

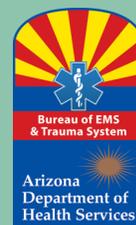
Arizona State Trauma Registry

Inter Rater

Reliability



Prepared By:



Acknowledgements

The Bureau of EMS and Trauma System would like to acknowledge the hard work of the Trauma Registry User's Group (TRUG), State Trauma Advisory Board (STAB) and the Trauma and Emergency Medical Services Performance Improvement (TEPI) committees.

Although time consuming and detail oriented, the Inter Rater Reliability project focused on data validation, quality, and timeliness; the fundamental aspects of any registry.

Special recognition for leading the project go to:

Mellissa Moyer, CSTR - John C. Lincoln North Mountain

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Executive Summary

Introduction: The Arizona State Trauma Registry (ASTR) collects data from forty two (42) facilities around the state. Given the varying levels of experience and training amongst the registrars, Arizona needed a way to measure the accuracy and consistency of the trauma data being submitted.

Objective: To standardize data collection and improve data quality in ASTR.

Methods: The State, in collaboration with the Trauma Registry User's Group (TRUG) recently performed an Inter Rater Reliability (IRR) project.

The TRUG members provided sample cases from real patients that were entered into ASTR. A small workgroup was formed to select an IRR case that was well-documented and representative of a typical state trauma patient, yet sufficiently challenging in order to stimulate discussion among members.

Trauma registrars were provided with the IRR case containing redacted health information and given a month to enter their results in the Trauma One software. The state trauma registrar compiled all the results and presented the workgroup with a frequency of selected answers. After discussion, the small workgroup developed a draft answer key which was discussed during the TRUG quarterly meeting on July 22, 2015. Based on input and discussion from the entire group the answer key was finalized.

Results: Of 90 registrars from 42 participating hospitals, 26 (29%) participated in the IRR. The majority of participants (81%) were from Level I trauma centers. The aggregate scores per section were: Demographics 92.4%; Injury 81.1%; Pre-hospital 92.5%; ED/Toxicology 86.7%; Discharge/Finance 75.4%; Procedures 67.2%; ICD-9 Diagnoses 21.0%; and AIS Diagnoses 36.9%. Overall, injury severity was underestimated by IRR participants (Table 1).

Table 1: Measures of injury severity, correct vs. average IRR score

	Correct Score	Average IRR Score
Injury Severity Score (ICD-9)	48	43.8
Injury Severity Score (AIS)	48	46.1
Revised Trauma Score	6.9	6.4
Probability of Survival	75.4%	70.0%

Conclusion: While overall participation from registrars and submitting facilities in the IRR was low, the project did identify slight inconsistencies, particularly in the coding of diagnoses and procedures. In future IRR projects, there should be more efforts to increase participation from registrars and submitting facilities.

Distribution of ICD 9 and AIS based ISS

Injury Severity Score (ISS)

A trauma patient's ISS can be calculated through the [International Classification of Diseases \(ICD\)](#) or the [Abbreviated Injury Score \(AIS\)](#).

Figure 1:
Distribution of ICD
based ISS:
ASTR, 2013

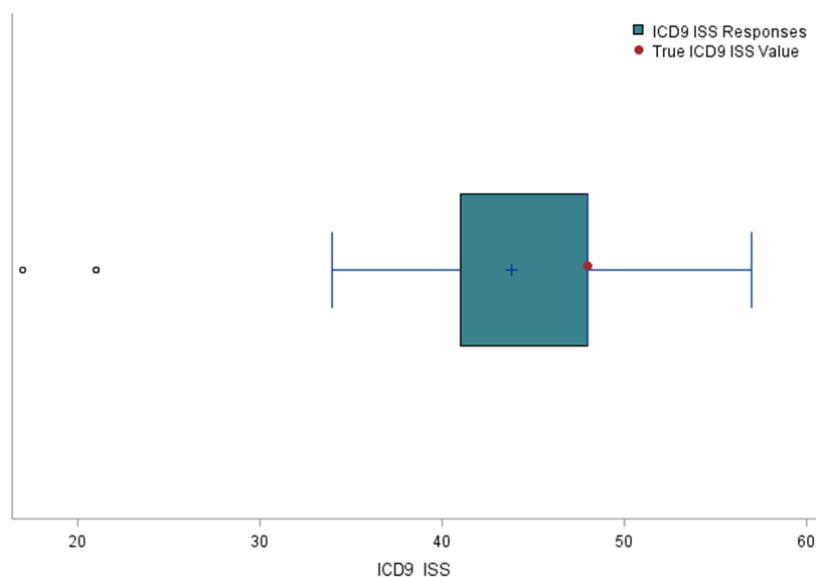
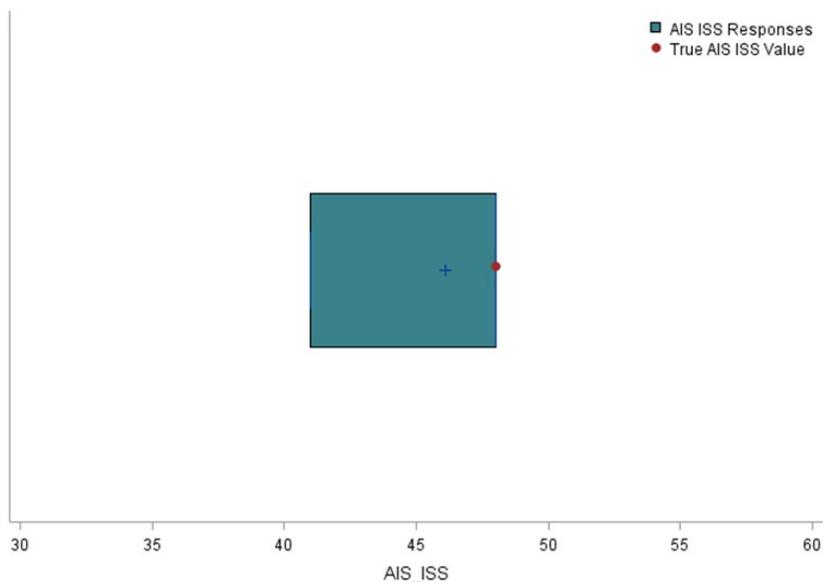


Figure 2:
Distribution of AIS
based ISS:
ASTR, 2013



Distribution of ICD-9 and AIS based ISS

ICD-9 based ISS

Table 1:
Distribution of ICD
based ISS:
ASTR, 2013

Total number	26
Mean	43.81
Standard Deviation	10.23

An ICD-9 based ISS is dependent upon the diagnosis codes that are selected. A registrar that underdiagnosed a patient will under report the ISS.

Table 2:
Percentile distribution
of ICD based ISS:
ASTR, 2013

Percentile	ICD-9 ISS
99%	57
75%	48
50th percentile	48
25%	41
Minimum	17

If providers fail to document a diagnosis, an under reporting of an ISS may occur.

The correct ICD9 ISS was 48, the mean was 43.8. This measure was under reported but was within one standard deviation.

AIS based ISS

AIS codes are for designated Level I Trauma Centers only. The AIS based ISS is dependent upon the 2005 AIS diagnosis codes that are selected. A registrar that underdiagnosed a patient will under report the ISS.

Total Number	22
Mean	46.09
Standard Deviation	3.19

Table 3:
Distribution of ICD
based ISS:
ASTR, 2013

If providers fail to document a diagnosis, an under reporting of an ISS may occur.

The correct AIS ISS was 48, the mean was 46.1. This measure was under reported but was within one standard deviation.

Percentile	AIS ISS
99%	48
75%	48
50th percentile	48
25%	41
Minimum	41

Table 4:
Percentile distribution
of AIS based ISS:
ASTR, 2013

Distribution of RTS and POS

Revised Trauma Score (RTS)

An RTS is based on a patient's vital signs (Glasgow Coma Score, Systolic Blood Pressure, and Respiratory Rate).

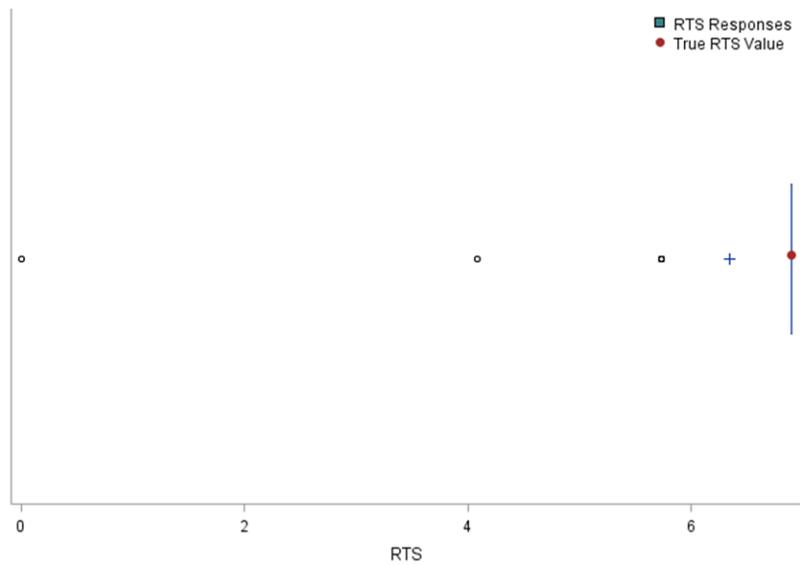


Figure 1:
Distribution of RTS:
ASTR, 2013

Probability of Survival (POS)

The POS is based on a patient's age, ISS, and RTS. Both RTS and POS are dependent on diagnosis codes and were used for insight in the IRR.

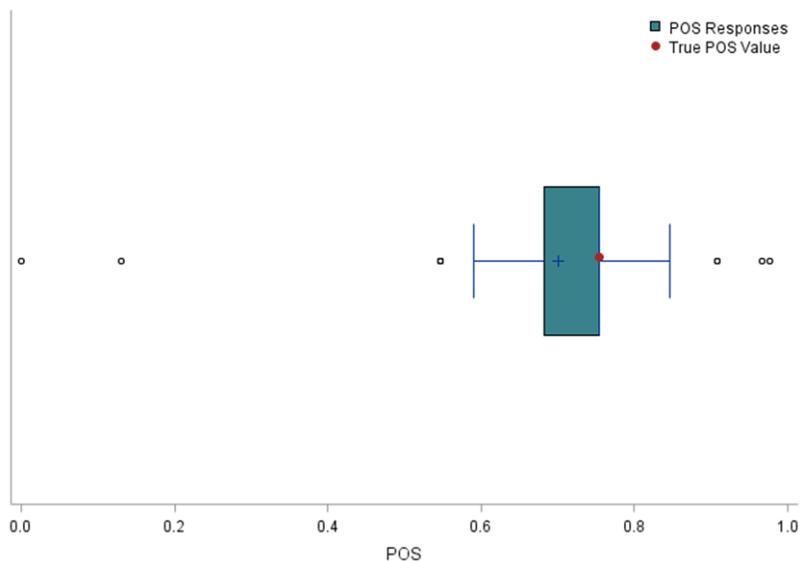


Figure 2:
Distribution of POS:
ASTR, 2013

Distribution of RTS and POS

Revised Trauma Score

Table 5:
Distribution of RTS:
ASTR, 2013

Total Number	26
Mean	6.35
Standard Deviation	1.46

The Emergency Department (ED) RTS is dependent upon a patient's systolic blood pressure, respiratory rate, and Glasgow Coma score.

Table 6:
Percentile distribution
of RTS:
ASTR, 2013

Percentile	RTS
99%	6.90
75%	6.90
50 th Percentile	6.90
25%	6.90
Minimum	0

The correct RTS was 6.9, the mean was 6.3. This measure was under coded but was within 1 standard deviation.

Probability of Survival

A POS is dependent upon Trauma Type, ISS (ICD-9), RTS in the ED, and a patient's age.

The correct POS was 0.754, the mean was .70. This measure was under coded but was within 1 standard deviation.

It is important to note that Trauma Registrars are trained to be more conservative in coding.

Total Number	26
Mean	0.70
Standard Deviation	0.22

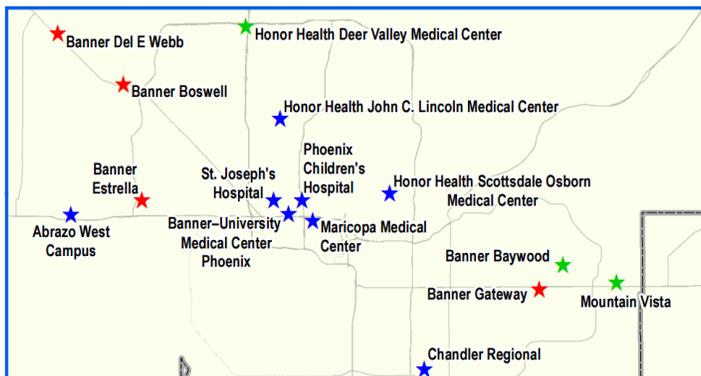
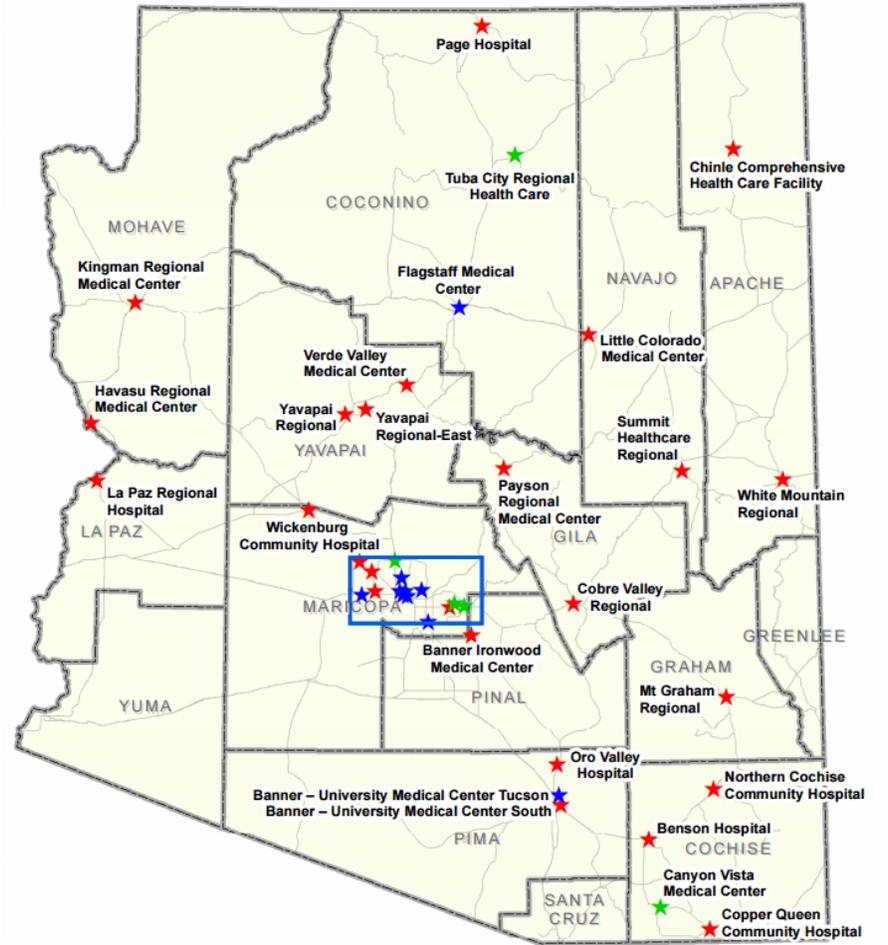
Table 7:
Distribution of POS:
ASTR, 2013

Percentile	POS
99%	0.976
75%	0.75
50 th Percentile	0.75
25%	0.68
Minimum	0

Table 8:
Percentile distribution
of POS:
ASTR, 2013

Appendix B.

DESIGNATED ARIZONA TRAUMA CENTERS



Trauma Centers

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

Map Date: June 2015

Data Source:
Bureau of EMS & Trauma System
Arizona Department of Health

Appendix C.

2013 Arizona Trauma Registry Inclusion Criteria

