Developing a Local Road Safety Plan

April 9, 2017
Presented by:
Nicole Waldheim, Danena Gaines, and Hillary Isebrands
Goal of this Workshop

Familiarize county and local practitioners with different types of local road safety plans and action steps to develop a plan.
Workshop Objectives

- Explain the importance of transportation safety planning
- Describe different types of local road safety plans
- Describe the local road safety planning process
- Identify action steps to develop a local road safety plan
Introductions

- Name
- Agency/Organization
- A unique or pressing safety issue on your local roads
Hillary Isebrands
Federal Highway Administration

Nicole Waldheim
Cambridge Systematics, Inc.

Danena Gaines
Cambridge Systematics, Inc.
Safety Center Vision and Mission

Vision
The National Center for Rural Road Safety is a **nationally recognized center** that **empowers** rural road owners with customized and innovative road safety practices to save lives.

Mission
The National Center for Rural Road Safety provides **coordinated, multidisciplinary, scalable, and accessible safety resources** in order to **empower** rural road users to accelerate road safety improvements and save lives.
Center Team Members

Local Technical Assistance Programs (LTAP) in Iowa, Louisiana, Montana, and New Jersey
Housekeeping

- Restrooms
- Break facilities
- Emergency procedures
- Ground rules
Local Road Safety Planning Overview

Understand the context for local road safety and importance of developing a plan for your jurisdiction
The Local Safety Context

- A local road is defined as any roadway maintained by a local agency (i.e. county, city, Tribal government)

- Approximately 76% of all road miles in the U.S. are owned and maintained by local entities

- Common types of safety issues on local roads
  - Access management
  - Changing traffic patterns due to growth
  - Improper sight distance
  - Improper signage
The Rural Safety Context

• 72% of rural roads are owned by local entities and contribute approximately 54% of all fatal crashes

• 19 percent of the United States population lives in rural areas, but rural fatalities account for 51 percent of all fatalities (2014)

• 16,710 out of 32,675 traffic fatalities occurred in rural areas (2014)

• Traffic crashes increased in 2015 and 2016
  » Inexpensive gas, distracted driving, and speeding

Importance of Incorporating Safety into the Planning Process

- **Address severe crashes** on public roads in nonmetropolitan areas
- **Use low cost countermeasures** to address high-risk roadway features at multiple locations
- Help the State and your local agency **meet fatality and serious injury targets** for all public roads
- Consider safety within the context of **all transportation projects** to make the future system safer
- **Save Lives!**
Opportunities to Engage in Safety
What is a Local Road Safety Plan?

- Coordinated by county or city engineers and planners
- Provides a comprehensive framework to reduce fatalities and serious injuries on the local system
- Utilizes the 4 Es
## Benefits of a Local Road Safety Plan?

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proactive Approach</strong></td>
<td>Shows the public and policy makers that something is being done</td>
</tr>
<tr>
<td><strong>Develop Partnerships</strong></td>
<td>Opportunity to improve relationships with the public, stakeholders, and other agencies</td>
</tr>
<tr>
<td><strong>Multidisciplinary Cooperation</strong></td>
<td>Agencies are better able to develop effective solutions with a 4-E approach</td>
</tr>
<tr>
<td><strong>Safer Roadways</strong></td>
<td>Comprehensive approach can lead to projects that reduce severe crashes</td>
</tr>
<tr>
<td><strong>Safety Funding</strong></td>
<td>Prioritized list of improvements can help agencies better justify funding requests</td>
</tr>
<tr>
<td><strong>Managing Liability</strong></td>
<td>Proactive risk management technique demonstrating an agency’s responsiveness</td>
</tr>
</tbody>
</table>
Approaches to Develop Local Road Safety Plans

- Establish Leadership
- Analyze Safety Data
- Determine Emphasis Areas
- Identify Strategies
- Prioritize and Incorporate Strategies
- Evaluate and Update the LRSP

- Compile Data
- Network Screening
- Select Sites for Investigation
- Diagnose Site Crash Conditions and Identify Countermeasures
- Prioritize Countermeasures for Implementation
- Implement Countermeasures
- Evaluate Effectiveness

Developing Safety Plans
A Manual for Local Rural Road Owners

Improving Safety on Rural Local and Tribal Roads
Safety Toolkit

August 2014
Opportunities to Fund Local Road Safety Plans?

- State DOT funded
  - Highway Safety Improvement Program (HSIP)
  - State Planning Funds

- Other Methods?
Core Safety Plans and Programs

Strategic Highway Safety Plan (SHSP)
- Updated every five years
- Infrastructure and behavioral countermeasures
- SHSP process approved by FHWA
- Requirement of HSIP

Highway Safety Improvement Program (HSIP)
- Report submitted annually
- Infrastructure improvements
- FHWA approved

Highway Safety Plan (HSP)
- Plan submitted annually
- Behavioral programs
- NHTSA approved
Transportation Plans

• Long-Range Transportation Plan (LRTP)
  » Safety performance measures

• Transportation Improvement Program (TIP)

• Comprehensive Transportation Plans

• Other Transportation Plans
  » Bicycle/Pedestrian
  » Corridor
  » Freight/Goods Movement
How do these programs relate to a local road safety plan?

• Help meet the national performance goal
  » Reduction in fatalities and serious injuries

• Show support for the SHSP

• Position your agency to apply for HSIP funding

• Contribute to regional transportation safety goal

• Help identify programs and partners to address behavioral safety
Types of Local Road Safety Plans—Case Studies

*Identify the different approaches to develop a local road safety plan*
Local Safety Plans Come in All Shapes and Sizes
Emphasis Areas
• Inattentive/distracted driving crashes
• Seat belt/occupant protection use
• Bicycle and pedestrian crashes
Central Arizona Governments Strategic Transportation Safety Plan

- Vision
- Goals
- Emphasis Areas
- Performance Measures and Targets
- Safety Project Identification—Network Analysis
- Field Investigations
- Tracking and Ongoing Coordination

Example 2
North Dakota County Safety Plans

Example 3

- Emphasis Areas
- Crash Factors
- Systemic Safety Analysis
- Priority Safety Strategies
- Infrastructure Safety Projects
- Behavioral Safety Strategies
Testimonials

1. What was the impetus for your local road safety plan?

2. How did you fund the plan, how much was it, and did you use internal or consultant resources to complete it?

3. What type of planning process did you use to develop the plan?

4. How have you used or plan to use the completed plan to address/improve safety?
Local Road Safety Planning Process

*Explain the different elements necessary to develop a local road safety plan*
Local Road Safety Plan
Process Elements

- Champion
- Multidisciplinary Collaboration
- Vision
- Safety Data
- Goals, Objectives, and Policies
- Crash Analysis
- Problem Identification and Countermeasures
- Performance Measures and Targets
Workbook Activity

Key Questions

Potential Challenges

Potential Action Items
Champion

“An individual who inspires others to take action”

• Assist in gathering all critical safety partners into a collaborative group

• Help secure the necessary leadership, resources, visibility, support, and commitment of all partners

• Must be credible and accountable, have excellent interpersonal and organizational skills, and be a skilled expediter
Multidisciplinary Collaboration

Approaches

- Discuss safety with established transportation committees
- Create a safety committee or engage safety stakeholders for plan development or an update
- Form a safety committee or participate in existing committees
- Engage in SHSP and HSIP
Multidisciplinary Collaboration

The 4 Es

- Engineers
- Enforcement
- Education
- Emergency Response

- Shelby-Toole County Community Transportation Safety Plan
  Transportation Safety Advisory Committee (TSAC)
  » Montana Highway Patrol
  » Mayors
  » Public Schools
  » Council on Aging
  » Local Sheriff’s Offices
  » Medical Center
### Participate on Other Safety Committees

<table>
<thead>
<tr>
<th>Type of Plan</th>
<th>How It Can Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Strategic Highway Safety Plan</td>
<td>• Understanding of a safety planning process</td>
</tr>
<tr>
<td>» Five-year plan, identifying strategies and actions to address most pressing infrastructure and behavioral needs</td>
<td>• Access to/understanding of crash data and analysis</td>
</tr>
<tr>
<td>• Highway Safety Plan</td>
<td>• Connection to safety stakeholders</td>
</tr>
<tr>
<td>» Annual plan, identifying programs and projects to address behavioral needs</td>
<td>• Insights into safety emphasis areas and proven strategies</td>
</tr>
<tr>
<td></td>
<td>• Understanding of HSIP funding and prioritization process</td>
</tr>
</tbody>
</table>
Vision Statements

What is a Vision?

• Big-picture idea of what you want to achieve
• Typically consists of general statements describing the desired end-state
• Should include statements about the importance of safety
Example Vision Statements

North Dakota SHSP
Zero Fatalities

Cheyenne MPO
Reduce fatal and injury crashes involving all roadway users through implementation of effective countermeasures

Hamilton County, AZ
Preserve and enhance the quality of life by improving transportation safety for all users
Creating a Vision

- How does your vision relate to the statewide SHSP vision?
- Relationship to the 4 Es?
  - How does the your vision relate to Engineering?
  - How does the your vision relate to EMS?
  - How does the your vision relate to Enforcement?
  - How does the your vision relate to Education?
- Are there other key relationships to your safety vision?
Safety Data

Getting Started

Questions to Ask

• Who manages the statewide crash database?

• What data are available and in what format?

• What data do I need?

• How do I obtain access to data?

How to Obtain the Data

• Set up a meeting with the owner of State crash database

• Attend a SHSP or TRCC meeting to learn more about available data

• Invite a State DOT crash analyst to a committee meeting

• Ask for training or assistance if necessary
Common Types of Traffic Safety Data

Datasets addressed in detail in this guidebook

Other safety datasets that are not addressed in detail in this guidebook

Source: Adapted from FHWA Applying Safety Data and Analysis to Performance-Based Transportation Planning, November 2015.
Crash Data

- For each crash that meets a minimum injury or property damage reporting threshold, a large set of information is collected and entered into a State database.
- Where, why, what, and how fatalities and serious injuries are occurring.
- Fatal and suspected serious injuries (Ks and As).

Model Minimum Uniform Crash Criteria (MMUCC)—Guidance on Data Points to Collect at a Crash Scene (Crash, Vehicles or Units Involved, People Involved)
Crash Data Process

Data Standards
*MMUCC*

Crash Scene
*Crash Report*

Data Storage
*State Database*

Crash Data Access
*DOT or Data Owner*

Analysis and Mapping

Countermeasure Development

Implementation

Evaluation

Implementation → Evaluation

Evaluation → Crash Data Access

Crash Data Access → Crash Scene

Crash Scene → Data Storage
Roadway Data

• Physical attribute and condition of the roadway network

• Associate crashes with road features to tell more of the crash story
  » Risk factors, performance of different facility types

Model Inventory of Roadway Elements (MIRE)
Functional class, surface type, shoulders, medians
Traffic Volume

• All States are required to collect and submit traffic count data to understand traffic volume

• Ability to understand safety risks based on the amount of vehicle travel—vehicle miles traveled (VMT)

FHWA’s Highway Performance Monitoring System (HPMS)
Other Data

- **Driver and Passenger**—information on drivers and passengers
- **Citation/Adjudication**—arrest and conviction records
- **Injury**—emergency department data, discharge data, trauma registry
- **Vehicle**—vehicle technologies, types of vehicles, other vehicles (CMV)
- **Qualitative**—results of public opinion surveys and public involvement
Learning More About Safety Data

• Explore Traffic Records Coordinating Committee activities
• Utilize Online and In-Person Training and Education Tools
• Attend a safety meeting (Strategic Highway Safety Plan, emphasis area team, statewide summit)
• Meet with your DOT District/Division person or headquarters staff
• Meet with law enforcement in your community
Obtaining Safety Data

Primary Sources

- State crash/roadway database (raw data or custom inquiries)
- Fatality Analysis Reporting System (FARS) [Link]
- FHWA Safety Data program ([Link])
- Centers for Disease Control WISQARS Injury Database
- Transportation and safety planning documents (SHSP, HSP, HSIP, LRTP)
Goals and Objectives

• Federal input (planning factors, performance goals)
• Public or stakeholder input
• Adopt from other plans (SHSP or Regional Safety Plan)
• Use data analysis to identify goals and objectives
Use Public and Stakeholder Input

Goal
Improve Pedestrian Safety

Objective
Complete missing segments of sidewalks along major roads

Question 5
With regard to bicycle and pedestrian features, how important are the following to you?

<table>
<thead>
<tr>
<th>Feature</th>
<th>Not Important</th>
<th>Somewhat Important</th>
<th>Moderately Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>More off-road trails aimed at recreation</td>
<td>12.6%</td>
<td>24.6%</td>
<td>31.4%</td>
<td>31.9%</td>
</tr>
<tr>
<td>More off-road trails aimed at commuting</td>
<td>21.5%</td>
<td>22.0%</td>
<td>30.9%</td>
<td>26.2%</td>
</tr>
<tr>
<td>Better on-road accommodations for bicyclists</td>
<td>19.4%</td>
<td>20.4%</td>
<td>30.4%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Completing missing segments of sidewalks along major roads</td>
<td>8.9%</td>
<td>21.1%</td>
<td>21.6%</td>
<td>48.4%</td>
</tr>
<tr>
<td>Improving crosswalk safety on major roads</td>
<td>3.7%</td>
<td>18.5%</td>
<td>31.7%</td>
<td>46.0%</td>
</tr>
</tbody>
</table>
Using Information from Other Plans to Set Goals and Objectives

- Review data

- Adopt applicable SHSP goals
  » Improve intersection safety

- Adopt applicable SHSP strategies
  » Systematically implement low-cost improvements at stop controlled intersections (examples include signing, pavement markings, delineation, improving sight distance)

Using Safety Analysis to Set Goals and Objectives

**Goal**
Reduce fatalities and major injuries that result from motor vehicle crashes

**Objectives**
Implement findings from road-safety audits at the top intersections or road segments with high numbers of rear-end crashes; implement rear-end crash reduction strategies as identified by the DOT.
Using Available Data

Montana Community Safety Plans

Missoula Area Community Transportation Safety Plan Strategies

**Intersection Crashes**
1. Improve safety at intersections with an above average number of crashes, fatalities and serious injuries through appropriate infrastructure improvements (signing, pavement markings, roadway, lighting, etc.) based on best practices.
2. Conduct education campaign on safe driving practices with a focus on intersection safety.
3. Improve pedestrian crossings and increase pavement markings for pedestrians at high-volume roadway intersections as warranted.

**Safety Belts/Occupant Protection Use**
1. Conduct outreach and education to educate groups with higher rates of non-use of safety belts on the importance of safety belt use.
2. Support enactment of stronger occupant protection laws at the state level and pursue a local primary safety belt ordinance.
3. Increase the number of child passenger safety technicians so the number of inspections can be increased.
4. Promote awareness and increase enforcement of the current safety belt law.

**Impaired Driving Crashes**
1. Conduct outreach to change the culture in Montana to one that does not accept impaired driving as acceptable behavior.
2. Strengthen impaired driving laws and local ordinances.
3. Increase and promote enforcement of impaired driving laws in the Missoula area.
Data Analysis

Getting Started

• What types of safety analysis methods can be utilized to inform transportation safety plans and projects?

• What do the different types of analyses tell me?
## Common Types of Data Analysis

<table>
<thead>
<tr>
<th>Analysis Category</th>
<th>Analysis Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benchmarking</strong></td>
<td>• How many fatalities and serious injuries are occurring in my area?</td>
</tr>
<tr>
<td></td>
<td>• How does this compare to other areas or my State?</td>
</tr>
<tr>
<td><strong>Identify Crash Trends and Contributing Factors</strong></td>
<td>• Who is involved in crashes?</td>
</tr>
<tr>
<td></td>
<td>• When are the crashes occurring?</td>
</tr>
<tr>
<td></td>
<td>• What are the major contributing factors to crashes?</td>
</tr>
<tr>
<td><strong>Identify and Evaluate Focus Crash Types</strong></td>
<td>• What are the most common crash types?</td>
</tr>
<tr>
<td></td>
<td>• What are the most common contributing factors?</td>
</tr>
<tr>
<td></td>
<td>• What are the characteristics of the over representation?</td>
</tr>
<tr>
<td><strong>Network Screening—Identify Sites for Safety Improvement</strong></td>
<td>• What locations (intersections or segments) show the most potential for safety improvements?</td>
</tr>
<tr>
<td><strong>Systemic Analysis—Identify Safety Risk Factors</strong></td>
<td>• What are the common characteristics of locations with crashes?</td>
</tr>
<tr>
<td></td>
<td>• What are the countermeasures to address these characteristics?</td>
</tr>
<tr>
<td></td>
<td>• How should we prioritize systemwide implementation?</td>
</tr>
<tr>
<td><strong>Corridor and Intersection Planning Safety Analysis</strong></td>
<td>• What are the safety effects of alternative roadway or intersection cross sections?</td>
</tr>
</tbody>
</table>
Benchmarking

• Provides a baseline understanding of the scope and scale of safety concerns in a planning area and compared to other areas

• Tracks transportation safety performance over the years
  » Number of fatalities
  » Number of serious injuries
  » Fatality and serious injury rates
  » Bicycle and pedestrian combined fatalities
  » Others (number of roadway departures)
Benchmarking Data

• Minimum Data Needed
  » Total crashes
  » Total fatalities and serious injuries
  » Geographic boundaries

• Optional Data
  » Vehicle miles traveled
  » Crash, fatality, serious injury data by emphasis area
  » High-level roadway data (roadway ownership, functional classification)
### Benchmarking Analysis

#### Crash Severity

<table>
<thead>
<tr>
<th>Jurisdictions</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Total</th>
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<td>0</td>
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<td>2</td>
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<td>1</td>
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<td>0</td>
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<td>2</td>
<td>3</td>
<td>2</td>
<td>30</td>
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<td>3</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<td>Other Areas</td>
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<td>23</td>
<td>30</td>
<td>30</td>
<td>21</td>
<td>14</td>
<td>18</td>
<td>20</td>
<td>13</td>
<td>174</td>
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<tr>
<td>Total Fatalities</td>
<td>20</td>
<td>30</td>
<td>36</td>
<td>26</td>
<td>19</td>
<td>24</td>
<td>27</td>
<td>20</td>
<td>29</td>
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#### Crash Severity Breakdown

<table>
<thead>
<tr>
<th>Year</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>(K) Total</td>
<td>27</td>
<td>32</td>
<td>31</td>
<td>25</td>
<td>24</td>
<td>18</td>
<td>22</td>
<td>23</td>
<td>26</td>
<td>228</td>
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<tr>
<td>(A) Serious Injury</td>
<td>85</td>
<td>85</td>
<td>104</td>
<td>105</td>
<td>93</td>
<td>49</td>
<td>50</td>
<td>58</td>
<td>65</td>
<td>699</td>
</tr>
<tr>
<td>(B) Non-Incapacitating</td>
<td>168</td>
<td>219</td>
<td>206</td>
<td>175</td>
<td>154</td>
<td>141</td>
<td>153</td>
<td>133</td>
<td>123</td>
<td>1,452</td>
</tr>
<tr>
<td>(C) Possible Injury</td>
<td>147</td>
<td>145</td>
<td>161</td>
<td>178</td>
<td>100</td>
<td>111</td>
<td>114</td>
<td>100</td>
<td>99</td>
<td>1,156</td>
</tr>
<tr>
<td>(D) Property Damage Only</td>
<td>863</td>
<td>879</td>
<td>1,041</td>
<td>726</td>
<td>658</td>
<td>695</td>
<td>639</td>
<td>712</td>
<td>7,065</td>
<td></td>
</tr>
</tbody>
</table>

#### Total Crash Count

- Total Crash Count: 1,314
- Total Property Damage Only: 7,065
- Total Percent Change: 4% to 13%, -12% to -19%, -11% to 6%, -8% to 7%, -22%

#### Total Crashes

- 68% Rural
- 32% Urban

#### Serious Injuries

- 81% Rural
- 19% Urban

#### Fatalities

- 93% Rural
- 7% Urban
Applying Benchmarking Analysis to Plans

• Helps “sell” safety as a priority—this is an area **WE NEED** to address in our transportation plans—just look at the numbers!

• Establish or reinforce a towards zero deaths vision

• Develop high-level transportation safety goals or objectives
  » Reduce fatalities and serious injuries in the planning region
  » Focus safety programs and resources on rural roads

• Establish baseline conditions for performance management
Application Examples

Look at these fatal crash numbers! We have to do something!

Fatalities

<table>
<thead>
<tr>
<th>Year</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>162</td>
</tr>
<tr>
<td>2011</td>
<td>185</td>
</tr>
<tr>
<td>2012</td>
<td>184</td>
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<td>2013</td>
<td>141</td>
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<tr>
<td>2014</td>
<td>135</td>
</tr>
</tbody>
</table>

Goal
Reduce transportation-related fatalities and serious injuries on rural roads
### Contributing Factors

**Analysis Areas**

- Who is involved in a crash (age and gender)
- What is involved in a crash (number and type of vehicle)
- When the crash occurred (year, month, date, hour)
- Where the crash occurred (segment, intersection, transportation analysis zone, other)
- Why a crash occurs (behavioral and infrastructure factors)

**What it Does**

- Provides high-level information on crash characteristics
- Identifies areas of concern
- Establishes emphasis areas
Contributing Factor Data

- Minimum Data Needed
  - Person data (age and gender)
  - Motor vehicle make, type, and total occupants
  - Crash incidence data (time of day, month, weather, lighting, roadway conditions etc.)
  - Contributing factors (age, impairment, seatbelt usage, speed, etc.)
  - Crash location
  - Crash severity (fatality, serious injury, property damage only)
## Contributing Factor Analysis

### Fatalities vs. Serious Injuries

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Fatalities</th>
<th>Serious Injuries</th>
<th>Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CAG Total</strong></td>
<td>124</td>
<td>454</td>
<td>578</td>
</tr>
<tr>
<td><strong>Geographic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>2</td>
<td>7.2%</td>
<td>18.4%</td>
</tr>
<tr>
<td>Rural</td>
<td>212</td>
<td>97.8%</td>
<td>80.6%</td>
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<tr>
<td>State Highway</td>
<td>27</td>
<td>21.8%</td>
<td>18.6%</td>
</tr>
<tr>
<td>Tribal Road</td>
<td>57</td>
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</tr>
<tr>
<td>Intersection Related</td>
<td>12</td>
<td>9.7%</td>
<td>17.8%</td>
</tr>
<tr>
<td>Lane Departure</td>
<td>201</td>
<td>81.5%</td>
<td>65.4%</td>
</tr>
<tr>
<td>Work Zone</td>
<td>6</td>
<td>0.2%</td>
<td>1.3%</td>
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<tr>
<td><strong>Demographics</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Young Driver (16-24)</td>
<td>26</td>
<td>21.0%</td>
<td>31.3%</td>
</tr>
<tr>
<td>Us and Older</td>
<td>22</td>
<td>17.7%</td>
<td>19.8%</td>
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<tr>
<td>Pedestrian Involved</td>
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<td>0.0%</td>
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<td><strong>Behavior</strong></td>
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<tr>
<td>Alcoived Involved</td>
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<td>Distracted Driver</td>
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<td>No Restraint Used</td>
<td>64</td>
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<tr>
<td>Sleepy or Fatigued</td>
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<tr>
<td>Speeding Involved</td>
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<tr>
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<tr>
<td>Wildlife/Animal Involved</td>
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<tr>
<td>Wet Weather</td>
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<td>Dusk/Dawn</td>
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### Graphical Representation

- **Fatalities**
- **Serious Injuries**

### Data Table

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Applying Contributing Factor Analysis to Plans

• Specific areas of safety focus to prioritize solutions
  » What should/can we address? Where can we find partners?

• Specific transportation safety goals or objectives
  » Reduce speed-related fatalities and serious injuries
  » Address wet weather-related fatalities and serious injuries

• Specific performance measures
  » Number of speed fatalities
  » Number of wet weather fatalities

• Identify locations (corridors, segments, intersections) in need of further safety analysis
Using Contributing Factor Analysis to Select Emphasis Areas

Potential Safety Emphasis Areas—Fatal and Incapacitating Injury Crashes in Bozeman

- Run-Off-The-Road
- Alcohol/Drug-Related
- Young Driver Involved
- Older Driver Involved
- Large Truck Involved
- Motorcycle Involved
- Intersection/Intersection-Related
- Pedestrian Involved
- Bicycle Involved
- Asleep/Fainted/etc. Related
- Speed-Related
- Animal Related
- Inattentive Driving Related
- Train Involved
- Unbelted Passengers*
- Native American (Fatalities Only)*

Crashes

- 2007-2011
- 2002-2006

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Network Screening

• Identifies sites (intersections, segments) that would benefit from safety improvements
  » Identify sites (crash frequency, crash rate, EPDO)
  » Prioritize sites
  » Field investigations and recommended countermeasures
Network Screening Data

Minimum data

- Crash frequency
- Crash location

Minimum data

- Crash severity
- Traffic volume data
- Roadway characteristic data
### Network Screening Analysis

#### 55 Candidate Intersections

**Crash Frequency**
The average number of crashes at a given intersection

**Equivalent Property Damage Only**
EPDO measure is calculated by applying a weighting factor to each crash according to its severity, and then summing the weighted crash frequency

**Crash Rate**
The number of crashes that occur at a given intersection during a certain time period in relation to exposure (the number of vehicles entering the intersection)

<table>
<thead>
<tr>
<th>Final Rank</th>
<th>Intersection</th>
<th>Traffic Control</th>
<th>Frequency Rank</th>
<th>EPDO Rank</th>
<th>Crash Rate Rank</th>
<th>Composite Score</th>
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<td>2</td>
<td>5</td>
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<td>4</td>
<td>SR 260 at Valley Road at Highline Drive</td>
<td>Stop Sign</td>
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<td>7</td>
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<td>5</td>
<td>Broad Street at Oak Street</td>
<td>Stop Sign</td>
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<td>16</td>
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<td>Stop Sign</td>
<td>14</td>
<td>3</td>
<td>24</td>
<td>41</td>
</tr>
</tbody>
</table>
Applying Network Screening to Plans

• Specific transportation safety goals or objectives
  » Address segments with the most potential for safety improvements

• Specific performance measures
  » Reductions crashes on identified segments

• Incorporate locations eligible for safety improvements into decision-making process for all transportation projects

• Plan for road safety audits or field investigations at sites to identify countermeasures
Application Example

Do you have a transportation project programmed here? Can safety improvements be considered?

Engage in road safety audits in your regions.
Project Identification and Countermeasures

<table>
<thead>
<tr>
<th>Project Identification Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Network Screening</td>
</tr>
<tr>
<td>• Road Safety Audits</td>
</tr>
<tr>
<td>• Systemic Analysis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Countermeasure Selection Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Systemic Analysis</td>
</tr>
<tr>
<td>• HSIP priorities</td>
</tr>
<tr>
<td>• FHWA Proven Countermeasures</td>
</tr>
<tr>
<td>• NCHRP Report 500 series</td>
</tr>
</tbody>
</table>
Process to Identify Safety Projects

• Conduct crash analysis

• Review HSIP application to understand eligibility criteria

• Coordinate with DOT and/or local partners on site or corridor analysis

• Conduct road safety audit or field investigation

• Recommend countermeasures
# ND Local Road Safety Plan

## Proposed Strategies, Countermeasures, Crash Reduction Factors, and Costs

<table>
<thead>
<tr>
<th>Rural Intersections</th>
<th>Estimated Effect</th>
<th>Estimated Cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roundabout</strong></td>
<td>20% to 50% all crashes/60% to 90% right-angle crashes</td>
<td>$4,200,000 per intersection</td>
</tr>
<tr>
<td><strong>Directional median</strong> (RCI or J-Turn)</td>
<td>17% all crashes/100% angle crashes</td>
<td>$1,080,000 per intersection</td>
</tr>
<tr>
<td><strong>Mainline dynamic warning sign</strong></td>
<td>50% all crashes/75% serious right-angle crashes</td>
<td>$60,000 per intersection</td>
</tr>
<tr>
<td><strong>Close median</strong></td>
<td></td>
<td>$30,000 per intersection</td>
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<tr>
<td><strong>Intersection lighting</strong></td>
<td>25% to 40% nighttime crashes</td>
<td>$10,200 per streetlight</td>
</tr>
<tr>
<td><strong>Upgrade signs and pavement markings</strong></td>
<td>40% upgrade of all signs and pavement markings/15% for STOP AHEAD pavement marking</td>
<td>$2,640 per approach</td>
</tr>
<tr>
<td><strong>Clear sight triangle</strong></td>
<td>37% serious injury crashes</td>
<td>$2,940 per intersection</td>
</tr>
</tbody>
</table>
Run-Off Road Countermeasures

**Lane Departure Crashes**

**Key Objectives**
Keep vehicles in their lane

**Key Strategies**
- Improved curve delineation
- Improved lane markings

**Key Objectives**
Improve shoulders

**Key Strategies**
- Safety edge
- Paved shoulders
- Shoulder rumble strips
FHWA Proven Safety Countermeasures

- Roundabouts
- Corridor Access Management
- Backplates with Retroreflective Borders
- Longitudinal Rumble Strips and Stripes on Two-Lane Roads
- Enhanced Delineation and Friction for Horizontal Curves
- Safety Edge℠ Medians and Pedestrian Crossing Islands in Urban and Suburban Areas
- Pedestrian Hybrid Beacon
- Road Diet

https://safety.fhwa.dot.gov/provencountermeasures/
Countermeasure Resources

- Crash Modification Factor (CMF) Clearinghouse
  http://www.cmfclearinghouse.org/

- FHWA Proven Countermeasures
  http://safety.fhwa.dot.gov/provencountermeasures/

- NCHRP 500 Series
  http://safety.transportation.org/guides.aspx

- NHTSA Countermeasures that Work

- Highway Safety Improvement Program (HSIP) Manual
  http://safety.fhwa.dot.gov/hsip/resources/fhwasa09029/
Performance Measures and Targets

- Should be included in any transportation planning document

- Provide a tracking mechanism and target for achieving safety vision, goal(s), and objective(s)

- Provide context for investment decision

Vision
Towards Zero Deaths

Goal
Reduce fatalities and serious injuries

Performance Measures
Number of fatalities
Number of serious injuries

Target
Reduce fatalities and serious injuries by 2% per year over the next five years

Strategies, Programs or Projects
Highway Safety Improvement Program
Transportation Improvement Program
Highway Safety Office Grants
Safety Performance Rule

- Defines five performance measures
  1. Number of fatalities
  2. Rate of fatalities per 100 million VMT
  3. Number of serious injuries
  4. Rate of serious injuries per 100 million VMT
  5. Number of nonmotorized fatalities and nonmotorized serious injuries

- Establishes a process to establish and report on targets

- Defines serious injuries

- Provides guidance to assess “significant progress”
Using Safety Analysis to Set/Track Performance Measures

<table>
<thead>
<tr>
<th>Performance Measures (Tracking Crash Data)</th>
<th>Targets (Evaluating Crash Results)</th>
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</thead>
<tbody>
<tr>
<td>Fatalities</td>
<td>Number of fatalities by x year</td>
</tr>
<tr>
<td>Serious Injuries</td>
<td>Number of serious injuries by x year</td>
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<tr>
<td>Fatality Rate</td>
<td>Rate by x year</td>
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<tr>
<td>Serious Injury Rate</td>
<td>Rate by x year</td>
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<tr>
<td>Bike and Pedestrian Fatalities and Serious Injuries</td>
<td>Number of fatalities and serious injuries by x year</td>
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Using Safety Analysis to Set/Track Performance Measures

<table>
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<tr>
<th>Year</th>
<th>Fatalities</th>
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<td>5% Reduction Target</td>
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<td>2006</td>
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Tying It All Together

**Vision**
Safety community

**Goal**
Safe transportation system

**Objectives**
(Usually several objectives)
- Reduce fatal crashes
- Reduce bike/ped crashes
- Enhance transit safety
- Reduce serious injuries

**Key Performance Measures**
- Number of fatal crashes
- Number of serious injuries
- Fatalities per 100M VMT

**Target**
- Decrease fatal crashes by 5% each year

**Project Evaluation Criteria**
- Decrease in crashes
- Decrease in serious injuries
- Decrease in societal costs due to crashes
- Decrease in conflict points
Identify specific actions to be taken to develop a local road safety plan for your agency
Workbook Activity

Key Questions

Potential Challenges

Potential Action Items
Report Back

• What are you top three priority action steps?

• What interesting opportunity or innovation will you employ when developing your plan?

• What is your biggest barrier to developing a local road safety plan?
Wrap Up and Key Takeways

Summary of the day and key takeways from participants
Resources to Develop Plans

FHWA Rural Local Road Safety Resources

https://safety.fhwa.dot.gov/local_rural/training/
Upcoming Training Opportunities and Resources

- Incorporating Safety Data into Rural Planning Processes Webinar, May 4th
- Local Road Safety Handbook
- Communicating Safety with Elected Officials Workshop
Contact Information

If you have any questions related to this workshop, please contact the instructors at:

NWaldheim@camsys.com, DGaines@camsys.com, or Hillary.Isebrands@dot.gov

Or contact the National Center for Rural Road Safety Help Desk at:
(844) 330-2200 or info@ruralsafetycenter.org

To learn more about the Safety Center: