ARIZONA DEPARTMENT OF HEALTH SERVICES

BUREAU OF EMERGENCY MEDICAL SERVICES AND TRAUMA SYSTEM

2013 EMS

JUNE QUARTERLY REPORT

AZ-PIERS Q3 & Q4 2012

Prepared by:

Data and Quality Assurance Section

Vatsal Chikani, M.P.H.

Bozena Branicz

Anne Vossbrink, M.S.

Rogelio Martinez, M.P.H.

Methodology

The data collected in this report comes from Electronic Patient Care Records (ePCRs) submitted to AZ-PIERS. The data includes the records of units notified between July 1, 2012 to December 31, 2012. The records were extracted on March 22, 2013.

The criteria for selecting ePCRs included in this trauma-focused pre-hospital report were modeled after North Carolina's "EMS Trauma Care Toolkit". The inclusion criteria was:

- "Injury Present" (E9.4) equal to "Yes" **OR**
- "Protocols Used" (E17.1) must have included one or more of the following:
    - Bites and Envenomations,
    - Burns,
    - Drowning / Near Drowning,
    - Electrical Injuries,
    - Extremity Trauma,
    - Head Trauma,
    - Multiple Trauma,
    - Back Pain,
    - Spinal Immobilization Clearance,
    - Pediatric Head Trauma,
    - Spinal Cord Trauma,
    - Thoracic injuries – adult,
    - Thoracic injuries – pediatric,
    - Trauma-Amputation,
    - Trauma-Arrest.

The datasets were then imported into Statistical Analysis Software (SAS, version 9.2) for analysis.

Limitations: Less than 15% of EMS Agencies were submitting data to AZ-PIERS in 2012, and therefore frequencies and percent distributions are not necessarily representative of the total Arizona population. If a patient received care for an injury involving more than one submitting EMS agency, that patient would be counted multiple times (once for each EMS agency encounter). This could affect the frequencies and percentages for some categories (ex: Injury Incident County).

AZ PIERS: July 1, 2012 to Dec 31, 2012

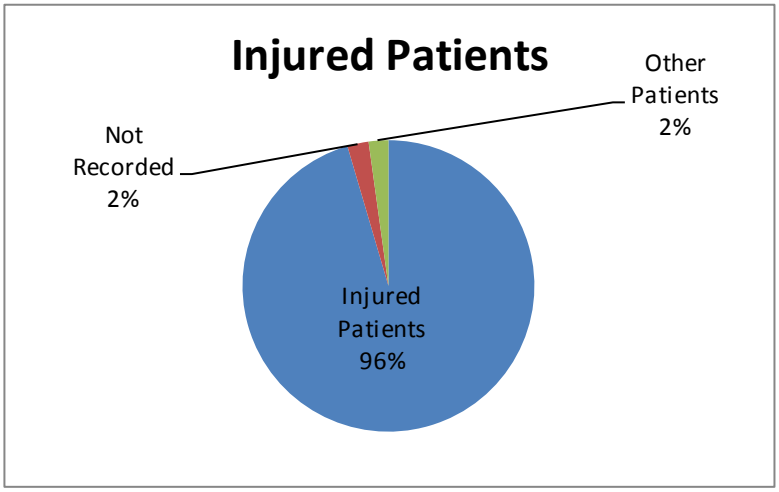
Total trauma patients and disposition

	N	%
Total Patients	12,833	100.00%
Injured Patients	12,249	95.44%
Not Recorded	303	2.36%
Other Patients	281	2.18%
Disposition of Injured Patient		
Cancelled	7	0.05%
Dead at Scene	50	0.38%
No Treatment Required	235	1.83%
Null Value	6	0.04%
Patient Refused Care	1,382	10.76%
Standby Only - No Patient Contacts	1	0.00%
Treated and Released	1,210	9.42%
Treated, Transferred Care	1,907	14.86%
Treated, Transported by EMS	16	0.12%
Treated, Transported by EMS (ALS)	7,337	57.17%
Treated, Transported by EMS (BLS)	636	4.95%
Treated, Transported by Law Enforcement	6	0.04%
Treated, Transported by Private Vehicle	40	0.31%

A total of 12,833 patients were identified as trauma patients in AZ-PIERS based on the inclusion criteria. Of these, 95% had been listed as having a possible injury.

Over 50% of these injured patients had a disposition of

- Treated & transported by EMS-ALS (57%),
- Treated & transferred care (14%),
- Patient refused care (11%),
- and treated and released (9%)



Trauma care data element completion rate (1 of 3)

	N	%
Agency ID		
Completion Rate	12,833	100.00%
Cause of Injury		
Missing	3,415	26.61%
Completion Rate	9,418	73.38%
Destination Name		
Missing	2,059	16.04%
Completion Rate	10,774	83.95%
Patient Disposition		
Missing	6	0.04%
Completion Rate	12,827	99.95%
Alcohol/Drug Use Indicator		
Missing	2,160	16.83%
Completion Rate	10,673	83.16%
Incident Location Type		
Missing	2,139	16.66%
Completion Rate	10,694	83.33%
Incident PCR Number		
Missing	4	0.03%
Completion Rate	12,829	99.96%
Incident Postal Code		
Missing	3	0.02%
Completion Rate	12,830	99.97%
Intent of Injury		
Missing	8,922	69.52%
Completion Rate	3,911	30.47%
Mechanism of Injury		
Missing	4,353	33.92%
Completion Rate	8,480	66.07%
Patient Age Units		
Missing	22	0.17%
Completion Rate	12,811	99.82%

*Null Values = Not applicable, not recorded, not reporting

Data element completion rate is an important component of data quality and analysis.

The 12,833 AZ-PIERS trauma patient records were reviewed for data quality by looking at 34 data elements within these records.

A “Missing” value includes Null values* and blanks. It is important to note that some of the “Missing” values may be valid answers.

Nulls were included as “Missing” as they do not improve the overall data quality available for feedback or analysis.

Trauma care data element completion rate (2 of 3)

Patient Ethnicity		
Missing	8,611	67.10%
Completion Rate	4,222	32.89%
Patient Gender		
Missing	119	0.92%
Completion Rate	12,714	99.07%
Patient Postal Code		
Missing	43	0.33%
Completion Rate	12,790	99.66%
Patient Race		
Missing	7,711	60.08%
Completion Rate	5,122	39.91%
Primary Impression		
Missing	1,103	8.59%
Completion Rate	11,730	91.40%
Primary Symptom		
Missing	542	4.22%
Completion Rate	12,291	95.77%
Response Mode To Scene		
Completion Rate	12,833	100.00%
Vials GCS Qualifier		
Missing	8,675	67.59%
Completion Rate	4,158	32.40%
Patient Arrived at Destination Date/Time		
Missing	4,893	38.12%
Completion Rate	7,940	61.87%
Arrived at Patient Date/Time		
Missing	2,113	16.46%
Completion Rate	10,720	83.53%
Unit Arrived on Scene Date/Time		
Missing	84	0.65%
Completion Rate	12,749	99.34%

Trauma care data element completion rate (3 of 3)

Dispatch Notified Date/Time		
Missing	5,416	42.20%
Completion Rate	7,417	57.79%
Unit En Route Date/Time		
Missing	74	0.57%
Completion Rate	12,759	99.42%
Unit Left Scene Date/Time		
Missing	2,997	23.35%
Completion Rate	9,836	76.64%
PSAP Call Date		
Missing	5,552	43.26%
Completion Rate	7,281	56.73%
Dates Transfer of Patient Care		
Missing	11,687	91.06%
Completion Rate	1,146	8.93%
Unit Notified by Dispatch Date/Time		
Missing	60	0.46%
Completion Rate	12,773	99.53%
Patient Age		
Missing	59	0.45%
Completion Rate	12,774	99.54%
Patient Date of Birth		
Missing	153	1.19%
Completion Rate	12,680	98.80%
Total Glasgow Coma Score		
Missing	1,292	10.06%
Completion Rate	11,541	89.93%
Respiratory Rate		
Missing	1,312	10.22%
Completion Rate	11,521	89.77%
Revised Trauma Score		
Missing	6,710	52.28%
Completion Rate	6,123	47.71%
Systolic Blood Pressure		
Missing	1,239	9.65%
Completion Rate	11,594	90.34%

County of Injury

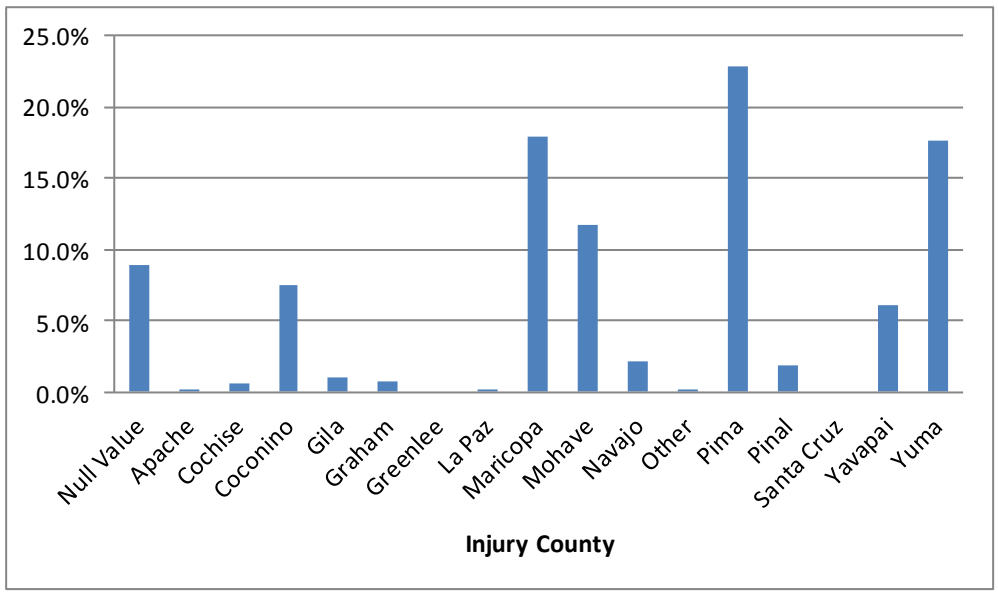
Incident County	N	%
Null Value	1,147	8.93%
Apache	23	0.17%
Cochise	75	0.58%
Coconino	970	7.55%
Gila	133	1.03%
Graham	101	0.78%
Greenlee	*	*
La Paz	24	0.18%
Maricopa	2,304	17.95%
Mohave	1,499	11.68%
Navajo	283	2.20%
Other	32	0.24%
Pima	2,936	22.87%
Pinal	238	1.85%
Santa Cruz	*	*
Yavapai	793	6.17%
Yuma	2,271	17.69%

*Counts less than 10 were withheld to protect patient identity

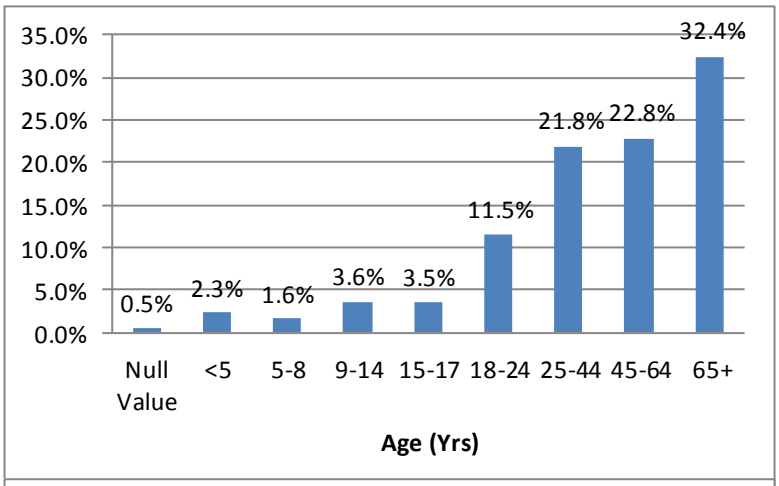
Injury incident county shows the Arizona county of injury for the patient. The counties with the largest percentages of injuries in AZ-PIERS are Pima, Maricopa, Yuma, and Mohave.

Approximately 9% of the injury incident county was a Null value. An incident county of 'Other' includes any counties outside Arizona.

County frequencies and percentages are not representative of all injured patients. This data reflects those patients who had contact with an AZ-PIERS participating EMS agency.

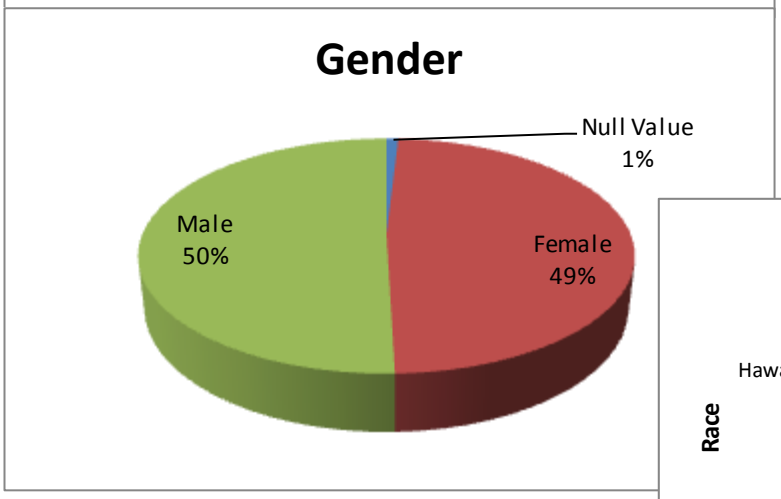


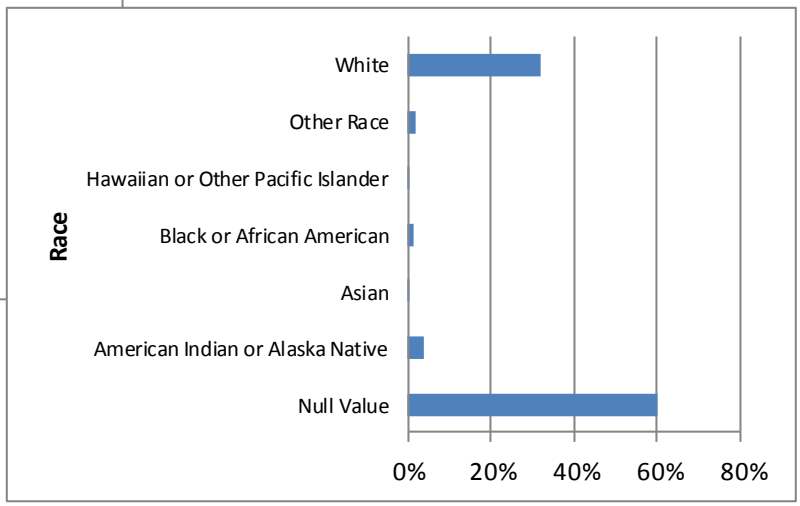
Patient demographics



Demographics were examined for injured patients. More than 55% were 45 and older. The largest demographic was 65 and older (32%). The gender of injured patients was almost evenly split (50% males and 49% females).

Race and ethnicity carry many implications in health care and is extremely important to collect.

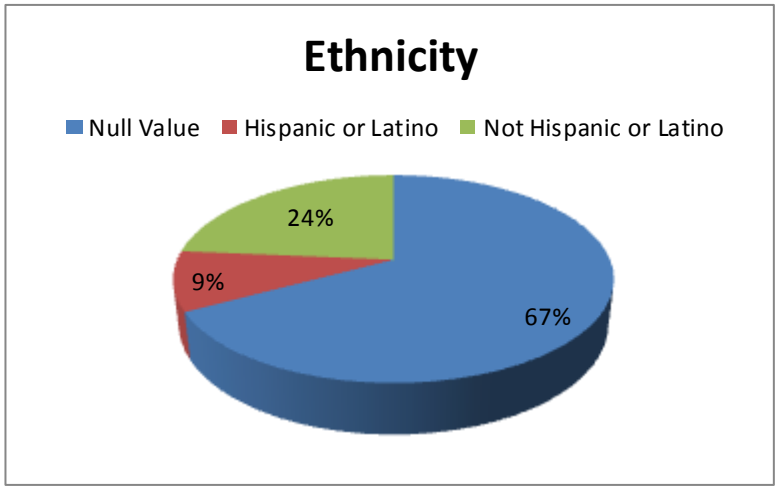




Race data was mostly missing from the data. Although White was the most indicated race (32%), a majority of patients were missing a classification.

A large percentage of ethnicity (67%) is not specified. Patients who are Not Hispanic or Latino made up a larger percentage of the ethnicity values. Ethnicity data is unreliable as a majority is missing.

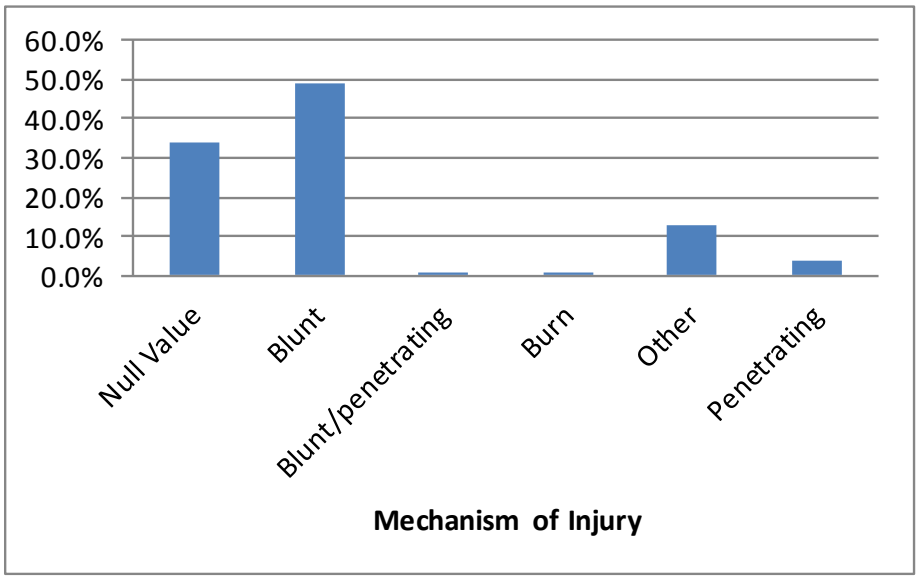
Many tools are available for training staff to collect this information.



Patient demographics

	N	%
Age		
Null Value	59	0.45%
<5	294	2.29%
5-8	201	1.56%
9-14	466	3.63%
15-17	448	3.49%
18-24	1,478	11.51%
25-44	2,803	21.84%
45-64	2,922	22.76%
65+	4,162	32.43%
Patient Gender		
Null Value	119	0.92%
Female	6,240	48.62%
Male	6,474	50.44%
Patient Race		
Null Value	7,711	60.08%
American Indian or Alaska Native	527	4.10%
Asian	50	0.38%
Black or African American	162	1.26%
Native Hawaiian or Other Pacific Islander	21	0.16%
Other Race	257	2.00%
White	4,105	31.98%
Patient Ethnicity		
Null Value	8,611	67.10%
Hispanic or Latino	1,190	9.27%
Not Hispanic or Latino	3,032	23.62%

Patient Mechanism of Injury (MOI)



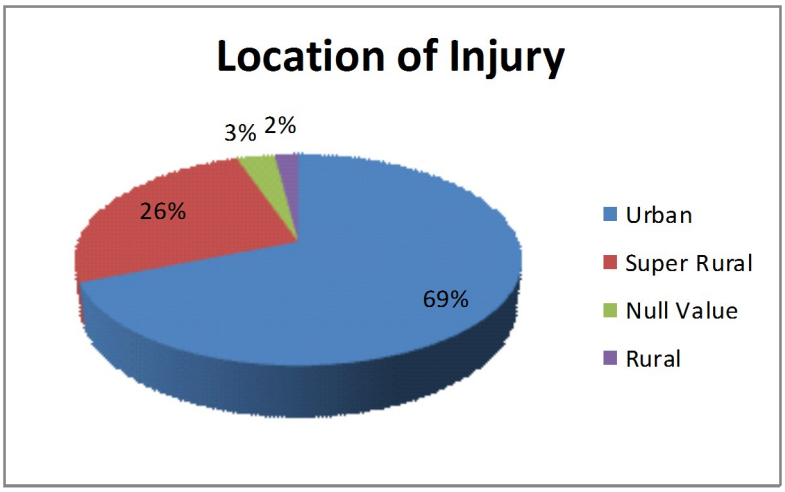
The mechanism of injured patients were blunt (50%), followed by other (13%), and penetrating (3%). In over 30% of injured patients, the MOI was a null value.

An understanding of how people get injured is important to target prevention efforts in our communities.

Mechanism of Injury	N	%
Blunt	6,270	48.85%
Null Value	4,353	33.92%
Other	1,642	12.79%
Penetrating	483	3.76%
Burn	63	0.49%
Blunt/penetrating	22	0.17%

Patient Location of Injury

Location of Injury	N	%
Urban	8,842	68.90%
Super Rural	3,312	25.80%
Null Value	419	3.26%
Rural	260	2.02%

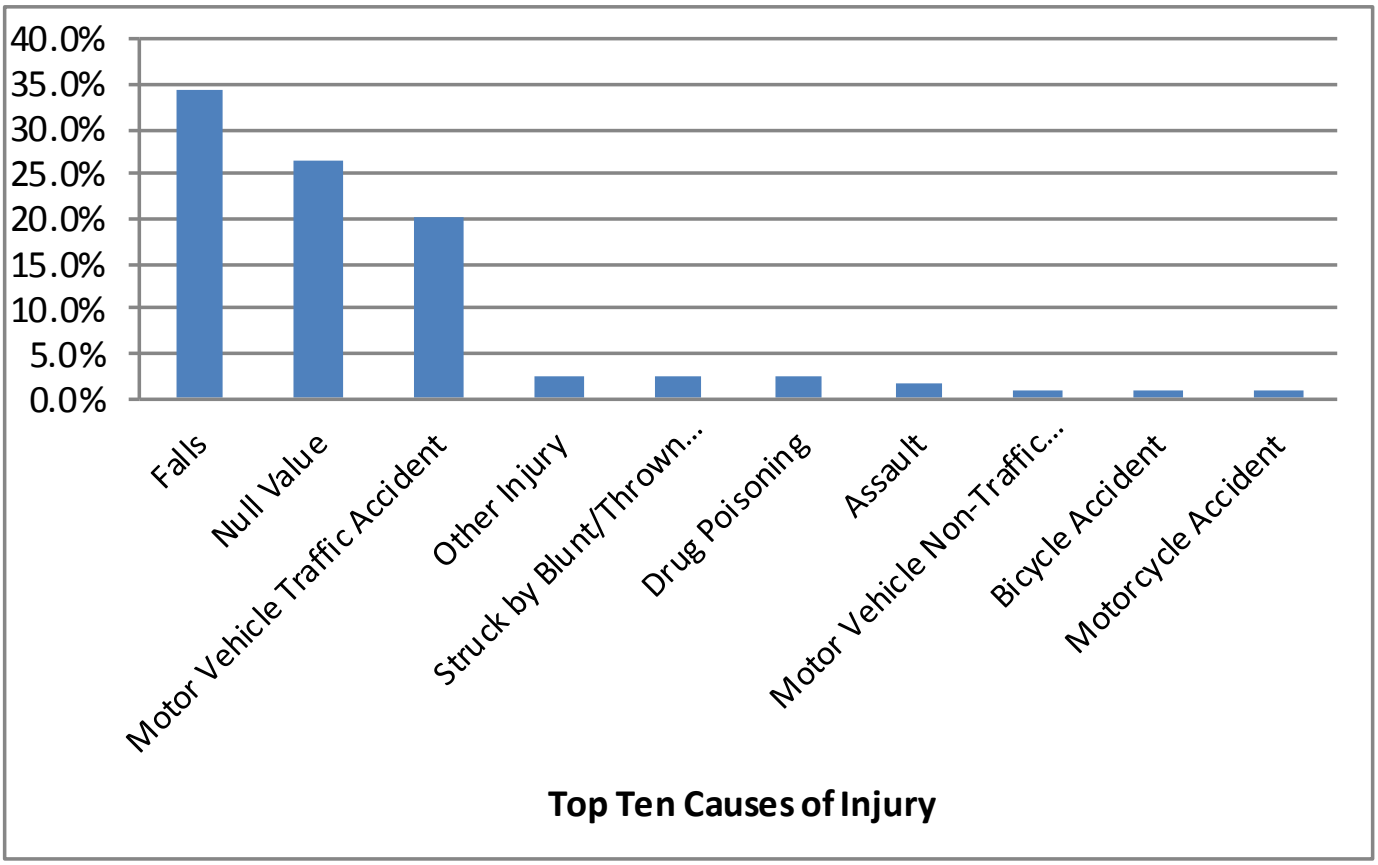


The Centers for Medicare & Medicaid Services has grouped zip codes as urban, rural, or super rural. These zip codes were imported in SAS and analyzed by injury of patients. The majority of injured patients occurred in urban areas (68%), followed by super rural (25%).

The highest percentages for injury location were home or residence (36%), followed by street or highway (19%).

Location of Injury	N	%
Home/Residence	4,659	36.30%
Street or Highway	2,420	18.85%
Null Value	2,139	16.66%
Health Care Facility (clinic, hospital, nursing home)	1,261	9.82%
Other Location	799	6.22%
Trade or Service (Business, bars, restaurants, etc.)	523	4.07%
Public Building (schools, gov, offices)	477	3.71%
Residential Institution (nursing home, jail/prison)	219	1.70%
Place of Recreation or Sport	210	1.63%
Lake, River, Ocean	49	0.38%
Industrial Place and Premises	45	0.35%
Farm	11	0.08%
Unspecified place	9	0.07%
Airport	9	0.07%
Mine or Quarry	3	0.02%

Cause of Injury

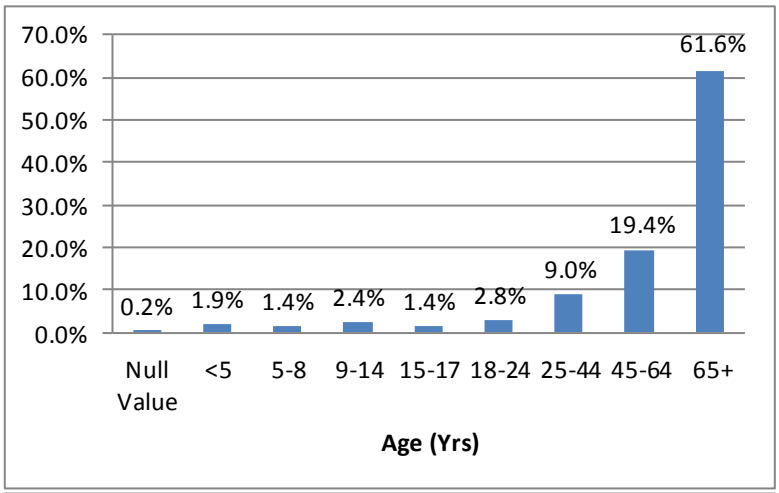


The top most common values for cause of injury were falls (35%), followed by a motor vehicle traffic accident (20%). Over 25% of injuries reported were null values.

Cause of Injury

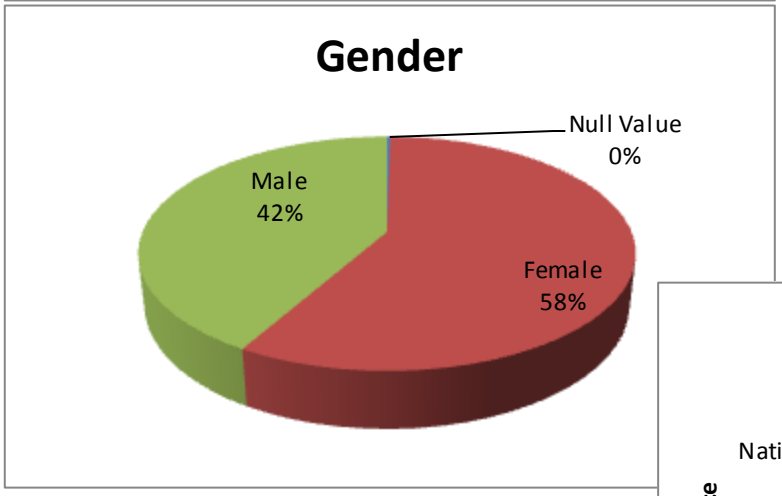
Cause of Injury	N	%
Falls	4,435	34.55%
Null Value	3,415	26.61%
Motor Vehicle Traffic Accident	2,583	20.12%
Other Injury	358	2.73%
Struck by Blunt/Thrown Object (E968.2)	326	2.54%
Drug Poisoning	299	2.32%
Assault	240	1.87%
Motor Vehicle Non-Traffic Accident	118	0.91%
Bicycle Accident	114	0.88%
Motorcycle Accident	105	0.81%
Bites	93	0.72%
Cut/Pierce	91	0.70%
Stabbing/Cutting Assault	91	0.70%
Pedestrian Traffic Accident	89	0.69%
Struck by or Against	52	0.40%
Excessive Heat	51	0.39%
Stabbing/Cutting Accidental (E986.)	41	0.31%
Machinery Accidents	34	0.26%
Fire and Flames	33	0.25%
ATV Rider	30	0.23%
Firearm Assault	29	0.22%
Motor Vehicle vs Pedestrian Accident	27	0.21%
Water Transport Accident	22	0.17%
Overexertion	22	0.17%
Firearm Self Inflicted	21	0.16%
Unarmed Fight/Brawl	14	0.10%
Firearm Injury (Accidental)	13	0.10%
Caught in/between Objects	12	0.09%
Non-Motorized Vehicle Accident	11	0.08%
Electrocution (Non-Lightning)	11	0.08%
Smoke Inhalation	10	0.07%
Hot Object/Substance	9	0.07%
Drowning	9	0.07%
Mechanical Suffocation	9	0.07%
Sexual Assault	9	0.07%
Venomous Stings (Plants, Animals)	7	0.05%

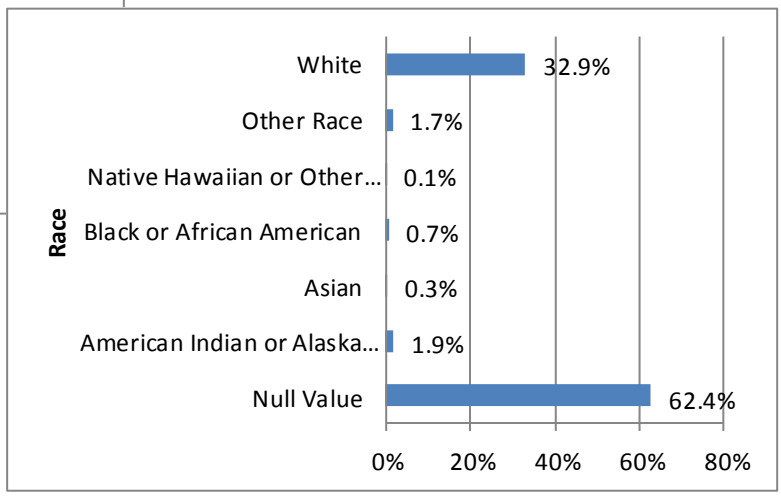
Falls



Additional analysis was done for individuals who were injured because of a fall. The largest percentage of people who fell were 45 and older (81%). Of all the EMS calls for falls, patients 65 and older made up 62% of injuries.

The gender of patients who fell was predominately female (58%), males represented 42%.

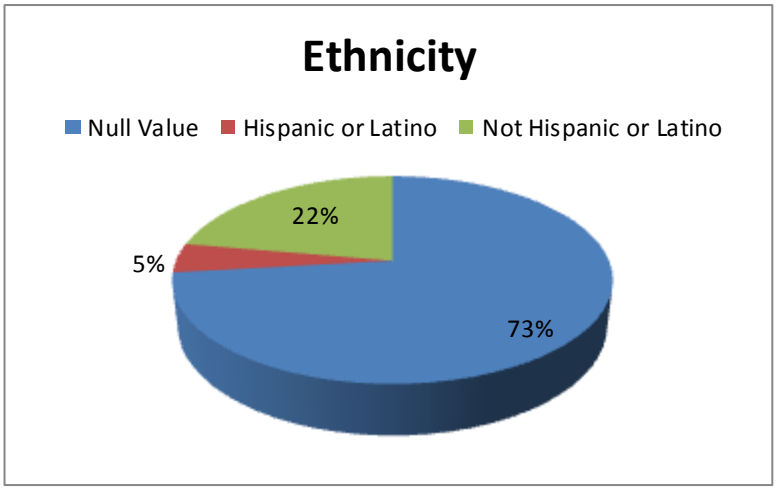




Race data was mostly missing from the data. Although White was the most indicated race (33%), a majority of patients were missing a classification (62%).

A large percentage of ethnicity (73%) is not specified. Patients who are not Hispanic or Latino made up a larger percentage of the ethnicity values (22%). Ethnicity data is unreliable as a majority is missing.

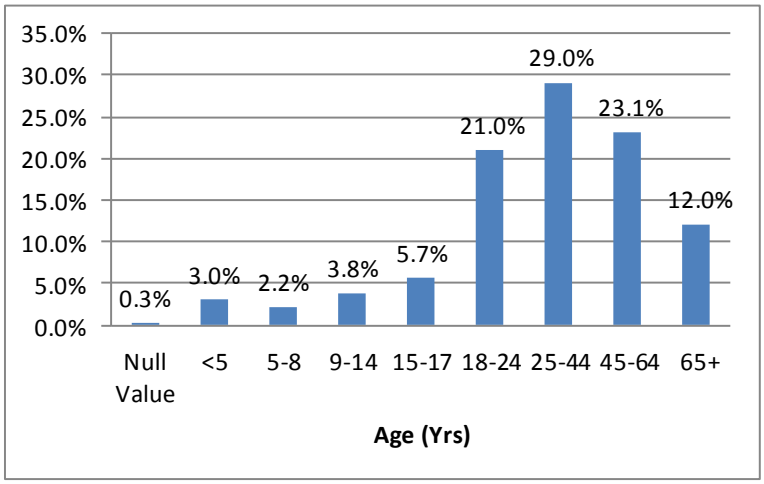
Many tools are available for training staff to collect this information.



Falls

	N	%
Age		
Null Value	9	0.20%
<5	83	1.87%
5-8	60	1.35%
9-14	105	2.36%
15-17	60	1.35%
18-24	122	2.75%
25-44	400	9.01%
45-64	862	19.43%
65+	2,734	61.64%
Patient Gender		
Null Value	11	0.24%
Female	2,573	58.01%
Male	1,851	41.73%
Patient Race		
Null Value	2,768	62.41%
American Indian or Alaska Native	85	1.91%
Asian	15	0.33%
Black or African American	29	0.65%
Native Hawaiian or Other Pacific Islander	5	0.11%
Other Race	74	1.66%
White	1,459	32.89%
Patient Ethnicity		
Null Value	3,245	73.16%
Hispanic or Latino	203	4.57%
Not Hispanic or Latino	987	22.25%

Motor Vehicle Traffic Accidents

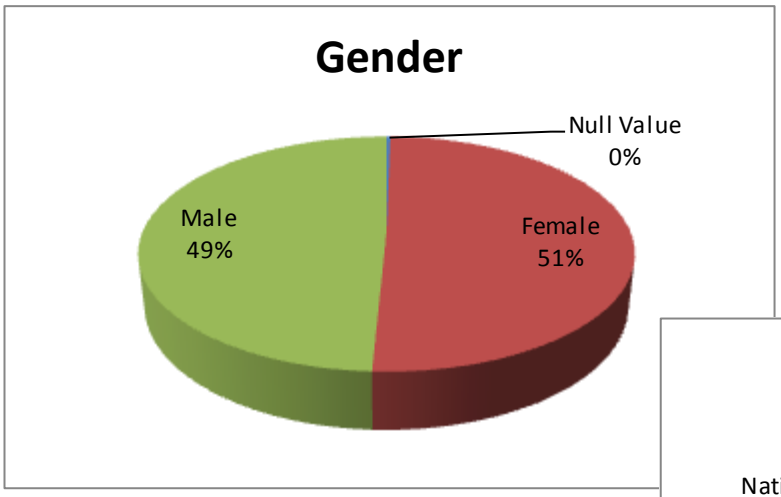


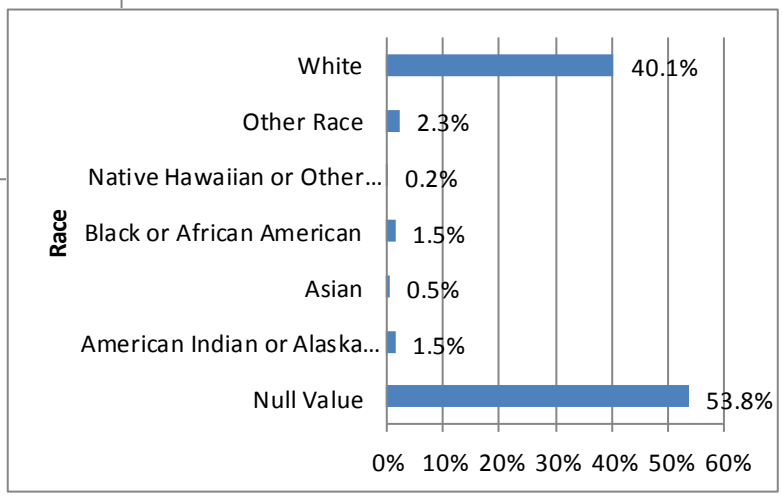
Additional analysis was done on patients who were injured because of a Motor Vehicle Traffic (MVT) accidents. The bulk of these injuries came from those between 18 and 64 years old.

The largest group were 25 to 44 year olds (29.0%), followed by 45 to 64 year olds (23.1%).

The gender of the MVT patients was split, females (51%), and males (49%).

There were no null values for gender of MVT injured patients.

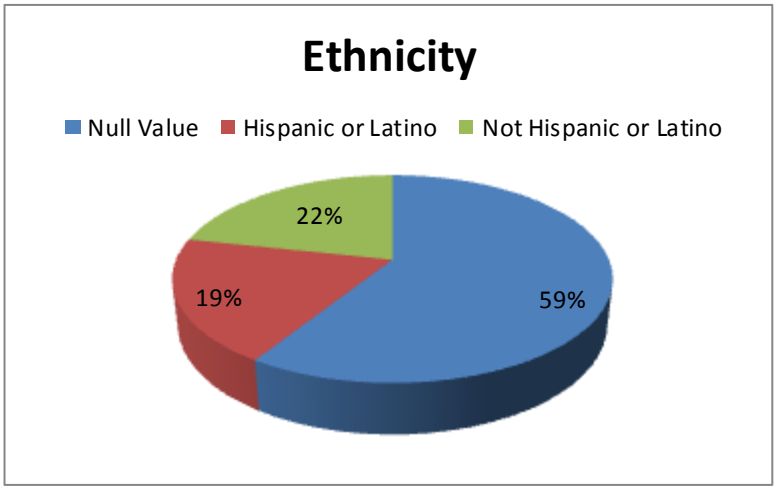




Race data was mostly missing from the data. Although White was the most indicated race (40%), a majority of patients were missing a classification (53%).

A large percentage of Ethnicity (59%) is not specified. Patients who are Not Hispanic or Latino made up a larger percentage of the ethnicity values (22%). Ethnicity data is unreliable as a majority is missing.

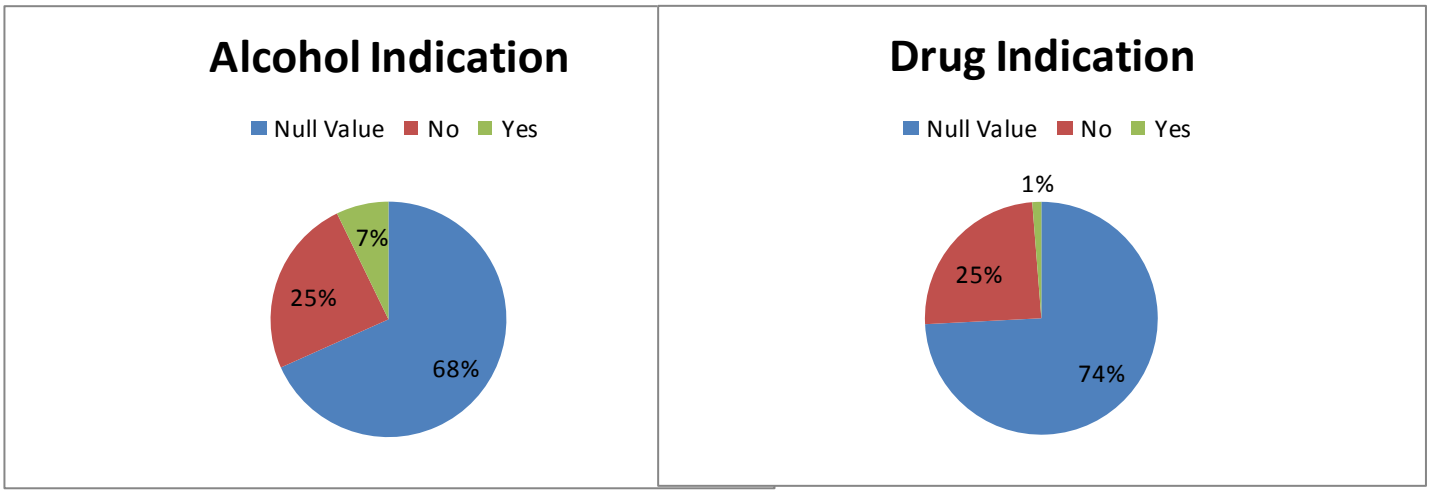
Many tools are available for training staff to collect this information.



Motor Vehicle Traffic Accidents

	N	%
Age		
Null Value	8	0.28%
<5	85	2.99%
5-8	61	2.15%
9-14	108	3.81%
15-17	162	5.71%
18-24	594	20.95%
25-44	821	28.96%
45-64	654	23.07%
65+	341	12.03%
Patient Gender		
Null Value	9	0.31%
Female	1,430	50.45%
Male	1,395	49.22%
Patient Race		
Null Value	1,524	53.77%
American Indian or Alaska Native	43	1.51%
Asian	15	0.52%
Black or African American	43	1.51%
Native Hawaiian or Other Pacific Islander	7	0.24%
Other Race	66	2.32%
White	1,136	40.08%
Patient Ethnicity		
Null Value	1,672	58.99%
Hispanic or Latino	549	19.37%
Not Hispanic or Latino	613	21.63%
Safety Equipment		
Null Value	982	34.65%
No	116	4.09%
Yes	1,736	61.25%
Alcohol Indication		
Null Value	2,153	75.97%
No	600	21.17%
Yes	81	2.85%
Drug Indication		
Null Value	2,223	78.44%
No	601	21.20%
Yes	10	0.35%

Alcohol and Drug Use



	N	%
Alcohol Indication		
Null Value	8,764	68.29%
No	3,146	24.51%
Yes	923	7.19%
Drug Indication		
Null Value	9,519	74.17%
No	3,153	24.56%
Yes	161	1.25%

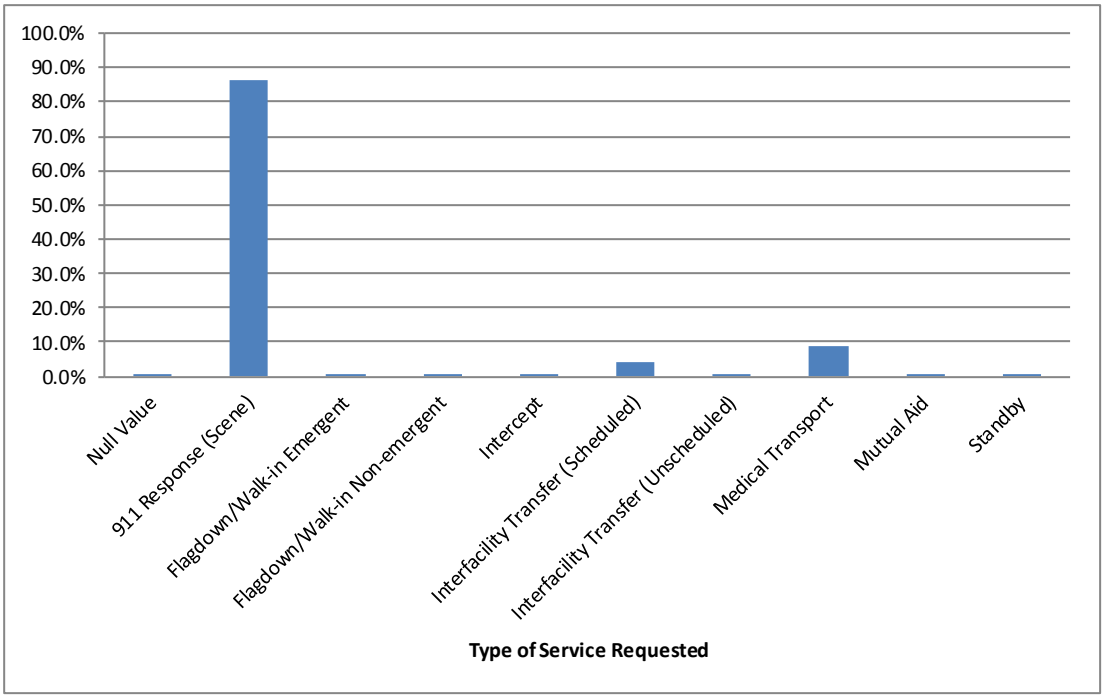
Alcohol and drug indicators are circumstances in which a patient admits to drug/alcohol use, the smell of is on the person, or if alcohol/drugs are at the scene.

Alcohol was indicated for 7% of the total injured patients. 25% of injured patients indicated that there was no alcohol associated with the injury.

Only 1% of injuries had any drug indicators involved, 25% of cases reported no indicators of drugs.

The majority of ePCRs reported null values for drug (74%) and alcohol indicators (68%). There is a high potential for strengthening the role of EMS in screening and referring individuals to the appropriate services.

Type of Service Requested



The majority of requested services was a 911 response (86%) for injured patients. This was followed by medical transport (9%), and a scheduled inter-facility transfers (4%).

	N	%
Type of Service Requested		
Null Value	30	0.23%
911 Response (Scene)	11,063	86.20%
Flagdown/Walk-in Emergent	28	0.21%
Flagdown/Walk-in Non-emergent	12	0.09%
Intercept	9	0.07%
Interfacility Transfer (Scheduled)	497	3.87%
Interfacility Transfer (Unscheduled)	33	0.25%
Medical Transport	1,140	8.88%
Mutual Aid	10	0.07%
Standby	11	0.08%

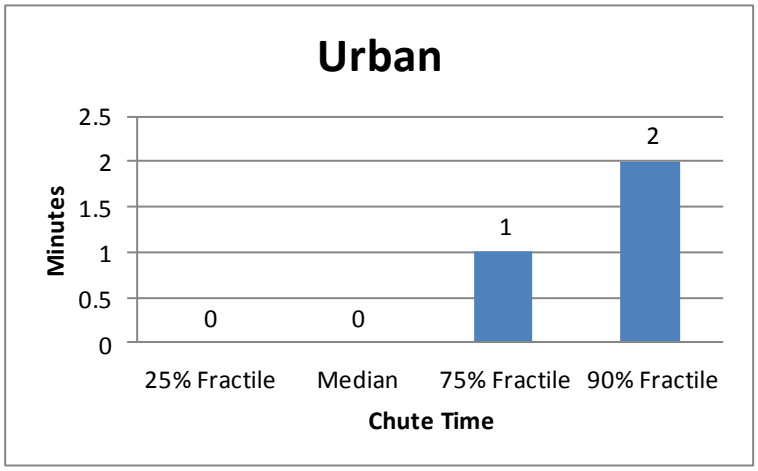
EMS System Chute Time- Interfacility Transfers Excluded

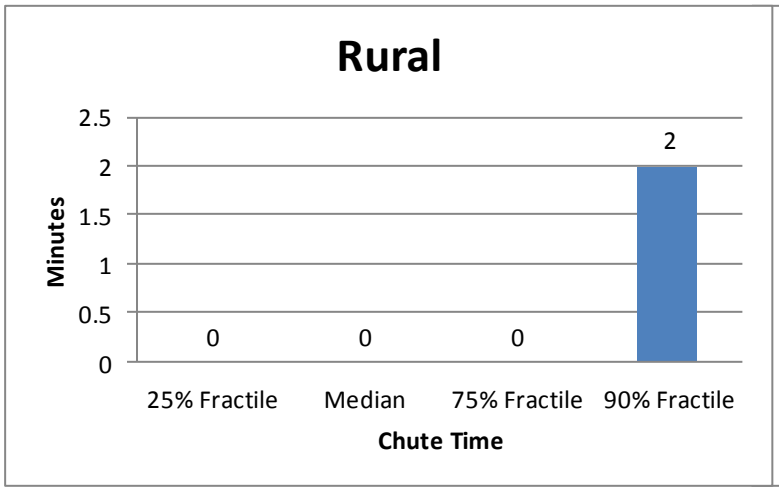
	Chute Time - Minutes							
	Not Documented	N	Min	Max	25% Fractile	Median	75% Fractile	90% Fractile
Overall	70	12,233	0	1,441	0	1.0	1	2
By Location of Injury								
Null Value	3	393	0	25	0	3.0	6	8
Super Rural	18	2,922	0	1,117	1	1.0	2	3
Rural	45	211	0	13	0	0.0	0	2
Urban	4	8,707	0	1,441	0	1.0	1	2

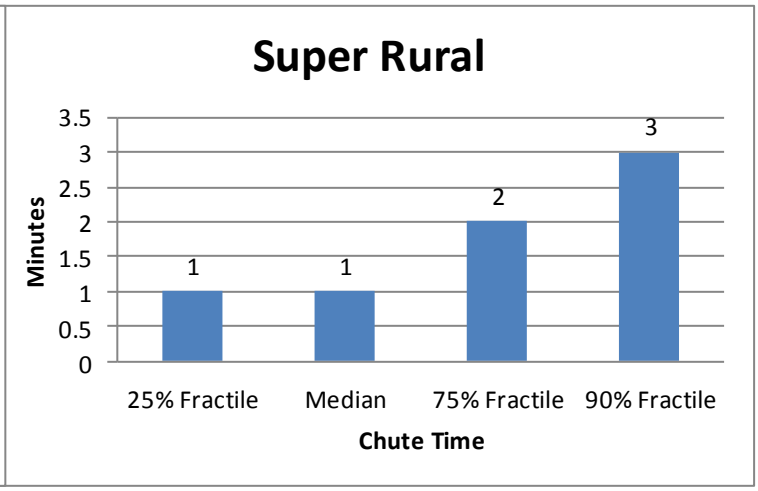
Chute time is the number of minutes from the time a unit is notified to the time the unit is en route.

The urbanicity of injured patients were considered when looking at chute times. In Arizona, 90% of urban & rural communities had a Chute time within two minutes. The 90% fractile was super rural was within three minutes.

The median chute time for rural EMS was less than one minute, the super rural and urban locations were within one minute .







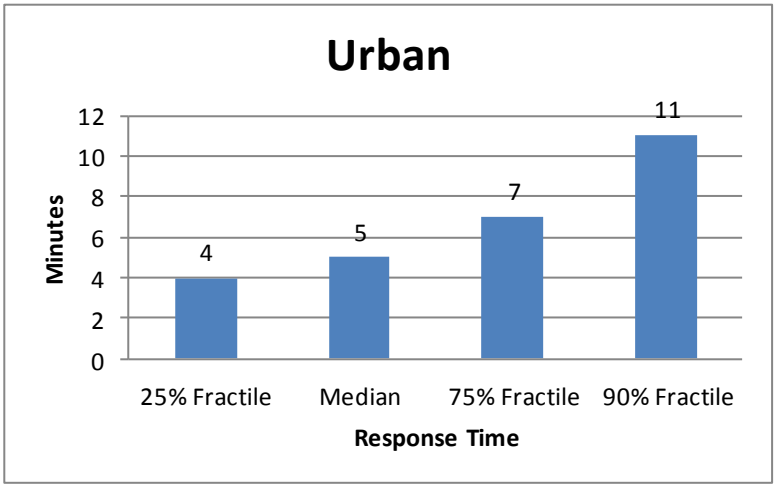
EMS System Response Time- Interfacility Transfers Excluded

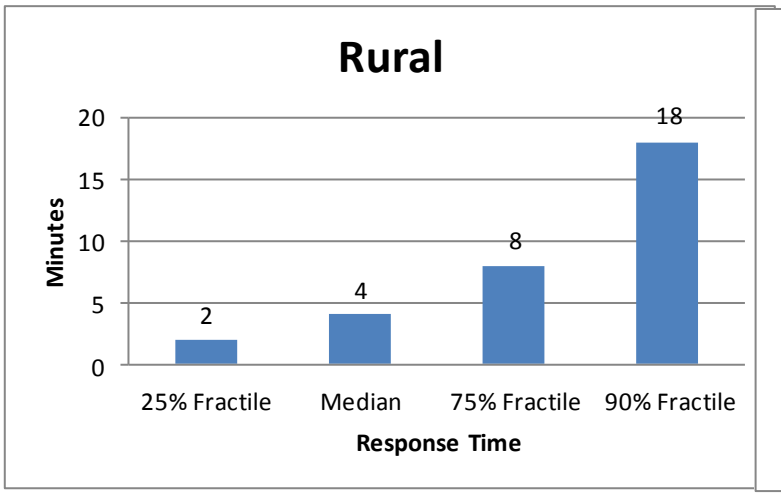
	Response Time - Minutes							
	Not Documented	N	Min	Max	25% Fractile	Median	75% Fractile	90% Fractile
Overall	68	12,235	0	1,450	4	5.0	8	13
By Location of Injury								
Null Value	3	393	0	89	7	14.0	21	30
Super Rural	20	2,920	0	1,448	4	6.0	9	17
Rural	44	212	0	37	2	4.0	8	18
Urban	1	8,710	0	1,450	4	5.0	7	11

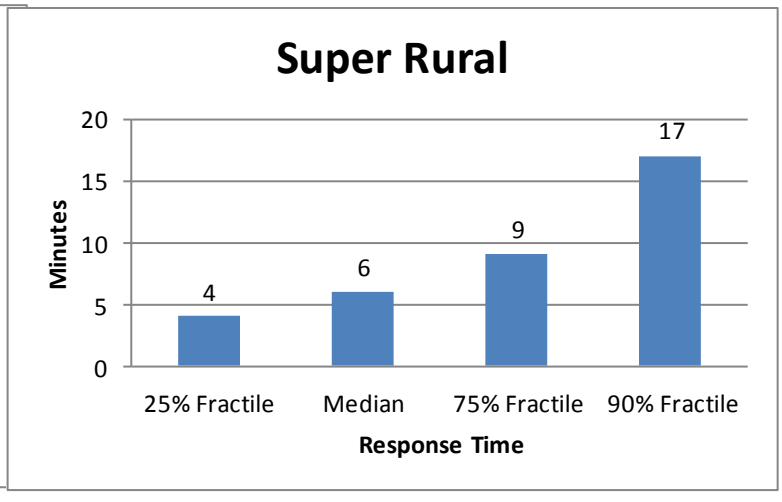
Response time is the number of minutes from the time the unit was notified to the time the unit arrived on scene.

The urbanicity of injured patients were considered when looking at response times. In Arizona, 75% of injured patients had response times of 7 minutes (urban), 8 minutes (rural) and 9 minutes in (super rural).

The median response time for communities were 4 minutes for rural, five minutes for urban, and six minutes for a super rural.







Delay in EMS System Response Time

	N	%
Reasons if Response Time >6 minutes		
Null Value	4,439	96.71%
Crowd	1	0.02%
Directions	14	0.30%
Distance	91	1.98%
Diversion	4	0.08%
Gated Community or Prison	1	0.02%
Safety	19	0.41%
Staff Delay	4	0.08%
Traffic	3	0.06%
Train	1	0.02%
Vehicle Crash	4	0.08%
Vehicle Failure	1	0.02%
Weather	8	0.17%

The median statewide response time for all trauma injuries was six minutes. For this report, any response times greater than 6 minutes were analyzed for delays.

The most common reasons for delays were distance (2%), safety (.4%), and directions (.3%).

Note that the majority of cases did not report a delay (97%).

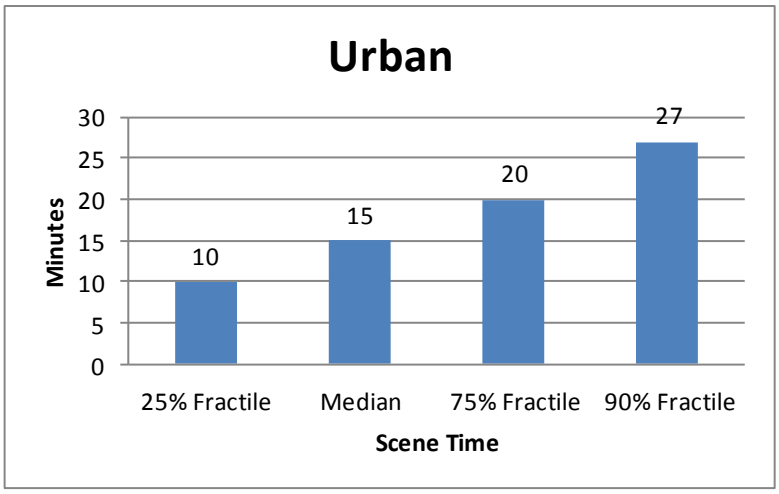
EMS System Scene Time-Interfacility Transfers Excluded

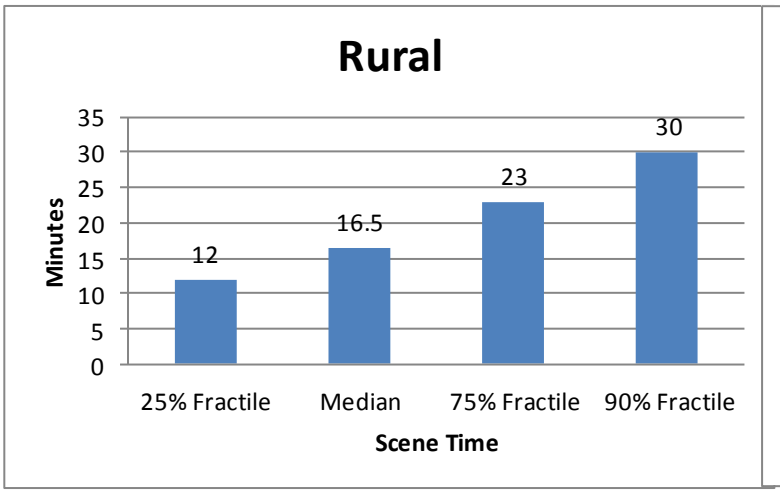
	Scene Time - Minutes							
	Not Documented	N	Min	Max	25% Fractile	Median	75% Fractile	90% Fractile
Overall	2,996	9,307	0	1,454	10	15.0	21	27
By Location of Injury								
Null Value	33	363	0	77	10	14.0	20	28
Super Rural	546	2,394	0	1,454	12	16.0	21	28
Rural	50	206	0	45	12	16.5	23	30
Urban	2,367	6,344	0	746	10	15.0	20	27

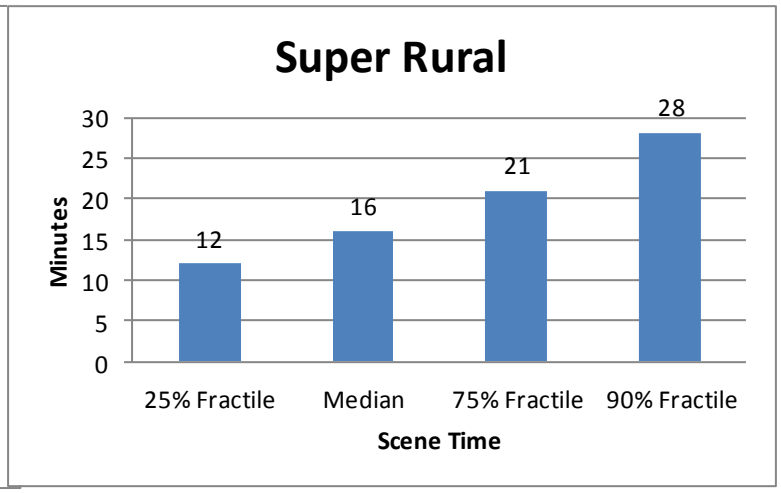
Scene time is the number of minutes the unit arrived on scene until the time it left.

In Arizona, 75% of injured patients had a scene time of 20 minutes for urban, 23 minutes for rural, and 21 minutes for super rural communities.

The median scene time for injury patients was 15 minutes for rural, 16.5 minutes for rural, and 16 minutes for super rural communities.







Delay in EMS System Scene Time

	N	%
Reasons if Scene Time >15 minutes		
Null Value	4,286	97.47%
Crowd	3	0.06%
Directions	10	0.22%
Distance	17	0.38%
Diversion	4	0.09%
Extrication > 20 Min	19	0.43%
Language Barrier	5	0.11%
Patient Access Delay (Lockout/Physical)	11	0.25%
Safety	16	0.36%
Staff Delay	15	0.34%
Traffic	6	0.13%
Vehicle Failure	1	0.02%
Weather	4	0.09%

The median statewide scene time for all trauma injury calls was 15 minutes. For this report, any response times greater than 15 minutes were analyzed for delays.

The most common reasons for delays were extrication greater than 20 minutes (.4%), distance (.4%), and safety (.36%).

Note that the majority of cases did not report a delay (97%).

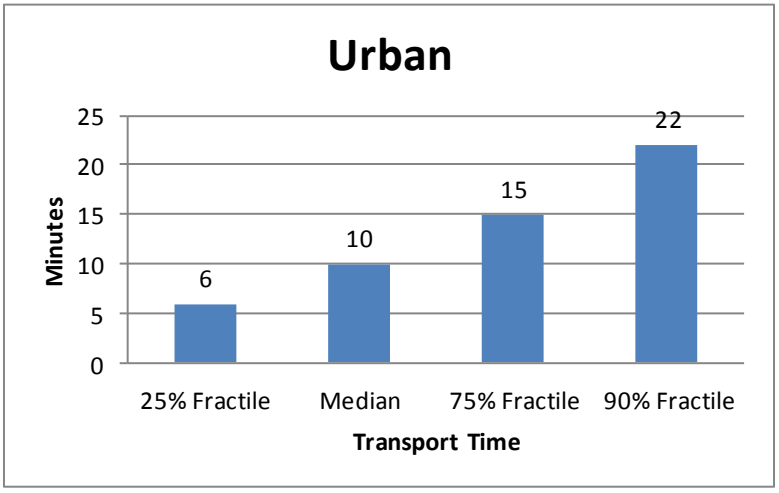
EMS System Transport Time- Interfacility Transfers Excluded

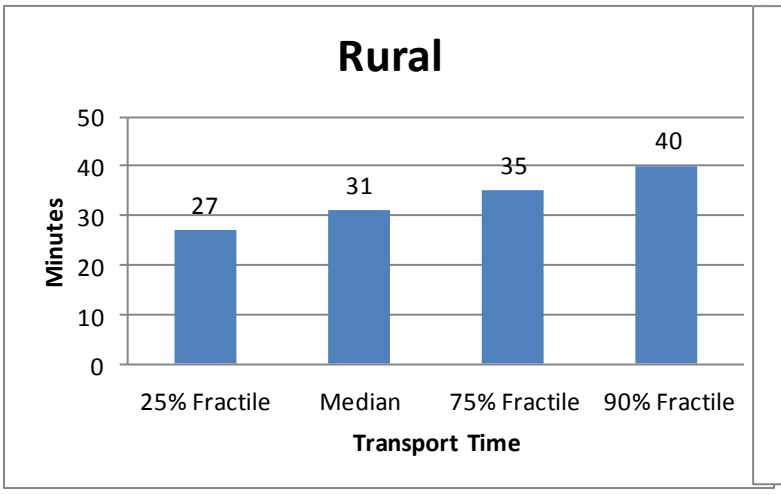
	Transport Time - Minutes							
	Not Documented	N	Min	Max	25% Fractile	Median	75% Fractile	90% Fractile
Overall	239	7,232	0	185	7	11.0	19	33
By Location of Injury								
Null Value	16	348	0	81	16	27.0	36	44
Super Rural	67	2,005	0	185	7	12.0	28	41
Rural	34	203	10	66	27	31.0	35	40
Urban	122	4,676	0	164	6	10.0	15	22

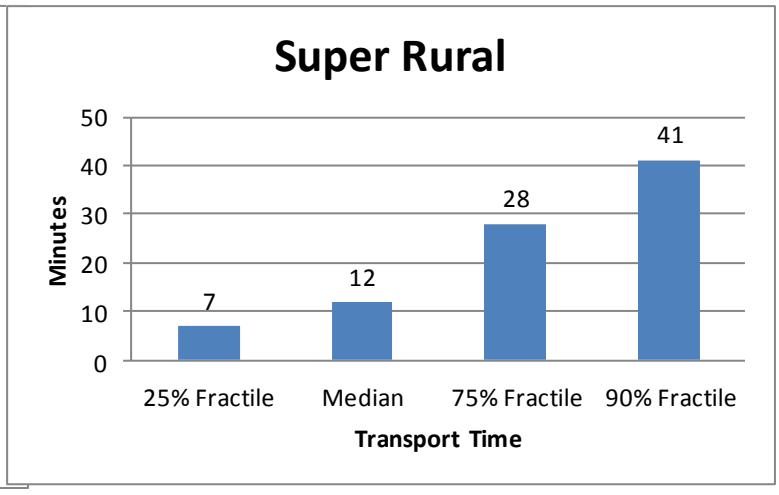
Transport time is the number of minutes the unit left the scene to the time the patient arrived at the destination.

In Arizona, 75% of injured patients had a transport time of 15 minutes for urban, 35 minutes for rural, and 28 minutes for super rural communities.

The median transport time for injury patients was 10 minutes for urban, 31 minutes for rural, and 12 minutes for super rural communities.







Delay in EMS System Transport Time

	N	%
Reasons if Transport Time >11 minutes		
Null Value	3,356	97.07%
Directions	1	0.02%
Distance	86	2.48%
Staff Delay	2	0.05%
Traffic	1	0.02%
Vehicle Failure	1	0.02%
Weather	10	0.28%

The median statewide transport time for all trauma injury calls was 11 minutes. For this report, any response times greater than 11 minutes were analyzed for delays.

The most common reasons for delays were distance (2%) and weather (.3%).

Note that the majority of cases did not report a delay (97%).