Tribal Transportation Strategic Safety Plan



presented by the

Tribal Transportation Safety Management System Steering Committee

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EXECUTIVE SUMMARY

Transportation safety issues have long plagued Native American and Alaska Native populations. Motor vehicle crash statistics describe fatality rates that are higher among the Native American and Alaska Native populations than the overall population in many states. Motor vehicle crashes are among the leading causes of death for Native Americans and Alaska Natives. An estimated average of 535 Native American and Alaska Native fatalities due to motor vehicle related crashes were reported each year 2010-2014. Additional transportation related deaths are known to occur that are not captured in the available databases.

Data from the Fatality Analysis Reporting System (FARS) showed 3,278 available fatality reports in Tribal areas from 2010-2014 despite known underreporting. An analysis of these fatality reports revealed several topics that are addressed in this National Tribal Transportation Safety Plan. The topics presented were selected by the Tribal Transportation Safety Management System Steering Committee after review of several data sources. Tribes are strongly encouraged to conduct a similar data analysis and customize a transportation safety plan that describes safety topics most applicable to the Tribe.

The topics addressed in this plan are listed below.

General Topics

- Decision Making Process
- Crash Data Availability and Limitations

Emphasis Topics

- Occupant Protection/Child Passenger Seats
- Roadway Departure
- Impaired Driving
- Pedestrian Safety
- Availability of Public Safety Services

Additional Topics

- Speed
- Driver Distraction
- Intersections
- Young Drivers
- Older Drivers
- Off-road Transportation
- Animal-Vehicle Crashes

TABLE OF CONTENTS

Executive Summary I

Introduction 1

Tribal Transportation Safety Management System Steering Committee 2

- Mission, Vision, and Goal 2
- About the Committee 2

Methodology and Supporting Data 3

General Topic: Decision Making Process 4

General Topic: Crash Data Availability and Limitations 5

Emphasis Topics 5

- Occupant Protection/Child Passenger Seats 6
- Roadway Departure 9
- Impaired Driving 12
- Pedestrian Safety 13
- Availability of Public Safety Services 17

Additional Topics 19

- Speed 19
- Driver Distraction 20
- Intersections 20
- Young Drivers 20
- Older Drivers 20
- Off-road Transportation 21
- Animal-Vehicle Crashes 22

Funding programs 23

Acronyms i

Works Cited ii

Appendix A. Data Analysis Methodology iii

Appendix B. Crash Data Contributing Factors Analysis for Tribal Areas v

Appendix C. Geographical Distribution of Fatalities xiii

Cover photos courtesy of: Confederated Salish and Kootenai Tribes, Grand Traverse Band of Ottawa and Chippewa Indians, BIA Indian Highway Safety Program, Cross Timbers Consulting, LLC (Tom Edwards), and Red Plains Professional, Inc. (Dale Lewis).

INTRODUCTION

A Strategic Transportation Safety Plan should identify problems and guide a collaborative effort toward addressing the high-risk attributes of transportation infrastructure, human behavior, and vehicles. The objective is to achieve the highest level of transportation safety by integrating the work of a variety of disciplines and agencies. These disciplines include leadership; research; data collection; planning, design, construction, operation, and maintenance of the transportation infrastructure; injury prevention and control; health education; and those disciplines involved in modifying transportation user behaviors.

This Tribal Transportation Strategic Safety Plan offers an assessment of transportation safety needs in Tribal areas and provides Tribal Governments with strategies and resources that can be utilized in the pursuit of saving lives. The development and continual update of a Tribe-specific strategic transportation safety plan tailored to the experience and needs of each Tribe is strongly encouraged. As Tribes develop custom safety plans and other safety efforts, the details of this document may be useful for comparison to national trends, identifying strategies, or finding resources. Transportation safety plans developed by a Tribe should be the starting place for transitioning from planning to implementation - not this national plan.

The Tribal Transportation Safety Management System Steering Committee developed this plan and anticipates future revisions periodically or when improved data becomes available. This safety plan and future updates will be published on the website www.TribalSafety.org.

This document will also serve as the study required by Congress in the Fixing America's Surface Transportation Act (FAST) Section 1117(c) and will inform the report to Congress required in the same section.

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Emphasis Topics

- Occupant Protection/ Child Passenger Seats
- Roadway Departure
- Impaired Driving
- Pedestrian Safety
- Availability of Public Safety Services

Additional Topics

- Speed
- Driver Distraction
- Intersections
- Younger Drivers
- Older Drivers
- Off-Road Transportation
- Animal-Vehicle Crashes

TRIBAL TRANSPORTATION SAFETY MANAGEMENT SYSTEM STEERING COMMITTEE

MISSION

Facilitate implementation of effective transportation safety strategies to save lives while respecting Native American and Alaska Native values by fostering communication, collaboration, and cooperation.

VISION

All transportation users arrive safely at their destinations.

GOAL

To prevent and reduce fatalities and injuries associated with the use of Tribal transportation facilities.

ABOUT THE COMMITTEE

The Tribal Transportation Safety Management System Steering Committee is a coalition of federal agencies and Tribal governments. The members of the committee represent programs that are designed to address transportation safety from multiple perspectives including enforcement, emergency medical services, education, and engineering. The following federal programs and Tribal governments are currently participating on the committee:

- Northern Cheyenne Tribe Transportation Program
- Pueblo of Zuni Roads Program
- Karuk Tribe Roads Program
- Central Council of the Tlingit and Haida Indian Tribes of Alaska
- Cherokee Nation Transportation Program
- Bureau of Indian Affairs (BIA) Division of Transportation
- BIA Northwest Region Transportation
- BIA Office of Justice Services Indian Highway Safety Program
- Centers for Disease Control (CDC)
- Federal Highway Administration (FHWA) Office of Safety
- FHWA Resource Center
- FHWA Tribal Transportation Program
- Indian Health Service
- National Highway Traffic Safety Administration (NHTSA) Region 6
- Tribal Technical Assistance Program Centers

Since 2015 the committee has met several times each year to coordinate and collaborate on programs, projects, and reports. This plan is a result of the committee's efforts to develop a resource that could help facilitate the implementation of programs and projects that will improve transportation safety in Tribal areas. More information about the committee can be found at www.TribalSafety.org.

METHODOLOGY AND SUPPORTING DATA

Motor vehicle crashes are the leading cause of death from unintentional injury for Native Americans and Alaska Natives ages 1 to 44 (CDC, n.d.). In some States, Native Americans are overrepresented in fatal crash rates by as much as 4 times the general population (Washington State, 2016), (New Mexico DOT, 2016). From the FARS data reported for 2010-2014, an average of 535 Native Americans and Alaska Natives are reported to have lost their lives in motor vehicle crashes each year. Also for 2010-2014 the FARS database includes 3,278 fatalities in areas where Tribal governments have the greatest influence on the engineering, enforcement, emergency medical services, and education. The methodology used to select applicable crash data is described in Appendix A.

These statistics are likely understated due to misidentification of Native Americans and Alaska Natives in crash data and underreporting of crash data in Tribal areas (FHWA, Report to Congress: Tribal Governments & Transportation Safety Data, 2017). In addition, many Tribes rely on modes of travel other than motor vehicles and incident data is not available on such transportation incidents in a national database.

The topics covered by this plan were selected by the Tribal Transportation Safety Management System Steering Committee. This selection was informed by the review of multiple sources of data including:

- Safety plans developed by Tribes
- NHTSA Fatality Analysis Reporting System (FARS)
- CDC Web-based Injury Statistics Query and Reporting System (WISQARS)
- State Strategic Highway Safety Plans (SHSP) with a Tribal emphasis
- United States Geological Survey Protected Areas Database
- United States Census Bureau American Community Survey

Fatalities are the focus of this report because FARS only contains fatality reports and is the only nation-wide database containing detail on motor vehicle crashes. A detailed analysis of the FARS data is provided in Appendix B and summarized throughout the rest of this plan. Fatalities and injuries should be of the greatest concern when prioritizing safety projects and are the focus of performance measures in most federal safety programs.

Based on the data analysis conducted for this plan, several topics were identified that must be addressed at a national level to improve transportation safety in Tribal areas. These topics are organized in three categories: General Topics, Emphasis Topics, and Additional Topics. General topics provide a framework for planning and data improvement. Emphasis topics address the contributing factors with the greatest potential for safety improvement in Tribal areas. Finally, additional topics are problems that appear to be emerging issues or may be a primary concern for some Tribes but are not as prominent in the national data analysis.

GENERAL TOPIC: DECISION MAKING PROCESS

Successful transportation safety programs usually follow a cyclical, strategic process (Figure 1) with these steps:



Figure 1. Decision Making Process

1. **Engage Stakeholders**. Transportation safety can be influenced by a wide variety of stakeholders. Valuable benefits are realized when transportation safety programs are established with cooperation from leadership, enforcement, engineering, emergency medical services, and education (or public outreach) in addition to input from the public.
2. **Plan** - Assess needs, analyze data, and plan. Development of a transportation safety plan is strongly encouraged. A safety plan can guide a committee's actions, provide a tool for communication, and be a critical link to funding. The major steps of safety plan development include:
    - *Identify Risk Factors.* Using available incident history, determine the most significant human, roadway, vehicular, and environmental factors influencing transportation safety. The planning process should involve consideration of the available crash history, input from local safety practitioners, and an assessment of transportation safety needs.
    - *Identify Countermeasures.* Determine what strategies can be used to address identified risk factors. Evaluate available resources that can be utilized to implement these strategies. Prioritize projects, programs, and further study needs in the safety plan. Further studies that may be identified include: assessments of safety processes (crash data collection, emergency response, etc.), road safety audits, systemic safety studies, and road design alternatives analyses.
3. **Implement**. Once a safety plan is complete, an effective transportation safety program will implement the identified additional studies, projects, and activities. Implementation may involve integration into other planning processes, seeking resources, and coordination with other governments.
4. **Evaluate and Update**. Throughout the implementation process an effective transportation safety program will monitor the plan's progress. When implementation of planned activities and projects has occurred or when new data is available stakeholders should reconvene and update the transportation safety plan.

RESOURCES:

- FHWA, Strategic Transportation Safety Plan Toolkit for Tribal Governments: https://flh.fhwa.dot.gov/programs/ttp/safety/stsp-toolkit.htm
- Highway Safety Improvement Program Manual, Planning: https://safety.fhwa.dot.gov/hsip/resources/fhwasa09029/sec3.cfm
- Systemic Approach to Safety: https://safety.fhwa.dot.gov/systemic/
- Examples of completed Tribal Safety Plans: www.TribalSafety.org
- Crash Modification Factors Clearinghouse: http://www.cmfclearinghouse.org/resources_countermeasures.cfm
- Manual for Selecting Safety Improvements on High Risk Rural Roads: https://safety.fhwa.dot.gov/hsip/hrrr/manual/

General Topic: Crash Data Availability and Limitations

With some exceptions, the quality and availability of crash data in Tribal areas needs significant improvement. A report to Congress published in 2017 by the FHWA identified several barriers to the collection, sharing, and analysis of quality crash data in Tribal areas. Among the barriers identified in the report were resources, effective communication, Tribal sovereignty concerns, and data collection methods.

The availability of quality crash data is vital to an understanding of the projects and programs that should be a priority in an effective safety program. For infrastructure-oriented safety decisions, roadway and traffic data are helpful to interpret crash data and identify opportunities for infrastructure-oriented safety treatments. Crash data is also valuable for acquiring funding from state and federal grants.

Tribes are encouraged to conduct a traffic records assessment to ensure that methods being used to collect, share, and analyze crash data are providing optimal benefit to the Tribe. Traffic records assessments can also be an effective tool to establish communication with state and local safety partners. In addition, the development of a transportation safety plan should be initiated by an analysis of the available safety data.

Resources:

- Guide for Effective Tribal Crash Reporting, NCHRP 788 – This publication from the Transportation Research Board provides a self-assessment process that Tribes and States can use to assess crash data and develop an action plan if improvements are needed: http://www.trb.org/Publications/Blurbs/171540.aspx
- Model Minimum Uniform Crash Criteria: http://www.mmucctraining.us/
- NHTSA Traffic Records Resources: https://www.nhtsa.gov/research-data/traffic-records
- FHWA, Report to Congress: Tribal Governments & Safety Data: http://flh.fhwa.dot.gov/programs/ttp/safety/
- Washington Traffic Safety Commission, Tribal Traffic Safety Advisory Board, Video: *Recording Our Past, Protecting Our Future:* http://wtsc.wa.gov/programs-priorities/tribes/ or https://youtu.be/VDrTQNLH2-g

Emphasis Topics

Five topics were identified as emphasis topics that can be addressed at a national level to improve transportation safety in Tribal areas. The Tribal Transportation Safety Management System Steering Committee selected these topics after review of several data sources. Emphasis topics address the contributing factors in crashes that have the greatest opportunity for transportation safety improvement in Tribal areas. The five emphasis topics are summarized in Table 1. Crashes often involve multiple contributing factors. As a result, many crashes overlap multiple emphasis topics.

Topic	Fatalities in Tribal Areas	% of all Vehicle Fatalities in Tribal Areas
Occupant Protection Devices Unused	1663 +	51% +
Roadway Departure	2062	63%
Impaired Driving	1318	40%
Pedestrians	346	11%
Availability of Public Safety Services	44% of fatal crashes with greater than 1 hour elapsed from Emergency Medical Service (EMS) notification to arrival at hospital	

Table 1. Data summary for emphasis topics

EMPHASIS TOPIC - OCCUPANT PROTECTION/CHILD PASSENGER SEATS

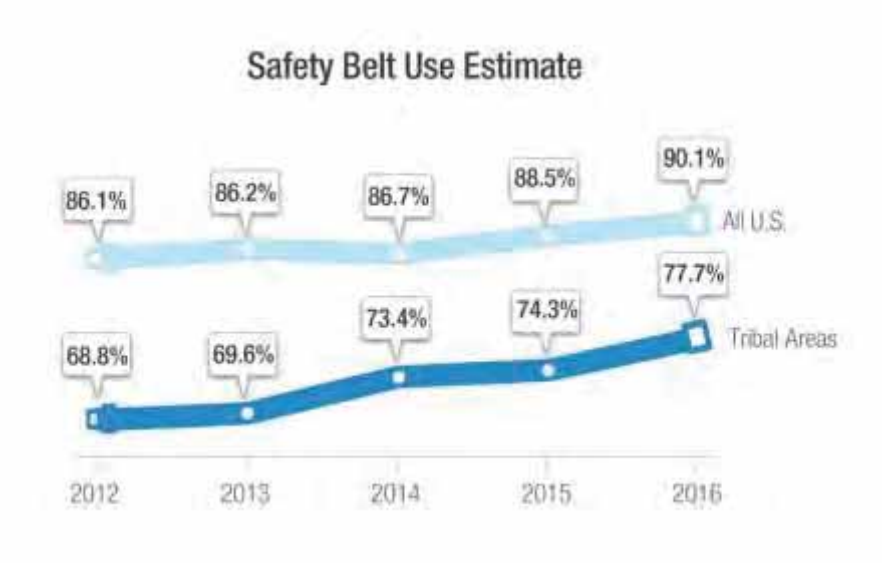

Figure 2. Seatbelt usage trends
Data Source: NHTSA, 2016 Safety Belt Use Estimate for the Indian Nations and NHTSA Traffic Safety Facts, Seat Belt Use in 2016-Overall Results

Occupant protection devices include seat belts, child safety seats, helmets, airbags, and other vehicle design features. These devices are designed to prevent or significantly reduce the severity of injuries when a crash occurs. Drivers and vehicle occupants can lessen the consequences of a potential crash by simply choosing to buckle up. Many Tribes and States identify occupant protection as an emphasis topic in a transportation safety plan.

Seat belts are underutilized in many Tribal areas. A national survey conducted by the BIA Indian Highway Safety Program in 2016 concluded that seatbelt usage in Tribal areas averaged 77.7% while the nationwide rate is much higher at 90.1% (NHTSA, 2016). As shown in Figure 2, seatbelt usage trends have been consistently lower in Tribal areas when compared to estimates for the entire United States. Some Tribes identified seat belt usage rates as low as 62% in their safety plans. Fortunately, usage rates have been trending upward.

The underutilization of occupant protection devices contributed to at least 1,494 fatalities from 2010-2014 in Tribal areas where a vehicle occupant was unrestrained. During this time, another 332 fatalities occurred where it is unknown if the individual was restrained or not. Unrestrained vehicle occupants represent more than half of the vehicle fatalities in Tribal areas.

Unrestrained vehicle occupants represent more than half of the fatalities in Tribal areas

Although child safety seat use rates for American Indian and Alaska Native communities vary greatly, rates are generally much lower than the overall population (CDC, n.d.). From 2010-2014 the reported data shows fifty-nine fatalities of vehicle occupants ages four and younger. Among these children only 25% were reported to have been restrained in some fashion.

Motorcycle riders represent 8% of the fatal motor vehicle crash data in Tribal areas which is low compared to 14% of all United States motor vehicle fatality data. A total of 257 motorcycle rider fatalities were reported on roadways in Tribal areas from 2010-2014. Head trauma is the most significant risk for motorcycle riders when involved in a crash although they are exposed to a variety of potentially lethal risks during a crash. In seven out of ten of motorcycle fatalities the rider was not wearing a helmet. Additional fatalities likely occurred off-road on motorcycle, all-terrain vehicles, and snow machine trails in Tribal areas. The FARS data that was reviewed only contains reported fatalities on public roadways.

STRATEGIES:

Tribal Governments can:

- Establish and enforce primary seat belt and helmet use laws.
- Ensure strong restraint laws for child passengers.
- Establish inspection stations for seat belts and child safety seats.
- Educate drivers and youth (see Figure 3):
  - Use a car seat, booster seat, or seat belt on every trip, no matter how short.
  - Buckle up the right way.
  - The lap belt goes across the hips, below the stomach.
  - The shoulder belt goes across the middle of the chest and over the shoulder.
  - Never put the shoulder belt behind your back or under your arm.
  - Wear seat belts even when the car or truck has air bags. Air bags are made to work with seat belts, not by themselves.
  - Never ride in the bed of a truck.
  - Never use a seat belt to buckle more than one person at a time.
  - Wear seat belts throughout pregnancy.
  - Use seat belt extenders if the seat belt is too small.
  - Find the right car seat or booster seat for a child's age, height, and weight (See Figure 4).
  - Buckle older children in a booster seat until the seat belt fits them properly. Seat belts fit properly when the lap belt lays across the upper thighs (not the stomach) and the shoulder belt lays across the chest (not the neck).
  - Get help installing a car or booster seat from a certified child passenger safety technician.
  - Properly buckle children in the back seat. The back seat is safest for children.
  - Never place a rear-facing car seat in front of an airbag. Airbags can injure or kill small children riding in the front seat.
  - Do not use traditional baby carriers (such as cradleboards) in place of a car seat. Traditional carriers do not keep children safe in cars or trucks.

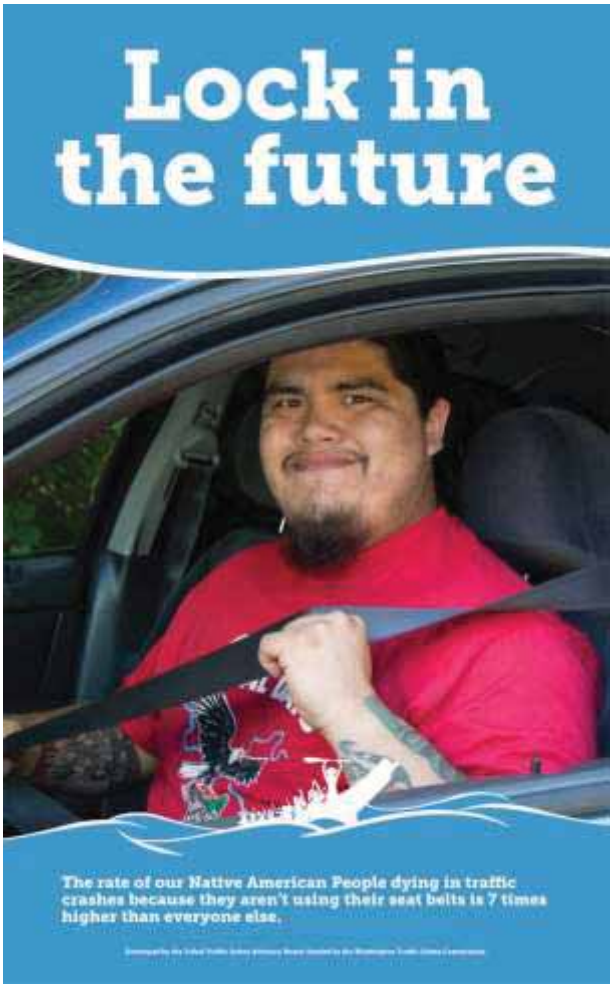

Figure 3. Educational materials developed by the Tribal Traffic Safety Advisory board of the Washington Traffic Safety Commission

Law Enforcement Can:

- Conduct short-term, high-visibility enforcement for child-passenger safety seats and seatbelts.
- Combine seat belt, impairment, and nighttime enforcement efforts.
- Maintain strong enforcement efforts.
- Work with law enforcement association committees.

- Enforce helmet laws.
- Coordinate enforcement efforts with education campaigns.
- Coordinate with Tribal council to ensure leadership support of enforcement campaigns.

RESOURCES:

- CDC, Roadway to Safer Tribal Communities Toolkit: http://www.cdc.gov/motorvehiclesafety/native
- NHTSA, Countermeasures that Work: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf
- IACP, Highway Safety Committee: http://www.theiacp.org/Highway-Safety-Committe
- IACP, Indian Country Law Enforcement Section: http://www.theiacp.org/Indian-Country-Law-Enforcement-Section
- IHS, Safe Native American Passengers: https://www.ihs.gov/MedicalPrograms/InjuryPrevention/index.cfm?module=toolbox&option=snap
- IHS, Child Passenger Safety Program: https://www.ihs.gov/MedicalPrograms/InjuryPrevention/index.cfm?module=toolbox&option=ride



Figure 4. Seventy-five percent of child fatalities were not using a child passenger seat
Photo courtesy of the BIA Indian Highway Safety Program

EMPHASIS TOPIC - ROADWAY DEPARTURE

From 2010-2014, roadway departure was a factor in crashes that resulted in at least 2,062 reported fatalities on roads in Tribal areas. This represents 63% of all reported motor vehicle fatalities in Tribal areas. Many Tribes and states identify roadway departure as an emphasis area in transportation safety plans. A roadway departure crash occurs when a vehicle leaves the traveled way resulting in a crash. Roadway departure crashes were identified when the first event in the crash was reported to be: impact with guardrail, impact with a fixed object (tree, utility pole, boulder, building, ditch, fence, etc.), ran off roadway, crossed median, crossed centerline, airborne vehicle, or re-entering the roadway.

Often crashes result from many combinations of factors. This emphasis topic focuses on strategies to address



Figure 5. One third of roadway departure fatalities in Tribal areas occurred in a horizontal curve.
Photo near the Native Village of Minto shows a visual trap that could lead a driver to miss the curve.

roadway departure only and does not address the behavioral factors, such as impaired and distracted driving, which often lead to road departure. For example, 44% of roadway departure fatalities are estimated to involve an impaired driver with a least a 0.08 BAC.

Some roadway departure crashes resulted in an object being hit. Figure 6 describes the most harmful event impacted in roadway departure fatalities in Tribal areas. This information reinforces the need to ensure the use of crashworthy roadside hardware (barriers, posts, and poles). This also highlights the advantages of providing a roadside that is recoverable and free of obstacles such as trees, hazardous fences, culvert ends, and other fixed objects.

Most roadway departure fatalities (71%) involve only one vehicle. Nine in ten roadway departure fatalities occur in rural areas with a significant portion, 47%, occurring on minor collector or lower classification rural roadways. Traffic volumes are typically lower at night, yet 43% of roadway departure crashes occur in the dark and 6% during dusk or dawn. Weather does not seem to play a significant role. Atmospheric conditions are clear or cloudy in 89% of roadway departure fatalities. Similarly, the road surface was reported to be dry for 83% of fatalities.



Figure 6. Most harmful event in roadway departure fatalities
Data source: 2010-2014 FARS Data

Roadway alignment is an important contributing factor to consider in roadway departure crashes. Thirty-five percent of roadway departure fatalities in Tribal areas occurred in a horizontal curve – a curve to the right or left (such as the curves to the left shown in Figures 5 and 7). This fact is significant because curved sections comprise a small portion of most road networks. At a national level roadway departure in curves is also a significant transportation safety issue. More than 25% of fatal crashes in the whole United States occur in curves with most of those crashes involving roadway departure. The average crash rate for horizontal curves is about three times that of other types of highway segments (FHWA, 2016).

STRATEGIES:

The strategies for roadway departure can generally be simplified in three categories: (1) Keep vehicles on the roadway, in their appropriate directional lane; (2) Reduce the potential for crashes when vehicles do leave the roadway or cross into opposing traffic lanes (provide for safe recovery); and (3) Minimize the severity of crashes that do occur.

- Keep vehicles on the roadway
  - Address behavioral topics (impairment, distraction, etc.) that can lead to road departure as discussed elsewhere in this plan.



Figure 7. Before (top) and after (bottom) pavement marking maintenance by the Reno-Sparks Indian Colony
Photo courtesy of Scott H. Carey, Reno-Sparks Indian Colony

- Ensure appropriate warning signs.
- Enhanced warning signs, especially in locations where crashes frequently occur or applied systemically to address high-risk factors.
- Use road surface friction treatments in spot locations such as curves, ramps and intersections with limited sight distance at approaches.
- Provide a shoulder to allow errant vehicles to safely return to the travel lane.
- Provide edge and shoulder rumble strips or stripes.
- Install and maintain pavement markings (see Figure 7).
- Install post mounted delineators.
- Maintain the roadway surface so that it can be safely traversed at the design speed.
- Avoid hillcrests and horizontal curves (curves to the left or right) at the same location.
- Ensure visibility of signs at night by implementing a sign management method recommended in the Manual on Uniform Traffic Control Devices (MUTCD).

- Provide for safety recovery
  - Provide clear zones free of hazardous roadside objects (See Figure 8).
  - Flatten roadside slopes so they are traversable.
  - Use Safety Edge on paving projects for safe re-entry of errant vehicles back on the travel way.
- Minimize crash severity
  - Install barriers, breakaway poles, crashworthy sign supports, or other crashworthy devices when hazards cannot be removed or relocated.
  - Update guardrail that does not meet a recent crashworthiness standard such as MASH or NCHRP Report 350.
  - Delineate hazards that cannot be removed, replaced, or shielded with barrier.



Figure 8. Hazardous roadside object identified through a systemic safety study.
Photo courtesy of the Confederated Salish and Kootenai Tribes

- Conduct a systemic safety study of roadway departure crashes to prioritize low cost strategies that mitigate the consequences of leaving the roadway.

RESOURCES:

- FHWA, Roadway Departure Safety: https://safety.fhwa.dot.gov/roadway_dept/
- Low Cost Treatments for Horizontal Curve Safety: https://safety.fhwa.dot.gov/roadway_dept/countermeasures/horicurves/fhwasa15084/
- Roadside Design Guide: https://bookstore.transportation.org/collection_detail.aspx?ID=105
- Night time sign visibility: https://safety.fhwa.dot.gov/roadway_dept/night_visib/policy_guide/sign_15mins/
- MUTCD 2A.08 Retroreflectivity: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2a.htm
- MUTCD 2A.15 Enhanced Conspicuity for Standard Signs: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2a.htm
- MUTCD 2C.06 Horizontal Alignment Warning Signs: https://mutcd.fhwa.dot.gov/htm/2009/part2/part2c.htm

EMPHASIS TOPIC - IMPAIRED DRIVING

An estimated 1,318 motor vehicle fatalities in Tribal areas from 2010-2014 involved an impaired driver. Among these fatalities are 1,168 involving a driver with a blood-alcohol concentration (BAC) of 0.08 and another 150 fatalities involving a driver with BAC between 0.01 and 0.07. For tribal areas, 40% of fatalities involved a driver impaired by alcohol with a BAC of at least 0.01. In comparison, 36% of fatal crashes during 2010-2014 in the United States overall are reported to involve a driver impaired by alcohol with a BAC of at least 0.01 (NHTSA, 2015).

Nationally, use of drugs other than alcohol (e.g., marijuana and cocaine) are identified in about 18% of motor vehicle driver deaths in the United States but test results were only available for 66% of cases in the studied crash data (NHTSA, 2010). Data on the involvement of drugs in fatal crashes in Tribal areas is not available. Anecdotally, if drug abuse is a factor then alcohol is typically also involved. Police officers often do not test for drug levels if alcohol impairment is also a factor. In addition, there are a wide variety of drugs and many require special equipment or a unique test to identify the suspected drug. Not all police departments are equipped with the necessary training, equipment, and tests to cover all controlled substances. Despite the unavailability of data, Law Enforcement officers often discuss the involvement of controlled substances as a growing problem on reservations based on their experience.

STRATEGIES:

Tribal Governments can:

- Establish and fully enforce existing laws that address the prevention of impaired driving. These include:
  - Blood Alcohol Concentration (BAC) of .08 limit laws;
  - Minimum legal drinking age laws;
  - Zero tolerance laws for drivers younger than 21 years old; and
  - Drug impaired driving.
- Authorize sobriety checkpoints. Checkpoints can reduce alcohol-related crash deaths by 9 percent.
- Require ignition interlock use for people convicted of drinking and driving, starting with their first offense.
- Restrict nighttime driving for teens to no later than 10 p.m. for at least the first 6 months of licensed driving.
- Restrict new drivers to no more than one passenger during the first 6 months of licensed driving.
- Ensure that alternatives to driving and walking are available for those leaving drinking establishments.
- Explore Community Guide supported strategies that may lead to a reduction in binge drinking.



Figure 9. Oklahoma Highway Patrol Troopers Conduct Sobriety Checkpoints at the request of Caddo Nation Injury Prevention.
Photo Courtesy of Antoinette Short

Local health professionals can:

- Conduct screening and brief interventions for risky behaviors, such as using alcohol and drugs, and driving while impaired.
- Educate patients about the dangers of drinking and driving.
- Assess prescription drug controls using the guidelines provided in the National Safety Council publication "Prescription Nation: Addressing America's Drug Epidemic" (http://www.nsc.org/learn/NSC-Initiatives/Pages/Prescription-Nation-White-Paper.aspx).

Law Enforcement can:

- Combine seat belt, impairment, and nighttime enforcement efforts.
- Publicize sobriety checkpoint programs.
- Conduct sobriety checkpoints (See Figure 9).
- Maintain strong enforcement efforts.
- Coordinate enforcement efforts with education campaigns.
- Coordinate with Tribal council to ensure leadership support of enforcement campaigns.
- Ensure police officers are adequately trained to identify and test alcohol and drug impaired drivers.

RESOURCES:

- CDC Roadway to Safer Tribal Communities Toolkit: http://www.cdc.gov/motorvehiclesafety/native
- CDC Impaired Driving: http://www.cdc.gov/motorvehiclesafety/impaired_driving
- NHTSA, Countermeasures that Work: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf
- CDC Community Guide, Motor Vehicle Injuries, https://www.thecommunityguide.org/topic/motor-vehicle-injury
- National Safety Council, *Prescription Nation: Addressing America's Drug Epidemic*, http://www.nsc.org/learn/NSC-Initiatives/Pages/Prescription-Nation-White-Paper.aspx

EMPHASIS TOPIC - PEDESTRIAN SAFETY

An average of 69 lives were lost each year (2010-2014) in Tribal areas when a pedestrian was struck by a vehicle. This represents 11% of the fatal crashes in Tribal areas. Many safety plans developed by Tribes and states identify pedestrian safety needs. A significant portion of the applications submitted to the Tribal Transportation Program Safety Fund have requested funding to improve pedestrian infrastructure.



Figure 10. Location of pedestrian crashes
Data source: 2010-2014 FARS

Consistent with national statistics, the overwhelming majority of pedestrian fatalities do not occur at an intersection, are most frequent in the evening after 5p.m., and occur in dark conditions where no lighting exists. Three out of every four pedestrian fatalities in Tribal areas occurs during dark conditions.

In Tribal areas, most pedestrian fatalities occurred in rural areas with 23% located on urban roads. The location of pedestrians with respect to the roadway at time of impact is described in Figure 10. The majority (77%) of pedestrian fatalities in both rural and urban Tribal areas occurred when a pedestrian was walking in or along the roadway, not at an intersection, and not in a marked crosswalk. Further study is necessary to identify if these individuals are crossing, walking within the roadway, or walking along the road at the time of the crash. Only 6% of the pedestrian fatalities in Tribal areas were reported to have occurred at an intersection.

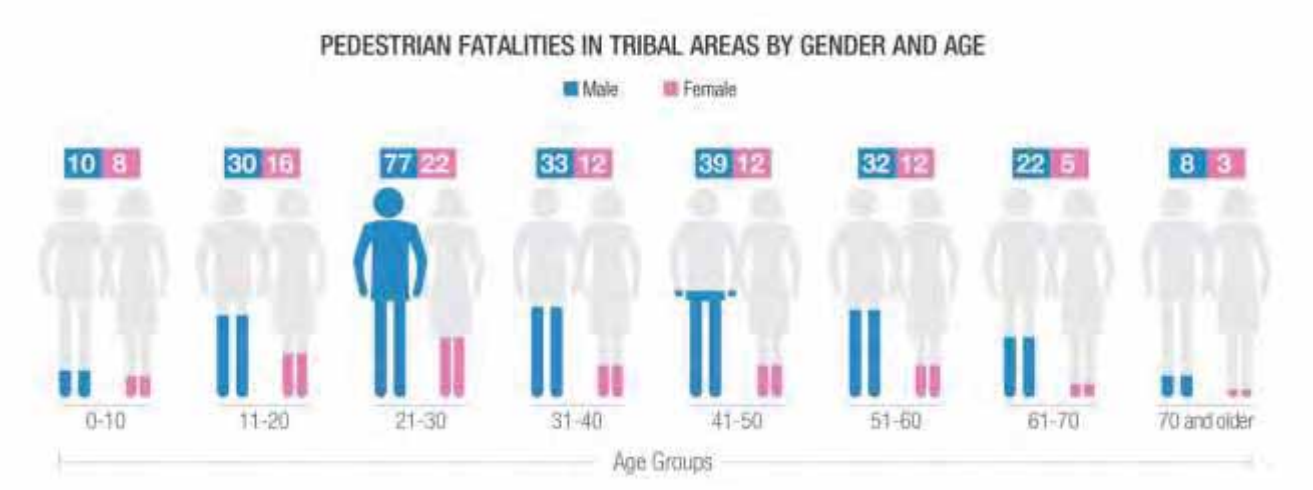

Figure 11. Age and gender of fatally injured pedestrians
Data source: 2010-2014 FARS

Pedestrian fatalities in Tribal areas are overwhelmingly (74%) males, with the largest age group being 21-30 years of age as shown in Figure 11. A significant portion (at least 43%) of pedestrian fatalities in Tribal areas involved a pedestrian who had consumed alcohol. This is a low estimate since 30% of pedestrian fatality reports did not report an alcohol result.

Native Americans and Alaska Natives experienced fatal pedestrian crash rates more than 3.5 times greater than other portions of the population in overall fatality data for the United States from 2005-2014 (Smart Growth America and National Complete Streets Coalition, 2016). An average of 98 Native Americans and Alaska Natives pedestrian fatalities occurred each year according to the overall United States FARS data from 2010-2014. Some of the behavioral strategies identified for Tribal areas may also help address Native American and Alaska Native pedestrian fatalities outside of Tribal areas. Additional detail on all Native American and Alaska Native fatalities both on and off Tribal areas can be found in the FHWA research report "Pedestrian Safety in Native America" (http://www.pedbikeinfo.org/data/library/details.cfm?id=2103).

Although not the focus of this emphasis area, many pedestrian improvements also have benefits for bicyclists. For reported fatal crashes on reservations, an average of five bicyclist fatalities occurred each year 2010-2014.

STRATEGIES:

Ensure that alternatives to driving and walking are available for those leaving bars and other locations where alcohol is being served.

Provide safe infrastructure for walking:

- Provide separated pathways (see example in Figure 12) or sidewalks in areas frequently used by pedestrians.

- When appropriate, provide pathways between origins and destinations independent of the road network that decrease pedestrian activity along roadways.
- Where pedestrian activity occurs along a roadway, provide roadway lighting.
- Mitigate obstacles such as bridges, culverts, steep embankments, snow storage, and utility apparatuses that may force pedestrians into the roadway.



Figure 12. Separated Pathway, Citizen Potawatomi Nation, Oklahoma
Photo courtesy of Tom Edwards, Cross Timbers Consulting, LLC

Minimize exposure for pedestrians crossing roadways:

- Shorten crossing distance with “bulb out” extensions of the curb & mid-crossing refuge islands.
- At stoplights with pedestrian signals, provide time for the pedestrian walk indication before conflicting signals turn green.
- Remove sight distance obstacles that can hide pedestrians from a driver’s view.
- Implement road diets where feasible to allow for refuge islands and eliminate the need for pedestrians to cross multiple lanes.

Educate Pedestrians:

- Walk on a sidewalk or path when one is available.
- If no sidewalk or path, walk on the shoulder, facing traffic. Stay alert.
- Avoid distractions that take eyes and ears off the surroundings.
- Be cautious. Never assume a driver sees you. Make eye contact with a driver before entering the travel lane.
- Be predictable. Cross streets at crosswalks or intersections when possible. This is where drivers expect and can see pedestrians.
- Be seen. Wear bright clothing during the day, and wear reflective materials or use a flashlight at night (See Figure 13).
- Avoid alcohol and drugs when walking; they impair your judgment and coordination.

Educate Drivers:

- Look for pedestrians everywhere.
- Never pass vehicles stopped at a crosswalk. They may be stopped to allow pedestrians to cross the street.
- Never drive under the influence of alcohol and/or drugs.
- Follow the speed limit; slow down around pedestrians.
- Stay focused and slow down where children are likely to be present, like school zones and neighborhoods.

RESOURCES:

- FHWA Pedestrian and Bicycle Safety: https://safety.fhwa.dot.gov/ped_bike/
- CDC Motor Vehicle Safety – Pedestrians: https://www.cdc.gov/motorvehiclesafety/pedestrian_safety/index.html
- NHTSA, Countermeasures that Work: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf
- NHTSA, Everyone is a Pedestrian: www.nhtsa.gov/nhtsa/everyoneisapedestrian/



Figure 13. Educate pedestrians to be seen. Wear bright clothing during the day and reflective materials or use a flashlight at night. Photo courtesy of BIA Indian Highway Safety Program

EMPHASIS TOPIC - AVAILABILITY OF PUBLIC SAFETY SERVICES

Many Tribal areas are rural with public safety services covering vast areas using limited resources. In addition, the remoteness of these locations requires individuals to make long commutes for employment, health services, education, and supplies. When a crash occurs in a remote Tribal area response times can be very long for police, emergency medical services, towing services, and fire and rescue crews. In addition, trauma centers can be a great distance away.

Training for officers in rural Tribal areas can be difficult to obtain. In some cases, enforcement officers do not have basic medical training and must wait with a victim until trained emergency medical personnel arrive. Training on basic roadway safety and efficient incident scene management techniques can also be needed.

Medical professionals describe a "golden hour" as the ideal timeframe in which to bring a severely injured individual to an appropriate physician. Emergency Medical Services (EMS) response times were only available for about one-third of the crash data examined. The available data shows that 44% of the fatal crashes in Tribal areas from 2010-2014 involved greater than one hour elapsed from the time EMS was notified until arrival at a medical treatment facility. For comparison, overall U.S. fatality data from 2010-2014 shows that 23% of fatalities in the United States occurred after at least one hour had elapsed between EMS notification and arrival at a medical treatment facility. The charts in Figure 14 provide additional detail about EMS response times.

Several of the safety plans developed by Tribes identify the need for increased resources for public safety services. Some Tribes are pursuing projects to improve emergency response time by updating 911 systems, improving street and address signage, creating helicopter landing pads, and mitigating obstacles that impact emergency response time.

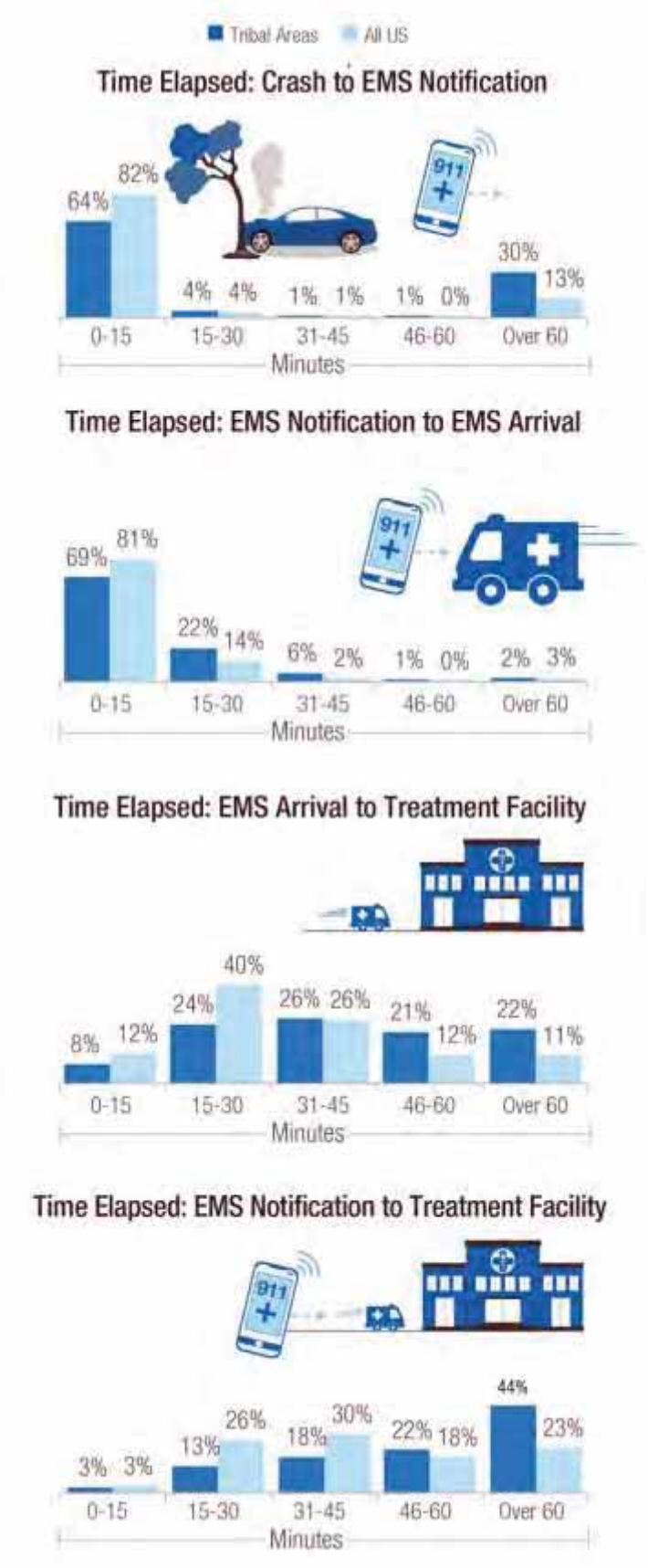

Figure 14. Comparison of EMS response times for Tribal areas and the rest of the USA
Source: 2010-2014 FARS Data

STRATEGIES:

- Provide basic medical training for volunteer community members who can respond to emergencies. The Community Emergency Response Teams program and the American Red Cross training are two options.
- Work with professional law enforcement associations that develop medical training and strategies such as the International Association of Chiefs of Police (IACP) Police Physicians Section.
- Provide first responders with incident management training to ensure safety and efficient crash scenes.
- Assess emergency notification, dispatch, communication, and response procedures to identify optimization needs.
- Collect incident management performance measure data.
- Address gaps in coverage for emergency communication systems.
- Train law enforcement in basic medical response.
- Ensure that EMS providers are using appropriately structured patient evaluations to provide the needed level and speed of care.
- Assess and identify the need for landing sites for medical transport helicopters (See Figure 15).
- Install and maintain emergency notification call boxes.
- Retain qualified staff at local health clinic



Figure 15. An air ambulance lands at a crash scene near Pawnee Nation
Photo courtesy of Chris McCray, Pawnee Nation

RESOURCES:

- Community Emergency Response Team (CERT) Program: https://www.fema.gov/community-emergency-response-teams
- American Red Cross Training: http://www.redcross.org/take-a-class
- IACP, Physicians Section: http://www.theiacp.org/Police-Physicians-Section
- Using Data to Improve Traffic Incident Management: https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/timdata.cfm
- Traffic Incident Management Responder Training: https://www.fhwa.dot.gov/innovation/everydaycounts/edc-2/tim.cfm
- U.S. Department of Homeland Security, Federal Law Enforcement Training Centers: https://www.fletc.gov/

ADDITIONAL TOPICS

The following topics were identified by the Safety Management System Steering Committee as topics that are either emerging issues or topics that are likely of interest to some Tribes but are not as prominent at the national level. These selections were based on the analyzed data sources and committee members' knowledge.

Table 2. Data summary for Additional topics

Topic	Fatalities in Tribal Areas	Percent of All Fatalities in Tribal Areas
Speed	1018	31%
Driver Distraction	Indeterminate	
Intersections	485	15%
Young Drivers (Age 15-22)	424	13%
Older Drivers (Age 65+)	443	13%
Off-Road Transportation	Indeterminate	
Animal-Vehicle Crashes	32	1%

SPEED

Speed is reported as a contributing factor in 1,018 fatalities (36%) in Tribal areas from 2010 to 2014. Speed related crashes represent both crashes where a vehicle was exceeding the posted speed limit as well as those cases where police reported that a vehicle's speed was unsafe for road, weather, traffic or other environmental conditions at the time. The national percentage of speed related crashes is slightly lower at 31% for the same period.

The data from Tribal areas indicates that just over one-third of the speed related fatalities were due to traveling too fast for conditions. Another one-third of the speed related crashes were due to exceeding the posted speed limit. One in four speed related fatalities involved vehicles racing. The remaining speed involved crashes did not have the specifics reported.

Victims of fatal speed related crashes in Tribal areas were less likely to be using occupant protection devices (Restraints were not used by fatally injured victims in 57% speed cases vs. 51% overall for Tribal Areas). Speed related fatalities involved an impaired driver for at least 60% of cases in Tribal areas. These facts suggest that drivers who participate in one risky behavior are more apt to also participate in other risky behaviors.

RESOURCES:

- NHTSA, Countermeasures that Work: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf
- ITE, Traffic Calming Guide: http://www.ite.org/traffic/
- FHWA, Speed Management Safety: https://safety.fhwa.dot.gov/speedmgt/
- FHWA, Methods and Practices for Setting Speed Limits: https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa12004/

Driver Distraction

Driver distraction was a factor in nearly 3,500 fatalities in the United States in 2015. There are many sources of distraction including talking or texting on a phone, eating or drinking, talking to passengers, and any other activity that takes a driver's attention from the task of driving. Data currently available on distracted driving crashes is not clear for Tribal areas. However, this is an emerging issue that should be considered in the safety planning process. Policies, laws, enforcement, and educational efforts can all help to reduce distracted driving.

Resources:

- NHTSA, Distracted Driving: Distraction.gov

Intersections

About fifteen percent of motor vehicle fatalities in Tribal areas from 2010-2014 were intersection related. This statistic is low in contrast to national data which consistently shows up to 23 percent of fatal crashes occur at intersections (FHWA, Intersection Safety, 2017). Despite the national statistics being low for reservations, intersection safety is highlighted as a major concern in some safety plans developed by Tribes. Some Tribes report very high numbers of serious crashes occurring at specific intersections in the Tribal area. So, while addressing intersections may not be a top priority at a national level some Tribes should pursue safety improvements at problem intersections starting by describing these problem locations in a transportation safety plan.

Resources:

- Institute of Transportation Engineers, Unsignalized Intersection Improvement Guide: www.ite.org/uiig
- FHWA, Intersection Safety: https://safety.fhwa.dot.gov/intersection/

Young Drivers

Young drivers, ages 15-20, were involved in 376 fatal crashes which resulted in 424 fatalities in Tribal areas from 2010-2014. The young driver was killed in 192 of the 424 fatalities. There is no data to determine if the young driver was "at fault" however a lack of experience could be a contributing factor for the majority of these crashes.

Among the young drivers involved in these crashes 67% are male. When restraint use was reported, 59% of young drivers who died were not using occupant protection devices (helmets or belts). About 48% of these crashes occurred in daylight. Crashes involving young drivers include roadway departure, multi-vehicle, and intersection related in similar proportion to the overall dataset of all fatal crashes in Tribal areas.

Resources:

- CDC Teen Driving Resources: https://www.cdc.gov/motorvehiclesafety/teen_drivers/index.html
- NHTSA, Countermeasures that Work: https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/812202-countermeasuresthatwork8th.pdf
- National Safety Council, Alive at 25 Program: https://aliveat25.us/

Older Drivers

Older drivers over age 65 are involved in crashes slightly less frequently in Tribal areas than in the entire United States. During 2014 just over 13% of the drivers involved in fatal crashes in the United States were age 65 or older. The reported fatal crash data for 2010-2014 in Tribal areas shows 12% of drivers involved in fatal crashes are over 65. Resources listed below may be useful for Tribes that identify a need to address older drivers.

RESOURCES:

- FHWA designing roadways for aging populations: https://safety.fhwa.dot.gov/older_users/
- CDC Information for keeping older drivers safer: https://www.cdc.gov/motorvehiclesafety/older_adult_drivers/
- NHTSA, Traffic Safety Facts – Older Population: https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812372
- NHTSA, Older Driver Safety: https://www.nhtsa.gov/road-safety/older-drivers

OFF-ROAD TRANSPORTATION

For some Tribes located in remote areas the primary mode of travel may not be conventional motor-vehicles. Trail, ice road (see Figure 16), air, and marine travel may be significantly more prominent in some Tribal communities than the use of standard roadway vehicles used in most of the United States. At national and regional levels, data is extremely limited on the fatal and injury incidents associated with the use of many of these modes. The safety issues associated with these modes of travel are likely to be different from the motor vehicle issues.

Tribes are strongly encouraged to develop a transportation safety plan that describes the Tribe's transportation safety history. These plans should be based on local knowledge of incident history in the absence of formal incident databases. These plans can be an especially helpful communication tool when the primary modes of travel are not conventional motor vehicles. Such plans could help to enhance the understanding of these issues by safety partners.



Figure 16. Ice Road Crew from the Native Village of Napaimute working near the Village of Chuathbaluk, Alaska.
Photo courtesy of Mark Leary, Native Village of Napaimute

Resources are limited for this topic because it is very broad and not well documented or understood. Tribal communities looking to address off-road transportation safety should consider the applicability of countermeasures and principals found in the other sections of this plan. Many of these strategies may have applicability, especially those that address behavioral issues like occupant protection and impairment. Further research is needed to understand the magnitude of the problem and associated risk factors.

RESOURCES:

- For marine safety – US Coast Guard Auxiliary: http://www.uscgboating.org/recreational-boaters/index.php
- For All Terrain Vehicle (ATV) safety – ATV Safety Institute: http://www.atvsafety.org/
- For Snowmobiles – Snowmobile Safety Awareness Program: http://www.saferiderssafetyawareness.org

Animal-Vehicle Crashes

Crashes involving a single vehicle colliding with an animal are frequent in Tribal areas. These crashes typically cause property damage but very rarely result in injury to a human. From 2010-2014 in Tribal areas a live animal was involved in motor vehicle crashes that resulted in 32 human fatalities. FARS data does not document the animal species or differentiate between domestic and wild animals. Because of the frequency, crashes involving a live animal have been a common topic at safety summits and in transportation safety plans developed by Tribes.

Countermeasures available to address animal-vehicle crashes are limited. Large animal passages over or under roads are very expensive and many designs are still considered experimental. Intelligent transportation systems involving detection and warning for animals in the roadway have had limited success. Likewise, fencing, shoulder widening, and warning signage have limited success in addressing crashes with some species of animals.

FUNDING PROGRAMS

TRIBAL TRANSPORTATION PROGRAM - SAFETY FUND

The Tribal Transportation Program Safety Fund is a competitively selected annual grant for infrastructure improvement, safety planning, and the analysis and collection of safety data. Under the FAST Act the fund is about $9 Million per year, a two percent set-aside from the Tribal Transportation Program. Requests for funding have exceeded the available amount by at least 300% every year.

TRIBAL TRANSPORTATION PROGRAM – TRIBAL SHARES

Each federally recognized Tribe participating in the Tribal Transportation Program is provided with an annual allocation of funding. This funding can be used for a wide range of transportation needs including the implementation of infrastructure safety projects.

BIA INDIAN HIGHWAY SAFETY PROGRAM (IHSP)

The Highway Safety Act of 1966, 23 U.S.C. 402, provides Department of Transportation (DOT) funding to assist federally recognized Tribes with implementation of traffic safety projects. The program is administered by the BIA Indian Highway Safety Program under an agreement with NHTSA.

U.S. DEPARTMENT OF JUSTICE, COMMUNITY ORIENTED POLICING SERVICES

The U.S. Department of Justice Office of Justice Programs and Office of Community Oriented Policing Services offer programmatic opportunities to highlight best-practice community policing and safety programs. Opportunities exist for Tribal and local law enforcement agencies to apply for grants to pilot safety-oriented initiatives.

STATE HIGHWAY SAFETY PROGRAMS

States can utilize their funds provided by the NHTSA to fund federally recognized Tribes to address traffic safety issues in their State. The State Highway Safety Programs, commonly referred to as Section 402, was initially authorized by the Highway Safety Act of 1966 and has been reauthorized and amended several times, including most recently under the FAST Act.

Section 402 supports state highway safety programs, designed to reduce traffic crashes and resulting deaths, injuries, and property damage. Section 405(c) supports the development and implementation of effective State programs that evaluate or improve safety data quality. A State may use these grant funds only for highway safety purposes; at least 40 percent of these funds are to be used by or for the benefit of Tribal governments and political subdivisions of the State to address local traffic safety problems. States are required to provide a 20 percent match for this funding. The program is administered by NHTSA at the Federal level and by the State Highway Safety Offices at the State level. Crash data improvements are eligible under 23 U.S.C. 402 and 405(c).

HIGHWAY SAFETY IMPROVEMENT PROGRAM (HSIP)

The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), which was originally signed into law on August 10, 2005, (Public Law 109-59) established the Highway Safety Improvement Program (HSIP) as a core Federal-aid program administered by State transportation departments. The overall purpose of this program is to achieve a significant reduction in traffic fatalities and serious injuries on all public roads through the implementation of infrastructure-related highway safety improvements. The SAFETEA-LU established extensive new resources and opportunities to advance highway safety throughout the country in a comprehensive, strategic manner. Core requirements for the HSIP are that projects be data driven and consistent with the State's Strategic Highway Safety Plan which is to be developed in partnership with State, Tribal, and local entities. The requirements for the HSIP are codified in 23 U.S.C. 148.

ACRONYMS

ATV	All-Terrain Vehicle
BAC	Blood Alcohol Concentration
BIA	Bureau of Indian Affairs
CDC	Centers for Disease Control
CERT	Community Emergency Response Team
DOT	Department of Transportation
EMS	Emergency Medical Services
FAST	Fixing America's Surface Transportation Act
FARS	Fatality Analysis Reporting System
FHWA	Federal Highway Administration
HSIP	Highway Safety Improvement Program
IACP	International Association of Chiefs of Police
ITE	Institute of Transportation Engineers
IHS	Indian Health Service
IHSP	Indian Highway Safety Program
MASH	Manual for Assessing Safety Hardware
MUTCD	Manual on Uniform Traffic Control Devices
NCHRP	National Cooperative Highway Research Project
NHTSA	National Highway Traffic Safety Administration
SHSP	Strategic Highway Safety Plan
USDOT	United States Department of Transportation
WISQARS	Web-based Injury Statistics Query and Reporting System

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APPENDIX A. DATA ANALYSIS METHODOLOGY

METHODOLOGY

The fatal crash data analysis conducted for this report was selected from the Fatality Analysis Reporting System (FARS) in two ways:

- Crashes coded as Indian Reservation
- Geospatial analysis

FARS established a field called "special jurisdiction" that is supposed to be populated to indicate if a fatal crash occurs within an Indian reservation, national park, or a variety of other special conditions. There is indication that the "special jurisdiction" field is underutilized and not adequate to represent all crashes on Indian reservations. Also, not all Federally recognized Tribes have an Indian reservation.

Ideally a geospatial analysis would be conducted using a road inventory that represented all roadways with a transportation significance to Tribes. Unfortunately, the National Tribal Transportation Facility Inventory is the only such data source and it is not Geographic Information System enabled.

In the absence of a road inventory this analysis determined that Tribal area boundaries could be used to define the fatal crashes that are most applicable to Tribes. There are many ways in which Tribal areas can be defined. Tribal area boundaries cannot be consistently defined across the 566 federally recognized Tribes in the United States because of the various ways in which Tribal areas are established. Instead, for the purposes of this analysis Tribal areas are represented by following data sources:

- United States Geological Survey Protected Areas Database (USGS PAD) version 1.1 (all fatal crashes in Indian Reservations, Land owned by Tribes, Bureau of Indian Affairs Tribal Trust Land, and Alaska Native Village Corporation boundaries)
- All fatal crashes in high Native American population counties in Oklahoma
- Fatal crashes where the death of a Native American or Alaska Native was reported in a US Census TIGER Oklahoma Tribal Statistical Area.

The results published in this plan may vary from other published analyses of fatal crashes in Tribal areas. The primary difference is likely related to the definition of "Tribal areas" in Oklahoma and Alaska.

ALASKA

Most of the 229 Tribes in Alaska do not have an Indian reservation. Instead, the Alaska Native Claims Settlement Act (ANSCA) established regional and village corporations where Tribes have some land ownership. The US Census TIGER definition of Alaska Tribal Statistical Areas was considered. However, the Census definition of Tribal areas included large urban areas and very few crashes of concern to Tribes. So, for Alaska this study considered Tribal areas to be the Alaska village corporation boundaries, as documented by the USGS PAD, and the Annette Island Reserve. This results in the inclusion in this study of 37 fatalities from 2010-2014 motor vehicle crashes in Alaska.

OKLAHOMA

Native Americans and Alaska Natives are estimated to comprise 13% of the population in the State of Oklahoma (US Census Bureau, 2013). Within Oklahoma there are 38 federally recognized Tribes. These Tribes receive 18% of the Tribal Transportation Program shares because of their large populations and large roadway networks (which

mostly consist of state and county roads used by Tribal members). However, most Tribes in Oklahoma do not have Indian reservations.

Large Oklahoma Tribal Statistical Areas have been established which cover about three quarters of the State of Oklahoma. These areas include large cities such as Tulsa and parts of Oklahoma City. Discussion at several conferences and over the phone with several employees of Tribes located in Oklahoma determined that these large areas would not appropriately represent the transportation interest of Tribes.

In the absence of geocoded road network data or well defined Tribal boundaries, an approach was developed to include relevant crash data for Tribes in Oklahoma. (Jurney, 2017) This approach selects crashes that meet one of these criteria:

- All fatal crashes that occur in a county where Native Americans are a higher percentage of the population than the statewide average according to the 2013 American Community Survey.
- All fatal crashes in an Oklahoma Tribal Statistical Area if the crash was reported to involve the death of a Native American or Alaska Native.

The result of this definition for Tribal areas in Oklahoma results in the identification of 1,495 fatalities during 2010-2014. Oklahoma crashes are a significant portion (45%) of the data used to support this National Tribal Transportation Safety Plan.

FATALITIES DISTRIBUTION BY STATE

The data set supporting used in this study included 3,278 fatalities which occurred in Tribal areas. Table 1 shows the distribution of these crashes by state. Oklahoma has been identified separately in the following tables because a significant portion of the overall data set comes from Oklahoma and the definition of Tribal areas is different for Oklahoma Tribes. This information is displayed on a map in Appendix C.

State	Fatalities
Oklahoma	1484
Arizona	570
New Mexico	295
Montana	141
Washington	123
South Dakota	108
Idaho	94
North Dakota	89
California	48
Minnesota	42
Wisconsin	38
Alaska	37

State	Fatalities
Oregon	30
Utah	30
New York	28
Wyoming	27
Michigan	25
Colorado	14
Nevada	13
North Carolina	10
Nebraska	9
Kansas	8
Mississippi	3
Texas	2

State	Fatalities
Arkansas	1
Connecticut	1
Maine	1
Alabama	0
Florida	0
Indiana	0
Iowa	0
Louisiana	0
Maryland	0
Massachusetts	0
Rhode Island	0
South Carolina	0

TABLE 1. FATALITIES IN TRIBAL AREAS BY STATE

APPENDIX B. CRASH DATA CONTRIBUTING FACTORS ANALYSIS FOR TRIBAL AREAS

EMPHASIS TOPICS OVERVIEW

Emphasis topics shown in Table 2 were selected by a committee after review of several data sources including:

- Safety plans developed by Tribes
- The National Highway Traffic Safety Administration's Native American Traffic Safety Facts: https://cdan.nhtsa.gov/NA_report/NA_Report.htm
- The Center for Disease Control's Web-based Injury Statistics Query and Reporting System (WISQARS)
- State Strategic Highway Safety Plans with a Tribal emphasis.
- United States Geological Survey Protected Areas Database

Topic	Fatalities in Tribal Areas (Except Oklahoma)		Fatalities in Oklahoma Tribal Areas		Total, All Tribal Areas	Percentage of Total
Total	**1794**		1484		3,278	
Occupant Protection Devices Unused	**> 855 (808 not restrained, 47 not using helmets)**	48%	> 808 (686 not restrained, 122 not using helmets)	54%	>1663 (1494 not restrained, 169 no helmet)	> 51%
Roadway Departure	1086	61%	976	66%	2062	63%
Impaired Driving	746 w/ BAC 0.08 or greater 830 w/ BAC > 0	BAC=>.08: 42%	422 w/ BAC 0.08 or greater 488 w/ BAC > 0	BAC=>.08: 32%	1168 w/ BAC 0.08 or greater 1318 w/ BAC > 0	BAC=>.08: 36% BAC>0: 40%
Pedestrians	249	14%	97	6.5%	346	10.5%
Availability of Public Safety Services	40% of fatal crashes where sufficient data was available had greater than 1 hour from EMS notification to arrival at a hospital		46% of fatal crashes where sufficient data was available had greater than 1 hour from EMS notification to arrival at a hospital		44% of fatal crashes where sufficient data was available had greater than 1 hour from EMS notification to arrival at a hospital	

TABLE 2. SUMMARY OF DATA SUPPORTING SELECTED EMPHASIS TOPICS

Detailed Emphasis Area Contributing Factors Analysis

Additional facts were determined from the 2010-2014 FARS data analysis and are provided below for both Oklahoma Tribal areas and Tribal areas in the rest of the United States. In the data set are three cases in Oklahoma with four fatalities which overlap these two distinct definitions of Tribal areas. These four fatalities are reported with the Tribal areas (except Oklahoma) definition.

Occupant Protection

		Fatalities in Tribal Areas (except Oklahoma)	Fatalities in Oklahoma Tribal Areas	All Tribal Areas Fatalities
Passenger Vehicles	**Restrained**	339	426	765
	Unrestrained	736	630	1366
	Unknown	119	64	183
	Total	1194	1120	2314
Large Trucks	**Restrained**	13	19	32
	Unrestrained	6	26	32
	Unknown	3	15	18
	Total	22	60	82
Motorcycles	**Restrained**	53	26	79
	Unrestrained	47	122	169
	Unknown	7	2	9
	Total	107	150	257
Other/Unknown Vehicles	**Restrained**	8	1	9
	Unrestrained	66	30	96
	Unknown	128	5	133
	Total	202	36	238
Total	**Restrained**	413	472	885
	Unrestrained	855	808	1663
	Unknown	257	86	343
	Total	1525	1366	2891

- Fatalities of persons age 0-4 years old
  - Oklahoma Tribal areas: 20 fatalities
  - Tribal areas (except Oklahoma): 39 fatalities
- Fatalities of unrestrained persons age 0-4 years old
  - Oklahoma Tribal areas: 6 fatalities of unrestrained; 3 unknown if restraint used; 11 fatalities using restraining systems
  - Tribal areas (except Oklahoma): 22 fatalities of unrestrained; 14 unknown if restraint used; only 3 fatalities using restraining systems

ROADWAY DEPARTURE		Fatalities in Tribal areas (except Oklahoma)	Fatalities in Oklahoma Tribal Areas	Fatalities in All Tribal Areas	Fatalities by the Highest Driver BAC in the Crash	
					BAC=.01+	BAC=.08+
2010-2014	Not a Roadway Departure Crash	708	508	1216	295	258
	Roadway Departure Crash	1086	976	2062	1023	910
	Total	1794	1484	3278	1318	1168

- Number of vehicles
  - Oklahoma Tribal areas: 654 fatalities involved only a single vehicle (67 %); 322 involved multiple vehicles
  - Tribal areas (except Oklahoma): 812 fatalities involved only a single vehicle (74.8%); 274 fatalities involved multiple vehicles
- Rural vs. Urban
  - Oklahoma Tribal areas: 889 rural; 87 urban
  - Tribal areas (except Oklahoma): 1,002 rural; 79 urban; 5 unknown
- Light condition
  - Oklahoma Tribal areas: 539 fatalities in daylight; 385 fatalities in dark; 43 fatalities at dawn/dusk; 9 fatalities in unknown light conditions
  - Tribal areas (except Oklahoma): 485 fatalities in daylight; 495 fatalities in dark; 79 fatalities at dawn/dusk; 27 fatalities in unknown light conditions

Roadway Departure Fatalities by Atmospheric Weather Conditions			
	Tribal Areas (except Oklahoma)	Oklahoma Tribal Areas	All Tribal Areas (fatalities)
Clear	792	619	1411
Rain	39	56	95
Sleet/Hail	4	5	9
Snow	22	3	25
Fog, Smoke, Smog	16	9	25
Severe Wind	4	0	4
Cloudy	145	227	422
Other/Unknown	64	7	71
Total	**1086**	**976**	**2062**

Roadway Departure Fatalities by Surface Condition			
	Tribal Areas (except Oklahoma)	Oklahoma Tribal Areas	All Tribal Areas
Dry	867	841	1708
Wet	58	90	148
Snow, Ice, or Slush	83	22	105
Other	61	16	77
Mud, Dirt, Gravel, Sand	17	7	24
Total	1086	976	2062

Roadway Departure Fatalities by Horizontal and Vertical Alignment

Tribal Areas (except Oklahoma)				
	Straight (no curve)	Horizontal Curve	unknown	Total
Level	450	204	1	655
Slope	121	176	3	300
Hillcrest	36	14		50
Sag	1	4		5
Unknown	16	20	40	76
Total	**624**	**418**	**44**	**1086**

Oklahoma Tribal Areas				
	Straight (no curve)	Horizontal Curve	unknown	Total
Level	436	173		609
Slope	209	101		310
Hillcrest	28	3		31
Sag	7	4		11
Unknown			15	15
Total	680	281	15	976

Most Harmful Event in Roadway Departure Fatalities

Most Harmful Event	Tribal Areas (except Oklahoma)	Oklahoma Tribal Areas	All Tribal Areas
Overturn	631	344	975
Other Vehicle in Use	250	283	533
Tree, Shrub	63	155	218
Roadside Topography	31	47	78
Signs, Poles, Signals	22	30	52
Barrier	14	20	34
Culvert	8	17	25
Immersion	17	3	20
Fence	4	9	13
Parked Vehicle	4	5	9
Other	42	63	105
Total	**1086**	**976**	**2062**

IMPAIRED DRIVING

Alcohol impaired driving is not always reported because not every driver is tested. Because of the low reporting, National Highway Traffic Safety Administration (NHTSA) has developed a statistical method known as multiple imputation that is used to estimate the involvement of alcohol in fatal motor vehicle crashes. The following numbers are estimates of fatalities where an impaired driver was involved.

	Tribal Areas (except Oklahoma)	Oklahoma Tribal Areas	All Tribal Areas
Total	1794	1484	3278
BAC=>.01	830	488	1318
BAC=>.08	746	422	1168

PEDESTRIANS

- Pedestrian fatalities
  - Oklahoma Tribal areas: 97 fatalities in 94 cases
  - Tribal areas (except Oklahoma): 249 fatalities in 244 cases
- Pedestrian Fatalities by Rural/Urban and Roadway Functional Classification

Rural	**Oklahoma Tribal Areas**	**Tribal Areas (except Oklahoma)**	**All Tribal Areas**
Rural Interstate (1)	10	16	26
Rural-Principal Arterial - Other (2)	14	51	65
Rural-Minor Arterial (3)	14	36	50
Rural-Major Collector (4)	21	38	59
Rural-Minor Collector (5)		10	10
Rural-Local Road or Street (6)	6	40	46
Rural-Unknown Rural (9)		5	5
Rural Total	**65**	**196**	**261**
Urban			
Urban Interstate	4	7	11
Urban-Principal Arterial - Other (Freeways or Expressways) (12)		2	2
Urban-Other Principal Arterial (13)	17	12	29
Urban-Minor Arterial (14)		9	9
Urban-Collector (15)	2	10	12
Urban-Local Road or Street (16)	9	8	17
Urban-Unknown Urban (19)		1	1
Urban Total	**32**	**49**	**81**
Unknown (99)		**4**	**4**

- Pedestrian location at time of fatal crash

Rural/Urban	Location	Tribal Areas (except Oklahoma)	Oklahoma Tribal Areas	All Tribal Areas
Rural	On Road, No Marked Crosswalk	152	51	203
	Unknown	24	1	25
	Shoulder/Roadside	8	9	17
	Intersection	10	4	14
	Not at Intersection, In Marked Crosswalk	1		1
	Sidewalk	1		1
Urban	On Road, No Marked Crosswalk	39	26	65
	Intersection	6	2	8
	Shoulder/Roadside	2	2	4
	Unknown	1	2	3
	Sidewalk	1		1
Unknown (99)	Unknown	4		4
Total		**249**	**97**	**346**

- Pedestrian Impairment (not driver impairment)

Pedestrian Fatalities - Alcohol Impairment of pedestrian				
	Male	**Female**	**Unknown**	**Total**
Tribal Areas (except Oklahoma)				
0 BAC	26	16		42
0.01-0.07 BAC	1			1
0.08 or higher	83	28		111
Unknown	45	13	1	58
Test not given	28	8		36
Oklahoma Tribal Areas				
0 BAC	40	11		51
0.01-0.07 BAC	1	1		2
0.08 or higher	25	8		33
Test not given	6	5		11
All Tribal Areas Total	**255**	**90**	**1**	**346**

- Age/gender distribution for pedestrian fatalities

	Male	Female	Unknown	Total
Tribal Areas (except Oklahoma)				
0-10	6	6		12
11-20	22	13		35
21-30	63	18		81
31-40	22	10		32
41-50	28	6		34
51-60	18	7		25
61-70	14	4		18
>70	6	1		7
Unknown	4		1	5
Oklahoma Tribal Areas				
0-10	4	2		6
11-20	8	3		11
21-30	14	4		18
31-40	11	2		13
41-50	11	6		17
51-60	14	5		19
61-70	8	1		9
>70	2	2		4
Total	**255**	**90**	**1**	**346**

Light Conditions for Pedestrian Fatalities

Light Condition	Oklahoma Tribal Areas	Tribal Areas (except Oklahoma)	Total
Daylight	17	35	52
Dawn/Dusk	4	6	10
Dark	64	154	218
Dark - Lighted	12	33	45
Unknown		21	21
Total	**97**	**249**	**346**

Pedestrian fatalities by time of day (All Tribal areas combined)

Time of Day	Total
Midnight	14
1am	14
2am	16
3am	13
4am	12
5am	15
6am	9
7am	5
8am	1
9am	6
10am	4
11am	4

Time of Day	Total
Noon	2
1pm	2
2pm	7
3pm	8
4pm	4
5pm	12
6pm	33
7pm	23
8pm	35
9pm	32
10pm	28
11pm	26
unknown	21

Bicycle fatalities

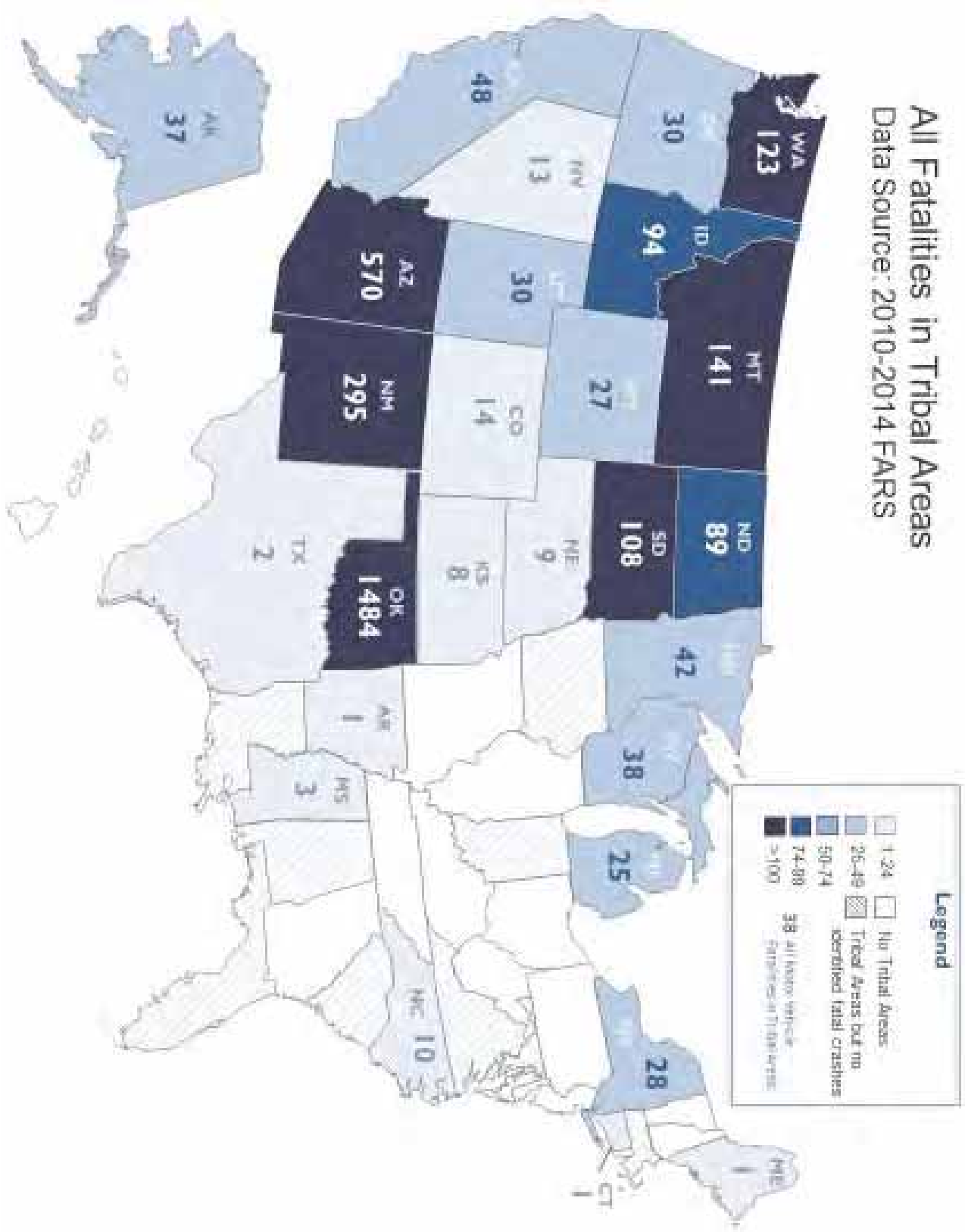
- Oklahoma Tribal areas: 9 bicycle fatalities; 5 other personal conveyance fatalities
- Tribal areas (except Oklahoma): 16 bicycle fatalities; 2 other personal conveyance fatalities; 1 non-motorized unknown type of vehicle

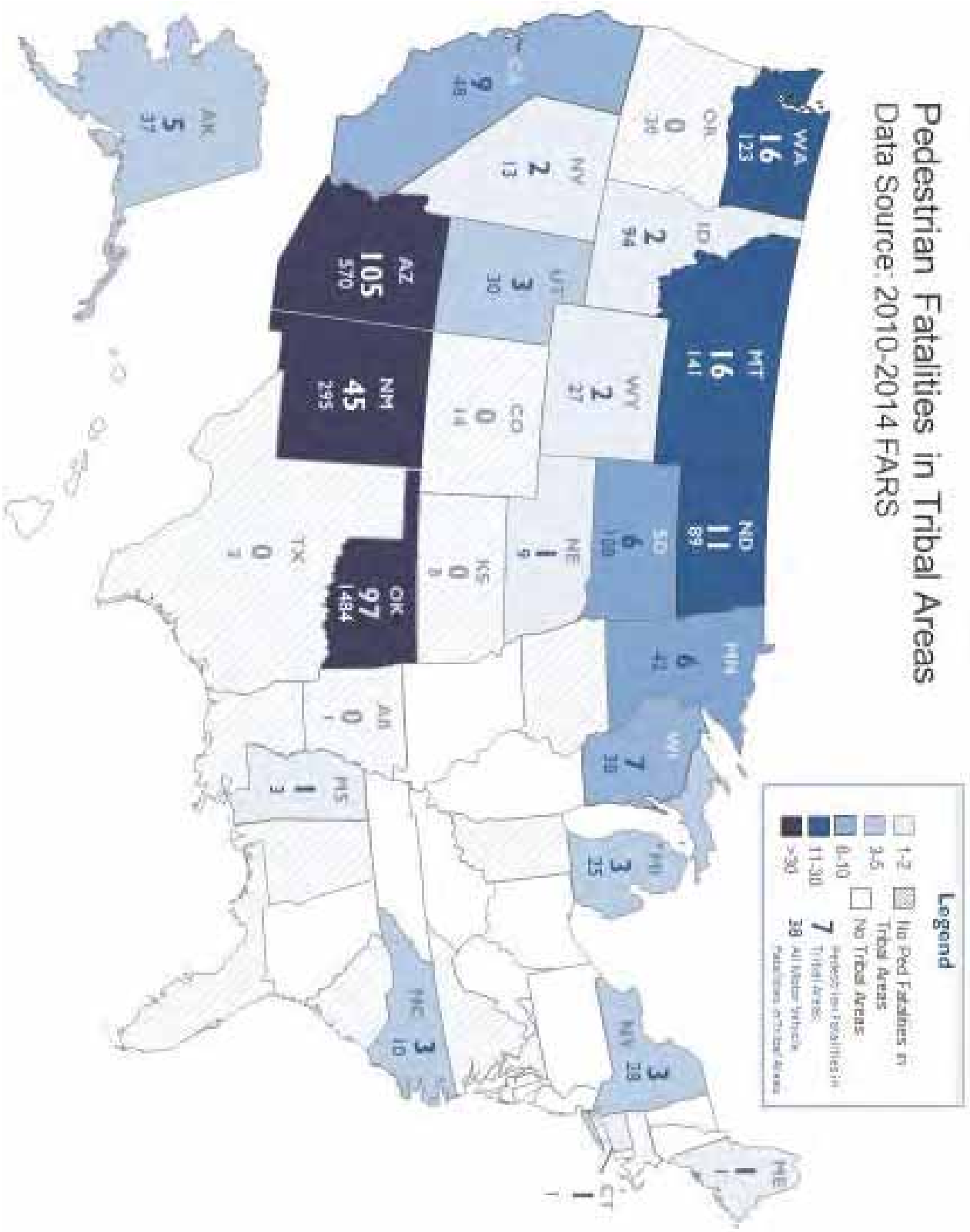
Availability of Public Safety Services

- Complete Emergency Medical Service (EMS) Response Time data was available for 1/3 fatality reports in Tribal areas (Oklahoma Tribal areas and rest of Tribal areas combined).
- EMS Response Times greater than one hour from notification to arrival at the treatment facility
  - Oklahoma Tribal areas: 46% of the cases with sufficient data reported more than one hour
  - Tribal areas (except Oklahoma): 40% of the cases with sufficient data reported more than one hour
  - All Tribal areas: 44% of the cases with sufficient data reported more than 1 hour
  - All USA: 23% of all cases with sufficient data

Additional Topics

	Oklahoma Tribal Areas		Tribal Areas (except Oklahoma)		All Tribal Areas	
	Fatalities	%	Fatalities	%	Fatalities	%
All fatalities	**1484**		**1794**		**3278**	
Speed Involved	370	25%	648	36%	1018	31%
Distracted	Indeterminate		Indeterminate		Indeterminate	
Intersections	303		20%		182	
Younger Drivers (Age 15-21)	197	10%	227	13%	424	13%
Older Drivers (Age 65+)	268	14%	175	9%	443	13%
Off-Road Transportation	Indeterminate		Indeterminate		Indeterminate	
Animal-Vehicle	14	1%	18	1%	32	1%


All Fatalities in Tribal Areas
Data Source: 2010-2014 FARS
Legend
1-24
25-49
50-74
74-99
>100
No Tribal Areas
Tribal Areas but no identified fatal crashes
38 All Motor Vehicle Fatalities in Tribal Areas
WA 123
30
48
NV 13
ID 94
MT 141
AZ 570
30
27
NM 295
CO 14
ND 89
SD 108
NE 9
KS 8
OK 1484
TX 2
AR 1
MS 3
42
38
25
28
NC 10
ME 1
AK 37


Pedestrian Fatalities in Tribal Areas
Data Source: 2010-2014 FARS
Legend
1-2
3-5
6-10
11-30
>30
No Ped Fatalities in Tribal Areas
No Tribal Areas
7 Pedestrian Fatalities in Tribal Areas
38 All Motor Vehicle Fatalities in Tribal Areas
WA 16 123
OR 0 30
ID 2 94
MT 16 141
ND 11 89
SD 6 100
NE 1 9
KS 0 8
OK 97 1484
TX 0 7
NM 45 295
AZ 105 570
CA 9 48
NV 2 13
UT 3 30
WY 2 27
CO 0 14
MN 6 42
WI 7 38
MI 3 25
NY 3 38
ME 1 1
CT 1 1
MC 3 10
AR 0 1
MS 1 3
AK 5 37