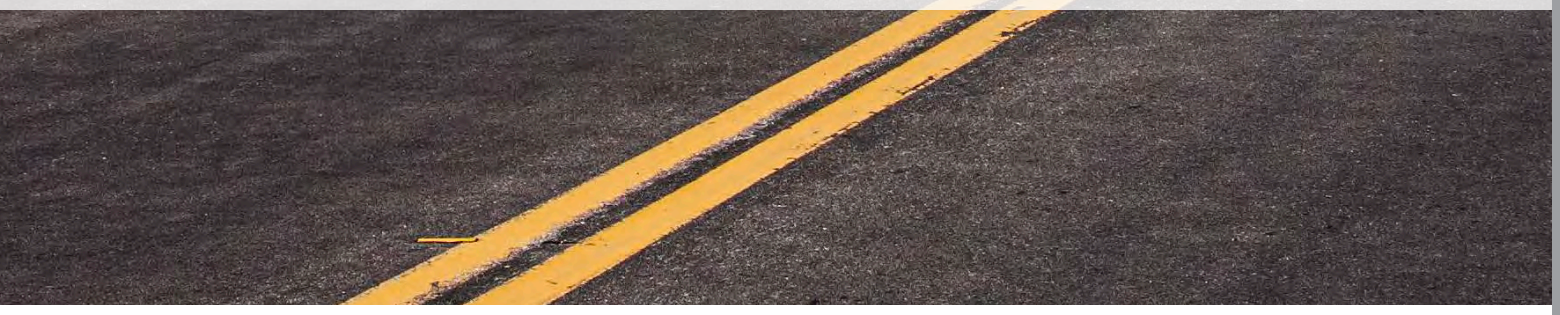
Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
A - Enhance Graduated Driver Licensing	A1 - Enact enhanced graduated drivers licensing system.	Low	Proven	X	X		
	A2 – Enact requirement for learner's permit or supervised driving to be held a minimum of 6 months (or a year).	Low	Proven		X		
	A3 – Extend night driving restriction to include all novice drivers under the age of 18 lasting a minimum of 6 months from date of licensure.	Low	Proven			X	
	A4 - Enact minimum age of 15 (or 16) for learner's permit.	Low	Tried				X
	A5 - Require 30 to 50 hours of supervised driving for drivers 16 to 17 years of age.	Low	Proven	X	X		
	A6 - Implement passenger restrictions for all novice drivers under the age of 18 lasting a minimum of 6 months from date of licensure.	Low	Proven	X		X	
	A7 - Prohibit cell phone use for drivers under the age of 18.	Low	Tried		X		
	A8 - Implement minimum age of 17 to qualify for a full, unrestricted license.	Low	Tried	X			X
B - Publicize, enforce, and adjudicate laws pertaining to young drivers	B1 - Publicize and enforce teen driving license provisions.	Moderate	Proven	X		X	
	B2 – Publicize and enforce laws pertaining to underage drinking and driving.	Moderate to High	Proven	X		X	
	B3 - Publicize and enforce helmet law for young motorcycle riders under 18.	Low	Proven				
	B4 – Enact hands-free cell phone use law to help detect and enforce no-texting/no-web-while driving law.	Low	Tried				X
C - Assist parents in monitoring their teens' driving	C1 - Require parent education as a driver education classroom component.	Low	Experimental	X		X	
	C2 - Publicize technology solutions to promote safe driving behaviors, reduce driver distraction and promote parental engagement.	Moderate	Experimental			X	

VISION ZERO
Zero fatalities. Zero excuses.

Young Drivers Strategies - *18% of all severe injuries during 5-year period*

Objectives	Strategies	Relative Cost to Implement and Operate	Effectiveness	Included in 2013 SHSP	Strategy Progress		
					Completed	Progress Made	Not Started
D - Improve young driver training	D1 - Improve content and delivery of driver education/training including vehicle recovery skills training.	Moderate to High	Experimental			X	
	D2 – Require classroom education for licensure and incorporate educating novice drivers about driving risks.	Low	Tried	X		X	

APPENDIX C
Emphasis Area Crash Facts Sheets



APPENDIX C

Lane Departure

North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Lane Departure

March 16, 2018

On North Dakota roadways, there were 1581 severe crashes resulting in 1906 severe injuries between 2012 and 2016 in which the crash involved a vehicle that departed the travel lane or the roadway. This is an average of 381 severe injuries per year and accounted for nearly 58% of all severe injuries during the five year period.

Driver Demographics

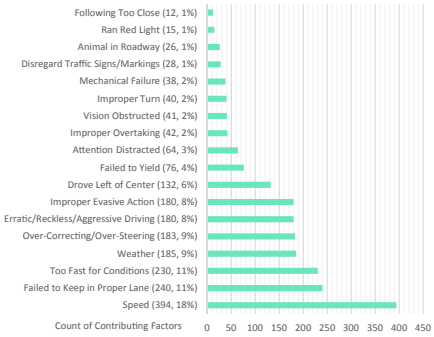
- A total of 2077 drivers were involved in these 1581 crashes.

Age	Female	Male	Total
≤19	94 (5%)	131 (6%)	225 (11%)
20-29	128 (6%)	450 (22%)	578 (28%)
30-39	70 (3%)	323 (16%)	393 (19%)
40-49	64 (3%)	283 (14%)	348 (17%)
50-59	59 (3%)	255 (12%)	314 (15%)
≥60	54 (3%)	163 (8%)	217 (10%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 2106 contributing factors in these crashes, among which Speed appears most often.

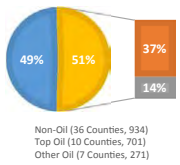


Location

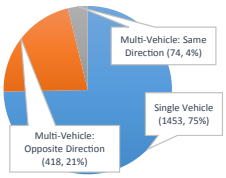
- The setting of these severe injuries is primarily Rural (85%) and a majority occurred on the Local (51%) system.

	Rural	Urban	Total
State	881 (46%)	51 (3%)	932 (49%)
Local	744 (39%)	230 (12%)	974 (51%)
Total	1625 (85%)	281 (15%)	1906 (100%)

- The majority of these severe injuries occur in Oil Counties (51%).
- The top 5 counties represent 40% of these severe injuries: Williams (12%), McKenzie (10%), Ward (7%), Cass (6%), and Burleigh (5%).



Crash Details



- 75% of these lane departure severe injuries are Single Vehicle type and 26% occurred on a curve.

Roadway Characteristics	
Straight	1400, 73%
On Curve	496, 26%
Unknown	10, 1%

Note: Totals may not sum to 100% due to some crashes showing characteristics of multiple lane departure types.

Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	857 (72%)
Fixed Object	158 (13%)
Ditch / Embankment	72 (6%)
Parked Motor Vehicle	46 (4%)
Ran off Roadway	28 (2%)
Other / Unknown	28 (2%)

- Alcohol or drugs were involved in 41% (784) of these severe injuries and 40% (637) of these severe crashes.
- 15% (290) of these severe injuries, occuring among 15% (242) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	60 (3%)	86 (5%)	80 (4%)	33 (2%)	259 (14%)
3:00-5:59 AM	40 (2%)	43 (2%)	33 (2%)	17 (1%)	133 (7%)
6:00-8:59 AM	46 (2%)	47 (2%)	72 (4%)	55 (3%)	220 (12%)
9:00-11:59 AM	29 (2%)	60 (3%)	36 (2%)	58 (3%)	183 (10%)
12:00-2:59 PM	53 (3%)	66 (3%)	64 (3%)	49 (3%)	232 (12%)
3:00-5:59 PM	74 (4%)	102 (5%)	84 (4%)	41 (2%)	301 (16%)
6:00-8:59 PM	75 (4%)	97 (5%)	109 (6%)	50 (3%)	331 (17%)
9:00-11:59 PM	48 (3%)	96 (5%)	74 (4%)	29 (2%)	247 (13%)
Total	425 (22%)	597 (31%)	552 (29%)	332 (17%)	1906 (100%)

- Across all seasons, nighttime (6:00 PM - 2:59 AM) account for 45% (724) of these severe injuries.
- Most of these severe injuries occurred under Dry (75%), Daylight (51%) conditions.

Surface Condition	
Dry	1434 (75%)
Snow/Ice	296 (16%)
Wet	114 (6%)
Dirt/Gravel	54 (3%)
Other	8 (0%)

Lighting Condition	
Daylight	978 (51%)
Dark (Not Lighted)	623 (33%)
Dawn/Dusk	164 (9%)
Dark (Lighted)	134 (7%)
Unknown	7 (0%)

Prepared by CH2M HILL, Inc.

Intersections
North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Intersections

March 16, 2018

On North Dakota roadways, there were 805 severe crashes resulting in 953 severe injuries between 2012 and 2016 in which the crash occurred at or in relation to an intersection. This is an average of 191 severe injuries per year and accounted for nearly 29% of all severe injuries during the five year period.

Driver Demographics

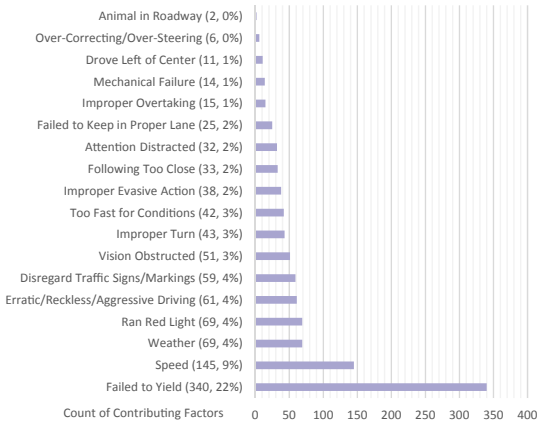
- A total of 1540 drivers were involved in these 805 crashes.

Age	Female	Male	Total
≤19	69 (4%)	88 (6%)	157 (10%)
20-29	115 (7%)	265 (17%)	380 (25%)
30-39	70 (5%)	178 (12%)	248 (16%)
40-49	69 (4%)	201 (13%)	270 (18%)
50-59	70 (5%)	176 (11%)	246 (16%)
≥60	76 (5%)	162 (11%)	238 (15%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 1055 contributing factors in these crashes, among which Failed to Yield appears most often.

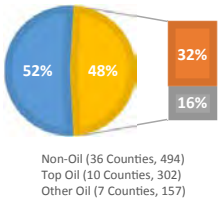


Location

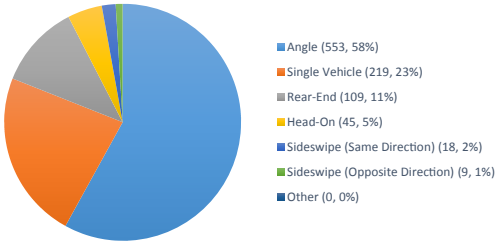
- The setting of these severe injuries is primarily Rural (59%) and a majority occurred on the Local (58%) system.

	Rural	Urban	Total
State	340 (36%)	63 (7%)	403 (42%)
Local	224 (24%)	326 (34%)	550 (58%)
Total	564 (59%)	389 (41%)	953 (100%)

- The majority of these severe injuries occur in Non-Oil Counties (52%).
- The top 5 counties represent 56% of these severe injuries: Williams (14%), Cass (12%), Ward (12%), Burleigh (9%), and McKenzie (9%).



Crash Details



- The traffic control devices at these intersections were Stop/Yield (215, 23%) and Signalized (171, 18%). No traffic control was reported for 518 (54%) of these severe injuries.

Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	81 (40%)
Pedalcycle	30 (15%)
Pedestrian	23 (11%)
Fixed Object	18 (9%)
Ditch / Embankment	13 (6%)
Other / Unknown	39 (19%)

- Alcohol or drugs were involved in 24% (228) of these severe injuries and 23% (182) of these severe crashes.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	8 (1%)	24 (3%)	31 (3%)	7 (1%)	70 (7%)
3:00-5:59 AM	8 (1%)	19 (2%)	13 (1%)	3 (0%)	43 (5%)
6:00-8:59 AM	23 (2%)	28 (3%)	51 (5%)	25 (3%)	127 (13%)
9:00-11:59 AM	18 (2%)	35 (4%)	17 (2%)	20 (2%)	90 (9%)
12:00-2:59 PM	28 (3%)	73 (8%)	40 (4%)	44 (5%)	185 (19%)
3:00-5:59 PM	48 (5%)	66 (7%)	50 (5%)	35 (4%)	199 (21%)
6:00-8:59 PM	31 (3%)	34 (4%)	51 (5%)	24 (3%)	140 (15%)
9:00-11:59 PM	18 (2%)	37 (4%)	35 (4%)	9 (1%)	99 (10%)
Total	182 (19%)	316 (33%)	288 (30%)	167 (18%)	953 (100%)

- Across all seasons, nighttime (6:00 PM - 2:59 AM) account for 45% (724) of these severe injuries.
- Most of these severe injuries occurred under Dry (80%), Daylight (62%) conditions.

Surface Condition	
Dry	764 (80%)
Snow/Ice	100 (10%)
Wet	81 (8%)
Dirt/Gravel	8 (1%)
Other	0 (0%)

Lighting Condition	
Daylight	592 (62%)
Dark (Not Lighted)	170 (18%)
Dark (Lighted)	114 (12%)
Dawn/Dusk	75 (8%)
Unknown	2 (0%)

Prepared by CH2M HILL, Inc.

Alcohol or Drug Related
North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Alcohol or Drugs

March 27, 2018

On North Dakota roadways, there were 886 severe crashes resulting in 1091 severe injuries between 2012 and 2016 in which the crash involved alcohol or drugs. This is an average of 218 severe injuries per year and accounted for nearly 33% of all severe injuries during the five year period.

Driver Demographics

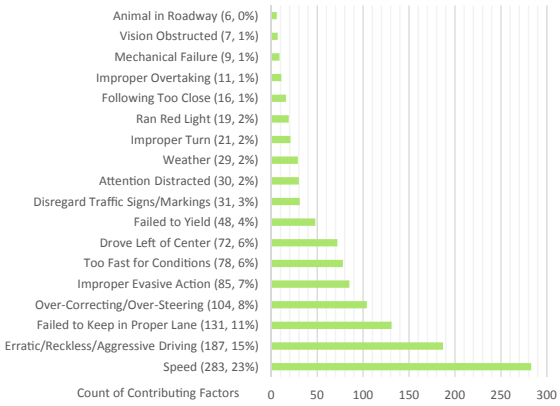
- A total of 1209 drivers were involved in these 886 crashes, of which 903 drivers had been using drugs or alcohol.

Age	Female	Male	Total
≤19	25 (3%)	45 (5%)	70 (8%)
20-29	55 (6%)	271 (30%)	326 (36%)
30-39	34 (4%)	167 (18%)	201 (22%)
40-49	25 (3%)	124 (14%)	150 (17%)
50-59	18 (2%)	100 (11%)	119 (13%)
≥60	5 (1%)	32 (4%)	37 (4%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 1167 contributing factors in these crashes, among which Speed appears most often.

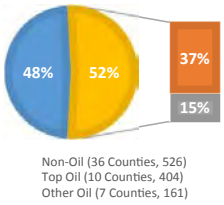


Location

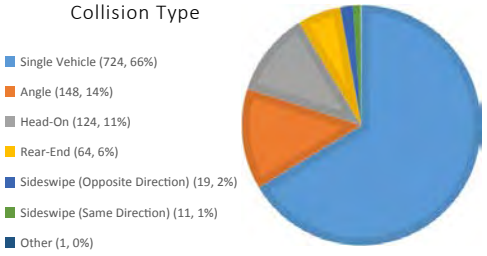
- The setting of these severe injuries is primarily Rural (82%) and a majority occurred on the Local (56%) system.

	Rural	Urban	Total
State	455 (42%)	26 (2%)	481 (44%)
Local	438 (40%)	172 (16%)	610 (56%)
Total	893 (82%)	198 (18%)	1091 (100%)

- The majority of these severe injuries occur in Oil Counties (52%).
- The top 5 counties represent 45% of these severe injuries: Williams (13%), McKenzie (11%), Ward (8%), Cass (7%), and Burleigh (6%).



Crash Details



Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	376 (61%)
Fixed Object	64 (10%)
Pedestrian	41 (7%)
Ditch / Embankment	27 (4%)
Parked Motor Vehicle	21 (3%)
Other / Unknown	88 (14%)

- Of these severe injuries, 51% involved speeding or aggressive driving, 63% involved an unbelted occupant, and 56% involved single-vehicle lane departure.
- 21% (228) of these severe injuries, occuring among 21% (182) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	59 (5%)	92 (8%)	90 (8%)	32 (3%)	273 (25%)
3:00-5:59 AM	22 (2%)	39 (4%)	19 (2%)	15 (1%)	95 (9%)
6:00-8:59 AM	18 (2%)	15 (1%)	16 (1%)	10 (1%)	59 (5%)
9:00-11:59 AM	5 (0%)	13 (1%)	5 (0%)	9 (1%)	32 (3%)
12:00-2:59 PM	15 (1%)	10 (1%)	22 (2%)	9 (1%)	56 (5%)
3:00-5:59 PM	33 (3%)	43 (4%)	34 (3%)	20 (2%)	130 (12%)
6:00-8:59 PM	45 (4%)	64 (6%)	58 (5%)	35 (3%)	202 (19%)
9:00-11:59 PM	43 (4%)	98 (9%)	79 (7%)	24 (2%)	244 (22%)
Total	240 (22%)	374 (34%)	323 (30%)	154 (14%)	1091 (100%)

- Across all seasons, nighttime (6:00 PM - 2:59 AM) accounts for 66% (719) of these severe injuries.
- Most occurred under Dry (82%), Dark (Not Lighted) (46%) conditions.

Surface Condition	
Dry	893 (82%)
Snow/Ice	90 (8%)
Wet	85 (8%)
Dirt/Gravel	17 (2%)
Other	6 (1%)

Lighting Condition	
Dark (Not Lighted)	502 (46%)
Daylight	351 (32%)
Dark (Lighted)	149 (14%)
Dawn/Dusk	83 (8%)
Unknown	6 (1%)

Prepared by CH2M HILL, Inc.

Unbelted Occupants

North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Unbelted Occupants

March 27, 2018

On North Dakota roadways, there were 1264 severe crashes resulting in 1599 severe injuries between 2012 and 2016 in which the crash involved an unbelted or improperly belted occupant. This is an average of 320 severe injuries per year and accounted for nearly 49% of all severe injuries during the five year period.

Driver Demographics

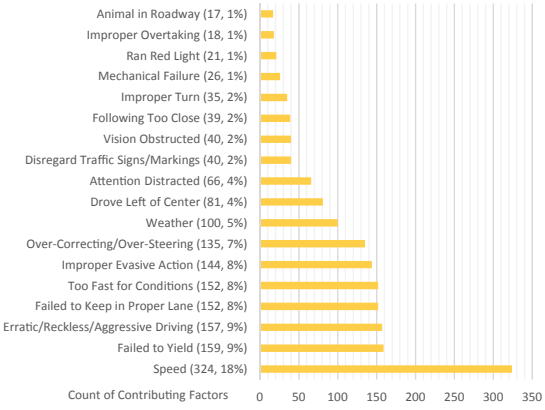
- A total of 1820 drivers were involved in these 1264 crashes, in which 1793 occupants were unbelted.

Age	Female	Male	Total
≤19	113 (6%)	184 (10%)	297 (17%)
20-29	125 (7%)	481 (27%)	606 (34%)
30-39	77 (4%)	265 (15%)	342 (19%)
40-49	43 (2%)	176 (10%)	220 (12%)
50-59	34 (2%)	153 (9%)	187 (10%)
≥60	27 (2%)	114 (6%)	141 (8%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 1706 contributing factors in these crashes, among which Speed appears most often.

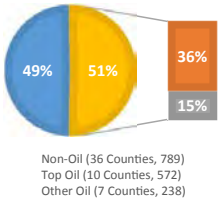


Location

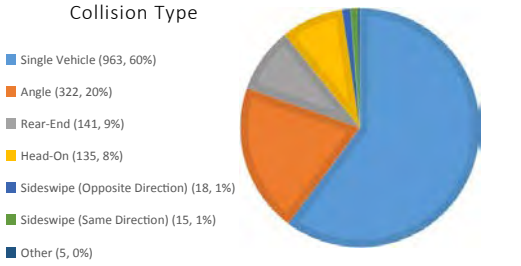
- The setting of these severe injuries is primarily Rural (84%) and a majority occurred on the Local (51%) system.

	Rural	Urban	Total
State	736 (46%)	47 (3%)	783 (49%)
Local	608 (38%)	208 (13%)	816 (51%)
Total	1344 (84%)	255 (16%)	1599 (100%)

- The majority of these severe injuries occur in Oil Counties (51%).
- The top 5 counties represent 41% of these severe injuries: Williams (12%), McKenzie (10%), Ward (7%), Burleigh (6%), and Cass (6%).



Crash Details



Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	514 (66%)
Fixed Object	66 (8%)
Ditch / Embankment	36 (5%)
Parked Motor Vehicle	26 (3%)
Pedestrian	12 (2%)
Other / Unknown	128 (16%)

- Of these severe injuries, 43% involved speeding or aggressive driving, 43% involved alcohol or drugs, and 52% involved single-vehicle lane departure.
- 25% (394) of these severe injuries, occuring among 25% (310) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	42 (3%)	63 (4%)	78 (5%)	20 (1%)	203 (13%)
3:00-5:59 AM	22 (1%)	31 (2%)	25 (2%)	11 (1%)	89 (6%)
6:00-8:59 AM	34 (2%)	42 (3%)	58 (4%)	46 (3%)	180 (11%)
9:00-11:59 AM	21 (1%)	41 (3%)	34 (2%)	42 (3%)	138 (9%)
12:00-2:59 PM	37 (2%)	72 (5%)	47 (3%)	30 (2%)	186 (12%)
3:00-5:59 PM	61 (4%)	98 (6%)	66 (4%)	57 (4%)	282 (18%)
6:00-8:59 PM	70 (4%)	84 (5%)	87 (5%)	51 (3%)	292 (18%)
9:00-11:59 PM	45 (3%)	89 (6%)	74 (5%)	21 (1%)	229 (14%)
Total	332 (21%)	520 (33%)	469 (29%)	278 (17%)	1599 (100%)

- Across all seasons, nighttime (6:00 PM - 2:59 AM) account for 45% (724) of these severe injuries.
- Most occurred under Dry (79%), Daylight (52%) conditions.

Surface Condition	
Dry	1260 (79%)
Snow/Ice	196 (12%)
Wet	107 (7%)
Dirt/Gravel	29 (2%)
Other	7 (0%)

Lighting Condition	
Daylight	828 (52%)
Dark (Not Lighted)	522 (33%)
Dark (Lighted)	126 (8%)
Dawn/Dusk	117 (7%)
Unknown	6 (0%)

Prepared by CH2M HILL, Inc.

Speeding or Aggressive Driving
North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Speeding or Aggressive Driving

March 27, 2018

On North Dakota roadways, there were 1071 severe crashes resulting in 1298 severe injuries between 2012 and 2016 in which the crash involved speeding or aggressive driving. This is an average of 260 severe injuries per year and accounted for nearly 39% of all severe injuries during the five year period.

Driver Demographics

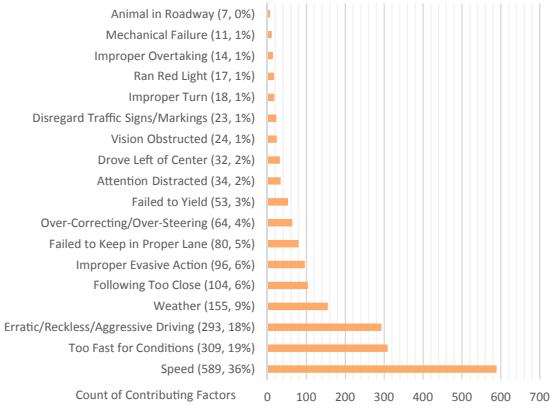
- A total of 1598 drivers were involved in these 1071 crashes, of which 1093 drivers had been driving aggressively.

Age	Female	Male	Total
≤19	57 (5%)	100 (9%)	157 (14%)
20-29	69 (6%)	321 (29%)	390 (36%)
30-39	35 (3%)	163 (15%)	199 (18%)
40-49	47 (4%)	130 (12%)	178 (16%)
50-59	16 (1%)	92 (8%)	109 (10%)
≥60	13 (1%)	47 (4%)	60 (5%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 1923 contributing factors in these crashes, among which Speed appears most often.

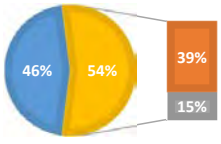


Location

- The setting of these severe injuries is primarily Rural (80%) and a majority occurred on the Local (53%) system.

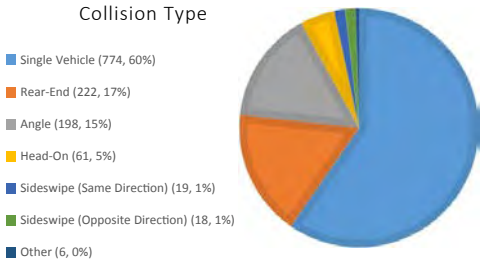
	Rural	Urban	Total
State	570 (44%)	41 (3%)	611 (47%)
Local	472 (36%)	215 (17%)	687 (53%)
Total	1042 (80%)	256 (20%)	1298 (100%)

- The majority of these severe injuries occur in Oil Counties (54%).
- The top 5 counties represent 45% of these severe injuries: Williams (12%), McKenzie (12%), Ward (9%), Cass (7%), and Burleigh (6%).



Non-Oil (36 Counties, 595)
Top Oil (10 Counties, 505)
Other Oil (7 Counties, 198)

Crash Details



Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	403 (61%)
Fixed Object	75 (11%)
Ditch / Embankment	32 (5%)
Parked Motor Vehicle	26 (4%)
Pedestrian	21 (3%)
Other / Unknown	102 (15%)

- Of these severe injuries, 43% involved alcohol or drugs, 53% involved an unbelted occupant, and 55% involved single-vehicle lane departure.
- 21% (270) of these severe injuries, occuring among 22% (231) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	36 (3%)	64 (5%)	61 (5%)	27 (2%)	188 (14%)
3:00-5:59 AM	20 (2%)	24 (2%)	29 (2%)	9 (1%)	82 (6%)
6:00-8:59 AM	30 (2%)	28 (2%)	38 (3%)	58 (4%)	154 (12%)
9:00-11:59 AM	20 (2%)	28 (2%)	22 (2%)	47 (4%)	117 (9%)
12:00-2:59 PM	36 (3%)	53 (4%)	41 (3%)	45 (3%)	175 (13%)
3:00-5:59 PM	45 (3%)	79 (6%)	37 (3%)	47 (4%)	208 (16%)
6:00-8:59 PM	49 (4%)	66 (5%)	56 (4%)	41 (3%)	212 (16%)
9:00-11:59 PM	33 (3%)	63 (5%)	46 (4%)	20 (2%)	162 (12%)
Total	269 (21%)	405 (31%)	330 (25%)	294 (23%)	1298 (100%)

- Summer afternoons and nights (12:00 PM - 2:59 AM) account for 25% (325) of these severe injuries.
- Most occurred under Dry (66%), Daylight (51%) conditions.

Surface Condition	
Dry	852 (66%)
Snow/Ice	324 (25%)
Wet	76 (6%)
Dirt/Gravel	37 (3%)
Other	9 (1%)

Lighting Condition	
Daylight	665 (51%)
Dark (Not Lighted)	401 (31%)
Dark (Lighted)	126 (10%)
Dawn/Dusk	101 (8%)
Unknown	5 (0%)

Prepared by CH2M HILL, Inc.

Young Drivers

North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Young Drivers

March 16, 2018

On North Dakota roadways, there were 480 severe crashes resulting in 601 severe injuries between 2012 and 2016 in which the crash involved a driver between the ages of 14 and 20. This is an average of 120 severe injuries per year and accounted for nearly 18% of all severe injuries during the five year period.

Driver Demographics

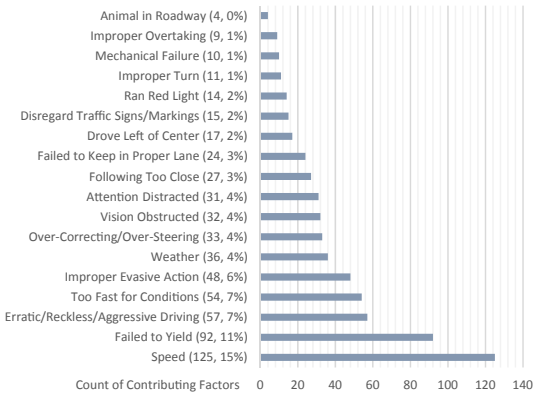
- A total of 803 drivers were involved in these 480 crashes, of which 516 were between the ages of 14 and 20.

Age	Female	Male	Total
14 or 15	38 (7%)	28 (5%)	66 (13%)
16 or 17	56 (11%)	73 (14%)	129 (25%)
18, 19 or 20	106 (21%)	215 (42%)	321 (62%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 639 contributing factors in these crashes, among which Speed appears most often.

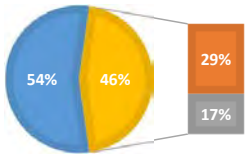


Location

- The setting of these severe injuries is primarily Rural (68%) and a majority occurred on the Local (64%) system.

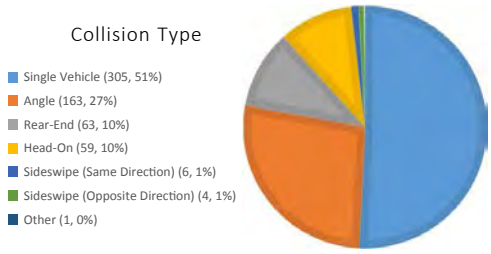
	Rural	Urban	Total
State	193 (32%)	26 (4%)	219 (36%)
Local	217 (36%)	165 (27%)	382 (64%)
Total	410 (68%)	191 (32%)	601 (100%)

- The majority of these severe injuries occur in Non-Oil Counties (55%).
- The top 5 counties represent 47% of these severe injuries: Cass (11%), Williams (11%), Ward (9%), Burleigh (8%), and McKenzie (7%).



Non-Oil (36 Counties, 328)
Top Oil (10 Counties, 173)
Other Oil (7 Counties, 100)

Crash Details



Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	130 (55%)
Pedestrian	33 (14%)
Fixed Object	26 (11%)
Parked Motor Vehicle	12 (5%)
Ditch / Embankment	9 (4%)
Other / Unknown	28 (12%)

- Alcohol or drugs were involved in 24% (144) of these severe injuries and 23% (109) of these severe crashes.
- 31% (186) of these severe injuries, occuring among 33% (158) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	8 (1%)	12 (2%)	19 (3%)	4 (1%)	43 (7%)
3:00-5:59 AM	9 (1%)	13 (2%)	11 (2%)	3 (0%)	36 (6%)
6:00-8:59 AM	8 (1%)	24 (4%)	26 (4%)	14 (2%)	72 (12%)
9:00-11:59 AM	9 (1%)	10 (2%)	14 (2%)	6 (1%)	39 (6%)
12:00-2:59 PM	18 (3%)	38 (6%)	16 (3%)	22 (4%)	94 (16%)
3:00-5:59 PM	31 (5%)	41 (7%)	23 (4%)	25 (4%)	120 (20%)
6:00-8:59 PM	33 (5%)	39 (6%)	40 (7%)	17 (3%)	129 (21%)
9:00-11:59 PM	17 (3%)	27 (4%)	9 (1%)	15 (2%)	68 (11%)
Total	133 (22%)	204 (34%)	158 (26%)	106 (18%)	601 (100%)

- Summer afternoon and evenings (12:00-11:59 PM) account for 24% (145) of these severe injuries.
- Most occurred under Dry (78%), Daylight (60%) conditions.

Surface Condition	
Dry	470 (78%)
Snow/Ice	71 (12%)
Wet	38 (6%)
Dirt/Gravel	16 (3%)
Other	6 (1%)

Lighting Condition	
Daylight	359 (60%)
Dark (Not Lighted)	144 (24%)
Dawn/Dusk	53 (9%)
Dark (Lighted)	44 (7%)
Unknown	1 (0%)

Prepared by CH2M HILL, Inc.

Older Drivers

North Dakota Strategic Highway Safety Plan Update

NDDOT North Dakota Department of Transportation

Severe (Fatal + Incapacitating) Injuries Involving Older Drivers

March 15, 2018

On North Dakota roadways, there were 317 severe crashes resulting in 381 severe injuries between 2012 and 2016 in which the crash involved a driver over the age of 64. This is an average of 76 severe injuries per year and accounted for nearly 12% of all severe injuries during the five year period.

Driver Demographics

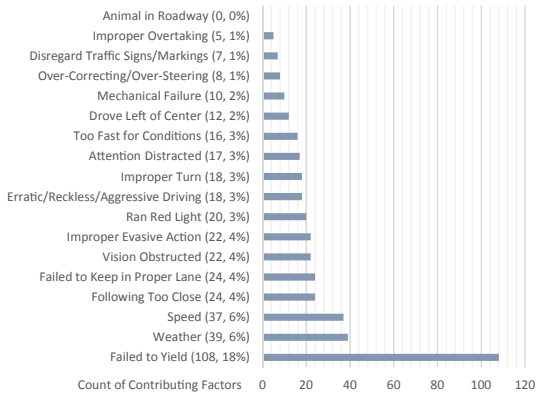
- A total of 616 drivers were involved in these 317 crashes, of which 340 were over the age of 64.

Age	Female	Male	Total
65-74	48 (14%)	154 (45%)	202 (59%)
75-84	40 (12%)	60 (18%)	100 (29%)
≥85	12 (4%)	26 (8%)	38 (11%)

Note: Totals may not sum to 100% due to drivers of unknown age and/or sex.

Contributing Factors

- Officers reported a total of 407 contributing factors in these crashes, among which Failed to Yield appears most often.

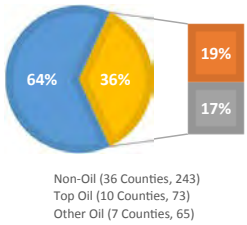


Location

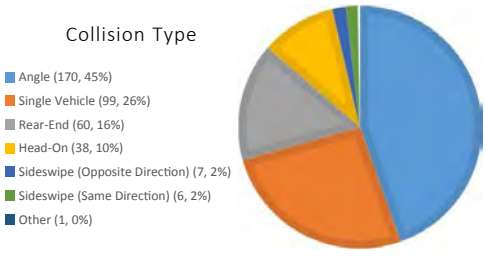
- The setting of these severe injuries is primarily Rural (69%) and a majority occurred on the State (53%) system.

	Rural	Urban	Total
State	182 (48%)	21 (6%)	203 (53%)
Local	80 (21%)	98 (26%)	178 (47%)
Total	262 (69%)	119 (31%)	381 (100%)

- The majority of these severe injuries occur in Non-Oil Counties (64%).
- The top 5 counties represent 43% of these severe injuries: Ward (10%), Burleigh (10%), Cass (10%), Williams (7%), and Grand Forks (6%).



Crash Details



Most Harmful Event for Single Vehicle Collision Type	
Overturn / Rollover	32 (36%)
Pedalcycle	14 (16%)
Fixed Object	14 (16%)
Pedestrian	5 (6%)
Parked Motor Vehicle	4 (4%)
Other / Unknown	21 (23%)

- Alcohol or drugs were involved in 8% (30) of these severe injuries and 9% (29) of these severe crashes.
- 48% (184) of these severe injuries, occuring among 49% (155) of these crashes, are intersection related.

Seasonal Factors

	Spring	Summer	Fall	Winter	Total
12:00-2:59 AM	4 (1%)	2 (1%)	1 (0%)	0 (0%)	7 (2%)
3:00-5:59 AM	4 (1%)	1 (0%)	1 (0%)	0 (0%)	6 (2%)
6:00-8:59 AM	5 (1%)	8 (2%)	16 (4%)	6 (2%)	35 (9%)
9:00-11:59 AM	12 (3%)	25 (7%)	7 (2%)	13 (3%)	57 (15%)
12:00-2:59 PM	29 (8%)	48 (13%)	22 (6%)	20 (5%)	119 (31%)
3:00-5:59 PM	24 (6%)	31 (8%)	25 (7%)	14 (4%)	94 (25%)
6:00-8:59 PM	11 (3%)	12 (3%)	12 (3%)	10 (3%)	45 (12%)
9:00-11:59 PM	2 (1%)	8 (2%)	7 (2%)	1 (0%)	18 (5%)
Total	91 (24%)	135 (35%)	91 (24%)	64 (17%)	381 (100%)

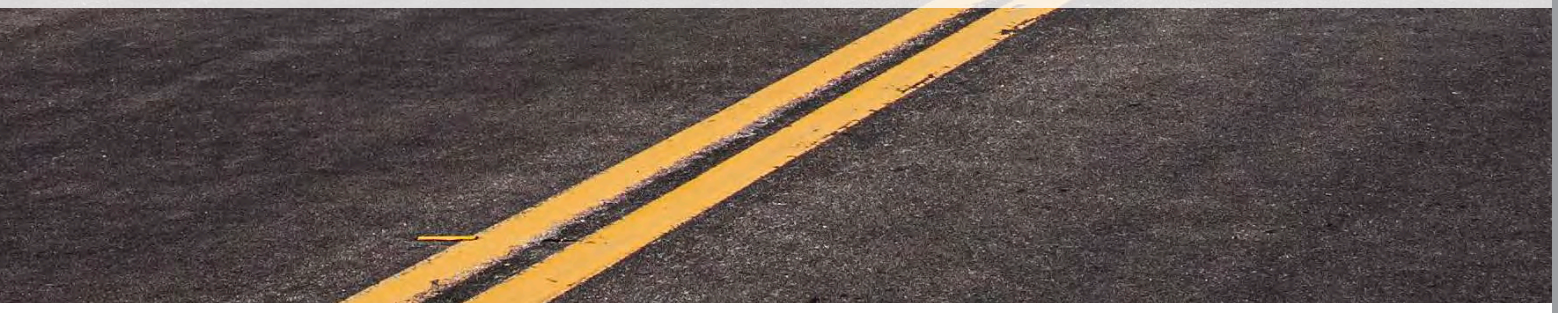
- Across all seasons, midday (9:00 AM - 5:59 PM) accounts for 71% (270) of these severe injuries.
- Most occurred under Dry (77%), Daylight (81%) conditions.

Surface Condition	
Dry	292 (77%)
Snow/Ice	53 (14%)
Wet	33 (9%)
Dirt/Gravel	3 (1%)
Other	0 (0%)

Lighting Condition	
Daylight	308 (81%)
Dark (Not Lighted)	38 (10%)
Dark (Lighted)	19 (5%)
Dawn/Dusk	16 (4%)
Unknown	0 (0%)

Prepared by CH2M HILL, Inc.

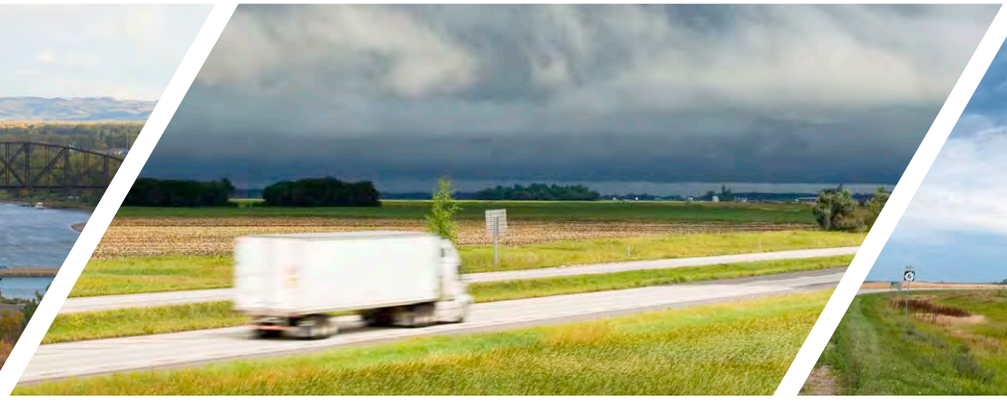
APPENDIX D
2012-2016 County Fatalities



APPENDIX D

2012-2016 COUNTY FATALITIES

County	Fatalities	County	Fatalities
Adams	2	McLean	19
Barnes	17	Mercer	8
Benson	15	Morton	24
Billings	4	Mountrail	29
Bottineau	9	Nelson	10
Bowman	3	Oliver	2
Burke	8	Pembina	7
Burleigh	29	Pierce	12
Cass	26	Ramsey	11
Cavalier	7	Ransom	6
Dickey	4	Renville	3
Divide	6	Richland	11
Dunn	16	Rolette	18
Eddy	3	Sargent	3
Emmons	6	Sheridan	1
Foster	0	Sioux	9
Golden Valley	3	Slope	4
Grand Forks	20	Stark	28
Grant	4	Steele	1
Griggs	3	Stutsman	28
Hettinger	1	Towner	3
Kidder	5	Traill	11
LaMoure	5	Walsh	12
Logan	0	Ward	52
McHenry	11	Wells	2
McIntosh	1	Williams	83
McKenzie	92		
		TOTAL	697



VISION ZERO

Zero fatalities. Zero excuses.