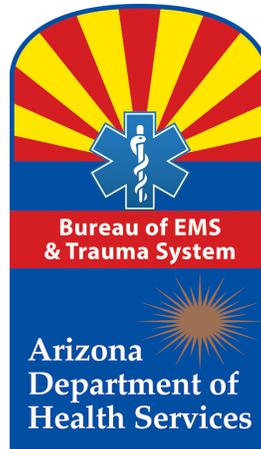


**ARIZONA DEPARTMENT OF HEALTH SERVICES
BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM**



**LEVEL I TRAUMA CENTERS
PERFORMANCE IMPROVEMENT MEASURES
ARIZONA STATE TRAUMA REGISTRY 2013
HOSPITAL DISCHARGE DATABASE 2013**

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Report No. 14-4-L1

Purpose:

The purpose of this report is to provide Level I trauma centers with a baseline level of comparison on their performance measures in 2013. This report can be used to support Quality Assurance initiatives in their communities and their referring hospitals.

This report analyzes four trauma related performance measures:

1. Reduce Emergency Department (ED) dwell time at Level III/IV trauma centers before transfer to Level I trauma centers,
2. Reduce transfers after admission,
3. Reduce deaths outside of trauma centers,
4. Increase trauma billing efficiency.

Methodology:

The [Arizona State Trauma Registry 2013](#) (ASTR) and the [Hospital Discharge Database 2013](#) (HDD) were queried for data on the four measures.

- 1) Patients with an ED disposition of “Transfer to acute care” were filtered. The final transfer destination was an Arizona Level I Center or an acute care facility in Nevada.

The ED Dwell time is the difference between two elements “ED/Hospital Arrival Date/Time” and “ED Exit Date/Time”, or if unavailable, “Length of Stay”.¹ **This measure used transfer data from Level III or Level IV trauma centers to your facility.**

- 2) The transfer after admission was calculated by first filtering patients who were admitted and then had a final discharge disposition as transfer. The final hospital discharge destination was an Arizona Level I trauma centers or a Nevada acute care facility.¹ **This measure used transfer data from Level III or Level IV trauma centers for your facility.**

- 3) Patients that die in a Non-trauma centers were found by querying trauma related injuries in the HDD. Deaths were limited to hospitals that were not designated trauma centers in 2013.²

- 4) The trauma billing efficiency score was calculated by comparing patients who had a trauma team activation and arrived by ambulance in ASTR. A hospital that meets this criteria would qualify for 068X revenue under the HDD. A billing efficiency score was calculated by comparing the numbers reported in HDD and ASTR.^{1,2}

¹ Source: Arizona State Trauma Registry

² Source: Hospital Discharge Database

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Data Source: Arizona State Trauma Registry 2013
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Performance Measure 1: Reduce ED Dwell Time

Table 1: ED dwell time by ISS by categorical classification

1st Performance Measure: ED dwell time (hrs)	Overall		By Injury Severity Score					
			Missing		ISS ≤15		ISS >15	
	N	%	N	%	N	%	N	%
<2 hours	243	17.4%	12	36.3%	193	17%	38	16.6%
≥2 hours	1,152	82.5%	21	63.6%	941	82.9%	190	83.3%
Total patients transferred	1,395	100%	33	100%	1,134	100%	228	100%

Table 2: Time distribution of ED dwell time

Median ED dwell time (hrs)	Count	25%	Median	75%	Max
Overall	1,362	2	3.4	5	21
By Injury Severity Score					
ISS ≤15	1,134	2	3.4	5	21
ISS >15	228	2	3.5	5	18

Traumatic injuries require that a system rapidly assess and intervene to prevent morbidity and mortality. One method for assessing performance on this measure is to evaluate the length of time patients are held in a level III or IV trauma center before they are transferred to a level I trauma center.

Most experts agree that patients whose injuries require a transport to a level I trauma center should be transferred within two hours of arrival at the level III or level IV trauma center. **This measure exclusively analyzed ‘transfer data’ from Level III/Level IV trauma centers to a Level I trauma center.**

While there are various factors that contribute to a transfer, a sending facility can develop interventions and best practices that can reduce the ED dwell time.

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2013
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Performance Measure 2: Reduce transfers after admission

Table 3: Transfers after admission by length of stay

2nd Performance Measure: Transfer after admission	Total	Level III Trauma Centers	Level IV Trauma Centers	%
Total patients	31	16	15	100%
LOS (Days)				
< 1 day	9	5	4	29%
1	16	8	8	51.6%
2	3	1	2	9.6%
3	2	1	1	6.4%
4	1	1	0	3.2%

The goal of any trauma system is to get the right patient to the right place in the right amount of time.

Depending upon the severity of injury, some patients should be evaluated and admitted at a level III or level IV trauma centers. These facilities must have the resources and personnel necessary to address the needs of that patient.

This measure used ‘patient transfer’ data from Level III/IV trauma centers for a Level I facility.

Patients that are outside of a level III/IV trauma center’s capabilities should be stabilized by the staff while simultaneously arranging for transportation to a proper level of care. Patients that present to a level III/ IV trauma center should be adequately screened to ensure that the hospital is able to provide the right level of care.

Level I Trauma Centers
Data Source: Hospital Discharge database 2013
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Performance Measure 3: Reduce deaths outside of trauma center

The Arizona State Trauma Advisory Board adopted the trauma triage guidelines developed by the Centers for Disease Control and Prevention. This evidence based tool recognizes seriously injured individuals who should receive treatment at a designated trauma center.

Table 4: Mortality at non-trauma centers

3rd Performance Measure: Mortality at Non-trauma centers	Died		Survived	
	N	%	N	%
Level I	642	2.8%	21,833	97.1%
Level IV	17	0.7%	2,354	99.2%
Level III	48	1.2%	3,784	98.7%
Non-trauma centers	178	1.5%	11,632	98.4%

Table 5: Mortality at non-trauma centers by county of residence

The area with the most mortality at Non-trauma centers in 2013 was the Southeastern part of the state. This was followed by the Northern, Central, and Western regions.

	N	%
Region		
Missing county	1	0.5%
Out of state county	9	5%
Northern	48	26.9%
Southeastern	87	48.8%
Central	23	12.9%
Western	10	5.6%

Table 6: Age demographics of deaths outside trauma centers

	N	%
Total Died	178	100%
<5	3	1.6%
5-8	1	0.5%
15-17	3	1.6%
18-24	14	7.8%
25-44	22	12.3%
45-64	135	75.8%
65+	1	0.5%

Table 7: Injury demographics of deaths outside trauma centers

Type of injury	N	%
Traumatic Brain Injury	50	28%
Other head, face, neck	17	9.5%
Vertebral column injury	10	5.6%
Torso	23	12.9%
Upper extremity	7	3.9%
Lower extremity	57	32%
Other & unspecified	1	0.5%
System wide & late effects	13	7.3%

Table 8: Admission demographics of deaths outside trauma centers

Source of admission	N	%
Non-Health Care Facility point of origin	166	93.2%
Clinic or Physician's Office	3	1.6%
Transfer from a Hospital (different facility)	6	3.3%
Transfer from another Health Care Facility	3	1.6%

Level I Trauma Centers
Data Source: Arizona State Trauma Registry 2013
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Performance Measure 4: Increase billing efficiency

Table 9: Billing efficiency for level I trauma centers

4th Performance Measure: Billing efficiency	ASTR - Trauma Team Activation and Arrived by Ambulance	HDD # 068X Selected	Trauma Billing Efficiency Score
Aggregate Level I	17,296	14,622	84.5%

Trauma team activations are vital resource that ensure a coordinated and capable response to injured patients presenting to a trauma center. This resource is an essential component of a trauma center and are costly to a hospital.

Financial viability ensures the sustainability of dedicated trauma care in communities. A commitment to clinical excellence must coincide with efficient billing.

Data from two registries (HDD and ASTR) were used to develop the following tool to describe how the designated trauma centers are performing related to trauma billing efficiency.

Trauma Billing Efficiency Score= HDD # 068X Selected / ASTR - Trauma Team Activation:

A higher value denotes a better trauma billing efficiency for the state.