



ARIZONA DEPARTMENT
OF HEALTH SERVICES

Cara M. Christ, MD, Director

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

STATE TRAUMA ADVISORY BOARD

2018 ANNUAL REPORT



This Report is Provided as Required by A.R.S. § 36-2222(E)(4)

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Director Christ:

We are honored to submit the **State Trauma Advisory Board 2018 Annual Report**. This report, required by A.R.S. §36-2222(E),(4), summarizes data collected by all Arizona trauma centers. This report has been reviewed and approved by the members of the State Trauma Advisory Board during the September 27, 2018 board meeting.

In this year's report we introduce a few content changes that we believe more accurately depict the status of traumatic injury in Arizona and the Arizona Trauma System.

- **Table 5, Page 13:** Trauma incidence and mortality proportion by mechanism of injury among severely Injured patients (ISS>15)

This new table focuses on the more severely injured patients who were more likely to have been transported to trauma centers for their clinical expertise.

- **Table 10, Page 17:** Age-specific trauma incidence and mortality proportion

An additional column (Percent of Arizona Population) was added to assist the reader in identifying when a particular age group is under or over-represented in the trauma center population or trauma center death population as compared to the State population. For example, children aged 10-14 make up 6.6% of Arizona's population, but represent 3.3% of the trauma center population and 1% of trauma center deaths.

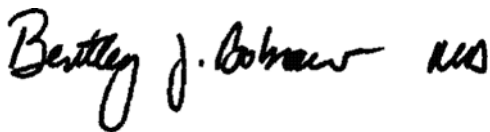
- **Figure 26b, Page 24:** Region-specific severe trauma (ISS>15) rate per 100,000

For the same reasons mentioned above for Table 5, this table offers a different perspective on trauma rates in the four regions of Arizona by reporting on only the more seriously injured patients who would have been transported to a trauma center for clinical reasons.

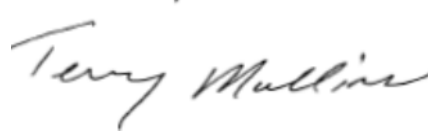
In closing, we understand that as a physician and as Director of the Department of Health Services, you understand that Arizona's trauma system relies on the dedication and hard work of thousands of individuals including law enforcement officers, 9-1-1 dispatchers, air and ground EMS providers, nurses, physicians, respiratory therapists, rehabilitation experts, registrars, researchers and educators.

It is our honor to submit this report on their behalf.

Sincerely,



Ben Bobrow, MD, Medical Director



Terry Mullins, MBA, MPH, Bureau Chief

Traumatic injury is a tremendous health concern in the United States. In the last decade, trauma deaths increased by 22.8%,¹ making it the leading cause of years of potential life lost.^{1,2} For those who survive, trauma can lead to lifelong physical suffering and places a substantial economic burden on the health system. In Arizona, the rate of traumatic injury continues to increase. In 2017, Arizona's trauma centers treated 51,666 people, of whom 1,220 (2.4%) died. Arizona's age-adjusted injury mortality rate is 81 per 100,000, while the national rate is 72 per 100,000, putting Arizona at 32nd place compared to other states.²

Traumatic injury exacts a significant financial burden on the state. In 2017, trauma center charges totaled \$2.2 billion, with a median charge per patient of \$23,752. Hospital reimbursement has remained consistently low, around 14.5%. In 2016 in Arizona, 44% of the population had private insurance, 21% of the population had Medicaid, and 15% of the population had Medicare.³ In 2017, the majority of trauma patients in Arizona were billed through Medicaid (31%), followed by private insurance (28%), and Medicare (27%) (Figure 16), whereas, nationally in 2016, the majority of trauma patients were billed through private insurance (35%), followed by Medicare (27%), while Medicaid was 16.3%.⁴

Unintentional injuries account for the majority of all traumas in Arizona and nationally.⁴ The top three mechanisms were Falls (40.9%), Motor Vehicle Traffic (28.6%), and Struck by/Against (7.2%), which made up 78% of all traumas in Arizona as well as nationally.

Although trauma affects all people, males and individuals over the age of 65 years are disproportionately affected, as are American Indian/Alaskan Natives (AI/AN). Males are involved in three times as many assault-related traumas as females, and have a mortality rate over two times higher. Adults 65 years and older had the highest trauma rate as compared to any other age group. AI/AN continue to have the highest rate of trauma and trauma-related deaths when compared to other racial/ethnic groups.

Alcohol and drug use are well known risk factors for trauma. In Arizona, 23% of patients were suspected or confirmed of being under the influence of drugs or alcohol when involved in a trauma. Drug and alcohol use were more prevalent among intentional trauma including assaults and self-inflicted injuries. Alcohol and drug involvement varies by age and race. Among the younger population, especially 15-17 year olds, there were more traumas involving drugs than alcohol.

Overall, 72% of motor vehicle occupants were using some form of passenger restraint when involved in a trauma. Although seatbelt use has been shown to save lives, it was least practiced among those between 15 and 17 years of age (63%). In the trauma patient population, 60% of motorcyclists, and less than a third of pedal-cyclists and off-road vehicle occupants were wearing a helmet when involved in a trauma.

Greater than 30% of trauma patients suffered from Traumatic Brain Injury (TBI). Among trauma patients, the incidence of TBI was highest in infants < 1 year of age (60%). TBIs were prevalent among trauma patients whose mechanism of injury indicated Child/Adult abuse (61%), MVT-Off Road (Motor Vehicle Traffic) (55%) and MVT Pedestrian (52%). 1 in 10 patients with a major head injury died.

Geographically, incident location influences trauma rate and patients' access to care. Arizona's Northern region had the highest rate of traumatic injury, almost double that of the Central region. Importantly, the median injury-to-ED arrival time for patients with Injury Severity Score > 15 was 45 minutes for urban locations vs. 88 minutes for rural locations.

1. Rhee P, Joseph B, Pandit V, et al. Increasing Trauma Deaths in the United States. *Ann Surg*. 2014;00(00):1-9. doi:10.1097/SLA.0000000000000600.
2. Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Web-based Injury Statistics Query and Reporting System (WISQARS) [online]. (2005) [cited 2017 Sep.]. Available from URL: www.cdc.gov/injury/wisqars
3. State Health Facts: Kaiser Family foundation. Available from URL: <http://www.kff.org/other/state-indicator/total-population>
4. National Trauma Data Bank Annual Report 2016. https://www.facs.org/~media/files/quality_programs/trauma/ntdb/ntdb_annual_report_2016.ashx

BACKGROUND

The Bureau of Emergency Medical Services (BEMSTS) and Trauma System is responsible for collecting, analyzing and reporting on data obtained from designated trauma centers and participating EMS agencies to enhance the EMS and Trauma System in Arizona. In 2017, there were 47 hospitals submitting data to the Arizona State Trauma Registry (ASTR) including twelve (12) Level I trauma centers, eight (8) Level III trauma centers, twenty-three (23) Level IV trauma centers, and four (4) non-designated hospitals. Appendix A contains a list of trauma centers reporting to ASTR as of 09/05/2018.

All trauma centers are required to report any injuries meeting the ASTR inclusion criteria (Appendix B). Level I, II and III trauma centers are required to submit the full ASTR data set while Level IV trauma centers and non-designated facilities have the option to submit either the full or reduced data set. The data in the ASTR is validated to meet more than 800 state and national rules. Validation is run at both the hospital and state levels. Any inconsistencies are flagged and returned to the hospitals for review or correction before the data is accepted.

All the Level I trauma centers in Arizona are located in urban areas of the state, including 10 in Maricopa County, one in Coconino County and one in Pima County. Due to Arizona's unique geography, the BEMSTS has divided the system into four distinct regions based on Arizona's 15 counties: Western (Mohave, La Paz and Yuma Counties), Northern (Yavapai, Coconino, Navajo and Apache Counties), Southeastern (Pima, Santa Cruz, Graham, Cochise and Greenlee Counties) and Central (Maricopa, Gila and Pinal Counties). Each region has its own community-based, non-profit organization dedicated to improving EMS and trauma care in the state.

Regional EMS Coordinating Systems

- Arizona Emergency Medical Services, Inc. (AEMS) - <https://www.aems.org/>
- Northern Arizona Emergency Medical Services (NAEMS) - <http://www.naems.org/>
- Southeastern Arizona EMS Council (SAEMS) - <http://saemscouncil.com/>
- Western Arizona Council of EMS (WACEMS) - <http://wacems.org/prod/>

METHODS

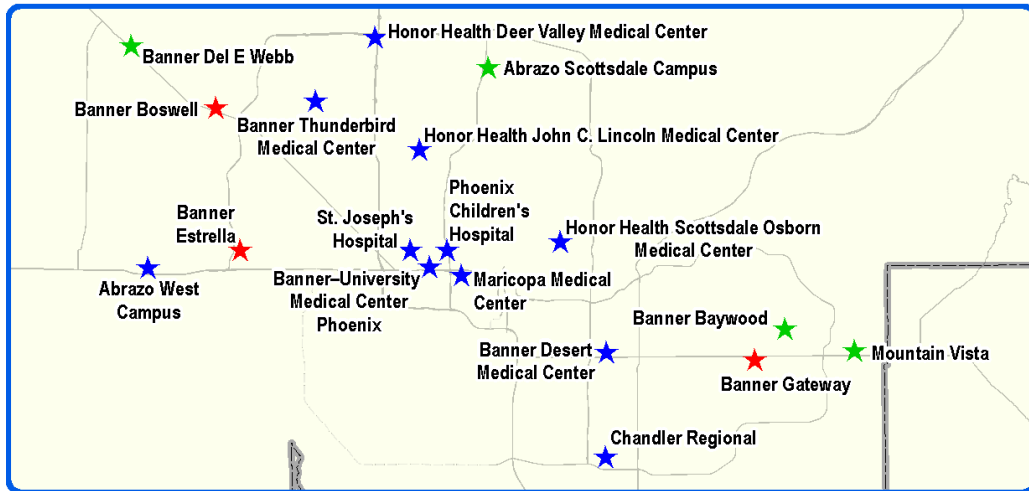
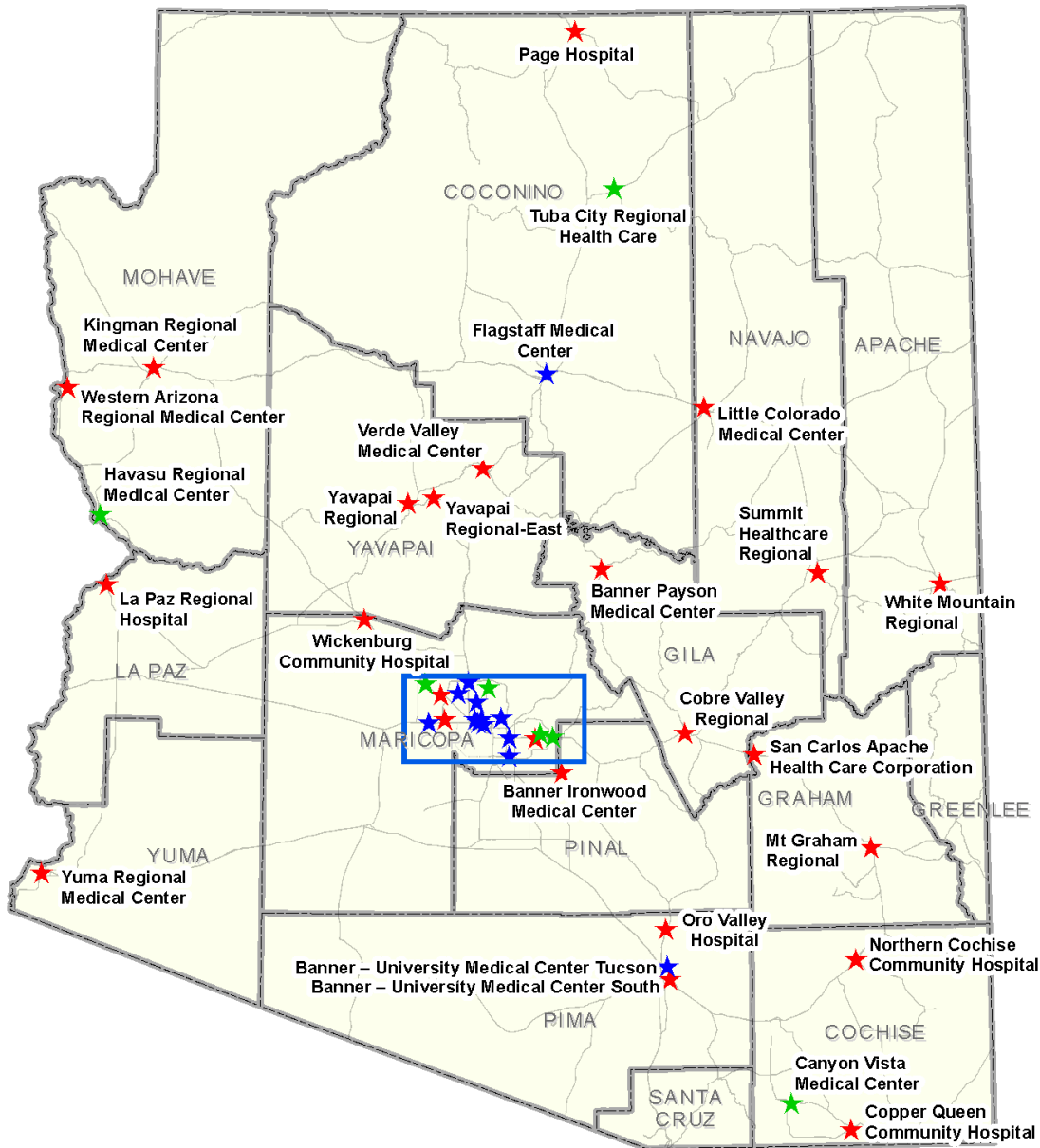
This report analyzed incidents of traumatic injury reported to the ASTR with an Emergency Department/Hospital Arrival Date between January 1, 2017 and December 31, 2017. The report gives an overview of trauma in the state by describing patient demographics, injury characteristics, trauma risk factors, regional differences and comparisons with national trauma data.

Descriptive statistics were used to depict the distribution of traumatic injury in Arizona as well as differences over time. When appropriate, rates and 95% confidence intervals (CIs) were calculated per 100,000 Arizona residents using 2017 population denominators from the Arizona Health Status and Vital Statistics database.⁵ If the CIs of two rates do not overlap, the difference between the rates is considered statistically significant (alpha 0.05). The 2017 data was compared with the 2015 and 2016 two-year median. The Vital Statistics Information Management System's Electronic Death Registry System (EDR) was used in order to show the complete picture of trauma mortality, including deaths that occurred outside of designated trauma centers.

Note: The 2017 National Trauma Data Bank (NTDB) Annual Report had not been released at the time this report was created; therefore, the section comparing ASTR to NTDB was removed.



5. Arizona Department of Health Services, Population Health and Vital Statistics. Population Denominators: 2016. <http://pub.azdhs.gov/health-stats/menu/info/pop/index.php>

DESIGNATED ARIZONA TRAUMA CENTERS



Trauma Centers

- ★ Level I
- ★ Level III
- ★ Level IV

Map Date: 6/1/2018

Data Source:
Bureau of EMS & Trauma System
AZ Department of Health Services

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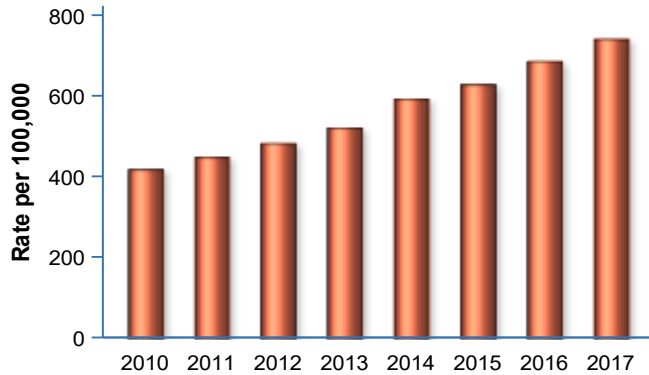
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TRAUMA DEMOGRAPHICS (N = 51,666)

INCIDENCE & RATE

Figure 1: Trauma rate per 100,000 by year



Data source: Arizona State Trauma Registry 2010-2017

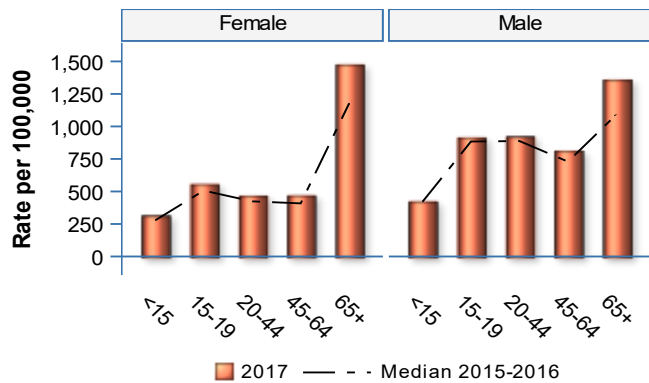
Table 1: Trauma incidence and rate per 100,000 by year

Year	Total Trauma cases	Rate per 100,000 (95%CI)
2010	26,688	418 [413, 423]
2011	28,721	446 [441, 451]
2012	31,246	481 [475, 486]
2013	34,275	521 [515, 526]
2014	39,373	591 [585, 596]
2015	42,351	627 [621, 633]
2016	46,842	685 [679, 691]
2017	51,666	742 [735, 748]

CI = Confidence interval

AGE & GENDER

Figure 2: Age and gender-specific trauma rate per 100,000



Data source: Arizona State Trauma Registry 2015-2017

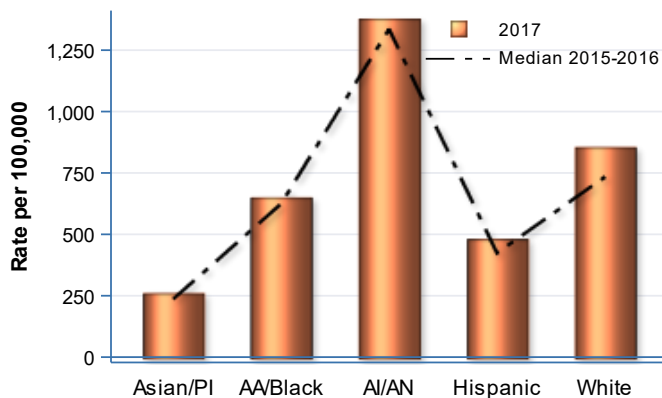
Table 2: Age and gender-specific trauma rate per 100,000

Gender	Age	Total Trauma Cases	Rate per 100,000 (95%CI)
Female	Total	21,872	624 [616, 632]
	<15	2,085	313 [300, 326]
	15-19	1,266	554 [523, 584]
	20-44	5,127	463 [450, 476]
	45-64	4,037	465 [451, 480]
	65+	9,357	1,472 [1,442, 1,502]
Male	Total	29,790	861 [851, 871]
	<15	2,925	422 [407, 437]
	15-19	2,188	911 [872, 949]
	20-44	10,697	918 [900, 935]
	45-64	6,615	808 [789, 828]
	65+	7,365	1,356 [1,325, 1,387]

CI = Confidence interval

RACE & ETHNICITY

Figure 3: Race-specific trauma rate per 100,000



Data source: Arizona State Trauma Registry 2015-2017, PI=Pacific Islander, AI/AN=American Indian/Alaska Native, AA=African American

Table 3: Race-specific trauma rate per 100,000

Race/ethnicity	Total Trauma Cases	Rate per 100,000 (95%CI)
Asian/PI	646	259 [239, 278]
AA/Black	2,135	649 [622, 677]
AI/AN	4,069	1,375 [1,333, 1,417]
Hispanic	10,379	480 [471, 489]
White	33,555	854 [845, 863]

CI= Confidence interval

INCIDENCE & MORTALITY

Table 4: Trauma incidence and mortality proportion by mechanism of injury

Mechanism	Count	Percent	Deaths	Mortality Proportion
Overall	51,666	100.00%	1,220	2.36%
Fall	21,137	40.91%	333	1.57%
MVT-Occupant	10,768	20.84%	211	1.95%
Struck By/Against	3,711	7.18%	20	0.53%
Cut/Pierce	2,024	3.91%	33	1.63%
MVT-Motorcyclist	1,884	3.64%	89	4.72%
Other Land Transport	1,691	3.27%	9	0.53%
MV Non-Traffic	1,657	3.20%	29	1.75%
Firearm	1,314	2.54%	218	16.59%
MVT-Pedestrian	1,147	2.22%	132	11.50%
Pedalcyclist, Other	943	1.82%	5	0.53%
Not Documented	893	1.72%	7	0.78%
Other Specified, Classifiable	759	1.46%	5	0.65%
MVT-Pedalcyclist	643	1.24%	19	2.95%
Pedestrian, Other	421	0.81%	21	4.98%
Other Specified, Not Elsewhere Classifiable	400	0.77%	32	8.00%
Bite And Stings-Nonvenomous	355	0.68%	2	0.56%
MVT-Unspecified	298	0.57%	4	1.34%
Unspecified	292	0.56%	7	2.39%
Machinery	211	0.40%	1	0.47%
Natural/Environmental, Other	198	0.38%	0	0.00%
Other Specified, Child/Adult Abuse	193	0.37%	16	8.29%
Other Transport	169	0.32%	4	2.36%
Overexertion	166	0.32%	1	0.60%
Hot Object/Substance	155	0.30%	0	0.00%
Fire/Flame	112	0.21%	2	1.78%
Suffocation	36	0.06%	12	33.33%
Drowning/Submersion	21	0.04%	6	28.57%
MVT-Other	20	0.03%	2	10.00%
Bite And Stings-Venomous	19	0.03%	0	0.00%
Other Specified, Foreign Body	15	0.02%	0	0.00%
Poisoning: Drug	7	0.01%	0	0.00%
Poisoning: Non-Drug	7	0.01%	0	0.00%

MVT = Motor Vehicle Traffic

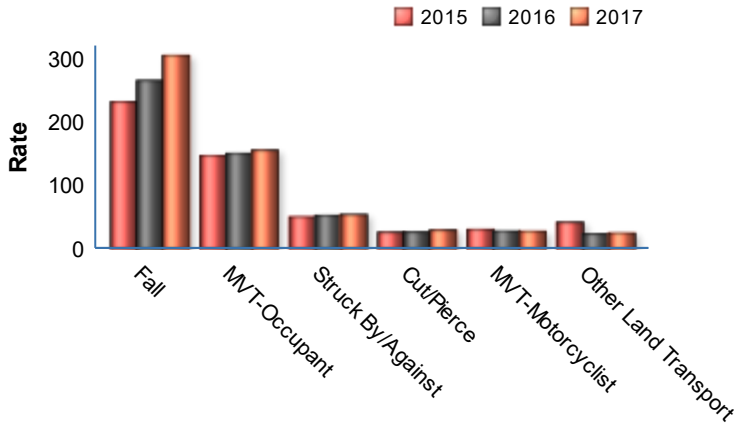
INCIDENCE & MORTALITY: INJURY SEVERITY SCORE (ISS) > 15

Table 5: Trauma incidence and mortality proportion by mechanism of injury among severely injured patients (ISS>15)

Mechanism	Count	Percent	Deaths	Mortality Proportion
Overall	5,485	100.00%	739	13.47%
Fall	2,256	41.13%	161	7.13%
MVT-Occupant	1,047	19.08%	132	12.60%
MVT-Motorcyclist	362	6.59%	71	19.61%
MVT-Pedestrian	325	5.92%	96	29.53%
Struck By/Against	286	5.21%	15	5.24%
Firearm	257	4.68%	144	56.03%
Other Land Transport	174	3.17%	6	3.44%
MV Non-Traffic	145	2.64%	22	15.17%
MVT-Pedalcyclist	99	1.80%	13	13.13%
Pedalcyclist,Other	86	1.56%	4	4.65%
Pedestrian,Other	70	1.27%	18	25.71%
Other Specified,Child/Adult Abuse	63	1.14%	10	15.87%
Other Specified,Not Elsewhere Classifiable	60	1.09%	16	26.66%
Unspecified	55	1.00%	6	10.90%
Cut/Pierce	54	0.98%	6	11.11%
Not Documented	41	0.74%	2	4.87%
Other Specified,Classifiable	40	0.72%	4	10.00%
MVT-Unspecified	16	0.29%	2	12.50%
Other Transport	16	0.29%	3	18.75%
Natural/Environmental, Other	9	0.16%	0	0.00%
Fire/Flame	6	0.10%	0	0.00%
MVT-Other	4	0.07%	1	25.00%
Drowning/Submersion	3	0.05%	3	100.00%
Overexertion	3	0.05%	1	33.33%
Suffocation	3	0.05%	2	66.66%
Hot Object/Substance	2	0.03%	0	0.00%
Bite And Stings-Nonvenomous	2	0.03%	1	50.00%
Bite And Stings-Venomous	1	0.01%	0	0.00%

RATE BY YEAR

Figure 4: Trauma rate per 100,000 by top 6 mechanisms of injury



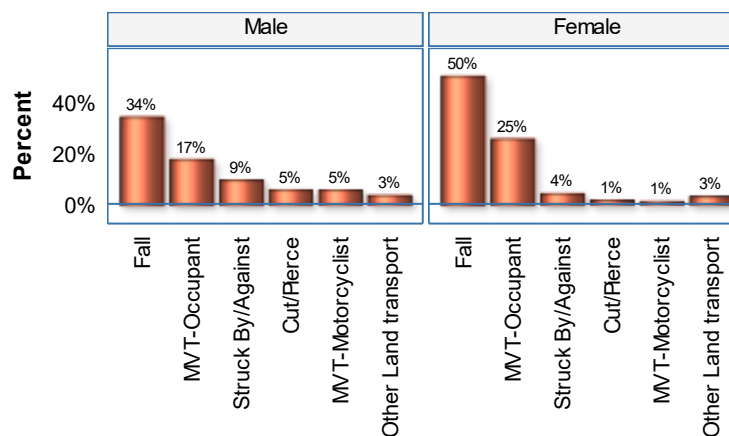
Data source: Arizona State Trauma Registry 2015-2017

Table 6: Trauma rate per 100,000 by top 6 mechanisms and year

Year	Mechanism of injury	Total Trauma Cases	Rate per 100,000 (95%CI)
2015	Fall	15,580	231 [227, 234]
	MVT-Occupant	9,868	146 [143, 149]
	Struck By/Against	3,377	50 [48, 52]
	Cut/Pierce	1,733	26 [24, 27]
	MVT-Motorcyclist	2,026	30 [29, 31]
	Other Land Transport	2,787	41 [40, 43]
2016	Fall	18,042	264 [260, 268]
	MVT-Occupant	10,213	149 [147, 152]
	Struck By/Against	3,547	52 [50, 54]
	Cut/Pierce	1,766	26 [25, 27]
	MVT-Motorcyclist	1,863	27 [26, 28]
	Other Land Transport	1,565	23 [22, 24]
2017	Fall	21,137	303 [299, 308]
	MVT-Occupant	10,768	155 [152, 158]
	Struck By/Against	3,711	53 [52, 55]
	Cut/Pierce	2,024	29 [28, 30]
	MVT-Motorcyclist	1,884	27 [26, 28]
	Other Land Transport	1,691	24 [23, 25]

GENDER

Figure 5: Gender-specific trauma proportion by top 6 mechanisms of injury



Data source: Arizona State Trauma Registry 2017

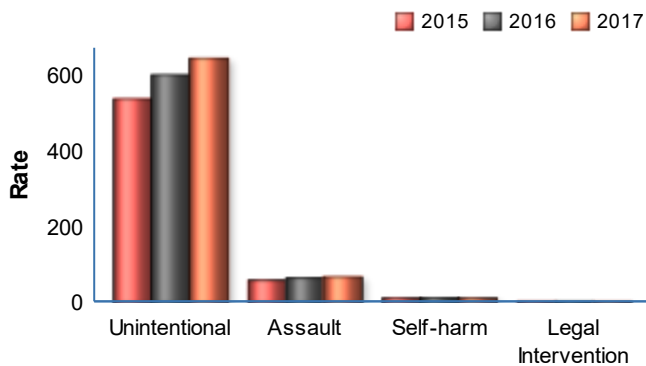
INCIDENCE & MORTALITY

Table 7: Trauma incidence and mortality proportion by intent of injury

Intent	Count	Percent	Deaths	Mortality Proportion
Overall	51,666	100.00%	1,220	2.36%
Unintentional	44,878	86.86%	886	1.97%
Assault	4,627	8.95%	142	3.06%
Self-harm	706	1.36%	130	18.41%
Undetermined	455	0.88%	38	8.35%
Legal/war	108	0.20%	17	15.74%
Not documented	892	1.72%	7	0.78%

INTENT RATE BY YEAR

Figure 6: Trauma rate per 100,000 by intent of injury and year



Data source: Arizona State Trauma Registry 2015-2017

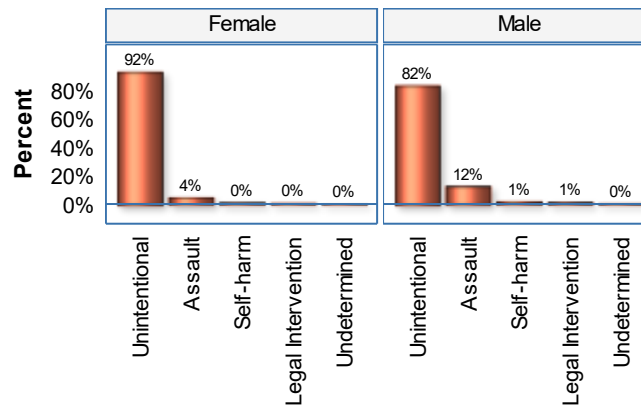
Table 8: Trauma rate per 100,000 by intent and year

Year	Intent of injury	Total Trauma	Rate per 100,000
2015	Unintentional	36,179	535 [530, 541]
	Assault	3,897	58 [56, 59]
	Self-harm	700	10 [10, 11]
	Legal Intervention	117	2 [1, 2]
2016	Unintentional	40,900	598 [593, 604]
	Assault	4,341	64 [62, 65]
	Self-harm	744	11 [10, 12]
	Legal Intervention	114	2 [1, 2]
2017	Unintentional	44,878	644 [638, 650]
	Assault	4,627	66 [65, 68]
	Self-harm	706	10 [9, 11]
	Legal Intervention	108	2 [1, 2]

CI= Confidence Interval

INTENT RATE BY GENDER

Figure 7: Gender-specific trauma proportion by intent



Data source: Arizona State Trauma Registry 2017

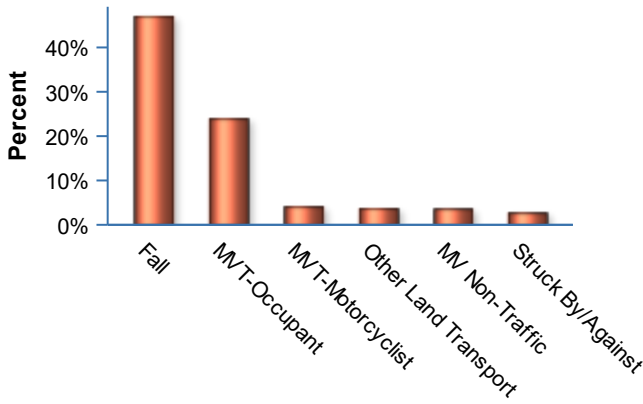
*Intent of Injury: Whether an injury was caused by an act carried out on purpose by oneself (Self-Harm) or by another person(s) (Assault), with the goal of injuring or killing; the injury was not inflicted by deliberate means (Unintentional) or; the injury was inflicted by the police or other legal authorities during law enforcement activities (Legal/War).

Centers for Disease Control and Prevention. Definitions for WISQARS Nonfatal. <https://www.cdc.gov/ncipc/wisqars/nonfatal/definitions.htm#nonfatalinjury>

INTENT OF INJURY

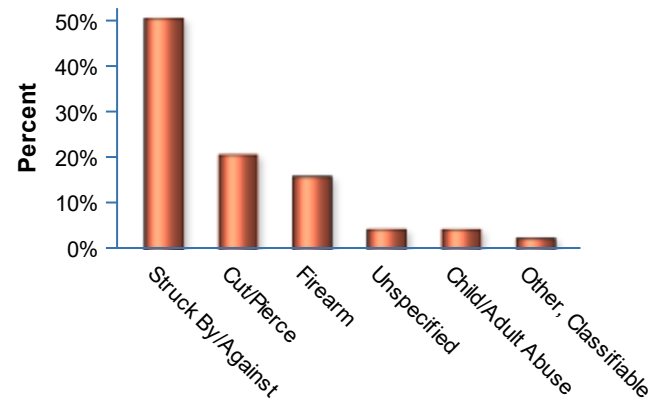
INTENT BY MECHANISM

Figure 8: Top six mechanisms of Unintentional trauma



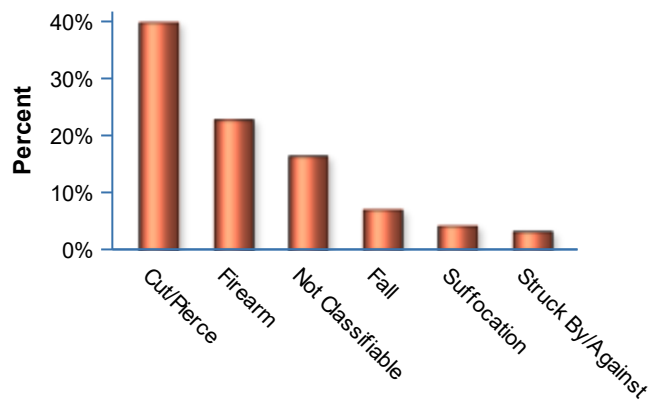
Data source: Arizona State Trauma Registry 2017

Figure 9: Top six mechanisms of Assault trauma



Data source: Arizona State Trauma Registry 2017

Figure 10: Top six mechanisms of Self-harm trauma

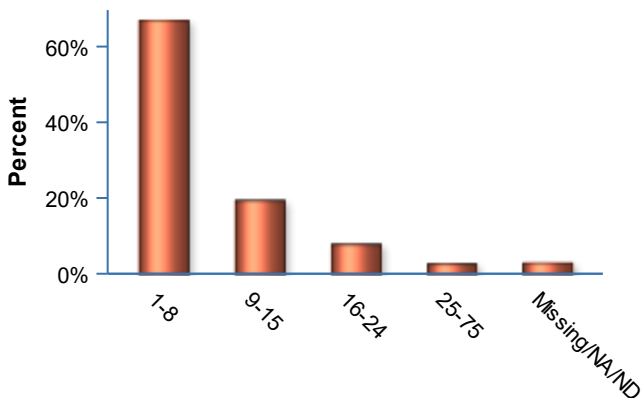


Data source: Arizona State Trauma Registry 2017

INJURY SEVERITY SCORE

INCIDENCE & MORTALITY

Figure 11: Trauma proportion by injury severity score



Data source: Arizona State Trauma Registry 2017

Table 9: Trauma incidence and mortality proportion by injury severity score

Injury Severity Score	Count	Percent	Deaths	Mortality Proportion
1-8	34,629	67.02%	218	0.62%
9-15	10,033	19.41%	235	2.34%
16-24	4,078	7.89%	168	4.11%
25-75	1,407	2.72%	571	40.58%
Missing/NA/ND	1,519	2.94%	28	1.84%

AGE-SPECIFIC MORTALITY

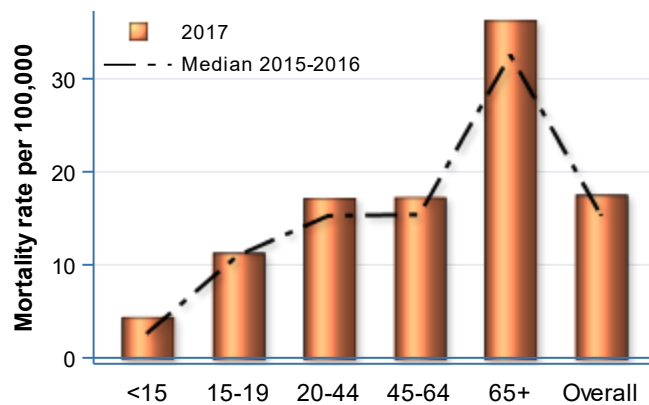
Table 10: Age-specific trauma incidence and mortality proportion

Age	Trauma Count	Trauma Percent	Percent of Arizona Population (n=6,965,897)*	Trauma Deaths	Trauma Mortality Proportion
Total	51,666	100.00%	100.00%	1,220	2.36%
<1	476	0.92%	1.26%	13	2.73%
1-4	1,379	2.66%	5.07%	14	1.01%
5-9	1,425	2.75%	6.55%	14	0.98%
10-14	1,730	3.34%	6.62%	18	1.04%
15-19	3,454	6.68%	6.73%	53	1.53%
20-24	3,862	7.47%	7.00%	99	2.56%
25-34	6,933	13.41%	13.45%	173	2.49%
35-44	5,030	9.73%	12.18%	118	2.34%
45-54	5,197	10.05%	12.21%	130	2.50%
55-64	5,455	10.55%	11.99%	161	2.95%
65-74	6,007	11.62%	9.87%	142	2.36%
75-84	6,017	11.64%	5.08%	145	2.40%
85+	4,701	9.09%	1.98%	140	2.97%

* Source: EDR 2017

AGE-SPECIFIC MORTALITY RATE

Figure 12: Age-specific trauma mortality rate per 100,000



Data source: Arizona State Trauma Registry 2015-2017

Table 11: Age-specific trauma mortality rate

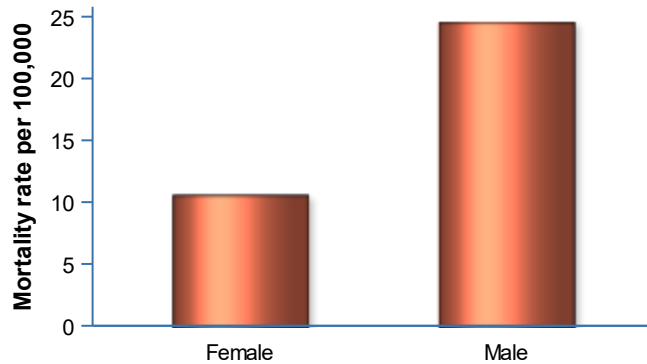
Age	Total Trauma Deaths	Rate per 100,000 (95%CI)
<15	59	4 [3, 5]
15-19	53	11 [8, 14]
20-44	390	17 [15, 19]
45-64	291	17 [15, 19]
65+	427	36 [33, 40]
Overall	1,220	18 [17, 18]

CI= Confidence interval

TRAUMA MORTALITY

GENDER-SPECIFIC MORTALITY RATE

Figure 13: Gender-specific trauma mortality rate per 100,000



Data source: Arizona State Trauma Registry 2017

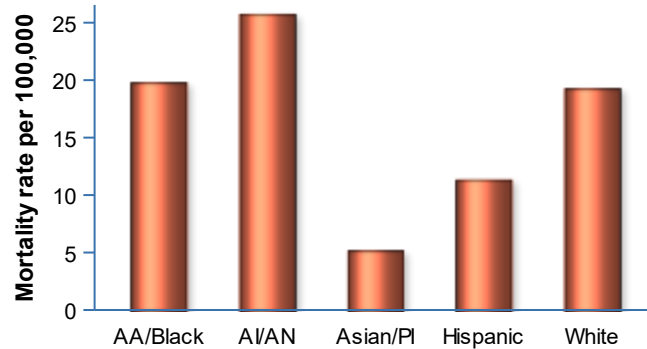
Table 12: Gender-specific trauma mortality rate per 100,000

Gender	Total Trauma Deaths	Rate per 100,000 (95%CI)
Female	371	11 [10, 12]
Male	848	25 [23, 26]

CI= Confidence interval

RACE-SPECIFIC MORTALITY RATE

Figure 14: Race-specific trauma mortality rate per 100,000



Data source: Arizona State Trauma Registry 2015-2017, PI=Pacific Islander, AI/AN=American Indian/Alaska Native, AA=African American

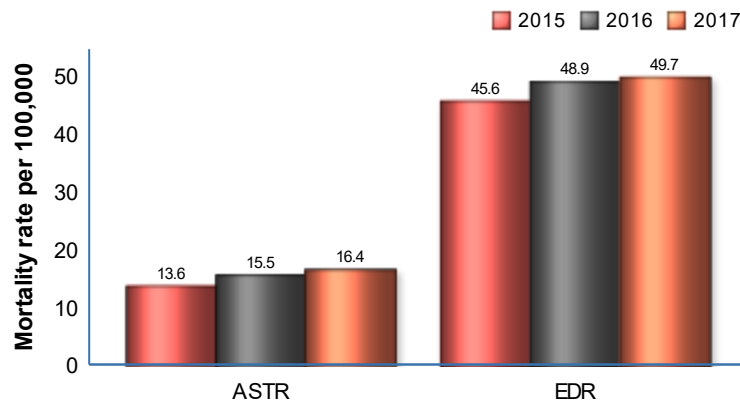
Table 13: Race-specific trauma mortality rate per 100,000

Race/ethnicity	Total Trauma Deaths	Rate per 100,000 (95%CI)
AA/Black	65	20 [15, 25]
AI/AN	76	26 [20, 31]
Asian/PI	13	5 [2, 8]
Hispanic	245	11 [10, 13]
White	756	19 [18, 21]

CI= Confidence interval

ASTR VS. STATEWIDE

Figure 15: Age-adjusted trauma mortality rate per 100,000: Trauma center deaths vs. Statewide trauma deaths



Data sources: Arizona State Trauma Registry 2015-2017, Arizona Electronic Death Registry, 2015-2017

Table 14: Age-adjusted trauma mortality rate per 100,000 by year: Trauma Center vs. Statewide*

Data source	Year	Total Trauma Deaths	Rate per 100,000 (95%CI)
ASTR	2015	965	13.6 [12.8, 14.5]
	2016	1,111	15.5 [14.6, 16.4]
	2017	1,220	16.4 [15.5, 17.3]
EDR	2015	3,268	45.6 [44.0, 47.1]
	2016	3,602	48.9 [47.3, 50.5]
	2017	3,742	49.7 [48.1, 51.3]

CI= Confidence interval

*Statewide data obtained from the Electronic Death Registry (EDR). Includes all trauma deaths including those that occurred outside of trauma centers.

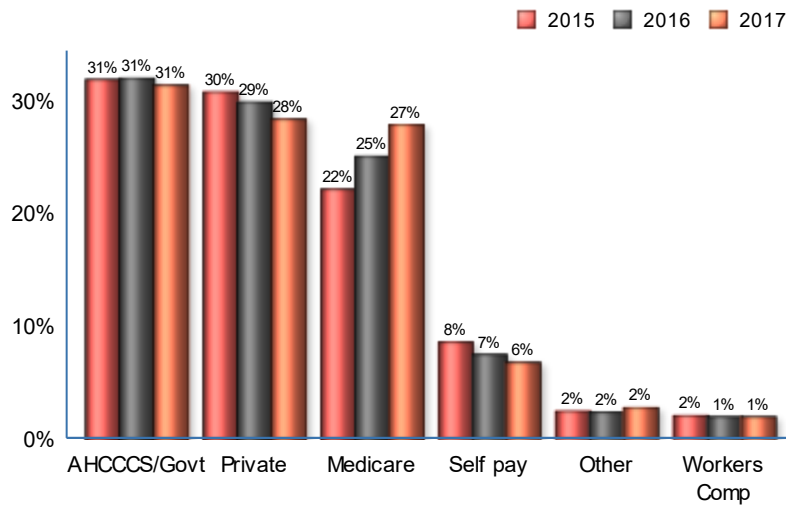
CHARGES & REIMBURSEMENT

Table 15: Total trauma charges and reimbursement by year

Year	Total Charges	Median Charges	Total Reimbursement	Reimbursement Percent
2014	\$1,602,920,471	\$23,497	\$261,156,506	16.2%
2015	\$1,667,301,074	\$22,026	\$274,959,253	16.4%
2016	\$1,923,007,348	\$22,418	\$302,128,477	15.7%
2017	\$2,187,732,051	\$23,752	\$317,620,953	14.5%

PRIMARY PAYER BY YEAR

Figure 16: Primary payment source of traumatic injuries by year



Data source: Arizona State Trauma Registry 2014-2015, Other includes: No fault auto, Not billed, and Other insurance

CHARGES & REIMBURSEMENT BY PAYER

Table 16: Total trauma charges and reimbursement by primary payer

Primary payer	Total Charges	Median Charges	Total Reimbursement	Reimbursement Percent
AHCCCS/Govt	\$770,978,450	\$24,435	\$72,478,082	9.4%
Medicare	\$603,783,061	\$25,359	\$86,668,072	14.3%
Private	\$620,675,518	\$23,550	\$140,856,508	22.6%
Self pay	\$92,617,254	\$19,420	\$3,371,226	3.6%
Workers Comp	\$56,214,090	\$25,312	\$11,808,201	21.0%
Other	\$42,409,922	\$17,914	\$2,429,950	5.7%
Not documented	\$1,053,757	\$21,401	\$8,915	0.8%
<i>Total</i>	<i>\$2,187,732,051</i>	<i>\$23,752</i>	<i>\$317,620,953</i>	<i>14.5%</i>

CHARGES & REIMBURSEMENT BY MECHANISM

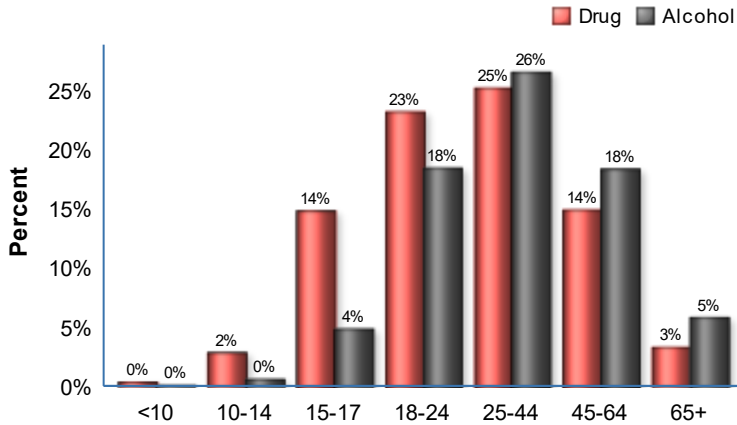
Table 17: Total trauma charges and reimbursement by mechanism of injury

Mechanism	Total Charges	Median Charges	Total Reimbursement	Reimbursement Percent
Bite And Stings-Nonvenomous	\$8,658,174	\$24,126	\$1,682,277	19.4%
Bite And Stings-Venomous	\$955,426	\$30,605	\$149,818	15.6%
Cut/Pierce	\$67,466,817	\$25,563	\$9,328,455	13.8%
Drowning/Submersion	\$643,280	\$22,508	\$170,591	26.5%
Fall	\$798,480,740	\$23,307	\$126,477,204	15.8%
Fire/Flame	\$9,674,175	\$11,305	\$878,517	9.0%
Firearm	\$102,217,882	\$33,046	\$13,422,463	13.1%
Hot Object/Substance	\$2,767,827	\$7,294	\$469,825	16.9%
MV Non-Traffic	\$67,380,838	\$19,804	\$9,093,828	13.4%
MVT-Motorcyclist	\$138,712,554	\$33,518	\$20,805,965	14.9%
MVT-Occupant	\$482,968,671	\$24,825	\$64,840,441	13.4%
MVT-Other	\$656,464	\$26,737	\$56,196	8.5%
MVT-Pedalcyclist	\$37,075,377	\$25,654	\$3,513,076	9.4%
MVT-Pedestrian	\$121,664,077	\$44,460	\$13,293,856	10.9%
MVT-Unspecified	\$9,069,068	\$15,077	\$1,387,516	15.2%
Machinery	\$5,693,900	\$23,664	\$1,144,217	20.0%
Natural/Environmental, Other	\$5,932,399	\$18,688	\$1,154,354	19.4%
Not Documented	\$9,075,261	\$10,330	\$2,687,201	29.6%
Other Land Transport	\$60,134,343	\$22,214	\$11,216,220	18.6%
Other Specified,Child/Adult Abuse	\$9,097,435	\$21,166	\$1,907,177	20.9%
Other Specified,Classifiable	\$38,208,631	\$22,568	\$5,187,907	13.5%
Other Specified,Foreign Body	\$356,705	\$13,009	\$53,962	15.1%
Other Specified,Not Elsewhere Classifiable	\$16,764,013	\$25,227	\$2,712,213	16.1%
Other Transport	\$9,599,750	\$24,216	\$1,000,190	10.4%
Overexertion	\$4,715,542	\$22,556	\$973,072	20.6%
Pedalcyclist,Other	\$28,701,067	\$18,316	\$5,115,801	17.8%
Pedestrian,Other	\$24,822,807	\$27,223	\$2,842,014	11.4%
Poisoning:Drug	\$65,589	\$5,160	\$15,612	23.8%
Poisoning:Non-Drug	\$127,061	\$20,412	\$3,799	2.9%
Struck By/Against	\$113,121,417	\$20,642	\$14,663,891	12.9%
Suffocation	\$1,449,612	\$23,812	\$218,082	15.0%
Unspecified	\$11,475,150	\$22,320	\$1,155,213	10.0%
<i>Total</i>	<i>\$2,187,732,051</i>	<i>\$23,752</i>	<i>\$317,620,953</i>	<i>14.5%</i>

DRUGS & ALCOHOL (SUSPECTED OR CONFIRMED USE) (N = 11,758)

AGE-SPECIFIC

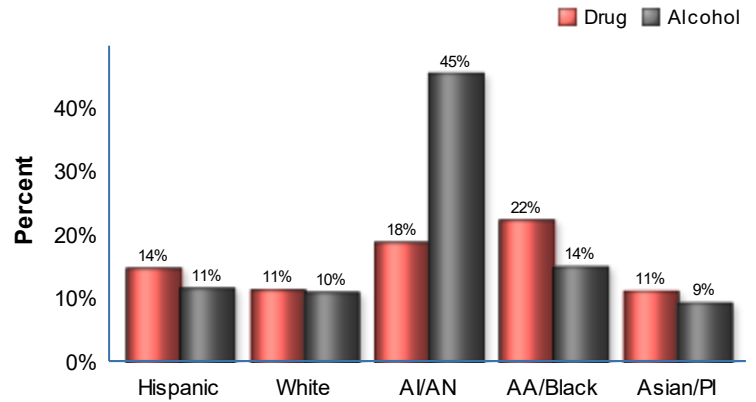
Figure 17: Age-specific trauma proportion by alcohol and drug use



Data source: Arizona State Trauma Registry 2017

RACE-SPECIFIC

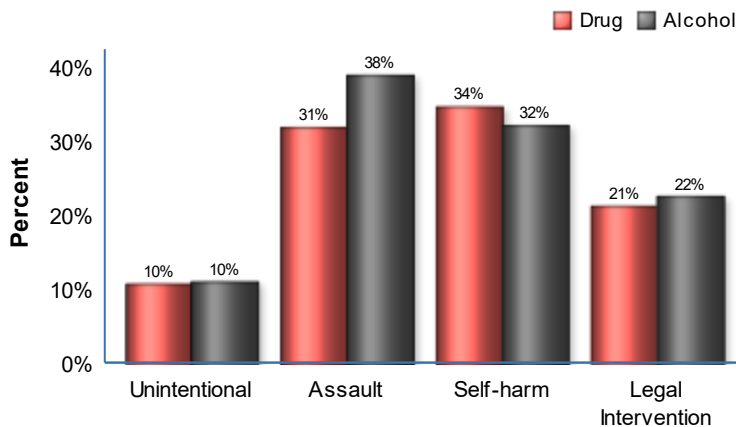
Figure 18: Race-specific trauma proportion by alcohol and drug use



Data source: Arizona State Trauma Registry 2015-2017, PI=Pacific Islander, AI/AN=American Indian/Alaska Native, AA=African American

INTENT-SPECIFIC

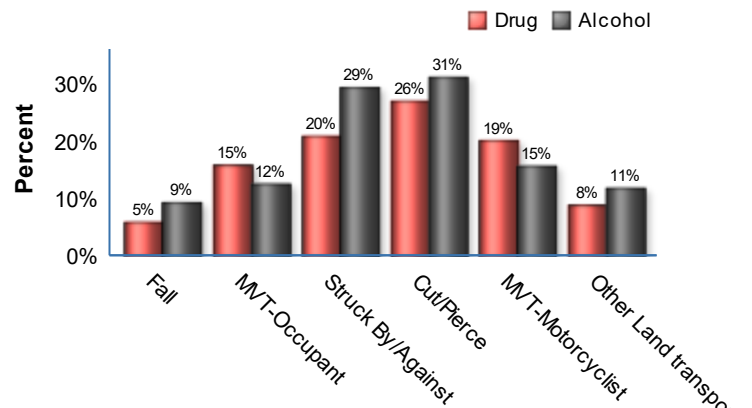
Figure 19: Intent-specific trauma proportion by alcohol and drug use



Data source: Arizona State Trauma Registry 2017

MECHANISM-SPECIFIC

Figure 20: Mechanism-specific trauma proportion by alcohol and drug use

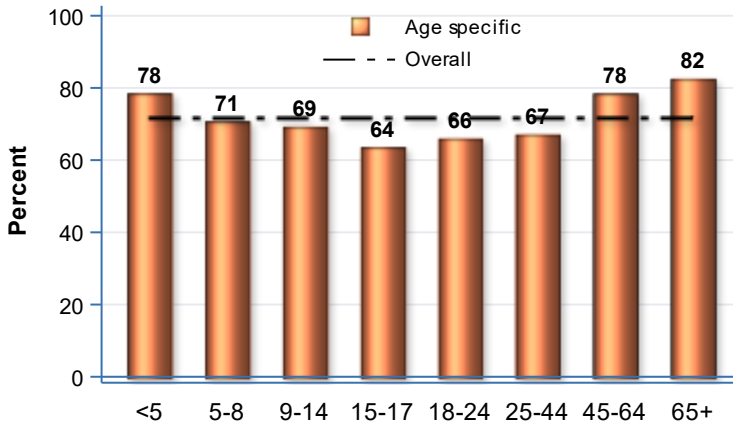


Data source: Arizona State Trauma Registry 2017

PROTECTIVE DEVICES

MVT-OCCUPANT (N = 10,768)

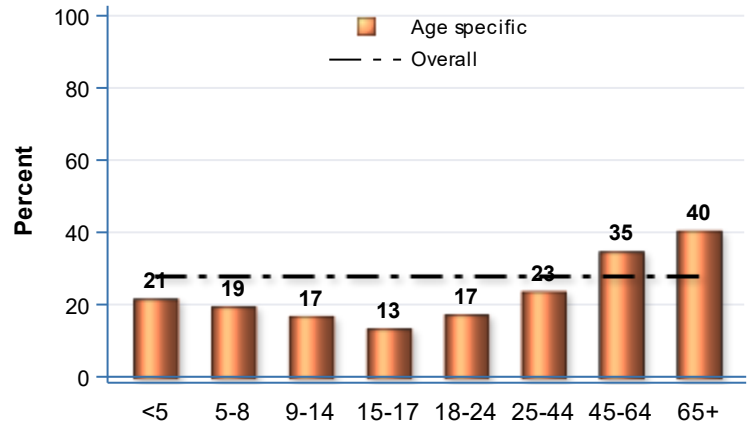
Figure 21: Age-specific proportion of restraint use among Motor Vehicle Traffic occupants



Data source: Arizona State Trauma Registry 2017

PEDAL CYCLIST (N = 1,586)

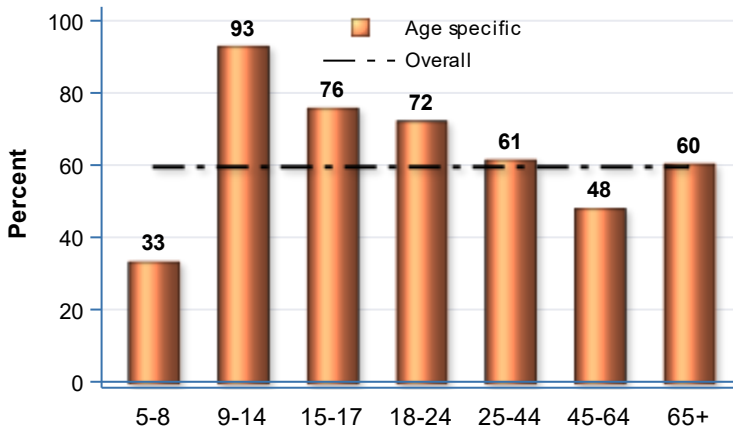
Figure 22: Age-specific proportion of helmet use among pedal-cyclists



Data source: Arizona State Trauma Registry 2017

MOTORCYCLIST (N = 1,884)

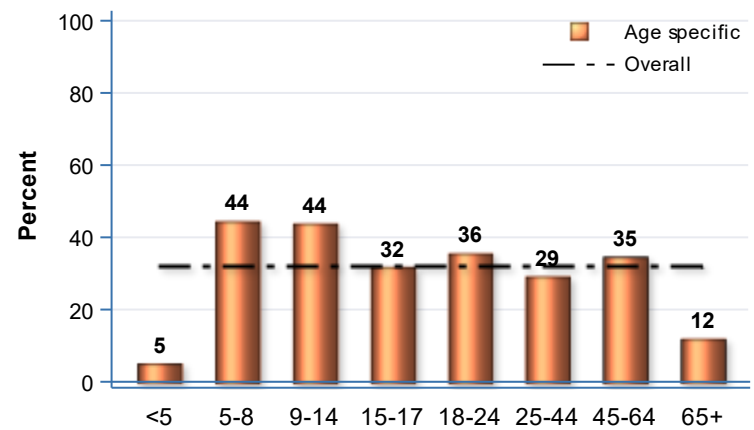
Figure 23: Age-specific proportion of helmet use among Motorcyclists



Data source: Arizona State Trauma Registry 2017

OFF-ROAD VEHICLE OCCUPANT (N = 1,535)

Figure 24: Age-specific proportion of helmet use among off-road vehicle occupants



Data source: Arizona State Trauma Registry 2017

INJURY TO ED ARRIVAL TIME

Table 18: Injury to ED arrival time for patient with an injury severity score > 15 by injury location

Injury location	ISS>15: Injury to ED Arrival Time (Minutes)				Injury time missing (n)
	N	Median time	25th percentile*	75th percentile**	
Rural	625	88	50	139	162 (26%)
Urban	2,094	45	32	65	1,024 (49%)
Statewide	2,719	49	34	80	1,186 (44%)

*25% of the cohort had a median transport time at or below this value

** 75% of the cohort had a median transport time at or below this value

Table 19: Injury to ED arrival time for transferred patients with an injury severity score > 15 by injury location

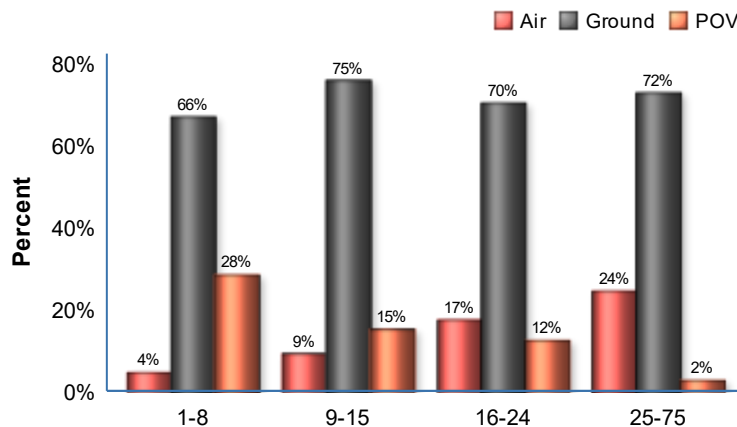
Injury location	ISS>15 and transferred to Level 1: Injury to ED Arrival Time (Minutes)				Injury time missing (n)
	N	Median time	25th percentile*	75th percentile**	
Rural	286	330	248	470	109 (38%)
Urban	590	309	220	462	357 (61%)
Statewide	876	314	227	469	466 (53%)

*25% of the cohort had a median transport time at or below this value

** 75% of the cohort had a median transport time at or below this value

MODE OF TRANSPORT

Figure 25: Mode of transport to trauma center by Injury Severity Score

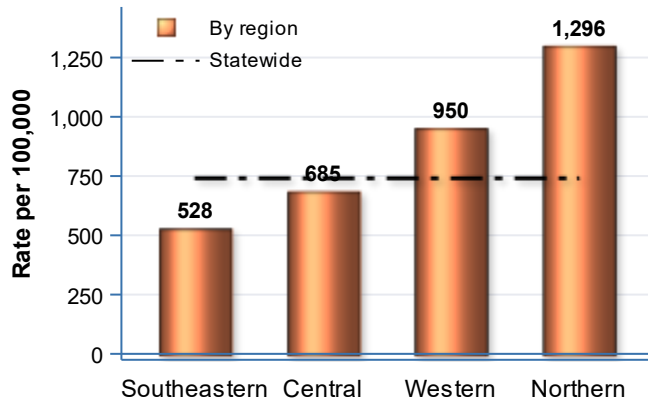


Data source: Arizona State Trauma Registry 2017

POV - Privately owned vehicle

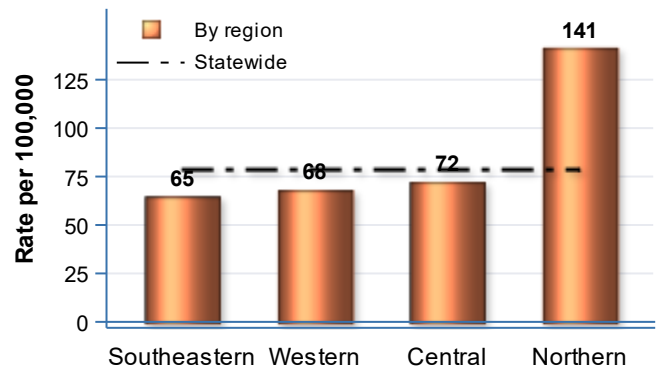
TRAUMA RATE

Figure 26a: Region-specific trauma rate per 100,000



Data source: Arizona State Trauma Registry 2017

Figure 26b: Region-specific severe trauma (ISS>15) rate per 100,000



Data source: Arizona State Trauma Registry 2017

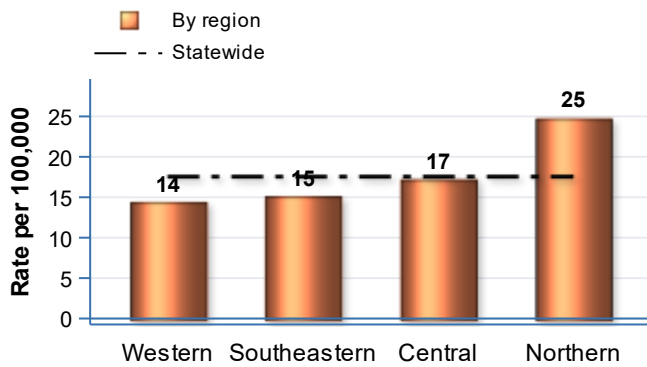
Table 20: Region-specific trauma rate per 100,000

Injury Region	All Trauma Patients		Severe Trauma Patients (ISS >15)	
	Total Trauma Cases	Rate per 100,000 (95%CI)	Total Trauma Cases	Rate per 100,000 (95%CI)
Western	4,305	950 [922, 979]	308	68 [60, 76]
Southeastern	6,626	528 [515, 541]	812	65 [60, 69]
Northern	7,173	1,296 [1,266, 1,326]	781	141 [131, 151]
Central	32,204	685 [677, 692]	3,394	72 [70, 75]

CI= Confidence interval

MORTALITY RATE

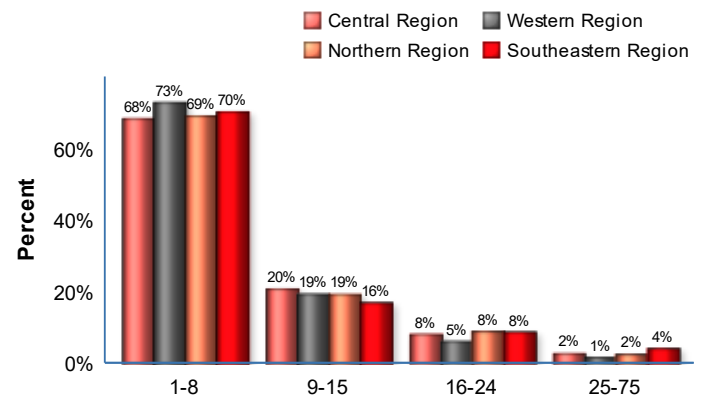
Figure 27: Region-specific trauma mortality rate per 100,000



Data source: Arizona State Trauma Registry 2017

MORTALITY BY ISS

Figure 28: Region-specific trauma proportion by Injury Severity Score



Data source: Arizona State Trauma Registry 2017

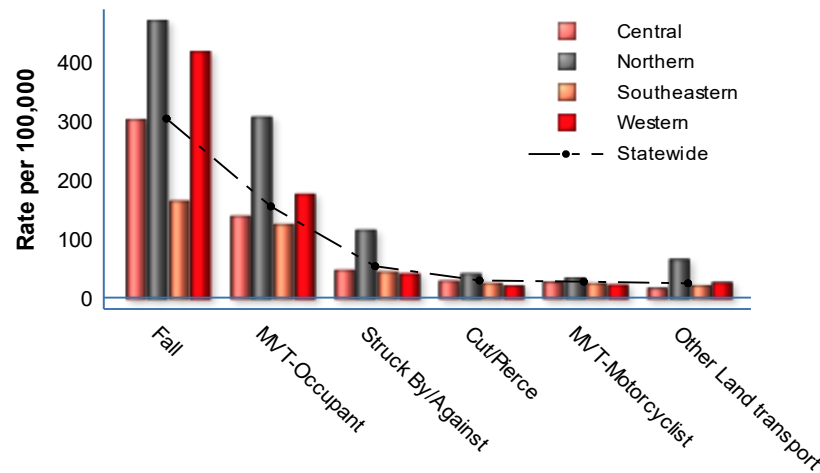
Table 21: Region-specific trauma mortality rate per 100,000

Injury Region	Total Trauma deaths	Rate per 100,000 (95%CI)
Western	65	14 [11, 18]
Northern	137	25 [21, 29]
Southeastern	189	15 [13, 17]
Central	806	17 [16, 18]

CI= Confidence interval

MECHANISM OF INJURY

Figure 29: Region-specific trauma rate per 100,000 by top 6 mechanisms



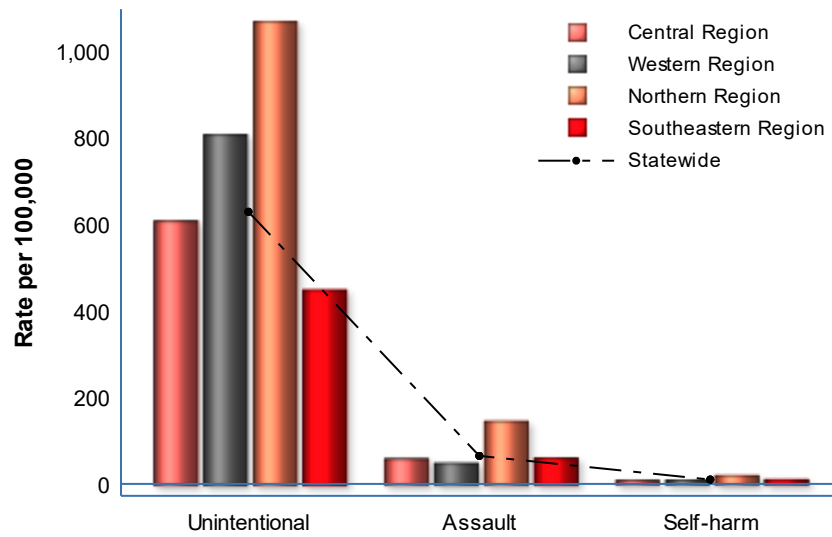
Data source: Arizona State Trauma Registry 2017

Table 22: Region-specific trauma rate per 100,000 by the top 6 mechanism of injury

Region	Mechanisms	Total Trauma Cases	Rate per 100,000 (95%CI)
Central	Fall	14,190	302 [297, 307]
	MVT-Occupant	6,483	138 [134, 141]
	Struck By/Against	2,225	47 [45, 49]
	Cut/Pierce	1,349	29 [27, 30]
	MVT-Motorcyclist	1,253	27 [25, 28]
	Other Land Transport	775	16 [15, 18]
Northern	Fall	2,598	469 [451, 488]
	MVT-Occupant	1,692	306 [291, 320]
	Struck By/Against	637	115 [106, 124]
	Cut/Pierce	230	42 [36, 47]
	MVT-Motorcyclist	184	33 [28, 38]
	Other Land Transport	358	65 [58, 71]
Southeastern	Fall	2,059	164 [157, 171]
	MVT-Occupant	1,562	124 [118, 131]
	Struck By/Against	558	44 [41, 48]
	Cut/Pierce	310	25 [22, 27]
	MVT-Motorcyclist	307	24 [22, 27]
	Other Land Transport	262	21 [18, 23]
Western	Fall	1,892	418 [399, 436]
	MVT-Occupant	798	176 [164, 188]
	Struck By/Against	187	41 [35, 47]
	Cut/Pierce	92	20 [16, 24]
	MVT-Motorcyclist	100	22 [18, 26]
	Other Land Transport	117	26 [21, 31]
Statewide	Fall	21,137	303 [299, 308]
	MVT-Occupant	10,768	155 [152, 158]
	Struck By/Against	3,711	53 [52, 55]
	Cut/Pierce	2,024	29 [28, 30]
	MVT-Motorcyclist	1,884	27 [26, 28]
	Other Land Transport	1,691	24 [23, 25]

INTENT OF INJURY

Figure 30: Region-specific trauma rate per 100,000 by intent



Data source: Arizona State Trauma Registry 2017

Table 23: Region-specific trauma rate per 100,000 by intent of injury

Region	Intent	Total Trauma Cases	Rate per 100,000 (95%CI)
Central Region	Unintentional	28,573	607 [600, 614]
	Assault	2,738	58 [56, 60]
	Self-harm	412	9 [8, 10]
Northern Region	Unintentional	5,914	1,069 [1,041, 1,096]
	Assault	800	145 [135, 155]
	Self-harm	110	20 [16, 24]
Southeastern Region	Unintentional	5,631	449 [437, 460]
	Assault	751	60 [56, 64]
	Self-harm	132	11 [9, 12]
Western Region	Unintentional	3,652	806 [780, 832]
	Assault	218	48 [42, 55]
	Self-harm	43	9 [7, 12]
Statewide	Unintentional	43,770	628 [622, 634]
	Assault	4,507	65 [63, 67]
	Self-harm	697	10 [9, 11]

CI= Confidence interval

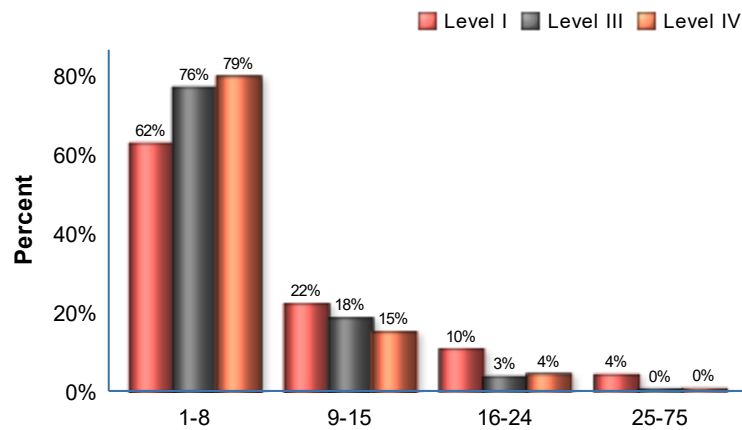
INCIDENCE & MORTALITY

Table 24: Trauma incidence and mortality proportion by trauma center designation

Trauma Center Designation	Count	Percent	Deaths	Mortality Proportion
Level I	31,515	62.13%	1,037	3.29%
Level III	8,275	16.31%	66	0.79%
Level IV	10,927	21.54%	115	1.05%

INJURY SEVERITY

Figure 31: Injury Severity Score by trauma center designation



Data source: Arizona State Trauma Registry 2017

CHARGES & REIMBURSEMENT

Table 25: Trauma charges and reimbursement by trauma center designation

Trauma Center Designation	Total Charges	Median Charges	Total Reimbursement	Reimbursement Percent
Level I	\$1,687,485,464	\$30,598	\$247,984,737	14.6%
Level III	\$295,040,453	\$21,626	\$41,173,199	13.9%
Level IV	\$192,646,592	\$13,450	\$26,372,727	13.6%
<i>Total</i>	<i>\$2,175,172,510</i>	<i>\$24,000</i>	<i>\$315,530,663</i>	<i>14.5%</i>

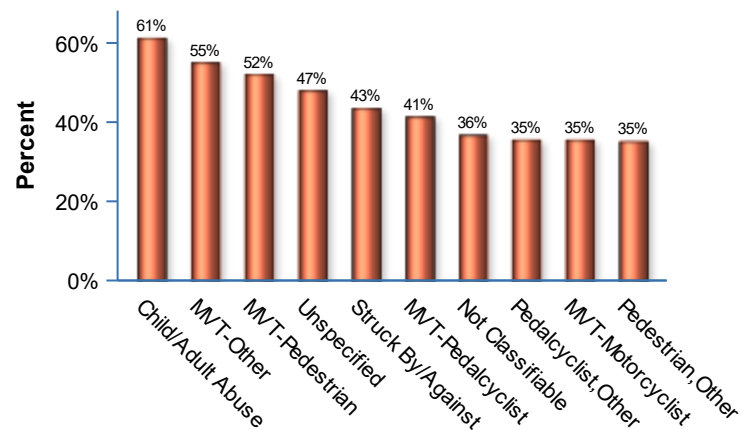
INCIDENCE & MORTALITY

Table 26: Traumatic brain injury incidence and mortality proportion by age and brain injury severity

Age	Total Trauma Cases	Major TBI				Minor TBI			
		N	Percent	Mortality	Mortality Percent	N	Percent	Mortality	Mortality Percent
Total	51,666	5,995	11.60%	640	10.67%	10,289	19.91%	136	1.32%
<1	476	172	36.13%	8	4.65%	114	23.94%	1	0.87%
1-4	1,379	177	12.83%	7	3.95%	220	15.95%	3	1.36%
5-9	1,425	95	6.66%	11	11.57%	190	13.33%	1	0.52%
10-14	1,730	105	6.06%	11	10.47%	361	20.86%	2	0.55%
15-19	3,454	276	7.99%	33	11.95%	840	24.31%	1	0.11%
20-24	3,862	309	8.00%	60	19.41%	812	21.02%	3	0.36%
25-34	6,933	635	9.15%	96	15.11%	1,462	21.08%	17	1.16%
35-44	5,030	479	9.52%	50	10.43%	1,074	21.35%	16	1.48%
45-54	5,197	561	10.79%	71	12.65%	1,098	21.12%	20	1.82%
55-64	5,455	670	12.28%	91	13.58%	1,008	18.47%	14	1.38%
65-74	6,007	884	14.71%	68	7.69%	1,050	17.47%	22	2.09%
75-84	6,017	941	15.63%	78	8.28%	1,138	18.91%	14	1.23%
85+	4,701	691	14.69%	56	8.10%	922	19.61%	22	2.38%

MECHANISM OF INJURY (TOP 10)

Figure 32: Proportion of Traumatic Brain Injury by mechanism



Data source: Arizona State Trauma Registry 2017

GLASGOW COMA SCORE (GCS)

Table 27: Traumatic brain injury incidence and mortality proportion by age and GCS

Age	Total Trauma Cases	TBI- GCS<9				TBI- GCS 9-12				TBI- GCS 12-15			
		N	Percent	Mortality	Mortality Percent	N	Percent	Mortality	Mortality Percent	N	Percent	Mortality	Mortality Percent
Total	51,666	1,382	2.67%	605	43.77%	526	1.01%	29	5.51%	14,056	27.20%	127	0.90%
<1	476	10	2.10%	8	80.00%	4	0.84%	0	.	262	55.04%	0	.
1-4	1,379	30	2.17%	9	30.00%	16	1.16%	0	.	344	24.94%	1	0.29%
5-9	1,425	29	2.03%	12	41.37%	9	0.63%	0	.	244	17.12%	0	.
10-14	1,730	31	1.79%	13	41.93%	16	0.92%	0	.	413	23.87%	0	.
15-19	3,454	107	3.09%	34	31.77%	28	0.81%	0	.	965	27.93%	0	.
20-24	3,862	128	3.31%	60	46.87%	34	0.88%	0	.	941	24.36%	2	0.21%
25-34	6,933	270	3.89%	106	39.25%	85	1.22%	1	1.17%	1,707	24.62%	5	0.29%
35-44	5,030	161	3.20%	60	37.26%	60	1.19%	0	.	1,300	25.84%	4	0.30%
45-54	5,197	192	3.69%	81	42.18%	63	1.21%	1	1.58%	1,370	26.36%	7	0.51%
55-64	5,455	174	3.18%	78	44.82%	62	1.13%	6	9.67%	1,403	25.71%	19	1.35%
65-74	6,007	108	1.79%	59	54.62%	42	0.69%	6	14.28%	1,747	29.08%	22	1.25%
75-84	6,017	90	1.49%	52	57.77%	61	1.01%	8	13.11%	1,883	31.29%	32	1.69%
85+	4,701	52	1.10%	33	63.46%	46	0.97%	7	15.21%	1,477	31.41%	35	2.36%

DISCHARGED TO REHAB BY PAYER

Table 28: Discharged to rehab by primary payer and Injury Severity Score

Primary Payer	Total Patient admitted		Discharged to Rehab		ISS <=15 and Discharged to Rehab		ISS >15 and Discharged to Rehab	
	N	%	N	%	N	%	N	%
AHCCCS	9,176	30.77%	398	4.33%	171	2.30%	226	14.57%
Medicare	9,226	30.94%	1,080	11.70%	857	11.02%	217	16.65%
Private	9,273	31.09%	757	8.16%	467	6.05%	286	20.22%
Self pay	1,450	4.86%	28	1.93%	16	1.31%	12	6.34%
Other	471	1.57%	12	2.54%	6	1.48%	5	8.62%
Not Documented	223	0.74%	15	6.72%	9	4.43%	6	31.57%
Total	29,819	100.00%	2,290	7.67%	1,526	6.17%	752	16.58%

DISCHARGED TO REHAB BY REGION

Table 29: Discharged to rehab by region of injury

Region	Total Patient Admitted		Discharged to Rehab	
	N	%	N	%
Missing Region	806	2.7%	56	6.9%
Central Region	21,216	71.1%	1,537	7.2%
Western Region	1,728	5.7%	151	8.7%
Northern Region	3,111	10.4%	267	8.5%
Southeastern Region	2,958	9.9%	279	9.4%
Statewide	29,819	100.0%	2,290	7.6%

LIST OF TRAUMA CENTERS BY LEVEL OF DESIGNATION

Health Care Institution	Address	Effective Date	Expiration Date
Level I Trauma Centers			
Abrazo West Campus	13677 W. McDowell Road, Goodyear, AZ 85395	06/30/17	*06/30/18
Banner - University Medical Center Phoenix	1111 E. McDowell Rd., Phoenix, AZ 85006	11/19/17	11/19/20
Banner Desert Medical Center (Provisional Designation)	1400 South Dobson Rd., Meza, AZ 85202	04/25/17	04/23/19
Banner Thunderbird Medical Center (Provisional Designation)	5555 W. Thunderbird Rd, Glendale, AZ 85306	10/03/17	09/30/19
Banner University Medical Center – Tucson	1501 N. Campbell Ave., Tucson, AZ 85724	11/11/17	11/11/18
Dignity Health, dba Chandler Regional Medical	1955 W. Frye Rd., Chandler, AZ 85224	07/01/18	07/01/21
Flagstaff Medical Center	1200 N. Beaver St., Flagstaff, AZ 86001	05/27/17	05/27/20
HonorHealth Deer Valley Medical Center (Provisional Designation)	19829 N. 27 th Ave., Phoenix, AZ 85027	12/01/17	06/01/19
HonorHealth John C. Lincoln Medical Center	250 E. Dunlap Ave., Phoenix, AZ 85020	04/24/17	04/24/20
HonorHealth Scottsdale Osborn Medical Center	7400 E. Osborn, Scottsdale, AZ 85251	10/25/17	10/27/18
Maricopa Medical Center	2601 E. Roosevelt, Phoenix, AZ 85008	12/19/17	12/19/20
Phoenix Children’s Hospital	1919 E. Thomas Rd., Phoenix, AZ 85016	08/31/16	*08/31/18
St. Joseph’s Hospital & Medical Center	350 W. Thomas Rd., Phoenix, AZ 85013	11/20/17	11/20/19
Level III Trauma Centers			
Abrazo Scottsdale Campus (Provisional Designation)	3929 E. Bell Rd., Phoenix, AZ 85032	04/10/17	*10/10/18
Banner Baywood Medical Center	6644 E. Baywood Ave., Mesa, AZ 85206	08/21/17	02/25/20
Banner Del E. Webb Medical Center	14502 W. Meeker Blvd, Sun City West, AZ 85375	01/28/18	01/25/19
Canyon Vista Medical Center	5700 E. Highway 90, Sierra Vista, AZ 85635	04/03/17	04/03/20
Havasu Regional Medical Center	101 Civic Center Ln., Lake Havasu City, AZ 86403	02/28/17	02/28/20
Mountain Vista Medical Center	1301 S. Crismon Rd., Mesa, AZ 85209	07/26/17	07/26/19
Tuba City Regional Health Care Corp.	P.O. Box 600, 167 Main St., Tuba City, AZ 86045	12/10/17	12/10/18

***Application Pending:** In accordance with R9-25-1307D – If an owner submits for renewal of designation, the designation does not expire until the Department has made a final determination.

LIST OF TRAUMA CENTERS BY LEVEL OF DESIGNATION

Level IV Trauma Centers			
Banner Boswell Medical Center	10401 W. Thunderbird Blvd., Sun City, AZ 85351	12/17/15	12/17/18
Banner Estrella Medical Center	9201 W. Thomas Road, Phoenix, AZ 85037	08/30/15	*08/30/18
Banner Gateway Medical Center	1900 N. Higley Road, Gilbert, AZ 85234	01/02/16	01/02/19
Banner Ironwood Medical Center	37000 N. Gantzel Rd., San Tan Valley, AZ 85140	10/11/15	*10/11/18
Banner Page Hospital	501 N. Navajo, Page, AZ 86040	11/05/17	11/05/20
Banner Payson Medical Center	807 S. Ponderosa Street, Payson, AZ 85541	11/22/16	11/22/19
Banner University Medical Center – South Campus	2800 E. Ajo Way, Tucson, AZ 85713	08/13/16	08/13/19
Cobre Valley Regional Medical Center	5880 S. Hospital Dr., Globe, AZ 85501	11/26/15	11/26/18
Copper Queen Community Hospital	101 Cole Ave., Bisbee, AZ 85603	12/01/15	12/01/18
Kingman Regional Medical Center	3269 Stockton Hill Rd., Kingman, AZ 86409	10/15/15	*10/15/18
La Paz Regional Hospital	1200 W. Mohave Rd., Parker, AZ 85344	06/02/18	06/02/21
Little Colorado Medical Center	1501 N. Williamson Ave, Winslow, AZ 86047	06/22/18	06/22/21
Mt. Graham Regional Medical Center	1600 S. 20 th Ave., Safford, AZ 85546	03/20/17	03/20/20
Northern Cochise Community Hospital	901 W. Rex Allen Dr., Willcox, AZ 85643	12/04/17	12/04/20
Oro Valley Hospital	1551 East Tangerine Road, Oro Valley, AZ 85755	04/18/16	04/18/19
San Carlos Apache Health Care Corporation	103 Medicine Way Road, Peridot, AZ 85542	05/09/18	05/09/21
Summit Healthcare Regional Medical Center	2200 Show Low Lake Rd., Show Low, AZ 85901	08/12/17	08/12/20
Verde Valley Medical Center	269 S. Candy Ln., Cottonwood, AZ 86326	08/18/17	08/18/20
Western Arizona Regional Medical Center	2735 Silver Creek Road, Bullhead City, AZ 86442	10/28/16	10/28/19
White Mountain Regional Medical Center	118 S. Mountain Ave., Springerville, AZ 85938	06/18/18	06/18/21
Wickenburg Community Hospital	520 Rose Ln., Wickenburg, AZ 85390	08/08/17	08/08/20
Yavapai Regional Medical Center – West Campus	1003 Willow Creek Road, Prescott, AZ 86301	01/10/17	01/10/20
Yavapai Regional Medical Center – East Campus	7700 E. Florentine, Prescott Valley, AZ 86314	06/24/17	06/24/20
Yuma Regional Medical Center	2400 South Avenue A, Yuma, AZ 85364	10/28/16	10/28/19

***Application Pending:** In accordance with R9-25-1307D – If an owner submits for renewal of designation, the designation does not expire until the Department has made a final determination.

TRAUMA PATIENT INCLUSION DEFINITION**ARIZONA STATE TRAUMA REGISTRY (ASTR)****Effective for records with ED/Hospital Arrival Dates January 1, 2016** – Current***** 1. EMS TRAUMA TRIAGE PROTOCOL**

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*** 1B. INTER-FACILITY INJURY TRANSFERS BY EMS**

A patient with injury who is transported via EMS transport from one acute care hospital to another acute care hospital;

***Note: For 2012 trauma data, only Level III and IV Trauma Centers were recommended to report inter-facility injury transfers. For 2008-2011 and 2013 forward, all designation levels are recommended to report inter-facility injury transfers.**

OR*** 2. HOSPITAL TRAUMA TEAM ACTIVATIONS**

A patient with injury or suspected injury for whom a trauma team activation occurs; **OR**

*** 3. ADMITTED OR DIED BECAUSE OF INJURY & MEETS ASTR DIAGNOSIS CODES**

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-10-CM (injury diagnosis code) within categories S00 through S99 with 7th character modifiers of A, B, or C ONLY. (Injuries to specific body parts –initial encounter)
T07 (unspecified multiple injuries)

T14 (injury of unspecified body region)

T20 through T28 with 7th character modifier of A ONLY (burns by specific body parts – initial encounter)

T30 through T32 (burn by TBSA percentages)

T79.A1 through T79.A9 with 7th character modifier of A ONLY (Traumatic Compartment Syndrome –initial encounter):

(Except exclusions below):

EXCLUSIONS for admitted or died ICD-10-CM patients:*** Only has late effects of injury or another external cause:**

(ICD-10-CM code within categories S00 through S99 (Injuries to specific body parts) with the 7th digit modifier code of D through S;

T20 through T28 (burns by specific body parts) with 7th character modifier of D through S;

T79.A1 through T79.A9 (Traumatic Compartment Syndrome) with 7th character modifier of D through S)

ARIZONA STATE TRAUMA REGISTRY INCLUSION CRITERIA

- * **Only has a superficial injury or contusion:**
(ICD-10-CM code within categories S00, S10, S20, S30, S40, S50, S60, S70, S80 or S90)
- * **Only has effects of a foreign body entering through an orifice:**
(ICD-10-CM code within T15 through T19)
- * **Only has an isolated femoral neck fracture from a same-level fall:**
(ICD-10-CM code within S72.0XXX through S72.2XXX with **any one of** V00.111X, V00.112X, V00.118X, V00.121X, V00.122X, V00.128X, V00.131X, V00.132X, V00.138X, V00.141X, V00.142X, V00.148X, V00.151X, V00.152X, V00.158X, V00.181X, V00.182X, V00.188X, V00.211X, V00.212X, V00.218X, V00.221X, V00.222X, V00.228X, V00.281X, V00.282X, V00.288X, V00.311X, V00.312X, V00.318X, V00.321X, V00.322X, V00.328X, V00.381X, V00.382X, V00.388X, W00.0XX, W00.9XX, W01.0XX, W03.XXX, W18.2XX, W18.40X, W18.41X, W18.42X, W18.43X, W18.49XX)
- * **Only has an isolated distal extremity fracture from a same-level fall:**
(ICD-10-CM code within S52.5XXX, S52.6XXX, S62.XXXX, S82.3XXX, S82.5XXX, S82.6XXX, S82.8XXX or S92.XXXX with **any one of** V00.111X, V00.112X, V00.118X, V00.121X, V00.122X, V00.128X, V00.131X, V00.132X, V00.138X, V00.141X, V00.142X, V00.148X, V00.151X, V00.152X, V00.158X, V00.181X, V00.182X, V00.188X, V00.211X, V00.212X, V00.218X, V00.221X, V00.222X, V00.228X, V00.281X, V00.282X, V00.288X, V00.311X, V00.312X, V00.318X, V00.321X, V00.322X, V00.328X, V00.381X, V00.382X, V00.388X, W00.0XX, W00.9XX, W01.0XX, W03.XXX, W18.2XX, W18.40X, W18.41X, W18.42X, W18.43X, W18.49XX)
- * **Only has an isolated burn:**
(ICD-10-CM code within categories T20 through T32)

*Inter-facility transfer item 1-B was added to the ASTR Inclusion Criteria, per the Bureau of EMS & Trauma System in November 2008. This item was then revised by the TEPI advisory committee for 2012, requiring only Level III and IV trauma centers to submit inter-facility transfers. For 2013 data forward, the advisory committee reinstated the original 2008-2011 inter-facility transfer criteria.

**The effective date of these criteria was updated to reflect that effective January 1, 2016 ICD-9-CM codes have been replaced by ICD-10-CM codes.

Note: New ASTR inclusion criteria went into effect for trauma records with ED/Hospital Arrival Dates Jan. 1, 2008 forward. Changes to inclusion criteria affect the numbers and types of records submitted to ASTR. Inclusion changes should be taken into consideration when comparing multiple years of trauma data.