

*Descriptive Study of Injuries within the
Cheyenne and Arapaho Tribal Territory of Oklahoma*

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ABSTRACT

In the Cheyenne and Arapaho (C&A) Tribes of Oklahoma's Tribal Territory, injuries need to be addressed by Tribal, State and Federal leaders whether they result in hospitalization or death. The purpose of this study was to determine the leading injury problems within the C&A Tribal Territory. The C&A Tribal Territory includes the following eight Oklahoma counties: Beckham, Blaine, Canadian, Custer, Dewey, Kingfisher, Roger Mills, and Washita. The data source used to study the leading injury issues for the C&A Tribal Territory was the Oklahoma State Department of Health's (OSDH) OK2SHARE Service database. Secondary data were obtained from this online health data surveillance system for American Indians (AI) living in the eight counties in the C&A Territory, and using database filters, to study fatalities and hospitalizations. From 2012-2017 there were 73 AI fatalities, and from 2012-2013 there were 83 AI hospitalizations within the C&A Tribal Territory. The three leading causes of injury fatality were motor vehicle crashes (MVC), firearms, and poisoning, with males more likely to die than females for MVC and firearm. The three leading causes of injury hospitalizations were falls, motor vehicle crashes, and poisoning, with similar distributions by gender. Results from this study allow the C&A Tribes of Oklahoma to prioritize strategies to prevent injury and violence in the future.

BACKGROUND

In the Cheyenne and Arapaho (C&A) Tribes of Oklahoma's Tribal Territory, injuries need to be addressed by Tribal, State and Federal leaders whether they result in hospitalization or death. In the United States from 1990 to 2009, AI/AN death rates for the three leading causes of unintentional injury were motor vehicle traffic crashes, poisoning, and falls, and these rates were 1.4 to 3.0 times higher among AI/AN persons than among Whites (Murphy et al., 2014). According to the Centers for Disease Control and Prevention (CDC), of the 10 Leading Causes of Death from 2012-2018 for all races and both sexes in Oklahoma, Unintentional Injuries were ranked fourth among all deaths (CDC, 2020) and for the age categories ranging from 1 through 44, unintentional injuries were ranked first (CDC, 2020). A similar pattern occurred for AI/AN deaths in Oklahoma during the same timeframe; unintentional injuries were ranked third of all deaths, and for ages 1 through 44, they were ranked first (CDC, 2020).

The C&A Tribal Territory includes the following eight Oklahoma counties: Beckham, Blaine, Canadian, Custer, Dewey, Kingfisher, Roger Mills, and Washita. The population of the Cheyenne and Arapaho Tribes is 12,185 (Cheyenne & Arapaho Tribes, 2020). The C&A government consists of Executive, Legislative, Judicial branches and a Tribal Council. The Tribe's primary services include Health, Education, Cultural, Social Services, Housing, Veteran's Administration, Vocational Rehabilitation, and Employment and Training.

After attending several injury prevention training courses, I initiated the C&A Injury Prevention coalition Northwest Oklahoma Injury Prevention Partnership (NWOKIPP). Established in February 2018, the coalition assisted with community injury prevention educational events (e.g., a prom impaired driving prevention activity) and three child passenger safety seat check events within the C&A service area. No prior studies on injuries within the C&A Tribal Territory have been conducted.

The purpose of this study was to determine the leading injury problems within the C&A jurisdiction, which will allow the Tribe's injury prevention coalition to focus its injury prevention efforts and provide data that can be used to apply for injury prevention grant funding.

METHODS

Data Source

The data source used to study the leading injury issues for the C&A Indian Territory was the Oklahoma State Department of Health (OSDH) OK2SHARE Service database. The Ok2share website "provides data to support evidence-based decision making for public health in Oklahoma, to plan and improve service delivery, evaluate health care systems, inform policy decisions, and aid in research" (OSDH, n.d.).

The secondary data obtained from the Ok2share database included injuries, for American Indians living in the eight counties in the Cheyenne and Arapaho Tribes Territory, which resulted in either hospitalization and/or death (mortality). The ok2share website allows for the study of different information using filters.

Data Collection

For mortality data, the following filters were used to run initial data queries, and queries were altered to look for trends in different areas, age groups, gender:

- Time Span: 2012-2017
- Geography: deselected 'Entire State' and selected the following counties included: Beckham, Blaine, Canadian, Custer, Dewey, Kingfisher, Roger Mills, and Washita
- Race: American Indian and the 'IHS Enhanced Linked Race' under the Use Revised IHS Racial Categories.
- Underlying Cause of Death: one or all

- Injury intent: one or all

For hospitalization data, the ok2share website only includes data through 2013. The following filters were used to run my initial data queries:

- Time span: 2012 to 2013
- County of Residence: same counties as selected for the Death data
- Race: American Indian.
- Mechanism/Cause: one or all

For hospitalization costs, the following filters were used:

- total costs
- cost per patient
- cost per day
- length of stay.

Data Analysis

Data downloaded for ok2share was exported into Excel, which was used to generate frequency distributions and create charts and graphs.

RESULTS

Injury Fatality

A total of 73 injury deaths occurred in the C&A Tribal Territory from 2012 to 2017 (Table 1). With 73 deaths over 6 years, the average deaths due to injury is 1.01 deaths per month. Firearm and Motor Vehicle crashes deaths totaled 17 each. In 2015 alone, there were 8 deaths due to Firearms, representing almost half of the total Firearm deaths during this timeframe. The third leading cause of death was Poisoning (n=12), followed by Suffocation (n=10), and Falls (n=5). The remaining 12 injury fatalities shown as other (causes are noted in the footnote) because each type of injury category had fewer than 5 fatalities and the OK2SHARE website notes them only as 'less than 5'.

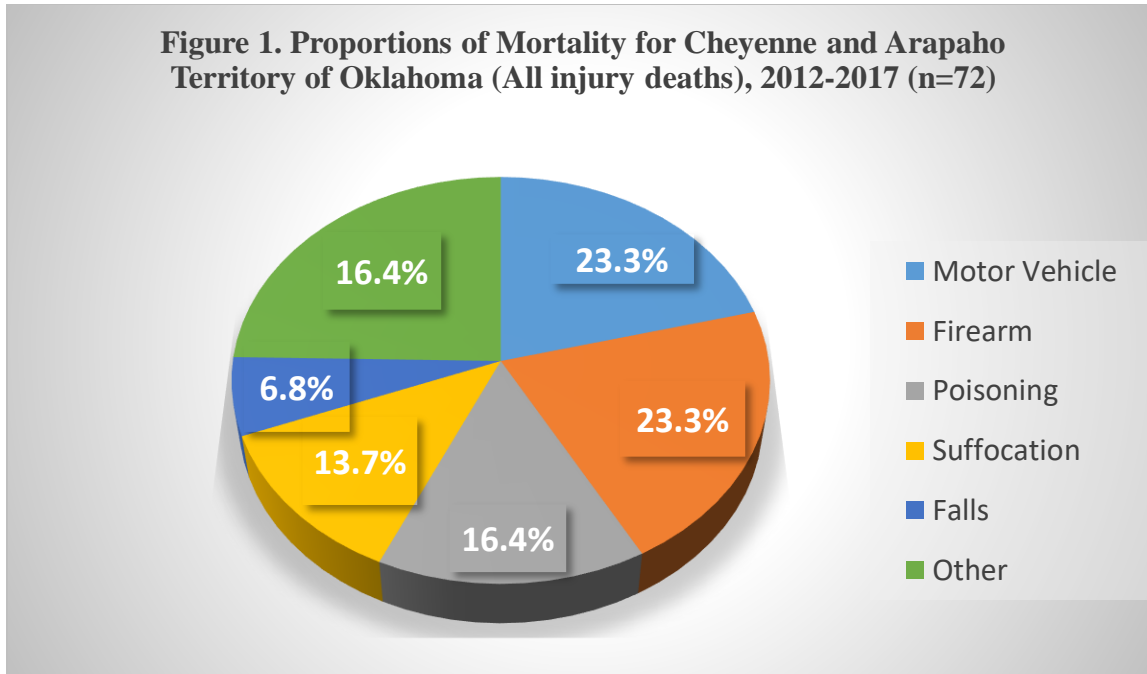
Table 1. Injury Mortality for the C&A Territory of Oklahoma, Five Leading Causes and Other Causes, 2012 - 2017, n=72.¹

<i>Cause</i>	<i>Unintentional</i>	<i>Self-Inflicted</i>	<i>Assault</i>	<i>Undetermined</i>	<i>Total</i>
Five Leading Causes					
Firearm	0	9	7	<5	17
Motor Vehicle Crashes	17	0	0	0	17
Poisoning	9	<5	0	0	12
Suffocation	<5	8	0	0	10
Fall	5	0	0	0	5
Other Causes					
Drowning/Submersion	<5	0	0	0	<5
Machinery	<5	0	0	0	<5
Natural/Environmental	<5	0	0	0	<5
Pedestrian, Non-Traffic	<5	0	0	0	<5
Bicyclist, Non-Traffic	0	0	0	0	0
Cut/Pierce	0	0	0	0	0
Fire/Burn	0	0	0	0	0
Struck By/Against	0	0	0	0	0
Total	44 (31)	20 (17)	7	<5	72 (55)

Source: ok2share

¹ Data shown in parentheses in the table represents the total when adding only those deaths ≥ 5 for each injury cause. The ok2share website provides a total number by category.

The three leading causes of injury death represented 63% of All Injury Deaths (Figure 1). When studying the proportions of injury mortality by injury cause, Firearm and MVC fatalities represented 23.3% each, Poisoning represented 16.4%, and Suffocation and Falls (combined) represented 20.6%. All other injury causes, combined, represented 16.4% of injury mortality.



Source: ok2share

Table 2 shows C&A injury fatalities by gender for the leading three types of injuries: MVC, Firearm, and Poisoning. Males were more vulnerable to fatalities by MVC's and Firearms than females. Females were more likely than males to die of poisoning.

Table 2. C&A Leading (Top 3) Causes of Injury Fatality by Gender, 2012-2017 (n=46)

Injury Cause	Male (n=32) % (n)	Female (n=14) % (n)
MVC	44% (14)	21% (3)
Firearm	44% (14)	21% (3)
Poisoning	12% (<5)	57% (8)

Source: ok2share

When attempting to study fatalities by age group, there were too few fatalities across the age groups to create a table because most were under 5. The only age group that had more than 5 fatalities, for any injury cause, was the 15-24 age group, and this was true for both MVC and Firearms.

Injury Hospitalizations

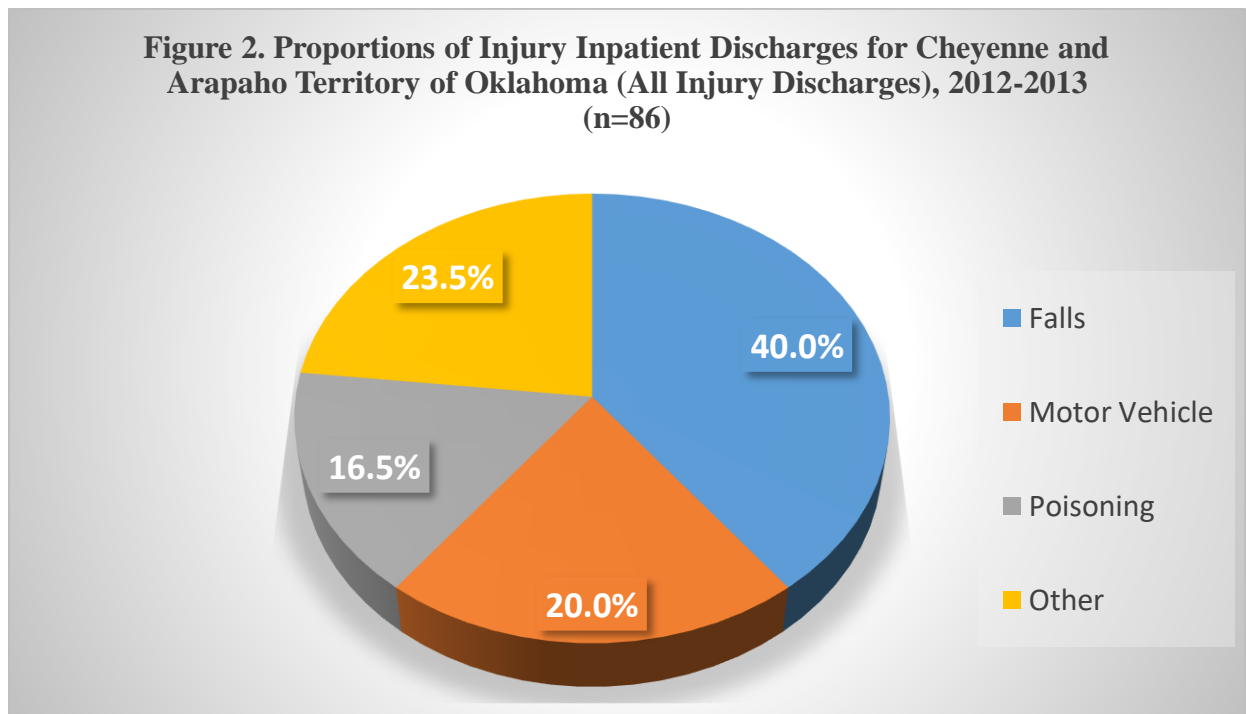
A total of 86 injury hospitalizations occurred within the C&A Tribal Territory from 2012 to 2013 (Table 3). Although data collected from the ok2share website was limited to only 2 years, the leading three causes for hospital discharges for the C&A Territory from 2012 to 2013 were: (1) Falls, (2) Motor Vehicle Crashes, and (3) Poisoning. With most categories of injury having fewer than 5 hospitalizations, 24% (n=20) of hospitalizations were due to other causes.

Table 3. Injury Hospitalization for the C&A Territory of Oklahoma, Three Leading Causes and Other Causes, 2012 - 2013, n=86.

<i>Cause</i>	<i>Unintentional</i>	<i>Self-Inflicted</i>	<i>Assault</i>	<i>Undetermined</i>	<i>Total</i>
Three Leading Causes					
Fall	34	0	0	0	34
Motor Vehicle Crashes	16	1	0	0	17
Poisoning	≥1, <5	>6, <10	0	<5	14
Other Causes					
Firearm	0	0	≥2, ≤8		≥2, ≤8
Suffocation	≥2, ≤8	0	0	0	≥2, ≤8
Drowning/Submersion	0	0	0	0	0
Machinery	≥2, ≤8	0	0	0	≥2, ≤8
Natural/Environmental	<5	0	0	0	<5
Pedestrian, Non-Traffic	0	0	0	0	0
Bicyclist, Non-Traffic	<5	0	0	0	<5
Cut/Pierce	≥2, ≤8	0	0	0	≥2, ≤8
Fire/Burn	<5	0	0	0	<5
Struck By/Against	<5	0	0	0	<5
Total					86

Source: ok2share

The three leading causes of injury hospitalization represented 75% (n=65) of all injury hospitalizations from 2012 to 2013 (Figure 2). When studying the proportions of injury hospitalizations for the three leading causes Falls represented 40% of all hospitalizations, followed by 20% for MVC and 16% for Poisoning. Other injury causes (all of which had fewer than 5 hospitalizations so cannot be reported separately) represented 23.5% of hospitalizations.



Source: ok2share

Similar to mortality data, when attempting to study hospitalizations by age group, there were too few hospitalizations resulting in have <5 cases for many of the age groups. The only age group that had >5 hospitalizations for any injury category was the 55 to 64 age group, and this was true for the Falls cause of injury hospitalization.

Hospitalization Costs

Table 3 summarizes hospitalization cost data for the C&A Territory from 2012 to 2013. There were similarities in costs between the two years of data, for average length of stay, average costs per patient, and average costs per day. The total costs in 2012 were higher than 2013.

Table 4. Injury Hospitalization Costs for C&A Territory, 2012-2013 (n=86).

<i>Metric</i>	<i>2012 (n=48)</i>	<i>2013 (n=38)</i>
Average length of stay	5.3 days	4 days
Total costs	\$2,672,309	\$1,665,887
Average costs per patient	\$55,673	\$43,813
Average costs per day	\$10,524	\$10,953

DISCUSSION

Previously, injuries within the C&A Tribal Territory have not been researched and evaluated. From 2012-2017 there were 73 Native American deaths, and from 2012-2013 there were 86 Native American hospitalizations within the C&A Tribal Territory. Motor vehicle crashes were in the three leading causes of injury deaths and hospitalizations for the years studied in this project. This indicates that efforts to address traffic safety at the C&A Tribes should be emphasized, including those that target younger tribal members (age 15 to 24 years), given that this was the only age group that had >5 fatalities for the MVC cause of injury death for the years studied for this project. Some injury prevention efforts have been conducted for community members, including traffic safety activities designed to increase child safety seat use and prevention underage driving while under the influence of alcohol. From his 2012 study, in a similar type of study, Bales states, “Proven preventive strategies ranging from education, enforcement, and environmental modifications should be implemented to reduce MVC’S” (Bales, 2012).

Unintentional poisoning was also in the leading causes of death and hospitalization for the C&A Indian Territory during the years studied for this project (2012 to 2017, and 2012 to 2017, respectively). This indicates that future injury prevention efforts at C&A could focus on enhancing the Tribes efforts to prevent poisoning, such as community campaigns focusing on prevention. According to the State of Oklahoma's plan to reduce prescription drug misuse, a "broad-based coordination between health care providers, substance abuse prevention and treatment providers, law enforcement and community-based organizations" is needed (Oklahoma Prevention Leadership Collaborative, 2016). Collaboration among these stakeholders within the C&A Tribes jurisdiction would be important to establish to focus on different community campaigns to prevent unintentional poisoning.

While only two years of data were available, falls represented the majority of injury-related hospitalizations between 2012 and 2013. The only age group that had >5 hospitalizations was the 55 to 64 age group, for falls. Additional research should be conducted to learn more about the age groups affected by falls. Additional years of data should be investigated when available to confirm that injury hospitalizations due to falls are the leading injury issue for the elder population (e.g., over 55 years). Fall prevention efforts should include "strategies recommended by the Center for Disease Control and Prevention, which consist of medication reviews, education, exercise, home modifications and eye evaluations" (Bales, 2012). Currently, the Tribe is conducting Community Health Representative home visits to assess and address fall risk factors.

Cost data reveals that approximately \$10,700 per day, for preventable injuries, can be reduced. This is money that could be used for prevention, instead of hospital treatment. Focusing on Injury Prevention Strategies provided by the CDC can lower hospital costs for IHS. Bales advised that "fall prevention should have Strategies recommended by the Center for Disease

Control and Prevention have consisted of medication reviews, education, exercise, home modifications and eye evaluations” (Bales, 2012).

A limitation of this study was that hospitalization data in the OK2Share database only reports data through 2013. To better compare leading cause of injury fatality and hospitalization for the C&A Territory, studying additional years of hospitalization data (e.g., 2012 to 2017) would be important to conduct, once additional data is added to the OK2Share website.

The C&A Tribes and the NWOKIPP can use the report to prioritize what types of injury prevention strategies should be prioritized to prevent injuries within the Tribal Territory. As the lead agency, the Tribe will need to address the injuries and reach out to tribal households with family members at risk of injury to save people’s lives and reduce costs for the tribe and the Indian Health Service.

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