

# Air Transport Trauma Report

Arizona State Trauma Registry (ASTR)

2008-2017

## Importance

Helicopters are an integral component of a state trauma system, especially in states like Arizona with vast geographical areas separating patients from trauma centers. The primary goal of Helicopter Emergency Medical Services (HEMS) transport is to ensure that patients with potentially severe injuries reach a definitive care facility within an intervention window when not possible with ground EMS transport. Optimizing the use of HEMS transport is important as there is a significant cost associated with this important resource. This report analyzes ten years of trauma data to describe the use of HEMS transport in Arizona.

## Methods

This report uses data from the Arizona State Trauma Registry (ASTR) for the years 2008 to 2017 and consists of patients with at least one HEMS transport from a trauma scene. The rate of HEMS transports were calculated by county for the most recent year of data (2017) using the 2017 population denominators from the Arizona Health Status and Vital Statistics database<sup>1</sup>. An Injury Severity Score (ISS) greater than 15 was used to define trauma patients with severe injury.

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

## Trend

In the past 10 years, the volume of patients transported by HEMS has decreased by 43% from a total of 6,128 HEMS transports in 2008 to a total of 3,502 HEMS transports in 2018. Over this period the largest decrease in HEMS transports volume has occurred in Maricopa County followed by Pinal County and Pima County; whereas the volume has remained consistent over the years in the other counties.

Figure 1: HEMS transports volume by year, ASTR 2008-2017

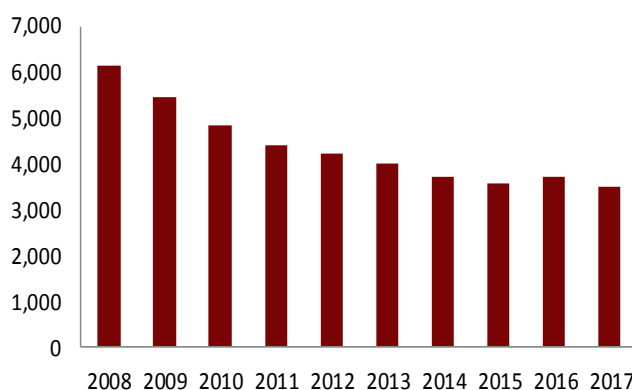
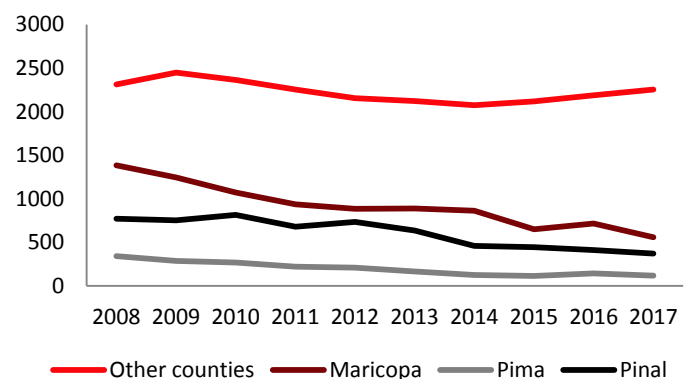


Figure 2: HEMS transports volume by year and county of injury, ASTR 2008-2017



## Volume

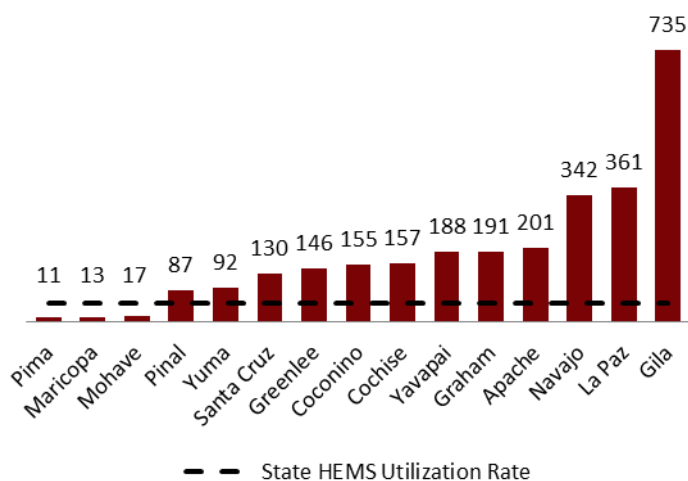
**Table 1: Volume of HEMS transports by county of injury and year, ASTR 2008-2017**

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Statewide	6,128	5,448	4,840	4,384	4,215	3,987	3,728	3,572	3,703	3,502
Apache	160	189	150	115	127	104	105	140	118	146
Cochise	274	275	255	262	261	237	170	209	174	201
Coconino	208	222	210	201	221	208	223	197	204	223
Gila	476	498	480	433	419	381	431	403	401	404
Graham	107	101	84	80	84	78	77	78	72	73
Greenlee	38	29	38	30	34	28	20	27	26	16
La Paz	65	45	74	73	57	83	87	102	102	78
Maricopa	1,382	1,245	1,072	936	885	888	863	647	716	557
Mohave	23	11	22	28	30	18	25	23	43	36
Navajo	348	378	378	312	323	330	301	342	361	381
Pima	341	284	266	219	209	165	123	113	143	117
Pinal	771	752	814	677	732	633	458	442	409	370
Santa Cruz	124	119	90	70	86	70	71	59	66	67
Yavapai	364	427	416	463	347	415	362	343	381	424
Yuma	125	155	168	186	166	168	202	195	241	203

## County Rate

In 2017, the state HEMS transport utilization rate was 50 per 100,000 residents. The utilization rates were higher in Arizona's rural counties as compared to urban counties. Pima County and Maricopa County reported the lowest rates of HEMS transports while La Paz County and Gila County reported the highest rates.

**Figure 3: HEMS transport rate per 100,000 Arizona Residents by county, ASTR 2017**

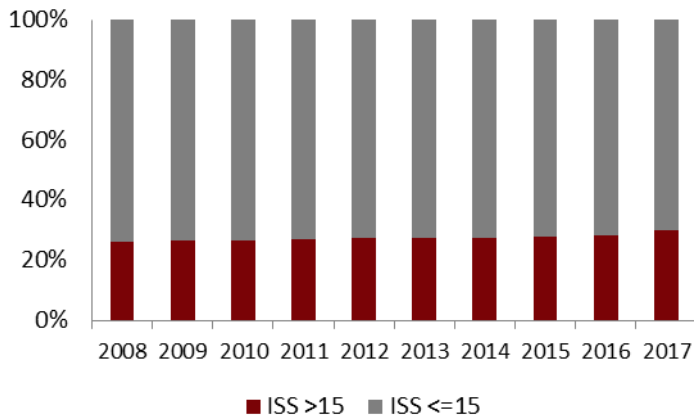


**Table 2: HEMS transport rate per 100,000 Arizona Residents by county, ASTR 2017**

County	Population 2017	HEMS Transports	Utilization Rate per 100,000
Pima	1,026,099	117	11
Maricopa	4,221,684	557	13
Mohave	209,792	36	17
Pinal	427,603	370	87
Yuma	221,648	203	92
Santa Cruz	51,507	67	130
Greenlee	10,961	16	146
Coconino	144,057	223	155
Cochise	128,383	201	157
Yavapai	225,364	424	188
Graham	38,275	73	191
Apache	72,713	146	201
Navajo	111,266	381	342
La Paz	21,598	78	361
Gila	54,947	404	735
Statewide	6,965,897	3,502	50

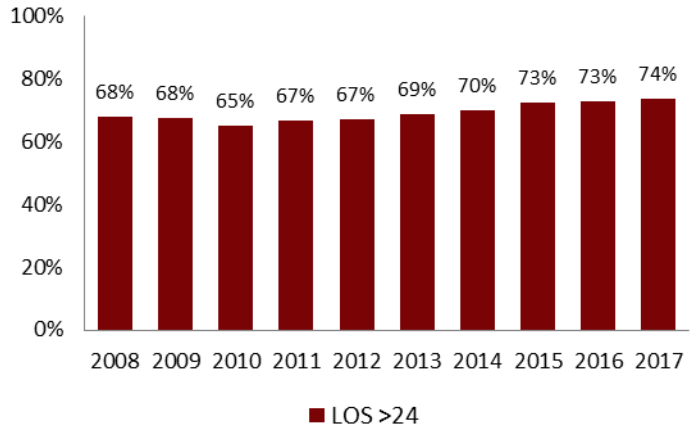
## Injury Severity Score

Figure 4: Percent of HEMS transports by Injury Severity Score (ISS) , ASTR 2008-2017



## Length of Stay

Figure 5: Percent of HEMS transports with a hospital Length of Stay (LOS) more than 24 hours, ASTR 2008-2017



The percent of HEMS transports with ISS greater than 15 have increased from 26% in 2008 to 30% in 2017 (Table 3). The percent of HEMS transports with length of stay >24 hours also increased from 68% in 2008 to 74% in 2017. The increase in mortality among HEMS transports from 2008 (3.8%) to 2017 (6.0%) also suggests that more severely ill patients are transported using HEMS.

Table 3: Percent of HEMS transports with an Injury Severity Score (ISS) greater than 15, a hospital Length of Stay (LOS) more than 24 hours, and mortality, ASTR 2008-2017

2008-2017	Total air transports	ISS >15		LOS >24 hours		Mortality	
	N	N	%	N	%	N	%
2008	6,128	1,580	26.2%	4,184	68.2%	235	3.8%
2009	5,448	1,422	26.5%	3,678	67.5%	225	4.1%
2010	4,840	1,248	26.4%	3,151	65.1%	197	4.0%
2011	4,384	1,152	26.8%	2,925	66.7%	190	4.3%
2012	4,215	1,132	27.4%	2,842	67.4%	190	4.5%
2013	3,987	1,063	27.2%	2,741	68.7%	175	4.3%
2014	3,728	1,003	27.3%	2,611	70.0%	171	4.5%
2015	3,572	982	27.9%	2,591	72.5%	161	4.5%
2016	3,703	1,020	28.2%	2,697	72.8%	211	5.6%
2017	3,502	1,038	30.1%	2,588	73.9%	211	6.0%

## Mechanism of Injury

The top three mechanisms of injury for HEMS transports were Falls, Motor Vehicle Traffic-Occupant and Struck By/Against. This corresponds to the top three mechanisms of injury for all trauma patients in Arizona<sup>2</sup>.

2. Bureau of EMS and Trauma System, 2018 STAB Annual Report, <https://www.azdhs.gov/preparedness/emergency-medical-services-trauma-system/#data-quality-assurance-reports>

Table 4: Percent of HEMS transports by Mechanism of Injury, ASTR 2008-2017

Mechanism of Injury	HEMS Transport %
Fall	26.0%
MVT-Occupant	25.8%
Struck By/Against	8.0%
Other Land Transport	7.8%
Cut/Pierce	5.5%
MVT-Motorcyclist	4.9%
Firearm	4.3%
MV Non-Traffic	4.2%
MVT-Pedestrian	2.1%
Other Specified, Classifiable	2.1%