ARIZONA DEPARTMENT OF HEALTH SERVICES

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

AMERICAN INDIAN TRAUMA REPORT

ARIZONA SPECIAL REPORT

ASTR 2011

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EXECUTIVE SUMMARY

In 2011, American Indians made up 5.6% of the Arizona population. The twenty-two tribes have a unique culture, a rich history and their own public health needs.

Through this special edition report we report that American Indians:

- Suffered a race specific trauma rate of 871 per 100,000 for American Indians. This was significantly* higher than those seen in all other races.
- A significantly* higher trauma rate for American Indians in urban and rural settings
- A significantly* lower rate for reaching a trauma center within one hour after injury
- Suffered significantly* more injuries from motor vehicle traffic, struck by or against, falls, cut or puncture, and other transportation
- A lower proportion of safety restraint use
- A greater proportion of injuries that involve drugs or alcohol

American Indian trauma patients were more likely to be:

- Male
- 15-44 years of age OR older than 75

The total rate years of potential life lost for American Indians because of traumatic injury is 2,445 years in 2011. This compares to all other races of 819 years.

Traumatic injury is often preventable with the appropriate safety practices and infrastructure. Although further research is warranted, it should be paired with public outreach, capacity building, and a collaborative approach.

*Statistically significant with a confidence interval of 95%

AMERICAN INDIAN TRAUMA REPORT

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AMERICAN INDIAN TRAUMA REPORT

Purpose: The purpose of this report is to describe the characteristics and trends of traumatic injury among the American Indian population in Arizona. The intent is to provide data that will be the foundation for injury prevention measures among American Indians in the future.

Methods: The Bureau of Emergency Medical System & Trauma System used 2011 data from the Arizona State Trauma Registry (ASTR). This information is collected from designated trauma centers in Arizona that participate in the state's trauma registry. In 2011, there were a total of 27 healthcare facilities, 23 state-designated trauma centers and four non-designated facilities, who submitted data.

Injuries included in this registry are those which fit the ASTR inclusion criteria (Appendix 1)[a]. The data included in the registry is limited to the more severe cases of injury, assisting in describing the burden of trauma on the healthcare system in Arizona. Data is limited to participating facilities in the state. Information on patients that are transported out of Arizona will be missed, as well as patients transported to non-participating hospitals. Specifically of importance to this report, trauma patients from the Northern Colorado River Valley are often transported to Las Vegas trauma centers, and from the eastern Navajo region to New Mexico trauma centers. As a result, data in this report may be an under-estimate of the actual figures, and only tells a part of the story.

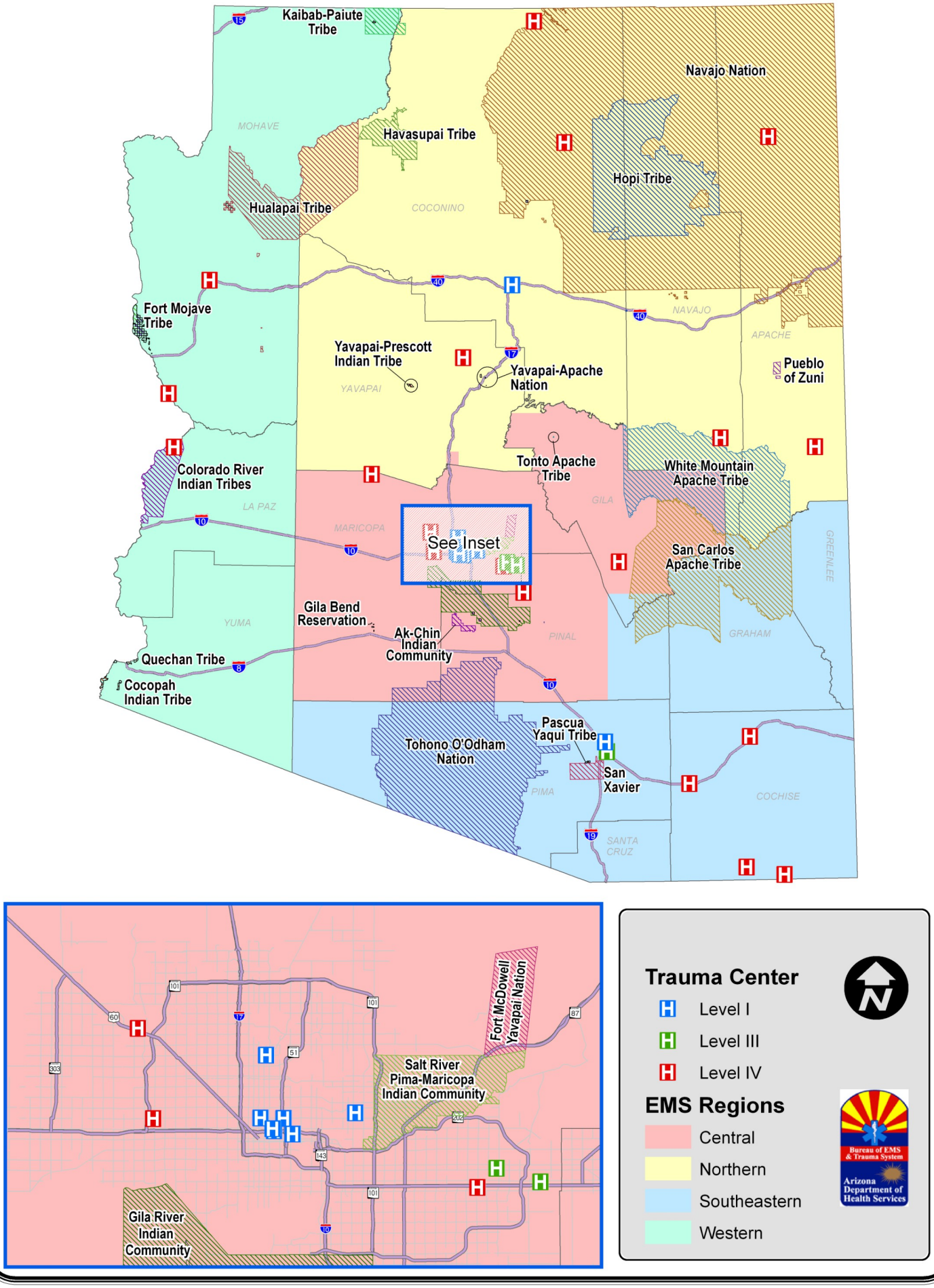
For purposes of analysis, "other race/ethnicity" includes White, Black/African American, and Hispanic. Asian/ Pacific Islander and "other" race/ethnic groups has been excluded from this report, as the representation of these populations is very small in ASTR.

In 2011, there were 3,141 cases of traumatic injury among the American Indian population reported to ASTR. Of these, 62 were fatal.

Geography: Arizona is 400 miles long and 310 miles wide for a total area of 114,006 square miles. The topography of the state is 364 square miles of water and a blend of deserts, mountains, and plateaus. The highest elevation is Humphrey's Peak (12,633 feet above sea level), the lowest elevation is the Colorado River (70 feet above sea level), and the mean elevation is 4,100 feet. Arizona shares contiguous borders with the states of California, Colorado, Nevada, New Mexico, and Utah. Internationally, the Mexican states of Sonora, and Baja California Norte share a border with Arizona.

Arizona is fortunate to be the home to a diverse culture of American Indians. The twenty-two tribes comprise approximately 5.6 percent of the population, and 29 percent of the land. The tribes are: Ak-Chin Indian Community, Cocopah Indian Tribe, Colorado River Indian Tribes, Fort McDowell Yavapai Nation, Fort Mojave Tribe, Gila River Indian Community, Havasupai Tribe, Hopi Tribe, Hualapai Tribe, Kaibab-Paiute Tribe, Navajo Nation, Pascua Yaqui Tribe, Pueblo of Zuni, Quechan Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, San Juan Southern Paiute Tribe, Tohono O'odham Nation, Tonto Apache Tribe, White Mountain Apache Tribe, Yavapai-Apache Nation, and Yavapai-Prescott Indian Tribe.

TRAUMA CENTERS, EMS REGIONS AND AMERICAN INDIAN TRIBES



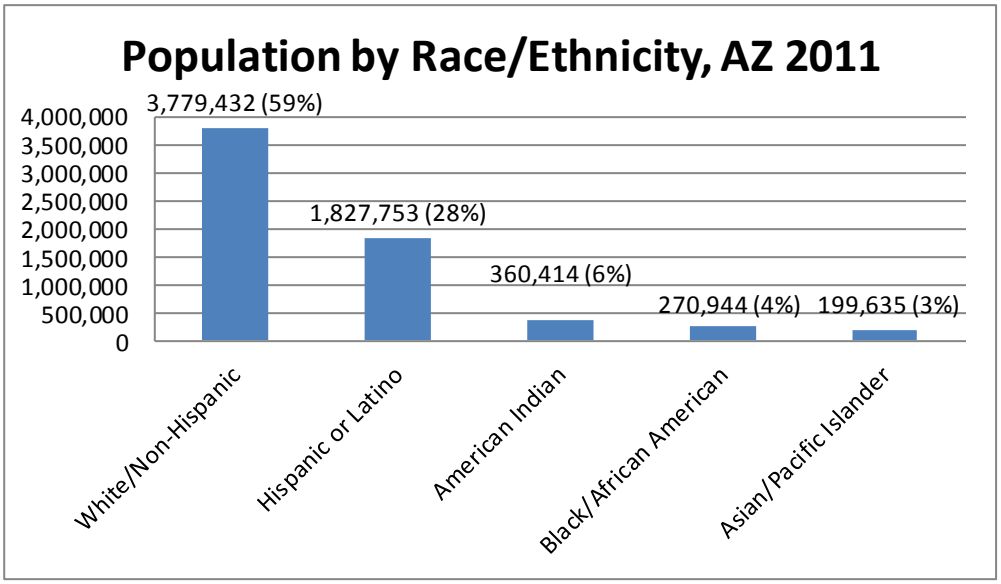
Updated as of May 1, 2013

ARIZONA TRIBES

The twenty-two American Indian tribes in Arizona each have unique culture and rich history. More information and resources on the tribes can be found at the Inter-Tribal Council of Arizona, Inc. website, or on the individual webpages of the tribes themselves.

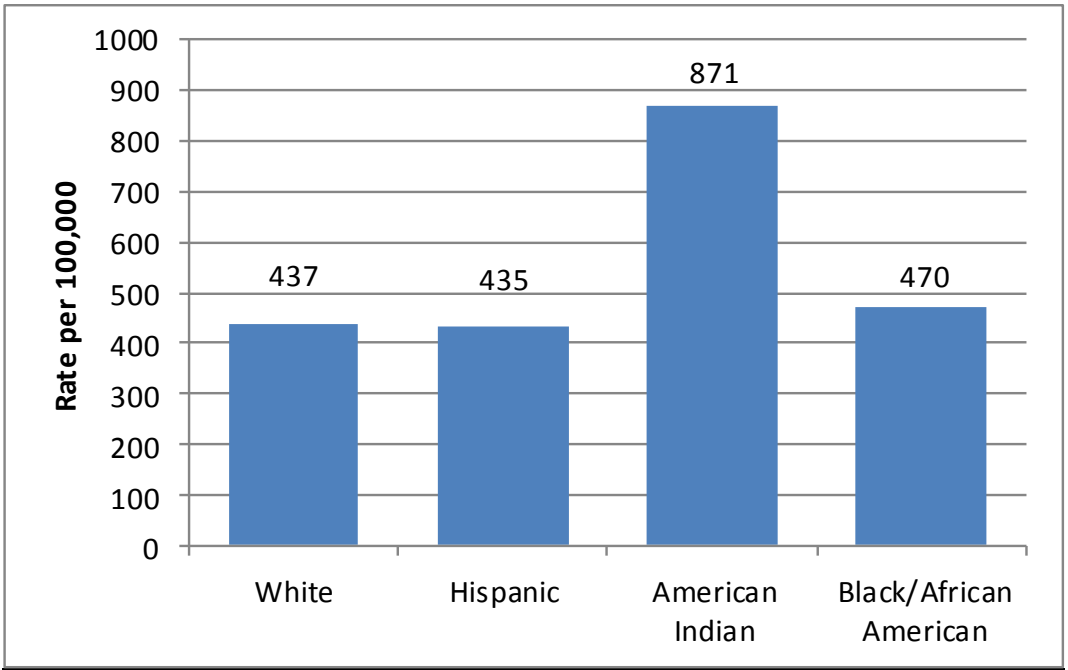
ARIZONA DEMOGRAPHICS

FIGURE 1: Arizona population by race/ethnicity, Arizona Health Status and Vital Statistics, 2011



Although American Indians account for 4 percent of Arizona's population (Figure 1), the rate of traumatic injury per 100,000 Arizona residents is almost double among American Indians as compared to other race/ethnicity groups (Figure 2).

FIGURE 2: Race-specific trauma rates per 100,000, ASTR 2011



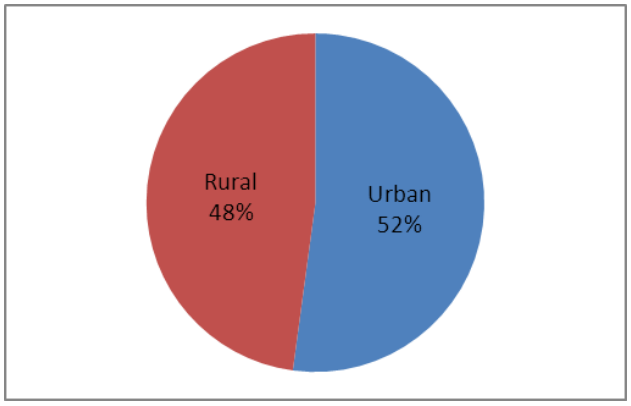
Race/Ethnicity	Count	Rate (95% CI)[b]
White	16,504	437 (430, 443)
Hispanic	7,948	435 (425, 444)
American Indian	3,141	**871 (841, 902)***
Black/African American	1,274	470 (444, 496)

* Statistically significant

AMERICAN INDIAN DEMOGRAPHICS

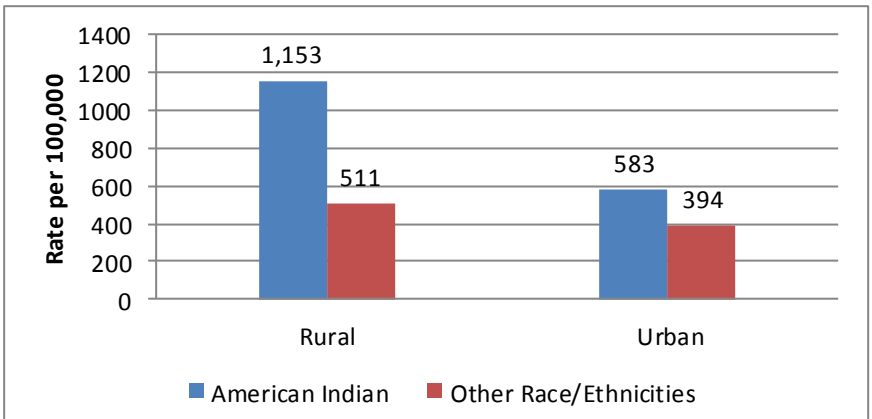
Of the Arizonan American Indian population, 52 percent live in urban counties[c] (Figure 3). A nearly equal proportion, 48 percent, live in rural counties. This differs from the ratio in the rest of the population– only 16 percent of non-American Indian Arizonans live in rural settings. American Indian is defined as having at least one parent of American Indian descent.

FIGURE 3: American Indian regional population, Arizona Health Status and Vital Statistics, 2011



Despite this, American Indians in rural settings have trauma rates nearly twice as high as that in urban settings (Figure 4). Approximately 1,153 traumatic injuries occur per 100,000 rural-dwelling American Indians, versus 583 per 100,000 urban dwelling American Indians.

FIGURE 4: Urban and rural trauma rate per 100,000 American Indians, ASTR 2011



Setting	American Indian		Other Race/Ethnicities	
	Count	Rate (95% CI)	Count	Rate (95% CI)
Rural	1,989	1,153 (1,102, 1,204) *	4,861	511 (497, 525)
Urban	1,096	583 (549, 618)*	19,876	394 (389, 400)

* Statistically significant

AMERICAN INDIAN TRAUMA CHARACTERISTICS

After the first hour following a traumatic injury, often called the "golden hour," a person's chance of survival may begin to reduce dramatically.

A large percentage of data on the golden hour is missing for all race/ethnicities. This information is calculated based on the time of injury, often recorded by the first responders or emergency medical providers. American Indian trauma patients are recorded as having received care within the first hour after traumatic injury about 22 percent of the time (Figure 5).

The higher rate of trauma in rural settings is partially accountable for this trend, as there are fewer trauma centers, and longer distances to reach the facilities. Of the American Indian rural population, only 13 percent reached a trauma center within the first hour after injury, while 31 percent of the urban population did.

FIGURE 5: Proportion of golden hour by race, ASTR 2011

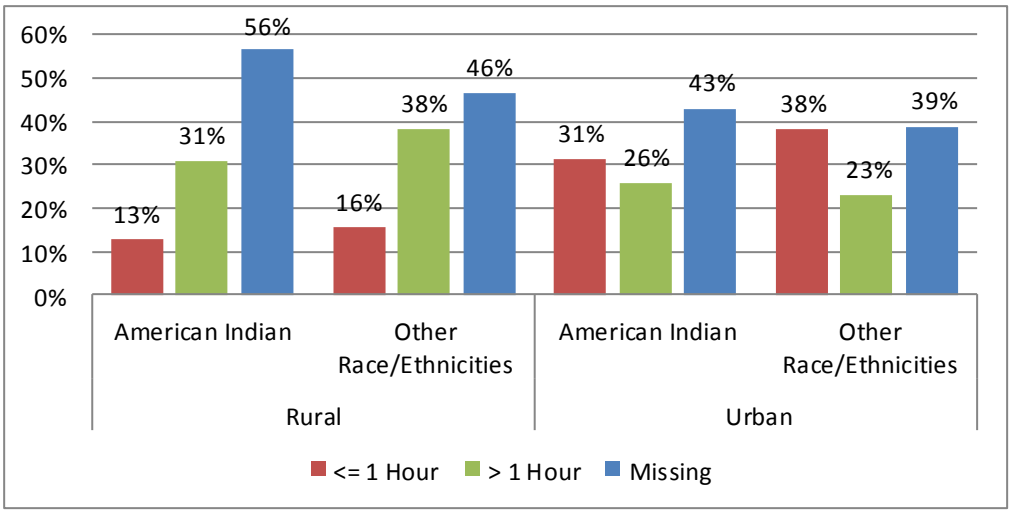


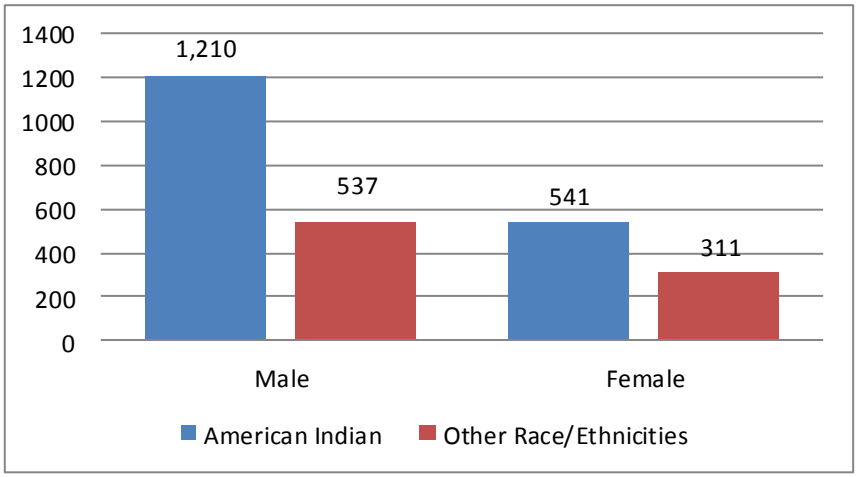
FIGURE 6: Golden hour frequency & percent, ASTR 2011

Golden Hour	American Indian		Other Race/Ethnicities	
	Count	Percent (95% CI)	Count	Percent (95% CI)
> 1 Hour	982	**31.26 (31.11, 31.41)***	6,707	26.07 (25.54, 26.61)
<= 1 Hour	697	**22.19 (22.05, 22.33)***	8,503	33.05 (32.48, 33.63)
Missing	1,462	**46.55 (46.39, 46.71)***	10,516	40.88 (40.28, 40.48)

*Statistically significant

AMERICAN INDIAN TRAUMA CHARACTERISTICS

FIGURE 7: American Indian trauma rate per 100,000 by sex, ASTR 2011

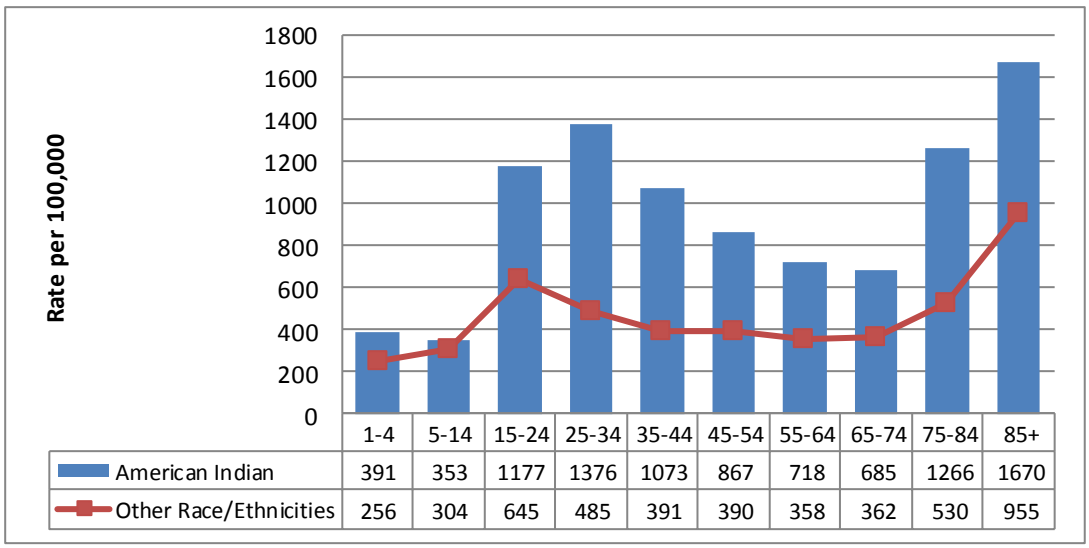


Despite the near equal ratio of male to female population, the rate of trauma is higher among American Indian males (Figure 7). This ratio differs from the ratio of males to females in the non-American Indian population in Arizona (537 per 100,000 males to 311 per 100,000 females). American Indian men have more than twice the rate of trauma than men of other race/ethnicities.

Gender	American Indian		Other Race/Ethnicities	
	Count	Rate (95% CI)	Count	Rate (95% CI)
Male	2,156	**1,210 (1,159, 1,261) ***	16,228	537 (529, 546)
Female	985	541 (507, 574)	9,497	311 (304, 317)

*Statistically significant

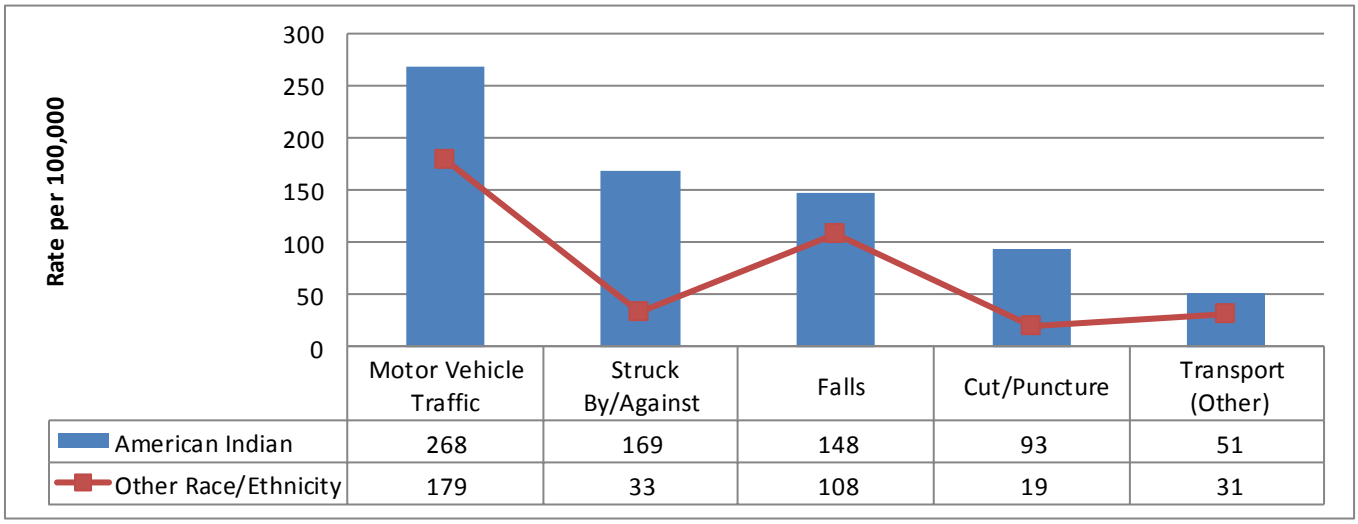
FIGURE 8: Trauma rates per 100,000 by age, ASTR 2011



American Indians have a higher rate of trauma across all age groups as compared to other race/ethnicities. The 85+ age group as the highest rate of trauma at 1,670 traumatic injuries per 100,000 (Figure 8).

MECHANISMS OF INJURY

FIGURE 9: Top 5 mechanisms of injury, rates per 100,000, ASTR 2011



The mechanisms of injury[d] that caused the most traumas among American Indians in 2011 were motor vehicle traffic incidents, struck by/against, falls, cut/puncture, and transport, other (Figure 9). The order of top causes in the American Indian population differs from that of the general population, with higher proportion of struck by/against and cut/puncture injuries than the non-American Indian Arizona population (Figure 10).

FIGURE 10: Mechanisms of injury, rate per 100,000, ASTR 2011

Cause	American Indian		Other Race/Ethnicity	
	Count	Rate (95% CI)	Count	Rate (95% CI)
Motor Vehicle Traffic	967	**268 (251, 285)***	10,850	179 (175, 182)
Struck By/Against	610	**169 (156, 183)***	2,003	33 (32, 34)
Falls	532	**148 (135, 160)***	6,584	108 (106, 111)
Cut/Puncture	334	**93 (83, 103)***	1,137	19 (18, 20)
Transport. Other	185	**51 (44, 59)***	1,912	31 (30, 33)

*Statistically significant

INTENT OF INJURY

American Indians have comparatively higher proportions of traumatic injuries that have homicide/ assault and suicide/self-inflicted intents (Figures 11 & 12). Alcohol use[e] was involved in 68 percent of homicidal traumatic injuries and 82 percent of suicidal/ self-inflicted traumatic injuries within the American Indian population.

FIGURE 11: Intent of injury by race, rate per 100,000, ASTR 2011

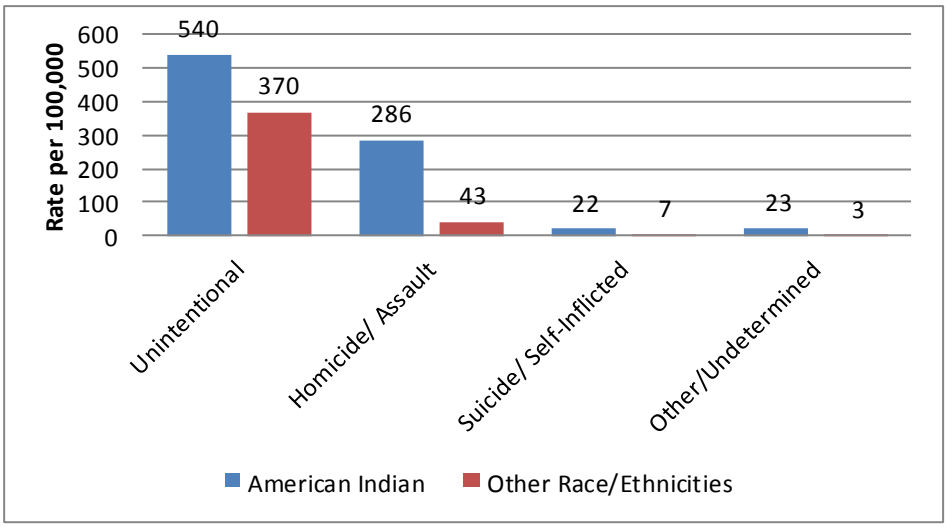


FIGURE 12: Intent of injury by race, rate per 100,000, ASTR 2011

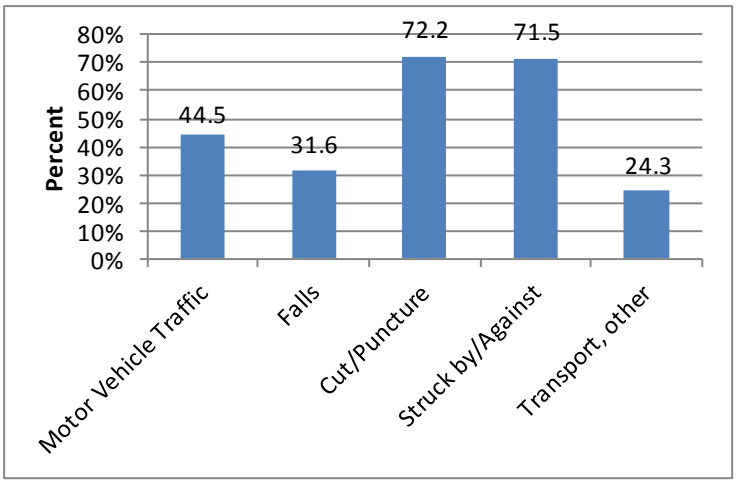
Intent	Race			
	AI		Other Race/Ethnicities	
	Count	Rate (CI)	Count	Rate (CI)
Unintentional	1,948	**540 (516, 564)***	22,513	370 (366, 375)
Homicide/Assault	1,029	**286 (268, 303)***	2,599	43 (41, 44)
Suicide/ Self-Inflicted	79	**22 (17, 27)***	430	7 (6, 8)
Other	84	**23 (18, 28)***	178	3 (2, 3)

* Statistically Significant

Alcohol was involved most frequently in cut/puncture and struck by/against traumatic injuries (Figure 13).

FIGURE 13: American Indian alcohol use by top 5 mechanisms of injuries, ASTR 2011

Approximately half of the injuries from the top five mechanisms among American Indians involved alcohol. Cut/puncture and struck by/against injuries both involved alcohol about 72 percent of the time.



TRAUMA RISK FACTORS

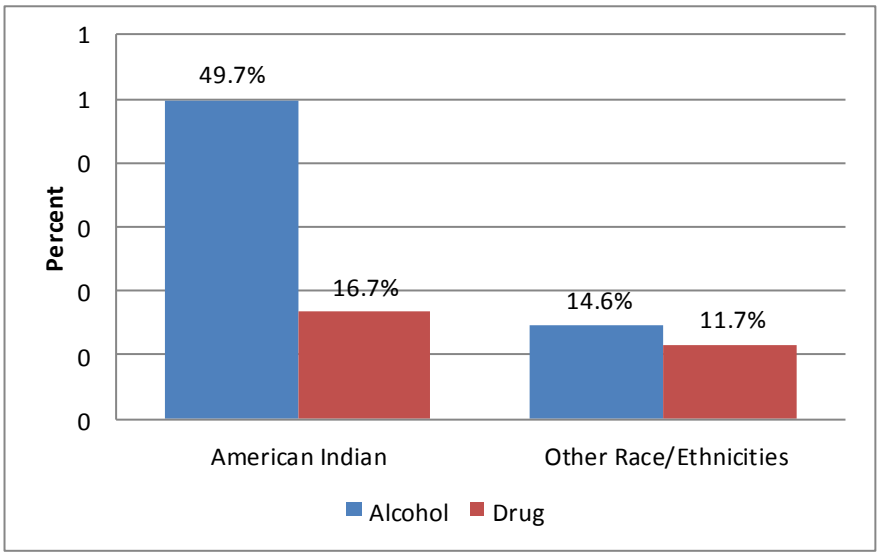
FIGURE 14: Frequency of alcohol use in top mechanisms of injury among American Indians, ASTR 2011

Cause	Yes		No		Missing	
	Count	Percent	Count	Percent	Count	Percent
Motor Vehicle Traffic	430	44.5%	436	45.1%	101	10.4%
Falls	168	31.6%	307	57.7%	57	10.7%
Cut/Puncture	241	72.2%	60	18.0%	33	9.9%
Struck by/Against	436	71.5%	125	20.5%	49	8.0%
Transport, other	45	24.3%	114	61.6%	26	14.1%

FIGURE 15: Frequency of alcohol and drug use in trauma by race/ethnicity, ASTR 2011

Race/Ethnicity	Yes		No		Missing	
	Count	Percent	Count	Percent	Count	Percent
Alcohol						
American Indian	1,560	49.7%	1,224	39.0%	357	11.4%
Other Race/Ethnicities	3759	14.6%	20,395	79.3%	1572	6.1%
Drug						
American Indian	525	16.7%	2,229	71.0%	387	12.3%
Other Race/Ethnicities	3000	11.7%	21010	81.7%	1716	6.7%

FIGURE 16: Proportion of alcohol and drug use in trauma by race/ethnicity, ASTR 2011

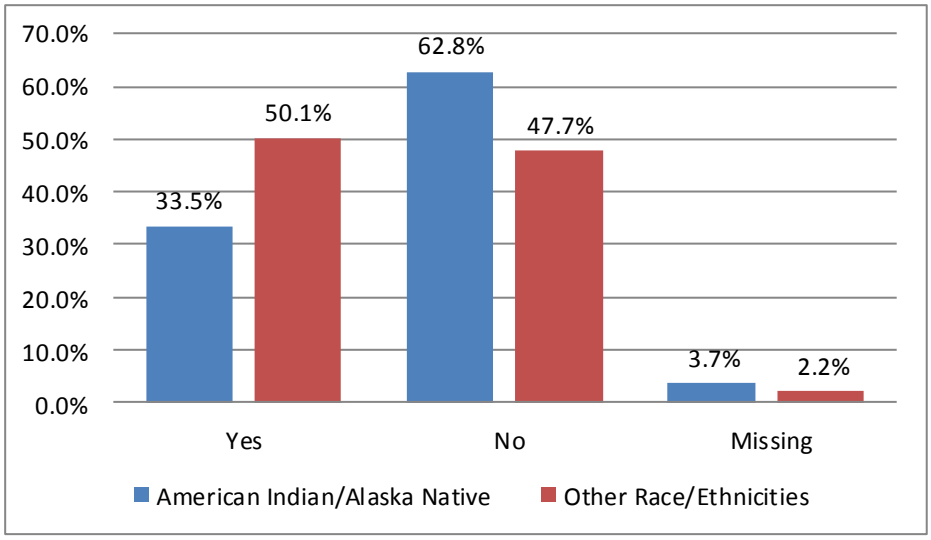


In traumatic injuries, American Indians had the highest percentage of alcohol use (49.7%) than any other race/ethnic group.

American Indians also had the second highest percentage of drug use (16.7%) in traumatic injuries.

TRAUMA RISK FACTORS

FIGURE 17: Proportion of safety restraint use by race/ethnicity, ASTR 2011



Approximately 34 percent of American Indian trauma patients involved in an motor vehicle traffic incident used safety restraints, this is the lowest reported proportion among all race/ethnicities (Figure 18).

FIGURE 18: Frequency of safety restraint use by race/ethnicity, ASTR 2011

Race/Ethnicity	Yes		No		Missing	
	Count	Percent (95% CI)	Count	Percent (95% CI)	Count	Percent (95% CI)
American Indian	324	33.5 (30.6, 36.55)	607	62.8 (59.7, 65.8)	36	3.7 (2.7, 5.1)
Other Race/Ethnicities	5,438	50.1 (49.2, 51.1)	5,172	47.7 (46.7, 48.6)	240	2.2 (2.0, 2.5)

Approximately 80 percent of American Indian trauma patients were discharged to their homes after being seen at a state-designated trauma center (Figure 19). Nearly eleven percent were transferred to an acute care facility for further treatment of their injuries.

FIGURE 19: American Indian hospital discharge location, ASTR 2011

Discharge Location	American Indian		Other Race/Ethnicities	
	Count	Percent	Count	Percent
Expired	62	2.0%	668	2.6%
Home	2,526	80.4%	21,463	83.4%
Home Health	*	*	17	0.1%
Left Against Medical Advice	*	*	124	0.5%
Skilled Nursing Facility, Long-term Care, Other Rehab.	195	6.2%	2,360	9.2%
Transfer to Acute Care	339	10.8%	1,094	4.3%
Total	**3,141**	**100%**	**25,726**	**100%**

*10 or fewer observations

TRAUMA CHARGES

The total hospital charges[f] to American Indians was $108,792,152 in 2011(Figure 20). The median hospital charge was $21,369.

Over 50% of hospital charges for American Indians were charged to AHCCCS/Medicaid, a higher percentage of governmental payment than other races (Figure 21).

FIGURE 20: American Indian primary payment methods, ASTR 2011

Primary Payer	Total Charges
Self-Pay	$8,659,513
Private	$18,632,949
AHCCCS & Other Government	$62,600,003
Medicare	$9,611,295
Other	$9,288,392
Total	$108,792,152

"Total Charges" refers to the whole dollar amount charged for services provided during an episode of care at the trauma facility. This amount does not reflect the total health care cost to the American Indian communities; it does not include charges for emergency medical service response, cost of providing the services, contribution from Indian Health Service, nor the actual reimbursement received for that episode of care.

FIGURE 21: Primary payment methods, ASTR 2011

Primary Payer	American Indian		Other Race/Ethnicities	
	Count	Percent (95% CI)	Count	Percent (95% CI)
Self pay	242	**7.7 (6.8, 8.7)***	3,764	14.6 (14.2, 15.1)
Private	387	**12.3 (11.2, 13.5)***	8,415	32.7 (32.1, 33.3)
AHCCCS & Other Government	1,708	**54.4 (52.6, 56.1)***	7,745	30.1 (29.6, 30.7)
Medicare	212	**6.7 (5.9, 7.7)***	3,277	12.7 (12.3, 13.2)
Other	592	**18.8 (17.5, 20.3)***	2,525	9.8 (9.5, 10.2)
Total	**3,141**	**100**	**25,726**	**100**

*** Statistically significant**

YEARS OF POTENTIAL LIFE LOST

FIGURE 22: Years of potential life lost rate per 100,000, CDC WISQARS 2010

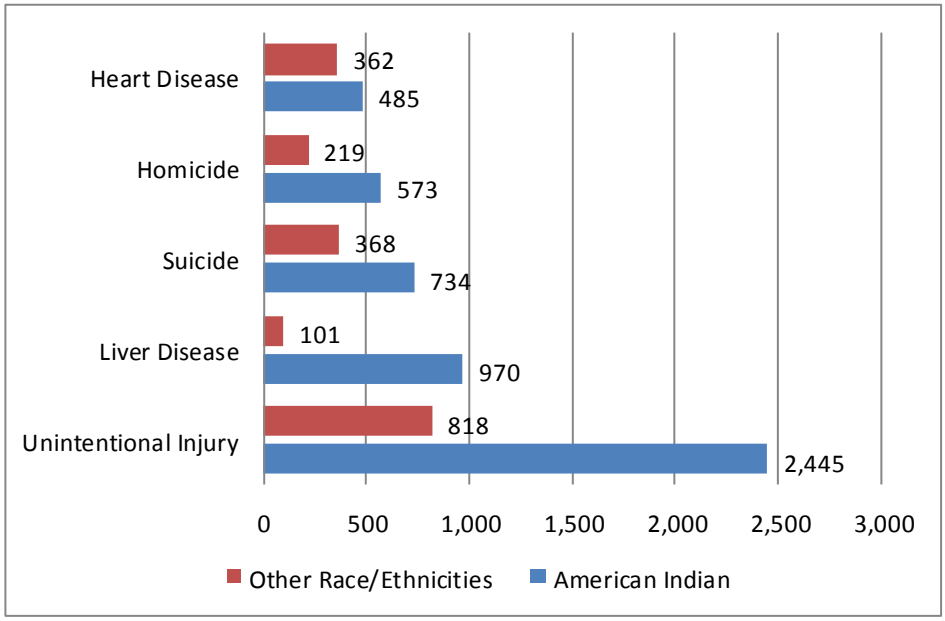


FIGURE 23: Count of years of potential life lost, CDC WISQARS 2010

Cause of Death	American Indian			Other Race/Ethnicities		
	Count	YPLL	YPLL Rate (95% CI)	Count	YPLL	YPLL Rate (95% CI)
Unintentional Injury	224	6,761	**2,445 (2,387, 2,503)***	1,729	42,836	819 (811, 826)
Liver Disease	144	2,683	**970 (934, 1,007)***	456	5,270	101 (98, 103)
Suicide	60	2,029	**734 (702, 766)***	839	19,286	369 (363, 374)
Homicide	49	1,584	**573 (545, 601)***	351	11,455	219 (215, 223)
Heart Disease	93	1,342	**485 (459, 511)***	1,854	18,929	362 (357, 367)

Three of the five top five causes of death in 2010 in the American Indian population in Arizona were trauma-related, according to the Centers for Disease Control and Prevention (http://www.cdc.gov/injury/wisqars/fatal.html).

Years of potential life lost (YPLL) measures the impact of premature death, and can be used to identify risks to public health and leading causes of death among a population. It is calculated by subtracting the age at death from a predetermined end point age, in this case, a standard of 65 years. For example, a person who died at age 50 would contribute 15 years of potential life lost in this equation.

Unintentional injuries were the top cause of death, accounting for 224 deaths and 6,761 YPLL in the Arizonan American Indian population in 2010 (Figure 23).

RECOMMENDATIONS

Based on the data presented in this report, the following recommendations are made to reduce trauma among the American Indian populations in Arizona.

Further Research

Presently, there are few publications on traumatic injury among American Indians. The information compiled in this report is only a snapshot of the true picture of trauma among the population. Additional efforts can be made on providing American Indian communities with useful information to analyze common causes of injury, risk factors, times, and locations within their communities.

Capacity Building

By identifying trauma risk factors and trends within their community, American Indian stakeholders would be able to develop interventions to build their capacity to respond to injuries. A strengthening and/or the development of a trauma registry , prevention programs, and collaborative approaches would assist in building such capacity. Stakeholders within the American Indian health community might consider partnerships with various institutions as a means of achieving this goal, including the Inter-Tribal Council of Arizona, Arizona Department of Health Services, local groups, and the Indian Health Service.

Public Outreach

The American Indian public should become involved by actively discussing topics such as seatbelt use, fall prevention, traffic safety, alcohol abuse, and violence prevention. Incentives for communities should center around injury prevention programs and events.

RESOURCES

For more information, please visit:

ADHS Bureau of Emergency Medical Services & Trauma System-

http://azdhs.gov/bems/index.htm

ADHS Bureau of Women's and Children's Health Office of Injury Prevention-

http://www.azdhs.gov/phs/owch/ipcfr/

Hopi Tribe Department of Community Health Services-

http://www.hopi-nsn.gov/tribal-services/department-of-community-health-services/

Hualapai Health Department-

http://hualapai-nsn.gov/services/hualapai-health-department/

Indian Health Service-

http://www.ihs.gov/

Inter Tribal Council of Arizona, Inc.-

http://itcaonline.com/

Navajo Nation Division of Health-

http://www.nndoh.org/

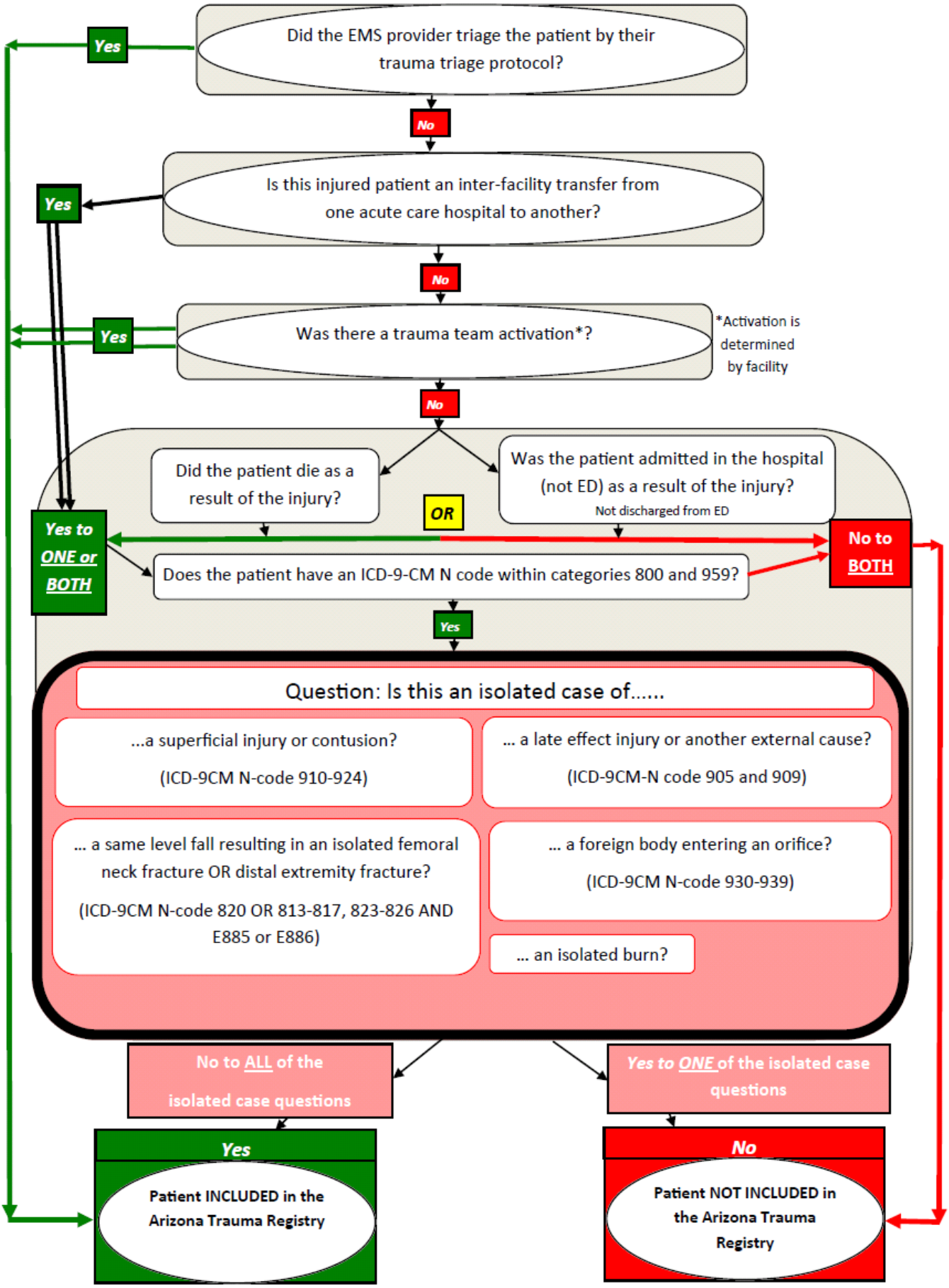
Tuba City Regional Health Care Corporation-

http://www.tchealth.org/

White Mountain Apache Tribe Division of Health Programs-

http://www.wmat.nsn.us/index.html

2013 Arizona Trauma Registry Inclusion Criteria



DEFINITIONS

a. Trauma Case Definition- (1) A patient with injury or suspected injury who is triaged from a scene to a trauma center or ED based upon the responding EMS provider's trauma triage protocol; **OR** Level III and Level IV Trauma Centers must report all patients with injury that are transported via EMS to another acute care hospital or trauma center; **OR** (2) A patient with injury or suspected injury for whom a trauma team activation occurs; **OR** (3) A patient with injury who is admitted as a result of the injury **OR** who dies as a result of the injury **AND** has an ICD-9-CM N-code within categories 800 through 959 **AND** does not **ONLY** have late effects of injury or another external cause (ICD-9-CM N-code within categories 905 through 909), a superficial injury or contusion (ICD-9-CM N-code within categories 910 through 924), effects of a foreign body entering through an orifice (ICD-9-CM N-code within categories 930 through 939), an isolated femoral neck fracture from a same-level fall (ICD-9-CM N-code within category 820 and ICD-9-CM E-code within category E885 or E886), an isolated distal extremity fracture from a same-level fall (ICD-9-CM N-code within categories 813 through 817 or 823 through 826 and (ICD-9-CM E-code within category E885 or E886), or an isolated burn (ICD-9-CM N-code within categories 940 through 949).

b. Confidence Interval- A confidence interval gives an estimated range of values which is likely to include an unknown population parameter, and indicates the amount of random error in the estimate.

c. Urban/ Rural- Categorization for urbanicity is defined based on Arizona Health & Vital Statistics data, identifying Maricopa, Pima, Pinal, and Yuma Counties as urban, and the remaining 11 counties in the state as rural.

d. Mechanisms of Injury– Based on CDC definitions, the cause of injury is the way in which the person sustained the injury; how the person was injured; or the process by which the injury occurred. A struck by/ against injury is a result of from being struck by a human, animal, or inanimate object. It also includes a force against a vehicle or machinery. A cut/puncture injury results from an incision, slash, perforation, or puncture by a pointed or sharp instrument, weapon, or object. Transport, other injuries include injuries from railway, water, air, space, animal and animal-drawn conveyances, ATVs, battery-powered carts, and methods of transports.

e. Alcohol/Drug Use- Alcohol and drug use is defined as indication of use through testing or self-report, regardless of level of impairment.

f. Total Charges- For purpose of analysis, "AHCCCS/Medicaid" and "Other Government" were categorized as "AHCCCS & other government," "Private-commercial BCBS," "Workers Comp," and "No fault auto" were categorized as "Private," and "missing," "Other," "Not billed," and "Not documented" were categorized as "other."