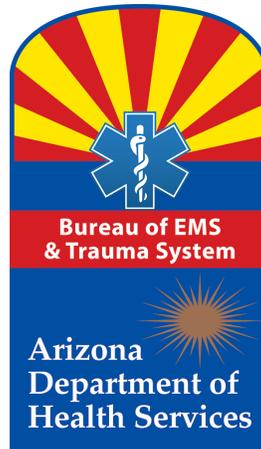


**ARIZONA DEPARTMENT OF HEALTH SERVICES
BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM**



**LEVEL I TRAUMA CENTERS
PERFORMANCE MEASURES:**

Probability of Survival, Transports, and Demographics

ARIZONA STATE TRAUMA REGISTRY 2011

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Data and Quality Assurance

Report No. 13-2-LI

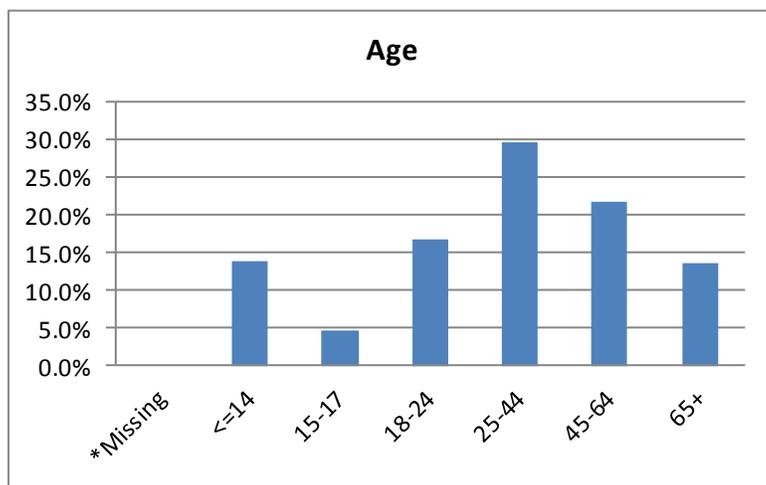
Level I Trauma Centers

Data Source: Arizona State Trauma Registry 2011

Report No. 13-2-L1

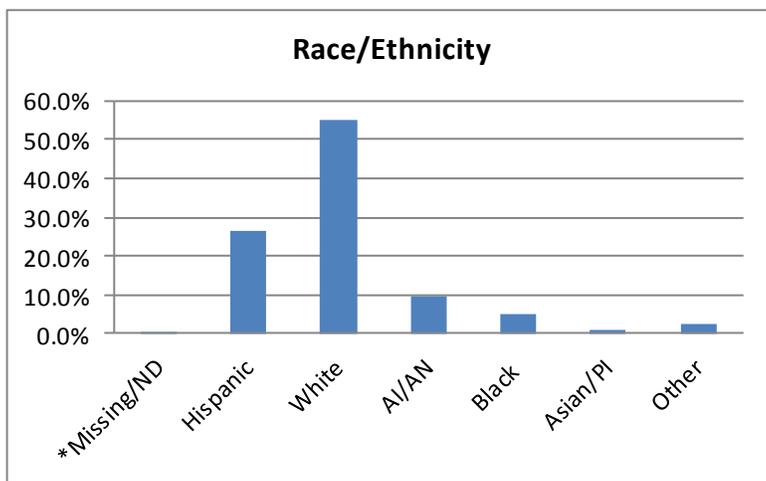
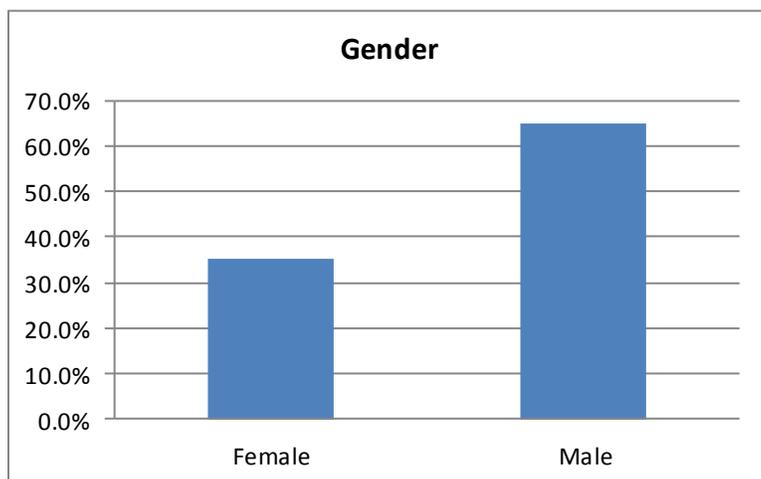
This quarterly report includes data from the eight (8) [state designated](#) Level I Trauma Centers . The [Arizona State Trauma Registry](#) (ASTR) received data on 23,609 trauma patients treated at these Level I

Demographics



These demographics show the percent distribution of the overall volume of trauma patients at Level I Trauma Centers.

- The makeup of trauma patients in the state are those 25-44 years (30%), 45-64 (21%) and 18-24 (15%),
- Males made up 65% of trauma patients,
- The volume of Whites (55%) was higher than Hispanics (26%) and American Indian/Alaska Native (10%). The lowest volume was seen among African Americans(5%) and Asian Pacific Islander (1%).



Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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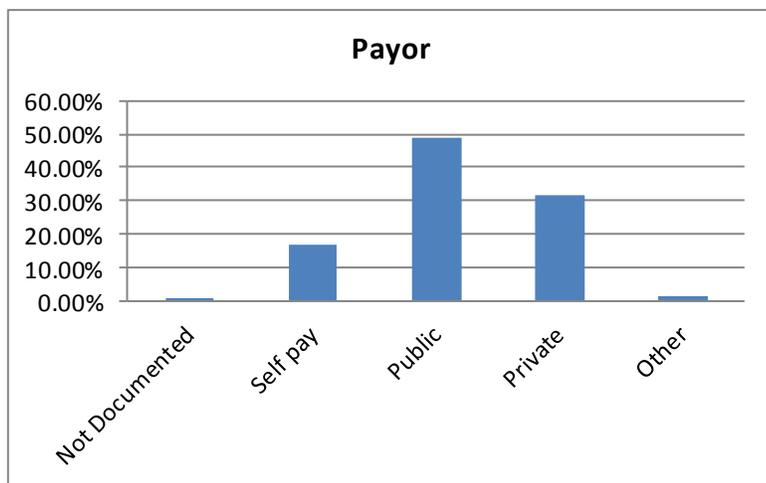
Demographics

	N	%
Total Trauma Patients	23,609	100.00%
Age		
*Missing	1	0.00%
<=14	3,261	13.81%
15-17	1,074	4.54%
18-24	3,941	16.69%
25-44	6,973	29.53%
45-64	5,138	21.76%
65+	3,221	13.64%
SEX		
*Missing/ND	1	0.00%
Female	8,305	35.17%
Male	15,303	64.81%
Ethnicity		
*Missing/ND	59	0.24%
Hispanic	6,247	26.46%
White	13,054	55.29%
American Indian or Alaska Native	2,249	9.52%
Black or African American	1,196	5.06%
Asian Pacific Islander	227	0.96%
Other	577	2.44%

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Method of payment among trauma patients

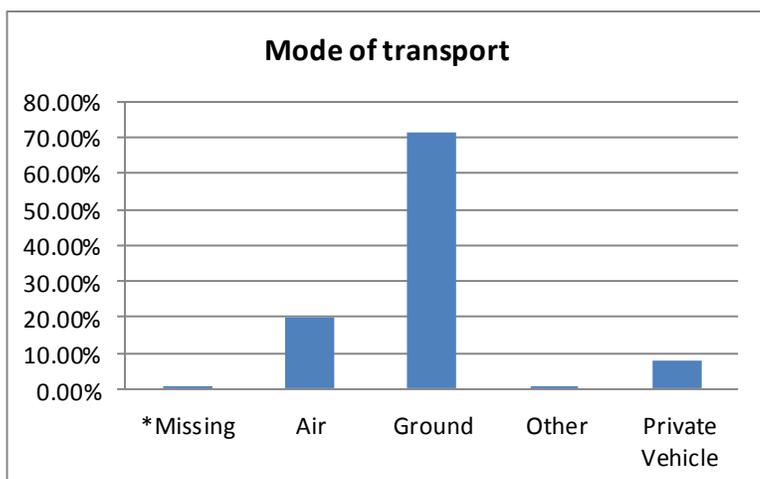
<i>Payer Mix</i>	<i>N</i>	<i>%</i>
<i>Not Documented</i>	244	1.03%
<i>Self pay</i>	3,930	16.64%
<i>Public</i>	11,535	48.85%
<i>Private</i>	7,530	31.89%
<i>Other</i>	370	1.56%



Public programs paid for the care sustained by trauma patients 49% of the time. This was followed by private insurance (32%) and self payment (17%).

This data suggests that a strong prevention program in reducing incidence would be beneficial in reducing the cost of trauma.

Mode of transport

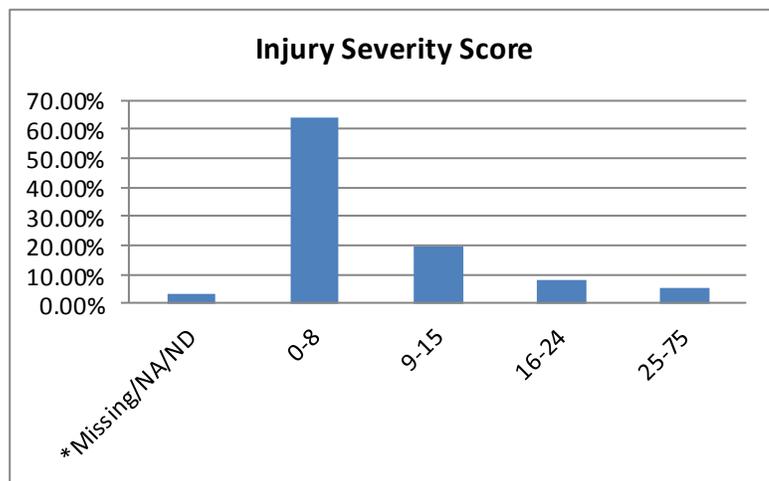


<i>Mode of transport</i>	<i>N</i>	<i>%</i>
<i>*Missing</i>	122	0.51%
<i>Air</i>	4,686	19.84%
<i>Ground</i>	16,860	71.41%
<i>Other</i>	38	0.16%
<i>Private Vehicle</i>	1,903	8.06%

Patients were transported to Level I Trauma Centers by ground ambulance (71%) , air ambulance (20%), and private vehicle (8%).

Level I Trauma Centers
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ISS

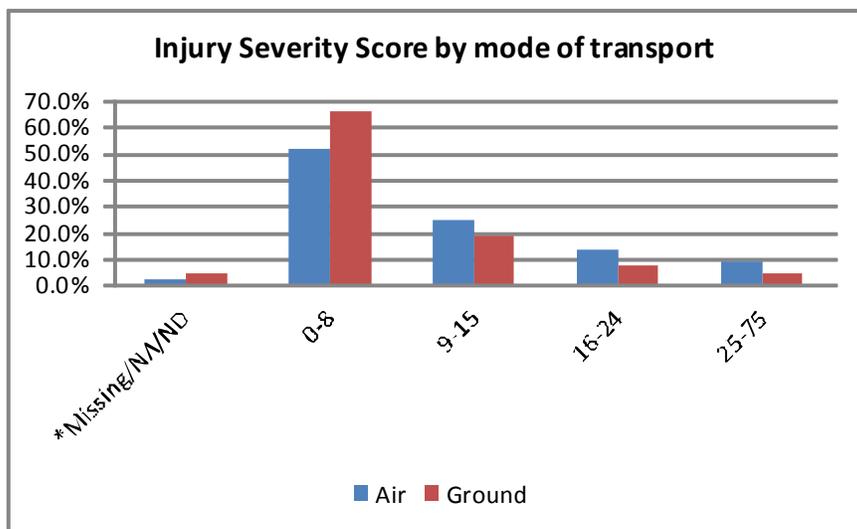


<i>Injury Severity Score</i>	<i>N</i>	<i>%</i>
<i>*Missing/NA/ND</i>	816	3.45%
<i>1-8</i>	15,075	63.85%
<i>9-15</i>	4,639	19.64%
<i>16-24</i>	1,876	7.94%
<i>25-75</i>	1,203	5.09%

An [Injury Severity Score](#) (ISS) assesses the degree of injury among multiple body parts. A higher ISS score means a patient is more severely injured. There are some limitations in using this tool exist but this has the greatest correlation with morbidity, mortality, and length of stay.

ISS by EMS mode of transport

Air transport should be utilized for patients that have suffered the most severe injuries. There are additional considerations that factor into choosing a method of transport besides ISS (i.e. travel time, patient health, geography).

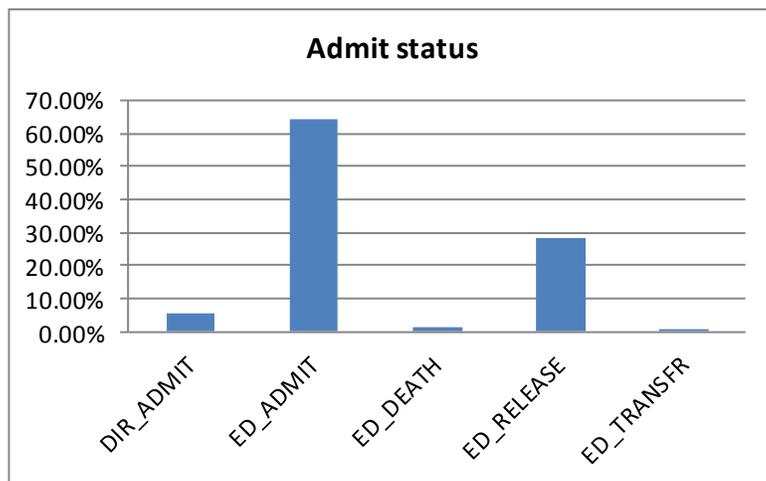


<i>Injury Severity Score</i>	<i>Air</i>		<i>Ground</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
<i>*Missing/NA/ND</i>	92	1.96%	686	4.06%
<i>1-8</i>	2,411	51.45%	11,103	65.85%
<i>9-15</i>	1,165	24.86%	3,113	18.46%
<i>16-24</i>	609	12.99%	1,189	7.05%
<i>25-75</i>	409	8.72%	769	4.56%

The trauma guidelines can be found on page 25 of the [Triage, Treatment, and Transport Guidelines](#) as recommended by the [Bureau of EMS and Trauma Systems](#).

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Admit status

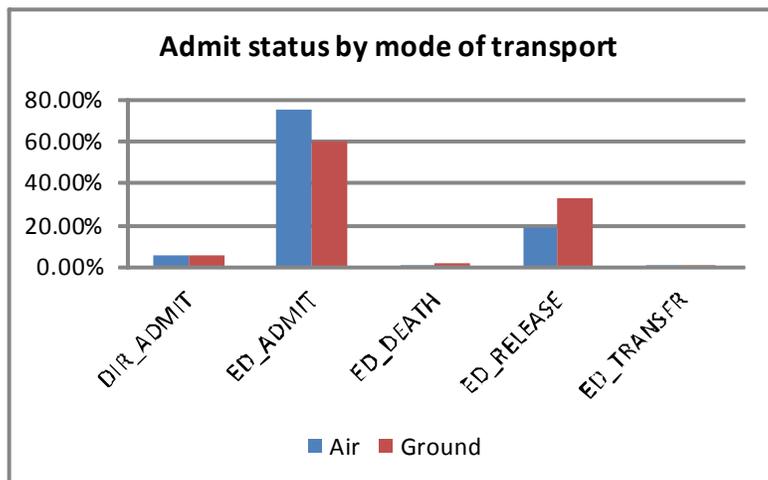


<i>Admit status</i>	<i>N</i>	<i>%</i>
<i>DIR_ADMIT</i>	1,284	5.43%
<i>ED_ADMIT</i>	15,198	64.37%
<i>ED_DEATH</i>	288	1.21%
<i>ED_RELEASE</i>	6,743	28.56%
<i>ED_TRANSFR</i>	96	0.40%

A majority of patients were admitted through the Emergency Department (ED) (64%) or through the hospital (5%). Of the total in 2011, 29% were released through by the ED. The percentage of deaths in Level I Trauma Centers was 1%.

Admit status by EMS mode of transport

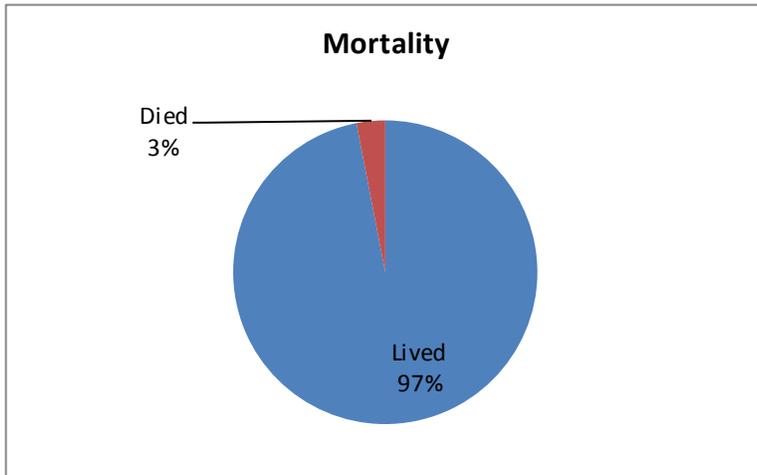
These graphs separate the admission levels of trauma patients. In a functioning trauma system, the percentage of air transport admissions (80%) would be higher than ground (65%). Additionally, it is expected that the releases through the ED would be lower for air (19%) versus ground (33%).



<i>Admit status by transport type</i>	<i>Air</i>		<i>Ground</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
<i>DIR_ADMIT</i>	246	5.24%	888	5.26%
<i>ED_ADMIT</i>	3,504	74.77%	10,120	60.02%
<i>ED_DEATH</i>	41	0.87%	246	1.45%
<i>ED_RELEASE</i>	877	18.71%	5,554	32.94%
<i>ED_TRANSFR</i>	18	0.38%	52	0.30%

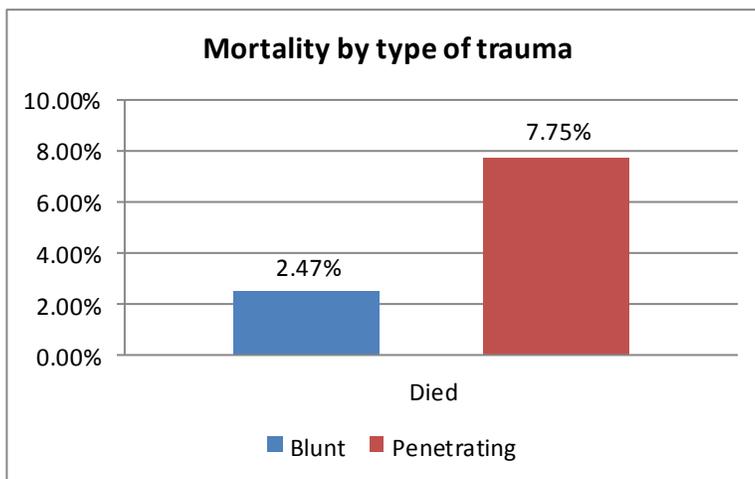
Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2011
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Overall Mortality



<i>Final outcome</i>	<i>N</i>	<i>%</i>
<i>Lived</i>	22,890	96.95%
<i>Died</i>	719	3.04%

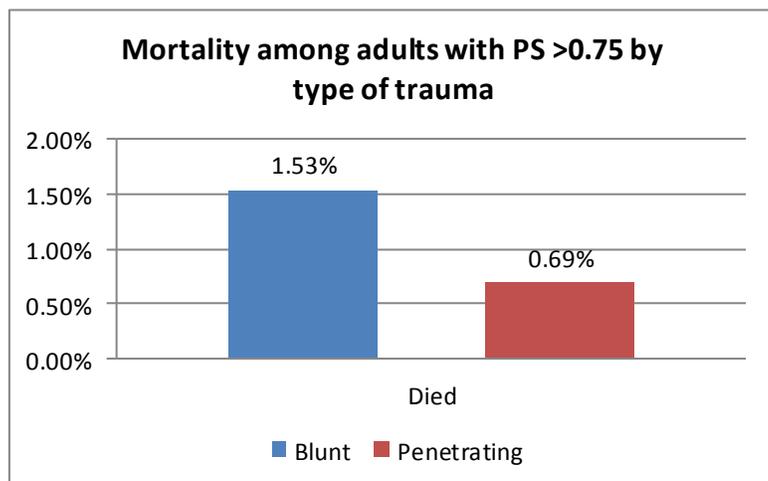
Mortality among blunt and penetrating injuries



<i>Final outcome</i>	<i>Type of trauma</i>			
	<i>Blunt</i>		<i>Penetrating</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
<i>Lived</i>	20,499	97.52%	2,320	92.24%
<i>Died</i>	521	2.47%	195	7.75%

Although 97% of patient survived their traumatic injury, the patients who had a penetrating injury had a higher mortality (8%).

Adult patients with a Probability of Survival (PS) >0.75 and their outcome by type of trauma



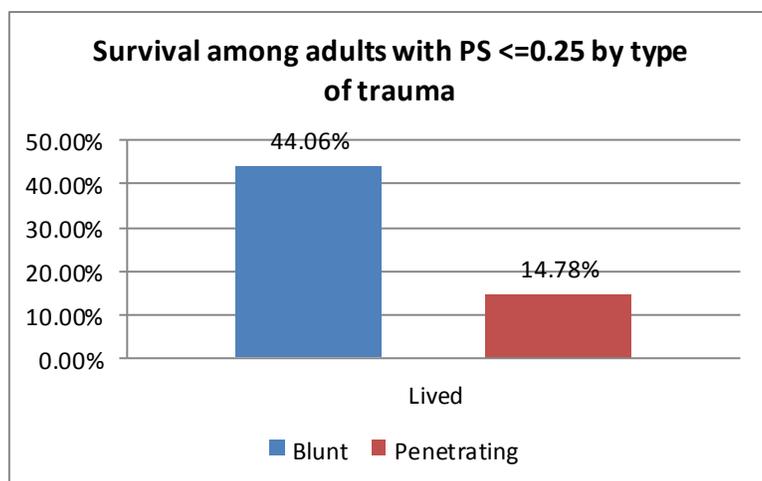
A [PS score](#) is calculated by factoring a patient's revised trauma score and ISS. A value greater than .75 means the patient is expected to survive.

Patients with an PS score of greater than .75 and died should be assessed for complications that might have occurred.

There were 200 patients who met this criteria.

	<i>Blunt</i>		<i>Penetrating</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Total adult patients with PS >0.75	12,226	100.00%	1,724	100.00%
Died	188	1.53%	12	0.69%
Lived	12,038	98.46%	1,712	99.30%

Adult patients with PS ≤0.25 and their outcome by type of trauma



A value less than .25 means the patient is expected to expire.

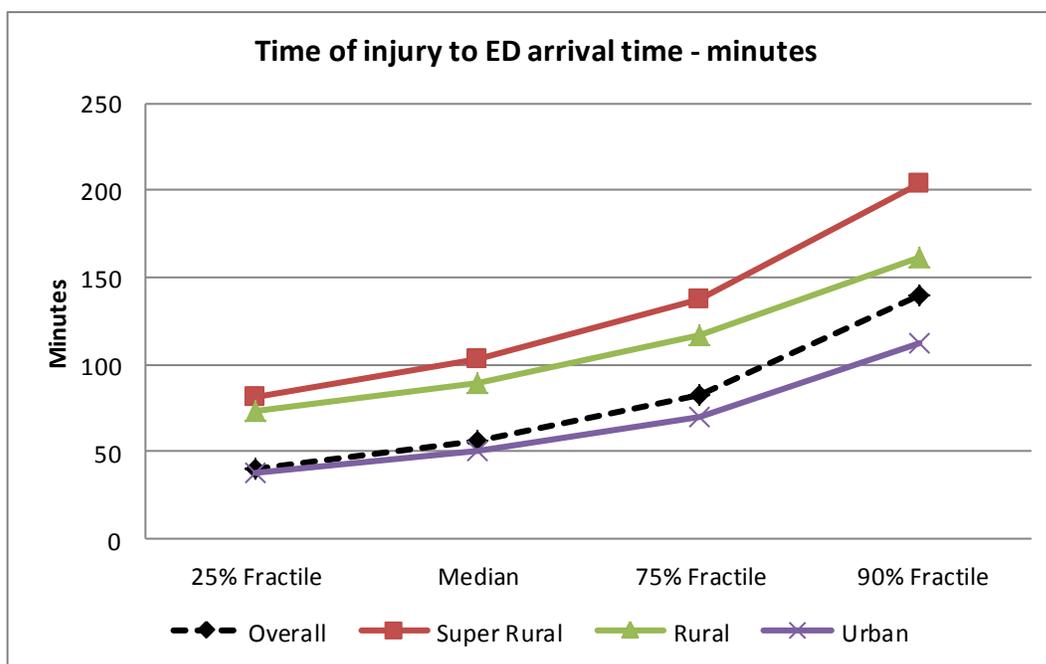
Patients with an PS score of less than .25 and lived could be assessed for best practices and successes that led to the patient's survival.

There were 99 total patients who met this criteria.

	<i>Blunt</i>		<i>Penetrating</i>	
	<i>N</i>	<i>%</i>	<i>N</i>	<i>%</i>
Total adult patients with PS ≤0.25	177	100.00%	142	100.00%
Died	99	55.93%	121	85.21%
Lived	78	44.06%	21	14.78%

Level I Trauma Centers
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Injury to ED arrival time- Interfacility transfers excluded



	<i>Time of injury to ED arrival - minutes</i>							
	<i>Not Documented</i>	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>25% Fractile</i>	<i>Median</i>	<i>75% Fractile</i>	<i>90% Fractile</i>
Overall	6,013	12,423	1	43,275	40	56.0	83	140
By Location of injury								
*Not Documented	176	211	4	9,650	68	117.0	235	711
Super Rural	435	1,299	20	7,429	82	103.0	138	204
Rural	238	431	11	1,786	73	90.0	117	162
Urban	5,164	10,482	1	43,275	38	51.0	70	112

The median time to arrive to a Level I Trauma Center in the state of Arizona is 56 minutes. This means that 50% of cases arrived to a Level I TC in less than 56 minutes and 50% took longer than this.

The time frame increased significantly for rural (90 minutes) and super rural communities (103 minutes).