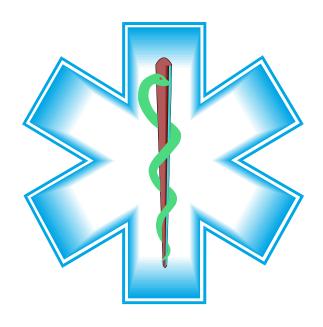
Tuolumne County Emergency Medical Services Agency

2018 Annual Statistical Report



February 27, 2019

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INTRODUCTION

The 2018 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.

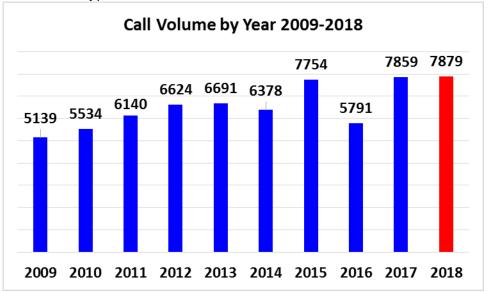
In 2010, Tuolumne County EMS implemented an <u>S-T El</u>evation <u>Myocardial Infarction</u> (STEMI) triage policy. This allows Paramedics in the field to transport, usually by air ambulance, a patient experiencing a serious cardiac event to be transported directly to a hospital capable of Percutaneous 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.

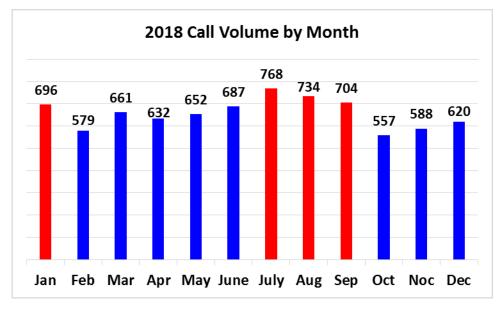
In September of 2011, Tuolumne County adopted the CRTCC Trauma Triage Criteria. This criteria is based on the Centers for Disease Control (CDC) trauma triage guidelines.

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.

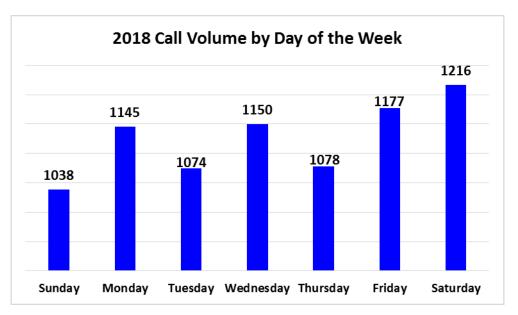
OVERVIEW OF CALL VOLUME

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

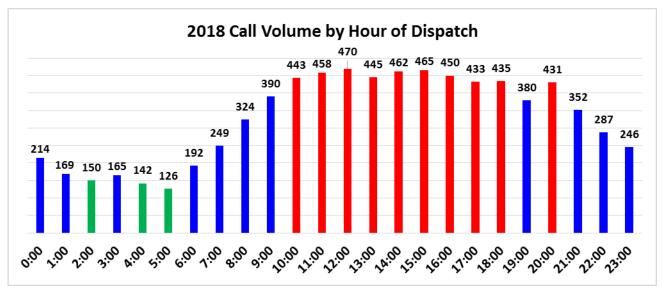




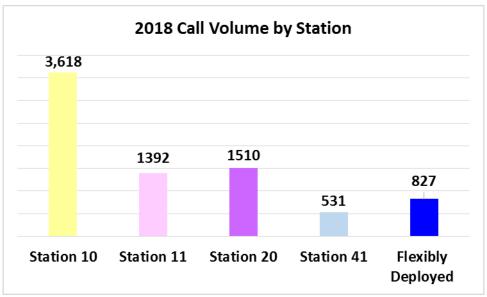
January, July, August, and September are the busiest months.



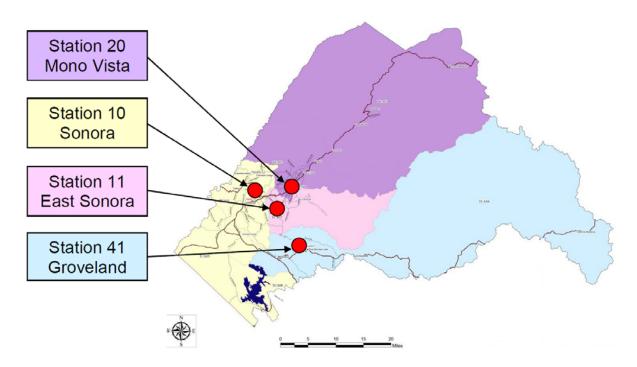
A breakdown of requests by day and time of day shows that call volumes may vary during the week, with the lowest volume on Sundays.



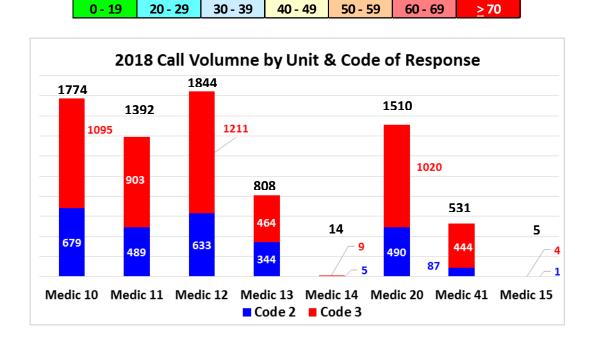
The busiest time is 09:00 through 18:00 and 20:00 (>400), the slowest 02:00 and 4:00 through 05:00 (<150), average is 328.



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



2018 Call Volume by Day of the Week and Hour of Dispatch							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0:00	38	30	23	24	30	35	34
1:00	32	24	20	20	12	26	35
2:00	15	23	20	22	19	29	22
3:00	20	20	31	23	19	22	30
4:00	27	13	19	12	27	19	25
5:00	19	23	14	19	17	17	17
6:00	21	32	38	28	27	23	23
7:00	36	39	27	42	31	41	33
8:00	45	42	45	53	45	50	44
9:00	49	72	51	71	50	48	49
10:00	69	75	54	61	66	66	52
11:00	65	86	63	59	63	60	62
12:00	62	70	64	67	73	61	73
13:00	62	59	69	76	56	57	66
14:00	61	66	59	63	65	68	80
15:00	41	77	68	78	58	69	74
16:00	47	63	64	71	51	81	73
17:00	49	62	63	64	55	75	65
18:00	70	43	53	72	55	65	77
19:00	46	50	50	52	61	52	69
20:00	60	65	55	67	54	65	65
21:00	36	47	41	37	68	63	60
22:00	40	32	49	34	38	44	50
23:00	28	32	34	35	38	41	38



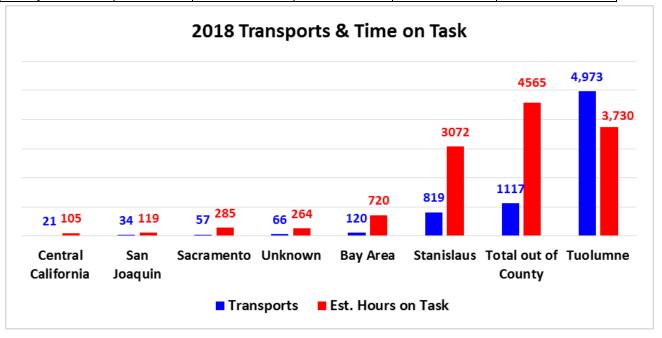
Response Times

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	

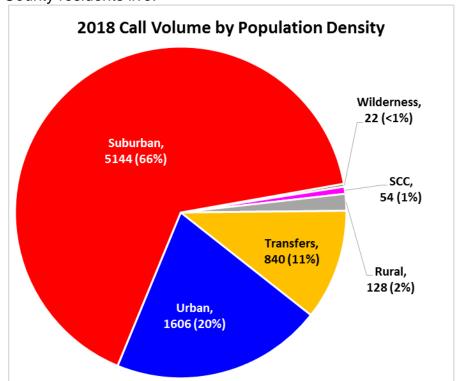
Urban = 101 to 500 people per mile **Suburban** = 51 to 100 people per mile **Rural** = 7 to 50 people per mile **Wilderness** = less than 7 people per mile **SCC** = Sierra Conservation Center (secured facilities may be exempted from response time requirements)

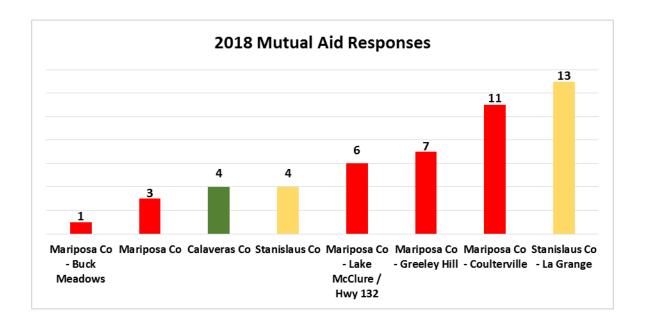
	Urban	Suburban	Rural	SCC	Wilderness
Minimum:	0 min	0 min	2 min	2 min	4 min
Maximum:	188 min	112 min	81 min	22 min	75 min
Average:	7.65 min	11.76 min	30.30 min	16.76 min	27.00 min
90 %ile:	12 min	19 min	43 min	22 min	53 min
Total Code 3 Responses	796	3,853	110	37	18

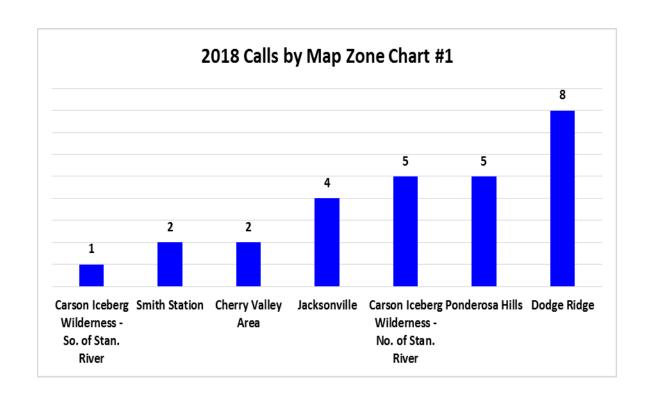


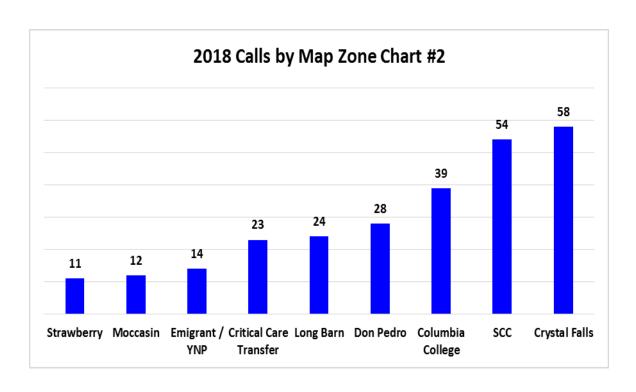
CALL LOCATION

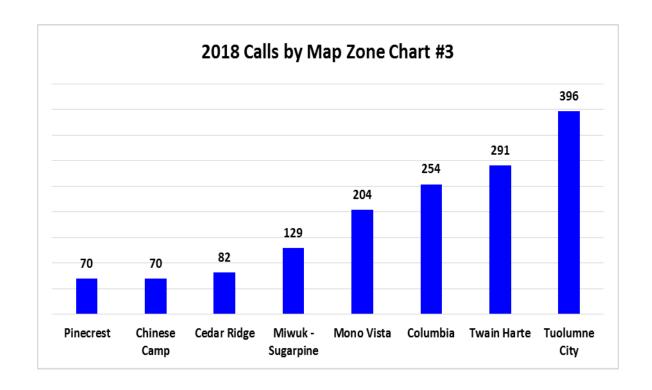
The breakdown of EMS requests by location reveals that the majority (66%) of requests occur in the suburban areas of Tuolumne County, where the majority of Tuolumne County residents live.

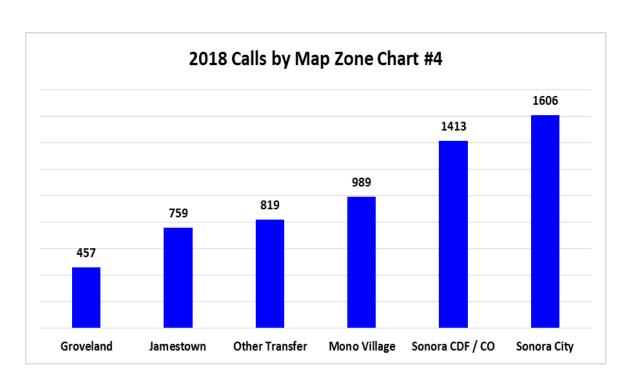








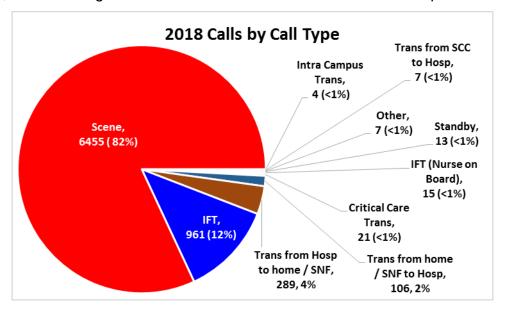




2018 Calls	s by S	cene Description	
Daycare center	1	Groveland Fire Department	11
Middle school	1	Adventist Health, Sonora - Unit 6	13
Athletic court	1	Adventist Health, Sonora - TCU	13
New Melones Reservoir	1	Religious institution	14
Sports & athletic area	1	Tuolumne County Jail	14
Other Hospital	1	Public administrative building	17
Other ambulatory surgery center	1	Maynord's Recovery Center	17
Other urgent care center	1	National Forest	18
Other ambulatory health services	1	Elementary school	20
Building [any] under construction	1	Other health care provider office	21
Dock or shipyard	1	Other SNF	22
industrial and construction area	1	Fire Department	22
Not Applicable	1	Other Waterway	23
Mark Twain Convalescent Hospital	1	Public park	24
Mathiesen Memorial Health Clinic	1	Prison	25
Athletic field	2	Group Camp / Outdoor Ed Facility	28
Forest Road Prompt Care	2	Campsite	29
Amusement park	2	High school	30
Swimming pool (public)	2	Not Recorded	33
Airport	3	Chicken Ranch Bingo	36
Farm	3	Adventist Health, Sonora - Unit 7	38
Snow play area	3	Unspecified residential institution	43
Railroad track	3	Other clinic / doctor's office	50
Meadow View Manor	3	Restaurant, bar or cafe	67
MACT Indian Health	3	Sierra Conservation Center	79
College	4	Indian Rock Prompt Care	95
Sonora Imaging	4	Private commercial establishment	100
Tuolumne River	5	Casa Viejo	101
EMS Rendezvous / LZ	5	Black Oak Casino	119
School dormitory	6	Other	123
Other board and care facility	6	Other public building	129
Dodge Ridge	6	Oak Terrace Memory Care	131
Wilderness area	6	Other ordinary street	149
Unspecified school	8	Other paved roadway	190
Other recreation area	8	Avalon Care Center	242
Lake Don Pedro	9	Skyline Place	297
Tuolumne Clinic	9	Highway (108, 132, 120, 49)	335
Health Club / Gym	9	Adventist Health, Sonora	1364
Groveland Clinic	10	Private Resident	3620

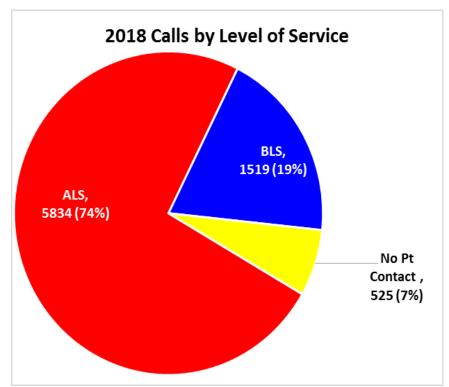
Calls by Type

In 2018, scene emergencies accounted for 82% of the total EMS requests for service.



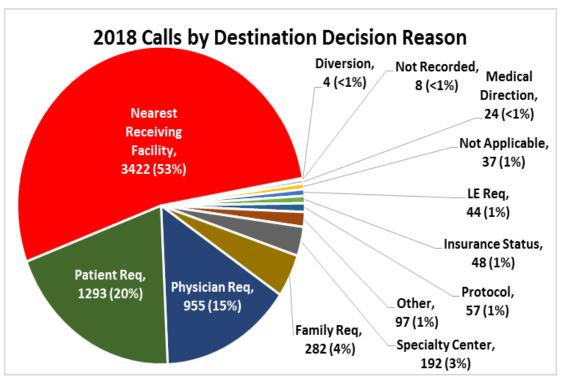
Level of Care

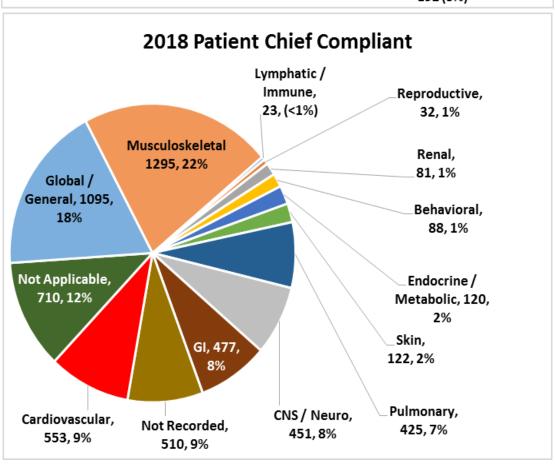
74% of all requests for service resulted in the delivery of advanced life support (ALS) procedures and/or medications administered to the patient. No Pt. Contact includes No patient contact and Call cancelled Enroute.



2018 Call by Disposition						
Trans By Another Amb From Scene	1	Trans To Rendezvous Point	88			
Treated, Transferred Care	2	Pt Released At Scene	114			
Dead On Scene, No Rescusc Attempted, Trans	3	Trans to Home	122			
Pt Refused Care, Trans	3	No Pt Contact Made	230			
Treated, Trans by Law Enforcement	6	No Treatment Required	238			
Trans To Other Location	7	Trans To SNF	268			
Treated, Trans by Private Vehicle	16	Call Cancelled Enroute	294			
Trans To Non-Hosp Medical Facility	35	Trans To Hosp (non-ED)	303			
Dead on Scene, Rescusc Attempted, Not Trans	47	Trans Refused AMA	477			
Dead on Scene, No Rescusc Attempted, Not Trans	56	Trans To ED	5,568			

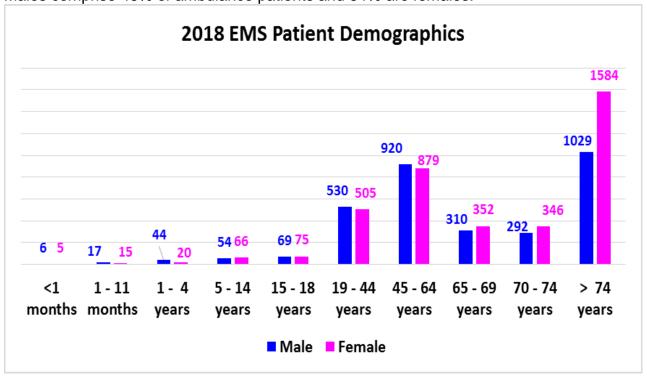
2018 Patient Distribution by	Red	ceiving Facilities, including trans	fers.
Clovis Community Hosp	1	Other Alameda County Hosp	3
Central California Children's Hosp	1	Other Contra Costa County Hosp	3
Other Madera County Hosp	1	Mercy Medical Center Merced	3
Sutter Roseville Medical Center	1	Sutter Memorial Hosp	3
Kaiser Hosp, South Sacramento	1	Doctors Hosp of Manteca	3
Mercy General Hosp	1	Fresno Community Hosp	4
Mercy San Juan Hosp	1	San Jose Medical Center	4
Methodist Hosp of Sacramento	1	Other San Francisco County Hosp	6
Other Sacramento County Hosp	1	VA Medical Center Palo Alto	6
Kaiser Hosp of Manteca	1	Valley Children's Hosp	7
St Joseph's Behavioral Health	1	St Joseph's Medical Center	7
Sequoia Hosp	1	Oak Valley Hosp	7
Santa Clara Valley Medical Center	1	California Pacific Medical Center	8
Kaiser Medical Center Santa Clara	1	Lucile Packard Children's Hosp	14
Emanuel Medical Center	1	U.C.S.F. Medical Center	18
Modesto Rehabilitation Hosp	1	San Joaquin General Hosp	18
Kaiser Medical Center Walnut Creek	2	Stanford University Hosp	20
Other Fresno County Hosp	2	Oakland Children's Hosp	31
John C. Fremont Hosp	2	U.C. Davis Medical Center	42
Kaiser Hosp, Sacramento	2	Avalon Care Center	64
Sutter General Hosp	2	Kaiser Medical Center Modesto	66
Shriner's Hosp Sacramento	2	Other Hosp Not Listed	66
Dameron Hosp	2	Memorial Medical Center	118
Lodi Memorial Hosp	2	Doctors Medical Center	626
Other Santa Clara County Hosp	2	Adventist Health, Sonora	4,909

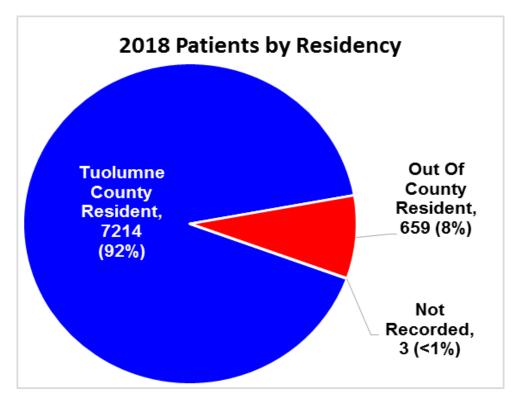




2018 EMS Demographics

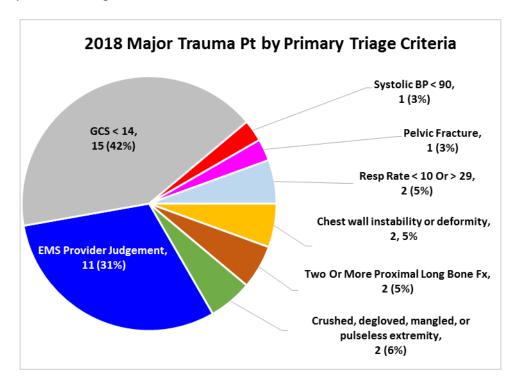
The average age of EMS patients is 61 for males, 65 for females and 63 overall. Males comprise 46% of ambulance patients and 54% are females.

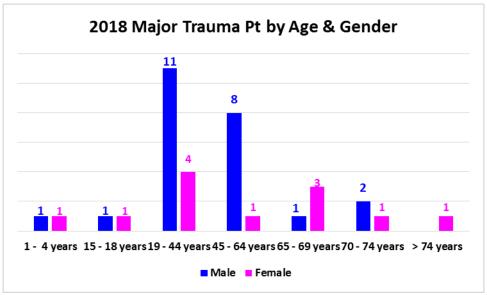




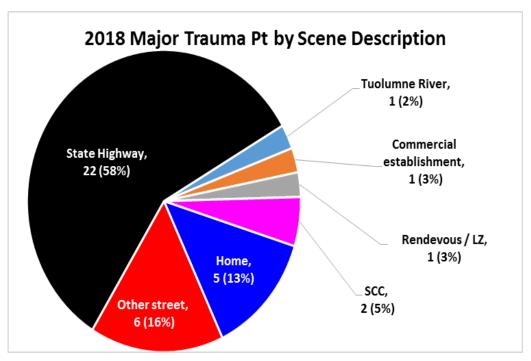
TRAUMA SYSTEM

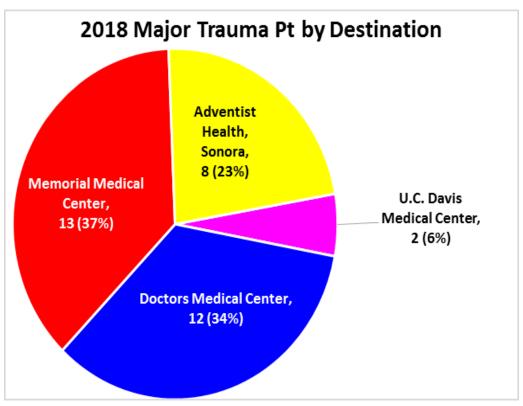
The Tuolumne County Trauma Plan has defined ten separate trauma triage criteria. The criteria are designed to categorize those trauma patients with an increased risk of mortality and morbidity due to their injuries. Glasgow Coma Scale of less 14 was the criteria used 42% of the time.



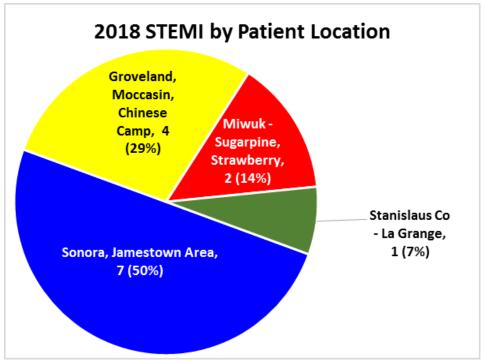


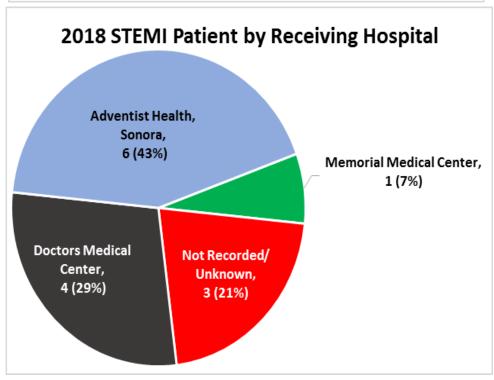
The average age of the Major Trauma patients is 41 for males, 46 for females and 42 overall. Males comprise 66% of trauma system entry patients and 33% are females. Two records did not document Patient age or gender.





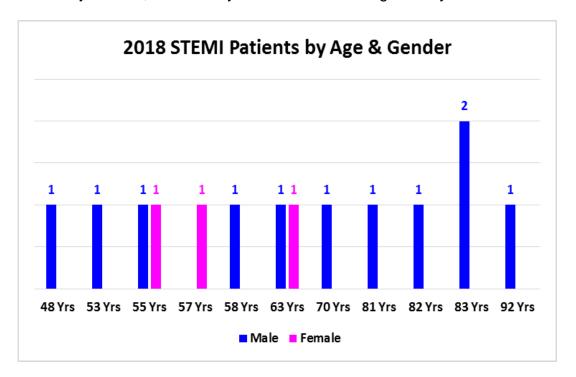
S-T Elevation Myocardial Infarction (STEMI)





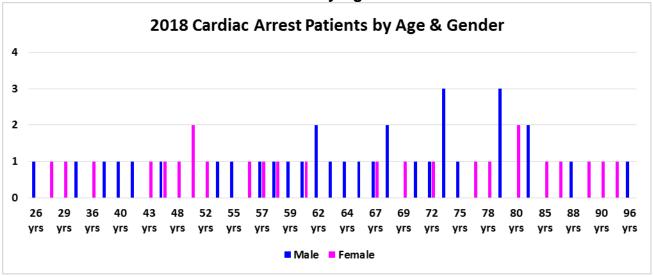
In 2018, 14 patients met the STEMI triage criteria; 6 of them were transported to AHS by ground ambulance, 4 were transported to Doctors Medical Center, 1 was transported to Memorial Medical Center and 3 receiving hospital was not documented.

Males comprised 79% of STEMI patients, 21% female. The average age of males STEMI patients was 70 years old, female 58 years old combined age is 67 years old.

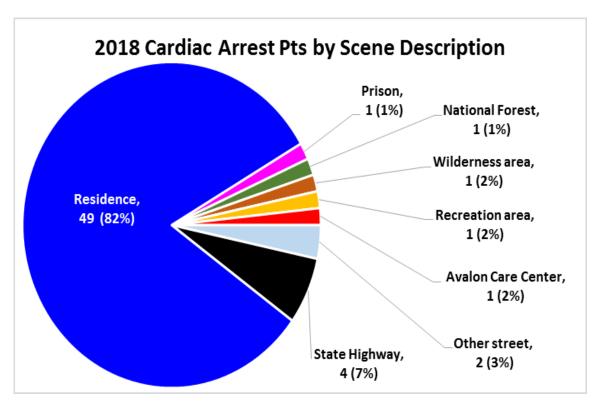


STEMI Location				
Anterior STEMI	2			
Inferior STEMI	8			
Lateral STEMI	4			
Posterior STEMI	0			

CARDIAC ARRESTS Cardiac Arrest by Age & Gender



In 2018, males comprise 57% of cardiac arrest victims. The average age was 63 years for males, 64 years for females, 64 years overall.

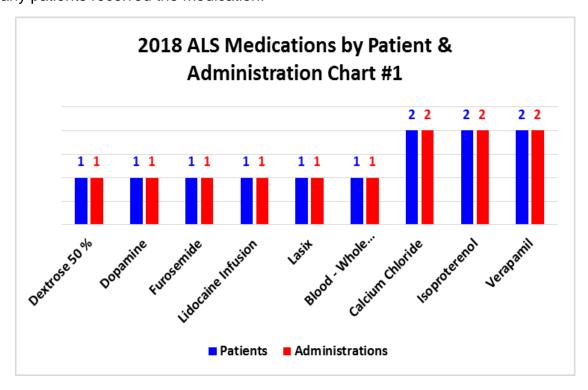


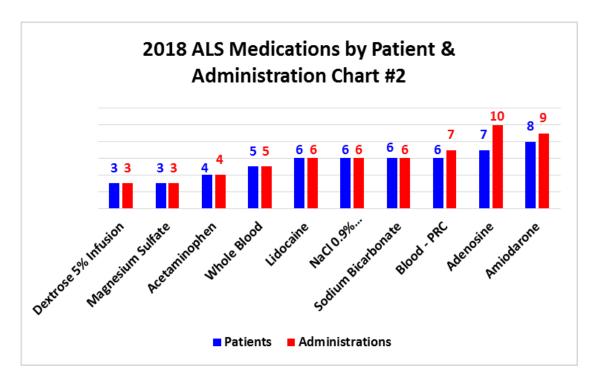
2018 Cardiac arrest Outcomes (Utstein Reporting Method)

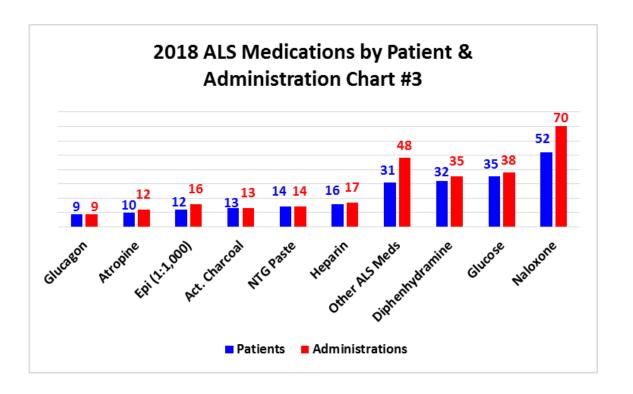
Absence of signs of circulation and/or considered for resuscitation				
Absence of signs	n = 57			
Resuscitation not attempted DNR	n= 11 n= 2	Resuscitation attempted n= 46 Defibrillation attempted n= 6		
Futile	n= 9	↓		
Witnessed Layperson Healthcare provider	n= 27 n= 18 n= 9	First monitored rhythm Shockable		
CPR prior to EMS	n= 16	Unk- AED $n=2$ Non-shockable $n=30$		
Mechanical CPR	n= 26	Asystole n= 28 PEA n= 11		
Presumed etiology Cardiac Trauma Drowning Respiratory Overdose Other/unknown	n= 36 n= 7 n= 1 n= 1 n= 1 n= 8	Outcome Return of Spontaneous Circulation at any time		
ROSC Patients Witnessed by layperson Witnessed by EMS Bystander CPR Bystander AED First Responder Defib Mechanical CPR Initial Rhythm Asystole	n= 8 n= 4 n= 2 n= 3 n= 0 n= 1 n= 4	Yes n= 8 No n= 38 Resuscitation Terminated Field n= 6 ED n= 2 Admitted n= 1 Transferred n= Unk Discharged alive n= Unk Neurologic outcome at discharge CPC 1 n= CPC 2 n=		
V-Fib V-Tach PEA Paced 17% of attempted resuscitatio result in ROSC	n= 1 n= 2 n= 1 n= 2	CPC 2		

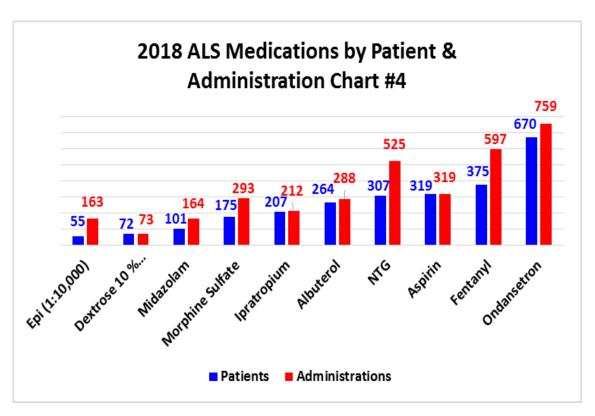
ALS MEDICATIONS

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

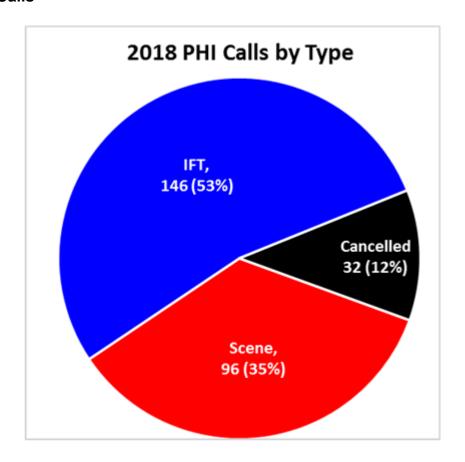


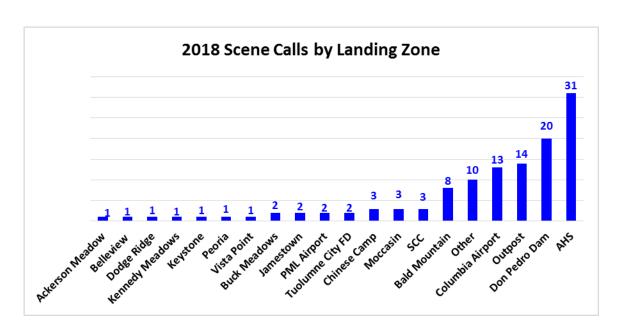


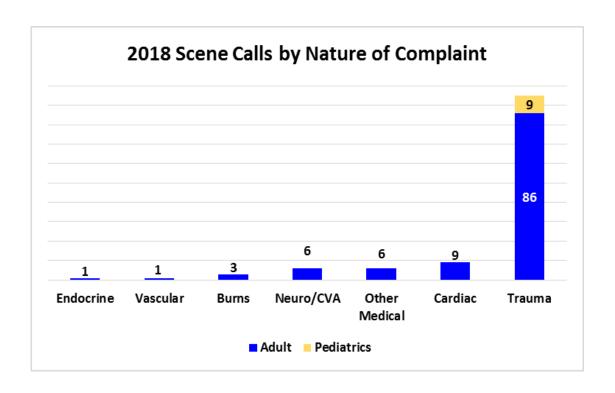


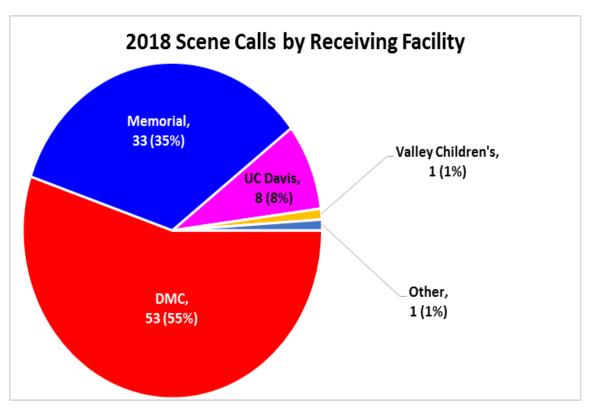


PHI- Scene Calls

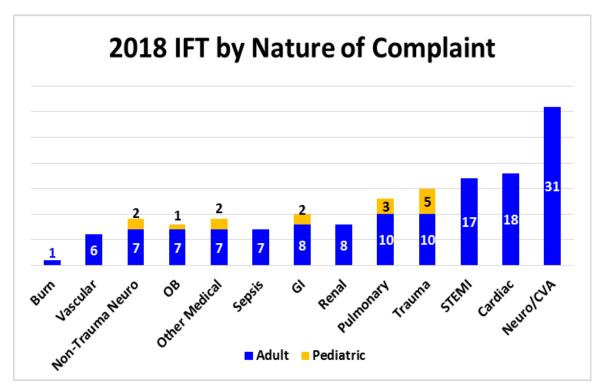




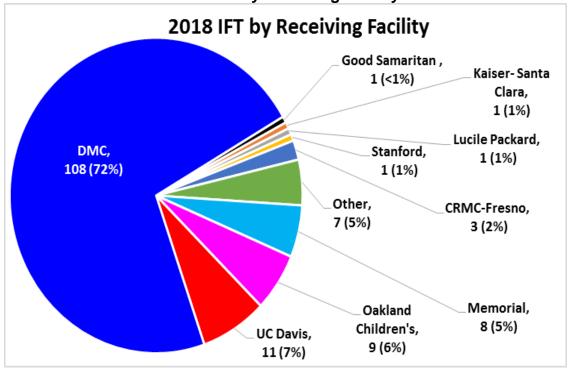




PHI- Inter-facility Transfer







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 45% 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 decreased to 17%, the ROSC rate will be monitored to determine if this decrease is an aberration or a trend that needs to be addressed.

The payer mix includes a high number of Medicare clients, which caps the allowable charge. The Medicare reimbursement rate does not sustain the cost of Medicare transports. Medicare and MediCal reimburse rates will continue to challenge the fiscal stability of the Tuolumne County Ambulance Enterprise Fund.