Motor Vehicle Crashes Involving Rural Native American Elders

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Introduction

Motor vehicle crashes (MVCs) take a large toll among members of the American Indian and Alaskan Native communities. Previous studies have found the rates of MVC mortality to be highest among American Indians and Alaska Natives, compared to other ethnic groups (Grossman, Sugarman, Fox, & Moran, 1997). Elders are at greater risk of vehicle-related injury/death due to the natural effects of aging (e.g., decreased vision, hearing and motor response) and their lower survivability regarding trauma (Baker, O'Neill, Ginsburg, & Li, 1992; National Center for Injury Prevention and Control [NCIPC], 1997; Ray, 1997; Kuklinski, 1998).

Nationally, elders are least likely to drive under the influence of alcohol/drugs, more likely to utilize safety restraints, and drive less often compared to younger cohorts (NCIPC, 1997). However, Native American elders may be at higher risk of MVC-related injury/death due to decreased safety belt use, poor road conditions, inadequate street illumination, and inadequate or insufficiently accessible emergency medical services (National Committee for Injury Prevention and Control, 1989). Additional studies are needed to examine the incidence and outcomes of MVCs involving older Native Americans.

Methods

To examine MVCs involving Native American elders (aged 55+) in North Dakota, we analyzed the state's ambulance runs data for years 1995, 1996, 1997, and 1998. These records contained a wide variety of information about the ambulance runs, including circumstances of the event and patients' injuries/illnesses. For the four-year period, there were 85,064 records for all patients. Of that figure, 39,739 (47%) pertained to patients aged 55 and older. Of the ambulance records for elders, 38,449 (97%) were Caucasian patients and 1,290 (3%) were Native American patients.

There are approximately 2,400 Native Americans aged 55 or older in North Dakota. The overwhelming majority reside on the four, rural-based Indian Reservations within the state. Comparatively, there are approximately 146,000 Caucasian elders in North Dakota, of which about 95,000 reside in rural (nonmetropolitan) areas.

These racial groups (combined) comprise over 97% of all elders in the state (U.S. Census Bureau, 2000). For comparative purposes, we calculated age-specific rates of ambulance calls for Native American and Caucasian elders using 1995-1998 U.S. Census population estimates. Because of very small Native elder populations in urban North Dakota, only nonmetropolitan figures were used in this study.

The following questions were addressed regarding Native American victims of rural MVCs responded to by ambulance squads, compared to similarly-aged rural Caucasian victims:

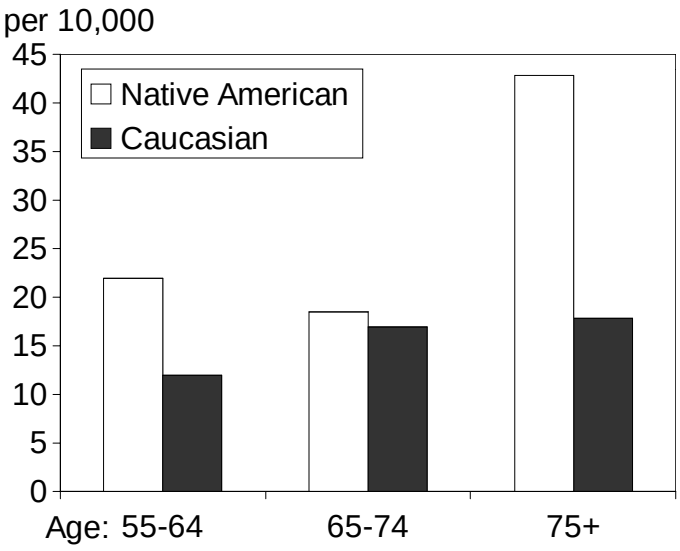
- To what extent were Native American elders involved in these crashes?
- Were they drivers or passengers of the vehicle?

- Were Native American elders wearing their safety belts?
- To what extent was alcohol a factor in these crashes?
- How many of the victims incurred some form of injury?
- What regions of the body were most likely to sustain injuries?
- How serious were these incurred injuries?

Results

Within this time period, 816 Caucasian and 23 Native elders in rural areas received ambulance care for MVC involvement. Analysis of population-based rates (see Figure 1) indicated that rural Native Americans, as a group, were almost twice as likely as Caucasians to be involved in a rural MVC (29.9 versus 15.5 victims per 10,000). Rates among Native Americans were found to exceed the rates for Caucasians across all three age groups of 55-64 years (83% higher), 65-74 years (9% higher) and 75 and older (139% higher).

Figure 1. MVC Involvement Among Rural North Dakota Elders



Data were examined to determine the vehicle seating position of MVC victims. Findings indicated that Natives were slightly more likely than Caucasians to be driving the vehicle when the crash occurred (56.5% versus 47.1%). For Natives, the percent of drivers remained relatively constant across the ages of 55-64 years (54.5% being drivers), 65-74 years (60%), and 75+ years (57.1%). Caucasians were slightly less likely to have been operating the vehicle (see Figure 2). Regarding seat belt use, 34.8% of Native Americans and 38.7% of Caucasians were documented as wearing a lap/shoulder restraint at the time of the crash. Native elders aged 75 years and older were least likely (14.3%) to have appropriately worn their safety belts (see Figure 3).

Figure 2. Rural Elders That Were Operating the Vehicle When Crash Occurred

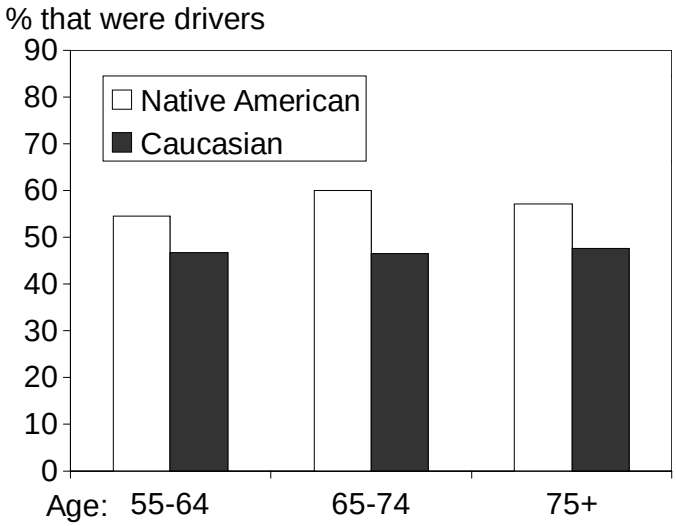
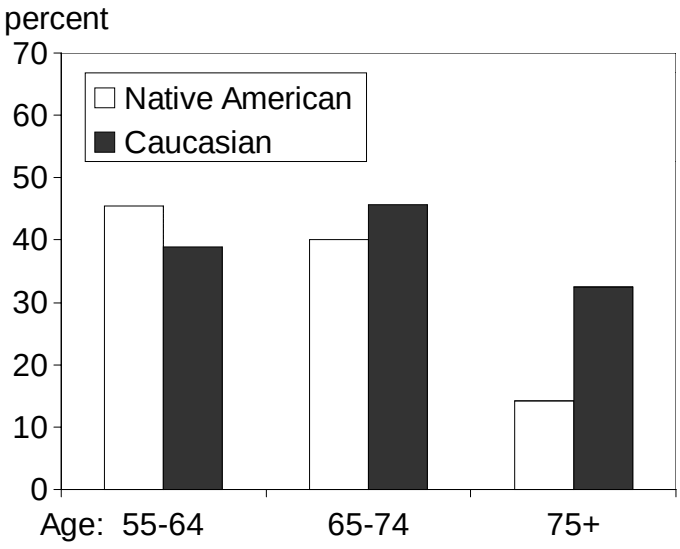


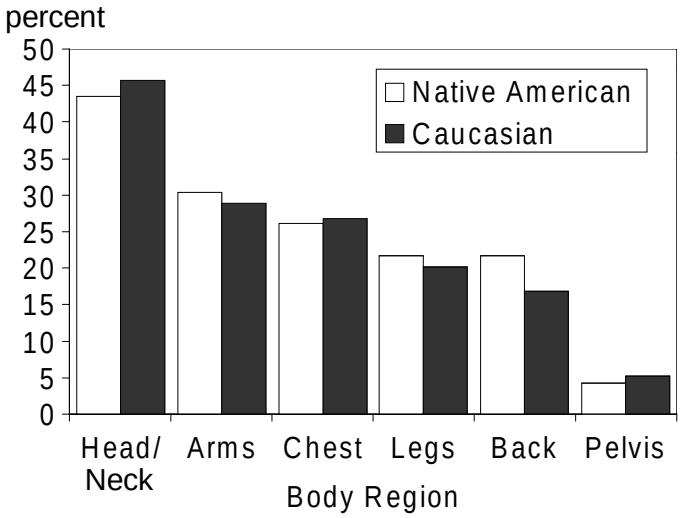
Figure 3. Appropriate Safety Belt Use Among Rural Elders Involved in Motor Vehicle Crashes



Overall findings indicated that 74.1% of Native Americans and 79.2% of Caucasians incurred one or more injuries due to involvement in the crashes. Native American victims were most likely to sustain injuries (see Figure 4) to their head/face/neck (43.5% of victims), fol-

lowed by arms (30.4%), chest (26.1%), legs (21.7%) and back (21.7%). The most common, specific physical complaints among Native American ambulance patients included 'pain' to the arms (26.1%), chest (26.1%), legs (21.7%), back (21.7%), head (17.4%), and soft/open wound to face (17.4%). The nature and frequency of injuries incurred by Caucasians appeared similar to those of Native Americans.

Figure 4. Injured Body Regions Among Rural Elders Involved in MVCs

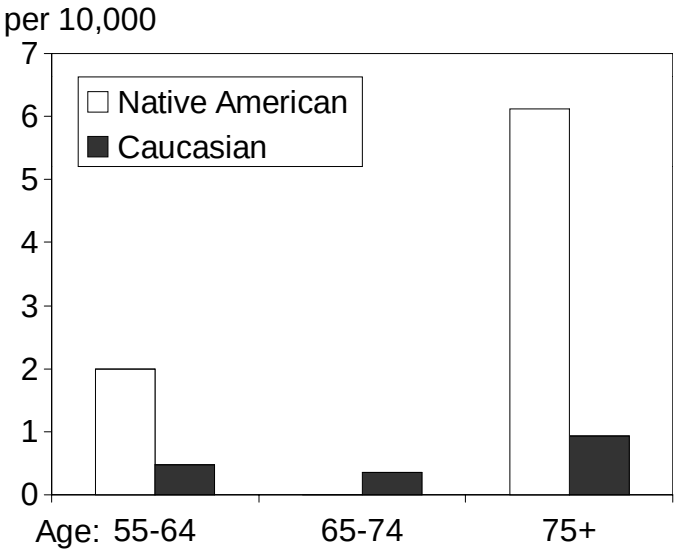


It is important to examine the extent to which alcohol contributed to the crashes. Driving under the influence dramatically increases the risk of crashes and is linked with greater likelihood of serious injury and death. Findings indicated that alcohol was a possible contributing factor for one Native American and 31 Caucasians.

Overall, Natives were three times as likely as Caucasians to be in 'serious condition' (i.e., Glasgow Coma Score=<8) as a result of their injuries. For victims aged 55-64 and 75+, Natives were, respectively, four and six times more likely than similarly-aged Caucasians to be in serious condition (see Figure 5). Regarding fatalities, 8.7% of Native Americans and 1.5% of Caucasians were dead on arrival of ambulance personnel.

Occurrences of MVC victims among nonmetro Native elders were examined according to ND county location. The most common locations for these MVCs were Sioux and

Figure 5. Rural Elderly MVC Victims in Serious Condition



Rolette Counties (17.4% each), areas that have the highest concentration of Native Americans in the state. Sioux County comprises a large portion of the Standing Rock Reservation and the Turtle Mountain Reservation is completely contained within Rolette County.

Conclusion

Native American elders were more likely than their Caucasian counterparts to be a victim of a rural motor vehicle crash. Of the Native American victims, slightly more than one-half (56.5%) were operating the vehicle at the time of the crash. Findings indicated that alcohol was not a significant contributing factor for crashes involving Native elders.

Only one-third (34.8%) of the Native American victims were documented as being appropriately harnessed in a lap/shoulder safety belt at the time of the crash, placing them at greater risk of serious injury or death. At the national level, lap/shoulder safety belts have been found to reduce the risk of fatal injury to front-seat passenger occupants by 45%. Air bags have been found to be important car safety devices, reducing fatalities by 11% (National Center for Statistics & Analysis, 1999). The low rate of safety restraint use among Native American crash victims suggests the need for greater efforts toward public education on the importance of safety belt use.

Approximately three-quarters of the elderly MVC victims sustained at least one injury, and the most common injuries were sustained to the head/neck, arms, chest and legs. Natives were three times more likely than Caucasians to be in serious condition as a result of their injuries.

The Centers for Disease Control (2000) have documented some measures that could contribute to increased motor vehicle safety for elders:

- *Improved design of cars that facilitate driving and increase crash protection.* Example: low-glare headlights; upgraded head restraints; and increased vehicle protective padding.
- *Improvements in roadway design.* Example: more spacious traffic lanes; improved roadway illumination; larger road signs; and lower posted speeds on road sections that call for intricate driving procedures.
- *Increased utilization of mass transportation.* This action would reduce the driving burden of some elders.
- *Modified driving privileges under certain specified conditions.* Some states can limit vehicle operation to specific time periods, road types or geographical regions. In an effort to increase driver safety, some states have decreased license terms for elderly drivers from 4 to 2-3 years.
- *Reporting of certain health ailments.* In many states, physicians must report to licensing authorities cases of specific health conditions that could negatively impact an individual's driving ability (American Association of Retired Persons, 1992; Fildes, Lee, Kenny, & Foddy, 1994; Centers for Disease Control, 2000).

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