



Tribal School Zone Safety Literature Review



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16. Abstract Motor vehicle crashes are the leading cause of death for Native Americans ages 4 to 44 years. Although traffic-related injuries and fatalities have been reduced in the U.S. over the past half century, American Indians continue to face higher traffic-related risk than the general U.S. population. Crashes involving pedestrians on tribal lands pose a significant problem. Among American Indian/Alaska Native, pedestrian crashes are the fourth leading cause of death and American Indians have higher rates of pedestrian injury and death per capita than any other race or ethnic group in the U.S. Similar to the overall American Indian/Alaska Native population, Native American children and youth face elevated rates of pedestrian crash injuries and fatalities. A dearth of information exists specific to child traffic related injuries and fatalities within school zones. However, across the U.S, each year approximately 800 school-aged children are killed in motor vehicle crashes during the morning and afternoon school travel hours. These deaths include children from all race and ethnic groups. Of these deaths, about 2% (20) are school bus-related (5 school bus passengers and 15 pedestrians). The other 98 % of school-aged deaths occur in passenger vehicles or to pedestrians, bicyclists, or motorcyclists. There are over 562 federally recognized tribes and 313 federal reservations that encompass almost 56 million acres of land in the U.S.. The majority of American Indian/Alaska Native tribes are sovereign nations, thus pass and enforce their own traffic safety laws. American Indian/Alaska Native groups are culturally and linguistically diverse with more than 200 native languages spoken. Many Native Americans live in rural, isolated areas where the roads are frequently narrow, poorly maintained and consist of unmarked oncoming lanes, few signs and poor lighting. Native American Communities present unique challenges for traffic and pedestrian safety. The culture, identification of leaders, at-risk populations and attitudes about prevention all differ from what is described in non-Native American communities. Understanding the social norms of a particular Native American group is crucial for developing interventions that will be successful. Based on the literature reviewed, motor vehicle crashes and pedestrian-motor vehicle crashes are significant issues facing the Native American populations.			
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Background on Native America

There are over 562 federally recognized tribes, including Alaska Native villages, and 313 federal reservations that encompass almost 56 million acres of land in the United States (U.S.). The majority of American Indian/Alaska Native tribes are sovereign nations, thus pass and enforce their own traffic safety laws. American Indian/Alaska Native groups are culturally and linguistically diverse with more than 200 native languages spoken. Many Native Americans live in rural, isolated areas. Frequently the roads in Indian Country are narrow, poorly maintained and consist of unmarked oncoming lanes, few signs and poor lighting. These roads often cross major highways on reservations, thus forming potentially dangerous intersections. The remoteness of these roads and intersections also can make it difficult for emergency vehicles to promptly arrive at crash scenes.¹

Native American traffic safety

Motor vehicle crashes are the leading cause of death for Native Americans ages 4 to 44 years.² Although traffic-related injuries and fatalities have been reduced in the U.S. over the past half century, American Indians continue to face higher traffic-related risk than the general U.S. population.³ Between 1975 and 2002, the number of fatal crashes on Indian reservations increased 52.2% while the total number of fatal crashes in the U.S. decreased 2.2%.⁴

The age-adjusted fatality rate from motor vehicle crashes among Native Americans is about twice as high compared to white, and the rate among members of the Navajo Nation (one of the largest American Indian tribes in the U.S.) is five times as high.^{5, 6, 7} Similar results were found in studies that examined American Indian populations in New Mexico and Arizona. Between 1959 and 1990, both male and female American Indians in New Mexico had motor vehicle fatality rates two to three times higher than whites.⁸ Campos-Outcalt and colleagues examined motor-vehicle crash fatality rates among different race and ethnic groups in rural and urban Arizona.⁹ Compared to other groups, the American Indian study population had disproportionately higher fatality rates in all age strata, in rural and urban areas and among vehicle occupants and pedestrians. Major factors contributing to these disparities included lower rates of seatbelt use, residing in rural areas, higher crash rates involving alcohol and a greater number of vehicle occupants.⁹

These elevated rates of motor vehicle crash fatalities are not unique to any one particular tribe or geographic region. Patel and colleagues analyzed data compiled by the CDC's National Center for Health Statistics on injury mortality from 1989-1998 for Native American children and youth residing in the 12 Indian Health Service (IHS) Areas. They found for all IHS Areas, that Native Americans 0 to 19 years old had motor vehicle related death rates higher than rate for the U.S. general population in the same age range. (Table 1). FARS data collected for the years 1975 to 2002 show that over 6,000 fatal motor vehicle crashes occurred on roads under the jurisdiction of Indian reservations.^{4, 2} These data on fatal motor-vehicle crashes occurring on Indian reservations across the U.S. over the past 30 years revealed seatbelt use and crashes involving alcohol as two areas of concern.

Table 1. Motor-vehicle and pedestrian related deaths for Native Americans ages 0 to 19 in the IHS Areas 1989-1998

IHS Area [‡]	Motor-vehicle related deaths per 100,000 population	Pedestrian related deaths per 100,000 population
Aberdeen Area (serves North Dakota, South Dakota, Iowa, and Nebraska)	39.5	7.5
Alaska Area (serves Alaska)	12.1	3.2
Albuquerque Area (serves New Mexico, Colorado and Texas)	33.7	8.3
Bemidji Area (serves Indiana, Minnesota, Michigan and Wisconsin)	29.7	5.4
Billings Area (serves Montana and Wyoming)	43.9	7.0
California Area (serves California and Hawaii)	17.0	3.9
Nashville Area (serves Eastern U.S.)	20.5	3.0
Navajo Area (serves Arizona, New Mexico, and Utah)	37.3	10.9
Oklahoma City Area (serves Oklahoma, Kansas, Texas)	16.7	2.0
Portland Area (serves Idaho, Oregon, and Washington)	22.4	3.1
Tucson Area (serves Southern Arizona)	24.5	8.2
All IHS Areas rate	26.4	5.5
US rate	11.5	1.5

[‡] See Figure 1 on page 6 for visual reference.

Source: Patel et al 2005

Compared to other race and ethnic groups, restraint usage by Native American motor-vehicle occupants on reservation continues to lag behind the national restraint usage rate.⁴ FARS data for crashes on Indian reservations from 1975 to 2002 show 76% of the fatally injured motor-vehicle occupants were not restrained at time of crash.⁴ Analysis of FARS data from 1999 to 2004 yielded similar findings and illustrated the rates are not declining. Seventy-eight percent of the Native Americans age 5 years and older killed in motor-vehicle crashes while driving or a passenger were unrestrained and over 50% of Native American children under 5 years of age killed in crashes were not in a child safety seat.² Young Native American children (<5 years of age) fatally injured in motor-vehicle crashes were the least likely to have been in child safety seats (only about 27%) or to have been wearing safety belts (< 7%) compared to their peers in other race and ethnic groups.²

Rates of alcohol involvement with motor-vehicle crashes among the Native American population are high. From 1982 to 2002, 65% of the 4,592 fatal motor-vehicle crashes that occurred on Indian reservations involved alcohol compared to 47% of motor-vehicle crashes nationally.⁴ The percentage of fatally injured drivers who were drinking was higher for Native Americans (57%)

than any other race or ethnic group according to FARS data from 1999 to 2004.² Although females traditionally have lower rates for alcohol use and other risky behaviors, the percentage of Native American females drinking and driving was considerably higher compared to females in other racial and ethnic groups.²

Native American pedestrian safety

Crashes involving pedestrians on tribal lands pose a significant problem. Among American Indian/Alaska Native, pedestrian crashes are the fourth leading cause of death and American Indians have higher rates of pedestrian injury and death per capita than any other race or ethnic group in the U.S.¹⁰ Adult pedestrian death rates for Native Americans were almost 3.5 times that of whites and 2.0 times that of blacks.¹¹ Data reported by the CDC/National Center for Health Statistics-Web-based Injury Surveillance and Reporting System (WISQARS) for 2001 show the age-adjusted pedestrian crash mortality rate for American Indian was 3.9 per 100,000 population, which was significantly higher than the national age-adjusted mortality rate of 1.68.¹⁰ Compared to their female counterparts, Native American males are nearly four times more likely to die from pedestrian-related injury.¹¹

A recent FHWA report by La Valley and colleagues on pedestrian safety in Native America identified factors associated with the high rates of pedestrian fatalities among American Indians/Alaska Natives.¹⁰ These factors included alcohol use, low income levels, rurality, low levels of education, proximity to bars, and roadway characteristics such as road design, traffic controls, and lighting. Similar to the motor-vehicle crash factors, alcohol involvement on the part of the pedestrian or driver contributed to elevated pedestrian fatality rate. Pedestrian fatalities involving alcohol occur more frequently among American Indians/Alaska Natives than all other race and ethnic groups with alcohol involved in 56% of American Indian pedestrian deaths compared to 31% for non-American Indian/Alaska Native pedestrian fatalities.¹⁰ Oftentimes, the pedestrian had been drinking at the time of the crash. Almost 70% of fatally injured Native American non-occupants[‡] over 15-years old had elevated blood alcohol levels when the crash occurred.²

New Mexico, Arizona, South Dakota, North Carolina, Wyoming, Washington and Tennessee had the highest rates of American Indian/Alaska Native pedestrian injury. These are states with the lowest population density (rural states) and with greater than 25% of American Indian/Alaska Native population living below the poverty line. They also have large American Indian/Alaska Native populations and except for New Mexico, have the highest American Indian/Alaska Native pedestrian fatality rates in the U.S. (Table 2).¹⁰ This is consistent with other research that indicates pedestrian injury rates are higher among minority status families and those living in rural and low-income areas.¹²

The American Indians/Alaska Natives experience more rural pedestrian fatalities than all other race and ethnic groups. Rural locations have an American Indian/Alaska Native pedestrian fatality rate per 100,000 population of 5.9 deaths versus 3.75 deaths per 100,000 population for urban areas.¹⁰ Higher vehicle speeds on rural roads and longer travel distances to medical care are factors that may help explain why nearly 30% of rural area crashes involving an American

[‡] In FARS system, non-occupants are mainly pedestrians and secondarily cyclists but can include occupants of parked cars, wheel chair, skate boards, other non-motorized transport devices and road maintenance equipment.²

Indian pedestrian results in death for the pedestrian.¹ The relationship between rurality and heightened pedestrian crash risk may also be influenced by inadequate transportation and small American Indian/Alaska Native communities in rural states being connected and bisected by state highways.^{13, 10} These highways serve as main roads through town and as connectors between towns. Walking may be the only viable transportation mode as access to transit and private vehicles may be limited. Additionally, states may place the emphasis of rural transportation enhancements on the maintenance and expansion of highways rather than pedestrian travel.¹⁰

Table 2. U.S. States with the highest American Indian/Alaska Native pedestrian fatality rates, 2003

State	Fatality rate per 100,000 population
Wyoming	16.49
Tennessee	10.94
Arizona	9.98
South Dakota	7.61
Washington	7.04
North Carolina	6.39

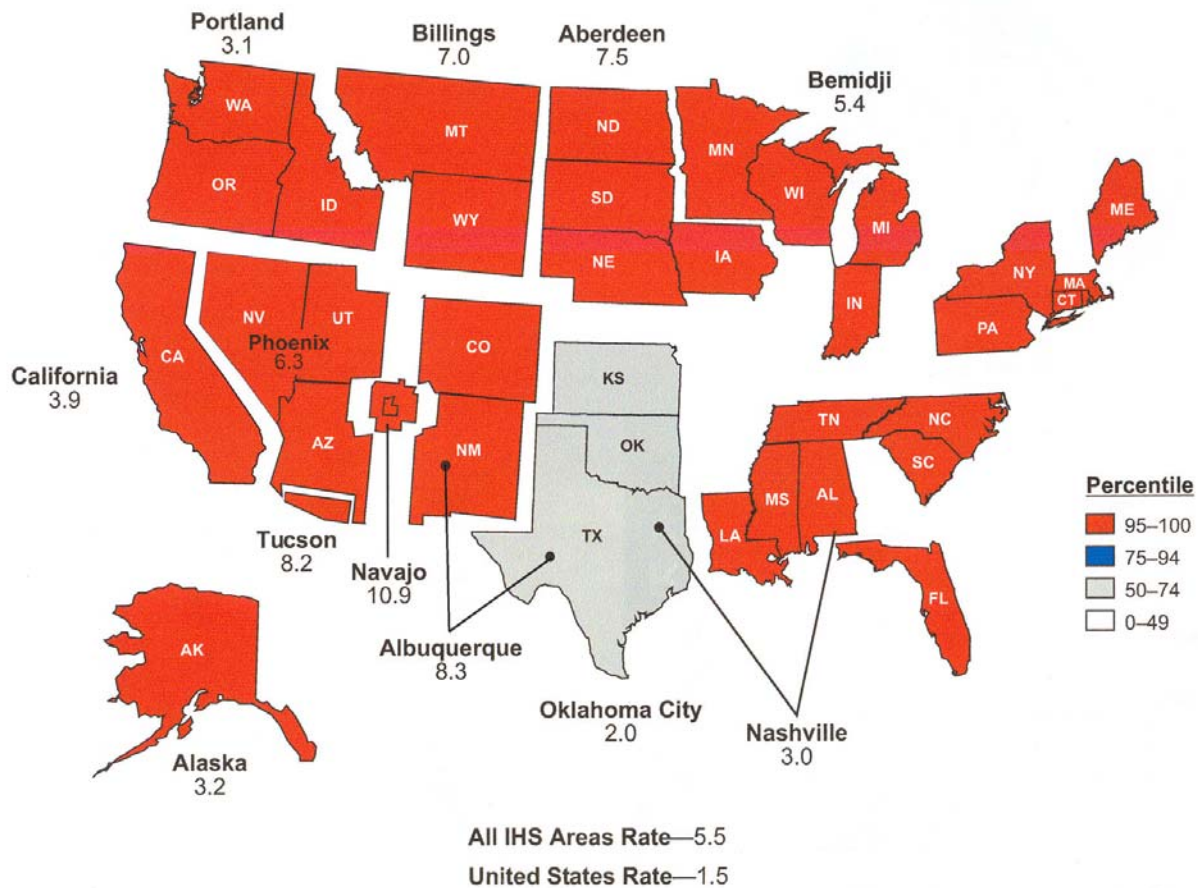
Adapted from La Valley 2004

Children and Youth

Similar to the overall American Indian/Alaska Native population, Native American children and youth face elevated rates of pedestrian crash injuries and fatalities. One study on childhood pedestrian deaths in New Mexico found that Native American children had the highest rates for pedestrian deaths of New Mexican children 0 to 14 years old who were fatally injured by motor vehicles.¹³ Compared with their black and white contemporaries in the US, Native Americans 19 years and younger had the highest injury-related death rates for motor vehicle crashes and pedestrian events.¹⁴

Injury mortality data from the CDC’s National Center for Health Statistics for 1989-1998 show that Native Americans 0 to 19 years residing in the 12 Indian Health Service (IHS) Areas (Figure 1) had a pedestrian-related fatality rate per 100,000 population that was 3.7 times higher (5.5 compared to 1.5) than the rate for the U.S. (Table 1). Across the 12 IHS Areas the pedestrian fatality rates ranged from 2.0 to 10.9 with the Aberdeen, Tucson, Albuquerque and Navajo IHS Areas having the highest pedestrian fatality rates among Native American ages 0-19 years old (5 to 7 times greater than the U.S. national rates). Furthermore, among the Alaska, Navajo and Tucson Areas, more than 25% of the children and youth (0-19 years) killed in motor vehicle crashes were pedestrians.¹⁵ For the American Indian/Alaska Native population age 0-19 years, Patel et al identified the highest rates of pedestrian-related death as occurring in two age groups: 1 to 4 years and 15 to 19 years.¹⁵ A comparison by gender among race shows that Native American males were over two times more likely than black males and almost four times as likely as white males to be killed as a pedestrian. Pedestrian crash rates of Native American females were 2.0 to 3.6 times greater than rates for black and white females respectively.¹⁵

Figure 1. Map of the 12 IHS Areas^{††} showing the pedestrian related deaths per 100,000 population of Native Americans 0 to 19 years old from 1989 to 1998.



^{††} IHS Areas are not necessarily defined by state borders. For example, the Albuquerque and Nashville IHS Areas include land in Texas (as indicated by the dual lines coming from these IHS Areas into Texas.)

Each IHS Area is listed by name with its age-adjusted mortality rate per 100,000 population. The colors of the map correspond to where the Area rate falls in relation to the national ranking of state rates for all racial groups combined from 1989 to 1998. The Areas in red have the highest pedestrian death rates and rank higher than 95% of all states. Areas in gray have pedestrian death rates that rank between 50% to 75% of all states.¹⁵

Source: Patel 2005

Within the NA population, 2003 data from the CDC WISQARS show that pedestrian fatality rates per 100,000 population were calculated for rural and urban groups.¹⁰ The pedestrian fatality rates for American Indian/Alaska Native females age 0 to 19 years old in urban and rural areas were approximately 1.0 and 3.0 per 100,000 respectively. Among American Indian/Alaska Native males 0 to 19 years old residing in urban locations, the pedestrian fatality rate was approximately 3.8 and for rural areas the rate was almost 5.0 with all of these deaths occurring in the 15 to 19 year age range.¹⁰

Native American pedestrian fatality

The typical American Indian/Alaska Native pedestrian fatality in the U.S. in 2003 occurred in a rural area, in the months of summer on a Saturday between 9:00 pm and 6:00am.¹⁰ The road was an undivided, unlit, two lane major rural collector, at a non-intersection location, without a crosswalk, with no traffic controls (82%) present, no street lights (50%) and vehicle speeds over 50 mph (74%). This incident most frequently involved male pedestrians 35 to 39 years of age. The top contributing factors in these crashes were ‘pedestrian in roadway’ (84%) and ‘pedestrian not visible’ (19%). The pedestrian had consumed alcohol in 56.3% of these crashes. The mean blood alcohol concentration (BAC) of these pedestrian fatalities was 0.23 mg/dL.¹⁰

Although pedestrian crashes among American Indian occur most commonly at night, daytime pedestrian injuries are common among children and the majority (94%) of NA pedestrian-related deaths among children and youth (age 0-19 years) occur on public roads.^{10,15} Consistent with other child pedestrian crash data, the majority (54%) of American Indian/Alaska Native children age 1 to 4, killed as pedestrians, were fatally injured in non-traffic locations such as private driveways and parking lots.^{13,15} Data on child pedestrian deaths in New Mexico from 1986 to 1990 reveal that across race and ethnic groups, including Native American, children 5 to 14 years old were more likely than younger children to be hit by a motor vehicle in a roadway.¹³

Factors that contribute to pedestrian injury in Native America include motorist and pedestrian behavior. Motorist speeding and failure to comply with traffic laws are driver behavior that can contribute to a fatal pedestrian crash. Lack of visibility, alcohol use, inattention, and walking within the roadway are behaviors that contribute to pedestrian injury and death among American Indian/Alaska Native.¹⁰ Other pedestrian behaviors that increase the risk of injury include walking along state and federal highways for intercommunity pedestrian travel.¹⁰

The interaction between pedestrian and motorist is an important factor in American Indian/Alaska Native pedestrian crashes. In 94% of American Indian/Alaska Native fatal pedestrian crashes the actual roadway was the location of the vehicle/motorist involved in the pedestrian crash—drivers seldom hit American Indian/Alaska Native pedestrians who were on sidewalks or in the median.¹⁰ The most common location in an American Indian/Alaska Native pedestrian fatality is in the roadway, at a non-intersection, accounting for 67.8% of American Indian/Alaska Native pedestrian fatalities.¹⁰

LaValley et al. compared fatal pedestrian crashes in the American Indian/Alaska Native population between urban and rural locations.¹⁰ Urban areas had lower pedestrian fatality rates than rural areas. The at-risk groups identified for urban locations were males 35 to 49 years old and females 35 to 39 years old.¹⁰ More children and elderly pedestrian fatalities occurred in urban areas versus rural areas in which improper crossing and walking in the roadway were cited as pedestrian behaviors contributing to the crashes. Poor visibility is also a factor, as demonstrated by the association of pedestrian injuries among children with the presence of parked cars.¹⁶ Research by Roberts et al. on the correlates of childhood pedestrian injuries in traffic found that streets with greater volume of vehicles and higher speeds were associated with greater risk of childhood pedestrian injuries than streets with lower volume and speed.¹⁷ The inattention in young children and improper crossing behavior often result in pedestrian injury.

Children under the age of eight, who cross streets alone, are more often involved in crashes due to them not crossing streets safely and correctly.¹⁰

American Indian pedestrian crashes occur most frequently in rural areas both on and off tribal lands. Rural area and on-reservation pedestrian crashes are associated with a lack of pedestrian facilities and other traffic control devices. Among rural American Indian/Alaska Native populations, males 15 to 39 years old and females age 25 to 39 were the main at-risk groups for rural pedestrian fatality.¹⁰ Two main pedestrian-attributed factors contributing to rural pedestrian fatalities were ‘walking in the roadway’ and ‘pedestrian not being visible to driver.’¹⁰ American Indian/Alaska Native driver behavior primarily contributing to fatal pedestrian crashes are driver inattention, speeding, and failure to yield. Additionally, compared to urban crashes, rural drivers were more likely to be male and to have been cited for drinking at the time of the crash.¹⁸

Motor vehicle speed is an important risk factor for injury and an important determinant of injury severity. Pedestrian crash severity is also much lower at low motor vehicle speeds. If a pedestrian is struck by a car traveling at 40 mph, there is an 85% likelihood that the pedestrian will be killed. This percentage drops to 45% at 30 mph and 5% at 20 mph.¹⁹ In 74% of rural fatal pedestrian crashes involving American Indian/Alaska Native, the vehicle speed exceeded 50 mph compared to 22.8% of urban crashes.¹⁰

Safety on the school journey via motor vehicle

Across the U.S, each year approximately 800 school-aged children are killed in motor vehicle crashes during the morning and afternoon school travel hours. These deaths include children from all race and ethnic groups. Of these deaths, about 2% (20) are school bus-related (5 school bus passengers and 15 pedestrians). The other 98 % of school-aged deaths occur in passenger vehicles or to pedestrians, bicyclists, or motorcyclists.²⁰ At the same time, approximately 152,000 school-age children are nonfatally injured during normal school travel hours each year. The majority (> 80%) of these nonfatal injuries occur in passenger vehicles; 11% occur to pedestrians and bicyclists, only 4% are school bus-related (about 5,500 school bus passengers and 500 school bus pedestrians), and fewer than 1% are to passengers in other buses.²²

A disproportionate share, approximately 55%, of the 800 passenger vehicle-related deaths occurred when a teenager was driving.²² Other studies have found similar results. After examining injury and death risk to U.S. school age children and youth during the morning commute Dellinger and Beck found that during two separate 3-year time periods the fatality rates and nonfatal injury rates were highest for passenger vehicles driven by persons under 21 years of age.²¹

From 1994 to 2004, 1,479 people died in school transportation-related crashes.[‡] Non-occupants (pedestrians, pedalcyclists, etc.) accounted for 22% of the deaths, and occupants of school transportation vehicles accounted for 8%. The other 70% of the people who died in those crashes were occupants of other vehicles involved.²² During that same time period, 182 school-age pedestrians (younger than 19 years old) were killed by school transportation-related crashes and

[‡] In these cases, a school transportation-related crash is a crash which involves, either directly or indirectly, a school-bus-body vehicle or a non-school bus functioning as a school bus, transporting children to or from school or school-related activities.

nearly 50% of these pedestrians were between ages 5 and 7 years. Of the 182 deaths, approximately 64% were killed by school buses, 5% by vehicles functioning as school buses, and 31% by other vehicles involved in the crashes.²²

According to NHTSA, 23 million students nationwide ride the school bus to and from school.²³ Across the country, children have a higher risk of injury when approaching or leaving the school bus than actually riding the bus.²³ It is important to educate children and adults on traffic safety rules and how to properly approach, board, alight, and leave the school bus.²³

Considerations for working with Native American populations

Native American Communities present unique challenges for motor vehicle and traffic and pedestrian safety. The culture, identification of leaders, at-risk populations and attitudes about prevention all differ from what is described in non-Native American communities.¹⁰ Perhaps this helps explain why most safety public awareness campaigns currently used for the general U.S. population may not be well-received by some Native Americans.¹

Programs and interventions that are customized for a target group often are more successful within that group than using efforts designed for the general population.³ Therefore, traffic safety efforts aimed at Native Americans need to be comprehensive, include environmental changes, actively involve the community and be tailored to local tribal culture and practice in their design and implementation.^{3, 15, 10}

Understanding the social norms of a particular Native American group is crucial for developing interventions that will be successful. For instance, some tribes believe that discussing injury and fatality can bring these events into being.¹⁰ Among the Navajo, discussing negative information and outcomes conflicts with their culture.²⁴ For example, a seat belt message delivered to Navajo members directly that states, “if you do not wear a seat belt and are in a crash then you might be injured” can be interpreted as wishing that event on them. Thus discussions and messages should focus on positive outcomes. In this particular example, the message should focus on people who survived a crash while wearing seat belts.²⁵

In some tribes guidance from traditional healers, tribal elders or community workers can be sought.^{1, 26} In other tribes, the tribal health director may be the appropriate contact. Also the use of traditional spiritual leaders to offer blessing prior to safety events helps provide people with a sense of true community ownership.²⁵ Many tribes have cultural centers to help nonmembers gain a greater understanding of the tribe. Furthermore, in communicating with American Indian/Alaska Native communities, it is recommended to convey information in a clear nonjudgmental style that is free of jargon and to avoid comparisons between American Indian/Alaska Native people and people of other cultures.²⁶ In some tribes, like the Navajo, people listen and observe and may not immediately respond. Outsiders working with Navajo should be aware that this initial non-response is their culture and not a sign of not caring or not listening.²⁵

In 2002, La Valley and colleagues conducted two series of focus groups in nine American Indian/Alaska Native communities across the U.S. to assess change readiness and strategies that

might be effective in addressing the high rates of pedestrian injury among American Indian/Alaska Native communities.¹⁰ Focus groups identified successful strategies for addressing pedestrian injury among American Indian communities including education and media based interventions, law enforcement interventions, child education, and pedestrian facility improvements.¹⁰

The majority of community participants indicated that, in general, individual responsibility and community responsibility for pedestrian safety was equal. With regards to children however, the attitude of a larger percentages of participants indicated that the community possessed a greater responsibility for pedestrian safety than the individual.¹⁰ Community beliefs on individual responsibility versus community responsibility for protecting intoxicated pedestrians indicated that promoting community action to address this issue may not be effective.

Results from the focus groups suggest that American Indian communities, once informed, may be ready to develop pedestrian safety interventions that are tailored specifically to their community.¹⁰ The results also indicate a history of little interest in engineering strategies and a greater interest using education to change behavior. Education is necessary, however when used alone is insufficient to achieve sustained measurable behavior change. There is a need to focus education or public awareness efforts on successful interventions that have incorporated several strategies into the overall intervention.¹⁰ One generic example is the use of appropriate traffic control devices to complement an educational campaign on safe and appropriate street crossings.

Program examples of working with Native American populations

Native American tribes across the U.S. are working with organizations such as FHWA, NHTSA and other groups to increase pedestrian and motor-vehicle safety within their communities. The FHWA has sponsored comprehensive Road Safety Audit programs on reservations in an effort to reduce traffic fatalities among the American Indian population. Conducting the audits on reservations stem from the concern that motor vehicle crashes are the leading cause of death among American Indians aged 5 to 44 years.²⁷ The road safety audit examines existing roads and intersections to identify safety issues as well as promote awareness of safe design practices in the design and implementation stages of future roads. These design practices include integrating multimodal safety concerns and considering human factors.

In 2005, road safety audits were performed on the Standing Rock Sioux Tribe (SRST) Reservation in North and South Dakota. The SRST Reservation covers 850,000 acres and has 200 miles of Bureau of Indian Affairs (BIA) roads and over 1,000 miles of country and state roads.²⁸ As part of the audit, road and intersections were classified using a crash frequency and severity framework that allowed for rating crash risks and identifying areas where safety was a concern.²⁸

Seven main safety issues on the SRST Reservation were identified; one of which involved the intersection of a BIA road and a state road located adjacent to school frontage. This intersection had a high driver workload in order to accommodate local, school and through traffic. For each of the seven safety issues, the audit also offered possible short- and long term measures to mitigate the risk and suggested counter measures that could be implemented cost effectively at

the design stage.²⁸ The SRST audit also resulted in the development of a training course for tribal officials and the general public.

The Zuni Pueblo Community in New Mexico developed a Walkability Advocacy Group to address pedestrian safety and promote walking for community health and safety. Initial analysis suggested the majority of individuals involved in crashes were between the ages of 5 and 9, and 18 to 29 and occurred primarily on New Mexico State Highways or on roads within the reservation. Barriers to walking were determined to be lack of sidewalks, clearly marked crosswalks and clear safety signs. An education campaign was conducted for the general public on safe driving and walking behavior and as school age children were struck at higher rates than any other group, an education curriculum was created and incorporated in the schools on the reservation and in the surrounding area.¹⁰

NHTSA Safe Communities Service Center has worked with the Tribal Safe Communities program across the U.S.²⁹ For instance, the Wyandotte Tribe of Oklahoma increased seat belt and child safety seat use and reduced motor vehicle crashes during the two years following the program's implementation. These results were achieved in part by the use of school programs, speed limit reductions, roadway improvements, public information and education campaigns and engineering treatments.³⁰

In 2002, observation surveys conducted on the Menominee Reservation in Wisconsin showed a 22% seat use rate and a 9% child safety seat rate. A combination of advocacy, policy and enforcement helps increase these usage rates. Strong advocacy from the Menominee Safe Communities Officer, the passage of seat belt and child seat laws by the Menominee Tribal Legislation and tribal police enforcing the laws through progressive ticketing contributed to seat belt and child safety seat use climbing to 43% and 38% respectively by summer 2003. Similarly, in an effort to increase seat belt use, the Shoshone and Arapaho Tribes Safe Community Program located on the Wind River Reservation in Wyoming established an education program on motor-vehicle occupant protection and worked with law enforcement to enforce speed laws and seat belt laws.

By the late 1980's, the Navajo Nation had low rates of seat belt usage and child safety seat usage coupled with rates of motor-vehicle related fatality and hospital discharge that were higher than the general U.S. population. These issues lead to the creation of the Navajo Nation Seat Belt/Community Traffic Safety Program. Anchored by the passage of a seat belt law by the Navajo Nation Tribal Council, education, encouragement and enforcement activities began in 1988. The activities included comprehensive community-level traffic safety education programs, school-based injury prevention curricula, a DWI task force and events, contests and awards. Other activities ranged from broadcasting English and Navajo language public service announcements on local radio stations, to distributing handouts on tribal seat belt laws at highly publicized roadblocks and providing child restraints at no cost to families in need.³¹

Surveys indicated that by the end of 1995 seat belt use and child restraint use on the Navajo Reservation was 78% and 45% respectively. Between 1988 and the mid 1990's the tribe's motor vehicle-related fatality rate declined 52% and motor vehicle-related hospital discharge rate decreased 50%.³¹

Other Tribal Safe Communities programs have worked to curtail drunk driving. From 1998 to 1999 the Pine Ridge South Dakota Safe Tribal Community with the support of the Oglala Sioux Tribe's Dept of Public Safety's Lakota Highway Patrol helped reduce the number of drunk drivers and fatal motor vehicle crashes while increasing seat belt and car seat usage by using a public awareness campaign and active enforcement of DWI and occupant protection laws.

The Turtle Mountain Safe Communities Program, serving the Chippewa Indian Nation in North Dakota, partnered with Mothers Against Drunk Driving (MADD) to create high school level activities to educate on seat belt use, school bus safety and bicycle safety. The partnership also identified changes needed to tribal law that would allow tribal courts to more effectively sentence individuals convicted of driving under the influence.²⁹

Safety messages

Results of the La Valley et al. focus groups and other research suggest that in order to appreciably reduce American Indian motor-vehicle related crash fatalities, pedestrian and alcohol-related fatalities have to be aggressively addressed.³² An education campaign should focus on American Indian populations of lower SES, children and males. The campaign messages should address young children's inability to make safe and accurate decisions about crossing traffic alone, and address the driver-pedestrian interaction such as how a child's height may make them less visible to drivers thus increasing the risk of pedestrian collision.^{10, 3, 13} Another message may be around the risks related to pedestrian and driver caused by alcohol impairment.^{10, 3} The campaign also should have rural and urban components with the urban component targeting all at-risk pedestrians and drinking drivers. The rural component should focus on drinking drivers and pedestrians walking in the roadway.¹⁸

Specific to children, Olson and colleagues suggest concentrating pedestrian injury preventive strategies on children's developmental capabilities and parent education.¹³ Children age 5 to 10 years enjoy exploring their environments but often do not yet have the ability to recognize and cope with potential traffic hazards by themselves. In general, children do not have the skills to negotiate motor vehicle traffic safely until age 10.³³ However, recognizing that children vary in their developmental readiness to make decisions about where and when to walk and cross a street, parents are often the best judges of when their child is ready to walk without an adult.

Education programs that emphasize basic safe street crossing behavior may be appropriate for children in grades K to 3. Children in grades 4 to 6 can handle more complex safety messages including crossing at signalized intersections, multiple threat situations, right turn on red and walking in parking lots. Children and youth ages 10 through 19 should also be taught more complex street situations, about being seen at night, dangers of alcohol use and walking, recreational walking, and others.³⁴

Several studies have evaluated efforts of educational materials on pedestrian behavior. While not developed specifically for Native American populations, the core content and messages of these materials may successfully reach these communities if adapted appropriately. A NHTSA film titled 'Willie Whistle' teaches children in grades K through 3 the safe way to cross streets. The educational film was reported to reduce dart and dash crashes by teaching children to stop at the curb and look left-right-left before entering the street. A second NHTSA film titled 'And

'Keep on Looking' was developed for children in grades 4 to 7 to convey street-crossing advice including crossing busy street, crossing at signalized locations, and safety in parking lots. The film was found to be effective in terms of observed behavior, information retained after viewing the film, and in a decrease in the number of pedestrian crashes in a study group.³⁴

Information on the journey to school should include safety message for teen drivers. Young drivers are involved in the majority of the journey to school passenger vehicle-related deaths and injuries.²² Messages on child passenger safety such as proper approaching, boarding and alighting the school bus are available from NHTSA.³⁵

In general, communities use many different approaches to make traveling to and from school safe whether the journey is by foot, bicycle or motor vehicle. Education information and messages target parents, neighbors and other drivers in the community to remind them to yield to pedestrians, to drive safely, be responsible pedestrians and take other actions to make it safer for pedestrians and bicyclists. While an education component is needed to help make school zones and the journey to school safer, other strategies should accompany education to increase the effectiveness of a program. Programs should use a combination of education, encouragement, enforcement, engineering and evaluation strategies to help achieve their goals. Employing a combination of these strategies is the approach many safe routes to school programs have taken. Encouragement strategies generate excitement about walking and bicycling safely to school. Enforcement activities can help to change unsafe behaviors of drivers, bicyclists and pedestrians. They increase driver awareness of laws, and they also can improve driver behavior by reducing speeds and increasing yielding to pedestrians. Engineering addresses the built environment with tools that can be used to create safe places to walk or bike and can also influence the way people behave.³⁶ More details and examples of using a combination of strategies are available from the Safe Routes to School Online Guide and the Safe Routes to School National Course.^{36, 37}

Summary

A dearth of information exists specific to child traffic related injuries and fatalities within school zones. In most cases the studies reviewed examined general American Indian populations stratified by age groups and thus school age children were one of many age groups discussed. The recommendations and suggestions mentioned in the studies were sometimes aimed at the American Indian populations as a whole and other times towards specific age groups. Pedestrian fatality risk among Native Americans peaks in early to mid adulthood for both urban (males age 35 to 49 and females age 35 to 39) and rural areas (males age 15-39 and females age 25 to 39) with alcohol use and poor pedestrian and driver skills contributing to these crashes. Working to improve pedestrian and driver safety by changing behaviors may instill the appropriate pedestrian and drive behaviors in children and youth that many can take into adulthood.

Based on the literature reviewed and focusing on children and youth, motor vehicle crashes and pedestrian-motor vehicle crashes are significant issues facing the Native American populations. Among Native American children and youth, motor vehicle death rates and pedestrian-related death rates were highest among those 15 to 19 years old and under 5 years old.

For motor vehicle crashes, low restraint use (seat belt and child seats) and alcohol involvement represented two areas of concern. Fatally injured Native American children were the least likely to have used child safety seats, or have been wearing safety belts. Alcohol intoxication on the part of the driver and/or pedestrian is primarily an issue among NA adults over 19 years, but fatalities involving American Indian/Alaska Native youth 15 to 19 years old indicate some alcohol use. American Indian/Alaska Native males and females 0 to 19 years old had higher rates of pedestrian fatalities regardless of setting (urban or rural) than their peers in other race or ethnic groups. The Aberdeen, Tucson, Albuquerque and Navajo IHS areas had the highest pedestrian fatality rates among NA ages 0 to 19 years old. One study indicated that Native American children 5 to 14 years old were more likely than younger children to be in a roadway when struck by a motor vehicle.¹³

When working with Native American communities, programs should have multiple strategies (education, enforcement, engineering, encouragement), be targeted to the appropriate groups, be tailored to their specific attitudes, beliefs and traditions, and actively involve community leaders and members. The approach to Native American pedestrian safety should consist of urban and rural elements. An education campaign should focus on American Indian populations of lower SES, children and males. Injury preventive educational messages for child pedestrians should focus on children's developmental capabilities and parent education. Another factor to consider is that some American Indian communities may exhibit disparate interests in one strategy over another such as engineering to education. This may require describing to the community and providing quality examples of the need to employ multiple strategies.

Summary Tables

Keys to remember:

Traffic safety efforts aimed at Native Americans need to be comprehensive, include environmental changes, actively involve the community and be tailored to local tribal culture and practice in their design and implementation.^{3, 15, 10}

The campaign also should have rural and urban components with the urban component targeting all at-risk pedestrians and drinking drivers. The rural component should focus on drinking drivers and pedestrians walking in the roadway.¹⁸

Messages and discussions should focus on positive outcomes rather than negative outcomes. For example, a message on street crossing should focus on safely crossing the street by crossing at the proper location and looking right, left, right rather than focusing on the potential of being struck by a motor vehicle by crossing the street at the wrong place.

Programs should involve a combination of education, encouragement, enforcement, engineering and evaluation strategies to increase their effectiveness.

Key geographic target locations:

The following Indian Health Service (IHS) areas and states should be considered the prime geographic locations for delivering materials aimed at parents, drivers, children and teachers in order to reduce child pedestrian injuries and fatalities.

IHS areas with the highest pedestrian death rates for NA ages 0 -19 per 100,000 population:

Navajo Area (serves Arizona, New Mexico, and Utah)

Albuquerque Area (serves New Mexico, Colorado and Texas)

Tucson Area (serves Southern Arizona)

Aberdeen Area (serves North Dakota, South Dakota, Iowa, and Nebraska)

Billings Area (serves Montana and Wyoming)

Source: Patel et al 2005

New Mexico, Arizona, South Dakota, North Carolina, Wyoming, Washington and Tennessee had the highest rates of American Indian/Alaska Native pedestrian injury for all age groups, the lowest population density (rural states) and had more than 25% of American Indian/Alaska Native population living below the poverty line.¹⁰ Several of these states contain part or all of an IHS area identified by Patel et al as having the highest pedestrian death rates among Native American children and youth.

Successful transportation safety programs have been implemented in several tribes. The Standing Rocks Sioux Tribe Reservation, the Pine Ridge South Dakota Tribal Community, Chippewa Indian Nation, the Zuni Pueblo Community, the Shoshone and Arapaho on the Wind River Reservation, and the Navajo Nation are six tribes that have transportation related safety programs and are located in one of the geographic target areas. Refer to the “Program examples of working with Native American populations” on page 9 for more details.

Primary target group: Parents

Types of safety messages

Message: Importance of watching children, particularly those 1 to 4 years old, in parking lots and driveways.

Rationale: Poor visibility is a factor in collision and crushing deaths of small children (1 to 4 years old), as demonstrated by the association of pedestrian injuries among children with the presence of parked cars and vehicles backing.¹⁶

Message: Regarding pedestrian and motor vehicle collisions, walking where facilities exist (sidewalks) is relatively safe.

Rationale: Drivers seldom hit American Indian/Alaska Native pedestrians who were on sidewalks¹⁰

Message: Educate parents on child’s age-related developmental capabilities

Rationale: Children age 5 to 10 years often have not developed the ability to recognize and cope with potential traffic hazards by themselves. In general, children do not have the skills to negotiate motor vehicle traffic safely until age 10.³³ However, recognizing that children vary in their developmental readiness to make decisions about where and when to walk and cross a street, parents are often the best judges of when their child is ready to walk without an adult.

Message: Education on proper road crossing strategies and identifying when an adult is needed to safely cross.

Rationale: In urban areas, improper street crossing and walking in the road were two pedestrian behaviors contributing to crashes.

Message: Use the appropriate restraint device (seat belts and child safety seat) when transporting children in a motor vehicle. Parents should also buckle-up.

Rationale: Of the Native American children killed in motor vehicle crashes as a passenger, the majority of them were not wearing a seat belt or in a child safety seat.² Across all age groups of the Native Americans, 76% of the fatally injured motor-vehicle occupants were not restrained at time of crash.⁴

Messages: School bus safety (see School bus rules...messages on page 17)

Rationale: Children are at greater risk for injury when approaching and leaving the school bus than actually riding on the bus.²³

Deliverer of message: Health and safety educators that have the support of tribal and community leaders. Ideally these educators will be from the tribe in which they are working.

Primary target group: Drivers

Types of safety messages

Message: Be alert to small children (1 to 4 years old) when driving in parking lots and driveway. Be mindful of child pedestrians along the roadway and at intersections, particularly in urban areas.

Rationale: Poor visibility is a factor in collision and crushing deaths of small children (1 to 4 years old), as demonstrated by the association of pedestrian injuries among children with the presence of parked cars and vehicles backing.¹⁶

Message: Benefits of traveling at or below the speed limit, complying with other traffic laws, and staying alert to pedestrian activity while driving

Rationale: Higher vehicle speed results in more severe pedestrian injury and increases the likelihood of death.¹⁷

American Indian/Alaska Native driver behavior primarily contributing to fatal pedestrian crashes are driver inattention, speeding, and failure to yield.¹⁸

As a driver be aware that pedestrians may be intoxicated, which can lead to unpredictable pedestrian behavior such as walking in the roadway, especially at non-intersection parts of the road.^{10, 3} Programs delivered in rural areas can focus on drinking drivers and pedestrians walking in the roadway.¹⁸

Message: Consequences of drinking and driving.

Rationale: Native Americans have high rates of pedestrian fatalities that involve alcohol use by the driver and/or pedestrian.¹⁰

Message: As the driver, the benefits of wearing a safety belt (reduced likelihood of injury or death if involved in a crash.) As a parent driver, the benefits of using the appropriate restraint device (seat belts and child safety seat) when transporting your children in a motor vehicle.

Rationale: Of the Native American children killed in motor vehicle crashes as a passenger a majority of them were not wearing a seat belt or in a child safety seat.² Across all age groups of the Native Americans, 76% of the fatally injured motor-vehicle occupants were not restrained at time of crash.⁴

Messages: Slow down in neighborhoods and school area and watch for children playing and congregating near bus stops.

Children arriving late for bus may dart into street without looking for oncoming traffic.

Rationale: Children are at greater risk for injury when approaching and leaving the school bus than actually riding on the bus.

Message: Learn the “flashing signal light system” that school buses use to alert motor vehicle drivers of pending stops. In most states, yellow flashing lights indicate bus is preparing to stop and load or unload children--motorist should slow down and prepare to stop. Red flashing lights and extending the stop arm indicate the bus has stopped and children are getting off. Motorist must stop and remain stopped until the flashing red lights stop and extended stop arm is withdrawn and the bus begins moving.²³

Rationale: Children are at greater risk for injury when approaching and leaving the school bus than actually riding on the bus.²³

Deliverer of message: Enforcement officers with the support of tribal and community leaders. For young drivers the use of role models and/or peer leaders to deliver the message may have a greater influence than from a formal authoritative figure.

Primary target group: Children and Youth

The two age groups with the highest rates of pedestrian-related death were children 1 to 4 years and 15 to 19 years.¹⁵

Location information: Daytime pedestrian injuries are common among children and the majority of deaths occur on public roads.^{10,15}

Campaigns should consist of rural and urban components with the urban component targeting all at-risk pedestrians and drinking drivers. The rural component should focus on drinking drivers and pedestrians walking in the roadway.¹⁸

Types of safety messages

Message: Children should watch for moving vehicles when walking through parking lots, driveways and walking between parked cars as drivers may not see the children.

Rationale: Poor visibility is a factor in collision and crushing deaths of small children (1 to 4 years old), as demonstrated by the association of pedestrian injuries among children with the presence of parked cars and vehicles backing.¹⁶

Messages: Proper street crossing and not walking in roadway.

Rationale: In urban areas, improper crossing and walking in the roadway were cited as pedestrian behaviors contributing to the crashes.

Message: When lighting conditions are low, pedestrians should wear clothing that is highly visible to drivers. (particularly among 15 -19 year olds)

Rationale:

Driver difficulty in seeing pedestrian due to low conspicuity is one factor that contributes to pedestrian injury and death among American Indian/Alaska Native.^{10, 3}

Message(s): Alcohol prevention*, drink responsibly and avoid driving drunk.

Rationale: The pedestrian death rate for rural area was almost 5.0 with all of these deaths occurring in the 15 to 19 year age range.¹⁰ Alcohol use (driver and pedestrian) among American Indian/Alaska Native youth 15 to 19 years old is a behavior that contributes to pedestrian injury and death.^{10, 3}

*This may require working with a separate intervention aimed at underage drinking.

Message: Walk on the sidewalk or beside the road rather than in the roadway.**

Rationale: Walking in the roadway is one behavior that contributes to pedestrian injury and death among American Indian/Alaska Native youth 15 to 19 years old.^{10, 3}

The most common location in an American Indian/Alaska Native pedestrian fatality is in the roadway, at a non-intersection, accounting for 67.8% of American Indian/Alaska Native pedestrian fatalities.¹⁰

**This may require working with public works to ensure the infrastructure and/or safety enhancements are present to accommodate safe walking.

Message: Wear a seat belt while traveling in a motor vehicle.

Rationale: Fatally injured Native American children were the least likely to have used child safety seats, or have been wearing safety belts.

Messages: School bus rules for approaching and leaving the school bus:

Get to the bus 5 minutes before the bus is scheduled to arrive. Stand at least 6 feet (3 giant steps) away from curb when the bus approaches.²³

Wait until the bus stops and opens the doors before approaching

Make eye contact with the bus driver and wait for their signal before you cross in front of the bus. When crossing in front of the bus walk at least 10 feet (5 giant steps) between you and the front of the bus, so that the driver can see you.^{23 38}

When getting off the bus, look to the rear of the bus before you step off the bottom step to make sure the way is clear.³⁸

Never walk behind the bus.²³

Use the handrails to avoid falling. Be careful that clothing and your book bag do not get

caught on the handrail or door.²³

If you drop something near the bus, tell the driver before you try to pick it up. The bus driver may not see you when you bend to pick up the item.²³

If you have to walk beside the stopped bus walk at least 6 feet (3 giant steps from the side).²³

Rationale: Children are at greater risk for injury when approaching and leaving the school bus than actually riding on the bus.²³

Deliverer of message: Parents, teachers, role models, enforcement officers, tribal leaders and key community members. For adolescents, the use of role models and/or peer leaders to deliver the message may have a greater influence than from a formal authoritative figure.

Primary target group: Teachers

Types of safety messages

Message(s): Grades K to 3: Education programs that emphasize basic safe street crossing behavior.

Grades 4 to 6: Education programs can offer safety messages that are more complex than those provided to younger children. These safety messages can include crossing at signalized intersections, multiple threat situations, right turn on red and walking in parking lots.

Grade 7 to 12: Education programs should include information on complex street situations, being seen at night, dangers of alcohol use and walking and recreational walking.³⁴

Rationale: Children age 5 to 10 years often have not developed the ability to recognize and cope with potential traffic hazards by themselves. In general, children do not have the skills to negotiate motor vehicle traffic safely until age 10.³³ However, recognizing that children vary in their developmental readiness to make decisions about where and when to walk and cross a street, parents are often the best judges of when their child is ready to walk without an adult.

Additional information: Several studies have evaluated efforts of educational materials on pedestrian behavior. While not developed specifically for Native American populations, the core content and messages of these materials may successfully reach these communities if adapted appropriately. A NHTSA film titled 'Willie Whistle' teaches children in grades K through 3 the safe way to cross streets. The educational film was reported to reduce dart and dash crashes by teaching children to stop at the curb and look left-right-left before entering the street. A second NHTSA film titled 'And Keep on Looking' was developed for children in grades 4 to 7 to convey street-crossing advice including crossing busy street, crossing at signalized locations, and safety in parking lots. The film was found to be effective in terms of observed behavior, information retained after viewing the film, and in a decrease in the number of pedestrian crashes in a study

group.³⁴

Deliverer of message: Teachers and educators

Primary target group: Public works

Message: Having adequate and appropriate infrastructure is one strategy that can help with reducing pedestrian fatalities. Work with public officials, public works and transportation personnel to begin creating a safer physical environment.

Rationale: Road design, traffic controls and lighting were identified as roadway characteristics associated with high rates of pedestrian fatalities among American Indians/Alaska Natives.¹⁰

Deliverer of message: Tribal leaders and key community members

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