Emergency Medical Services
2015 Annual Report

Arizona Department of Health Services

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Bentley J. Bobrow, MD, Medical Director

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Arizona Department of Health Services– Medical Director

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Ambulance Service Corporation

Dan Millon
Department of Public Safety

Gene McDaniel
Prehospital Emergency Medical Training Program
Phoenix Fire Department

Howard Reed
Ambulance Service Corporation

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Emergency Medicine Physician—Central Region

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Public Member

Tyler Matthews, CEP
Public Member

Robert Costello
Public Member

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Hospital Administrator (Population >500K)

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Governor's Office of Highway Safety

Rebecca Haro, NREMT-P
Statewide Fire District Association Representative (TEPI liaison)
North County Fire & Medical

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Trauma Surgeon
Havasu Regional Medical Center - Lake Havasu City, AZ

Dale Woolridge, MD
Public Member

Daniel Spaite, MD
Emergency Medicine Physician—Southeaster Region

Glenn Kasprzyk
Public Member/Vice Chair
American Medical Response

James Hayden, CEO
Public Member

John Karolzak
Three Largest Employers of EMCTs
American Medical Response

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Local EMS Coordinating System—Central Region

Michele Preston, MD
Emergency Medicine Physician—Western Region

Patricia Coryea-Hafkey, RN
Professional Nurse

Riane Page, MD
Emergency Medicine Physician—Northern Region

Rodney Reed
Local EMS Coordinating System—Western Region

Todd Harms
Three Largest Employer of EMCTs

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Hospital Administrator (Population <500K)

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Arizona Department of Health Services– Medical Director

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Emergency Medicine Physician—Southeastern Region

Jonathan Maitem, DO
Emergency Medicine Physician—Central Region

Michele Preston, MD
Emergency Medicine Physician—Western Region

Phillip Richemont
Physician with Full-Time Practice in a Rural Area

Toni Gross, MD
Physician Specializing in Pediatric Medicine (PMD Liaison)

Jim Dearing, DO
Hospital Administrator (Population >500K)

Gail Bradley, MD
Physician Specializing in Cardiac Care/Vice Chair Education Liaison

Frank Walter, MD
Physician Specializing in Toxicology

Kevin Foster, MD
Physician Specializing in Trauma Surgery

Nicholas Theodore, MD
Physician Specializing in Acute Head Injury/Spinal Cord Care

Riane Page, MD
Emergency Medicine Physician—Northern Region (TEPI Liaison)

James Hayden, CEO
Public Member

Trauma and EMS Performance Improvement Standing Committee Membership

Chris Salvino, MD, MS, FACS
Chair
Havasu Regional Medical Center - Lake Havasu City, AZ

Bill Ashland, RN
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Phoenix, AZ

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Introduction

On behalf of the Data and Quality Assurance team, we are pleased to present the 2015 EMS Annual Report. Much like the State Trauma Advisory Board Annual Report,[1] this document should serve as a record of system-level EMS activity for the 2014 reporting year. In order to document changes over time, this report will maintain a consistent focus with additional content being added through time.

EMS is undergoing many changes. The Patient Protection and Affordable Care Act contains several sections that apply directly or indirectly to the provision of EMS. Most of these sections focus on the importance of EMS data collection, data analysis and the use of data in driving performance improvement initiatives. Additionally, the EMS Compass (www.emscompass.org), a nationwide initiative funded through the National Highway Traffic Safety Association (NHTSA) Office of EMS, has developed performance measures and will continue to develop more.

This past year the Bureau of EMS and Trauma System successfully provided EMS agencies with access to outcome data after linking the Arizona State Trauma Registry, the Hospital Discharge Database, and the Cardiac Event Data and Reporting system (CEDaR). EMS has long considered accessing outcome data as the gold standard for targeted and timely performance improvement initiatives. This is an expansion similar to the long-standing success found in the Save Hearts in Arizona Registry & Education[2] and the Excellence in Prehospital Injury Care (EPIC).[3]

Arizona is fortunate to have medical directors, performance improvement officers, and chief executives that value the importance of data collection, data analysis, and the continuous quality improvement processes. In fact, Arizona's EMS providers have helped shape the provision of out-of- hospital and in-hospital cardiac arrest care around the world. More recently, the work of some of Arizona's 9-1-1 dispatch centers has shown dramatic results for bystander CPR. The Journal of the American Medical Association published a report on Arizona's success this month.[4] Lastly, your work in adopting and reporting data on the traumatic brain injury care in EPIC is also promising dramatic improvements in patient outcomes.

With the assistance of the Trauma and EMS Performance Improvement standing committee,[5] several EMS performance improvement resources and activities are now in place including the EMS Performance Improvement Manual,[6] the EMS Registry Users Group, and numerous EMS registry training opportunities each year.

As you review this report, we hope that you will share any ideas that you have for our next report. We extend our sincerest thanks and gratitude to the 18,000 EMCTs in Arizona who respond to the requests for EMS at all times. Your work makes a positive difference in the lives of all Arizonans.

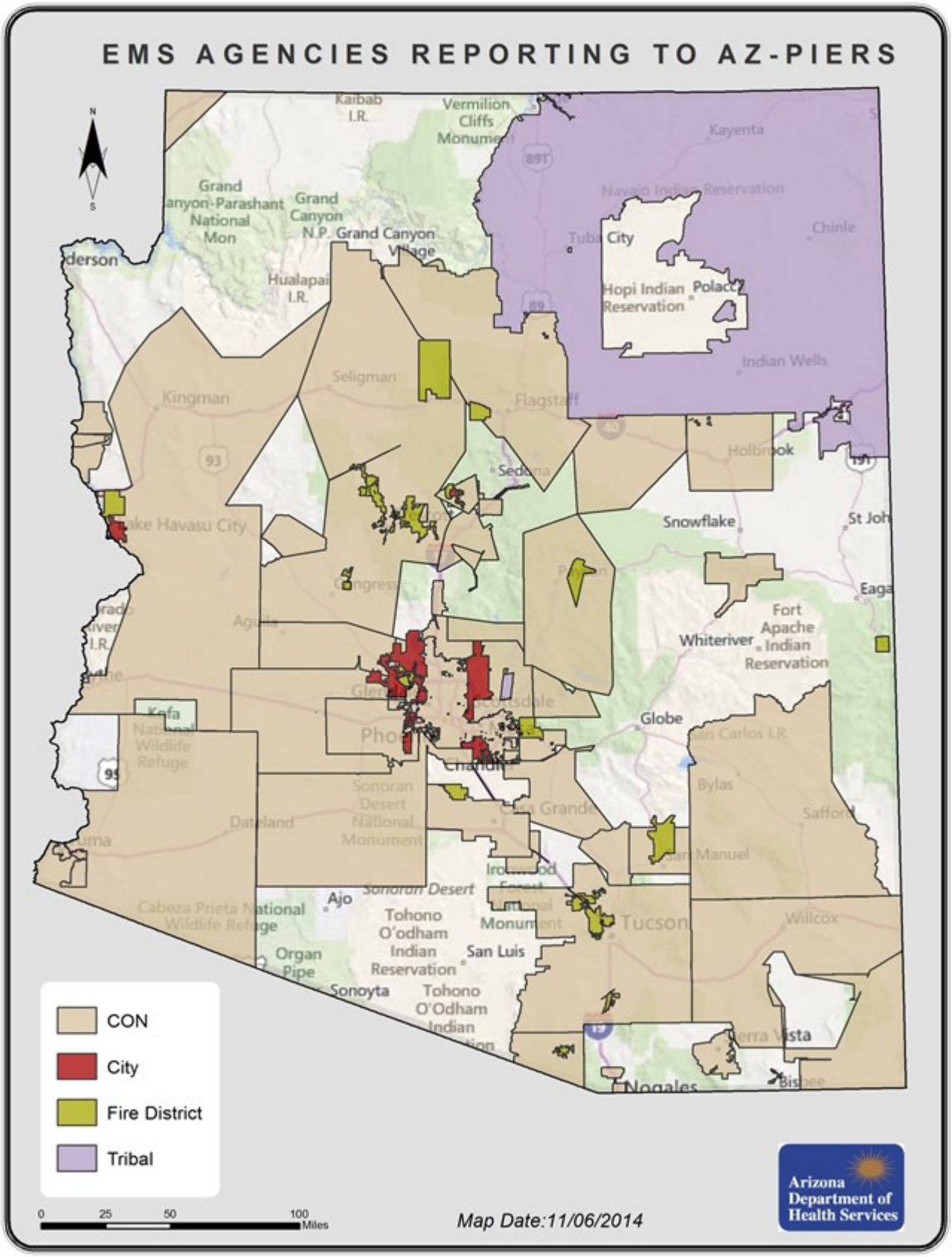
In the future, we expect to see Community Integrated Paramedicine, which includes Treat and Refer initiatives, as new models for the use of EMS personnel in our healthcare system. Being able to collect, analyze and use these data to improve care is vital to ensuring that these systems deliver the promised benefits. The flow of data from Health Information Exchanges (HIE),[7] with Arizona's very own Health-e Connection, will help shape the way organizations obtain outcome data and medical history data in the future.

Sincerely,

Terry Mullins
Bureau Chief

Bentley Bobrow
Medical Director

[1] http://azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/reports/2015-stab-annual-report.pdf
[2] http://azdhs.gov/preparedness/emergency-medical-services-trauma-system/save-hearts-az-registry-education/index.php
[3] http://www.epic.arizona.edu/
[4] Bobrow BJ, Spaite DW, Vadeboncoeur TF, et al. Implementation of a Regional Telephone Cardiopulmonary Resuscitation Program and Outcomes After Out-of-Hospital Cardiac Arrest. *JAMA Cardiol.* Published online May 04, 2016. doi:10.1001/jamacardio.2016.0251.
[5] http://azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/advisory/STAB/TEPImembership.pdf
[6] http://www.azdhs.gov/documents/preparedness/emergency-medical-services-trauma-system/data/users/ems-performance-improvement-plan.pdf
[7] http://www.azhec.org/



The EMS agencies highlighted here submitted 2014 data to the AZ-PIERS Annual Report.

Submitting Agencies

Thank you to all our 2014 submitters! This report would not be possible without you!

Action Medical Svc. - Ganado
Action Medical Svc. - Winslow
Aerocare Med. Transport-AeroMed
Air Evac Svcs.
Alpine Fire Dist.
American Ambulance
American Comtrans
Arivaca Fire Dist.
Arizona State University Student EMS
Arrowhead Mobile Healthcare
Avondale Fire & Medical Department
Beaver Dam-Littlefield Fire District
Black Canyon Fire Dept.
Buckeye Valley Rural Vol. Fire Dist.
Bullhead City Fire Dept. Ambulance Svc.
Camp Verde Fire District
Central Yavapai Fire Dist.
Chandler Fire Dept.
Clarkdale Fire Dist.
Classic Lifeguard Aeromedical Svc.
Congress Fire Dist.
Cottonwood Fire Dept.
Eloy Fire District Ambulance Svc.
Fort McDowell Yavapai Nation Fire Department
Fort Mojave Mesa Fire District
Golder Ranch Fire District
Green Valley Fire Dist.
Guardian Air (Flagstaff)
Guardian Medical Transport
Healthcare Innovations
High Country Fire Rescue
Holbrook EMS
Kord's Southwest
Lake Havasu City Fire Department
Life Line Ambulance Svc.
LifeNet (Arizona)
LifeStar EMS
Maricopa County Sheriff's Office (MCSO)
Maricopa Fire Dept.
Mayer Fire & Rescue
Mohave Valley Fire Dept. Ambulance Svc.
Montezuma-Rimrock Fire District
Native American Air Ambul. - OMNI Flight
Navajo Nation EMS - Fort Defiance
Navajo Nation EMS - Red Mesa
North County Fire & Medical District
Northwest Fire Rescue Dist.
PMT- Professional Medical Transport
Peoria Fire Dept.
Pine/Strawberry Fire Dept.
Queen Creek Fire Dept.
REVA
Rio Rico Fire District
Rio Verde Fire Dist.
River Medical Inc.
Rural Metro Corp. (Pinal) - TRI-CITY MED
Rural/Metro Corp. (Pima)
Rural/Metro Corp. (Yuma)
Rural/Metro Corp. - AMT (Maricopa)
Sacred Mountain Medical Svc.
San Juan Regional Air Care (New Mexico)
Scottsdale Fire Dept.
Southwest Ambulance & Rescue of AZ
Southwest Ambulance (Maricopa)
Southwest Ambulance of Casa Grande
Southwest Ambulance of Safford
Sun Lakes Fire District
Superstition Fire and Medical District
Surprise Fire Dept.
Tonopah Valley Fire Dist.
Tri-Valley Ambulance Svc.
Tubac Fire District Ambulance Svc.
Twin Arrows EMS
Verde Valley Ambulance Co.
Verde Valley Fire District
Williamson Valley Fire Dist.
Yarnell Fire Dist.
Yuma Fire Department

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

2014 Data
Emergency Medical Services
Annual Report

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Purpose and Methods

Purpose:

The purpose of this report is to systematically describe EMS calls occurring in Arizona. We have synthesized data from the Arizona Prehospital Information & EMS Registry System (AZ-PIERS) and the Hospital Discharge Database (HDD) to provide stakeholders with key information on Arizona's EMS patients.

Methodology:

The AZ-PIERS is a free electronic Patient Care Records (ePCRs) registry that allows EMS agencies to collect and transmit to the State. The primary purpose of the AZ-PIERS is to optimize prehospital care through a data driven, quality assurance approach. In 2014, about 65 EMS agencies were submitting data to the AZ-PIERS; these agencies cover approximately 63% of Arizona's area and 97% of Arizona's population. The database includes both required and optional reporting elements and data are validated to meet National EMS Information System (NEMSIS) standards. The AZ-PIERS captures agency information, patient demographics, response times, incident location, and prehospital treatment.

A total of 484,265 EMS runs were submitted to AZ-PIERS from January 1, 2014, to December 31, 2014. We used the 2014 population denominators, from the Arizona Health Status and Vital Statistics database, to calculate EMS run rates per 100,000 Arizona residents. These data were analyzed using SAS software, version 9.4 (SAS Institute, Cary, NC).

In order to obtain the final hospital outcome for EMS runs with an incident disposition of Treated & Transferred or Treated & Transported (n = 394,007), a deterministic linkage between AZ-PIERS and the Hospital Discharge Database (HDD) was performed. Of the 394,007 treated/transported EMS runs, 290,902 (74%) qualified for linkage. Runs not qualifying for linkage consisted of patients who were transported to facilities not reporting to the HDD, facilities outside of Arizona, or had missing data on all linkage variables. Following linkage, 252,580 (87%) EMS runs were successfully matched to their respective records in the HDD.

If a single patient is treated by more than one EMS agency, AZ-PIERS will collect that patients information from all the corresponding agencies, leading to multiple records for the same patient. In order to report the information from the HDD at the patient level, duplicate runs were removed. After removing the duplicates, a total of 209,066 linked patient level records were available from the HDD. This patient level information was used when reporting information from the HDD.

Total EMS Runs

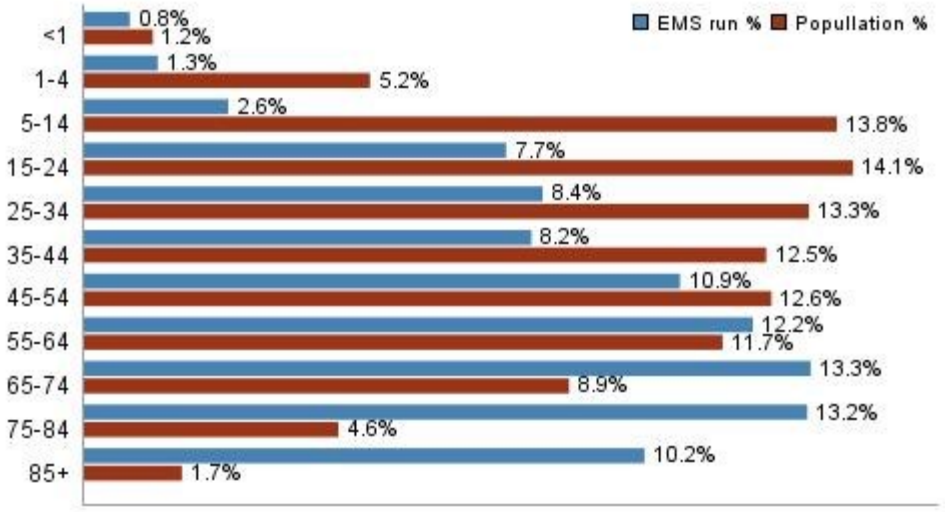
EMS Run Volume by age

There were 484,265 EMS runs reported to AZ-PIERS from January 1, 2014, to December 31, 2014.

As age increases, the proportion of patients utilizing EMS services begins to exceed the proportion of Arizona's population (Graph 1). For example, 5.2% of the population is 1 to 4 years old; while this group makes up only 1.3% of EMS runs. Conversely, 1.7% of the population is 85 years or older; while this group makes up 10.2% of EMS runs.

About half of all EMS runs involved individuals over 55 years of age (Table 1)

Graph 1: Age distribution of EMS runs and Arizona population



Data source: AZ-PIERS 2014, Arizona Health Status and Vital Statistics 2014

Table 1: EMS run volume by age

	Count	%
Total EMS runs	484,265	100.0%
Age (years)		
Missing	51,562	10.6%
< 1	4,078	0.8%
1-4	6,565	1.3%
5-14	12,829	2.6%
15-24	37,524	7.7%
25-34	40,773	8.4%
35-44	39,773	8.2%
45-54	52,978	10.9%
55-64	59,461	12.2%
65-74	64,600	13.3%
75-84	64,293	13.2%
> 85	49,829	10.2%

Total EMS Runs

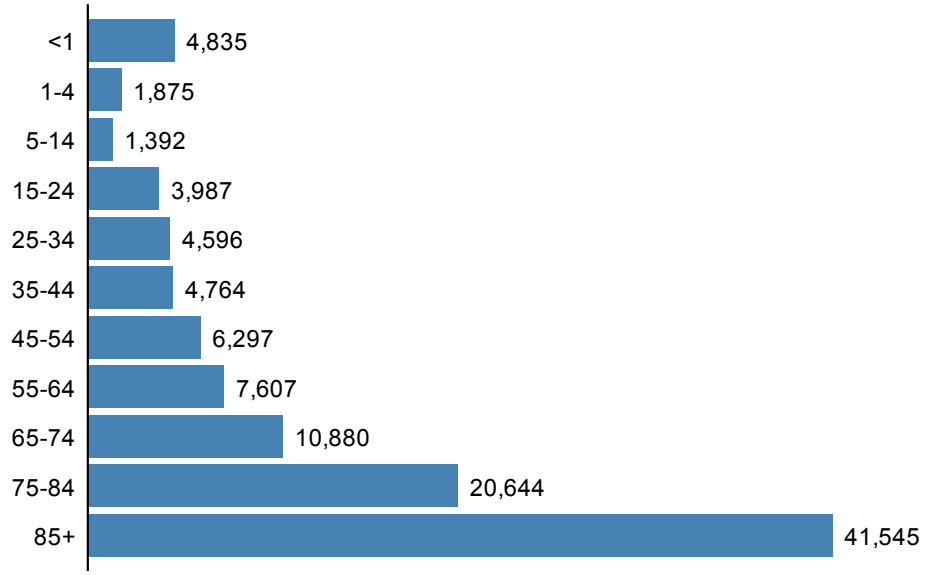
EMS run rate by age

An EMS run rate allows for comparisons among groups despite differences in population makeup.

The EMS run rate per 100,000 Arizona residents increases with age.

Individuals aged 85 years and older have the highest EMS run rate in the state with 41,545 runs per 100,000 Arizona residents.

Graph 2: EMS run rate per 100,000 Arizona residents by age



Data source: AZ-PIERS 2014

Table 2: EMS run rate per 100,000 Arizona residents by age

	Arizona population	EMS runs	Run Rate
Total EMS runs	6,667,241	484,265	—
Age (years)			
Missing	—	51,562	—
< 1	84,342	4,078	4,835
1-4	350,065	6,565	1,875
5-14	921,419	12,829	1,392
15-24	941,262	37,524	3,987
25-34	887,233	40,773	4,596
35-44	834,861	39,773	4,764
45-54	841,342	52,978	6,297
55-64	781,612	59,461	7,607
65-74	593,726	64,600	10,880
75-84	311,439	64,293	20,664
> 85	119,940	49,829	41,545

Total EMS Runs

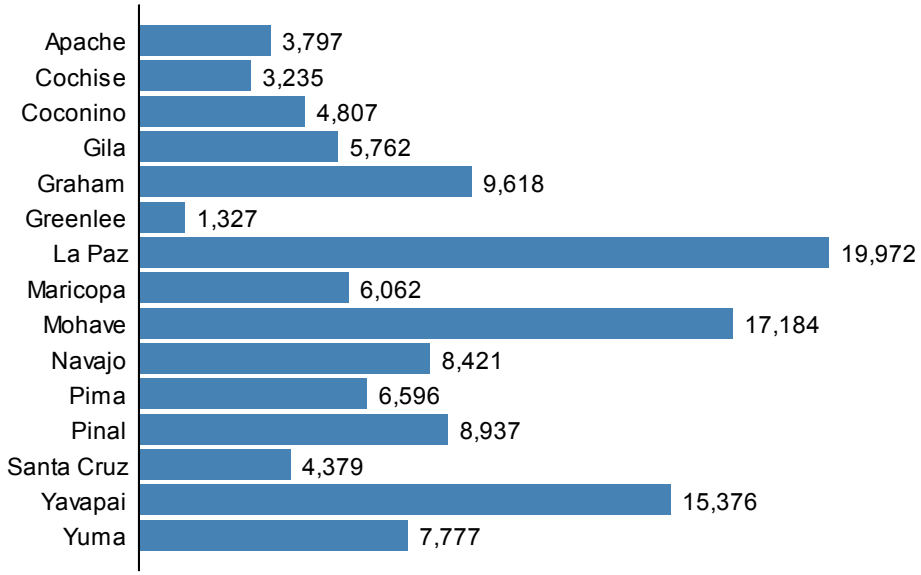
EMS run rate by county

The EMS run rate allows for comparisons on the use of EMS in counties despite differences in population.

Given that not all EMS agencies submit data to AZ-PIERS, the rates for some counties may be underestimated.

Only 2% of EMS runs involved incidents occurring outside of Arizona.

Graph 3: EMS run rate per 100,000 Arizona residents by county



Data source: AZ-PIERS 2014

Table 3: EMS run rate per 100,000 Arizona residents by county

	Count	%	Rate
County of Incidence			
Missing	8,493	1.7%	—
Apache	2,729	0.5%	3,797
Cochise	4,194	0.8%	3,235
Coconino	6,700	1.4%	4,807
Gila	3,124	0.6%	5,762
Graham	3,685	0.7%	9,618
Greenlee	139	0.0%	1,327
La Paz	4,235	0.8%	19,972
Maricopa	243,005	51.2%	6,062
Mohave	35,055	7.3%	17,184
Navajo	9,194	1.9%	8,421
Pima	66,435	14.0%	6,596
Pinal	35,413	7.4%	8,937
Santa Cruz	2,170	0.4%	4,379
Yavapai	33,113	6.9%	15,376
Yuma	16,488	3.4%	7,777
Outside of Arizona	9,141	1.8%	—

Total EMS Runs

Race, Ethnicity and Gender

Although race and ethnicity are standard medical questions, race was missing for 42% and ethnicity was missing for 85% of EMS runs.

The Health Research and Educational Trust recommends that providers ask for ethnicity prior to race.

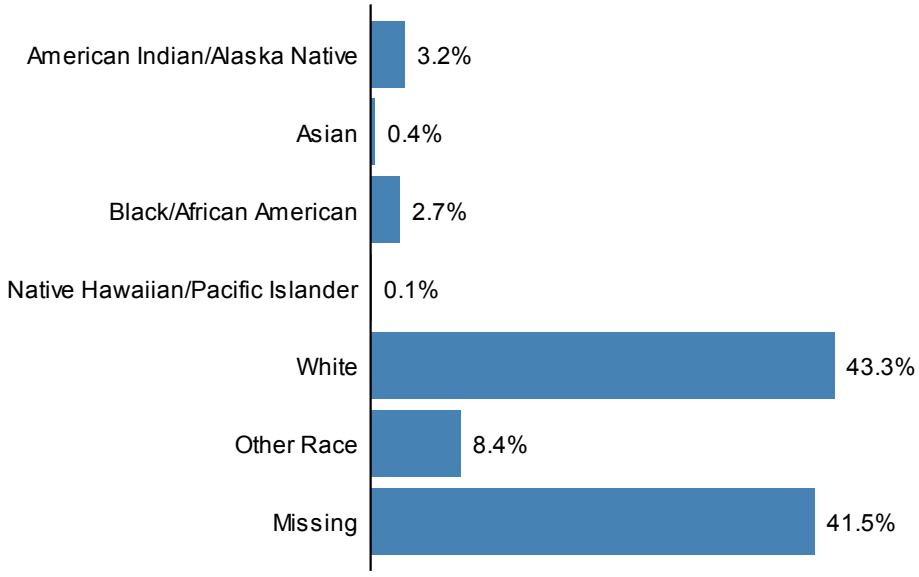
Example:

"*We want to make sure that all our patients get the best care possible. We would like you to tell us your racial/ethnic background so that we can review the treatment that all patients receive and make sure that everyone gets the highest quality of care."*

1. *Do you identify yourself as Hispanic, Latino, or of Spanish origin?*
   - *Yes*
   - *No*
   - *Declined to answer*

2. *Which category best describes your race?*
   - *American Indian/ Alaskan Native*
   - *Asian*
   - *White*
   - *Other*
   - *Declined to answer*

Graph 4: EMS run volume by race



Data source: AZ-PIERS 2014

Table 4: EMS run volume by gender, race and ethnicity

	Count	%
Gender		
Missing	59,419	12.2%
Male	206,291	42.5%
Female	218,555	45.1%
Race		
Missing	201,249	41.5%
American Indian/Alaska Native	15,668	3.2%
Asian	2,244	0.4%
Black/African American	13,466	2.7%
Native Hawaiian/Pacific Islander	641	0.1%
White	210,071	43.3%
Other Race	40,926	8.4%
Ethnicity		
Missing	409,754	84.6%
Hispanic or Latino	11,088	2.2%
Not Hispanic or Latino	63,423	13.0%

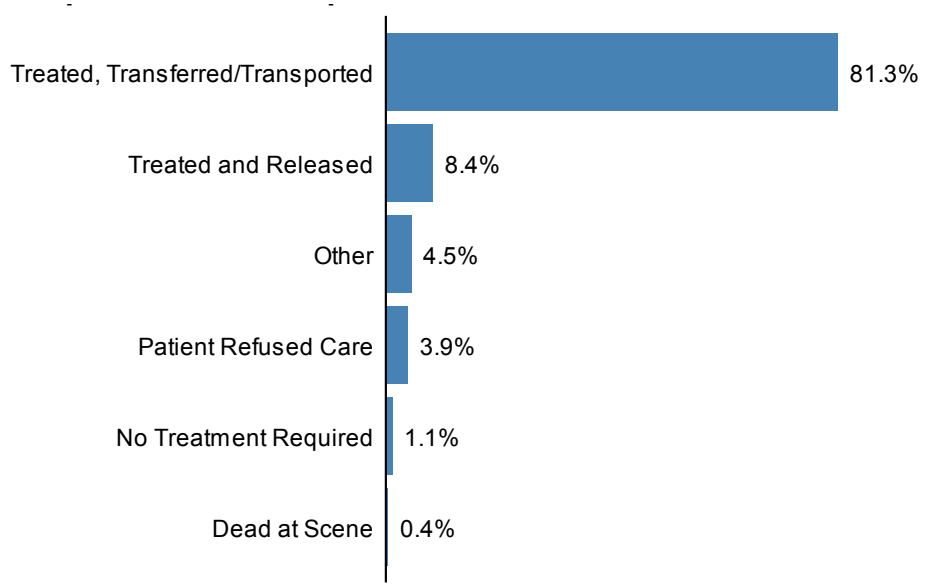
Total EMS Runs

Incident Disposition

For 81% of EMS runs, patients were either treated and transferred between EMS agencies or treated & transported directly to the hospital.

There were 2,078 (0.4%) EMS runs with a discharge disposition of dead at scene.

Graph 5: Incident disposition of total EMS runs



Data source: AZ-PIERS 2014

Table 5: Incident disposition of total EMS runs

	Count	%
Treated, Transferred/Transported	394,007	81.3%
Treated and Released	41,052	8.4%
Other	22,262	4.5%
Patient Refused Care	19,202	3.9%
No Treatment Required	5,664	1.1%
Dead at Scene	2,078	0.4%

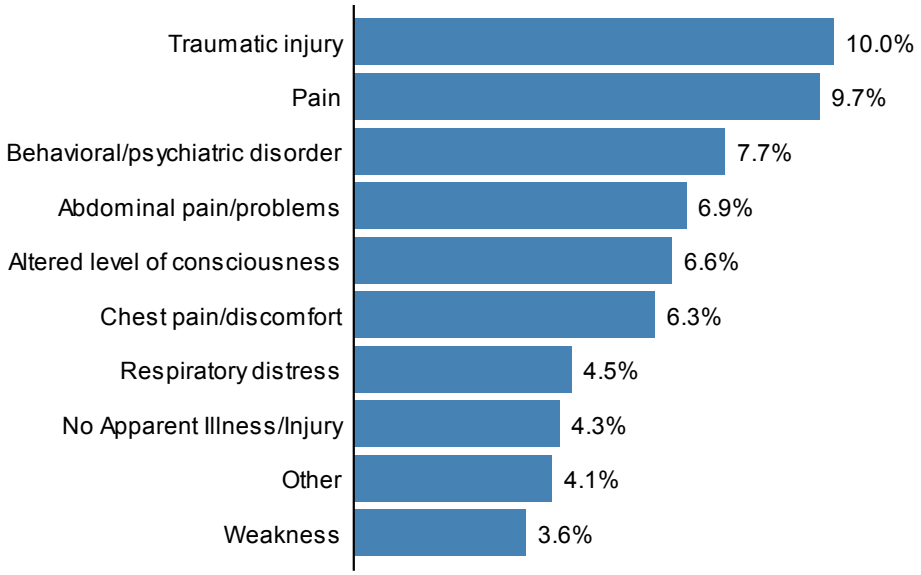
Total EMS Runs

Provider Primary Impression

The EMS Provider Primary Impression was missing for 37.3% of EMS runs. When recorded, traumatic injury, pain, and behavioral/ psychiatric disorder were the top three primary impressions.

Tables 6a to 6c show the top 30 provider primary impressions.

Graph 6: Provider Primary Impression (Top 10)



Data source: AZ-PIERS 2014

Table 6a: Provider primary impression (Top 10)

	Count	%
Traumatic injury	29,168	10.0%
Pain	28,322	9.7%
Behavioral/psychiatric disorder	22,576	7.7%
Abdominal pain/problems	20,219	6.9%
Altered level of consciousness	19,363	6.6%
Chest pain/discomfort	18,314	6.3%
Respiratory distress	13,249	4.5%
No Apparent Illness/Injury	12,510	4.3%
Other	12,068	4.1%
Weakness	10,475	3.6%

Total EMS Runs

Provider Primary Impression

Table 6b: Provider primary impression (Next 11-20)

	Count	%
Unknown Problem	7,651	2.6%
Seizure	7,109	2.4%
Other Illness/Injury	5,470	1.8%
Syncope/fainting	5,017	1.7%
Nausea/Vomiting (Unknown Etiology)	4,652	1.6%
Cardiac rhythm disturbance	4,495	1.5%
Ethyl Alcohol Abuse	4,087	1.4%
Stoke/Cerebrovascular Accident	4,009	1.3%
General Malaise	3,455	1.1%
Fever	3,400	1.1%

Table 6c: Provider primary impression (Next 21-30)

	Count	%
Headache	3,166	1.0%
Back Pain (Non-Traumatic)	3,093	1.0%
Diabetic symptoms (hypoglycemia)	2,704	0.9%
Cardiac Arrest	2,176	0.7%
Other Abdominal/GI Problems	1,833	0.6%
Unconscious	1,743	0.6%
Other CNS Problem	1,697	0.5%
Poisoning/drug ingestion	1,629	0.5%
COPD (Emphysema/Chronic Bronchitis)	1,493	0.5%
Allergic reaction	1,476	0.5%
All other impressions	32,937	11.3%

GI = Gastro Intestinal, CNS = Central Nervous System, COPD = Chronic Obstructive Pulmonary Disease

Treated & Transferred / Transported

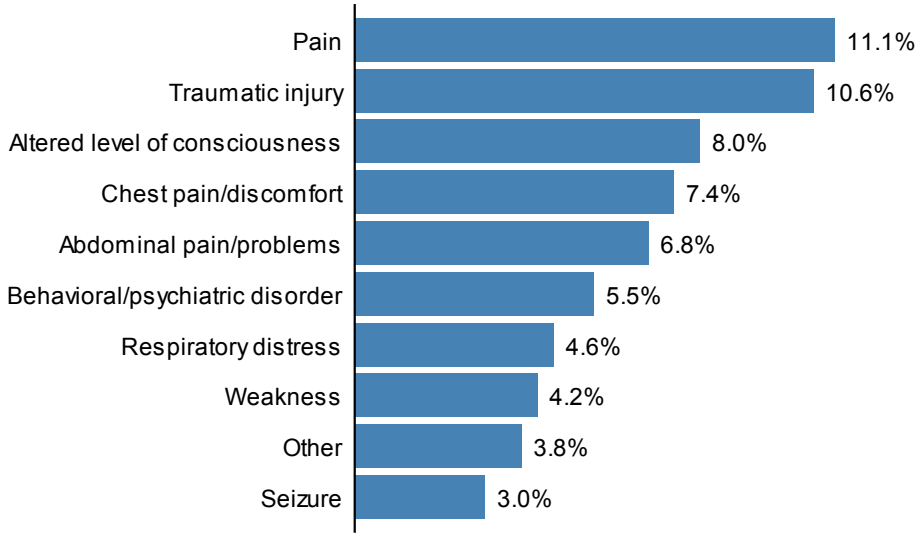
Provider Primary Impression

After linkage (See page 8 for details), 87% of qualifying EMS runs were successfully matched to their respective records in the HDD, for a total of 252,580 linked records.

The EMS provider primary impression was missing for 30% of the linked records.

When recorded, the top three EMS primary impressions for transported patients were pain, traumatic injury, and altered level of consciousness.

Graph 7: EMS primary impression (Top 10) of EMS runs transported to the hospital



Data source: AZ-PIERS 2014

Table 7: EMS primary impression (Top 10) of EMS runs transported to the hospital

	Count	%
Pain	19,685	11.1%
Traumatic injury	18,823	10.6%
Altered level of consciousness	14,172	8.0%
Chest pain/discomfort	13,105	7.4%
Abdominal pain/problems	12,052	6.8%
Behavioral/psychiatric disorder	9,830	5.5%
Respiratory distress	8,179	4.6%
Weakness	7,504	4.2%
Other	6,843	3.8%
Seizure	5,362	3.0%

Treated & Transferred / Transported

Hospital Primary Diagnosis

The 252,580 linked EMS runs represent 209,066 patient level records in the HDD (see page 8 for details).

The top three hospital diagnoses for patients transported to the hospital were chest pain, alcohol-related disorders and superficial injury.

Table 8: Hospital principal diagnosis (Top 10) of EMS patients transported to the hospital

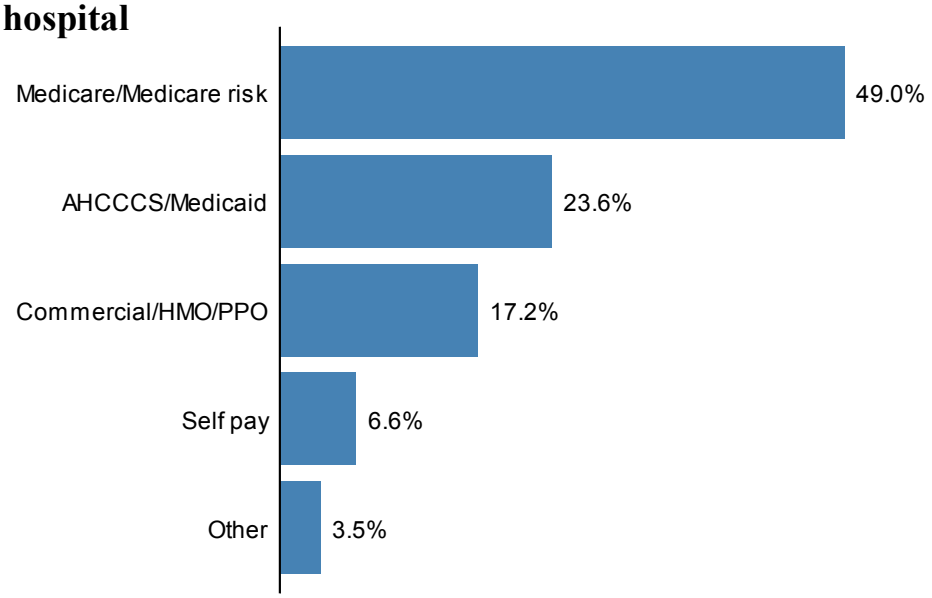
	Count	%
Chest pain	10,276	4.9%
Alcohol-related disorders	8,163	3.9%
Superficial injury	7,096	3.3%
Other injury	6,955	3.3%
Syncope	6,379	3.0%
Epilepsy/Copy Number Variation	6,371	3.0%
Septicemia	6,256	2.9%
Abdominal pain	5,571	2.6%
Dysrhythmia	4,548	2.1%
Sprain	4,492	2.1%

Treated & Transferred / Transported

Payer Source

The majority of hospital charges incurred by transported EMS patients were billed to either Medicare (49%) or Medicaid (24%).

Graph 8: Payer source for EMS patients transported to the hospital



Data source: AZ-PIERS 2014

Table 9: Payer source for EMS patients transported to the hospital

Payer status	Count	%
Medicare/Medicare risk	102,527	49.0%
AHCCCS/Medicaid	49,345	23.6%
Commercial/HMO/PPO	35,980	17.2%
Self pay	13,865	6.6%
Other	7,349	3.5%

Note: AHCCCS = Arizona Health Care Cost Containment System, HMO = Health Maintenance Organization, PPO = Preferred Provider Organization

Total Charges

The total charges for the 209,057 patients that were treated and transported to a hospital were $5,019,777,808, with a median charge of $9,506.

Treated & Transferred / Transported

Hospital Discharge Status

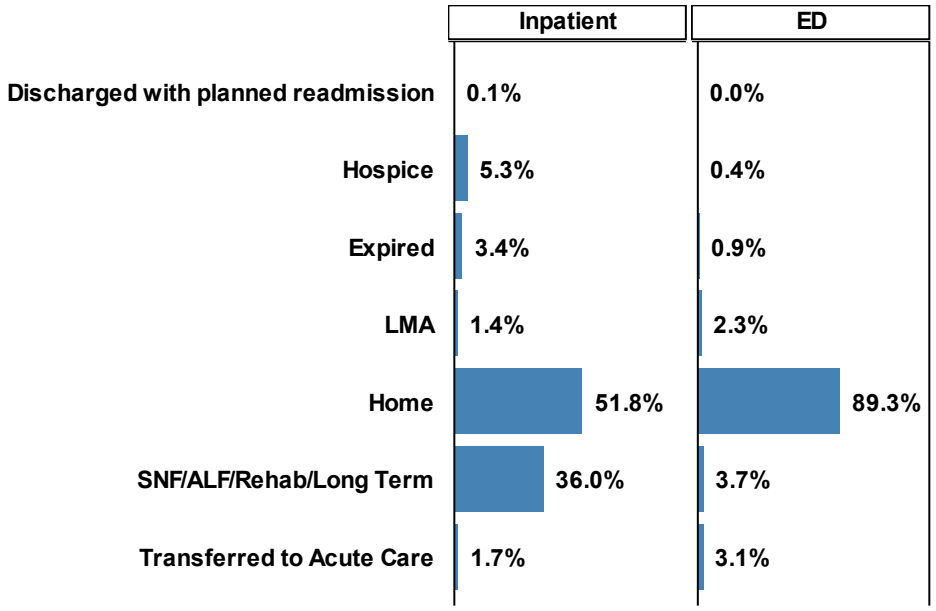
Of the EMS patients transported to the hospital, 66% (138,656) were discharged from the Emergency Department (ED), and 33% (70,410) were admitted to the hospital.

Of those discharged from the ED, 89% were discharged home.

Of the admitted patients, 52% were discharged home and 36% were discharged to a SNF/ ALF/Rehab or long term nursing facility. 3.4% of admitted patients died in the hospital.

Among the admitted patients, the median hospital length of stay was 4 days.

Graph 9: Hospital discharge status of transported EMS patients



Data source: AZ-PIERS 2014 and HDD 2014

Table 10: Hospital discharge status of transported EMS patients

Hospital discharge status	Admitted as an inpatient		Discharged from ED	
	Count	%	Count	%
Home	36,862	52.3%	124,016	89.4%
Transferred to Acute Care	1,255	1.7%	4,498	3.2%
SNF/ALF/Rehab/Long Term	25,031	35.5%	4,915	3.5%
LMA	1,026	1.4%	3,318	2.3%
Expired	2,447	3.4%	1,339	0.9%
Hospice	3,657	5.1%	532	0.3%
Discharged w/ planned readmission	132	0.1%	38	0.0%
Total	70,410	100.0%	138,656	100.0%

Note: SNF = Skilled Nursing Facility, ALF = Assisted Living Facility, LMA = Left Against Medical Advice

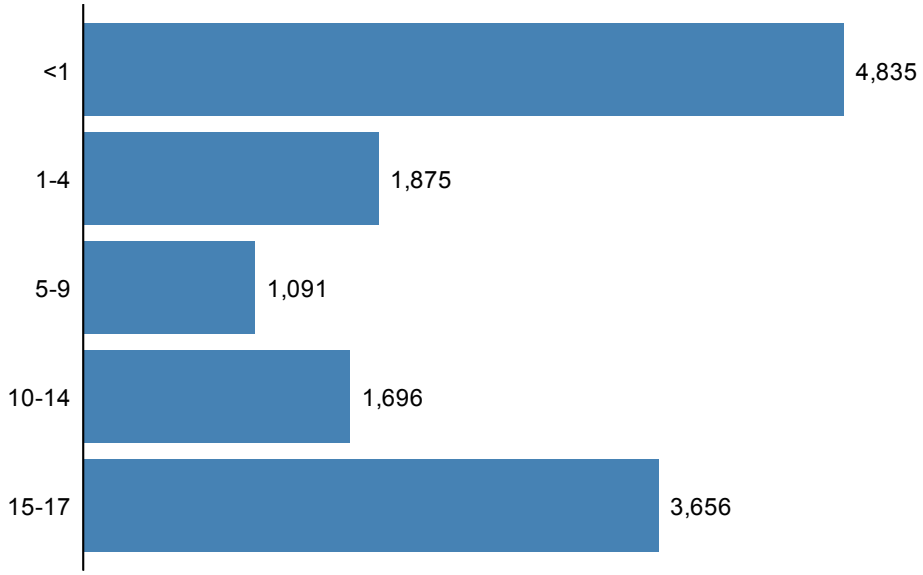
Pediatric Population

EMS run rate by age

There were 33,375 (7%) EMS runs involving pediatric patients under the age of 18.

Less than one year olds had the highest EMS run rate with 4,835 runs per 100,000 Arizona residents.

Graph 10: Age-specific pediatric EMS run rate per 100,000 Arizona residents



Data source: AZ-PIERS 2014

Table 11: Pediatric EMS run volume by age

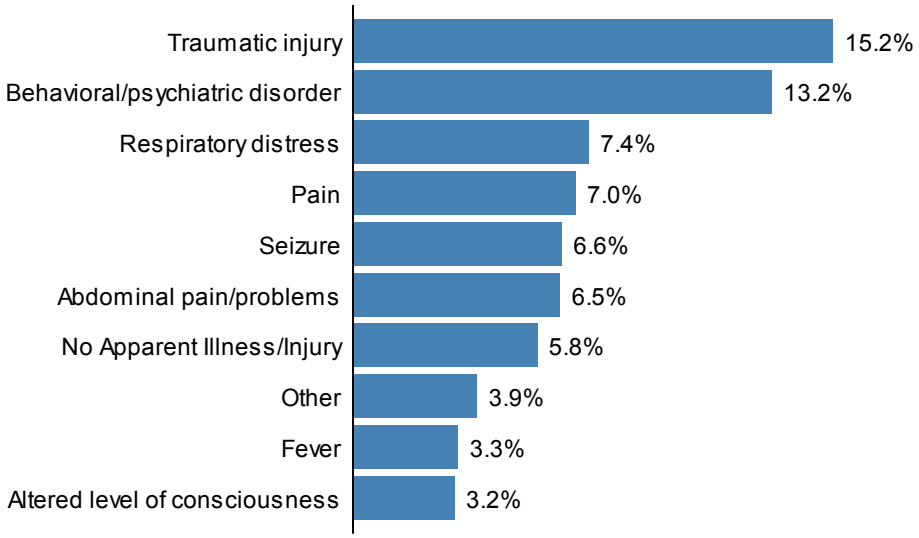
	Count	%
Total pediatric cases	33,375	100.0%
Age (years)		
<1	4,078	12.2%
1-4	6,565	19.6%
5-9	5,052	15.1%
10-14	7,777	23.3%
15-17	9,903	29.6%

Pediatric Population

Provider Primary Impression

The top three primary impressions for EMS runs involving pediatrics were traumatic injury, behavioral/psychiatric disorder, and respiratory distress.

Graph 11: Provider primary impression (Top 10) for pediatric EMS runs



Data source: AZ-PIERS 2014

Table 12: Provider primary impression (Top 10) for pediatric EMS runs

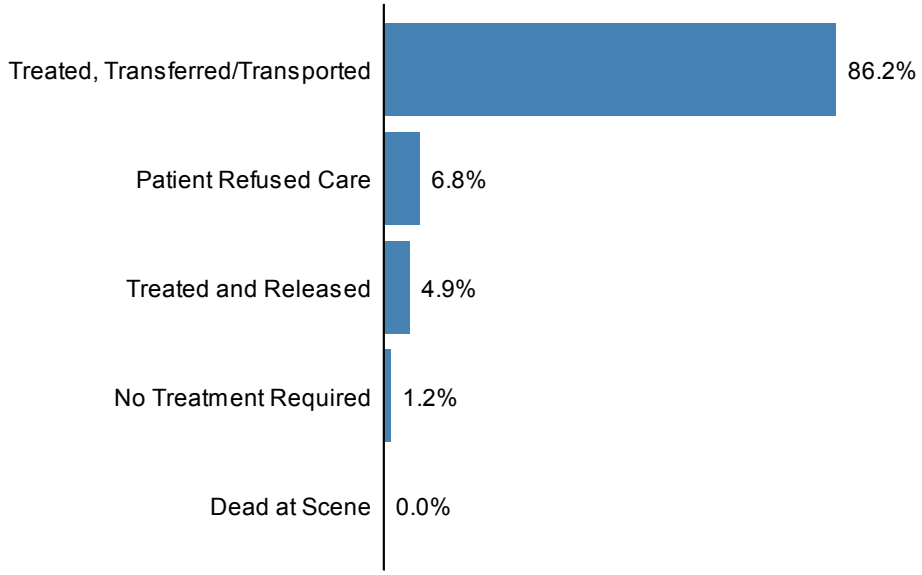
	Count	%
Traumatic injury	3,568	15.2%
Behavioral/psychiatric disorder	3,111	13.2%
Respiratory distress	1,751	7.4%
Pain	1,652	7.0%
Seizure	1,550	6.6%
Abdominal pain/problems	1,537	6.5%
No Apparent Illness/Injury	1,368	5.8%
Other	921	3.9%
Fever	780	3.3%
Altered level of consciousness	752	3.2%

Pediatric Population

Incident Disposition

For 86% of EMS runs involving pediatrics, the patient was either treated and transferred between EMS agencies or treated & transported directly to the hospital.

Graph 12: Incident disposition for pediatric EMS runs



Data source: AZ-PIERS 2014

Table 13: Incident disposition for pediatric EMS runs

	Count	%
Other	218	0.6%
Dead at Scene	13	0.0%
No Treatment Required	433	1.2%
Patient Refused Care	2,278	6.8%
Treated and Released	1,637	4.9%
Treated, Transferred/Transported	28,796	86.2%

Pediatric Population

Hospital Diagnosis

A total of 14,162 pediatric EMS runs were linked to the HDD.

The top three hospital diagnoses for the linked cases were Epilepsy/Copy Number Variation, Other Injury, and Superficial Injury.

Table 14: Hospital principal diagnosis (Top 10) for pediatric EMS runs

	Count	%
Epilepsy/Copy Number Variation	1,518	10.7%
Other injury	1,044	7.3%
Superficial injury	906	6.3%
Mood disorders	848	5.9%
Intracranial injury	553	3.9%
Syncope	412	2.9%
Open wound head	409	2.8%
Sprain	396	2.7%
Fracture arm	383	2.7%
Other upper respiratory infection	375	2.6%

Pediatric Population

Hospital Discharge Status

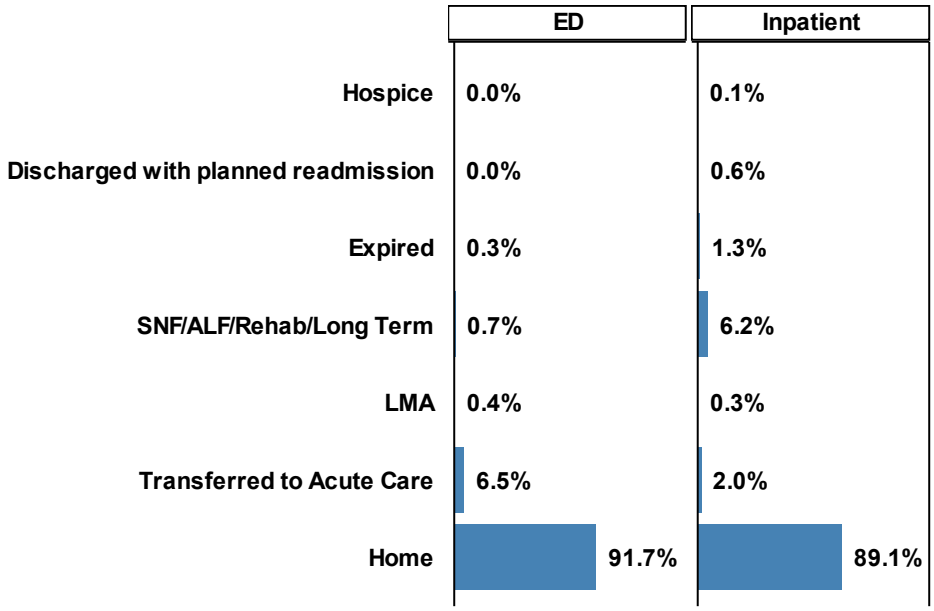
Of the 14,162 linked pediatric EMS runs, 18% were admitted to the hospital and 82% were discharged from the ED.

The majority of pediatric patients were discharged home from either the ED or after admission to the hospital.

The inpatient mortality for pediatric patients was 1.3% and the ED mortality was 0.3%.

6.2% of pediatric inpatients were discharged to a SNF/ ALF/Rehab or to a long term care facility.

Graph 13: Hospital discharge status for pediatric EMS runs



Data source: AZ-PIERS 2014 and HDD 2014

Table 15: Hospital discharge status for pediatric EMS runs

Hospital discharge status	Admitted as inpatient		Discharged from ED	
	Count	%	Count	%
Home	2,250	89.1%	10,675	91.7%
Transferred to Acute Care	52	2.0%	765	6.5%
SNF/ALF/Rehab/Long Term	159	6.2%	83	0.7%
LMA	8	0.3%	57	0.4%
Expired	35	1.3%	42	0.3%
Hospice	5	0.1%	9	0.0%
Discharged with planned readmission	16	0.6%	6	0.0%
Total	2,525	100.0%	11,637	100.0%

SNF = Skilled Nursing Facility, ALF = Assisted Living Facility, LMA = Left Against Medical Advice

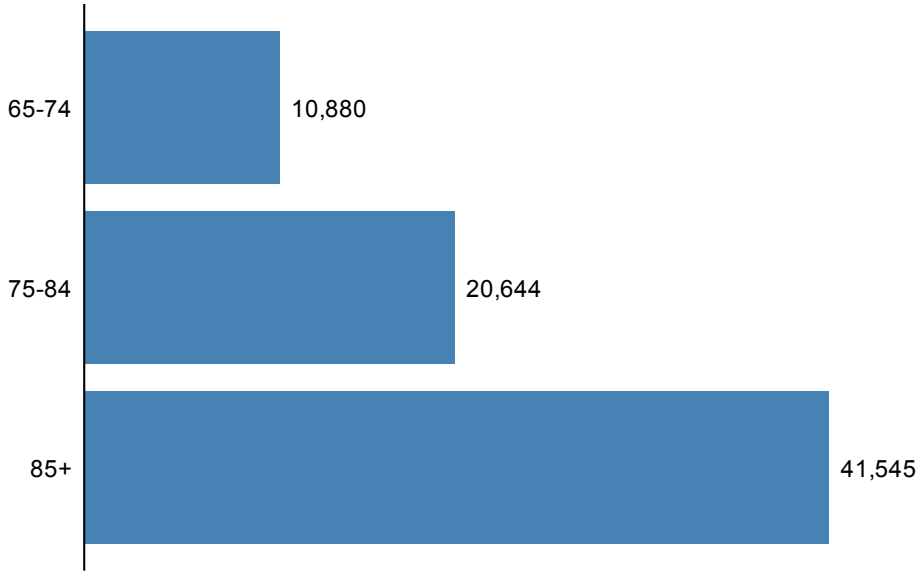
Geriatric Population

EMS run rate by age

There were 178,722 (37%) EMS runs involving geriatric patients 65 years or older.

Patients over the age of 85 had the highest EMS run rate with 41,545 runs per 100,000 Arizona residents.

Graph 14: Age-specific geriatric EMS run rate per 100,000 Arizona residents



Data source: AZ-PIERS 2014

Table 16: Age-specific geriatric EMS run rate per 100,000 Arizona residents

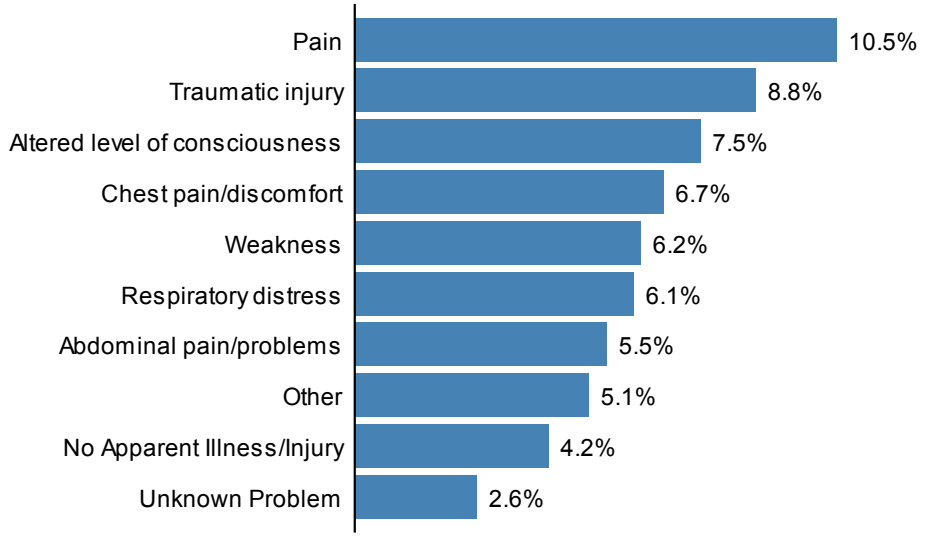
	Count	%	Rate per 100,000
Total geriatric cases	178,722	100.0%	—
Age (years)			
65-74	64,600	36.1%	10,880
75-84	64,293	35.9%	20,644
>85	49,829	27.8%	41,545

Geriatric Population

Provider Primary Impression

Pain, Traumatic Injury, and Altered Level of Consciousness were the top three primary impressions for EMS runs involving geriatrics.

Graph 15: Provider primary impression (Top 10) for geriatric EMS runs



Data source: AZ-PIERS 2014

Table 17: Provider primary impression (Top 10) for geriatric EMS runs

	Count	%
Pain	12,327	10.5%
Traumatic injury	10,259	8.8%
Altered level of consciousness	8,848	7.5%
Chest pain/discomfort	7,904	6.7%
Weakness	7,321	6.2%
Respiratory distress	7,140	6.1%
Abdominal pain/problems	6,450	5.5%
Other	5,991	5.1%
No Apparent Illness/Injury	4,964	4.2%
Unknown Problem	3,127	2.6%

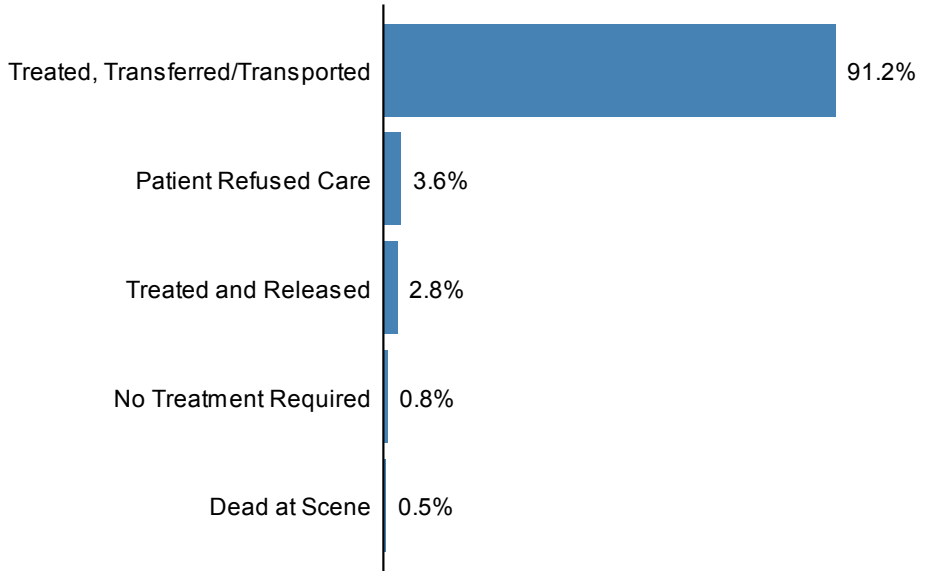
Geriatric Population

Incident Disposition

Geriatrics were treated and transferred/transported more often than other age groups (91.2%).

0.5% of runs involving geriatrics had an EMS discharge disposition of dead at scene.

Graph 16: Incident disposition for geriatric EMS patients



Data source: AZ-PIERS 2014

Table 18: Incident disposition for geriatric EMS patients

	Count	%
Not Documented	371	0.2%
Cancelled	257	0.1%
Dead at Scene	1,032	0.5%
No Patient Found	204	0.1%
No Treatment Required	1,490	0.8%
Patient Refused Care	6,478	3.6%
Treated and Released	5,065	2.8%
Treated, Transferred/Transported	163,058	91.2%
Public Assist	210	0.1%
EMS Care / Assistance	557	0.3%

Geriatric Population

Hospital Diagnosis

A total of 111,578 geriatric EMS runs were linked to the HDD.

Septicemia, Chest Pain, and Syncope were the top three hospital primary diagnoses among geriatric patients.

Table 19: Hospital principal diagnosis (Top 10) for geriatric EMS patients

	Count	%
Septicemia	5,344	4.7%
Chest pain	4,859	4.3%
Syncope	4,035	3.6%
Dysrhythmia	3,762	3.3%
Other injury	3,510	3.1%
Fracture hip	3,393	3.0%
Urinary Tract Infection	3,351	3.0%
Acute Cerebrovascular Disease	3,167	2.8%
Superficial injury	3,105	2.7%
Pneumonia	2,889	2.5%

Geriatric Population

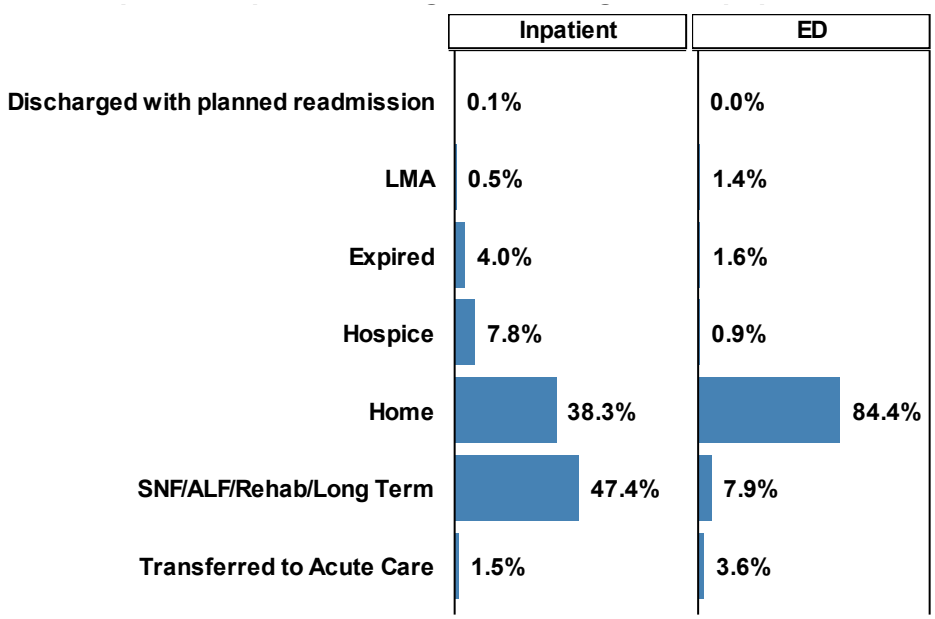
Hospital Discharge Status

Of the 111,578 geriatric EMS runs, 46% were admitted to the hospital and 54% were discharged from the ED.

The inpatient mortality for geriatric patients was 4.0% and the ED mortality for geriatric patients was 1.6%.

47.4% of geriatric inpatients were discharged to a SNF/ALF/Rehab or to a long term care facility.

Graph 17: Hospital discharge status for geriatric EMS patients



Data source: AZ-PIERS 2014 and HDD 2014

Table 20: Hospital discharge status for geriatric EMS patients

Hospital discharge status	Admitted as inpatient		Discharged from ED	
	Count	%	Count	%
Home	19,822	38.3%	50,603	84.4%
Transferred to Acute Care	826	1.5%	2,178	3.6%
SNF/ALF/Rehab/Long Term	24,474	47.4%	4,767	7.9%
LMA	277	0.5%	846	1.4%
Expired	2,106	4.0%	989	1.6%
Hospice	4,069	7.8%	553	0.9%
Discharged with planned readmission	53	0.1%	15	0.0%
Total	51,627	100.0%	59,951	100.0%

Note: SNF = Skilled Nursing Facility, ALF = Assisted Living Facility, LMA = Left Against Medical Advice

Mortality

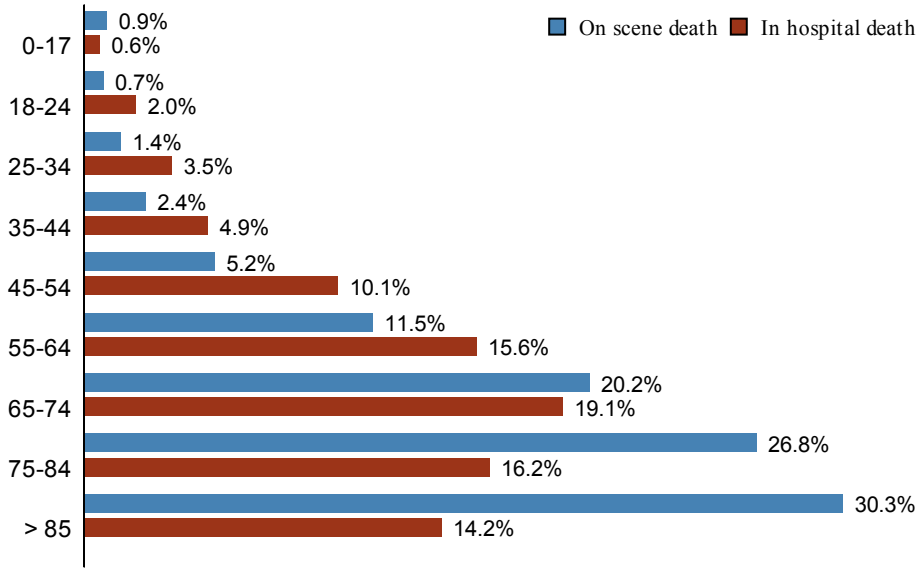
On Scene & In-hospital

There were 2,078 runs with an EMS discharge disposition of dead at scene.

There were 7,975 EMS patients who died in the hospital.

Among pediatrics (<18) and geriatrics (65+), the proportion of on scene deaths was higher than the proportion of in-hospital deaths.

Graph 18: On scene and in-hospital mortality by age



Data source: AZ-PIERS 2014, Arizona Health Status and Vital Statistics 2014

Table 21: On scene and in-hospital mortality by age & gender

	On Scene		In-hospital	
	N	%	N	%
Total mortality	2,078	100.0%	7,975	100.0%
Age (years)				
Missing	277	13.3%	12	0.1%
<1	6	0.2%	25	0.3%
1-4	1	0.0%	16	0.2%
5-9	1	0.0%	11	0.1%
10-14	3	0.1%	14	0.1%
15-17	2	0.0%	7	0.0%
18-24	43	2.0%	61	0.7%
25-34	73	3.5%	117	1.4%
35-44	103	4.9%	196	2.4%
45-54	211	10.1%	417	5.2%
55-64	326	15.6%	921	11.5%
65-74	398	19.1%	1,612	20.2%
75-84	337	16.2%	2,145	26.8%
>85	297	14.2%	2,421	30.3%
Gender				
Missing	300	14.4%	183	2.2%
Male	1,143	55.0%	4,115	51.5%
Female	635	30.5%	3,677	46.1%

Mortality

Provider Primary Impression/Hospital Primary Diagnosis

Table 22a: Provider primary impression (Top 10) for on scene mortality

Died On Scene	N	%
Obvious death	807	48.4%
Cardiac Arrest	592	35.5%
Traumatic injury	57	3.4%
Cardiac Arrest - Asystole	52	3.1%
Unconscious	43	2.5%
Other	27	1.6%
Altered level of consciousness	18	1.0%
Gun Shot Wound/Open Wound	12	0.7%
Respiratory arrest	6	0.3%
Syncope/fainting	4	0.2%

Table 22b: Provider primary impression (Top 10) for in-hospital mortality

Died In Hospital	N	%
Altered level of consciousness	1,049	14.6%
Cardiac Arrest	1,033	14.4%
Respiratory distress	873	12.2%
Weakness	392	5.4%
Pain	389	5.4%
Traumatic injury	373	5.2%
Abdominal pain/problems	347	4.8%
Stoke/CVA	244	3.4%
Other	231	3.2%
Chest pain/discomfort	230	3.2%

The provider primary impression was missing for 20% on scene deaths, and 27% of in-hospital deaths. The top three primary impressions for in-hospital deaths were Altered level of consciousness, Cardiac Arrest and Respiratory Distress.

The top three principal diagnoses for EMS patients who died in the hospital were Septicemia, Cardiac Arrest and Acute Cerebrovascular disease.

Table 23: Hospital principal diagnosis (Top 10) for in-hospital mortality

	N	%
Septicemia	1,697	17.1%
Cardiac arrest	1,347	13.5%
Acute Cerebrovascular disease	698	7.0%
Adult respiratory failure	583	5.8%
Acute myocardial infarction	393	3.9%
Congestive heart failure; Non-hospitalist	341	3.4%
Pneumonia	299	3.0%
Intracranial injury	278	2.8%
Fracture hip	227	2.2%
Aspiration pneumonia	215	2.1%