SEAT BELT USE ON NORTH DAKOTA RURAL ROADS

Kimberly Vachal

Rural Transportation Safety and Security Center
Upper Great Plains Transportation Institute
North Dakota State University

February 2011
Overview

- Background - Why Seat Belts on Rural Roads?
- Other Surveys/Data Sources
- Initial Work
- Current Method
- Results
- Discussion
Crash Injury Risk

- In the United States, about one-quarter of travel takes place on rural roads, but nearly half of all traffic deaths occurred on rural roads between 2003 and 2007.
- In ND, from 2002 to 2009, 88% of serious injuries (fatal and disabling injuries) resulting from motor vehicle crashes, occurred on rural roads (NDDOT).
Enhancing mobility of people and goods in rural America.

Serious Injury Crash Location by Road Class, 2005-2009

Serious injury includes fatal and disabling injuries.

Location of Serious Injury Crashes in ND

<table>
<thead>
<tr>
<th>Functional Class</th>
<th>Location of Injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interstate</td>
<td>13%</td>
</tr>
<tr>
<td>Principal</td>
<td>30%</td>
</tr>
<tr>
<td>Collectors</td>
<td>4%</td>
</tr>
<tr>
<td>Arterials</td>
<td>12%</td>
</tr>
<tr>
<td>Local</td>
<td>40%</td>
</tr>
<tr>
<td>Urban</td>
<td>35%</td>
</tr>
</tbody>
</table>

Enhancing mobility of people and goods in rural America.
Local Road Crashes, 2005 to 2009

ND Crashes 2005 to 2009 – Local Roads Only (no towns)
Red=Fatal    Blue=Injury    Brown=PDO (n=9,070)

Enhancing mobility of people and goods in rural America.
Occupant Protection

- Crash risk and injury severity can be influenced by many factors – driver behavior, travel environment, vehicle technology, roadway characteristics, roadside features, etc.

  - Existing technology - no-cost, easy to use.
  - Studies have generally been shown seat belt use rates on rural roads is lower than on urban roads (Dinh-Zarr 2001, Nichols et. al 2007, Strine et. al 2010).
Enhancing mobility of people and goods in rural America.

ND Rural Crashes - No Seat Belt Factor

2005 to 2009

Data Source: NDDOT Crash Data

Legend

County
sb0
Less than 38.4%
38.4% to 43.7%
43.8% to 48.8%
More than 48.8%

NO SEAT BELT INCIDENCE: RURAL ROAD CRASHES*

*Injury Crashes
Intervention

- Seat belt laws
- Primary enforcement
- Enhanced enforcement
- Incentives
- Mass media campaigns
- Education programs

Source: Harris 2005
Enhancing mobility of people and goods in rural America.

- In 2010, Kansas became 31st state with primary law.

Average Self-Reported Seat Belt Use, 2008
- Primary Law States: 88.2%
- Secondary Law States: 79.2%

Source: IIHS 2011

Self-Reported Seat Belt Use Rate, 2008
- Primary Law
- Secondary Law

Source: CDC 2011

Enhancing mobility of people and goods in rural America.
CIOT Activity, May Mobilization

Seat Belt Citations per 100,000 Population

Source: NHTSA
(P): Primary Enforcement

Enhancing mobility of people and goods in rural America.
Annual State Patrol Seat Belt Citations, Average 2005-2009

<table>
<thead>
<tr>
<th>State</th>
<th>Citations per 100,000 Population</th>
<th>Fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>1,800</td>
<td>$20</td>
</tr>
<tr>
<td>MT</td>
<td>1,600</td>
<td>$30</td>
</tr>
<tr>
<td>WY</td>
<td>1,400</td>
<td>$25</td>
</tr>
<tr>
<td>SD</td>
<td>1,200</td>
<td>$20</td>
</tr>
<tr>
<td>CO</td>
<td>1,000</td>
<td>$71</td>
</tr>
<tr>
<td>MN</td>
<td>800</td>
<td>$25</td>
</tr>
<tr>
<td>ID</td>
<td>600</td>
<td>$10</td>
</tr>
<tr>
<td>NE</td>
<td>400</td>
<td>$25</td>
</tr>
<tr>
<td>NV</td>
<td>200</td>
<td>$25</td>
</tr>
</tbody>
</table>

Self-Reported Seat Belt Use, CDC 2008

Sources: Citations from UGPTI Phone Survey of State Patrols; Fines from IIHS, 2010.
Other Seat Belt Use Measures

座带使用率

<table>
<thead>
<tr>
<th>州</th>
<th>CDC 2008 (Self-Reported)</th>
<th>FARS 2007-2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho</td>
<td>76.6%</td>
<td>57.9%</td>
</tr>
<tr>
<td>Kansas</td>
<td>74.2%</td>
<td>49.4%</td>
</tr>
<tr>
<td>Montana</td>
<td>69.4%</td>
<td>46.0%</td>
</tr>
<tr>
<td>North Dakota</td>
<td>59.2%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Nevada</td>
<td>85.8%</td>
<td>68.9%</td>
</tr>
<tr>
<td>Washington (P)</td>
<td>92.0%</td>
<td>70.3%</td>
</tr>
<tr>
<td>Wyoming</td>
<td>67.4%</td>
<td>44.8%</td>
</tr>
</tbody>
</table>

Enhancing mobility of people and goods in rural America.
Enhancing mobility of people and goods in rural America.

ND Crash Report Seat Belt Use

<table>
<thead>
<tr>
<th>Year</th>
<th>All Crashes Interstate and Urban</th>
<th>All Crashes Rural</th>
<th>Injury Crashes Interstate and Urban</th>
<th>Injury Crashes Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>73.2%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>74.8%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>77.6%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>77.7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>78.0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: NDDOT
Note: Injury includes Fatal.
Rural Seat Belt Pilot

‘Measure it… to Understand It and to Manage It’

- Systematic measurement to supplement anecdotal information, enforcement statistics, and crash seat belt reports.
- Conducted in cooperation with the NDDOT and FHWA in 2009.
- Continued in 2010 and 2011 as a NDDOT TSO program activity.
Enhancing mobility of people and goods in rural America.

Study Objectives

- Establish rural seat belt survey protocol.
- Utilize partnerships with state and local associates to conduct seat belt observations.
- Provide traffic safety offices and local officials with a ‘measure’ they can use in understanding and managing this public health issue.
- Measure effects of new rural high visibility enforcement (HVE) activities.
NOPUS Statewide Seat Belt Survey
Methodology

- National Occupant Protection Use Survey (NOPUS) effort is supported by NHTSA – which approved the sample design and survey method for each state.

- Survey sample design uses traffic density=annual vehicle miles traveled, so only state roads considered.

- County population stratified by population and quadrant.
  - Highest population counties and random sample of lower population counties included in the survey.
  - VMT data used for site selection within sample counties.

Enhancing mobility of people and goods in rural America.

NDSU
Rural Road Seat Belt Survey

Methodology

- Traditional observation survey method.
- Sample design included preferred and optional counties.
- Site selection:
  - 1 site in per town – maximum of 2 towns in a county.
  - Higher traffic corridors to identify 3-4 sites beyond town.
  - Minimum 30 minutes, up to one hour allowed, to meet 30 minimum observations per site.
  - Minimum of 20 miles from interstate.

- Seat belt observations collected at each site during June or July, between 7 am and 7 pm.
  - Pilot project in 2009 included additional April measurement for HVE.

- Main focus on driver seat belt use, also collected passenger belt use when possible.
Survey Counties

Survey Group:
Green=Rural
Gray=NOPUS
Tan=None

Enhancing mobility of people and goods in rural America.
2010 Results: Overview

- 5,735 observations of driver seat belt use, compare to 6,919 in 2009.
- 1,330 observations of passenger seat belt use compared to 1,051 in 2009.
- Observations collected at 152 sites in 23 counties, a slight increase from 149 in 2009.
‘Overall’ Seat Belt Use Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Rural Survey</th>
<th>NOPUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>44.8%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>46.8%</td>
<td>74.8%</td>
</tr>
</tbody>
</table>
Enhancing mobility of people and goods in rural America.

Highway Use Rates, By County

Observed Seat Belt Use

Rolette: 40.6% 2009
Pierce: 48.8% 2009
Eddy: 44.8% 2009
Cavalier: 53.5% 2009
Dunn: 53.7% 2009
Bowman: 54.8% 2009
Hettin.: 55.4% 2009
Griggs: 57.8% 2009
Slope: 60.0% 2009
Benson: 61.1% 2009
Ransom: 62.9% 2009
Billings: 63.0% 2009
LaMoure: 63.7% 2009
Adams: 67.8% 2009
Sargent: 67.9% 2009
Townet: 68.6% 2009
Walsh: 68.9% 2009
Dickey: 70.7% 2009
McHenry: 81.4% 2009
Divide: 84.2% 2009
McLean: 84.2% 2009
Driver Gender

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>40.2%</td>
<td>53.7%</td>
</tr>
<tr>
<td>2010</td>
<td>42.8%</td>
<td>53.4%</td>
</tr>
</tbody>
</table>
## Seat Belt Use, By Vehicle Type

<table>
<thead>
<tr>
<th>Vehicle Type</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>48.0%</td>
<td>48.4%</td>
</tr>
<tr>
<td>Truck</td>
<td>34.4%</td>
<td></td>
</tr>
<tr>
<td>SUV</td>
<td>50.6%</td>
<td>52.2%</td>
</tr>
<tr>
<td>Van</td>
<td>63.7%</td>
<td>59.1%</td>
</tr>
</tbody>
</table>
Driver/Passenger Use Correlation

Pearson’s Corr. = 0.835, p < 0.0001, n = 1,330 (2009)

Enhancing mobility of people and goods in rural America.
High Visibility Enforcement (2009)

- Significant increase in seat belt use was found measuring intervention effects of HVE in rural counties.

<table>
<thead>
<tr>
<th></th>
<th>No HVE</th>
<th>HVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre HVE</td>
<td>43.8%</td>
<td>38.5%</td>
</tr>
<tr>
<td>Post HVE</td>
<td>46.7%</td>
<td>50.1%</td>
</tr>
</tbody>
</table>
Discussion

[Links and contact information]