STEMI System of Care Plan

Contra Costa County Emergency Medical Services Agency
This plan was prepared for the
California Emergency Medical Services Authority
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**STEMI Regulation**

California’s Statewide STEMI Critical Care System is described in the California Code of Regulations; Title 22, Division 9, Chapter 7.1. These regulations outline the requirements of all components of the STEMI Critical Care System including the Local EMS Agency, pre-hospital providers, and hospitals.

As a requirement of the California Regulations, this document is to serve as a formal written plan for the Contra Costa County Emergency Medical Services Agency (CCCEMSA) STEMI Critical Care System.

Contra Costa County Emergency Medical Services Agency STEMI Critical Care System Plan has been written in accordance with Title 22, Division 9, Chapter 7.1 of the California Code of Regulations.

**STEMI Critical Care System**

About 647,000 people die of heart disease in the United States every year. Heart disease is the leading cause of death for both men and women. Coronary heart disease (CHD) is the most common type of heart disease, killing over 370,000 people annually. Every year approximately 805,000 adult Americans have a heart attack. Of these cases, 605,000 are a first-time heart attack and the other 200,000 happen to people who have already had a first-time heart attack.¹ A heart attack, also known as Myocardial Infarction (MI), is a life-changing event that places heavy burden on patients, families, and caregivers. When a patient is suffering from a cardiac event, timely intervention is critical to reverse the damage; reduce mortality, morbidity, and disability in addition to improving survivor quality of life.

Although many EMS agencies in California have developed STEMI systems of care, there have been no standardized statewide requirements for the development and implementation of a STEMI critical care system until now.

The broad objective for a California STEMI Critical Care System is to improve the care of patients suffering from a life-threatening acute heart attack. More specifically, standardized statewide requirements will lead to the consistent application of standardized care, thus protecting the health and safety of the public.²

Contra Costa County’s STEMI Critical Care System is a subspecialty care component of the EMS system that was developed in 2008 by the Contra Costa County Emergency Medical Services Agency (CCCEMSA). This critical care system links prehospital and hospital care to deliver treatment to STEMI patients who potentially require immediate medical or surgical intervention.

¹ [https://www.cdc.gov/heartdisease/facts.htm](https://www.cdc.gov/heartdisease/facts.htm)
Stakeholders

Contra Costa County EMS Agency
Contra Costa County is in Northern California, with a population of approximately 1,150,000. CCCEMSA works diligently to ensure that the communities, which are spread over its approximate 716 square-miles, have access to STEMI treatment and services that provide quality care based on research and evidence-based medicine.

Contra Costa specialty care programs are further refined by the agency’s commitment to excellence as defined in the Vision, Mission, and Principles:

Vision
To be the exceptional, outcome-focused Emergency Medical Services (EMS) leader that others seek to model.

Mission Statement
To ensure that quality emergency medical services are available for all people in Contra Costa County and that emergency medical care is provided in a coordinated, professional and timely manner.

Principles
- Always Ensure patient safety
- Inspire and emulate professionalism
- Provide service with a high level of integrity
- Assure a reliable and high-quality emergency response
- Support emergency and disaster preparedness
- Integration with healthcare system to improve outcomes
- Promote and support community resilience

Key personnel at Contra Costa County EMS involved in the Stroke System of Care include:

- Dr. David Goldstein – EMS Medical Director and Acting EMS Director
- Mia Fairbanks MSN, RN – STEMI/Stroke Program Coordinator
- Medical Advisory Committee – Technical advisory group (Physicians, Nurses, Paramedics)
- Emergency Medical Care Committee (EMCC) – Advisory group to Board of Supervisors

Contra Costa County STEMI Receiving Centers
The California State Regulations define a STEMI Receiving Center (SRC) as a “licensed general acute care facility that meets the minimum hospital STEMI care requirements pursuant to Section 100270.124 and is able to perform Percutaneous Coronary Intervention (PCI).”
Contra Costa County EMS Agency has written agreements with hospitals that are designated STEMI receiving centers. To be considered for STEMI receiving center designation, fill out a CCCEMSA STEMI Center Designation Application packet. The application packet contains an evaluation tool that CCCEMSA uses to ensure that the facility meets the requirements to receive STEMI Center Designation.

STEMI Centers must also maintain compliance with CCCEMSA designation criteria outlined in Policy document #5003 – EMS STEMI Receiving Center Designation. The following are designated STEMI Receiving Centers in Contra Costa County:

John Muir Medical Center – Walnut Creek Campus
John Muir Medical Center – Concord Campus
San Ramon Regional Medical Center
Kaiser Walnut Creek
Sutter Delta

Contra Costa County Pre-Hospital Providers
Contra Costa County is comprised of a mix of public Fire First Responder agencies, public and private ALS Transport agencies and BLS Interfacility agencies. A combination of ground, air and specialty CCT transport are all offered within the county. The community can access emergency transport services providers through the 9-1-1 system and BLS and CCT private ambulance services can be utilized by calling a ten-digit number.

Once on scene, the first responder and ambulance transport crews coordinate their efforts to rapidly identify, treat and transport STEMI patients to a STEMI Receiving Center. A critical component in the continuum of care is the transmission of 12-Lead ECG findings. Providers electronically transmit a 12-Lead ECG to the receiving hospital and when needed, prehospital providers can contact base hospital personnel for On-Line Medical Direction (OLMD). Field crews notify the STEMI Receiving Center of the incoming patient with a “STEMI Alert” radio report in order to allow hospital staff to prepare for expeditious triage and treatment upon patient arrival.

Prehospital providers work closely with the hospital staff to ensure that all pertinent information is relayed for a seamless transition within the continuum of care.

Contra Costa County Emergency Medical Services Agency has a policy in place to describe the process in which 12-Lead ECG transmission takes place. Policy #6004-Transmission of Cardiac Monitor Data and Field Procedure FP01 – 12-Lead ECG serve as an advanced life support skill guideline for obtaining, utilizing, and transmitting 12-Lead ECG’s.

The ACS /STEMI Patient
Contra Costa County EMS Agency believes that rapid identification, treatment and transport of STEMI patients by emergency medical personnel is a valuable part of optimal care for the victims of cardiac emergencies. Morbidity and mortality rates in STEMI patients have been shown to be directly related to the degree of myocardial damage sustained as a result of vessel occlusion. An important determinant of outcomes for the
STEMI patient is timely reperfusion of the coronary arteries. Reperfusion of the affected artery can salvage myocardium that would otherwise become necrotic.

A STEMI diagnosis is based on electrocardiographic changes that show evidence of evolving myocardial injury, as well as the presentation of the patient. When there are electrocardiographic changes and the patient presents with pain or symptoms of suspected cardiac origin, the patient goes directly to the cardiac catheterization laboratory for a possible reperfusion treatment. Therefore, STEMI patients benefit the most from rapid coronary reperfusion therapy.³

Contra Costa County Emergency Medical Services Agency has a Field Treatment Guideline in place to assist field providers in the rapid identification of a patient who may be suffering an ST Elevation MI. Field Treatment Guideline #AC08-Chest Pain: Suspected Cardiac or STEMI describes signs and symptoms of a suspected STEMI patient and is the guideline for treatment in Contra Costa County.

Destination

In STEMI systems of care, STEMI patients should be transported to the closest, most appropriate facility staffed and equipped to perform immediate percutaneous coronary intervention (PCI) to facilitate reperfusion. STEMI destination policies that allow emergency medical services to bypass non-percutaneous coronary intervention-capable facilities are associated with significantly faster treatment times for patients with ST-Elevation MI. Time to treatment in STEMI’s is a critical determinant of patient outcomes. Reducing delays relies on a robust emergency medical system that can transport a patient directly to a percutaneous coronary intervention-capable hospital, even if it means driving past a closer hospital.⁴

In the rare situation that the closest, most appropriate STEMI center is not available to accept a STEMI patient due to an internal disaster or occupied Cath Lab suites, field providers will transport the patient to the next closest, most appropriate STEMI receiving center.

Contra Costa County EMS Agency has a policy in place to assist field providers in determining destination for a STEMI patient. Policy document #4009 – STEMI Triage and Destination, outlines the destination facilities for patient populations requiring specialty systems of care.

³ https://www.heart.org/idc/groups/heart-public/@wcm/@mwa/documents/downloadable/ucm_487492.pdf
⁴ http://circinterventions.ahajournals.org/content/11/5/e005706
Communication

Studies show that EMS transportation is associated with shorter door-to-balloon time in patients with ST-segment elevation myocardial infarction. In addition to EMS transportation, when prehospital crews make notification of an incoming STEMI patient to the receiving hospital, it is again associated with shorter door-to-balloon time.⁵

Early notification of an incoming STEMI patient allows appropriate hospital resources to mobilize prior to patient arrival. Due to the time-sensitive nature of reperfusion on outcomes, the diligent practice of STEMI-alerts from the field is a vital element in the continuum of care spectrum as it is meant to effectively and rapidly communicate the need for expeditious treatment upon patient arrival.

Contra Costa County prehospital providers utilize cell phones to communicate with the STEMI receiving centers. Every STEMI receiving center in Contra Costa County has a dedicated phone number in the Emergency Department for the purposes of receiving radio reports, including STEMI Alerts.

Contra Costa County EMS has a policy in place to give direction on a notification report to receiving hospitals. Policy #3004 - Base Hospital and Receiving Center Reports addresses the minimum acceptable information to be communicated and provides a standardized and consistent approach to prehospital notifications.

Inter-Facility Transfers

STEMI patients seen at non-STEMI receiving centers or STEMI referral centers, occasionally require emergent transfer to a STEMI receiving center. For this reason, Contra Costa County STEMI receiving centers have plans developed that include pre-arranged agreements with STEMI referral centers for transfer of patients. STEMI referral centers utilize 911 to transfer patients having a STEMI to the closest STEMI receiving center. STEMI referral centers and STEMI receiving centers meet to discuss cases and any identified quality improvement issues. STEMI referral centers in Contra Costa County include:

   Kaiser Antioch
   Kaiser Richmond
   Contra Costa Regional Medical Center

Contra Costa County EMS Agency has a policy in place to provide guidelines for ambulance transport of patients between acute care hospitals. Policy document #5006 – Hospital Guidelines for Acute Care Inter-Facility Transfers.

⁵ https://www.ajemjournal.com/article/S0735-6757(16)30234-0/pdf
Data Collection

STEMI system of care monitoring and evaluation is conducted through the Contra Costa County EMS Agency Quality Improvement Program.

In the past, prehospital and hospital STEMI data has been collected on a quarterly basis and compiled into a database developed by the Contra Costa County EMS Agency. The pre-hospital data points were derived from national and California standards. Hospital outcome quality measures meet the America Heart Association (AHA) guidelines and standards. The indicators include First Medical Contact (FMC) to Intervention Time, 12-lead acquisition within 10 minutes of FMC, hospital destination and scene time. STEMI receiving centers provide follow up information on all patients that were taken to the cardiac catherization lab.

In 2020, Contra Costa County EMS Agency will implement Get With the Guidelines – Coronary Artery Disease® (GWTG-CAD®). GWTG-CAD® is a national quality improvement program and STEMI data registry offered by the AHA. Based on the STEMI Critical Care Regulations implemented in July of 2019, the need for a more comprehensive and standardized approach to data collection was recognized. All data elements identified in regulation, as well as any other data elements identified by the EMS agency or the hospital will be entered into GWTG-CAD® and evaluated on a quarterly basis. This will allow the EMS agency to have a comprehensive view of the Contra Costa County STEMI system as well as be able to benchmark against other regional and national systems.

Utilizing GWTG-CAD® will also allow CCCEMSA to apply for Mission: Lifeline® recognition, an award acknowledging the STEMI system as meeting specific quality and achievement measures. Contra Costa County has participated every year since 2013, receiving Bronze, Silver and Gold Plus recognition. For 2018, Contra Costa County submitted the Team application, allowing all participants in the STEMI System of Care to be recognized. The Contra Costa County STEMI System of Care received Mission: Lifeline® Gold Plus recognition in 2018 (See Attachment A).

STEMI Care Committee

As the delivery of cardiac care evolves to become more interconnected, coordinating care between prehospital Providers, Nurses, Physicians, and other disciplines has become increasingly important. In its simplest form, interprofessional collaboration is the practice of approaching patient care from a team-based perspective.

When implementing interprofessional collaboration and learning to work together and respecting one another’s perspectives in healthcare, multiple disciplines can work more effectively as a team to help improve patient outcomes. In addition, it improves the coordination and communication between healthcare professionals and thus in turn, improves the quality and safety of patient care.
Contra Costa County Emergency Medical Services Agency has a STEMI Care Committee that has representation from each of the STEMI Receiving Centers as well as members that represent the prehospital providers in the area. The STEMI Care Committee meets regularly and is tasked at reviewing performance data, identifying areas in need of improvement, and carrying out and monitoring improvement efforts. For these activities, the committee uses a variety of QI approaches and tools, including Plan, Do, Study, Act (PDSA) cycles, assessments, audits and feedback, benchmarking and best practices research. They provide expertise to address potential quality improvement initiatives within our STEMI system, which contributes, to the development or revision of STEMI related policies, procedures and treatment protocols.

Education and Outreach

An annual EMS report is distributed to all county stakeholders, out of county stakeholders and is available for viewing on the Contra Costa County EMS agency website, CCCEMS.org. Distribution of the report provides an opportunity to share our systems delivery of care, quality improvement information on specialty care and clinical and operational programs.

EMS provider education is provided based on any changes to the system identified through the QI process or changes derived from research and Evidence Based Practice. All new Emergency Medical Technicians and Paramedics must attend a mandatory EMS Orientation which provides an overview of our STEMI system, including recognition and destination of STEMI patients.

Neighboring EMS Agencies

Contra Costa County EMS works with neighboring counties to ensure the same standard of STEMI care is provided when our EMS providers take patients to out of county facilities. Contra Costa EMS recognizes hospitals outside of Contra Costa County as appropriate destinations for STEMI patients in two ways:

- The neighboring county has an existing STEMI System of Care
- The out of county hospital designated as a STEMI Receiving Center by the Local EMS Agency

Data is obtained for patients transported to out of county hospitals in the same manner as our in-county hospitals. Out of county hospitals are recognized in our STEMI field treatment guideline and patient destination policy. Out of county STEMI receiving hospitals include the following:

Kaiser Oakland – Alameda County
Stanford Valley Care Hospital – Alameda County
Summit Medical Center – Oakland – Alameda County
Kaiser Vallejo – Solano County
Both Alameda and Solano counties have recognized STEMI Systems of Care, with existing policy and field treatment guidelines and quality improvement activities that support the treatment and destination of STEMI patients.

## 2020 Goals

<table>
<thead>
<tr>
<th>Objective #1 Review STEMI Receiving Center Policy</th>
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<tbody>
<tr>
<td><strong>Specific:</strong></td>
</tr>
<tr>
<td>• The Current STEMI Designation Policy was implemented at the beginning of the STEMI system in 2008.</td>
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<tr>
<td>• With the addition of the STEMI Critical Care System Regulations, existing STEMI Designation Policy may be out of date and new regulations will need to be added</td>
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<tr>
<td><strong>Measurable:</strong></td>
</tr>
<tr>
<td>Current STEMI Designation policy will be updated to meet the requirements of the new STEMI Critical Care System regulations.</td>
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<tr>
<td><strong>Attainable:</strong></td>
</tr>
<tr>
<td>STEMI Center Designation Policy will be reviewed during annual Policy Review.</td>
</tr>
<tr>
<td><strong>Relevant:</strong></td>
</tr>
<tr>
<td>Policies outline and guide the development of new and existing STEMI Receiving Centers. Having the most up to date information incorporated into our Designation Policy provides clear direction for any new hospital wishing to become a designated STEMI receiving center.</td>
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<tr>
<td><strong>Time:</strong></td>
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<tr>
<td>Policy and contract will be updated by December 2020.</td>
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Objective #2 Develop local STEMI educational initiatives with STEMI system stakeholders to increase awareness of Coronary Artery Disease and MI, including identifying barriers or limitations to positive health behaviors

**Specific:**

- Using Get With the Guidelines – CAD data, and partnering with Public Health, identify and engage at risk populations within Contra Costa County.
- Review innovate projects aimed at promoting positive health behaviors
- Create or implement an already existing community awareness project.

**Measurable:**

Success of community awareness and education will be measured through improving behavioral responses to warning symptoms, STEMI treatment rates, mortality and use of 911.

**Attainable:**

This will be an ongoing project incorporated into already existing oversight of the STEMI system.

**Relevant:**

Heart Disease is the leading cause of death in the United States. Heart disease crosses most racial and ethnic groups in the United States. About ½ of Americans have one of the three major risk factors for heart disease. These include high blood pressure, high blood cholesterol and smoking.

**Time:**

Outreach and development to start in January 2020 with implementation to take place in 1st quarter of 2021.

**Outcome:**

Develop new partners and work with existing stakeholders in the development of an innovative and sustainable CAD/MI community awareness and education program.
**Objective #3 Implement STEMI Bundle of Care**

**Specific:**

- Utilizing First Pass, a responder QA/QI tool, implement a STEMI Bundle of Care based on the Contra Costa STEMI Protocol.
- Measure clinical quality and protocol compliance utilizing measures that have proven to make a difference in the outcome of the patient, including transport to a STEMI receiving center and pre-notification of incoming STEMI patients.

**Measurable:**

All ALS Fire first responders and ALS transport providers will be utilizing the First Pass STEMI Bundle of Care by July 2020. Bundle of care compliance and any identified areas of improvement will be incorporated into the LEMSA and STEMI quality improvement programs.

**Attainable:**

This will be an ongoing project incorporated into already existing oversight of the STEMI System.

**Relevant:**

First Pass STEMI Bundle of Care will support identified State and National Core Measures.

**Time:**

Implementation of First Pass for Contra Costa County Providers will begin in second quarter of 2020. Bundle compliance will be reviewed on a daily basis by EMS Provider agencies with data being incorporated into quarterly reports to the LEMSA.

**Outcome:**

Improved protocol compliance and clinical quality.
References


STEMI Contract Expiration Dates

<table>
<thead>
<tr>
<th>STEMI Receiving Center</th>
<th>Contract Expiration</th>
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<tbody>
<tr>
<td>John Muir Walnut Creek</td>
<td>August 31, 2022</td>
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<tr>
<td>John Muir Concord</td>
<td>August 31, 2022</td>
</tr>
<tr>
<td>Sutter Delta</td>
<td>August 31, 2022</td>
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<tr>
<td>Kaiser Walnut Creek</td>
<td>August 31, 2022</td>
</tr>
<tr>
<td>San Ramon Regional Hospital</td>
<td>August 31, 2022</td>
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Mission: Lifeline EMS Recognition Achievement Measures

EMS MEASURE 1 - Percentage of patients with non-traumatic chest pain/ACS symptoms (which may include chest pain or discomfort in other areas of the body (e.g. arm, jaw, epigastrium) of suspected cardiac origin, shortness of breath, sweating, nausea, vomiting, dizziness, and atypical or unusual symptoms) in patients >35 years of age, treated and transported by EMS who received a pre-hospital 12 Lead

PLUS MEASURE (Required reporting but not used for baseline recognition analysis)- Using the same patient population in EMS Measure 1, The Percentage of 12 Lead ECG’s performed within 10 Minutes of EMS First Medical Contact on patients with an initial complaint non-traumatic chest pain/ACS symptoms (which may include chest pain or discomfort in other areas of the body (e.g. arm, jaw, epigastrium) of suspected cardiac origin, shortness of breath, sweating, nausea, vomiting, dizziness, and atypical or unusual symptoms), who are >35 years of age.
EMS MEASURE 2 - The percentage of hospital notifications or 12 Lead ECG transmissions suggesting a STEMI alert (or Cardiac Cath Lab Activation), that are performed within 10 minutes of the first STEMI positive 12 Lead ECG in the field.

EMS MEASURE 3 - Percentage of patients treated and transported directly to a STEMI Receiving Center, with EMS First Medical Contact to device time <90 Minutes and/or EMS First Medical Contact to PCI <120 Minutes when transport time >45 minutes and Door to Balloon <30 Minutes. (When destination facility = STEMI Receiving Center)

Recognition Level Requirements:

- Aggregated annual compliance (≥75%) on applicable Mission: Lifeline® Measures (1-3)
- Must have achieved SILVER award level in 2017
Attachments

Attachment 1 – Mission: Lifeline® Achievement Award
The American Heart Association proudly recognizes

Contra Costa County EMS
Martinez, CA


Mission: Lifeline®–EMS – GOLD PLUS
Achievement Award – EMS Agency

The American Heart Association/American Stroke Associations recognizes this EMS provider organization, and the EMS provider organizations it supports, as an integrated EMS team. The EMS team has demonstrated continued success in using the Mission Lifeline® program. Thank you for applying the most up-to-date evidence-based treatment guidelines to improve patient care and outcomes in the community you serve.*

Nancy Brown
Chief Executive Officer
American Heart Association

Lee Schwamm, MD, FAHA
Chairperson, Quality Oversight Committee

Ivor Benjamin, MD
President American Heart Association

*For more information, please visit Heart.org/MissionLifeline