EFFECTIVE February 1, 2018

STEMI Alert – Trial Study and New Terminology Update

To All County of SLO ALS Providers and Training Institutions:

It has come to the attention of the County of San Luis Obispo medical community that the latest Zoll X-Series software (in newly purchased monitors or monitors that have been updated) provides a more detailed 12-Lead analysis, and more liberal use of ***STEMI*** and ***ACUTE MI*** terminology than previous software.

In coordination with local cardiologists, emergency room physicians, and other stakeholders the EMS Agency and STEMI Receiving Center (French Hospital) have resolved to conduct a 6-month trial study of field activations of STEMI Alerts using the updated software.

Trial Study Protocol:

- **Zoll X-Series (WITH the updated software)**
  - Initiate a STEMI Alert and transport to the closest STEMI Receiving Center with any 12-Lead report that includes either of the following alerts (category 1-5b):
    - ***STEMI***
    - ***ACUTE MI***

  These alerts will be followed by a detailed description of potential ischemia/injury, much like the older software (see attached example), i.e.:

  `<Inferior infarct (confounder adj. STE in II/AVF/III, ST dep in aVL) possibly acute> (Category 5b)

  For the duration of this trial study, initiate STEMI Alert based solely on the ***STEMI*** or ***ACUTE MI*** alert, not the language in the detailed description that follows.

PLEASE SEE PAGE 2
Please note: Zoll X-Series WITHOUT the software update and Zoll E-Series will continue to be used to activate STEMI Alerts as they always have been:

- **Zoll X-Series (WITHOUT updated software, as before)**
  Initiate a STEMI Alert with a 12-Lead reading that contains any one of the following reports (category 1-4):
  - <Acute STE (lesion location) Infarct> or ***STEMI*** - (Category 1)
  - <Probable Acute STE (lesion location) Infarct> - (Category 2)
  - <Acute Anterior Infarct> - (Category 3)
  - < (Lesion location) Infarct, Probably Acute> - (Category 4)

  **Do not activate a STEMI Alert** with any other readings, including terminology with “possible” or “possibly” and continue to transport to the closest hospital per protocol
  - < (Location) Infarct, Possibly Acute> - (Category 5)
  - < Probable subendocardial injury> - (Category 6)

- **Zoll E-Series (as before)**
  Initiate a STEMI Alert for the following 12-lead report:
  - ***Acute MI Suspected***

Contact your EMS field supervisor or EMS Agency if you are unsure which monitor/software you have. Please contact your Zoll representative for any needed assistance with the software updates.

**Additional literature explaining the various categories and terminology is available for your review:**

- Zoll Category comparisons (attached)
- STEMI Triage and Destination Policy #152 and 12-Lead Procedure #707 (attached)

**It is the responsibility of the EMS Providers to ensure that all appropriate personnel receive this information. This policy change shall be effective as of February 1, 2018.**

Please contact Kathy Collins at 805-788-2514/kcollins@co.slo.ca.us or Douglas Brim at 805-788-2518/dbrim@co.slo.ca.us with any questions or concerns.
12-Lead EKG Samples

Zoll X-Series with updated software

*** STEMI ***
Abnormal finding for 40+ female
Probable acute ST elevation inferior infarct [borderline STE in aVF/III, ST dep in aVL]
Sinus tachycardia with frequent supraventricular premature complexes
Moderate right axis deviation [QRS axis > 90]
Minimal evidence of LVH [STT abn in I] Short QT interval

Zoll X-Series without updated software

Abnormal finding for 40+ female
Probable acute ST elevation inferior infarct w/posterior extension
[confounder adj. STE in II/aVF/III, ST dep in aVL/V1-V3]
Sinus bradycardia
Moderate evidence of LVH [STT abn in I, high QRS voltages]
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Current</th>
<th>New</th>
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</thead>
<tbody>
<tr>
<td><strong>Category 1</strong>&lt;br&gt;STE Acute MI</td>
<td>Acute MI that meets STEMI criteria, no confounding conditions</td>
<td>*** STEMI ***&lt;br&gt;Acute ST elevation inferior infarct [marked STE in II/aVF/III, ST dep in aVL]</td>
<td>No Change</td>
</tr>
<tr>
<td><strong>Category 2a</strong></td>
<td>Acute MI that meets STEMI criteria, confounding conditions present</td>
<td>Probable acute ST elevation inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL]</td>
<td>*** STEMI ***&lt;br&gt;Probable acute ST elevation inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL]</td>
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<tr>
<td><strong>Category 2b</strong></td>
<td>Acute MI that nearly meets STEMI criteria, no confounding conditions</td>
<td>Probable acute ST elevation inferior infarct [borderline STE in II/aVF/III]</td>
<td>*** STEMI ***&lt;br&gt;Probable acute ST elevation inferior infarct [borderline STE in II/aVF/III]</td>
</tr>
<tr>
<td><strong>Category 3</strong>&lt;br&gt;Acute MI</td>
<td>Acute MI that does not meet STEMI criteria, with or without confounding conditions</td>
<td>Acute anterior infarct [STJ dep w/tall T-waves V2-V4]</td>
<td>*** Acute MI ***&lt;br&gt;Acute anterior infarct [STJ dep w/tall T-waves V2-V4]</td>
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<tr>
<td><strong>Category 4a</strong>&lt;br&gt;MI, Probably Acute</td>
<td>Acute evolving MI that meets STEMI criteria, with or without confounding conditions</td>
<td>Inferior infarct [STE in II/aVF/III, ST dep in aVL], probably acute</td>
<td>*** STEMI ***&lt;br&gt;Inferior infarct [STE in II/aVF/III, ST dep in aVL], probably acute</td>
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<tr>
<td><strong>Category 4b</strong>&lt;br&gt;MI, Probably Acute</td>
<td>Acute evolving MI that does not meet STEMI criteria, with or without confounding conditions</td>
<td>Inferior infarct [STE in II/aVF/III, ST dep in aVL], probably acute</td>
<td>*** Acute MI ***&lt;br&gt;Inferior infarct [STE in II/aVF/III, ST dep in aVL], probably acute</td>
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<td><strong>Category 5a</strong>&lt;br&gt;MI, Possibly Acute</td>
<td>Acute evolving MI that meets STEMI criteria, with or without confounding conditions</td>
<td>Inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL], possibly acute</td>
<td>*** STEMI ***&lt;br&gt;Inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL], possibly acute</td>
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<tr>
<td><strong>Category 5b</strong>&lt;br&gt;MI, Possibly Acute</td>
<td>Acute evolving MI that does not meet STEMI criteria, with or without confounding conditions</td>
<td>Inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL], possibly acute</td>
<td>*** Acute MI ***&lt;br&gt;Inferior infarct [confounder adj. STE in II/aVF/III, ST dep in aVL], possibly acute</td>
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<tr>
<td><strong>Category 6</strong>&lt;br&gt;Non-STE Acute MI/ST Depression Subendocardial Injury</td>
<td>Probable subendocardial injury [confounder adj. ST dep in V3-V6]</td>
<td>No Change</td>
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POLICY #152: STEMI TRIAGE AND DESTINATION
(with Telemetry)

I. PURPOSE
A. To establish guidelines for Emergency Medical Services (EMS) personnel to identify and transport patients with acute ST-segment Elevation Myocardial Infarction (STEMI) who could benefit from the rapid response and specialized services of a STEMI Receiving Center (SRC).

II. SCOPE
A. This policy applies to adult patients with chest pain or other symptoms indicative of Acute Coronary Syndrome (ACS) with a 12-lead ECG demonstrating elevated ST-segments indicating a specific type of myocardial infarction.

III. DEFINITIONS/GLOSSARY
- Percutaneous Coronary Intervention (PCI): A broad group of percutaneous techniques utilized for the diagnosis and treatment of patients with STEMI.
- Return of Spontaneous Circulation (ROSC): The return of a palpable pulse after cardiac arrest.
- STEMI: An acute myocardial infarction that generates a specific type of ST-segment elevation on a 12-lead ECG.
- “STEMI Alert”: A report from EMS personnel that notifies a STEMI Receiving Center as early as possible that a patient has a specific computer-interpreted prehospital 12-lead ECG indicating a STEMI, allowing the SRC to initiate the internal procedures to provide appropriate and rapid treatment interventions.
- “12-Lead Consultation” – Contact SLO County STEMI Receiving Hospital (French Hospital Medical Center) when the patient does not meet a STEMI ALERT Criteria and transmitting the 12-lead ECG would benefit
- STEMI Receiving Center (SRC): A facility licensed for cardiac catheterization laboratory and recognized as an SRC by the County of San Luis Obispo Emergency Medical Services Agency (EMS Agency).
- STEMI Referral Hospital (SRH): An acute care hospital in the County of San Luis Obispo (SLO) that is not designated as a STEMI Receiving Center.
- SLO STEMI Receiving Center (SLO SRC) – refers to the STEMI Receiving Center in San Luis Obispo County (French Hospital Medical Center) to be used for medical direction and or destination decisions.

IV. POLICY
A. Determine if patient condition meets STEMI Patient Triage Criteria.
B. “STEMI Alert” notifications - contact the nearest SRC (French or Marian) as soon as possible

C. “12-Lead ECG Consultations” including consultation for alternate destination - contact the SLO SRC (French)

V. PROCEDURE

A. Determine if patient condition meets STEMI Patient Triage criteria:
   1. Patients meeting EMS Agency Protocol Adult Chest Pain #640: or with indications for 12-lead ECG per EMS Agency 12-lead ECG Policy #707 with computerized interpretation of an accurately performed pre-hospital 12-lead ECG indicating ***STEMI*** (or equivalent computerized interpretation).

B. Destination and Notification
   1. Transport to nearest SRC (French or Marian) or as directed by a SLO SRC (French).
      a. Patients meeting the STEMI Patient Triage Criteria are considered a “STEMI Alert” and must be transported to the nearest SRC.
      b. Patients with ROSC regardless of 12-lead ECG reading
      c. The SRC Emergency Department must be notified as early as possible of the incoming “STEMI Alert” and/or ROSC to activate the SRC’s internal STEMI/PCI system.
   2. An Emergency Department physician at the SLO SRC (French) must be consulted to determine patient destination in the following:
      a. “STEMI Alert”:
         (1) The patient is unstable with a SBP<90mmHg and transport time to the SRC would add more than 30 minutes to the transport time to a STEMI Referral Hospital (SRH).
         (2) Patient is uncooperative with the procedure and/or expresses a personal preference for destination other than the SRC; see EMS Agency Policy #203: Patient Refusal of Treatment or Transport.
      b. Questionable 12-Lead ECG
      c. Patients who, while enroute, develop unmanageable airway or cardiac arrest without ROSC must be transported to the closest hospital, with the transporting provider notifying the intended SRC of the change in destination.
      d. When a patient is diverted to another hospital the SLO SRC (French) shall notify the receiving hospital and provide information regarding the destination decision.

C. Contact the nearest SRC as soon as possible with “STEMI Alert” Notification
   1. For patients with identified STEMI, destination must be promptly determined after the prehospital 12-lead ECG is completed and read. The SRC must be notified as soon as possible.
2. The “STEMI Alert” notification must contain the following information:
   a. Call identified as a “STEMI Alert”.
   b. ETA to SRC.
   c. Patient age and gender.
   d. Confirmation of ECG reading and whether it appears to be free of significant artifact.
   e. Confirmation that the appropriate treatment protocol is being followed.
   f. Results of any medications given.
   g. Additional information if required:
      (1) Any confusion regarding chief complaint or treatment.
      (2) Destination decision assistance.

3. ECG Transmission:
   a. With a STEMI Alert or ROSC and when the equipment is available, the ALS provider shall transmit a 12-lead ECG to a SRC (French or Marian);
      (1) Notify the SRC that you are capable of 12-lead ECG transmission and that you have transmitted, or are about to transmit the 12-lead ECG previously obtained.
      (2) Include on the transmitted 12-lead ECG the patient age and sex required for the ECG monitor to accomplish its interpretation and be used as an identifier for the SRC.
      (3) Do not include the name of the patient with the transmission of the 12-lead ECG.
   b. When “Consulting” with a SLO SRC (French) and transmitting the 12-lead ECG would benefit the consultation:
      (1) Notify the SLO SRC (French) that you are capable of 12-lead ECG transmission and that you have transmitted, or are about to transmit the 12-lead ECG.
      (2) Include on the transmitted 12-lead ECG the patient age and sex required for the ECG monitor to accomplish its interpretation and be used as an identifier for the SRC.
      (3) Do not include the name of the patient with the transmission of the 12-lead ECG.

4. Documentation
   a. Findings of prehospital 12-lead ECGs, the time of the “STEMI Alert,” and patient identification must be documented on the 12-lead ECG and the prehospital PCR.
   b. Two copies of the prehospital 12-lead ECG (multiple if performed) must be made, with one delivered to the receiving hospital responsible for the continued care of the patient, and one included with the prehospital PCR.
VI. AUTHORITY

- California Health and Safety Code, Division 2.5, Sections 1797.67, 1798, 1798.170.
12-LEAD ECG

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<tr>
<th></th>
<th>ADULT</th>
<th>PEDIATRIC (≤34KG)</th>
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<tr>
<td><strong>BLS</strong></td>
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<tr>
<td>Universal Protocol #601</td>
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<tr>
<td><strong>BLS Optional</strong></td>
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<tr>
<td>Pulse Oximetry – O₂ administration per Airway Management Protocol #602</td>
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<td><strong>ALS Standing Orders</strong></td>
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<td>• Used in conjunction with appropriate EMS Protocol, or at paramedic discretion</td>
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<td>• Obtain early</td>
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<td>• Serial 12-lead ECGs should be obtained when possible</td>
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<td><strong>Base Hospital Orders Only</strong></td>
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<td>As needed</td>
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<tr>
<td><strong>Notes</strong></td>
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<tr>
<td>• Indications:</td>
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<tr>
<td>o Signs and symptoms suggestive of Acute Coronary Syndrome (ACS) as defined in Chest Pain/Acute Coronary Syndrome Protocol #640</td>
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<td>o Atypical symptoms or anginal equivalents such as; shortness of breath, syncope, dizziness, weakness, diaphoresis, nausea/vomiting or altered level of consciousness</td>
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<td>o Cardiac dysrhythmia/respiratory distress cardiogenic shock</td>
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<td>o Post cardioversion</td>
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<td>o Cardiac arrest patients with return of spontaneous circulation (ROSC)</td>
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<td>o Diabetic patients with shortness of breath</td>
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<td>• Consider not performing a 12-lead ECG:</td>
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<tr>
<td>o Trauma unless an event of cardiac origin is suspected</td>
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<tr>
<td>o An uncooperative patient</td>
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<tr>
<td>• Documentation</td>
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<tr>
<td>o 12-lead ECG shall be a part of the patient record – either attached or as part of an ePCR</td>
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<tr>
<td>o A copy of the 12-lead ECG shall be delivered to the personnel at the receiving hospital responsible for continued care of the patient and be included in the patient care record</td>
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<tr>
<td>• Contact and transport to STEMI Receiving Center (SRC), French or Marian, when:</td>
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<tr>
<td>o Positive reading for STEMI – “<em><strong>STEMI</strong></em>” or equivalent reading</td>
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<tr>
<td>o STEMI Alerts or ROSC and when capable – transmit the 12-lead ECG to the receiving SRC (French/Marian) per STEMI Triage and Destination Policy #152</td>
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<tr>
<td>o STEMI 12-Lead Consults - Contact the SLO SRC (French) when transmitting 12-lead ECG for consultations per STEMI Triage Destination Policy #152</td>
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