

SAN JOAQUIN — COUNTY —

Emergency Medical Services Agency

Annual Report 2021



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Message from the EMS Administrator

In 2021, SJCEMSA staff, along with every EMS system participant, was again asked to rise to the challenge imposed by another year of operating in pandemic response mode. 2021 proved to be particularly difficult for everyone in EMS and many residents of San Joaquin County, as demonstrated by a dramatic increase in the number of patients transported by ambulance in the 9-1-1 system. In the years prior to the coronavirus pandemic (COVID-19), ambulance transports tended to increase by approximately 1% each year. Following a 2% drop in 2020, the volume of ambulance transports increased by nearly 9% in 2021.

This increase in the demand for EMS and hospital resources added to the already significant demands for medical mutual aid, vaccine and therapeutics distribution, the need to address hospital patient surges, and staffing shortages.

Our success in having met these challenges is due to the coordinated effort of the many agencies and individuals involved in the complex system of prehospital medical care and emergency response that comprise the EMS system in San Joaquin County.

Jared Bagwell
EMS Administrator

Message from the EMS Medical Director

Instead of a prosperous recovery to normal operations, 2021 continued to stretch the patience and endurance of the residents of San Joaquin County and all whose jobs are linked to the EMS system. While the benefits derived from the availability of COVID-19 Vaccines were many, the ongoing stress of performing normal EMS related tasks during a pandemic continued to impact the health and well-being of all EMS system participants. Nevertheless, due to the tenacity and hard work performed by individual care givers, the San Joaquin County EMS system successfully met the many challenges that characterized 2021.



Katherine Shafer, MD
EMS Medical Director

EMS System Oversight

Governmental oversight of EMS systems in California is organized in a two-tiered system that consists of the State EMS Authority to ensure the adoption of statewide EMS system competencies, and local (county and regional) EMS agencies (LEMSAs) that are given the statutory authority “to plan, implement, and evaluate”¹ their respective EMS systems at the county level. For example, the California Health and Safety Code, section 1797.103 directs the State EMS Authority to implement statewide guidelines to address the following components: (a) Manpower and training. (b) Communications. (c) Transportation. (d) Assessment of hospitals and critical care centers. (e) System organization and management. (f) Data collection and evaluation. (g) Public information and education. (h) Disaster response. The manner and degree to which LEMSAs meet these guidelines is a function of local structure, needs, and available resources.

Local EMS System Requirements

Division 2.5 of the California Health and Safety Code requires (in part) that LEMSAs:

1. Enter into written agreements with EMS system participants.
2. Have an EMS Medical Director.
3. Ensure EMS system requirements are met at the local level.
4. Ensure compliance of EMT training programs.
5. Certify, accredit, and authorize EMS Personnel.
6. Authorize local Advanced Life Support (ALS) programs.
7. Establish local medical control policies and procedures.
8. Create Exclusive Operating Areas (EOAs) for emergency ambulance services.
9. Adopt policies and procedures for calculating and reporting ambulance patient offload times.
10. Require the use of an electronic health record system by EMS system participants.

¹ California H.S.C. section 1797.204

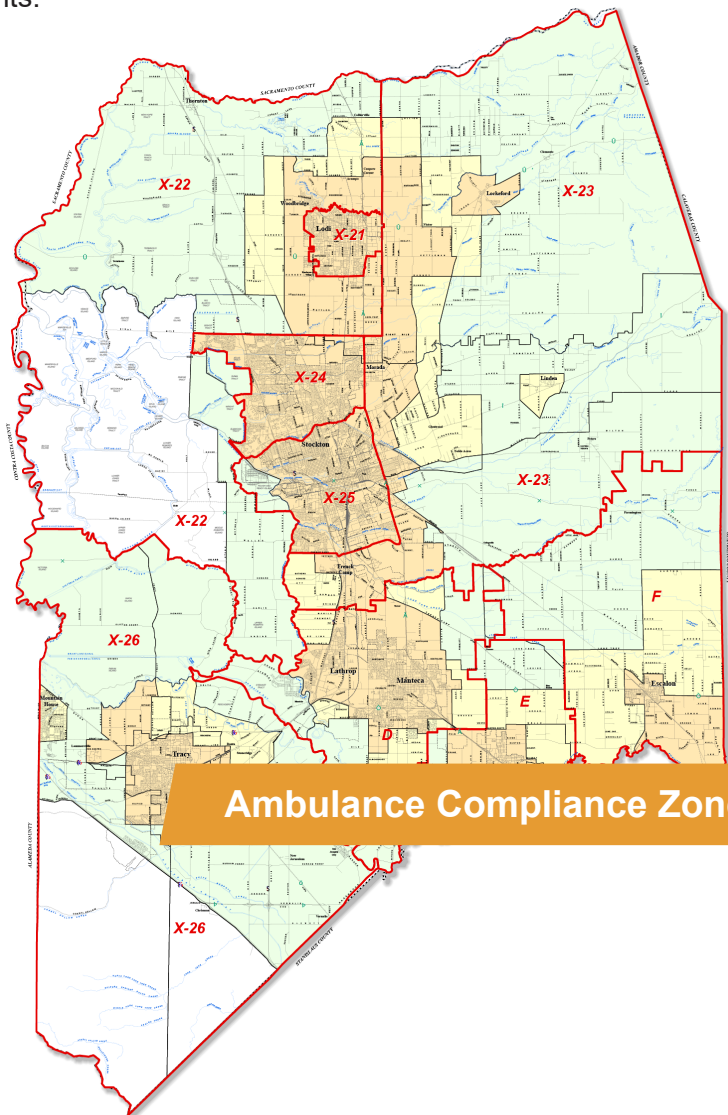
Our Local EMS System Overview

San Joaquin County encompasses nearly 920,000 acres (or about 1,440 square miles), with a population of approximately 783,534 (1/1/2021, California Department of Finance). With 80% of the population (627,843) concentrated in the seven (7) cities in San Joaquin County, and the remaining 20% (155,691) disbursed throughout more rural areas, the SJCEMSA's EMS system planning and policy development efforts incorporate equity considerations by following State guidelines to balance EMS resource availability throughout the county.

9-1-1 ALS response and transport EMS services is provided by four ambulance providers, each of which operates primarily in their respective compliance zones as follows: American Medical Response in Zone X; Manteca District Ambulance in Zone D; Ripon Consolidated Fire District in Zone E, and Escalon Community Ambulance in Zone F. On July 21, 2020, the San Joaquin County Board of Supervisors approved a renewed agreement with American Medical Response – West (AMR) for exclusive emergency and ALS service in ambulance zone X for the period May 1, 2021, to May 1, 2026. This agreement included reconfiguration of the ambulance compliance subzones from eleven to six. The reconfigured subzones

are designed to capture an increase in monthly call volume to more than 100 calls per subzone and incentivize ambulance deployment in rural areas including the Highway 26 and Highway 4 corridors. The Board of Supervisors also approved a renewed agreement with Manteca District Ambulance for November 1, 2021 to October 31, 2026.

ALS First Response services are provided by Ripon Consolidated Fire District, the South San Joaquin County Fire Authority, and the Stockton Fire Department. Basic Life Support (BLS) services are provided by sixteen (16) fire districts and departments.



Ambulance Compliance Zones

Data Collection and System Evaluation

Data Collection System

The ability to meet the statutory requirement to “plan, implement, and evaluate an emergency medical services system..., consisting of an organized pattern of readiness and response services based on public and private agreements and operational procedures” relies heavily upon adopting and effectively using a system of data collection that can integrate information that comes from a variety of sources, and a variety of types. To successfully meet this goal, SJCEMSA uses a comprehensive system that collects data from hospitals, ambulance, and emergency dispatch centers. Ambulance and First Responders all use a patient care reporting system that is paperless and follows state and local requirements. The specialty care centers (Trauma, Stroke, STEMI) each function with unique data collection requirements. The emergency dispatch centers collect data that measures response time compliance of ambulance, First Responders, and internal dispatch center performance of dispatch personnel. All the data used to create this annual report comes from one or more of these data sources. The following visual representation shows an example of the data collection pathway for a patient that requires treatment at a STEMI Receiving Center (SRC).

STEMI Patient Data Pathway

Dispatch Data

1. Call received and data collected in emergency dispatch CAD
2. Call address, type of call, and level of emergency are determined and sent to closest ambulance unit Mobile CAD



On Scene Patient Care Report Data

1. Paramedic acquires 12-Lead EKG data
2. 12 Lead EKG electronically transmitted to STEMI receiving center
3. Paramedic completes patient care report (PCR)
4. PCR data is combined with pertinent CAD data and sent to STEMI receiving center (SRC)



Hospital Data

SRC compiles PCR and in-hospital data in Get With The Guidelines Coronary Artery Disease (GWTG-CAD)



STEMI Report Data

SJCEMSA retrieves the compiled data for review and quality improvement



STEMI Report

SJCEMSA completes monthly evaluation of data and includes in the CQI process

Staffing and Training

Paramedic Staffing

The nationwide staffing challenges of paramedics are well documented. While San Joaquin County has not completely avoided this problem, the efforts of the SJCEMSA in coordination with local ambulance providers under contract to provide 9-1-1 emergen-

cy ambulance response has been effective. Some of the successful efforts to mitigate the staffing challenges of paramedics have included aggressive recruitment, paramedic school scholarship programs, and efficient on-boarding of new paramedics.

Emergency Medical Responder Training

The SJCEMSA coordinated an EMR course that included students from the San Joaquin County Sheriff Boat Patrol, Disaster Healthcare Volunteer (DHV), and other fire departments and districts in San Joaquin County. The thirty-six hours of in-class

instruction was provided during a five-day period in June 2021 that included a minimum of sixteen (16) hours of online training. This course met the requirements for initial certification as a San Joaquin County Emergency Medical Responder.

LUCAS Device Deployment

San Joaquin County purchased and deployed 47 LUCAS 3 Chest Compression System devices (LUCAS Device) to equip first out fire apparatus operated by fire departments located in San Joaquin County in 2021. The LUCAS Device delivers high-quality chest compressions and is

to be used on adult cardiac arrest patients. The LUCAS Device provides hands-free CPR, allowing first responders to focus on other patient-care tasks while reducing both risk of provider injury and exposure to COVID-19 aerosolized droplets.

Prehospital Ventilator Deployment and Protocol Development

Starting December 6, 2021, SJCEMSA authorized the use of mechanical continuous positive airway pressure (CPAP) machines and mechanical ventilators. SJCEMSA purchased and deployed 38 Zoll Z ventilators to outfit emergency ambulances located

in San Joaquin County. These devices will expand the standard of care for patients requiring artificial respirations while reducing the risk for prehospital and hospital exposure to COVID-19 aerosolized droplets.

On-line Portal to Apply for Certifications, Accreditations, and Authorizations

On April 15, 2021, SJCEMSA launched an online application portal for certifications, accreditations, and authorizations. The ImageTrend software solution has increased efficiency of the application process for both the applicant and the SJCEMSA. Applicants will be able to submit an application with required documents and pay the fee using the online application portal. Applications that require

organization affiliation will also be completed using the online application portal process. In addition, the new online application portal provides a public look up feature to check the status of a certification, accreditation, or authorization. This public portal is a local addition to the State central registry offered for paramedic and EMT certifications look up.

Communications

On January 18, 2021, due to changes in legislation, the City of Stockton Emergency Communications Dispatch (ECD) began receiving requests for emergency ambulance services directly from the requesting party and providing Medical Priority Dispatch System (MPDS). This change occurred as part of a phased approach beginning with the inclusion of emergency medical calls for the City of Lodi followed by the City of Manteca on February 24, 2021, the City of Tracy on September 20, 2021,

and the City of Stockton in December of 2021. Stockton Fire ECD, along with the Valley Regional Emergency Communications Center (VRECC), receive and process San Joaquin County's 9-1-1 emergency medical calls for service. The successful transition of EMS communications in San Joaquin County aligning with recent legislative changes occurred due to the collaboration of SJCEMSA, VRECC, and Stockton Fire ECD.

Emergency Medical Dispatch Process

Emergency Medical Dispatch Centers (such as VRECC or the Stockton Fire ECD) receive 9-1-1 emergency calls from Public Safety Answering Points. The call is briefly interrogated by trained Emergency Medical Dispatchers to determine the nature and severity. Once the call is categorized into

one of 34 EMS determinant types (such as "breathing problems" or "fall") and ranked in one of the six acuity Levels severity categories (Alpha, Bravo, etc.), a dispatcher provides the closest appropriate First Responder and emergency ambulance units with the call information.

The emergency ambulance response time requirement for code 3 (red lights and sirens) calls to urban areas (which comprise 91% of all code 3 calls) is 7 minutes and 29 seconds. This requirement is more stringent than the California EMS Authority minimum guidelines and those of every other EMS system in the State.

Emergency Medical Dispatch and Ambulance Response Performance

After a call has been processed and EMD occurred, response times are tracked for performance. The overall dispatch process, EMD process, and response time is tracked for performance. In San Joaquin County, the dispatcher performance time and the emergency ambulance response time are

included in the overall response time compliance. This means the dispatcher performance (time the dispatcher takes to evaluate and assign the call to the ambulance) is included in the ambulance drive time to further demonstrate the true efficiency and speed of our EMS response times.

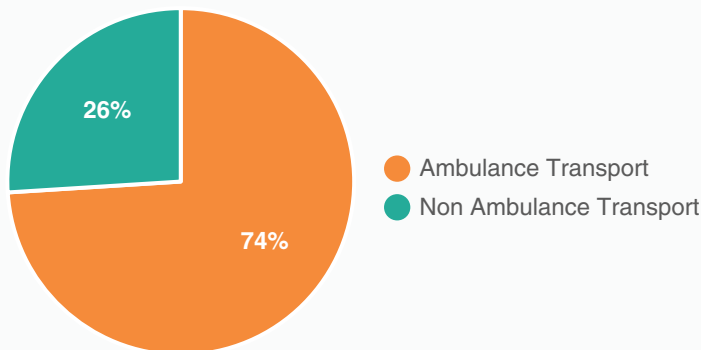
Response and Transport

A total of 87,898 total ambulance responses to 9-1-1 requests occurred in 2021, resulting in 65,070 ambulance transports of patients to acute care facilities in San Joaquin County, Sacramento County, and Stanislaus County.

9-1-1 Ambulance Responses (Arrived On-Scene) in 2021

NRLS and RLS	Zone X	Zone F	Zone D	Zone E	Total
NRLS & RLS Responses	74,505	1,115	10,646	1,632	87,898
Percent with RLS Response	64.89%	67.98%	68.01%	67.71%	65.36%
Percent with NRLS Response	35.11%	32.02%	31.98%	37.09%	32.28%

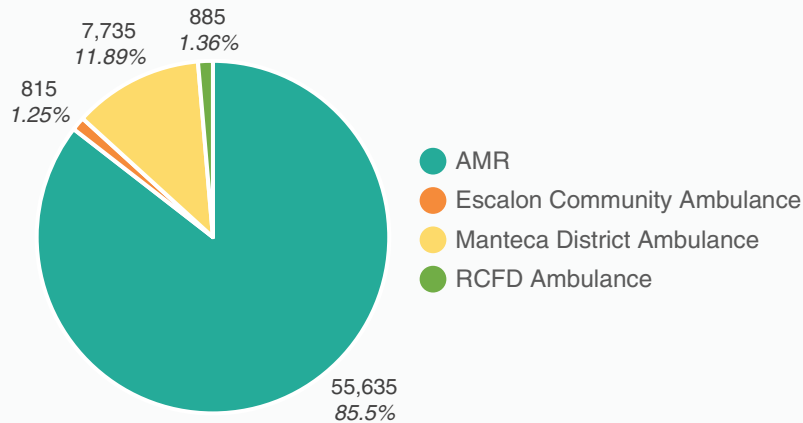
Percent of Ambulance Responses Resulting in a Patient Transported by Ambulance in 2021



Each of the four ambulance response zones in San Joaquin County are served by a primary provider. The table below shows that most ambulance patients are transported by each zone's primary provider, and also shows the number of times ambulance patients are transported by another (non-primary) provider that was the most appropriate resource due to proximity to the call.

Ambulance Zones by Ambulance Providers	Number of Ambulance Transports	Percent
Zone X – AMR Zone	55,658	N/A
AMR	55,334	99.42%
Manteca District Ambulance	319	0.57%
Escalon Community Ambulance	5	0.01%
Zone F – Escalon Community Ambulance Zone	794	N/A
Escalon Community Ambulance	688	86.65%
Manteca District Ambulance	69	8.69%
AMR	23	2.90%
RCFD Ambulance	14	1.76%
Zone D - Manteca District Ambulance Zone	7,599	N/A
Manteca District Ambulance	7,227	95.10%
AMR	256	3.37%
RCFD Ambulance	67	0.88%
Escalon Community Ambulance	49	0.64%
Zone E - RCFD Ambulance	1,019	N/A
RCFD Ambulance	804	78.90%
Manteca District Ambulance	120	11.78%
Escalon Community Ambulance	73	7.16%
AMR	22	2.16%
Grand Total	65,070	N/A

Transports by Ambulance Provider in 2021



First Responder Responses in 2021

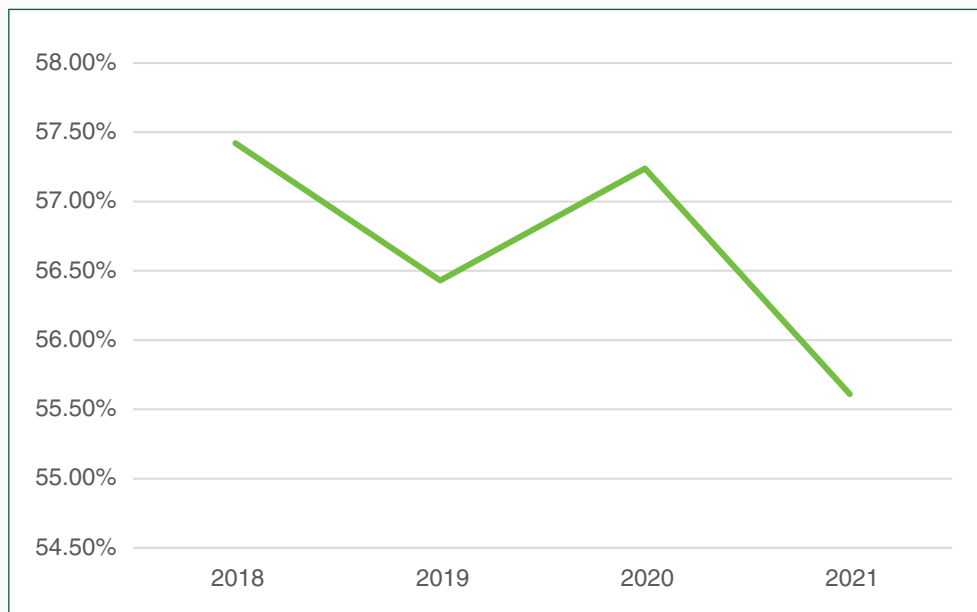
Fire Department or District	EMS Responses	Arrived On-Scene	Cancelled Enroute
Clements Fire District	190	158	32
Collegeville Fire District	109	64	45
Escalon Fire District	831	725	106
Farmington Fire District	169	151	18
French Camp-McKinley Fire District	871	626	245
Lathrop-Manteca Fire District	2,954	2,243	711
Liberty Fire District	201	171	30
Linden Peters Fire District	492	420	72
Lodi Fire Department	5,513	4,660	853
Manteca Fire Department	7,744	6,521	1,223
Mokelumne Fire District	545	453	92
Montezuma Fire District	580	488	92
Mountain House Fire Department	514	453	61
Ripon Consolidated Fire District	1,330	1,131	199
Stockton Fire Department	33,610	23,337	10,273
South San Joaquin County Fire Authority	7,832	6,113	1,719
Thornton Fire District	747	575	172
Waterloo Morada Fire District	1,658	1,228	430
Woodbridge Fire District	1,304	1,000	304

Ambulance Patient Off-load Delays

Successful EMS systems implement policies that ensure adequate ambulance resources are available to respond to medical emergencies. Ambulances delayed in emergency departments awaiting transfer of patient care causes delays in return of EMS resources. To address this issue, effective January 1, 2016, the California Health and Safety Code, section 1797.120 required the State EMS Authority to “adopt a statewide methodology for the calculation and reporting by a local EMS agency of ambulance offload time” as a means of addressing the statewide patient offload delay problem. This resulted in the development of a measurement called

the Ambulance Patient Offload Time (APOT) and the adoption of the standard for hospitals to accept the transfer of patient care and move the patient to either a gurney or wheelchair no later than 20 minutes from the arrival of the ambulance patient in the emergency department. As shown in the chart below, the trend for meeting this standard since 2018 does not show improvement, with data combined from all hospitals in San Joaquin County only meeting the 20-minute standard slightly more than half the time. This is, in part, due to a 10% increase in transport volume between 2020 and 2021.

Combined Hospital APOT Performance within 20 Minutes from 2017 to 2020



Another performance metric used throughout the State is a determination of hospitals' 90th percentile APOT times (performing 90% of the time). In the table below, ten (10) percent of all APOTs exceed the time shown. Since St. Joseph's Medical Center and San Joaquin General Hospital receive a significantly larger volume of ambulance patients transports than other hospitals, their APOT times can affect the EMS system disproportionately.

90th Percentile APOT Time By Hospital in 2021

Hospital	Time
Adventist Health Lodi Memorial	0:33:36
Dameron Hospital Association	0:35:35
Doctors Hospital of Manteca	0:26:34
Kaiser Permanente, Manteca	0:32:54
San Joaquin General Hospital	0:43:25
St. Joseph's Medical Center of Stockton	0:40:20
Sutter Tracy Community Hospital	0:36:59

Mutual Aid Provided to Stanislaus County

Emergency ambulance response demands can vary dramatically within any given hour or day, and such demands may occasionally require that a county's EMS system seek assistance from a neighboring county (i.e., mutual aid). Because both counties share a significant border, such a relationship has historically existed between San Joaquin County and Stanislaus County. Clearly, the importance of mutual aid is beneficial to both counties. As shown in the table below, the number of mutual aid requests from Stanislaus County have increased during the last two years. Since the response areas of ECA and RCFD border Stanislaus County, these providers have borne the brunt of this additional challenge.

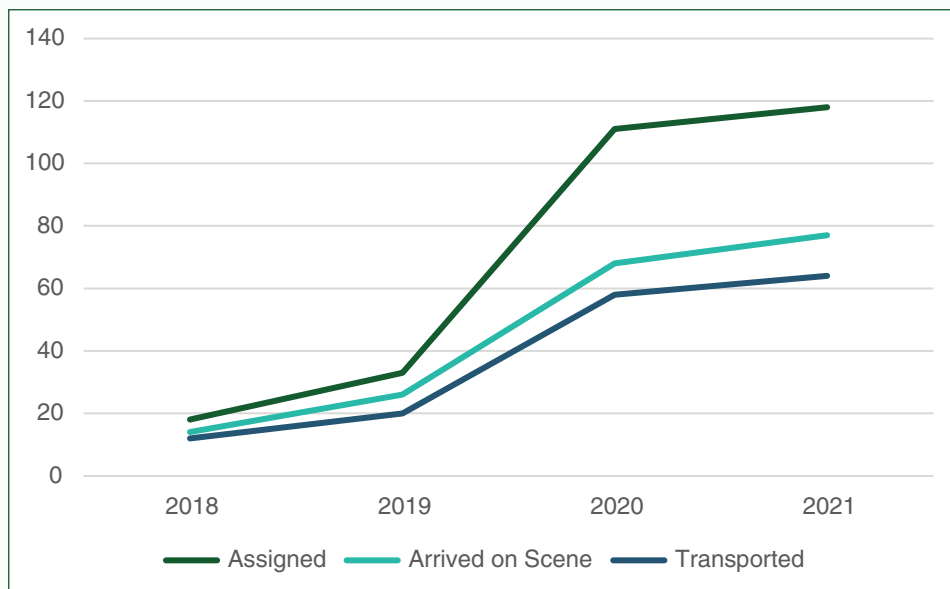
Emergency 9-1-1 Ambulance Mutual Aid from San Joaquin County to Stanislaus County for All Providers

Event	2018	2019	2020	2021
Assigned	18	33	111	118
Arrived on Scene	14	26	68	77
Transported	12	20	58	64

Emergency 9-1-1 Ambulance Mutual Aid from San Joaquin County to Stanislaus County for RCFD and Escalon

RCFD					Escalon	
Event	2018	2019	2020	2021	Event	2021
Assigned	3	12	75	73	Assigned	26
Arrived on Scene	1	8	43	42	Arrived on Scene	19
Transported	1	5	36	34	Transported	14

All Providers for 2018-2021

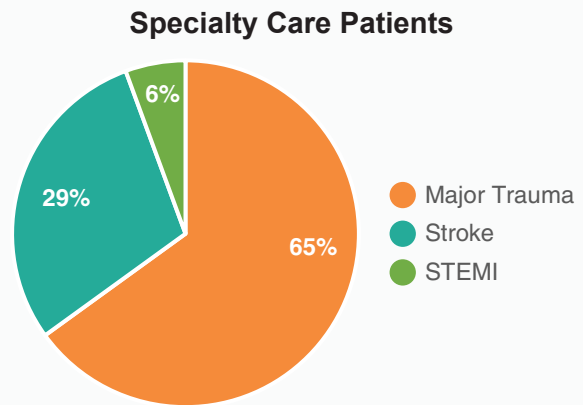


Hospital Facilities and Specialty Critical Care

Acute care facilities in San Joaquin County provide definitive medical care to patients transported by ambulance through the emergency 9-1-1 system. The SJCEMSA has designated hospitals in San Joaquin County to provide three types of specialty care services: 1. Major trauma patients (San Joaquin General Hospital); 2. Patients that require emergency cardiac catheterization (Dameron Hospital Association & St. Joseph’s Medical Center as STEMI Receiving Centers); and 3. Primary Stroke Centers (all hospitals). Most ambulance patients, (92.5%) do not require transport to a specialty care center. In compliance with SJCEMSA policies, of the 65,070 patients transported by ambulance, nearly 5,000 were transported to specialty care centers designated by the SJCEMSA during 2021.

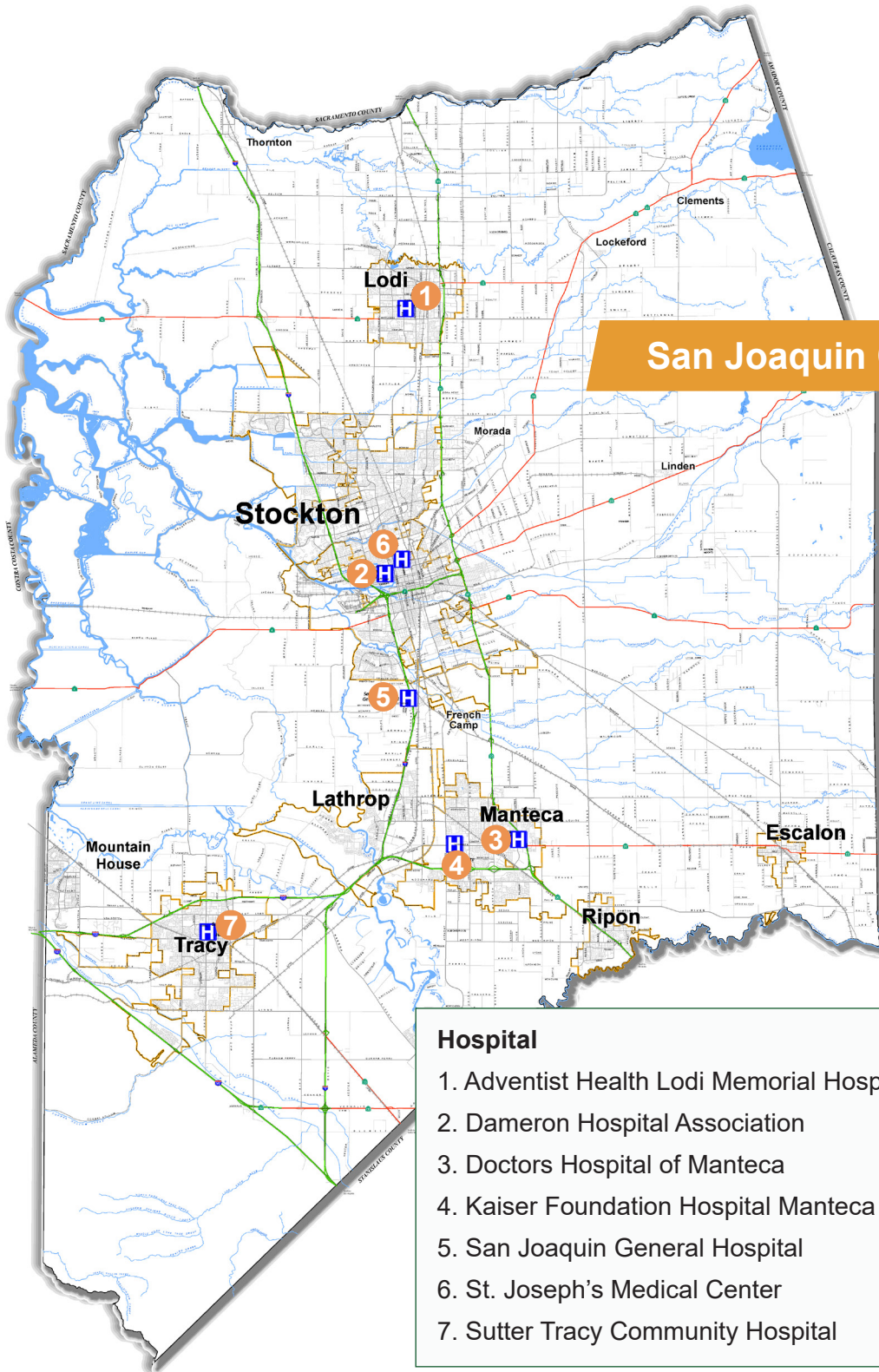
Percent of Patients Transported by Ambulance to Specialty Care Centers in 2021

Specialty	Number of Patients
Major Trauma	3,178
Stroke	1,435
STEMI	274
Total Specialty	4,887
Other	60,183
Grand Total	65,070



Ambulance Transports From the 9-1-1 System by Hospital in 2021

Hospital	Ambulance Transports from 9-1-1
Adventist Lodi Memorial Hospital	7,840
Dameron Hospital Association	6,373
Doctors Hospital Manteca	4,106
Kaiser Hospital Manteca	3,386
San Joaquin General Hospital	11,952
St Josephs Medical Center	25,175
Sutter Tracy Community Hospital	3,888
Hospitals In Stanislaus County	1,983
Hospitals In Sacramento County	360



San Joaquin County Hospitals

Hospital	Specialty
1. Adventist Health Lodi Memorial Hospital	Stroke
2. Dameron Hospital Association	Stroke, STEMI
3. Doctors Hospital of Manteca	Stroke
4. Kaiser Foundation Hospital Manteca	Stroke
5. San Joaquin General Hospital	Stroke, Trauma
6. St. Joseph's Medical Center	Stroke, STEMI
7. Sutter Tracy Community Hospital	Stroke

Major Trauma

On April 1, 2021, San Joaquin General Hospital (SJGH) was designated as a Level II Trauma Center by the SJCEMSA with expiration date of August 31, 2025. SJGH has successfully met all requirements necessary for Level II Trauma Center designation by incrementally adding specialty care services, infrastructure, equipment, and processes since the initial designation as a Level III Trauma Center in July 2013. The designation process included a site survey and verification by the American College of Surgeons (ACS) during August 2021.

A Level II Trauma Center provides immediate trauma surgery, emergency medicine, critical care, neurology, thoracic and other specialty services. Additionally, a Level II Trauma Center serves as a regional resource accepting complex cases from community hospitals and lower-level trauma centers. SJGH trauma services has an active Performance Improvement and Patient Safety Program (PIPS) with 3rd level of review. A multidisciplinary team meets once a month to discuss trauma related data and identify areas for improvement. During these meetings processes have been created to ensure best practice for all trauma patients, including review of operating suites, reintubation and return of patients to the ICU, pediatric radiologic exposure, substance abuse evaluation, and community safety outreach.

SJCEMSA coordinates an active Trauma Audit Committee (TAC) chaired by a practicing trauma surgeon

from the Level I trauma center at the UC Davis Medical Center. SJCEMSA TAC provides a fourth level of case review with participation of service provider physician directors and surgeons. An example of the importance of the work conducted by the San Joaquin County TAC was its pivotal role in identifying blood product usage and appropriate ratios to prevent wastage and support evidence-based practice, antibiotic timing of one hour to prevent infection and complications, and procurement policy creation.

Major trauma is any injury that has the potential to cause prolonged disability or death. Traumatic injury is the primary cause of death for people ages 1 to 44, regardless of gender, race, or economic status. The SJCEMSA is responsible for assessing, directing, developing, and implementing the county's trauma plan based upon local topography, demographics, population density, available healthcare resources, and funding. The data collected in this program is derived from a hospital-based trauma registry purchased by the SJCEMSA and developed to allow a review of aggregate data to identify variations in care and ultimately result in better treatment and patient care. Patients identified in the prehospital setting as major trauma patients meet criteria established in SJCEMSA policies using an assessment methodology designed to minimize elapsed on-scene times to no more than ten minutes.

Major trauma is any injury that has the potential to cause prolonged disability or death.

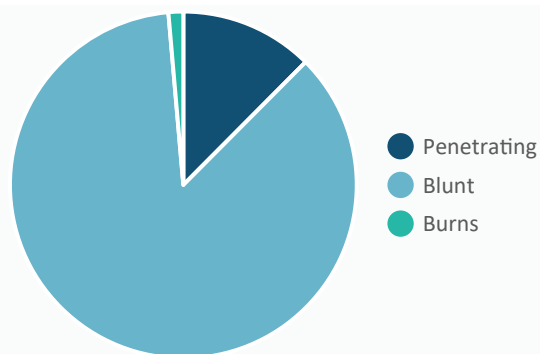
Major Trauma Patient Counts by Age in 2021

<12	13 to 20	21-35	36-45	46-55	56-65	66-75	>75
148	392	1,039	455	372	341	290	572

The types of major trauma are categorized as penetrating (typically stabbing or gunshots); blunt (typically motor vehicle accidents); and burns.

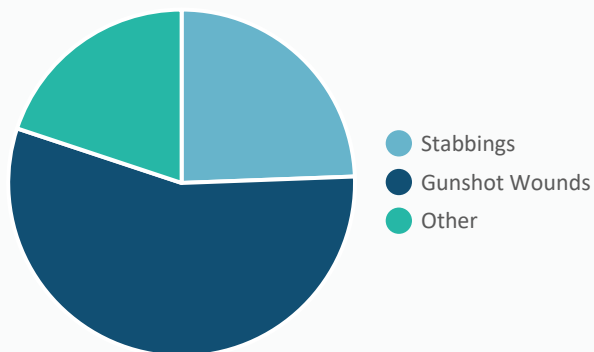
Patients Transported by Ambulance to a Trauma Center in 2021

Type of Injury	Count	Percent
Penetrating	422	12.46%
Blunt	3,140	86.15%
Burns	51	1.38%
Total	3,178	100.00%



Break Down of All Cases of Penetrating Trauma in 2021

Type	Count	Percent
Stabbings	103	24.41%
Gunshot Wounds	235	55.69%
Other	84	19.91%
Total	422	100.00%



Stroke

The less time from the onset of an acute stroke to the time a patient receives definitive care in the hospital setting, the better the patient outcome. For this reason, prehospital personnel are trained to rapidly

identify and transport suspected stroke patients and to pre-alert the closest stroke center of their impending arrival. This pre-alert or stroke alert saves precious minutes by alerting key hospital

staff and ensuring the availability of diagnostic tools (CT or MRI).

The tool used by paramedics to rapidly identify suspected stroke patients is a nationally recognized method called the Cincinnati Prehospital Stroke Scale (CPSS). However, because so many illnesses mimic a stroke (e.g., all causes of altered level of consciousness), such prehospital stroke scales

capture many non-stroke patients in the “suspected stroke” net. As found in most EMS systems, this purposeful “over-triage” of suspected stroke cases resulted in a higher ratio of prehospital patients suspected of having stroke compared to those that were diagnosed as having stroke following an in-hospital CT scan or MRI.

Patients with End Diagnosis of Stroke in 2021

Suspected / Diagnosed	Count
Number of Suspected Strokes per EMS (CPSS)	1,435
Number of Patients with End Diagnosis of Stroke (CT or MRI)	671
Ratio of Overtriage	2.14 : 1

Despite the use of comprehensive stroke criteria to identify stroke patients, the confounding nature of stroke symptoms and the fact that prehospital stroke scales rely heavily upon a patient’s ability to respond to direct questions, many cases of stroke are missed by prehospital personnel. In 2021, of the 671 patients transported by ambulance with an end diagnosis of stroke, only 54.7% of those patients

were identified as suspected stroke patients in the prehospital setting. Subsequently, hospitals did not receive a stroke alert for 45.3% of stroke patients prior to arrival. Such a pattern is typical nation-wide and is unlikely to change in the absence of new technology that provides prehospital personnel with diagnostic abilities as effective as in-hospital based CT scans.

Patients Transported by Ambulance with Stroke Diagnosis in 2021

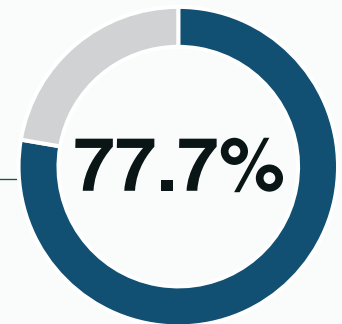
Suspected / Diagnosed	Count
Number of Patients with End Diagnosis of Stroke at Hospital	671
Number of Patients Suspected of Having a Stroke by EMS	367

The American Heart Association recommends that EMS systems adopt the goal of having prehospital personnel provide hospitals with pre-alert of suspected stroke patients at least 75% of the time. Stroke systems of care also emphasize the importance of determining and documenting the time

that a patient was last known to be well (since the in-hospital treatment of strokes depend upon this information). As shown below, prehospital personnel provided pre-alert 77.7% of the time and documented Last Known Well Time (LKWT) 89% of the time during 2021.

Summary of Prehospital Stroke Identification Performance in 2020

Suspected / Pre-alert	Count	Percent
Number of Patients Suspected of Having a Stroke by EMS	367	N/A
Patients for Whom EMS Provided Hospital Pre-alert	284	77.7%
Patients for Whom EMS Provided Documented Last Known Well Time (LKWT)	328	89.4%



The examples in the table below of Stroke CQI Processes measured in 2021 are consistent with the goal to continually track (and as necessary) work to improve the speed at which seriously ill patients receive appropriate medical care. The average elapsed times are examples of a positive result following the establishment of goals and coordination

of training by the SJCEMSA in cooperation with pre-hospital providers and primary stroke centers. Only through constant effort and a team approach can the challenges inherent in accomplishing the necessary steps to assess, package, care for and navigate patients through each process be met.

Stroke CQI Processes Measured in 2020	Average Elapsed Time
Elapsed Time from Ambulance Arrival at Patient to Time Patient Transported by Ambulance	0:10:14
Elapsed Time from Arrival at Hospital to Arrival at Radiology (CT Scan)	0:10:41
Elapsed Time from EMS Arrival at Patient to Arrival at Radiology (CT Scan)	0:35:00

STEMI

SJCEMSA received the American Heart Association's Mission: Lifeline® EMS Gold Plus Achievement Award for the second consecutive year related to specific quality improvement measures to treat patients who suffer severe heart attacks for 2021. The American Heart Association's Mission: Lifeline program helps reduce barriers to prompt treatment for heart attacks – starting from when 9-1-1 is called, to EMS transport and continuing through hospital treatment and discharge. Optimal care for heart attack patients takes coordination between the individual hospital, EMS and healthcare system. Program participants apply for the award recognition by demonstrating how their organization has committed to improving quality care for STEMI patients.

An ST-Elevation Myocardial Infarction (STEMI) is a very serious type of heart attack during which one of the heart's major arteries (that supplies oxygen and nutrient-rich blood to the heart muscle) is blocked. The two (2) hospitals designated by the SJCEMSA as STEMI receiving centers in San Joaquin County are Dameron Hospital Association and St. Joseph's Medical Center. These hospitals submit data that allows the SJCEMSA to measure key metrics pertaining to successful performance in both prehospital and in-hospital setting. Because successful patient outcomes rely upon the skill of medical practitioners to rapidly and successfully provide a percutaneous

intervention (PCI) to stop the real time death of heart muscle, the measurement of outcomes and key elapsed time metrics are essential.

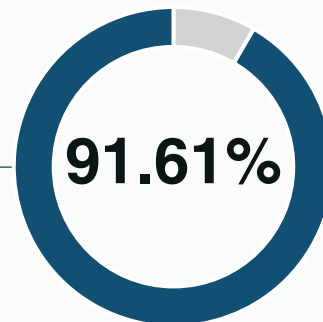
As shown below, Continuous Quality Improvement metrics related to elapsed time are routinely measured by SJCEMSA staff working with the STEMI Coordinators of both STEMI Receiving Centers in San Joaquin County. However, it is also important to emphasize the success in survival outcomes for patients that are identified as STEMI patients and transported by ambulance to either St. Joseph's Medical Center or Dameron Hospital Association during 2021.

It is important to note that the population of patients identified in prehospital setting as STEMI patients (274 in 2021) are captured using methods purposefully designed to avoid STEMI patient identification failures. This method resulted in an approximate 3:1 over triage of patients in 2021 with a total 84 patients found eligible to receive an emergency percutaneous intervention (PCI). The primary reason why many patients do not receive an emergency PCI is that a PCI is only an appropriate treatment for a very specific kind of cardiac problem. Many of the patients that do not receive a PCI require in-hospital cardiac care but are better served by medication or other procedures.

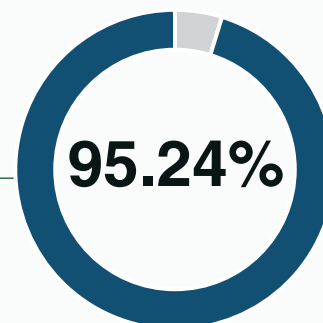
San Joaquin County EMS Agency received the American Heart Association's Mission: Lifeline® EMS Gold Plus Achievement Award for the second consecutive year.

STEMI Patient Survival during 2021

Transported / Discharged Alive	Counts	Percent
Total # of STEMI Patients Transported by Ambulance to STEMI Receiving Centers in San Joaquin County	274	N/A
Number of Patients Discharged Alive	251	91.61%



Transported / Discharged Alive	Counts	Percent
Total # of STEMI Patients Transported by Ambulance to STEMI Receiving Centers in San Joaquin County that Received Percutaneous Intervention (Balloon)	84	100.00%
Number of Patients Discharged Alive	80	95.24%



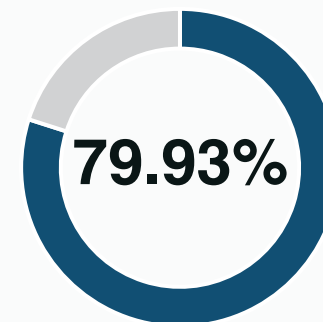
As previously discussed in the topics of Major Trauma and Stroke, the speed at which patients are assessed and treated are important metrics in both the prehospital and in-hospital settings. In the case of STEMI, the sooner that patients are assessed and enroute to a hospital, the sooner that they will receive definitive cardiac care.

STEMI Continuous Quality Improvement Elapsed Time Metrics in 2021

Cases of Elapsed On-Scene Time < 15 Minutes

< 15 Minutes	Total	Percent < 15 Min
219	274	79.93%*

*AHA Goal > 75%



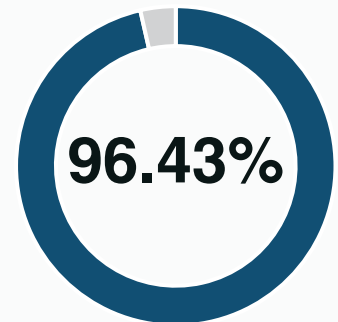
* According to data collected by the American Heart Association, the on-scene time performance in San Joaquin County is superior to the average elapsed on-scene times in other STEMI programs in California and the United States

The key in-hospital metric that measures speed and also directly correlates to patient survivability in whether patients receive a PCI within 90 minutes of arrival at the hospital. As shown below, STEMI Receiving Centers (SRCs) in San Joaquin County exceed AHA’s goal of meeting this metric 75% of the time.

Percent of STEMI Cases with Elapsed Time of ≤ 90 Min from Arrival at Hospital (SRC) to receiving PCI (balloon device)

≤ 90 Min	Total	Percent
81	84	96.43%

(AHA Goal > 75%)

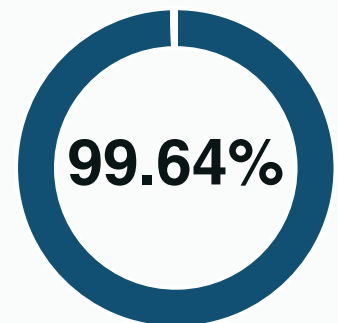


The patient care provided to suspected STEMI patients relies upon the use of 12-lead EKGs in the prehospital setting. As shown in the table below, paramedics in San Joaquin County understand that the 12-lead EKG is an essential diagnostic tool to identify STEMI patients.

Percent of STEMI Cases That EMS Performed EKG in 2021

Successful	Total	Percent
273	274	99.64%

(AHA Goal > 75%)



As circumstances allow, paramedics transmit the findings of their EKG from the prehospital setting to the SRC which is reviewed by a physician to confirm the diagnosis. Upon receipt of a notification from the prehospital setting of the impending arrival of a STEMI patient, the SRC can prepare to receive a STEMI patient and more quickly perform a lifesaving PCI.

Disaster Medical Response

The SJCEMSA's disaster medical response activities in 2021 continued to focus on the coordination of agencies involved in all aspects of medical care within San Joaquin County in response to the

COVID-19 pandemic and to maintain SJCEMSA's regulatory role while maintaining the flexibility to meet the challenges to the individual responders and organizations that comprise the EMS system.

Growth and Importance of the San Joaquin County Healthcare Coalition

The efforts to coordinate agencies that provide medical care are clearly demonstrated by the activities of the San Joaquin County Healthcare Coalition.

The 2013 Boston Marathon Bombing, 2012 Hurricane Sandy and the 2009 H1N1 influenza pandemic, were clear examples of the importance of having healthcare systems organized and able to effectively respond to a variety of potential threats. In response, the U.S. Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response (ASPR) and the California Department of Public Health (CDPH) provided local healthcare system preparedness funding through the Hospital Preparedness Program (HPP). In January 2012 ASPR released the National Guidance for Healthcare System Preparedness and the eight Healthcare Preparedness Capabilities: Healthcare System Preparedness, Healthcare System Recovery, Emergency Operations Coordination, Fatality Management, Information Sharing, Medical Surge, Responder Safety and Health, and Volunteer Management.

On January 31, 2014, the SJCEMSA developed the "San Joaquin Operational Area Healthcare Coalition Governance" document as a template to improve and sustain the healthcare preparedness capabilities within San Joaquin County. At the core of this document is the development of three Healthcare Coalition Functional Groups:

- Medical/Health Multi-Agency Coordination Group (Med MAC)
- Emergency Preparedness Committee (EPC)
- Healthcare Coalition Memorandum of Understanding Signatories (Healthcare Coalition)

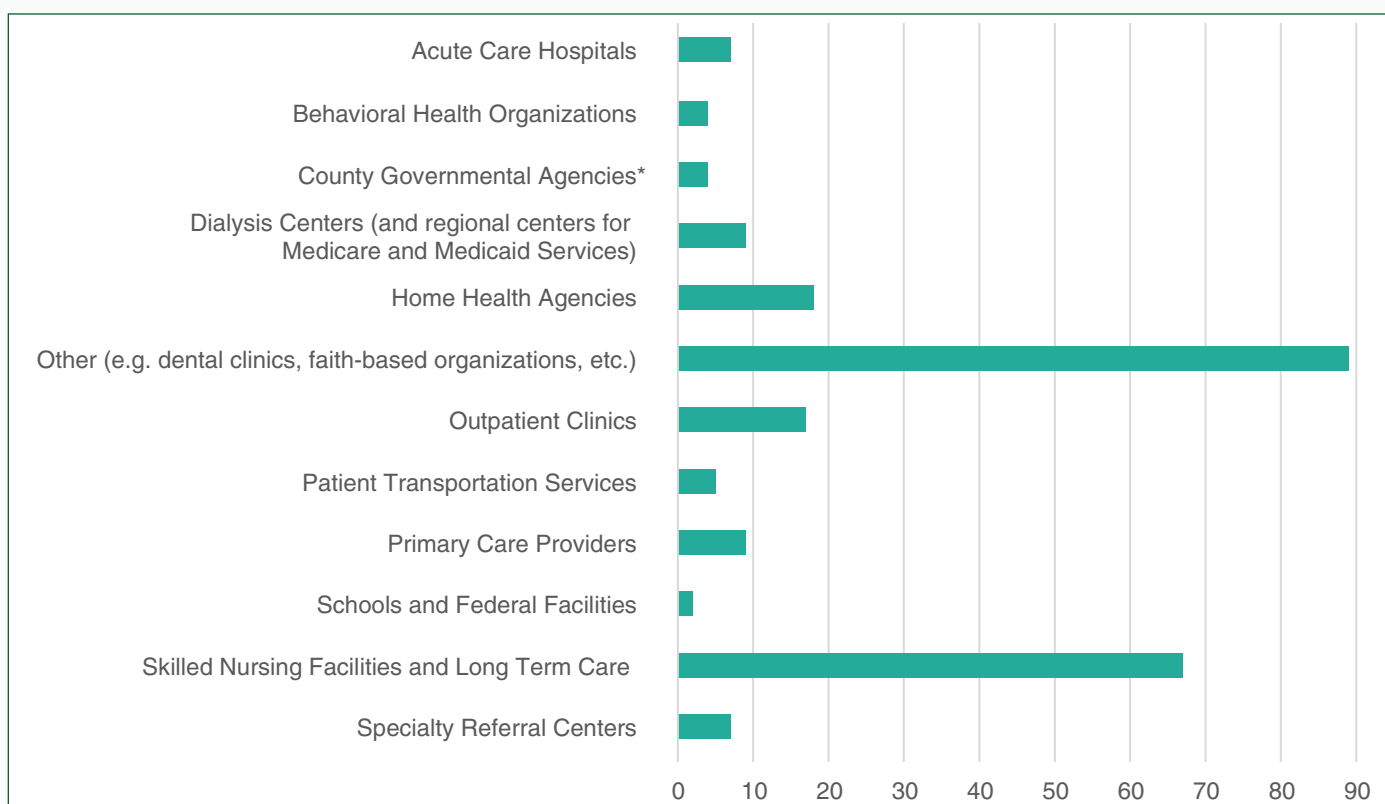
While each of these groups played important roles that contributed to healthcare preparedness and response during the COVID-19 pandemic, the activities and dramatic growth of the Healthcare Coalition is noteworthy. The value of Healthcare Coalition membership was clearly demonstrated during the pandemic as the SJCEMSA coordinated the sharing of personnel, equipment, supplies, pharmaceuticals, and information as specified in the Healthcare Coalition MOU.

Healthcare Coalition Membership and Benefits During COVID-19 Pandemic

During the first few years following the inception of the Healthcare Coalition at the end of 2014, membership slowly rose to sixty (60) and was comprised primarily of acute care hospitals, public health agencies, emergency management agencies and skilled nursing facilities. However, because of the impact

of COVID-19 and the increased outreach by the SJCEMSA, membership in the Healthcare Coalition jumped almost four-fold to 222 members in 2020 and finally to 238 members in 2021. Membership organization types are shown in the chart below:

San Joaquin County Healthcare Coalition Membership in 2021



* County Governmental Agencies are County Public Health & Emergency Management Agencies

As described in the Medical/Health Multi-Agency Coordination Group (Med Mac) Plan, the SJCEMSA facilitated meetings to keep members informed about the status of patient surge and strategies to address patient surge challenges as they impacted

medical facilities in San Joaquin County.

While all the benefits of information sharing for Healthcare Coalition members cannot be easily tallied, the benefits enjoyed by Healthcare Coalition

members is clearly demonstrated by the number of requests for resources that were processed by the SJCEMSA at the request of Healthcare Coalition members. There were 1,419 requests for resources that resulted in the processing of 2,229,298 items that primarily consisted of PPE, staffing, and COVID-19 test kits.

SJCEMSA's Regulatory Response to the COVID-19 Pandemic

Effective **January 7, 2021**, SJCEMSA authorized all licensed general acute care hospitals in San Joaquin County to employ and use SJCEMSA accredited paramedics and emergency medical technicians (EMTs) within their respective scope of practice. This authorization will remain effective until the end of the current state of emergency unless rescinded earlier by SJCEMSA. Each general acute care hospital may directly employ certified EMTs and SJCEMSA accredited paramedics.

On **January 8, 2021**, SJCEMSA requested and received approval for accredited paramedics to participate in COVID-19 vaccination programs approved by San Joaquin County Public Health Services and enrolled in the California COVID-19 Vaccination Program (CalVax) and administer influenza and COVID-19 vaccinations.

On **January 12, 2021**, SJCEMSA requested and received approval for certified EMTs who are affiliat-

ed with authorized San Joaquin County providers to participate in COVID-19 vaccination programs approved by San Joaquin County Public Health Services and enrolled in CalVax to administer COVID-19 vaccinations in accordance with SJCEMSA policies and procedures.

On **January 12, 2021**, SJCEMSA authorized General Acute Care Hospitals to hire paramedics and EMTs for Hospital Staffing as outlined in SJCEMSA Policy Memorandum No. 2021-01 (Revised): Coronavirus (COVID-19) Authorization for General Acute Care Hospitals to Employ and Use Prehospital Care Personnel.

During a six week period in the **summer of 2021**, the SJCEMSA Medical Health Operational Area Coordinator (MHOAC) activated an ambulance strike team to assist the San Joaquin County Department of Public Health to administer COVID-19 vaccines to 639 home-bound individuals.

Only three counties participated in ambulance strike team missions in California (Los Angeles, Marin, and San Joaquin). San Joaquin County provided the most vaccines using ambulance strike teams to homebound individuals than any other county.

Marin County:	165
LA County:	502
SJ County:	639

While it was important that the SJCEMSA obtained approval to train and use paramedics and EMTs to administer influenza and COVID-19 vaccinations, success of this program relied upon the fact that personnel from both ambulance and first responder agencies met the challenge, as shown in the table below:

EMS System Participants Who Trained and Participated in Vaccination Events

Organization	EMTs Trained	Paramedics Trained	Participated in Events	How Many Vaccinated (approx)
South San Joaquin County Fire Authority	5	20	Yes	2,000-3,000
Stockton Fire Department	73	70	Yes	400
Ripon Consolidated Fire District	6	9	Yes	360
Lodi Fire Department	42	0	Yes	Unknown
AMR	0	5	Yes	100
Lathrop Manteca Fire District	65	3	Yes	Unknown

During 2021, as the Medical Health Operational Area Coordinator (MHOAC) responsible for determining equitable distribution of therapeutics within San Joaquin County, made available through allocations from the California Department of Public Health (CDPH) (based on population and positivity rates). The calculations required for distribution were particularly challenging due to national shortages of these therapeutics. The U.S. Department of Health and Human Services (HHS) allocated courses each week based on COVID-19 case counts and hospitalizations for the preceding week. CDPH then allo-

cated product to each local jurisdiction's "MHOAC" based on numbers of new COVID-19 cases and COVID-19 hospital admissions, both expressed as a 7-day average. All hospitals and clinics were eligible to participate in receiving and administering monoclonal antibodies.

SJCEMSA was available to assist hospitals in obtaining EMT and paramedic staffing locally and through the medical/health mutual aid system as specified in Policy Memo 2020-34 Coronavirus (COVID-19) Hospital Staffing Resource Requests.

In Conclusion

Success in meeting the demands made necessary by the challenges unique to 2021 required a high degree of cooperation, resilience, flexibility, and determination from all EMS system participants. In 2022, the SJCEMSA intends to focus on such key areas as EMS policy review and development and EMT and Paramedic Training program development.