

## ST ELEVATION MYOCARDIAL INFARCTIONS (STEMI) TRIAGE GUIDELINE

- Subject:** ST - ELEVATION MYOCARDIAL INFARCTION (STEMI) TRIAGE GUIDELINE
- Reference:** N.J.A.C. 8:41-1.1 et seq.
- Purpose:** To establish guidelines for determining which patients may benefit from transportation directly to a Primary Percutaneous Coronary Intervention (PCI) hospital licensed to perform primary percutaneous coronary intervention.
- Scope:** This guideline applies to all Advanced Life Support Personnel
- Responsibility:** MICU, AMU, and SCTU programs are responsible for monitoring the use of and compliance with this guideline
- Definitions:** ST Elevation MI (STEMI): a patient presenting with signs and symptoms of Acute Coronary Syndrome (ACS) and ST segment elevation of at least one millimeter in two or more anatomically contiguous leads
- PCI Hospital: A hospital designated as a PCI center by NJDHSS and providing primary PCI services.
- Procedure:** The following procedure shall be performed whenever patients present with signs and symptoms suggestive of ACS (consider atypical presentation in female, diabetic, or elderly patients) and for patients with return of spontaneous circulation (ROSC) post-cardiac arrest:
1. The patient shall be appropriately managed within the Advanced Life Support (ALS) scope of practice and in accordance with applicable laws and regulations. (N.J.A.C. 8:41-1.2)
    - a. A 12 lead ECG shall be acquired as early as possible during the initial assessment. Serial ECGs should be acquired if initial ECG is non-diagnostic or when the patient's condition changes.
    - b. The presence of the following will classify the patient as a STEMI:
      - i. ST segment elevations of at least one millimeter in two or more anatomically contiguous leads **OR**
      - ii. Presumably new Left Bundle Branch Block
    - c. ECGs reflecting STEMI shall be transmitted to medical command and/or the receiving PCI hospital at the earliest opportunity.
  2. Determine destination hospital in consultation with Medical Command at the earliest opportunity ( N.J.A.C. 8:41-9.6) :
    - a. Transportation directly to a Primary PCI hospital should be considered with the following:
      - i. By ground – if the ground transport time to the PCI hospital is less than or equal to 30 minutes.
      - ii. By airmedical transport – if the ground transport time to the PCI hospital is greater than 30 minutes.
      - iii. By ground – if airmedical transport is not available AND ground transport time to the PCI hospital is less than or equal to 60 minutes
      - iv. Consider weather and time of day (traffic flow) when calculating ground transport times.
      - v. Consider and request airmedical transport as early as possible.

**ST ELEVATION MYOCARDIAL INFARCTIONS (STEMI)  
TRIAGE GUIDELINE**

- vi. If Fibrinolysis is contraindicated in the patient.
  
- b. Transportation to the closest hospital shall be considered when one or more of the of the following are present:
  - i The patient's airway cannot be managed
  - ii The patient is in cardiac arrest without ROSC
  - iii. The patient is hemodynamically unstable as evidenced by the presence of:
    - 1. altered mental status OR
    - 2. severe hypotension OR
    - 3. life threatening arrhythmia
  - iv. Airmedical transport is not available AND the ground transport time to the PCI hospital is greater than 60 minutes.
  
- 3. Transport to the closest appropriate destination hospital shall be initiated at the earliest opportunity, delayed only by the initial assessment and provision of life-saving care. Further assessment and all adjunctive care should be provided en route to the hospital as circumstances permit or as directed by medical command.

## References – STEMI Guidelines

Aguirre, F. et al. Rural Inter Hospital Transfer of ST–Elevation Myocardial Infarction Patients for Percutaneous Coronary Revascularization: The Stat Heart Program. *Circulation*. 117:1145-1152. 2008

American Heart Association. Heart Disease and Stroke Statistics – 2008 Update. Dallas. 2008

Andersen, Henning et al. A Comparison of Coronary Angioplasty with Fibrinolytic Therapy in Acute Myocardial Infarction, *NEJM* (349:733-742) 2003.

Antman, EM et al. 2007 Focused Update of the ACC/AHA 2004 Guidelines for the Management of Patients with ST-Elevation Myocardial Infarction: A Report of the ACC/AHA Task Force on Practice Guidelines. *Circulation*. 2008; 117.

Bates, Erik & Brahmajee, Nallamothu. Commentary: The Role of Percutaneous Coronary Intervention in ST-Segment Elevation Myocardial Infarction. *Circulation*. 118;567-573. 2008.

Bradley, Elizabeth H. et al. Door-to-Drug and Door-to-Balloon Times: Where Can We Improve? Time to Reperfusion Therapy in Patients with ST-Segment Elevation Myocardial Infarction (STEMI) *American Heart Journal* (151:1281-7) 2006.

Campbell, Paul T. et al. Prehospital Triage of Acute Myocardial Infarction; Wireless Transmission of Electrocardiograms to the On-Call Cardiologist via a Handheld Computer. *Journal of Electrocardiology* (38: 300-309) 2005.

Cannon, C. et al. Relationship of Symptom-Onset-to-Balloon Time and Door-to-Balloon Time with Mortality in Patients Undergoing Angioplasty for Acute Myocardial Infarction. *JAMA*. 283;2941-2947. 2000

Clark, Cheryl. Beating The Clock. *Union-Tribune* May 7, 2006. Retrieved from [www.signonsandiego.com/pt/cpt?action=cpt&title=SignOnDandiego](http://www.signonsandiego.com/pt/cpt?action=cpt&title=SignOnDandiego) on April 26, 2007.

County of Los Angeles, Department of Health Services 2006 Emergency Medical Services Agency. St-Elevation Myocardial Infarction Receiving Center Standards.

Dalby, M. et al. Transfer for Primary Angioplasty Versus Immediate Thrombolysis in Acute Myocardial Infarction: A Meta-Analysis. *Circulation*. 108; 1809-1814. 2003

Dhruva, V. et al. ST-Segment Analysis Using Wireless Technology in Acute Myocardial Infarction (STAT-MI) Trial. *JACC*. 50; 509-513. 2007

Drew, Barbara J, et al. Novel Electrocardiogram Configurations and Transmission Procedures in the Prehospital Setting: Effect on Ischemia and Arrhythmia Determination. *Journal of Electrocardiology* (39: S157-S160) 2005.

FDNY EMSC OGP 155-11: Prehospital Identification of Coronary Reperfusion Candidates. October 15, 2007.

Gersh, Bernard & Antman, Elliott. Selection of the Optional Reperfusion Strategy for STEMI: Does Time Matter? *European Heart Journal*. 27;761-763. 2006

Grines, C. et al. A Randomized Trial of Transfer for Primary Angioplasty Versus On-Site Thrombolysis in Patients with High-Risk Myocardial Infarction; The Air Primary Angioplasty in Myocardial Infarction Study. *JACC*. 39;1713-1719. 2002.

Henry, T. et al. A Regional System to Provide Timely Access to Percutaneous Coronary Intervention for ST-Elevation Myocardial Infarction. *Circulation*. 116;721-728. 2007.

Henry, Timothy. et al. ST-Segment Elevation Myocardial Infarction: Recommendations on Triage of Patients to Heart Attack Centers. *JACC* (47:1339-1345) 2006.

Jacobs, Alice. et al. Development of Systems for ST-Elevation Myocardial Infarction Patients: Executive Summary. *Circulation* (116: 217-230) 2007.

Jaslow, David. Out-of-Hospital STEMI Alert. *EMS* (36: 50-55) 2007.

Jollis, J. et al. Implementation of a Statewide System for Coronary Reperfusion for ST-Segment Elevation Myocardial Infarction. *JAMA*. 298;310. 2007

Keely, Ellen, Boura, Judith, Grines, Cindy. Primary Angioplasty versus Intravenous Thrombolytic Therapy for Acute Myocardial Infarction: A Quantitative Review of 23 Randomized Trials. *The Lancet* (361: 13-20) 2003.

Kereikes. Dean J. Specialized Centers and Systems for Heart Attack Care. *American Heart Hospital Journal* (6: 14-20) 2008.

LeMay, Michael R. et al. A Citywide Protocol for Primary PCI in ST Segment Elevation Myocardial Infarction. *NEJM* (358:231-240) 2008.

Marchione., Marilyn. ER Plans Seeks Faster Heart Attack Care. *The Star Ledger*. November 13, 2006.

Mensah, G. et al. Development of Systems of Care for ST-Elevation Myocardial Infarction Patients: The Patient and Public Perspective. *Circulation*. 116;333-338. 2007.

Moyer, Peter, et al. Development of Systems for ST-Elevation Myocardial Infarction Patients. The Emergency Medical Services and Emergency Department Perspective. *Circulation*. (115:000-000) 2007.

Myers, J. Brent. et al. Evidence Based Performance Measures for Emergency Medical Services Systems: A Model for Expanded EMS Benchmarking. *Prehospital Emergency Care* 12: 141-151. 2008

Nallamotheu, Brahmajee, Bates, Eric, et al. Driving Times and Distances to Hospitals with Percutaneous Coronary Intervention in the United States: Implications for Prehospital Triage of Patients with ST-Elevation Myocardial Infarction. *Circulation*. (113: 1189-1195) 2006.

Nallamotheu, Brahmajee, Krumholz, Harlan M. et al. Development of Systems of Care for ST-Elevation Myocardial Infarction Patients: Gaps, Barriers, and Implications. *Circulation* (116:368-372) 2007.

Price, Timothy, Hooker, Edmond, & Neubauer, Joshua. Prehospital Provider Prediction of Emergency Department Disposition: Implications for Selective Diversion. *Prehospital Emergency Care*. (9:322-325) 2005.

Rathore, Saif, et al. Regionalization of ST-Segment Elevation Acute Coronary Syndromes Care: Putting a National Policy in Proper Perspective. *JACC* (47:1346-1349). 2006.

Rokos, Ivan C, et al. Rationale for Establishing Regional ST-Elevation Myocardial Infarction Receiving Center (SRC) Networks. *American Heart Journal* (152:661-667). 2006.  
Sanz, M. et al. Development of Systems of Care for ST-Elevation Myocardial Infarction Patients: The Physician Perspective. *Circulation*. 116;339-342. 2007.

Slovis, Corey, M. Five Reasons to do a Field ECG. 6/16/2006. JEMS.com. Retrieved from JEMS.COM vol 162 on 6/14/2006.

Solis, P, et al. Development of Systems of Care for ST-Elevation Myocardial Infarction Patients: Policy Recommendations. *Circulation*. 116:373-376. 2007.

Steinbuch, Robert. Regulatory Changes for the Treatment of Patients with Heart Attacks. *American Journal of Cardiology*. (99:1166-1167) 2007.

STEMI Receiving Centers Advance Cardiac Care. *The Pulse*. Spring 2007 (official newsletter of the LA County FD EMS Program).

The AHA's Acute Myocardial Infarction Advisory Working Group (Jacobs, et al). Recommendations to Develop Strategies to Increase the Number of ST-Segment Elevation Myocardial Infarction Patients with Timely Access to Primary Percutaneous Coronary Intervention. *Circulation*. 113;2152-2163. 2006.

Thygeson, et al. Universal Definition of Myocardial Infarction. *JACC* 50;2173-2195. 2007

TIME – Timely Intervention for Myocardial Infarction 11 July 2007. Retrieved from Medical News Today Article [www.medicalnewstoday.com/printerfriendlynews.php?newsid=76400](http://www.medicalnewstoday.com/printerfriendlynews.php?newsid=76400) on 8/12/2007.

Ting, H, et al. Implementation and Integration of Prehospital ECGs into Systems of Care for Acute Coronary Syndrome: A Scientific Statement from the American Heart Association Interdisciplinary Council of Quality of Care and Outcomes Research, Emergency Cardiac Care, Cardiovascular Nursing, and Council on Clinical Cardiology. *Circulation*. 118:1066-1079. 2008.

Widimsky, P. et al. Long Distance Transport for Primary Angioplasty vs Immediate Thrombolysis in Acute Myocardial Infarction: final Results of the Randomized National Multicentre Trial – PRAUGE-2. *European Heart Journal* (24: 94-104) 2003.

Widimsky, P, Budesinsky, D. V., et al. Long Term Outcomes of Patients with Acute Myocardial Infarction Presenting to Hospitals Without Catheterization Laboratory and Randomized to Immediate Thrombolysis or Inter-hospital Transport for Primary Percutaneous Intervention: Five Years Follow-up of the PRAGUE-2 Trial. *European Heart Journal*. (29:678-684). 2007.

Zanini, R. et al. Impact of Prehospital Diagnosis in the Management of ST-Elevation Myocardial Infarction in the Era of Primary Percutaneous Coronary Intervention: Reduction of Delay and Mortality. *Journal of Cardiovascular Medicine*. 9;570-575. 2008.

Additional References added November 9, 2009

- *Circulation*. 2006, 113:1189-1195. Nammamothu, Bates, Wang, Bradley, Krumholz.
- *Journal of Emergency Medicine*. 2004, November;27(4):345-353. Anderson, Mitchell, Fish, Feldman.  
NJDHSS, Center for Health Statistics, 2009
- *CJEM*. 2009, January;11(1):29-35. Caudle, Piggott, Dostaler, Graham, Brison.
- *Catheter Cardiovascular Intervention*. 2009, August 31. Rao, Kardouh.  
*Care*. 2006, July-September; 10(3):374-377. Goldsten, McEachin, Swor, Heferberg

- CJEM. 2009, September; 11(5): 473-480. Skull, et al.