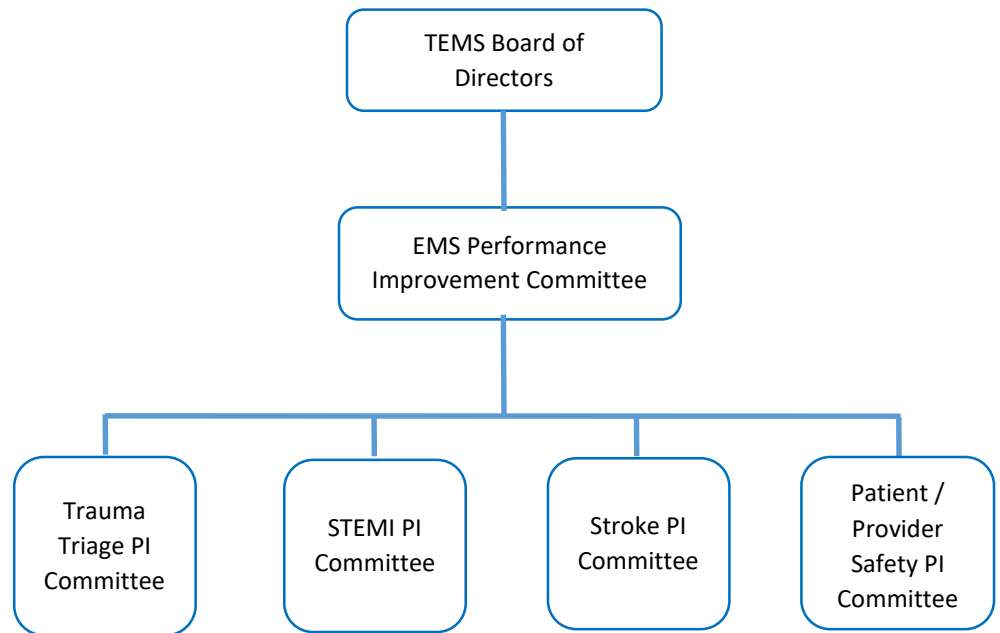


## Tidewater EMS (TEMS) Regional EMS Performance Improvement (PI) Plan

### Vision

The EMS Performance Improvement (PI) Committee, under direction of the Board of Directors (BOD) Committee, is responsible for assuring and improving the quality of pre-hospital care within EMS systems that are served by the TEMS council. This Committee bridges communication between the PI Committees and the BOD.

Performance Improvement Organizational Chart



### TEMS Information

[The TEMS Region](#) – Includes information regarding the layout, demographics and weather  
[TEMS Hospital Capabilities](#) – Includes all hospitals TEMS agencies transport patients to for Stroke, STEMI, and Trauma care.

### Objectives

*Performance Improvement* means measuring the output of a particular business process or procedure, then modifying the process or procedure to increase the output, increasing efficiency, or increasing the effectiveness of the process or procedure. Within compliance of the Code of Virginia and EMS Regulations, the objectives of this plan are to:

- Δ Share best practices, provide transparency and discuss issues identified within each PI Committee
- Δ Collect patient care statistics to evaluate system effectiveness and identify trends
- Δ Make evidence based practices recommendations to drive changes in the region
- Δ Promote the development of standardized data collection and analysis and provide data to stakeholders
- Δ Support, oversee and provide constructive feedback and direction to TEMS PI Committees
- Δ Monitor the use of Medical Incident Review (MIR) to continuously study and improve processes, systems, and organizations. Provide solutions to resolve identified patient care issues.
- Δ Broadly analyze the components of community health using data from hospitals and prehospital agencies, so comprehensive care at the right time and at the right place is ensured
- Δ Identify educational needs of EMS providers of the region through benchmarking/highlighting significant findings and through qualitative/quantitative measures
- Δ Performance Improvement request may be submitted by Operating Medical Director's (OMD), Medical Operation Committee (MOC), and Board of Director (BOD), or any committee

### Performance Indicators

In 2007, performance indicators were added to enhance quality improvement initiatives and facilitate consistency in performance expectation. They are a means of following identified performance benchmarks through the performance improvement process. Obtaining final outcome data from local hospitals to include

diagnosis, significant findings, and discharge status dramatically increases and enhances the quality and performance improvement capabilities throughout the TEMS region. Performance indicators were developed to increase documentation reliability throughout the region and should be used as a template for patient care documentation related to specific protocols. Compliance enables the regional council and local EMS/Fire agencies to obtain a valid snapshot of how any given agency is performing with regards to specific protocols. Ultimately improving the consistency and quality of prehospital patient care.

### Membership / Responsibilities

The EMS PI Committee shall be comprised of the Chair and Vice-Chair for each PI Committee (Patient and Provider Safety, STEMI, Stroke, and Trauma) and the Education and Training Committee and is served by TEMS.

1. Members of the EMS PI Committees are charged with the responsibility of assuring that reasonable standards of care and professionalism are met within our EMS system. Members are given the following responsibilities:
  - o Maintain active membership, which is defined as 75% attendance by each committee member and/or their designee at all meetings
  - o Act as liaison to all local EMS agencies, committees and hospitals
2. The chairperson of the EMS PI Committee shall be responsible for:
  - o Final decisions and actions of the PI Committee
  - o Be an active member of the STEMI, Stroke, Trauma, or Provider/Patient Safety PI Committee
  - o Draft all letters of recommendations to local EMS agencies, hospitals, Operating Medical Director's (*OMD*), Medical Operation Committee (*MOC*), or Board of Director (*BOD*)
  - o Provide an executive summary to the Operating Medical Director's (*OMD*), Medical Operation Committee (*MOC*), and Board of Director (*BOD*)
3. Maintain strict confidentiality of patient, provider, and personnel information. Communication with other entities of the system is essential; specifically, when a problem is identified within the system such as: skills, critical thinking, documentation, equipment, protocol deviation or other general issues. The committee informs the appropriate agency and elicit input for possible solutions while making all reasonable efforts sanitize records and maintain patient anonymity
4. Meetings are held on an 'as needed' basis beginning January 2021

## Tidewater EMS (TEMS) Regional STEMI Performance Improvement Plan – 2021

### Vision

To develop a STEMI Emergency Care System that decreases cardiac mortality and morbidity in the TEMS region.

### TEMS Information

[The TEMS Region](#) – Includes information regarding the layout, demographics and weather

[STEMI PI Committee Membership](#) – Includes purpose, roles, responsibilities and membership

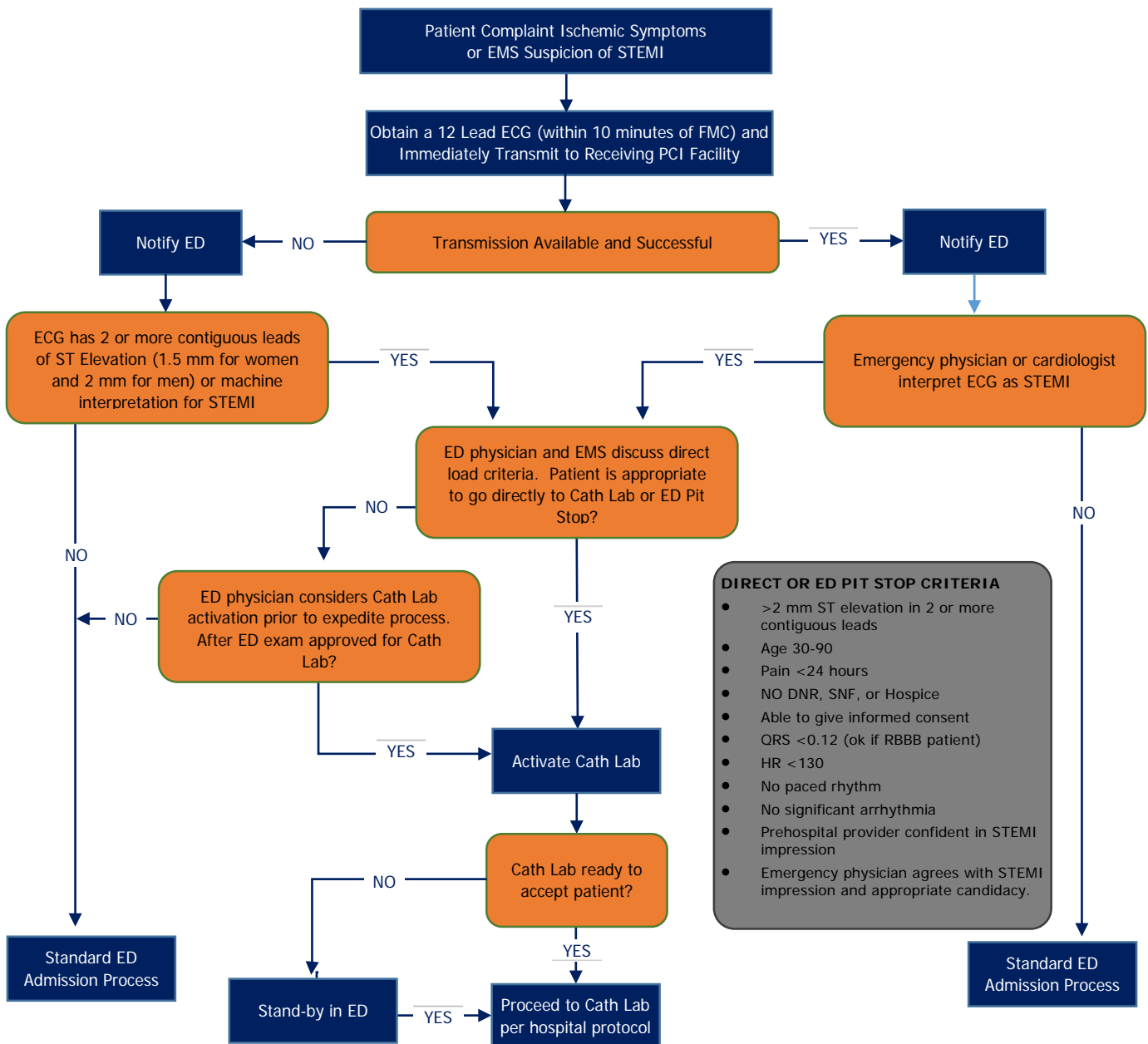
[Hospital Capabilities by Region](#) – Includes easily identified, STEMI receiving hospitals

### Goals

This Regional plan is assigned to the STEMI PI Committee for development, updating, monitoring, and working within the STEMI Systems of Care located on [www.heart.org](http://www.heart.org). Data has shown both morbidity and mortality are optimized when rapid interventional reperfusion is done within ninety minutes of EMS first medical contact (FMC); therefore, ST-Elevation Myocardial Infarction (STEMI) patients should be recognized as quickly as possible. Within compliance with the Code of Virginia and EMS Regulations, this plan:

- Δ Utilizes 12-lead ECG and pre-hospital notification to the receiving facility in tandem to reduce time to reperfusion
  - If ECG is unable to be transmitted, provider should deliver a hard copy to the ED with the patient
- Δ Patients must receive care in a hospital that has a STEMI treatment program in place, which is capable of providing immediate and comprehensive assessment, resuscitation, intervention, and definitive care
- Δ EMS personnel must be trained to accurately recognize, treat and transport STEMI patients rapidly
- Δ The Tidewater EMS Council must have continuous and effective region-wide coordination of pre-hospital and hospital care resources to ensure an expeditious transport to the closest available interventional center or facility capable of performing percutaneous coronary intervention (PCI)
- Δ Track and monitor the care capabilities by meeting at least quarterly with prehospital providers, emergency physicians, interventional cardiologists, nursing staff, receiving hospital representatives, and other appropriate individuals
- Δ Provide quality EMS service and patient care to the EMS Systems' citizens.
- Δ Review the quality of the process through continuous evaluation of the EMS System based on established STEMI EMS performance measures
- Δ Although physicians in the emergency departments will confirm this diagnosis, pre-hospital care providers are competent to apply STEMI diagnostic criteria by using their 12-lead monitor defibrillators to recognize a STEMI
- Δ ALS providers are proficient in pain management
- Δ Follow the Chest Pain/Acute Coronary Syndrome protocol for Goals, Treatment, Special Considerations and decision scheme and reference the 12-Lead ECG protocol for indications and procedure
- Δ Designates the [STEMI PI Committee Membership](#) responsible for execution

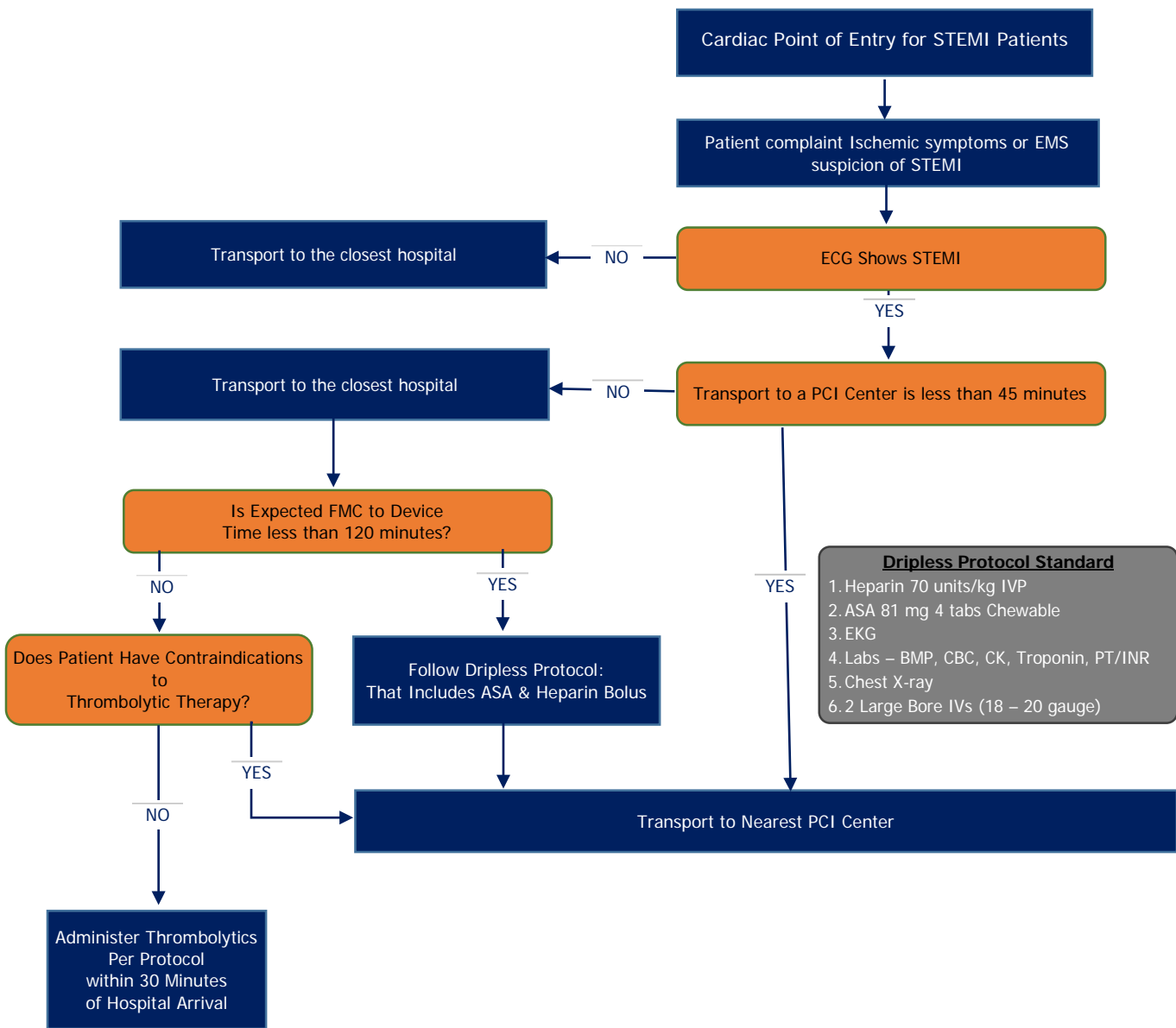
## Action Plan: Field Triage Decision Scheme



The purpose of this decision scheme is to:

1. Minimize the time from symptom onset to coronary reperfusion.
2. Rapidly identify potential STEMI patients by performing a timely 12-lead ECG per protocol.
3. Quickly recognize a STEMI by 12-lead ECG either by monitor interpretation for BLS providers or by recognition by ALS providers.
4. Early notification and transmission of 12-lead ECG insures timely Catheter Lab Team activation.
5. Rapidly identify the best Primary PCI Hospital/ STEMI-Receiving Center destination for the patient.
6. Minimize scene time to 15 minutes or less (including obtaining and transmitting a 12-lead ECG)

## Non-PCI to PCI Algorithm



### Inter-hospital transfer:

- Δ Establish single phone call to activate the interventional team and transportation
- Δ Travel time <45 minutes = Ground; >45 minutes = Helicopter
- Δ Arrival time from dispatch: Ground arrives within 30 minutes; Helicopter arrives within 45 minutes
- Δ Cath lab team is available within 30 minutes of notification

## Mission: Lifeline – EMS Measurement Criteria

Each EMS system should maintain a standardized algorithm for evaluating and treating patients with symptoms suggestive of myocardial ischemia. The reporting measures give insight into possible gaps in care that warrant a stronger focus as well as planning for future measures. Current metrics include:

- Δ % non-traumatic chest pain/ACS symptoms in patients  $\geq 35$  y/o, treated and transported by EMS who:
  - Received a pre-hospital ECG
  - % 12-Lead performed  $\leq 10$  minutes of FMC (85% target)
  - Transmission  $\leq 12$  minutes of obtaining ECG
  - Received aspirin: either by EMS or self-administration
- Δ % hospital notifications or 12-lead ECG transmission suggesting a STEMI alert performed  $\leq 10$  minutes of first STEMI positive 12-lead ECG in the field
- Δ % patients treated and transported directly to STEMI Receiving Center, with EMS FMC/arrival to device time  $\leq 90$  minutes (75% target) and/or EMS FMC/arrival to PCI  $\leq 120$  minutes (25% target) when transport time  $\geq 45$  minutes and Door to Balloon  $\leq 30$  minutes
  - % EMS FMC to PCI (75% target)
- Δ % STEMI patients treated and transported directly to a STEMI referring hospital, for reperfusion:
  - With a Door to Needle time of  $\leq 30$  minutes – OR –
  - Initial EMS FMC to PCI of the transfer for PCI patients  $\leq 120$  minutes
- Δ % of adult Out-Of-Hospital Cardiac Arrest (of suspected etiology), with ROSC in the field, with ROSC maintained to the ED, who has a 12 Lead ECG acquired
  - 12 lead obtained for sustained ROSC
  - Sudden Cardiac Arrest survival rate per Utstein parameters

## Mission: Lifeline

All hospitals should consider being a part of [Get With The Guidelines \(GWTG\) Mission: Lifeline](#) program established by the American Heart Association, which tracks % ASA, % Beta Blocker; % High Intensity Statin; % ACE/ARB at Discharge; Cardiac Rehabilitation Referral from an Inpatient Setting (75% target for all)

All agencies should follow the [STEMI Systems of Care](#) guidelines

- Δ There should be on-going multidisciplinary team meetings that include EMS, non-PCI hospitals/STEMI Referring Centers, and PCI hospitals/STEMI-Receiving Centers to evaluate outcomes and quality improvement data. Operational issues should be reviewed, problems identified, and solutions implemented
- Δ Each STEMI System should include a process for pre-hospital identification and activation, destination protocols to STEMI Receiving Centers, and transfer for patients who arrive at STEMI Referring Centers and are primary PCI candidates, and/or are fibrinolytic ineligible and/or in cardiogenic shock
- Δ Each system should have a recognized system coordinator, physician champion, and EMS medical director
- Δ Each system component (EMS, STEMI Referring Centers and STEMI-Receiving Centers) should meet the appropriate criteria listed above

## Destination Protocols

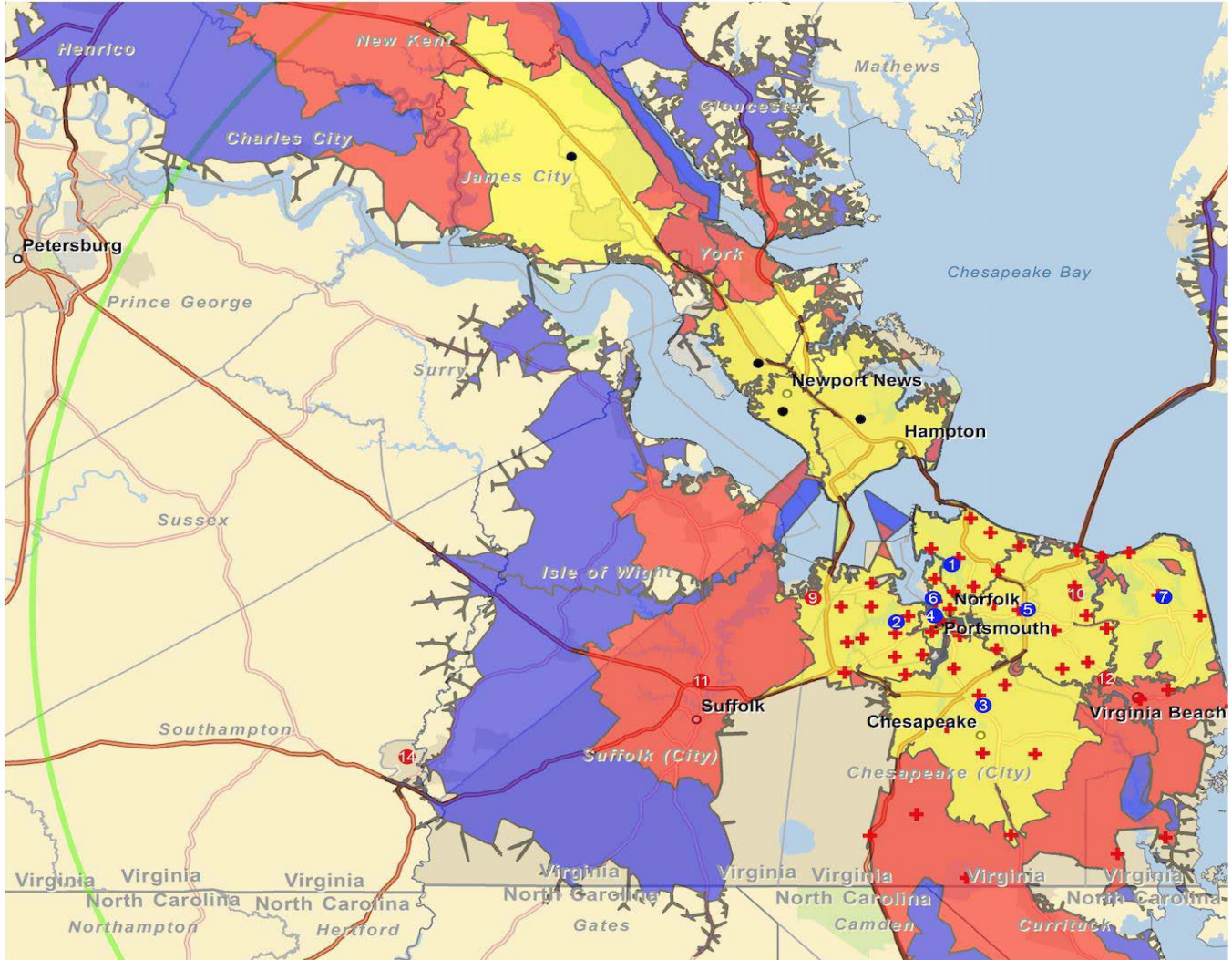
- Δ Bypassing PCI Referring centers when transport is  $< 30$  minutes; to achieve primary PCI within 90 minutes
- Δ Emergency transfer by EMS or other agencies to a STEMI-Receiving Center of patients with STEMI who transport themselves to a STEMI Referring Center
- Δ Air transport patients with anticipated long transport times and/or fibrinolytic ineligible and/or in cardiogenic shock

- Δ Administration of fibrinolytic therapy prehospital or in STEMI Referring Center for fibrinolytic eligible patients with time to primary PCI >90 minutes
  - Δ Emergency transfer to STEMI Receiving Center of patients who develop STEMI while in a non-PCI hospital
- Non-PCI Hospital/ STEMI Referring Center
- Δ Each ED should maintain a standardized reperfusion STEMI care pathway that designates primary PCI as the preferred reperfusion strategy if transfer of patients to a primary PCI hospital/STEMI-Receiving Center can be achieved within times consistent with ACC/AHA guidelines (within 120 minutes from arrival to referring hospital to PCI)
  - Δ Each ED should maintain a standardized reperfusion STEMI care pathway that designates fibrinolysis in the ED (for eligible patients) when the system cannot achieve times consistent with ACC/AHA guidelines for primary PCI
  - Δ If reperfusion strategy is for primary PCI transfer, a streamlined, standardized protocol for rapid transfer and transport to a STEMI-Receiving Center should be operational
  - Δ If reperfusion strategy is for primary PCI transfer, all patients should be transported to the most appropriate STEMI-Receiving Center where the expected first door-to-balloon (first device used) time should be within 90 minutes (considering ground versus air transport, weather, traffic)
  - Δ The STEMI Referring Center should have an ongoing quality improvement process, including data measurement and feedback, for the STEMI population and collect and submit Mission: Lifeline required data elements in GWTG
  - Δ A program should be in place to track and improve treatment (acutely and at discharge) with ACC/AHA guideline based Class I therapies

Primary PCI Hospital/ STEMI-Receiving Center

- Δ Protocols for triage, diagnosis and Cardiac Catheterization Laboratory (Cath Lab) activation should be established within the primary PCI hospital/STEMI-Receiving Center
- Δ A single activation phone call should alert the STEMI team
- Δ Criteria for EMS activation of the Cath Lab should be established in conjunction with EMS offices
- Δ The STEMI-Receiving Center should be available 24 hours/7 days a week to perform primary PCI
- Δ The Cath Lab staff including interventional cardiologist should arrive within 30 minutes of activation call
- Δ There should be universal acceptance of STEMI patients (no diversion). There should be a plan for triage and treatment for simultaneous presentation of STEMI patients
- Δ Interventional cardiologists should meet ACC/AHA criteria for competence and perform at least 11 primary PCI procedures per year and 75 total PCI procedures per year
- Δ The STEMI-Receiving Center should meet ACC/AHA criteria for volume and perform a minimum of 36 primary PCI procedures and 200 total PCI procedures annually
- Δ The STEMI-Receiving Center should participate in the Mission: Lifeline-approved data collection tool, GWTG
- Δ A program should be in place to track and improve treatment (acutely and at discharge) with ACC/AHA guideline based Class I therapies
- Δ There should be a recognized STEMI-Receiving Center liaison/system coordinator to the system and a recognized physician champion

## Tidewater EMS STEMI Region



### EMERGENCY MEDICAL SERVICES

+ EMERGENCY MEDICAL SERVICES

### DRIVE TIME TO PPCI HOSPITAL

15 minutes

30 minutes

45 minutes

### HELICOPTER FLIGHT RADIUS

60



## Definitions

**12-Lead electrocardiogram (ECG)** – a test using a device that measures the electrical activity of the heartbeat and can help medical personnel determine if a heart attack has occurred and whether the heart attack was a STEMI or non-STEMI event. When a 12-lead ECG is done, 10 wires ("leads") are attached to the arms, legs and chest. These wires each record electrical impulses, but from a different position in relation to the heart.

**Acute Myocardial Infarction (AMI)** – the medical term for a heart attack, which occurs when the blood supply to part of the heart muscle itself - the myocardium - is severely reduced or stopped.

**Angioplasty aka Balloon Inflation** – a procedure used to treat patients with a partially or completely blocked artery that restricts blood flow through the heart. A type of percutaneous coronary intervention (PCI), this procedure requires a slender balloon-tipped tube to be threaded from an artery in the groin to a trouble spot in the artery of the heart. The balloon is inflated, which compresses the blockage and widens the narrowed artery to restore blood flow.

**Cath Lab** – the department in a medical facility that specializes in cardiac catheterization, which is a procedure to examine blood flow to the heart and test how well the heart is pumping.

**Cardiogenic shock** – inadequate organ perfusion due to low heart output. This condition is frequently a precursor to death, and can be recognized by the presence of hypotension (systolic blood pressure of 90 mmHg or less) in the setting of a myocardial infarction.

**Diversion plan** – an emergency medical service protocol to divert patients with ST elevation myocardial infarction from the closest non-PCI hospital to a PCI capable hospital. Diversion protocols are particularly useful when patients have a contraindication to fibrinolysis, or first medical contact to device deployment at the PCI hospital can be achieved within 90 minutes on a consistent basis.

**Door-to-Balloon Time (D2B)** – the amount of time between a heart attack patient's arrival at the hospital to the time he/she receives percutaneous coronary intervention (PCI), such as angioplasty.

**Door-to-Needle Time (D2N)** – the amount of time between a heart attack patient's arrival at the hospital to the time he/she receives clot-busting medications, referred to in medical terms as fibrinolytics or thrombolytics.

**Electrocardiogram (ECG/EKG)** – a recorded tracing of the electrical activity of the heart.

**Emergency Medical Treatment and Active Labor Act (EMTALA)** – a statute that governs when and how a patient may be (1) refused treatment or (2) transferred from one hospital to another when in unstable condition. The EMTALA was passed as part of the Comprehensive Omnibus Budget Reconciliation Act of 1986, and is sometimes referred to as "the COBRA law."

**Fibrinolysis** – the breakdown of fibrin, usually by the enzymatic action of plasmin. Fibrin is a protein necessary for blood clotting that forms a web-like mesh that traps red blood cells and platelets and holds clots together. In the case of myocardial infarction, the administration of drugs that facilitate fibrin breakdown is referred to as "fibrinolysis."

**Fibrinolytic Therapy** – the use of pharmaceuticals or injections of medication to break up a blood clot inside an artery or cavity of the heart so that blood flow can be improved or restored. Also called thrombolytics, this type of treatment is widely available at hospitals across the US.

**Fibrinolytic** – an agent used to facilitate fibrin breakdown by activating plasminogen.

**FMC-to-Device Time (FMC2D)** – the amount of time between EMS making First Medical Contact (FMC) with a heart attack patient in the pre-hospital system to device activation, or "balloon" time, which is the first attempt to mechanically open the culprit lesion and restore blood flow.

**Left Bundle Branch Block** – a condition in which ventricular contraction is not completely synchronized due to a block in conduction of an electrical impulse to the ventricles; in LBBB, right ventricular endocardial activation begins before, and is often completed before, initiation of left ventricular endocardial activation; *benign LBBB is rare*; preexisting LBBB in absence of clinical evidence of heart disease is rare.

**Percutaneous coronary intervention (PCI)** – a procedure used to open or widen narrowed or blocked blood vessels supplying the heart. The blood vessels are accessed through the skin over the leg (femoral) or arm (radial or brachial) arteries. A thin catheter is advanced over a soft-tipped guide-wire through the arterial tree to the base of the heart where the coronary arteries arise. A smaller guide-wire is then advanced into the coronary artery and across the blockage, followed by balloon-dilation catheters, stents, and other artery opening devices as needed.

**PCI-Capable Hospital** – a hospital that has the equipment, expertise and facilities to administer percutaneous coronary intervention (PCI), a mechanical means of treating heart attack patients.

**Point of Entry (POE)** – the part of the healthcare community where treatment of a patient begins, such as when emergency medical services arrive on the scene or the patient walks into the emergency department at a hospital.

**Reperfusion** – the restoration of blood flow to an organ or tissue that has had its blood supply cut off, as after a myocardial infarction.

**Reperfusion Therapy** – one or more techniques to restore blood flow to part of the heart muscle damaged during a heart attack. It may include clot-dissolving drugs (thrombolysis), balloon angioplasty or surgery.

**ST-elevation myocardial infarction (STEMI)** – a severe heart attack caused by a prolonged period of blocked blood supply that affects a large area of the heart. These attacks carry a substantial risk of death and disability and call for a quick response by many individuals and systems.

**STEMI Alert** – a communication from EMS personnel that provides early notification to a PCI Capable Hospital that a patient with a prehospital 12-lead interpretation of STEMI is in route to their institution.

**STEMI System** – an integrated group of separate entities focused on reperfusion therapy for STEMI within a region that typically includes emergency medical services (EMS) providers, at least one community (non-PCI or STEMI-referral) hospital and at least one tertiary (PCI- capable or STEMI-receiving) hospital. The system may include one or more of the following components: leadership teams of EMS, emergency medicine, cardiology, nursing and administration; standardized communication (i.e., STEMI alert system); standardized transportation; and data collection and feedback. Please note: In some systems, there may be a single hospital with PCI capabilities that has established protocols with EMS providers and contains at least one of the components stated above.

**Thrombolytics** – the use of pharmaceuticals or injections of medication to break up a blood clot inside an artery or cavity of the heart so that blood flow can be improved or restored. Also called fibrinolytic therapy, this type of treatment is widely available at hospitals across the United States.

**VHAC** – [Virginia Heart Attack Coalition](#)

## Tidewater EMS (TEMS) Regional Stroke Triage Performance Improvement (PI) Plan – 2021

### Vision

To develop a Stroke Emergency Care System that decreases mortality and morbidity in the TEMS region.

### TEMS Information

[The TEMS Region](#) – Includes information regarding the layout, demographics and weather

[Stroke Committee Membership](#) – Includes purpose, roles, responsibilities and membership

[Hospital Capabilities by Region](#) – Includes easily identified stroke center descriptions with names and location

### Goals

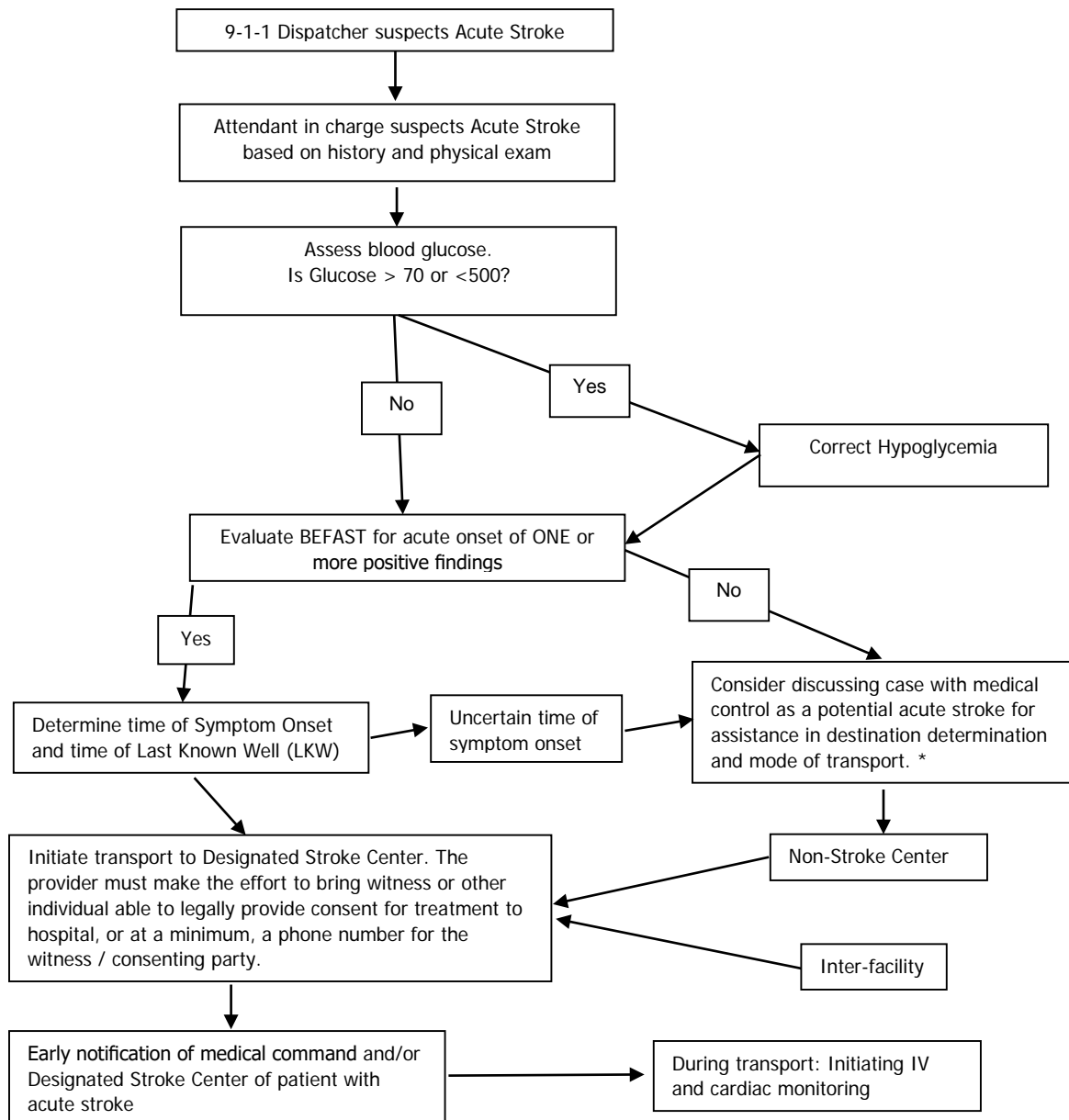
This Regional plan is assigned to the Stroke PI Committee for development, updating and monitoring and provides guidelines to facilitate the early recognition of “Acute Stroke Patients” and expedite transport to a Healthcare Facilities Accreditation Program (HFAP), Den Norske Veritas (DNV), or Joint Commission (JC) “certified” Designated Stroke Center within the specified time frame. Within compliance of the Code of Virginia and EMS Regulations, this plan:

- Δ Establishes a uniform set of criteria for pre-hospital and inter-facility triage and transport of acute stroke patients
- Δ Sets guidelines for rapidly and accurately identifying patients suffering from Stroke-like presentation
- Δ Promotes the transportation of patients to the closest Designated Stroke Center (DSC)
- Δ Provide a plan to transport to a DSC via ground transport, Medevac, or non-designated centers based on the operational criteria for each
- Δ Encourages quality EMS service and patient care provided to the EMS system’s citizens
- Δ Continuously evaluate the EMS system based on established EMS performance measures for Stroke and incorporates the minimum reporting standards set by [Mission: Lifeline](#)
- Δ Aggregate acute stroke triage findings on an intermittent basis, at a minimum annually, to assist EMS systems and the Virginia Stroke Systems Task Force improve the local, regional and Statewide Stroke Triage Plans
- Δ Follow the Cerebral Vascular Accident (CVA or Stroke) protocol for Goals, Treatment, Special Considerations and decision scheme and reference the Prehospital Stroke Exams protocol for procedure
- Δ Designates the [Stroke PI Committee](#) responsible for execution

### Stroke Related Resources

- Δ Virginia Stroke System Web page: <http://virginiastrokesystems.org/>
- Δ Virginia Office of EMS Stroke Web page: <http://www.vdh.virginia.gov/OEMS/Trauma/Stroke.htm>
- Δ JC: <http://www.jointcommission.org/CertificationPrograms/PrimaryStrokeCenters/>
- Δ DNV: <http://dnvaccreditation.com/pr/dnv/primary-stroke-center-certification.aspx>
- Δ HFAP: <https://www.achc.org/hfap.html>

## Action Plan: Field Stroke Triage Decision Scheme



\* If time from symptom onset is more than 4 hours, discuss case with on-line medical control as a potential "acute stroke patient" for additional guidance. Patients with specific acute stroke types may benefit from intervention up to 24 hours, although the sooner an acute stroke is treated, the better the potential outcome. Based on patient time of onset and discussion with Medical Control, consider whether use the helicopter EMS (HEMS) will offer potential benefit to the patient, either in **time to Designated Stroke Center**, or for critical care management expertise. EMS does not determine whether a patient is excluded from any or all therapeutic options. Final decisions regarding patient eligibility for any given intervention will be determined by the receiving physician(s).

## BEFAST Pre-Hospital Stroke Scale

All patients suspected of having an acute stroke should undergo a formal screening algorithm such as the BEFAST. Use of stroke algorithms has been shown to improve identification of acute strokes by EMS providers up to 30%. ANY, one or more, abnormal (positive) finding which is suspected or known to be acute in onset is considered an indicator of potential acute stroke.

B-(Balance)	BALANCE: Is the person experiencing a sudden loss of balance or coordination? Normal: Patient is free of balance or gait issues. Abnormal: Patient has a sudden or new loss of balance or gait.
E-(Eyes)	EYES: Is person having a sudden change in vision or trouble seeing? Normal: Patient has no change in vision or blindness. Abnormal: Patient has change in vision, blindness in field of vision, or a gaze to one side.
F-(Face)	FACIAL DROOP: Have patient smile or show teeth. (Look for facial asymmetry) Normal: Both sides of the face move equally or movement is normal for patient. Abnormal: One side of the patient's face droops or does not move.
A-(Arm)	MOTOR WEAKNESS: Arm drift (Have patient close eyes, extend arms, palms up for 10 seconds; if only leg is involved, have patient hold leg off floor for 5 seconds) Normal: Remain extended equally, drifts equally, or does not move at all. Abnormal: One arm drifts down when compared with the other.
S-(Speech)	Have the patient repeat, "You can't teach an old dog new tricks" Normal: Phrase is repeated clearly and correctly. Abnormal: Words are slurred (dysarthria) or abnormal (dysphasia) or none (aphasia).
T-(Time)	Time of SYMPTOM ONSET or LAST known to be NORMAL _____ If patient awakened with symptoms, when were they last known to be normal?

\* Results of the BEFAST should be documented on the patient's pre-hospital medical record.

### Specific Processes:

- Δ The ability to rapidly and accurately identify patients suffering from Stroke.
- Δ Patients who have sustained a Stroke event must receive care in a hospital that has a Stroke treatment program in place, which is capable of providing immediate and comprehensive assessment, resuscitation, intervention, and definitive care.
- Δ The Tidewater EMS Council must have continuous and effective region-wide coordination of pre-hospital and hospital care resources so that Stroke patients will be most expeditiously transported to the closest available interventional center or facility capable of performing neuro-endovascular procedures and neurosurgery; and, so that patient care can be provided in a manner that is both appropriate and timely, while establishing and maintaining continuity. To accomplish this there must be a method of tracking the care capability for Stroke patients and reviewing the quality of the process itself.
- Δ Provide quality EMS service and patient care to the EMS Systems' citizens.
- Δ Continuously evaluate the EMS System based on established Stroke EMS performance measures.
- Δ Benchmark analysis.

### Best Practices

- Δ Providers should gather information (e.g. history, etc.) that will assist physician(s) to evaluate the suitability for acute reperfusion therapy of any patient presenting with signs/symptoms that suggest stroke or ischemic chest pain
- Δ Fill out the [appropriate checklist](#) (located on page 11) **without delay** of treatment or transport and present it to the emergency department physician at the receiving facility

- △ Mode of transportation for Stroke patients who meet any of the criteria of the BEFAST Pre-Hospital Stroke Scale, indicative of an acute stroke, shall be transported to the **closest Designated Stroke Center**
  - Transport time, road and weather conditions should help determine best transport option
  - Use HEMS to lessen the time from scene to Stroke Center vs ground transport; within three hours of symptom onset (on-line medical control can alter the window of onset to treatment); and transport directly to a Designated Stroke Center
- △ Any patient with a compromised airway or impending circulatory collapse must be transported to the closest hospital Emergency Department, regardless of stroke readiness capability
- △ Initiate Rapid transport once acute stroke is suspected. Rapid Transport means shortening scene time and **DOES NOT mean transporting with red-lights and sirens**
- △ The benefit of reperfusion therapy decreases with time; consultation with on-line Medical Control is **STRONGLY** encouraged when patient will not arrive at a Designated Stroke Center within the three-hour window from symptom onset.
- △ Stroke Designation/Certification is voluntary and identifies hospitals that established and maintain an acute stroke program which provides a specific level of medical, technical, and procedural expertise for acute stroke patients as designated by Centers for Medicare & Medicaid Services (CMS) through JC or other accrediting bodies approved by CMS for this purpose
- △ Designation ensures that the hospital is prepared to provide definitive acute stroke care at all times and has an organized approach to providing clinical care, performance improvement, education etc.
- △ The TEMS council does not oversee the process for inter-facility transfer of patients, but hospitals should have guidelines and agreements developed and executed for acute stroke patients

### Evaluation Criteria

All reports are de-identified for confidentiality and compliance to the statewide plan.

- △ Stroke alert going to receiving centers
- △ % Last Known Well documentation
- △ % stroke with glucose reading
- △ Stroke on-scene time <15 minutes
- △ Over- and under- triage to Designated Stroke centers in comparison to the total number of acute stroke patients delivered to hospitals
- △ Helicopter EMS utilization
- △ Mission: Lifeline Stroke
  - % of patients with suspected stroke for whom advanced notification (Stroke alert) was provided to the destination hospital
  - % of patients with suspected stroke, treated and transported who had a documented LKW time

### Definitions

**Acute Stroke** – a patient suspected of having an acute cerebral ischemic event or stroke with the onset of any one symptom within the specified time frame

**Designated Stroke Center** – a hospital that achieved Primary Stroke Center Certification by the JC or equivalent accrediting body

## Tidewater EMS (TEMS) Regional Trauma Triage Performance Improvement Plan – 2021

### Vision

To develop an inclusive system, incorporating healthcare facilities, transportation, human resources, communications, and other identified components, that get the right patient to the right hospital in the shortest amount of time possible while maximizing resources. Thus improving the delivery of EMS and decreasing mortality, hospitalization, disability and morbidity in the TEMS region.

### TEMS Information

[The TEMS Region](#) – Includes information regarding the layout, demographics and weather

[Trauma Committee Membership](#) – Includes purpose, roles, responsibilities and membership

[Hospital Capabilities by Region](#) – Includes easily identified, STEMI receiving hospitals

### Goals

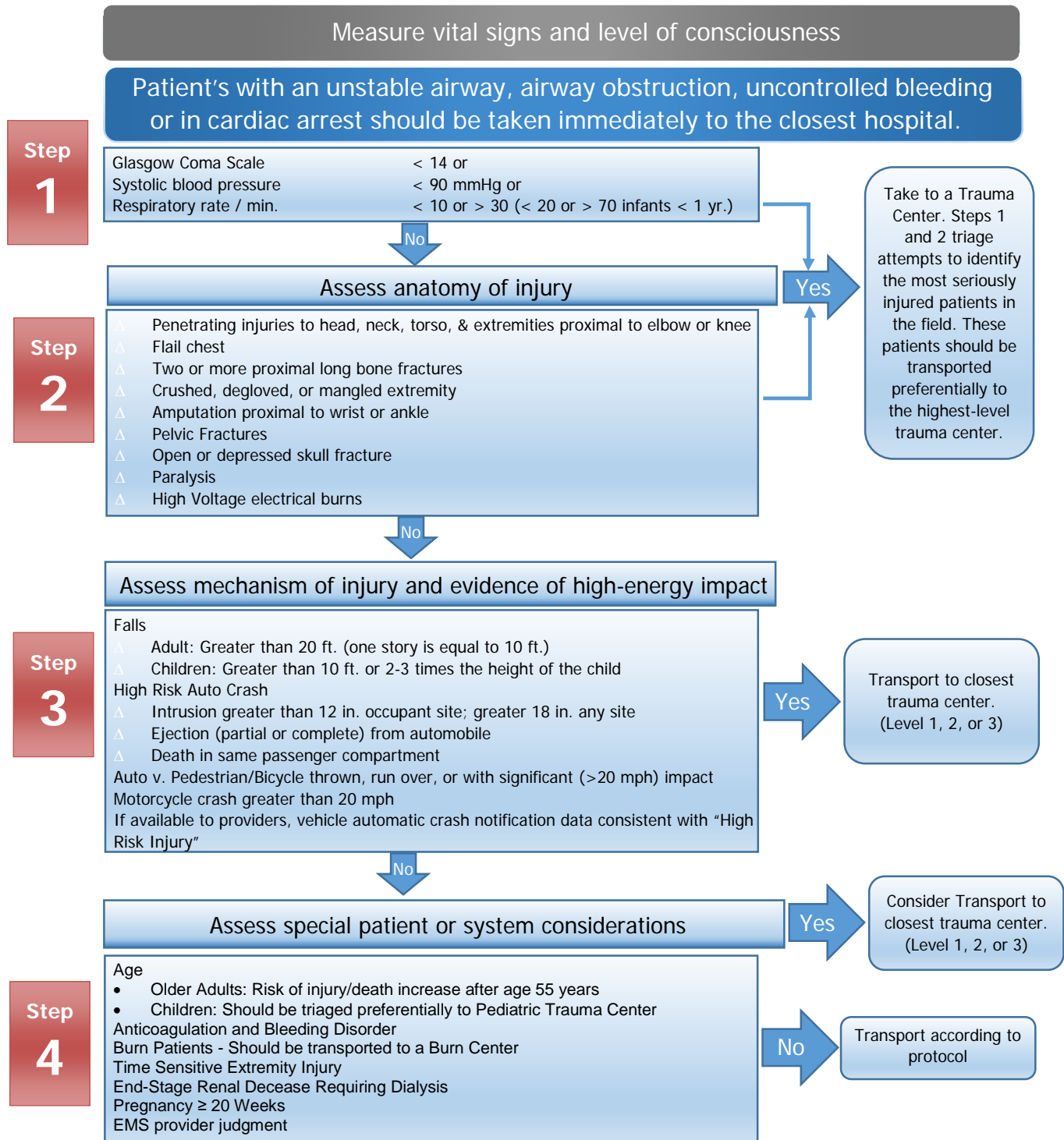
Trauma patient recognition and triage is a two-tiered system including:

1. Initial triage in the prehospital setting (using the Field Trauma Triage Decision Scheme and Pre-Hospital Trauma Triage Criteria), and
2. Secondary triage at all hospitals (including possible transfer to another hospital based on the Inter-Hospital Transfer criteria)

Within compliance with the Code of Virginia and EMS Regulations, this plan:

- Δ Establishes a uniform set of criteria for identifying and providing quality care for pre-hospital and inter-facility trauma patients
- Δ Geography, hospital capabilities, air medical services, local EMS resources and others guide how and to where the identified trauma patient will be transported or transferred
- Δ Promotes rapid access for pediatric and adult trauma patients to appropriate, organized trauma care through accepted criteria and coordinated ground/air pre-hospital transport
- Δ Conducting, promoting, and encouraging programs of education and training designed to upgrade the knowledge and skills of healthcare providers involved in trauma care (follow EMTALA and HIPAA laws)
- Δ Supports transferring any [Pediatric Trauma Score](#) ≤6 to a Designated Trauma Center
- Δ Educate public that any family member or bystander can initiate help by calling 911 and assured to receive guidance from trained emergency medical dispatchers, with a focus on maintaining a viable airway, bleeding control, spinal immobilization, and the prevention of shock
- Δ First responders and emergency medical personnel provides prompt on-scene treatment and stabilization in accordance with medical protocols (on-scene <15 minutes)
- Δ Patients are transported to the closest, most appropriate, emergency department/trauma center
- Δ Patient receives continuing care and rehabilitation to provide the highest chance at a complete recovery in the shortest time frame possible
- Δ For patients with burn injuries, follow the Burns protocol and the Burn Chart: Adult or Burn Chart: Pediatric protocol to determine percentage of body affected
- Δ Follow Prehospital Trauma Triage Criteria protocol to determine appropriate care for each patient
- Δ Refer to Tourniquet Application protocol, when applicable
- Δ During Mass Casualty Incidents, reference the Hampton Roads MCI Response Guide regarding patient distribution
- Δ Designates the [Trauma PI Committee](#) responsible for managing the execution

## Action Plan: Field Triage Decision Scheme



\*Pre-hospital providers should transfer trauma patients with uncontrolled airway, uncontrolled hemorrhage, or if there is CPR in progress to the closest hospital for stabilization and transfer.



## Inter-hospital Criteria for Transfer of a Trauma Patient to a Designated Trauma Center

Inter-hospital transfer to trauma center requires a physician to physician consult. The referring and receiving physician may use the following criteria for determination of that transfer:

	Adult	Pediatric (<15 y/o)
Respiratory	<ul style="list-style-type: none"> <li>Δ Bilateral thoracic injuries</li> <li>Δ Significant unilateral injuries in &gt;55 y/o</li> <li>Δ (e.g. pneumothorax, hemo-pneumothorax, pulmonary contusion, &gt;5 rib fractures).</li> <li>Δ Significant unilateral injuries in patients with pre-existing cardiac and/or respiratory disease</li> <li>Δ Respiratory compromise requiring intubation.</li> <li>Δ Flail chest</li> </ul>	<ul style="list-style-type: none"> <li>Δ Bilateral thoracic injuries</li> <li>Δ Significant unilateral injuries in patients with pre-existing cardiac and/or respiratory disease</li> <li>Δ Flail chest</li> </ul>
CNS	<ul style="list-style-type: none"> <li>Δ Unable to follow commands</li> <li>Δ Open skull fracture</li> <li>Δ Extra-axial hemorrhage on CT, or any intracranial blood</li> <li>Δ Paralysis</li> <li>Δ Focal neurological deficits</li> <li>Δ GCS ≤ 13</li> </ul>	<ul style="list-style-type: none"> <li>Δ Open skull fracture</li> <li>Δ Extra-axial hemorrhage on CT</li> <li>Δ Focal neurological deficits</li> </ul>
Cardiovascular	<ul style="list-style-type: none"> <li>Δ Hemodynamic instability as determined by the treating physician</li> <li>Δ Persistent hypotension</li> <li>Δ Systolic B/P (&lt;100) without immediate availability of surgical team</li> </ul>	
Injuries	<ul style="list-style-type: none"> <li>Δ Any penetrating injury to the head, neck, torso or extremities proximal to the elbow or knee without a surgical team immediately available, where the physician in charge feels treatment of injuries would exceed capabilities of the medical center</li> <li>Δ The combination of trauma with burns.</li> <li>Δ Significant abdominal to thoracic injuries in patients where the physician in charge feels treatment of injuries would exceed capabilities of the medical center</li> </ul>	<ul style="list-style-type: none"> <li>Δ Any penetrating injury to the head, neck, chest abdomen or extremities proximal to the knee or elbows without a surgical team immediately available</li> <li>Δ Combination of trauma with burn injuries</li> <li>Δ Any injury or combination of injuries where the physician in charge feels treatment of the injuries would exceed the capabilities of the medical center</li> </ul>
Special Considerations	Trauma in pregnancy, age >55, pediatric, bariatric, special needs individuals	Pediatric Trauma Score ≤6

## Pediatric Trauma Score Determination

Component	+2	+1	-1
Size	Child/Adolescent, >20kg (44lbs)	Toddler, 11-20kg	Infant, <10kg (22lb)
Airway	Normal	Assisted O2, mask, cannula	Intubated, ETT, King, LMA, Crike
Consciousness	Awake	Obtunded; loss of consciousness	Coma; Unresponsiveness
Systolic BP	Greater than 90mm/Hg; good peripheral pulses, perfusion	51-90 mm/Hg; peripheral pulses, pulses palpable	<50 mm/Hg; weak peripheral or no pulses
Fracture	None seen or suspected	Single closed fracture anywhere	Open, multiple fractures
Cutaneous	No visible injuries	Contusion, abrasion, lacerations less than 7 cm through fascia	Tissue loss, any GSW, or stabbing through fascia

## Best Practices

- Δ Notify the hospital with a radio report as quickly as possible to ensure their preparedness and increase the ease of turnover
- Δ Transport patients with unmanageable airway problems **or** uncontrolled hemorrhage to the **closest** hospital emergency department
- Δ **Traumatic cardiac arrest with any electrical cardiac activity:** Transport to designated trauma center if transport time is less than 10 minutes' difference from the closest hospital
- Δ Consider transport to a Level 1 Trauma Center for **patients with critical burns.** (e.g. Sentara Norfolk General, or MCV Medical Center)
- Δ Consider Transport of Pediatric Patients (patients that are less than 15 years of age) with critical burns to a Level 1 Pediatric Trauma Center (Children's Hospital of the King's Daughters)
- Δ Pregnant patients (Greater than 20 weeks) that do not meet the trauma criteria should be transported to closest OB/GYN facility
- Δ Consider contacting medical control to address concerns about patient care, appropriate receiving facility, or air transport decisions
- Δ When providing a pediatric trauma radio report include the corresponding Broselow Tape color associated with the patient size
- Δ When giving the patient and patient care report to the Trauma Team in the Trauma Bay, ensure that the most important information which includes the following is given to the team within 20 seconds:
  - Age and sex
  - Injuries noted and changes with patient during transport (include condition and vitals)
  - Intervention(s) and patients' response to the intervention(s)
- Δ Agencies operating within a 30-minute ground transport time of a trauma center should maintain on-scene times of <15 minutes and document any delay, establish early contact to alert trauma center staff, and can request air ambulance transport without Medical Control authorization
- Δ Air ambulance transport should not delay the patient's arrival at the hospital
- Δ Scenes located outside a 30-minute ground transport time and air transport is on delay or unavailable should transport all trauma patients to the closest hospital. The provider should limit on-scene times to <15 minutes, establish early contact to receiving hospital because the facility may divert patient to a trauma center en-route or expedite transfer after arrival

## Evaluation Criteria

- Δ On scene times below 15 minutes
- Δ Needle/Chest decompressions: how often performed and % with patient improvement
- Δ Traumatic cardiac arrest: total cases and % needing chest decompression
- Δ Transport destinations: % going to level 1, 2, 3 Trauma centers
  - Track OMD/Diversion/Over triaged
- Δ Spinal Immobilization needed vs. used

## Definitions

**Non-Trauma Center Hospital** – Provide prompt assessment, resuscitation, stabilization, and arrange for the transfer of the patient to a facility that can provide definitive trauma care.

**Trauma Level I** – Level I trauma centers have an organized trauma response and are required to provide definitive care for every aspect of injury, from prevention through rehabilitation. These facilities must have adequate depth of resources and personnel with the capability of providing leadership, education, research and system planning.

**Trauma Level I Pediatric** – Pediatric trauma centers have an organized trauma response and are required to provide definitive care for every aspect of injury, from prevention through rehabilitation for pediatric patients (less than 15 years of age). These facilities must have adequate depth of resources and personnel with the capability of providing leadership, education, research and system planning.

**Trauma Level II** – Expected to provide definitive care, regardless of the severity of injury. The specialty requirements may be fulfilled by on call staff that is promptly available to the patient. Due to some limited resources, Level II centers may have to transfer more complex injuries to a Level I center. Level II centers should also take on responsibility for education and system leadership within their region.

**Trauma Level III** – Provides prompt assessment, resuscitation, stabilization, emergency operations and arrange for the transfer of the patient to a facility that can provide definitive trauma care. Level III should take on responsibility for education and system leadership within their region.

**Trauma Victim** – A person who has acquired serious injuries and/or wounds brought on by either an outside force or an outside energy. These injuries and/or wounds may affect one or more body systems by blunt, penetrating or burn injuries. These injuries may be life altering, life threatening, or ultimately fatal wounds.