2018 NEVADA ANNUAL TRAUMA REPORT

Department of Health and Human Services
Division of Public and Behavioral Health
Public Health Preparedness Program

Steve Sisolak
Governor
State of Nevada

Richard Whitley, MS
Director
Department of Health and Human Services

Lisa Sherych
Interim Administrator
Division of Public and Behavioral Health

Ihsan Azzam, PhD, MD
Chief Medical Officer
Division of Public and Behavioral Health

July 2019
edition 1.0
v color

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

Thank you to all persons who contributed to his publication: Karen Beckley, MPA, MS; Tabatha Hart; Martha Framsted; Malinda Southard, DC; Danika Williams, MPH; and Mavis Quansah Amissah for their contribution(s) to this publication.

PURPOSE OF REPORT

The purpose of this report is to provide a picture of trauma within the state of Nevada based upon data submitted by hospitals to the Nevada Trauma Registry. This report presents data in a usable form for local health authorities, healthcare providers, and the public. The Nevada Division of Public and Behavioral Health (DPBH) shall prepare an Annual Trauma Report in accordance with Nevada Administrative Code (NAC) 450B.768. The data contained within this annual report is based upon calendar year and summarizes the data submitted by hospitals regarding the reported traumas handled by each facility.

It should be noted, that data depicted in this report reflects only data entered and reported to the NTR. If, for some reason access to or recording of data was not feasible, data may not have been captured in a facility's Electronic Medical Record (EMR), thus would not be recorded in the NTR and not be seen in this report.

INTRODUCTION

WHAT IS THE NEVADA TRAUMA REGISTRY (NTR)?

Per Nevada Revised Statutes (NRS) 450B.238, and Nevada Administrative Code (NAC) 450B.768, the NTR was established in 1987, to collect data on persons who sustain a physical (blunt or penetrating) injury caused by an accident or by violence. The NTR data is collected from all licensed acute care hospitals and trauma centers in Nevada.

For the 2018 Annual Trauma Report, ICD-10 codes were utilized. Per National Trauma Data Bank criteria, for an injury to be reported as a trauma, it must have at least one ICD-10 code from the following ranges: S00 - S99 (7th Character Modifier A, B, or C), T07, T14, T20-T28 (7th Character modifier A), T30-32, and T79.A1-T79.A9 (7th character modifier A) and the patient must have either:

- been admitted to a facility for at least 24 hours;
- died following treatment or evaluation; **or**
- been transferred into or out of a facility.

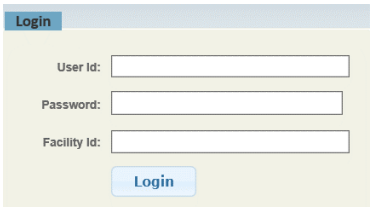
The NTR currently collects the required data points from both the National Trauma Data Bank (NTDB) established by the American College of Surgeons and data points identified in NAC 450B.766 and 450B.768. Included (but not limited to) are data on the event causing the injury, severity of the injury, place of the injury, length of hospital stay, diagnosis(es) of the patient, discharge destination of the patient and payer source.

The NTR can provide information on the incidence, prevalence, morbidity, and mortality of injuries reported in Nevada. The data can be broken down to a specific county, specific hospital, specific race, or specific age group. These data are available for state, private or federal entities and can be used for grant applicants to measure the impact of trauma in Nevada; as well as initiate health education programs that address traumatic injuries.

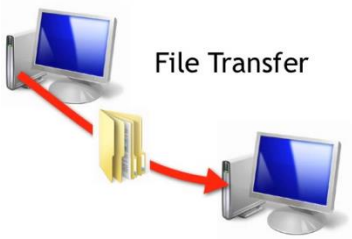
The 2018 Annual Trauma Report is based upon data submitted to the NTR by Nevada's four designated trauma centers and 33 non-trauma center hospitals, for a total of 37 facilities that operated during the

calendar year. To be considered compliant with NAC 450B.768, a hospital must enter all trauma records into the NTR, or notify the State NTR Manager that no records met the criteria to be submitted, by the quarterly due date.

Non-trauma centers submit trauma data by logging into the NTR via a user name and password. Trauma centers utilize their in-house version of the NTR software and electronically transfer the data from their software to the state NTR.



OR



Per NAC 450B.768 – all trauma data (non-trauma centers & trauma centers) must be submitted to the Nevada Trauma Registry no later than 60 days after the calendar year quarter.

- Quarter 1 = January 1 – March 31 (due on June 1)
- Quarter 2 = April 1 – June 30 (due on Sept. 1)
- Quarter 3 = July 1 – September 30 (due on Dec. 1)
- Quarter 4 = October 1 – December 31 (due on March 1)

Below is a summary table that outlines per year the percentage of facilities that were compliant with submitting data to the NTR.

YEAR	% of Non-Trauma Centers Compliant	% of Trauma Centers Compliant
2014	41%	0%
2015	100%	0%
2016	100%	75%
2017	100%	96%
2018	98%	100%*

* In 2018, the four trauma centers submitted all required trauma data to the NTR. There were changes in facilities throughout the year with facilities being newly opened in the final quarter of the reporting year. This resulted in some variations in how many facilities were active throughout the 2018 year, and in turn the overall scoring of compliance. There was a total of three instances of non-compliance over the 12-month period. Two instances of non-compliance occurred at the same facility with the remaining instance of non-compliance being a unique occurrence of one month out of the twelve for an individual facility.

State NTR staff continue to train personnel at non-trauma center hospitals to improve data entry accuracy.

The vendor, Digital Innovation, Inc., is working with each designated trauma center to ensure at least 10 years' worth of historical data is transferred into the NTR. As of June 2018, only Sunrise Medical Center has submitted 10 years of historical data. The remaining three trauma centers are in the stages of mapping and testing. Below is the historical data process:

Preparation → Analysis (Mapping) → Development (Conversion) → Testing → Deployment

When analyzing data between 2015 and 2016, it is advised not to compare the data. The 2015 Annual Trauma Report only had data from the non-trauma centers. When analyzing data between 2016 and 2017, it is also advised to not compare the data, as facilities transitioned from the use of ICD-9 to ICD-10 diagnosis codes. There are significant changes in the diagnosis detail within the ICD-10 coding, making a comparison between the two years inaccurate. The data from both 2017 and 2018 were pulled from ICD-10 diagnosis codes; however, as there was an additional hospital added in the last quarter of the reporting year they cannot be 100% comparable.

In addition to continual training of non-trauma center hospital personnel on the NTR software, the NTR Manager utilized quarterly facility report cards for each hospital to educate data entry staff. These report cards are tailored for each facility and include information about the facility's compliance and accuracy of data entry against the general accuracy reports of their peer facilities. Additionally, these quarterly report cards provide tips, hints, and notes for each facility about how to improve data entry. The quality and accuracy of data entered into the NTR has a direct impact on what can be analyzed for the Annual Trauma Report.

Finally, collaborative relationships have continued to be built with trauma personnel from various disciplines throughout the state. Some of the methods being utilized in these efforts include:

- Hosting quarterly conference calls with trauma center staff;
- When possible, meeting in person with hospital personnel responsible for NTR data entry;
- Participating in local healthcare coalitions;
- Quarterly NTR user group meetings.

Overall, through regular communication, offering NTR user trainings, delivering reminders about quarterly trauma data due dates, and revitalization and development of relationships across the state, hospital data entry compliance has dramatically increased from the 2014 submissions of data to 2018 years' submissions. Additionally, as compliance from the state's hospitals continue to improve on the adequacy of their data submissions; the amount and quality of the data available for analyses within the NTR for subsequent annual reports will continue to improve. This will result in strengthened detail and depth of future annual trauma reports.

NEVADA TRAUMA REGISTRY BACKGROUND

The definition of a trauma incident and the requirements for trauma reporting are outlined in both the Nevada Revised Statutes and Nevada Administrative Code. These statutes and codes are outlined below.

NEVADA REVISED STATUTE (NRS)

NRS 450B.105 "Trauma" defined. "Trauma" means any acute injury which, per standardized criteria for triage in the field, involves a significant risk of death or the precipitation of complications or disabilities.

NRS 450B.238 Regulations requiring hospital to record and maintain information. The State Board of Health shall adopt regulations which require each hospital to record and maintain information concerning the treatment of trauma in the hospital. The Board shall consider the guidelines adopted by the American College of Surgeons which concern the information which must be recorded.

NEVADA ADMINISTRATIVE CODE (NAC)

The NAC regarding the treatment of trauma in Nevada and the corresponding Trauma Registry reporting requirements, guidelines, and procedures can be found at **NAC 450B.760** through **NAC 450B.774**, inclusive.

In summary, the regulations state that the Division of Public and Behavioral Health shall develop a standardized system for the collection of information concerning the treatment of trauma and carry out a system for the management of that information. The system must provide for the recording of information concerning treatment received before and after admission to a hospital. This system is called the NTR.

Each hospital shall submit to the Division trauma data on a quarterly basis which complies with the criteria prescribed by the Division and contains at least the minimum data set required by the National Trauma Data Bank (NTDB) established by the American College of Surgeons and any other information required by the Division or the State Board of Health.

The Division shall prepare an annual report for the preceding calendar year summarizing the data submitted by hospitals on patients with traumas.

METHODOLOGY

*Please note that there was an additional facility added to the reporting within the final quarter the data is not always directly comparable from 2017-2018.

The NTR is a depository of trauma incident data from across the state. All hospitals within Nevada are required to submit data quarterly to the NTR. To be classified as a trauma, a series of criteria identified by the American College of Surgeons must be met. For an incident to be classified as a trauma, the patient must have:

- At least one diagnostic code for injury:
    - ICD-10 code from the following ranges: S00 -S99 (7th Character Modifier A, B, or C), T07, T14, T20-T28 (7th Character modifier A), T30-32, and T79.A1-T79.A9 (7th character modifier A) and the patient must have either:
- At least one of the following criteria:
    - Patient was in the hospital for at least 24 hours due to injuries;
    - Injury resulted in death; or
    - Patient was transferred between hospitals using EMS or air ambulance.

Each year the data within the NTR will be statistically analyzed to evaluate incident traumas in Nevada. This evaluation is presented in the Annual Trauma Report, written by the state, in accordance with **NAC 450B.768**.

In 2018, the NTR captured 11,533 trauma cases. This report includes cases for patients with an Emergency Department/Hospital Arrival Date between January 1, 2018 and December 31, 2018. All data was analyzed using SAS Version 9.4 (SAS Institute, Cary, NC).

All trauma rates were calculated per 100,000 Nevada residents using the Nevada State Demographer, age, gender, race, and Hispanic origin (ASRHO) estimates and projections, vintage 2018 population data. The vintage year refers to the final year of the time series. The results for the previous year are released after July 1 of the following year. When appropriate, a 95% Confidence Interval (CI) was calculated for comparing rate estimates. CIs provide a range of values that describe the uncertainty surrounding an estimate and may be used to assess statistical significance. When comparing trauma rates within a table, if the range of the CIs for two rates do not overlap, the rates can be considered significantly different. If the CI ranges overlap, then the difference is not significant.

Example:

Group	Count [Confidence Interval]
A	392 [385, 398]
B	390 [380, 399]
C	826 [796, 857]

In the table, above, the CIs for groups A and B share a range of values (385-398), thus there is no statistically significant difference in these rates. However, there is a statistically significant difference between group A and group C and between group B and group C as the ranges for their CIs do not overlap.

RESULTS

From January 1, 2018 through December 31, 2018, a total of 11,533 traumas were recorded in the NTR by the 39 facilities in Nevada. In 2017, 9,768 traumas were recorded from 38 facilities in Nevada.

The following pages includes data analysis of:

- Trauma cases
- Demographics
- Place and mechanism of injury
- Injury characteristics
- Patient transportation
- Patient discharge and transfer
- Risk factors
- Safety equipment, and
- The breakdown of falls data.

11,533 Traumas in 2018

Technical Notes: Throughout this report, trauma cases are presented in several different ways.

- Total trauma cases include all cases reported to the Nevada Trauma Registry, including transfers between facilities. Therefore, in the event that a trauma patient presents at one facility and is transferred to another facility, that case is represented twice.

- Unique trauma cases are calculated by matching trauma records based on birth date, injury date, patient zip code, and discharge/arrival date. Unique trauma cases include only the first presentation to a facility, and not transfers between facilities; except in Tables 4, 9, 11, 16, 17, 18 and Figure 8 where traumas are assigned to the last transfer facility. This logic was used to account for the following situations:
    - When considering traumas that resulted in deaths, it is important to analyze based on the facility at time of death. Therefore, throughout this report, when a table lists Mortality Proportion and 11,533 in Unique Traumas, the table is based upon last facility.
    - There were some instances where the mechanism of injury differed between facility of first presentation and facility at time of death. In this case the mechanism was assigned based on facility at time of death.
        - Please note, the state of Nevada does not try and change/correct patient records at the first facility if it does not match information at the last facility.

- Patient Transfer trauma cases are determined by the following question reported by the facilities, “If transferred, facility?” This question is self-report by hospital staff and does not always align with the results of our match to calculate unique trauma cases.

TRAUMA CASES BY FACILITY

Table 1: Trauma Cases by Facility, 2018 (includes Nevada Residents and Non-Residents)

County	Facility	Unique Traumas Trauma Patients^		Total Trauma Cases*	
Clark County	Boulder City Hospital	56	0.5%	56	0.4%
	Centennial Hills Hospital	363	3.1%	372	3.0%
	Desert Springs Hospital Center	17	0.1%	17	0.1%
	Henderson Hospital	212	1.8%	216	1.7%
	Mesa View Regional Hospital	91	0.8%	91	0.7%
	Mountain View ER at Aliante	2	0.0%	2	0.0%
	Mountain View Hospital	625	5.4%	627	5.0%
	North Vista Hospital	214	1.9%	214	1.7%
	Southern Hills ER at the Lakes	18	0.2%	18	0.1%
	Southern Hills Hospital Medical Center	103	0.9%	103	0.8%
	Spring Valley Hospital Medical Center	455	3.9%	492	3.9%
	St. Rose Dominican Hospital Blue Diamond	11	0.1%	11	0.1%
	St. Rose Dominican Hospital De Lima Campus	209	1.8%	209	1.7%
	St. Rose Dominican Hospital North Las Vegas	79	0.7%	79	0.6%
	St. Rose Dominican Hospital San Martin Campus	182	1.6%	192	1.5%
	St. Rose Dominican Hospital Siena Campus §	396	3.4%	403	3.2%
	St. Rose Dominican Hospital West Flamingo	13	0.1%	13	0.1%
	St. Rose Dominican Hospital West Sahara	14	0.1%	14	0.1%
	Summerlin Hospital Medical Center	370	3.2%	390	3.1%
	Sunrise Hospital Medical Center §	1,671	14.5%	1,839	14.7%
	University Medical Center §	3,242	28.1%	3,680	29.5%
	Valley Hospital Medical Center	40	0.3%	40	0.3%
Washoe County	Incline Village Community Hospital	5	0.0%	6	0.0%
	Northern Nevada Medical Center	170	1.5%	170	1.4%
	Renown Regional Medical Center §	1,403	12.2%	1,644	13.2%
	Renown South Meadows Medical Center	199	1.7%	199	1.6%
	St. Mary's Regional Medical Center	211	1.8%	214	1.7%

(Continued Next Page)

Trauma Cases by Facility, 2018 Continued					
County	Facility	Unique Traumas Trauma Patients^		Total Trauma Cases*	
All Other Counties	Banner Churchill Community Hospital	123	1.1%	123	1.0%
	Battle Mountain General Hospital	30	0.3%	30	0.2%
	Carson Tahoe Regional Medical Center	240	2.1%	240	1.9%
	Carson Valley Medical Center	147	1.3%	148	1.2%
	Desert View Hospital	315	2.7%	315	2.5%
	Grover C. Dils Medical Center	25	0.2%	25	0.2%
	Humboldt General Hospital	37	0.3%	37	0.3%
	Mt. Grant General Hospital	9	0.1%	9	0.1%
	Northeastern Nevada Regional Hospital	134	1.2%	134	1.1%
	Pershing General Hospital	12	0.1%	12	0.1%
	South Lyon Medical Center	33	0.3%	33	0.3%
	Williams Bee Ririe Hospital	57	0.5%	57	0.5%
Nevada (Total)		**11,533**	**100.0%**	**12,474**	**100.0%**

^Unique Trauma Patients are calculated by matching transferred patient based on birth date, injury date, patient zip code, and discharge/arrival date and only counted once by the facility where they first presented with the trauma (except when mortality data is analyzed), which is represented as Unique Trauma throughout the report.
*****Total Trauma cases are all the cases reported to the Nevada Trauma Registry, for 2018.
§ Designated Trauma Centers

Out of all the facilities listed in Table 1, the designated trauma centers had the highest number of trauma cases. University Medical Center had the highest number of unique trauma cases at 3,242 (28.1%), followed by Sunrise Hospital Medical Center 1,671 cases (14.5%), and finally, Renown Medical Center at 1,403 cases (12.2%).

Out of the non-trauma centers, the facility with the highest number of trauma cases was Mountain View Medical Center at 625 cases (5.4%), followed by Spring Valley Hospital Medical Center at 455 cases (3.9%), and finally, Summerlin Hospital Medical Center at 370 cases (3.2%).

Table 2: Trauma Incidence and mortality proportion by trauma center designation for Trauma Center levels 1-4

Trauma Center Designation	Count*	Column Percent	Deaths	Mortality Proportion (Row Percent)
Trauma Center level 1	3680	49.5%	220	6.0%
Trauma Center level 2	3481	46.8%	214	6.1%
Trauma Center Level 3	274	3.7%	10	3.6%
Trauma Center Level 4				
Total	7435	100.0%	444	6.0%

*There is 1 unknown discharge status (dead/alive) case.

DEMOGRAPHICS

Of 11,533 unique traumas recorded in the NTR between January 1, 2018 and December 31, 2018, 57.4% of them were in male patients, 42.5% were in female patients. (See Table 3).

Table 3: Nevada Trauma Cases by Gender (Unique Traumas), 2018

Gender	Count	Percent	Rate per 100,000 (95% CI)
Male	6,619	57.4%	435.7 (425.2-446.2)
Female	4,907	42.5%	324.4 (315.3-333.5)
Gender Not Reported	7	0.1%	-
Total	11,533	100%	380.4 (373.4-387.3)

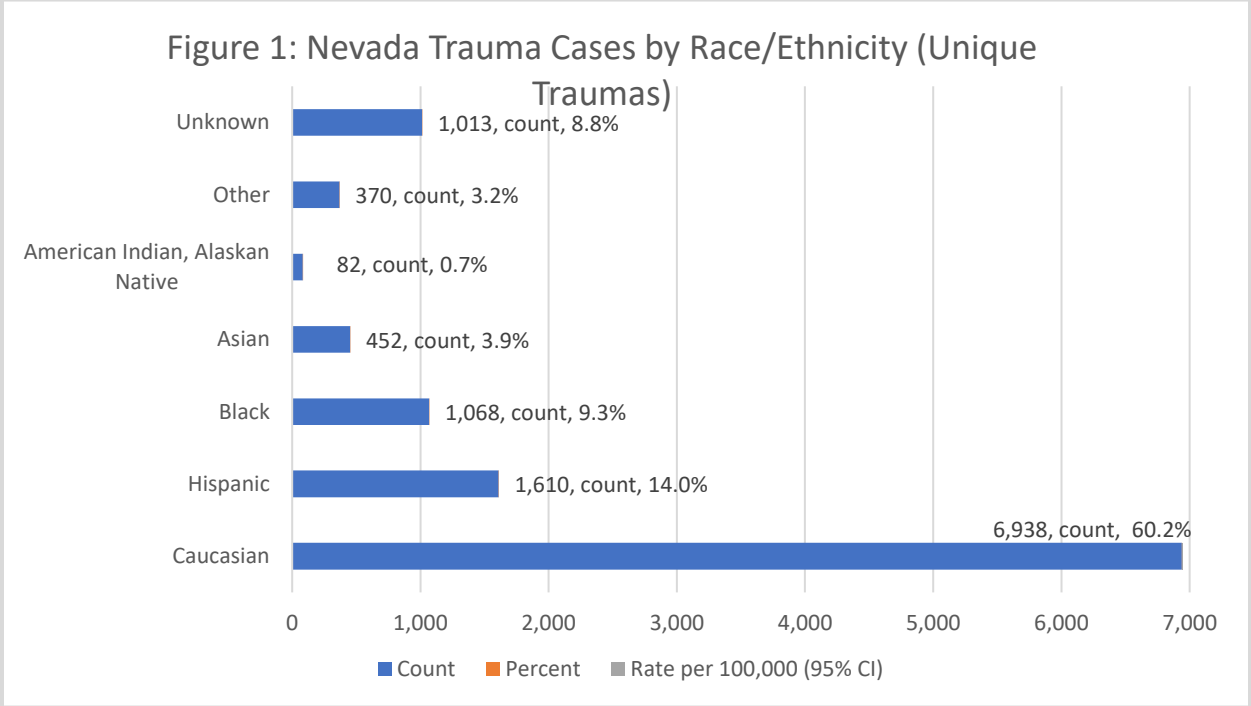
Table 4: Trauma Cases by Race/Ethnicity (Unique Traumas), 2018

Race/Ethnicity	Count	Percent	Rate per 100,000 (95% CI)
Caucasian	6,938	60.2%	448.4 (437.9-459.0)
Hispanic	1,610	14.0%	180.4 (171.6-189.2)
Black	1,068	9.3%	401.3 (377.3-425.4)
Asian	452	3.9%	155.2 (140.9-169.5)
American Indian, Alaskan Native	82	0.7%	233.5 (183.0-284.1)
Other	370	3.2%	-
Unknown	1,013	8.8%	-
Total	11,533	100.0%	380.4 (373.4-387.3)

*****The unique traumas per race/ethnicity are significantly higher due to the higher population of Caucasian individuals in the state of Nevada.

See **Figure 1** on following page to view data listed in Table 4 as a chart.

Figure 1: Number and Percentage of Unique Trauma Cases by Race/Ethnicity, 2018 NTR, Nevada



Trauma affects people of all races and ethnicities. Per the 2018 Nevada Census, Nevada's highest populations by Race and Ethnicity were the following:

- Caucasian – 60.2%
- Hispanic – 14.0%
- African-American – 9.3%

Due to Nevada having higher percentages of Caucasian, Hispanic, and Black/African-American populations over other races/ethnicities, the data reflects that higher percentages of trauma cases also occur to Caucasian, Hispanic, and African-American people. The unique traumas per race/ethnicity are significantly higher due to the higher population of Caucasian individuals in the state of Nevada. This should not give the impression that world-wide these populations are more affected by Trauma injuries than others. The chart is based off the population for the state of Nevada only.

Table 5: Age-Specific Trauma Cases by Race/Ethnicity (Unique Traumas*)

Age Groups	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Total	11,532	100.0%	496	4.3%
<1	100	0.9%	4	4.0%
1-5	205	1.8%	6	2.9%
6-17	560	4.9%	14	2.5%
18-24	838	7.3%	41	4.9%
25-34	1,304	11.3%	59	4.5%
35-44	1,086	9.4%	57	5.2%
45-54	1,209	10.5%	53	4.4%
55-64	1,449	12.6%	72	5.0%
65-74	1,758	15.2%	64	3.6%
75-84	1,741	15.1%	73	4.2%
85+	1,280	11.1%	53	4.1%
Unknown	2	0.0%	0	0.0%

* By last transfer facility.
Please note, that throughout this report, when a table lists Mortality Proportion and 11,532 in Unique Traumas, the table is based upon last facility that the patient received treatment from.

Table 5 breaks the number of trauma cases down by age, deaths, and the percentage of death per age group. Out of the 11,532 unique trauma cases in Nevada for 2018, the age group with the highest number/percentage of traumas was age 65-74 years old at 1,758 cases or 15.2%, second was 75-84 years old at 1,741 cases or 15.1%, and third was 55-64 years old at 1,449 cases or 12.6%. The age group of 35-44 years old has the highest percentage of death from their trauma at 5.2%, followed by 55-64 years old at 5.0%, and 18-24 years old at 4.9%.

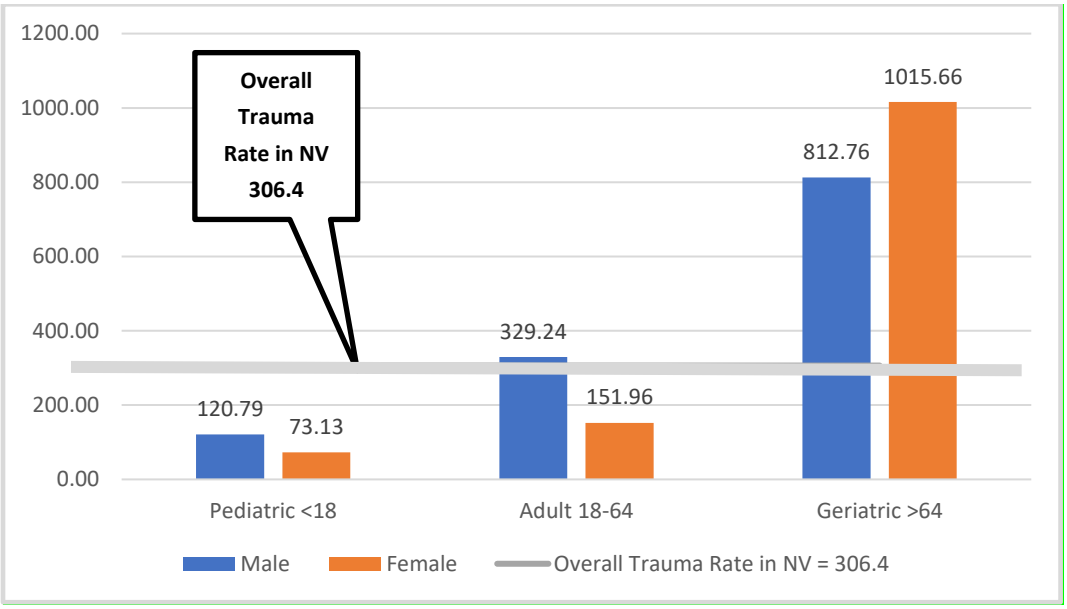
Table 6: Age and Gender-Specific Trauma Rates per 100,000 Nevada Residents (Unique Traumas)

Age Group	Male		Female		Total*	
	n	Rate per 100,000 (95% CI)	n	Rate per 100,000 (95% CI)	n	Rate per 100,000 (95% CI)
Pediatric <18	444	120.8 (109.6-132.0)	256	73.1 (64.2-82.1)	701	97.7 (90.5-104.9)
Adult 18-64	3,131	329.2 (317.7-340.8)	1,405	152.0 (144.0-159.9)	4,538	242.0 (234.9-249.0)
Geriatric >64	1,631	812.8 (773.3-852.2)	2,418	1015.7 (975.2-1056.1)	4,051	923.3 (894.9-951.7)
Total	5,206	342.7 (333.4-352.0)	4,079	269.7 (261.4-277.9)	9,290	306.4 (300.2-312.6)

* There were five cases where gender was not reported.
It should be noted, that data depicted in this report is a reflection based solely on data points recorded within the NTR. It does not include patient history, or examination.

To further breakdown the number of trauma cases in Nevada Residents only, males overall account for 56% of the trauma cases, whereas females account for 44%. The age and gender of the highest number of trauma cases in 2018 were males aged 18-64 years old at 36% of the total cases.

Figure 2: Age and Gender-Specific Trauma Rates per 100,000 Nevada Residents, 2018



Traumas per age, sex & 100,000 people in NV Residents

#1 - SENIORS are more likely to have a trauma with senior females even more likely than senior males.

Table 7: County-Specific Trauma Rates per 100,000 County Residents (Unique Traumas)

County *	Count	Rate per 100,000 (95% CI)
Carson City	178	318.2 (271.4-364.9)
Churchill	136	526.8 (438.3-615.3)
Clark	7,338	328.7 (321.2-336.3)
Douglas	165	337.3 (285.8-388.8)
Elko	131	244.2 (202.4-286.0)
Esmeralda	3	309.9 (0.0-660.6)
Eureka	5	271.1 (33.5-508.8)
Humboldt	42	248.5 (173.4-323.7)
Lander	40	653.6 (451.0-856.1)
Lincoln	34	669.6 (444.5-894.6)
Lyon	137	247.2 (205.8-288.6)
Mineral	19	412.0 (226.7-597.2)
Nye	409	872.1 (787.6-0,956.6)
Pershing	24	360.7 (216.4-505.0)
Storey	8	193.9 (59.5-328.3)
Washoe	1,002	219.7 (206.1-233.3)
White Pine	58	539.2 (400.5-678.0)
Out of State	1,094	-
Unknown	710	-

* Where trauma occurred per Federal Information Processing Standard (FIPS) code.

It should be noted that Trauma Rates per county are based upon ICD-10 diagnosis coding recorded by the treating facilities, and does not include backgrounds, patient history, or examination.

Highest Trauma Cases

Utilizing FIPS codes of where an injury occurred:

#1) Clark County recorded the highest number of trauma cases at 7,338 cases.

#2) Washoe with 1,002 trauma cases.

#3) Nye County with 420 trauma cases.

However, there were 1,094 trauma cases that occurred out-of-state, and 757 were unknown.

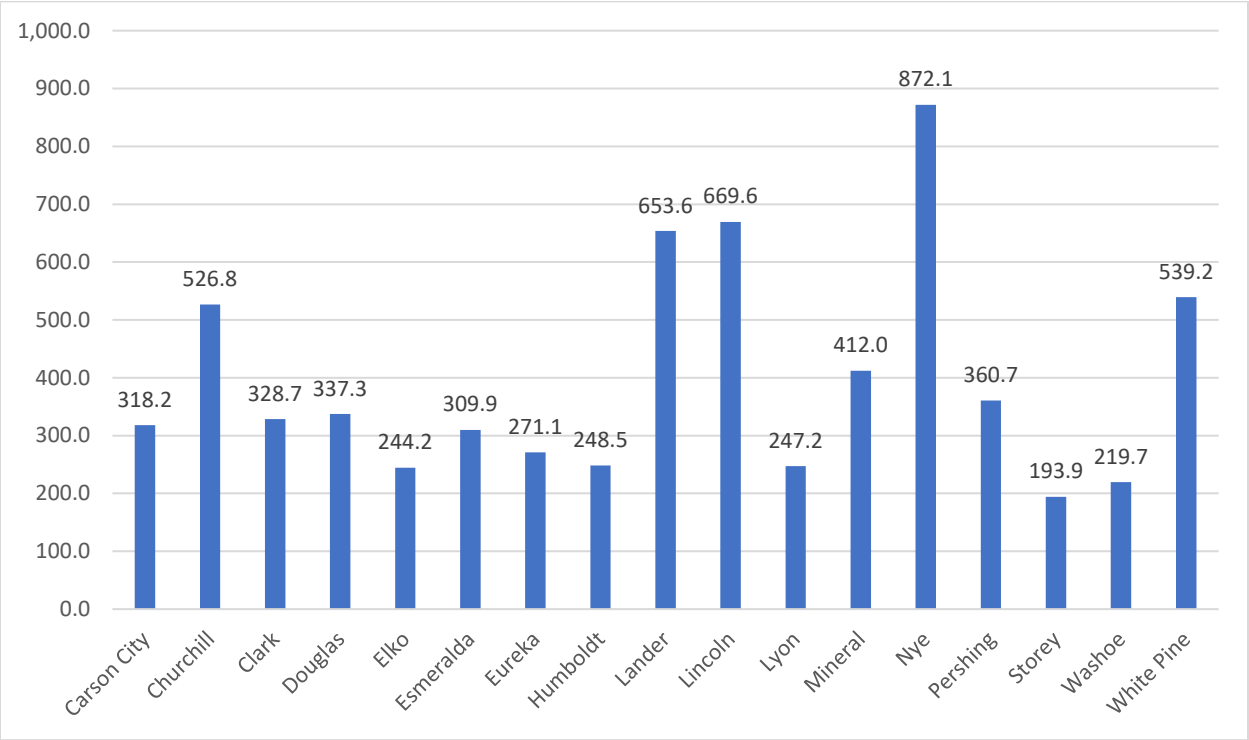
Highest Trauma Rate

When comparing the number of cases per 100,000 in each county, **rural counties had a higher rate of traumas than urban counties.**

#1 Nye County
#2 Lincoln County
#3 Lander County

See also Figure 3 - next page

Figure 3: County-Specific Trauma Rates per 100,000 County Residents



When analyzing the number of trauma cases per 100,000 people in Nevada, this analysis shows that Nye County had the highest rate at 872.1 cases per 100,000 people. This was then followed by Lincoln County with 669.6 cases per 100,000 people, and then Lander County at 653.6 cases per 100,000 people.

Traumas Rates/ 100,000 People

#1 Nye County

#2 Lincoln County

#3 Lander County

Table 8: Age Specific Traumatic Brain Injury Incidence and Mortality Proportion (Unique Traumas)

Age Group	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Pediatric <18	205	9.0%	14	6.8%
Adult 18-64	1170	51.6%	114	9.7%
Geriatric >64	893	39.4%	91	10.2%
Unknown	1	0.0%	0	0.0%
Total	2269	100.0%	219	9.7%

Mortality Proportions Post Traumatic Brain Injury by Age Group

When comparing the number of cases per age group, adults between the ages of 18-64 had the highest number of Traumatic Brain Injuries. However, those in the Geriatric, over 64 age range had the highest amount of mortalities after a brain injury.

#1 Geriatric

#2 Adult

#3 Pediatric

Table 9: Age-Specific Traumatic Brain Injury Incidence and Mortality Proportion (Unique Traumas)

Age Groups	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Total	2,269	100.0%	219	9.7%
<1	37	1.6%	4	10.8%
1-5	47	2.1%	4	8.5%
6-17	121	5.3%	6	5.0%
18-24	170	7.5%	20	11.8%
25-34	228	10.0%	20	8.8%
35-44	204	9.0%	18	8.8%
45-54	248	10.9%	26	10.5%
55-64	320	14.1%	30	9.4%
65-74	350	15.4%	40	11.4%
75-84	329	14.5%	32	9.7%
85+	214	9.4%	19	8.9%
Unknown	1	0.0%	0	0.0%

Table 10: Primary Payment Source Proportion for 2016, 2017, 2018*

Primary Source of Payment	2016	2017	2018
Medicare	26.2%	28.5%	31.9%
Private Insurance	22.9%	19.5%	21.0%
Medicaid	20.9%	19.7%	19.2%
Self-Pay	9.0%	7.9%	6.2%
Other Commercial	3.7%	4.3%	4.8%
No Fault Automobile	3.3%	2.5%	2.4%
Other Government	2.9%	4.0%	4.1%
Worker's Compensation	1.5%	1.6%	1.4%
Other	0.9%	1.4%	1.3%
Military	0.4%	0.5%	0.5%
Charity	0.3%	0.3%	0.3%
Unknown	7.9%	9.9%	6.9%

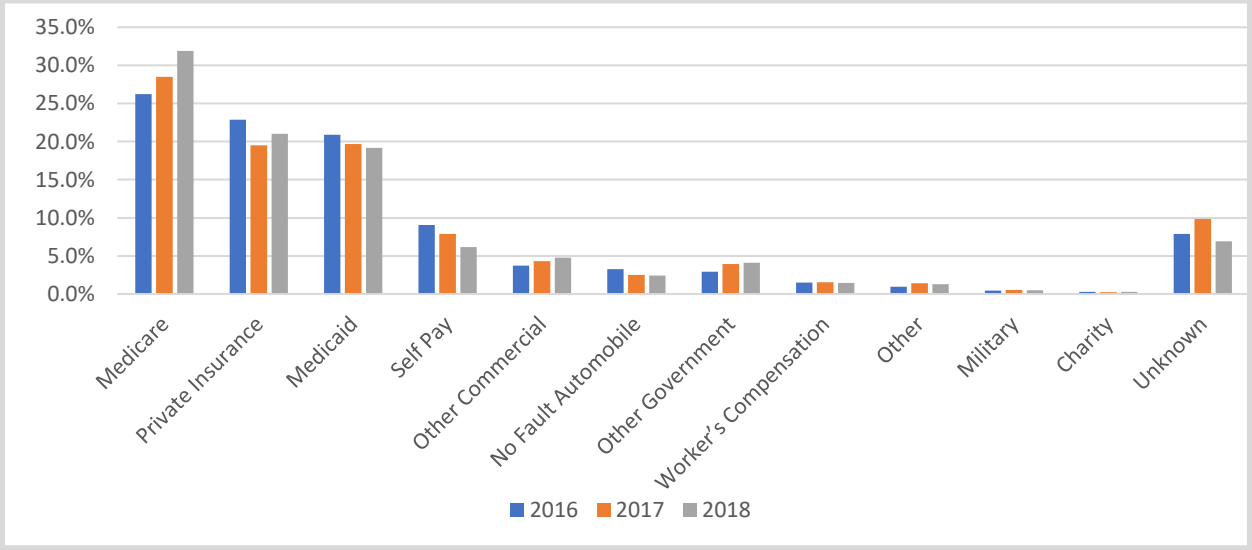
Of the 11,532 total traumas reported in Nevada in 2018, the majority were paid for through Medicare, followed by private health insurance, Medicaid, and then Self Pay. This order was the same in 2016.

From 2017 to 2018, the number of traumas covered by Medicaid increased by 16%, whereas Medicare increased by 33.37%.

Figure 4 displays the difference in Primary Source of Payment between 2016, 2017, and 2018 in a column chart.

*On page 7 of this report, it is recommended to not compare 2015 and 2016 data or 2016 and 2017 data. However, prior years' data in Table 7 was included due to the data being from proportions.

Figure 4: Primary Payment Source Proportion for 2016, 2017, and 2018 Traumas in Nevada*



*Please note that there was an additional facility added to the reporting within the final quarter the data is not always directly comparable from 2017-2018.

PLACE AND MECHANISM OF INJURY

In 2018, the majority of traumas occurred in the home, followed by the street, and then via Trade and Service Area (See Table 8).

Table 11: Trauma Incidence by Place of Injury (Unique Traumas)

Place of Injury	Trauma Count	Percent
Residential	4,971	43%
Street	3,316	29%
Trade and Service Area	657	6%
Recreation area	338	3%
Sports Area	171	1%
Wilderness	221	2%
Other Specified	190	2%
School or Public Area	185	2%
Industrial and Construction	102	1%
Farm	23	0%
Transport Vehicle as Place	22	0%
Military Training Ground	2	0%
Railroad Track	3	0%
Slaughter House	1	0%
Unknown/Unspecified	1,331	12%
Total	11,533	100%

#1 place of injury was in the **HOME**

Table 12: Trauma Incidence and Mortality Proportion by Mechanism of Injury (Unique Traumas)

Mechanism	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Falls	5,893	51.1%	154	2.6%
Motor Vehicle Traffic	2,304	20.0%	163	7.1%
Struck by/Against	755	6.5%	9	1.2%
Firearm	487	4.2%	110	22.6%
Cut/Pierce	552	4.8%	16	2.9%
Motor Vehicle Non-Traffic	211	1.8%	4	1.9%
Other Transport (Land, Sea, Sky)	171	1.5%	2	1.2%
Other Specified	281	2.4%	14	5.0%
Pedal Cyclist, Other	153	1.3%	0	0.0%
Natural/Environmental	176	1.5%	3	1.7%
Pedestrian, Other	91	0.8%	12	13.2%
Unspecified	83	0.7%	2	2.4%
Fire/Burn	66	0.6%	0	0.0%
Unknown	73	0.6%	3	4.1%
Machinery	48	0.4%	0	0.0%
Overexertion	40	0.3%	0	0.0%
Drowning	6	0.1%	0	0.0%
Suffocation	142	1.2%	4	2.8%
Total	11,532	100.0%	496	4.3%

*The reported Unique Traumas are analyzed by patients last transfer facility.

Top 3 Traumas

#1 Falls

#2 Motor Vehicle Traffic-Related

#3 Struck by/Against

Top 3 Deaths by Traumas

#1 Firearms

#2 Pedestrian

#3 Motor Vehicle Traffic

In 2018, out of the 11,538 total unique trauma cases, the top three mechanisms of traumatic injury in Nevada were Falls (51.1%), Motor Vehicle Traffic-Related (20.0%), and Struck by/Against (6.5%). Additionally, out of the total trauma cases, higher proportions of death were from Firearm incidents (22.6%), Pedestrian Incidents (13.2%), and Motor Vehicle Traffic Incidents (7.1%).

Currently the NTR collects trauma data via ICD-10 codes. With ICD-10 codes, some trauma mechanisms are not available as a code. For example, in Table 9, a facility can choose one of the following ICD-10 codes if the cause of the trauma is not available as an ICD-9 choice: Pedestrian, Other; Other Specified, Unspecified, and Unknown.

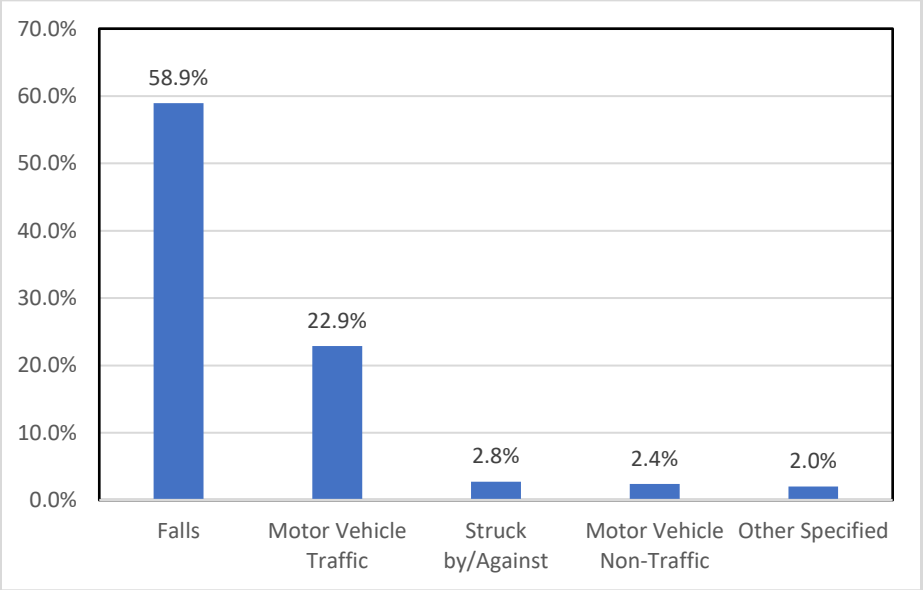
Table 13: Trauma Rates for Top Three Mechanisms of Injury by Age (Unique Traumas)

Age Group	Falls		Struck by/Against		Motor Vehicle Traffic	
	n	Rate per 100,000 (95% CI)	n	Rate per 100,000 (95% CI)	n	Rate per 100,000 (95% CI)
Pediatric <18	317	44.2 (39.3-49.0)	85	11.8 (9.3-14.4)	156	21.7 (18.3-25.2)
Adult 18-64	1,653	88.1 (83.9-92.4)	561	29.9 (27.4-32.4)	1,701	90.7 (86.4-95.0)
Geriatric >64	3,921	893.7 (865.7-921.7)	96	21.9 (17.5-26.3)	431	98.2 (89.0-107.5)
Unkown	1					
Total	5,892	194.3 (189.4-199.3)	742	24.5 (22.7-26.2)	2,288	75.5 (72.4-78.6)

Table 10 outlines the top three mechanism for injury by age. The number one trauma injury per age group are the following:

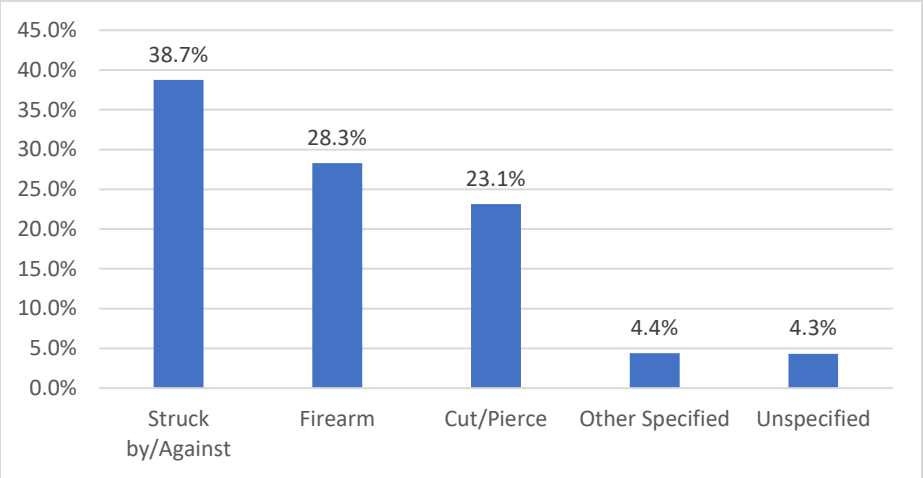
- Pediatrics ≤17 years old = Falls
- Adults 18-64 years old = Motor Vehicle Traffic-Related
- Geriatric 65+ years old = Falls

Figure 5: Top Five Mechanisms of Unintentional Trauma (n=9,924)



FALLS
#1 cause of unintentional trauma

Figure 6: Top Five Mechanisms of Homicide/Assault-Related Trauma (n=1,159)



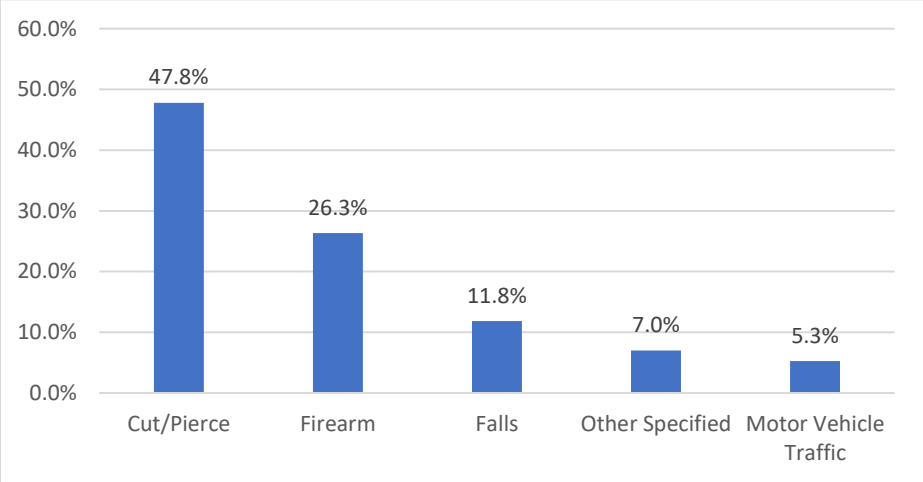
Homicide/Assault

#1 Struck by/Against

#2 Firearm

#3 Cut/Pierce

Figure 7: Top Five Mechanisms of Suicide/Self-Inflicted Trauma (n=228)



Suicide/Self-Inflicted

#1 Cut/Pierce

#2 Firearm

#3 Falls

Table 14: Traumatic Brain Injury Incidence and Mortality by Mechanism of Injury

Mechanism	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Falls	1,169	51.5%	83	7.1%
Motor Vehicle Traffic	604	26.6%	76	12.6%
Struck by/Against	199	8.8%	5	2.5%
Firearm	54	2.4%	36	66.7%
Other Specified	46	2.0%	8	17.4%
Pedal Cyclist, Other	36	1.6%	0	0.0%
Motor Vehicle Non-Traffic	35	1.5%	0	0.0%
Other Transport (Land, Sea, Sky)	34	1.5%	2	5.9%
Suffocation	24	1.1%	1	4.2%
Unspecified	23	1.0%	0	0.0%
Cut/Pierce	13	0.6%	2	15.4%
Pedestrian, Other	13	0.6%	5	38.5%
Unknown	10	0.4%	1	10.0%
Natural/Environmental	7	0.3%	0	0.0%
Fire/Burn	1	0.0%	0	0.0%
Overexertion	1	0.0%	0	0.0%
Total	2,269	100.0%	219	9.7%

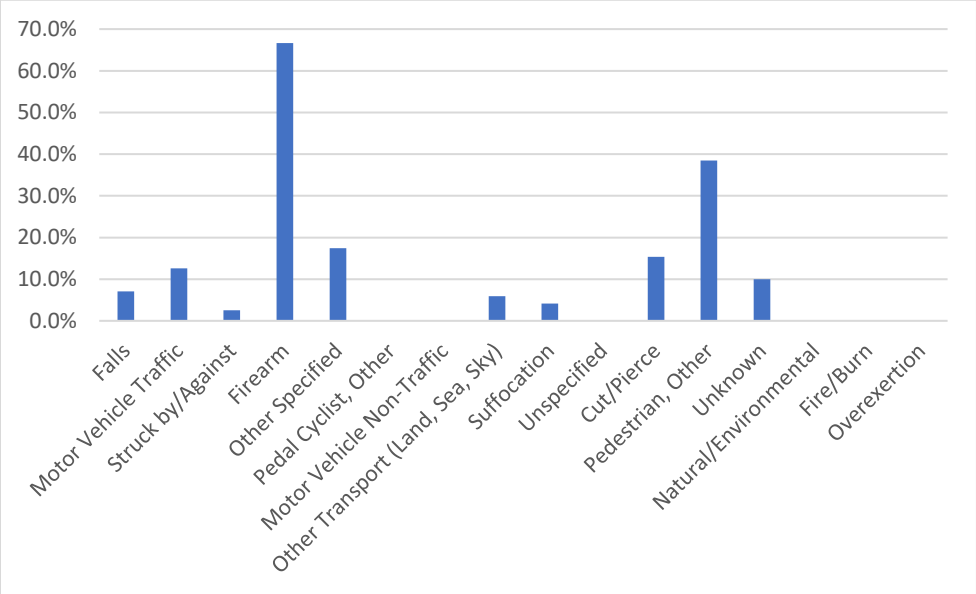
Top Mortalities from Traumatic Brain Injury by Mechanism of Injury

#1 Firearm

#2 Pedestrian, Other

#3 Other Specified

Figure 8: Mortality Proportion of Traumatic Brain Injury Incidence by Mechanism of Injury (Unique Traumas)



INJURY CHARACTERISTICS: INJURY SEVERITY SCORE (ISS)

Injury Severity Score (ISS) is an anatomical scoring system that provides an overall score for patients with multiple injuries. The ISS has values from 1 to 75:

ISS score of 1-8 = Minor
ISS score of 9-15 = Moderate
ISS score of 16-24 = Serious
ISS score 25-75 = Severe

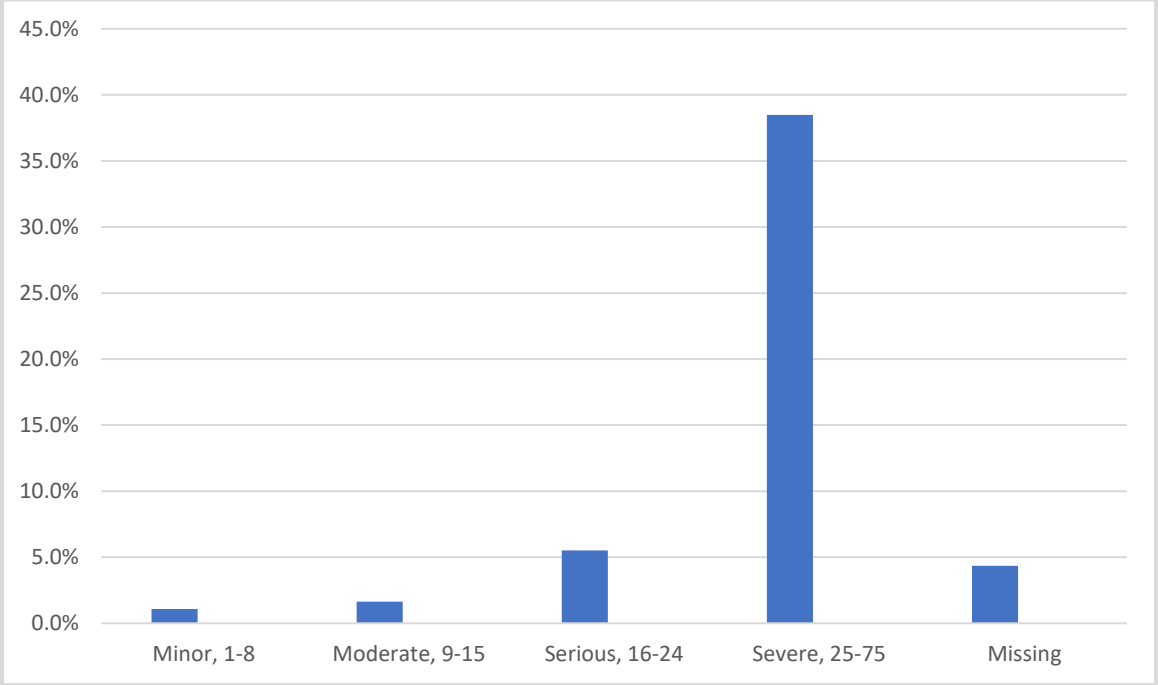
Table 15: Trauma Incidence and Mortality Proportion by Injury Severity Score (ISS) (Unique Traumas)

Injury Severity Score	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Minor, 1-8	5,292	45.9%	57	1.1%
Moderate, 9-15	4,298	37.3%	70	1.6%
Serious, 16-24	1,124	9.7%	62	5.5%
Severe, 25-75	795	6.9%	306	38.5%
Missing/NA/ND	23	0.2%	1	4.3%

Throughout the report Unique Traumas are analyzed by where the patient first originated, but regarding mortality data, the analysis is based off their final facility.

In 2018, the majority of patients had a Minor ISS between a 1 and 8 and ultimately had the lowest mortality proportion rate. Correspondently, patients with a Severe ISS between a 25 and 75 had the highest mortality proportion rate. Therefore, the lower the ISS the less likely a patient was to die from their trauma. The higher the score, the more likely for a patient to die.

Figure 9: Trauma Mortality Proportion* by Injury Severity Score, Nevada



* By last transfer facility.

Data sources: Nevada Trauma Registry, 2018

Table 16: Traumatic Brain Injury Incidence and Mortality Proportion (Unique Traumas) by Injury Severity

Injury Severity Score	Count	Column Percent	Deaths	Mortality Proportion (Row Percent)
Minor, 1-8	565	24.9%	4	0.7%
Moderate, 9-15	829	36.5%	13	1.6%
Serious, 16-24	444	19.6%	27	6.1%
Severe, 25-75	430	19.0%	175	40.7%
Unknown	1	0.0%	0	0.0%
Total	2,269	100.0%	219	9.7%

Table 17: Injury to ED arrival time for patient with an injury severity score >15 by injury location; Rural, Urban, Statewide

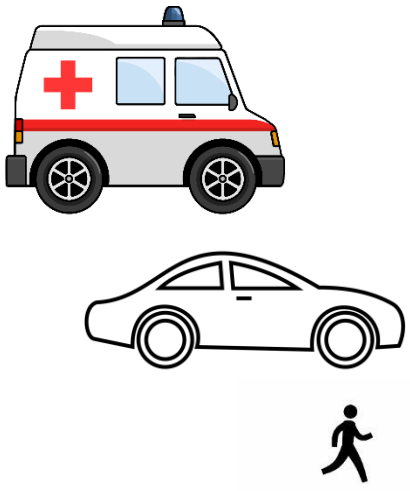
County	<1 hour	1-3 hours	3-6 hours	6-9 hours	9-12 hours	>12 hours
Carson City	6	5	1	0	0	0
Churchill	13	10	0	0	0	1
Clark	1,070	104	28	10	6	39
Douglas	5	9	2	0	0	0
Elko	7	0	1	0	0	0
Esmeralda	0	0	0	0	0	0
Eureka	1	0	0	0	0	0
Humboldt	1	4	0	1	1	0
Lander	0	0	2	0	0	0
Lincoln	4	0	0	0	0	0
Lyon	5	10	0	0	0	1
Mineral	2	0	0	0	0	0
Nye	19	1	2	0	0	1
Pershing	1	1	1	0	0	1
Storey	0	1	0	0	0	0
Unknown	63	7	7	3	2	4
Washoe	126	24	1	1	1	3
White Pine	13	2	0	0	0	0
Out of State	187	41	20	11	4	10
Total	1,523	219	65	26	14	60

PATIENT TRANSPORTATION

Patients have many ways of getting to a hospital. In 2018, the majority of trauma patients in Nevada were transported to the hospital by ground ambulance followed by private vehicle or walk-ins. (See Table 12).

Table 18: Mode of Transport to Reporting Hospital (Unique Traumas)

Mode of Arrival	Trauma Count	Percent
Ground Ambulance	7,918	69%
Private Vehicle or Walk-in	2,671	23%
Helicopter Ambulance	831	7%
Fixed-Wing Ambulance	60	1%
Unknown	9	0%
Police	37	0%
Other	5	0%
Public Safety	2	0%
Total	11,533	100%



In addition to reviewing the data regarding mode of patient arrival, it may also be valuable for community stakeholders to review patient mode of arrival according to Injury Severity Score (ISS) ranges (See Table 13). In Table 13, people with the highest ISS were transported to the hospital via ground ambulance.

Table 19: Mode of Transport by Injury Severity Score (ISS) (Unique Traumas)

Mode of Arrival	Injury Severity Score Range				
	Minor 1-8	Moderate 9-15	Serious 16-24	Severe 25-75	Missing/NA ISS Scores
Ground Ambulance	3,451	3,114	762	575	16
Private Vehicle or Walk-in	1,648	815	138	62	8
Helicopter Ambulance	211	300	177	143	0
Fixed-Wing Ambulance	17	22	13	8	0
Unknown	5	2	1	1	0
Police	26	8	3	0	0
Other	1	4	0	0	0
Public Safety	2	0	0	0	0
Total	5,361	4,265	1,094	789	24

Multi-Level ISS Most Utilized Transport= Ground Ambulance

PATIENT DISCHARGE AND TRANSFER

Of the 11,533 total trauma cases in Nevada during 2018; 1,666 were transferred to a designated trauma center. University Medical Center received the highest number of transferred patients from other facilities, but St. Rose Dominican Hospital Siena Campus had the lowest average ISS out of the trauma centers. See Table 14.

Table 20: "Patient Transfer to" Nevada Trauma Centers by Injury Severity Score (ISS)

Facility Patient Transferred To	Trauma Cases	Injury Severity Score Range		
		Mean ISS	Standard Deviation	ISS Range
Renown Regional Medical Center	445	6.8	6.0	1 - 99
St. Rose Dominican Hospital Siena Campus	72	6.1	3.9	1 - 26
Sunrise Hospital Medical Center	322	6.6	5.6	1 - 32
University Medical Center	827	8.6	9.0	1 - 99
Total	1,666			

"Patient Transfer to" is determined by the question, "Was Patient Transferred to Facility?" and not through the matching process that creates the Unique Traumas.

RISK FACTORS: DRUG/ALCOHOL USE

Of the 11,533 unique traumas recorded in the NTR in 2018, Drug/Alcohol Use was determined to be involved in 1,922 (17%) of the cases. 14% of Unintentional trauma injury involved drug or alcohol use, and 33% of Homicide/Assault involved drug or alcohol use.

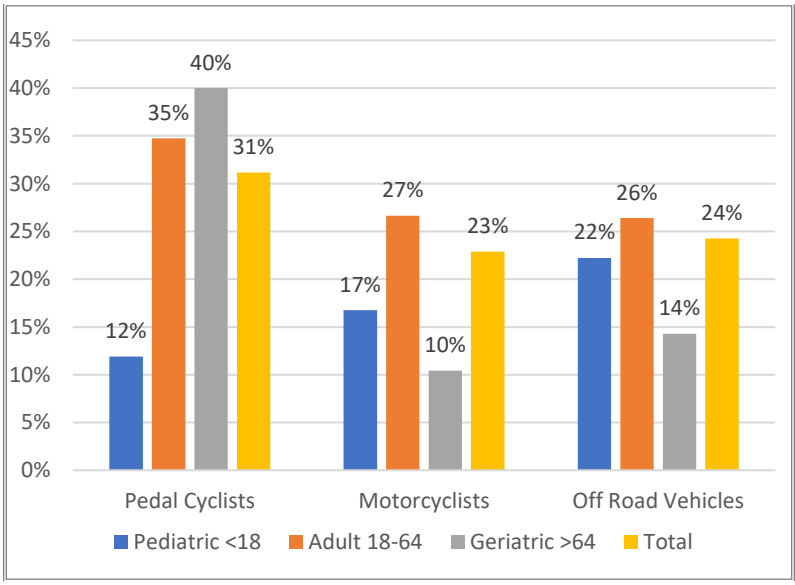
Table 21: Injury Intent and Drug/Alcohol Use (Unique Traumas)

Injury Intent	Trauma Cases	Drug/Alcohol Use	Percent Drug/Alcohol Use (Row Percent)
Unintentional	9,924	1,401	14%
Suicide	228	88	39%
Homicide/Assault	1,159	384	33%
Legal Intervention	26	8	31%
Undetermined (accidental/intentional)	114	30	26%
Missing	79	11	14%
Unknown	3	0	0%
Total	11,533	1,922	17%

SAFETY EQUIPMENT

Helmet use is an important safety measure especially when riding a bicycle, motorcycle, or an off-road vehicle. Unfortunately, even with helmet laws, not everyone wears one when participating in these activities. Overall, only 31% of the trauma cases wore helmets when on a bicycle, 23% while on a motorcycle, and 24% while on an off-road vehicle. See **Figure 10**.

Figure 10: Proportion of Helmet Use among Pedal Cyclists, Motorcyclists, and Off-Road Vehicle Users (Unique Traumas)



Among people with traumas, **SENIORS** are more likely to have worn a helmet on a bicycle, but adults between the ages of 18-64 were more consistent in Helmet use amongst all 3 activities.

Table 22: Age-Specific Restraint Use Among Motor Vehicle Traffic Occupants

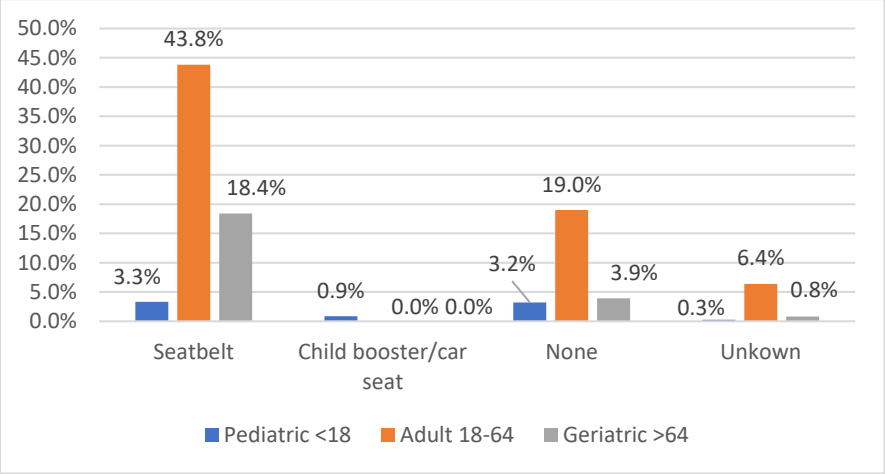
Age Group	Pediatric <18	Adult 18-64	Geriatric >64	Total
Seatbelt	46	611	257	914
Child booster/car seat	12	0	0	12
None	45	265	55	365
Unknown	4	89	11	104
Total	107	965	323	1395

Among those who were involved in a motor vehicle incident resulting in a Trauma within the state of Nevada; a total of 1,395 reported that they had been wearing appropriate age-specific restraints when the incident occurred. Per the National Highway Traffic Safety Administration (NHTSA) wearing the proper restraints saves an estimated 14,955 lives in 2017. An additional 2,549 people could have been potentially saved if they had been wearing seatbelts. The importance of using the appropriate type of restraint are highlighted by the NHTSA; as the risk of injury among child passengers is significantly higher when their seat belts are loose or improperly positioned. The NHTSA reported that 54% of unrestrained 13-15-year-old passenger vehicle occupants were killed in crashes in 2017, 51% of Male Passenger Vehicle Occupants killed in 2017 were unrestrained, with a total of 47% of passenger vehicle occupants killed being unrestrained.

Table 23: Age-Specific Proportion of restraint use among Motor Vehicle Traffic Occupants

Age Group	Pediatric <18	Adult 18-64	Geriatric >64	Total (column percent)
Seatbelt	3.3%	43.8%	18.4%	65.5%
Child booster/car seat	0.9%	0.0%	0.0%	0.9%
None	3.2%	19.0%	3.9%	26.2%
Unknown	0.3%	6.4%	0.8%	7.5%
Total	7.7%	69.2%	23.2%	100.0%

Figure 11: Age-Specific Proportion of restraint use among Motor Vehicle Traffic Occupants



We see from Table 23 and Figure 11 that only 3.3% of pediatric occupants are reported to have been properly wearing a seat belt restraint while in the vehicle. The Geriatric Population over the age of 64 reported that 18.4% were wearing a Seatbelt, with 43.8% of Adults reporting wearing a Seatbelt while in a motor vehicle. It should be noted that not all who were involved in a Motor Vehicle Accident resulting in a Trauma were willing to provide information regarding restraint use at the time of the incident. It is also imperative to be aware that the above Figure is referencing the populations that were reported to be properly restrained in the correct type of safety restraint for their age group.

FALLS – BY LAST TRANSFER FACILITY

Falls were the leading mechanism of trauma in Nevada during 2018. Correspondingly, most traumas occur at home (See Table 24). When breaking down the falls by gender, the trauma rate was higher for females than males, but only by 258 cases. (See Table 24).

Table 25 is broken down further by the type of falls. This table outlines that the number one type of fall that caused a trauma injury was from Same Level, Slipping/Tripping/Stumbling at 60.7%. However, the number one type of fall that caused death was from Assault Related (such as being pushed/shoved off of/or onto an object by a person intending to harm).

Table 24: Trauma Rate for Falls by Gender (Unique Traumas*)

Sex	n	Rate per 100,000 (95% CI)
Female	3,300	218.2 (210.7-225.6)
Male	2,752	181.1 (174.4-187.9)
Unknown	4	-
Total	6,056	199.7 (194.7-204.8)

More fall traumas occur to females than males

* By last transfer facility.

Table 25: Incidence and Mortality Proportion by Type of Fall (Unique Traumas*)

Type of Falls	Count	Percent of Falls (Column Percent)	Deaths	Mortality Proportion (Row Percent)
Same Level (Slipping, Tripping, Stumbling)	3,677	60.7%	88	2.4%
Unspecified	617	10.2%	25	4.1%
From Furniture	425	7.0%	6	1.4%
Steps	330	5.4%	15	4.5%
Multi-Level: Cliff, Tree, Water, Etc	291	4.8%	2	0.7%
On or From Ladder/Scaffolding	201	3.3%	5	2.5%
Pedestrian Conveyance Accident	198	3.3%	1	0.5%
Out of Building or Structure	91	1.5%	8	8.8%
Fall Due to Environmental Factors	61	1.0%	0	0.0%
Collision, Push or Shove By, or Another Person	54	0.9%	0	0.0%
Playground Equipment	52	0.9%	0	0.0%
Suicide Related	43	0.7%	4	9.3%
Undetermined Fall from High Place	11	0.2%	1	9.1%
Assault Related	5	0.1%	1	20.0%
Total	6,056	100.0%	156	2.6%

* By last transfer facility.

Table 26: Trauma Rate by Age and Type of Fall (Unique Traumas)*

Age Group	Type of Fall					
	Unspecified		From Same Level		From Furniture	
	n	**Rate per 100,000 (95% CI)**	n	**Rate per 100,000 (95% CI)**	n	**Rate per 100,000 (95% CI)**
Pediatric <18	9	1.3 (0.4-2.1)	73	10.2 (7.8-12.5)	78	10.9 (8.5-13.3)
Adult 18-64	183	9.8 (8.3-11.2)	785	41.9 (38.9-44.8)	71	3.8 (2.9-4.7)
Geriatric >64	425	96.9 (87.7-106.1)	2,818	642.3 (618.6-666.0)	276	62.9 (55.5-70.3)
Unknown			1			
Total	617	20.4 (18.7-22.0)	3,677	121.3 (117.4-125.2)	425	14.0 (12.7-15.4)

* By last transfer facility

FINAL NOTE

With vast improvements in data entry compliance and accuracy, the quality of the data available in the Nevada Trauma Registry (NTR) has been enhanced. The NTR Manager and Coordinator thank all NTR users, at the various trauma and non-trauma centers in Nevada, for their patience and diligence in learning to accurately enter data into the NTR. Your dedication and efforts are recognized and valued.

As collaboration amongst the facilities and the Nevada Trauma Registry continues to grow, we are working towards compiling and maintaining a complete historical data for the four trauma centers. Through ongoing partnerships to improve the amount and quality of information in the NTR, these data and subsequent reports become more valuable to the various NTR community stakeholders.

CITATIONS

American College of Surgeons. National Trauma Data Bank 2016 Annual Report. Available at: https://www.facs.org/~/media/files/quality%20programs/trauma/ntdb/ntdb%20annual%20report%202016.ashx

Nevada State Demographer's Office. 2003-2018 ASRHO Estimates and Projections. Division of Public and Behavioral Health edition. Vintage 2018.

Nevada Revised Statutes. Treatment of Trauma. NRS 450B.105, 450B.236 – 450B.239. Available at: http://www.leg.state.nv.us/NRS/NRS-450B.html#NRS450BSec236

Nevada Administrative Code. Treatment of Trauma. Initial Procedures and Collection of Information. NRS 450B.760 – 450B.774. Available at: http://www.leg.state.nv.us/nac/NAC-450B.html#NAC450BSec760

ADDITIONAL INFORMATION

For additional information regarding this publication, contact:

Rachel Marchetti
Division of Public and Behavioral Health
Public Health Preparedness Program
Rmarchetti@health.nv.gov (775) 684-3244

FUNDING SOURCE

This report was produced by the Division of Public and Behavioral Health and supported by the Grant Number, TP17-17010201SUPP18, funded by the Centers for Disease Control and Prevention and the Assistant Secretary for Preparedness and Response. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention, Office of the Assistant Secretary for Preparedness and Response, or the Department of Health and Human Services.

RECOMMENDED CITATION

Division of Public and Behavioral Health. *2018 Annual Trauma Report*. Carson City, Nevada. e 1.0, July 2019.