Management Audit of the County of Santa Clara the Emergency Medical Services Agency

Prepared for the Board of Supervisors of the County of Santa Clara

July 12, 2022

Prepared by the

Board of Supervisors Management Audit Division

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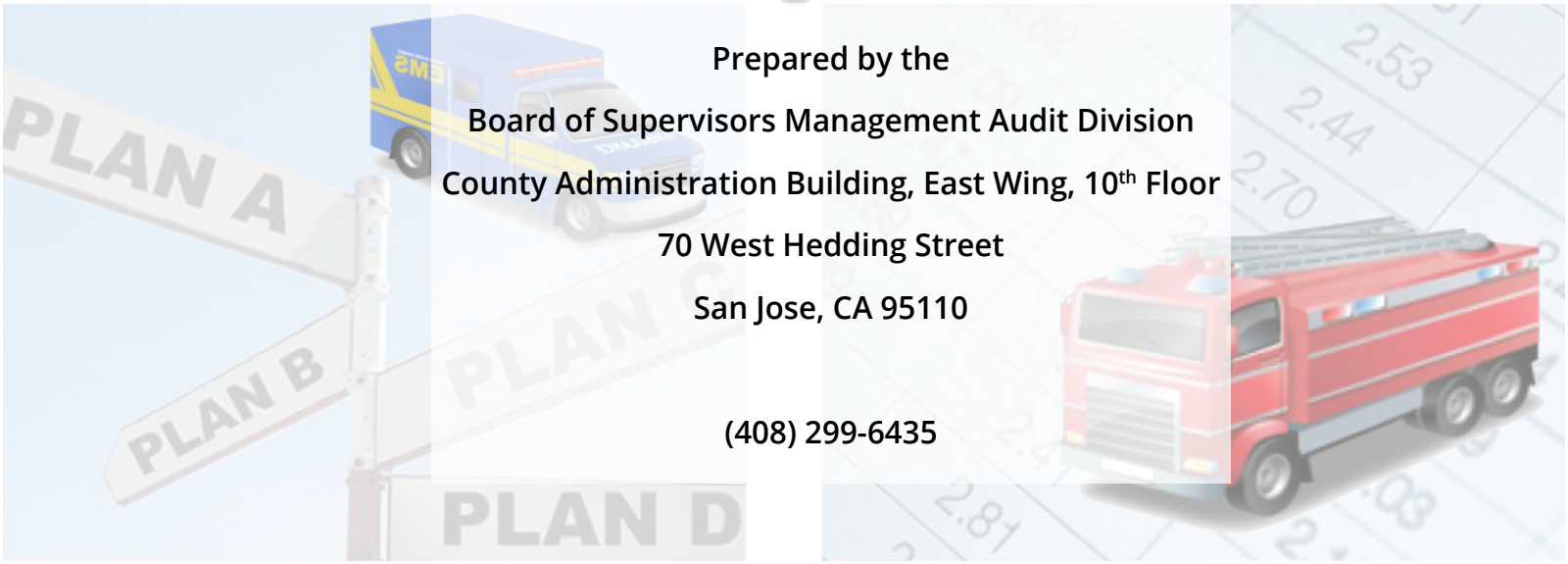

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July 12, 2022

Supervisor Otto Lee, Chair
Supervisor Cindy Chavez, Vice Chair
Board of Supervisors' Finance and Government Operations Committee
70 West Hedding Street San Jose, CA 95110

Dear Supervisors Lee and Chavez:

We have completed the Management Audit of the Emergency Medical Services Agency (EMS). This audit was added to the Management Audit Division's work plan by the Board of Supervisors of the County of Santa Clara, pursuant to the Board's power of inquiry specified in Article III, Section 302(c) of the Santa Clara County Charter. This audit was conducted in conformity with generally accepted government auditing standards as set forth in the 2018 revision of the "Yellow Book" of the U.S. Government Accountability Office. The purpose of this audit was to examine the Emergency Medical Services Agency to identify opportunities to increase their efficiency, effectiveness, and economy.

The report includes seven findings and 20 recommendations related to Exclusive Operating Agreement monitoring and reporting, inspecting and monitoring ambulances, emergency ambulance response times, hospital patient surge plan updates, electronic patient care record visibility to hospitals, post-hospital trauma data collection, and auditing provider continuing education courses.

In the attached responses to this audit, the Emergency Medical Services Agency agrees or partially agrees with 18 of the 19 recommendations directed to them and disagrees with one of these recommendations. The Agency disagrees with Recommendation with Recommendation 7.3 to "consider revising audit standards to differentiate between formal certification and recertification courses and single topic trainings of eight hours or less". According to the Agency's written response, "This is not applicable as formal approved EMT/Paramedic program/courses are not CE courses and are already audited by the EMS Agency through a different process". However, as noted on page 58 of our report, "Our review of CE courses shows variation in course type and content by provider…. For example, Heartshare offers Advanced Life Support (ALS) and Basic Life Support (BLS) courses with most courses offered for four to six-hours. Stanford offers courses that meet National Registry of Emergency Medical Technician (NREMT) standards for EMT

certification, consisting of 170 course hours, and recertification, consisting of 40 course hours." We continue to recommend that the EMS Agency consider revising audit standards to differentiate between formal certification and recertification courses and single topic trainings of eight-hours or less.

One recommendation concerning requesting monthly reports from the Deputy County Executive for the County Health System on VMC's actions to reduce Ambulance Patient Offload Time is directed to the Board of Supervisors Health and Hospital Committee chair.

If implemented, the recommendations would:

- allow for flexibility of performance measurement and reporting over the term of the Exclusive Operating Agreement to support consistent oversight of EMS system;
- ensure that EMS Agency practices on tracking mileage and age of service comply with the EOA agreement. Improved tracking will prevent the risk of end-of-life vehicles in active service and vehicle maintenance issues that could impact ambulance services;
- ensure that the EMS Agency is providing a more comprehensive level of oversight of ambulance response times, which can help lead to more consistent services by the contracted ambulance provider;
- give the EMS Agency useful information in coordinating hospital bypass requests;
- improve patient care by enabling EMS providers to communicate more efficiently with hospital personnel regarding the disposition of patients in transport, and scope of care provided during transport;
- enable the EMS system (on a local and State level) to provide oversight of emergency services and continue to improve the quality of these services;
- bring the EMS Agency into compliance with internal policy requirements governing CE courses and CE providers, confirm that CE courses are covering new or updated protocols and policies, and help prevent the risk of inadequate training standards.

We would sincerely like to thank the Emergency Medical Services Agency and its staff for their thoughtful, patient, and professional cooperation and assistance throughout this audit.

Respectfully submitted,

Cheryl Solov
Management Audit Manager

CC: Supervisor Mike Wasserman
Supervisor Susan Ellenberg
Supervisor S. Joseph Simitian
James R. Williams, County Counsel

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Executive Summary

Section 1: Exclusive Operating Agreement Monitoring and Reporting

The Exclusive Operating Agreement (EOA) is considered a performance-based agreement and defines specific performance requirements, but many performance indicators defined in the original 2010 agreement are no longer in effect, while other indicators have been implemented. The EOA agreement, however, does not sufficiently define Rural/Metro's requirement to comply with all EMS Agency performance indicators.

Also the EMS Agency collects data on performance indicators adopted by the California Emergency Medical Services Authority and the EMS Agency's Emergency Medical Care Committee (EMCC), and Prehospital Care System Quality Improvement Program (PCSQIP) but does not consistently report the performance results. For example, data for timely submission of patient care records (PCRs) for time sensitive injuries is collected monthly but not always reported to the EMCC. Ambulance patient offload time (APOT) measures the time to transfer a patient from the ambulance to the care of emergency department staff; Valley Medical Center exceeds the 25-minute patient offload time, but the EMS Agency does not consistently report APOT by hospital in the annual reports, making it difficult to identify Valley Medical Center and other hospitals' performance. Because the EMS system is not meeting its goals for timely submission of PCRs for time sensitive injuries, the EMS Agency should provide regular reports to the EMCC. In addition, because Valley Medical Center has longer ambulance patient offload time than other hospitals in the County, the EMS Agency director should report APOT by hospital monthly to the Health and Hospital Committee.

The EMS Agency director should include provisions in the upcoming EOA agreement allowing for flexibility of performance measurement and reporting over the term of the agreement, including specifying that EOA agreement performance measurement and reporting requirements are contained in EMS policies and procedures, which will be revised and updated periodically over the term of the agreement. The EMS Agency director should also report biannually to the EMCC and monthly to the Health and Hospital Committee on "timely submission of PCRs for time sensitive injuries" and on "ambulance patient offload time" by hospital. The Health and Hospital Committee Chair should request monthly reports from Valley Medical Center on actions to reduce ambulance patient offload time. These recommendations are within the current scope of work of the EMS Agency and would provide for better measurement of performance and increased oversight.

Section 2: Inspecting and Monitoring Ambulances

The EMS Agency is not adequately tracking and monitoring the mileage and age of service of Rural/Metro ambulances, as required by the EOA agreement. In addition, Rural/ Metro's vehicle replacement plan is outdated. A report submitted by Rural/ Metro of a point-in-time count of their fleet of 63 ambulances as of December 13, 2021, showed that one ambulance exceeded the mileage limit of 250,000. Rural/ Metro removed from service two of the 63 ambulances based on year placed in service and not mileage limits but the ambulance with mileage exceeding 250,000 remains in service. One other ambulance that had 229,884 miles on December 13, 2021, is six months away from meeting the 250,000-mile limit, which may be less than the time needed to procure a replacement ambulance. Seven other ambulances were

placed in service in 2017 and will reach the five-year age limit in 2022. However, Rural/Metro has not provided the EMS Agency a plan for replacement of these ambulances. Insufficient monitoring of mileage and age of service, as well as an out-of-date vehicle replacement plan, contribute to an increased risk of end-of-life vehicles in active service and vehicle failure and maintenance issues that could impact ambulance response times and delivery of services.

To ensure the EMS Agency is sufficiently tracking and monitoring mileage and age of service requirements for ambulances as specified in the EOA agreement, the Agency should develop and establish formal compliance protocols and procedures to periodically monitor and document mileage of Rural/Metro vehicles. The EMS Agency should also work with Rural/Metro to develop an updated vehicle replacement plan that details (1) an alternate schedule until the end of the Rural/Metro contract in 2024, and (2) specific steps on how Rural/Metro is planning to replace ambulances approaching end of life. The Agency should also assess whether a data field could be included in ImageTrend, the EMS Patient Care Data System reporting component, for the Agency to track mileage of Rural/Metro vehicles, and work with Rural/Metro to determine whether the over 10-year-old bariatric ambulances need to be replaced or if age requirements for bariatric ambulances need to be modified in the EOA agreement. Implementing these recommendations will ensure that EMS Agency practices on tracking mileage and age of service comply with the EOA agreement. Improved tracking will prevent the risk of end-of-life vehicles in active service and vehicle maintenance issues that could impact ambulance services. Implementing these recommendations will not cost Santa Clara County any additional funds outside of existing staff time.

Section 3: Emergency Ambulance Response Times

According to stakeholder discussions, ambulance responses may vary within the month, with response times slower at the beginning of the month compared to response times later in the month. According to an analysis of six months of data between 2020 and 2021, the Management Audit Division found that average response times were consistently shorter at the end of each month as opposed to the rest of the month. Code 3 call responses (with lights and sirens) were, on average, 0.71% to 5.15% shorter at the end of the month, while Code 2 call responses (without lights and sirens) at the end of the month were 0.78% to 7.98% shorter on average. Subzone 5 (South County) experienced the most consistent shifts in response times at the end of the month, with shorter response times in five of the six sample months for both Code 2 and Code 3 calls. The decrease in average ambulance response times across all zones and codes in the last week of the month as compared to the rest of the month suggests more ambulances are deployed at the end of the month to meet response time requirements. The EOA agreement set initial ambulance deployment standards, but after the first six months, the provider could set ambulance deployment schedules at its discretion. The EMS Agency does not maintain information on the providers ambulance schedules and the availability of ambulances over the course of the month, raising the risk that the ambulance provider is not consistently meeting the 90% response time requirement over the course of the month.

To allow for more comprehensive oversight, the EMS Agency should in the successor EOA agreement with a new ambulance provider following the Request for Proposal (RFP) process, provide for (a) ambulance deployment and response standards based on dispatch acuity and (b) response time monitoring on a more frequent basis rather than monthly basis in each of the five subzones. Implementing these recommendations will ensure that the EMS Agency is providing a more comprehensive level of oversight of ambulance response times, which can help lead to more consistent services by the contracted ambulance provider.

Section 4: Hospital Patient Surge Plan Updates

The EMS Agency's regulatory role involves ensuring that the request for an ambulance diversion (or "bypass") is due to unforeseen, not normal conditions. The hospital's updated patient volume management plan provides the EMS Agency with context to inform the decision as to whether to approve a hospital to go on bypass. The EMS Agency does not define the patient volume management plan or its elements, just that the plans comply with the guidelines of the Joint Commission on Accreditation of Healthcare Organizations, although the EMS Agency does not have access to these guidelines, and the guidelines are not necessarily available to hospitals. The patient volume management plans vary by hospital. For example, Stanford and VMC are the two level one trauma centers in the County, but the hospitals use different criteria for determining when the hospital is at capacity, making it difficult for the EMS system to determine when a bypass request is warranted. EMS Agency policy also states that patient volume management plans will be reviewed annually. However, there is no review or approval process in place.

The EMS Agency should provide a template and/or guide to hospitals specifying what to include in the annual patient volume management plan submission and should establish a patient volume management plan review and approval policy and procedure. EMS Agency data staff should consider integrating hospital software tools for patient volume monitoring into the EMResource, the web-based EMS system, for real-time monitoring when available and applicable. The EMS Agency should also evaluate updating the EMS Hospital Bypass Policy 603 to reflect operational changes if different procedures and practices are appropriate. Costs may be incurred by hospitals that have to draft an EMS Agency-specific compliance report, but there will be no cost to the agency beyond staff time to review and approve the annual plan submissions and staff time dedicated to establishing appropriate software integrations. Enforcing EMS Agency policy and updating submission will give the Agency useful information in coordinating hospital bypass requests.

Section 5: Electronic Patient Care Record Visibility to Hospitals

EMS Agency policy provides for the EMS provider (usually a fire department or ambulance paramedic) to document preliminary patient assessment data, including supplementary data such as electrocardiogram monitoring, in the electronic patient care record (ePCR) as soon as possible. The hospital hub platform allows patient assessment information to be transferred to the emergency department of the receiving facility as soon as the facility is selected. The ePCR also allows for documentation of stroke symptoms as they evolve during the encounter with the EMS provider, which can be made available in real time to the emergency department of the receiving facility. The extent to which the emergency departments access the ePCR information in near real time and prior to ambulance departure is not known;

this is not information tracked by EMS Agency staff, and our discussions with staff from two hospital emergency departments suggest that ePCR data downloaded from the hospital hub is used retrospectively but not consistently used by emergency department staff for patient care. Emergency department staff do not have consistent access to the hospital hub platform. More than half of the emergency department staff on the lists of three County hospitals selected for review had never logged into the system. Hospital staff may not be aware of the hospital hub, and if they are aware, do not know how to obtain access. The result is that the ePCR may not be available for review by hospital staff for patient treatment.

The EMS Agency should work with respective emergency department nurse managers and EMS ambulance providers to ensure timely entry of ePCR data, and the PCR data is available to emergency department staff for patient treatment. EMS Agency staff should also verify hospital hub users with all hospital emergency department nurse managers each year, communicate the process for updating the hospital hub access staff list during the year, and consider publishing information on the EMS Agency website on the benefits of the hospital hub tool and ways for hospital staff to access the tool. These recommendations can be implemented within the EMS Agency scope of work. Patient care will improve when EMS providers are able to communicate to hospital personnel the disposition of the patient in transport, and scope of care provided during the transport.

Section 6: Post-Hospital Trauma Data Collection

All three Trauma Centers report data on patient destination and discharge diagnosis, but only VMC reports data on total hospital charges. Stanford and San Jose Regional Medical Center, as private businesses, are not reporting patient charge data, and the hospital designation agreements do not explicitly require reporting of this data. According to the California Emergency Medical Services Authority, the Inland Counties EMS Agency, comprising San Bernardino, Inyo, and Mono counties, reports all three metrics for the County hospital and two private hospitals, but the California Emergency Medical Services Authority did not provide information on other local EMS agencies' reporting. Data on patient destination, discharge diagnosis, and patient charges is reported to the California and National Emergency Medical Services Information Systems (CEMSIS and NEMSIS respectively) and used to assess EMS needs and performance, and to benchmark performance, determine effectiveness of clinical interventions, and facilitate cost-benefit analyses. This data can be used to provide perspective and comparison amongst California Trauma Systems and can inform systemwide quality improvement. Not receiving this data undermines the ability of the EMS system (on a local and State level) to provide oversight of emergency services and continue to improve the quality of these services.

The EMS Agency should work with the California Emergency Medical Services Authority on procedures to obtain patient charge data from private hospitals, including standard language in hospital designation agreements for provision of this data by private hospitals and guarantees on intended use and confidentiality of data. In the meantime, the director of SCC EMS Agency should distribute notice via email to the directors of all three Trauma Centers informing them of the total hospital charges data collection requirement and requesting submission of this data. Disclosure of patient charge data would contribute to cost-benefit analyses of emergency medical

services and measurement of emergency medical services outcomes. County staff time would be required in working with the California Emergency Medical Services Authority and the County's designated trauma centers, but this time should be incorporated into existing resources.

Section 7: Auditing Provider Continuing Education Courses

The EMS Agency updated its internal policies (Policy #809) in 2018 to standardize audit procedures for CE providers and courses, although Title 22 does not require audits. EMS policy requires each CE provider to submit an annual summary of all CE courses offered in the previous calendar year. The policy states that the agency will audit a minimum of 10% of the courses at the conclusion of each year. EMS does not have documented protocols for conducting audits. A comprehensive audit only occurred for courses offered in Calendar Year (CY) 2018. Although CE provider audits were conducted in 2015, 2016, and 2017, the process was not formal. While audits were not conducted in CY 2019 and CY 2020, in February 2022 the EMS Agency sent letters to CE providers to obtain the list of CE courses offered in CY 2021 in preparation for the audit. Documenting and standardizing audit procedures would ensure consistent auditing practices and oversight of CE course providers.

The EMS Agency should document methods for selecting courses for audits and consider revising audit standards to differentiate between formal paramedic and emergency medical technician certification and recertification courses and one-time advanced life support/basic life support courses. The EMS Agency should also ensure that the County ambulance provider, which is required to provide in-service training to first responder agencies and lacked complete CE course documentation in the 2018 audit, fully comply with EMS audit requirements. Implementing these recommendations will bring EMS into compliance with internal policy requirements governing CE courses and CE providers and help prevent the risk of inadequate training standards. Additionally, EMS will be able to confirm that CE courses are covering new or updated protocols and policies, consistent with EMS' oversight role of ensuring the quality of CE courses offered for EMT and paramedic personnel. Implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time to develop and conduct annual audits.

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INTRODUCTION

This Management Audit of Emergency Medical Services was authorized by the Board of Supervisors of the County of Santa Clara as part of the County's Fiscal Year 2020–21 Management Audit Work Plan pursuant to the Board's power of inquiry specified in Article III, Section 302(c) of the Charter of the County of Santa Clara.

PURPOSE, SCOPE, AND OBJECTIVES

The purpose of the audit was to examine the operations, staffing, management practices, and finances of Emergency Medical Services, and to identify opportunities to increase their efficiency, effectiveness, and economy. Work on this audit began with an entrance conference on September 17, 2021, and a draft report was issued to Emergency Medical Services on April 7, 2022. The Management Audit Division also sent the audit draft to the Office of the County Counsel for review and comment.

An exit conference was held with Emergency Medical Services on April 21, 2022, and a revised draft incorporating feedback from the exit conference was issued to Emergency Medical Services on June 23, 2022 for written response. This final report includes those written responses as Attachment A on page 63

AUDIT METHODOLOGY

As part of this management audit the Management Audit Division conducted interviews with all staff levels, executive management to line staff, across Emergency Medical Services. Interviews were conducted virtually one-on-one with staff members due to the ongoing COVID-19 pandemic. Additional interviews included meetings with the California Emergency Medical Services Authority, CalFire, Palo Alto City Fire, Valley Medical Center Hospital, and Kaiser San Jose Hospital.

The Management Audit Division staff reviewed contracts, procedure manuals, training materials and procedures, compliance standards, assessment procedures and practices, software used by Emergency Medical Services, as well as data used to assess contractor compliance. The Management Audit Division staff also received virtual tours from Emergency Medical Services staff of the databases used to manage and oversee emergency medical services in the County and conducted a survey of EMS Agency staff.

COMPLIANCE WITH GENERALLY ACCEPTED GOVERNMENT AUDITING STANDARDS

This management audit was conducted under the requirements of the Board of Supervisors Policy Number 3.35 as amended on May 25, 2010. That policy states that management audits are to be conducted under generally accepted government auditing standards issued by the United States Government Accountability Office. We conducted this performance audit in accordance with generally accepted government auditing standards set forth in the 2018 revision of the "Yellow Book" of the U.S. Government Accountability Office. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis

for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. In accordance with these requirements, we performed the following management audit procedures:

Audit Planning - This management audit was selected by the Board of Supervisors using a risk assessment tool and an estimate of audit work hours developed at the Board's direction by the Management Audit Division. After audit selection by the Board, a detailed management audit work plan was developed and provided to the Department.

Entrance Conference - An entrance conference was held with Emergency Medical Services managers to introduce the management audit team, describe the management audit program and scope of review, and to respond to questions. A letter of introduction from the Board, a management audit work plan, and a request for background information were also provided at the entrance conference.

Pre-Audit Survey - A preliminary review of documentation and interviews with Emergency Medical Services managers and staff was conducted to obtain an understanding of the program, and to isolate areas of operations that warranted more detailed assessments. Based on the pre-audit survey, the work plan for the management audit was refined.

Field Work - Field work activities were conducted after completion of the pre-audit survey, and included:

- additional interviews with Emergency Medical Services staff;
- interviews with agencies involved in emergency medical response within the County, including battalion chiefs at CalFire and Palo Alto City Fire and emergency room managers and coordinators at Valley Medical Center Hospital and Kaiser San Jose Hospital;
- interviews with directors of the California Emergency Medical Services Authority;
- analysis of data provided by Emergency Medical Services;
- further review of documentation and other materials provided by Emergency Medical Services;
- survey of Emergency Medical Services staff.

Draft Report - On April 7, 2022, a draft report was prepared and provided to Emergency Medical Services containing our preliminary findings, conclusions, and recommendations.

Exit Conference – An exit conference was held with Emergency Medical Services managers on April 21, 2022, to collect additional information pertinent to our report, obtain their views on the report findings, conclusions, and recommendations, and make corrections and clarifications as appropriate. Following the exit conference, a revised draft was provided to Emergency Medical Services for its use in preparing its formal written response.

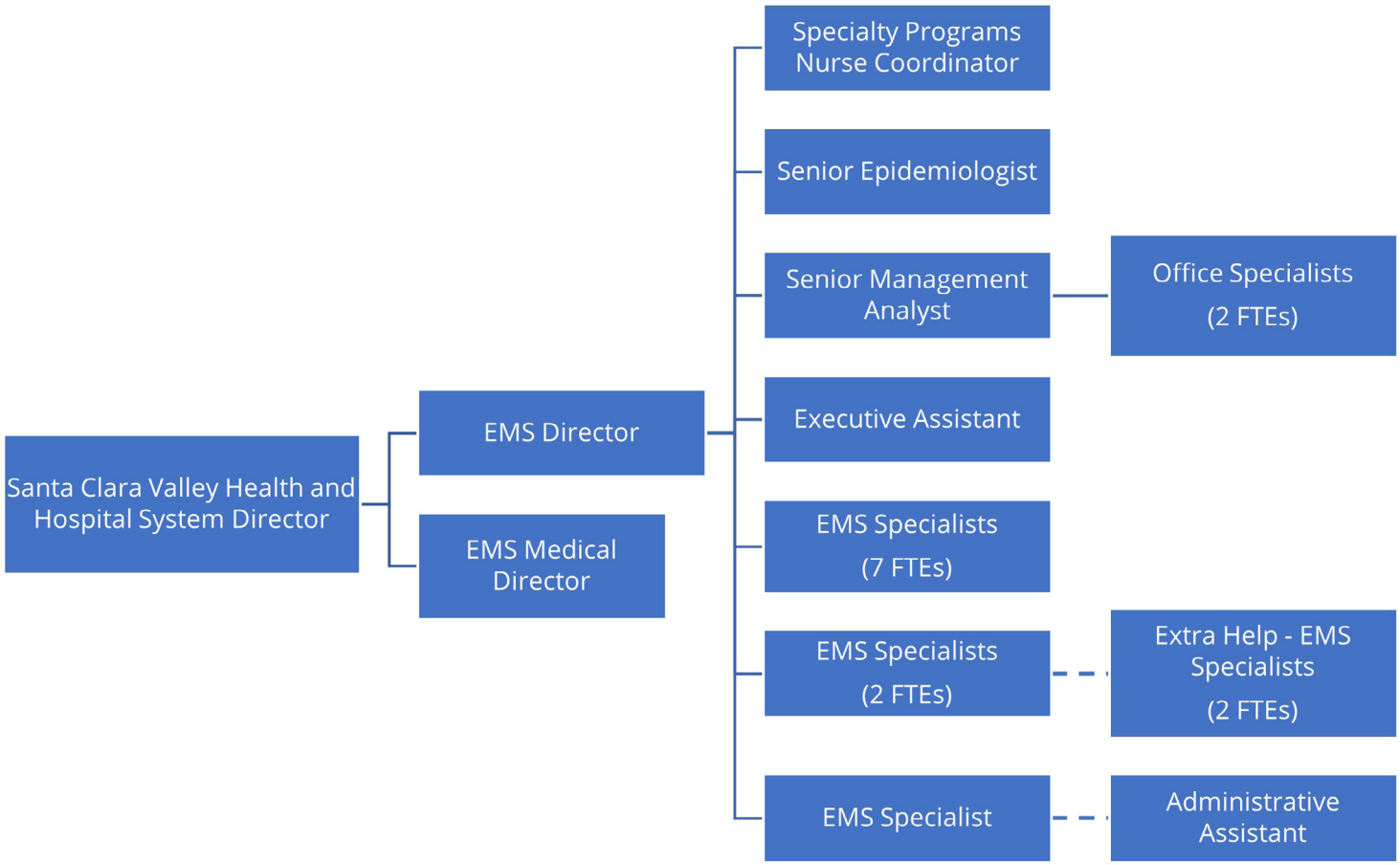
Final Report - A final report was prepared following the exit conference and provided to Emergency Medical Services on June 23, 2022. Emergency Medical Services was requested to provide a written response to the report, which is attached to this final report (see Attachment A on page 63).

BACKGROUND

Overview of Emergency Medical Services

Emergency Medical Services Agency (EMS Agency or "the Department") is responsible for overseeing the quality of Santa Clara County's emergency medical services system, including overseeing contracts with the 9-1-1 transport providers (ambulances). For Fiscal Year 2020–21 the Department's adopted budget had a net revenue of $86,574 (based on $6.3 million net expenditures and $6.4 million net revenues), with 19.0 full-time equivalent (FTE) staff as of January 1, 2022 (see Figure I.1 below).

Figure I.1: *Organization of Emergency Medical Services Staff*



Source: Created by the Management Audit Division based on Emergency Medical Services' organizational chart and materials from the Employee Services Agency as of January 1, 2022.

Emergency Medical Services Functions

Santa Clara County's emergency medical services system includes: medical dispatch centers, fire districts and departments, a contracted ambulance provider, hospitals, specialty care facilities, and pre-hospital training programs. The EMS Agency conducts its oversight role collaboratively with these system stakeholders.

The EMS Agency oversees ambulance provider and fire department compliance to EMS Agency regulations and agreements for service within the County. This includes conducting inspections of vehicles and supplies, overseeing response times to emergency calls, and providing certification or licensure for emergency medical technicians and paramedic personnel. Emergency medical training is also available

for the public, and information is provided on the EMS Agency website regarding the County's Emergency Alert System, pool safety, preventing snake bites, stroke awareness, heat related illnesses, falls and seniors, influenza, heart attacks, and carbon monoxide.[1]

The EMS Agency oversees the Hospital Designation Agreements, which allow hospitals to receive emergency patients with specific medical needs (e.g. trauma, stroke, or heart attack patients). When emergency rooms become impacted, the EMS Agency works with hospitals to try to decrease wait times for ambulances. In the case of a large-scale emergency, such as a mass casualty or wounded scenario, EMS Agency personnel will coordinate the response of emergency medical service entities.

Organization of Emergency Medical Services Within the County

State oversight of the EMS Agency is provided by the California Emergency Medical Services (CA EMS) Authority, which was established in 1980 by the State legislature and codified into the Health and Safety Code. The CA EMS Authority is designed to provide a unified approach to emergency and disaster medical services by establishing emergency medical care and disaster response standards and regulations, as well as providing oversight and technical assistance to local EMS agencies throughout the State.

Local EMS agencies, however, are all unique, some serve a single county, others contract with multiple counties, and each one is organized based on the existing government structure, hospital system, and the needs of that jurisdiction. There are no State laws or regulations specifying where within a local government each local EMS agency should reside. Indeed, there is a case for why an EMS agency might be located under a range of relevant county departments, whether it is the local Emergency Management Division, Health and Hospital System, Public Health Department, or Fire Department. It is important for the State to be aware of the organization of each EMS agency, however, as some may pose a conflict of interest if the local EMS agency is a part of an entity that they regulate, such as a Fire Department.[2] Local EMS agencies are also responsible for overseeing special hospital designations through Hospital Designation Agreements. These agreements allow hospitals to receive emergency patients with specific needs (such as trauma, stroke, and heart attack) (see Section 6, starting on page 49, for further discussion).

In Santa Clara County, as of January 2022, the EMS Agency is part of the County's Health and Hospital System. However, less than 10-years ago, the EMS Agency was a part of the County's Public Health Department. The impacts of the position of the EMS Agency within the Health and Hospital System are mainly felt through reporting lines. Currently the EMS Agency reports to the director of the Health and Hospital System, who reports monthly to the Board of Supervisors through the Health and Hospital Committee (see Figure I.1 on page 9).[3] This organization would make sense if it brought the EMS Agency and the Health and Hospital System databases into closer synchronicity and increased communication abilities. Combining this data could improve County emergency medical services.

1 Santa Clara County Emergency Medical Services: Public Education. Retrieved March 16, 2022, from https://emsagency.sccgov.org/services/education/public-education.

2 Local EMS agencies are responsible for inspecting and certifying emergency transportation vehicles, including Fire Department vehicles.

3 During these Board meetings, Supervisors often request special reports from EMS. For example, during the June 4, 2019, Board of Supervisors meeting, Supervisor Chavez requested that EMS provide a report relating to Sexual Assault Response Team protocols.

Background and Contract History of EOA Agreement

As identified in the local EMS Plan, Santa Clara County has elected to provide emergency medical ambulance transportation services through the creation of an Exclusive Operating Area (EOA) contract. Per the EOA contract, only the designated emergency medical care and transport service provider may provide prehospital emergency medical care and transport services in response to calls received through the 9-1-1 system within the area or sub-area defined in the EMS Plan.

The County and Rural/Metro of California, Inc. (Rural/Metro) entered into the original Emergency Medical Services Agreement on December 10, 2010, for Advanced Life Support First Response and Advanced Life Support Emergency Ambulance Services for the County's EOA. This agreement was effective July 1, 2011, with a term of five-years and two optional three-year extensions. From June 7, 2011, through February 9, 2016, the Board of Supervisors executed six amendments to the agreement with Rural/Metro.

In 2016, the County exercised the first of its two options to extend the agreement for an additional three-years. This extended the EOA agreement with Rural/Metro through June 30, 2019. In June 2019, the Board of Supervisors approved a seventh amendment that allowed the County to exercise the second and last of its two options to extend the agreement with Rural/Metro for an additional three-years, through June 30, 2022.[4] In October 2020, the Board of Supervisors approved an eighth amendment that allowed the County to extend the contract with Rural/Metro through June 30, 2024.[5]

CA EMS Authority Regulations

As previously mentioned, the original EOA agreement between the County and Rural/Metro had a term of five-years, with two optional three-year extensions, for a total contract period of 11-years. According to the California EMS Authority, there is no State requirement which limits the contract period for EOAs created with a competitive process. The CA EMS Authority informed the Management Audit Division that a multidisciplinary stakeholder workgroup that includes representation from local EMS agencies is working on a new draft of EMS regulations, and that contract durations for EOAs is one of the subjects being contemplated. The workgroup is still developing the draft and the SCC EMS Agency has not been directly involved in this stakeholder group. There is no formal timeline for completion of these regulations.

4 According to EMS staff, the agency issued a competitive process for a new ambulance provider in February 2018 (RFP-HHS-FY18-0069 Emergency Ambulance Services). However, there was only one bidder (American Medical Response West) and its proposal was deemed non-conforming to the solicitation's requirements set forth by the County. Consequently, the County rejected AMR's non-conforming proposal.

5 According to EMS staff, as the Eighth Amendment was being negotiated with Rural/Metro, the full effects of the COVID-19 pandemic on the EMS system began to be realized, and the EMS Agency determined it was necessary to extend the ambulance services contract. The contract extension allowed the EMS Agency to continue its efforts to engage stakeholders regarding the future state of the EMS system, while allowing the EMS system time to stabilize. According to EMS staff, the contract extension will provide the time necessary to conduct a full RFP process where various models could be proposed for the system moving forward, including a public option or a public-private partnership.

Upcoming Competitive Solicitation Process for New Ambulance Provider

In preparation for an upcoming competitive process for a new ambulance provider, the EMS Agency is currently engaging stakeholders in discussions regarding the future state of the EMS system, where various models could be proposed for the system moving forward including a public option or a public-private partnership. The agency plans to conduct a full Request for Proposals (RFP) process in 2023. Figure I.2 below details the proposed RFP timeline for the new ambulance provider according to the EMS Agency and the Procurement Department.

Figure I.2: ***Proposed RFP Timeline for New Ambulance Provide***

Action/Description	Date
Issue RFP	**February 22, 2023**
Pre-Proposal Conference	March 9, 2023
Deadline to submit written questions	March 23, 2023
Respond to written questions and issue addendum to RFP if necessary	April 6, 2023
RFP proposal due date	**April 27, 2023, by 3:00pm (PST)**
Proposal evaluation	The week of May 15, 2023
Vendor presentations/interviews (if applicable)	The week of June 12, 2023
Selection of finalist(s) and negotiations	The week of July 10, 2023
Submission of agreement for execution	May 2024
Contract award and commencement of agreement	July 2024

Source: The EMS Agency and SCC Procurement Department.

RECOMMENDATION PRIORITIES

The priority rankings shown for each recommendation in the audit report are consistent with the audit recommendation priority structure adopted by the Finance and Government Operations Committee of the Board of Supervisors, as follows:

Priority 1: Recommendations that address issues of non-compliance with federal, State, and local laws, regulations, ordinances, and the County Charter; would result in increases or decreases in expenditures or revenues of $250,000 or more; or suggest significant changes in federal, State, or local policy through amendments to existing laws, regulations, and policies.

Priority 2: Recommendations that would result in increases or decreases in expenditures or revenues of less than $250,000; advocate changes in local policy through amendments to existing County ordinances and policies and procedures; or would revise existing departmental or program policies and procedures for improved service delivery, increased operational efficiency, or greater program effectiveness.

Priority 3: Recommendations that address program-related policies and procedures that would not have a significant impact on revenues and expenditures but would result in modest improvements in service delivery and operating efficiency.

DEPARTMENT ACCOMPLISHMENTS

Audits typically focus on opportunities for improvements within an organization, program, or function. To provide additional insight into Emergency Medical Services, we requested that management provide some of its noteworthy achievements. These are highlighted as Attachment B on page 71 of this report.

ACKNOWLEDGMENTS

We would like to thank the management and staff of Emergency Medical Services for their assistance and cooperation with this audit. In addition, we are grateful to the California Emergency Medical Services Authority, CalFire, Palo Alto City Fire, Valley Medical Center Hospital, and Kaiser San Jose Hospital for their time and feedback during this audit.

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Section 1: Exclusive Operating Agreement Monitoring and Reporting

Background
The Emergency Medical Services (EMS) Agency entered into an agreement with Rural/Metro of California (Rural/Metro) in 2010 to provide Advanced Life Support (ALS) First Response and Ambulance Services for the County's Exclusive Operating Area (EOA).

Problem, Cause, and Adverse Effect
The EOA agreement is considered a performance-based agreement and defines specific performance requirements, but many performance indicators defined in the original 2010 agreement are no longer in effect, while other indicators have been implemented. The EOA agreement, however, does not sufficiently define Rural/Metro's requirement to comply with all EMS Agency performance indicators.

The EMS Agency collects data on performance indicators adopted by the California Emergency Medical Services Authority and the EMS Agency's Emergency Medical Care Committee (EMCC), and Prehospital Care System Quality Improvement Program (PCSQIP) but does not consistently report the performance results. For example, data for timely submission of PCRs for time sensitive injuries is collected monthly but not always reported to the EMCC. Ambulance patient offload time (APOT) measures the time to transfer a patient from the ambulance to the care of emergency department staff; Valley Medical Center exceeds the 25-minute patient offload time, but the EMS Agency does not consistently report APOT by hospital in the annual reports, making it difficult to identify Valley Medical Center and other hospitals' performance. Because the EMS system is not meeting its goals for timely submission of PCRs for time sensitive injuries, the EMS Agency should provide regular reports to the EMCC. In addition, because Valley Medical Center has longer ambulance patient offload time than other hospitals in the County, the EMS Agency director should report APOT by hospital monthly to the Health and Hospital Committee.

Recommendations
The EMS Agency director should include provisions in the upcoming EOA agreement allowing for flexibility of performance measurement and reporting over the term of the agreement, including specifying that EOA agreement performance measurement and reporting requirements are contained in EMS policies and procedures, which will be revised and updated periodically over the term of the agreement. The EMS Agency director should also report biannually to the EMCC and monthly to the Health and Hospital Committee on "timely submission of PCRs for time sensitive injuries" and on "ambulance patient offload time" by hospital. The Health and Hospital Committee Chair should request monthly reports from Valley Medical Center on actions to reduce ambulance patient offload time.

Savings, Benefits, and Costs
These recommendations are within the current scope of work of the EMS Agency and would provide for better measurement of performance and increased oversight.

FINDING

Background and History of Exclusive Operating Area (EOA) Agreement

As identified in the local Emergency Medical Services (EMS) Plan, Santa Clara County has elected to provide ambulance first response and transport services through the creation of an Exclusive Operating Area (EOA). An EOA is defined as the EMS area or sub-area defined in the EMS plan within which only the designated ambulance provider may provide prehospital emergency medical care and transport services in response to calls received through the 9-1-1 system for a defined period of time. The County and Rural/Metro of California, Inc. (Rural/Metro) entered into the original EOA agreement on December 10, 2010, following a competitive solicitation to provide Advanced Life Support (ALS) First Response and ALS Emergency Ambulance Services for the County's EOA. The original agreement was for 11 years through 2021 but was extended for three additional years through June 2024 with the option to extend for three more years through June 2027, or a potential agreement term of more than 16 years. According to the Emergency Medical Services (EMS) Agency report to the Board of Supervisors, "the combination of the COVID-19 pandemic, civil unrest, and wildfires have caused significant instability within the EMS System, and the EMS Agency has determined that an extension of the 9-1-1 Ambulance Services contract is necessary to allow time for the system to stabilize prior to issuing a new request for proposal".

The EOA agreement outlines the contractual terms of Rural/Metro's services provided for each of the municipalities and districts within the County, and includes the following areas: scope of work, emergency ambulance response times and penalties, fleet and equipment stipulations, clinical quality and medical oversight protocols and requirements, technology, data and reporting requirements, integration of first responders, Rural/Metro employees and workforce requirements, ambulance billing and fees, and other provisions.

Rural/Metro provides first response and advanced life support ambulance transport for most cities[6] and the unincorporated County. The closest available emergency response unit – which may be a city fire department or fire district fire engine staffed by firefighters trained as emergency medical technicians (EMTs) or paramedics – is to respond to an emergency medical incident until a Rural/Metro ambulance and paramedics arrive on the scene. The EOA agreement defines response times and medical response priorities.

EOA Agreement Performance Requirements

The EOA agreement is considered a performance-based agreement and defines specific performance requirements, including ambulance response times, maintenance of fleet and equipment, and clinical quality. The agreement requires monthly reporting from Rural/Metro and requires Rural/Metro to implement an electronic data system that interfaces with the County Computer Aided Dispatch (CAD) system.

6 Cities in the EOA are Mountain View, Cupertino, Santa Clara, Milpitas, Sunnyvale, Los Altos, Los Altos Hill, Campbell, Los Gatos, Saratoga, Monte Serino, San Jose, Morgan Hill, and Gilroy. Palo Alto and Stanford are not included in the EOA.

Quality Improvement Reporting Requirements in the EOA Agreement

The original EOA agreement required monthly reporting from Rural/Metro on clinical, operational, and financial performance and provided for a quality improvement program with measurable results. Quality improvement program monthly reporting included reports on clinical indicators, new procedure monitoring, and EMS Agency monitoring activities. As outlined in Exhibit H[7] of the EOA agreement, Rural/Metro is required to track and report on specific clinical indicators to the County monthly including:

1. Clinical Indicators: Compliance with Protocol A08 - Cardiac Clinical Indicator, Compliance with Protocol A13 - Stroke Center Destination, and Compliance with Policy 605 - Trauma Triage;
2. New Procedure Monitoring: Continuous Positive Airway Pressure (CPAP), Intraosseous (IO) for Adults; and
3. LEMSA (Local EMS Agency) Monitoring Activities: Return of Spontaneous Circulation (ROSC), Intubation Rates.

Based on a review of the EOA agreement and correspondence with EMS staff, reporting requirements as outlined in the current EOA agreement are obsolete and do not align with current practices. These changes were not included in previous modifications to the agreement. The EOA agreement states that the processes identified in Exhibit H may be modified due to changes in local, State, or federal regulations, or at the direction of the EMS Agency Director, but does not specifically state Rural/Metro's obligation to comply with other performance indicators.

EOA performance indicators now consist of (1) indicators approved by the Prehospital Care System Quality Improvement Committee (PCSQIC), (2) measures adopted in the Emergency Medical System Quality Improvement Program (EQIP), (3) California Emergency Medical Services Authority core quality measures, and (4) indicators recommended by the Board of Supervisors.

Emergency Medical Service System Quality Improvement Program

The EOA agreement requires Rural/Metro to have a continuous clinical quality improvement program with oversight provided by the EMS medical director, and to comply with the State's Emergency Medical Services Quality Improvement Program (EQIP). California Government Code sets guidelines for local emergency medical services agencies' quality improvement programs and provides for the California Emergency Medical Services Authority to review each agency's EQIP at least every five years. Santa Clara County's most recent (2019) Emergency Medical Services Quality Improvement Program (EQIP) Plan was completed in June 2020.

7 The EOA agreement states the following in Article VI: Clinical Quality and Medical Oversight: "Section 6.1 Clinical Quality Program: Rural/Metro will provide the County of Santa Clara with a clinical program that achieves contemporary benchmarks of clinical excellence in a progressive and sustainable fashion. Rural/Metro's clinical and continuous quality improvement (CQl) programs and activities must be reviewed by County EMS Medical Director and be approved by the County and will be conducted in accordance with the County's Prehospital Care Policies. Exhibit H documents Rural/Metro's clinical and continuous quality improvement (CQI) programs and activities. The processes identified in the Exhibit H may be modified due to changes in local, State and/ or federal regulations and at the direction of the County EMS Medical Director/ Agency."

Prehospital Care System Quality Improvement Program

According to the staff report to the November 18, 2021, Emergency Medical Care Committee, prehospital quality indicators are selected by a volunteer committee or prehospital care stakeholders; quality indicators for 2021 focused on new treatment initiatives, pediatric care, and stroke care. Changes in the performance indicators are made as part of the annual update process through the Prehospital Care System Quality Improvement Program or the EMS Agency.

California Emergency Medical Services Authority Core Quality Measures

The California Emergency Medical Services Authority implemented the core quality measures project in 2012, setting Statewide measures for emergency medical services and prehospital treatment of patients. While not all California counties participate in the project, the Santa Clara County Emergency Medical Services agency has participated every year since implementation.

Domestic Violence EMS Response

In response to a request from the Board of Supervisors, the EMS Agency implemented training and reporting on domestic violence incidents. Collection and reporting domestic violence data began in February 2020.

Data Collection and Reporting

The EMS Agency updated the EMS Patient Care Data System in 2019 to comply with State and national requirements. The system's data reporting component, ImageTrend, allows for collecting and reporting patient data. EMS staff report on aggregated patient data from the EMS Agency's performance indicators to the PCSQIC, as well as the Emergency Medical Care Committee (EMCC). EMS Agency staff author and vet the reports for the selected indicators each year. The EMS Agency runs the reports on a monthly or daily basis for providers to review the data. The providers' Quality Improvement (QI) coordinators are provided access to these reports through the ImageTrend report writer. According to EMS Agency staff, providers now verbally report on the status of the indicators at the quarterly PCSQIC meetings. EMS Agency staff also have monthly EOA Quality Assurance (QA) provider meetings with Rural/Metro to discuss indicators. Figure 1.3 on page 19 shows the current 2021 EOA clinical indicators.

Figure 1.3: *2021 EOA Clinical Indicators*

Performance Indicator	Objective/ Surveillance	Entity That Selects Indicator	Entity That Indicator is Reported To
Behavioral Sedation	Medication/usage efficacy	PCSQIC	PCSQIC
IV Acetaminophen Performance	Trial medication efficacy	PCSQIC	PCSQIC
Pediatric Respiratory Assessment	State Core Measure	PCSQIC	PCSQIC/State Core Measure
Trauma (Best Practices)	Trauma best practices	PCSQIC	PCSQIC
ACS (Best Practices)	Cardiac best practices	PCSQIC	PCSQIC
Stroke (Best Practices)	Stroke best practices	PCSQIC	PCSQIC
Base Station Performance	Protocol adherence	PCSQIC	PCSQIC
Cardiac Arrest (ROSC)	Return of spontaneous circulation in cardiac arrest patients and outcomes	EMS Agency/ 2019 EQIP	Board of Supervisors
Ambulance Patient Offload Time (APOT)	Transition of care and patient offload times	EMS Agency/ 2019 EQIP	Board of Supervisors, State of California
Electronic Patient Care Record Documentation	Patient care record validation scores (at least 80 points out of 100)	EMS Agency/ 2019 EQIP	Board of Supervisors
Timely Submission of PCRs for Time Sensitive Injuries	Patient care record submission for specialty care patients	EMS Agency/ 2019 EQIP	Board of Supervisors
Trauma Scene Time Reduction	Trauma scene times exceeding 15-minutes	EMS Agency/ 2019 EQIP	Board of Supervisors
Domestic Violence EMS Response	Domestic violence patients assessed by EMS provider	Board of Supervisors	Board of Supervisors
Community Paramedicine Pilot (Alternate Destination)	Patients assessed for pilot entry/exclusion	State of California	State of California

Source: EMS Agency.

Documenting and Reporting Clinical Indicators

Formal reporting on ambulance and clinical performance varies by type of indicator, and not all 2021 performance indicators shown in Figure 1.3 above are routinely documented and reported.

Several indicators were documented and reported to the November 2021 Emergency Medical Care Committee (the most recent committee meeting reviewed for this audit) or included in the 2020 Annual Report (the most recent annual report). Behavioral sedation, intravenous (IV) acetaminophen performance, pediatric respiratory assessment, and trauma best practices indicators, and responses to domestic violence incidents were documented and reported to the November 2021 Emergency Medical Care Committee. Responses to domestic violence incidents and two measures of ambulance performance – ambulance patient offload time and trauma scene time reduction – were reported in the 2020 Annual Report. Also, three indicators are reported annually to the California Emergency Medical Services Authority core quality measures project, including indicators for pediatric respiratory assessment and cardiac and stroke care best practices.

Some indicators noted in Figure 1.3 on page 19 were either documented and reported to previous Emergency Medical Care Committee meetings but not to the most recent Emergency Medical Care Committee meeting in November 2021 or were included in the 2019 Annual Report but not included in the 2020 Annual Report. Indicators for cardiac arrest/return of spontaneous circulation were documented and reported to the August 2020 Emergency Medical Care Committee but not to subsequent committee meetings. The community paramedicine pilot and base station performance were discussed in the 2019 Annual Report, but no discussions of these indicators were included in the 2020 Annual Report or Emergency Medical Care Committee meetings.

Electronic Patient Care Record Documentation and Timely Submission of PCRs for Time Sensitive Injuries

The 2019 EQIP included two measures, shown in Figure 1.3 on page 19, for patient care records: (1) electronic patient care record (PCR) documentation and (2) timely submission of PCRs for time sensitive injuries.

Electronic patient care documentation was a continuing measure to be collected monthly. According to the 2019 EQIP, EMS agency staff were to conduct education for all EMS system field providers on the appropriate way to complete a PCR for when medical assessments and/or medical care has been performed within the 9-1-1 system to ensure valid information in the patient care record. The 2019 EQIP provided for a validation score of at least 80 points out of 100. The California Emergency Medical Services Authority collects patient care records through the State system (California Emergency Medical Services Information System or CEMSIS) and reports to the National Emergency Medical Services Information System or NEMSIS. The 2019 EQIP outcome measure for "electronic PCR documentation" is "increase patient care record submission validation score". The 2019 EQIP reported 93.1% of patient care records were submitted to CEMSIS in FY 2018–19, and EMS Agency staff reported to the February 2021 Emergency Medical Care Committee that 99.5% of patient care records had been submitted to CEMIS in calendar year (CY) 2020.

Timely submission of PCRs for time sensitive injuries was a new measure in the 2019 EQIP, which anticipated that PCR information would be submitted in FY 2019–20 based on the average scene time plus 20 minutes and in FY 2020–21 based on the average scene time plus 10 minutes. The actual time for submission of PCRs in FY 2018–19 was average scene time plus 172 minutes. According to the 2019 EQIP, the goal is to decrease the time elapsed between when patient information is collected at the scene of the incident and posted to the hospital for time sensitive injuries, such as stroke.

Data for timely submission of PCRs for time sensitive injuries is collected but was not reported to the Emergency Management Care Committees in February 2021 or November 2021. According to information provided by the EMS Agency to the management audit team, timely submission of PCRs for time sensitive injuries in FY 2019–20 was average scene time plus 127 minutes, an improvement from the timely submission of PCRs for time sensitive injuries in FY 2018–19 but less than anticipated. Timely submission of PCRs for time sensitive injuries in FY 2020–21 was average scene time plus 90 minutes, an improvement from the timely submission of PCRs for time

sensitive injuries in FY 2019–20 but less than anticipated. Because the EMS system is not meeting its goals for timely submission of PCRs for time sensitive injuries, the EMS Agency should provide ongoing reports to the Emergency Management Care Committee on activities to increase timely reporting.

Annual Quality Improvement Program Reporting on Ambulance Service Indicators

The EMS Agency reports each year on system performance. Three reported ambulance service indicators are:

1. Response time: 90% of ambulance responses will be within the number of minutes defined in the EOA agreement
2. Ambulance Patient Offload Time: the time it takes to transfer a patient from the ambulance to emergency department staff
3. Time on Scene: number of minutes on scene for trauma incidents

Prior to 2020 and the onset of the pandemic, Rural/Metro was responding to more than 120,000 emergency medical incidents annually and transporting approximately two-thirds of patients. The number of emergency medical incident responses in 2020 decreased to approximately 116,000, as shown in Figure 1.4 below.

Figure 1.4: *Ambulance Responses and Transports 2016 to 2020*

	2016	2017	2018	2019	2020	Change
Ambulance Responses	121,599	126,019	123,478	124,394	116,647	-4%
Ambulance Transports	79,896	82,042	81,721	83,860	78,505	-2%
% Transports	66%	65%	66%	67%	67%	

Source: Santa Clara County Emergency Medical Services Agency Annual Report.

Response Time Reporting

The EOA agreement requires Rural/Metro to respond to 90% of ambulance calls within a required time by subzone and call priority specified in the agreement. Response time data is aggregated and reported annually in the Emergency Medical Services Agency annual report.

According to the annual report for each year, Rural/Metro exceeded the 90% threshold for Code 3 (sirens and lights) response times in each of the five years between 2016 and 2020. Reporting methods varied in each of the annual reports. In 2016 and 2017, the EMS Agency presented the Code 3 response time compliance by Rural/Metro by subzone, each of which exceeded the 90% threshold for Code 3 calls. In 2018 through 2020, the EMS Agency presented the Code 3 response time compliance by Rural/Metro as the monthly average for all zones over the course of the year. The reported response time compliance over the course of the year for 2018, 2019, and 2020 was 92.8%, 91.8%, and 92.6% respectively. Ambulance response times are discussed in more detail in Section 3, starting on page 31 of this report.

Ambulance Patient Offload Time

Ambulance Patient Offload Time (APOT) measures the time it takes to transfer a patient to the care of emergency department staff. California Health and Safety Code requires the EMS Agency to calculate Ambulance Patient Offload Time using a standard methodology, which is calculated for all hospitals in Santa Clara County. Ambulance Patient Offload Time pertains to hospital procedures rather than ambulance procedures, but delays in offloading patients reduce the availability of ambulances to respond to other emergency medical calls. According to the EMS Agency, offload time is expected to be 25 minutes or less.

Valley Medical Center and San Jose Regional Medical Center have the highest number of transports countywide with approximately 16,000 ambulance transports to each hospital each year. The time to offload patients differs between the hospitals with Valley Medical Center exceeding the 25-minute threshold in most months. According to the EMS Agency annual reports, between 2016 and 2018, San Jose Regional Medical Center average monthly APOT ranged from 16 minutes to 30 minutes but overall met the 25-minute threshold, and Valley Medical Center average monthly APOT ranged from 31minutes to 56 minutes, not meeting the 25-minute threshold. The EMS Agency 2019 Annual Report did not report APOT measures by hospital. The EMS Agency 2020 Annual Report showed significant increases in APOT for both Valley Medical Center and San Jose Regional Medical Center; both hospitals reported patient offload times of more than one hour in December 2020. According to discussions with Valley Medical Center staff, the long offload time for VMC is due to delays in moving patients out of emergency department beds. One change made by VMC is having an emergency room physician assess the patient in the ambulance or waiting room, which provides more timely patient assessment but doesn't free up the ambulance to respond to other emergency medical services calls.

According to the EMS Agency 2020 Annual Report, although offloading patients was delayed at several hospitals in 2020 due to the pandemic, delays in offloading patients have been a long-term problem. In October 2020, the EMS Agency began sending daily reports to hospitals for delays of more than 20 minutes in offloading patients. Ambulance Patient Offload Time is reported monthly to the Board of Supervisors Health and Hospital Committee as part of a request from the Board that the Deputy County Executive for the County Health System report on emerging issues. Because Valley Medical Center has longer Ambulance Patient Offload Time than other hospitals in the County, the EMS Agency Director should consistently report Ambulance Patient Offload Time for Valley Medical Center to the Health and Hospital Committee each month. The Health and Hospital Committee Chair should also request monthly reports from the Deputy County Executive for the County Health System on VMC's actions to reduce Ambulance Patient Offload Time. The EMS Agency 2019 Annual Report did not include Ambulance Patient Offload Time by hospital, but rather, presented an aggregated time countywide. The EMS Agency Director should report Ambulance Patient Offload Time in future annual reports by month and by hospital, which has been the practice in prior years.

Time on Scene

The EMS Agency's 2019 EQIP set a new objective for "Trauma Scene Time Reduction". According to the 2019 EQIP, "In order to discourage an increase in prehospital scene times, the EMS Agency will be tracking and reviewing trauma scene times" with the goal to lower average trauma scene time. The goal for trauma scene time was 15 minutes.

In the 2016 Annual Report, the EMS Agency reported that 37% of ambulance responses to a trauma incident had less than 15 minutes on scene and 63% of ambulance responses to a trauma incident had less than 20 minutes on scene. This measure was not reported in 2017 or 2018. In the 2019 and 2020 Annual Reports, the EMS Agency reported average time on scene for trauma incidents of 15.3 minutes and 14.4 minutes, within the goal set by the 2019 EQIP.

CONCLUSION

The EMS Agency collects and reports data on clinical indicators and ambulance performance as part of its oversight role of the EMS system and the EOA agreement with Rural/Metro for ambulance services. Performance indicators included in the EOA agreement have changed over time, but the EOA agreement does not sufficiently address how Rural/Metro, the County's EOA ambulance provider, is to comply with new indicators. Also, formal reporting varies by type of indicator and not all 2021 performance indicators are routinely documented and reported. The EMS Agency needs to consistently report to the Emergency Medical Care Committee and the Health and Hospital Committee on performance indicators impacting the ambulance system, especially Ambulance Patient Offload Time – a performance measure which Valley Medical Center has not met in several years – and Timely Submission of PCRs for Time Sensitive Injuries, a performance measure that was not met by ambulance providers in FY 2019–20 and FY 2020–21.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

1.1 Include provisions in the upcoming EOA agreement allowing for flexibility of performance measurement and reporting over the term of the agreement, including specifying that EOA agreement performance measurement and reporting requirements are contained in EMS policies and procedures, which will be revised and updated periodically over the term of the agreement. (Priority 2)

1.2 Report bi-annually to the Emergency Medical Care Committee and monthly to the Board of Supervisors Health and Hospital Committee on "timely submission of PCRs for time sensitive injuries" and on "ambulance patient offload time" by hospital; and include these performance indicators in the annual reports. (Priority 2)

The Board of Supervisors' Health and Hospital Committee Chair should:

1.3 Request monthly reports from the Deputy County Executive for the County Health System on VMC's actions to reduce Ambulance Patient Offload Time. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

Implementing these recommendations will ensure that the County's ambulance provider is complying with current EMS Agency performance requirements, even if requirements are not specified in the EOA agreement, and will provide ongoing information to the Board of Supervisors and Emergency Medical Care Committee on how the prehospital system meets performance expectations, allowing for increased oversight Implementing these recommendations can be achieved within existing EMS Agency resources.

Section 2: Inspecting and Monitoring Ambulances

Background
Rural/Metro's emergency fleet was acquired and put into service in July 2011 when the initial Exclusive Operating Area (EOA) agreement between Rural/Metro and Santa Clara County was initiated. Under the EOA agreement, all ambulances shall be replaced at 250,000 miles or five years, whichever comes first. If any ambulance exceeds 250,000 miles, liquidated damages of $2,500 for each such ambulance per month shall accrue, regardless of the time such ambulance is used in the 9-1-1 system.

Problem, Cause, and Adverse Effect
EMS Agency is not adequately tracking and monitoring the mileage and age of service of Rural/Metro ambulances, as required by the EOA agreement. In addition, Rural/Metro's vehicle replacement plan is outdated. A report submitted by Rural/Metro of a point-in-time count of their fleet of 63 ambulances as of December 13, 2021, showed that one ambulance exceeded the mileage limit of 250,000. Rural/Metro removed from service two of the 63 ambulances based on year placed in service and not mileage limits but the ambulance with mileage exceeding 250,000, which was placed in service in 2018, remains in service. One other ambulance that had 229,884 miles on December 13, 2021, is six months away from meeting the 250,000-mile limit, which may be less than the time needed to procure a replacement ambulance. Seven other ambulances were placed in service in 2017 and will reach the five-year age limit in 2022. However, Rural/Metro has not provided the EMS Agency a plan for replacement of these ambulances. The lack of proper monitoring of mileage and age of service, as well as an out-of-date vehicle replacement plan, contribute to an increased risk of end-of-life vehicles in active service and vehicle failure and maintenance issues that could impact ambulance response times and delivery of services.

Recommendations
To ensure the EMS Agency is properly tracking and monitoring mileage and age of service requirements for ambulances as specified in the EOA agreement, the Agency should develop and establish formal compliance protocols and procedures to periodically monitor and document mileage of Rural/Metro vehicles. The EMS Agency should also work with Rural/Metro to develop an updated vehicle replacement plan that details (1) an alternate schedule until the end of the Rural/Metro contract in 2024, and (2) specific steps on how Rural/Metro is planning to replace ambulances approaching end of life. The Agency should also assess whether a data field could be included in ImageTrend, the EMS Patient Care Data System reporting component, for the Agency to track mileage of Rural/Metro vehicles, and work with Rural/Metro to determine whether the over 10-year-old bariatric ambulances need to be replaced or if age requirements for bariatric ambulances need to be modified in the EOA agreement.

Savings, Benefits, and Costs
Implementing these recommendations will ensure that EMS Agency practices on tracking mileage and age of service comply with the EOA agreement. Improved tracking will prevent the risk of end-of-life vehicles in active service and vehicle maintenance issues that could impact ambulance services. Implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time.

FINDING

Background

Rural/Metro's emergency ambulance fleet was acquired and put into service in July 2011 when the initial Exclusive Operating Area (EOA) agreement between Rural/Metro and Santa Clara County was initiated. The contracted EOA emergency ambulance service provider (Rural/Metro) must operate in accordance with State regulations and Santa Clara County Ordinance Code including associated Ambulance Permit Regulations. On December 13, 2021, the ambulance fleet consisted of 60 standard and 3 bariatric units[8], for a total of 63 ambulances. These units comprise the "core fleet" that is used routinely to transport patients.

EOA Agreement Fleet Requirements

The EOA agreement outlines specific contractual terms and requirements for Rural/Metro's emergency ambulances. Section 5.1.2 in the EOA agreement provides that all ambulances shall be replaced at 250,000 miles or five years, whichever comes first. The EOA Agreement states the following:

> "Beginning August 1, 2019, Rural/Metro will ensure that no ambulance used to provide Services under this Agreement exceeds 250,000 miles. If any ambulance exceeds this mileage standard, liquidated damages of $2,500 for each such ambulance per month shall accrue, regardless of the amount of time such ambulance is used in the 9-1-1 system. These liquidated damages shall be paid within thirty (30) days of occurrence to the County EMS Trust Fund."

The EMS Agency Does Not Adequately Track and Monitor the Mileage of Rural/Metro Ambulances

Despite the requirements specified in the EOA agreement, the EMS Agency vehicle inspection reporting and monitoring process does not include tracking mileage of Rural/Metro emergency ambulances. According to EMS Agency staff, the vehicle inspection and compliance process of Rural/Metro emergency ambulances includes the following:

1. Initial inspection of the ambulance by EMS Agency staff when Rural/Metro purchases a new vehicle;
2. Annual self-inspection by Rural/Metro using the checklist of requirements in EMS Agency Policy #302[9] and reported to the EMS Agency; and
3. Annual random audit of 10% of the agency's fleet conducted by EMS Agency staff, who uses the checklist of requirements in EMS Agency Policy #302 as the primary inspection criteria.

8 A bariatric ambulance is modified to carry individuals with weights exceeding 300 pounds.

9 The purpose of Policy #302 is to establish minimum inventory requirements for all prehospital care assets in Santa Clara County. Inventory requirements include minimum required quantities for areas such as Advanced Life Support medications, supplies and equipment.

Based on a review of EMS Agency vehicle inspection reports and the checklist of requirements in EMS Agency Policy #302, odometer readings are not monitored and documented on an ongoing, regular basis. According to EMS Agency staff, mileage for each emergency ambulance is only documented at the time the vehicle is placed into service in the County. During the annual audit of the agency's fleet, mileage of Rural/Metro emergency ambulances is not recorded or formally documented by EMS Agency staff.

Rural/Metro maintains a Fleet Preventative Maintenance process that includes a Preventative Maintenance Inspection (PMI) checklist that must be completed with each PMI inspection. As part of this process, PMI inspections must be completed at intervals to monitor wear conditions to ensure repair prior to becoming a mechanical failure and to proactively change fluids to prolong the vehicle life. The PMI checklist includes items on equipment, an odometer reading, and other maintenance concerns and components. EMS Agency staff do not periodically review any PMI Inspection reports and compliance mechanisms as part of their internal vehicle inspection process of Rural/Metro ambulances. There is also no data field available in ImageTrend, the EMS Patient Care Data System reporting component, to track mileage of Rural/Metro ambulances.

Rural/Metro's Vehicle Replacement Plan is Outdated

While Rural/Metro has worked with the EMS Agency to develop a schedule for the replacement of ambulances that are at end of life or out of service due to a motor vehicle accident, it is outdated and only covers 2016 through 2019, as shown in Figure 2.1 below.

Figure 2.1: ***Rural/Metro Ambulance Replacement Schedule***

Quarter	2016	2017	2018	2019
Q1 (Jan-Feb-Mar)	0	6	4	0
Q2 (Apr-May-Jun)	0	6	3	0
Q3 (Jul-Aug-Sep)	4	10	3	0
Q4 (Oct-Nov-Dec)	4	10	0	0

Source: Rural/Metro Ambulance Maintenance and Replacement Schedule, Submitted to EMS Agency on March 22, 2016.

According to Rural/Metro's vehicle replacement plan, core fleet vehicles will be replaced with new or lower-mileage vehicles having similar configurations and specifications of the current core fleet when vehicles reach 250,000 miles +/-10,000 miles or are removed from service due to a motor vehicle accident. The plan lacks specific steps on how Rural/Metro is planning to replace ambulances approaching end of life, such as determining the length of time needed to plan for and procure replacement ambulances, and the deployment plan for reserve ambulances. According to EMS Agency staff, the agency is not responsible for vehicle replacement planning. Instead, Rural/Metro notifies the EMS Agency when they have removed an ambulance from service. The EMS Agency will then internally document and confirm that the ambulance has been removed from service. The EMS Agency relies on Rural/Metro reporting on vehicle replacement and is not proactively checking or monitoring for compliance on mileage and years of service as detailed in the EOA agreement.

Rural/Metro's Emergency Ambulance Mileage and Age of Service

Rural/Metro Ambulance Mileage

As previously stated, under the EOA agreement, all ambulances shall be replaced at 250,000 miles or five years, whichever comes first. The Management Audit Division requested the EMS Agency to submit a report documenting emergency ambulance data from Rural/Metro. A report submitted by Rural/Metro to EMS of a point-in-time count on December 13, 2021, of their current fleet of 63 ambulances showed that one ambulance exceeded the mileage limit of 250,000. Figure 2.2 below shows the mileage, initial year of service and date of last service for Rural/Metro ambulances within the top 30% of the mileage requirement of 250,000.[10]

Figure 2.2: ***Top 30% of Rural/Metro Fleet Within 250,000 Mileage Limit (as of December 13, 2021)***

Date Placed in Service	Mileage as of 12/13/21	Date of Last Maintenance
3/27/18	251,945	November 5, 2020
2016 (1)	240,476	October 25, 2021
2014(1)	235,714	September 27, 2021
5/21/18	229,884	December 2, 2021
3/27/18	207,140	December 13, 2021
3/20/18	203,327	August 16, 2021
2017 (1)	202,350	December 8, 2021
2017 (1)	202,127	November 23, 2021
2017 (1)	200,171	December 6, 2021
2017 (1)	193,951	November 17, 2021
2017 (1)	192,521	November 15, 2021
2017 (1)	183,891	December 13, 2021
2017 (1)	180,870	September 8, 2021
2017 (1)	176,922	December 2, 2021

Source: Data received from the EMS Agency.

Note: (1) The month and day of service was not available.

Rural/Metro removed from service two ambulances listed in Figure 2.2 above based on year placed in service and not mileage limits. These ambulances were placed in service in 2014 and 2016 and had mileage of 235,714 and 240,476 respectively. The ambulance placed in service in 2018 with mileage of 251,945 remains in service.

Six other ambulances that were in service on December 13, 2021 and shown in Figure 2.2 above had mileage between 200,000 and 229,884 miles. Rural/Metro's vehicle replacement plan used an anticipated mileage of 3,200 miles per unit per month to determine their replacement schedule. By using this mileage standard, 50,000 miles

10 This includes 14 ambulances with a mileage above 175,000 (top 30% of 250,000) and 49 ambulances with mileage below 175,000.

is approximately 15.6 months away from meeting the 250,000-mileage limit. The ambulance with 229,884 (as of December 13, 2021), as shown in Figure 2.2 on page 28, would be six months away from meeting this mileage limit, which may be less than the time needed to procure replacement ambulances.

Rural/Metro Ambulance Age of Service

The EMS Agency is not adequately tracking and monitoring the age of service of Rural/Metro ambulances. Information on the initial date of service for some of the ambulances is incomplete because EMS Agency staff did not document the exact start date for ambulances in 2017, as shown in Figure 2.2 on page 28. Of the 63 ambulances in Rural/Metro's fleet on December 13, 2021, seven have a start date in 2017 and, therefore, are approaching (or exceeded depending on the month, which is unknown) the age limit of five years.

Rural/Metro will need to replace these seven ambulances in 2022. Because Rural/Metro's vehicle replacement plan lacks specific steps on how Rural/Metro is planning to replace ambulances approaching end of life, such as determining the length of time needed to plan for and procure replacement ambulances, the EMS Agency will need to monitor Rural/Metro's replacement plan for these seven ambulances to ensure compliance with the EOA agreement.

The remaining ambulances began service after 2017 except for three bariatric ambulances, which have been in service for over ten-years (since July 1, 2011). The requirements for bariatric ambulances differ from standard ambulances in that the bariatric ambulances are equipped to the basic life support level. Standard ambulances are equipped at the advanced life support (paramedic) level. Bariatric ambulances have hydraulic lift gates, a wider patient compartment body and have ambulance cots that can handle patients that weigh at least 1,000 pounds. However, it is not stated in the EOA agreement that bariatric ambulances are excluded from the five-year ambulance replacement requirement.

Liquidated Damages

Under the EOA agreement between the County and Rural/Metro, beginning August 1, 2019, if any ambulance exceeds the mileage limit of 250,000 miles, liquidated damages of $2,500 for each such ambulance per month shall accrue, regardless of the amount of time the ambulance is used in the 9-1-1 system. As shown in Figure 2.2 on page 28, one ambulance exceeded the mileage limit of 250,000. However, a review of liquidated damages accrued by Rural/Metro since 2016 does not show liquidated damages for noncompliance with the 250,000-mileage limit.

Because the EMS Agency vehicle inspection reporting and monitoring process does not include tracking mileage of Rural/Metro emergency ambulances, and EMS Agency staff does not periodically review Rural/Metro's PMI Inspection reports and compliance mechanisms as part of their internal vehicle inspection process of their ambulances, the amount of liquidated damages that may have accrued due to noncompliance cannot be calculated.

CONCLUSION

EMS is not adequately tracking and monitoring the mileage and age of service of Rural/Metro ambulances, as required by the EOA agreement. Odometer readings are not monitored and documented on an ongoing, regular basis as part of the EMS vehicle inspection reporting and monitoring process. In addition, Rural/Metro's vehicle replacement plan is outdated and only covers 2016 through 2019. A report submitted by Rural/Metro of a point-in-time count on December 13, 2021, of their current fleet of 63 ambulances showed that one ambulance exceeded the mileage limit of 250,000. The lack of proper monitoring of mileage and age of service, as well as an out-of-date vehicle replacement plan, contribute to an increased risk of end-of-life vehicles in active service and vehicle failure/maintenance issues that could impact ambulance response times and delivery of services. The lack of oversight and monitoring also raises the risk that EMS is not adequately capturing liquidated damages that may have accrued due to noncompliance with EOA mileage requirements.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

2.1 Develop procedures for EMS Agency staff to periodically monitor and document mileage of Rural/Metro ambulances. (Priority 2)

2.2 Work with Rural/Metro to develop an updated ambulance replacement plan that details (1) an alternate schedule until the end of the Rural/Metro contract in 2024, and (2) specific steps on how Rural/Metro is planning to replace ambulances approaching end of life, such as determining the length of time needed to plan for and procure replacement ambulances, and the deployment plan for reserve ambulances. (Priority 2)

2.3 Assess whether a data field could be included in ImageTrend, the EMS Patient Care Data System reporting component, for the EMS Agency to track mileage of Rural/Metro vehicles. (Priority 2)

2.4 Work with Rural/Metro to determine whether the over 10-year-old bariatric ambulances need to be replaced or if age requirements for bariatric ambulances need to be modified in the EOA agreement. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

Implementing these recommendations will ensure that existing EMS Agency practices on tracking mileage and age of service are in compliance with specified contractual terms in the EOA agreement. Improved oversight will help prevent the risk of end-of-life vehicles in active service and vehicle failure and maintenance issues that could impact ambulance response times and delivery of services. Additionally, EMS Agency will be able to better capture liquidated damages that may have accrued due to noncompliance with EOA mileage requirements. Finally, implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time.

Section 3: Emergency Ambulance Response Times

Background
Rural/Metro, the Exclusive Operating Area (EOA) ambulance provider, must respond to 90% of ambulance calls each month within the parameters set in the EOA agreement for each of five subzones in the County. Response time is measured from the time the call is dispatched by Santa Clara County Communications to the time the ambulance arrives at the scene. Response time compliance is calculated separately for each of the five County subzones by call priority – Code 3, response with lights/sirens, and Code 2, response without lights/sirens – and is achieved when 90% or more of responses in the month for each call priority in each subzone meet the specified response time requirements.

Problem, Cause, and Adverse Effect
According to stakeholder discussions, ambulance responses may vary within the month, with response times slower at the beginning of the month compared to response times later in the month. According to an analysis of six months of data between 2020 and 2021, the Management Audit Division found that average response times were consistently shorter at the end of each month as opposed to the rest of the month. Code 3 call responses were, on average, 0.71% to 5.15% shorter at the end of the month, while Code 2 call responses at the end of the month were 0.78% to 7.98% shorter on average. Subzone 5 (South County) experienced the most consistent shifts in response times at the end of the month, with shorter response times in five of the six sample months for both Code 2 and Code 3 calls. The decrease in average ambulance response times across all zones and codes in the last week of the month as compared to the rest of the month suggests more ambulances are deployed at the end of the month to meet response time requirements.

The EOA agreement set initial ambulance deployment standards, but after the first six months, the provider could set ambulance deployment schedules at its discretion. The EMS Agency does not maintain information on the providers ambulance schedules and the availability of ambulances over the course of the month, raising the risk that the ambulance provider is not consistently meeting the 90% response time requirement over the course of the month.

Recommendations
To allow for more comprehensive oversight, the EMS Agency should in the successor EOA agreement with a new ambulance provider following the Request for Proposal (RFP) process, provide for (a) ambulance deployment and response standards based on dispatch acuity and (b) response time monitoring on a more frequent basis rather than monthly basis in each of the five subzones.

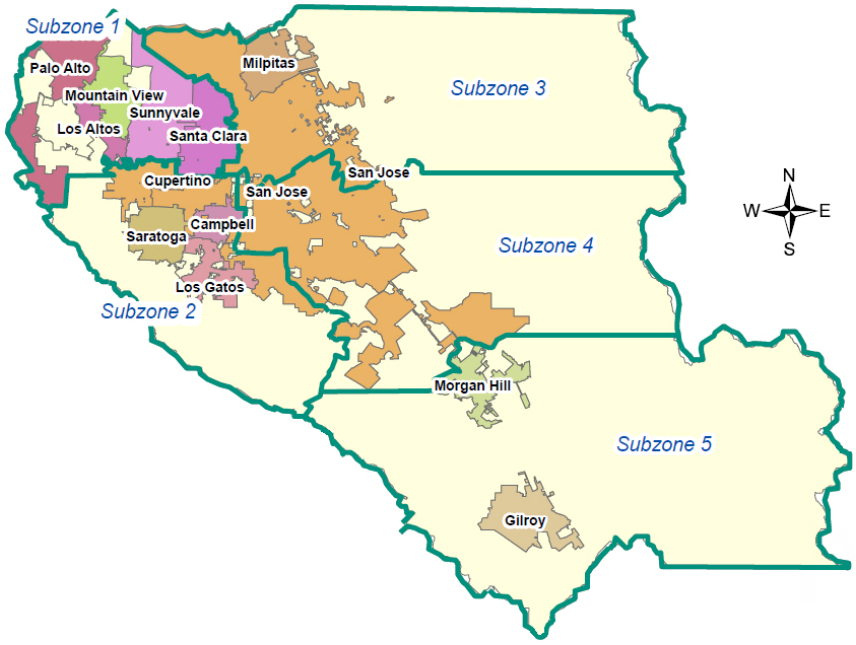
Savings, Benefits, and Costs
Implementing these recommendations will ensure that the EMS Agency is providing a more comprehensive level of oversight of ambulance response times, which can help lead to more consistent services by the contracted ambulance provider.

FINDING

Exclusive Operating Area Agreement Ambulance Response Time Standards

Rural/Metro, the Exclusive Operating Area (EOA) ambulance provider, must meet the response times to ambulance calls as detailed in the current EOA agreement with Santa Clara County, which is overseen by the Emergency Medical Services (EMS) Agency. "Response time" means the time interval commencing with an ambulance service provider receipt of a request for service (call dispatched by Santa Clara County Communications) to the arrival of an ambulance operated by the service provider at the place of the request.[11] Response time compliance is calculated separately for each of five subzones by call priority: Code 3 - response with lights/sirens; and Code 2 - response without lights/sirens (EOA subzones are shown in Figure 3.1 below). Response time compliance is achieved when 90% or more of responses in the month for each call priority in each subzone meet the specified response time requirements as defined by population density (urban/metro, suburban, and rural/wilderness areas). The specific times for County EOA emergency ambulance response are detailed in the EMS Agency Policy #651.

Figure 3.1: *Exclusive Operating Area Subzones*



Subzone	Areas Included
Subzone 1	Los Altos Hills, Los Altos, Mountain View, Sunnyvale and unincorporated areas Loyola, and Moffett Field
Subzone 2	Campbell, Cupertino, Los Gatos, Monte Sereno, San Jose (west), Saratoga and the unincorporated areas of Burbank, and Redwood Estates
Subzone 3	Milpitas, San Jose (north), and Santa Clara
Subzone 4	San Jose (east and south)
Subzone 5	Gilroy, Morgan Hill, and unincorporated areas San Martin

Source: Santa Clara County Exclusive Operating Agreement, Exhibit B.

The EOA agreement includes the assessment of fines and penalties (liquidated damages) which are paid by the EOA ambulance provider for failing to meet standards outlined in the contract, such as response times. Liquidated damages for response time non-compliance are assessed monthly but are waived if the EOA ambulance provider achieves a 92% aggregate response time compliance for both call priorities across the County as a whole.

11 Chapter XVI - Ambulance Ordinance Code - October 2005.

Response time data in the County is automatically uploaded to a third-party validation system, First Watch[12], which is configured and monitored by the EMS Agency. First Watch then generates monthly reports on response time compliance for the EMS Agency. These reports are configured based upon the calculation methodology required under the contract with Rural/Metro.

EOA Agreement Scope of Work and the EMS Agency Mission Statement

Both the EOA Agreement and EMS Agency's mission statement stipulate the goals of the emergency ambulance provider and system. The EOA Agreement states the following in Article III: Scope of Work:

> "Section 3.1 Rural/Metro shall provide Advanced Life Support First Response and Advanced Life Support Emergency Ambulance Services to the County for the County's EOA (the "Services"). Rural/Metro shall use the County Communications Center and will work cooperatively with the County and with the municipal public safety partners to provide outstanding emergency and prehospital medical services to County residents."

In addition, the EMS Agency's mission statement states the following:

> "The mission of the Santa Clara EMS System is to evolve a cost-effective, collaborative, and outcome-based EMS delivery system that produces clinically superior and culturally competent care, while achieving high levels of patient satisfaction from the people of Santa Clara County."

Response Times of Rural/Metro Emergency Ambulance Services

Response Time Calculation and Reporting

Response time is calculated from the time the ambulance is dispatched by the County Communications Center to the arrival of the ambulance at the scene; response time, however, can be reset if a call is (i) upgraded from Code 2 to Code 3, (ii) downgraded from Code 3 to Code 2, (iii) reassigned, or (iv) canceled. The EMS Agency reports monthly on Rural/Metro response time performance to the Board of Supervisors Health and Hospital Committee. According to these reports, Rural/Metro meets the monthly response time threshold of 90%, although according to the March 16, 2022, report, Code 3 response time was less than 90% for all five subzones in January 2022 and was less than 90% for Subzone 1 and Subzone 3 in December 2021. According to the EMS Agency, January and February 2022 performance was still under review and had not yet been reconciled at the time of the audit.

Response Time Variation During the Month

While monthly response times reported to the Emergency Medical Care Committee and Board of Supervisors Health and Hospital Committee generally meet the 90% threshold, according to stakeholder discussions, ambulance responses may vary within the month, with response times slower at the beginning of the month compared to response times later in the month. Analysis of weekly average response times, provided by the EMS Agency out of First Watch, suggest inconsistencies in

12 According to EMS, FirstWatch is the host, and EMS has access privileges to FirstWatch.

emergency service delivery, especially in Subzone 5 in southern Santa Clara County. The Management Audit Division analyzed six sample months of data in 2020 and 2021 (March, April, and August of each year). We took the average response times for each week (provided by the EMS Agency), grouped the weeks into two periods (the start of the month, first 21 days, and the end of the month, last nine–ten days), and calculated the average response time for these periods by month and call code. We then calculated the percentage change between the response times at the start of the month and those at the end of the month. This comparison was made separately for Code 2 calls (response without lights/sirens) and Code 3 calls (response with lights/sirens).

Across all subzones and months sampled, the Management Audit Division found that most response times at the end of the month were shorter than the response times at the start of the month (see Figure 3.2 on page 35). On average, response times for Code 2 calls at the end of the month were 0.78% to 7.98% shorter, which equates to 5 seconds to 48 seconds shorter assuming the response would normally take 10:00 minutes at the start of the month.[13] Response times for Code 3 calls were, on average, 0.71% to 5.15% shorter at the end of the month, or 4 seconds to 31 seconds shorter for a response which would normally take 10:00 minutes at the start of the month.[14] Subzone 5 appears to experience the greatest and most consistent shifts in response times at the end of the month, with shorter response times in five of the six sample months for both Code 2 and Code 3 calls (the exception being August 2020).

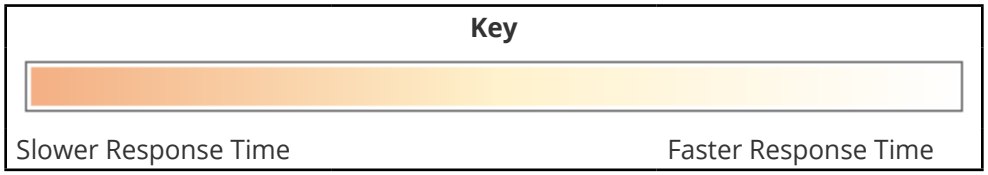
13 10:00-minutes is used as a real-world example and is not representative of any particular EMS response time requirement and/or standard.

14 10:00-minutes is used as a real-world example and is not representative of any particular EMS response time requirement and/or standard.

Figure 3.2: *Change in the Average Response Times in the Last Third of the Month: March, April, and August of 2020 and 2021*

Code 2 Calls - Response Without Lights and Sirens					
	Subzone 1	**Subzone 2**	**Subzone 3**	**Subzone 4**	**Subzone 5**
March 2020	-2.39%	-9.13%	-11.16%	-8.48%	-17.09%
April 2020	2.11%	7.22%	1.25%	6.66%	-13.85%
August 2020	-3.55%	1.01%	-2.42%	2.07%	2.66%
March 2021	-4.39%	-0.31%	1.75%	1.77%	-5.49%
April 2021	-2.03%	1.04%	-0.62%	2.19%	-8.91%
August 2021	-10.26%	-8.32%	-8.45%	-8.91%	-5.19%
Average % Change:	**-3.42%**	**-1.41%**	**-3.28%**	**-0.78%**	**-7.98%**

Code 3 Calls - Response With Lights and Sirens					
	Subzone 1	**Subzone 2**	**Subzone 3**	**Subzone 4**	**Subzone 5**
March 2020	-5.21%	-10.67%	-6.12%	-7.42%	-14.66%
April 2020	4.09%	6.94%	-0.55%	1.57%	-3.13%
August 2020	-4.92%	-1.47%	-5.81%	2.06%	14.28%
March 2021	-3.59%	5.69%	4.68%	-1.76%	-3.26%
April 2021	6.25%	-4.19%	1.80%	2.13%	-16.41%
August 2021	-3.68%	-1.35%	1.76%	-8.90%	-7.71%
Average % Change:	**-1.18%**	**-0.84%**	**-0.71%**	**-2.05%**	**-5.15%**



Source: Santa Clara 911 Response and Transport Summary Data for March, April, and August in 2020 and 2021, as provided by the EMS Agency.

The decrease in average response times for emergency ambulance services at the end of the month may reflect adjustments to achieve the 90% response time compliance required in the EOA agreement. Problematically though, it indicates inconsistent service delivery during the month.

According to discussions with EMS Agency staff, the decrease in response times at the end of the month is because the ambulance provider is trying to make compliance (90%) in a specific zone or is trying to make an overall compliance of 92% to achieve the liquidated damages waiver identified in the 8th Amendment to the EOA Agreement (Section 4.4.6). According to EMS Agency staff, the ambulance provider has probably deployed additional ambulances at the end of the month to achieve the compliance goals.

EOA Agreement Ambulance Deployment

The EOA agreement requires Rural/Metro to maintain sufficient resources to meet response time requirements (Section 4.3) and Exhibit L defines deployment planning and the initial ambulance deployment plan, which was based on call volume for three years from approximately 2007 to 2010. The deployment plan called for at least 23 post locations at night and 32 post locations during the day and detailed the hours of service by time of day and day of week by subzone. After the first six months of operation in 2010, Rural/Metro could change the post locations and around-the-clock coverage at its discretion. Changes to the ambulance deployment plan were not documented in modifications to the original EOA agreement, and the EMS Agency does not have ongoing documentation of ambulance deployment plans.

According to the EMS Agency, in Santa Clara County the ambulance provider deploys ambulances based on historical demand. For example, according to EMS Agency staff, generally between the hours of 1pm to 9pm, the demand for service is at its highest. The ambulance provider generally will have up to 40 to 45 ambulances at around 5pm. Then as demand decreases, the number of deployed ambulances decreases. Historically, demand is at its lowest between 3am to 5am, and there may be only 20 to 22 ambulances during that timeframe. EMS Agency staff states that using historical data to forecast the present demand is not perfect since history cannot predict all the circumstances that create demand for EMS Agency services or affect ambulance availability. A consistent decrease in response times may indicate that there are more ambulances deployed relative to the calls for service.

Our analysis of the average response time data suggests that the ambulance provider may be deploying more ambulances at the end of the month to offset longer response times than permitted under the EOA agreement earlier in the month. However, because the EMS Agency relies on the provider to deploy ambulances and forecast demand for services based on historical data, as provided in the EOA agreement, the agency did not have documented response time patterns and was unable to determine and confirm the specific causes for the inconsistencies in response times.

Data Limitations

The average response time data shown in Figure 3.2 on page 35 is not a reflection of response times measured for compliance under the EOA agreement. The data reflects the percentage change in average response times for all responses. According to EMS Agency staff, the "average response time" data used in the sample includes all times for all of the following responses: cancelled on-time, cancelled late, and arrival on scene. For measuring response time compliance by the 90th percentile, as required under the EOA agreement, the EMS Agency does not include cancelled on-time calls. The EMS Agency was unable to retrieve raw response time data for the requested timeframe because of an undue burden in downloading and processing the data in this fashion.

CONCLUSION

The goals of the emergency ambulance provider and system as stipulated in the EOA agreement, and the EMS Agency mission statement emphasizes "outstanding emergency and prehospital medical services to County residents", as well as "clinically superior and culturally competent care". However, as shown in an analysis of six months of data in 2020 and 2021, the decrease in response times for emergency

ambulance services in the last week of the month as compared to the first three weeks, especially in subzones 1, 3, and 5, may indicate inconsistencies in service delivery. While the EOA agreement set initial ambulance deployment standards, after the first six months, the provider could set ambulance deployment schedules at its discretion. The EMS Agency does not maintain information on the providers ambulance schedules and the availability of ambulances over the course of the month, raising the risk that the ambulance provider is not consistently achieving the service delivery goals as outlined in the EOA agreement and the EMS Agency mission statement.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

3.1 In the successor EOA agreement with a new ambulance provider following the Request for Proposals (RFP) process, (a) provide for ambulance deployment and response standards to be established in Agency policy, which can serve as a living document subject to amendment, and (b) base ambulance deployment and response standards on dispatch acuity and provide response time monitoring on a more frequent basis rather than monthly basis in each of the five subzones. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

Implementing these recommendations will ensure that the EMS Agency is providing a more comprehensive level of oversight of ambulance response times, which can help lead to more consistent services by the contracted ambulance provider. Additionally, implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time.

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Section 4: Hospital Patient Surge Plan Updates

Background
EMS Agency policy requires County hospitals to submit by December 1st every year an updated patient volume management plan. The purpose of the policy is to define the circumstances in which a facility can request an ambulance to bypass the facility to relieve congestion.

Problem, Cause, and Adverse Effect
The EMS Agency's regulatory role involves ensuring that the request for an ambulance diversion (or "bypass") is due to unforeseen, not normal conditions. The hospital's updated patient volume management plan provides the EMS Agency with context to inform the decision as to whether to approve a hospital to go on bypass.

The EMS Agency does not define the patient volume management plan or its elements, just that the plans comply with the guidelines of the Joint Commission on Accreditation of Healthcare Organizations, although the EMS Agency does not have access to these guidelines, and the guidelines are not necessarily available to hospitals. The patient volume management plans vary by hospital. For example, Stanford and VMC are the two level one trauma centers in the County, but the hospitals use different criteria for determining when the hospital is at capacity, making it difficult for the EMS system to determine when a bypass request is warranted.

EMS Agency policy also states that patient volume management plans will be reviewed annually. However, there is no review or approval process in place.

Recommendations
The EMS Agency should provide a template and/or guide to hospitals specifying what to include in the annual patient volume management plan submission and should establish a patient volume management plan review and approval policy and procedure. EMS Agency data staff should consider integrating hospital software tools for patient volume monitoring into the EMResource, the web-based EMS system, for real-time monitoring when available and applicable. The EMS Agency should also evaluate updating the EMS Hospital Bypass Policy 603 to reflect operational changes if different procedures and practices are appropriate.

Savings, Benefits, and Costs
Costs may be incurred by hospitals that have to draft an EMS Agency-specific compliance report, but there will be no cost to the agency beyond staff time to review and approve the annual plan submissions and staff time dedicated to establishing appropriate software integrations. Enforcing EMS Agency policy and updating submission will give the Agency useful information in coordinating hospital bypass requests.

FINDING

Hospital Patient Volume Management Plans

A hospital patient volume management plan[15] defines the conditions for overcrowding, and what actions ancillary departments at the hospital should take to promote patient safety and help relieve saturation where patient volume challenges or exceeds available resources. Ten of Santa Clara County's eleven hospitals are required to annually submit updated patient volume management plans to EMS Agency.[16]

The EMS Agency Policy 603 Hospital Bypass states:
"The hospital shall have an EMS Agency-approved patient volume management plan that utilizes the guidelines established by The Joint Commission (TJC) as a minimum. The hospital shall revise and submit the plan annually for review and approval by the EMS Agency. Plans must be submitted by December 1st of each year."

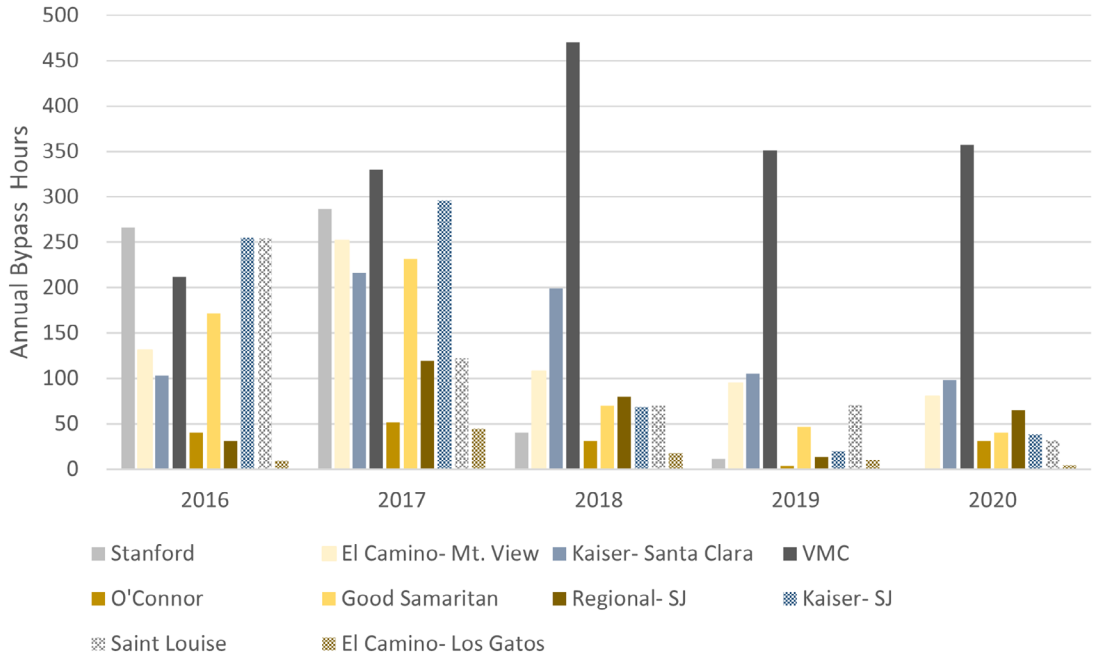
The purpose of Policy 603 is to define the circumstances in which a facility can request an ambulance to bypass the facility to relieve congestion. Hospital bypass is initiated through the 911 emergency call system. Policy 603 provides that bypass of a hospital is based on the approved patient volume management plan.

According to the EMS Agency's annual reports, the agency closely monitors the hours the hospitals are on ambulance bypass. Hospitals may not be on bypass for more than 60 minutes and then must remain open for at least 60 minutes after the bypass episode. Hospital bypass episodes decreased by 49% in the five years between 2016 and 2020, from more than 1,400-hours in 2016 to approximately 750 hours in 2020. Valley Medical Center, as the level one trauma center and public hospital in the County, has the highest hours of bypass but bypass hours decreased by 24% between 2018 and 2020. Figure 1 below shows the annual hours of bypass by hospital between 2016 and 2020.

15 A patient volume management plan, also called a patient surge plan, refers to an increase in patient volume that is not due to a Mass Casualty Incident. Separate Emergency management plans address planning for a Mass Casualty Incident.

16 The Palo Alto Veterans Administration (PAV) Hospital is federally exempt from this requirement.

Figure 4.1: *Total Annual Hospital Bypass Hours 2016 to 2020*



Source: EMS Agency Hospital Bypass by Month Reports.

Limited Patient Volume Management Plan Guidance, Review Process

The EMS Agency does not provide a template or list of required patient volume management plan elements beyond the one stipulation that the plan should, at minimum, comply with the guidelines established by the Joint Commission on Accreditation of Healthcare Organizations ("Joint Commission").[17] However, the EMS Agency does not have access to the Joint Commission guidelines. According to Agency staff, the Joint Commission has oversight of hospitals' patient volume management plans, and the EMS Agency serves as a collaborative partner.[18]

The patient volume management plans vary by hospital. Stanford and VMC are the two level one trauma centers in the County and had the most detailed plans, but the hospitals use different criteria for defining capacity. VMC defines capacity using the NEDOC (National Emergency Department Overcrowding) scale to determine when the emergency department is overcapacity. Kaiser San Jose also defines capacity using the NEDOC scale but uses different numbers to define capacity levels than VMC. Stanford defines capacity in three stages – conventional, contingency or surge, and critical – and establishes staffing, space, supply, and standard of care criteria for each stage. San Jose Regional Medical Center, which is a level two trauma center and

17 The Joint Commission is a health care accreditation organization that periodically conducts an accreditation survey of Santa Clara County hospitals and medical facilities.

18 According to discussions with EMS Agency staff, the Agency only becomes involved if the hospital is not able to handle the surge in patient volume. The EMS Agency coordination role is further defined by the California Department of Public Health in the California Public Health and Medical Emergency Operations Manual.

has high annual ambulance volume, does not define capacity in the patient volume management plan but rather gives examples of peak census. Lack of standardization across the 10 County hospitals results in inconsistency for the entire EMS system when determining the need for hospital bypass.

Hospitals are to review the patient volume management plans annually and submitted to the EMS Agency by December 1 of each year, although changes to the plan are only made when needed. The EMS Agency does not have a formal process for reviewing and approving hospitals' annual patient volume management plan submission. The only hospital report that EMS Agency reviews is the ambulance patient offload time report (discussed in more detail in Section 1 of this report).

Ambulance Bypass to Relieve Patient Surge

In some instances, a hospital's reasonable standard of care may be overwhelmed, and hospital administrators may request EMS patient transports to bypass their facility. Facility bypass, or ambulance diversion[19] is a management tool that may be used upon EMS Agency approval for 60 minutes per occurrence when patient load exceeds hospital resources. The decision to allow a hospital to go on bypass is based on the patient volume management plan.

EMS Agency's regulatory role involves ensuring that the request for an ambulance diversion is due to unforeseen, not normal conditions. An updated and standardized patient volume management plan from a hospital provides the EMS Agency with timely data and context to inform the decision as to whether, at any given moment, to approve a hospital to go on bypass and the extent to which that will affect the hospital system. The EMS Agency needs to be informed of developments and changes to a hospital's institutional constraints such as bed capacity and staffing levels, which change regularly. Hospital patient volume management plans provide necessary context for the EMS Agency to make a data-informed decisions in emergency situations.

In addition to providing the EMS Agency context for system-wide management, annual patient volume management plans guide a hospital internally on protocol and procedure during a surge in patient volume. Ambulance bypass data suggest that hospitals are not meeting their goals to reduce the number of hours spent on bypass; in 2020–2021, while each hospital is on average below the 36-hour per month on ambulance bypass threshold set by the EMS Agency in Policy 603, occasionally hospitals have exceeded 36-hours per month on ambulance bypass, normally coinciding with winter months. Hospitals' regular revisions of internal policy could help ensure continuity of operations and mitigate patient backlogs. Hospital planning is a critical way to reduce diversion hours, and EMS Agency plays a role in in disseminating best practices and encouraging planning in its oversight capacity.

19 Diversion is the closure of the Emergency Department to all incoming transfers through the Emergency Department and the inability to accept incoming ambulance traffic.

Software for Patient Volume Capacity Management

Hospitals use various evaluation tools to quantify Emergency Department crowding. For instance, VMC uses the National Emergency Department Overcrowding Scale (NEDOCS)[20] and Kaiser Santa Clara uses the T2 Surge Tool. These measurements, rather than subjective staff perception of overcrowding, are a determining factor that defines the notification tree in requesting and approving ambulance bypass. Currently, EMS Agency does not have visibility into hospitals' surge evaluation tools. However, NEDOCS can be integrated into EMResource[21] for real time monitoring. This would enable hospitals to communicate live status to prehospital EMS operators, and work as an early warning system to better plan and manage patient surges, informing transport decisions that can be taken to ameliorate overcrowding.

In the absence of real-time visibility into a hospital's patient volume levels, patient volume management – or surge – plans communicate capacity and assist the EMS Agency in identifying and mitigating impediments to patient flow.

CONCLUSION

Current hospital and EMS Agency practices relating to planning for and managing surges in patient volume are inconsistent with EMS Hospital Bypass Policy (No. 603). The Bypass Policy states that the plans are to be reviewed and approved by the EMS Agency, but there is no review or approval process in place. Plans are supposed to utilize Joint Commission guidelines, but the EMS Agency does not have access to these guidelines. Also, it is technologically possible to integrate hospital patient volume monitoring tools into EMS Agency technology, but no actions have been taken to do so. Each of the ten individual hospitals is part of an integrated County emergency medical system; each patient volume management plan should be readily accessible to foster coordination and synchronicity.

20 NEDOCS is an objective measure of overcrowding used by hospitals nationwide, incorporating institutional constants such as bed count, patient count, respirator availability, wait time, etc. to reflect overcrowding. The NEDOCS score determines each hospital department's activities at each level of overcrowding. At VMC, the NEDOCS is used to reflect overall overcrowding of the Hospital, not just the Emergency Department.

21 EMResource is an internet-based EMS Communications system used by the EMS Agency and EMS transporters to track when hospitals have activated 9-1-1 ambulance diversion.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

4.1 Establish within EMS Agency a patient volume management plan review and approval policy and procedure and obtain access to the Joint Commission Guidelines to use for evaluation. (Priority 2)

4.2 Consider providing a template or required information checklist to guide hospitals in drafting their annual patient volume management plans. (Priority 2)

4.3 Consider incorporating hospital patient volume monitoring tools into EMS Agency technology, where available and applicable. (Priority 2)

4.4 Update EMS Hospital Bypass Policy 603 to reflect operational changes if different procedures and practices are appropriate. Consider updates prior to the established policy review date of January 1, 2023. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

Costs may be incurred by hospitals that have to draft an EMS Agency-specific compliance report, but there will be no cost to the agency beyond staff time to review and approve the annual plan submissions and staff time dedicated to establishing appropriate software integrations. Enforcing EMS Agency policy and updating submission will give the Agency useful information in coordinating hospital bypass requests.

Section 5: Electronic Patient Care Record Visibility to Hospitals

Background
An electronic patient care record (ePCR) is completed by emergency medical service (EMS) providers for every EMS response that occurs within Santa Clara County. County emergency departments of the receiving facilities use hospital hub, a web-based platform, to view and/or print the ePCR. The hospital hub platform implemented in 2015 allows real time transfer of the patient assessment documented in the ePCR by the ambulance provider to the emergency department of the receiving facility.

Problem, Cause, and Adverse Effect
EMS Agency policy provides for the EMS provider (usually a fire department or ambulance paramedic) to document preliminary patient assessment data, including supplementary data such as electrocardiogram monitoring, in the ePCR as soon as possible. The hospital hub platform allows patient assessment information to be transferred to the emergency department of the receiving facility as soon as the facility is selected. The ePCR also allows for documentation of stroke symptoms as they evolve during the encounter with the EMS provider, which can be made available in real time to the emergency department of the receiving facility. The extent to which the emergency departments access the ePCR information in near real time and prior to ambulance departure is not known; this is not information tracked by EMS Agency staff, and our discussions with staff from two hospital emergency departments suggest that ePCR data downloaded from the hospital hub is used retrospectively but not consistently used by emergency department staff for patient care.

Emergency department staff do not have consistent access to the hospital hub platform. More than half of the emergency department staff on the lists of three County hospitals selected for review had never logged into the system. Hospital staff may not be aware of hospital hub, and if they are aware, do not know how to obtain access. The result is that the ePCR may not be available for review by hospital staff for patient treatment.

Recommendations
The EMS Agency should work with respective emergency department nurse managers and EMS ambulance providers to ensure timely entry of ePCR data, and available to emergency department staff for patient treatment. EMS Agency staff should also verify hospital hub users with all hospital emergency department nurse managers each year, communicate the process for updating the hospital hub access staff list during the year, and consider publishing information on the EMS Agency website on the benefits of the hospital hub tool and ways for hospital staff to access the tool.

Savings, Benefits, and Costs
These recommendations can be implemented within the EMS Agency scope of work. Patient care will improve when EMS providers are able to communicate to hospital personnel the disposition of the patient in transport, and scope of care provided during the transport.

FINDING

Electronic Patient Care Records and the Hospital Hub

The Santa Clara County Emergency Medical Services (EMS) Agency updated the policy for electronic patient care record (ePCR) documentation in 2020 with a plan for review of the policy in 2023. The policy defines documentation standards and requires submission of patient data into the County's EMS Patient Care Data System ("EMS Data System") in near real time. The policy provides for the EMS provider (usually a fire department or ambulance paramedic or emergency medical technician) to document preliminary patient assessment data as soon as possible. In addition to the patient assessment, the policy requires supplementary data, such as electrocardiogram (ECG) monitoring, to be included in the ePCR. The ePCR is to be left with the receiving facility prior to the departure of the EMS provider from the receiving facility. According to the EMS Agency's 2017 Annual Report, the Agency planned to upgrade the EMS data system in 2018 to include the hospital hub platform, a tool used by emergency department receiving facilities to retrieve prehospital ePCR data for patients transported to the emergency department. The hospital hub platform was completed in 2015, replacing the prior practice of creating and submitting to the receiving facility a PDF (or portable document form) of the ePCR created by the EMS provider. The new hospital hub platform allowed real time transfer of the patient assessment documented in the ePCR to the emergency department of the receiving facility. According to the EMS Agency's 2019 Annual Report, the hospital hub platform allows patient assessment information to be transferred to the emergency department of the receiving facility as soon as the facility is selected. The ePCR also allows for documentation of stroke symptoms as they evolve during the encounter with the EMS provider, which can be made available in real time to the emergency department of the receiving facility.

The County's EMS system includes 11 hospitals.[22] Valley Medical Center and San Jose Regional Medical Center are the two largest receiving facilities for emergencies. Valley Medical Center, San Jose Regional Medical Center and Stanford Medical Center are designated trauma centers.

The EMS Agency has designation agreements with 10 of the 11 hospitals defining the roles and responsibilities of the County EMS Agency and the respective hospitals in receiving patients; the agency does not have a designation agreement with Palo Alto Veterans Administration Hospital. According to the designation agreements, the hospital is to comply with EMS Agency procedures, which includes use of the hospital hub to access patient data when a patient is transferred to the receiving hospital's emergency department. In implementing the hospital hub, according to EMS Agency staff, an EMS Specialist from the agency worked with the nurse manager of each hospital's emergency department to identify which staff should have access to the hospital hub. Hospital emergency departments had different lists of which staff would have access to the hospital hub and some hospitals listed several individuals, others listed only the emergency department nurse manager. Each hospital staff person has an individual account not shared with other staff, allowing for tracking which hospital staff viewed the incident recorded in the ePCR. According to discussions with EMS Agency staff, hospital emergency departments are responsible to maintain

22 The 11 hospitals are Valley Medical Center, San Jose Regional Medical Center, El Camino Hospital Mountain View, El Camino Hospital Los Gatos, Kaiser Santa Clara, Kaiser San Jose, Good Samaritan, Stanford, O'Connor, St. Louise, and VA Palo Alto.

updated lists for staff access to ePCR data through the hospital hub platform and ensure adequate staff training on hospital hub access. Discussions with emergency department staff at some hospitals indicates that hospital emergency department staff do not have consistent communication with EMS Agency staff on access to the hospital hub platform.

Communication Channel Maintenance

Collaboration is a core element of the mission of the County EMS System. Ten of the eleven hospital emergency departments in Santa Clara County have communicated a list of emergency department staff that should be granted access to view the ePCR via hospital hub (missing is Palo Alto Veterans Administration Hospital). There are a total of 617 users across the ten hospital lists.

The hospital user lists are unrefined. More than half of the emergency department staff on the lists of three County hospitals selected for detailed review had never logged in to the system.[23] Over the three-year period from December 2019 to December 2021, five out of the 25 Kaiser San Jose Hospital staff on the access list logged in to hospital hub; eight out of 65 from Saint Louise Regional Medical Center; and 25 of the 52 staff listed for VMC had logged in in the last three-years.

Hospital emergency department staff do not all know about hospital hub. According to discussions with EMS Agency staff, the EMS Agency relies on emergency department managers to share hospital hub access with staff. For those emergency department staff who are aware of hospital hub, many do not know how to obtain access. In order to obtain a log in to hospital hub, staff must notify their supervisor/ manager who then may communicate to EMS Agency's EMS Specialist an updated staff list of the medical personnel that should have access . Hospital Staff that may need access include registrars, medical doctors, registered nurses, medical unit clerks, and others that work in a variety of hospital receiving facilities including the Emergency Department, Trauma Center, Stroke Center, and STEMI Center.

Timeliness of ePCR Submission

According to EMS Agency Policy 500, ePCR data is to be entered in near real time, and according to discussions with EMS Agency staff, patient information is available to the receiving emergency department as soon as it is entered by the EMS provider in the database. For 9-1-1 transports, the patient information should be available to the emergency department staff before the ambulance leaves the site.

Electronic patient care records are real-time records of patient care. The hospital hub allows the ambulance provider to document vital signs and other values while the provider is at the patient's bedside, allowing the real time transfer of the most current data to be made available in the hospital hub. The ePCR data for 9-1-1 ambulance transports should be available to the receiving facility as soon as the facility is selected for receiving the patient. The extent to which this information is available to emergency department staff, including whether EMS providers enter the data into the ePCR in real time and emergency department staff access the hospital hub at the time

23 Detailed hospital hub user access records were provided to the audit team by EMS Agency for September 2015 through December 2021 for these three randomly selected County Emergency Departments: Valley Medical Center, Sainte Louise Regional Medical Center and Kaiser Foundation San Jose.

of the patient arrival is not known; this is not information tracked by the EMS Agency. Our discussions with staff from two hospital emergency departments show that the information is used retrospectively for chart review but not routinely accessed by emergency department staff when the patient arrives at the emergency department.

CONCLUSION

The ePCR contains important patient data that needs to be communicated in real time from EMS providers to the receiving hospital staff. The communication channels for sharing the ePCR between the EMS system and the hospitals is already established, it just requires more frequent (at least annual) maintenance to ensure the appropriate hospital staff are granted access. The EMS Agency also needs to work with the receiving emergency departments to ensure that they are receiving timely ePCR information for 9-1-1 transports, and that patient information is available to emergency department staff for patient treatment.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

5.1 On at least an annual basis, contact all County hospital emergency department nurse managers via email with the current list of approved staff for hospital hub access, ask that the list be updated to include current staff who need access to the system, and remove staff who no longer require access. Communicate the process for updating the hospital hub access staff list during the year. (Priority 2)

5.2 Consider publishing information on the EMS Agency website on the benefits of the hospital hub tool and ways for hospital staff to access the tool. (Priority 2)

5.3 Work with respective emergency department nurse managers and EMS ambulance providers to ensure timely entry of ePCR (electronic patient care record) data by ambulance providers and availability of ePCR data to emergency department staff for patient treatment. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

These recommendations can be implemented within the EMS Agency scope of work. Patient care will improve when EMS providers are able to communicate to hospital personnel the disposition of the patient in transport, and scope of care provided during the transport.

Section 6: Post-Hospital Trauma Data Collection

Background
The Emergency Medical Services (EMS) Agency is responsible to plan, implement, manage, and evaluate the County Trauma System, which is comprised of three designated Trauma Centers (Valley Medical Center (VMC), San Jose Regional Medical Center, and Stanford Health Care). The hospital designation agreements with the County require each Trauma Center to submit data to the County Trauma Registry. The California Emergency Medical Services Authority requires data on three metrics as part of the Trauma Registry, including: 1) patient destination, 2) discharge diagnosis, and 3) total hospital charges.

Problem, Cause, and Adverse Effect
All three Trauma Centers report data on patient destination and discharge diagnosis, but only VMC reports data on total hospital charges. Stanford and San Jose Regional Medical Center, as private businesses, are not reporting patient charge data, and the hospital designation agreements do not explicitly require reporting of this data. According to the California Emergency Medical Services Authority, the Inland Counties EMS Agency, comprising San Bernardino, Inyo, and Mono counties, reports all three metrics for the County hospital and two private hospitals, but the California Emergency Medical Services Authority did not provide information on other local EMS agencies' reporting.

Data on patient destination, discharge diagnosis, and patient charges is reported to the California and National Emergency Medical Services Information Systems (CEMSIS and NEMSIS respectively) and used to assess EMS needs and performance, and to benchmark performance, determine effectiveness of clinical interventions, and facilitate cost-benefit analyses. This data can be used to provide perspective and comparison amongst California Trauma Systems and can inform systemwide quality improvement. Not receiving this data undermines the ability of the EMS system (on a local and State level) to provide oversight of emergency services and continue to improve the quality of these services.

Recommendations
The EMS Agency should work with the California Emergency Medical Services Authority on procedures to obtain patient charge data from private hospitals, including standard language in hospital designation agreements for provision of this data by private hospitals and guarantees on intended use and confidentiality of data. In the meantime, the director of SCC EMS Agency should distribute notice via email to the directors of all three Trauma Centers informing them of the total hospital charges data collection requirement and requesting submission of this data.

Savings, Benefits, and Costs
Disclosure of patient charge data would contribute to cost-benefit analyses of emergency medical services and measurement of emergency medical services outcomes. County staff time would be required in working with the California Emergency Medical Services Authority and the County's designated trauma centers, but this time should be incorporated into existing resources.

FINDING

Trauma Data Collection

A trauma patient is defined as a patient sustaining a traumatic injury within 14 days of initial hospital encounter and meeting additional criteria as defined by the National Trauma Data Standard (NTDS). Hospitals must be designated as trauma centers by their Local Emergency Medical Services Agency (LEMSA) to receive and treat trauma patients. Santa Clara County's Emergency Medical Services (EMS) Agency (the County's LEMSA) has hospital designation agreements for trauma care with three hospitals: Santa Clara Valley Medical Center (VMC), Regional Medical Center of San Jose, and Stanford Health Care. These hospitals constitute the County's Trauma Centers, and serve the residents of Santa Clara County, as well as residents of neighboring San Mateo, Santa Cruz, San Benito, and Monterey Counties.

State Data Requirements for Trauma Centers

The California Emergency Medical Services (EMS) Authority regulations stipulate that LEMSAs with designated trauma centers are required to collect, and report to the California EMS Information System (CEMSIS) on a quarterly basis prehospital and hospital patient care data. Included in the data requirements are three discharge data elements:

1. Patient Destination
2. Discharge Diagnosis
3. Total Hospital Charges.[24]

CEMSIS data is reported to the National Emergency Medical Services Information System or NEMSIS, administered by the National Highway Traffic Safety Administration Office of Emergency Medical Services. According to the NEMSIS website, NEMSIS provides the framework for collecting, storing, and sharing standardized EMS data to assess EMS needs and performance. Data from NEMSIS is also used to benchmark performance, determine effectiveness of clinical interventions, and facilitate cost-benefit analyses.

Each designated trauma center is required to participate in the LEMSA's data collection efforts. The hospital designation agreements between Santa Clara County and the three trauma centers – VMC, Stanford, and San Jose Regional Medical Center – require the hospital to maintain patient care, revenue, and expenditure records, and on a quarterly basis provide the EMS Agency with patient outcome information for all patients transported by ambulance. The agreements provide for the designated trauma centers to participate in data collection and evaluation studies conducted by the EMS Agency, including but not limited to patient outcomes, on request from the EMS Agency.

24 CA EMSA Regulations Book, Section 100257, "Data Collection".

Incomplete Trauma Center Data in Santa Clara County

The EMS Agency is vested with the authority to plan, implement, manage, and evaluate the Santa Clara County Trauma System. In this role, the EMS Agency maintains a central Trauma Registry that aggregates data inputted by the County's three trauma centers. All three fields itemized in the data dictionary are supposed to be completed by the hospitals for trauma patients, according to EMS Agency policy, to comply with California Emergency Medical Services Authority regulations.[25]

The EMS Agency's Trauma Center Designation Agreements with the hospitals include the following language: "Hospital shall participate in the Trauma Registry and submit data to the Trauma Registry on a regular basis, as requested by EMS Agency."

The minimum data elements that the County Trauma Centers are required to upload into the County Trauma Registry are further defined in Santa Clara County's Trauma Registry Data Dictionary (2022) as follows:

Patient Destination:	"Disposition: The unit or facility (home is an example of a facility) where the patient was discharged to."
Discharge Diagnosis:	"Inpatient Disposition Code: the disposition of the patient when discharged from the hospital."
Charge Total:	"The final billed amount charged for this admission, aggregate amount expressed in whole dollar figures."

The EMS Agency is meeting the State's prehospital and hospital patient care data submission requirements, but in terms of discharge data, is only reporting the first two metrics (Patient Destination and Discharge Diagnosis). County Trauma Centers are not consistently documenting information for the third metric (Charge Total) in the County Trauma Registry, and the EMS Agency has therefore never been able to report on this metric to the State.[26] From January 1, 2019–December 31, 2021, Stanford Health Care reported charge totals for less than 1% of its 4,087 trauma patients.[27] The remainder were listed as "$0.00", blank or "Not Applicable". Over the same three-year period, Regional Medical Center of San Jose reported charge totals for two out 3,136 patients, the remainder were blank, "Not Applicable" or "Not Documented". In contrast, Santa Clara Valley Medical Center (VMC) records the charge total for over 97% of its 5,020 patients.

Consequently, the EMS Agency is not fully meeting California Emergency Medical Services Authority regulations on trauma center discharge data reporting. Santa Clara Valley Medical Center, as a public hospital, reports data on patient charges but Stanford and San Jose Regional Medical Center, as private businesses, are not reporting patient charge data, and the trauma center designation agreements do not explicitly require reporting of this data. The California Emergency Medical Services Authority reported to us that the Inland Counties EMS Agency, which covers San Bernardino, Inyo, and Mono counties, obtains data on patient charges for all covered

25 EMS Agency Policy No. 407, "Trauma Registry Data Collection and Management".

26 As of March 11, 2022, Santa Clara County's trauma data submissions for the first two fields (Patient Destination and Discharge Diagnosis) are current through September 2021, according to State EMS Authority officials.

27 According to Trauma Registry data provided by EMSA for January 1, 2019- December 31, 2021. October 2021 data for Regional Medical Center is excluded due to corrupt data.

trauma centers, which includes the San Bernardino County hospital (Arrowhead Regional Medical Center) and two private nonprofit hospitals. The California Emergency Medical Services Authority did not report if other LEMSAs were obtaining data on patient charges.

Impacts of Incomplete Data

The data on total hospital charges per patient is meant to provide perspective and comparison amongst California Trauma Systems. This information is also made available through the National Emergency Medical Services Information System for research and evaluation. Increasing transparency on health care costs is important to inform systemwide quality improvement in the State and is therefore valuable information for regulators, hospital administrators, and patients. Not receiving this data undermines the ability of the EMS system (on a local and State level) to provide oversight of emergency services and continue to improve the quality of these services. Furthermore, it diminishes the status, reputation, and credibility of the California EMS System to have regulations in place that are not followed or enforced.

The respective hospital designation agreements do not explicitly require disclosure of patient charge information by private hospitals and the EMS Agency does not have a way to require disclosure of this information. The EMS Agency should work with the California Emergency Medical Services Authority on procedures to obtain patient charge data from private hospitals, including standard language in hospital designation agreements for provision of this data by private hospitals and guarantees on intended use and confidentiality of data.

CONCLUSION

The State EMS Authority requests Trauma Systems to report three discharge metrics (patient destination, discharge diagnosis, and total hospital charges), meant to help EMS regulators manage and improve the Statewide Trauma System. By (re)introducing this State reporting requirement to County Trauma Centers, the EMS Agency can become compliant with State regulations, and benefit from the transparency associated with recording costs for services.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

6.1 Distribute notice via email to the directors of all three SCC Trauma Centers informing them of the total hospital charges data collection requirement and requesting submission of this data element, per the “Charge Total” definition listed in the County’s 2020 Trauma Registry Data Dictionary, on at least a quarterly basis, to satisfy State regulations. (Priority 1)

6.2 Work with the California Emergency Medical Services Authority on procedures to obtain patient charge data from private hospitals, including standard language in hospital designation agreements for provision of this data by private hospitals and guarantees on intended use and confidentiality of data. (Priority 1)

SAVINGS, BENEFITS, AND COSTS

Disclosure of patient charge data would contribute to cost-benefit analyses of emergency medical services and measurement of emergency medical services outcomes. County staff time would be required in working with the California Emergency Medical Services Authority and the County's designated trauma centers, but this time should be incorporated into existing resources. EMS Agency outreach to the directors of Santa Clara County's three Trauma Centers to request collection and quarterly submission of the "Charge Total" data element will not incur costs to the EMS Agency. Hospital staff will be requested to devote a small fraction of time to consistently record this one additional field. The benefits include entering into State regulation compliance and gaining the ability to evaluate total hospital charges for services across the County Trauma System, and in comparison, to other Trauma Centers throughout the State. Increasing transparency on health care costs is important information for regulators, hospital administrators, and patients.

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Section 7: Auditing Provider Continuing Education Courses

Background
Under Title 22 of the California Code of Regulations, the Santa Clara County Emergency Medical Services (EMS) Agency is responsible for ensuring the quality and availability of continuing education (CE) courses offered for emergency medical technician (EMT) and paramedic personnel, as well as providing a mechanism for qualified persons or agencies to become approved CE providers. Continuing education is intended to provide paramedics and emergency medical technicians (EMTs) with knowledge and skills to practice prehospital medicine.

Problem, Cause, and Adverse Effect
The EMS Agency updated its internal policies (Policy #809) in 2018 to standardize audit procedures for CE providers and courses, although Title 22 does not require audits. EMS policy requires each CE provider to submit an annual summary of all CE courses offered in the previous calendar year. The policy states that the agency will audit a minimum of 10% of the courses at the conclusion of each year. EMS does not have documented protocols for conducting audits. A comprehensive audit only occurred for courses offered in Calendar Year (CY) 2018. Although CE provider audits were conducted in 2015, 2016, and 2017, the process was not formal. While audits were not conducted in CY 2019 and CY 2020, in February 2022 the EMS Agency sent letters to CE providers to obtain the list of CE courses offered in CY 2021 in preparation for the audit. Documenting and standardizing audit procedures would ensure consistent auditing practices and oversight of CE course providers.

Recommendations
The EMS Agency should document methods for selecting courses for audits and consider revising audit standards to differentiate between formal paramedic and emergency medical technician certification and recertification courses and one-time advanced life support/basic life support courses. The EMS Agency should also ensure that the County ambulance provider, which is required to provide in-service training to first responder agencies and lacked complete CE course documentation in the 2018 audit, fully comply with EMS audit requirements.

Savings, Benefits, and Costs
Implementing these recommendations will bring EMS into compliance with internal policy requirements governing CE courses and CE providers and help prevent the risk of inadequate training standards. Additionally, EMS will be able to confirm that CE courses are covering new or updated protocols and policies, consistent with EMS' oversight role of ensuring the quality of CE courses offered for EMT and paramedic personnel. Implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time to develop and conduct annual audits.

FINDING

Continuing Education for Paramedics and Emergency Medical Technicians

The California Emergency Medical Services Authority requires paramedics to be licensed by the State and emergency medical technicians (EMT) to be certified by the State or by the National Registry of Emergency Medical Technicians (NREMT). Paramedics and EMTs are recertified every two-years. The Santa Clara County Emergency Medical Services (EMS) Agency is responsible for assuring that EMTs and paramedics working in the County meet minimum training and educational standards to perform their functions. Paramedics and EMTs must certify every two years that they have met continuing education (CE) requirements, 48 CE hours for paramedics and 24 CE hours for EMTs.

Under Title 22 of the California Code of Regulations[28], the EMS Agency is responsible for ensuring the quality and availability of CE courses offered EMTs and paramedic personnel, as well as providing a mechanism for qualified persons or agencies to become approved CE providers. As stated in Title 22 of the California Code of Regulations[29], an EMS CE provider is an individual or organization approved by State requirements to conduct continuing education courses, classes, activities or experiences and issue earned continuing education hours to EMS personnel for the purposes of maintaining certification/licensure or re-establishing lapsed certification or licensure. Continuing education is a course, class, activity, or experience designed to be educational in nature, with learning objectives and performance evaluations for the purpose of providing EMS personnel with reinforcement of basic EMS training, as well as knowledge to enhance individual and system proficiency in the practice of pre-hospital emergency medical care.[30]

According to EMS staff, there were 19 approved CE providers in Santa Clara County in 2021. They include the following: Santa Clara County EMS Agency, Rural/Metro 911 County Ambulance provider, Palo Alto Fire Department, Santa Clara County Fire Department, Gilroy Fire Department, Milpitas Fire Department, Mountain View Fire Department, NASA/Ames Fire Department, San Jose Fire Department, Santa Clara City Fire Department, Sunnyvale Department of Public Safety, Silicon Valley Ambulance, Heartshare Training, Bay Area Training Academy, Mission College, San Jose City College, South Bay Regional Training, Foothill College, and Stanford University.

28 As stated in Title 22, Division 9: Prehospital Emergency Medical Services, Chapter 11: EMS Continuing Education, Article 1., Section 100390.5, the local EMS agency shall be the agency responsible for approving EMS Continuing Education Providers whose headquarters are located within the geographical jurisdiction of that local EMS agency.

29 Title 22, Division 9: Prehospital Emergency Medical Services, Chapter 11: EMS Continuing Education, Article 1., Section 100390.

30 Title 22, Division 9: Prehospital Emergency Medical Services, Chapter 11: EMS Continuing Education, Article 1.,100390.3.

Auditing Practices of Continuing Education Courses

According to Santa Clara County EMS Policy #809 (Continuing Education Provider Guide)[31], the agency requires each CE provider to submit an annual summary of all CE courses offered in the previous calendar year. In addition, the policy states that the agency will audit a minimum of 10% of the courses at the conclusion of each year. The policy details that the following information will be requested for each course offering audited:

1. Complete outlines for each course selected including a brief overview, instructional objectives, comprehensive outline, and methods of evaluation;
2. Course completion rosters;
3. Curriculum vitae/resume for each Instructor; and
4. Record of time, place, date, and number of CE hours awarded.

Title 22 of the California Code of Regulations[32] does not require routine audits of CE courses but provides that CE certificates may be audited for cause by the certifying/licensing authority or as part of the certifying/licensing authority's continuing education verification process.

The EMS Agency's Policy #809 was updated in May 2018, providing guidelines for continuing education providers. The guidelines state that the contents of the CE course should be relevant, enhance the practice of prehospital emergency care, and related to the knowledge base or technical skills required for the practice of prehospital medicine. Continuing education topics are to be in the national standard curricula for training EMS staff [33], but may include "advanced topics in subject matter outside the scope of practice of the certified or licensed EMS personnel but directly relevant to emergency medical care (e.g. surgical airway procedures)" as stated in California Code of Regulations 100391.1(a)(8).

According to EMS Agency staff, although CE provider audits were conducted in 2015, 2016, and 2017, the process was not formal and did not follow the audit requirements specified in Policy #809 that requested information from CE providers on course outlines, rosters, instructor resumes, and record of time, place, date, and number of CE hours awarded. The EMS Agency conducted a more comprehensive audit of 2018 CE courses and providers. The EMS Agency requested a list of all courses and selected for audit 10% of CE courses from each of 16 providers in the County. According to EMS Agency staff who conducted the audit for CY 2018, the audit sample was primarily chosen at random from the provider list using an auto-number generator in Excel; however, the EMS Agency does not have a standard process for the selection of the 10% audit sample. As shown in Figure 7.1 on page 58, the EMS Agency audited 164 courses offered by 16 providers in 2018.

31 Attachment G of Policy #809 (Continuing Education Provider Guide).
32 Chapter 11: EMS Continuing Education, Article 3: Continuing Education Records, Sections 100392(d) and 100395.
33 The California Emergency Medical Services Authority website lists organizations setting standards, including California Approved Paramedic Continuing Education (CAPCE), National Registry of Emergency Medical Technicians (NREMT), and Accrediting Commission for Community and Junior Colleges (ACCJC).

Figure 7.1: *Number of Continuing Education Course Audit by Provider 2018*

Provider	# Courses Offered	# Audited
SCC Ambulance EMS CE Program (Rural/Metro)	90	9
Foothill College EMS CE Provider	58	6
Gilroy Fire Department EMS CE Provider	17	2
HeartShare Training EMS CE Provider	1,090	110
Milpitas Fire Department EMS CE Provider	12	2
NASA Ames Fire Department EMS CE Provider	11	2
Mountain View Fire Department EMS CE Provider	21	3
Palo Alto Fire Department EMS CE Provider	46	5
San Jose City College EMS CE Provider	1	1
San Jose Fire Department EMS CE Provider	9	2
Santa Clara City Fire Department EMS CE Program	72	8
Santa Clara County Fire Department EMS CE Program	37	4
Silicon Valley Ambulance EMS CE Program	11	2
Stanford EMS CE Program	6	1
Sunnyvale DPS EMS CE Program	53	6
Westmed College EMS CE Program	1	1
Total:	**1,535**	**164**

Source: Data provided by the EMS Agency.

According to documentation provided by the EMS Agency, the 16 CE providers were generally in compliance with Policy #809 requirements with the exception of Rural/Metro, the County's Exclusive Operating Area (EOA) ambulance provider, which lacked complete documentation for the audited CE courses. Because the EMS Agency oversees the EOA agreement between the County and Rural/Metro, which requires Rural/Metro to provide in-service training for first responder agencies, the EMS Agency should ensure Rural/Metro's annual compliance with CE provider requirements.

Our review of CE courses shows variation in course type and content by provider. Overall, the courses offered by CE providers in 2018 conformed to the State requirement that continuing education be relevant to and enhance knowledge and skills of emergency prehospital medical care. However, the types of courses differed by provider. For example, Heartshare offers Advanced Life Support (ALS) and Basic Life Support (BLS) courses with most courses offered for four to six-hours. Stanford offers courses that meet National Registry of Emergency Medical Technician (NREMT) standards for EMT certification, consisting of 170 course hours, and recertification, consisting of 40 course hours. The EMS Agency should consider revising audit standards to differentiate between formal certification and recertification courses and single topic trainings of eight-hours or less.

No audit was completed for courses offered in CY 2019 because of the onset of the COVID-19 pandemic in early 2020. In February 2022, the EMS Agency sent letters to CE providers to obtain the list of CE courses offered in CY 2021 in preparation for the audit.

CONCLUSION

The EMS Agency implemented more comprehensive CE course audit standards in 2018, but subsequent to the 2018 audit, did not conduct annual audits of CE course providers until 2022. The EMS Agency should document methods for selecting courses for audits and consider revising audit standards to differentiate between formal certification and recertification courses and one-time advanced life support/ basic life support courses.

RECOMMENDATIONS

The Santa Clara County Emergency Medical Services Agency director should:

7.1 Ensure annual audits that follow the requirements outlined in EMS' Policy #809 for courses offered every calendar year and document the process for course selection of the 10% audit sample. (Priority 2)

7.2 Ensure that the County ambulance provider, which under the EOA agreement is to provide in-service training for first responder agencies, meets EMS' Policy #809 guidelines for continuing education course content and audit documentation. (Priority 2)

7.3 Consider revising audit standards to differentiate between formal certification and recertification courses and single topic trainings of eight-hours or less. (Priority 2)

SAVINGS, BENEFITS, AND COSTS

Implementing these recommendations will bring EMS into compliance with internal policy requirements governing CE courses and CE providers and help prevent the risk of inadequate training standards. Additionally, EMS will be able to confirm that CE courses are covering new or updated protocols and policies, consistent with EMS' oversight role of ensuring the quality of CE courses offered for EMT and paramedic personnel. Implementing these recommendations will not cost Santa Clara County any additional funds outside of preexisting staff time to develop and conduct annual audits.

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Attachments A-B

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County of Santa Clara
Emergency Medical Services System

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Date: July 7, 2022

To: Board of Supervisors Management Audit Division

From: Jackie Lowther, RN, MSN, MBA
Director, Emergency Medical Services

Subject: Reponses to Management Audit of the County of Santa Clara the Emergency Medical Services Agency

Thank you for the opportunity to respond to your audit of the Emergency Medical Services Agency. You will find our response below:

Section 1: Exclusion Operation Agreement Monitoring and Reporting

Recommendation 1.1

Include provisions in the upcoming EOA agreement allowing for flexibility of performance measurement and reporting over the term of the agreement, including specifying that EOA agreement performance measurement and reporting requirements are contained in EMS policies and procedures, which will be revised and updated periodically over the term of the agreement. (Priority 2)

Response to Recommendation 1.1 - Partially Agree

The Santa Clara County EMS Agency is committed to providing quality services to all our communities. The medical director will oversee an annual evaluation of the QI program annually by the EMS Agency, various committees, and stakeholders. An annual update will be created to inform, educate, and train all individuals involved in QI activities. Key performance indicators are selected based on the previous year's data. Policies can be focused on the next EOA contract to include performance measurements which will be reviewed and reported quarterly. There are limits to what data can be shared with the public due to privacy issues. In addition, creating restrictive reporting requirements into an agreement impedes bidders, placing in policy is an enhanced solution.

Recommendation 1.2

Report bi-annually to the Emergency Medical Care Committee and monthly to the Board of Supervisors Health and Hospital Committee on "timely submission of PCRs for time sensitive

injuries" and on "ambulance patient offload time" by hospital; and include these performance indicators in the annual reports.

Response to Recommendation 1.2: - Agree

This report can be modified into a monthly report. This data can be presented to the EMCC and HCC at any interval specified. It is recommended that these reports begin CY22 Q3, September 2022, with a cumulative trend since 2019.

The Board of Supervisors' Health and Hospital Committee Chair should:

Recommendation 1.3

Request monthly reports from the Deputy County Executive for the County Health System on VMC's actions to reduce Ambulance Patient Offload Time. (Priority 2)

Recommendation 1.3

Defer to Deputy County Executive for the County Health System

Section 2: Inspecting and Monitoring Ambulances

Recommendation 2.1:

Develop procedures for EMS Agency staff to periodically monitor and document mileage of Rural/Metro ambulances. (Priority 2).

Response to Recommendation 2.1: - Agree

Beginning in April 2022, the EMS Agency requested and has received monthly ambulance odometer reports from Rural/Metro. The reports are provided at the close on each month. The reports contain odometer readings and preventative maintenance service. The report is reviewed to ensure that no ambulance exceeds the mileage or service life requirements.

Recommendation 2.2:

Work with Rural/Metro to develop an updated ambulance replacement plan those details (1) an alternate schedule until the end of the Rural/Metro contract in 2024, and (2) specific steps on how Rural/Metro is planning to replace ambulances approaching end of life, such as determining the length of time needed to plan for and procure replacement ambulances, and the deployment plan for reserve ambulances. (Priority 2)

Response to Recommendation 2.2: - Agree

The EMS Agency will work with Rural/Metro to develop an ongoing ambulance replacement schedule. The replacement schedule will provide a quarterly summary of projected deployment of new ambulances. In follow up to the audit report initial findings, the following table identifies the actual number of new ambulances placed into service since 2019. A total of 48 new ambulances have entered service.

Quarter	2019	2020	2021	2022
Q1 (Jan-Feb-Mar)	14	4	2	0
Q2 (Apr-May-Jun)	12	0	0	2
Q3 (Jul-Aug-Sep)	4	6	4	N/A
Q4 (Oct-Nov-Dec)	0	0	0	N/A

Recommendation 2.3:

Assess whether a data field could be included in ImageTrend, the EMS Patient Care Data System reporting component, for the EMS Agency to track mileage of Rural/Metro vehicles. (Priority 2)

Response to Recommendation 2.3: - Partially Agree

The use of ImageTrend to track odometer readings is a potential option. Currently, ambulance crews record the number of miles a patient was driven, not the actual odometer reading at the beginning and end of each transport. The EMS Agency will work with Rural/Metro to study the feasibility of having a daily odometer log data field added to ImageTrend.

Recommendation 2.4:

Work with Rural/Metro to determine whether the over 10-year-old bariatric ambulances need to be replaced or if age requirements for bariatric ambulances need to be modified in the EOA agreement. (Priority 2)

Response to Recommendation 2.4: - Agree

The EMS Agency will work with Rural/Metro to determine the best solutions to maintain bariatric ambulance capabilities. Possible options include purchasing new bariatric ambulances or adding specialized equipment to each non-bariatric ambulance.

Section 3: Emergency Ambulance Response Times

Recommendation 3.1:

In the successor EOA agreement with a new ambulance provider following the Request for Proposals (RFP) process, (a) provide for ambulance deployment and response standards to be established in Agency policy, which can serve as a living document subject to amendment, and (b) base ambulance deployment and response standards on dispatch acuity and provide response time monitoring on a more frequent basis rather than monthly basis in each of the five subzones. (Priority 2)

Response to Recommendation 3.1: - Agree

The EMS Agency will advocate for the development of a Request for Proposals and a successor EOA agreement that will ensure sound ambulance deployment strategies and response standards. Those standards will be based on proven operational protocols that address an EMS patient's medical needs.

Currently, the EMS Agency can monitor response times daily. The EOA agreement specifies that Rural/Metro's response time compliance will be measured and reported monthly. The current standard of measuring EOA response time compliance is used statewide by other County EMS Agencies. We believe that the current monthly measurement practice should not be change.

Section 4: Hospital Patient Surge Plan Updates

Recommendation 4.1:

Establish within EMS Agency a patient volume management plan review and approval policy and procedure and obtain access to the Joint Commission Guidelines to use for evaluation. (Priority 2)

Response to Recommendation 4.1: - Partially Agree

The Joint Commissions current definition for Emergency Departments is **"**Reducing the time patients remain in the emergency department (ED) can improve access to treatment and increase quality of care. Reducing this time potentially improves access to care specific to the patient condition and increases the capability to provide additional treatment. They have a check list for Emergency Management and Emergency Department Flow diagrams. It is not in the EMS Agency's regulatory authority to dictate how hospital operations will occur. However, a review and approval policy will be written after collaboration with hospital partners on the issue.

Recommendation 4.2:

Consider providing a template or required information checklist to guide hospitals in drafting their annual patient volume management plans. (Priority 2)

Response to Recommendation 4.2 – Partially Agree

Currently several hospitals have checklists which can be discussed in collaboration with all hospital stakeholders to determine if this is a feasible option.

Recommendation 4.3:

Consider incorporating hospital patient volume monitoring tools into EMS Agency technology, where available and applicable. (Priority 2)

Response to Recommendation 4.3 – Partially Agree

This could be accomplished with the use of EMResource which we have in operation today, with modification of hospital functions of reporting to allow for better tracking or monitoring of bed capacity.

- This takes accurate reporting by the hospitals. We learned during the pandemic that the ED is not the place to collect and send this data. It was very apparent that the ED only knew about the ED and was not involved with in-patient, it is also very difficult to report in a timely manner during times of surg.

Recommendation 4.4:

Update EMS Hospital Bypass Policy 603 to reflect operational changes if different procedures and practices are appropriate. Considerations prior to the established policy review date of January 1, 2023. (Priority 2)

Response to Recommendation 4.3 – Agree

Policies will be updated to reflect any changes made as a result of this process.

Section 5 – ePCR Visibility to Hospital

Recommendation 5.1:

On at least an annual basis, contact all County hospital emergency department nurse managers via email with current list of approved staff for hospital hub access, ask that the list be updated to include current staff who need access to the system and remove staff who no longer require access. Communicate the process for updating the hospital hub access staff list during the year. (Priority 2)

Response to Recommendation 5.1: Agree

All system users will be updated annually at the fiscal year end, this will be accomplished by the permit officer during the annual permitting process.

Recommendation 5.2:

Consider publishing information on the EMS Agency website on the benefits of the hospital hub tool and ways for hospital staff to access the tool. (Priority 2)

Response to Recommendation 5.2: Agree

A link will be provided on the main website including a short video which will explain the use and login to the system. This task will be accomplished by December 2022. Currently, the EMS Agency has provided monthly meetings with ED Mangers starting in May 2022 to include information and training on the hospital hub.

Recommendation 5.3:

Work with respective emergency department nurse managers and EMS ambulance providers to ensure timely entry of ePCR (electronic patient care record) data by ambulance providers and availability of ePCR data to emergency department staff for patient treatment. (Priority 2)

Response to Recommendation 5.3: - Partially Agree

For the EMS Agency to provide constant re-enforcement of our existing data policy, the EMS Agency will create standardized chart submission reports for all permitted services submitting data into the EMS Data System. The EMS Agency will continue to study and analyze compliance to the submission standards through the newly created EMS Data Committee. Developing and implementing these new reports, the EMS Agency will gain visibility and become able to appropriately monitor timely submission of all charts. These reports will be designed, vetted, and implemented by the end of 2022.

Section 6 Post-Hospital Trauma Data Collection

Recommendation 6.1:

Distribute notice via email to the directors of all three SCC Trauma Centers informing them of the total hospital charges data collection requirement and requesting submission of this data element, per the “Charge Total definition listed in the County’s 2020 Trauma Registry Data Dictionary, on at least a quarterly basis, to satisfy State regulations. (Priority 1)

Response to Recommendation 6.1: - Agree

SCC Policy 407 stipulates that all Trauma Centers in Santa Clara County shall submit data to the EMS Agency, which includes total charges. To receive compliance, the EMS Director will send a memo to each hospital CEO in August 2022 articulating the need for this specific data. This memo will detail that the data will be kept confidential (not displayed in meetings). Additionally, the Specialty Programs Nurse will discuss with Trauma Program Mangers to enable abstractors on how obtain this information. The date element will be monitored for improvement.

Recommendation 6.2:

Work with the California Emergency Medical Services Authority on procedures to obtain patient charge data from private hospitals, including standard language in hospital designation agreements for provision of this data by private hospitals and guarantees on intended use and confidentiality of data. (Priority 1)

Response to Recommendation 6.2: - Agree

The EMS Director will discuss with the EMS Authority a mechanism to include in hospital designation agreements a provision for data entry and guarantees on intended use and confidentiality of data.

Section 7 – Auditing Provider Continuing Education Courses

Recommendation 7.1:

Ensure annual audits that follow the requirements outlined in EMS Policy #809 for courses offered every calendar year and document the process for course selection of the 10% audit sample. (Priority 2)

Response to Recommendation 7.1: Partially Agree

The Agency has documented that the audit will be a random selection of 10% of the CE courses that a CE Provider teaches in a calendar year. The Training and Education Standards Units audit is to ensure that classes taught be any CE Provider in approved by the Santa Clara County EMS Agency are teaching classes in line with the Title 22 regulations. Contract management over the EOA provider is managed through the EOA Contract Manager.

Recommendation 7.2:

Ensure that the County ambulance provider, which under the EOA agreement is to provide in-service training for the responder agencies, meets EMS' Policy #809 guidelines for continuing education course content and audit documentation. (Priority 2)

Response to Recommendation 7.2: - Partially Agree

A continuing education provider is allowed to choose what topics their courses will cover. The Agency's responsibility is to ensure that those topics are in line with Title 22. The annual EMS Update course covers the Protocols and Policies that the EMS Agency requires the EMS Providers to learn, study and review. Continuing Education may be awarded for the EMS Update Course content, but it is not required as part of the training.

All education is documented by providers and submitted to the EMS Agency.

Recommendation 7.3:

Consider revising audit standards to differentiate between formal certification and recertification courses and single topic trainings of eight hours or less. (Priority 2)

Response to Recommendation 7.3 - Disagree

This is not applicable as formal approved EMT/Paramedic program/courses are not CE courses and are already audited by the EMS Agency through a different process.

County of Santa Clara
Emergency Medical Services System

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Date: July 7, 2022

To: Board of Supervisors Management Audit Division

From: Jackie Lowther, RN, MSN, MBA
Director, Emergency Medical Services

Subject: Management Audit Report of the Emergency Medical Services Agency – Accomplishments

Thank you for the opportunity to provide highlights of accomplishments of the Santa Clara County EMS Agency.

The EMS Agency is charged with the planning, coordination, and evaluation of the County's entire EMS System. The EMS System is a multi-faceted composition of providers that include, 9-1-1 dispatch centers, law enforcement agencies, park rangers, fire departments, ambulance services, hospitals, and specialty centers (trauma, stroke, and ST-Segment Elevation Myocardial Infarction - STEMI). Each day, our providers (stakeholders) routinely respond to, treat, and transport hundreds of patients.

The boundaries of prehospital EMS are evolving to meet the needs of our communities. The ideal is for all communities to be served by a well-planned and highly coordinated emergency medical system. Relying on local data to identify system trends and gaps, the EMS Agency has implemented "best practice" protocols to improve the patient's health care experience.

Management Audit Accomplishments:

- Provided Immediate Need Mutual Aid Response in the form of Incident Management Team Members and Ambulance Strike Teams to the North Bay Fires, Yountville Veteran's Home Evacuation and Mendocino Complex Fires.
- Gilroy Fire Department Behavioral Health Alternate Destination Pilot Project 2017-2022.
- Development of a comprehensive Multicausality Incident Plan and Annex in 2018.
- Management of the Gilroy Garlic Festival Shooting 2019
- Management of the Valley Transportation Authority (VTA) Active Shooter event in 2021.
- Introduction of intravenous acetaminophen for non-narcotic prehospital analgesia.
- Introduction of tranexamic acid for hypotension in critical trauma.
- Introduction of the laryngeal mask airway as both a primary and alternative airway management device.

- American Heart Association (AHA) Stroke Registry adoption and integration into stroke care continuous quality improvement.
- New Trauma Registry.
- Development of a STEMI registry for STEMI care continuous quality improvement.
- Development of a cardiac arrest registry for nontraumatic and traumatic cardiac arrest continuous quality improvement.
- Base Hospital Guidelines development for the Base Hospital physicians.

Medical-Health Mutual Aid Program:

- To date, Medical Health Operational Area Coordinator (MHOAC) Program has successfully received, reviewed and managed 266 Medical-Health Mutual Aid Requests from the Operational Area for Personnel, Equipment and Supplies to mitigate our COVID-19 response.
- Worked with original equipment manufacturer (OEM) to establish a clear and concise resource requesting process for all requests for mutual aid within the Operational Area.
- Mobile Intensive Care Nurse (MICN) Classes: 2018 - 12 RNs and in 2019, RNs trained to be Base Station Nurses.

Disaster Management:

- Successfully acquired and provided all Hospitals with a standardized system and equipment for the evacuation of their hospitals during a significant event or disaster.
- Successfully acquired and provided County Ambulance with ballistic protection to be used in response to an active shooter incident to maintain personnel safety.

COVID-19 Response:

- Supported County EOC Activation in response to COVID-19 by filling the roles of Operations Section Chief and Medical-Health Branch Director for the duration of activation. Total of five (5) staff members dedicated to this effort.
- In conjunction with County Fire managed the Public Safety Vaccine Clinic in which 31,187 vaccinations were delivered to: law enforcement, fire, EMS, Public Transit and education personnel.
- Successfully managed the EMS-Fire Mobile Vaccine Program, which delivered vaccines to over 2,000 medically fragile homebound seniors or those with disabilities. The Team of three EMS Personnel alone provided 827 vaccines to these individuals.
- Successfully trained over 230 paramedics and emergency medical technicians (EMTs) in the administration of the COVID-19 vaccine through an expanded scope of practice.
- Successfully distributed 38,340 COVID-19 Antigen Tests to all Public Safety Agency Personnel within the Operation Area from Law Enforcement, Fire and EMS.
- Contingency and crisis EMS system planning and contingency plan execution during five (5) rounds of COVID-19 through creative use of Standard Dispatch Orders.
- Implemented several policies consistent with emerging State standards to allow paramedics and EMTs to administer COVID-19 vaccines, including paramedics administering COVID-19 testing.

- Implemented several policies, memorandums of understanding (MOUs) with PHD to implement a First Responder Mobile Vaccination Program, including staffing an EMS Agency mobile clinic twice weekly for almost 10 months.
- DICO - Designated Infection Control Officer which is a process to ensure all providers within the EMS System would be properly notified should they come in contact with a confirmed infectious disease.
- Improved testing process for applicants due to COVID-19 response.
- Emergency Medical Services Pediatric Receiving Center Designation process planning and implementation for Santa Clara County hospitals.

Continuing Education:

- 2018: Upgraded our EMS System to high performance CPR and purchased new high performance CPR mannequins for the EMS providers.
- 2018: Created two PSAs, Hands Only CPR and When to Call 9-1-1.
- Stop the Bleed kits provided to all first responders through the EMS Trust Fund.
- Developed and approved Assault/Abuse/Domestic Violence Policy to include strangulation training was provided to all field medics.
- Community outreach – Dial 911 for Stroke Campaign – Post cards translated into five (5) languages distributed to over 5,000 areas of need.
- Lifesaving Information for Emergencies (L.I.F.E.) File: Created a countywide tool to assist the public during their time of need and distributed over 40,000 throughout Santa Clara County.
    - Have so far distributed 4,738 cards to 41 different locations. The break down is:
        - East county: 3 locations = 350 cards
        - South: 5 locations = 370 cards
        - West: 10 locations = 1,570 cards
        - North: 14 locations = 1,958 cards
        - Central: 4 locations = 490 cards

Equipment:

- 2017: Purchased 350 new radios for the EMS System to upgrade the Non-9-1-1 and air ambulance providers.
- 2018: Provided 150 radios to the Santa Clara County Parks Service to upgrade their communications Systems.
- Lucas CPR devices purchased for first responders through the EMS Trust Fund.
- Over 700 automated external defibrillators (AEDs) provided to the community.
- Assisted 11 hospitals in rolling out trunked radio system.

Data Systems:

- Implemented a new data collection form template used by all 911 providers (except Palo Alto Fire), starting January 1, 2020, which:
    - Streamlined the 911 providers data collection process.

    - Reduced time on task for 911 providers, prioritized verbal patient assessment with documentation habits.
    - Allowed for simplistic charting to occur at the patient bedside, allowing compliance to State Regulations about patient bedside data capture.
    - Brought data collection training into the EMS Annual Update training.
- Significantly improved data transmission of Non-9-1-1 data to CEMSIS with high success rates.
- Built a process for program managers to view and repair charts that were failed by CEMSIS collection standards.
- Hospital Hub mechanism for hospitals to receive electronic patient charts in real time.
- Added an "Assess and Refer" worksheet to the 911 ePCR charting.
    - Allowing for proper documentation when the protocol 700-S14 Respiratory Viral Syndrome Transport Decision was utilized.
- Abuse/strangulation data collection – first in California.

Honors/Awards:

- Jason Weed – State of California Meritorious Service Medal
- Michael Cabano – County Board of Supervisors Medal for Outstanding Service-COVID-19, Santa Clara County Emergency Managers Association Special Recognition of Outstanding Achievement, State of California Meritorious Service Medal
- Daniel Franklin – County Employee Excellence of the Year
- Christopher Duncan – County Employee Excellence of the Month