12-LEAD ELECTROCARDIOGRAM (ECG)

ALS

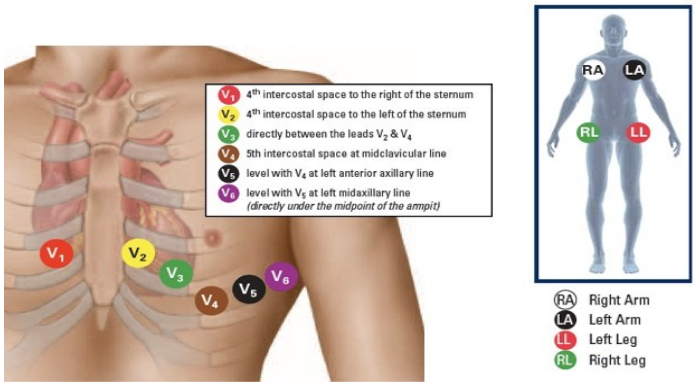
INDICATIONS

Any patient with one or more of the following:

- Signs/symptoms suggestive of acute coronary symptom (e.g. chest pain, upper abdominal pain, dyspnea, acute generalized weakness, nausea or other "suspicious" symptoms)
- Cardiac dysrhythmias on 4-lead ECG
- Post-cardiac arrest or ROSC
- Electrical injury or burns
- Poisonings, overdoses and electrolyte derangements as clinically warranted

TECHNIQUE

Figure 1: ECG lead placement



1. Prepare ECG monitor and connect 12-lead cables
2. Apply chest leads using the landmarks indicated on **Figure 1**
3. Interpret ECG findings (see Appendix A for STEMI Territory Reference)
4. If isoelectric line has significant artifact or machine reads "poor data quality" (or equivalent), attempt to reacquire a clean 12-lead ECG if patient condition allows
5. If a patient meets the criteria for an **EMS STEMI ALERT**:
   a) Transport to an approved STAR Cardiac Receiving Center (#**Policy 5000 Destination**)
   b) Provide early notification to the STAR facility per (**#3020 Field to Hospital Communications**)
   c) Transmit the ECG to the receiving facility.
6. For inconclusive ECG's, suspected false negatives, transmit the ECG to Base Hospital and contact for consultation.
7. For patients with suspected ACS, serial 12-lead ECGs should be obtained if the patients clinical status changes or if the ECG changes are noted on the cardiac monitor, and every 15 minutes if transport time allows

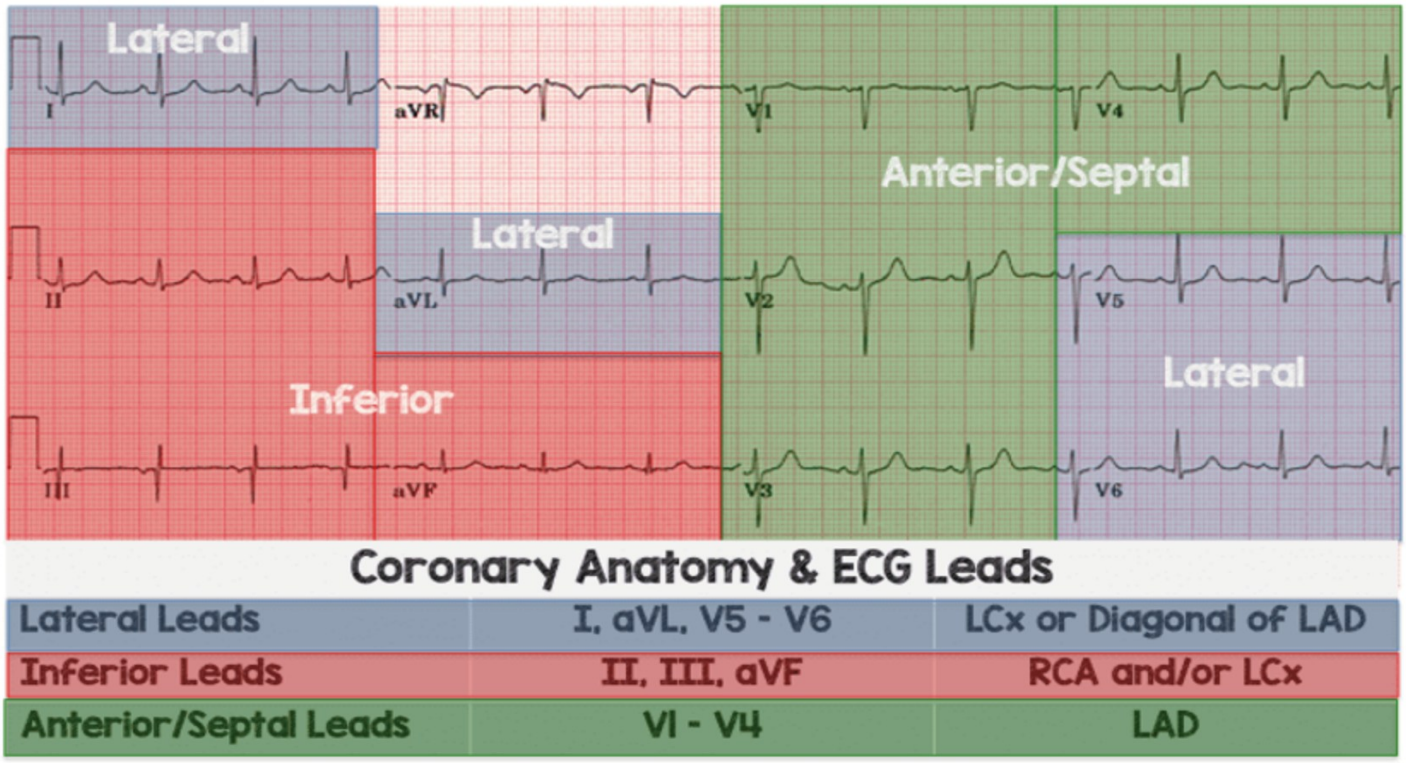
Table 1: Definition of EMS STEMI Alert: at least one of the following
New or presumed new ST-segment elevation of >1mm (one small box) in at least two contiguous leads
ECG machine interpretation ***ACUTE STEMI*** or similar wording

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DOCUMENTATION

- 12-lead ECG should include the following information included prior to acquisition:
  - Patient Last Name + First Initial
  - Gender
  - Age
  - Under-**patient ID field,** list ambulance unit number (e.g. list as "SFFD 574," etc). This is to avoid confusion between ambulance unit number and patient age)
- PCR documentation should include:
  - Computer and paramedic interpretation of the 12-lead ECG. If applicable, ST elevation in millimeters and location of reciprocal changes
  - EMS Personnel responsible for procedure (eprocedures.09 and eprocedures.10)
  - Time of symptom onset (in HH:MM format)
  - Time of hospital notification for STEMI Alert
- Copies of 12-lead ECG should be provided to the receiving hospital physician upon EMS arrival, left at the receiving hospital at time of patient delivery, and attached to the EMS patient care report (ePCR)

APPENDIX A: STEMI Territories



Reference: Sekohn, N. STEMI. Clerkship Directors in Emergency Medicine. Published 2023. Accessed March 13, 2026. https://www.saem.org/about-saem/academies-interest-groups-affiliates2/cdem/for-students/online-education/m3-curriculum/group-electrocardiogram-%28ecg%29-rhythm-recognition/stemi

Appendix **B:**

STAR Center	Prehospital ECG transmission contact
CPMC VNC	14154477308 (Fax)
Kaiser	14158332582 (Fax)
UCSF Parnassus	14153531792 (Fax)
UCSF Stanyan	14157504886 (Fax)
ZSFG	carepoint-sfgh@sfdph.gdcarepoint.com
Seton	16509915454 (Fax)