CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Memorandum

TO: PUBLIC SAFETY, FINANCE AND STRATEGIC SUPPORT COMMITTEE

FROM: Robert Sapien, Jr.

SUBJECT: **ANNUAL FIRE DEPARTMENT EMERGENCY MEDICAL SERVICES REPORT**

DATE: April 5, 2023

Approved  Date 4/11/2023

RECOMMENDATION

Accept the annual report on Fire Department Emergency Medical Services delivery including Emergency Medical Services Dispatch, Emergency Response, and integration of services with the County Emergency Medical Services system.

BACKGROUND

The San José Fire Department (Department) mission is to protect life, property, and the environment through prevention and response. One facet of the Department's all-hazards response is emergency medical first response. Fire-based first responder emergency medical services are a critical component to prehospital care because firefighters, solely, are trained and equipped to engage in hazardous environments, effect rescues, suppress fires, decontaminate patients exposed to hazardous materials, and other scene mitigations, all towards accessing patients and initiating care at the earliest possible moment.

First Responders

All sworn personnel are trained and certified to the emergency medical technician-defibrillation (EMT-D) level to provide Basic Life Support (BLS) patient care which includes cardiopulmonary resuscitation (CPR) and first-aid skills. Other practices within the BLS scope include chest compressions, administering oxygen, securing basic airways, utilization of Automatic External Defibrillators (AEDs), spinal motion restriction, bleeding control, emergency childbirth with newborn resuscitation, and conducting fundamental patient assessment.

In 1995, the Department began providing Advanced Life Support (ALS) services, quickly expanding citywide by assignment of a Firefighter/Paramedic on every frontline company. Paramedics (EMT-P) are trained and equipped to deliver a broader scope of practice than EMTs including endotracheal intubation, establishing intravenous (IV) lines, administering

pain/therapeutic medications, conducting electrocardiogram (ECG) analysis, synchronized cardioversion, manual defibrillation, and differential diagnosis.

The Department provides first-responder patient care through an agreement with Santa Clara County under *California Health and Safety Code § 1797.178, 1797.204, and 1798*, which establishes the Santa Clara County Emergency Medical Services Agency (County EMSA) as being responsible for system coordination, medical oversight, and support of the delivery for all emergency medical services (EMS) within Santa Clara County. The *911 Emergency Medical Services Provider Agreement between City of San José and the County of Santa Clara EMS Agency*[1] (911 EMS Provider Agreement) outlines the cooperation between the Department, County EMSA, the contracted County ambulance provider, and other stakeholders in assuring timely and efficient response to emergency medical incidents while providing the highest quality of patient care. A typical medical emergency within San José involves a dual response of both one Fire Department frontline company with ALS/Paramedic-level capabilities and one County ambulance that provides patient transport to definitive care at one of the emergency departments (ED) at a local hospital. Once Department personnel arrive on scene, they provide patient assessment and initial treatments, when the ambulance arrives on scene, patient care is formally transferred to the ambulance paramedic and the fire crews assist with patient packaging and loading for transport. In circumstances where the patient is in critical condition, the responding Firefighter/Paramedic will ride in the transport ambulance, supporting patient care until arrival at the hospital ED.

California Health and Safety Code § Division 2.5 authorizes each county to establish a local EMS agency (LEMSA) to oversee the delivery of EMS within that geographic area[2]. This level of governance allows for local control of EMS. Santa Clara County EMSA is the designated entity that provides essential functions such as:

- Carrying out regulations relative to EMS systems (the State EMS Agency promulgates regulations and LEMSAs carry out those regulations)
- Certifying, accrediting, and authorizing EMS field personnel
- Developing/approving medical treatment protocols and policies for local EMS service providers (i.e., EMTs, paramedics, dispatchers)
- Ensuring emergency ambulance services (Rural Metro/AMR, a private for-profit company, is contracted by Santa Clara County to provide 9-1-1 ambulance services)

The 911 Medical Services Provider Agreement between Santa Clara County EMSA and the City of San José includes a provision for "First Responder Funding" sourced from ambulance transport revenues. To receive first responder funding, the Department must meet performance criteria specified in the agreement including response time performance. Fiscal Year 2021-2022 performance resulted in approximately $2.9 million in first responder funding. The cost incurred

[1] https://emsagency.sccgov.org/sites/g/files/exjcpb266/files/General/CityofSanJoseEMSAgreementAmendments20181231.pdf
[2] https://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=HSC&division=2.5.&title=&part=&chapter=4.&article=

by the Department to operate ALS-level EMS services was approximately $6.8 million, with a 43% cost recovery realized from first responder funding in Fiscal Year 2021-2022.

Medical Priority Dispatch Services

9-1-1 calls are first answered by the Police Communications Dispatch, the primary public safety answering point (PSAP). Calls for fire services are transferred to Fire Communications, a secondary PSAP. Fire Communications Public Safety Radio Dispatchers (PSRD) are trained as Emergency Medical Dispatchers and play a key role in providing lifesaving instructions over the phone while first responders are en route to the emergency location. Pre-arrival instructions include bleeding control, tourniquet application, burn treatment, childbirth assistance, abdominal thrusts (commonly known as the Heimlich maneuver), high-performance CPR, and other life-saving actions. These interventions can be critical to patient survival. For example, pre-arrival instruction directing high-performance CPR is supported by study findings indicating a doubled likelihood of survival[3] when CPR is initiated prior to EMS responder arrival. PSRDs utilize the International Academies of Emergency Dispatch (IAED) Medical Priority Dispatch System[4] (MPDS), asking callers a series of triage questions to determine the nature of the emergency to determine resource needs while continuing to provide the caller with potentially life-saving instructions. Based on the triage, PSRDs will accurately dispatch the closest available responders to provide emergency medical services.

The Department's Fire Communications Division performs monthly quality assurance audits to determine compliance with call-taking protocols. In Fiscal Year 2021-2022, the Division maintained 94.42% compliance in utilizing MPDS protocols whereas the average for all Accredited Centers of Excellence[5] worldwide performed at 88.45% compliance respectively.

Fire Department Ambulance Transport

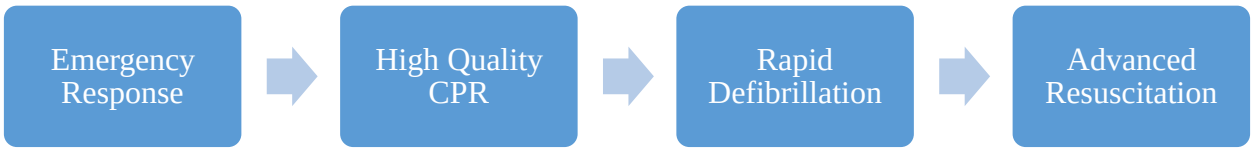
The Department deploys three Rescue Medics (RM) staffed with one Fire Engineer and one Firefighter/Paramedic. These RMs can provide routine emergency medical response and patient transport as part of the 911 EMS Provider Agreement in four specific scenarios:

- When immediate lifesaving transportation is required
- Material failure of the contracted ambulance provider when emergency transport is required
- Delay of the contracted ambulance provider when emergency transport is required
- Upon approval from the County EMS Agency Duty Chief

[3] https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.118.038179
[4] https://www.emergencydispatch.org/what-we-do/emergency-priority-dispatch-system/medical-protocol
[5] https://www.emergencydispatch.org/what-we-do/accreditation

Public Access Defibrillators

Heart disease is the leading cause of death in the United States with nearly 700,000 cardiac-related deaths in 2020[6]. Survival from cardiac arrest doubles when a bystander utilizes an Automated External Defibrillator (AED) before first responders arrive[7]. The American Heart Association uses the term "Chain of Survival" to describe the initial processes that are required for an individual to survive cardiac arrest:



In 2007, the City of San José adopted the goal of becoming a "Heart Safe City" by improving cardiac safety for the community[8]. One of the methods recognized to accomplish this goal was the establishment and promotion of a Public Access Defibrillator (PAD) program throughout City of San José facilities. When the PAD program was initiated, there were 19 AEDs at different City-owned buildings. The Department provided oversight on the inspection, maintenance, and training of this program – to which there are now over 246 AEDs available across 96 facilities. The Department continues these efforts further to follow State and local regulations by requiring City employees to be trained on how to perform CPR and use the AED.

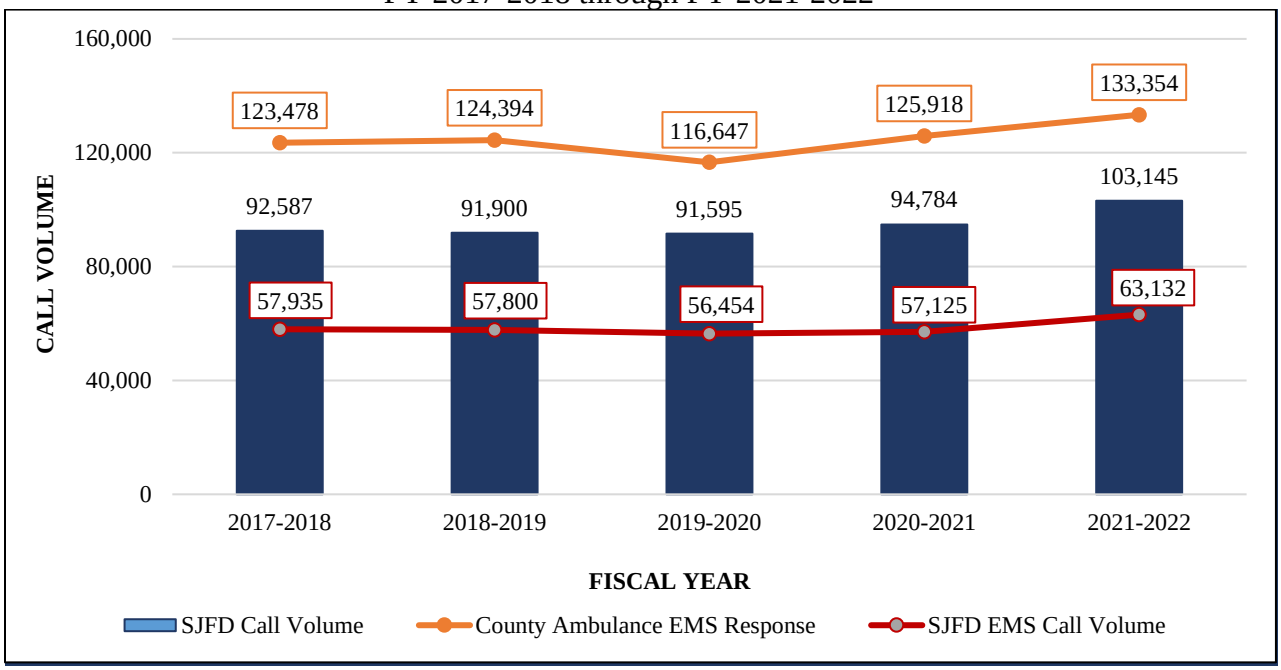
ANALYSIS

Increasing EMS Call Volume

The Department's call volume has increased substantially from Fiscal Year 2020-2021 to Fiscal Year 2021-2022, as reported in the annual *Fire Department Call Volume Status Report*[9] presented to the Public Safety, Finance and Strategic Support (PSFSS) Committee on March 17, 2023. From Fiscal Year 2017-2018 through Fiscal Year 2020-2021, the Department's EMS-related call volume had remained relatively stable within 1% to 2% overall change year-over-year.

[6] https://www.cdc.gov/heartdisease/facts.htm
[7] https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.117.029067
[8] http://www3.sanjoseca.gov/clerk/CommitteeAgenda/PSFSS/092007/PS092007_06.pdf
[9] https://sanjose.legistar.com/View.ashx?M=F&ID=11705140&GUID=83284FDA-A17A-4B52-864A-AD6B50816F94

Chart 1: City Call Volume and Countywide Ambulance Call Volume
FY 2017-2018 through FY 2021-2022



From Fiscal Year 2020-2021 to Fiscal Year 2021-2022, Department EMS call volume increased by over 10%. This increase in demand for EMS services within San José and the County can be attributed to several factors:

- Aging Population: According to the *California State Plan on Aging 2017-2021*[10], the number of County residents above age 65 will increase 99% from 277,700 in 2010 to 553,409 in 2030, and County residents aged 85 and older are estimated to increase 85% from 28,039 in 2010 to 51,772 in 2030. Those 85 and older have a significantly higher rate of severe chronic health conditions and functional limitations that result in the need for more health and supportive services. The rapid growth of this age group has many implications for the healthcare sector.

- Increased Homelessness: The *2022 Homeless Count and Survey Comprehensive Report*[11] determined that the number of unhoused individuals within San José has increased from 4,350 in 2017 to 6,650 in 2022, an increase of 53% over that five-year span. In that same survey, unhoused individuals self-reported several health conditions that may affect their ability to maintain housing or employment:

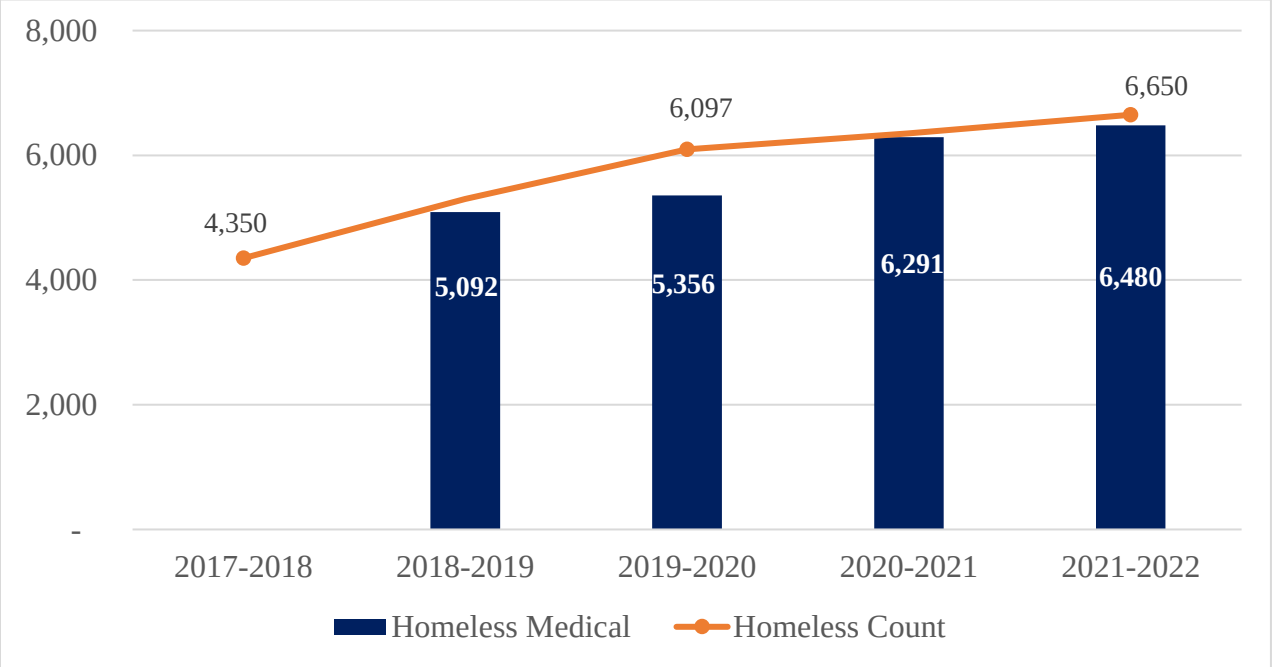
    - Psychiatric/Emotional Conditions (41%)
    - Alcohol & Drug Use (40%)
    - PTSD (32%)

[10] https://aging.ca.gov/download.ashx?lE0rcNUV0zbUy1iwYmWKng%3d%3d
[11] https://www.sanjoseca.gov/home/showpublisheddocument/92524/638054026112130000

- Chronic Health Condition (29%)
- Physical Disability (23%)
- Traumatic Brain Injury (12%)
- HIV/AIDS-Related Illness (2%)

These health conditions could lead to an increase in the utilization of 9-1-1 EMS resources as many unhoused individuals cannot afford healthcare through typical insurance providers. Chart 2 provides a comparison between the number of unhoused residents in San José and the number of EMS responses for the homeless by Fiscal Year. As the number of homeless in San José increases so does the number of EMS responses for the homeless. In Fiscal Year 2021-2022, responses for homeless medical emergencies accounted for 10% of total EMS responses. As high-density housing increases in development, homeless encampments or temporary housing locations become more concentrated, and mass transportation becomes more readily available, impacts will likely continue to be unbalanced across fire station response areas, further straining resource availability.

Chart 2: EMS Responses and San José Unhoused Population



Note: The Department began recording homeless response data beginning June 2018

The Department's Bureau of EMS and Training - EMS Division reviews electronic patient care reports that are completed after each patient contact. This data is used to track trends that could better define the sudden increase in EMS call volume. Between Fiscal Year 2020-2021 and Fiscal Year 2021-2022 two emerging patient impressions that account for the greatest increase in electronic patient care reports were 1) "Traumatic Injury" cases, which increased by 20%, and 2) cardiac-related issues such as "Chest Pain / Dysrhythmia / Hypertension", which increased by

19%. Together these two categories of patient impressions account for more than one-third of the increase in electronic patient care reports in this last Fiscal Year.

Chart 3: Major Observations on Patient Primary Impressions

	Department Provider's Primary Patient Impression	**FY 17-18**	**FY 18-19**	**FY 19-20**	**FY 20-21**	**FY 21-22**
1	Traumatic Injury	8,751	8,978	8,252	7,701	9,259
2	General Weakness	3,580	3,545	3,355	3,886	4,387
3	Respiratory Distress	2,940	3,291	3,476	3,807	4,201
4	Abdominal Pain / Problems	2,892	2,776	2,743	3,156	3,521
5	No Medical Complaint / Findings	3,849	3,839	3,648	3,194	3,171
6	Behavioral/Psychiatric Crisis / Excited Delirium	2,194	2,395	2,282	2,564	2,785
7	ALOC - (Not Hypoglycemia or Seizure)	2,193	2,082	2,274	2,591	2,617
8	Alcohol Intoxication / Overdose	2,375	2,436	2,411	2,274	2,488
9	Non-Traumatic Body Pain	1,764	2,234	2,132	2,315	2,473
10	Chest Pain / Dysrhythmia / Hypertension	2,046	2,027	1,965	1,861	2,210

The Department engages in EMS continuous quality improvement, data analysis, and advancement of initiatives to address particular challenges including increased service demand:

- Geriatric EMS Patients: In December 2022, the Department conducted mandatory training for all sworn personnel regarding proper protocol concerning geriatric EMS patients focusing on how to conduct patient assessments for older adults, age-related changes to body systems, and unique transport/movement considerations.

- Trauma Care: In December of 2022, the Department conducted mandatory training for all sworn personnel to address trauma-related patient care. The training focused on types of medication available for Firefighter/Paramedics to administer for pain relief, spinal motion restriction to protect any possible injuries to the neck or back, and prehospital trauma triage criteria with a focus on motor vehicle accidents. For trauma patients, the “Golden Hour” is a well-practiced benchmark of advanced EMS systems where the goal is to transport patients with head, thoracic or abdominal injuries to the operating room within the first hour of sustaining the injury. The Department tracks elapsed time for crews to perform initial extrication and treatment, but the metric for overall “Golden Hour” performance is incomplete due to ambulance data being proprietary and unavailable for interagency sharing.

- Advanced Cardiac Monitors & Defibrillators: In February 2023, the Department submitted a proposal for the Assistance to Firefighters Grant[12] through the Federal Emergency Management Agency (FEMA) to replace over half of the current inventory of LifePak 15 cardiac monitors which are used by Firefighter/Paramedics to conduct ECG analysis. These devices are critical for ALS providers to determine if a patient is suffering from a potential heart attack. These devices can deliver precise levels of electrical defibrillation for patients in cardiac arrest. The remaining inventory is scheduled for replacement utilizing the Department's Construction & Conveyance Tax funding.

- High-Performance "Pit Crew" CPR: The concept of High Performance or "Pit Crew" CPR encompasses several key concepts including coordinated communication amongst rescuers, CPR efficiency and choreography, and implementation of mechanical chest compression devices. In March 2022, the Department's EMS Division and Fire Communications Division sent personnel to attend the "Resuscitation Academy". The objective of this training was to increase survival from sudden cardiac arrests using public health data, academic medical research, and partnerships with non-government organizations, such as the American Heart Association. Participants were tasked with bringing back valuable knowledge and training to advance the Department's delivery of cardiopulmonary resuscitation CPR techniques, data collection methods, and analysis in an effort to continuously monitor and improve the quality of care.

- Return of Spontaneous Circulation Data: Return of Spontaneous Circulation (ROSC) is when the heart returns to a rhythm that sustains circulation and perfusion of the body after sudden cardiac arrest. It should be noted that ROSC does not definitively result in survival, it is simply the first of many steps that must be done to ensure that the patient survives and is neurologically intact. The Department monitors ROSC performance as it is displayed in Chart 4.

Chart 4: Return of Spontaneous Circulation Rates

	FY 17-18	**FY 18-19**	**FY 19-20**	**FY 20-21**	**FY 21-22**
Cardiac Arrest – Non-Traumatic	509	569	771	968	927
Cardiac Arrest - Traumatic	37	59	45	73	67
TOTAL CARDIAC ARREST	546	628	816	1041	994
Return of Spontaneous Circulation (ROSC)	204	254	201	250	234
ROSC Rate	37%	40%	25%	24%	24%

[12] https://www.fema.gov/grants/preparedness/firefighters

- AED Usage Prior to EMS Arrival: As stated previously in this memorandum, providing rapid defibrillation for a sudden cardiac arrest patient dramatically increases the probability of survival. The Department tracks the number of occurrences where an AED was utilized for a sudden cardiac arrest patient prior to the arrival of first responders as shown in Chart 5 and continues to increase AED availability throughout the community by managing the City PAD program.

Chart 5: AED Utilization on Sudden Cardiac Arrest Patients Prior to EMS Arrival

	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
AED Utilized Prior to Arrival	2	4	8	9	10

- Administration of Naloxone: All San José Fire Department first responders, both EMT and Paramedics, are trained in administering Naloxone (brand name Narcan) to reverse the effects of opioids in suspected overdose scenarios. EMTs can administer the medicine via intranasal spray and Paramedics are trained to administer the medicine via IV. Examples of opioids involved in overdose are heroin, fentanyl, oxycodone, hydrocodone, and morphine. The Department tracks Naloxone administration for overdose patients, as shown in Chart 6.

Chart 6: Administration of Naloxone

	FY 17-18	FY 18-19	FY 19-20	FY 20-21	FY 21-22
Naloxone Usage	148	151	194	267	266

County Ambulance Impacts to Fire Department Response Times

The Department closely monitors the monthly performance of the contracted County ambulance provider, Rural Metro, to determine operational impacts that affect the Department response times. County EMS provides a monthly report[13] to the Santa Clara County Board of Supervisors *Health and Hospital Committee* which identifies several factors that have contributed to decreased County ambulance availability:

- Staffing Challenges: Currently, there is a national shortage of paramedics and EMTs. This shortage has been exacerbated by an increase in workforce leave due to illness and attrition. The contracted ambulance provider submitted plans to County EMS outlining strategies on utilization of supplemental staffing, aggressive recruiting, scholarships, sign-on bonuses, and partnerships with private and fire resources to purchase unit hours.

[13] http://sccgov.iqm2.com/Citizens/FileOpen.aspx?Type=1&ID=13132&Inline=True

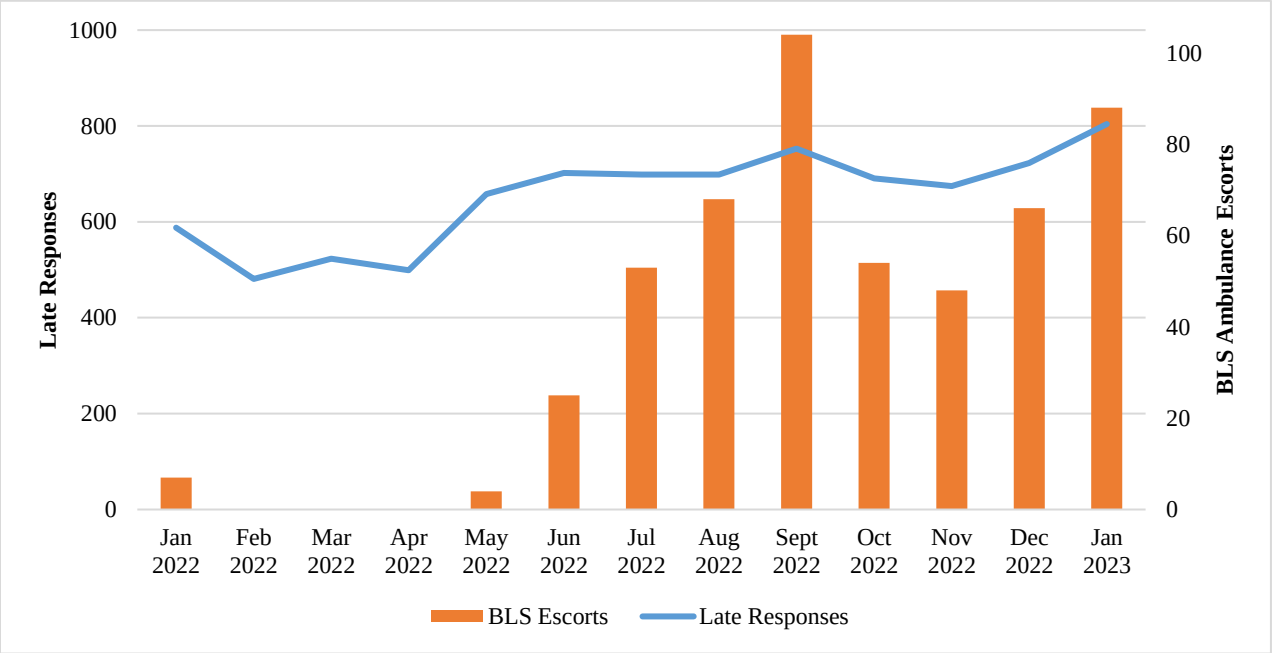
- Ambulance Patient Offload Delays (APOD): Hospitals play a critical role in ensuring that 9-1-1 ambulances are available for the next emergency. APOD is the time it takes to transfer a patient to an ED stretcher for hospital staff to assume responsibility for the care of the patient and has a significant impact on ambulance turnaround time and ambulance availability. All EDs have worked diligently throughout these continually challenging times to improve ambulance patient offload times and work collaboratively with EMS providers. There have been significant improvements over the last year in ambulance offload times. Delays are multifactorial, but overwhelmingly ED overcrowding is a key factor, whether because of the high volume/high acuity of patients or the inability to move admitted patients through care and discharge.

- Systemwide Increased Call Volume: As stated previously in this report, both the Department and County ambulance EMS responses have increased in Fiscal Year 2021-2022. This increased call volume has an impact on ambulance availability. Correspondingly, the increase in County ambulance call volume has seen an increase in ambulance transports as well. As more ambulances are responding to emergencies and transporting patients, fewer ambulances are available to respond to the next medical emergency.

The resulting decrease in ambulance availability correlates with increased late responses experienced by the Department. When the County ambulance provider experiences resource constraints and cannot provide enough system coverage with ALS or paramedic-staffed ambulances, the following protocols are implemented to mitigate service disruption:

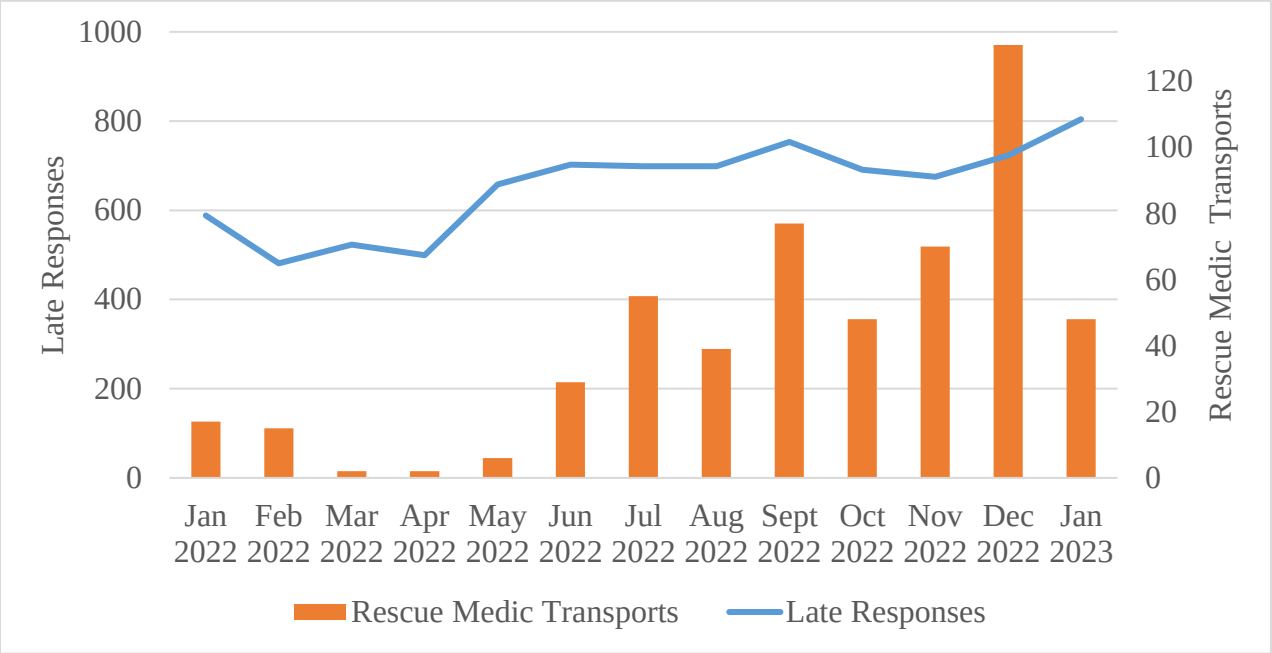
- Deploy more BLS ambulances with EMTs only: This action results in an increase in situations where a Department Firefighter/Paramedic must accompany or escort a patient to the ED to provide the highest level of patient care for emergent situations. LEMSA protocols also determine whether a patient can be transported by EMTs or must be transported with a paramedic in the ambulance as protocol typically ensures that ALS or paramedic-level service is available. During this time, the Department's emergency response company is either considered "out-of-service" while retrieving the Firefighter/Paramedic from the ED or "in-service BLS", which would entail another ALS company to be available to provide response coverage for any incoming EMS-related incidents. Chart 7 below depicts the trickle-down effect for when this occurs and its correlation to increased late responses.

Chart 7: BLS Ambulance Escorts and Late Responses



- Activate Department Rescue Medics to provide patient transport: Rescue Medics provide emergency patient transport in situations where the County ambulance provider cannot or if there is a delay in response. In these cases, the County determines that the minimum threshold of available ambulances requires activation of supplemental Department ambulances to maintain system status management. Three Rescue Medics are staffed full-time and provide both fire suppression and emergency medical response. However, when these Rescue Medics are tasked with transporting patients, a correlation occurs with increased late responses as seen in Chart 8.

Chart 8: Rescue Medic Transports and Late Responses



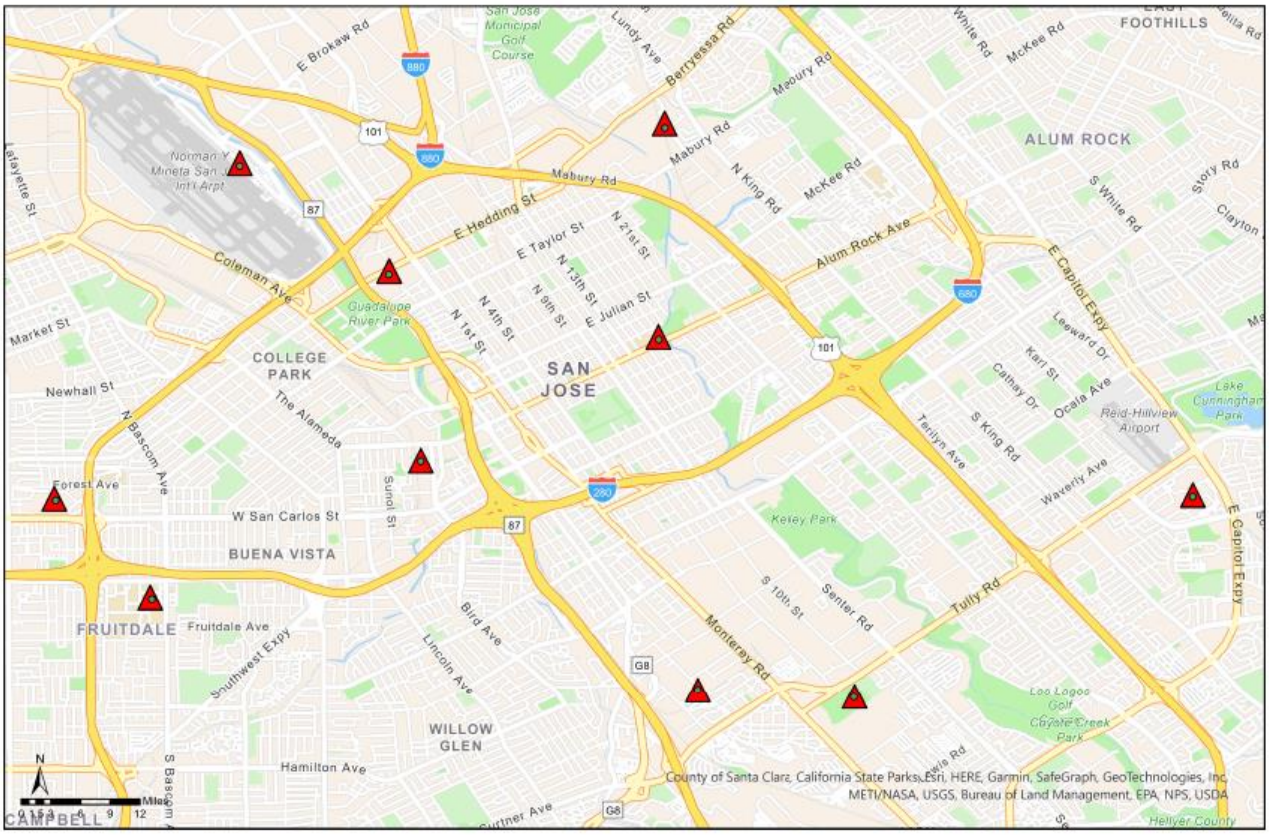
The Department collaborates closely with County EMS to improve workflow and efficiency when cooperating with the contracted vendor who provides ambulance transport services. This coordinated effort includes minimizing "out-of-service" time for frontline companies, participation in a county-wide paramedic taskforce to improve recruitment/training opportunities, offering expanded internship opportunities to expedite onboarding of new paramedics within the county, reducing Department late response financial penalties through qualified exemptions, and updating protocols and policies to better adapt to the current deployment model of County ambulances without detracting from the overall quality of services rendered and delivery of patient care.

9-1-1 Referral Programs

The Department's EMS Division employs one full-time Nurse Practitioner to coordinate the 9-1-1 Referral Program which addresses frequent users who could be better served by resources other than prehospital emergency care providers. The Nurse Practitioner coordinates with Santa Clara County Social Services Agency and private healthcare insurance providers to match the right resources for the individual and reduce 9-1-1 system burden.

As seen in Figure 1, the Department identified ten locations in San José that utilized the 9-1-1 EMS system most frequently in Fiscal Year 2021-2022. Several facilities within the City of San José utilize prehospital emergency care providers with higher frequency. The Department's EMS Division continues to address these facilities in an effort to educate and maximize opportunities to employ on-site healthcare workers that have an equal or greater scope of practice to provide appropriate patient care or utilization of non-emergency private ambulance transport companies.

Figure 1: Top 10 High Volume Locations for EMS Events FY 2021-2022



As EMS delivery continues to evolve, the Department will continue to monitor and report annually on targeted metrics.

COORDINATION

This memorandum has been coordinated with the City Attorney's Office.

ROBERT SAPIEN, JR.
Fire Chief, Fire Department

For questions, please contact Patrick Chung, Battalion Chief, at Patrick.Chung@sanjoseca.gov or (408) 799-1844