



Division of Public Health Services

Office of the Assistant Director

Public Health Preparedness Services

Bureau of Emergency Medical Services and Trauma System

150 N. 18th Avenue, Suite 540
Phoenix, Arizona 85007
(602) 364-3150 / 1-800-200-8523
(602) 364-3568 FAX

JANICE BREWER, GOVERNOR
WILL HUMBLE, DIRECTOR

STATE TRAUMA ADVISORY BOARD (STAB)

Date: September 25, 2014 - **Time:** 9:00 A.M.

Location: 150 N. 18th Ave., Conference Room 215A & 215B

Conference Call: 1-877-820-7831 - **Code:** 450908#

iLinc URL: <https://azdhsems.ilinc.com/join/xcphsxt>

You must register prior to the meeting to join the web conference session.

AGENDA

- I. Call to Order – Ben Bobrow, MD
- II. Roll Call – Jennifer Herbert (24 Members, 13 required for quorum)
- III. Chairman’s Report – Ben Bobrow, MD
 - a. Attendance report (Attachment III.a.) and recommendations
 - b. Ethics and Loyalty Oath Status
 - c. New member, Judy Baum – Rehabilitation Specialist
 - d. 2015 Meeting Schedule (Attachment III.d.)
- IV. Bureau Report – Terry Mullins
 - a. Workgroups for Trauma Plan and Green/Orange Book
- V. Discussion and Action Items
 - a. Discuss, amend, approve STAB meeting minutes of May 29, 2014 (Attachment V.a.)
 - b. Discuss, amend, approve the AZ EMS PI Plan – Chris Salvino, MD (Attachment V.b.)
 - c. Discuss, amend, approve the 2014 STAB Annual Report - Vatsal Chikani, MPH (Attachment V.c.)
- VI. Reports
 - a. Trauma & EMS Performance Improvement Standing Committee – Chris Salvino, MD
 - b. Education Standing Committee – Mark Venuti
 - c. Protocols, Medications and Devices Standing Committee – Michael Pflieger, MD
 - d. U of A Center for Rural Health Initiatives – Joyce Hospodar, AZ Flex Program
 - e. DQA

Persons with disabilities may request reasonable accommodations such as a sign language interpreter, by contacting Donna Meyer, Administrative Assistant III, 602-364-3158; State TDD Number 1-800-367-8939; or Voice Relay Number 711. Request should be made as early as possible to allow time to arrange accommodations.

“Health and Wellness for all Arizonans”

- i. EMS Data Collection Coverage Map – Maureen Brophy, MPH
- ii. Quarterly Reports Update – Rogelio Martinez, MPH

VII. Agenda Items for Next Meeting

VIII. Call to the Public: A public body may make an open call to the public during a public meeting, subject to reasonable time, place and manner restrictions, to allow individuals to address the public body on any issue within the jurisdiction of the public body. At the conclusion of an open call to the public, individual members of the public body may respond to criticism made by those who have addressed the public body, may ask staff to review a matter, or may ask that a matter be put on a future agenda. Members of the public body shall not discuss or take legal action on matters raised during an open call to the public unless the matters are properly noticed for discussion and legal action. A.R.S. § 38-431.01 (G).

Members of the public body may present a brief summary of current events. Members of the public body shall not propose, discuss, deliberate, or take legal action on matters raised during a summary of current events unless the matters are properly noticed for discussion and legal action.

IX. Summary of Current Events

- a. October 6, 2014: Level 1 Trauma Center 8th Annual EMS Conference, St. Joseph’s Hospital, Phoenix, AZ
- b. November 13-14, 2014: AZTrACC, Talking Stick Resort, Scottsdale, AZ

X. Next Meeting: January 29, 2015 @ 9:00 AM in rooms 215A & 215B – 2nd Floor 150 Building

XI. Adjournment

*NOTE: The State Trauma Advisory Board may vote to enter into executive session. This executive session is authorized under A.R.S. § 38-431.03, Subsection (A), paragraph 2. The purpose of this executive session will be to review confidential trauma registry data, as authorized under A.R.S. § 36-2220, for evaluating trauma system quality assurance, trauma system quality improvement processes, and trauma system performance improvement plans in order to make recommendations to the Arizona Department of Health Services.

Persons with disabilities may request reasonable accommodations such as a sign language interpreter, by contacting Donna Meyer, Administrative Assistant III, 602-364-3158; State TDD Number 1-800-367-8939; or Voice Relay Number 711. Request should be made as early as possible to allow time to arrange accommodations.

“Health and Wellness for all Arizonans”

Committee Attendance Report

Attachment III. a

State Trauma Advisory Board

		Present	Tele	Absent
Anthony Rhorer	National Association of Orthopedic Trau			
	1/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/26/2013	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	1/23/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	5/29/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Bentley Bobrow	Chair/ADHS BEMS Medical Director			
	1/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bill Ashland	Local Regional Emergency Medical Servi			
	1/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Chris Salvino	Trauma Center Representative			
	1/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
David Notrica	Statewide Pediatric Organization Repres			
	1/19/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	4/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	1/23/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	5/29/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
David Ridings	Fire Department in a County with a Pop			
	1/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

State Trauma Advisory Board

		Present	Tele	Absent
David Ridings	Fire Department in a County with a Pop			
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debbie Johnston	Statewide Hospital Association Represe			
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	9/26/2013	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Garth Gemar	National Association of Retired Persons			
	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Iman Feiz-Erfan	Statewide Neurosurgical Society Repres			
	1/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	5/29/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Jeff Farkas	Statewide Fire District Association Repr			
	1/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jennefer Kieran	Federal Indian Health Services Organiza			
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kelly Silberschlag	Statewide Rehabilitation Facility Repres			
	1/23/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	5/29/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Laurie Wood	Urban Advanced Life Support BASE Hos			
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	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

State Trauma Advisory Board

Present Tele Absent

Laurie Wood	Urban Advanced Life Support BASE Hos			
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mark Venuti	Statewide Ambulance Association Repre			
	1/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Martyn Fink	Department of Public Safety Representa			
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	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Michael Pflieger	National Organization of Emergency Ph			
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	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Michelle Ziemba	Local Regional Emergency Medical Servi			
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Peter Rhee	Trauma Center Representative			
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Philip Johnson	Rural Advanced Life Support BASE Hospi			
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	4/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

State Trauma Advisory Board

Attachment III. a

Present Tele Absent

Philip Johnson	Rural Advanced Life Support BASE Hospi			
	9/20/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	5/29/2014	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Rodney Reed	Local Regional Emergency Medical Servi			
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	4/19/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Roy Ryals	Local Regional Emergency Medical Servi			
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	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scott Petersen	Statewide Org. Representing a National			
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	4/19/2012	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
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	5/29/2014	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Tina Tessay	Tribal Health Organization Representati			
	9/20/2012	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2/25/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/16/2013	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
	9/26/2013	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vicki Bennett	Society of Trauma Nurses Representativ			
	4/19/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	9/20/2012	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1/23/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	5/29/2014	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Bureau of Emergency Medical Services and Trauma System
2015 Statutory/Standing Committee Meetings**

Date	Time	Meeting	Conference Room
January 29, 2015	9:00 a.m.	State Trauma Advisory Board	215A & 215B – 2nd Floor 150 Bldg
January 29, 2015	10:30 a.m.	Emergency Medical Services	215A & 215B – 2nd Floor 150 Bldg
January 29, 2015	12:00 p.m.	Medical Direction Commission	215A & 215B – 2nd Floor 150 Bldg
March 19, 2015	9:00 a.m.	Trauma and EMS Performance Improvement (TEPI)	215A & 215B – 2nd Floor 150 Bldg
March 19, 2015	10:30 a.m.	Education Committee	215A & 215B – 2nd Floor 150 Bldg
March 19, 2015	12:00 p.m.	Protocols, Medications and Devices Committee	215A & 215B – 2nd Floor 150 Bldg
May 21, 2015	9:00 a.m.	State Trauma Advisory Board	215A & 215B – 2nd Floor 150 Bldg
May 21, 2015	10:30 a.m.	Emergency Medical Services Council	215A & 215B – 2nd Floor 150 Bldg
May 21, 2015	12:00 p.m.	Medical Direction Commission	215A & 215B – 2nd Floor 150 Bldg
July 16, 2015	9:00 a.m.	Trauma and EMS Performance Improvement (TEPI)	215A & 215B – 2nd Floor 150 Bldg
July 16, 2015	10:30 a.m.	Education Committee	215A & 215B – 2nd Floor 150 Bldg
July 16, 2015	12:00 p.m.	Protocols, Medications and Devices Committee	215A & 215B – 2nd Floor 150 Bldg
September 17, 2015	9:00 a.m.	State Trauma Advisory Board	215A & 215B – 2nd Floor 150 Bldg
September 17, 2015	10:30 a.m.	Emergency Medical Services Council	215A & 215B – 2nd Floor 150 Bldg
September 17, 2015	12:00 p.m.	Medical Direction Commission	215A & 215B – 2nd Floor 150 Bldg
November 19, 2015	9:00 a.m.	Trauma and EMS Performance Improvement (TEPI)	215A & 215B – 2nd Floor 150 Bldg
November 19, 2015	10:30 a.m.	Education Committee	215A & 215B – 2nd Floor 150 Bldg
November 19, 2015	12:00 p.m.	Protocols, Medications and Devices Committee	215A & 215B – 2nd Floor 150 Bldg

DISCLAIMER: “Meeting schedule subject to change upon the request of the Governor’s Office or the Office of the Director. Should this occur, the Bureau will make all reasonable efforts to contact the affected members as soon as feasible.”

Trauma Plan Progress Assessment, September 2014

Goal 1: System Leadership					
Objective 1.1: Diversify to provide more inclusive statewide STAB representation.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Increase rural trauma representation.	The addition of two more rural trauma members:	ADHS	STAB	2014	This would require a statutory change
	1. Trauma surgeon				
	2. Trauma coordinator from a designated trauma center.				
Objective 1.2: Require electronic data submission of all EMS agencies including ground and air services.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Implement limits on the number of reappointments for STAB members.	Track and publish meeting attendance and participation.	ADHS	STAB	Ongoing	1: Each meeting has a verbal roll call. 2: Each meeting packet includes an attendance report 3: Bylaw have been amended to tighten attendance requirements 4: Staff have contacted members that have missed more than 2 consecutive meetings and will present responses to STAB in September
Objective 1.3: Develop a Trauma Program Managers Group.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Regularly convene and empower a Trauma Program Managers Group.	Participation of urban and rural trauma managers.	ADHS CFRH	Trauma Managers	Ongoing	Trauma Program Managers Workgroup is jointly sponsored by BEMSTS and UA Center for Rural Health Meeting 1: University of Arizona Medical Center 7/20/2013 Meeting 2: Flagstaff Medical Center 11/15/2013 Meeting 3: Banner Good Samaritan Medical Center 3/21/2014 Meeting 4: Scottsdale Osborn 7/18/2014 Meeting 5: Scheduled for 11/21/2014 at St. Joe's Phoenix
Goal 2: System Development/Integration					
Objective 2.1: Build and improve a tiered integrated trauma system.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Increase Level III and Level IV trauma centers in rural/tribal areas.	Number of Level III and Level IV designated trauma centers.	ADHS CFRH	Statewide trauma centers & AZTrACC	Ongoing	1: Have added Safford, Payson and Prescott (2) and Globe as level IV. 2: Tuba City Regional Medical Center has applied for Level III verification. 3: BEMSTS staff met with Western Region Hospital Administrators (Yuma) in the fall, in an effort to renew interest in Level III designation. 4: BEMSTS staff met with Sierra Vista Hospital to discuss trauma designation 5: The Center for Rural Health continues to support Critical Access Hospital participation in trauma system
	Move towards all rural/tribal hospitals becoming Level IV Trauma Centers.				
	Recruit key rural hospitals to serve as regional level III trauma centers				
Objective 2.2: Establish guidelines for regional trauma care.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Improve system integration including prevention, capacity, communication and referral capabilities.	Reduction in incidence of traumatic injuries as well as over and under trauma triage.	ADHS	All level trauma centers and acute care hospitals, EMS Regions	Ongoing	1: Initiated and continue to support PI Project targeting (1) ED dwell times, (2) late transfers after admission (3) transfers to non trauma centers (4) enhancing cost recovery for trauma team deployment. 2: Queried databases to pull over/under triage data for Arizona Over/Under Triage Target workgroup. 3: Published first Regional EMS and Trauma Report (http://azdhs.gov/bems/data/quality-assurance-reports.php?pg=county-regional) 4: Additional level I trauma centers now offering RTTD Course 5: SAEMS and NAEMS maintain regional trauma subcommittees

Objective 2.3: Improve trauma training to all level providers statewide.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
<p>Provide rural trauma education, including pediatric, geriatric, and burn populations, to surgeons, emergency physicians, nurses and EMCTs.</p> <p>Assign additional support for RTTDC coordinator.</p>	<p>Number of training sessions.</p> <p>Increase in Level I trauma center involvement.</p> <p>Number of RTTDCs</p>	Level I trauma centers	Regional EMS councils, Trauma Centers, EMS agencies	Ongoing	<p>1 - Good Samaritan, FMC, CRMC and UMC are certified to teach and have taught the RTTDC course. In 2013, 6 courses were taught. As of 5/23/14, 7 RTTDC were taught as per ACS.</p> <p>2- JCL staff sharing G60 program concept with hospitals and and pre-hospital partners through the state</p> <p>3 - ADHS PACES Program continues to provide funds to each of the four EMS Regions to support pediatric education</p> <p>4 - AEMS, NAEMS and SAEMS sponsor pediatric EMS conferences</p> <p>5 - Maricopa Medical Center with American Academy of Pediatrics are providing western Arizona hospitals and EMS agencies with pediatric outreach for the next two years.</p> <p>6 - ADHS Bureau of Public Health Emergency Preparedness (PHEP) continues to support the Arizona Burn Network with grant funds</p>
Goal 3: Prehospital Care & Transport					
Objective 3.1: Maximize the effectiveness of regionalized trauma triage.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
<p>Define regional scene and inter-facility transport protocols directing patients to the most appropriate level hospital and trauma center by the most appropriate mode.</p>	<p>Over and under trauma triage rates.</p> <p>Pass non-punitive EMS trauma destination protocols that take into account EMS Region variations and resources</p>	ADHS, TEPI	Regional EMS Councils,	Ongoing	<p>1 - On July 14, 2014 the Over/U.nder Triage Target workgroup met to review data, a second meeting scheduled for September</p> <p>2 -SAEMS is in the process of updating their destination and triage protocols</p> <p>3- AEMS has updated its triage protocols to take into account level III trauma centers.</p> <p>4 - the EMResource has been updated to record new level III trauma center designations.</p>
Objective 3.2: Better inclusion of EMS data in the Arizona State Trauma Registry (ASTR).					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
<p>Require electronic data submission of all EMS agencies including ground and air services.</p> <p>Confirm data for trauma triage elements.</p> <p>Provide regionalized prehospital trauma reports.</p>	<p>Proportion of trauma events in the ASTR with complete pre-hospital data.</p>	ADHS, TEPI, Regional EMS Councils	EMS Agencies, EMSC, MDC	2018	<p>1 - Data submission is NOT mandatory. While AZPIERS is voluntary, as of June 25, 2014 the database contains 568,999 electronic patient care records. 82 EMS agencies participate (22% of all EMS agencies, 45% of all CONS) for an average of 34,000 records a month (out of 85,000 potential estimated/month).</p> <p>2 - ASTR: For 2013, we received complete run sheets 31.5% of the time for EMS ground and 37.3% of the time for EMS air</p> <p>3- AZ-PIERS Data Dictionary has specific trauma triage elements http://azdhs.gov/bems/documents/data/PIERS/az-piers-data-dictionary-2014.pdf</p> <p>4- Individual and aggregate trauma reports are provided to each AZPIERS agency quarterly http://azdhs.gov/bems/documents/data/quality-assurance/14-1-ems.pdf</p> <p>5: EMS trauma triage decisions are poorly recorded and or imported into AZ-PIERS. The revised AZ Data Dictionary should enhance the value of these elements</p>
Strategy	Measure(s)	Lead	Partners	Timeline	Status
<p>Modify current certification requirements to include mandatory age specific continuing education.</p>	<p>Implementation of standards for prehospital trauma education.</p>	ADHS, Regional EMS Councils	<p>EMSC, Education Committee,</p> <p>Training Programs,</p> <p>Trauma Centers</p>	2015	<p>No new action has been taken on this topic. Current statute/rule requirements follow the national standards on EMS education. Those standards cover special populations. Each medical director may also require additional specific training to meet the needs of the community.</p>
<p>Develop event calendar/web references of available trauma education from all trauma centers and other sources.</p>		ADHS, Regional EMS Councils	<p>Trauma Centers</p> <p>Training Programs</p> <p>Regions</p>	Ongoing	<p>Done: http://azdhs.gov/bems/documents/trauma/az-trauma-care-educational-opportunities.pdf</p>

Objective 3.4: Develop a central communication system to facilitate field-to-facility, inter-facility, and all-hazards response communication.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Gap analysis to identify opportunities to improve the communication system.	Analysis of communication system.	ADHS	ADOA Public Safety Interoperability Communications	2015	This will be a long-term issue, several projects are underway. New opportunities (Arizona First Net, a national EMS broadband platform) exist or are planned. BEMSTS and PHEP monitor/participate in statewide meetings.
Identify funding.	Funding search.	ADHS Emergency Preparedness		2015	

Goal 4: Special Populations

Pediatric

Objective 4.P.1: Development of a pediatric specific injury report.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Create a pediatric trauma report.	Pediatric injury, incidence, process, and outcome report (exclusive of drowning, poisonings, and strangulation).	EMSC, ADHS utilizing the trauma registry report	PACES	2014	BEMSTS has not created a specific report for pediatric trauma.

Objective 4.P.2: Outline roles and responsibilities of definitive pediatric care facilities.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Expansion of existing pediatric prepared emergency care (PPEC) program.	Increased level of participation.	AzAAP	AzAAP Hospitals	Ongoing	1: Maricopa Medical Center with American Academy of Pediatrics are providing Western Arizona with pediatric outreach for hospitals (including tribal) and EMS for the next two years. 2: There are currently 18 facilities that have been verified with 5 scheduled. This represents. Based on 2013 emergency dept volume data- 62% of children treated in AZ ED's are now being seen in an ED that participates in Pediatric Prepared Emergency Care.

Objective 4.P.3: Develop Pediatrictrauma triage protocols

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Evaluate existing pediatric trauma protocols and data including those critically injured.	Evaluate over and under pediatric triage.	ADHS, EMSC, Regional EMS Councils	STAB	2015	1 -On July 14, 2014 the Over/Under Triage Target workgroup met to review data, a second meeting scheduled for September.
Development of recommendations for which patients require transport to the closest facility.	See Objective 3.1 (2)		TEPI, Trauma Registrars, Trauma Centers		SAEMS and AEMS have both recently revised their protocols to accommodate new trauma centers.

Objective 4.P.4: Comprehensive assessment of pediatric trauma beds within the system.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Query state license for number of all pediatric trauma beds.	Number of pediatric trauma beds.	ADHS, AzHHA, EMSC	PACES	2014	PACES has focused on medical not trauma beds.

Objective 4.P.5: Lower the pediatric injury mortality rate by 20% in 2 years.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Track epidemiology.	Pediatric mortality rate.	Pediatric Trauma Centers	Safe Kids, EMS for Children, Office of Injury Prevention for DHS	2018	PACES and the ADHS' Office of Injury Prevention are both monitoring pediatric injury and are supporting comprehensive injury prevention programs across the state. All level I trauma centers have injury prevention programs, and most include pediatrics.
Institute effective injury prevention and outreach.					

Geriatrics

Objective 4.G.1: Incorporate use of American College of Surgeons Committee on Trauma geriatric guidelines for outcome data collection.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Expand ASTR inclusion criteria and include the following data element to be submitted to the ASTR.	Length of stay	ADHS	Trauma centers	2014	1 - BEMSTS reports on some of these measures routinely, but not specifically for the geriatric population. 2 - Changes to inclusion criteria require rule change - a rule writing moratorium is in place.
	Mortality and morbidity				
	ED dwell time				
	Time to OR				
	Ground level falls with extremity fractures				

Objective 4.G.2: Improve timely discharge of geriatric patients to appropriate rehabilitation facility.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Partner with Rehabilitation Centers.	Timely discharge to rehabilitation facility.	ADHS	Rehabilitation hospitals, Trauma centers, AzHHA	2014	BEMSTS has asked facilities to voluntarily submit FIM scores. Lancet has created FIM data elements for admission and discharge. To date, these have not been reported.

Burns

Objective 4.B.1: Incorporate American Burn Association burn collection data.						Attachment IV. a.
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Include the following burn injury data elements into the ASTR.	Incidence	ADHS, TEPI, TRUG	Burn center directors	2015	Current rule (inclusion criteria) excludes burns without other injury. This would require a change to rule.	
	Etiology					
	Geographic distribution					
	Length of stay					
	Mortality					
Objective 4.B.2: Develop statewide burn triage and transfer plan.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Develop burn triage and transfer criteria based upon American Burn Association (ABA) guidelines.	Burn over and under triage.	ADHS, Burn center directors	Trauma centers and burn centers	2015	1: This has not been accomplished. 2: SAEMS has updated their regional protocol to take into account the UMC burn program.	
Objective 4.B.3.: Promote effective disaster management, including surge capacity, at the state level using existing comprehensive burn disaster network.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Incorporate current Arizona burn disaster network into the trauma disaster plan. Review and modify AZ burn disaster network plan.	AZ Burn Disaster Network Plan developed by the AZ Burn Center	ADHS,	Trauma staff and the planning team	Ongoing	PHEP continues to support the Arizona Burn Network. It also partners with Maricopa Medical Center and other hospitals and EMS agencies in exercises.	
	Number trained and retrained	PHEP,				
	Number of supplies to burn centers	Burn center directors				
Goal 5: Injury Prevention						
Objective 5.1: Reduce injury related morbidity and mortality through primary injury prevention.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Strengthen and coordinate statewide trauma center primary injury prevention programs.	Trauma Center site surveys	ADHS	Trauma Center survey teams, Trauma Centers, EMS agencies, EMSC, Safe Kids Coalitions	Ongoing	1: Ongoing trauma manager workgroups supporting development of PI/Injury Prevention capacity in level IV trauma centers. 2: A TOPIC Course was held in August of 2014 3: ADHS' Office of Injury Prevention meets regularly but not all AZ trauma centers participate.	
	Office of Injury Prevention report					
Objective 5.2: Improve rural injury prevention.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Identify high leverage rural injury events.	Specific rural trauma issues identified in the ASTR.	ADHS	Trauma Centers, IPAC, Safe Kids Coalition, MADD	Ongoing	1: BEMSTS has not been able to accomplish the Rural highway EMS Resource Assessment project, but plans to accomplish it in 2015. 2: There was broad representation of the EMS and trauma community of the Starategic Highway Safety plan. 3: BEMSTS has not specifically reported on rural injury epidemiology.	
Disseminate these data to the rural trauma prevention community.	Rural Highway EMS Resource Assessment Projects		DUI Courts, SBIRT, Fall Prevention	July 2014 - ongoing		
Coordinate primary prevention activities of the rural trauma centers.			GOHS			
Objective 5.3: Coordinate the implementation of this Trauma Plan with the 2012-2016 Arizona Injury Prevention Plan.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Coordinate with the IPAC.	Degree of the implementation of the Arizona Injury Prevention Plan.	ADHS	IPAC, OIP, Trauma Centers and EMS providers	Ongoing	1: Trauma System website updated to include Injury Prevention resources. 2: CDC Injury Prevention 101 course featured on Trauma System website with link to training. 3: ADHS' Office of Injury Prevention is mentoring new trauma center Injury prevention coordinators	
Make the Injury Prevention 101 course available to trauma center staff. (www.safestates.org)						
Objective 5.4: Facilitate linkage between trauma centers and state and local primary injury prevention programs.						
Strategy	Measure(s)	Lead	Partners	Timeline	Status	
Establish collaborations focused on fall-related injury prevention.	Representation of falls coalition within trauma centers.	ADHS	Trauma Centers, OIP, Office of Chronic Disease, EMS	Ongoing	1: Falls were widely reported in the 2013 Annual Report. http://azdhs.gov/bems/documents/reports/2013-stab-annual-report.pdf 2: BEMSTS collaborated with Healthy Aging Program to develop fall infographics 3: Banner Healthcare instituted the Matter of Balance program	
	Incidence and mortality due to falls reported in the annual trauma report.					

Objective 5.5: Initiate and implement a statewide burn prevention program focusing on the common causes of burn injuries.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Implement American Burn Association prevention programs.	Documentation of prevention programs	Burn Center Director	AZ Burn Found.,	Ongoing	No progress has been made on this topic.
	Annual review of burn etiologies		Maricopa Health Foundation, ADHS		
	Number of programs, interventions, outcomes				
Goal 6: Medical Rehabilitation					
Rehabilitation					
Objective 6.1: Integrate trauma center, inpatient rehabilitation facilities, and long term acute care hospitals statewide.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Develop a model for incorporating medical rehabilitation facilities into the state trauma system.	1. Convene a task force to formally assess the current trauma rehabilitation status.	ADHS	Rehabilitation Centers, Trauma Centers, Task Force	2015	No progress has been made on this topic.
	2. Identify nationally recognized standards and processes.				
	3. Assess feasibility of establishing standards and designation in Arizona.	Task Force			
Objective 6.2: Ensure adequate medical rehabilitation services are available to meet the needs of trauma patients throughout the state.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Integrate Rehabilitation data elements into the ASTR.	Analysis of rehabilitation care through the ASTR.	ADHS	STAB, TRUG	2014	BEMSTS has asked facilities to voluntarily submit FIM scores.
Conduct a survey of current medical rehabilitation resources, including availability of specialty beds within the state.	Assessment results.	ADHS	OMFL at ADHS; providers; AzHHA	2015	No progress has been made on this topic.
Ensure transfers to medical rehabilitation facilities is determined based upon patient criteria and services provided by the facility.	3. Develop document identifying criteria for appropriate admission to rehabilitation facility.	STAB	Providers, AzHHA	2014	No progress has been made on this topic.
Objective 6.3: Efficient transfer of patients between trauma centers and medical rehabilitation facilities.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Remove financial barriers to efficient patient transfers.	Data on transfers to rehabilitation services.	ADHS	AHCCCS, Health Plans/Carriers, AzHHA	2015	No progress has been made on this topic.
	Development of reimbursement policies.	STAB			
	Develop advocacy strategy.				

Acute-Stress Recovery (ASR)

Objective 6.ASR.1: Perform SWOT analysis.

Attachment IV. a.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
<p>Develop an ASR tool to assess resources available for victims and families post trauma.</p> <p>Identify and disseminate best practices.</p> <p>Collaborate with regional behavioral health authorities</p>	Creation of the post-trauma ASR tool.	ADHS Division of Behavioral Health Services	State Trauma/EMS regions. Behavioral health partners, Social Work, Case Management community agencies	2015	No progress has been made on this topic.

Objective 6.ASR.2: Develop resources to assist EMS Agencies and Trauma Centers with ASR.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Develop and disseminate the trauma plan to community partners involved with ASR.	Education to regional ASR stakeholders.	ADHS	Community partners identified in the SWOT analysis and STAB.	2016	No progress has been made on this topic.

Goal 7: Trauma System Evaluation

Objective 7.1: Significantly reduce the injury mortality rate in the state of Arizona.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Iterative measurement, evaluation, and publication of the incidence and outcomes of traumatic injuries in Arizona.	Assessing factors related to rural/urban, blunt/penetrating, age, transportation method and time, and level of hospital care through the ASTR.	ADHS	STAB, AZTrACC,	Ongoing	This is being accomplished as a component of the annual, quarterly and regional/county reports.
Seek partnerships to increase access to trauma care in rural Arizona	Assess the ASTR and HDD to assess delays in transfers, transfers after admission, deaths in non-trauma centers and improve trauma billing efficiency	CFRH	EMS Regional Councils, Level I Trauma Program Managers	3 to 4 times per year	Baseline data have been collected. Intervention and training has been undertaken and further data collection to assess progress are underway.

Objective 7.2: Perform a biennial review benchmarking the objectives and progress towards the goals in the State Trauma Plan.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Perform mid-course assessments of the trauma plan assessment on a yearly basis	Annual STAB workgroup report	ADHS	STAB	Annually, beginning in 2014	This is the first step in that process. A workgroup will be asked to identify priorities for next year and to assist in accomplishing them.

Objective 7.3: Evaluate urban and rural regional mode of transportation and transport times.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Identify audit filters for appropriate utilization for mode of transport and transport times for trauma patients.	Review transportation times in regional aggregate.	TEPI	EMS	2014	<p>1: BEMSTS is currently performing an in-depth assessment of the causes of prolonged ED dwell times. The preliminary results should be available this fall.</p> <p>2: On July 14, 2014 the Over/Under Triage Target workgroup met to review data, a second meeting scheduled for September.</p>
	Evaluation of transport time: Time call received to dispatch, dwell times at sending hospital, arrival at tertiary care facility.				

Objective 7.4: Establish a monitoring and evaluation system for the Trauma Plan.

Strategy	Measure(s)	Lead	Partners	Timeline	Status
Develop a system for measuring implementation and impact of the Trauma Plan.	Timely access to trauma care	ADHS	All trauma stakeholders	Ongoing	<p>1: BEMSTS is willing and able to develop specific reports. We have significant on-going reporting requirements (quarterly reports for each trauma center and EMS agency that submits data, an annual STAB report as well as ad-hoc reports) so we request that this be coordinated via TEPI.</p> <p>2: Most of these measures are folded into one or more of the existing reports. Care must be taken to avoid dilution of efforts.</p>
	Preventable deaths				
	Overall mortality				
	Preventable morbidity				
	Time to transfer				
	Transfer after admission				
	ED dwell times pre-transfer				
Length of stay in hospital					
Trauma billing efficiency					

Objective 7.5: Require annual review of local EMS QI activities					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Require all EMS agencies to submit an annual QI plan with quarterly reporting to BEMSTS.	% of participation.	ADHS	Regions, EMS Agencies, EMSC, MDC	2018	1: While AZPIERS is voluntary, as of June 25, 2014, the database contains 568,999 records. 82 EMS agencies participate (22% of all EMS agencies, 45% of all CONs) for an average of 34,000 records/month. 2: A workgroup has finished an EMS PI Plan that will be submitted for approval at the July 2014 TEPI meeting. Once approved, it will be distributed to all EMS agencies in AZ. 3: Agencies that have committed to be Premier EMS Agencies must review 100% of all STEMI, Stroke, OHCA and Trauma cases, have a PI coordinator and have agency Administrator buy-in and committment. (http://azdhs.gov/bems/data/PEAP.htm)
Develop rules and guidelines for submission.					The EMS Registry users Group (modeled after the Trauma Registry Users Group) developed the Arizona EMS Data dictionary and submission requirements.
Define trauma specific indicators necessary for EMS to report.	Obtain data from Premier EMS Agency registry.	ADHS	Regions, EMS Agencies, EMSC, MDC	2018	1: The first EMS trauma report was published this year (http://azdhs.gov/bems/documents/data/quality-assurance/14-1-ems.pdf) 2: A23.
Goal 8: Statutory Authority/Administrative Rules/Funding					
Objective 8.1: Increase statutory authority to regulate the Arizona trauma system.					
Strategy	Measure(s)	Lead	Partners	Timeline	Status
Amend current trauma system statutes and rules.	Design trauma center needs criteria for new and existing trauma centers, as well as performance benchmarks and standards of care.	ADHS	Trauma centers, System stakeholders	Ongoing	No progress has been made on this topic.
	Change trauma center funding legislation and evaluate alternative trauma funding strategies to include all trauma centers.				No progress has been made on this topic. This would require a change to statute and/or rule.
Identify evidence based guidelines to increase trauma funding.	Appoint a State Trauma Medical Director with trauma surgical expertise based upon feasibility.				No progress has been made on this topic.
	Establish State pediatric trauma center verification and designation levels.	No progress has been made on this topic. This would require a change to statute and/or rule.			
	Establish State burn center verification and designation levels.	No progress has been made on this topic. This would require a change to statute and/or rule.			

STATE TRAUMA ADVISORY BOARD (STAB)

May 29, 2014 - 9:00 A.M.

150 N. 18th Ave., Conference Room 215A&B

Meeting Minutes - DRAFT

Present

Ben Bobrow
 Bill Ashland
 Chris Salvino
 David Ridings
 Debbie Johnston
 Garth Gemar
 Jeff Farkas
 Jennefer Kieran
 Laurie Wood
 Mark Venuti

Michael Pflieger
 Michelle Ziemba*
 Peter Rhee
 Philip Johnson*
 Rodney Reed
 Roy Ryals
 Scott Petersen*
 Vicki Bennett

*indicates teleconference

Absent

Anthony Rorer
 David Notrica
 Iman Feiz-Erfan
 Kelly Silberschlag
 Peter Rhee
 Martyn Fink
 Tina Tessay

- I. Call to Order – Ben Bobrow, MD at 9:03 AM.
- II. Roll Call – Jennifer Herbert (24 Members, 13 required for quorum). A quorum was present
- III. Chairman’s Report – Ben Bobrow, MD
 - a. Attendance report reminder
 - b. Welcome new Federal Indian Health Services Organization Representative: Jennefer Kieran, MD, from Phoenix Indian Medical Center
 - c. Parliamentary considerations
 - d. Normal saline shortage discussion
- IV. Bureau Report – Terry Mullins
 - a. Progress report on ACS Recommendations and Trauma Plan projects. Plan to develop workgroups to address the following:
 - i. Trauma Plan progress report
 - ii. Develop a crosswalk of the ACS Green vs. Orange book
 - iii. Develop Arizona over and under triage targets
 - b. Impact of new ACS Orange Book
- V. Discussion and Action Items
 - a. Discuss, amend, approve STAB meeting minutes of January 23, 2014. Mark Venuti made the motion to approve the minutes as presented, seconded by Roy Ryals. The minutes were approved and the **motion carries**.
 - b. Approve the revised STAB Bylaws. Debbie Johnston made the motion to approve the bylaws, seconded by Rod Reed. A discussion ensued and the friendly amendment to change the wording to Article VII was proposed by Scott Peterson. The **motion carries** with the friendly amendment.
- VI. Reports
 - a. Trauma & EMS Performance Improvement Standing Committee – Chris Salvino, MD
 - b. Education Standing Committee – Mark Venuti
 - c. Protocols, Medications and Devices Standing Committee – Michael Pflieger, MD

- d. U of A Center for Rural Health Initiatives – Joyce Hospodar, AZ Flex Program
 - e. DQA – Rogelio Martinez, MPH
 - f. Prehospital Guideline for External Hemorrhage – Terry Mullins
 - g. Evidence Based Guidelines – Toni Gross, MD
- VII. Agenda Items for Next Meeting: Have PMD consider the new Prehospital Guideline for External Hemorrhage for the TTTG.
- VIII. Call to the Public: Chris Salvino, MD, indicated the importance of determining the new guidelines in the updated ACS Orange Book, as it may be time sensitive.
- IX. Summary of Current Events
- a. EMS Odyssey, June 5-6, 2014 – Desert Willow Conference Center, Phoenix, AZ
 - b. Southwest Regional Trauma Conference, July 31-August 1, 2014 – JW Marriott Tucson Starr Pass Resort & Spa, Tucson, AZ
 - c. AZTrACC, November 13-14, 2014 – Talking Stick Resort, Scottsdale, AZ
- X. Next Meeting: September 25, 2014, 9:00 AM at 150 N. 18th Ave., Conference Room 540A
- XI. Adjourned at 10:03 AM

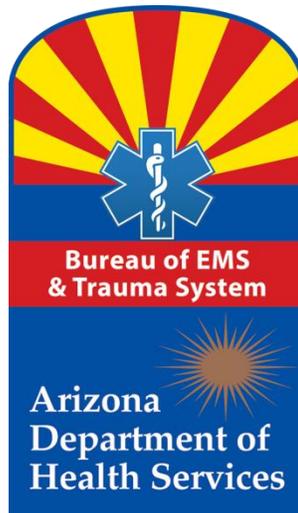
Approved by STAB
Date:

VISITORS PLEASE SIGN IN

STAB MEETING

DATE - May 29, 2014 @ 9:00 A.M.

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18			



Arizona Department of Health Services Bureau of EMS and Trauma System EMS Agency Performance Improvement Plan Manual



Approved by TEPI: July 17, 2014

Pending Approval from STAB, MDC, EMS council in September 2014

We would like to acknowledge the efforts of the following individuals who were responsible for preparing this resource:

Chair: Mary McDonald, RN, BSN

Tucson Fire Department

Brian Smith, EMT-P

Flagstaff Medical Center

Glenn Kasprzyk

Life Line Ambulance

Jill McAdoo, RN

Life Line Ambulance

Josh Gaither, MD

University of Arizona Medical Center

Kevin Burkhardt

Southwest Rural/Metro

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Banner Goldfield Medical Center

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Northwest Fire/Rescue District

With staff support from:

Rogelio Martinez, MPH

Data and Quality Assurance Section Chief

Bureau of EMS and Trauma System

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Purpose

The purpose of this EMS Performance Improvement manual is to assist agencies in identifying improvements in care; implementing loop closure for Quality Improvements (QI); improving patient outcomes through an achievable system of support and education for agencies and providers.

EMS Performance Improvement Plan

An EMS Performance Improvement Plan will drive the performance of providers to patients in the pre-hospital environment. It will be used in the EMS community to implement and monitor best practices, allow for collaboration with stakeholders, and lead to high functioning care in every patient contact in the state of Arizona.

The goal of the plan is to provide effective, safe, cost-beneficial, patient-focused, pre-hospital medical and trauma services to those presenting to the EMS System. Programs should focus on quality improvement; education and training; effective healthcare delivery systems; public education and prevention programs; and developing strong working relationships with other community partners. *A presentation of the EMS continuum of care in a patient interaction is presented in Appendix A.*

Examples of Performance Improvement Objectives

- Improve pre-hospital care in my agency for patients with Out-of Hospital Cardiac Arrest
- Improve pre-hospital care in my agency for patients with stroke
- Improve pre-hospital care in my agency for patients with major trauma
- Improve pre-hospital care in my agency for patients with ST-segment Elevation Myocardial Infarction (STEMI)

Definitions

- Performance Improvement - A system that improves the execution or accomplishment of its intended purpose.
- Process Improvement - A measurement technique that analyzes a series of actions to improve its effectiveness or efficiency
- Quality Improvement - A system that improves the overall quality of a product or service
- Quality Assurance - A system that ensures a desired level of quality in the development, production, or delivery of products and/or services.
- Loop Closure - Demonstrating that a corrective action has the desired effect as determined by continuous evaluation. Although some process loops may never be completely closed, all initiatives should demonstrate the continuous pursuit of performance improvement and patient safety.

Beginning a Performance Improvement Plan

Ideally, an agency should identify the goals of their agency PI plan prior to any data collection, analysis, or PI implementation. The process should begin with an identification of evidenced based criteria, standardization in data collection, proper selection of analytical methods, and most importantly timely loop closure of any proposed changes.

For agencies that are unable to purchase their own ePCR software, the [Arizona Pre-Hospital Information & EMS Registry System](#) offers FREE software and assistance in the implementation of this process.

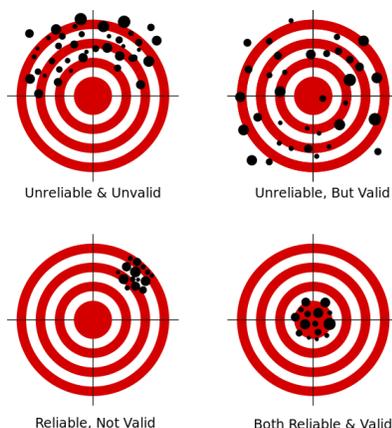
Data Collection

The data collection process should be part of daily operations in EMS care. Data collection is done by providers in the field, reviewed by managers, and used by organizational leadership to drive decisions. Information that is gathered should be done in a purposeful, reliable, and standard format, preferably with an electronic patient care reporting (ePCR) system. It is essential to note that a performance improvement program should not be a punitive process. A proactive, multi-disciplinary effort will improve patient care significantly.

Everyone, whether it is one individual or a set of assigned EMS personnel, should be interpreting the documentation on the electronic Patient Care Report (ePCR) in a similar fashion using a QA tool that has definitions for each criteria being audited. Interpretation of data gathering should not be dependent on individual discretion. An elaborate web-based system will not be of use, if incoming data is flawed. Collection of data should be weighted (scored) and consistent across patient encounters.

There are three distinct concepts in the data collection process; validity, reliability, and accuracy. Additional data definitions are presented in Appendix B.

Figure 1: Data concepts



Validity- the extent to which a measurement captures what it is supposed to measure. Example: Does an EKG interpretation identify a ST-elevation Myocardial Infarction?

Reliability- the extent to which a measurement tool can be repeated and yield repeatable results. Example: Does an automated blood pressure device provide measurements that are consistent?

Accuracy- the extent to which the measurement represents the true value. Example: The comparison of a field blood glucose monitor to a lab value obtained at a hospital.

Data Analysis

The process of data analysis can take many different forms. The [Premier EMS Agency Program \(PEAP\)](#) requires that 100% of runs with STEMI, Stroke, Out of Hospital Cardiac Arrest (OHCA), and major trauma are reviewed. Agencies can work with their base hospital, Medical Direction Authority, and/or quality assurance officers to establish their protocols and procedures for criteria audit filters, trends, performance, and other useful information in your agency. Agencies should strive to benchmark their services and outcomes against others to understand how they compare against similar agencies. Regular, [quarterly reports](#) are sent to agencies that participate in AZ-PIERS that include benchmarked information on confirmed cases of STEMI, stroke, OHCA, and Major Trauma.

PI Implementation

The remainder of this manual identifies the PI implementation process. The individuals internal to the agency are identified along with the processes and examples. **This is the most difficult part of any system and requires constant attention; done correctly this will allow for agencies to determine best practices for their individual agencies.**

Individuals Involved

Role of Organizational Leadership

Performance Improvement requires absolute commitment from Organization Leadership in order to succeed. These individuals could be the Chief Executive Officer, Fire Chief, Medical and Operations District Management Teams or President of an organization. Organization Leadership, which includes Medical Direction, should provide the authority and direction to their personnel to have an honest, non-punitive approach to resolve issues with processes.

Role of Medical Director

A Medical Director provides guidance, leadership, and oversight over all prehospital practice. An EMCT in the field serves as an extension of the Medical Director in an organization. In addition to providing medical direction they MUST identify critical criteria for performance improvement, and delegate to the Educator/Training Department to establish the tools to achieve the desired results. Medical Directors also establish protocols, policies, and procedures that guide patient care.

Role of Quality Assurance Team/Manager

Individual(s) will be designated with the role and responsibility for performance improvement. This individual(s) is a person in direct and constant communication with the designated liason for medical direction. This role should ensure that there is timely loop closure and see themselves as directly supporting the providers in their day-to-day role. Lastly, this role should

work with receiving facilities to obtain patient outcomes in a timely fashion that ultimately drive care.

Role of EMS Educator

EMS Educators should work to establish and implement best practices within all aspects of the department/company training program. These individuals must be able to gather and identify community and organizational resources that lead to improvement in care. EMS educators should work with the QA team to reinforce evidence based education or training.

Role of Emergency Medical Care Technician (EMCT)

The role of the EMCT includes providing excellent care and documentation for their patients using best practices. EMCTs should proactively look for feedback from their agencies to improve the care they provide in the field. EMCTs are essential to implementing changes as guided by their agency’s PI plan. Additionally, EMCTs in an organization need to be aware of the goals and mission of the agency to ensure success of the program.

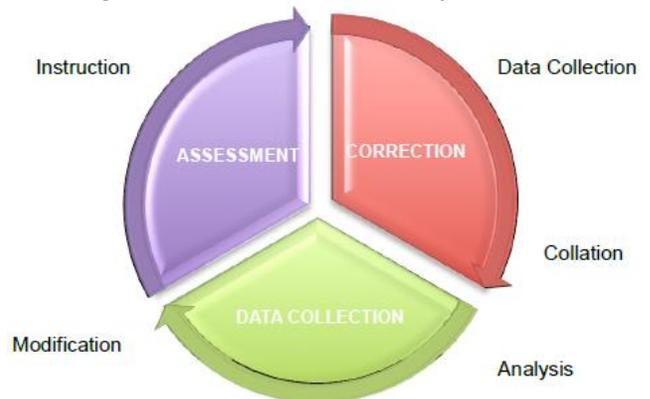
Implementation of a PI Program

A performance improvement plan consists of a foundation in data collection, identification of potential issues, and continuous surveillance of processes. Figure 2 and 3 are two examples of the merger in these principles.

Figure 2: Systems Management in Public Health

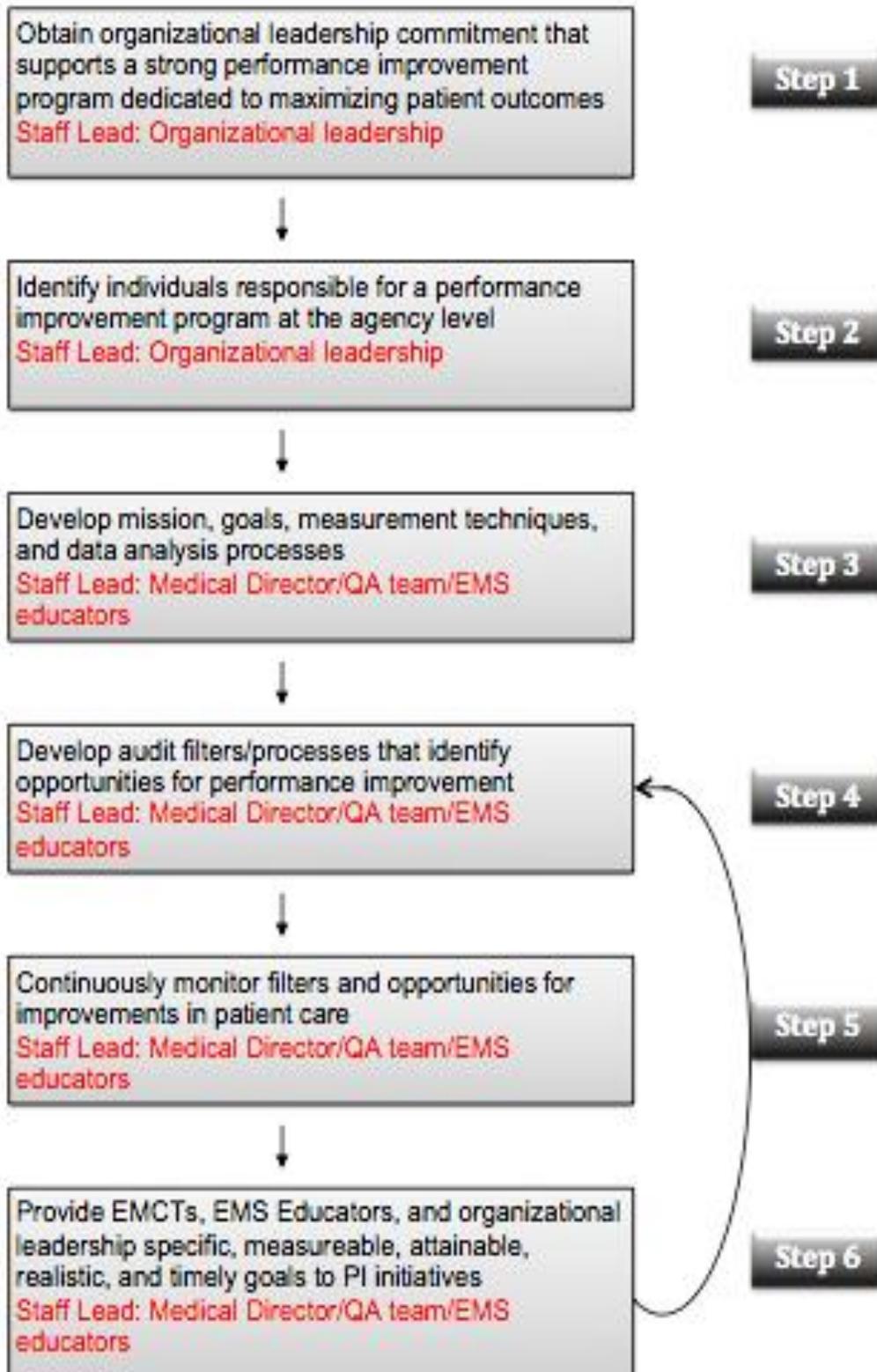


Figure 3: ACS Performance Improvement



Once the organizational leadership commits to optimizing patient care above all else, the performance improvement plan can begin. The leadership will need to identify individuals that are passionate, determined, and persistent to solve arising issues. A major importance to a PI program is the constructive and mutually supportive relationship that must occur between the QA individual(s) and the Medical Director. Figure 4 below identifies a sample implementation process for performance improvement.

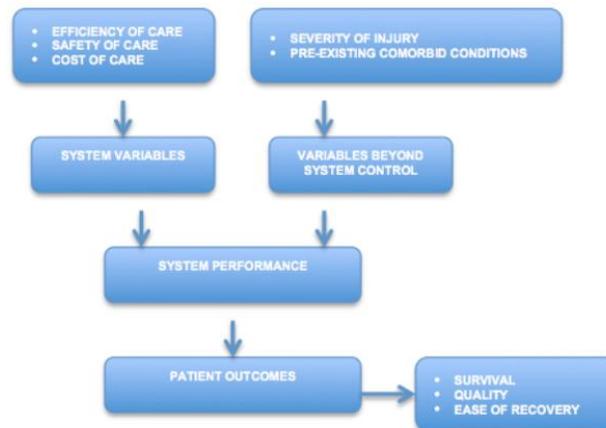
Figure 4: Implementation of a PI program



Filters for PI

Filters can be used to flag issues that require the attention of the QA team. In certain cases, these situations may be appropriate but further exploration is required. Although these filters are not all encompassing, they are a good place to start. Agencies can look at developing their own filters for acceptable thresholds (90% is common), documentation, clinical excellence, research projects, and protocol adherence.

Figure 5: Categorization of Influential Variables



- Trauma cases with:
 - Scene times > 20 min,
 - No documentation of patient destination (when transported),
 - Endotracheal Intubation,
 - Number of cases with ETI,
 - Number of cases with RSI,
 - Number of attempts per case prior to success,
 - Number of cases with use alternative rescue airways.
- STEMI cases with:
 - Missing an ECG,
 - No administration of aspirin,
 - No administration of oxygen,
 - Failure to transport to a cardiac receiving center.
- Stroke cases with:
 - Performing a stroke assessment,
 - Not obtaining a blood glucose value,
 - Failure to pre-notify hospital.
- Out of Hospital Cardiac Arrest cases with:
 - No documentation of chest compressions,
 - No documentation of defibrillation time,
 - No documentation of date/time at which resuscitative measures are withdrawn.

Closing the PI loop

In EMS there are two types of categories of variables impacting the outcome of a patient; the internal (system) variables and external (beyond system control) variables. The internal-variables for a patient who suffered a Traumatic Brain Injury would be time of response of unit after receiving notification, adherence to [EPIC protocols](#), and timely transportation to a designated trauma center. The external agency variables would be factors such as weather, injury severity, and age of patients.

Agencies with a PI plan will have to decide the degree of response each issue will require. Appendix C provides a schematic on a typical response to an issue. Issues of improvement can be classified as a **first level** (minor), **second level** (moderate), or **third level** (major issue). A first level review could typically require only the response of the QA team (delay in submission of an ePCR). A second level review could require a response from the QA team and the Medical Director and can be used as a teaching moment (improper protocol adherence, medication mix-up, complex case). A third level is a systemic failure that could require the attention of the QA manager, Medical Director, and a peer review committee (STEMI patients failing to meet door to balloon times, trauma patients failing to receive pain medication).

Additional resources and theories have been established to identify opportunities for improvements and solutions. These include an Ishikawa diagram (fishbone/root cause analysis), (Lean) Six Sigma, System Managements in Public Health, and others (*see Additional Resources for further information*).

After opportunities for improvement and solutions have been established with success it is important to train and educate within the agency on these new findings. Education programs can use successful cases to train providers through real life scenarios. An excellent education program will challenge providers to understand potential pitfalls, challenges, and solutions. Agency progress should be integrated and reinforced into the training, course material, and staff. Education programs can consider using guest speakers who experienced the problem first hand and found solutions.

It is important to note that sentinel events, errors, and areas of improvement should follow the EMS agency's PI program. Appropriate personnel from the department(s) that will be affected should attend. The Medical Director, or the equivalent, should be involved in the process.

EMS agencies should strive to resolve issues in three months. In some complex cases the inquiry might extend further, however, timely resolution is essential to a PI program.

Sample Case Studies

Case Study 1

An EMS Agency has decided to investigate the administration of its narcotics in patients undergoing musculoskeletal injuries. The EMS Agency decides to evaluate the effectiveness of pain management in patients through the EMCTs' documentation of a pain score and the appropriateness of the administration of narcotics.

[First Level Review]

The EMS Agency analyzes 100% of musculoskeletal injuries for one month. Each musculoskeletal injury is broken into two specific categories, pain scale assessment performed and narcotic administration. The QA Manager identifies that 10% of the charts did not document a pain scale and 45% of all patients did not receive pain medication.

[Second Level Review]

The QA Manager surveys the field providers on reasons for the lack of pain management and use of a pain scale. After analyzing the results, the QA Manager finds that many providers were unaware that a pain scale was on the ePCR. The QA Manager contacts the vendor to have the pain scale tool placed within the vital signs field. A department in-service is done on proper documentation of a pain scale assessment and includes a closed call rule that forces providers to answer the assessment field.

The QA Manager brings the results of the survey to the Organization Leadership that many providers felt that management pressed field providers to get into service too quickly and that the hospital prioritized replacing an EMCT's controlled substances as unimportant to operations. The Medical Director contacts the hospital pharmacy group to request a faster and more streamlined process for medication replacement.

[Third Level Review]

After a few weeks of inquiry, the QA Manager identified the lack of a field implementation of a pediatric pain scale. The EMS Agency identifies community stakeholders to determine the implementation of best practices into a pediatric pain assessment. A small workgroup is assigned to re-educate, monitor, track progress, and find solutions to the issue. They are tasked with presenting their policies to the EMS Agency. The committee decides to follow up with monthly and quarterly reports. Additionally, the committee embeds audit filters to determine if any improvements are occurring within the department.

After a year of continuous monitoring, the group finds a department wide compliance of 95% for pain assessments and 65% for the distribution of narcotics. The workgroup disbands and the QA manager begins to monitor the issue every quarter.

Case Study 2

A rural EMS Agency receives an AZ-PIERS quarterly report on STEMI outcomes from ADHS. After reviewing their performance against the aggregate, the QA Manager determines that they would like to find ways to improve their patient's outcomes.

[First Level Review]

In the AZ-PIERS STEMI report, the EMS Agency learns that they had 70 patients who were treated at a hospital for a STEMI in the past three months. Of those cases, only 21 patients went to a cardiac receiving/referral center. Additionally, all cases failed to document an ECG assessment. The QA manager believes that these results led to more patients being discharged to hospice or a long term skilled nursing facility. The QA Manager identifies this as an issue and recruits the Medical Director to increase the percentage of patients who get discharged home.

[Second Level Review]

The QA Manager discovers that the cardiac monitors are outdated and require replacement in order to reliably interact with their ePCR. Due to recent funding cuts, the board has been unable to approve the purchase of new monitors. As a community with a large demographic of older adults, the Medical Director urges the significance of having more reliable cardiac monitors. The fire district board approves the Medical Director's plan of replacing the cardiac monitor, transporting patients to cardiac receiving/referral centers, and monthly STEMI chart reviews.

[Third Level Review]

The fire district board members, QA manager, and Medical Director begin looking for funds to replace the monitors. They ask for assistance from their closest cardiac receiving/referral center, regional council, professional EMS organization, and other nearby fire districts. After some months the department finds a small rural specific grant that allows for the purchase of three refurbished cardiac monitors. The fire district board, Medical Director, and QA manager monitor their surveillance of STEMIs in their community for the next year.

Additional Resources

Arizona Trauma and EMS Performance Improvement toolkit:

- <http://www.azdhs.gov/bems/documents/data/users/stemi.pdf>
- <http://www.azdhs.gov/bems/documents/data/users/cardiac-arrests.pdf>
- <http://www.azdhs.gov/bems/documents/data/users/major-trauma.pdf>
- <http://www.azdhs.gov/bems/documents/s data/users/stroke.pdf>

American College of Surgeons “Resources for Optimal Care of The Injured Patient” 2006.

BMGI Videos and Topics: *Search for topics*

- Introduction to Lean
- Introduction to Lean Six Sigma
- The Five Principles of Lean
- The Eight Types of Waste
- Visual Management
- Current State Value Stream Maps
- Creating a Pareto Charts
- Data Collection

Center for Disease Control and Prevention:

- <http://www.cdc.gov/stltpublichealth/performance/>

Emergency Medical Services System Quality Improvement Program Model Guidelines:

- <http://ems.ca.gov/media/default/pdf/ems166.pdf>

Joint Commission: Accreditation, Health Care, Certification

- http://www.jointcommission.org/Sentinel_Event_Policy_and_Procedures/

National Public Health Performance Standards Program:

- <http://www.cdc.gov/NPHPSP/PDF/UserGuide.pdf>

Public Health Quality Improvement Exchange:

- <https://www.phqix.org/>

Sample PI Plan

Purpose: The EMS Agency shall follow the comprehensive Performance Improvement Program that addresses policies to continuously improve clinical quality.

Performance Improvement Plan: The EMS Agency shall include prospective, concurrent, and retrospective initiatives designed to improve the care delivered by the agency's providers (whether ALS or BLS levels of care).

- All aspects of the Clinical Performance Improvement Program shall be developed in conjunction with Medical Administration and receive approval from the Medical Director.
- The EMS Agency's Operations Division will identify and develop the avenue for the implementation of the Performance Improvement Plan.

Objectives: The EMS Agency shall have measurable clinical indicators that are regularly assessed for compliance with established thresholds. These indicators shall include, at a minimum, the following:

- Accurate patient assessment
- Medical interventions delivered in accordance with established Administrative Orders;
- Success of skills;
- Clinical documentation quality, and
- Outcome data.

Note: If the agency Medical Director allows Permissive Skill(s), the EMS Agency shall also conduct appropriate review of these services.

Closing the PI Loop: The EMS Agency shall have a process for identifying and addressing instances where measurable indicators are not in compliance with established thresholds. This process shall include individual exceptions and department trends. Both circumstances should be addressed with on-going education.

The EMS Agency shall define reporting process for Performance Improvement activities and issues. This shall include, at a minimum: documenting & reporting individual issues; following through with the respective individuals to resolve the problem, documenting and reporting data to the Organizational Leadership, Operations, Medical Director, and others as needed. Areas of the program determined to be in need of improvement will be identified, changed, reassessed, and reported on every quarter.

Identified improvements in the standard of care will be initiated by Medical Director and follow through the EMS Agency's chain of command.

Intended for Quality Assurance Purposes Only

Sample PI Plan

Filters:

Stroke:

- Documentation of a patient's last well known time
- Documentation of stroke assessment and results
- Contact date/time hospital was contacted
- Documentation of a blood glucose
- Transport to a Stroke Center

STEMI:

- Obtain an ECG as soon as unit arrives on scene
- Notify the hospital on the ECG (results/transmit)
- Documentation of aspirin administration (unless contraindicated)
- Documentation of oxygen administration (unless contraindicated)
- Transport to a Cardiac Center

Out of Hospital Cardiac Arrest:

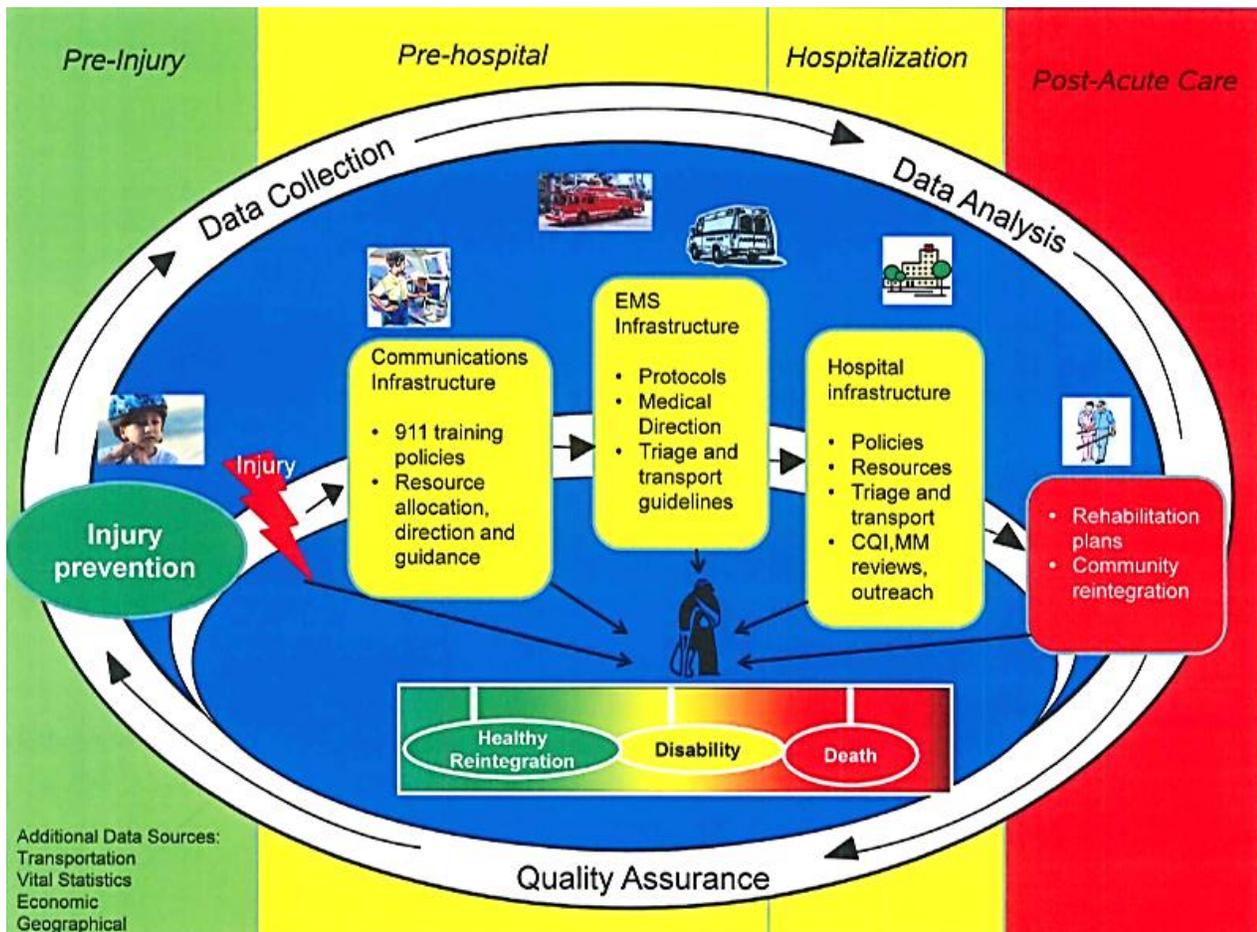
- Document whether bystander CPR was performed
- Document whether cardiac arrest was witnessed
- Document initial cardiac rhythm
- Document spontaneous circulation
- Document termination of resuscitation
- Reduce time to first compression upon unit arrival on scene
- Reduce time to defibrillation upon unit arrival on scene
- Transport to a Cardiac Center

Major Trauma:

- Reduce on scene time
- Document trauma triage criteria
- Document time and date of measurements for systolic blood pressure, respiratory rate, total GCS
- Document any transfers of patients
- Document intubations attempts and successes
- For TBI patients over the age of 18, maintain ETCO₂ between 35% and 45%, systolic blood pressure above 90 mmHg, and pulse oximetry above 90%
- For TBI patients under the age of 18, maintain ETCO₂ between 35% and 45%, systolic blood pressure (70 + 2 x age), and pulse oximetry above 90%
- Transport to a designated Trauma Center

Intended for Quality Assurance Purposes Only

Appendix A: EMS Integration Across All Phases of Care



An EMS data collection model should look at all potential legs of care from the patient perspective. Data sources include injury prevention activities, 911 dispatch/communication, pre-hospital, hospital, and rehabilitation. The focus of the system should be treating the patient and preventing death/disability in order to maximize the health reintegration of the patient into society.

The goal of every EMS system is to minimize the amount of mortality and morbidity occurring in their communities.

Appendix B: Definitions of Common Data Measurements

I. Statistical

A. Measures of Central Tendency: These are data measurements which show how the data is the same or; where most of the people, places or things tend to score or behave. These measurements are in the middle of what has often been called the “bell shaped curve”.

1. Mean (average) – The sum of all measured, or counted, data divided by the total number of data points; for example in the below data, if all the data values added together equal = 223 is divided by the total number of data points which are 15, then the product would be 14.8. Thus, the mean value of the data is 14.8.

2. Mode – the value repeated most often in raw data. For example in the data below the value 12 is repeated the most. Thus the mode value is 12

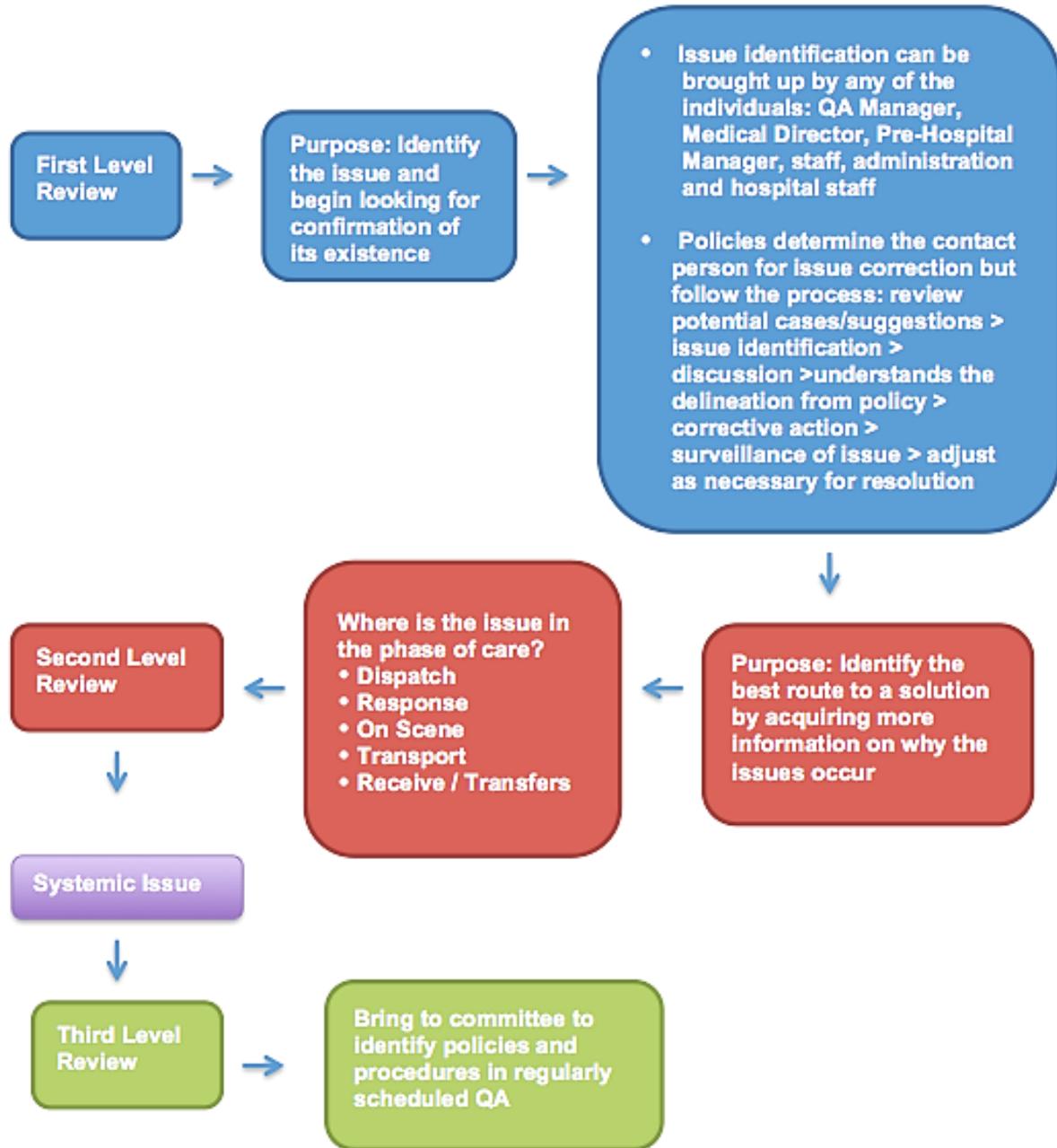
3. Median – the middle of all the measured or counted data points. For example, in the data below, all values are placed in numerical order and then the middle value is found by dividing by 2 and counting the ordered values until the middle value is identified. Thus, 12 is the middle of the ranked data points. Sample data: 8, 8, 9, 10, 10, 12, 12, 12, 14, 16, 16, 18, 20, 28, 30

B. Measures of Dispersion: These are data measurements which show how the data is different or; where most of the people, places or things are different. These measurements are on the outside of what has often been called the “bell shaped curve”.

1. Range – the maximum value minus the minimum data value.

2. Standard Deviation – A measurement which shows how widely spread (dispersed) any set of data is from the mean (average) of an entire data distribution. The standard deviation takes into account all the data points.

Appendix C: Hierarchy of Review Levels in an EMS Program



Closing

The Arizona Department of Health Services and Bureau of EMS & Trauma System would like to thank the EMS providers in the state for their innumerable counts of service, bravery, and sacrifice to the people in Arizona. The intention of this manual is to serve as a resource for individuals on the front lines striving to improve the care they provide to EMS patients at their time of greatest need. Special thanks are extended to the Trauma and EMS Performance Improvement standing committee and the EMS PI Plan workgroup responsible for this most valuable resource.

Further information and technical assistance can be accessed online at <http://www.azdhs.gov/bems/data/index.htm> or by contacting the DQA section chief directly at 602-542-2246.



State Trauma Advisory Board 2014 Annual Report



**Arizona Department of Health Services
Will Humble, Director**

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**This Report is Provided
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State Trauma Advisory Board 2014 Annual Report

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State Trauma Advisory Board

Listed below are the dedicated professionals and citizens who serve the State of Arizona as members of the State Trauma Advisory Board and the Trauma and EMS Performance Improvement Standing Committee by giving their time, expertise, and invaluable guidance to the Arizona trauma system. On behalf of the Arizona Department of Health Services and the citizens of Arizona, we thank them for their many contributions.

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Annual Report to the Director

Introduction

In 2013, the Arizona Trauma System continued to mature and improve through the guidance of the state's stakeholders. This collaboration produced significant and tangible progress that was prioritized in the state trauma plan. One of the many accomplishments of the past year is that a record number of trauma centers successfully completed the re-designation process. Another accomplishment is the collaboration and education among the trauma program managers during their recent meetings. There continues to be opportunities for sustained growth; the members of the Arizona Trauma System, representing hundreds of stakeholders and dozens of organizations, will continue to guide our future progress.

2013 - 2014 Highlights

- **Trauma Plan Progress – Key Highlights:** Several key initiatives that were either accomplished this past year or had significant progress include:
 - **Increase active participation by the State Trauma Advisory Board (STAB) members – Accomplished.**
 - Each meeting has a verbal roll call,
 - Each meeting packet includes an attendance report,
 - Bylaws have been amended to better communicate the attendance requirements,
 - Staff contacted members who have missed more than two consecutive meetings and will present responses at STAB during September's meeting.
 - **Develop a Trauma Program Managers Group – Accomplished.**
 - A majority of trauma program managers regularly attend workshops that are jointly sponsored by the Bureau of Emergency Medical Services and Trauma System (Bureau) and the University of Arizona Center for Rural Health.
 - Meeting 1: University of Arizona Medical Center 7/20/2013,
 - Meeting 2: Flagstaff Medical Center 11/15/2013,
 - Meeting 3: Banner Good Samaritan Medical Center 3/21/2014,
 - Meeting 4: Scottsdale Health Care Osborn Medical Center 7/18/2014,
 - Meeting 5: Scheduled for 11/21/2014 at St. Joseph's Hospital and Medical Center,
 - Meeting 6: Scheduled for 3/20/2015,
 - Meeting 7: Scheduled for 7/17/2015.
 - **Build and improve a tiered integrated trauma system – Significant Progress.**
 - The number of Level III and Level IV trauma centers in the rural and tribal areas has increased.

- Mt. Graham Regional Medical Center, Payson Regional Medical Center, Yavapai Regional Medical Center-West Campus, Yavapai Regional Medical Center-East Campus, and Payson Regional Medical Center have become designated Level IV trauma centers.
 - Tuba City Regional Medical Center has applied for Level III verification; Summit Regional Healthcare has shown interest in moving toward Level III verification.
 - Bureau staff met with Western Region Hospital Administrators (Yuma) and Sierra Vista Medical Center in an effort to renew interest in Level III designation.
 - Bureau staff met with Valley View Medical Center and Little Colorado Medical Center to discuss level IV trauma designation.
 - The Center for Rural Health continues to support Critical Access Hospital participation in the trauma system.
- **Improve trauma training to all level providers statewide – Significant Progress.**
 - Banner Good Samaritan Medical Center, Flagstaff Medical Center, Chandler Regional Medical Center and the University of Arizona Medical Center- University Campus each hold certification to teach the Rural Trauma Team Development Course (RTTDC). In 2013, 6 courses were taught.
 - Trauma Outcomes and Performance Improvement Course (TOPIC) developed by the Society of Trauma Nurses, hosted by Banner Good Samaritan Medical Center and the Center for Rural Health, was offered to trauma program managers and medical directors.
 - John C. Lincoln- North Mountain shared the geriatric “G60” program with hospitals and pre-hospital partners throughout the state. The G60 program advocates for an aggressive multi-disciplinary response to older adults who have experienced trauma.
 - The Pediatric Advisory Committee for Emergency Services continues to provide funds to each of the four EMS Regions to support pediatric education.
 - Three regional councils [Arizona EMS (AEMS), Northern Arizona EMS (NAEMS), and the Southeastern Arizona EMS (SAEMS)] sponsored pediatric EMS conferences.
 - Maricopa Medical Center and the American Academy of Pediatrics are providing western Arizona hospitals and EMS agencies with pediatric outreach for the next two years.
 - The Bureau of Public Health Emergency Preparedness (PHEP) continues to support the Arizona Burn Network with grant funds.

- **Define regional scene and inter-facility transport protocols directing patients to the most appropriate level trauma center – Significant Progress.**
 - On July 14, 2014, a workgroup met to define the Arizona criteria for Over/Under Triage; a second meeting is scheduled for September.
 - SAEMS is in the process of updating their destination and triage protocols.
 - AEMS has updated its triage protocols to take into account level III trauma centers.
 - The EMResource website has been updated to record new level III trauma center designations.

- **Better inclusion of EMS data in the Arizona State Trauma Registry (ASTR) – Significant Progress.**
 - 86 EMS agencies (23%) submit 34,000 e-PCR records to the Arizona Pre-hospital Information and EMS Registry System (AZ-PIERS) each month. Current volume is 642,162 patient care records.
 - In 2013, the ASTR received completed run sheets 69% of the time for EMS ground agencies and 82% of the time for air ambulances. This was a decline for ground EMS; in 2012, 74% of the run sheets were completed.
 - AZ-PIERS trauma triage elements in the current dataset will be revised in future updates.
 - Individual and aggregate trauma reports were provided to all submitting EMS agencies and hospitals.

- **Arizona State Trauma Registry (ASTR):** The Trauma Registry Users Group (TRUG) continued to review elements and definitions to maintain its consistent high quality data across centers. A highly anticipated transition from a Virtual Protocol Network (VPN) to a web-based registry has begun. Centers that contribute the reduced trauma data set have transitioned successfully; in 2015 trauma centers that submit the full trauma data set will also transition to the web-based registry.

- **The Arizona Excellence in Pre-Hospital Injury Care (EPIC) Public Health Project:** Traumatic Brain Injury (TBI) is a major public health problem in Arizona and across the United States and carries an immense societal burden. In response to this public health problem, the Director of ADHS has established two projects called the Excellence in Prehospital Injury Care (EPIC) and EPIC4KIDS. These projects are based upon the growing scientific evidence that the management of TBI in the early minutes after injury profoundly impacts outcome. The ADHS/Bureau and the University of Arizona Emergency Medicine Research Center (AEMRC) are in the final months of the 3rd year of a 5-year NIH supported effort to implement and measure the nationally vetted evidence-based TBI treatment guidelines. EPIC is a unique statewide trauma quality improvement effort aimed at improving outcomes from moderate and severe TBI through implementing these prehospital TBI treatment guidelines across the state of Arizona. EPIC involves prehospital data collection and ASTR data linkage as well as risk

stratification which allows the evaluation of the effectiveness of those prehospital interventions focused on oxygenation, ventilation, and blood pressure management in over 120 EMS systems in Arizona. For more information visit www.epic.arizona.edu.

- **Quality Assurance Reports to trauma centers:** Trauma centers received reports that benchmarked their individual performance to the statewide aggregate. These reports compared patient demographics, transfers, billing efficiency, mortality by ISS and body injuries, and many others. These reports can be found online at <http://www.azdhs.gov/bems/data/quality-assurance-reports.php?pg=qa>.

Opportunities

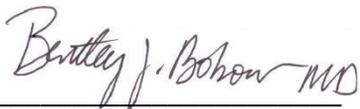
There are many remaining goals and objectives in the Arizona State Trauma Plan. The coming year will present a number of opportunities to enhance the Arizona Trauma System.

- Create a Trauma Plan Prioritization workgroup,
- Complete the transition to a web-based registry for all trauma centers,
- Federal requirements to utilize the ICD-10 reporting system along with revisions to the American College of Surgeons trauma center verification criteria will likely expose areas within our current regulatory language to be updated,
- The inclusion of several facilities into the trauma system from rural Arizona to improve access to trauma care,
- Improve the quality of EMS trauma triage data collection.

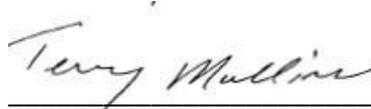
Conclusion

While we have been able to achieve many of our strategic goals this past year, many more remain. A great success has been the enhanced communication between all of the trauma centers and with our EMS agencies. The addition of new trauma centers bring talented and dedicated stakeholders that will continue to shape the development of our state trauma system in the future.

Respectfully submitted on behalf of the Members of the State Trauma Advisory Board,



Bentley J. Bobrow, Chair
Bureau Medical Director



Terry Mullins
Bureau Chief

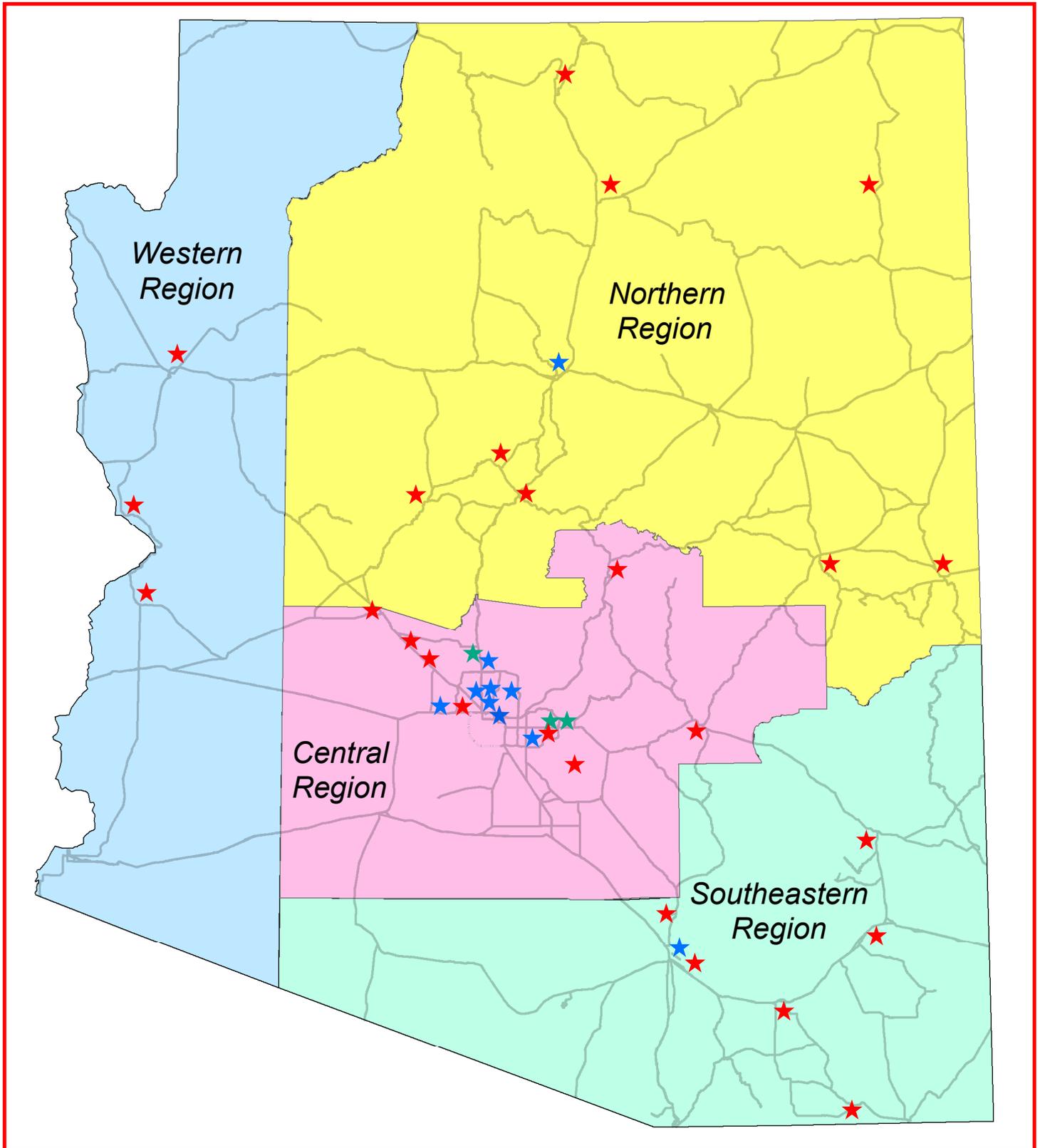
Arizona State Designated Trauma Centers

Health Care Institution	Address	Effective Date	Expiration Date
Level I Trauma Centers			
Banner Good Samaritan Medical Center	925 E. McDowell Rd., Phoenix, AZ 85006	11/19/11	11/19/14
Dignity Health, dba Chandler Regional Medical Center <i>(Provisional Designation)</i>	1955 W. Frye Rd., Chandler, AZ 85224	3/24/14	9/24/15
Flagstaff Medical Center	1200 N. Beaver St., Flagstaff, AZ 86001	05/27/14	05/27/17
John C. Lincoln - North Mountain	250 E. Dunlap Ave., Phoenix, AZ 85020	04/24/14	04/24/15
Maricopa Medical Center	2601 E. Roosevelt, Phoenix, AZ 85008	12/20/11	12/20/14
Phoenix Children's Hospital	1919 E. Thomas Rd., Phoenix, AZ 85016	08/31/12	08/31/15
St. Joseph's Hospital & Medical Center	350 W. Thomas Rd., Phoenix, AZ 85013	11/20/13	11/20/16
Scottsdale Healthcare – Osborn	7400 E. Osborn, Scottsdale, AZ 85251	10/25/11	10/25/14
The University of Arizona Medical Center – University Campus	1501 N. Campbell Ave., Tucson, AZ 85724	11/12/11	11/12/14
West Valley Hospital <i>(Provisional Designation)</i>	13677 W. McDowell Road, Goodyear, AZ 85395	7/21/14	1/21/16
Level III Trauma Centers			
Banner Baywood Medical Center	6644 E. Baywood Ave., Mesa, AZ 85206	05/12/14	02/25/15
John C. Lincoln Deer Valley Hospital	19829 N. 27 th Ave., Phoenix, AZ 85027	06/09/14	4/08/17
Mountain Vista Medical Center	1301 S. Crismon Rd., Mesa, AZ 85209	7/23/14	7/26/16
Level IV Trauma Centers			
Banner Boswell Medical Center	10401 W. Thunderbird Blvd., Sun City, AZ 85351	12/17/12	12/17/15
Banner Del E. Webb Medical Center	14502 W. Meeker Blvd, Sun City West, AZ 85375	01/09/14	01/09/17
Banner Estrella Medical Center	9201 W. Thomas Road, Phoenix, AZ 85037	08/30/12	08/30/15
Banner Gateway Medical Center	1900 N. Higley Road, Gilbert, AZ 85234	01/02/13	01/02/16
Banner Ironwood Medical Center	37000 N. Gantzel Rd., San Tan Valley, AZ 85140	10/11/12	10/11/15
Banner Page Hospital	501 N. Navajo, Page, AZ 86040	11/05/11	11/05/14
Benson Hospital	450 S. Ocotillo Ave., Benson, AZ 85602	03/03/14	03/03/17
Chinle Comprehensive Health Care Facility	P.O. Drawer PH, Chinle, AZ 86503	09/09/13	09/09/16
Cobre Valley Regional Medical Center	5880 S. Hospital Dr., Globe, AZ 85501	11/26/12	11/26/15
Copper Queen Community Hospital	101 Cole Ave., Bisbee, AZ 85603	12/01/12	12/01/15
Havasu Regional Medical Center	101 Civic Center Ln., Lake Havasu City, AZ 86403	01/20/14	01/20/17
Kingman Regional Medical Center	3269 Stockton Hill Rd., Kingman, AZ 86409	10/15/12	10/15/15

Health Care Institution	Address	Effective Date	Expiration Date
La Paz Regional Hospital	1200 W. Mohave Rd., Parker, AZ 85344	06/02/12	06/02/15
Mt. Graham Regional Medical Center	1600 S. 20 th Ave., Safford, AZ 85546	03/20/14	03/20/17
Northern Cochise Community Hospital	901 W. Rex Allen Dr., Willcox, AZ 85643	12/04/11	12/04/14
Oro Valley Hospital	1551 East Tangerine Road, Oro Valley, AZ 85755	4/18/13	4/18/16
Payson Regional Medical Center	807 S. Ponderosa Street, Payson, AZ 85541	11/22/13	11/22/16
Summit Healthcare Regional Medical Center	2200 Show Low Lake Rd., Show Low, AZ 85901	08/12/11	08/12/14
The University of Arizona Medical Center South Campus	2800 E. Ajo Way, Tucson, AZ 85713	08/13/13	08/13/16
Tuba City Regional Health Care Corp.	P.O. Box 600, Tuba City, AZ 86045	05/06/12	05/06/15
Verde Valley Medical Center	269 S. Candy Ln., Cottonwood, AZ 86326	08/18/11	08/18/14
White Mountain Regional Medical Center	118 S. Mountain Ave., Springerville, AZ 85938	06/18/12	06/18/15
Wickenburg Community Hospital	520 Rose Ln., Wickenburg, AZ 85390	08/08/11	08/08/14
Yavapai Regional Medical Center – West Campus	1003 Willow Creek Road, Prescott, AZ 86301	01/10/14	01/10/17
Yavapai Regional Medical Center – East Campus	7700 E. Florentine, Prescott Valley, AZ 86314	6/24/14	6/24/17

EMS REGIONS AND TRAUMA CENTERS

August 21, 2014



Level I Trauma Center
Level III Trauma Center
Level IV Trauma Center

**ARIZONA STATE TRAUMA REGISTRY (ASTR)
2013 TRAUMA DATA SUBMISSION**

LEVEL I TRAUMA CENTERS (Full Data Set)	Reporting Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Hospital YTD Totals
	ED/Hosp Arrival Dates	JAN-MAR 2013	APR-JUN 2013	JUL-SEP 2013	OCT-DEC 2013	
	ASTR Due Date	7/1/2013	10/1/2013	1/2/2014	4/1/2014	
Total Records from all Level I Trauma Centers by Qtr:		5615	5999	5894	5966	
Banner Good Samaritan Medical Center	Number of Records	624	660	604	727	2615
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/2014	
Flagstaff Medical Center	Number of Records	364	441	514	415	1734
	Date Received	5/22/2013	8/26/2013	12/19/2013	2/25/2014	
John C. Lincoln North Mountain Hospital	Number of Records	737	747	737	838	3059
	Date Received	6/20/2013	9/26/2013	12/31/2013	4/1/2014	
Maricopa Medical Center	Number of Records	597	628	598	594	2417
	Date Received	6/25/2013	10/8/2013	1/7/2014	4/1/2014	
Phoenix Children's Hospital	Number of Records	518	577	633	640	2368
	Date Received	7/3/2013	10/7/2013	1/9/2014	4/17/2014	
Scottsdale Healthcare-Osborn	Number of Records	840	859	804	834	3337
	Date Received	6/26/2013	10/1/2013	1/13/2014	4/1/2014	
St. Joseph's Hospital & Medical Center	Number of Records	825	906	826	862	3419
	Date Received	6/28/2013	9/30/2013	12/23/2013	3/21/2014	
University of AZ Medical Center-UNIVERSITY CAMPUS (was UMC)	Number of Records	1110	1181	1178	1056	4525
	Date Received	7/1/2013	10/3/2013	12/30/2013	3/31/2014	

LEVEL III-PROVISIONAL TRAUMA CENTERS (Full Data Set)	Reporting Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Hospital YTD Totals
	Total Records from all Level III Provisional Hospitals by Qtr:	659	671	690	817	
Banner Baywood Medical Center (new designation 7/30/12)	Number of Records	158	144	133	185	620
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/2014	
John C Lincoln - Deer Valley (new designation 2/4/2013)	Number of Records	121	186	203	212	722
	Date Received	6/19/2013	9/26/2013	12/31/2013	4/1/2014	
Mountain Vista Medical Center (new designation 2/24/12)	Number of Records	380	341	354	420	1495
	Date Received	6/24/2013	10/10/2013	12/30/2013	4/11/2014	

Bureau of EMS & Trauma System Data & Quality Assurance Section

LEVEL IV TRAUMA CENTERS (Full or Reduced Data Set)		Reporting Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
Total Records from ALL Level IV Trauma Centers by Qtr:			1715	1669	1873	1838	Hospital YTD Totals
FULL DATA SET LEVEL IV							
Banner Boswell Medical Center (Full Data Set)	Number of Records	71	52	51	76		250
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/2014		
Banner Estrella Medical Center (new designation 8/30/12)	Number of Records	115	121	102	120		458
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/14		
Banner Gateway Medical Center (new designation 1/2/13)	Number of Records	60	19	32	25		136
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/14		
Banner Ironwood Medical Center (new designation 10/11/12)	Number of Records	19	13	12	14		58
	Date Received	6/27/2013	9/27/2013	12/27/2013	3/14/14		
Banner Del Webb (new designation 1/9/2014)	Number of Records			125	160		285
	Date Received			12/27/2013	3/14/2014		
Kingman Regional Medical Center	Number of Records	140	129	132	107		508
	Date Received	6/20/2013	10/1/2013	1/14/2014	4/2/2014		
Summit Healthcare Regional Medical Ctr	Number of Records	74	74	114	95		357
	Date Received	6/25/2013	9/27/2013	12/23/2013	4/1/2014		
Tuba City Regional Health Care	Number of Records	177	213	224	227		841
	Date Received	6/28/2013	10/1/2013	1/2/2014	4/1/2014		
University of AZ Medical Center-SOUTH CAMPUS (was UPH) (new designation 2/13/12)	Number of Records	366	185	99	118		768
	Date Received	7/25/2013	9/17/2013	12/12/2013	3/28/2014		
Verde Valley Medical Center(Cottonwood)	Number of Records	36	62	61	51		210
	Date Received	7/9/2013	10/1/2013	12/26/2013	4/8/2014		
Yavapai Regional Medical Center-West (Full Data Set)	Number of Records	53	83	140	114		390
	Date Received	7/2/2013	10/1/2013	12/31/2013	4/8/2014		
REDUCED DATA SET LEVEL IV							
Banner Page Hospital	Number of Records	47	79	66	48		240
	Date Received	7/1/2013	10/1/2013	1/24/2014			
Benson Hospital	Number of Records	17	15	22	29		83
	Date Received	7/1/2013	11/14/2013	12/1/2013	1/24/2013		
Chinle Comprehensive Health Care	Number of Records	54	73	88	71		286
	Date Received	6/25/2013	9/29/2013	4/1/2014	4/1/2014		
Cobre Valley Medical Center (new designation 11/26/12)	Number of Records	39	10	29	25		103
	Date Received	7/1/2013	10/1/2013	12/4/2013	3/20/2014		
Copper Queen Community Hospital	Number of Records	51	54	67	45		217
	Date Received	7/2/2013	10/1/2013	1/22/2014	4/2/2014		
Havasu Regional Medical Center	Number of Records	94	82	70	96		342
	Date Received	6/18/2013	9/27/2013	1/20/2013	4/1/2014		
La Paz Regional Hospital	Number of Records	16	14	14	18		62
	Date Received	7/8/2013	10/21/2013	1/3/2014	5/1/2014		
Northern Cochise Hospital	Number of Records	25	32	37	34		128
	Date Received	7/1/2013	10/1/2013	1/14/2014	3/31/2014		
Oro Valley Hospital	Number of Records	17	26	42	36		121
	Date Received	6/26/2013	9/15/2013	5/12/2014	5/12/2014		
Payson Regional Medical Center	Number of Records			21	26		47
	Date Received						

Bureau of EMS & Trauma System Data & Quality Assurance Section

Southeast Arizona Medical Center	Number of Records		29			
	Date Received		10/1/2013			29
White Mountain Regional Medical Center	Number of Records	182	247	282	190	901
	Date Received	6/26/2013	10/1/2013	1/2/2014	3/31/2014	
Wickenburg Community Hospital	Number of Records	62	57	43	62	224
	Date Received	7/1/2013	10/1/2013	5/13/2014	5/13/2014	
Mt Graham Regional Medical Center	Number of Records				51	51
	Date Received				5/13/2014	

Bureau of EMS & Trauma System Data & Quality Assurance Section

NON-DESIGNATED HOSPITALS (Full or Reduced Data Set)	Reporting Quarter	Quarter 1	Quarter 2	Quarter 3	Quarter 4	
Total Records from all Non-Designated Hospitals by Qtr:		0	280	303	287	Hospital YTD Totals
Sierra Vista Regional Medical Center (Full Data Set)	Number of Records					0
	Date Received					
Yuma Regional Medical Center (Full Data Set)	Number of Records					0
	Date Received					
Banner Desert Medical Center (Full Data Set)	Number of Records		280	303	260	843
	Date Received		9/27/2013	12/27/2013	3/14/14	
Yavapai Regional Medical Center-East (Full Data Set)	Number of Records				27	27
	Date Received				4/8/2014	

Total 2013 Reporting Hospitals = 38
 (*does not include * pending facilities)

Total ASTR 2013 Records by Quarter:			
7989	8619	8760	8908

Total ASTR 2013
34,276

Notes: The ASTR Trauma Patient Inclusion Criteria were changed, effective for ED/Hospital Arrival Dates January 1, 2008 forward. Designated Level I, II and III Trauma Centers are required to submit the full ASTR data set. Level IV and non-designated hospitals may choose to submit either the Full or Reduced ASTR data set.

TRAUMA PATIENT INCLUSION DEFINITION

ARIZONA STATE TRAUMA REGISTRY (ASTR)

Effective for records with ED/Hospital Arrival Dates Jan. 1, 2008 – Dec. 31, 2013

➤ 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

➤ 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

***Note: For 2012 trauma data, only Level III and IV Trauma Centers were required to report inter-facility injury transfers. For 2008-2011 and 2013 forward, all designation levels are required to report inter-facility injury transfers.**

➤ HOSPITAL TRAUMA TEAM ACTIVATIONS

A patient with injury or suspected injury for whom a trauma team activation occurs; OR

➤ 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 (except exclusions below):

EXCLUSIONS for admitted or died ICD-9-CM 800-959 patients:

- Only has late effects of injury or another external cause:
(ICD-9-CM N-code within categories 905 through 909)
- Only has a superficial injury or contusion:
(ICD-9-CM N-code within categories 910 through 924)
- Only has effects of a foreign body entering through an orifice:
(ICD-9-CM N-code within categories 930 through 939)
- Only has an isolated femoral neck fracture from a same-level fall:

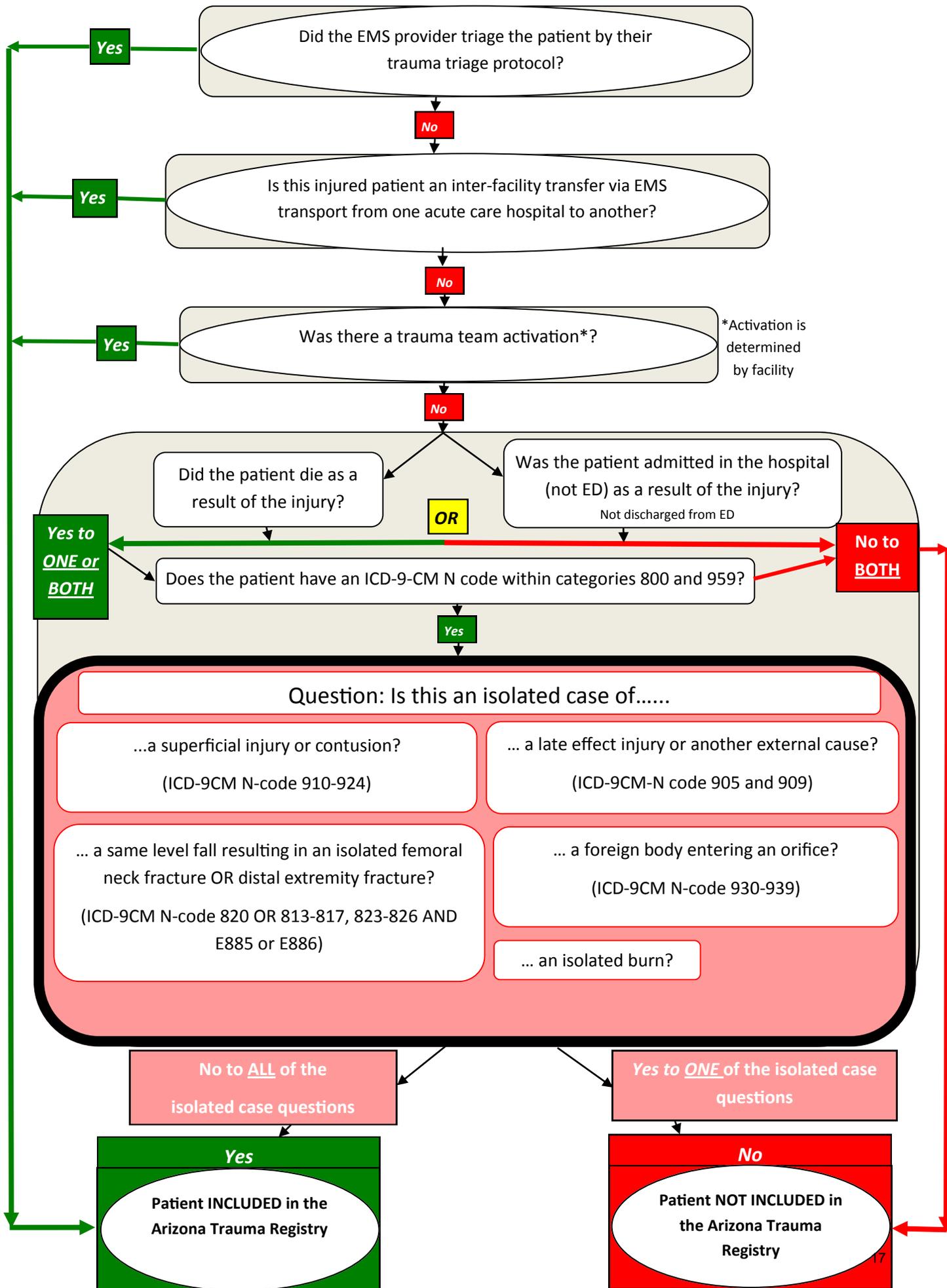
(ICD-9-CM N-code within category 820 **AND** ICD-9-CM E-code within category E885 or E886)

- 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)
- Only has an isolated burn:
(ICD-9-CM N-code within categories 940 through 949)

*Inter-facility transfer item 1-B was added to the ASTR Inclusion Criteria, per the Bureau of EMS & Trauma System in November 2008. This item was then revised by the TEPI advisory committee for 2012, requiring only Level III and IV trauma centers to submit inter-facility transfers. For 2013 data forward, the advisory committee reinstated the original 2008-2011 inter-facility transfer criteria.

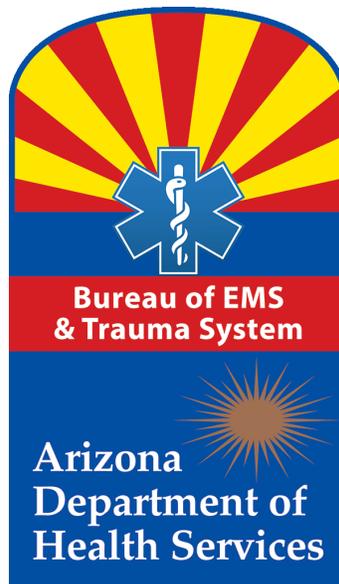
Note: New ASTR inclusion criteria went into effect for trauma records with ED/Hospital Arrival Dates Jan. 1, 2008 forward. Changes to inclusion criteria affect the numbers and types of records submitted to ASTR. Inclusion changes should be taken into consideration when comparing multiple years of trauma data.

2013 Arizona Trauma Registry Inclusion Criteria



**Arizona Department of Health Services
Bureau of Emergency Medical Services and Trauma System**

**State Trauma Advisory Board
2014 Annual Report**



Prepared by:

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ACKNOWLEDGEMENT

The Arizona Department of Health Services' Bureau of Emergency Medical Services and Trauma System (BEMSTS) wishes to acknowledge the continued hard work and dedication of the many individuals involved in working to improve patient outcomes. Special thanks are extended to the members of the State Trauma Advisory Board, Trauma and EMS Performance Improvement committee, participating trauma centers, medical directors, program managers, and registrars. Their dedication to continuously improving the data collection processes makes it possible to fully evaluate and advance the trauma system in Arizona.

2014 ARIZONA STATE TRAUMA REGISTRY ANNUAL REPORT

Purpose:

The purpose of this report is to describe the incidence and outcomes of trauma patients injured in Arizona through the Arizona State Trauma Registry (ASTR). ASTR is dedicated to capturing information on the most severely injured patients in Arizona. The definition of an Arizona trauma patient is presented on pages 15-17. Various descriptions of locations, rates, and mechanisms of injury are presented.

Methods:

In 2013, the ASTR received data from 35 state designated trauma centers and two non-designated healthcare institutions. For the 2013 reporting year, the Arizona EMS and Trauma System had eight Level I trauma centers. There were six Level I trauma centers in Maricopa County, one in Coconino County, and one in Pima County. There were 22 Level IV trauma centers and three Level III trauma centers located primarily in the rural areas of the state. Two non-designated hospitals voluntarily submitted data to the ASTR for the year 2013. Please refer to pages 11-14 for a list of 2013 reporting hospitals, their designation level, and type of data set collected.

Arizona's Levels I - III trauma centers were required to submit the full ASTR data set. Level IV and non-designated facilities had the option to submit the full or reduced data set. Full data set hospitals entered their data into their own version of Trauma One[®] and then exported the state required data elements to ASTR on a quarterly basis. Reduced data set hospitals entered data directly into the state trauma database. A validation tool checked more than 800 state and national rules. Validation was run at the hospital and at the state level. Inconsistencies were flagged and returned to the hospital for review or correction.

This trauma registry annual report analyzed cases for patients with an Emergency Department/Hospital Arrival Date of January 1 - December 31, 2013 with the Statistical Analysis System (SAS) Version 9.2.

Although the National Trauma Data Bank (NTDB) differs in inclusion criteria from the ASTR, certain measures were compared. State data were restricted by admission status, transfer status and outcome status to match when possible to the national data.¹

The ASTR received 34,275 records from 35 participating health care institutions in 2013. Case volume increases may not reflect a change in traumatic injuries but rather a more inclusive data collection system in the analysis.

Geo-Population:

Arizona is 400 miles long and 310 miles wide for a total area of 114,006 square miles. The topography has a blend of deserts, mountains, and plateaus. The highest point is Humphrey's Peak (12,633 feet above sea level), the lowest point is the Colorado River (70 feet above sea level), and the mean elevation is 4,100 feet. Arizona shares contiguous borders with the states of California, Colorado, Nevada, New Mexico, and Utah. Internationally, the Mexican states of Sonora, Chihuahua, and Baja California Norte share a border with Arizona.

There are twenty-two (22) federally recognized American Indian tribes in Arizona with a total population of 309,035 in 2013.

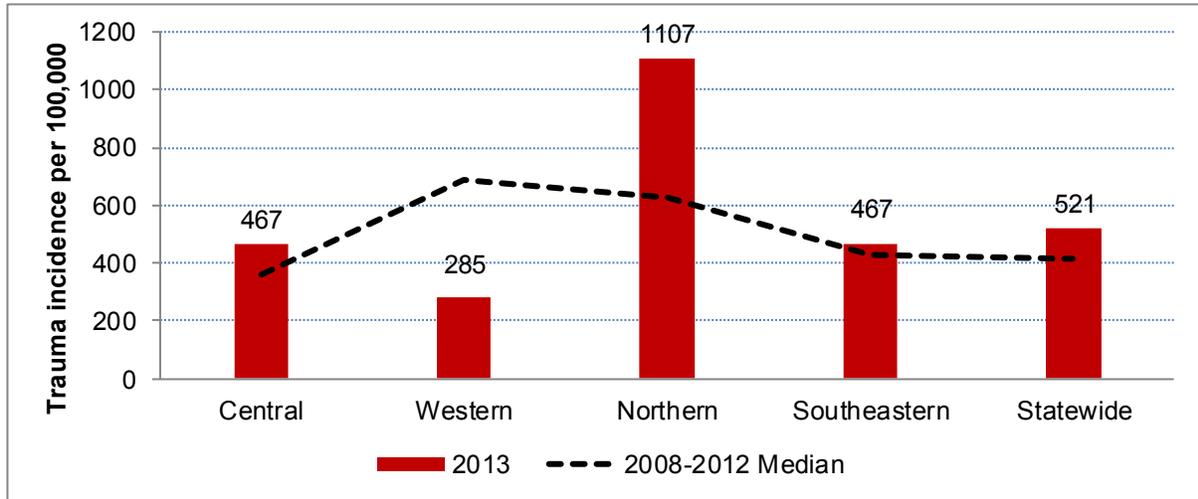
The total Arizona population increased by 1.2% to bring the number of residents to 6,581,053 in 2013.² Urban counties (Maricopa, Pima, Pinal, and Yuma) accounted for 84.2% of the population. The remaining counties (Apache, Cochise, Coconino, Gila, Graham, Greenlee, La Paz, Mohave, Navajo, Santa Cruz, and Yavapai) accounted for 15.8% of the population.

Maricopa County, with a population of 3.9 million, is home to Phoenix, the capitol of state government.

¹ <http://www.facs.org/trauma/ntdb/pdf/ntdb-annual-report-2012.pdf>

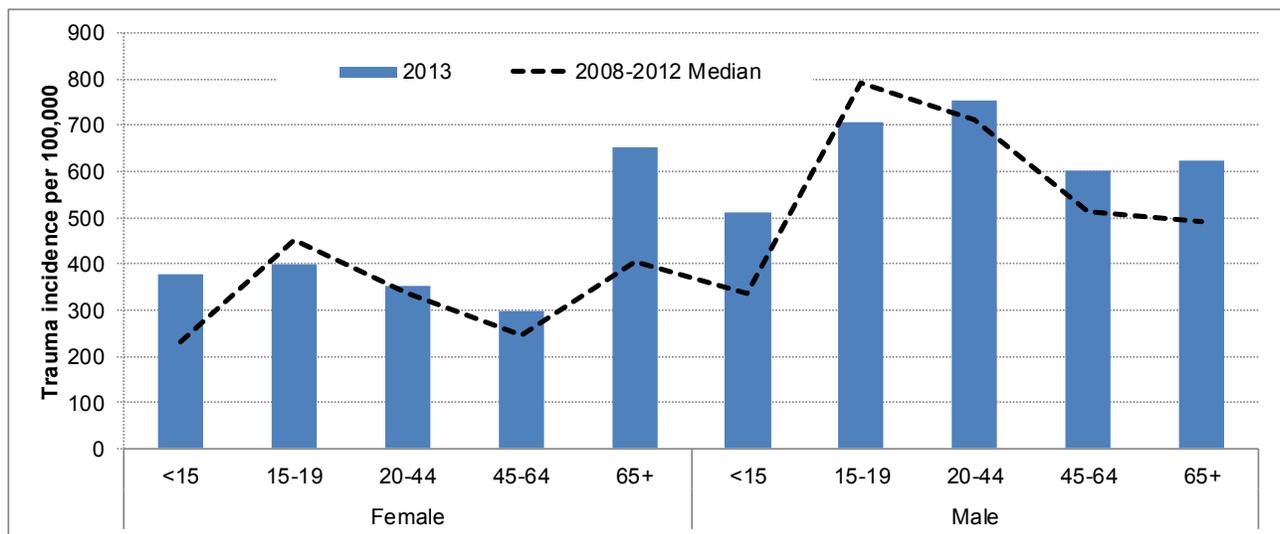
² <http://azdhs.gov/plan/menu/info/pop/index.php>

Figure 1: Region-specific trauma rates per 100,000 Arizona residents, ASTR 2008-2013



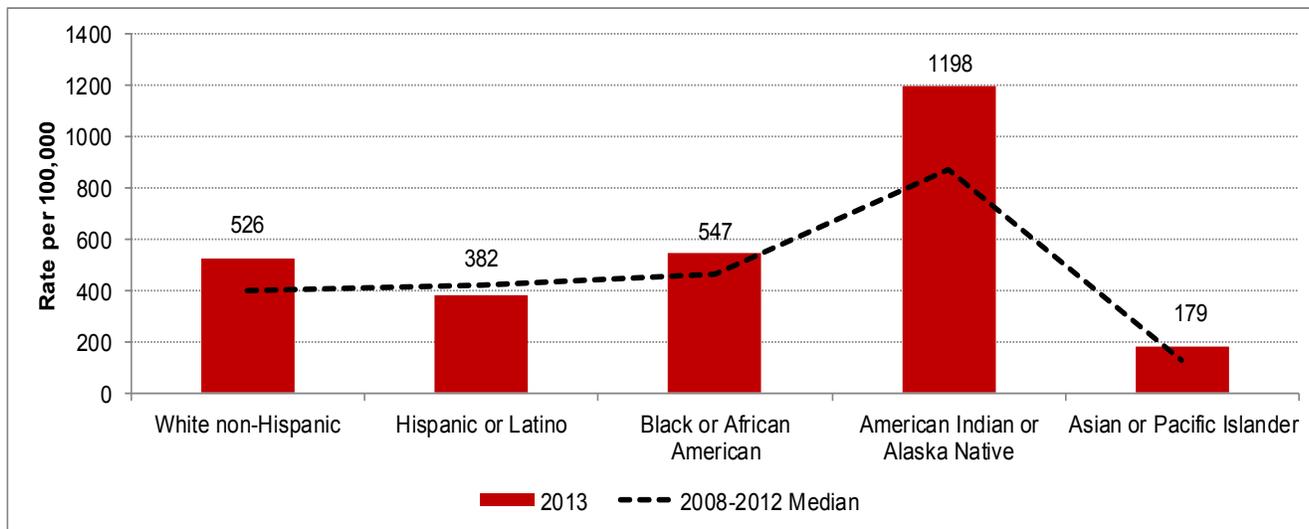
Although the Central region is the most densely populated and has the highest volume of trauma, in previous years it reported the lowest trauma rate per 100,000 residents when compared to all other regions (Figure 1). The Western region’s trauma rates may be under reported as a previously participating hospital with high volume did not contribute data to the ASTR in 2013.

Figure 2: Gender & age-specific trauma rates per 100,000 Arizona residents, ASTR 2008-2013



Across most age groups, males have a higher trauma rate than females. There was a decrease in the trauma rate for 15-19 year olds in 2013 when compared to the 2008-2012 median. The highest trauma rate occurred in males 20-44, followed by geriatric (>65) females. It is possible that the increase in trauma rates for pediatric and geriatric populations may be related to an increase in the number of reporting hospitals located in rural communities (Figure 2).

Figure 3: Race-specific trauma rates per 100,000 Arizona residents, ASTR 2008-2013



Although White non-Hispanics had the highest volume of trauma, American Indian/Alaska Native experienced the highest trauma rates per 100,000 residents. An in-depth trauma report on American Indian trauma can be found at:

<http://www.azdhs.gov/bems/data/quality-assurance-reports.php?pg=county-regional>

Following American Indian/Alaska Natives trauma rates were Black/African American, White Non-Hispanics, and Hispanic or Latino. The lowest rates of trauma were seen in Asian or Pacific Islanders.

Table 1: Age-specific trauma proportion and case fatality proportion, ASTR 2013

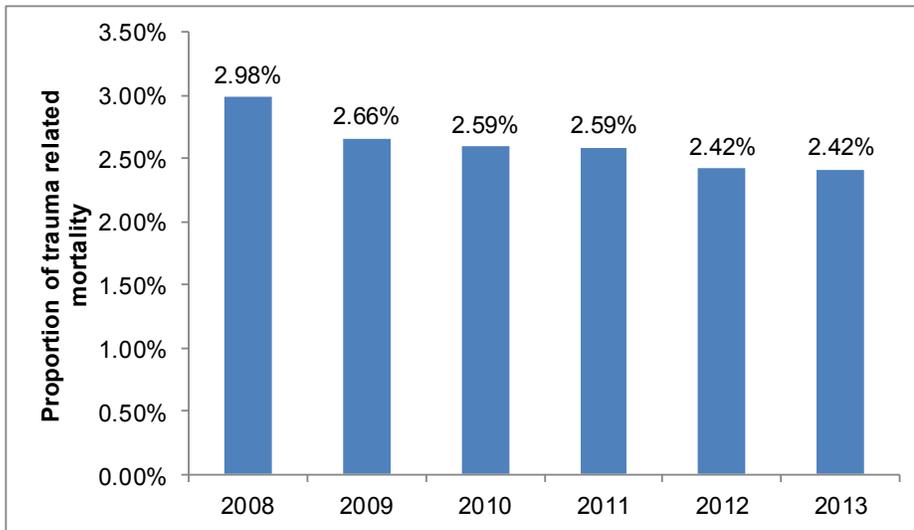
INCIDENTS AND CASE FATALITY RATE BY AGE				
Age	Count	Percent	Deaths	Case Fatality Rate
<1	2,493	7.27%	18	0.72%
1-4	1,165	3.39%	23	1.97%
5-9	1,177	3.43%	10	0.84%
10-14	1,274	3.71%	19	1.49%
15-19	2,625	7.65%	54	2.05%
20-24	3,322	9.69%	71	2.13%
25-34	5,103	14.88%	126	2.46%
35-44	3,705	10.80%	100	2.69%
45-54	3,925	11.45%	104	2.64%
55-64	3,199	9.33%	111	3.46%
65-74	2,499	7.29%	71	2.84%
75-84	2,237	6.52%	63	2.81%
>85	1,549	4.51%	58	3.74%
Missing	2	0%	0	0%
Total	34,275	100.00%	828	2.41%

Trauma affects people of all ages and is the leading cause of death among persons 1-44 years of age.³ Of the reported 34,275 trauma patients, the overall mortality proportion was 2.4%.

The highest case fatality was observed among those over 85 years of age (3.7%) (Table 1).

³ <http://www.cdc.gov/Traumacare/pdfs/TraumaCentersFactsheet20090921-a.pdf>

Figure 4: Trauma related mortality proportion, ASTR 2008-2013



The case fatality proportion has been steadily decreasing from 2.98% in 2008 to 2.42% in 2013 (Figure 4). We intend to explore this positive survival trend in future reports.

Figure 5: Age-specific trauma related mortality rates per 100,000 Arizona residents, ASTR 2008-2013

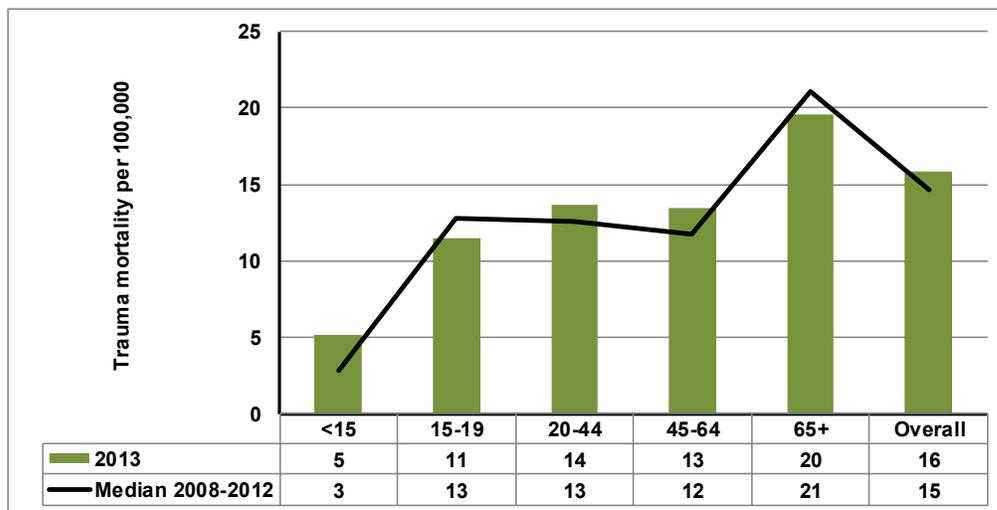


Figure 5 depicts trauma mortality rates per 100,000 Arizona residents by age. Arizona’s highest trauma mortality rate per 100,000 was in the 65+ age group. The mortality rate for 15-19 year age group decreased in 2013 as compared to the 2008-2012 median rate.

INJURY CHARACTERISTICS: MECHANISM OF INJURY

Figure 6: Top mechanisms of injury rate per 100,000 Arizona residents by region, ASTR 2013

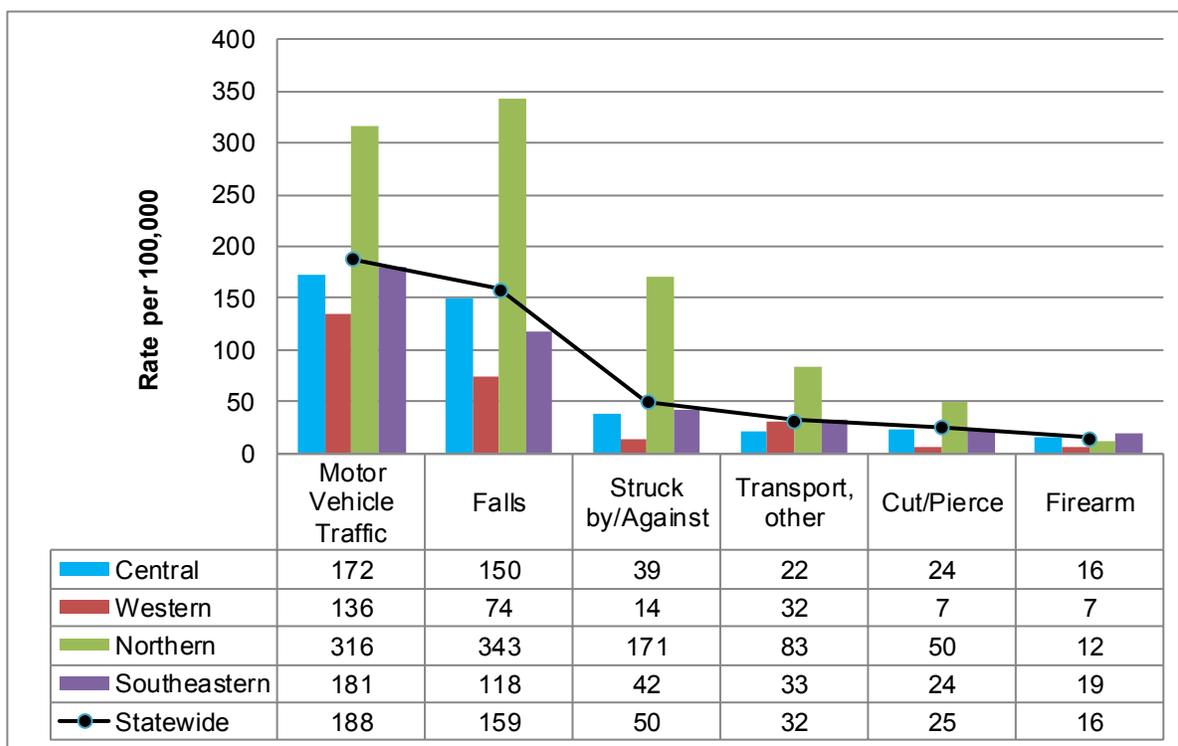


Figure 6 shows top mechanisms of injury rate per 100,000 Arizona residents by region for the year 2013. The Southeastern region has the highest rate for firearm injuries while the Northern region has the highest rate for the other five top mechanisms of injury.

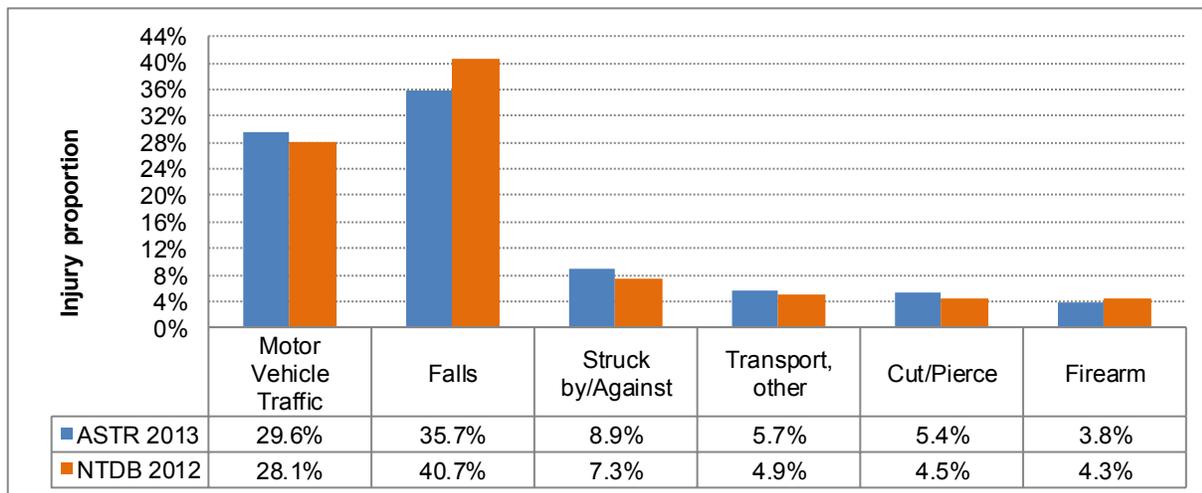
The motor vehicle traffic category only includes motor vehicles traveling on a public road or highway. “Transport, other” includes various other types of vehicles such as railway, off-road, water craft, and air craft. “Struck by/against” includes being struck by objects or people, intentionally or unintentionally.

Table 2: Mechanism of injury and case fatality proportion, ASTR 2013

INCIDENCE AND CASE FATALITY PROPORTION BY MECHANISM OF INJURY				
MECHANISM	COUNT	PERCENT	DEATHS	CASE FATALITY PROPORTION
Motor Vehicle Traffic (MVT)	12,349	36.02%	360	2.91%
Falls	10,443	30.46%	140	1.34%
Struck by/Against	3,283	9.57%	19	0.57%
Transport, other	2,087	6.08%	31	1.48%
Cut/Pierce	1,670	4.87%	31	1.85%
Firearm	1,022	2.98%	169	16.53%
Pedal Cyclist, other	768	2.24%	8	1.04%
Other Specified	579	1.68%	12	2.07%
Unspecified	519	1.51%	28	5.39%
Natural/Environmental	396	1.15%	0	0
Not elsewhere classifiable	298	0.86%	4	1.34%
Machinery	220	0.64%	0	0
Fire/Burn	189	0.55%	1	0.52%
Overexertion	161	0.46%	0	0
Pedestrian, other	149	0.43%	6	4.02%
Suffocation	87	0.25%	15	17.24%
Drowning	31	0.09%	4	12.90%
Poisoning	15	0.04%	0	0
Missing, Not Applicable, or Not Documented	9	0.02%	0	0
Total	34,275	100.00%	828	2.41%

Table 2 describes the trauma incidence and fatality proportion by mechanism of injury for 2013 ASTR data. Motor vehicle traffic related trauma is the most common mechanism of injury (36.02%), followed by falls (30.46%), struck by/against (9.57%), transport, other (6.08%), cut/pierce (4.87%), and firearm (2.98%).

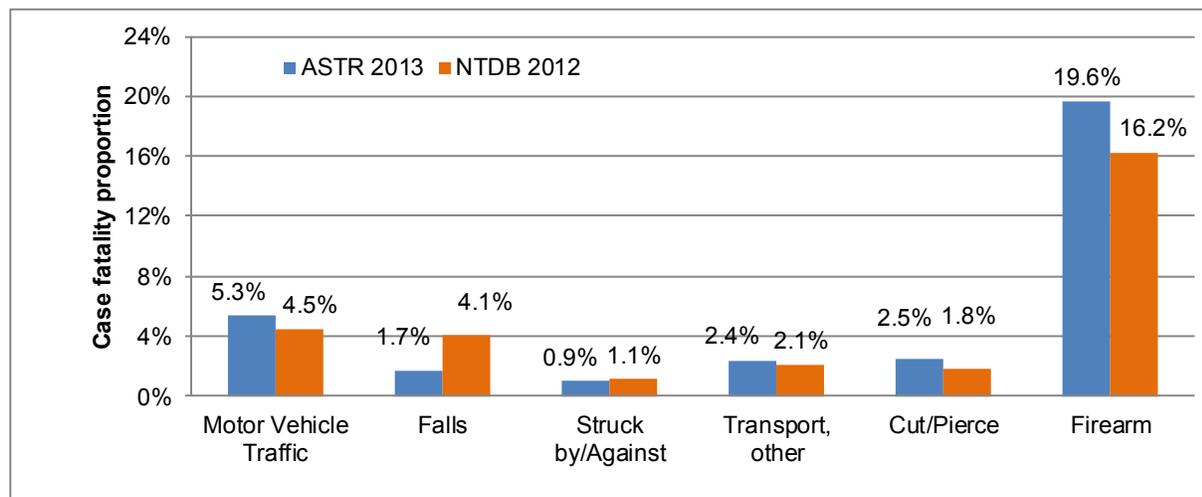
Figure 7: Top six mechanisms of injury proportion - ASTR vs. NTDB



For comparison purposes, ASTR inclusion criteria is matched to NTDB inclusion criteria.
 ASTR=Arizona State Trauma Registry, NTDB=National Trauma Data Bank

Arizona has a higher motor vehicle traffic related trauma proportion as compared to the national average. Although Arizona’s rate of falls is presented as being lower, state inclusion criteria restricts the type of falls that are submitted to the registry (Figure 7). Falls may be under reported in this comparison as a result.

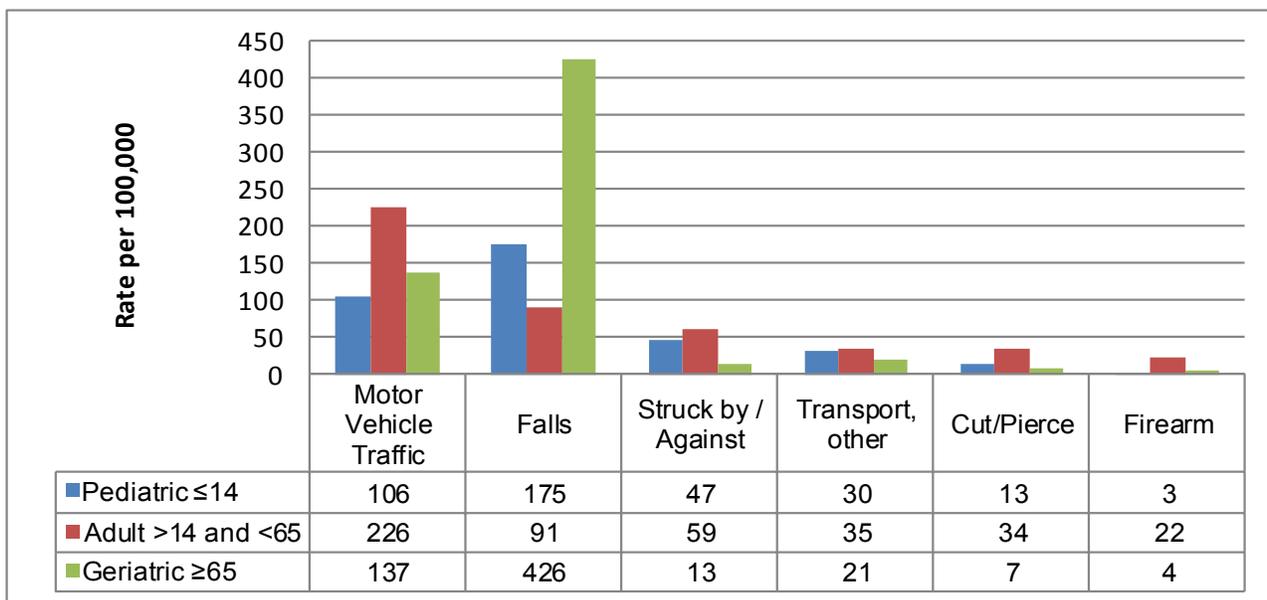
Figure 8: Top six mechanisms of injury case fatality proportion - ASTR vs. NTDB



For comparison purposes, ASTR inclusion criteria has been matched to NTDB inclusion criteria.
 ASTR=Arizona State Trauma Registry, NTDB=National Trauma Data Bank

Arizona has a higher case fatality proportion for firearm related traumas as compared to the firearm fatalities reported in the NTDB (19.6% vs. 16.2%). However, firearm injuries account for approximately 3% of all traumas in the state.

Figure 9: Selected mechanisms of injury rate per 100,000 Arizona residents by age category, ASTR 2013



The mechanism of injury with the highest rate in both geriatric (≥ 65 years) and pediatric (≤ 14) populations are falls, followed by motor vehicle traffic (Figure 9).

Figure 10: Trauma rate per 100,000 Arizona residents by age category and region, ASTR 2013

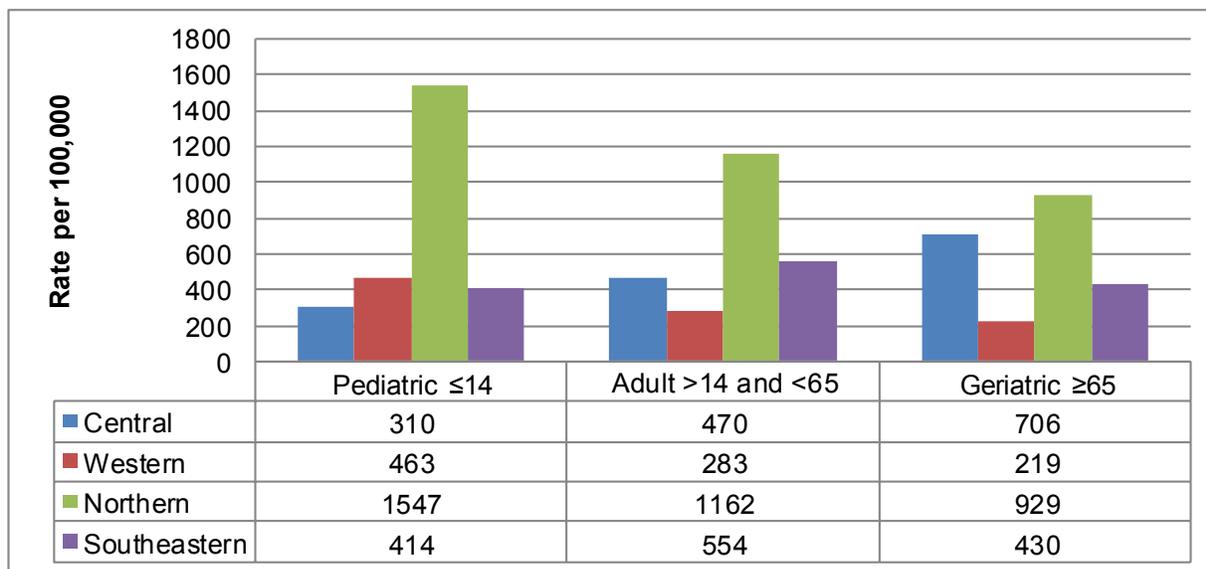
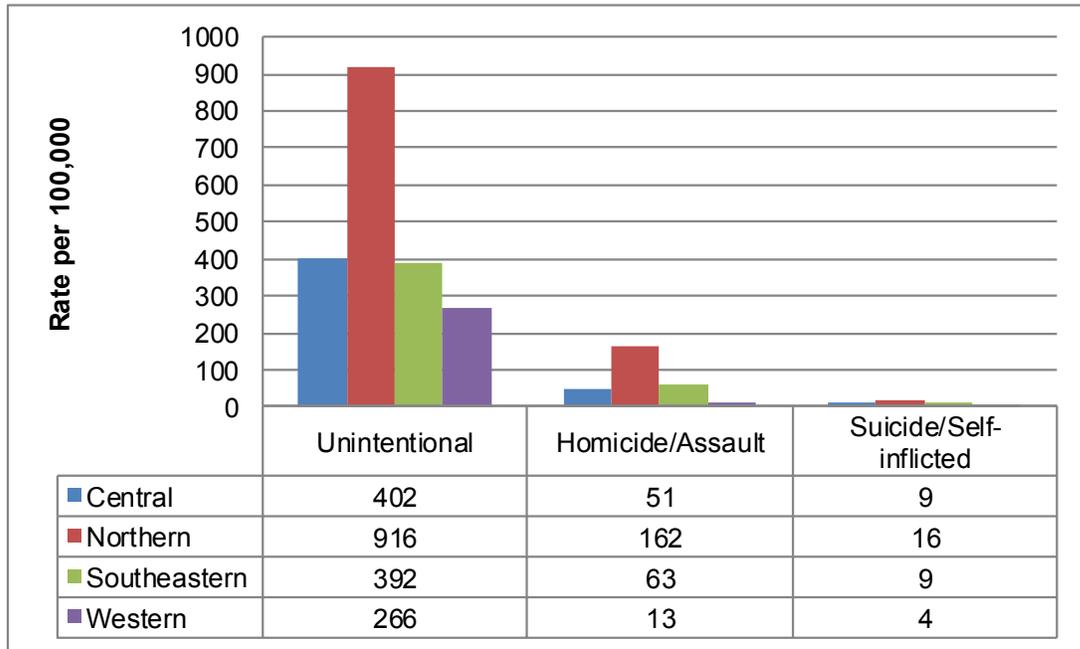


Figure 10 shows the highest trauma rates were in the Northern region regardless of age demographic.

INJURY CHARACTERISTICS: INTENT OF INJURY

Figure 11: Regional trauma rate by intent per 100,000 Arizona residents: ASTR 2013



The rate of unintentional injury was highest in the Northern region of the state. Homicide/assault and suicide/self-inflicted injury rates were also the highest in the Northern region.

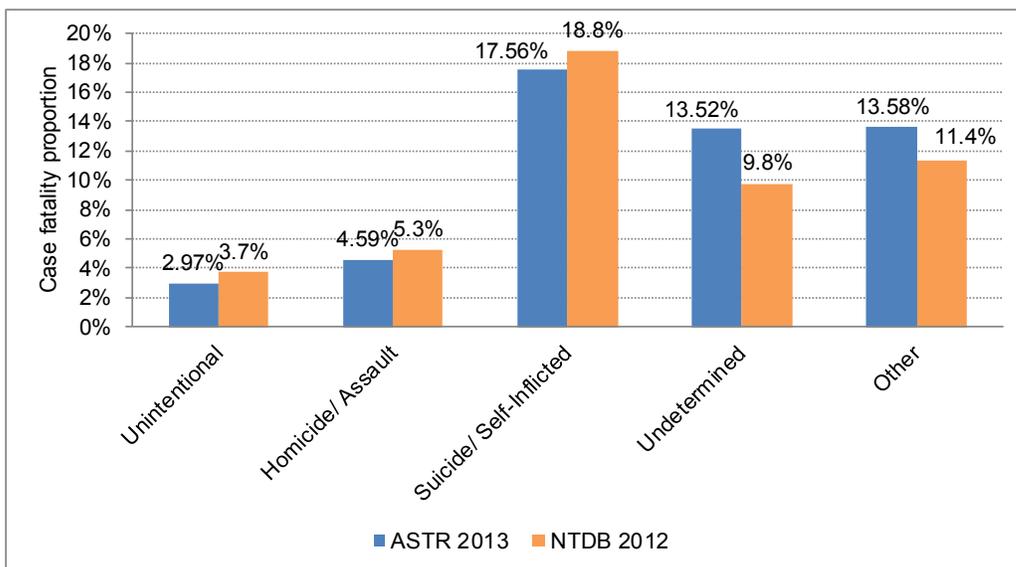
The Western region's trauma rates may be under reported as a previously participating hospital with high volume did not contribute data in 2013.

Table 3: Trauma incidence and case fatality proportion by intent and gender, ASTR 2013

TRAUMA INCIDENTS AND CASE FATALITY RATE BY INTENT AND GENDER								
	Overall		Deaths		Male		Female	
	Count	Percent	Count	Case Fatality Rate	Count	Percent	Count	Percent
Unintentional	29,319	85.54%	571	1.94%	17,177	58.58%	12,136	41.39%
Homicide	3,971	11.58%	127	3.19%	3,234	81.44%	737	18.55%
Suicide	601	1.75%	91	15.14%	445	74.04%	156	25.95%
Undetermined	276	0.8%	28	10.14%	207	75%	69	25%
Legal Intervention	100	0.29%	11	11%	92	92%	8	8%
Not Applicable Not Documented or Blank	8	0.02%	0	0	4	50%	3	37.5%
Total	34,275	100%	828	2.41%	21,159	61.73%	13,109	38.24%

Overall, 85.54% of all 2013 trauma records were unintentional injuries, with a case fatality proportion of 1.94%. Suicide/self-inflicted traumas account for 1.75% of the overall, but has a case fatality proportion of 15.14% (Table 3). Among males, the incidence of homicide/assault is almost five times that of females.

Figure 12: Trauma mortality proportion by intent - ASTR vs. NTDB



For comparison purposes, ASTR inclusion criteria has been matched to NTDB inclusion criteria. ASTR=Arizona State Trauma Registry, NTDB=National Trauma Data Bank

Figure 12 shows that trauma mortality is lower in Arizona for unintentional, homicide/assault, and suicide/self inflicted when compared to the National Trauma Data Bank (NTDB). Arizona has a higher mortality in “undetermined” and “other.”

Top six mechanisms of injury by intent

Figure 13: Unintentional trauma injury proportion, ASTR 2013 (n=29,319)

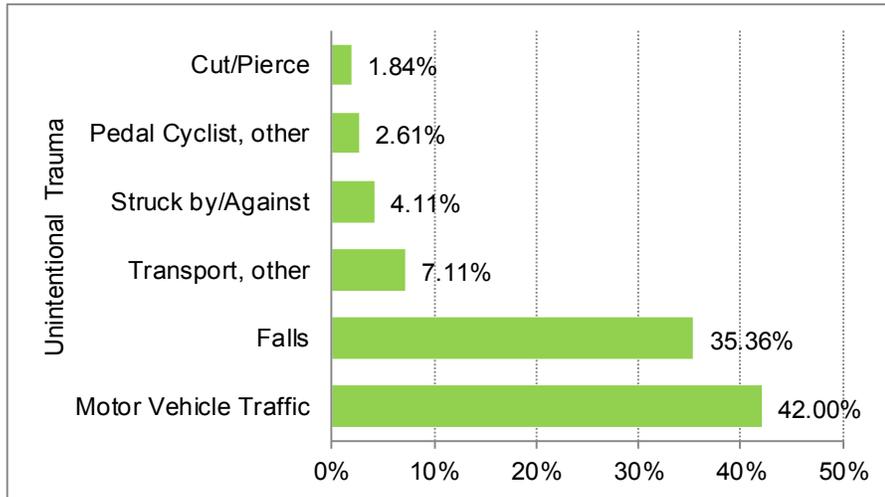


Figure 14: Homicide/assault related trauma proportion, ASTR 2013 (n=3,971)

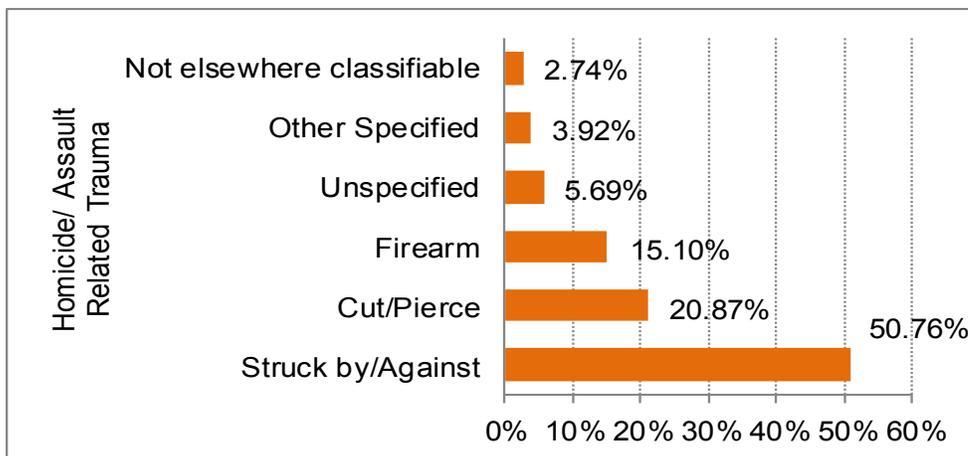
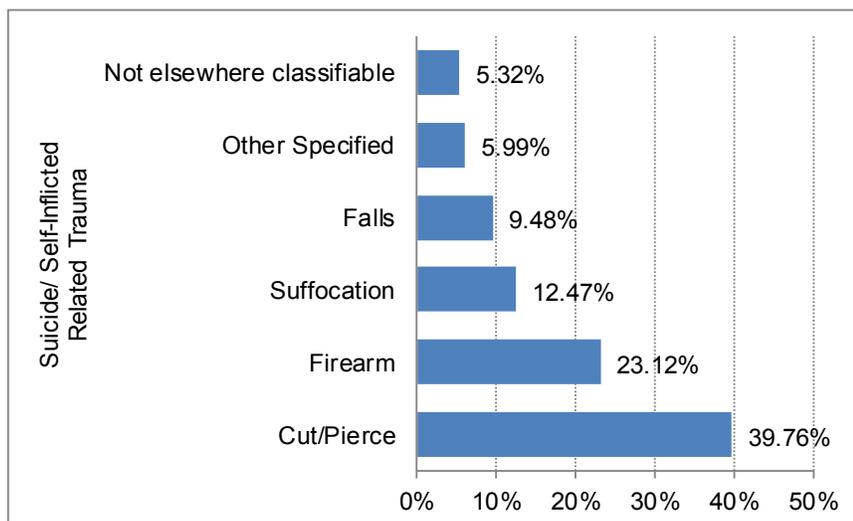


Figure 15: Suicide/Self-inflicted trauma proportion, ASTR 2013 (n=601)



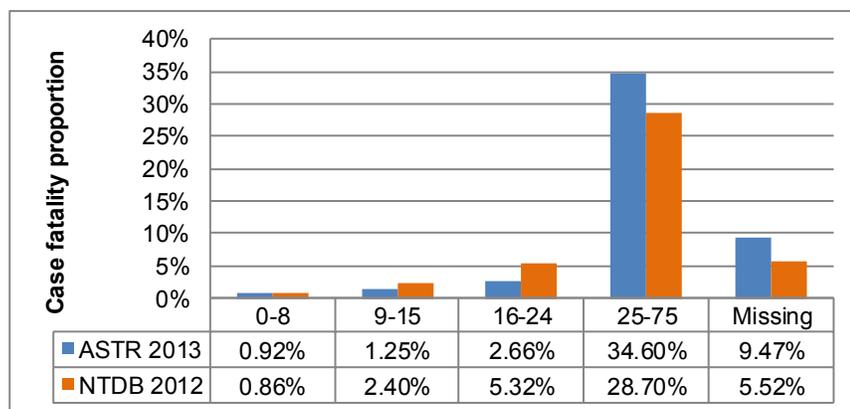
INJURY CHARACTERISTICS: INJURY SEVERITY

Table 4: Trauma incidence and case fatality proportion by Injury Severity Score (ISS), ASTR 2013

INCIDENTS AND CASE FATALITY PROPORTION BY INJURY SEVERITY SCORE				
Injury Severity Score	Count	Percent	Deaths	Case Fatality Rate
0-8	21,802	63.6%	107	0.49%
9-15	7,175	20.93%	86	1.19%
16-24	2,605	7.6%	69	2.64%
25-75	1,582	4.61%	546	34.51%
Missing	1,111	3.24%	20	1.8%
Total	34,275	100%	828	2.41%

Approximately 5% of trauma patients had an Injury Severity Score (ISS) of ≥ 25 with a case fatality proportion of 35.5% (Table 4). An ISS represents the severity of an injury sustained by a patient. Injuries with an ISS < 15 are minor to moderate, and patients with an ISS over 25 have suffered a severe injury. An ISS is calculated through the use of the ninth revision of the International Classification of Diseases.

Figure 16: Trauma case fatality proportion by ISS - ASTR vs. NTDB

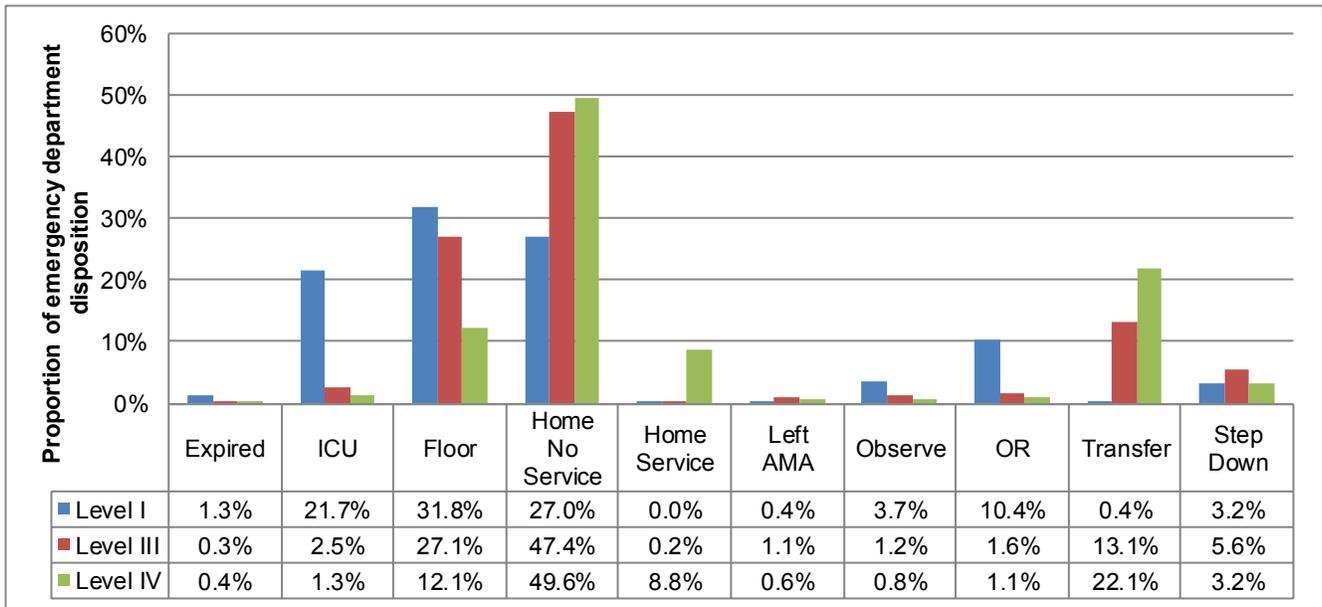


For comparison purposes, ASTR inclusion criteria is matched to NTDB inclusion criteria. ASTR=Arizona State Trauma Registry, ISS=Injury Severity Score, NTDB=National Trauma Data Bank

Arizona has a slightly lower case fatality proportion for trauma patients with an ISS 16-24, but a higher fatality for patients with an ISS 25-75. Slightly less than 10% of cases had a missing ISS (Figure 16).

OUTCOMES

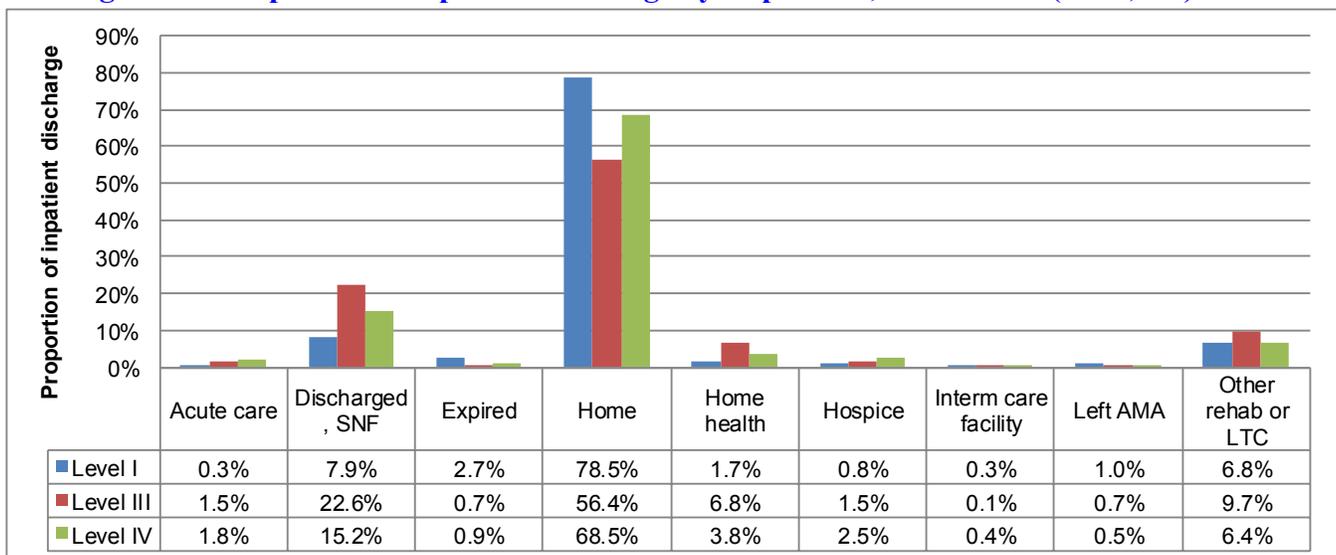
Figure 17: Proportion of emergency department discharge by disposition, ASTR 2013 (n=32,871)



AMA=Against Medical Advice, ICU=Intensive Care Unit, OR=Operating Room

A large portion of trauma patients in Level III and Level IV trauma centers were discharged with no out-patient services/home services from the Emergency Department (ED) (47% and 49.6%, respectively). In Level I trauma centers patients were either discharged home with no out-patient home services (27%), admitted from the ED to the floor of the hospital (31.8%), admitted to the Intensive Care Unit (ICU) (22%), or admitted to the Operating Room (OR)(10%).

Figure 18: Proportion of inpatient discharge by disposition, ASTR 2013 (n=20,304)

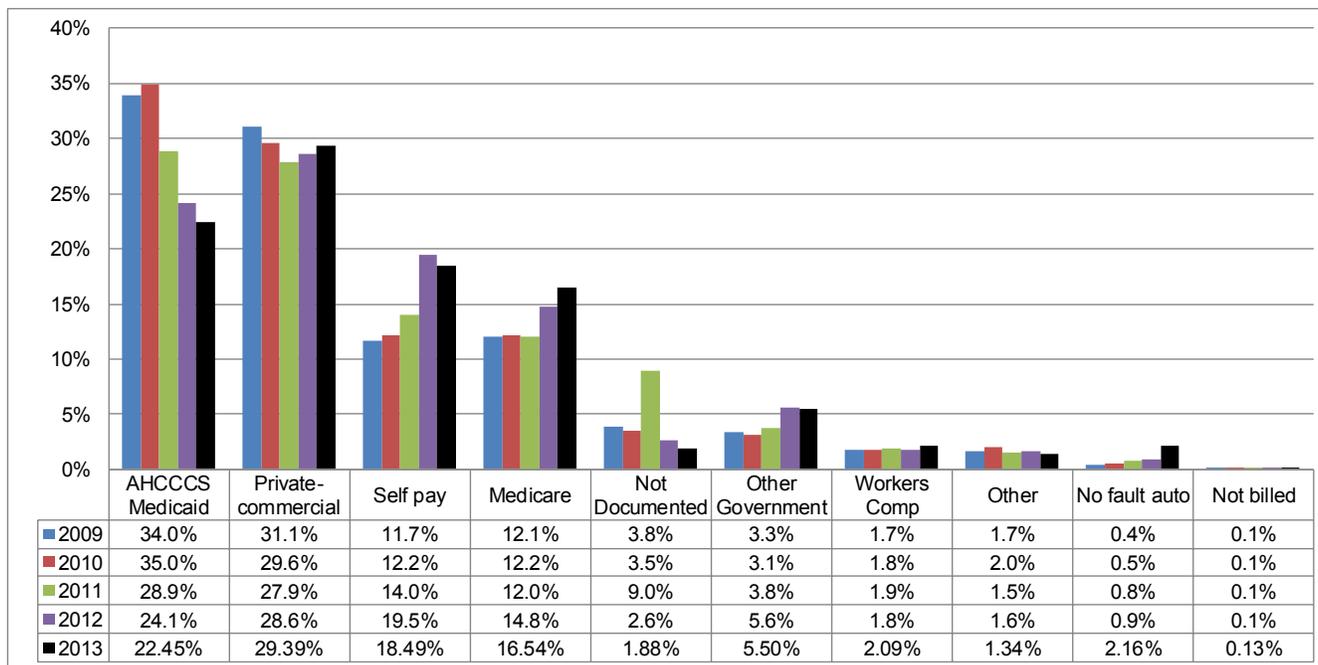


AMA=Against Medical Advice, SNF=Skilled Nursing Facility

Most patients were discharged to their home by all levels of trauma centers. Level III trauma centers discharged more of their patients to skilled nursing facilities (22.6%).

PRIMARY PAYMENT SOURCE AND TOTAL TRAUMA CHARGES

Figure 19: Primary payment source proportion, ASTR 2009-2013



Since 2009, the Arizona Health Care Cost Containment System (AHCCCS) as a primary payment source has decreased while self pay has increased (Figure 19).

Table 5: Primary payer, total charges and reimbursements, ASTR 2013 (n=34,275)

Primary Payer	Total Charges ^a	Median Charges	Total Reimbursement*
Private - commercial	\$466,788,339	\$25,527	\$127,394,700
Self pay	\$294,907,697	\$26,565	\$2,401,954
AHCCCS/Medicaid	\$284,985,291	\$18,980	\$25,166,234
Medicare	\$264,125,309	\$28,884	\$45,303,485
Other Government	\$85,721,469	\$23,309	\$9,001,184
Workers Comp	\$40,597,782	\$29,292	\$14,350,623
No fault auto	\$21,239,875	\$15,986	\$1,956,599
Other	\$17,681,650	\$21,755	\$1,954,621
Not documented	\$6,267,602	\$18,685	\$335,943
Not billed	\$780,416	\$10,354	\$0
Total Charges	\$1,483,095,430	\$24,144	\$227,865,343

^a Total charges is defined as the whole dollar amount for services provided during an episode of care in the hospital.

* Total reimbursement represents the amount reported at the time data were finalized.

The median charge to a trauma patient from the hospital was \$24,144. This does not include any pre-hospital charges or rehab charges associated with trauma.

TOTAL CHARGES BY AGE AND MECHANISM OF INJURY

Table 6: Age-specific charges and reimbursements, ASTR 2013 (n=34,275)

Age groups	Total Charges	Median Charges	Total Reimbursement
<15	\$125,207,093	\$11,300	\$22,866,064
15-19	\$108,527,236	\$21,334	\$16,570,690
20-44	\$548,688,718	\$24,915	\$67,403,464
45-64	\$388,599,926	\$30,021	\$66,205,934
65+	\$312,067,205	\$32,912	\$54,819,190
Total Charges	\$1,483,095,430	\$24,144	\$227,865,343

The most expensive median charge for trauma treatment was seen in older adults (\$32,912).

Table 7: Charges and reimbursements, by mechanism of injury, ASTR 2013 (n= 34,275)

Mechanism of Injury	Total Charges	Median Charges	Total Reimbursement
Falls	\$420,598,075	\$24,836	\$77,430,913
MVT - Occupant	\$373,122,548	\$23,818	\$51,868,712
MVT - Motorcyclist	\$131,113,758	\$34,659	\$22,626,235
Other Transport	\$96,594,594	\$23,935	\$16,256,483
Struck by/Against	\$90,045,780	\$17,965	\$11,972,612
MVT - Pedestrian	\$82,891,995	\$33,537	\$9,740,855
Firearm	\$64,346,537	\$30,453	\$6,780,371
Cut/Pierce	\$54,306,696	\$23,978	\$5,448,438
Other Specified	\$32,727,688	\$18,950	\$5,987,416
MVT - Pedal Cyclist	\$28,630,778	\$27,680	\$3,297,654
Other Pedal Cyclist	\$27,767,546	\$24,527	\$4,837,490
Not Specified	\$25,291,849	\$23,422	\$3,175,484
Other Pedestrian	\$11,910,512	\$33,977	\$615,545
MVT - Other	\$9,623,445	\$17,314	\$1,548,220
Natural/Environmental	\$9,242,280	\$17,601	\$1,802,754
Not elsewhere classifiable	\$8,211,009	\$18,873	\$1,174,792
Machinery	\$6,091,848	\$19,957	\$1,405,748
Fire/Burn	\$3,308,633	\$8,357	\$387,071
Suffocation	\$3,038,526	\$27,350	\$434,348
Overexertion	\$2,731,128	\$9,570	\$757,420
Drowning	\$618,767	\$15,374	\$128,993
Poisoning	\$611,628	\$32,871	\$78,199
Missing	\$269,809	\$24,312	\$109,591
Total	\$1,483,095,430	\$24,144	\$227,865,343

Trauma Centers charged \$129 million to treat patients for Falls and Motor Vehicle Traffic (MVT) - Occupant injuries. These two injuries accounted for 56% of reimbursements listed in Figure 19.

From 2012 to 2013, total trauma charges increased by \$157 million while reimbursement decreased by \$61 million.

DRUG AND ALCOHOL USE AND TRAUMA

Of the 28,164 adult patients, 20.49% of patients (5,773) were positive for alcohol and 15.23% of patients (4,290) were positive for drugs. Drug and/or alcohol use includes patients that were confirmed, suspected, or reported to have taken the substance. In 2013, 29.9% of all trauma patients over the age of 14 tested positive for either drug or alcohol use (Table 8).

The pediatric (≤ 14 years) population was excluded from the drug and alcohol analysis.

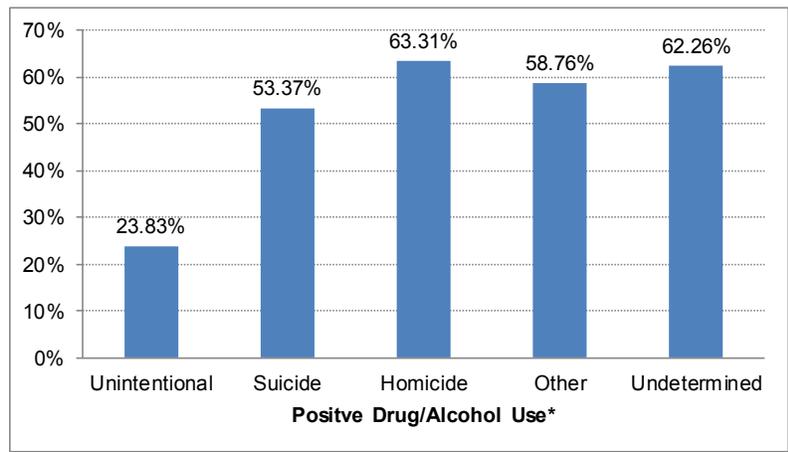
Table 8: Intent of injury and drug and alcohol use*, ASTR 2013

INTENT OF INJURY AND DRUG ALCOHOL USE (Age >14 YEARS)				
Injury Intent	Count	Percent	Drug/ Alcohol Use*	Drug/ Alcohol %
Unintentional	23,611	83.83%	5,627	23.83%
Suicide/ Self-Inflicted	577	2.04%	308	53.37%
Homicide/ Assault	3,661	12.99%	2,318	63.31%
Other	97	0.34%	57	58.76%
Undetermined	212	0.75%	132	62.26%
Missing	6	0.02%	1	16.66%
Total (Age>14 Years)	28,164	100%	8,443	29.97%

* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

Traumatic cases that had drug/alcohol indicators over half the time were suicide/self-inflicted (53%), homicide/assault (63%), other (59%), and undetermined (62%).

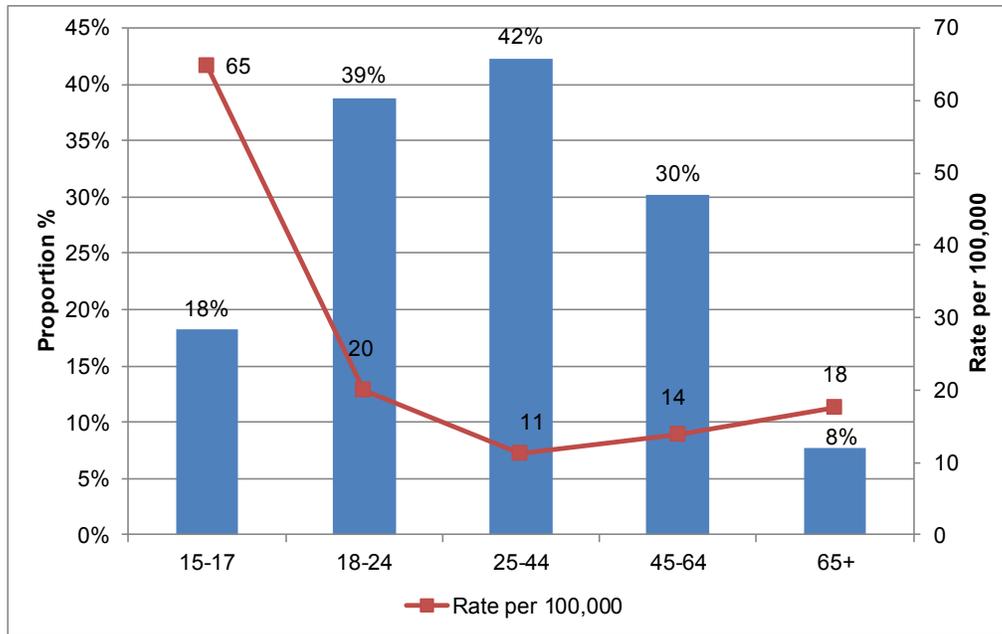
Figure 20: Drug and alcohol use* by intent, ASTR 2013 (n=28,164)



* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

For all intents of injury except unintentional, more than half tested positive or were suspected positive for drugs or alcohol (Figure 20).

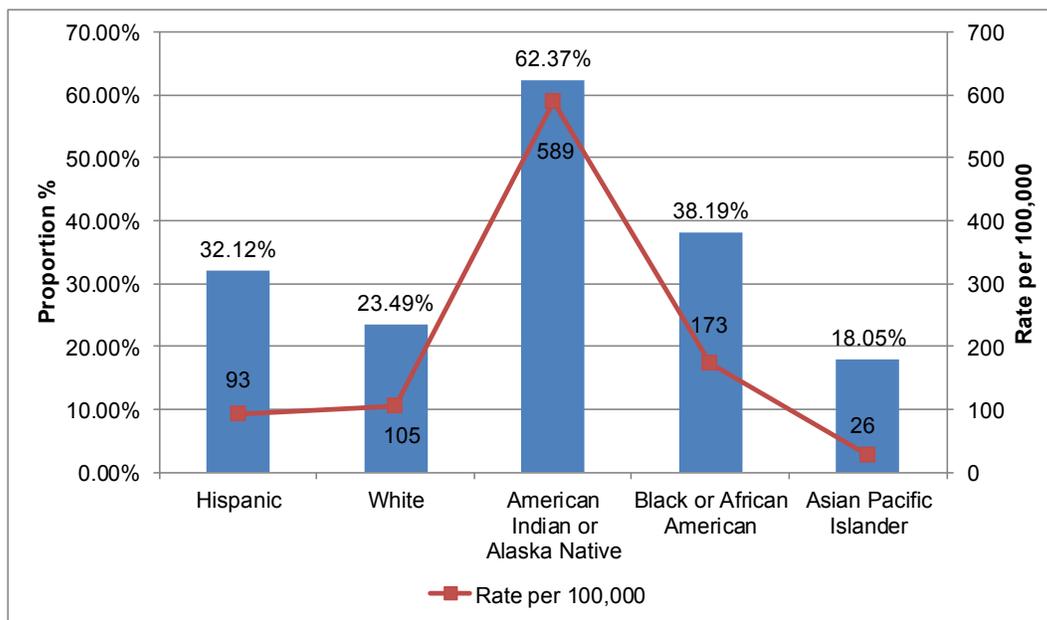
Figure 21: Drug and/or alcohol use* by age, ASTR 2013



* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

Although 18% of cases in 15-17 year olds had drugs and/or alcohol in their system, when compared to per rate of 100,000 they had the highest rate compared to all other groups combined.

Figure 22: Drug and/or alcohol use* by race/ethnicity, ASTR 2013

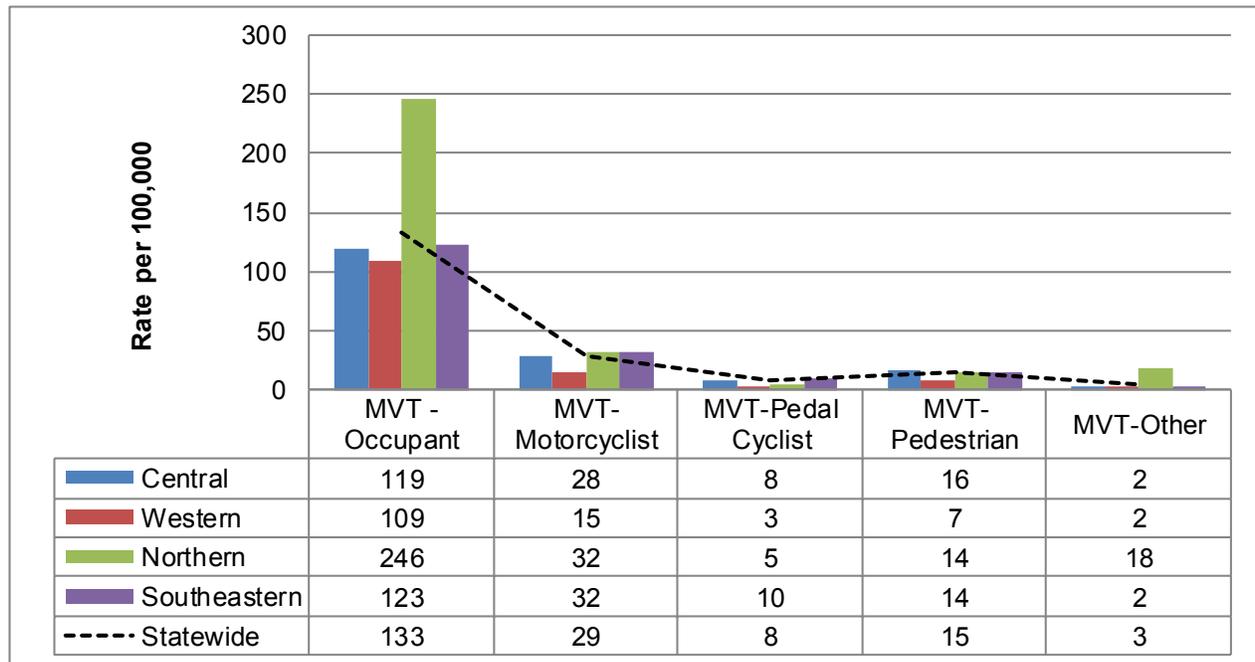


* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

Figure 22 shows that 62% (1,909) of American Indian/Alaska Native trauma patients were under the influence of drugs and/or alcohol. However, the largest volume of trauma patients under the influence of drugs and/or alcohol were White (4,025).

MOTOR VEHICLE TRAFFIC RELATED TRAUMA

Figure 23: Motor vehicle traffic related trauma rate per 100,000 by region, ASTR 2013



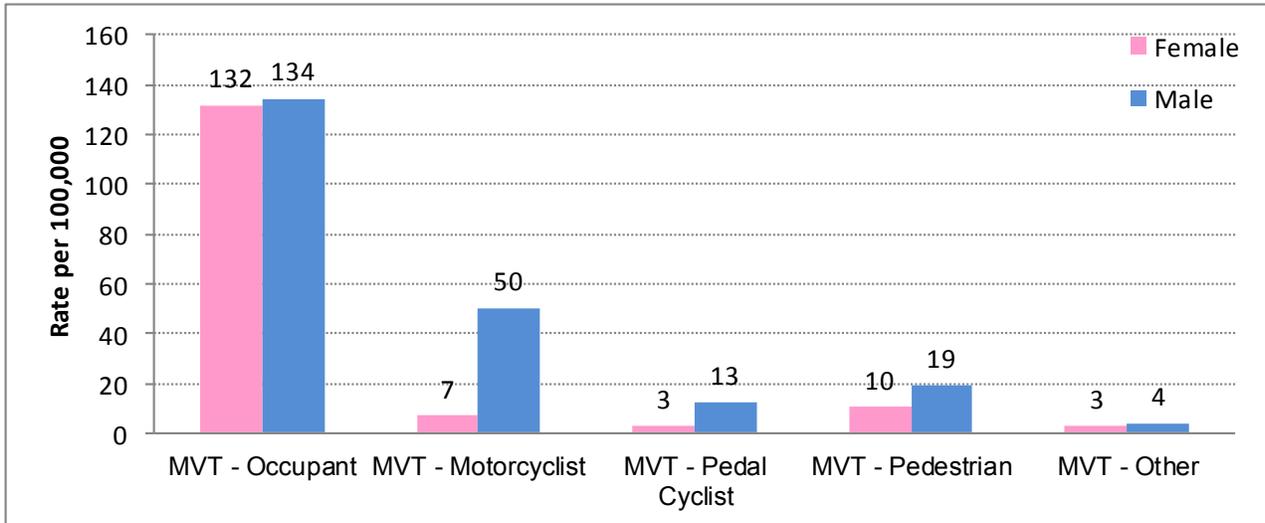
Although the Central Region had the highest volume of injured MVT-Occupants, it is believed to have the lowest rate per 100,000 residents. The Western region is thought to be under reported as a previously reporting hospital with high volumes did not report in 2013. The Northern Region had the highest motor vehicle traffic trauma per 100,000 residents (Figure 23).

Table 9: Motor vehicle traffic related trauma incidence and case fatality proportion, ASTR 2013

INCIDENCE AND CASE FATALITY PROPORTION BY TYPES OF MVT				
Motor Vehicle Traffic Accidents	Count	Percent	Deaths	Case Fatality proportion
MVT - Occupant	8,744	70.8%	166	1.89%
MVT - Motorcyclist	1,881	15.23%	85	4.51%
MVT - Pedal Cyclist	516	4.17%	15	2.9%
MVT - Pedestrian	978	7.91%	88	8.99%
MVT - Other	230	1.86%	6	2.6%
Total	12,349	100%	360	2.91%

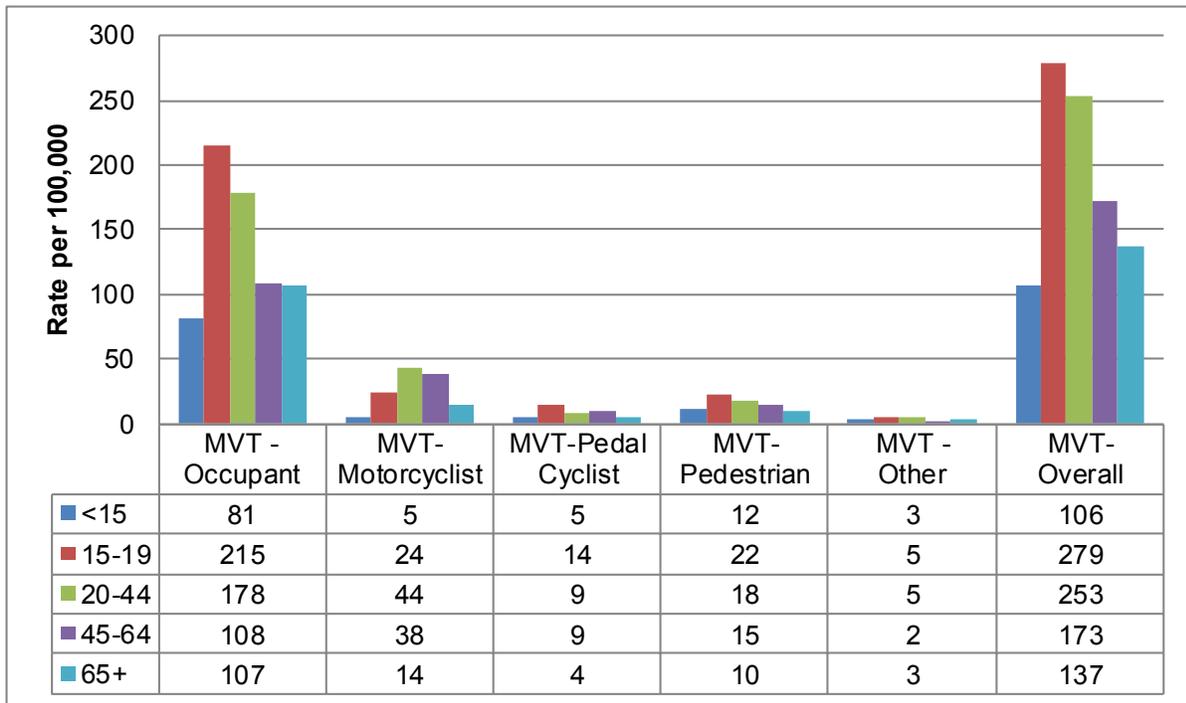
Table 9 describes the types of MVT related trauma and case fatality proportion. Of the 34,275 trauma cases, 36% (12,349) were from motor vehicle traffic related trauma. The highest case fatality proportion is among pedestrians involved in MVT related trauma (8.99%).

Figure 24: Motor vehicle traffic related trauma rates per 100,000 Arizona residents by gender, ASTR 2013



There was no gender difference found for injured MVT-occupants. For all the other types of MVT related trauma, the predominant gender was male (Figure 24).

Figure 25: Motor vehicle traffic related trauma rates per 100,000 Arizona residents by age, ASTR 2013



Although 20-44 year olds have the highest MVT related trauma volumes, 15-19 year olds have the highest rates per 100,000 residents for MVT-occupant, pedal cyclist, and pedestrian related traumas (Figure 25).

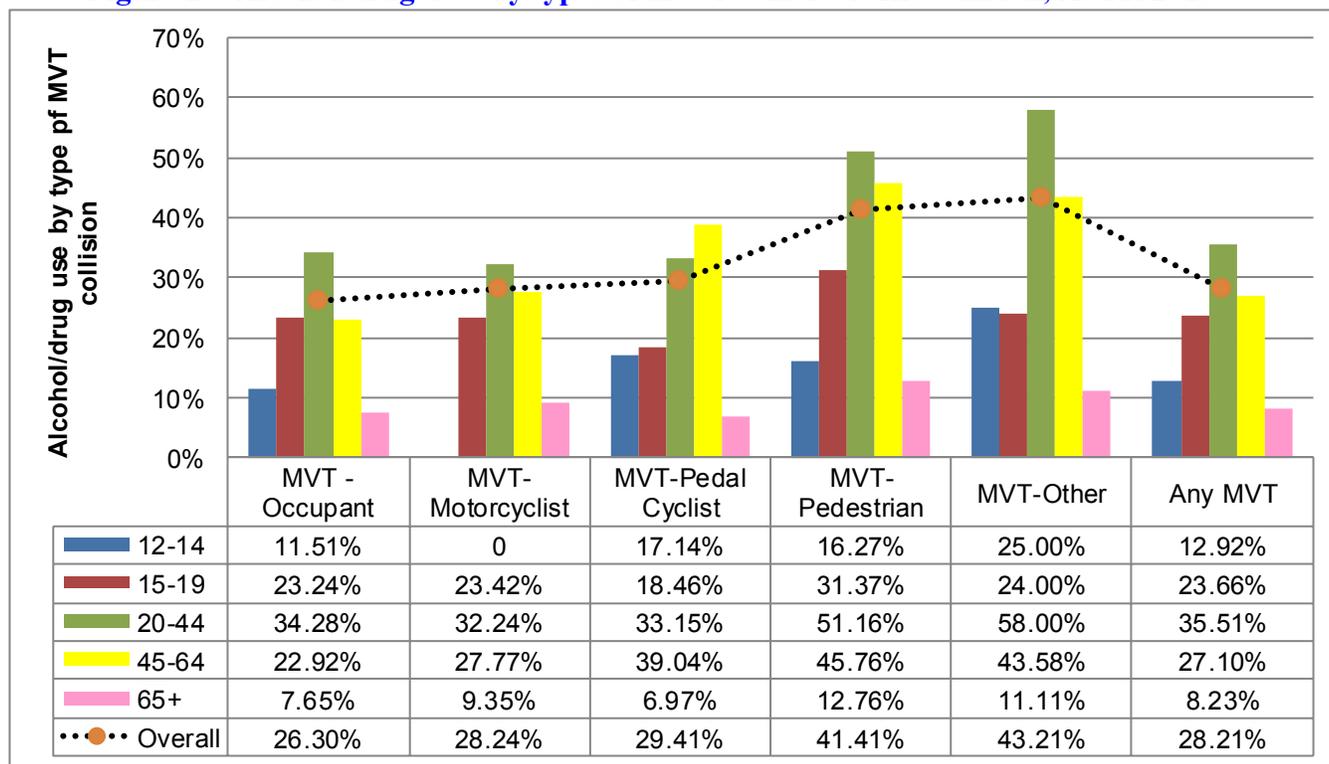
Table 10: Alcohol/drug use* by types of motor vehicle traffic collisions, ASTR 2013

INCIDENCE AND CASE FATALITY PROPORTION BY TYPES OF MVT												
Age groups	MVT-Occupant		MVT-Motorcyclist		MVT-Pedal Cyclist		MVT-Pedestrian		MVT-Other		Any MVT	
	N	%	N	%	N	%	N	%	N	%	N	%
12-14	19	11.51%	0	0	6	17.14%	7	16.27%	2	25%	34	12.92%
15-19	235	23.24%	26	23.42%	12	18.46%	32	31.37%	6	24%	311	23.66%
20-44	1,324	34.28%	305	32.24%	62	33.15%	198	51.16%	58	58%	1,947	35.51%
45-64	395	22.92%	170	27.77%	57	39.04%	108	45.76%	17	43.58%	747	27.1%
65+	80	7.65%	13	9.35%	3	6.97%	12	12.76%	3	11.11%	111	8.23%
Overall	2,053	26.3%	514	28.24%	140	29.41%	357	41.41%	86	43.21%	3,150	28.21%

* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

For all MVT related traumas except MVT-Pedal Cyclist, 20-44 year olds have the highest proportion of alcohol/drug use compared to any other age group. In 2013, 35% of the 20-44 age group had used alcohol or drugs at the time of their trauma.

Figure 26: Alcohol/drug use* by types of motor vehicle traffic collision, ASTR 2013

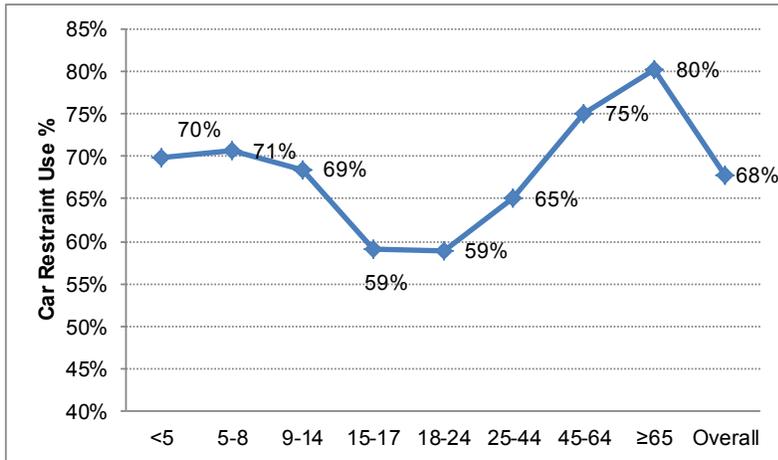


* Drug and/or alcohol use includes patients with confirmed, suspected, or reported to take either substance.

Overall, one in four MVT-occupants or MVT-motorcyclists involved in a collision were confirmed or suspected for using alcohol/drug (Table 10 and Figure 26). This number remained unchanged from last year.

PROTECTIVE DEVICE USE

Figure 27: Age-specific proportion of car restraint use, ASTR 2013 (n=8,774)



Of the 8,744 MVT injured occupants, 68% used a car seat or seat belt (restraint). Motor vehicle occupants ages 15-17 were least likely to use a restraint. The most frequent restraint use was found in adults ≥ 65 (Figure 27).

Figure 28: Proportion of helmet use for motorcyclist (n=1,881) and pedal cyclist (n= 1,284) for adult vs. pediatric, ASTR 2013

Of the 1,881 MVT motorcyclists who suffered a trauma, 48.7% used a helmet. Of the 1,284 traffic and non-traffic pedal cycle trauma, slightly more than a quarter used a helmet.

Of the 319 pediatric (<18 years) pedal cyclists involved in a trauma, only 14.7% used a helmet (Figure 28).

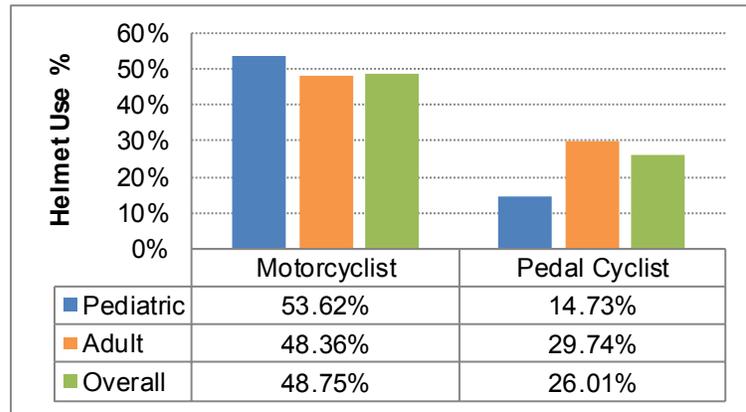
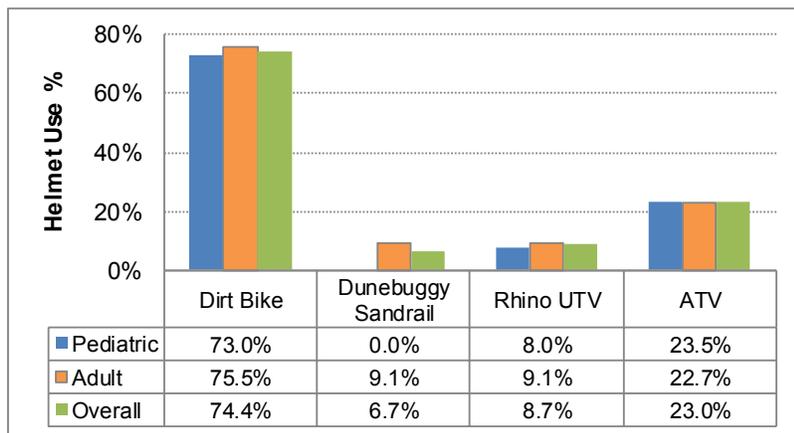


Figure 29: Rate of helmet use for select off road vehicles for adult vs. pediatric, ASTR 2013 (n=868)



Out of the 180 dirt bike injuries, 74 (41.1%) cases involved pediatric cases (<18 years). There were no pediatric cases involved in the 15 dunebuggy/sandrail injuries. The 69 rhino/UTV injuries had 25 (36%) pediatric cases. Lastly, 36% ATV trauma injuries involved pediatric cases.

Only 23% of patients injured on an ATV were wearing a helmet; whereas, 74.4% of injured dirt bike riders were wearing a helmet (Figure 29).

TRAUMATIC BRAIN INJURY (TBI)

Table 11: Age-specific TBI incidence and case fatality proportion, ASTR 2013 (n=8,384)

TBI INCIDENCES AND CASE FATALITY PROPORTION BY AGE								
Age groups	Major TBI				Minor/Moderate TBI			
	Count	Percent	Deaths	Case Fatality Proportion	Count	Percent	Deaths	Case Fatality Proportion
<1	247	5.8%	7	2.83%	287	6.95%	0	0
1-4	136	3.19%	14	10.29%	159	3.85%	0	0
5-9	93	2.18%	6	6.45%	121	2.93%	1	0.82%
10-14	98	2.3%	10	10.2%	234	5.67%	0	0
15-19	255	5.98%	31	12.15%	486	11.77%	0	0
20-24	276	6.48%	40	14.49%	450	10.9%	0	0
25-34	508	11.93%	76	14.96%	642	15.55%	0	0
35-44	397	9.32%	56	14.1%	463	11.22%	0	0
45-54	510	11.97%	61	11.96%	480	11.63%	0	0
55-64	524	12.3%	65	12.4%	303	7.34%	1	0.33%
65-74	433	10.16%	38	8.77%	238	5.76%	2	0.84%
75-84	458	10.75%	41	8.95%	159	3.85%	1	0.62%
≥85	323	7.58%	22	6.81%	104	2.52%	5	4.80%
Overall	4,258	100%	467	10.96%	4,126	100%	10	0.24%

Major TBI is equivalent to Type I of the Barell Matrix or AIS code with head injury severity ≥ 3 . Moderate and minor TBI are equivalent to Type II and Type III of the Barell Matrix respectively. A total of 4,258 major TBI cases, and 4,126 minor/moderate TBI cases were treated in an ASTR reporting hospital in 2013. The case fatality proportion among major TBI cases is 10.96% (Table 11). The highest case fatality proportion was among 25-34 years for major TBI (14.9%), followed by the 35-44 years group (14.1%) (Figure 30).

Figure 30: TBI case fatality by age

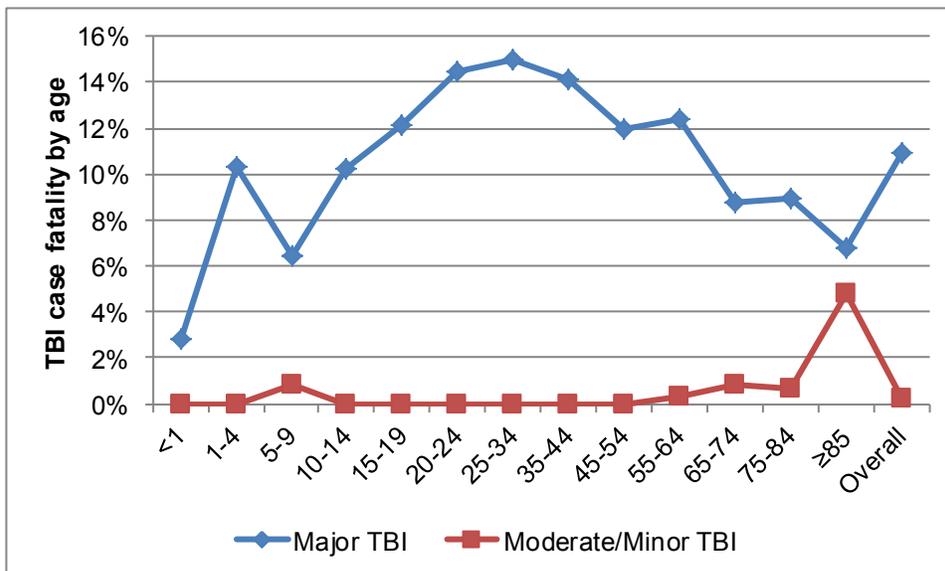


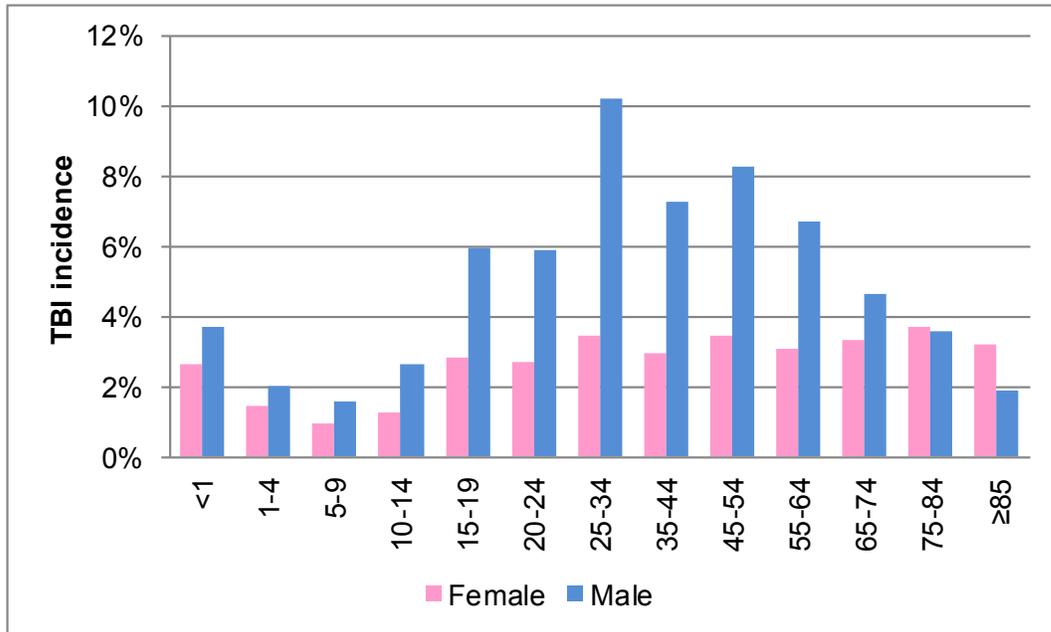
Table 12: Age-specific TBI incidence and case fatality proportion by ED GCS score, ASTR 2013 (n=8,301)

TBI INCIDENCES AND CASE FATALITY PROPORTION BY GCS												
Age groups	GCS 13-15				GCS 9-12				GCS <9			
	Count	Percent	Deaths	Case Fatality Proportion	Count	Percent	Deaths	Case Fatality Proportion	Count	Percent	Deaths	Case Fatality Proportion
<1	460	6.63%	1	0.21%	14	4.11%	1	7.14%	26	2.52%	5	19.23%
1-4	244	3.52%	0	0	17	5%	0	0	30	2.91%	14	46.66%
5-9	181	2.61%	0	0	7	2.05%	1	14.28%	24	2.33%	6	25.00%
10-14	297	4.28%	0	0	8	2.35%	1	12.5%	26	2.52%	9	34.61%
15-19	633	9.13%	0	0	21	6.17%	1	4.76%	83	8.05%	30	36.14%
20-24	587	8.46%	0	0	26	7.64%	1	3.84%	110	10.67%	39	35.45%
25-34	904	13.04%	0	0	42	12.35%	1	2.38%	194	18.83%	75	38.65%
35-44	680	9.81%	2	0.29%	42	12.35%	3	7.14%	133	12.91%	51	38.34%
45-54	793	11.44%	3	0.37%	53	15.58%	1	1.88%	137	13.3%	57	41.60%
55-64	659	9.50%	6	0.91%	42	12.35%	4	9.52%	123	11.94%	56	45.52%
65-74	583	8.41%	4	0.68%	20	5.88%	2	10%	63	6.11%	34	53.96%
75-84	530	7.64%	11	2.07%	26	7.64%	2	7.69%	60	5.82%	29	48.33%
≥85	380	5.48%	12	3.15%	22	6.47%	2	9.09%	21	2.03%	13	61.90%
Overall	6,931	100%	39	0.56%	340	100%	20	5.88%	1,030	100%	418	40.58%

ED= Emergency Department, GCS= Glasgow Coma Score, TBI=Traumatic Brain Injury

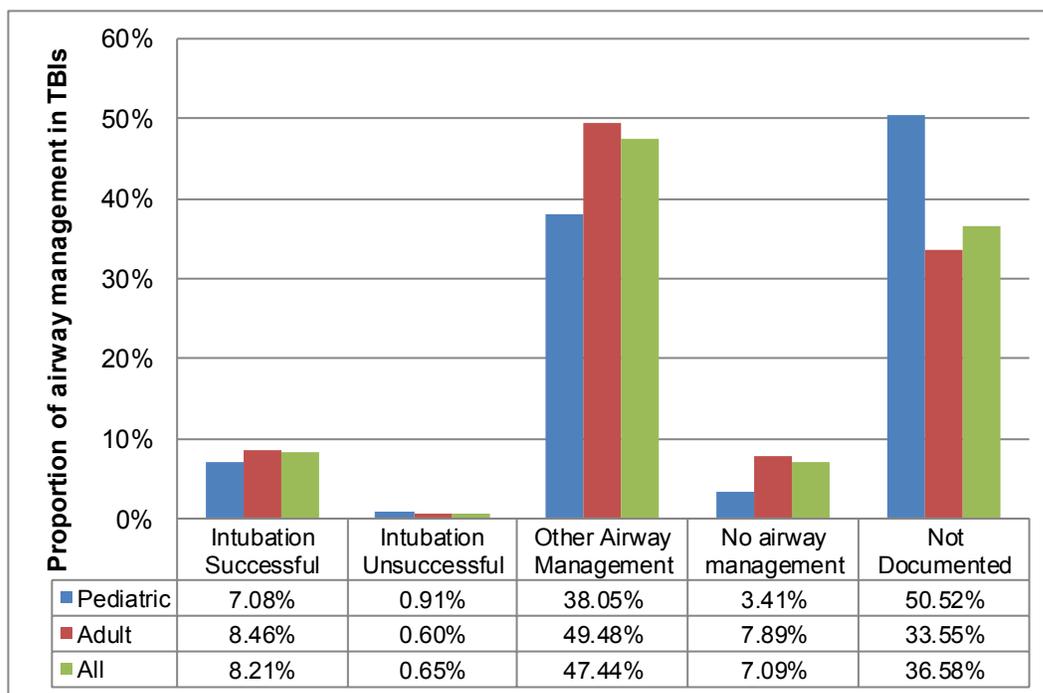
Table 12 shows distribution of TBI incidence and case fatality proportion by ED Glasgow Coma Score (GCS) and age. Overall mortality for the GCS<9 group was 40.58% and within this group, patients ≥85 year-old had the highest case fatality proportion. GCS information was missing in 74 TBI cases and were excluded from Table 12.

Figure 31: TBI incidence by age and gender, ASTR 2013, n=8,384



Males make up more TBI cases than females in every age group except for the ≥ 75 year age group (Figure 31).

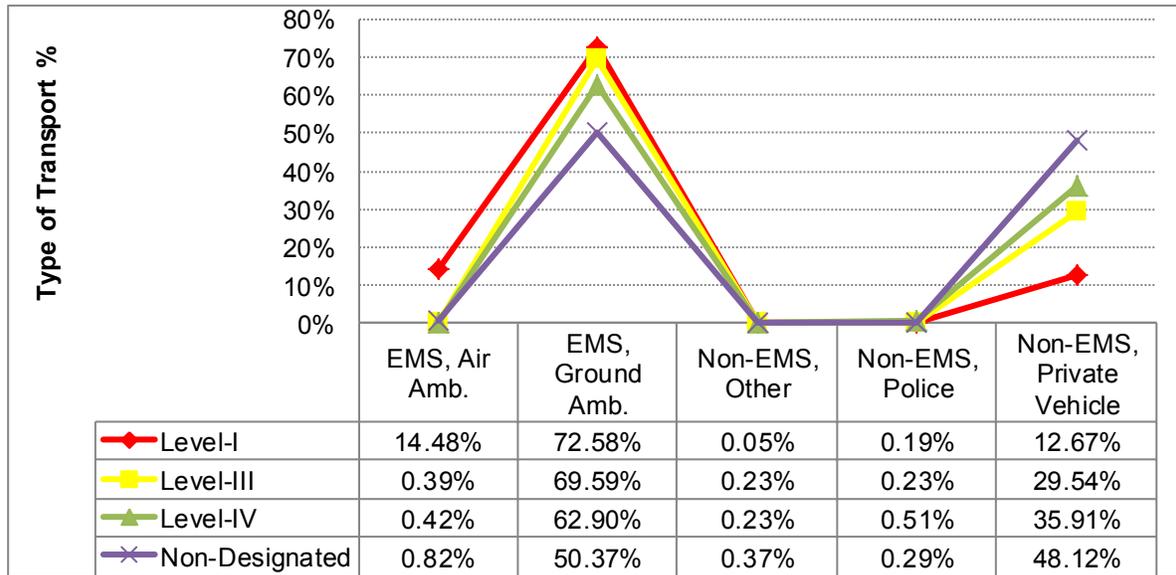
Figure 32: Field airway management among major TBI patients, ASTR 2013 (n=4,258)



Of the 762 pediatric (< 19 years) major TBI cases, 7% (54) received successful intubation. Overall 8% of the major TBI cases received successful intubation, 47% received other types of airway management (ex: auto-ventilator, bag valve mask , etc.), 7% did not receive any airway management and in 37% of the cases, airway management was not documented (Figure 32).

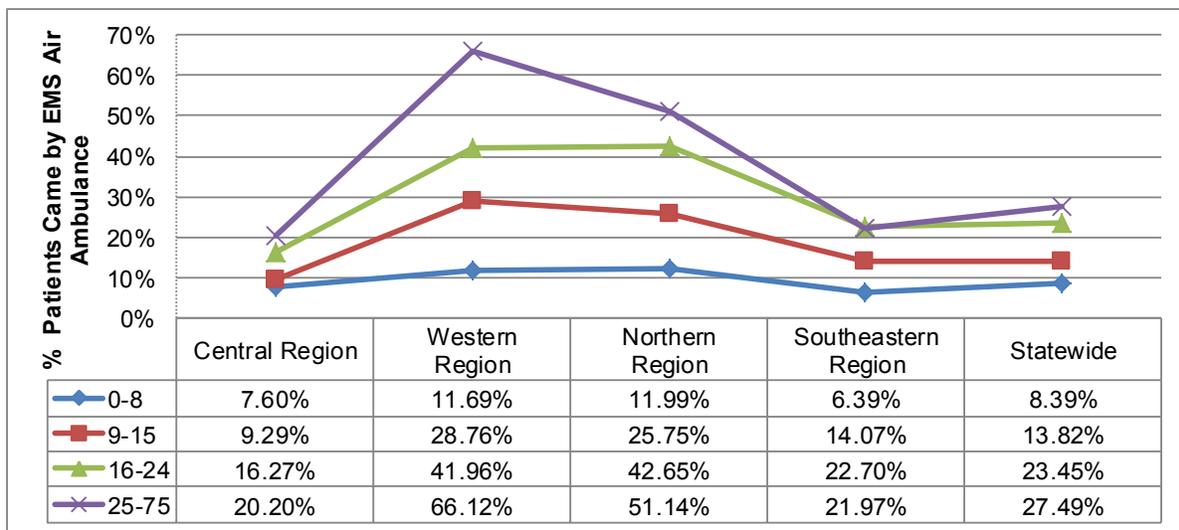
TYPE OF TRANSPORT

Figure 33: Mode of transport into reporting hospital, ASTR 2013



EMS ground ambulances were the most common mode of transport into any trauma center. However, EMS air ambulances were more likely to be the mode of transport into a Level I trauma center, and private vehicles were more likely to be the mode into a Level III, Level IV, or non-designated hospital (Figure 33).

Figure 34: Patients arriving at hospital via EMS air ambulance by region and ISS, ASTR 2013



The percent of patients arriving via EMS air ambulance is highest when the Injury Severity Score (ISS) is >15. The Northern region had the highest proportion of arrival by EMS air ambulance for all ISS categories as compared to any other region (Figure 34).

GOLDEN HOUR

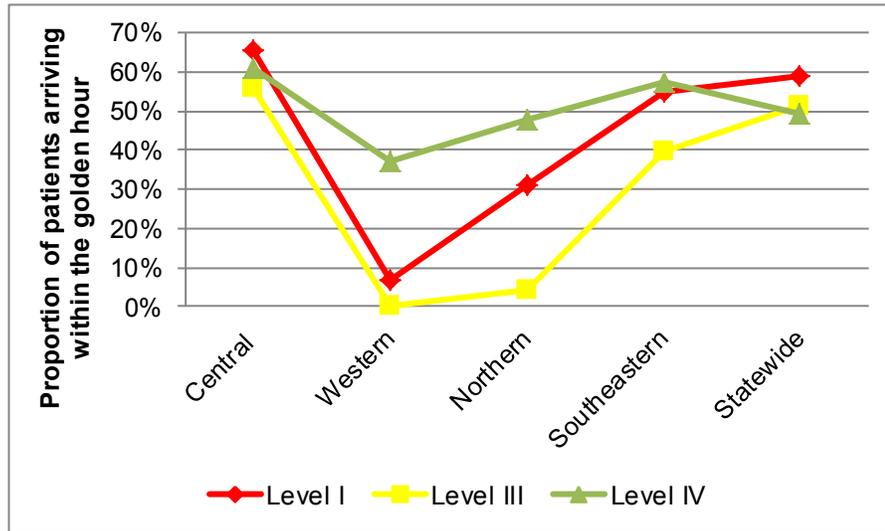
The golden hour report examines whether a patient arrived at a designated trauma center within one hour from the time of injury. Non-designated trauma centers and inter-facility transfers to a trauma center were not included in this analysis. The golden hour cannot be calculated for patients with a missing time of injury. Injury date/time was missing for approximately 27.4% (7,450) of patients transported to any trauma center; these cases were excluded from the analysis.

Table 13: Proportion of patients arriving within the Golden Hour by region, ASTR 2013

PATIENTS ARRIVING AT A TRAUMA CENTER WITHIN GOLDEN HOUR					
Golden Hour					
≤1 Hour					
Region	Total Patients Analyzed	≤ 1 Hour		Patients excluded due to missing data	
	N	N	%	N	%
Central	10,909	6,931	63.53%	6,023	35.57%
Western	777	270	34.74%	235	23.22%
Northern	3,580	1,489	41.59%	801	18.28%
Southeastern	4,469	2,344	52.45%	391	8.04%
Statewide	19,735	11,034	55.91%	7,450	27.40%
Median Golden Hour					
	Total Patients Analyzed	25th Percentile (hours)	Median (hours)	75th Percentile (hours)	
Central	10,909	0.6	0.9	1.3	
Western	777	0.8	1.4	2	
Northern	3,580	0.7	1.2	2	
Southeastern	4,469	0.7	1	1.5	
Statewide	19,735	0.7	0.9	1.5	

Of the 19,735 analyzed patients who arrived at a designated trauma center, 55.91% arrived within the golden hour. More patients (63.53%) injured in the central region arrived within the golden hour as compared to the other regions. Improved pre-hospital data completeness for Injury date/time might alter the golden hour results (Table 11).

Figure 35: Proportion of patients arriving within the golden hour by level of designation, ASTR 2013 (n=19,735)



The benefit of Level IV designation is reflected in Figure 35 where a regional analysis for golden hour is shown. There are more patients reaching a Level IV trauma center within the golden hour in the Western, Northern, and Southeastern regions as compared to a Level I trauma center.

Table 14: Proportion of patients arriving within the golden hour by level of designation, ASTR 2013

PATIENTS ARRIVING AT A TRAUMA CENTER WITHIN GOLDEN HOUR BY DESIGNATION LEVEL							
Golden Hour							
≤1 Hour							
Region	Total Patients	Level I		Level III		Level IV	
	N	N	%	N	%	N	%
Central	10,909	5,331	65.59%	1,091	56.09%	509	60.81%
Western	777	4	6.77%	0	0	266	37.09%
Northern	3,580	410	31.32%	1	4.34%	1,078	47.95%
Southeastern	4,469	1,858	54.75%	292	39.56%	194	57.39%
Statewide	19,735	7,603	58.99%	1,384	51.12%	2,047	49.44%

Table 15: Golden hour by county of injury, ASTR 2013

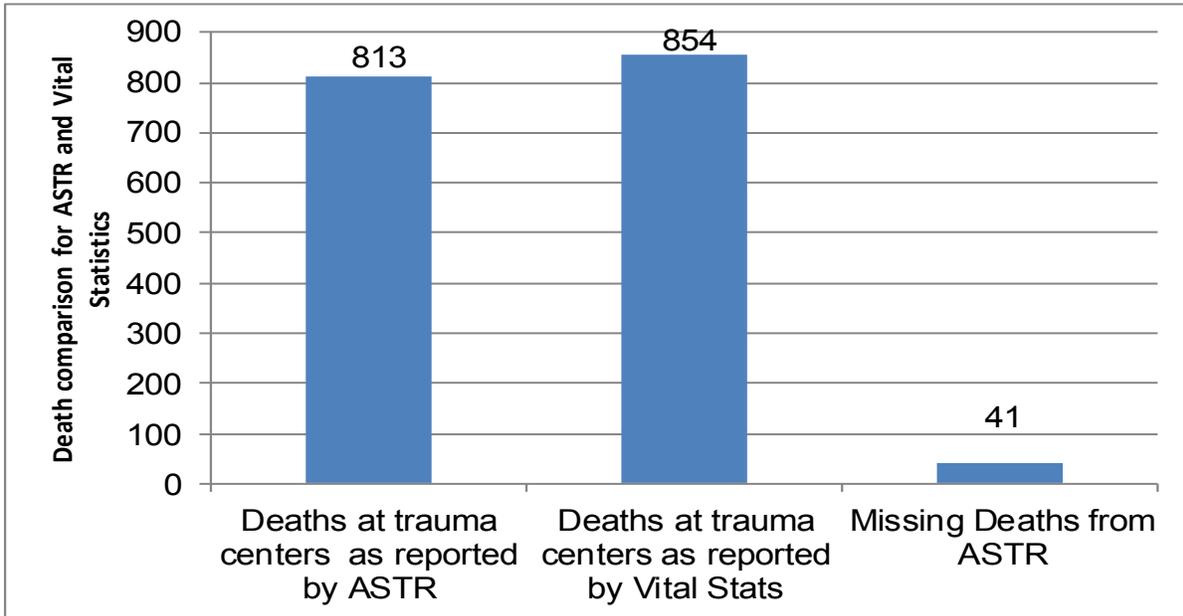
GOLDEN HOUR BY COUNTY OF INJURY					
County of Injury	Total Patients Analyzed	≤ 1 Hour		Patients excluded due to missing data	
		N	%	N	%
Maricopa	9,586	6,492	67.72%	5,464	36.30%
Pima	3,795	2,122	55.91%	245	6.06%
Coconino	1,642	792	48.23%	280	14.56%
Apache	848	398	46.93%	258	23.32%
Cochise	515	208	40.38%	131	20.27%
Pinal	1,076	402	37.36%	482	30.93%
Mohave	670	238	35.52%	175	20.71%
Navajo	510	167	32.74%	98	16.11%
La Paz	90	29	32.22%	43	32.33%
Yavapai	580	132	22.75%	165	22.14%
Yuma	17	3	17.64%	17	50.00%
Gila	247	37	14.97%	79	24.23%
Santa Cruz	89	12	13.48%	5	5.31%
Graham	52	2	3.84%	9	14.75%
Greenlee	18	0	0	1	5.26%
Statewide	19,735	11,034	55.91%	7,452	27.41%

The Golden Hour is not the only important measure. Ensuring that patients make it into the organized trauma system is vital, even if it takes more than 60 minutes. Additional trauma centers in rural Arizona will improve access to the trauma system.

DEATHS

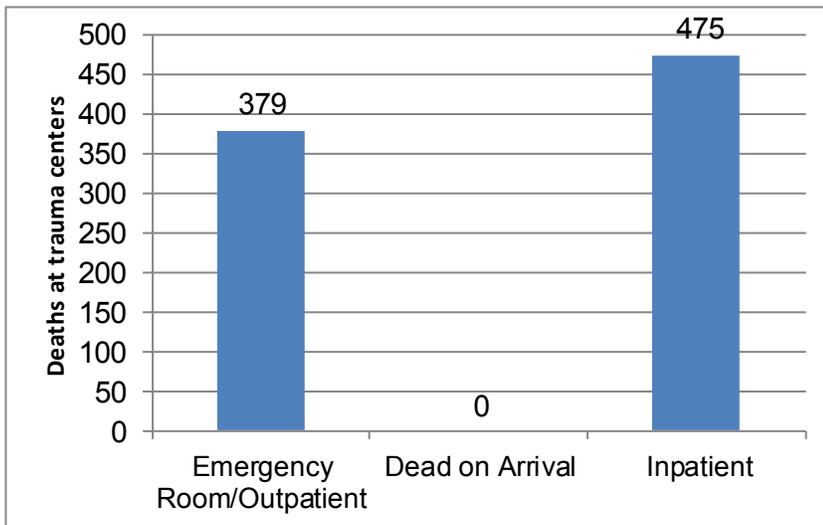
Understanding the number of deaths occurring in Arizona will help the trauma system in treatment and prevention efforts. The Vital Statistics registry was compared to the ASTR for data consistency and injury deaths occurring outside of the state's trauma centers.

Figure 36: Reported deaths comparison, ASTR 2013 and Vital Statistics 2013



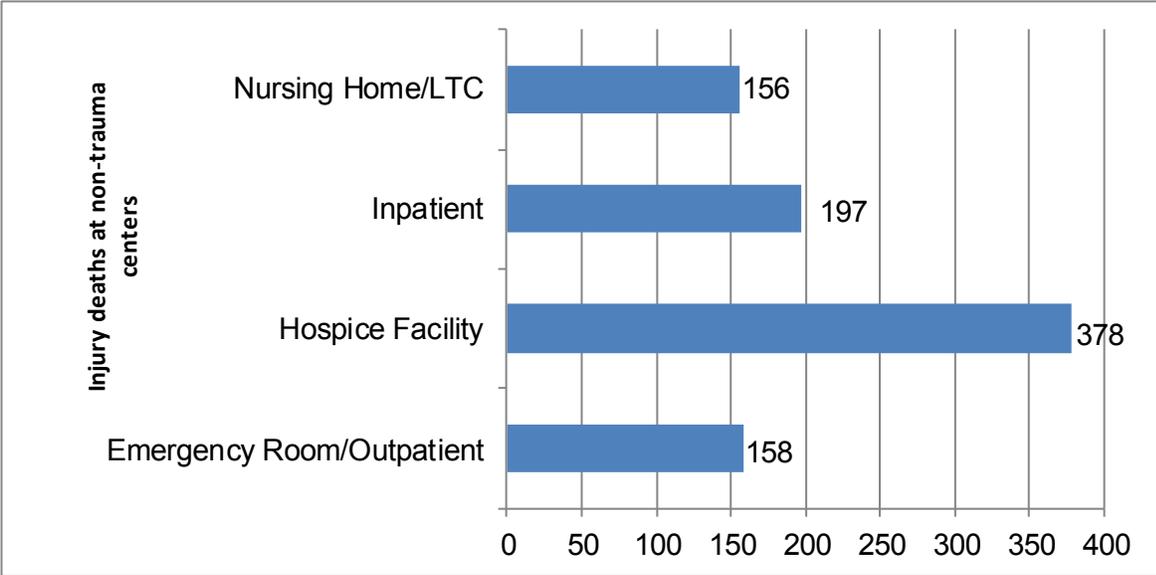
The Vital Statistics registry was queried to find injury deaths that occurred at a trauma center during their designation period. In 2013, facilities reported that 813 deaths occurred. At the same time, the Vital Statistics registry reported 854 deaths (Figure 36).

Figure 37: Number of deaths at trauma centers, Vital Statistics 2013 (n=854)



In the 854 deaths that occurred at trauma centers, 44% occurred in the Emergency Department. In previous years, trauma centers reported cases that were dead on arrival through the death certificate that is submitted to ADHS. For 2012, 2011, and 2010 trauma centers reported 3, 7, and 4 patients dead on arrival, respectively.

Figure 38: Injury deaths in non-trauma center hospitals, Vital Statistics 2013 (n=889)



Injury deaths in non-trauma center facilities are presented in Figure 38. In 2013, trauma centers discharged 975 patients to hospice.

Figure 39: Out of Hospital Injury Deaths, Vital Statistics 2013 (n=1,798)

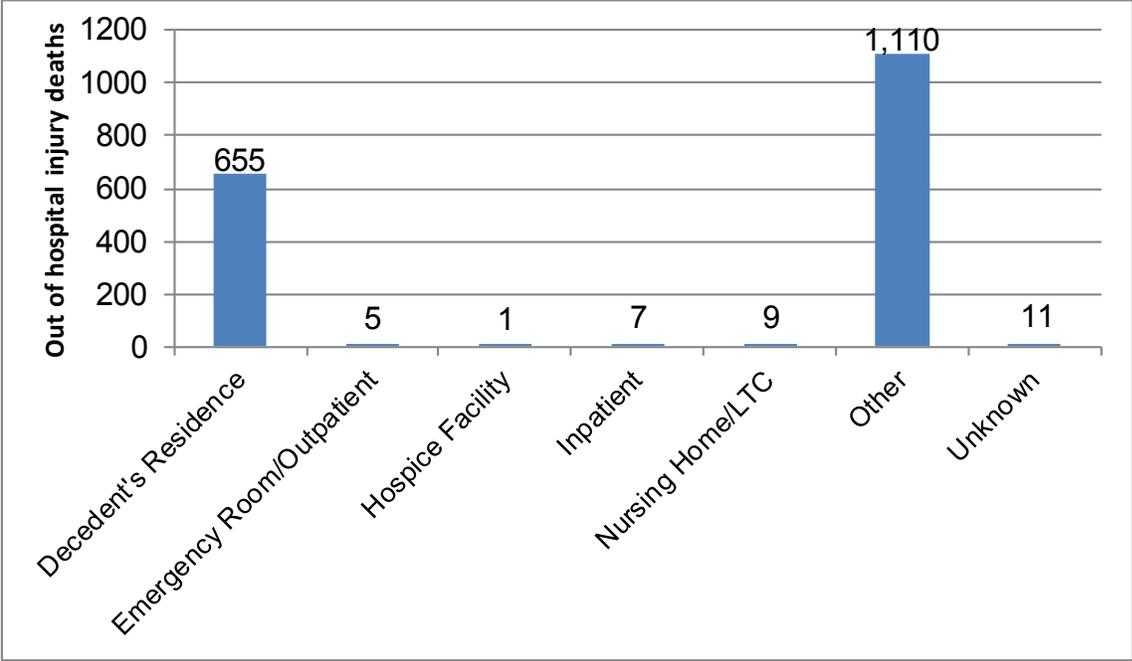


Figure 39 presents the injury deaths that occurred outside of a hospital. If the hospital name was omitted it is listed here as unknown.

ADMISSION TO REHAB/LTC

Of the 20,305 trauma patients admitted to a trauma center, 6.8% were discharged to a rehabilitation center or Long Term Care (LTC) facility. Table 16 shows the access to rehab/LTC by primary payer and Table 17 shows the same by injury region. The self pay patients and the Central region had the lowest percent of patients discharged to rehab/LTC.

Table 16: Admitted to Rehab/LTC by Primary Payer, ASTR 2013

ACCESS TO REHAB/LTC								
Primary Payer	Total Patients Admitted		Discharged to Rehab/LTC		ISS <=15 and Discharged to Rehab/LTC		ISS >15 and Discharged to Rehab/LTC	
	N	%	N	%	N	%	N	%
Medicare	4,128	20.32%	482	11.67%	338	10.37%	138	17.01%
Private	6,762	33.30%	571	8.44%	312	5.78%	256	21.06%
AHCCCS	5,145	25.33%	236	4.58%	117	2.90%	114	12.88%
Other	502	2.47%	17	3.38%	7	1.60%	10	18.18%
Self pay	3,768	18.55%	92	2.44%	55	1.84%	35	4.95%
Total	20,305	100%	1,398	6.89%	829	5.15%	553	66.71%

AHCCCS=Arizona Health Care Cost Containment System, LTC=Long Term Care

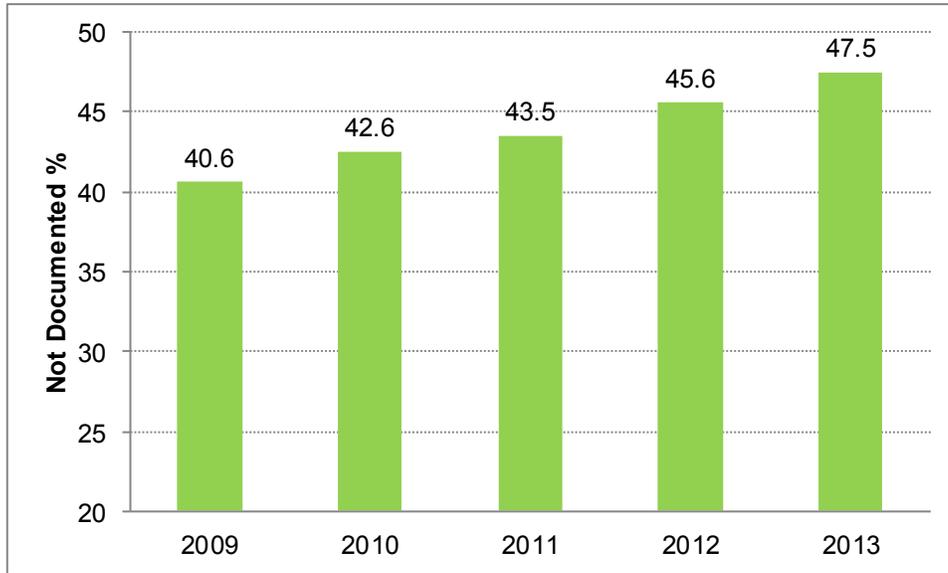
Missing in the trauma data is an understanding of the physical, social, and mental functionality of patients upon discharge. Rehabilitation facilities often perform functional assessments of patients. The Arizona trauma system may benefit from additional information following treatment at a trauma center.

Table 17: Admitted to Rehab/LTC by Injury Region, ASTR 2013

ACCESS TO REHAB/LTC				
Injury Region	Total Patients Admitted to trauma center		Discharged to Rehab/LTC	
	N	%	N	%
Southeastern Region	2,615	12.87%	276	10.55%
Northern Region	2,557	12.59%	204	7.97%
Missing Region	507	2.49%	35	6.90%
Western Region	551	2.71%	34	6.17%
Central Region	14,075	69.31%	849	6.03%
Total Admitted	20,305	100%	1,398	6.89%

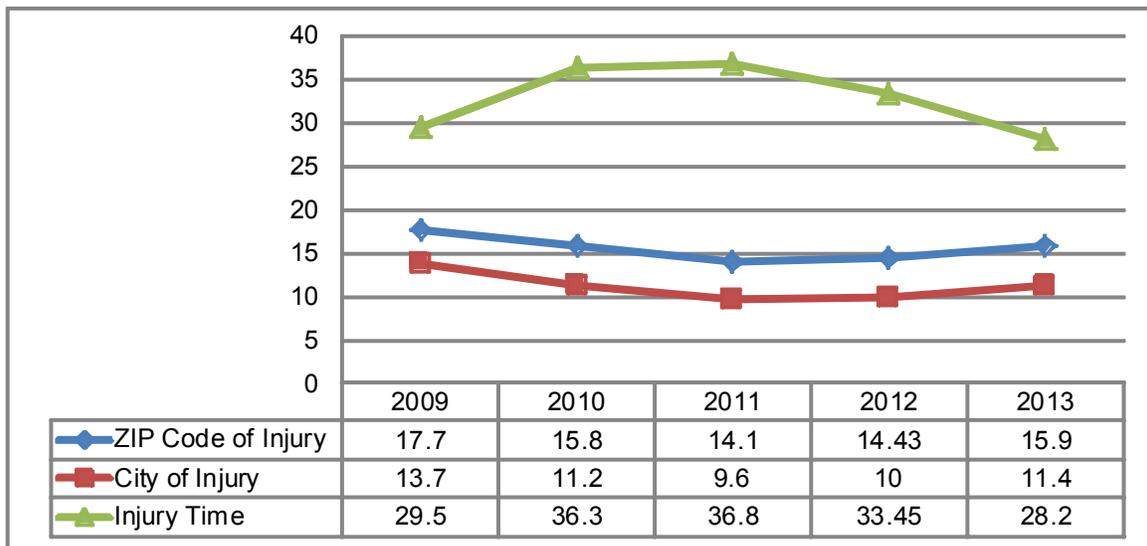
DATA QUALITY

Figure 40: Field airway management not documented among severely injured trauma patients, ASTR 2009-2013



Although data completeness continues to improve each year, obtaining pre-hospital data is still a challenge. A large percentage (47.5%) of field airway management data was not documented for severe trauma patients in 2013 (GCS <9 and ISS >15). Field airway management documentation has been consistent through the years (Figure 40). Over the years, the injury time field has been consistently missing which impacts vital measurements like Golden Hour (Figure 41).

Figure 41: Percent not documented for select injury data elements, ASTR 2009-2013



Street location is a free text field and not all entries are actual addresses. Data will need to be queried further to determine actual completeness and is thought to be under reported.

