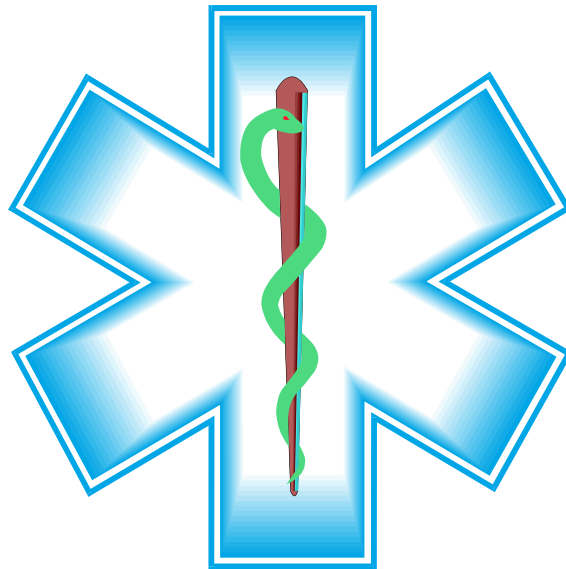

Tuolumne County
Emergency Medical Services Agency

2019 Annual Statistical Report



February 26, 2020

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INTRODUCTION

The 2019 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 EMSsystem 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, EMSsystem 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 in-hospital 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, EMSsystem 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 S-T Elevation Myocardial Infarction (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.

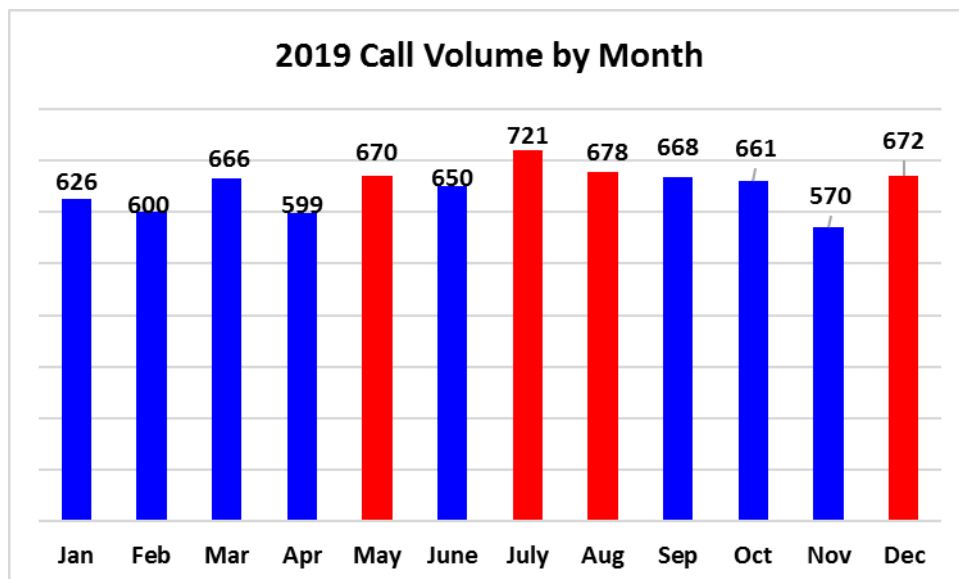
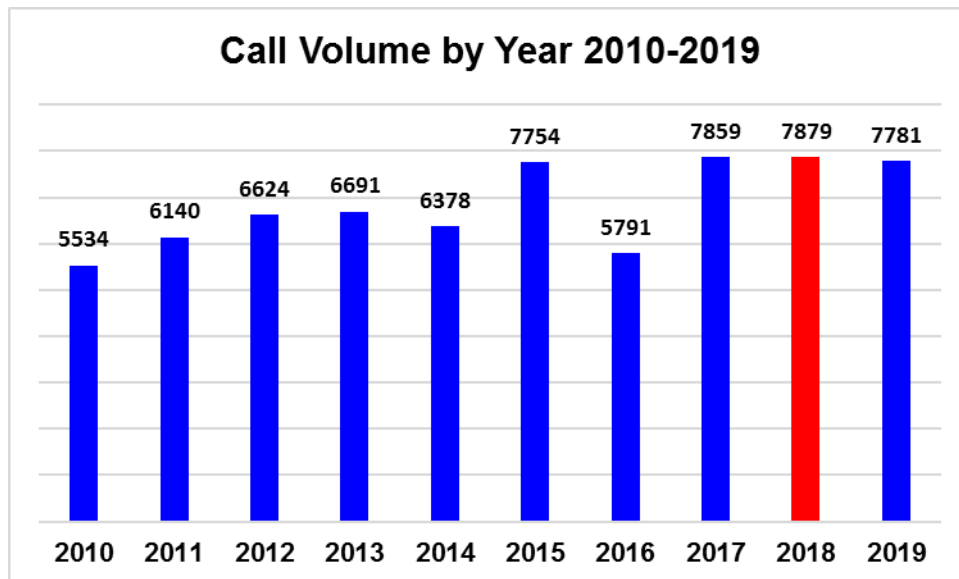
In September of 2011, Tuolumne County adopted the CRTCC Trauma Triage Criteria. These criteria is based on the Centers for Disease Control (CDC) trauma triage guidelines.

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.

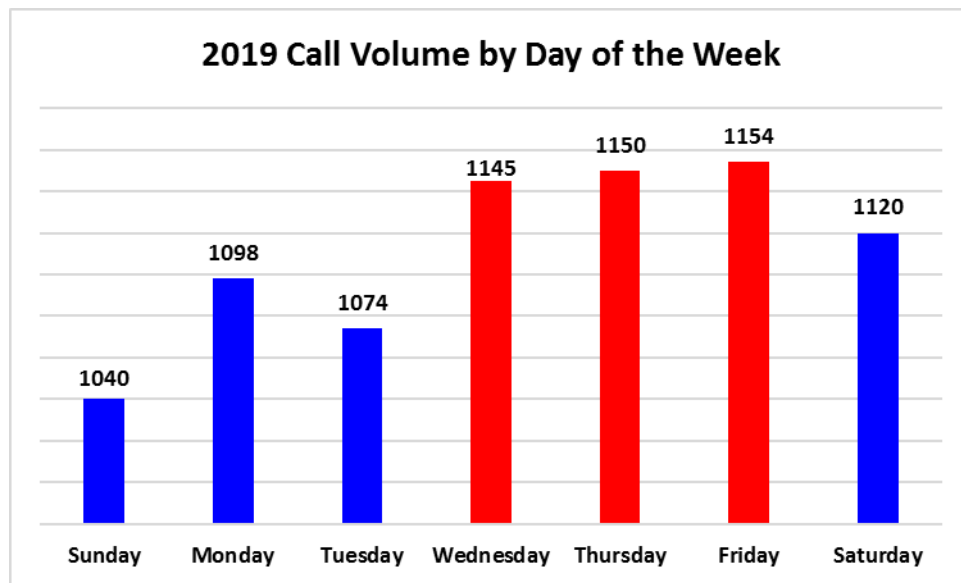
In 2019, the Tuolumne County Sheriff's Office began providing Emergency Medical Dispatch (EMD) call screening and providing pre-arrival instructions.

OVERVIEW OF CALL VOLUME

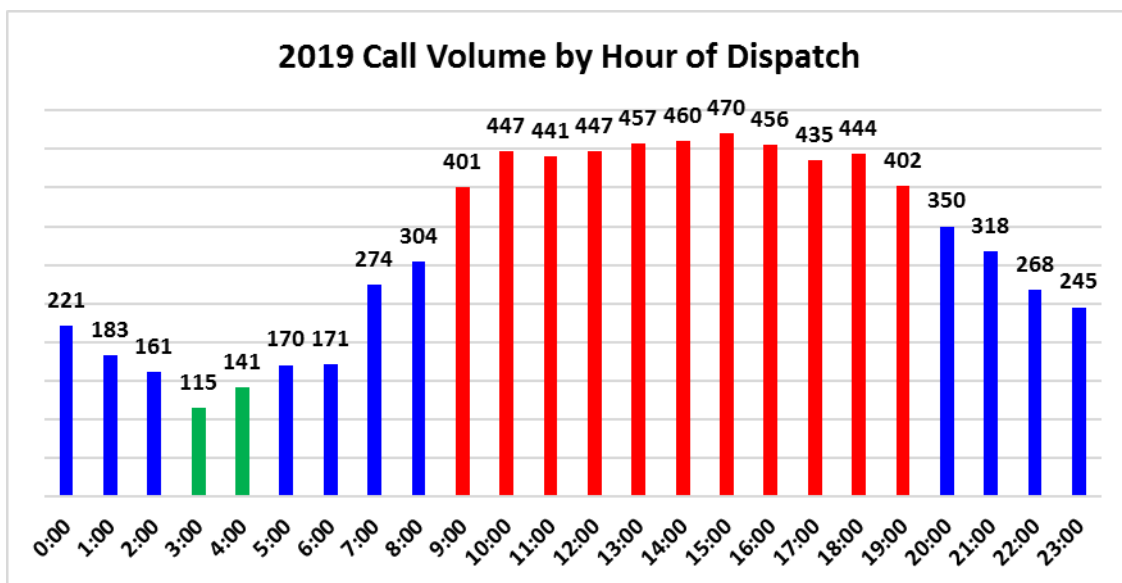
As illustrated in the graphs below, unless otherwise specified EMS requests include both scene and transfer call types.



May, July, August, and December are the busiest months.



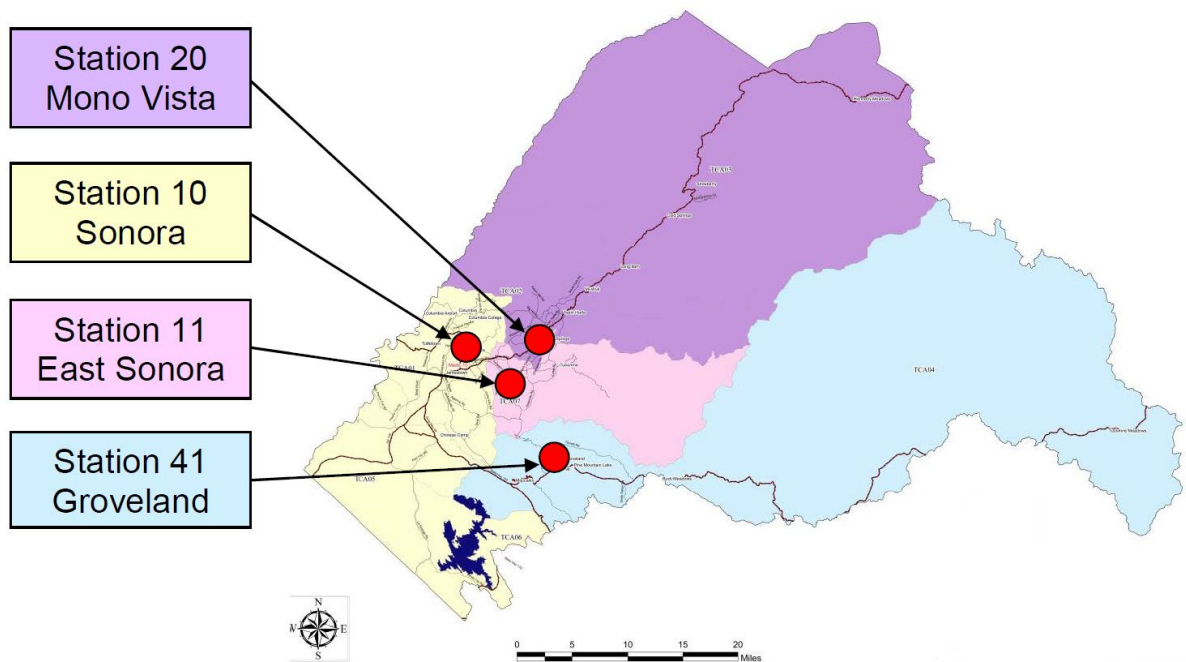
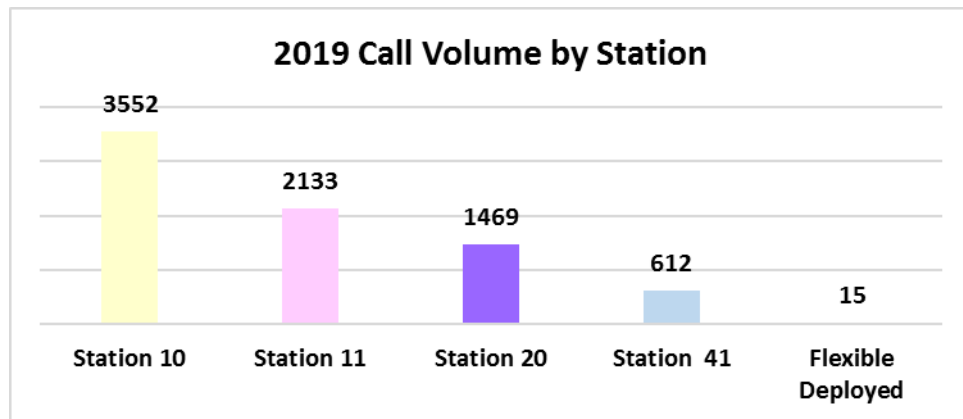
A breakdown of requests by day and time of day shows that call volumes may vary during the week, with the lowest volume on Sundays.



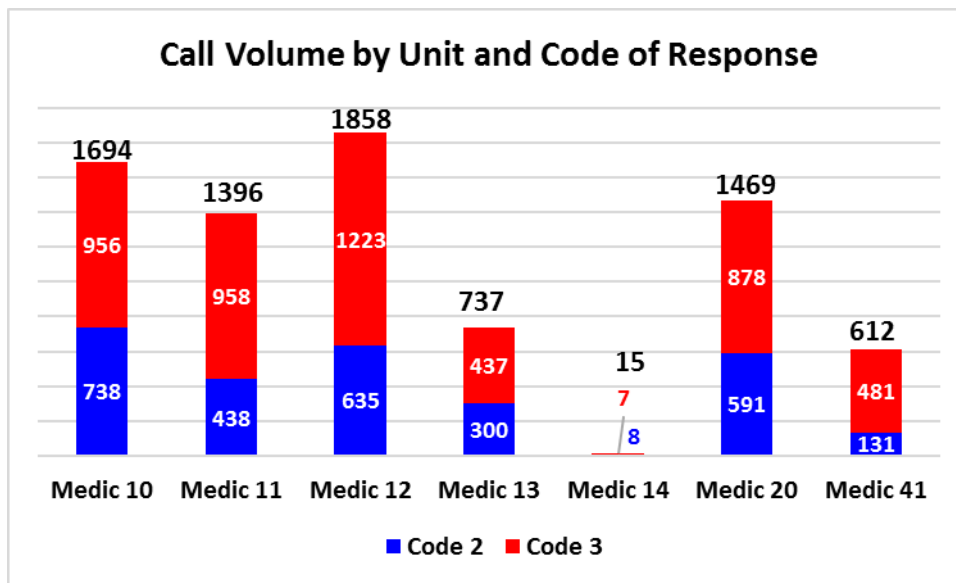
The busiest time is 09:00 through 19:00 (>400), the slowest 03:00 and 4:00 (<150), average is 324.

2019 Call Volume by Day of Week and Hour of Dispatch							
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
0:00	30	29	31	24	35	34	38
1:00	32	29	21	22	22	24	33
2:00	29	25	28	23	14	18	24
3:00	21	14	13	12	18	22	15
4:00	26	17	24	22	13	23	16
5:00	20	26	23	24	24	27	26
6:00	23	19	23	20	29	31	26
7:00	43	42	39	43	38	35	34
8:00	45	44	46	40	58	37	34
9:00	50	61	63	59	64	56	48
10:00	48	63	71	65	66	68	66
11:00	51	55	64	77	66	64	64
12:00	52	70	58	71	67	71	58
13:00	62	71	66	71	65	64	58
14:00	51	62	80	79	85	51	52
15:00	70	61	56	65	64	77	77
16:00	59	70	69	72	71	58	57
17:00	50	55	68	65	64	67	66
18:00	60	69	39	70	59	67	80
19:00	57	57	53	67	54	59	55
20:00	54	44	38	56	50	57	51
21:00	42	45	32	37	46	61	55
22:00	34	35	38	31	41	45	44
23:00	31	35	31	30	37	38	43

0 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	≥ 70
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As illustrated above, Station 10 responded to the majority of all EMS requests. Flexible Deployment includes M-14 and M-15.



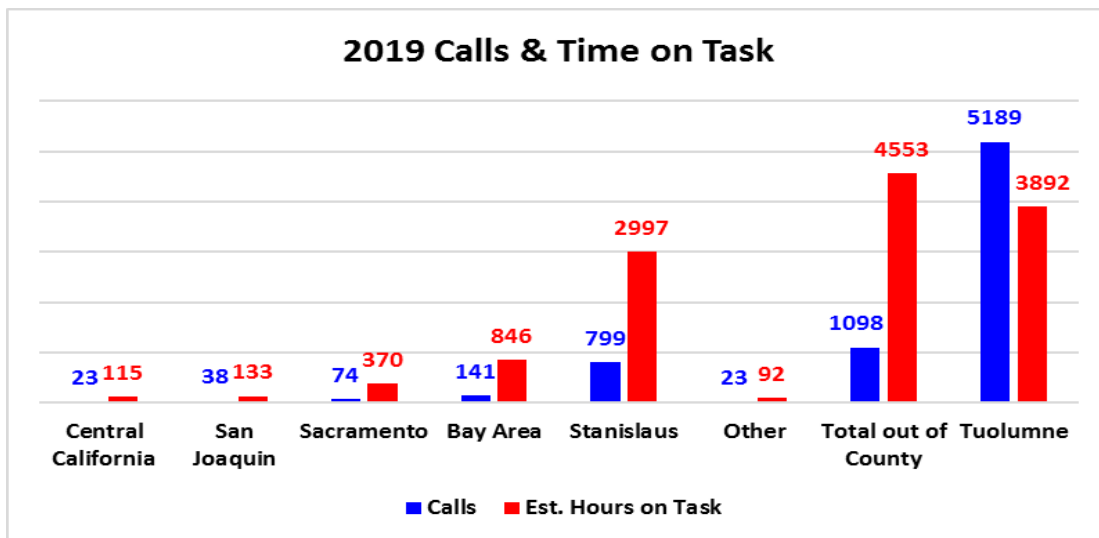
Response Times

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

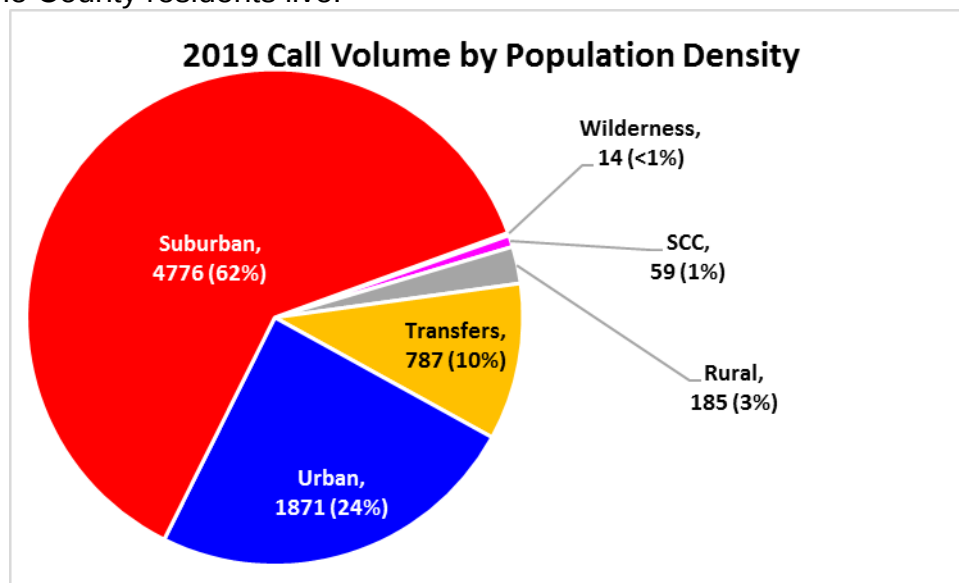
Urban = 101 to 500 people per mile **Suburban** = 51 to 100 people per mile
Rural = 7 to 50 people per mile **Wilderness** = less than 7 people per mile
SCC = Sierra Conservation Center (secured facilities may be exempted from response time requirements)

	Urban	Suburban	Rural	SCC	Wilderness
Minimum:	0 min	0 min	2 min	6 min	0 min
Maximum:	38 min	153 min	89 min	28 min	56 min
Average:	7.54 min	12.50min	34.18 min	17.77 min	19.40 min
90 %ile:	12 min	20 min	49 min	22 min	55 min
Total Code 3 Responses	868	3,608	144	52	10

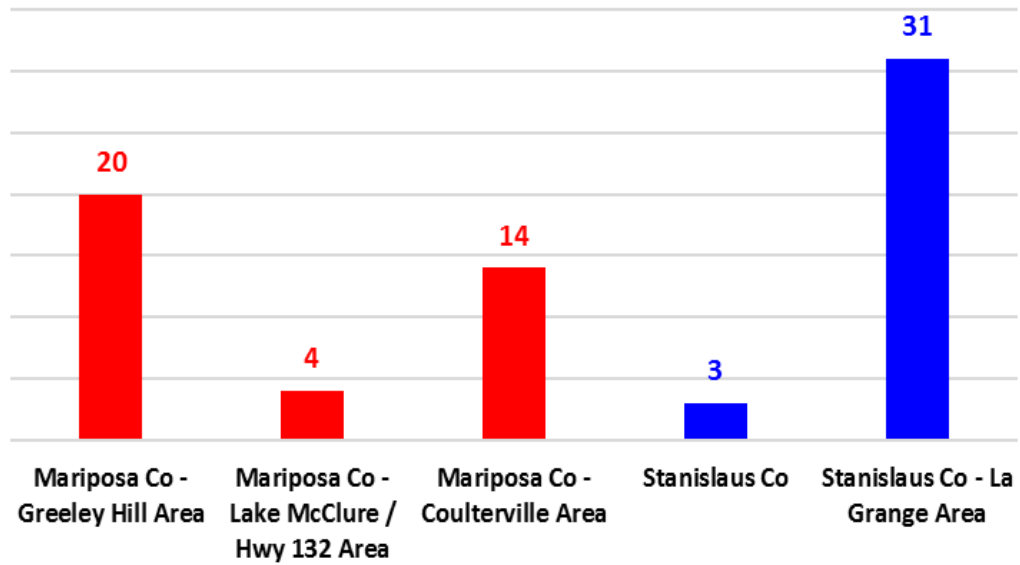


CALL LOCATION

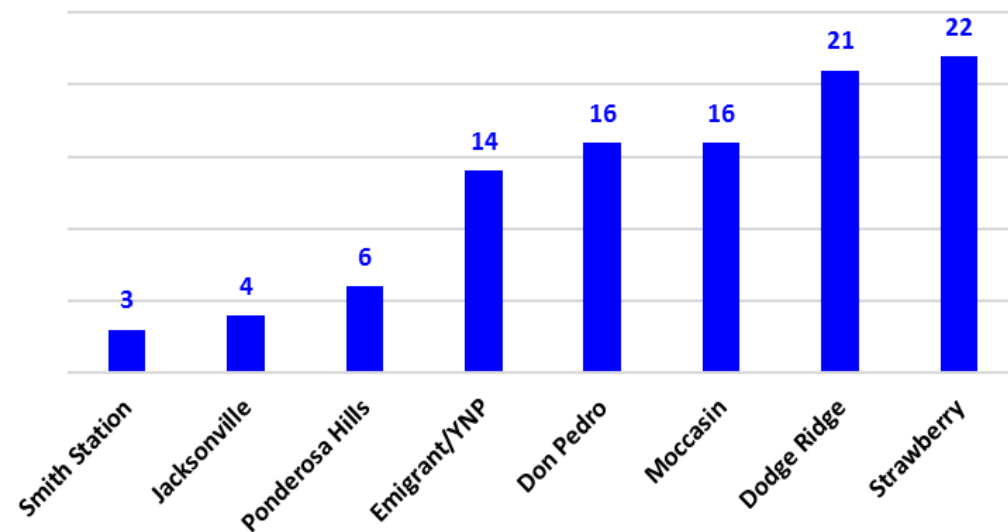
The breakdown of EMS requests by location reveals that the majority (62%) of requests occur in the suburban areas of Tuolumne County, where the majority of Tuolumne County residents live.



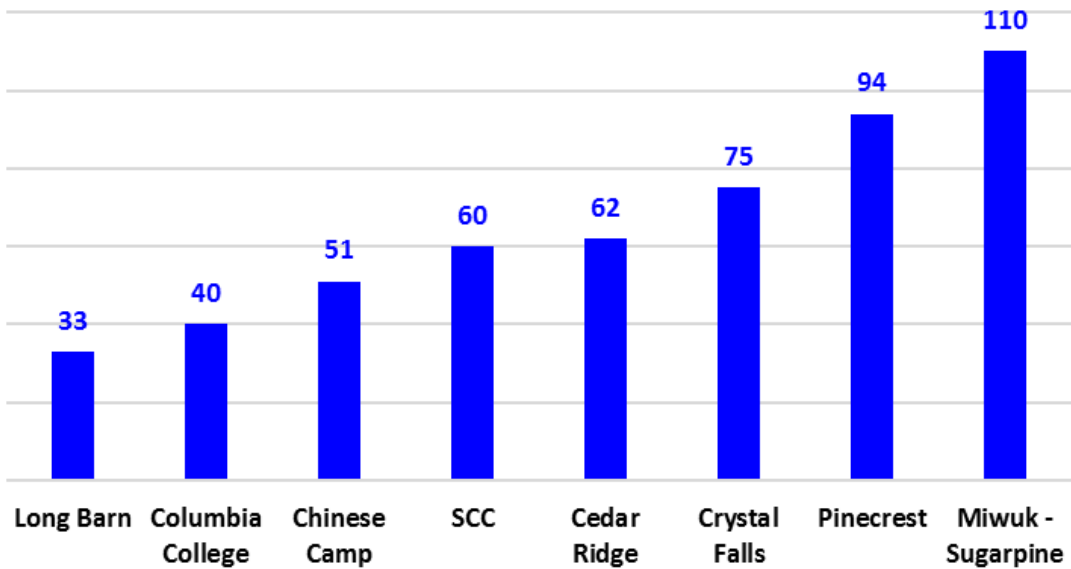
2019 Mutual Aid Responses



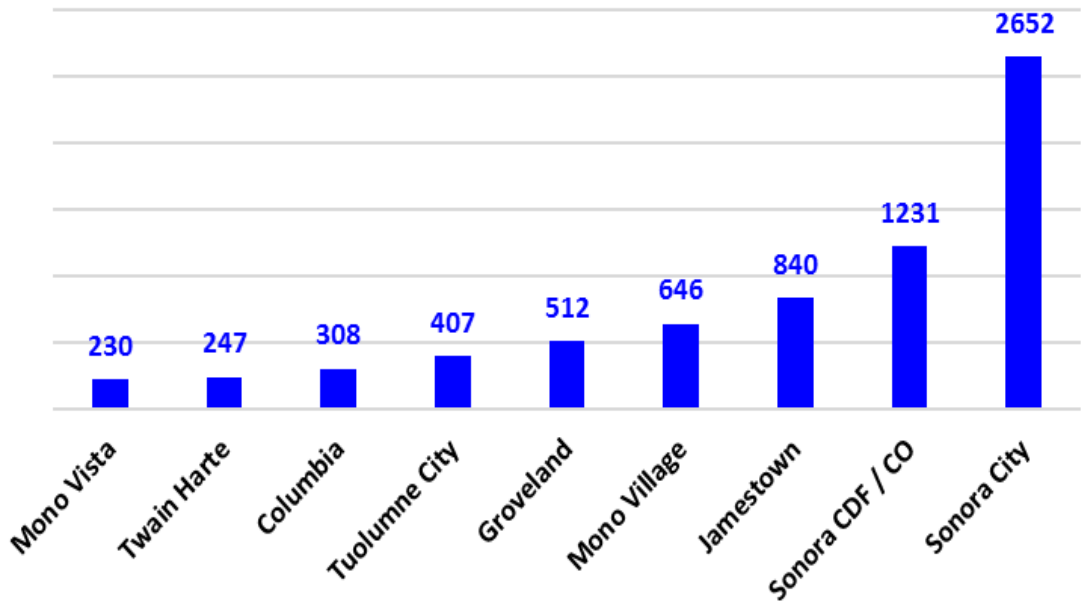
2019 Calls by Map Zone, Chart #1



2019 Calls by Map Zone, Chart #2



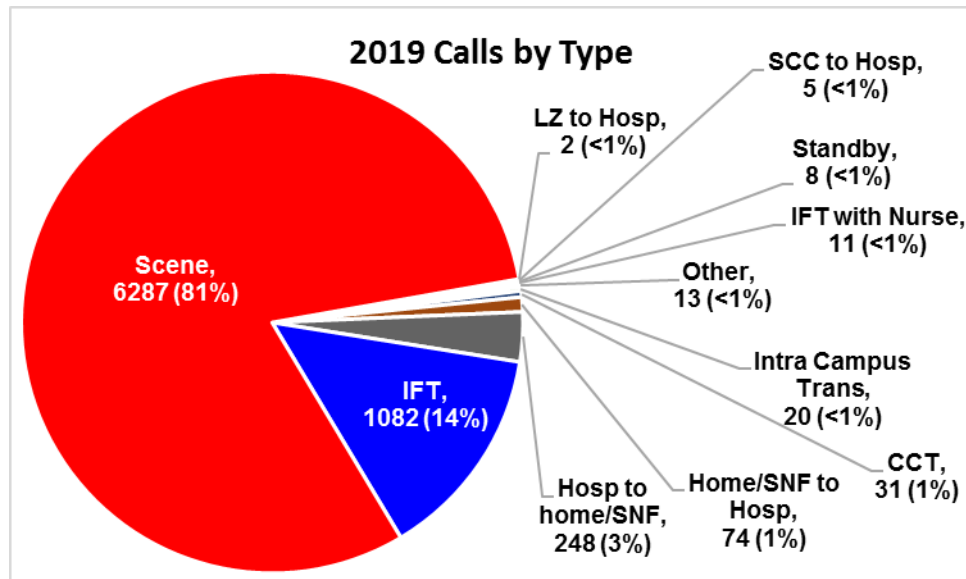
2019 Calls by Map Zone, Chart #3



2019 Calls by Scene Description			
Middle school	1	Lake Don Pedro	14
Tuolumne River	1	Maynard's Recovery Center	16
Service area	1	Adventist Health, Sonora - Unit 7	16
Other urgent care center	1	National Forest	17
Building [any] under construction	1	Elementary school	18
Factory	1	College	18
Farm	1	Unspecified residential institution	19
Beach	1	Other Waterway	19
Daycare center	2	Other recreation area	19
Athletic field	2	Public administrative building	20
New Melones Reservoir	2	Other health care provider office	22
Other specified sports and athletic area	2	Tuolumne County Jail	24
Greenley Primary Care	2	Fire Department	26
Health Club / Gym	2	Group Camp / Outdoor Ed Facility	28
Adventist Health, Sonora - Transitional Care	2	Dodge Ridge	32
Unspecified school	3	High school	34
Cultural building	3	Chicken Ranch Bingo	36
Forest Road Prompt Care	3	Public park	39
Specified industrial and construction area	3	Campsite	41
Mathiesen Memorial Health Clinic	3	Restaurant, bar or cafe	46
Snow play area	4	Prison	50
EMS Rendezvous / LZ	4	Other clinic / doctor's office	53
Wilderness area	4	Sierra Conservation Center	86
Tuolumne General Medical Facility	5	Oak Terrace Memory Care	88
Other SNF	5	Black Oak Casino	89
Airport	6	Casa Viejo	93
Meadow View Manor	6	Indian Rock Prompt Care	101
Other board and care facility	7	Other commercial establishment	114
MACT Indian Health	7	Other	114
Tuolumne Clinic	8	Other public building	139
Other Hospital	9	Other ordinary street	151
Ambulatory health services establishment	9	Skyline Place	224
Not Recorded	9	Other paved roadway	243
Groveland Fire Department	9	Highway (108, 132, 120, 49)	299
Not Applicable	10	Avalon Care Center	300
Groveland Clinic	12	Adventist Health, Sonora	1419
Adventist Health, Sonora - Unit 6	12	Private residence	3,517
Religious institution	13		

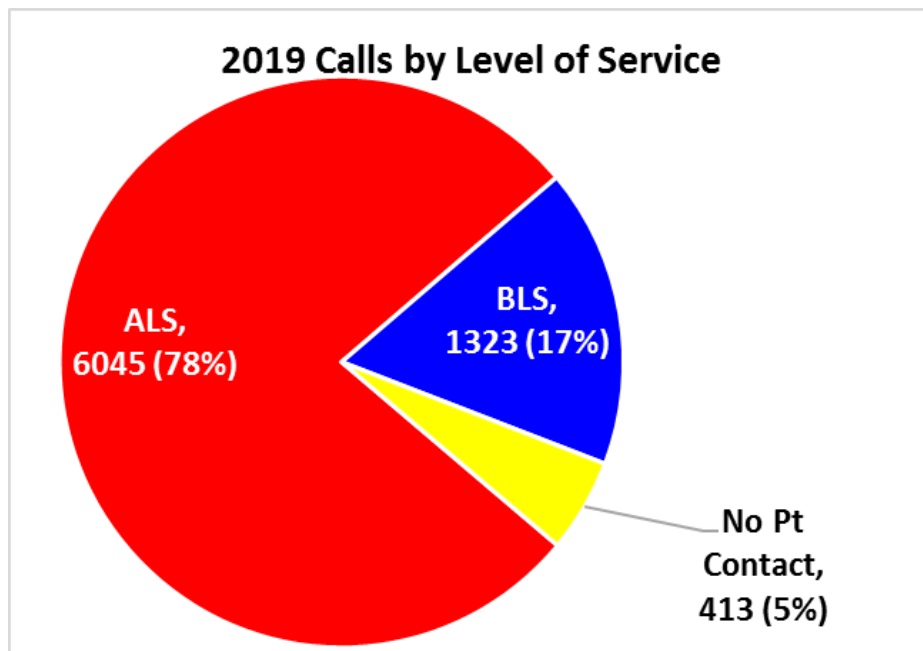
Calls by Type

In 2019, scene emergencies accounted for 81% of the total EMS requests for service.



Level of Care

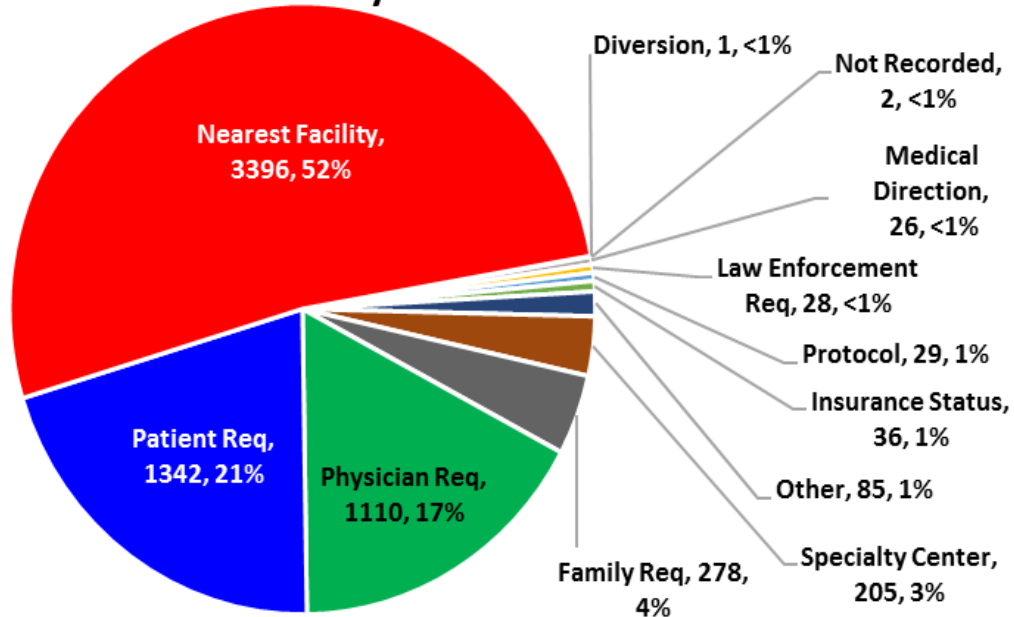
78% of all requests for service resulted in the delivery of advanced life support (ALS) procedures and/or medications administered to the patient. No Pt. Contact includes No patient contact and Call cancelled Enroute.



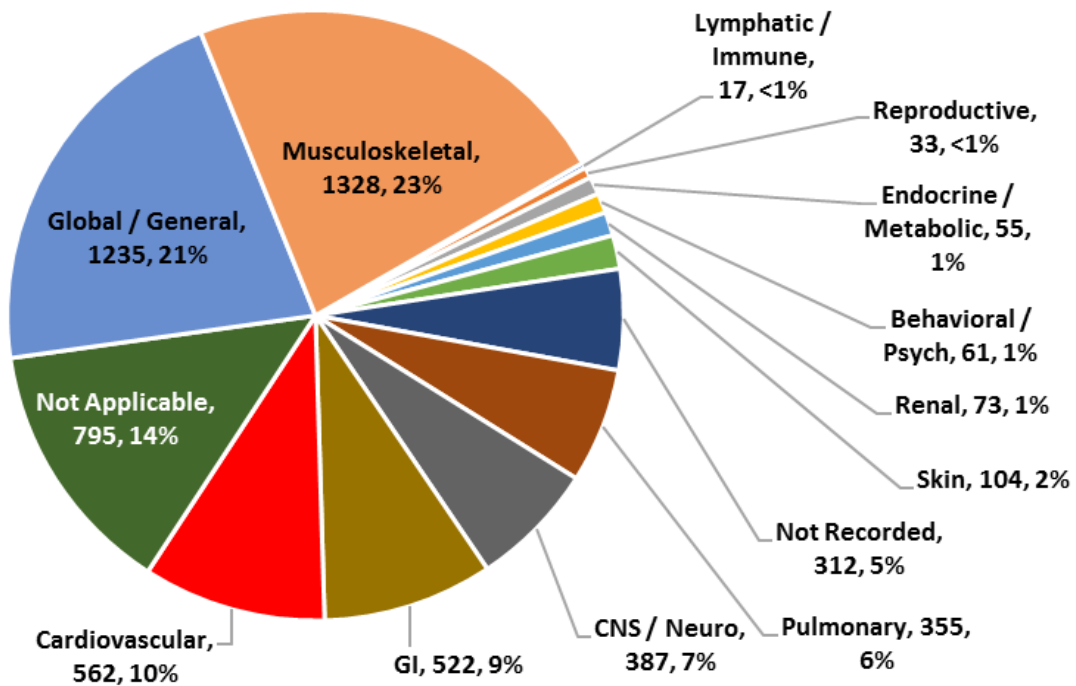
2019 Calls by Disposition			
Trans by another Ambulance from Scene	1	Trans to Home	97
Patient Refused Care, Trans	5	Patient Released at Scene	98
Treated, Transferred Care	8	No Treatment Required	155
Treated, Trans by Law Enforcement	10	No Patient Contact Made	190
Treated, Trans by Private Vehicle	11	Call Cancelled Enroute	223
Trans to Other Location	12	Trans to a SNF	250
Trans to Non-hospital Medical Facility	39	Trans to Hospital (non-ED)	351
Dead on Scene, Resusc Attempted, Not Trans	43	Trans Refused AMA	487
Dead on Scene, No Resusc Attempted, Not Trans	44	Trans to ED	5,675
Trans to Rendezvous Point	82		

2019 Patient Distribution by Receiving Facilities, including transfers			
Alta Bates Summit Medical Center	1	Sutter Medical Center - Sacramento	5
Kaiser Permanente, Walnut Creek	1	Sutter Memorial Hospital	5
John Muir Medical Center	1	Other Santa Clara Co. Hospital	5
Adventist Health Vallejo, Behavioral Health	1	Mercy Medical Center, Merced	6
Kaiser Permanente, Vallejo	1	Other San Francisco Co. Hospital	6
John C Fremont	1	Lucile Packard Children's Hospital	6
Mercy General Hospital	1	Other Alameda Co. Hospital	7
Methodist Hospital of Sacramento	1	Valley Children's Hospital	7
Vibra Hospital of Sacramento	1	St. Joseph's Medical Center	7
Shriners Hospitals, Northern Cal	1	Fresno Community Hospital	8
California Pacific Medical Center, Davies	1	Adventist Health Lodi	8
Mark Twain Medical Center	2	Emanuel Medical Center	8
Sutter Roseville Medical Center	2	VA Palo Alto	11
Kaiser Permanente, Sacramento	2	UCSF Medical Center	13
Other Sacramento Co. Hospital	2	San Joaquin General Hospital	17
Zuckerberg San Francisco General Hosp	2	Regional Medical Center of San Jose	18
California Pacific Medical Center	2	Stanford Health Care	20
Doctors Hospital of Manteca	2	Oakland Children's Hospital	26
Other Contra Costa Co. Hospital	3	UC Davis Medical Center	52
Kaiser Permanente, Santa Clara	3	Kaiser Permanente, Modesto	57
Central Valley Specialty Care	3	Avalon Care Center	92
Oak Valley Hospital	3	Other Hospital Not Listed	93
Doctors Medical Center, Behavioral Health	3	Memorial Medical Center	122
Mercy San Juan Medical Center	4	Doctors Medical Center	636
Kaiser Permanente, Manteca	4	Adventist Health Sonora	5,004

2019 Calls by Destination Decision Reason

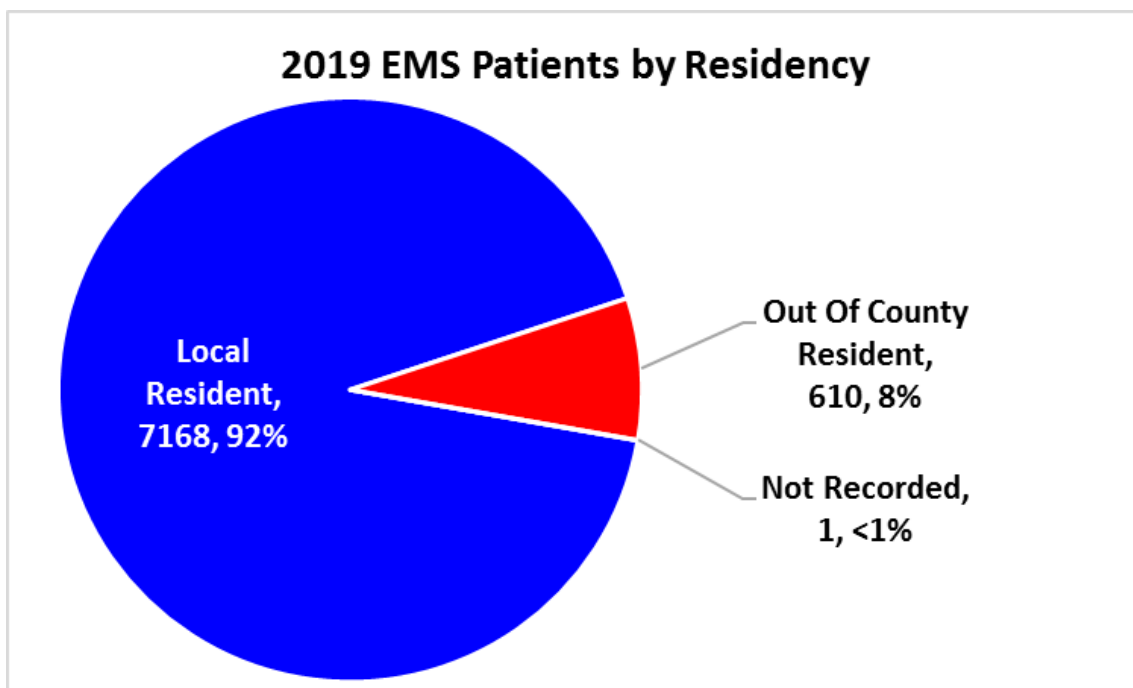
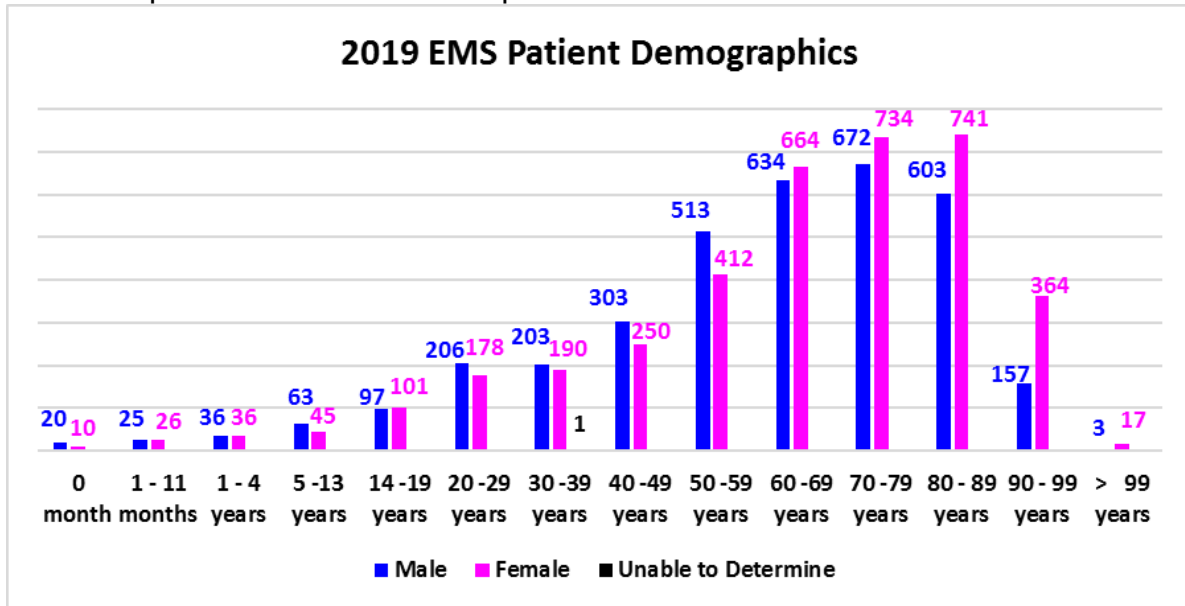


2019 Patient Chief Complaint



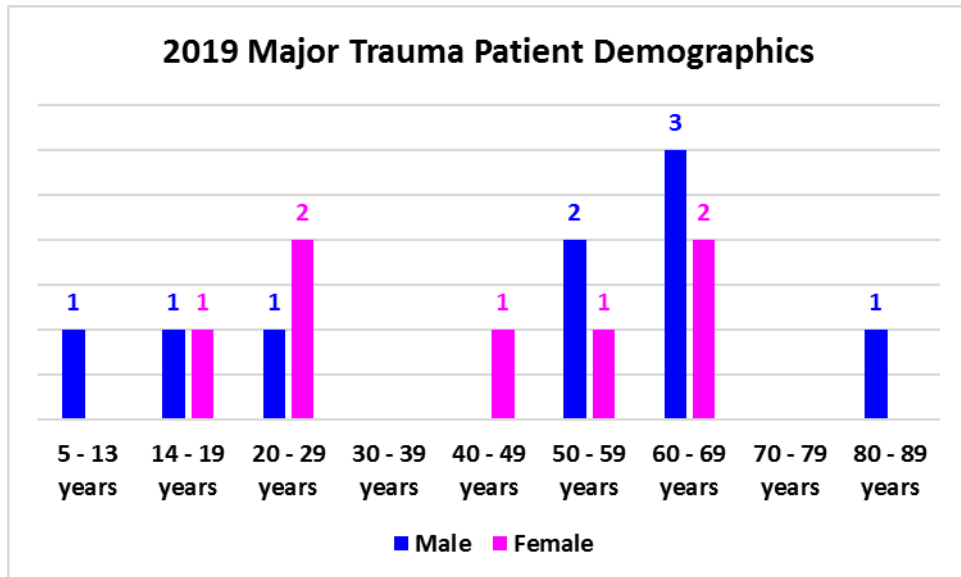
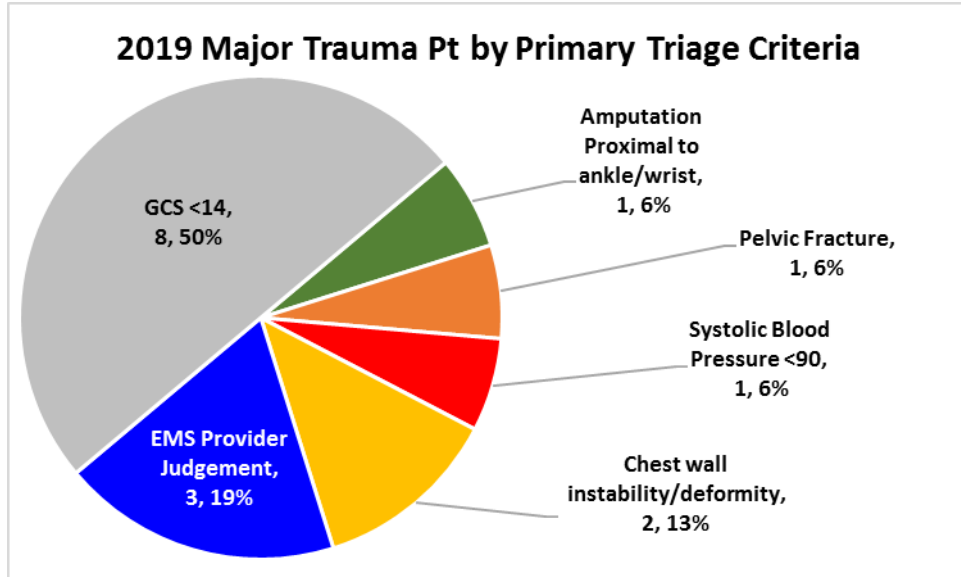
2019 EMS Demographics

The average age of EMS patients is 60 for males, 65 for females and 62 overall. Males comprise 48% of ambulance patients and 52% are females.



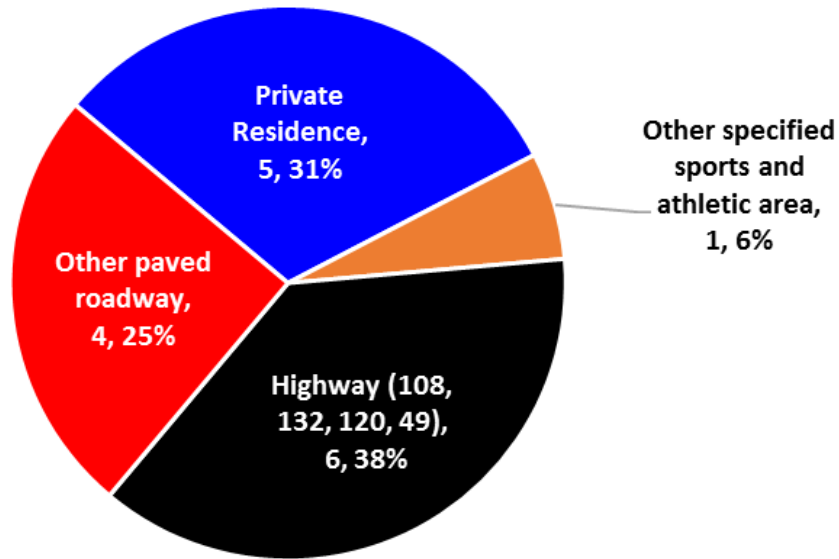
TRAUMA SYSTEM

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. Glasgow Coma Scale of less than 14 was the criteria used 50% of the time.

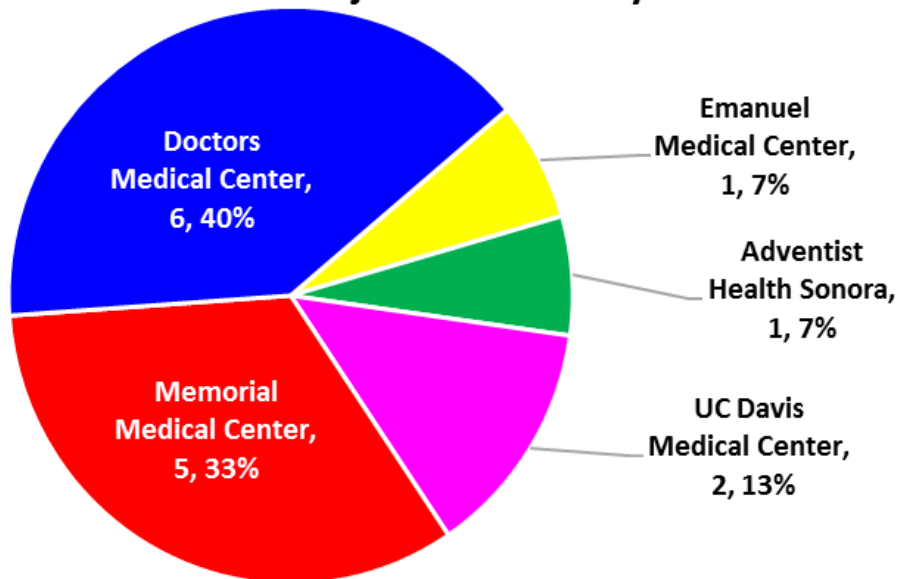


The average age of the Major Trauma patients is 50 for males, 41 for females and 46 overall. Males comprise 56% of trauma system entry patients and 44% are females.

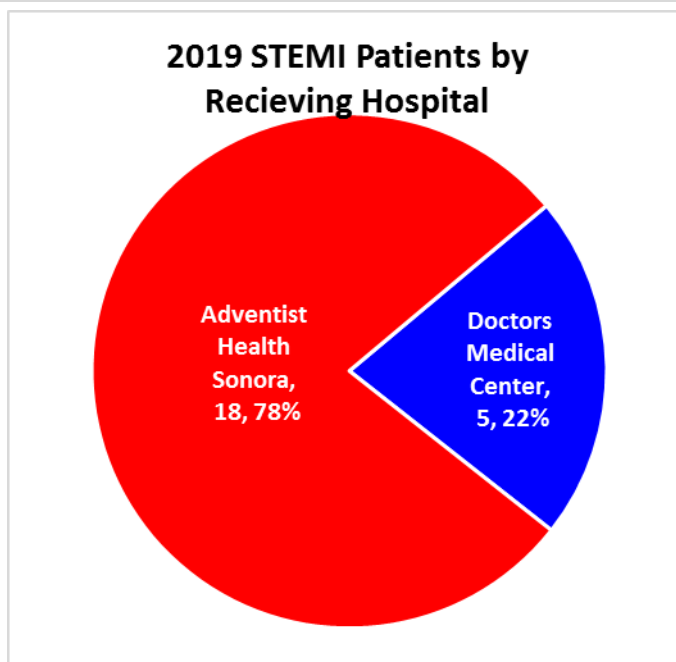
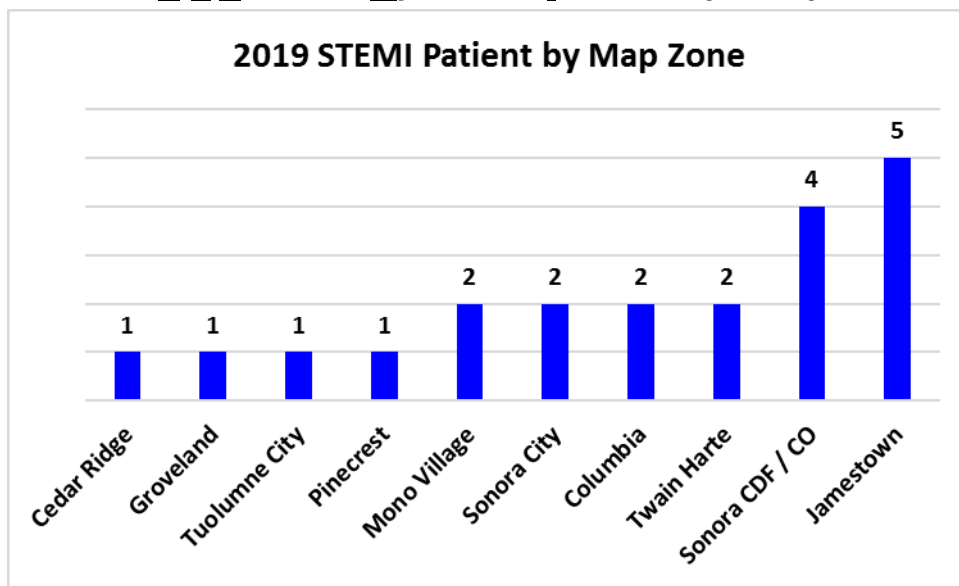
2019 Major Trauma Pt by Scene Description



2019 Major Trauma Pt by Destination

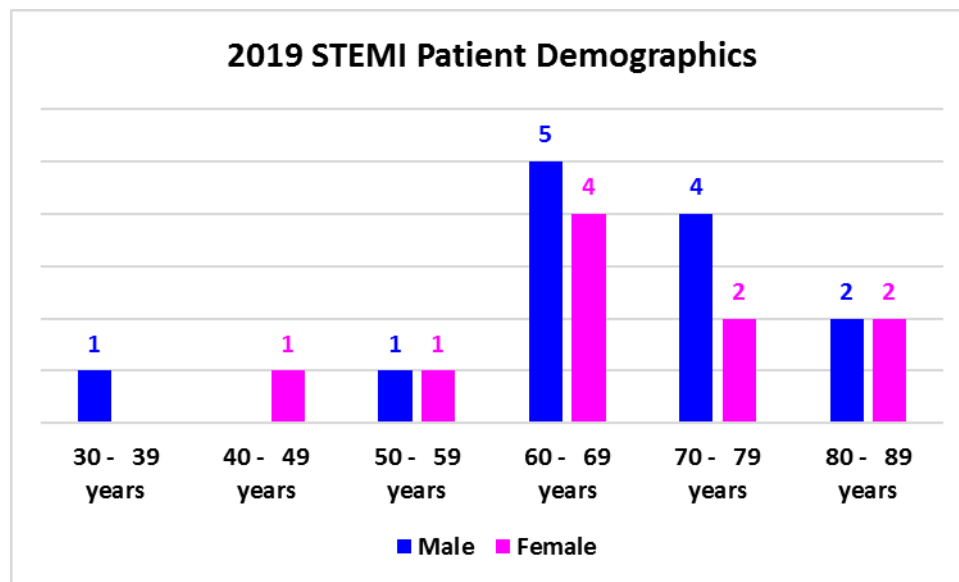


S-T Elevation Myocardial Infarction (STEMI)



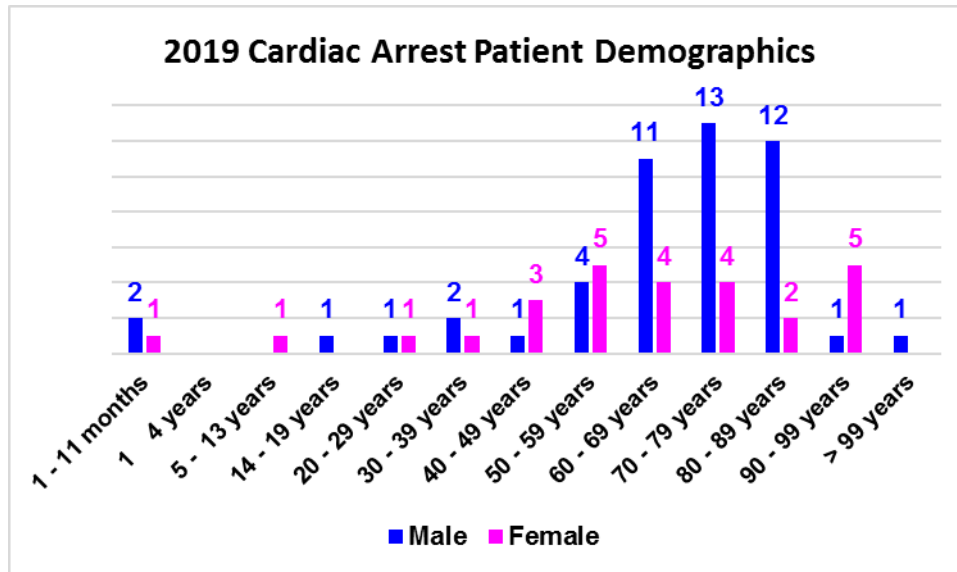
In 2019, 23 patients met the STEMI triage criteria; 18 of them were transported to AHS by ground ambulance, 5 were transported to Doctors Medical Center.

Males comprised 57% of STEMI patients, 43% female. The average age of males STEMI patients was 68 years old, female 68 years old combined age is 68 years old.

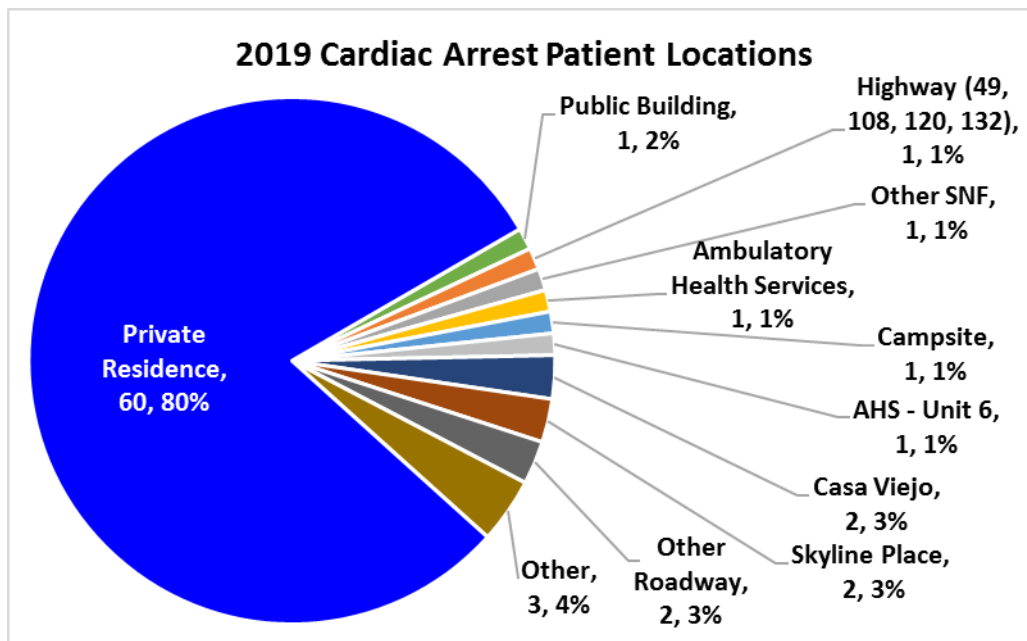


STEMI Location	
Anterior STEMI	2
Inferior STEMI	10
STEMI, NOS	11

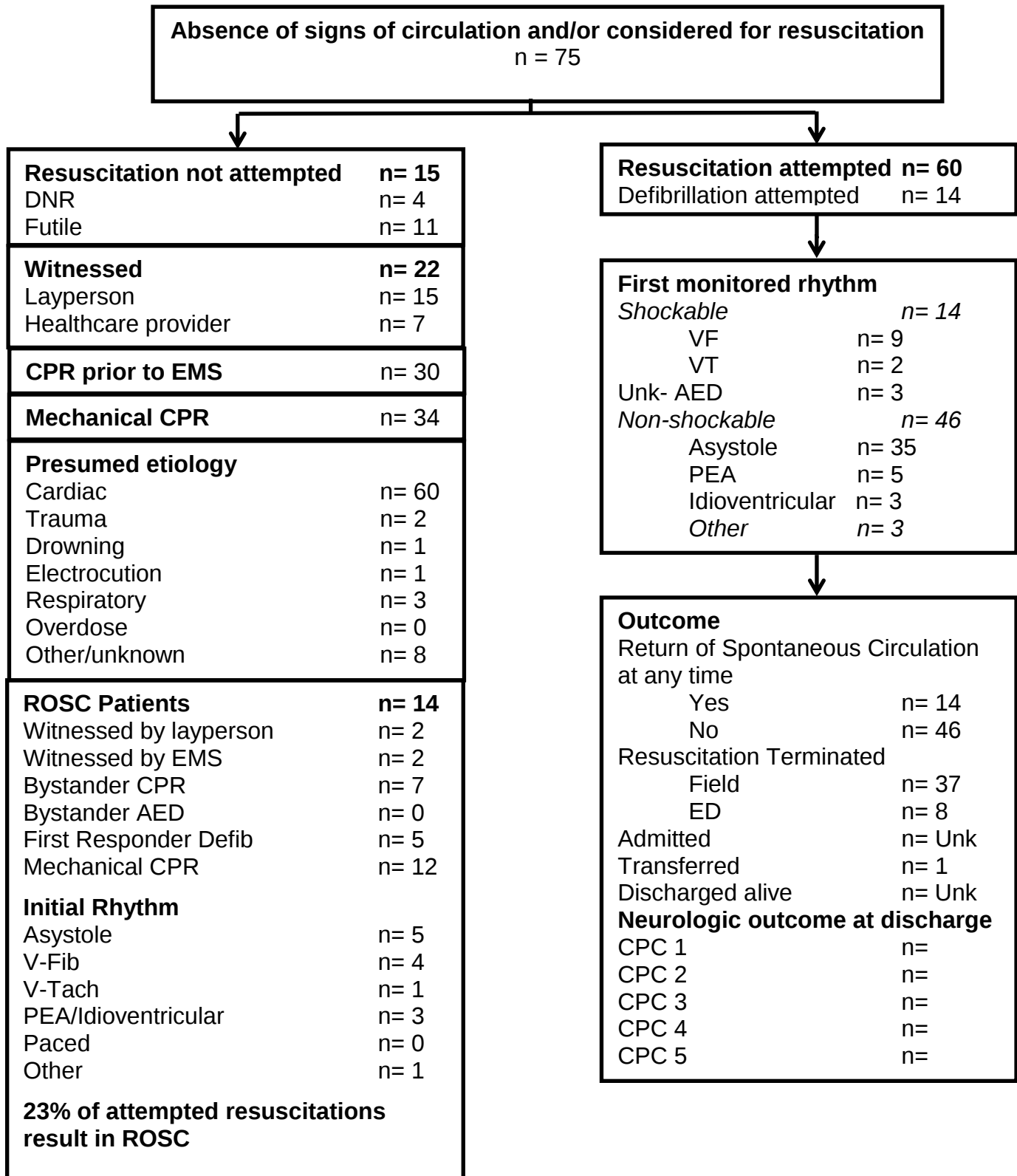
CARDIAC ARRESTS



In 2019, males comprise 64% of cardiac arrest victims. The average age was 67 years for males, 62 years for females, 65 years overall.

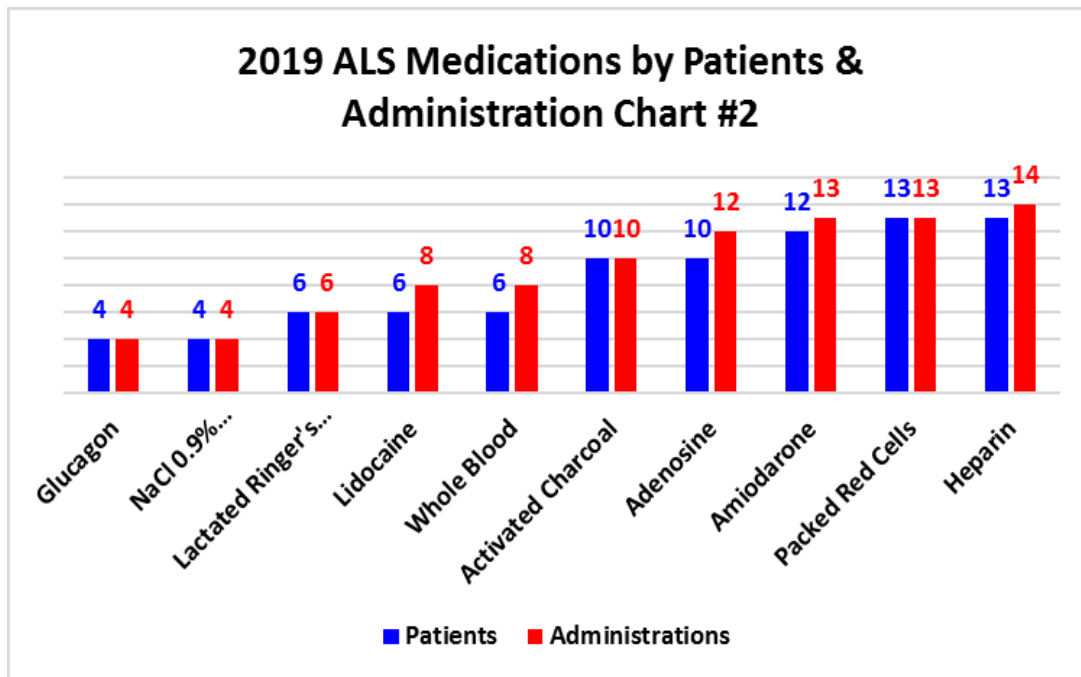
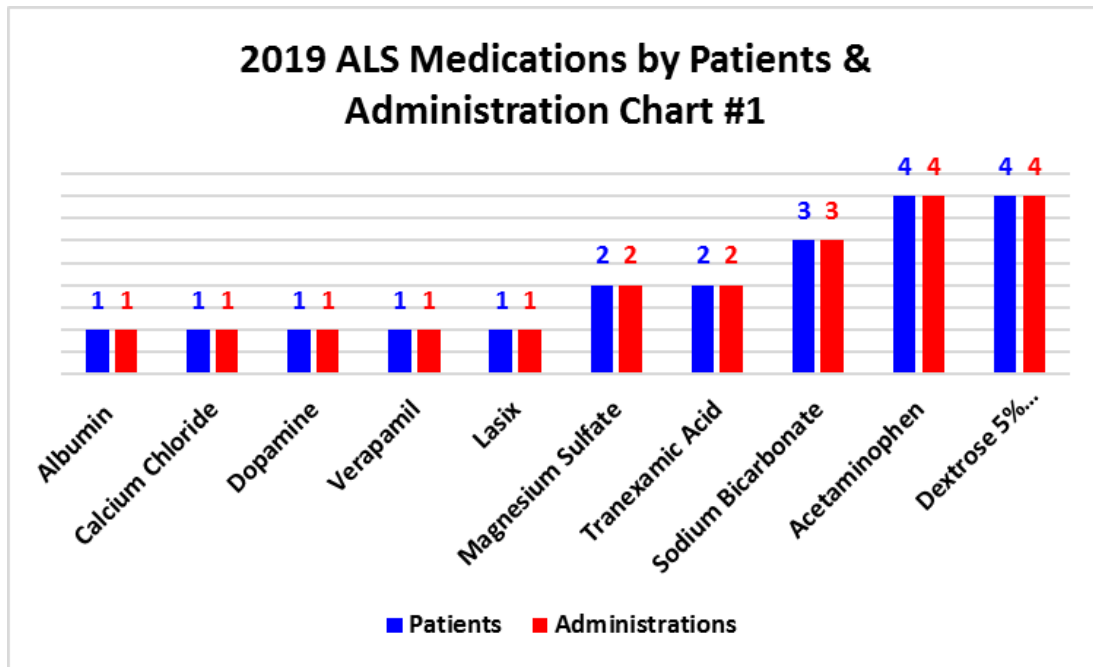


**2019 Cardiac arrest Outcomes
(Utstein Reporting Method)**

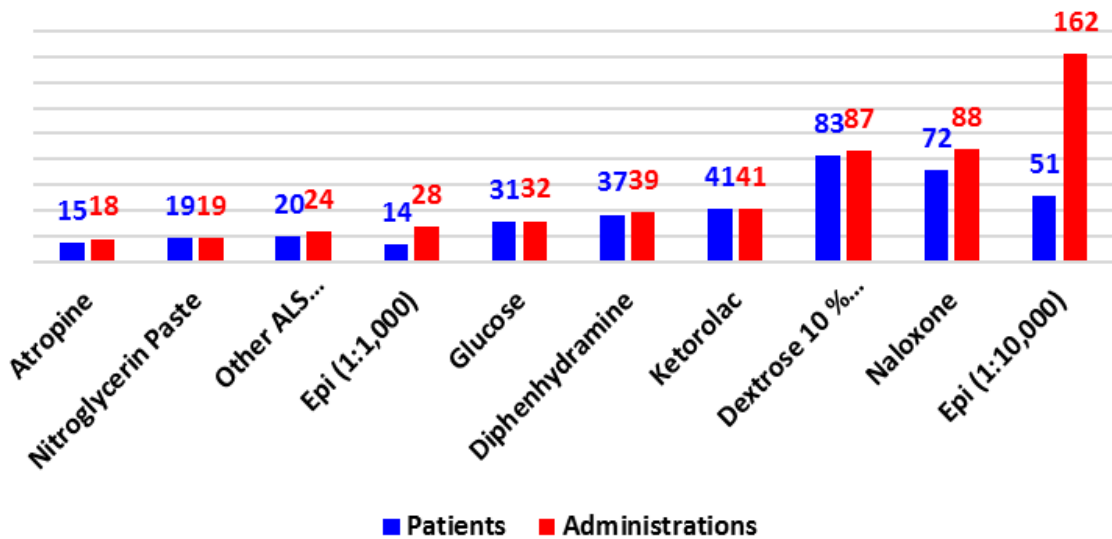


ALS MEDICATIONS

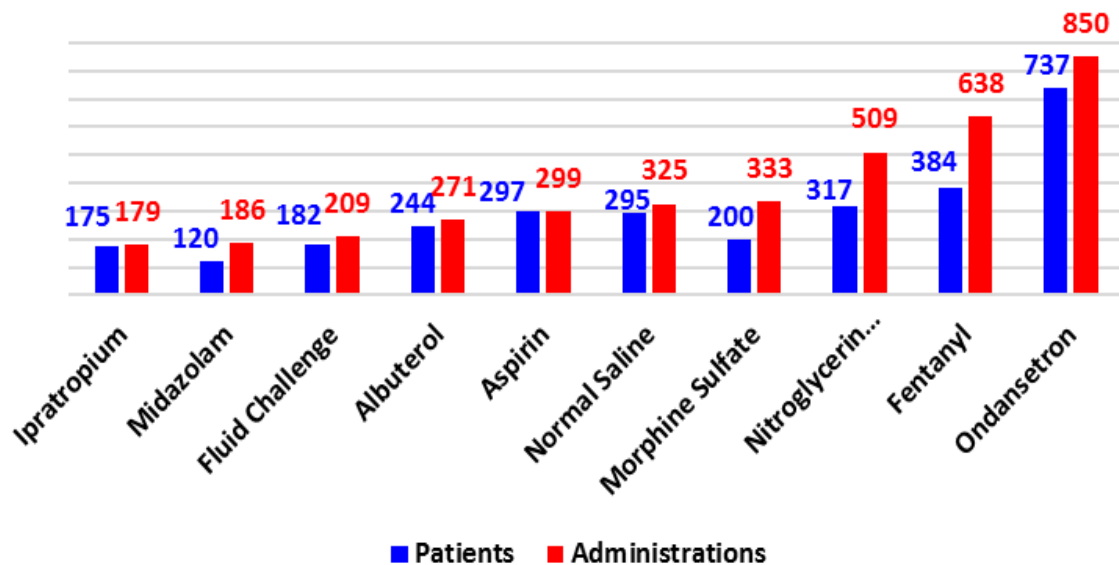
The charts below represent the number of times a medication was administered and how many patients received the medication.



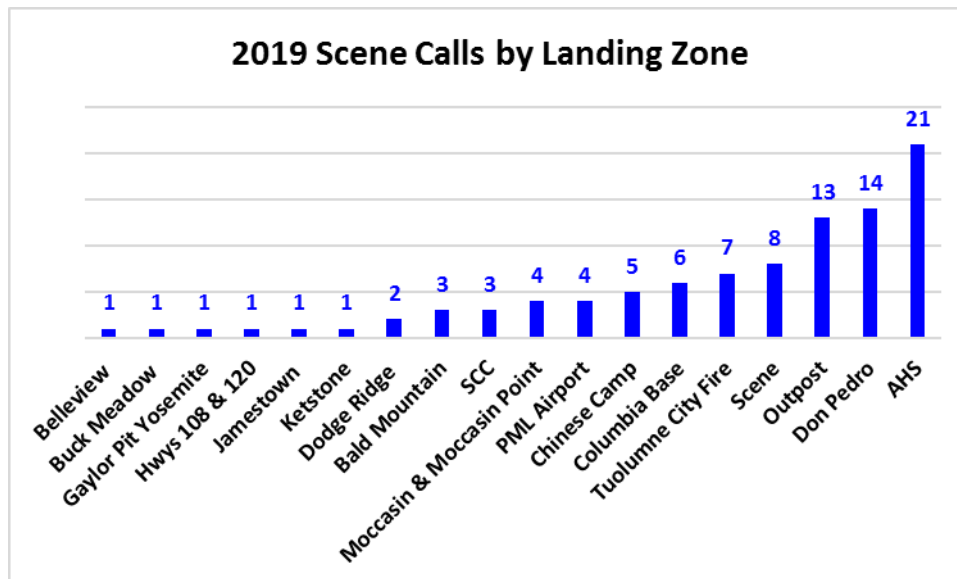
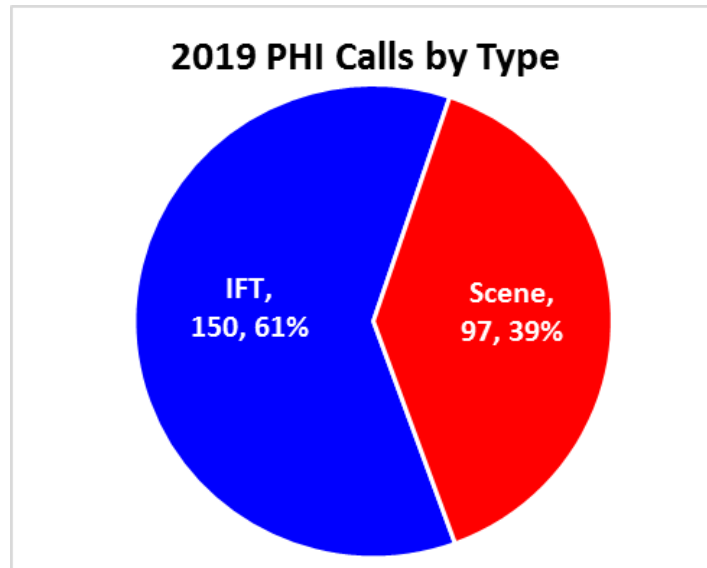
2019 ALS Medications by Patients & Administration Chart #3



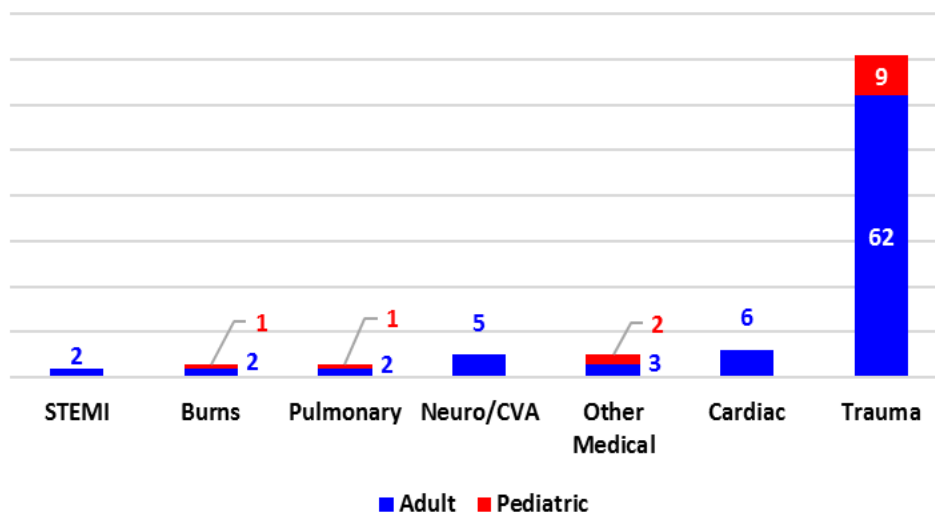
2019 ALS Medications by Patients & Administration Chart #4



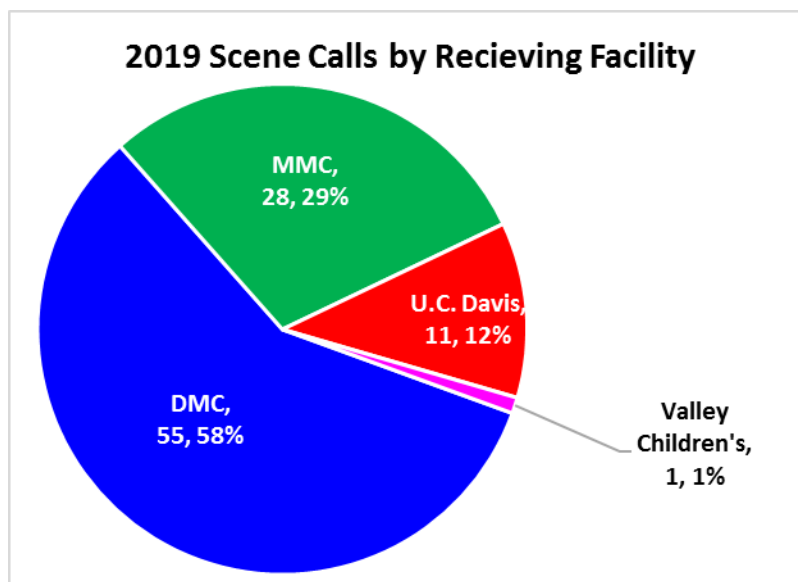
PHI- Scene Calls



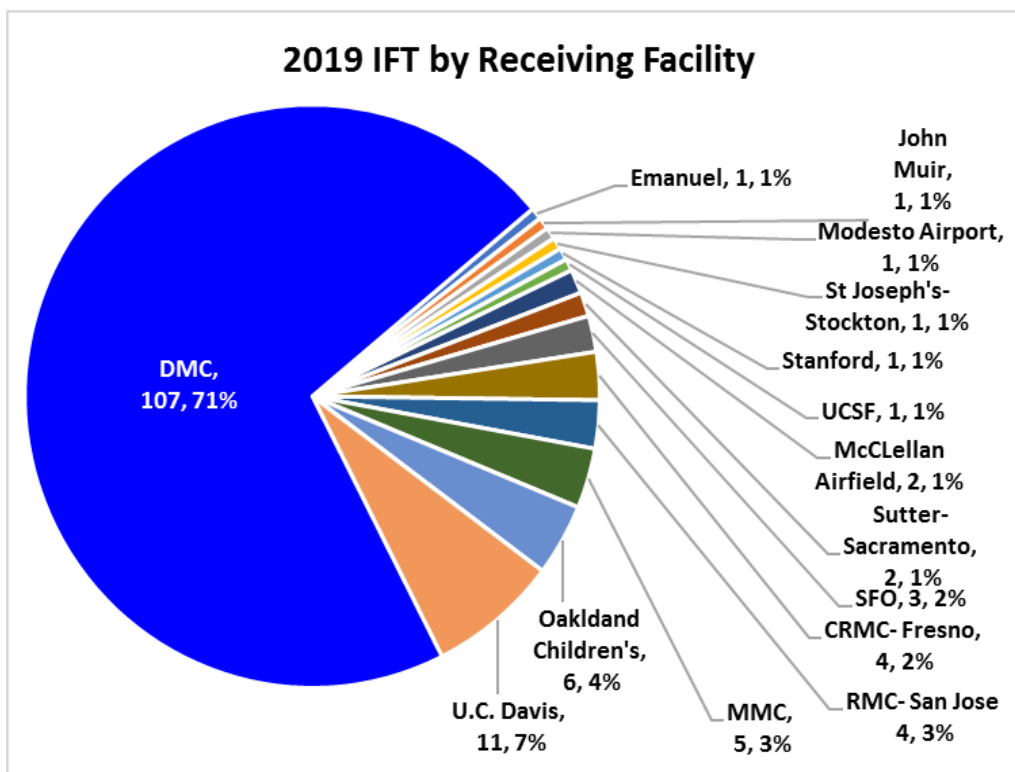
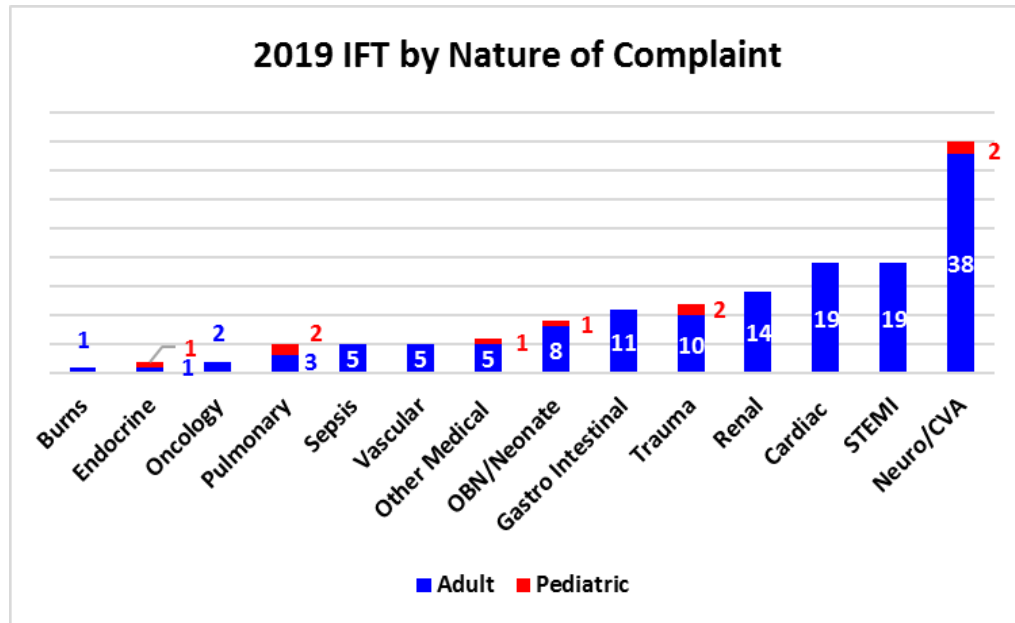
2019 Scene Calls by Nature of Complaint



2019 Scene Calls by Recieving Facility



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 58% 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 from 17% to 23%, returning to previous years ROSC rate.

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.