

Region III STEMI Plan

I. Plan Goals

- A. To develop a Region III STEMI System that when implemented, will result in decreased mortality and morbidity in the MIEMSS Region III. In order to accomplish this, a number of specific processes are essential. These are:
1. The ability to rapidly and accurately identify patients suffering from STEMI. This term used throughout the plan refers to the current STEMI definition by the American College of Cardiology (ACC) and American Heart Association (AHA), ST-Elevation Myocardial Infarction.
 2. If possible patients who have sustained a STEMI event should receive care in a hospital that has a primary percutaneous coronary intervention program [pPCI] in place which is capable of providing immediate and comprehensive assessment, resuscitation, intervention, and definitive care. Additionally, receiving hospitals must provide access to rehabilitation programs and participate in data collection.
 3. Continuous and effective region-wide coordination of pre-hospital and hospital care resources, so that STEMI patients will be most expeditiously transported to the closest available cardiac interventional center. This process requires a method of tracking the interventional care capabilities for STEMI patients and reviewing the quality of the process itself.
 4. An ongoing and effective Quality Improvement (QI) Program, in order to assure continuing appropriate function in providing the highly specialized care necessary in the management of STEMI. This program will include evaluation of: pre-hospital management, hospital management, and overall system function. Collection of a standard pre-hospital dataset will be required. Hospitals will meet MHCC and MIEMSS regulatory requirements for data collection.
- B. The goal is that no greater than 90 minutes lapses between the 9-1-1 call time (E) and the time that the patient undergoes PCI (B) for a minimum of 75% of STEMI cases in Region III.

II. Regional STEMI Plan Overview

- A. A Region III STEMI Committee comprised of the regional leaders in EMS, Emergency Medicine, and Cardiology has developed a plan for a Regional STEMI System that meets the goals set forth in the previous section. The components, to some degree, have separate and individual identities and functions; however there should be an

understanding, a desire, and willingness to work together in a unified effort to reach the end result.

- B. Systems require oversight of project concept, overall responsibility, developmental aspects, implementation, and evaluation of continuing activities. The Maryland Institute for Emergency Medical Services Systems has the responsibility for coordinating pre-hospital EMS activities throughout the State of Maryland.
- C. The Regional STEMI System involves the organization of already existing resources into a program providing comprehensive care for STEMI patients through all phases of their management from the moment of onset through rehabilitation. The two basic patient management components of this system are the pre-hospital providers and individual hospital organizations.
- D. The system function involves the establishment and implementation of the STEMI protocol from The Maryland Medical Protocols for EMS Providers and STEMI triage criteria included in this Plan. Based upon need, modifications and additions may be developed by the Region III STEMI Committee.
- E. Hospitals participating in this system and receiving STEMI system patients will have organized response systems, including:
 - 1. equipment and facilities
 - 2. trained and committed personnel
 - 3. organized management protocols.
- F. The Emergency Department plays a critical role in STEMI management. Rapid availability of a cardiologist and the ability to perform interventional cardiology care are pivotal services in determining the survival and recovery of STEMI patients. Emergency Medicine and Cardiology leadership of hospital STEMI programs is therefore essential in order for hospitals to participate in the STEMI System. This leadership role must be clearly defined within the Hospital STEMI Plan along with specific appropriate authority to carry out that leadership role. Evidence of continuing leadership should be demonstrated through emergency physician and cardiologist participation in the Regional STEMI System activities and through the individual hospital QI programs.

III. Region III STEMI Committee

- A. The Region III STEMI Committee will be responsible for the implementation of this plan. Committee membership will be comprised of representatives from the following groups:
 - 1. Cardiac Interventional Centers (CIC) Hospitals:

- a. Cath team members
- b. Emergency Physicians
- c. Cardiologists
- d. Hospital Administration
- e. Emergency and/or STEMI Nursing
- f. Data Coordinators

2. Non CIC Hospitals:

- a. Emergency Physicians
- b. Cardiologists
- c. Hospital Administrators
- d. Emergency Nurses

3. Pre-Hospital Jurisdictions:

- a. Pre-hospital EMS Providers
- b. EMS Service Leadership

4. Other Representation:

- a. Regional and Jurisdictional EMS Medical Directors
- b. MIEMSS Regional Administrators
- c. MIEMSS Office of Hospital Programs

B. The duties of the Region III STEMI Committee include the review of the overall function of the STEMI program including hospital and pre-hospital activities. This review will evaluate the adequacy of these various activities and aid in the development of system function reports and recommendations regarding the hospital or pre-hospital components or functions, including responsibilities, standards, and activities. If recommendations directly involve pre-hospital aspects of the STEMI program they will be referred to the Office of the State EMS Medical Director. Recommendations for hospital aspects will be referred to the Office of Hospital Programs for review.

IV. Regional STEMI System: Components and Organization

A. Pre-hospital Component

1. EMS Units are an integral part of the Regional STEMI System. All EMT Basics, Intermediates and Paramedics need to have a basic knowledge and awareness of the Regional STEMI System elements and system function. This specifically refers to the activation criteria (identification of a STEMI) and communications procedures.

2. On-line and off-line medical control physicians within the Region will also need to be aware of the Regional STEMI System elements and system function.

B. Hospital Component

1. Each CIC must have an Emergency Physician and Cardiologist responsible for oversight of the STEMI Program. This responsibility includes:
 - a. Maintain compliance with MIEMSS and MHCC standards for CIC designation and provision of primary PCI services respectively.
 - b. Oversight responsibility for the Hospital STEMI QI Program and participation in Regional STEMI System administrative and QI activities as per the Regional STEMI Plan, including data collection and reporting.
2. Each Non CIC must:
 - a. Establish and maintain basic STEMI treatment plans / clinical pathways to evaluate the appropriateness of thrombolytic therapy versus patient transfer to a CIC.
 - b. Establish and maintain transfer agreements with CIC's in accordance with the 90 minute 9-1-1 to Balloon time goal for a minimum of 75% of all cases.
 - c. Participate in Regional STEMI System QI activities as per the Regional STEMI Plan, including data collection and reporting.

C. Communications Component

1. Communications are critical to the function of the STEMI System. Communications provide:
 - a. essential knowledge of the overall status of pre-hospital STEMI activities and hospital resource availability on a continuous basis
 - b. access to system organization and function protocols whenever such information is requested by pre-hospital personnel or hospital based personnel
 - c. a link between the pre hospital providers and CIC's for the rapid exchange of information including 12 lead ECG findings resulting in efficient pre-hospital care provision and hospital preparation for STEMI patient arrival
 - d. collection of uniform System-wide data for QI activities.
2. Providing all of these functions to the entire System on a continuous basis requires a central communications facility with constant communications capabilities to all pre-hospital units and participating hospitals, plus the ability to immediately and directly link the pre-hospital providers to CIC's. This central communications will be facilitated by the existing Emergency Medical Resource Center (EMRC). EMRC

maintains knowledge of the functional status of all system hospitals at all times and establishes a communication link between the EMS provider and receiving facility.

D. Data / Quality Improvement Component

1. This component is essential for function of the Regional STEMI System. There is a need to evaluate the system function to determine continuing effectiveness in the management of STEMI. The Region III STEMI QI Subcommittee will be established with the goal of reviewing regional STEMI program activities for appropriateness, quality, and quantity of activities. This component should examine overall STEMI emergencies, care and outcomes, and provide information for use in determining and developing STEMI teaching programs, as well as information for use in potential STEMI research studies. The QI Subcommittee will develop and maintain a STEMI QI Dataset intended to fulfill the goals of this component as defined by the subcommittee. This dataset shall include, but not be limited to, data components from:
 - a. CAD
 - b. Pre-hospital patient care reports
 - c. CIC's data and EMS feedback reports
 - d. Non-CIC data and EMS feedback reports

2. The STEMI QI Subcommittee will document continuing function and allow the implementation of improvements to the Regional STEMI System. This program will be Region-wide, with the individual EMS jurisdictions and hospitals performing their own QI evaluations and reporting to the Region III STEMI QI Subcommittee. The appropriateness, quality and quantity of all activities in the system must be continuously monitored in the areas of pre-hospital care, medical care of the patients in the hospitals and overall system function. The following basic QI processes should be considered by each individual entity:
 - a. Assignment of a QI manager to oversee the organizational process and coordinate all STEMI system QI activities.
 - b. Development of a written QI program to evaluate STEMI patient care.
 - c. Establishment of a QI data collection method
 - d. Completion of QI evaluations by the individual system participants. Cases to be evaluated include specific automatic criteria such as major complications and death, as well as those cases which are requested for review by those involved in the care of the patient.
 - e. Determination of the presence (or absence) of QI issues through the data evaluation process.
 - f. The provision for an appropriate feedback mechanism for STEMI cases initiated in the pre-hospital EMS setting.
 - g. Development and implementation of corrective action plans

h. Re-evaluation of the efficacy of the corrective action plan.

V. STEMI System Activation Criteria

A. The STEMI System may be activated for patients based upon the following:

1. Pre-hospital EMS provider identification of a STEMI based upon 12-Lead ECG interpretation and clinical evaluation of the patient.
2. The transmission of a 12-Lead ECG to a CIC hospital, which is in turn determined to be indicative of a STEMI.

B. The pre-hospital EMS jurisdictions within Region III that are currently transmitting 12-Lead ECGs to CIC's are identified in Appendix A of this plan.

C. The pre-hospital EMS jurisdictions within Region III do not currently have 12-Lead ECG transmission capabilities to CIC's are identified in Appendix A of this plan. These jurisdictions activate the hospital STEMI team based upon pre-hospital EMS provider interpretation.

VI. SYSTEM OPERATIONS

A. System operations refers to the activities that occur once it is determined a patient meets system activation criteria and communications has been established within the system. These activities include CIC destination determination, continuing communications, provision of field care, patient transport, and CIC management.

1. Hospital Destination

- a. Hospital destination will be determined by the closest available CIC, provided that the Center is not greater than 30 minutes farther than the nearest hospital emergency department. A current list of CIC's in and adjacent to Region III can be found in Appendix B of this plan.
- b. Current hospital alert status should not be considered in the determination of hospital destination.
- c. Air transportation should be considered for STEMI patients who are greater than a 30 minute drive time from the nearest CIC and if it will save time.
- d. Dual consultation with the CIC and local emergency department may be used.
- e. If due to extenuating circumstances a patient can not reach a CIC within 30 minutes by either ground or air, the patient should be taken to the nearest hospital emergency department.

- f. Any significant patient condition changes are to be communicated directly to medical direction at the receiving hospital as those changes may result in an alteration of the destination hospital STEMI Team activation.
 - g. If the patient is or becomes unstable (inadequate spontaneous ventilations without a secured airway or in cardiac arrest) the patient should be transported to the closest hospital.
2. Transportation
- a. Consider air (medevac) transportation if the patient will arrive at the designated Cardiac Intervention Center more quickly than by ground transportation. Consider medevac transportation if ground transportation would deplete limited EMS resources in the community.
 - b. If neither ground nor air transportation of a STEMI patient to a designated Cardiac Interventional Center is achievable within an acceptable amount of time according to protocols, the STEMI patient shall be transported to the nearest emergency department. Adverse weather, heavy traffic, and medevac availability may impact the ability to deliver a STEMI patient directly to a designated Cardiac Interventional Center.
 - c. Any significant patient condition changes are to be communicated directly to medical direction at the receiving hospital as those changes may result in an alteration of the destination hospital STEMI Team activation.
 - d. If the patient is or becomes unstable (inadequate spontaneous ventilations without a secured airway or in cardiac arrest) the patient should be transported to the closest hospital.
3. Interfacility Transfers
- a. In the event that a STEMI patient is received by a non CIC hospital or a CIC hospital without current capacity for the patient, it is the responsibility of the referring hospital to acquire appropriate transportation to a CIC hospital.
 - b. The emergency department may make use of
 - i. a licensed commercial medevac OR Maryland State Police medevac if commercial service is unavailable and as long as appropriate *staffing and equipment is available”
 - ii. or a licensed commercial specialty care ground transport ambulance service.
 - c. If these services are not available in a clinically reasonable time;
 - i. a licensed commercial ground ALS ambulance service may be used as long as appropriate *staffing and equipment”² are provided.
 - ii. A jurisdictional ALS ambulance as long as appropriate *staffing and equipment”
 - iii. See appendix C
 - d. The method of transportation shall be based the patient’s needs and the mode that will most rapidly deliver the patient to the CIC.

- e. The transferring hospital should maintain access to the current MD Medical Protocols for EMS Providers and the scope of practice for pre-hospital EMS providers when preparing a STEMI patient for transfer.
- f. Any significant patient condition changes during patient transfer are to be communicated directly to medical direction at the receiving CIC as those changes may result in an alteration of the destination hospital STEMI Team activation.

Appendix A

12-Lead ECG Transmission Capabilities

- I. The following Region III EMS Jurisdictions currently transmit 12-Lead ECGs to CIC's using the Lifenet System:
 - A. Annapolis City EMS
 - B. Anne Arundel County EMS
 - C. Baltimore City EMS
 - D. Baltimore County EMS
 - E. Carroll County EMS
 - F. Harford County EMS
 - G. Howard County EMS

- II. The following Region III EMS Jurisdictions do not currently transmit 12-Lead ECGs to CIC's:
 - A. BWI Airport EMS

Appendix B

CIC and Non CIC Hospitals

1. CIC hospitals (STEMI Receiving Centers) within Region III include the following:
 - a. Anne Arundel Medical Center
 - b. Baltimore Washington Medical Center
 - c. Carroll Hospital Center
 - d. Franklin Square Hospital Center
 - e. Howard County General Hospital
 - f. Johns Hopkins Bayview Medical Center
 - g. Johns Hopkins Hospital
 - h. Sinai Hospital
 - i. St. Agnes Hospital
 - j. St. Joseph Medical Center
 - k. Union Memorial Hospital
 - l. University of Maryland Medical Center
 - m. Upper Chesapeake Medical Center

2. Non CIC hospitals (STEMI Referral Centers) within Region III include the following:
 - a. Bon Secours Hospital
 - b. Greater Baltimore Medical Center
 - c. Good Samaritan Hospital
 - d. Harbor Hospital
 - e. Harford Memorial Hospital
 - f. Maryland General Hospital
 - g. Mercy Medical Center
 - h. Northwest Hospital

3. CIC hospitals outside of Region III that may receive EMS STEMI patients include the following:
 - a. Frederick Memorial Hospital

4. Out of State CIC hospitals that may receive EMS STEMI patients from Region III include the following:
 - a. Christiana Hospital, Newark, DE

Appendix C

EMS Operational Program use as Interfacility Transport

B. A jurisdictional EMS operational program may not provide interfacility specialty care transport from one hospital to another unless:

(1) Approved as a specialty care transport ambulance service; or

(2) The following conditions are met:

(a) A licensed or specialty care transport ambulance service is not available within a clinically reasonable time, as determined by the referring physician;

(b) Health care providers authorized by law to provide the level of care required are available to staff the ambulance; and

(c) Required specialty equipment is available.