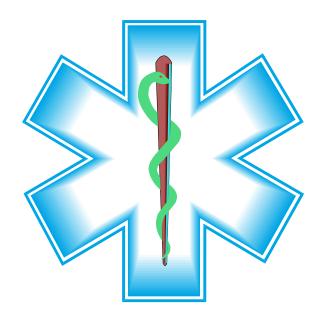
Tuolumne County Emergency Medical Services Agency

2017 Annual Statistical Report



February 28, 2018

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INTRODUCTION

The 2017 Annual Statistical Report compiles and condenses an entire year's worth of data about the Tuolumne County EMS system. The data included in this report is derived from pre-hospital patient care records (PCRs) completed by Tuolumne County Ambulance Service (TCAS) personnel, unless otherwise noted.

Since July 1, 1993, TCAS has collected PCR data using the software program EMS DataPro (EMSDP) provided for their use by the Tuolumne County EMS Agency (TCEMSA). Once entered in EMSDP, the data is submitted in an electronic format to the TCEMSA, where the data is imported into a central version of EMS DataPro. The TCEMSA then validates the data.

In September 2000, TCAS, with the assistance of the EMS agency, initiated a program for completing PCRs using EMS Outfielder (EMSOF). EMSOF provides immediate data availability for daily quality assurance/quality improvement reviews and imports patient billing information directly into the billing system used by TCAS.

In January 2017, TCAS, with the assistance of the EMS agency, initiated a program for completing PCRs using EMS Outfielder NEMSIS 3 (EMSOFN3). EMSOFN3 is compliant with the National Emergency Medical Service Information System (NEMSIS) and California Medical Service Information System (CEMSIS) requirements.

The Tuolumne County Emergency Medical Services System is comprised of four 9-1-1 answering points including Tuolumne County Sheriff's Dispatch, City of Sonora Police Department Dispatch, CHP Dispatch (located in Merced County) and Mariposa County Sheriff's Dispatch.

- Ambulance dispatching is provided by the Tuolumne County Sheriff's Dispatch Center.
- BLS first response services are provided by Tuolumne County Fire Dept., Tuolumne City Fire Dist., Columbia College Fire Dept., Twain Harte Fire Dist., Columbia Fire Dist., Sonora City Fire Dept., Miwuk-Sugarpine Fire Dist., and the Groveland Fire Dist.
- U.S. Forest Service, Tuolumne County Sheriff's Search and Rescue, Don Pedro Recreation Agency, Dodge Ridge Ski Patrol provides specialized BLS response services.
- Tuolumne County Ambulance Service provides ALS service. Mercy Medical Transport from Mariposa County provides the Lake Don Pedro area ALS Ambulance service.
- PHI provides air ambulance services with day-to-day mutual aid from the California Highway Patrol (CHP) Air Operations Division, Mercy Air, CALSTAR and R.E.A.C.H. Air Ambulances.

In June 2003, grant funds were made available to TCEMSA for the purpose of purchasing and installing EMSystem communication software and related computer hardware for the emergency departments of Tuolumne General Hospital and Sonora Regional Medical Center (SRMC) and the EMS agency office. In early 2004, EMSystem

linked Tuolumne County's EMS system with the other ten (10) counties of OES Region IV, enabling Tuolumne General Hospital (TGH), as the county's Disaster Control Facility, to view real-time emergency department availability when determining patient disbursement during a multi-casualty incident (MCI).

In 2004, The Tuolumne County Emergency Medical Services System developed and implemented a Trauma Plan, in conjunction with Memorial Medical Center, Doctors Medical Center of Modesto, Mountain Valley, El Dorado County, Central California, Northern California, Sacramento County, and Santa Barbara County EMS Agencies. The Trauma Plan provides a framework that assures that the citizens and visitors of Tuolumne County receive comprehensive prehospital and hospital trauma care. Tuolumne County relies on Trauma Centers throughout Northern California for inhospital trauma care. Air Ambulances are used as the primary means of transportation for patients meeting Tuolumne County's major trauma patient criteria.

In July 2007, TGH closed leaving only one acute care hospital in Tuolumne County. SRMC assumed the duties of the county's Disaster Control Facility and Mountain Counties South Control Facility.

In 2008, EMSystem was expanded to include data elements for the Department of Health and Human Services HAvBED (Hospital Available Beds for Emergencies & Disasters). This capability allows for accurate and consistent polling of hospital resources nationwide.

In June of 2009, TCEMSA was instrumental in the development of the Central Regional Trauma Coordinating Committee (CRTCC), a twelve county regional committee. The purpose of the committee is to standardize and improve the provision of trauma care within the region. The CRTCC, is working in coordination with four other CRTCCs throughout the State and the State EMS Authority to build a strong, cohesive statewide trauma system.

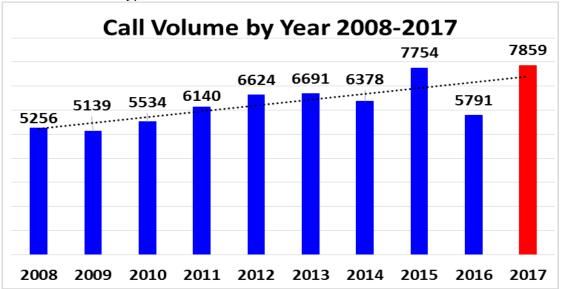
In 2010, Tuolumne County EMS implemented an <u>S-T El</u>evation <u>Myocardial Infarction</u> (STEMI) triage policy. This allows Paramedics in the field to transport, usually by air ambulance, a patient experiencing a serious cardiac event to be transported directly to a hospital capable of Percutaneous Coronary Intervention (PCI). Decreasing the time from the recognition of a STEMI to PCI greatly decreases the injury to the cardiac muscle and increases the survival rate of these patients.

In September of 2011, Tuolumne County adopted the CRTCC Trauma Triage Criteria. This criteria is based on the Centers for Disease Control (CDC) trauma triage guidelines.

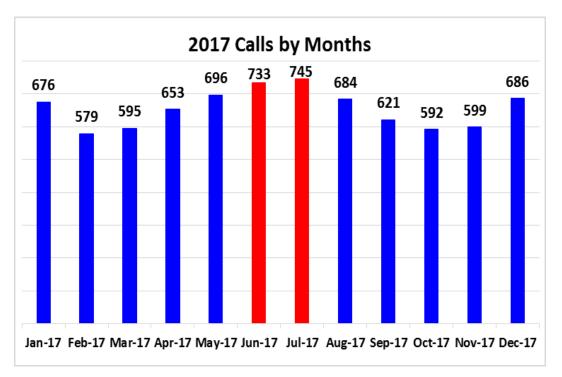
In February 2015, Dr. Todd Stolp retired, leaving both the Public Health Officer and EMS Medical Director positions vacant. Due to the increasing complexities of Public Health and EMS Systems it was decided that the bifurcation Public Health Officer and EMS Medical Director duties would best serve the County of Tuolumne. Dr. Kimberly Freeman contracted with the County of Tuolumne as the EMS Medical Director.

OVERVIEW OF CALL VOLUME

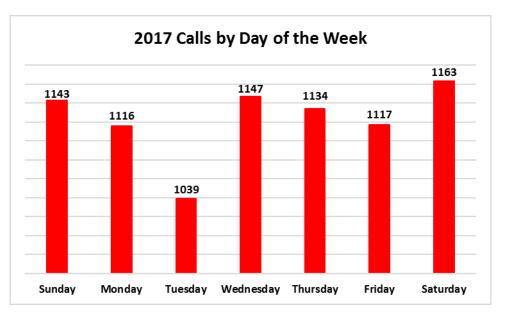
As illustrated in the graphs below, unless otherwise specified EMS requests include both scene and transfer call types.



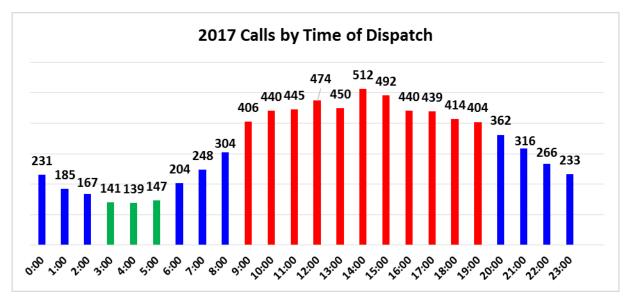
There has been a 50% increase in call volume over the past 10 years. 2017 was the busiest year on record.



June and July are the busiest months; February, March, October and November are the least busy months.

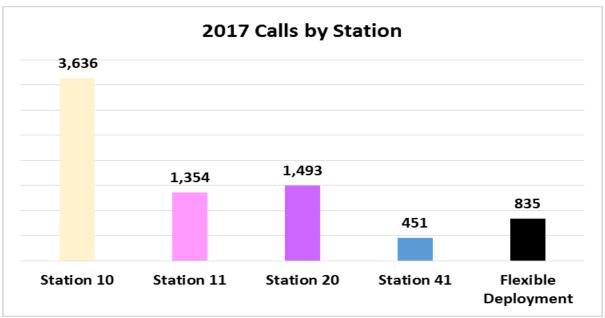


A breakdown of requests by day and time of day shows that call volumes may vary during the week, with the lowest volume on Tuesdays.

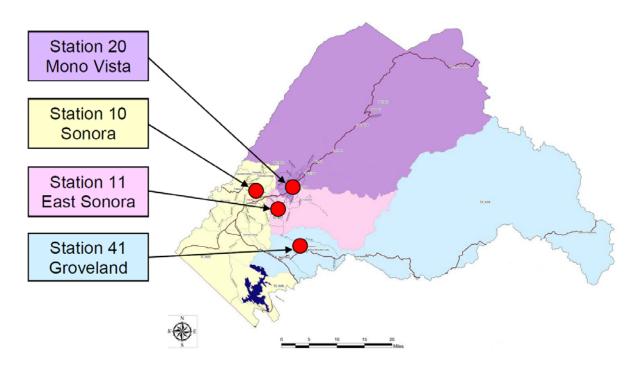


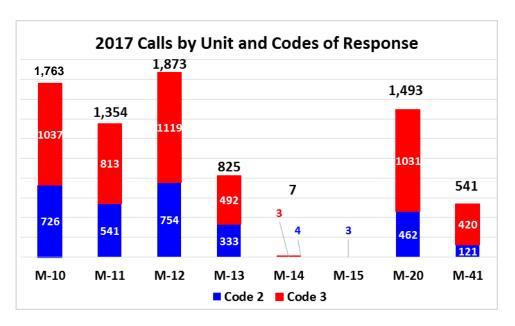
The busiest time is 09:00 through 19:00 (>400), the slowest 03:00 through 05:00 (<150), average is 327.

2017 Call Distribution by day of week and hour of dispatch							
	Sunday	lay Monday Tuesday Wed		Wednesday	Thursday	Friday	Saturday
0:00	39	25	38	38	24	26	41
1:00	32	22	20	27	24	30	30
2:00	31	18	18	28	28	20	24
3:00	28	25	12	8	22	16	30
4:00	22	19	21	20	15	18	24
5:00	25	17	24	16	24	20	21
6:00	44	28	26	23	36	21	26
7:00	26	44	36	45	34	30	33
8:00	48	55	51	37	42	35	36
9:00	56	56	45	73	63	54	59
10:00	58	79	57	74	66	58	48
11:00	54	71	6 5	70	69	63	53
12:00	62	57	59	76	67	76	77
13:00	53	69	63	68	77	52	68
14:00	66	77	70	72	70	72	85
15:00	74	65	72	67	76	77	61
16:00	66	51	71	57	53	73	69
17:00	55	52	61	67	73	69	62
18:00	64	57	43	53	60	63	74
19:00	51	56	55	61	67	58	56
20:00	54	46	45	57	45	55	60
21:00	45	46	36	34	40	60	55
22:00	51	46	30	42	30	25	42
23:00	39	35	21	34	29	46	29



As illustrated above, Station 10 responded to the majority of all EMS requests. Flexible Deployment includes M-13, M-14 and M-15.





Response Times

The California Emergency Medical Services Authority (EMSA) has established recommended guidelines for Code 3 response time standards to EMS requests, based on population density. Although the validity of these response time guidelines has been called into question, the EMSA recommends that EMS responses meet these response time guidelines at least 90% of the time.

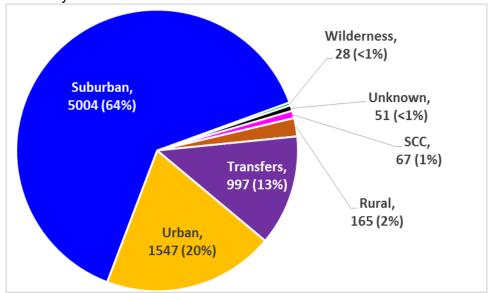
	BLS 1 st Response	ALS Ambulance	
Urban	5 minutes	8 minutes	
Suburban	15 minutes	20 minutes	
Rural	15 minutes	20 minutes	
Wilderness	ASAP	ASAP	

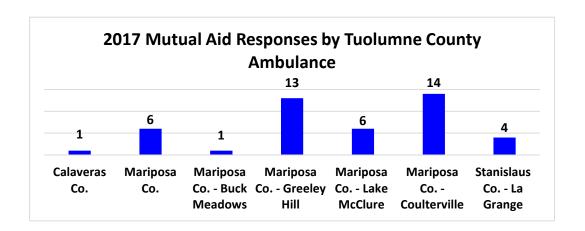
Urban = 101 to 500 people per mile **Suburban** = 51 to 100 people per mile **Rural** = 7 to 50 people per mile **Wilderness** = less than 7 people per mile **SCC** = Sierra Conservation Center (secured facilities may be exempted from response time requirements)

	Urban	Suburban	Rural	SCC	Wilderness
Minimum:	0 min	0 min	6 min	7 min	6 min
Maximum:	69 min	131 min	125 min	31 min	77 min
Average:	7.33 min	11.49 min	28.72 min	18.34 min	37.11 min
90 %ile:	12 min	19 min	41 min	25 min	66 min

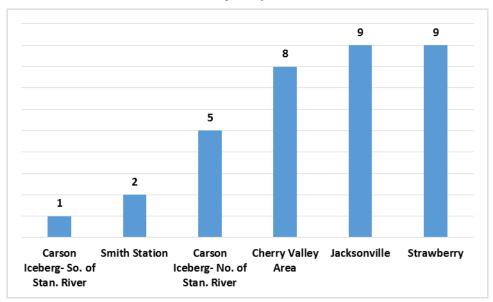
CALL LOCATION

The breakdown of EMS requests by location reveals that the majority (64%) of requests occur in the suburban areas of Tuolumne County, where the majority of Tuolumne County residents live.

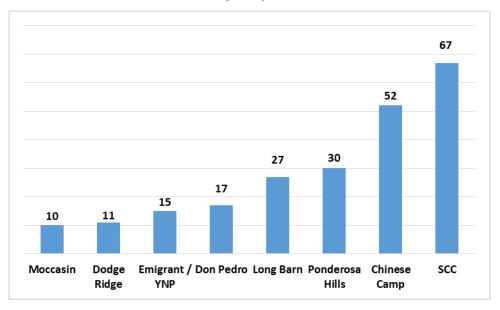




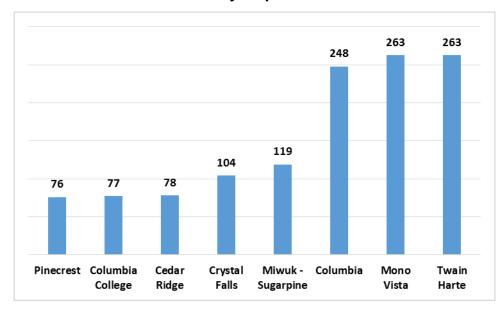
2017 Calls by Map Zone Chart #1



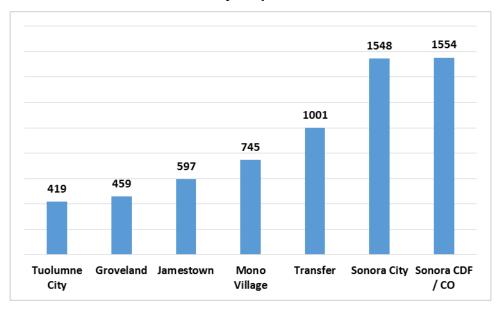
2017 Calls by Map Zone Chart #2



2017 Calls by Map Zone Chart #3



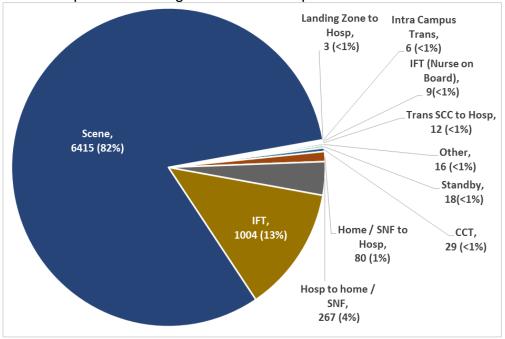
2017 Calls by Map Zone Chart #4



2017 Calls by Scene Description						
Daycare center	1	Tuolumne General Med Facility	15			
Trade school	1	National Forest	15			
Building [any] under construction	1	Religious institution	16			
Factory	1	Public administrative building	17			
Snow play area	1	Other board and care facility	18			
Beach	1	Other health care provider office	18			
Swimming pool	1	Campsite	18			
Athletic court	2	Dodge Ridge	20			
New Melones Reservoir	2	AHS Transitional Care Unit	22			
Mark Twain Convalescent Hospital	2	Fire Department	23			
Mathiesen Memorial Health Clinic	2	AHS Unit 7	24			
MACT Indian Health	2	Elementary school	26			
Swimming pool (public)	3	High school	27			
Other specified sports & athletic area	3	Not Recorded	27			
Service area	3	Public park	29			
Greenley Primary Care	3	Other recreation area	29			
EMS Rendezvous / LZ	3	Tuolumne County Jail	31			
Groveland Clinic	4	Outdoor Education Facility/Camp	33			
Forest Road Prompt Care	4	Unspecified residential institution	35			
Other ambulatory surgery center	4	Chicken Ranch Bingo	37			
Other urgent care center	4	Casa Viejo	41			
Cultural building	5	Other clinic / doctor's office	45			
Airport	5	Prison	54			
Other Hospital	5	Sierra Conservation Center	57			
Ambulatory health services establishment	5	Other SNF	61			
Other industrial & construction area	5	Restaurant, bar or cafe	66			
Maynord's Recovery Center	5	Indian Rock Prompt Care	79			
Unspecified school	6	Other commercial establishment	86			
Movie house or cinema	6	Black Oak Casino	104			
Wilderness area	6	Oak Terrace Memory Care	117			
Health Club / Gym	8	Other public building	131			
College	9	Other paved roadway	178			
Lake Don Pedro	9	Skyline Place	180			
Other Waterway	9	Avalon Care Center	198			
Groveland Fire Department	9	Other	207			
Sonora Imaging	10	Other ordinary street	220			
Meadow View Manor	10	Highway (108, 132, 120, 49)	323			
Tuolumne Clinic	11	Adventist Health Sonora	1,394			
AHS Unit 6	11	Private Residence	3,300			

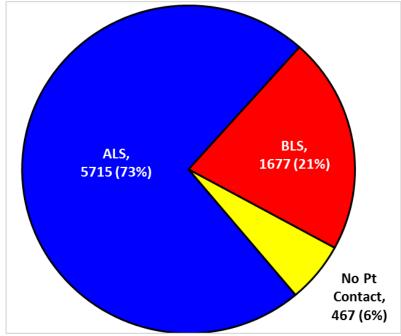
Calls by Type

In 2017, scene emergencies accounted for 82% of the total EMS requests for service. Transfers make up the remaining 18% of EMS requests for services.



Level of Care

73% of all requests for service resulted in the delivery of advanced life support (ALS) procedures and/or medications administered to the patient. No Pt. Contact includes No patient contact and Call cancelled Enroute.

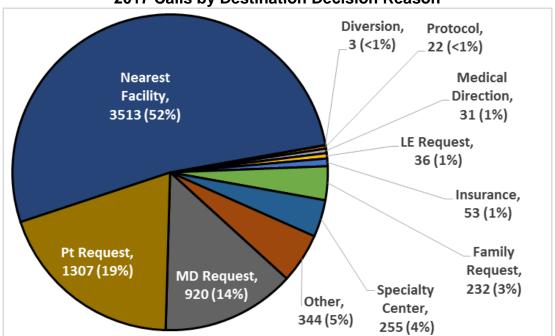


2017 Calls by Disposition						
Transport by other Ambulance		Transport to Rendezvous Point	82			
Dead On Scene, No Rescusc Attempted, Transported	2	Transport to Home	100			
Treated, Transferred Care	3	Patient Released At Scene	144			
Treated, Transported by Law Enforcement	13	No Patient Contact Made	173			
Treated, Transported by Private Vehicle	16	Transport to A SNF	187			
Patient Refused Care, Transported	16	No Treatment Required	192			
Transport to Other Location	31	Call Cancelled Enroute	294			
Dead On Scene, Resusc Attempted, Not Transported	35	Transport to Hospital (non-ED)	357			
Transport to Non-hospital Medical Facility	40	Transportation Refused AMA	473			
Dead On Scene, No Rescusc Attempted, Not Transported	47	Transport to ED	5652			

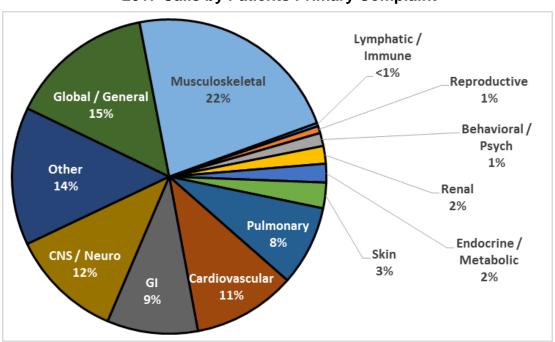
PATIENT DISTRIBUTION					
The chart below shows the patient distribution by receiving facilities, including transfers.					
Mark Twain - St. Joseph's 1 VA Medical Center Palo Alto					
Concord Medical Pavilion	1	Other Alameda County Hospital	4		
Kaiser Medical Center Walnut Creek	1	Kaiser Hospital of Manteca	4		
Central California Children's Hospital	1	San Jose Medical Center	4		
Other Marin County Hospital	1	Other Fresno County Hospital	5		
Other Napa County Hospital	1	Other Sacramento County Hospital	5		
Mercy San Juan Hospital	1	Other Santa Clara County Hospital	5		
Sierra Vista Adolescent Hospital	1	California Pacific Medical Center	6		
Shriner's Hospital Sacramento	1	St. Joseph's Medical Center	7		
Davies Medical Center	1	Lucile Packard Children's Hospital	7		
Other San Francisco County Hospital	1	Oak Valley Hospital	8		
Doctors Hospital of Manteca	1	Valley Children's Hospital	13		
Other San Mateo County Hospital	1	Stanford University Hospital	16		
Kaiser Medical Center Santa Clara	1	U.C.S.F. Medical Center	18		
Emanuel Medical Center	1	San Joaquin General Hospital	26		
Kaiser Medical Center Oakland	2	Oakland Children's Hospital	39		
Other Contra Costa County Hospital	2	U.C. Davis Medical Center	45		
Fresno Community Hospital	2	Avalon Care Center	57		
Mercy Medical Center Merced	2	Other Hospital Not Listed	59		
Kaiser Hospital, Sacramento	2	Kaiser Medical Center Modesto	73		
Lodi Memorial Hospital	2	Memorial Medical Center	144		
Stanislaus Behavioral Health Center	2	Doctors Medical Center	733		
Kaiser Hospital, South Sacramento	3	Adventist Health Sonora	4,816		
Sutter General Hospital	3				

^{1,259} patients were transported to hospitals outside of Tuolumne County (an average of 3.5 out of County transports per day).

2017 Calls by Destination Decision Reason

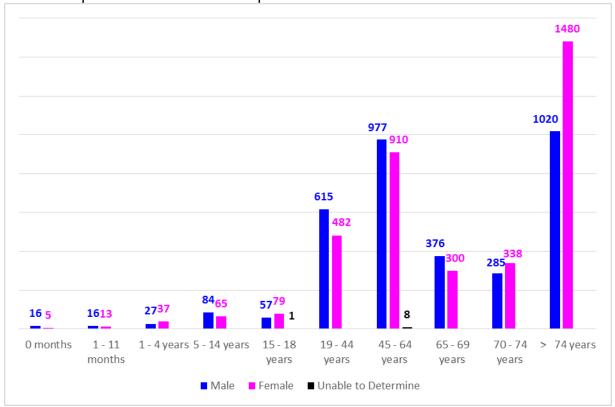


2017 Calls by Patients Primary Complaint



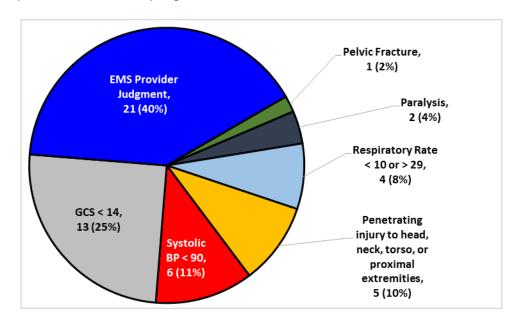
2017 EMS Demographics

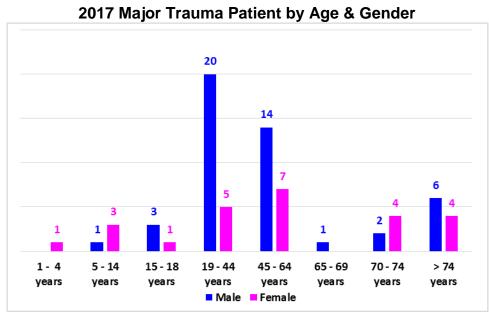
The average age of EMS patients is 59 for males, 64 for females and 62 overall. Males comprise 48% of ambulance patients and 52% are females.



TRAUMA SYSTEM

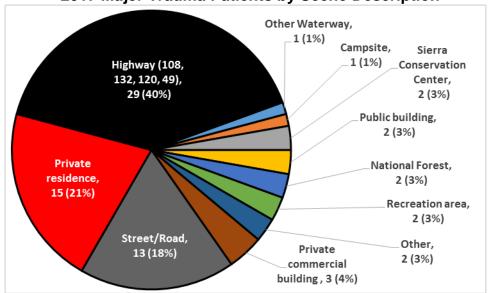
The Tuolumne County Trauma Plan has defined ten separate trauma triage criteria. The criteria are designed to categorize those trauma patients with an increased risk of mortality and morbidity due to their injuries. Paramedic judgment was the criteria used 40% of the time.



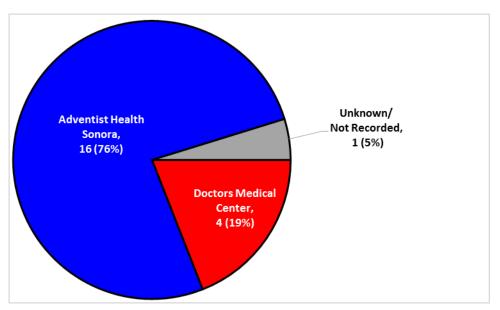


The average age of the Major Trauma patients is 46 for males, 47 for females and 46 overall. Males comprise 65% of trauma system entry patients and 35% are females.

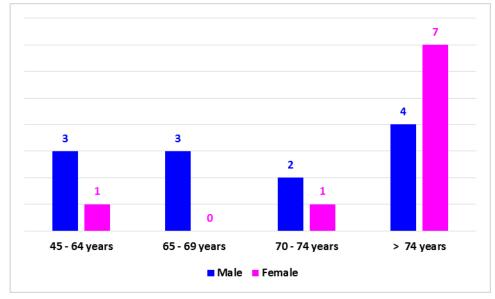
2017 Major Trauma Patients by Scene Description



S-T Elevation Myocardial Infarction (STEMI)

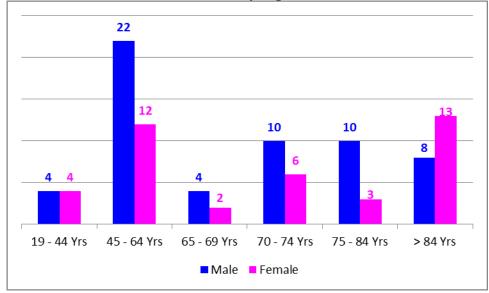


In 2017, 21 patients met the STEMI triage criteria; 16 of them were transported to AHS by ground ambulance, 4 were transported to Doctors Medical Center and 1 receiving hospital was not documented. Males comprised 57% of STEMI patients, 43% female. The average age of males STEMI patients was 70 years old, female 83 years old combined age is 75 years old.

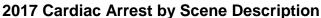


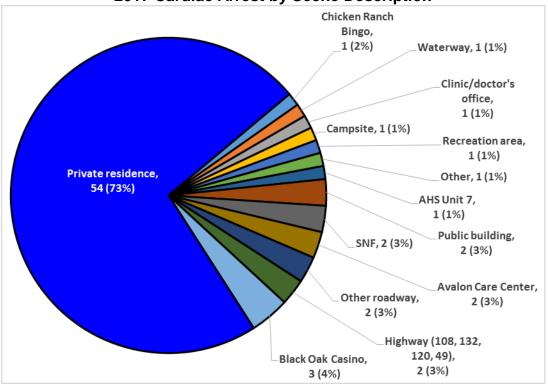
STEMI Location					
Anterior STEMI 6					
Inferior STEMI 14					
Lateral STEMI 1					
Posterior STEMI	0				

CARDIAC ARRESTS Cardiac Arrest by Age & Gender



In 2017, males comprise 77% of cardiac arrest victims. The average age was 63 years for males, 67 years for females, 64 years overall.





73% of cardiac arrests occur in a private residence.

2017 Cardiac arrest Outcomes (Utstein Reporting Method)

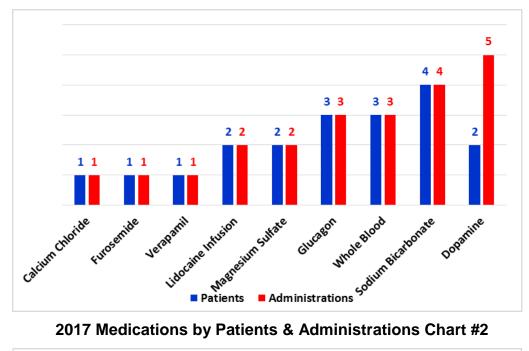
Absence of signs of circulation and/or considered for resuscitation n = 74Resuscitation attempted n= 51 Resuscitation not attempted n= 23 Defibrillation attempted n = 21DNR n=3**Futile** n = 20Witnessed n= 27 First monitored rhythm Layperson n = 23Shockable n = 21Healthcare provider n=4VF n = 10VT n=2Unk- AED n=9**CPR prior to EMS** n = 27Non-shockable n = 30Asystole n = 20**Mechanical CPR** n = 22PEA n=5Idioventricular n= 2 Presumed etiology Other n=3Cardiac n = 50Trauma n=9**Drowning** n=1**Outcome** Respiratory n=6Return of Spontaneous Circulation Overdose n=3at any time Other/unknown n=5Yes n = 16No n = 58**ROSC Patients** n= 16 Resuscitation Terminated Witnessed by layperson n = 10n = 24Field Witnessed by EMS n=1ED n = 10**Bystander CPR** n = 10Admitted n=1Bystander AED n=0Transferred n=1First Responder Defib n=7Discharged alive n=1Mechanical CPR n=6Neurologic outcome at discharge CPC 1 **Initial Rhythm** n=1Asystole CPC 2 n=4n= CPC 3 V-Fib n=5n= V-Tach n=1CPC 4 n= PEA n=5CPC 5 n= n=1Sinus 32% of attempted resuscitations

result in ROSC

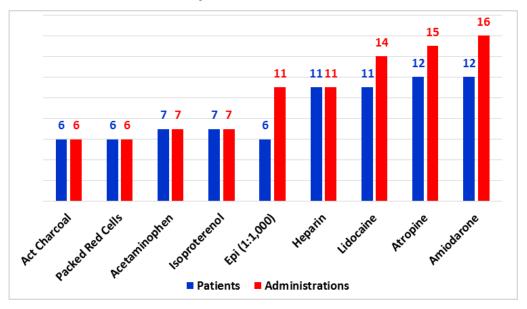
ALS MEDICATIONS

The charts below represent the number of times a medication was administered and how many patients received the medication.

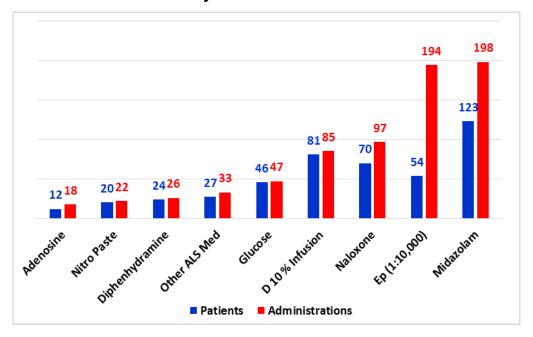
2017 Medications by Patients & Administrations Chart #1



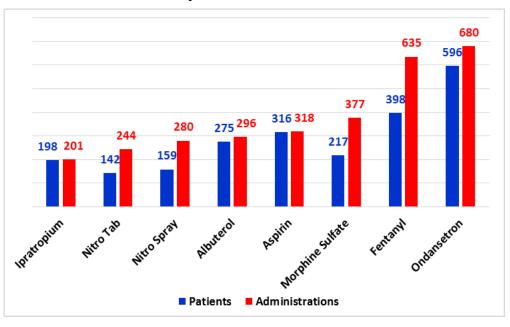
2017 Medications by Patients & Administrations Chart #2



2017 Medications by Patients & Administrations Chart #3



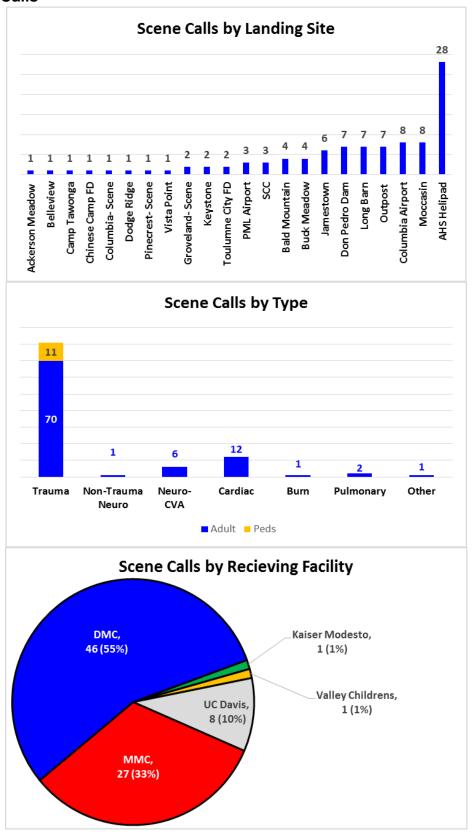
2017 Medications by Patients & Administrations Chart #4



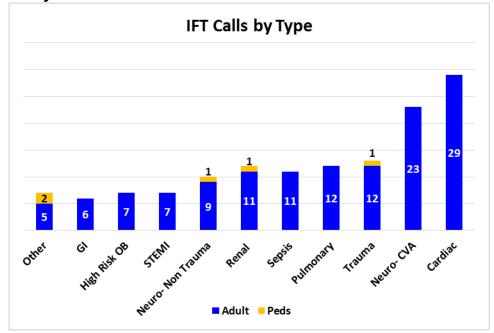
Infrequently Used Skills

Needle thoracostomy	King LT airway	Synchronized Cardioversion	Intraosseous infusion	PICC Catheter Access	Implanted Port Access
5- 100%	12- 92%	4- 75%	28- 96%	3- 100%	1- 100%

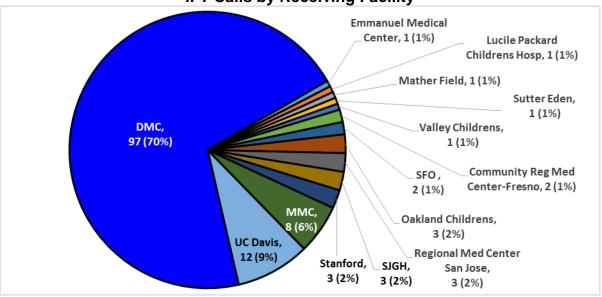
PHI- Scene Calls



PHI- Inter-facility Transfer



IFT Calls by Receiving Facility



SUMMARY

I would like to thank Tuolumne County Ambulance Service and PHI Air Medical for providing the data that made this report possible. I would also like to thank all of the First Response Agencies for the excellent service they provide to the County of Tuolumne.

The Tuolumne County EMS System remains a strong asset to the County, its citizens and visitors. The ten-year trend shows a 50% increase in calls for EMS service, most notably along the Highway 108 corridor. With the increase in call volume the response times have also increased as has the occurrences when there were no ambulances available.

Paramedics from Manteca District Ambulance Service continue to provide excellent care for their patients. Tuolumne County has continued to add medications and procedures to the local paramedic scope of practice to better meet the needs of the patients. The percentage of cardiac arrest patients that have achieved the Return of Spontaneous Circulation (ROSC) has increased to 32%, due to the teamwork of First Responders, Emergency Medical Technicians, Paramedic and Flight Nurses.

The payor mix includes a high number of Medicare clients, which caps the allowable charge, the collection of revenue is problematic; the possible loss of the Medicare Superrural supplement only makes this situation more dire. Medicare and MediCal reimburse rates will continue to challenge the fiscal stability of the Tuolumne County Ambulance Enterprise Fund.