
Creating a Multi-State Injury Surveillance System for Two American Indian Populations

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Introduction

Injuries are the leading cause of death for those 1 - 44 years of age.¹ Injuries cost an estimated \$406 billion annually in medical costs and lost productivity.² In 2007, injuries accounted for 51% of all deaths among people ages 1 - 44 years of age, more deaths than non-communicable diseases and infectious diseases combined.³

The first step to effectively prevent injuries is to identify the frequency and type of injuries occurring at the local level. This can be a surprisingly difficult task. A request was made to IHS Environmental Health staff by Fort Mojave Clinic personnel to provide data on the injury problems and trends at Fort Mojave. The Fort Mojave Tribe and the neighboring Chemehuevi Tribe are located on Federal reservations that span three states: Arizona, California, and Nevada. The two communities depend on non-IHS emergency rooms for trauma care. Using ER logs at IHS facilities to implement a severe injury surveillance system (as many other service units have done) was therefore not possible for these two tribes. We sought to build an injury surveillance system based on emergency room, hospitalization, and mortality databases maintained by each state. We hoped that establishing the framework for this type of surveillance system would benefit many tribes in California, Nevada, and Arizona.

Methods

We obtained permission from both the Fort Mojave and Chemehuevi Tribal Councils to conduct this project and publish this paper. We completed data-sharing agreements with each of our target hospitals. We also obtained approval from the IHS Phoenix Area IRB to publish.

Our project population was Native Americans living in the zip codes located within the boundaries of both reservations. We obtained the zip codes from tribal members living on the

reservations by text-messaging the emergency preparedness coordinators at the two tribes and verified the zip codes using the US postal service website.⁴ We determined that the Chemehuevi Tribe shares its zip code with the Fort Mojave Tribe. Therefore, the surveillance system contains injury data from both tribes.

Patient Discharge Data and Emergency Department Data. We interviewed clinic staff, tribal members, Emergency Medical Services (EMS) personnel, care flight personnel, and the tribal emergency preparedness coordinators to determine which hospitals were utilized most often by tribal members with injuries. We then conducted phone interviews with staff at each of the five main hospitals on how best to obtain their injury data. We learned that all hospital discharge and emergency room data were reported to centralized data collection offices within each state (Figure 1). Arizona, California and Nevada require all non-federal hospitals to report PDD and EDD data to the state.

The target population and case definition for our data requests were:

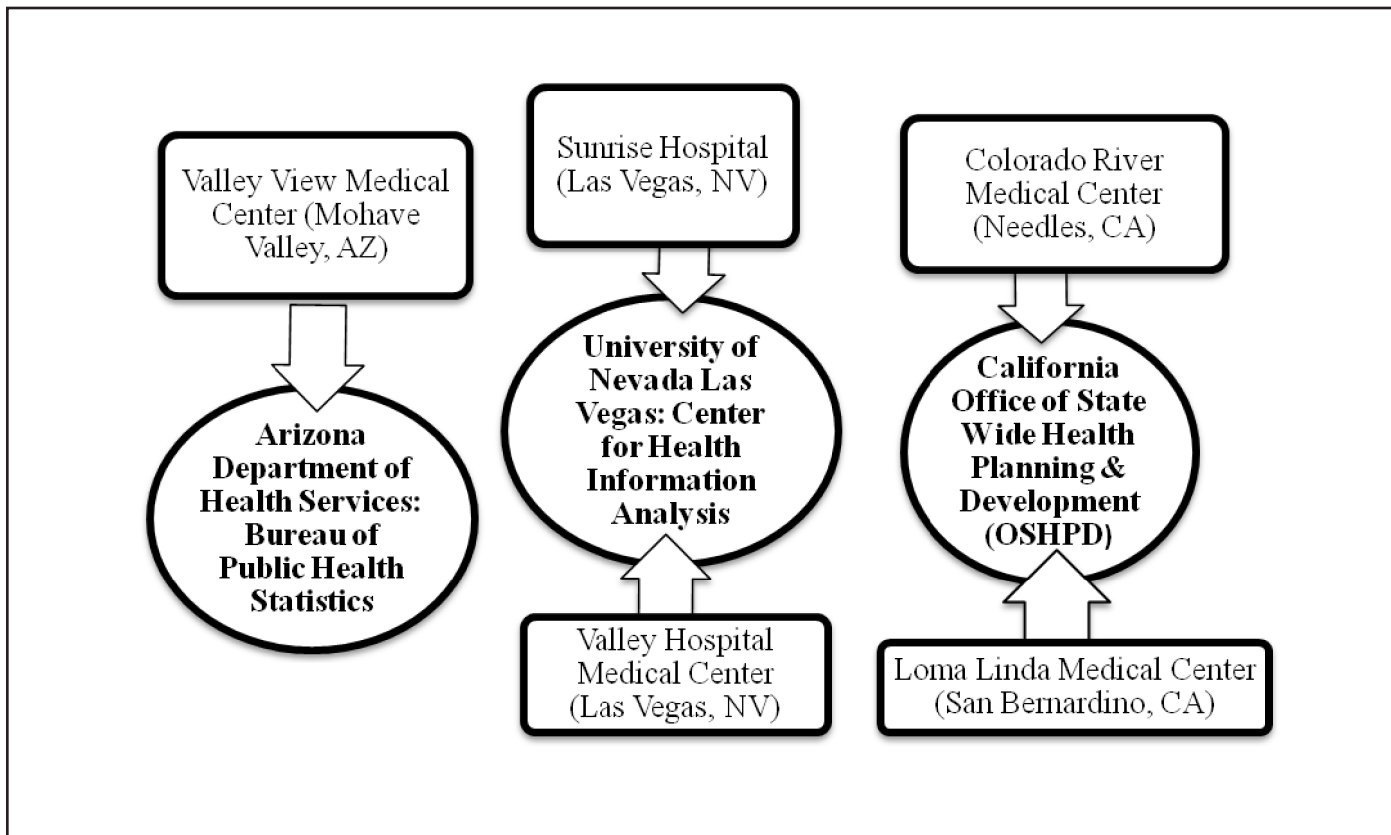
- Patients who required a hospitalization or emergency department visit;
- Received an ICD-9 diagnosis code (N-code) between 800.01 - 999.9;
- Received the diagnosis between 01/01/2001 and 12/31/2010; OR
- All Fatalities between 01/01/2001 and 12/31/2010;
- Race = Native American;
- Resided in locations with the specific zip codes for the two reservations.

The process for obtaining the injury data from each state source was as follows:

California Office of Statewide Health Planning and Development (OSHPD). We completed a request for non-public, patient-level data. The request was denied by the Committee for the Protection of Human Subjects (CPHS) because the IHS was not listed in the California Health and Safety (CHS) Code as an approved recipient of data. The CDC, which was listed as an approved recipient, declined to submit the data request on our behalf. The OSHPD ultimately waived the requirement and plans to update the CHS Code to include IHS on the list of approved data recipients. It took approximately six months to obtain the data from California.

University of Nevada Las Vegas, Center for Health

Figure 1. Each main hospital treating individuals from our two communities reports utilization data to its respective state's hospital data collection office.



Information Analysis. We submitted the data request form via e-mail and received the electronic data within 24 hours.

Arizona Department of Health Services, Bureau of Public Health Statistics. Because the Phoenix Area IHS already had a data-sharing agreement with the state of Arizona, we obtained our requested data in three months.

We obtained injury mortality data from each state's vital statistics agency:

California Department of Public Health, Health Information and Research Section. We submitted our data request form, a vital statistics data files application, and an access agreement. IHS purchased the data at a cost of \$100 per year (\$900 total) and the data were received within three months.

Nevada Department of Health and Human Services, Nevada State Health Division. We submitted the data request form and signed a data-sharing agreement. The mortality data were received in approximately one month.

Arizona Department of Health Services, Vital Statistics. The data-sharing agreement between the Phoenix Area IHS and the state of Arizona also covered vital statistics data.

We combined the data from our six sources using

Microsoft Office Excel® 2007. We merged common variables and then analyzed the data using CDC Epi Info 7. Individual patient ages had to be aggregated into age groups to be consistent with the Nevada patient discharge data (PDD). To protect patient confidentiality, Nevada reports age groups only.

The results of the analyses were then transferred back into MS Excel to construct tables and figures. Rates were calculated using the IHS user population as denominators.⁵

Results

We identified reliable injury data sources from all three states to provide injury surveillance data to the Fort Mojave and Chemehuevi Tribes. While many of the states had been working to establish a centralized system for several years, all of them had arrived at a reliable collection process by 2008. Table 1 shows the status of the centralized electronic injury data components by year for each of our state sources. Table 2 summarizes the process of obtaining the data from each data source.

In 2008 and 2009, the patient discharge data (PDD), emergency department data (EDD), and injury mortality data were available from each state. During those two years, there

Table 1. Data availability by source

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
CA (OSHPD) -PDD	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
AZ-PDD				χ	χ	χ	χ	χ	χ	χ
NV (UNLV)-PDD	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
AZ-EDD								χ	χ	χ
NV (UNLV)-EDD								χ	χ	
CA (OSHPD)-EDD					χ	χ	χ	χ	χ	χ
CA Vital Statistics	χ	χ	χ	χ	χ	χ	χ	χ	χ	
AZ Vital Statistics	χ	χ	χ	χ	χ	χ	χ	χ	χ	χ
NV Vital Statistics						χ	χ	χ	χ	χ

Abbreviations:

- OSHPD: Office of Statewide Health Planning and Development
- UNLV: University of Nevada Las Vegas
- PDD: patient discharge data
- EDD: emergency department data

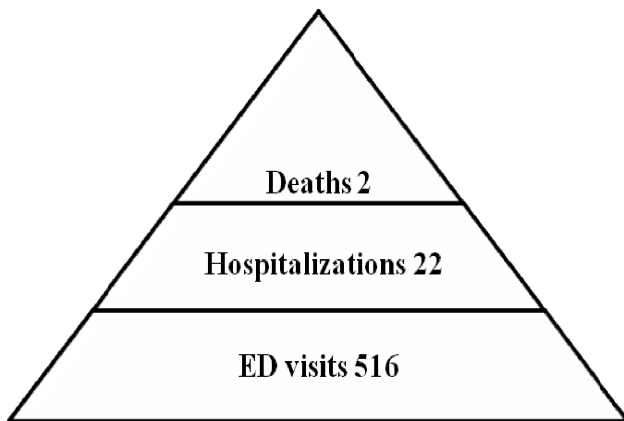
Table 2: Data Source Summary

Data Sources	Request method	Receipt Time	Cost of Data Set	Format of data set
CA (OSHPD) -PDD	Form	6 Months	\$0	MS Excel
AZ-PDD	Email request	3 Months	\$0	MS Excel
NV (UNLV)-PDD	Email request	24 hours	\$0	Email
AZ-EDD	Email request	3 Months	\$0	MS Excel
NV (UNLV)-EDD	Email request	24 hours	\$0	Email
CA (OSHPD)-EDD	Form	6 Months	\$0	MS Excel
CA Vital Statistics	Form	3 Months	\$90 per year	Win ZIP
AZ Vital Statistics	Email request	3 Months	\$0	MS Excel
NV Vital Statistics	Form	1 Month	\$0	MS Excel

Abbreviations:

- OSHPD: Office of Statewide Health Planning and Development
- UNLV: University of Las Vegas
- PDD: patient discharge data
- EDD: emergency department data

Figure 2. Injury cases in 2008 and 2009 on the Fort Mojave and Chemehuevi Reservations.



were a total of 540 injuries among Native Americans on the Fort Mojave and Chemehuevi reservations. Of the 540 injuries, there were 2 deaths, 22 hospitalizations, and 516 emergency room visits (Figure 2).

Of the 540 reported injuries, the five leading underlying causes were falls (32%), struck by/against (14%), overexertion (11%), cut/pierce (11%), motor vehicle crash or MVC (10%), and assault (9%) (Table 3). Categorized by intent, the injuries were unintentional (90%), assaults (9%), self-inflicted (1%), and undetermined (0.4%).

Several categories of injury in Table 3 (such as “struck by/against,” “overexertion,” and “cut/pierce”) are non-specific and are usually associated with injuries that are relatively minor (i.e., are “treated and released” from the emergency room rather than hospitalized). Table 4 summarizes the injury causation categories that are more specific, usually more severe, and accounted for at least 10 injuries in the dataset. Falls (61%), motor vehicle crashes (19%), and assaults (17%) were the top three categories.

Discussion and Recommendations

This project provides the framework for an injury surveillance system that can be utilized by tribes in Arizona, California, and Nevada to prioritize resources and evaluate programs. Injury mortality data are available from each of the three states for the years 2006 to 2010; patient discharge data from 2004 to 2010; and emergency room data from 2008 and 2009 (Table 1).

We analyzed the data from all six data sources for the years 2008 and 2009 to determine the three leading specific causes of injury for our two tribes: falls, motor vehicle crashes, and assaults.

Strategies to reduce these injuries include exercise programs, medication management, and home modifications to reduce falls; sobriety checkpoints and occupant restraint laws to reduce motor vehicle-related injuries; and partnerships

Table 3: Distribution of underlying causes of injury in 2008-2009 resulting in an emergency department visit, hospitalization or death among Native Americans on the Fort Mojave & Chemehuevi Reservations

Underlying causes of injury	Number	Percent
Fall	175	32%
Struck by, against	73	14%
Overexertion	60	11%
Cut/pierce	59	11%
MVC	55	10%
Assault	48	9%
Miscellaneous other	27	5%
Natural environmental	23	4%
Poisoning	10	2%
Other (less than 10 cases per category)	10	2%
TOTAL	540	100%

Table 4: Distribution of specific causes of 10 or more injuries in 2008-2009 resulting in an emergency department visit, hospitalization, or death among Native Americans on the Fort Mojave & Chemehuevi Reservations.

TOTAL	540	100%
Specific causes of injury	Number	Percent
Fall	175	61%
MVC	55	19%
Assaults	48	17%
Poisoning	10	3%
TOTAL	288	100%

among law enforcement, behavioral and environmental health, and social services to identify risk factors and create community-specific action plans to address violence. Further analysis of the data will explore total costs by injury type, costs per injury event, and injury rates by gender and age group. These analyses can help identify high-risk populations and establish priorities for intervention.

One limitation to generalizing our zip code-based surveillance approach is that not all tribes have defined boundaries with corresponding zip codes. Misclassification/misreporting of race is another limitation. The IHS Office of Program Statistics routinely incorporates adjustments for misclassification/misreporting in their injury data reports.⁶ Tribes whose members frequently utilize tribal and federal medical facilities (IHS, tribal, or VA hospitals, for example)

would not receive a complete injury profile were they to solely rely on state hospitalization datasets that exclude federal and tribal facilities from mandatory reporting requirements.⁷

To build on our findings, we recommend that the Fort Mojave and Chemehuevi Tribes submit a joint application for an IHS Tribal Injury Prevention Cooperative Agreement Program (TIPCAP) grant. The data from this project can be used to substantiate need, identify priorities, and evaluate the effectiveness of interventions. Secondly, IHS injury prevention staff should submit injury data requests at least every three years to the agencies identified by this project in Arizona, Nevada, and California. The zip code-specific data can provide the tribes they serve with important insights into their injury issues and trends. Finally, IHS should continue to work with the state of California to include the IHS as a data recipient under the state's Health and Safety code.

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