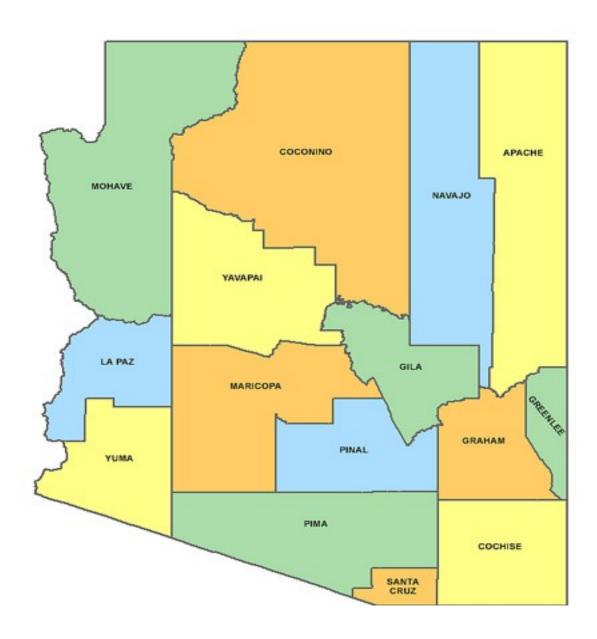


COUNTY LEVEL TRAUMA REPORT 2018



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In 2016, Arizona's trauma centers treated 46,842 people, with an all-trauma injury rate of 627 per 100,000 and a severe trauma injury rate of 74 per 100,000 Arizona residents. Urban counties like Maricopa, Pima and Pinal had lower trauma rates than most of the rural counties. Most of the rural counties also had higher rates of severe trauma than urban counties. The severe trauma rate was calculated in order to control for patients with minor injuries who may have been transported to a trauma center because it was the closest or most convenient facility. Severe trauma patients are defined as having an Injury Severity Score (ISS) greater than 15.

The distribution of race/ethnicity-specific trauma rates varied by county. Statewide, American Indian/ Alaska Natives had the highest rate of traumatic injury followed by Whites and then Black/African Americans.

Older adults 65 and above had the highest rate of traumatic injury in Arizona followed by 25-44 year olds. Counties like Coconino, Gila, La Paz and Navajo had higher rates of trauma among 25-44 years olds, whereas counties like Apache, Cochise, Maricopa, and Yuma had higher rates of trauma among those 65 year and above.

Statewide, falls are the leading mechanism of all trauma with 264 falls per 100,000 and severe trauma with 30 falls per 100,000 Arizona residents

In all 15 counties, the rate of Unintentional trauma was the highest followed by Homicide and Suicide.

The highest proportion of trauma charges were billed to the Arizona Health Care Cost Containment System (AHCCCS)/Other Government followed by Private insurance and Medicare.

Statewide, the crude trauma mortality rate was 16 per 100,000 Arizona residents. The ASTR is limited to deaths that occurred within <u>healthcare facilities that submit data</u> to the Arizona State Trauma Registry; therefore, these rates only show a portion of the true trauma mortality rate in Arizona.

Statewide, 14.5% of traumas involved the suspected or confirmed use of alcohol and 14.1% of traumas involved the suspected or confirmed use of drugs. Navajo county had the highest proportion of alcohol related trauma and Pima county had the highest proportion of drug related trauma.

Statewide, 71.4% of trauma patients were wearing some form of safety restraint (lap belt, shoulder belt or car seat) when involved in a motor vehicle traffic accident.

BACKGROUND

The purpose of this report is to describe traumatic injury in each of Arizona's 15 counties using the Arizona State Trauma Registry (ASTR). The intent is to identify county-specific areas of need in order to develop and strengthen local injury prevention programs.

The Bureau of Emergency Medical Services (EMS) 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 2016, there were 43 hospitals submitting data to the Arizona State Trauma Registry (ASTR) including ten (10) Level I trauma centers, seven (7) Level III trauma centers, twenty-four (24) Level IV trauma centers, and two (2) non-designated hospitals.¹

All trauma centers are required to report any injuries meeting the ASTR inclusion criteria (Appendix A). All the Level I trauma centers in Arizona are located in urban areas of the state, including eight in Maricopa County, one in Coconino County and one in Pima County.

METHODS

This report analyzed incidents of traumatic injury reported to the ASTR with an Emergency Department/Hospital Arrival Date between January 1, 2016 and December 31, 2016. The report gives an overview of trauma in the fifteen counties by describing patient demographics, injury characteristics, and trauma risk factors.

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 2016 population denominators from the Arizona Health Status and Vital Statistics database.² If the CIs of two rates do not overlap, the difference between the rates is considered statistically significant (alpha 0.05).

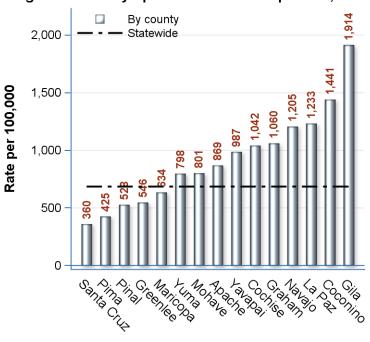
The county of injury was either missing or located outside of Arizona in 2.7% (n = 1,256) of trauma cases which were excluded from this analysis.

^{1.} Arizona Department of Health Services, Emergency Medical Services & Trauma System. Data & Quality Assurance—Arizona State Trauma Registry. http://azdhs.gov/preparedness/emergency-medical-services-trauma-system/index.php#data-quality-assurance-astr

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

TABLE 1: INCIDENCE RATE

Figure 1: County-specific trauma rate per 100,000

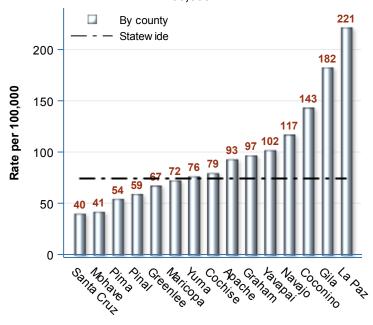


Injury	Total Trauma	Rate per 100,000
Santa Cruz	182	360 [308, 412]
Pima	4,308	425 [413, 438]
Pinal	2,182	528 [506, 550]
Greenlee	57	546 [405, 688]
Maricopa	26,240	634 [627, 642]
Yuma	1,737	798 [760, 835]
Mohave	1,649	801 [763, 840]
Apache	627	869 [801, 937]
Yavapai	2,174	987 [946, 1,029]
Cochise	1,337	1,042 [986, 1,098]
Graham	406	1,060 [957, 1,163]
Navajo	1,331	1,205 [1,141, 1,270]
La Paz	262	1,233 [1,084, 1,382]
Coconino	2,054	1,441 [1,378, 1,503]
Gila	1,040	1,914 [1,798, 2,030]
Statewide	46,842	685 [679, 691]

TABLE 2: SEVERE TRAUMA INCIDENCE RATE

Figure 2: County-specific severe trauma (ISS>15) rate per 100,000

Data source: Arizona State Trauma Registry 2016



Injury County	Total Trauma Cases with ISS>15	Rate per 100,000 (95%CI)
Santa Cruz	20	40 [22, 57]
Mohave	85	41 [33, 50]
Pima	546	54 [49, 58]
Pinal	242	59 [51, 66]
Greenlee	*	67 [17, 117]
Maricopa	2,991	72 [70, 75]
Statewide	5,074	74 [72, 76]
Yuma	166	76 [65, 88]
Cochise	102	79 [64, 95]
Apache	67	93 [71, 115]
Graham	37	97 [65, 128]
Yavapai	224	102 [88, 115]
Navajo	129	117 [97, 137]
Coconino	204	143 [123, 163]
Gila	99	182 [146, 218]
La Paz	47	221 [158, 284]

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases

TABLE 3: RACE SPECIFIC TRAUMA RATE PER 100,000

Injury	AI/	AN	Asia	an/PI	Black	k/AA	Hisp	anic	Wh	ite
county	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Apache	214	409	*	*	*	*	45	963	349	2,512
Cochise	10	782	*	*	32	544	343	771	933	1,269
Coconino	1,087	2,908	46	1,582	19	713	125	630	756	948
Gila	272	3,123	*	*	*	*	59	580	683	1,980
Graham	48	978	*	*	*	*	108	860	239	1,211
Greenlee	*	*	*	*	*	*	22	451	35	698
La Paz	33	1,270	*	*	*	*	41	738	173	1,370
Maricopa	669	887	382	208	1,543	653	5,583	443	17,501	735
Mohave	48	1,018	20	645	17	555	88	264	1,431	885
Navajo	687	1,410	*	*	18	1,108	97	783	507	1,083
Pima	250	927	57	172	196	499	1,411	383	2,319	425
Pinal	246	1,195	18	192	76	377	413	341	1,395	576
Santa Cruz	*	*	*	*	*	*	111	265	63	788
Yavapai	43	1,156	27	1,007	32	1,355	193	608	1,853	1,031
Yuma	44	1,844	*	*	45	930	800	593	817	1,129
Statewide	3,710	1,276	600	242	2,030	635	9,746	463	29,374	758

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases. Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Gila **Apache** Cochise Coconino Graham 3000 2000 1000 0 Rate per 100,000 Greenlee La Paz Maricopa Mohave Navajo 3000 2000 1000 0 Santa Cruz Pima **Pinal** Yavapai Yuma 3000 2000 1000 Al/AN Asian/Pl Black/AA Hispanic White -

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

Data source: Arizona State Trauma Registry 2016 Trauma rates were not calculated when trauma volume was <10

TABLE 4: AGE-SPECIFIC TRAUMA RATE PER 100,000

Injury	<1	l 5	15	-24	25-	44	45	-64	65	+
county	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Apache	86	500	62	573	198	1,207	124	703	157	1,559
Cochise	103	431	101	640	366	1,219	330	1,027	437	1,648
Coconino	239	937	150	446	875	2,528	452	1,391	338	2,070
Gila	83	895	86	1,544	332	3,436	222	1,490	317	2,123
Graham	64	719	52	884	172	1,633	67	825	51	1,047
Greenlee	*	*	*	*	24	858	13	523	*	*
La Paz	18	591	14	730	85	2,474	74	1,495	71	899
Maricopa	2,811	331	1,734	306	8,242	726	5,352	536	8,101	1,376
Mohave	76	248	83	399	432	1,095	348	602	710	1,246
Navajo	144	570	102	669	609	2,481	269	990	207	1,139
Pima	325	179	343	214	1,753	735	1,056	429	831	446
Pinal	218	265	167	342	642	590	453	478	702	891
Santa Cruz	22	191	17	227	77	721	31	247	35	419
Yavapai	181	589	145	667	575	1,457	506	788	767	1,198
Yuma	219	468	121	351	458	876	289	643	650	1,657
Statewide	4,740	351	3,310	348	15,332	873	9,828	593	13,650	1,215

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases. Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Figure 4: Age-specific trauma rate per 100,000 **Apache** Cochise Coconino Gila Graham 3000 2000 1000 0 Rate per 100,000 Greenlee La Paz Maricopa Mohave Navajo 3000 2000 1000 0 Pima Pinal Santa Cruz Yavapai Yuma 3000 2000 1000 0 ■ <15 ■ 15-24 ■ 25-44 ■ 45-64 □ 65+ -</p>

Data source: Arizona State Trauma Registry 2016 Trauma rates were not calculated when trauma volume was <10

TABLE 5: TRAUMA RATE PER 100,000 BY TOP 6 MECHANISM OF INJURY

Injury Cut/Pierce		Fa	II	MV Non-Traffic		MVT-Motorcyclist		MVT-Occupant		Struck By/Against		
county	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate
Apache	22	31	260	360	47	65	*	*	97	134	58	80
Cochise	23	18	568	443	135	105	35	27	192	150	96	75
Coconino	80	56	621	436	94	66	37	26	530	372	298	209
Gila	69	127	416	766	54	99	28	52	163	300	113	208
Graham	17	44	95	248	28	73	*	*	96	251	43	112
Greenlee	*	*	18	173	*	*	*	*	14	134	*	*
La Paz	*	*	70	329	20	94	*	*	73	344	*	*
Maricopa	1,001	24	11,019	266	809	20	1,140	28	5,406	131	1,886	46
Mohave	27	13	685	333	82	40	68	33	377	183	78	38
Navajo	67	61	330	299	115	104	14	13	365	331	168	152
Pima	239	24	999	99	244	24	242	24	1,174	116	356	35
Pinal	79	19	907	219	85	21	83	20	500	121	139	34
Santa Cruz	*	*	70	138	24	47	*	*	34	67	*	*
Yavapai	43	20	838	381	136	62	91	41	513	233	88	40
Yuma	45	21	809	372	14	6	50	23	424	195	115	53
Statewide	1,770	26	18,042	264	1,970	29	1,870	27	10,213	149	3,550	52

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases. Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Apache Cochise Coconino Gila Graham 800 400 0 Rate per 100,000 Greenlee La Paz Maricopa Mohave Navajo 800 400 0 Pima Santa Cruz Pinal Yavapai Yuma 800 400 0

MV Non-Traffic MVT-Motorcyclist

Statew ide

Figure 5: Trauma rate per 100,000 by top 6 mechanism of injury

Cut/Pierce

U: Trauma rates are unstable and not calculated when trauma volume is <10 cases

TABLE 6: TRAUMA RATE PER 100,000 BY INTENT OF INJURY

Injury	Hom	icide	Sui	cide	Uninte	ntional
county	N	Rate	N	Rate	N	Rate
Apache	75	104	14	19	531	736
Cochise	70	55	28	22	1,191	928
Coconino	366	257	28	20	1,637	1,148
Gila	145	267	30	55	849	1,563
Graham	43	112	10	26	350	914
Greenlee	*	*	*	*	54	518
La Paz	11	52	*	*	236	1,111
Maricopa	2,234	54	407	10	23,191	561
Mohave	72	35	10	5	1,409	685
Navajo	247	224	25	23	1,044	946
Pima	620	61	94	9	3,533	349
Pinal	158	38	40	10	1,959	474
Santa Cruz	*	*	*	*	177	350
Yavapai	62	28	29	13	2,075	942
Yuma	124	57	15	7	1,590	730
Statewide	4,290	63	750	11	40,288	589

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases. Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Figure 6: Trauma rate per 100,000 by intent of injury Apache Cochise Coconino Gila Graham 1500 1000 500 0 Rate per 100,000 Greenlee La Paz Maricopa Mohave Navajo 1500 1000 500 0 Pima Pinal Santa Cruz Yavapai Yuma 1500 1000 500 0 ■ Homicide ■ Suicide ■ Unintentional

Data source: Arizona State Trauma Registry 2016 Trauma rates were not calculated when trauma volume was <10

TABLE 7: PRIMARY PAYMENT SOURCE OF TRAUMATIC INURIES

Injury Self pay		AHCCCS/Govt		Private		Medicare		Other		Workers Comp		
county	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent	N	Percent
Apache	*	*	245	40.0%	203	33.2%	145	23.7%	*	*	*	*
Cochise	98	7.8%	401	32.2%	251	20.2%	382	30.7%	77	6.1%	33	2.6%
Coconino	74	3.6%	967	47.2%	600	29.3%	325	15.8%	34	1.6%	46	2.2%
Gila	78	7.5%	363	34.9%	287	27.6%	291	28.0%	*	*	10	0.9%
Graham	50	12.3%	139	34.3%	166	40.9%	42	10.3%	*	*	*	*
Greenlee	*	*	14	24.5%	21	36.8%	13	22.8%	*	*	*	*
La Paz	31	11.8%	75	28.6%	98	37.4%	51	19.4%	*	*	*	*
Maricopa	1,924	7.4%	7,917	30.6%	8,437	32.6%	6,713	26.0%	288	1.1%	533	2.0%
Mohave	98	5.9%	308	18.6%	396	24.0%	560	33.9%	273	16.5%	14	0.8%
Navajo	43	3.2%	657	49.5%	409	30.8%	179	13.4%	10	0.7%	29	2.1%
Pima	492	11.4%	1,646	38.3%	1,064	24.7%	831	19.3%	183	4.2%	78	1.8%
Pinal	169	7.7%	683	31.3%	598	27.4%	665	30.5%	19	0.8%	44	2.0%
Santa Cruz	24	13.1%	51	28.0%	36	19.7%	30	16.4%	33	18.1%	*	*
Yavapai	178	8.2%	526	24.3%	597	27.5%	683	31.5%	117	5.4%	63	2.9%
Yuma	84	4.8%	557	32.2%	371	21.4%	621	35.9%	55	3.1%	41	2.3%
Statewide	3,410	7.4%	14,738	32.3%	13,733	30.1%	11,607	25.4%	1,120	2.4%	930	2.0%

^{*} Cases are suppressed when trauma volume is <10 cases

Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

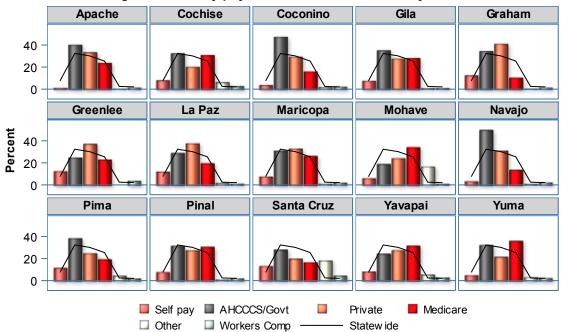


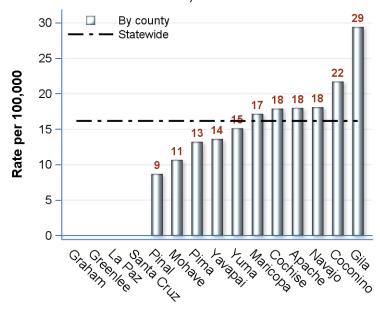
Figure 7: Primary payment source of traumatic injuries

TABLE 8: TRAUMA FATALITY RATE

Injury County	Total Trauma Deaths	Mortality Rate per 100,000 (95%CI)
Graham	*	*
Greenlee	*	*
La Paz	*	*
Santa Cruz	*	*
Pinal	36	9 [6, 12]
Mohave	22	11 [6, 15]
Pima	134	13 [11, 15]
Yavapai	30	14 [9, 19]
Yuma	33	15 [10, 20]
Maricopa	711	17 [16, 18]
Cochise	23	18 [11, 25]
Apache	13	18 [8, 28]
Navajo	20	18 [10, 26]
Coconino	31	22 [14, 29]
Gila	16	29 [15, 44]
Statewide	1,106	16 [15, 17]

^{*} Trauma rates are unstable and not calculated when trauma volume is <10 cases. Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Figure 8: County-specific trauma fatality rate per 100,000



Data source: Arizona State Trauma Registry 2016 Trauma fatality rates were not calculated when fatality count was <5

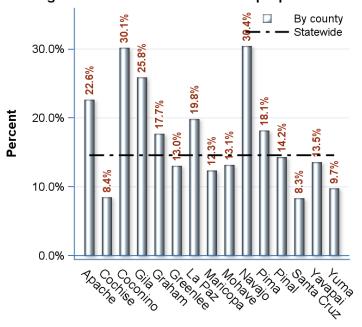
TABLE 9: ALCOHOL AND DRUG RELATED TRAUMA PROPORTION

			suspected irmed		uspected firmed
Injury county	Total trauma	N	%	N	%
Apache	627	128	22.6%	66	11.6%
Cochise	1,337	111	8.4%	152	11.5%
Coconino	2,054	616	30.1%	163	7.9%
Gila	1,040	216	25.8%	139	16.6%
Graham	406	51	17.7%	26	9.0%
Greenlee	57	*	*	*	*
La Paz	262	52	19.8%	38	14.5%
Maricopa	26,240	3,240	12.3%	3,831	14.6%
Mohave	1,649	217	13.1%	135	8.1%
Navajo	1,331	377	30.4%	252	20.2%
Pima	4,308	759	18.1%	878	21.0%
Pinal	2,182	311	14.2%	338	15.5%
Santa Cruz	182	15	8.3%	27	15.0%
Yavapai	2,174	295	13.5%	201	9.2%
Yuma	1,737	170	9.7%	125	7.1%
Statewide	46,842	6,660	14.5%	6,470	14.1%

^{*} Cases are suppressed when trauma volume is <10 cases

Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

Figure 9: Alcohol-related trauma proportion



Data source: Arizona State Trauma Registry 2016

Figure 10: Drug related trauma proportion

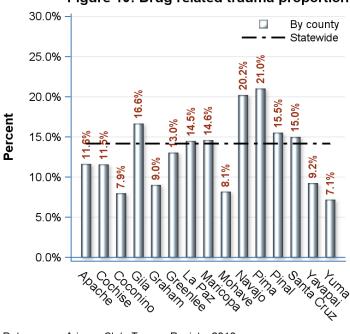


TABLE 10: SEAT BELT USE AMONG OCCUPANTS OF MOTOR VEHICLE TRAFFIC ACCIDENTS

		Car r	estrain use
Injury county	Total MV traffic occupants	N	%
Apache	95	56	58.9%
Cochise	185	133	71.8%
Coconino	520	371	71.3%
Gila	160	98	61.2%
Graham	93	66	70.9%
Greenlee	14	*	*
La Paz	70	58	82.8%
Maricopa	5,321	3,857	72.4%
Mohave	372	248	66.6%
Navajo	363	244	67.2%
Pima	1,147	848	73.9%
Pinal	496	337	67.9%
Santa Cruz	34	21	61.7%
Yavapai	504	400	79.3%
Yuma	421	304	72.2%
Statewide	9,930	7,100	71.4%

^{*}Cases are suppressed when trauma volume is <10 cases

Statewide total is rounded to the nearest 10th to avoid identifying the number of cases in categories with an asterix

By county

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Figure 11: Seat belt use among MVT occupants

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Figure 12: County-specific falls with severe trauma (ISS >15) rate per 100,000

Data source: Arizona State Trauma Registry 2016

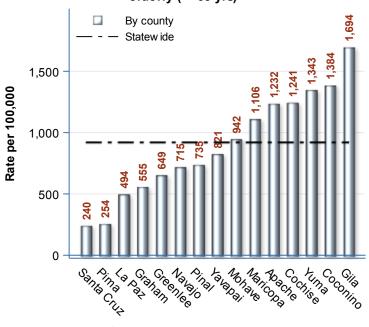


Figure 13: County-specific falls rate per 100,000 among elderly (>=65 yrs)

ARIZONA STATE TRAUMA REGISTRY INCLUSION CRITERIA

PATIENT INCLUSION DEFINITION

ARIZONA STATE TRAUMA REGISTRY (ASTR)

Effective for records with ED/Hospital Arrival Dates October 1, 2015 - 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;

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-9-CM N-code (injury diagnosis code) within categories 800 through 959 or 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-9-CM or ICD-10-CM patients:

Only has late effects of injury or another external cause:

(ICD-9-CM N-code within categories 905 through 909)

(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 ifier of D through S)

ARIZONA STATE TRAUMA REGISTRY INCLUSION CRITERIA

- Only has a superficial injury or contusion:
 - (ICD-9-CM N-code within categories 910 through 924) (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-9-CM N-code within categories 930 through 939) (ICD-10-CM code within T15 through T19)
- Only has an isolated femoral neck fracture from a same-level fall: (ICD-9-CM N-code within category 820 AND ICD-9-CM E-code within category E885 or E886) (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-9-CM N-code within categories 813 through 817 or 823 through 826 AND ICD-9-CM E-code within category E885 or E886) (ICD-10-CM code within S52.XXXX, S62.XXXX, S82.XXXX 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.XXXX, W18.2XX, W18.40X, W18.41X, W18.42X, W18.43X, W18.49XX)
- Only has an isolated burn:

(ICD-9-CM N-code within categories 940 through 949) (ICD-10-CM code within categories T20 through T32)