

EMS System Review and Blueprint Report



**SOLANO EMERGENCY MEDICAL
SERVICES COOPERATIVE**

DRAFT

Submitted by

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Executive Summary

The Solano County EMS system has been an extremely robust, high-performing system with an outstanding record of success and exceptional contractor compliance, effective Local EMS Agency oversight, and public-private collaboration. SEMSC engaged PWW to evaluate its current system and assist in designing and implementing a new RFP and provider Contract for the 2020-2030 procurement cycle. The first phase of that process was to conduct stakeholder listening sessions and review documentation and data regarding the current system, and to develop this Blueprint report to summarize the findings of our assessment and provide our recommendations for the 2020-2030 EMS system planning horizon.

Since the last procurement cycle, which culminated in the 2010 award of an EOA contract to the incumbent provider, much has changed in healthcare reimbursement and clinical practice. Evidence-based medicine, the Triple Aim, reform and uncertainty in health insurance markets, a significant increase in high-deductible plans which has greatly increased the self-pay portion of the healthcare payer mix and many other factors make the 2020-30 cycle much different than the landscape of the past ten years.

There are two overarching concerns which have guided the development of our recommendations for the next ten year cycle: (1) incorporating evidence-based, clinical best practices to allow the EMS system to improve its focus on optimizing patient outcomes; and (2) maintaining and ensuring system financial stability for the term of the Contract in light of recent high-profile EMS system failures in other California counties.

Our key recommendations in this Blueprint report are: (1) implement a tiered ALS-BLS response system with an “Omega” protocol option for low-acuity calls; (2) implement centralized EMD and pre-arrival instructions in a Contractor-based secondary PSAP with a call processing time standard; (3) substantially reduce red lights and siren usage to benchmarks of <50% during response and <5% during transport; (4) reform the current response-time performance standards to correspond with standardized EMD response determinants; (5) maintain the PPP unit-hour savings formula for high-acuity calls, implement a response-optional category for low-acuity calls, supplement the PPP payment mechanism with a mandatory per-call fee for utilization of PPP paramedics during transport, and implement an automatic increase in the cost-based payments by the Contractor to the PPP agencies; (6) incorporate CCTs into the EOA as a necessary response to the erosion of market-based CCT capacity in the County, maintain the ALS+RN program, and implement a triage transport (RTT) program for rapid interfacility transports; (7) expand the EOA to include Zone C for 911/emergency calls to improve LEMSA oversight and accountability in this area; (8) restructure the liquidated damages provisions to incentivize evidence-based practices that are shown to optimize patient outcomes while eliminating built-in incentives for non-compliance, and increase the flat franchise fee to cover estimated Contract oversight costs; (9) implement a weighted and scored formula for patient charges in the RFP process, and require the Contractor to adopt certain consumer protections such as hardship waiver criteria; (10) implement workforce protections including a hiring preference for the incumbent provider’s field personnel in the event of a change in Contractor, implement turnover disincentives, promote workforce diversity and assure training on infrequently-used critical skills; (11) increase financial transparency through specific Contractor financial reporting and annual revenue cycle auditing requirements; (12) allow for Contract modification in the event of changed circumstances necessary to optimize the system or avoid financial unsustainability; and (13) implement a requirement that the Contractor have current and 5 years’ prior experience as an EOA provider of a population of at least 300,000.

Summary of Recommendations

The following is a summary of the major system modification recommendations that are discussed throughout this report. Please note that these are not the only options, but the ones chosen for presentation in this report are based on stakeholder input, the present EMS system design, and analysis of pertinent documents. Below we summarize mayor recommendations that are discussed in the report and provide page references to where the complete discussions can be found.

1. **Tiered EMS Response:** SEMSC runs an all ALS system. It is recommended that SEMSC convert to a tiered response EMS system based on response determinants under a standardized Medical Priority Dispatch System (MPDS). MPDS is commonly used to triage 911 calls, and optimize EMS system deployment configurations. The level of service dispatched is based on medically valid, differential response determinants. MPDS is the national standard for high performance dispatch centers. Most patient conditions as reported in 911 calls require only BLS services. A dispatch triage system spares ALS units from initial dispatch where the patient's condition as reported to the PSAP requires only BLS care. Implementation of a tiered response dispatch system will decrease the ambulance service costs of the Contractor, increase the availability of ALS units for more serious calls, and decrease the wasteful allocation of EMS resources. Many important operational, fiscal, and cost-effective patient care benefits can be realized with a tiered response system. A computer-aided dispatch triage algorithm can facilitate improvements in both EMS system operations and prehospital patient care by safely and reliably dispatching appropriate EMS resources to attend to persons with reported illnesses and injuries who require EMS. In addition, we recommend an option for implementation of the Emergency Communications Nurse System (ECNS) and/or the NAED "Omega" protocol for low-acuity calls, which will allow for non-EMS system response, referral to appropriate alternative services and follow-up. **(See pp. 30-31.)**
2. **Central Emergency Medical Dispatching (EMD):** EMS dispatching in the County is currently conducted by seven discrete dispatch centers. Not all of those dispatch centers use standardized EMD protocols. Consideration should be given to converting to central dispatching for emergency medical calls. We recommend that the RFP require the Contractor to serve as a secondary PSAP to conduct centralized EMD for all medical calls made to individual PSAPs. This will eliminate the additional time required to relay to the Contractor call intake information. By establishing central EMD there will be a consistency in determining calls that require an ALS response and those that require a BLS response. The dispatch protocols will accomplish this by including systemized caller interrogation questions and protocols matching the call-intake information with a determination of injury or illness severity dictating whether an ambulance response is required and, if so, whether it should be conducted with red lights and sirens. MPDS post-dispatch, pre-arrival instructions can be used to keep the caller and the patient safe, and also, where necessary, to turn the caller into a first responder by giving the caller

potentially life-saving instruction. Centralized EMD can also facilitate much more effective data collection, QI activities and system integration. **(See pp. 31-33.)**

3. **Red Lights and Sirens:** There are no studies that support the use of red lights and siren (RLS) is linked to improved patient outcomes. In fact, studies have shown that the use of RLS is dangerous to EMS professionals, the public, and patients. Therefore, we are recommending that emergency medical dispatchers direct a Code 3 RLS response only for those emergency calls classified as Delta or Echo under National Academies of Emergency Dispatch (NAED)-compliant dispatch protocols. We recommend the use of benchmarks to reduce RLS use both during response and patient transport. **(See p. 33-34.)**
4. **Response Time Performance Standards:** We are recommending the reformation of existing 911/emergency response time standards based on standardized EMD protocols and tiered response principles that establish differential standards for high-priority calls and lower-acuity calls. **(See pp. 34-35).**
5. **The EMS Public-Private Partnership:** We are recommending that the RFP continue a public-private partnership arrangement between the Contractor and Cities that want to participate via their ALS first response programs. We recommend the maintenance of unit-hour cost-based reimbursement by the Contractor to the PPP cities for first response costs for the most serious calls that require ALS response under the dispatch protocols. We recommend that for lower-acuity calls the ALS first response be classified as “response optional” calls. We recommend that the Contractor be required to compensate the PPP Cities when they assist the Contractor on scene or in preparation for patient transport (for example, lift assist), and for the utilization of a PPP paramedic during patient transport when necessary. We further recommend that all cost-based payments made by Contractor to the participating PPP Cities be automatically adjusted by an amount that is equal to the percentage increase in Contractor’s approved ALS charges over the course of the new Contract. **(See pp. 35-37.)**
6. **Interfacility Transports:** ALS ambulance interfacility transfers that require a registered nurse to attend to the patient due to the patient’s condition or prescribed medications are the responsibility of the current EOA provider. CCTs are not the responsibility of the current EOA provider and are furnished by a competitive market. The number of CCTs has greatly diminished over the last few years due to an improved focus on the proper classification of interfacility levels of care required during transport. However, this has led to the apparent reduction of market-based CCT capacity. This means that some needed CCTs may not be performed or timely performed due to cost, inconvenience and other factors associated with the reduction of CCT volume to expected statistical levels. To ensure that CCTs are performed when needed, we recommend CCTs be included in the EOA under the new Contract. We also recommend that the EOA provider have the discretion to subcontract the performance of CCTs. If the EOA provider decides not to subcontract CCTs and is unavailable to conduct a CCT, or if it subcontracts CCTs and

neither the EOA provider nor the subcontractor is available, we further recommend that the facility requesting a CCT be able to request an unpermitted provider to conduct the CCT as per the provisions of Resolution 12-001. We are also recommending the implementation of a retriage transport (RTT) program and new response level (Priority 9), allowing hospitals to utilize incoming ambulance for ALS interfacility transports that require service under certain conditions. **(See pp. 37-40.)**

7. **Expanding the EOA to Include Zone C:** The Vacaville Fire Department currently has an EOA to provide emergency ALS ambulance service in Zone C pursuant to the grandfather provision in Section 1797.224 of the Health & Safety Code. However, under this arrangement the desired level of clinical oversight, accountability, and system integration has not been realized, according to stakeholders. It is within SEMSC's prerogative to include Zone C (and the City of Vacaville) in the EOA to be awarded to the successful proposer on the next RFP. Although we are not recommending that the City of Vacaville be included in the EOA, in order to provide SEMSC with clinical oversight of the emergency ambulance services provided in Zone C and to ensure the provider of those services has greater accountability to SEMSC for the performance of those services, we are recommending that Zone C, other than the territorial limits of the City of Vacaville, be included in the new RFP and Contract. **(See p. 40.)**
8. **Restructuring Liquidated Damages and Fees:** We are recommending that fines and penalty (liquidated damages) provisions be restructured to align proper incentives/disincentives with patient care goals. In particular, incentives to properly recognize and treat conditions including STEMI, stroke, trauma and others are appropriate. We recommend that the RFP incentivize the Contractor's satisfaction of the prehospital steps to shorten the time for definitive treatment of these conditions by providing for the assessment of liquidated damages when it fails to satisfy those steps. We also recommend that fees cover reasonable LEMSA costs of oversight and administration and that the RFP and Contract not institutionalize a penalty-based revenue stream that the LEMSA in the future may come to depend upon for its operating costs. **(See pp. 40-44.)**
9. **Patient Charges:** We recommend a weighted, composite formula for assessing Proposer's patient charges as part of the RFP scoring process. We recommend a provision for automatic annual increases not to exceed inflation, and a requirement that the Contractor implement financial hardship criteria for full or partial waivers of out-of-pocket charges for eligible patient accounts. **(See pp. 44-45.)**
10. **Personnel and Workforce Provisions:** Many dedicated highly trained personnel are currently working in the Solano County EMS system. Turnover in EMS clinical staff is costly and potentially disruptive to the quality and continuity of EMS in Solano County. Therefore, we recommend that the RFP require that in the event of a change in contracted provider, the new Contractor shall fill its available EMS practitioner positions (i.e., field

staff personnel) by first offering these positions to current employees of the incumbent provider at substantially equivalent compensation and conditions of employment. In addition, we recommend that turnover disincentives for full-time EMS field practitioners be considered, that measures to facilitate cultural diversity in the workplace be utilized, that steps are taken to reduce on-duty EMS provider fatigue, that training on data-driven infrequently-used skills be implemented, and that employee assistance programs, specifically including suicide prevention resources, be made available. **(See p. 45-46.)**

11. **Financial Reports and Accountability:** Under the current Master Agreement the contracted provider is not required to file financial reports with SEMSC. To enable SEMSC to ensure the financial stability of the Contractor and of the EMS system, and to promote transparency, we recommend a requirement for the routine submission of Contractor financial reports and audited financials. We also recommend that the Contractor be required to undergo an annual outside billing and coding audit and that the Contractor maintain acceptable financial reserves during the term of the Contract. **(See p. 46.)**
12. **Modification of the Terms and Conditions of the Contract:** During the contract period there is a possibility that modification of the contract awarded will be needed based on new evidence, changes in standards of care, financial distress of the Contractor and/or the EMS system, changes in reimbursement, or other changes which, in the determination of SEMSC, necessitate modification of the contract. We recommend that the RFP reserve to SEMSC the right to modify terms and conditions of the contract with the Contractor should there be a need to do so. **(See p. 46.)**
13. **Experience Requirement:** We recommend a minimum experience requirement of 5 years and status as a current EOA provider serving a population of at least 300,000 persons as an eligibility requirement for consideration of a Proposal. **(See p. 46-47.)**

Introduction

On June 8, 2018, the Solano County Emergency Medical Services Cooperative (SEMSC) entered into a contract with Page, Wolfberg & Wirth, LLC (PWW), a national EMS industry law and consulting firm, to conduct a three-phased process that will conclude with the negotiation of the next contract with an ambulance service provider to provide ambulance services in a chosen exclusive operating area (EOA) for a period of up to ten years.

Phase I is an EMS System Review and Stakeholder Engagement Process pursuant to which PWW utilized data and documents pertaining to the existing EMS system, and obtained stakeholder input at multiple listening sessions. Based upon that review PWW is presenting to the SEMSC Board this Solano County EMS System Review and Blueprint Report that summarizes stakeholder input and our findings and presents key points that we are recommending be incorporated in a new Solano County RFP. We are recommending that the ground ambulance service to be provided in the EOA include emergency and 911 ambulance services, ALS interfacility and CCT ambulance service in all of Solano County except for the City of Vacaville.

Several stakeholder meetings were held, including two on-site forums in Solano County, and four additional stakeholder focus group meetings by video conference.¹ The stakeholders who participated in Phase I provided insightful, candid and thorough input. A summary of selected stakeholder comments is attached as Appendix A. A visual diagram of the existing EMS System Configuration is attached as Appendix B.

Phase II requires PWW to synthesize the results of the EMS System Review and Stakeholder Engagement Process to prepare a draft RFP for the procurement of the Contractor for the next contract cycle. Subject to approval of County Counsel, we intend to provide the draft RFP to stakeholders and solicit their input. PWW will then make appropriate changes to the draft and prepare a final draft that will be submitted to the SEMSC Board. Final revisions will be made as directed by the SEMSC Board and then the final RFP will be submitted to the California EMS Authority ("EMSA" or "Authority") for its review and approval.

After the Authority approves the RFP, the SEMSC Board will issue the RFP. Phase III will require the establishment of an Independent Review Panel (IRP) to evaluate and score proposals submitted in response to the RFP, the selection of the proposer, and the negotiation of a contract with the selected proposer. PWW will make recommendations to the SEMSC staff for composition of the IRP, draft a proposed contract for the use of the SEMSC Board in negotiating a contract with the selected proposer, make revisions to the proposed contract as directed by the SEMSC Board, and assist County staff in negotiating and finalizing the contract with the selected proposer

¹ The four stakeholder focus group sessions were in addition to the two sessions required in the SEMSC/PWW contract.

Methodology

This phase of the project involves primarily a review of documents and input from EMS system stakeholders. A list of the documents and information that were initially requested from the County, edited to identify documents and information received and not received/not available, is attached as Appendix C.

Document collection and offsite review by PWW staff was initiated on August 13, 2018 and continued throughout the period of Phase I of the project through supplemental document requests, which were promptly fulfilled by County staff whenever the requested documentation was available. Some documentation and/or data requests were also made directly to the incumbent Contractor by PWW.

Onsite stakeholder meetings were conducted in Solano County as follows:

- July 12, 2018 – Solano County Events Center
Focus: existing EMS system assessment
- September 28, 2018 – Solano County Events Center
Focus: recommendations for 2020-2030 procurement cycle

In addition to these two scheduled open forum stakeholder input sessions, we held four additional focus group sessions with targeted stakeholder groups, including:

- Fire Chiefs Focus Group - August 14, 2018 (via video conference)
- Healthcare Facility Administrators/Practitioners Focus Group - August 15, 2018 (via video conference)
- City Managers Focus Group - September 21, 2018 (via video conference)
- EMS Labor Union Focus Group - September 28, 2018 (via video conference)

Additionally, we conducted extensive literature searches regarding response times, emerging clinical best practices, red lights and siren use, emergency medical dispatch, and a host of other issues. The Project Bibliography is included as Appendix E.

Limitations and Disclaimers

Our firm was engaged in a consulting capacity, not in a legal capacity. Accordingly, it is beyond the scope of this engagement for us to provide a legal analysis of issues presented.

Methodologies employed to conduct this review (i.e., stakeholder meetings and review of certain available data) have inherent limitations. Stakeholder input, while important to any EMS system assessment, naturally tends to reflect built-in biases and political considerations of the stakeholders. In addition, any assumptions or options presented based on available data will inevitably depend upon the accuracy, completeness and suitability of the data provided. We specifically note that some data was presented to us with a stated lack of confidence in its overall accuracy. It is important for SEMSC to verify key data upon which many of the assumptions and recommendations in this report are based.

This report is rendered to SEMSC with the expectation that it will become a public record. Any potential bidders that may be considering submitting a proposal are cautioned to make their own careful analysis of EMS system issues, call volumes, potential revenues, and other issues prior to submitting a bid. Potential bidders are cautioned not to incur any expense in reliance upon the recommendations made in this report and that the final EMS system configuration and RFP specifications are within the discretion of the SEMSC Board and not the consultants.

The Solano County EMS System

Solano County Demographics

The County has a total area of approximately 909 square miles.² Of this, approximately 84 square miles are water area and 675 miles are rural land area. Estimated population of Solano County is 445,458 people.³ The population centers of the County, which together comprise approximately 93.5% of the County's population, are found in Table 1 below.

City	Population (2017)
City of Vallejo	122,105
City of Fairfield	116,266
City of Vacaville* (*Excluded From EOA)	100,032
City of Suisun City	29,639
City of Benicia	28,343
City of Dixon	20,202

According to the U.S. Census Bureau, population in the County grew approximately 7.8% between April 1, 2010 and July 1, 2017, which exceeds the rate of growth in California generally.

According to the Census Bureau, approximately 15% of Solano County's population is over the age of 65, which is a higher percentage than the statewide 13.9%. The median household income in the County is approximately \$69,227, which is approximately 8.5% above the state median. It is estimated that 11.4% of the County's residents have incomes below the Federal Poverty Level (FPL).

Major employers in the County are Travis Air Force Base, Kaiser Permanente, Solano County, California State Prison, Six Flags and North Bay Medical Center, among others.

Exclusive Operating Areas (EOAs)

Solano County currently has two EOAs. One EOA, currently assigned to Medic Ambulance Service, Inc. (Medic), covers all of Solano County and part of Sacramento County. It includes emergency ALS ambulance service for all of Solano County with the exception of the City of

² Solano County, 2018.

³ U.S. Census Bureau, July 1, 2017.

Vacaville, the Travis Air Force Base⁴, and an area known as Zone C. It also includes emergency ALS ambulance service for the City of Isleton and the Delta and River Delta Fire Protection Districts in Sacramento County. In addition, the EOA includes ALS interfacility transports throughout the entire EOA. The second EOA, assigned to the Vacaville Fire Department, covers an area known as Zone C. For Zone C the Vacaville Fire Department is the exclusive provider of emergency ALS ambulance service and, for the City of Vacaville, it is the exclusive provider of emergency ALS first response and transport.^{5,6}

Exclusive operating areas are defined in Division 2.5, Sections 1797.85 and 1797.224 of the Health and Safety Code and, the State of California has recognized the following types of services as eligible for inclusion in EOAs in California: 911 Emergency Response, 7-Digit Emergency Response, ALS Ambulance, Interfacility Transport (IFT), ALS IFT, BLS Non-Emergency and IFT, BLS Non-Transport, Standby Service, Standby Service with Transport Authorization, and Specialty Care Transport (SCT).⁷

Master Agreement

Since 2000 Medic has been assigned the EOA by SEMSC, a joint powers authority and the local EMS agency designated by Solano County. In April 2000, following a competitive RFP process conducted by SEMSC, SEMSC contracted with Medic to exclusively conduct ground emergency and non-emergency ALS service in most of the EOA, and ALS interfacility transports in Vacaville and Zone C, as described above. In May 2010 Medic was again awarded, through a competitive RFP process, the exclusive ambulance service contract⁸ (Master Agreement) to provide those services in the EOA. The Master Agreement was for five years, subject to an automatic five-year renewal if SEMSC found that Medic had been in substantial compliance with its responsibilities thereunder. That finding was made and the Master Agreement was renewed.

Medic is currently required to provide ALS ambulance responses to all requests for service in the EOA for which the Master Agreement assigns it responsibility.⁹ Paramedics may not serve as the primary attendant for the interfacility transport of patients who are being treated with skills, medications or IV solutions that are outside the scope of practice of a

⁴ The Travis Air Force Base is under the operational control of the Air Mobility Command and is not within SEMSC's jurisdiction.

⁵ The Vacaville Fire Department has the right to provide emergency ALS first response and ambulance service in the City of Vacaville under Health & Safety Code § 1797.201 and has an EOA to provide emergency ALS ambulance service in Zone C pursuant to the grandfather provision in Health & Safety Code § 1797.224.

⁶ The EOA currently assigned to Medic will be referred to as "the EOA".

⁷ Ambulance Zones, Ground Exclusive Operating Areas (EOA) Status Determinations by EMSA as of August 2018.

⁸ The Solano Emergency Medical Services Cooperative Ambulance Service Contract.

⁹ ALS ambulance transfers require a registered nurse if dictated by the patient's condition or prescribed medications. Section 11.1.2 of the Master Agreement provides that when requested by a health care facility the ALS ambulance needs to be staffed by a minimum of one EMT-I and one registered nurse or, when approved by SEMSC, another allowed health care professional.

paramedic.¹⁰ In the event the patient requiring an ALS interfacility transport is being so treated, the sending facility must request that the ambulance crew include an appropriate caregiver, generally a registered nurse, to attend to the patient. The patient's physician must complete the Solano County Interfacility Ambulance Transfer Request Form when making such a request.^{11,12}

To enter into a Master Agreement with SEMSC Medic was required to pay a one-time \$100,000 fee to offset SEMSC's costs in developing and executing the competitive selection process. Medic is also required to pay an annual franchise fee. The annual franchise fee was \$500,000 for the first five years of the current Master Agreement and has continued to be \$500,000 through the five-year renewal period.

High Performance EMS System

The Solano County EMS system under the EOA is what is typically referred to as a "high performance system," that is, it incorporates response time standards and associated penalties. This system was considered an industry standard at the time of the 2008 procurement. Under the Master Agreement Medic is required to satisfy specified response time standards. The Master Agreement addresses five levels of priority responses and establishes a response time standard for responding to calls in each priority level. It also imposes a 90% monthly fractile response time standard for each priority level. A fine, specified by priority level, is to be imposed for each response that exceeds the response time standard for that priority level unless it falls within an exception to the response time standard as set forth in the Master Agreement. However, except for a Priority Level 4¹³ response, no fine is to be assessed for a response to any call during a calendar month that does not meet the response time standard if the 90% monthly fractile response time requirement has been met for that priority level.

Over the course of the Master Agreement and its renewal Medic has not failed to meet a 90% monthly response time standard. Therefore, it has not been assessed any fines. In FY 16-17 Medic conducted 27,844 Priority 1, Code 3 responses that were subject to the response time requirement, with 27,597 of the responses satisfying the response time requirement, for a compliance rate of 99.11%. In FY 17-18, through March of 2018, Medic conducted 21,815 Priority 1, Code 3 responses that were subject to the response time requirement, with 21,592 of the responses satisfying the response time requirement, for a compliance rate of 98.98%.

According to the incumbent provider, total emergency and ALS Interfacility Transport volumes for the years 2013 – 2018 (YTD) for which it was responsible are set forth below.

¹⁰ 22 CCR § 1001.46

¹¹ See Solano County Policy Memorandum 7200 and Section 11.1.2 of the Master Agreement.

¹² If the patient is critically ill or injured a CCT is required.

¹³ A Priority 4 level EMS call is for a non-scheduled response for a presumed life threatening emergency at a medical facility where a patient is under the direct care of a physician wishing immediate transport to another medical facility that has a higher level of care. This type of call is determined by an emergency medical dispatcher (EMD) using approved medical protocols in which the EMD determines that time for transport is of the essences, and where the sending physician may or may not have arranged appropriate medical staffing for the transport unit.

Table 2 - Emergency Responses by Year, 2013-2018

Year	Emergency Responses
2013	28,919
2014	30,101
2015	31,657
2016	32,228
2017	33,090
2018* *January 1 – September 30	23,367

Table 3 - ALS Interfacility Transports by Year, 2013-2018

Year	ALS Interfacility Transfers
2013	4,253
2014	4,077
2015	4,285
2016	4,318
2017	4,357
2018* *January 1 – September 30	3,781

Other Ground Ambulance Services

The Master Agreement does not cover CCT or BLS ambulance services. CCTs are regulated under SEMSC Resolution 12-001. To conduct CCTs in Solano County a ground ambulance service provider requires a permit from SEMSC to do so.

Ambulance service providers with current permits to perform CCTs in Solano County are Falcon Critical Care Transport, Inc (Falcon CCT), Falck Northern California d/b/a VeriHealth (Falck), American Medical Response-Sutter Health Division (AMR), Medic, and ProTransport 1, LLC. (ProTransport). During FY 2017-18, Falcon CCT performed 98 CCTs, Medic performed 207

CCTs, Falck performed approximately 40 CCTs, and AMR and ProTransport each performed no CCTs.

Ambulance service providers with current permits to perform BLS ambulance service in Solano County are Falcon CCT, Falck, AMR, Medic, ProTransport, Bay Medic Transportation, Inc., Sacramento Valley Ambulance, Inc., and WestMed Ambulance Service.

Public Private Partnership

The Master Agreement provides for Medic to enter into a Public Private Partnership (PPP) with those fire jurisdictions desiring to participate in a PPP with Medic by accepting responsibility for providing a timely paramedic first response to calls within their jurisdiction. The fire jurisdictions that chose to participate are the Cities of Benicia, Dixon, Fairfield and Vallejo. Medic entered into a PPP Agreement¹⁴ with the four cities and the PPP Agreement was approved by SEMSC. It imposed an ALS first response time requirement of seven (7) minutes on the PPP City fire departments.

Each PPP City was also required to enter into an ALS first response agreement with SEMSC.¹⁵ Under these agreements failure of a PPP City to respond with a first response unit¹⁶ to a Level 1, Code 3 call within the seven (7)-minute response time requirement is subject to a fine of \$15 for each minute a response exceeds seven (7) minutes unless it falls within an exception to the response time standard as set forth in the agreement. Also, as with the SEMSC contract with Medic, these agreements provide that no fine is to be imposed for a tardy response if the fire department exceeds the response time requirement more than 90% of the time in the calendar month.

In FY 16-17 the four PPP Cities, collectively, had 22,429 ALS first responder responses to Priority 1, Code 3 responses that were subject to the response time requirement, with 20,748 of the responses satisfying the response time requirement, for a compliance rate of 92.51%. In FY 17-18, through March of 2018, they collectively conducted 17,367 Priority 1, Code 3 responses that were subject to the response time requirement, with 15,615 of the responses satisfying the response time requirement, for a compliance rate of 91.77%.

Significant Features of the PPP Arrangement

For Priority 1¹⁷ responses in urban areas the Master Agreement imposes upon Medic a nine (9)-minute response time standard, but it imposes a twelve (12)-minute response time standard for Priority 1 responses in the PPP fire jurisdictions.

Medic's response time standard for Level 1, Code 3 responses in the PPP Cities was increased from nine (9) minutes to twelve (12) minutes by SEMSC taking into account the PPP

¹⁴ The Public Private Partnership Agreement for ALS First Responder Emergency Services.

¹⁵ An Agreement for First Response Advanced Life Support (ALS) Non-Transport Services.

¹⁶ An ALS vehicle staffed with one EMT-I and one EMT-Paramedic.

¹⁷ A Priority 1 call is an EMS call for a presumed life-threatening emergency.

Cities' commitment to provide ALS first response within seven (7) minutes 90% of the time. In or about November 2008, Medic developed a System Status Deployment Plan (SSDP) for responding in the PPP City jurisdictions based upon a twelve (12)-minute response time standard.

As a result of the expanded time to respond, Medic determined that its SSDP required fewer ambulances and EMS personnel to service the PPP Cities than if it were operating under a nine (9)-minute response time standard. Medic estimated that this would save it approximately 17,000 unit hours per year at a cost-savings rate of \$86.51 per unit hour, or \$1,470,670.

Pursuant to the PPP Agreement, in the first year of the contract this amount, subject to some adjustment due to payment already having been made to the PPP Cities under a prior PPP agreement, was the Annual Dollar Allocation paid by Medic to SEMSC and disbursed by SEMSC to the PPP Cities. The current Annual Dollar Allocation continues to be \$1,470,670. The PPP Agreement also explains circumstances under which Medic's Annual Dollar Allocation to the PPP Cities could be decreased. None of those circumstances has occurred.

Under the PPP Agreement Medic provides at no cost to the PPP Cities ALS and BLS continuing education, including but not limited to CPR, ACLS, PALS and PHTLS for all PPP City full time paid paramedics, sufficient to maintain their licenses and satisfy applicable Solano County accreditation requirements. The training also includes regular orientation programs for newly purchased equipment.

Also, under the PPP Agreement, Medic exchanges all disposable supplies, including identical backboards, with the PPP Cities' first responder paramedics on a one-for-one basis, for those supplies directly used on patients by the first responder paramedics when Medic also responds to the call. Further, on the first weekend of each month, Medic collects and rotates among the PPP Cities ALS medications (excluding narcotics) that will expire within nine months. For mass casualty incidents Medic responds with a supervisor certified to the National Incident Management System (NIMS) 1400 level.

Other First Responders

There are fire departments other than the fire departments of the PPP Cities that also provide first response services in Solano County. The Suisun City Fire Department, the Suisun Fire Protection District, and the Montezuma Fire Protection District are BLS fire departments. They provide BLS first response when there is an emergency EMS dispatch in their jurisdictions. The Dixon Fire Department also may respond BLS if the first or second out Dixon ALS unit is already on a call, which is rare. The Vacaville Fire Protection District also provides BLS first response in Zone C, for which the Vacaville Fire Department provides ALS ambulance emergency response.

Hospitals

Hospitals within Solano County that have emergency departments to which patients may be transported by ambulance or otherwise are Kaiser Permanente Vacaville Medical Center,

Kaiser Permanente Vallejo Medical Center, NorthBay Medical Center, NorthBay VacaValley Hospital, Sutter Solano Medical Center, and David Grant Medical Center. David Grant Medical Center is located at the Travis Air Force Base, but being a United States Military facility, SEMSC has no authority over it.

Out-of-county hospitals to which patients in Solano County most frequently go or are transferred are Sutter Davis, Sutter Delta Medical Center—Antioch, John Muir Medical Center—Walnut Creek, John Muir Medical Center—Concord, Kaiser Permanente—Antioch, Queen of the Valley, Children’s Hospital, and University of California Davis Medical Center.

Kaiser Permanente Vacaville Medical Center is a County designated Level II Trauma Center, a Mass Casualty Incident Base, a base hospital, a stroke center, and has an emergency department approved for pediatrics (EDAP). Kaiser Permanente Vallejo Medical Center is a STEMI Center, a stroke center, a base hospital, and has an EDAP. NorthBay Medical Center is a County designated Level III Trauma Center and an ACS Verified Level II Trauma Center, a STEMI Center, a base hospital, and has an EDAP.

NorthBay VacaValley Hospital is a base hospital a stroke center and has an EDAP. Sutter Solano Medical Center is a base hospital and a stroke center. John Muir Concord is a STEMI Center. Children’s Hospital is a Pediatric Trauma Center. The University of California Davis Medical Center is a Level I Trauma Center and a Pediatric Trauma Center.

Out-of-County STEMI Centers include John Muir Medical Center—Walnut Creek, John Muir Medical Center—Concord, Kaiser Permanente Medical Center—Walnut Creek, Sutter Delta Medical Center—Antioch, Mercy General Hospital—Sacramento, Sutter Medical Center—Sacramento, and University of California at Davis Medical Center—Sacramento. John Muir Medical Center—Concord is the only out-of-county STEMI center with which Solano County contracts to serve as a STEMI Center.

Dispatching

Dispatching in Solano County is fragmented. There are currently seven dispatch centers in Solano County: the Solano County Sheriff’s Office, the public safety communication centers for the cities of Benicia, Vallejo, Fairfield, Vacaville, Suisun, and Medic Ambulance. They do not all use dispatch determinants and protocols.¹⁸ Information gathered by the PSAPs is then provided to Medic, which dispatches a Medic ALS ambulance. The Sheriff’s Office Dispatch Center also handles the coordination of air ambulances for scene calls to all areas of the County and the coordination of mutual aid for the County and out-of-County requests. People requiring emergency ambulance service may also call Medic directly.

¹⁸ We are informed that the Fairfield and Vacaville PSAPs and Medic currently have EMD.

Air Ambulance Services

Two air ambulance services—CalStar and REACH Air Medical Services (REACH)—have air ambulance provider permits from SEMSC to operate in Solano County. They are authorized by SEMSC to provide air medical transportation from a prehospital scene incident or interfacility transfer originating within the County. CalStar and REACH are authorized to provide air medical services for the following hospitals: Kaiser Permanente Vacaville Medical Center, Kaiser Permanente Valejo Medical Center, NorthBay Medical Center, NorthBay VacaValley Hospital, and Sutter Solano Medical Center. The California Highway Patrol is also authorized to provide air ambulance service in the County, but it does not require an air ambulance provider permit to do so.

Community Paramedicine¹⁹

Since September 15, 2015 Medic has operated a Community Paramedicine pilot program in Solano County in collaboration with NorthBay Medical Center, pursuant to approval of the California EMS Authority. It is a post-discharge program that focuses on patients with chronic obstructive pulmonary disease and congestive heart failure that are treated and discharged from NorthBay Medical Center. The goal of the program is to help those patients handle these conditions out-of-hospital so that they are not readmitted for the same reason.

NorthBay Medical Center identifies patients eligible to participate in the program and those patients may choose to participate or not participate in the post-discharge Community Paramedicine program. Patients who choose to participate are not charged for their participation. The duties of Medic's community paramedics include making two to four home visits within 30 days after discharge and to help patients participating in the program to stay healthy. Services may include such things as help with medication, providing nutritional advice and arranging for insurance and other resources required by the patients.

Through March of 2018, 178 patients have been enrolled in the Community Paramedicine program. In the first quarter of 2018, 79% of the patients then enrolled in the program did not return to the NorthBay Medical Center via its emergency department within 30 days. None of the emergency department visits resulted in readmissions.²⁰

¹⁹ This is not a requirement of the Master Agreement.

²⁰ The statistical data was derived from the University of California San Francisco Report on Implementation of HWPP #173 – Community Paramedicine – Quarter 2018.

EMS System Revenues, Costs and Oversight: A Background Discussion

The Reality of Ambulance Revenues

It is important to frame the issue that underlies every EMS system design: an EMS system can perform only to the level of the revenues that support it. An EMS system that places mobile emergency departments with an emergency physician and critical care nurse every 3 miles throughout a county would be publicly and politically desirable, but utterly unaffordable. On the other hand, a system with one BLS ambulance serving 100,000 people would be highly affordable, but completely undesirable from a public health and safety perspective.

Somewhere between those extreme examples lies the optimum EMS system configuration for each county. EMS system design is always an accommodation of necessity between the public's desire for the fastest EMS response and the highest level of care with the reality of the resources available to support that system.

The challenge in every EMS system is to find that balance, that equilibrium.

To Payers, EMS is a Transport Commodity. EMS is, unfortunately, viewed primarily as a transport commodity by healthcare payers. Insurers pay for ambulance transports, not EMS systems. Thus, revenues are available only for calls that result in covered transports. Most payer criteria require that the transport meet medical necessity guidelines, that the patient be transported to a covered destination, that the patient receive covered services at the origin or destination, and other stringent criteria. Unfortunately, reimbursement is insignificant for cancelled calls, "treat no transport" responses, standbys, patient refusals of care, waiting time, extra crew members when needed, non-transport intercept services and other services. Patient transport is only part of what an EMS system does, but it comprises nearly all the revenue available to support all of the vital EMS system activities apart from patient transport.

Even when an EMS response does result in a patient transport, it is important to note that many payers are limiting, denying or retrospectively recouping reimbursement for transports that the payer believes fail to meet medical necessity and other payment criteria. It is vital to

Summary

An EMS system can deploy resources and perform only to a level that is allowed by the revenues that support it.

EMS system revenues derive only from a subset of patient transports, yet transport revenues can fall short of covering broader system costs. In the Solano County EMS system this is not currently an acute problem, but SEMSC must always be forward-looking. If substantial costs above revenues for reimbursed transports are added via response time requirements for 911 calls, non-emergency, interfacility and critical care transports, or if an undue amount of system costs are imposed on the contracted provider, such "negative subsidies" can impose financial stress on the contractor – and thus the EMS system – and cause the EMS system to fail. Other EMS systems in California faced insolvency or collapse, largely due to these unsustainable costs placed on the contracted providers.

understand that while EMS systems must respond to all 911 calls, not every ambulance response to a 911 patient will result in reimbursement – even when the patient is transported. This is because Medicare, Medi-Cal, and commercial payers often refuse payment for transports where they unilaterally determine that the patient could have been safely transported by means other than an ambulance. The simple fact in most communities is that a number of patients who call 911 do not have true emergencies and do not genuinely require transport by ambulance from a clinical perspective. Yet, legal duties of care obligate EMS systems to respond to all 911 calls (within the mandated response times, of course) and transport the vast majority of these patients. So, even though EMS system reimbursement is available only for patient transports, there is a subset of patient transports that simply are not reimbursable.

Therefore, most direct revenue available to an EMS system is strictly transport-related, despite the fact that many responses – and even some transports – do not result in reimbursement. Many responses are not reimbursable, even though the cost of readiness for those responses is substantial. The federal government is the single largest payer for ambulance services, yet federal studies have demonstrated that ambulance transport revenues fall short of compensating most ambulance services for their transport costs. And again, reimbursement is generally not even available for the multitude of responses that do not result in patient transport. Put simply, a non-subsidized EMS system must survive only on the revenues generated by a subset of that EMS system’s responses.

Most EMS Reimbursement Falls Short of Costs. A study by the United States Government Accountability Office (GAO)²¹ found that Medicare reimbursement results in an average Medicare margin of negative 6 percent for ambulance providers without shared costs.²² Put another way, the rates paid by Medicare, which is the single largest payer in the payer mix for most ambulance services in the United States, falls short of covering costs by an average of 6%. Again, reimbursement from Medicare and most other payers is available only for calls which result in a medically necessary ambulance transport, not for responses which terminate without transport, or for transports deemed to be medically unnecessary. By extension, the costs for most responses that terminate without transport or that result in non-covered transports must therefore necessarily be shifted onto those patients who receive covered transports.

In California, the average losses from the transport reimbursement offered by governmental payers like Medicare and Medi-Cal are even more pronounced. One study identified the average costs of a private sector ambulance transport to be \$589.²³ Medi-Cal pays an average of \$124 to \$135 per transport. Medicare pays about \$507 for an average ALS

²¹ Ambulance Providers: Costs and Expected Medicare Margins Vary Greatly. United States Government Accountability Office, Report GAO-07-383, May 2007.

²² In the context of the GAO report, “providers without shared costs” meant those ambulance services that were not part of a hospital or a municipality. The GAO concluded that it was impractical to evaluate costs in EMS agencies that were operated as departments of larger entities like hospitals or cities. Accordingly, the GAO report focused on independent ambulance services whose revenues and costs could be allocated only among ambulance transport services and not other, unrelated products or services.

²³ California Ambulance Association, California’s Ground Emergency Ambulance Transportation (GEMT) Certified Public Expenditure, July 17, 2013.

transport. Governmental payers comprise about 58%²⁴ of the payer mix in Solano County, and virtually all of those transports would be performed at a loss if these data are accurate.

The Reality of “Zero-Subsidy” EMS Systems. The challenge of operating a high-performance EMS system is particularly acute in “zero subsidy” systems; that is, systems in which the ambulance transport provider is required to subsist entirely on the transport revenues collected from patients and third-party payers. EMS agencies in California that wish to sustain one or more EOAs must recognize that an EMS system is challenged to sustain itself in the new healthcare environment when it must subsist solely on transport revenues and a some of those revenues go to penalties or fees for the Local EMS Agency, and some go to subsidies or are reallocated to other components of the EMS system (i.e., first responder agencies). A recent white paper focused on EMS reimbursement in California pointedly concluded, “EMS systems in California may require subsidies, may have to significantly restructure their operations or will become insolvent.”²⁵ We have seen no evidence of such financial strain presently in Solano County²⁶, but SEMSC must look forward and give serious consideration as to what measures need to be taken to prevent this from becoming a reality.

It has been suggested that the implementation of the Affordable Care Act should be increasing provider revenues, as more individuals become insured. However, the white paper²⁷ on EMS reimbursement in California stated the nature of this fallacy succinctly:

“The significant growth in the number of Medi-Cal insured, Medi-Cal’s exceptionally low reimbursement rate, and Medi-Cal’s prohibition against balance billing suggests that EMS system that have high proportions of Medi-Cal insured are not financially solvent now, or will not be financially solvent, if: (1) the proportion of high paying commercial insurance plans decreases; or (2) the average amount paid by commercial plans decreases; or, (3) populations transition from higher-paying commercial insurance to Medi-Cal. Conversely, in those EMS systems where the proportion of uninsured and private pay decreases, while the proportion of Medi-Cal insured increases, and the proportion and reimbursement of other payer groups remain unchanged, average net revenue may increase.”

Meeting Operating Expenses is One Thing, Making Capital Investments is Another. Even when a contractor can cover operating expenses with its transport revenues, other needed investments in people and capital may lag. Part of every dollar earned ought to go to the

²⁴ We were not able to obtain ambulance service payer mix. This is based on 2016 emergency department payer mix in Solano County.

²⁵ Petrie, M., EMS Reimbursement in California: Discerning the Facts, April 2016.

²⁶ Again it must be evidenced that no Contractor financials were made available for our review.

²⁷ Petrie, M., EMS Reimbursement in California: Discerning the Facts, April 2016.

replacement of vehicles, medical equipment and other capital expenditures, and part should ideally be invested in cash reserves to cover contingencies. As discussed in more detail below, these longer-term investments also need to be taken into account when designing an EMS system that requires the contractor to be self-sufficient in reliance on its transport revenues.

Two recent cases are particularly noteworthy:

- In Alameda County in 2015, the system was deemed to be unsustainable and the contractor was paid an outright cash subsidy of \$4 million during the term of the contract.
- In Santa Clara County in 2016, concessions given during the term of the contract such as elimination of franchise fees and dispatch fees, elimination of contractor negative subsidy requirements such as funding county software and equipment purchases, elimination of late penalties and other such modifications were estimated at a value of \$7 million in contractor subsidies.

Notably, the Santa Clara County Executive, in his memos to the Board of Supervisors regarding these contractual changes, wrote the following revealing passages:

"We continue to be concerned about the sustainability of the system and [the contract amendment] attempts to continue balancing costs and response times is a way that we believe still yields a high quality, cost effective product for everyone involved."

"While there have been criticisms regarding [the contractor's] original bid...we must focus on the current state of the EMS system and the need to take steps to assure the continuity of effective emergency medical services into the future."

-Santa Clara County Executive²⁸

Solano County EMS System Revenues. We have undertaken to project available EMS system revenues for the Solano County EMS System, for the first three years of the procurement cycle, consistent with the EMS system configuration we are recommending.²⁹ Revenue projections are \$21,296,011 for the first year, \$21,906,576 for the second year, and \$22,513,538 for the third year. The Revenue Projections Spreadsheet is attached as Appendix D.

In creating the projected revenue spreadsheet, current supplier data was not available and therefore it was necessary to make the following assumptions. Payor mix % (transport

²⁸ May 5, 2015 and February 9, 2016 memoranda from Jeffrey V. Smith, County Executive, to the Santa Clara County Board of Supervisors.

²⁹ The incumbent Contractor's revenue information was not made available for our review. These calculations represent projections only and no guarantee is made as to available system revenues and these projections should not be relied upon as such.

volumes for patients by insurance provider type: Medicare, Medicaid, Commercial, or Self Pay) was estimated based on emergency department data for the locale.³⁰ Total call volume was based on current volume with an annual increase estimated from an average of the past 5 years' increases. Average mileage per transport was based on the average distance traveled to receive medical services in urban areas. Medicare allowed payment amounts were based on 2018 fee schedule rates for the main zip code of the locale with an annual 1% inflation factor applied to both base rates and mileage rate. Medi-Cal rates were based on current payment rates, unadjusted annually. Self-pay estimated collection rates are based on conservative historical data from other EMS agencies.

Small variations in any one of these estimates may result in significant decrease or increase in the projected revenue. Changes in payor rules, policies, coverage decisions or rates may also result in significant variances in projected revenue. The estimates and projections contained herein are *not* guaranteed - proposers should conduct their own due diligence in determining call volumes, average loaded mileage, payor mix, payor policies/rates, level of service mix, and other variables that may affect total cost of performance and expected reimbursement.

The Reality of EMS Oversight

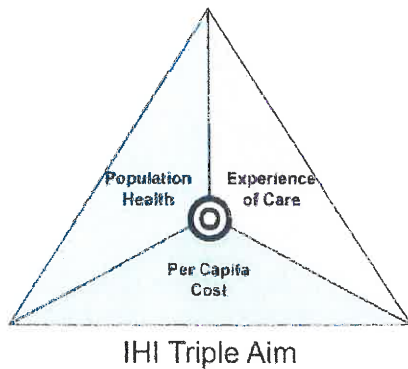
On the other side of the coin, EMS oversight agencies must ensure that their contractors are accountable and that they provide quality care and responsive service to their constituents. When a Local EMS Agency (LEMSA) elects to create one or more EOAs and utilizes a competitive process to award contracts to serve those EOAs, the EMS Agency has a right to receive the benefit of its bargain and ensure that the contractor delivers on the promises it makes when it submits a proposal and signs a contract with the LEMSA.

Takeovers and System Procurements are Expensive. EMS Agencies must balance their desire for firm oversight with the reality that if an EMS system fails, it is the county that is vested with the responsibility to organize and maintain that system. The SEMSC RFP, like most such EMS procurements, should contain a takeover clause as a system "safety valve". A takeover, however, would be an expensive proposition for a county. In addition, should a county elect to replace its system with a new competitive procurement prior to the expiration of a contract term, a premature procurement adds significant costs to the system as well. Therefore, the RFP and the ensuing contract should be constructed to ensure that the Contractor completes required responsibilities to provide responsive service and quality care under terms that make the performance of those responsibilities sustainable throughout the entire contract period.

As discussed above, other county EMS Agencies in California have faced imminent or actual system failures brought on by financial non-viability of their contracts. It is always difficult to attribute precisely the causes of financial distress in any large, complex entity with multiple cost centers and revenue sources. But these systems have concluded that the array of

³⁰ This is based on the presumption that the payer mix of patients in the emergency department would reasonably approximate that of patients transported by ambulance.

penalties, fees and system enhancements required to be paid by the contractor had to be modified to prevent collapse of the systems.³¹



Are We Measuring the Right Things? Modern healthcare is moving towards the “triple aim” of improving population health, improving the experience of care, and reducing the per capita cost of healthcare.³² One of the driving forces behind this movement is the adoption of evidence-based medicine. As healthcare moves towards evidence-based medicine, some commentators have suggested that EMS systems are measuring the wrong metrics when determining how well they are functioning. For decades the hallmark of a high functioning EMS system was how fast an ambulance arrived for a patient. It was long theorized that the quicker an ambulance arrived at a

patient’s side the better the patient outcome. However recent research has shown, that except for a few patient conditions, quicker response times do not equate to better patient outcomes. However, measuring response times is an attractive metric, because it is easy to measure, and the data is readily available to EMS system administrators and public oversight officials.

While measuring patient outcomes would give better insight in to how well an EMS system is functioning, it is often difficult. Currently there is no widely achieved integration between EMS, hospital and post-hospital care provider electronic health records (EHR). While measures like mortality, length of stay and functional status and other health status indicators would be better indications of EMS system effectiveness than measuring response time, that data is currently too hard to measure. As a result, response times have widely been used as a standard to measure EMS systems.

Do Response Times Matter? The goal of any EMS system should be to improve the outcomes of the patients it treats. However, getting to the patient faster does not always translate to improved patient outcomes. In fact, trying to lower response times can increase the overall operational cost of an EMS system, making such reductions economically infeasible.³³ EMS system administrators should have a good handle on the financial costs of reducing response times versus the actual benefit to patient outcomes. The literature suggests that there is no correlation between quicker response times and improved patient outcomes for most patient

³¹ As mentioned above, in the Alameda and Santa Clara EMS systems, there were notable amendments made to provider contracts during the term of those agreements. In Alameda, the provider received direct cash subsidies of \$4 million paid by the county, and in Santa Clara the \$7 million subsidies took the form of penalty concessions, franchise fee eliminations, zone reclassifications and other substantial changes. In neither case was the system re-bid, and to our knowledge there have been no objections (thus far) by the state EMS Authority or by unsuccessful bidders.

³² Institute for Healthcare Improvement, <http://www.ihl.org/engage/initiatives/tripleaim/pages/default.aspx>

³³ One study estimated that to reduce response times by one minute in England and Wales would cost approximately £54 million (\$69 Million). Colin O’Keeffe et al., Role of ambulance response times in the survival of patients with out-of-hospital cardiac arrest, 10 Emergency Medicine Journal, (2009).

conditions. Some of the studies that support the conclusion that quicker response times for most patient conditions are not indicative of improved patient outcomes are summarized here:

- A 2002 study, conducted in a metropolitan county with a population of 620,600, examined the correlation between specified response times and survival in an urban EMS system. The EMS system employed a single tier response at the ALS level and a 90% fractile response time specification of 10:59 minutes for Priority 1 (emergency life-threatening) calls and 12.59 minutes for Priority 2 (emergency non-life-threatening) calls. All studied calls resulted in patient transports to a Level 1 trauma center. The review covered 5,424 transports. Seventy-one patients died, but the study found no significant difference in median response times between survivors and non-survivors. Response times equal to or less than 5 minutes were associated with improved survival when compared to response times exceeding 5 minutes. The study's conclusion was that "changing the system's response time specifications to times less than [10:59 minutes for Priority 1 calls and 12.59 minutes for Priority 2 calls], but greater than 5 minutes, would [not] have any beneficial effect on survival."³⁴
- A retrospective cohort study published in 2005 evaluated the effect of paramedic response time on patient survival to hospital discharge. The patients were transported to a single urban county teaching hospital. The study revealed that "a paramedic response time of ≤ 8 minutes was not associated with survival to hospital discharge after controlling for several important cofounders, including level of illness severity. However, a survival benefit was identified when the response time was ≤ 4 minutes." Further, when only medical noncardiac arrest patients were considered the effect of even the ≤ 4 minute response time was not significantly associated with survival to hospital discharge. Response time considered was the interval from the initiation of the 911 call to the arrival of the ambulance at the scene.³⁵
- In 2006, the results of a study were published examining 20 paramedic accounts of the effects on patient care and on their own health and safety in an effort to respond within 8 minutes of dispatch in cases involving prehospital thrombolysis. The

The association between ambulance response times and patient outcomes has not been conclusively established by the peer-reviewed data. Response time benefits have been demonstrated only for a very small subset of the most critical calls, such as cardiac arrest and near-arrest.

³⁴ Blackwell et al., *Response time effectiveness; comparison of response time and survival in an urban emergency medical services system*, 9 *Academy of Emergency Med.*, (2002).

³⁵ Peter Pons et al., *Paramedic Response Times: Does it Affect Patient Survival?*, 12 *Academic Emergency Medicine*, (2005).

conclusion reached was “[t]he 8-minute response time is not evidence-based and is putting patients and ambulance crews at risk.”³⁶

- A study published in 2009 conducted a review of mortality of and the frequency of critical procedural interventions performed on 373 Priority 1 patients. The study was conducted in a county in which a single-tiered ALS response time limit of 10:59 minutes was imposed for Priority 1 calls. Response time considered was the interval between when the address and chief complaint were verified or at 30 seconds after call receipt, whichever was less and the arrival of the ambulance at the scene. The study found that for those 373 Priority 1 patients, patients who waited longer than 10:59 minutes for an ambulance, when compared to patients who did not wait longer than 10:59 minutes, experienced between a 6% increase and a 4% decrease in mortality. The study concluded that “[n]either the mortality nor the frequency of critical procedural interventions varies substantially based on [a] prespecified [advanced life support response time].”³⁷
- A one-year retrospective study published in 2012 evaluated response times in 7,760 cases to determine whether an 8-minute EMS response time was associated with mortality at time of hospital discharge. Response time was defined as 9-1-1 call receipt to ALS unit arrival on scene. The study focused on adults with a life-threatening event as assessed at the time of the 911 call. For patients who had a response time of 8 minutes or more, 7.1% died, while for patients who had a response time of 7:59 minutes or less, 6.4% died. Those who conducted the research concluded there was “[questionable] clinical effectiveness of a dichotomous 8-minute ALS response time on decreasing mortality for the majority . . . [n]ot suggest[ing] that rapid EMS response is undesirable or unimportant for certain patients.”³⁸
- The results of another study designed to determine the influence of shorter ambulance response times on patient outcomes were published in 2013. The study was conducted in an EMS system covering both urban and rural areas. It reviewed responses to Priority 1 dispatches for patients 13 years of age or older involving motor vehicle crash injuries, penetrating trauma, difficulty breathing, and chest pain complaints. The review covered 2,164 transports, 569 of which were transports to a trauma center. The study found that “[i]n cases seen at a major trauma center, longer

³⁶ L Price, *Treating the clock and not the patient; ambulance response times and risk*, 15 *Quality Safety in Health Care*, (2006).

³⁷ Blackwell et al., *Lack of association between prehospital response times and patient outcomes*, 13 *Journal Prehospital Emergency Care*, (2009).

³⁸ Ian Blanchard et al., *Emergency Medical Services Response Time and Mortality in an Urban Setting*, 16 *Journal Prehospital Emergency Care*, (2012).

response times were not associated with worse outcomes for the diagnostic groups tested.”³⁹

- A 2016 study of 503 ambulance response times for people 65 years of age or older who had fallen to the floor found that 8% of them died within 90 days, but that those who died within that period did not wait significantly longer for an ambulance than those who survived within that period.⁴⁰

When do Response Times Matter? For the vast majority of EMS calls, these and other research studies show that response times have no correlation to positive patient outcomes. However, that are a few categories of patient conditions where research has shown a positive correlation between shorter response times and positive patient outcomes. For example, patients suffering cardiac arrest, and ST-Elevation Myocardial Infarction (STEMI) are more likely to have a positive outcome with shorter response times. Some of the studies that support the conclusion that patients suffering from cardiac arrest, stroke, trauma and STEMI are more likely to have a positive outcome with shorter response times are summarized below:

- A 2010 study in the United Kingdom examined ambulance response data from 4 ambulance services over a 5-year period. The study focused on emergency calls where the patient was reported as unconscious, not breathing, or complaining of acute chest pain. This data was further limited by patients who had no vital signs, and CPR was started by EMS outside of the hospital. For every one-minute reduction in response time, the odds of survival increased by 24%. Response times under 6 minutes lead to a survival change of greater than 5%. “[I]t is possible that rapid response to patients in immediate risk of arrest may be at least as beneficial as rapid response to those who have arrested.”⁴¹
- In 2001 the University of Glasgow analyzed all out of hospital cardiac arrests that were attended by Scottish Ambulance Service between May 1991 and March 1998. Only cardiac arrests that were not witnessed by EMS, but attended by EMS within 15 minutes, were included in the study. Reducing response times to 8 minutes increased survival rates 8%, and response times equal to or less than 5 minutes increased survival rates to 10-11%.⁴²
- The American College of Cardiology and American Heart Association recommends that patients suffering a STEMI have percutaneous coronary intervention (PCI)

³⁹ Steven Weiss et al., *Does Ambulance Response Time Influence Patient Condition among Patients with Specific Medical and Trauma Emergencies?*, 106 Southern Medical Journal, (2013).

⁴⁰ Emily Cannon et al., *Ambulance Response Times and Mortality in Elderly Fallers*, 33 Emergency Medicine Journal, (2016).

⁴¹ Colin O’Keeffe et al., *Role of ambulance response times in the survival of patients with out-of-hospital cardiac arrest*, 10 Emergency Medicine Journal, (2009).

⁴² Jill P. Pell et al., *Effect of reducing ambulance response times on deaths from out of hospital cardiac arrest: cohort study*, 322 British Medical Journal, (2001).

under 90 minutes from first medical contact.⁴³ A 2010 study examined the effects of response times on the outcomes of patients suffering a STEMI. The patient population were patients presenting with an acute STEMI that was diagnosed by prehospital electrocardiogram in Mecklenburg County, North Carolina. The study determined that response times, among several other variables, were key indicators of successful PCI within 90 minutes. Response times under 11 minutes increased a patient's chance of receiving PCI within 90 minutes by nearly 75%. Ultimately the study determined "[a]lthough all prehospital patients may not require the same EMS response, it appears as though STEMI patients may benefit from early EMS arrival."⁴⁴

- The American Heart Association and the American Stroke Association recommend that patients experiencing a stroke receive thrombolytic therapy within 3 hours from stroke symptom onset.⁴⁵ A 2012 study examined if EMS prenotification was associated with shorter treatment times for patients experiencing a stroke.⁴⁶ In cases where EMS pre-notified hospitals of incoming strokes, patients were more likely to be treated with thrombolytic within 3 hours (82.8% versus 79.2%). Prenotification was also associated with shorter wait for a CT scan (26 minutes versus 31 minutes) and shorter symptom onset to thrombolytic time (141 minutes versus 145 minutes). Overall EMS prenotification was associated with quicker treatment and improved patient outcomes.
- Several studies have determined factors that improve survivability of a traumatic injury. One factor has been shown to improve the patient's odds of surviving a traumatic injury is transporting patients to appropriate trauma centers. Trauma patients treated at trauma centers have decreased mortality rates (7.6% vs. 9.5%) and 1-year mortality rates (10.4% to 13.8%).⁴⁷ Additionally, transporting severely injured patients from the scene directly to a trauma center is associated with a reduction in mortality and morbidity.⁴⁸ It is vital that EMS not only recognize traumatic injuries early, but transport the patient to an appropriate trauma center, and notify the receiving trauma center as early as possible.

⁴³ Percutaneous Coronary intervention is a non-surgical procedure that uses a catheter to place a stent to open blood vessels in the heart that have been narrowed by plaque buildup. American Heart Association.

⁴⁴ Jonathan R. Studnek et al., Association between prehospital time intervals and ST-elevation myocardial infarction system performance, 122 *Circulation*, (2010).

⁴⁵ 2018 Guidelines for the Early Management of Patients With Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke* 2018;49:e46-e110.

⁴⁶ Lin, C. B. (2012). Emergency Medical Service Hospital Prenotification Is Associated With Improved Evaluation and Treatment of Acute Ischemic Stroke. *Circulation: Cardiovascular Quality and Outcomes*, 514-522.

⁴⁷ MacKenzie, E. J. (2006). A National Evaluation of the Effect of Trauma-Center Care on Mortality. *The New England Journal of Medicine*, 366-378.

⁴⁸ Sampalis, J. S. (1997). Direct Transport to Tertiary Trauma Centers Versus Transfer from Lower Level Facilities: Impact on Mortality and Morbidity Among Patients With Major Trauma. *Journal of Trauma*, 288-295.

Taken together, these studies tell us that ultimately, but for a few specific, critical and relatively low-volume cases, there has been no conclusive empirical or evidence-based data that a shortened response time is associated with decreased mortality rates or a drop in other poor patient outcomes. Based upon these peer-reviewed studies it appears that response time as an indicator of quality is speculative at best, with the possible exception of a very limited group of patients.

It is important that policymakers understand that while response time measurement is the most common proxy for EMS system “quality” in use today, response time standards are very expensive to achieve and do not conclusively yield better patient outcomes for the investment. Any EMS system that is faced with economic constraints and finds it necessary to make hard choices would thus be well-advised to consider the response time data from the literature when deciding how best to allocate relatively scarce EMS system resources.

The research is clear, quicker EMS response times correlate to improved patient outcomes for patients suffering from a few conditions, such as a STEMI or in cardiac arrest. EMS systems should place more importance on response times for these conditions, while deemphasizing responses times for other, less critical conditions.

Ultimately, SEMSC should consider working toward the implementation of a fully evidence-based EMS system. Where the clinical evidence does not support high-cost features such as stringent response time standards, those practices should be curtailed, de-emphasized or altogether abandoned in favor of designing a system around metrics that have a proven positive impact on clinical outcomes. For instance, metrics such as door-to-balloon times for appropriate STEMI patients, door-to-needle times in patients with acute stroke, time to aspirin administration for patients with acute MI onset, and other evidence-based clinical metrics should ultimately take the place of metrics with dubious clinical benefits, high costs, and unwarranted safety risks. Our system configuration recommendations are designed largely with these goals in mind.

EMS System Blueprint: 2020-2030

Tiered Response

All-ALS Deployment is Required, But Usually Not Necessary.

Solano County's EMS response system requires an ALS ambulance response coupled with a fire department first responder ALS response for 911 calls in the PPP Cities.

Current contractor ambulances that respond to these dispatches are staffed with a paramedic and an EMT-I. The PPP City fire departments do not transport patients. They respond with a fire truck and at least one paramedic to the scene. A fire department paramedic will attend to the patient's emergency care needs until the ALS ambulance arrives and the care of the patient can be transferred to the ALS ambulance crew.

It has been recognized that the vast majority of 911 calls do not require an ALS intervention (less than 5%), that patients in cardiac arrest account for fewer than 1-2% of calls, and that fewer than 15% of patients require any type of ALS procedure or even ALS-level monitoring by ALS personnel.^{49, 50} If these figures apply in Solano County, about 15% of the patients for whom an ambulance response is dispatched through the 911 system require ALS care. The EMS needs of the remaining patients could be provided by EMTs performing BLS skills within their scope of practice.

Using paramedics to respond to a call when only BLS services are required does not generate any more revenue than if the response was handled by EMTs only. Medicare and Medi-Cal are payers for most of the ambulance services provided in the County. Regardless of whether there is an ALS response, if only a BLS response is required based on the dispatched condition of the patient, they pay at the BLS rate of reimbursement, not the higher ALS rate of reimbursement. Also, reimbursement from those governmental payers for ambulance services is less than the costs of providing those services.

The costs of employing paramedics and deploying ALS ambulances are greater than the costs of employing EMTs and deploying BLS ambulances. Because they use paramedics to respond to calls where only BLS skills are required, the incumbent provider is incurring greater costs than warranted from a clinical perspective. And, as mentioned above, reimbursement is not based upon the level of vehicle (BLS vs. ALS) that is deployed; it is based upon the information communicated to the dispatcher and the services required by the patient. Therefore, there is a large subset of responses for which comparatively expensive ALS units are deployed when only BLS-level reimbursement is being received. This is an example of how the

⁴⁹ Pepe PE, Mattox KL, Fischer RP, Matsumoto CM. *Geographical patterns of urban trauma according to mechanism and severity of injury.* J Trauma. 1990;30:1125-32.

⁵⁰ For a discussion of the advantages and disadvantages of both an all ALS and a tiered response ambulance system see Stout J, Pepe PE and Mosesso VN. *All-Advanced Life Support vs Tiered-Response Ambulance System.* Prehospital Emergency Care. January/March 2000, Vol. 1, No. 4.

economic realities of transport-based reimbursement could fail to cover the costs of system deployment at an all-ALS level.

If an ALS ambulance response is requested only when the condition of the patient is reported as requiring ALS, then paramedics would be responding to fewer calls, as those calls that clinically require only a BLS response would be handled by EMTs. A clinical advantage of this model would be more frequent exposure by paramedics to patients who require the performance of ALS skills, thus combatting the erosion of such skills due to infrequent use. Also, having a smaller group of paramedics might enhance the ability of the system medical directors to focus on special areas of concern.

Since an ALS response is not required when the condition of the patient as reported to the dispatcher indicates that a BLS response is appropriate, we are recommending that the County's all ALS response system transition to a tiered response system as discussed next.

Tiered EMS Response is a Recognized Standard of Care. It has long been recognized as an industry standard of care that medically-validated dispatch protocols with differential ALS-BLS response determinants can safely and effectively support tiered EMS system deployment. Accordingly, SEMSC should consider requiring in the upcoming RFP the implementation of ALS-BLS tiered response and permit BLS responses for those calls in which the system's validated dispatch protocols permit a BLS-level response. Although tiered deployment is a long-recognized standard of care in EMS, SEMSC may wish to also direct the next EOA contractor to perform 100% QA reviews of 911 BLS deployments for a prescribed time period to ensure that the response determinants are resulting in appropriate BLS responses.

If tiered EMS response is required by the RFP, this will have an impact on the PPP Cities. There will not be a need for those cities to provide ALS first response if the call is dispatched as a BLS emergency. This will be discussed in greater detail later.

Emergency Communications Nurse System or the Omega Protocol. Just as not all 911 calls require an ALS response, not all calls to a PSAP even require an ambulance response. Emergency Communications Nurse System (ECNS) or the NAED "Omega" protocol provide alternative response, referral and/or differential disposition of low-acuity calls which do not warrant an EMS response. These programs are designed to be implemented within an EMS communication center alongside a Medical Priority Dispatch System (MPDS). They include a clinical assessment of the caller's needs and reduce the demand for ambulance transports and trips to emergency departments when unnecessary. We recommend this option for inclusion in the SEMSC RFP.

Centralized EMD

Tiered EMS Response Will Require the Use of EMD. Tiered EMS response cannot be implemented in the EOA without the use of Emergency Medical Dispatch (EMD) with medically valid ALS and BLS response determinants. The issue then becomes whether it is preferable for all of the PSAPs to employ EMD to make tiered dispatching decisions or for one entity to carry out centralized EMD.

It is certainly less costly for one entity to perform EMD for the EOA than to have all of the five PSAPs that operate in the County and the Contractor each conduct EMD. It would also be much easier – and would achieve the goal of all-EMD much more quickly – for SEMSC to impose that responsibility on a single entity via contract than imposing such a requirement on the existing municipal and County PSAPs. The RFP would be a convenient tool to require all proposers to agree to provide EMD for the entire EOA as a scored component of their bid. Unless the four cities in the EOA with PSAPs and the Sheriff’s Office choose to join together in an alliance, bid on the RFP, and then be awarded the contract, the RFP and the ensuing contract with an EOA provider would not serve as vehicles to impose EMD responsibility on their five PSAPs.

We believe that having one entity perform central EMD for emergency ambulance response throughout the EOA is the best approach. A centralized dispatch center with full EMD and pre-arrival instruction capabilities is a cornerstone of an effective EMS system, as it is necessary for properly prioritizing EMS response, and for facilitating the immediate initiation of care by bystanders and others on the scene prior to arrival of EMS. Therefore, we are recommending that the RFP require proposers to provide central EMD and to function as the secondary PSAP for all EMS calls in the County. We also recommend the imposition of call-processing time standards for the Contractor’s secondary PSAP.⁵¹

To achieve good patient outcomes, which should be the primary goal of EMD, one of the critical requirements is that the dispatchers be trained both as an emergency medical dispatcher and on the specific EMD protocols to be employed, as approved by SEMSC. Excellence in EMD needs to be the objective. Therefore, we recommend that emergency medical dispatcher certification of the Contractor’s dispatchers should be required to help ensure that. If the dispatchers of the Contractor are not certified by NAED as an emergency medical dispatcher when the new EOA contract goes into effect, we recommend that they be required to secure that certification no later than a year thereafter. Then they should be required to maintain their EMD certification while they are dispatching for the Contractor. The EMD operation, itself, should meet the standards for an Accredited Center of Excellence (ACE) accreditation by NAED.

With centralized EMD, and all dispatchers receiving the same training and using the same protocols, there will be a consistency in the call-taking process and providing pre-arrival instructions that would be much more difficult to achieve if EMD is not centralized. Both of these components are critical in advancing good patient outcomes. Following approved call-taking protocols will best ensure proper identification of the patient’s primary problem and the resources, ALS or BLS, to address that problem. And following approved protocols for pre-arrival instructions can help keep the patient’s condition from deteriorating and, in some cases, mean the difference between life or death.⁵² Therefore, we recommend that when the new

⁵¹ Scott, G., Without minutes to spare: call processing time should reflect nature of the crisis, *The Journal*, 2007 Sept/Oct, p. 13

⁵² Centralized dispatch has been shown to improve both bystander CPR rates and the likelihood of dispatcher-provided CPR instructions for patients suffering out of hospital cardiac arrest. Ro, Y.S. Et Al. (2018). Association between the

contract goes into effect if the Contractor's dispatchers are not providing callers with pre-arrival instructions in accordance with NAED standards, when appropriate, they should be required to do so no later than a year thereafter. By having EMD performed by the Contractor, its dispatchers will become more proficient in EMD simply due to the volume of calls they will handle and the repetition of calls communicating the same patient conditions.

Another need of the Contractor, if it is the entity providing central EMD, is to have computer aided dispatch (CAD) software capable of monitoring, deploying, redeploying and managing its ambulance resources. Among other features of its CAD software that we recommend be required are the ability to collect and monitor all data elements required by SEMSC, to be fully integrated with SEMSC's First Watch syndromic surveillance software, to have full voice recording capabilities for all oral communications, to have automatic time-stamp capabilities in conjunction with Automatic Vehicle Location (AVL) capabilities, and to enable remote access to its CAD software by SEMSC staff to enable the extraction of any and all data and reports deemed necessary by SEMSC to facilitate its EMS system oversight responsibilities.

Red Lights and Sirens Usage

Do all Emergencies Require Responding with Red Lights and Sirens? SEMSC Policy Memorandum 5520 in conjunction with the current Master Agreement dictate the use of red lights and sirens while responding to emergency calls. Often red lights and sirens are seen as a way to get EMS professionals to patients faster, therefore improving patient outcomes. However, there are no studies that support that the use of red lights and sirens are linked to improved patient outcomes. In fact, studies have shown that the use of red lights and sirens is dangerous to EMS professionals, the public, and patients. One study found that red lights and sirens were activated in 80 percent of all crashes involving ambulances.⁵³ This same study went on to conclude that an "essential issue verified in the analysis of these data is the fact that the use of lights or sirens often places the responding ambulance and the civilian population at risk." A second study found that 60 percent of crashes and 58 percent of fatalities involving ambulance crashes occurred while red lights and sirens were activated.⁵⁴

The idea that the use of red lights and sirens improve patient outcomes, while rational, is flawed. The use of red lights and sirens create a dangerous environment and should be used in very limited situations when competing interests in good patient outcomes outweighs the dangers. While we do not dispute that the use of red lights and sirens can aid an ambulance to get to a patient or to a hospital faster, and that getting to a hospital faster is helpful in certain cases, we believe that the permitted use of red lights and sirens should be limited. Therefore, we recommend that the RFP prohibit the Contractor from issuing a Code 3 directing a red lights and

centralization of dispatch centers and dispatcher-assisted cardiopulmonary resuscitation programs: A natural experimental study. *Resuscitation*, 29-35.

⁵³ Sanddal, et al., Ambulance Crash Characteristics in the US Defined by the Popular Press: A Retrospective Analysis. *Emergency Medicine International*, Vol 2010, Article ID 525979 (2010).

⁵⁴ Kahn, et al., Characteristics of Fatal Ambulance Crashes in the United States: An 11-Year Retrospective Analysis. *Prehospital Emergency Care*, Vol. 5, No. 3 (July/September 2001).

siren response except for those calls classified as Delta or Echo under the Contractor’s NAED-compliant dispatch protocols.

In accordance with published national recommendations,⁵⁵ we recommend that RLS usage be tracked and that liquidated damages provisions be established for calls in which more than 50% of responses utilize RLS, and for a transport RLS rate exceeding 5%.

Response Time Performance Standards

As discussed above, we believe that the published clinical evidence clearly demonstrates that response time requirements in most so-called “high-performance EMS systems” are expensive and do not yield clinical benefits for that expense. However, we do recommend that the award of an exclusive contract for up to ten years to a single provider brings with it the need for accountability on the part of the Contractor to the Local EMS Agency and to the cities, towns and citizens that are its principal stakeholders and consumers.

Therefore, we recommend that response time standards be reflective of the protocol-based EMD response determinants for emergency/911 calls as follows:

Response Priority	Minimum Response Level	Urban Area	Rural Area	Remote Area
Delta/Echo (Code 3)	ALS	9 minutes or less, 90% of the time	15 minutes or less, 90% of the time	60 minutes or less, 90% of the time
Charlie (Code 2)	ALS	12 minutes or less, 90% of the time	18 minutes or less, 90% of the time	69 minutes or less, 90% of the time
Bravo (Code 2)	BLS	18 minutes or less, 90% of the time	24 minutes or less, 90% of the time	75 minutes or less, 90% of the time
Alpha (Code 1)	BLS	40 minutes or less, 90% of the time	60 minutes or less, 90% of the time	90 minutes or less, 90% of the time

⁵⁵Kupas, D., *Lights and sirens use by Emergency Medical Services: above all do no harm*, Maryn Consulting under Contract with National Highway Traffic Safety Administration, May 2017

We further recommend that response time standards for interfacility transports be as follows:

Table 5 Interfacility Transport Response Time Standards		
Call Type	Response Mode	Response Time Standard
<u>Priority 3</u> Urgent request for non-scheduled interfacility transport	Code 2 – Non-lights and siren response	30 minutes from receipt of call
<u>Priority 4</u> Non-emergency unscheduled interfacility transport	Code 2 – Non-lights and siren response	60 minutes from receipt of call
<u>Priority 5</u> Non-emergency transport scheduled > 60 but < 4 hours in advance	Code 2 – Non-lights and siren response	20 minutes from scheduled pickup time
<u>Priority 6</u> Non-emergency interfacility transfer scheduled > 4 hours in advance	Code 2 – Non-lights and siren response	10 minutes from scheduled pickup time
<u>Priority 7</u> Critical Care Transport – Stat-Urgent (emergency transfer)	Code 2 – Non-lights and siren response (unless directed otherwise by sending physician)	30 minutes from time of request
<u>Priority 8</u> Critical Care Transport – Immediate (non-emergency transfer)	Code 2 – Non-lights and siren response	60 minutes from time of request
<u>Priority 9</u> Re-Triage Transport – Immediate interfacility transfer	Code 2 – Non-lights and siren response	15 minutes from time of request

The EMS Public Private Partnership

Under the current EMS system, the Contractor basically “buys” three minutes off of the twelve (12) minute response time standard for emergency response in urban areas due to the commitment of the PPP Cities to provide ALS first response within seven minutes when there is an emergency dispatch. This commitment by the PPP Cities allowed the Contractor to revise its SSDP for responding in those cities. The Contractor determined that the revisions to its SSDP would reduce its unit hour costs. Pursuant to the Master Agreement and the additional

agreements with the PPP cities, the Contractor estimated its annual cost-savings and has paid that annual cost-savings amount to the PPP Cities, through SEMSC.

We recommend that the RFP again require contracted arrangements between the Contractor and those cities that choose to provide ALS first response and enter into a PPP arrangement with the Contractor.

If, as we recommend, the RFP requires that a tiered EMS response system replace the current all-ALS response system, for those calls for which the EMD dispatch determinants direct a BLS response, the Contractor should have the discretion to dispatch a BLS or ALS ambulance. In those cases, we do not believe that an ALS first response by a PPP City should be required. A PPP City would have the discretion to provide an optional ALS first response in these non-ALS cases, but the Contractor would not receive any cost-savings due to the ALS first response. Therefore, we recommend that the RFP provide that the Contractor calculate its cost-savings attributable to PPP City ALS first response only when ALS first response is warranted by the dispatch protocols.

We recommend that the RFP require proposers to submit a detailed proposal outlining their projected unit hour costs and the projected unit hour savings afforded to the proposer by virtue of the ALS first response services that would be furnished by the PPP Cities for EMD Charlie, Delta and Echo-level calls. We further recommend that by virtue of the ALS first response services furnished by the PPP Cities, the Contractor be required to compensate the PPP-Cities based on the proportional unit-hour cost-savings for the arrival of an ALS ambulance on-scene within (12) minutes (90% of the time) for Delta/Echo-level calls, and 15 minutes (90% of the time) for Charlie-level calls.

We further recommend that the RFP should provide a mechanism for the Contractor to exclude from its unit-hour savings calculation payments any Charlie/Delta/Echo-level calls in which it places an ALS ambulance on scene prior to the arrival of the ALS first response unit, and all Alpha/Bravo-level calls for which the PPP city elects to respond.⁵⁶ The RFP should require proposers to certify the accuracy of their calculated unit-hour costs and should caution that manipulation of those figures for purposes of inducing selection of their proposal may constitute a violation of state and federal law.

There will likely be occasions when the PPP Cities provide services for the Contractor other than ALS first response. They should be reimbursed by the Contractor for those services. We recommend that the Contractor be required to negotiate a cost-based amount of reimbursement with each PPP City for reimbursement by the Contractor of the City's reasonable costs of its ALS first response personnel when such personnel are needed to assist the Contractor

⁵⁶ Although we again note that we are not acting in a legal capacity in this engagement, we believe it is appropriate to point out that in these cases, the Contractor would derive no benefit from a first response by a PPP city. Accordingly, we express our reservations about whether requiring or even permitting payments by the Contractor to a PPP city in these circumstances (i.e., calls where the ambulance arrives on scene prior to the first responders, or where the first responders respond voluntarily to Alpha/Bravo level calls) would be permissible under Federal law, namely the federal anti-kickback statute, 42 U.S.C. § 1320a-7b(b).

on scene or in preparation for patient transport (for example, lift assist), regardless of the priority level of the emergency dispatch, and that the Contractor retain documentation of the cost basis for the reimbursement.

Also, if a proposer intends to deploy ambulances at the BLS level for Alpha and Bravo-level calls, we recommend that the proposer include a proposed per-call fee for the utilization of a paramedic from the PPP City for those calls for which the Contractor furnished a BLS-level response, but for which it is determined that an ALS practitioner is required to provide patient care during transport.⁵⁷ This could also be necessary even when Contractor deploys an ALS-level response but requires an additional paramedic during transport. In order to ensure compliance with federal law, the Contractor's proposed per-call fee for the use of a PPP paramedic may not exceed the amount of cost savings Contractor incurs by virtue of deploying a BLS ambulance vs. an ALS ambulance on Alpha/Bravo-level calls.

We further recommend that if the Contractor's initially approved ambulance service charges are permitted to increase throughout the term of the contract, which we do recommend later herein, that all cost-based payments made by Contractor to the PPP Cities be adjusted by an amount that is equal to the percentage increase in Contractor's approved ALS charges.

Interfacility Transports

The CCT Resolution. On October 11, 2012, SEMSC adopted Resolution 12-001 requiring operators of emergency ambulances to obtain a permit to conduct Critical Care Transports (CCTs) originating in Solano County. As defined in the resolution a CCT is the interfacility transportation by ground ambulance vehicle, including the provision of medically necessary supplies and services, of a critically injured or ill patient who requires during transport critical care interventions in a medical specialty area such as nursing care, emergency medicine, respiratory care, or cardiovascular care.

Initially, some of the facilities in Solano County appeared to misinterpret the "critically ill or injured" requirement for a CCT and were requesting CCTs when, pursuant to the Master Agreement, the transports should have been conducted by the contracted provider as an ALS transport. Although these patients may not have satisfied the definition of a critically ill or injured patient, their condition or the medications they needed during transport required they be attended to by a specialized health care professional. A few thousand CCTs were being

⁵⁷ We believe that this should be an area of focus in the EMS Agency's quality improvement program. For instance, if there is an unusually high number of calls that are dispatched BLS but that end up requiring a paramedic during transport, the root cause of this would require investigation. On one hand, it could be that the dispatch protocol is undertriaging the response and that the response determinants need to be modified. On the other, it could indicate inappropriate patient assessment practices by the on-scene providers.

conducted in Solano County when national data reflected less than one percent of all ambulance transports were properly characterized as CCTs.⁵⁸

ALS-RN Transports. In part to address that problem, SEMSC adopted Policy Memorandum No. 7200. Interfacility Transfer Guidelines, which distinguishes between when a CCT is appropriate and when an ALS transport with an RN is appropriate. SEMSC then educated facilities that were still requesting CCTs that should have been conducted as an ALS transport with an RN. The policy and SEMSC's educational efforts were very successful from the standpoint that the number of ambulance transports conducted as CCTs decreased dramatically to the point where CCT utilization is much more in line with national data.

Eliminating improper CCT utilization and implementing ALS-RN transports was also important for system sustainability and ensuring that the incumbent provider received requests for ambulance transports to which it was entitled under the Master Agreement. A sufficient volume of ALS interfacility transports is desirable to permit a Contractor to subsidize the cost of its operations for emergency/911 services under the applicable performance standards.

However, with the proper calibration of ALS vs. CCT-level transports comes a new concern: that the reduced CCT volume makes an open, competitive CCT market non-viable. That is, the decreased CCT volume may lead to some CCT providers abandoning this line of service in Solano County, making it more difficult for facilities to secure these relatively rare but very important transports. There is much less market incentive to conduct CCTs when there are only a few hundred CCTs to perform in a year than if there are several thousand CCTs to conduct. In fact, during the last fiscal year, some of the providers with permits to conduct CCTs in the County conducted no CCTs.

Therefore, we are recommending that CCTs be included as a responsibility of the Contractor under the next RFP. Making the Contractor responsible for CCTs will ensure that these vital transports are conducted. We also recommend that the Contractor have the discretion to subcontract the performance of CCTs with providers who have a permit to provide CCTs in the County. If the EOA provider decides not to subcontract CCTs and is unavailable to conduct a CCT, or if it subcontracts CCTs and neither the EOA provider nor the subcontractor is available, we further recommend that the facility requesting a CCT be able to request an unpermitted provider to conduct the CCT as per the provisions of Resolution 12-001.

Ambulance Transport Following Re triage. Sometimes patients are transported to the emergency department of a hospital that is not an appropriate hospital to handle the patient's condition as assessed by the ambulance crew and the patient needs to be retriaged at the hospital. On other occasions a patient may be transported to a hospital that is appropriate based upon the prehospital assessment of the patient's condition, but after arriving at that hospital the patient exhibits symptoms which dictate that the patient be retriaged. As in the first case, the retriaging of the patient may reveal that the hospital that received the patient is not the most

⁵⁸ Medicare Provider Utilization and Payment Data: Physician and Other Supplier, <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Medicare-Provider-Charge-Data/Physician-and-Other-Supplier.html>

appropriate to treat the patient's condition and that the patient needs to be transferred to a more appropriate hospital. If the patient requires ALS during transport (as one would expect of most retriaged patients) the interfacility transfer of the patient will be the Contractor's responsibility where ALS IFTs are included in the EOA.

The transport to the initial receiving hospital may have been performed by a provider other than the contracted EOA provider (i.e., an out-of-county provider, or the City of Vacaville Fire Department). Although the ALS interfacility transport of the retriaged patient would be the contractual responsibility of the Contractor, representatives of some stakeholder hospitals have advocated that the ambulance that transported the patient to the hospital should be permitted to conduct the interfacility transport, if it is willing to do so, when rapid transport to a hospital qualified to treat the retriaged patient's condition is critical. The need for a rapid interfacility transport could be required, for instance, when a critically injured patient presenting to a non-trauma hospital requires prompt transfer to a trauma center.

We agree with the hospital stakeholders that procedures should be established to implement a retriage transport (RTT) program. RTT would permit a hospital to arrange for an ambulance service other than the Contractor to transport the patient to an appropriate facility when the receiving hospital determines that rapid transfer of the patient is required and the Contractor is unable to provide that rapid transfer. Therefore, we recommend that the RFP allow for an exception to permit the receiving hospital to arrange for the ambulance service that transports the patient to the hospital⁵⁹ to conduct the ALS interfacility transport if certain conditions are met. Those conditions would be that the hospital determine that the patient's condition requires rapid transfer to an appropriate facility, that it contact the Contractor or an ambulance service subcontracted by the Contractor (if the Contractor chooses to subcontract such interfacility transports) and request that the Contractor or subcontractor conduct the transport, and the Contractor or subcontractor either advises that it cannot provide the transport within 15 minutes, or 15 minutes expires from the hospital's request and a Contractor or subcontractor ambulance has not arrived to conduct the transport.

We believe this approach would best balance the need for assuring sufficient transport volume for Contractor sustainability with the facility's need to effectuate a rapid transport of retriaged patients when necessary. Of course, it must be noted that the agencies that originally transport these patients to the receiving facilities cannot be compelled to wait – or to perform these ALS interfacility transfers – but this approach would at least allow for this option. We also recommend that this issue be monitored by the EMS Agency staff and Medical Director to ensure that these retriaged transfers are being appropriately categorized without excessive ambulance wait times and that every consideration is given to ensuring the Contractor the ALS IFT call volume to which it is entitled under the Contract while providing rapid IFTs of retriaged patients when clinically appropriate.

⁵⁹ Or another ambulance service, provided they have a permit to provide ambulance service in the County and are otherwise qualified to perform ALS interfacility transports.

Finally, we recommend that a new response priority code – Priority 9 – should be added to the existing Solano County response codes to reflect triage transports.

Expanding the EOA to Include Zone C

Under the Solano County EMS System Status Plan, SEMSC chose to assign to the Vacaville Fire Department an EOA to provide emergency ALS ambulance service in Zone C pursuant to the grandfathering provision in Section 1797.224 of the Health & Safety Code. Under Section 1798 of the Health & Safety Code, the medical direction and management of an EMS system is to be under the medical control of the medical director of the local EMS agency. That medical direction and management has been construed broadly by the California EMS Authority and case law to include clinical control, quality assurance and pertinent data collection from facilities and providers of ambulance and first response service in the EMS system.

However, under the current arrangement with the Vacaville Fire Department providing emergency ambulance service in Zone C and within the City of Vacaville, the desired level of clinical oversight, accountability, and system integration has not been realized, according to stakeholders. It is within SEMSC's prerogative to include Zone C in the EOA, for both emergency/911 and interfacility ALS transports⁶⁰ in the next RFP. To provide SEMSC with the desired level of clinical oversight of the emergency ambulance services provided in Zone C and to ensure the provider of those services will be subject to greater accountability to SEMSC for the performance of those services, we are recommending that Zone C be included in the Contract awarded under the next RFP.⁶¹

Fees and Liquidated Damages Provisions

Fines and Penalties. The current Master Agreement provides for the imposition of fines and penalties on the contracted provider for failing to satisfy monthly ambulance response time requirements 90% of the time, as well as other penalty provisions.⁶² Any fines collected would be used by SEMSC and the County to help them cover the cost of carrying out EMS system oversight responsibilities. This arrangement provides for a reverse subsidy that rewards SEMSC and the County for EMS system failures which, as we have discussed previously, do not have an adverse impact on patient outcomes in most cases. Put another way, we do not believe that a Local EMS Agency's operating expenses should be based on an expectation of fines and penalties;

⁶⁰ We note that grandfathering eligibility for an EOA assignment under 1797.224 does not confer a *right* of exclusivity to an eligible provider; it merely affords the Local EMS Agency of awarding an EOA without a competitive process. The LEMSA may also utilize a competitive process to establish exclusivity in the EOA.

⁶¹ We further note that SEMSC may elect to include the City of Vacaville in the EOA for the new procurement cycle if it so chooses; however, we are not recommending that action in this report. We note that while Section 1797.201 allows a City to maintain the level of services it historically provided, that section by its plain language does not confer any rights of exclusivity.

⁶² As the term "penalty" carries legal connotations in contract law, we recommend the use of the term "liquidated damages" to better describe these provisions.

that provides a perverse incentive on the part of the oversight agency that its contracted provider fall short of contractual expectations. Instead, as discussed below, we believe that a flat franchise fee should be established that reasonably covers the LEMSA's administrative costs related to Contractor and EMS system oversight/compliance, and that the system design should not contain incentives for non-compliance based on the LEMSA's fiscal needs.⁶³

We have seen, in other California EMS systems, as previously noted, where such fines have contributed to system unsustainability because their imposition undermined the financial stability of the contracted EOA provider. This has not been a problem for the Solano EMS system, but we encourage a departure from the fining provisions in the current Master Agreement to ensure that enforcement of such provisions does not at some point undermine the financial stability of the next Contractor. We generally discourage the imposition of fines for Contractor failures that do not adversely impact patient outcomes. We recommend, as discussed below, that the liquidated damages provisions be restructured to incentivize proper clinical care that is demonstrated to have a direct clinical benefit to the patient, and to disincentivize certain contingencies and events that, frankly, never should occur. An EMS system design should make penalties a rare exception, not an expectation.

We acknowledge the need for EMS to be delivered promptly and efficiently to those in need within the EMS system, and to ensure accountability for the cities and other municipalities in the County who must live with the Contractor selected by SEMSC. Accordingly, we do preserve monthly response time compliance standards, but believe that fines should not be imposed for failures to satisfy those standards unless the failure is repeated or egregious. Consequently, we recommend that the RFP provide that penalties in the form of fines not be imposed upon the Contractor for failing to satisfy response time standards unless such failure for emergency calls or interfacility transports extends for at least three (3) consecutive months.

In addition, we believe that penalties for certain "never events" should be included to provide proper incentives that align with the goals of system oversight, quality and accountability. For example, failure to achieve and maintain CAAS or ACE accreditation (both of which will be recommended for inclusion in the RFP) should be significantly penalized. Departure from clinical standards that have a direct impact on patient outcomes should likewise be carefully monitored and disincentivized, as discussed below.

While as previously discussed there is no correlation between quicker response times and improved patient outcomes for most patient conditions, there are patient conditions for which time to treatment can mean the difference between life and death. These include STEMI, stroke, cardiac arrest and in some instances, trauma. Strategies in the prehospital setting that improve time to definitive treatment for these conditions are critically important. There are evidence-based prehospital clinical performance standards that do improve patient outcomes for these

⁶³ To be clear, we have seen absolutely no evidence of this occurring in the past in Solano County. We have, however, seen this in other system in California, and we strongly believe that such inappropriate incentives should not be institutionalized in the forthcoming RFP and Contract.

conditions and we recommend that they not only be required by the RFP, but that fines be imposed upon the Contractor for failing to satisfy those standards.

The first prehospital metric for reducing time to treatment for each of these conditions is recognizing the symptoms of the condition. For example, some symptoms of a STEMI include chest pain, dyspnea, pallor, diaphoresis, nausea, vomiting, dizziness or lightheadedness, and weakness. If some of these symptoms are present, a STEMI should be suspected. The next step to determine a STEMI is to conduct a 12-lead electrocardiogram (ECG). The ECG measures the electrical activity of the heart to show whether or not it is working normally and it can be used to determine the presence, location and extent of jeopardized myocardium during acute coronary occlusion. The patient has a STEMI when the interval between the recorded jagged heartbeats appears abnormally elevated. If that occurs, the next step is to issue a STEMI alert, which includes transmitting the 12-lead ECG results to the STEMI center to which the patient is being transported so that it can mobilize its cardiac cath lab before the patient's arrival. The prehospital information provided to the STEMI center will help it determine and prepare for addressing the STEMI through thrombolysis, percutaneous transluminal coronary angioplasty (PTCA) or coronary artery bypass graft surgery (CABG). The final prehospital procedure for reducing the time for definitive care is transporting the patient to an appropriate hospital. For a STEMI patient, reducing the time to definitive treatment can reduce the odds of morbidity or mortality.

Incentives for Clinical Performance Standards. Because we recommend that this procurement cycle incorporate evidence-based best practices that are demonstrated to positively impact patient outcomes, we believe that liquidated damages provisions should be structured to provide incentives accordingly. While we will not list here every potential liquidated damages provision that will be recommended for inclusion in the RFP and Contract, we will provide examples of how these monetary disincentives can be aligned with SEMSC's goals of optimizing patient outcomes. These incentives would center on the Contractor's satisfaction of the prehospital steps needed to shorten the time for definitive treatment for those conditions identified in the literature (and summarized earlier in this report) for which time is shown to be a critical factor in optimum outcomes. For instance, some of these clinical incentives would include as follows:

Stroke

- Failure to recognize neurologic symptoms of a stroke
- Failure to issue a stroke alert for a patient with an abnormal finding on the Cincinnati Prehospital Stroke Scale prior to departing the scene
- Failure to transport the patient to an appropriate stroke center pursuant to protocol

STEMI

- Failure to recognize symptoms of a STEMI
- Failure to conduct a 12-lead electrocardiogram after recognizing symptoms of a STEMI

- Failure to issue a prompt STEMI alert (e.g., within 5 minutes of the time of 12-lead EKG capture showing ST elevation)
- Failure to transport the STEMI patient to an appropriate STEMI center pursuant to protocol

Trauma

- Failure to recognize the physical or emotional signs of trauma
- Failure to notify the appropriate trauma center prior to departing the scene with the patient
- Failure to transport the patient to the appropriate trauma center pursuant to protocol

Cardiac Arrest

- Failure to notify the receiving facility of a patient in cardiac arrest before leaving the scene
- Deviation from resuscitation protocols

Mass Casualty Incidents

- Failure to notify area receiving facilities and trauma centers within five (5) minutes on scene of a mass casualty incident (MCI)

Fees. Under the current Master Agreement, the current contracted provider has been required to pay an annual franchise fee of \$500,000 to SEMSC. The franchise fee is used by SEMSC to compensate Solano County for the work it performs in monitoring, enforcing and managing the Master Agreement with the contracted provider. That fee was initially determined by a budget determined by the SEMSC Director based upon the projected costs of the County's work in performing these functions. The amount of the fee has remained the same during the entire period of the Master Agreement.

The cost of performing the monitoring, enforcement, management and quality assurance functions has without a doubt increased while the amount of the franchise fee has remained constant. While earlier in this report we have cautioned against the imposition of excessive fees so as not to contribute to unsustainability of the EMS system, and while we believe that EMS system oversight costs should be borne by the local agencies as a matter of public responsibility and avoidance of conflict of interest, we do realize that most local EMS agencies have become dependent to a degree on franchise fees and even on penalty revenue as discussed above. For reasons we addressed above, we do not believe that LEMSAs should become dependent on a recurring stream of revenue from penalties and contractual enforcement, as that injects improper incentives into oversight and enforcement. If the LEMSA desires to recover oversight costs through the imposition of a fee, that fee should be based on the LEMSA's documented costs that directly relate to oversight, enforcement and support of the Contract and the Contractor. That fee should be established in advance and predictable to all parties. The new contract will be for five (5) years and an additional five (5) years upon the mutual agreement of SEMSC and

the Contractor. With the likelihood that the County's costs in performing its oversight responsibilities will continue to increase, we agree with the EMS Agency staff's recommendation that the annual franchise fee be increased to \$600,000. However, as system sustainability is the ultimate goal, we also recommend that penalty provisions be reformed and that SEMSC have the discretion to lower or waive this fee or any other fees or liquidated damages in the event it determines that the EMS system is financially distressed.

We are not recommending elimination of the one-time contract award fee of \$100,000 to cover the County's costs in development of the RFP, negotiating with the selected proposer and preparing and executing a contract.

Patient Charges

Under the current Master Agreement some charges for the contracted provider's services were set by SEMSC and some were negotiated. During the term of the franchise the provider was permitted to increase its charges based upon annual inflation adjustments. To the best of our knowledge, charges were not scored in proposal evaluation in the prior procurement cycle.

We recommend that the next RFP require each proposer to propose its charges for each specified level of ambulance service the Contractor will be providing and that its proposed composite total charge (CTC) be scored as part of the selection process. The methodology we propose is that the proposed charges be multiplied as follows:

- BLS NE x 0.01
- BLS E x 0.15
- ALS 1 NE x 0.09
- ALS 1 E x 0.60
- ALS 2 x 0.10
- CCT x 0.05

This formula arrives at a CTC per ambulance transport. The proposer with the lowest CTC would receive the maximum points allowed. For other proposers, the points they receive for their CTC would be reduced from the maximum allowable points by the percent their CTC exceeds the lowest CTC. So, for example, if 100 points are awarded for the lowest CTC, and the CTC of another proposer is 30 percent higher, that proposer would receive 70 points for its CTC. We believe that requiring each proposer to propose its charges, and scoring them as we are recommending, will cause competitors, hoping to win the contract, to propose the lowest charges they believe will enable them to make a reasonable profit under the contract to ensure EMS system sustainability.

The methodology we are proposing is not intended to be reflective of actual service mix experience and should not be relied upon by a proposer in making service mix estimations. The sole purpose of this recommended price-scoring methodology is to assign relative weights to the proposer's charges for each level of service, plus mileage. It is recognized that the RFP, as proposed by us is for emergency ambulance service, and ALS interfacility and CCT services,

however, the applicable billing guidelines for Medicare and other payers will require the utilization of BLS-level charges when appropriate.

We also recommend that the Contractor be entitled to an automatic annual increase in its approved charges, not to exceed the amount of the average annual percentage increase in the CPI-Medical Care, San Francisco Metropolitan Area, for the twelve (12)-month period preceding the anniversary date of the Contract. In the event this annual average CPI figure is zero or negative, we recommend the Contractor not be entitled to an automatic increase in charges.

In the event changed circumstances substantially impact costs of providing services under the contract or there are substantial reductions in revenue caused by factors that are beyond the control of the Contractor, we further recommend that the Contractor have the discretion to request increases or decreases in charges to patients to mitigate the financial impact of such changed circumstances above and beyond the automatic adjustments.

In addition, as an additional consumer protection, we recommend that the RFP incorporate a requirement for the adoption of financial hardship criteria for determining eligibility for reduction or write-offs of patient charges.

Personnel and Workforce Provisions

Incumbent Workforce Protection. A number of dedicated highly trained personnel are currently working in the Solano County EMS system. Turnover in EMS clinical staff would be costly and potentially disruptive to the quality and continuity of EMS care in Solano County. Therefore, as suggested by stakeholders, we recommend that the RFP require that in the event of a change in contracted provider, the new Contractor shall fill its available EMS practitioner positions (i.e., field staff) by first offering these positions to current employees of the incumbent provider at substantially equivalent compensation and conditions of employment. It is further recommended that the RFP require that a new Contractor permit incumbent personnel hired to retain "seniority status" earned while working full-time in the Solano County EMS system. These provisions should apply only to EMS field staff and not to supervisory, managerial, administrative or executive personnel.

Turnover Disincentives. Recognizing that EMS has a higher-than-average turnover rate, and the costs and EMS system disruptions associated with turnover,⁶⁴ we recommend liquidated damages for field staff turnover rates for full-time employees in excess of 20% annually, based on published national benchmarks.⁶⁵

Other Workforce Provisions. As suggested by stakeholders, we recommend other provisions regarding the EMS workforce, including required training on infrequently-utilized critical skills, as determined by regular, periodic review of clinical data. We also recommend the inclusion of

⁶⁴ Patterson, P, et al., The longitudinal study of turnover and the cost of turnover in EMS, Prehosp. Emerg. Care, 2010: 14(2), 209-221

⁶⁵ Avesta Systems and the American Ambulance Association, 2018 Ambulance Industry Employee Turnover Study, May 1, 2018.

RFP and Contract provisions designed to prevent excessive fatigue in on-duty employees and provisions intended to foster a culturally tolerant and diverse workplace. In addition, we recommend the inclusion of an employee assistance/stress management program, specifically including access to suicide prevention resources given the prevalence of suicide in the EMS and first responder communities.

Financial Reports and Accountability

Under the current Master Agreement, the contracted provider is not required to file financial reports with SEMSC. To enable SEMSC to ensure the financial stability of the Contractor and of the EMS system, and to promote transparency, we believe financial reports should be routinely submitted. We recommend that the RFP require the Contractor to submit regular financial reports to SEMSC, no less frequently than every six months, that at a minimum, include the following:

- Gross charges
- Total revenue collected
- Charges, transport volume and revenue by payor
- Charges, transport volume and revenue by HCPCS code and origin/destination modifiers
- Dollar amount of overpayments refunded, by payer, including credit balances refunded to patients
- Dollar amounts of hardship waivers granted
- Aging accounts receivable report, by payor

We also recommend that SEMSC require the Contractor to undergo an outside audit of its medical billing and coding practices, that it be required to maintain certain minimum financial reserves, and that the Contractor submit annual audited financial statements to SEMSC.

Modification of Contract Terms and Conditions

During the contract period there is a possibility that modification of the contract awarded will be needed based on new evidence, changes in standards of care, financial distress of the Contractor and/or the EMS system, changes in reimbursement, or other changes which, in the determination of SEMSC, necessitate modification of the contract. We recommend that the RFP reserve to SEMSC the right to modify terms and conditions of the contract with the Contractor should there be a need to do so.

Experience Requirement

During the stakeholder meetings and focus group sessions, there was considerable discussion regarding the threshold requirement for certain minimum experience for the Contractor, and whether that experience could be aggregated by multiple entities to meet the desired experience threshold. We are extremely mindful of the implications of this issue on the ability of smaller companies and other entities – such as cities – to be able to bid on the RFP.

However, we believe that there is a substantial difference in the experience it requires for one entity to deploy EMS system resources for a 300,000 population of an EOA versus multiple entities deploying to serve smaller subpopulations of that area.

Accordingly, it is our recommendation that current experience of at least 5 years serving an EOA of a minimum population of 300,000 be required as a condition of proposal eligibility in the forthcoming procurement cycle.

Appendix A

Summary of Selected Stakeholder Comments

SELECTED STAKEHOLDER COMMENTS
(Individual Commenter Identities Withheld)

Stakeholder Meeting 1 – 7/12/18

- Asked for stakeholder focus group meetings to allow specific groups to provide direct feedback
- Keep ALS IFT in the EOA
- Keep ALS w/RN in the EOA
- Consider enabling facilities to arrange for a provider other than the contracted provider to perform and ALS IFT when re-triage occurring at the receiving hospital dictates rapid transport to another hospital and the contracted provider is not timely available
- Consider the Contractor serving as a secondary PSAP to provide centralized EMD
- Address circumstances in which fire department medics would be part of transport process
- The PPP Cities need data reporting/integration by the Contractor
- Mandate continuation of the PPP arrangement

Focused Stakeholder Meeting– Fire Chiefs – 8/14/18

- Fire departments do not want to be “taken out” of the call-taking and dispatch process for the people in the communities they serve
- Fire departments do not want to be dispatched by a commercial service
- Unless more specific requirements are imposed on the Contractor with respect to the PPP Cities in the RFP, the PPP Cities will be in an inferior bargaining position with the Contractor
- Any increase in money going into the system should be used to help the PPP fire departments.
- The restocking arrangement should be revised
- If medics are used by the Contractor for ambulance transports the Contractor should be required to return them
- The PPP Cities should receive all or at least a percentage of the Contractor’s additional revenues due to its rate increases
- There should be a re-evaluation of Contractor unit hour costs
- The time on scene by both the Contractor and the PPP City fire department should be calculated in the same manner
- There should an increase in PPP City response time to 8 minutes due to the need of their personnel to put on protective equipment
- The fire departments and districts should be able to use an alliance model to jointly bid on the EOA contract as a partnership
- The Contractor should provide funding for each PPP City to have EMD
- The Contractor should provide funding for each PPP City to have a cardiac monitor

Focused Stakeholder Meeting– Healthcare Facility Administrators/Practitioners – 8/15/18

- Support the current ALS with RN and the CCT distinctions
- There is a concern about the ability of ambulance staff to perform certain skills
- Some of the RNs are not qualified to attend to certain patients, for example pediatric patient in ALS IFTs and they need additional training
- The training required for ALS RNs should be addressed in the RFP and additional training required for certain transports
- Hospitals have problems in sending their own nurses on ambulance transports due to union contract restrictions
- Determination of whether a CCT is required should rest with the EMS medical director
- Hospitals should be able to arrange for a provider other than the contracted provider to perform an ALS IFT when re-triage at the receiving hospital dictates rapid transport to another hospital and the contracted provider is not timely available
- The RFP should require that there be customer service reporting of Contractor's services
- When transports from a SNF are required fire truck at the SNF is not needed
- Customer service/reporting in RFP for facilities
- Hospitals want centralized EMD & PAI
- If there is to be centralized emergency medical dispatch there should be a requirement that dispatchers have AED location and notification capabilities
- If there is to be centralized emergency medical dispatch there should be a requirement that dispatchers provide callers with pre-arrival instructions
- Community paramedicine should not be addressed in the RFP as hospitals may want to provide community paramedicine services for their own patients

Focused Stakeholder Meeting– City Managers – 9/21/18

- There needs to be a specified financial model and greater transparency of Contractor costs and revenues
- The PPP Cities are not satisfied with the current distribution of revenues arising out of the PPP
- Revenues to the PPP Cities from the current EOA provider do not fully cover the Cities' costs in providing ALS first response services
- The Contractor should be required to file financial reports with SEMSC
- Without cost information from the Contractor the PPP Cities cannot make informed decisions
- There should be per-call or indexed adjustments to PPP Payments
- The cities that operate PSAPs should have the discretion to employ EMD
- The Contractor should be required to staff EMD positions in each of the PSAPs
- The RFP should permit the significant experience requirement to be cumulatively demonstrated by all participants in a joint venture rather than be shown by the lead agency in a joint venture

- Consideration should be given to requiring 5150 trips as a Contractor responsibility
- The RFP needs to include provisions that protect the incumbent workforce

Stakeholder Meeting 2 – 9/28/18

- Special requirements should be imposed for conditions such as stroke, STEMI, trauma and cardiac arrest where time to definitive treatment is critical
- The Contractor should share in the cost of First Watch
- CCTs should not be part of the EOA as that would alienate other providers who are currently providing CCTs

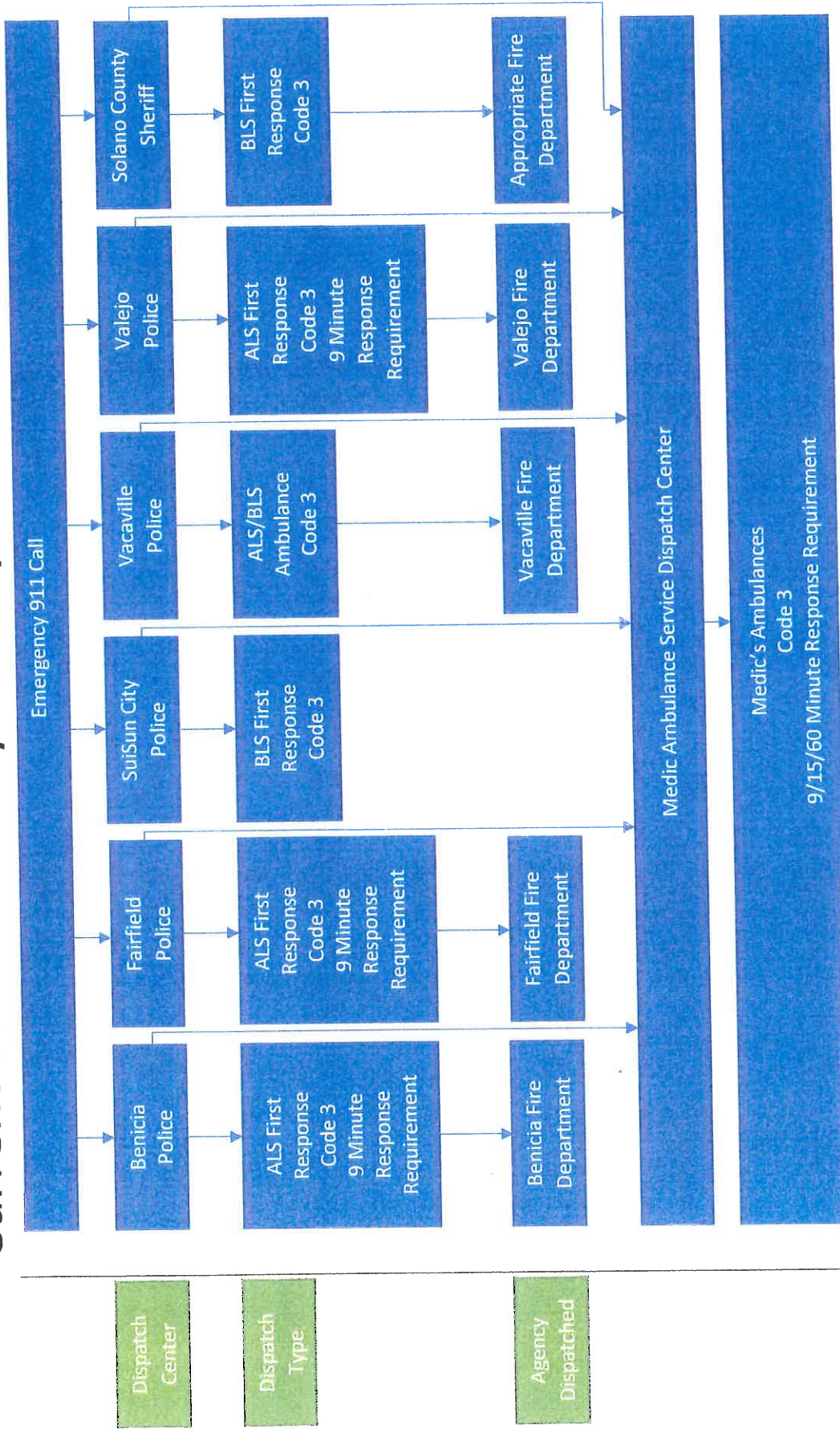
Focused Stakeholder Meeting – EMS Labor Union Representatives – 9/28/18

- Mandate that the EOA contractor train EMS personnel on performing infrequently-used skills
- Implement workforce preference provisions for incumbent contractor employees
- Require tracking of employee turnover data
- Require equivalent compensation and benefits
- Require COLA increases
- Require payment of a night shift differential
- Recommend re-chassising of vehicles at no more than 200,000 miles

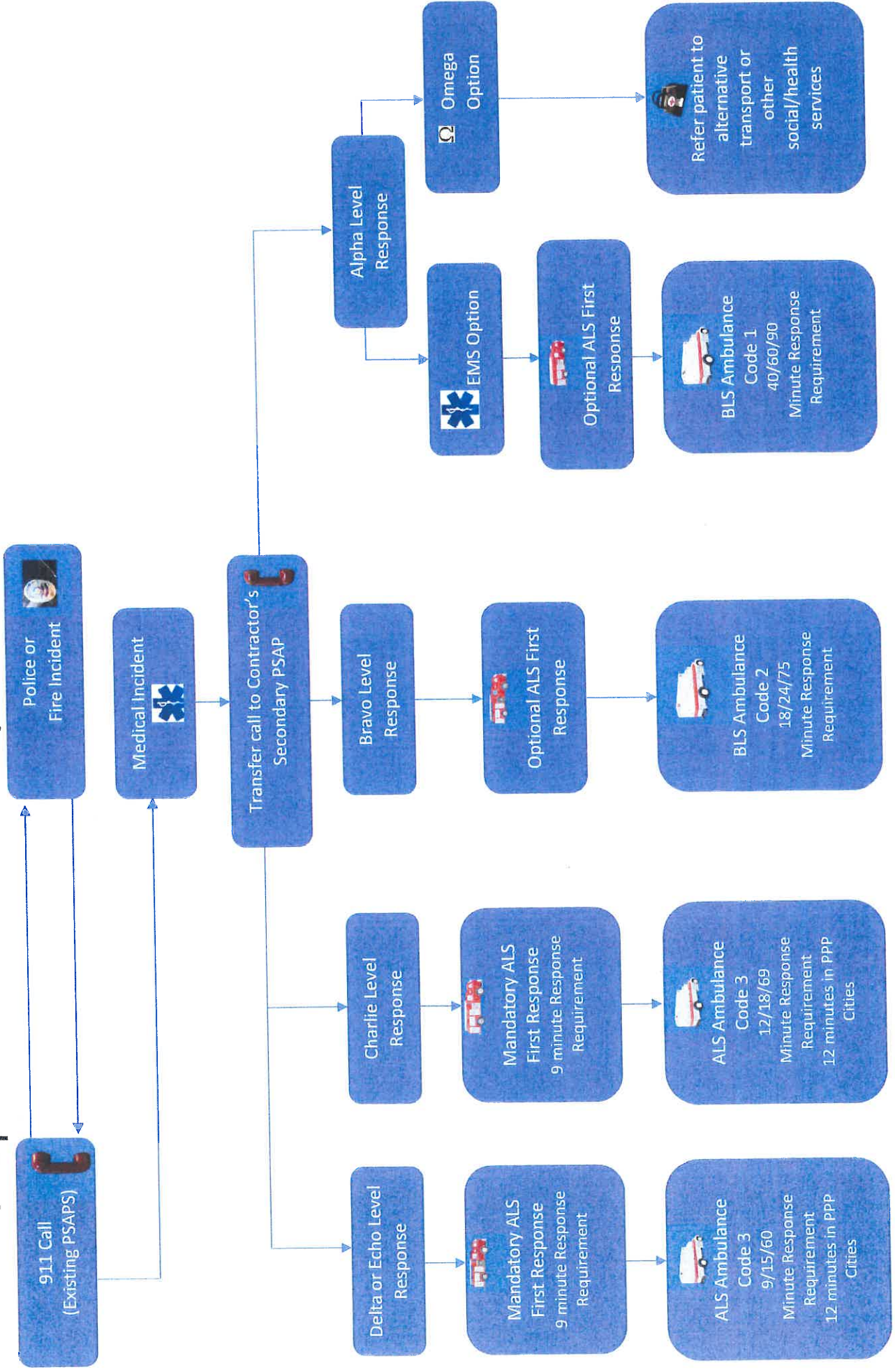
Appendix B

Diagrams of Current and Proposed EMS System Configurations

Current Solano County EMS System Configuration



Proposed Solano County EMS System Configuration



Appendix C

Document Request Satisfaction Table

Category	Requested Documents	N/A	Exempt	Fulfilled
A. Ground EMS Documents	1 RFP for current ground EOA competitive procurement 2 Proposal of winning bidder for current ground EOA competitive procurement 3 Final, current ground EOA contract 4 Any ground EOA contract amendments 5 Any current mutual aid agreements 6 Current public private partnership agreement for ALS first responder emergency services 7 All PPP amendments 8 Any other current first response, response time tolling or intercept agreements 9 Any other current contract for ambulance or other EMS service 10. LEMSA mutual aid policies	X	X	X X X X
B. Air Ambulance Documents and Data	1 Any current LEMSA air ambulance contracts 2 Any LEMSA air ambulance contract amendments 3 Air ambulance utilization policy/protocol 4 Air ambulance utilization data (since ground EOA contract inception, by month, including air ambulance requests and air ambulance transports)	X	X	X X
C. Ground EOA Contractor Performance Documents (all data should be monthly from the period of contract inception to report date)	1 Contractor self-dispatch data (all emergency response requests received directly by contractor) 2 Response data (all contractor responses, including call volume by level and type) 3 Transport data (all contractor transports, including transport volume by level of service) 4 Call declination data (all calls for which contractor was unable to respond and utilized mutual aid) 5 Service mix (contractor level-of-service transport data by HCPCS code) 6 Response time compliance data (including response time performance by month, deviations from required standards and financial penalties assessed by month) 7 Average transport distance (contractor data of average loaded mileage per transport for HCPCS code A0425. If possible, include overall average loaded mileage-per-transport, and average loaded mileage-		X X	X X X

	<p>per-transport for each level of service – A0428, A0429, A0427, etc.)</p> <p>8 Average total call time (contractor and/or dispatch center data measuring average interval of time responded through time available, both overall and for each level of service)</p> <p>9 Ambulance offload time data (if specifically measured; if not specifically measured, then average time interval from arrival at facility until time available for next response is a suitable proxy. If possible, provide overall average offload intervals and intervals by specific levels of service)</p> <p>10 Transports originating at healthcare facilities (total number and percentage of total transport volume)</p> <p>11 Deployment plans and plan modifications</p> <p>12 Compliance data and reports for EOA contractor and public private partnership fire departments</p> <p>13 Patient satisfaction data</p>		X		
			X		
					X
			X		X
			X		X
D. Dispatch Documents and Data	<p>1 Current 911 center EMD protocols (no copy necessary if using standard MPDS version 11.1 or later, unless locally modified)</p> <p>2 Current contractor internal EMD protocols (if different from 911 center EMD protocols)</p> <p>3 Emergency dispatch data – contractor (summary data on all 911 dispatches of contractor by priority and response determinant)</p> <p>4 Emergency dispatch data – mutual aid (all 911 referrals for mutual aid)</p>	X	X		
E. Clinical Documents	<p>1 Current ground EMS clinical protocols</p> <p>2 Applicable transport destination protocols (trauma, STEMI, stroke, peds, etc.)</p>				X
					X
F. EMS Resource Inventory Documentation and Data	<p>1 Total number of contractor transport-capable ambulances dedicated to in-county utilization</p> <p>2 Total number of contractor transport-capable ambulances dedicated exclusively to 911 response</p> <p>3 Identification of all contractor station and substation locations (including # of ambulances garaged at each location and staffing at each)</p>				X
					i
					X

	<p>4 Total number of contractor transport-capable ambulances stationed out-of-county that are utilized for in-county 911 response</p> <p>5 Total number of air ambulances based in county</p> <p>6 Total number of air ambulances based outside of county regularly utilized for in-county response</p> <p>7 Total number of ground transport-capable ambulances based outside of county but utilized for in-county mutual aid (non-contractor owned)</p> <p>8 Total number of ground transport-capable ambulances based outside of the county but authorized for in-county mutual aid</p> <p>9 Contractor staffing plan and/or staffing schedules</p>	X		X
G. Hospital Resource Inventory Documentation and Data	<p>1 Total number of hospital-based EDs in county (including number of facilities and estimated ED bed capacity)</p> <p>2 Total number of out-of-county based hospital EDs that regularly serve in-county patients (including number of facilities and estimated ED bed capacity)</p> <p>3 Designated specialty hospitals serving the county (trauma, PEDS, STEMI, stroke, etc.; include LEMSA-designated facilities as well as "verified" facilities)</p> <p>4 Non-designated specialty care facilities serving the county (behavioral health, etc.)</p> <p>5 Hospital E.D. payor mix data</p>		X	i i X i
H. Contractor Revenue Cycle Data	<p>1 Total billable transports</p> <p>2 Total billable transports by level of service</p> <p>3 Chargemaster or contractor list of retail charges, by level of service</p> <p>4 Identification of payor contracts to which contractor is a party (including payor and rates, by level of service)</p> <p>5 Contractor financial hardship policy and forms</p> <p>6 Contractor write-offs (including hardship, bad debt, etc.)</p> <p>7 A/R aging report by payor</p> <p>8 Payor mix (contractor revenues by payor)</p> <p>9 Net collection percentage (total and by payer)</p> <p>10 Average revenue per transport (total and by level of service)</p>		X X X X X X X X	

I. Stakeholder List	1 List of stakeholders identified for stakeholder meetings (include names, titles, and contact information)			X
J. Miscellaneous	1 Current Approved EMS Plan (including Transportation Component) 2 EMS Authority Approvals and/or Correspondence regarding EMS plan/transportation component approval, modification or rejection 3 Most recent County EMS Annual Report			X i X

Appendix D

Revenue Projection Spreadsheets

Solano County, CA EMS Transport Fee - Revenue Projections Year One (2020)		Total Projected Transport Volume ¹	Est. Medicare Transports (24%) ²	Est. Medicaid Transports (34%) ²	Commercial/ Auto Transports (35%) ²	Est. Private Pay Transports (7%) ²		
		39,434	9,464	13,407	13,801	2,760		
Payor: Medicare (24%)		EST. % OF Transports (Miles per Trip)	Medicare Allowed Charge³	Est. Medicare Transport Volume²	Total Charges	Total Medicare Allowed Charges	Medicare Paid Amount	Total Medicare Cash Receipts
BLS-NE (A0428)	16.0%	\$ 1,261	\$ 273.01	1,514	\$ 1,908,851	\$ 413,337	80%	\$ 330,670
BLS-E (A0429)	18.0%	\$ 1,471	\$ 436.32	1,704	\$ 2,506,584	\$ 743,499	80%	\$ 594,799
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 327.62	95	\$ 119,795	\$ 31,124	80%	\$ 24,899
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 518.74	6,057	\$ 8,909,847	\$ 3,142,008	80%	\$ 2,513,607
ALS2 (A0433)	0.0%	\$ -	\$ 750.79	-	\$ -	\$ -	80%	\$ -
SCT (A0434)	1.0%	\$ 3,850	\$ 887.40	95	\$ 365,750	\$ 84,303	80%	\$ 67,442
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 7.44	9,465	\$ 1,706,066	\$ 352,098	80%	\$ 281,678
					\$ 15,516,893	\$ 4,766,360		\$ 3,810,068
								Medicare Receipts
								Medicare Co-Pay Receipts ⁴
								Medicare Total
								\$ 4,308,789
Payor: Medicaid (34%)		EST. % OF Transports (Miles per Trip)	Medicaid Allowed Charge	Est. Medicaid Transport Volume²	Total Charges	Total Medicaid Allowed Charges	Medicaid Paid Amount	Total Medicaid Cash Receipts
BLS-NE (A0428)	16.0%	\$ 1,261	\$ 107.16	2,145	\$ 2,704,416	\$ 229,858	100%	\$ 229,858
BLS-E (A0429)	18.0%	\$ 1,471	\$ 118.20	2,413	\$ 3,549,523	\$ 285,217	100%	\$ 285,217
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 107.16	134	\$ 168,974	\$ 14,359	100%	\$ 14,359
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 118.20	8,580	\$ 12,621,180	\$ 1,014,156	100%	\$ 1,014,156
ALS2 (A0433)	0.0%	\$ -	\$ 118.20	-	\$ -	\$ -	100%	\$ -
SCT (A0434)	1.0%	\$ 3,850	\$ 118.20	134	\$ 515,900	\$ 15,839	100%	\$ 15,839
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 3.55	13,406	\$ 2,416,432	\$ 237,957	100%	\$ 237,957
					\$ 21,976,425	\$ 1,797,386	TOTAL	\$ 1,797,386
Payor: Commercial/Auto (35%)		EST. % OF Transports (Miles per Trip)	Est. Ins. Allowed Charge	Est. Commercial / Auto Transport Volume²	Total Charges	Total Insurance Allowed Charges	Insurance Paid Amount	Total Insurance Cash Receipts
BLS-NE (A0428)	16.0%	\$ 1,261	\$ 844.74	2,208	\$ 2,783,846	\$ 1,865,177	100%	\$ 1,865,177
BLS-E (A0429)	18.0%	\$ 1,471	\$ 985.57	2,484	\$ 3,653,964	\$ 2,448,156	100%	\$ 2,448,156
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 844.87	138	\$ 174,018	\$ 116,592	100%	\$ 116,592
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 985.57	8,833	\$ 12,993,343	\$ 8,705,540	100%	\$ 8,705,540
ALS2 (A0433)	0.0%	\$ -	\$ -	-	\$ -	\$ -	100%	\$ -
SCT (A0434)	1.0%	\$ 3,850	\$ 2,579.50	138	\$ 531,300	\$ 355,971	100%	\$ 355,971
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 24.15	13,801	\$ 2,487,630	\$ 1,666,712	100%	\$ 1,666,712
					\$ 22,624,102	\$ 15,158,148	TOTAL	\$ 15,158,148

Solano County, CA EMS Transport Fee - Revenue Projections Year One (2020)		Total Projected Transport Volume ¹	Est. Medicare Transports (24%) ²	Est. Medicaid Transports (34%) ²	Commercial / Auto Transports (35%) ²	Est. Private Pay Transports (7%) ²		
Est. % of Transports (Miles per Trip)		Charges	Self-Pay Allowed Charge	Est. Private Pay Transport Volume ²	Total Self-Pay Charges	Total Non- Resident Self- Pay Charges ³	Est. Private Pay Collection%	Total Self-Pay Cash Receipts
BLS-NE (A0428)	16.0%	\$ 1,261	1,260.80	442	\$ 557,274	78,018	5%	\$ 3,901
BLS-E (A0429)	18.0%	\$ 1,471	1,471.00	497	\$ 731,087	102,352	5%	\$ 5,118
ALS1-NE (A0426)	1.0%	\$ 1,261	1,261.00	28	\$ 35,308	4,943	5%	\$ 247
ALS1-E (A0427)	64.0%	\$ 1,471	1,471.00	1,766	\$ 2,597,786	363,690	5%	\$ 18,185
ALS2 (A0433)	0.0%	\$ -	-	-	\$ -	-	5%	\$ -
SCT (A0434)	1.0%	\$ 3,850	3,850.00	28	\$ 107,800	15,092	5%	\$ 755
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	36.05	2,761	\$ 497,670	69,674	5%	\$ 3,484
					4,526,925	633,769	TOTAL	\$ 31,688
GRAND TOTALS - CHARGES/ALLOWED CHARGES					\$ 64,644,344	\$ 22,355,663		

GRAND TOTAL - PROJECTED CASH RECEIPTS - YEAR ONE \$ 21,296,011
OVERALL PROJECTED AVERAGE REVENUE PER TRANSPORT \$ 540
GROSS COLLECTION PERCENTAGE 33%
NET COLLECTION PERCENTAGE 95%

Footnotes:

- 1 Transport volume is based on estimates provided by Solano County with a projected increase based on historical data from years 2013-2017.
- 2 Estimated number Medicare transports per level of service estimated based on local hospital admission payor mix and may not be consistent with CMS data or other payors' HCPCS code mix
- 3 Based on 2018 Medicare rates taken from 2018 Ambulance Public Use File from the Centers for Medicare and Medicaid Services with a 1% annual inflation increase
- 4 Medicare Co-Pay estimate is 52% of total Medicare copayments; Medicare copayments are 20% of Medicare approved charges
- 5 Non-resident self-pay charges estimated to comprise 14% of total self-pay charges

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Solano County, CA EMS Transport Fee - Revenue Projections Year Two (2021)			Total Projected Transport Volume ¹ 40,477	Est. Medicare Transports (24%) ² 9,714	Est. Medicaid Transports (34%) ² 13,762	Commercial/ Auto Transports (35%) ² 14,167	Est. Private Pay Transports (7) ² 2,833	
Payor: Medicare (24%)	Est. % of Transports (Miles per Trip)	Charge	Medicare Allowed Charge ³	Est. Medicare Transport Volume ²	Total Charges	Medicare Paid Amount	Total Medicare Cash Receipts	
	BLS-NE (A0428)	16.0%	\$ 1,261	\$ 275.72	1,554	\$ 1,959,594	\$ 428,469	\$ 342,773
BLS-E (A0429)	18.0%	\$ 1,471	\$ 441.15	1,749	\$ 2,572,779	\$ 771,571	\$ 617,257	
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 330.87	97	\$ 122,317	\$ 32,094	\$ 25,679	
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 523.87	6,217	\$ 9,145,207	\$ 3,256,900	\$ 2,805,520	
ALS2 (A0433)	0.0%	\$ -	\$ 758.23	-	\$ -	\$ -	\$ -	
SCT (A0434)	1.0%	\$ 3,850	\$ 896.19	97	\$ 373,450	\$ 86,930	\$ 69,544	
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 7.52	9,714	\$ 1,750,949	\$ 365,246	\$ 292,197	
					\$ 15,924,296	\$ 4,941,211	\$ 3,952,969	
							\$ 513,886	
							\$ 4,466,855	
Payor: Medicaid (34%)	Est. % of Transports (Miles per Trip)	Charges	Medicaid Allowed Charge	Est. Medicaid Transport Volume ²	Total Charges	Medicaid Paid Amount	Total Medicaid Cash Receipts	
BLS-NE (A0428)	16.0%	\$ 1,261	\$ 107.16	2,202	\$ 2,776,722	\$ 235,986	\$ 235,986	
BLS-E (A0429)	18.0%	\$ 1,471	\$ 118.20	2,477	\$ 3,643,667	\$ 292,781	\$ 292,781	
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 107.16	138	\$ 174,018	\$ 14,788	\$ 14,788	
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 118.20	8,808	\$ 12,956,568	\$ 1,041,106	\$ 1,041,106	
ALS2 (A0433)	0.0%	\$ -	\$ 118.20	-	\$ -	\$ -	\$ -	
SCT (A0434)	1.0%	\$ 3,850	\$ 118.20	138	\$ 531,300	\$ 16,312	\$ 16,312	
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 3.55	13,763	\$ 2,480,781	\$ 244,293	\$ 244,293	
					\$ 22,563,056	\$ 1,845,246	\$ 1,845,246	
Payor: Commercial/Auto (35%)	Est. % of Transports (Miles per Trip)	Charges	Est. Ins. Allowed Charge	Est. Commercial / Auto Transport Volume ²	Total Charges	Insurance Paid Amount	Total Insurance Cash Receipts	
BLS-NE (A0428)	16.0%	\$ 1,261	\$ 844.87	2,267	\$ 2,858,687	\$ 1,915,320	\$ 1,915,320	
BLS-E (A0429)	18.0%	\$ 1,471	\$ 985.57	2,550	\$ 3,751,050	\$ 2,513,204	\$ 2,513,204	
ALS1-NE (A0426)	1.0%	\$ 1,261	\$ 844.87	142	\$ 179,062	\$ 119,972	\$ 119,972	
ALS1-E (A0427)	64.0%	\$ 1,471	\$ 985.57	9,067	\$ 13,337,557	\$ 8,936,163	\$ 8,936,163	
ALS2 (A0433)	0.0%	\$ -	\$ -	-	\$ -	\$ -	\$ -	
SCT (A0434)	1.0%	\$ 3,850	\$ 2,579.50	142	\$ 546,700	\$ 366,289	\$ 366,289	
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	\$ 24.15	14,168	\$ 2,553,782	\$ 1,711,034	\$ 1,711,034	
					\$ 23,226,838	\$ 15,561,982	\$ 15,561,982	

Solano County, CA EMS Transport Fee - Revenue Projections Year Two (2021)		Total Projected Transport Volume ¹	Est. Medicare Transports (24%) ²	Est. Medicaid Transports (34%) ²	Commercial / Auto Transports (35%) ²	Est. Private Pay Transports (7) ²		
		40,477	9,714	13,762	14,167	2,833		
EST. % OF Transports (Miles per Trip)		Charges	Self-Pay Allowed Charge	Est. Private Pay Transport Volume ²	Total Self-Pay Charges	Total Non- Resident Self- Pay Charges ⁵	Est. Private Pay Collection%	Total Self-Pay Cash Receipts
Payor: Self-Pay (7%)								
BLS-NE (A0428)	16.0%	\$ 1,261	1,261.00	453	\$ 571,233	79,973	5%	\$ 3,999
BLS-E (A0429)	18.0%	\$ 1,471	1,471.00	510	\$ 750,210	105,029	5%	\$ 5,251
ALS1-NE (A0426)	1.0%	\$ 1,261	1,261.00	28	\$ 35,308	4,943	5%	\$ 247
ALS1-E (A0427)	64.0%	\$ 1,471	1,471.00	1,813	\$ 2,666,923	373,369	5%	\$ 18,668
ALS2 (A0433)	0.0%	\$ -	-	-	\$ -	-	5%	\$ -
SCT (A0434)	1.0%	\$ 3,850	3,850.00	28	\$ 107,800	15,092	5%	\$ 755
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	36.05	2,832	\$ 510,468	71,466	5%	\$ 3,573
					4,641,942	649,872	TOTAL	\$ 32,494
GRAND TOTALS - CHARGES/ALLOWED CHARGES					\$ 66,356,131	\$ 22,998,311		

GRAND TOTAL - PROJECTED CASH RECEIPTS - YEAR ONE \$ 21,906,576
OVERALL PROJECTED AVERAGE REVENUE PER TRANSPORT \$ 541
GROSS COLLECTION PERCENTAGE 33%
NET COLLECTION PERCENTAGE 95%

Footnotes:

- Transport volume is based on estimates provided by Solano County with a projected increase based on historical data from years 2013-2017. not used to calculate these projections.
- Estimated number of Medicare transports per level of service estimated based on local hospital admission payor mix and may not be consistent with CMS data or other payors' HCPCS code mix
- Based on 2018 Medicare rates taken from 2018 Ambulance Public Use File from the Centers for Medicare and Medicaid Services with a 1% annual inflation increase
- Medicare Co-Pay estimate is 52% of total Medicare copayments; Medicare copayments are 20% of Medicare approved charges
- Non-resident self-pay charges estimated to comprise 14% of total self-pay charges

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Solano County, CA EMS Transport Fee - Revenue Projections Year Three (2022)		Total Projected Transport Volume ¹	Est. Medicare Transports (24%) ²	Est. Medicaid Transports (34%) ²	Commercial/ Auto Transports (35%) ²	Est. Private Pay Transports (7%) ²	
		41,520	9,965	14,117	14,532	2,906	
Payor: Medicare (24%)							
EST. % OF Transports (Miles per Trip)	Charge	Medicare Allowed Charge ³	Est. Medicare Transport Volume ²	Total Charges	Total Medicare Allowed Charges	Medicare Paid Amount	Total Medicare Cash Receipts
BLS-NE (A0428)	\$ 1,261	\$ 278.42	1,594	\$ 2,010,034	\$ 443,801	80%	\$ 355,041
BLS-E (A0429)	\$ 1,471	\$ 445.48	1,794	\$ 2,638,974	\$ 799,191	80%	\$ 639,353
ALS1-NE (A0426)	\$ 1,261	\$ 334.11	100	\$ 126,100	\$ 33,411	80%	\$ 25,729
ALS1-E (A0427)	\$ 1,471	\$ 529.01	6,378	\$ 9,382,038	\$ 3,374,026	80%	\$ 2,699,221
ALS2 (A0433)	\$ -	\$ 765.66	-	\$ -	\$ -	80%	\$ -
SCT (A0434)	\$ 3,850	\$ 904.98	100	\$ 385,000	\$ 90,498	80%	\$ 72,395
Loaded Miles (A0425) (Average/Trip)	\$ 36.05	\$ 7.59	9,966	\$ 1,796,372	\$ 378,210	80%	\$ 302,563
				\$ 16,338,518	\$ 5,119,137		\$ 4,095,310
							\$ 532,390
							\$ 4,627,700
							Medicare Receipts
							Medicare Co-Pay Receipts ⁴
							Medicare Total
Payor: Medicaid (34%)							
EST. % OF Transports (Miles per Trip)	Charges	Medicaid Allowed Charge	Est. Medicaid Transport Volume ²	Total Charges	Total Medicaid Allowed Charges	Medicaid Paid Amount	Total Medicaid Cash Receipts
BLS-NE (A0428)	\$ 1,261	\$ 107.16	2,259	\$ 2,848,599	\$ 242,074	100%	\$ 242,074
BLS-E (A0429)	\$ 1,471	\$ 118.20	2,541	\$ 3,737,811	\$ 300,346	100%	\$ 300,346
ALS1-NE (A0426)	\$ 1,261	\$ 107.16	141	\$ 177,801	\$ 15,110	100%	\$ 15,110
ALS1-E (A0427)	\$ 1,471	\$ 118.20	9,035	\$ 13,290,485	\$ 1,067,937	100%	\$ 1,067,937
ALS2 (A0433)	\$ -	\$ 118.20	-	\$ -	\$ -	100%	\$ -
SCT (A0434)	\$ 3,850	\$ 118.20	141	\$ 542,850	\$ 16,666	100%	\$ 16,666
Loaded Miles (A0425) (Average/Trip)	\$ 36.05	\$ 3.55	14,117	\$ 2,544,589	\$ 250,577	100%	\$ 250,577
				\$ 23,142,135	\$ 1,892,710	TOTAL	\$ 1,892,710
Payor: Commercial/Auto (35%)							
EST. % OF Transports (Miles per Trip)	Charges	Est. Ins. Allowed Charge	Est. Commercial / Auto Transport Volume ²	Total Charges	Total Insurance Allowed Charges	Insurance Paid Amount	Total Insurance Cash Receipts
BLS-NE (A0428)	\$ 1,261	\$ 844.87	2,325	\$ 2,931,825	\$ 1,964,323	100%	\$ 1,964,323
BLS-E (A0429)	\$ 1,471	\$ 985.57	2,616	\$ 3,848,136	\$ 2,578,251	100%	\$ 2,578,251
ALS1-NE (A0426)	\$ 1,261	\$ 844.87	145	\$ 182,845	\$ 122,506	100%	\$ 122,506
ALS1-E (A0427)	\$ 1,471	\$ 985.57	9,300	\$ 13,680,300	\$ 9,165,801	100%	\$ 9,165,801
ALS2 (A0433)	\$ -	\$ -	-	\$ -	\$ -	100%	\$ -
SCT (A0434)	\$ 3,850	\$ 2,579.50	145	\$ 558,250	\$ 374,028	100%	\$ 374,028
Loaded Miles (A0425) (Average/Trip)	\$ 36.05	\$ 24.15	14,531	\$ 2,619,213	\$ 1,754,873	100%	\$ 1,754,873
				\$ 23,820,569	\$ 15,959,782	TOTAL	\$ 15,959,782

Solano County, CA EMS Transport Fee - Revenue Projections Year Three (2022)									
	Total Projected Transport Volume ¹	Est. Medicare Transports (24%) ²	Est. Medicaid Transports (34%) ²	Commercial / Auto Transports (35%) ²	Est. Private Pay Transports (7%) ²				
	41,520	9,965	14,117	14,532	2,906				
	Est. % of Transports (Miles per Trip)	Charges	Self-Pay Allowed Charge	Est. Private Pay Transport Volume ²	Total Self-Pay Charges	Total Non- Resident Self- Pay Charges ⁵	Est. Private Pay Collection%	Total Self-Pay Cash Receipts	
BLS-NE (A0428)	16.0%	\$ 1,261	1,261.00	465	\$ 586,365	82,091	5%	\$ 4,105	
BLS-E (A0429)	18.0%	\$ 1,471	1,471.00	523	\$ 789,333	107,707	5%	\$ 5,385	
ALS1-NE (A0426)	1.0%	\$ 1,261	1,261.00	29	\$ 36,569	5,120	5%	\$ 256	
ALS1-E (A0427)	64.0%	\$ 1,471	1,471.00	1,860	\$ 2,736,060	383,048	5%	\$ 19,152	
ALS2 (A0433)	0.0%	\$ -	-	-	\$ -	-	5%	\$ -	
SCT (A0434)	1.0%	\$ 3,850	3,850.00	29	\$ 111,650	15,631	5%	\$ 762	
Loaded Miles (A0425) (Average/Trip)	5	\$ 36.05	36.05	2,906	\$ 523,807	73,333	5%	\$ 3,667	
					\$ 4,763,784	666,930	TOTAL	\$ 33,346	
GRAND TOTALS - CHARGES/ALLOWED CHARGES					\$ 68,065,005	\$ 23,638,559			

GRAND TOTAL - PROJECTED CASH RECEIPTS - YEAR ONE \$ 22,513,538
OVERALL PROJECTED AVERAGE REVENUE PER TRANSPORT \$ 542
GROSS COLLECTION PERCENTAGE 33%
NET COLLECTION PERCENTAGE 95%

Footnotes:

- 1 Transport volume is based on estimates provided by Solano County with a projected increase based on historical data from years 2013-2017.
- 2 Estimated number of Medicare transports per level of service estimated based on local hospital admission payor mix and may not be consistent with CMS data or other payors' HCPCS code mix
- 3 Based on 2018 Medicare rates taken from 2018 Ambulance Public Use File from the Centers for Medicare and Medicaid Services with a 1% annual inflation increase
- 4 Medicare Co-Pay estimate is 52% of total Medicare copayments; Medicare copayments are 20% of Medicare approved charges
- 5 Non-resident self-pay charges estimated to comprise 14% of total self-pay charges

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Appendix E

Project Bibliography

Project Bibliography

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