

EL DORADO COUNTY EMS AGENCY

ADMINISTRATIVE POLICIES

Effective: 02/26/2021

Michelle Patterson (signature on file)

Director, EMS Agency

STEMI Plan

I. PURPOSE:

To ensure the best possible clinical outcomes for patients suffering from an ST Elevation Myocardial Infarction (STEMI) through:

- A. Rapid and accurate field diagnosis
- B. Indicated pre-hospital care as outlined in the relevant field policies, protocols and procedures.
- C. Transport to the time-closest and most appropriate medical facility.

II. AUTHORITY:

The overall responsibility for administration of emergency medical services in the County of El Dorado, and the specific responsibility for administration of a STEMI Plan within that jurisdiction is statutorily vested with the El Dorado County Emergency Medical Services Agency (EDCEMSA) pursuant to:

- A. California Health and Safety Code, Division 2.5, Chapter 4
- B. California Code of Regulations, Title 22, Division 9, Chapter 7.1 "ST Elevation Myocardial Infarction Critical Care System"

III. STAKEHOLDERS:

The entities with relevant proximity to this plan are the EMS providers, hospitals and Joint Power(s) Authority(s) (JPA) operating in El Dorado County. Responsibility for regular execution of this plan is vested in the below named agencies; subject to their scope, territory and existing agreements.

West Slope	East Slope
Marshall Hospital	Barton Memorial Hospital
West Slope JPA	Cal Tahoe JPA
Cal Fire - Mt Danaher	CalSTAR – South Lake Tahoe
Cal Fire - Cameron Park	Fallen Leaf Lake Fire
Diamond Springs Fire	Lake Valley Fire Protection District
El Dorado County Fire Protection District	Meeks Bay Fire Protection District
El Dorado Hills Fire Protection District	North Tahoe Fire
Georgetown Fire Protection District	City of South Lake Tahoe
Mosquito Fire Protection District	
Pioneer Fire Protection District	
Rescue Fire Protection District	

IV. POLICY:

- a) Patient Identification: Determination of a STEMI case shall derive from a combination of factors, originating with the field diagnosis of the attending Paramedic and concluding with definitive diagnosis of the receiving facility. Attending Paramedics shall utilize clinical judgement and diagnostic equipment to identify a STEMI, pursuant to the following EDCEMSA policies:
 - i. Acute Coronary Syndrome (ACS) Protocol (Annex 1)
 - ii. 12-Lead Electrocardiogram (ECG) Field Procedure (Annex 2)
 - iii. STEMI Destination Field Procedure (Annex 3)
- b) Destination: The ideal destination for the majority of STEMI cases is a STEMI Receiving Center (SRC) with Percutaneous Coronary Intervention (PCI) capacity. Alternatively, facilities capable

of delivering thrombolytic therapy may be used when circumstances dictate. Determination of the appropriate receiving facility shall be guided by the following EDCEMSA policies:

- i. STEMI Destination Field Procedure (Annex 3)
 - ii. STEMI Receiving Center Designation Administrative Policy (Annex4)
- c) Field Communication: The County of El Dorado is topographically diverse with vast, sparsely populated areas of extreme high and low elevation. As a result, the ideal means of communication from field to hospital may vary considerably from one case to the next. Personnel are encouraged employ mobile radio systems and recorded MICN line (cell) when notifying the receiving facility of an incoming STEMI. The content of such notifications are outlined in the following EDCEMSA policies:
- i. Patient Destination Plan (Annex 5, 7th bullet)
 - ii. STEMI Destination Field Procedure (Annex 3)
- d) Inter-Facility Transfer: The decision to move a STEMI case from one health facility to another shall be based on the clinical needs of the patient in the context of available resources, and shall be principally determined by the referring and accepting physicians. To that end EDCEMSA stipulates that:
- i. Referring facilities and SRCs shall establish and maintain transfer agreements to facilitate efficient patient movement as required.
 - ii. Transferring facilities, in conjunction with the SRC, shall be responsible for obtaining the appropriate level of transportation when transferring STEMI patients.
- e) Data Collection: EDCEMSA has implemented a county-wide Electronic Patient Care Reporting (ePCR) system which serves as the primary repository for all patient care data.
- i. Provider: In addition to the universally generated ePCR, EDCEMSA requires all STEMI cases to be captured on a separate 'STEMI Report form' (Annex 6) and submitted for review within 10 days of patient contact.
 - ii. Hospitals: Medical facilities in the jurisdiction of EDCEMSA, whether referring or receiving, adhere to the relevant federal and state laws regarding documentation and data management. To the extent required and allowable under the Health Information Portability and Accountability Act (HIPAA) among others, certain STEMI data points may be collected for inclusion in EDCEMSA statistics (see Annex 6).
 - iii. EDCEMSA: All STEMI related data as may be generated in the jurisdiction of EDCEMSA and within the scope of the LEMSA, shall be retained by EDCEMSA and reported to the California Emergency Medical Services Authority (EMSA) in the manner legally prescribed.
- f) Receiving Centers in Neighboring Jurisdictions: As a matter of established practice, receiving centers outside of the County of El Dorado may be utilized as initial destinations when/if said facilities are the time-closest and most appropriate based on patient condition and other relevant factors. In the case of referral, part d) of this section shall apply.
- g) Continuous Quality Improvement (CQI): Under the oversight of the Medical Director, EDCEMSA maintains a volume of EMS Continuous Quality Improvement Plans (EQIP) and convenes a CQI committee which meets on a regular basis. Patient interactions relating to core measures, or which otherwise fall within the scope of the committee, are reviewed for adherence to standing field policies, protocols and procedures. Findings of the committee may proffer one-

to-one remediation with specific clinicians, system wide training targets, changes to existing policy, or otherwise contribute to the body of operational knowledge underpinning the CQI process overall.

- h) Public Information and Education: Cardiac Health: EDCEMSA is committed to the promotion of STEMI system support and the dissemination of cardiovascular education for the benefit of the citizens of El Dorado County. To that end, EDCEMSA:
 - i. Avails itself to the operational stakeholders in El Dorado County (see section III) in their community level public education and training for their volunteer rosters.
 - ii. Contributes, upon request, to the development and dissemination of Public Health department programs on acute coronary syndrome, brain and heart health and access to the STEMI Critical Care System among others.
 - iii. Ensures that designated medical facilities participate in the development of public awareness and education campaigns for their service areas.

V. REVIEW:

This plan is subject to revision based on CQI findings, periodic internal policy review, or according to the EMSA system status update reporting timeline.

VI. ENTRY INTO EFFECT:

This plan shall be adopted EDCEMSA policy upon the affixing of EDCEMSA Director Signature and approval of the EMS Authority.

Drafted:

 Guy Valente (signature on file)
X_____ EMS/EP Supervisor

 2/26/21
Date_____

Approved:

 Dr. David Brazzel (signature on file)
X_____ Medical Director

 2/26/21
Date: _____

Annex 1

EL DORADO COUNTY EMS AGENCY PREHOSPITAL PROTOCOLS

Effective: July 1, 2015

Reviewed: July, 2017, 2019

Revised: July, 2017



EMS Agency Medical Director

CHEST PAIN/ACUTE CORONARY SYNDROME (ACS)

BLS TREATMENT

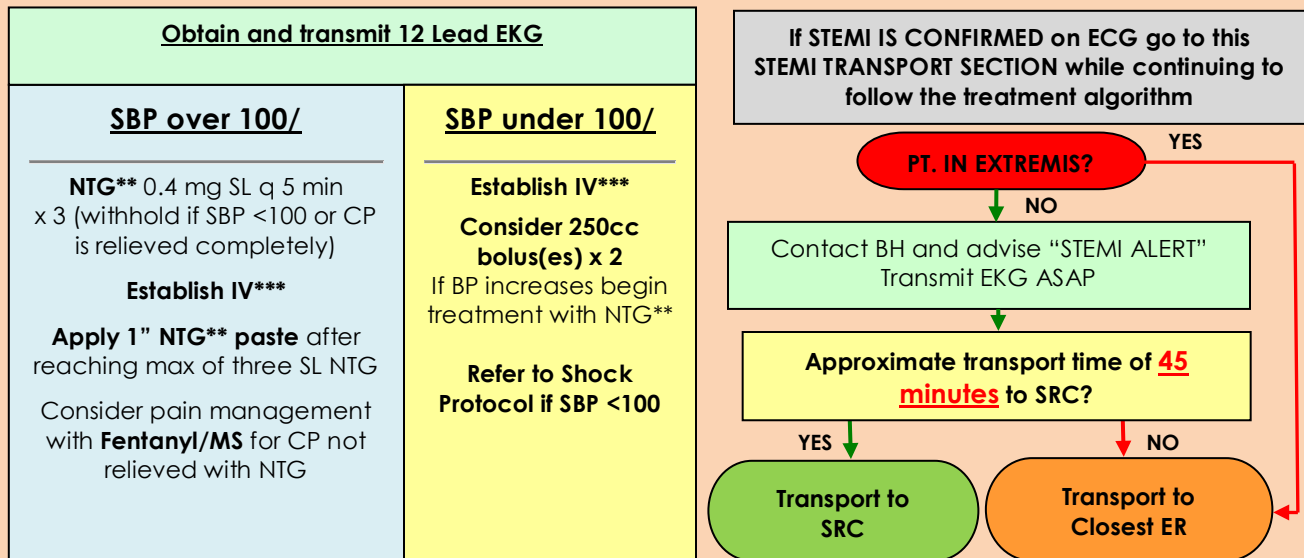
ROUTINE MEDICAL CARE - administer oxygen at appropriate flow rate. Keep patient in position of comfort and don't allow patient to walk.

ASPIRIN* – Give 324 MG PO.

BLS personnel may assist patient with own medications (NTG), see **Field Policy: BLS Medication Administration**.

PROTOCOL PROCEDURE: Possible thrombolytic/STEMI candidates should be identified and transported immediately with treatment performed en route. Not all AMI/ACS patients present with chest pain; other signs or symptoms (such as: feelings of impending doom, diaphoresis, palpitations, nausea, dyspnea, pain in back, arm, or jaw) may be present that could also indicate an ACS/AMI. Contact the base station for all STEMI patients and for orders in all suspected AMI/ACS cases not presenting with chest discomfort, pain, or pressure. Consider air transport for STEMI patients in remote areas or for long ground transport times. **12 lead EKGs cannot solely diagnose an AMI, treat all potential cardiac symptoms as such, regardless of 12 lead findings.**

ALS TREATMENT



NOTES:

*ASA should be given even if the patient's symptoms have subsided or the patient has self-administered prior to your arrival.

**If patient has taken any erectile dysfunction medication in the last 48 hours do not give NTG or apply NTG paste. Go directly to Fentanyl or MS if SBP is >100 in this situation.

**NTG paste should be applied after reaching maximum dose of SL NTG and should only be removed if SBP <100.

*** Consider second IV and/or Twin Cath with saline lock for suspected STEMI/thrombolytic candidates.

References: Formulary; Nitro, Aspirin, Fentanyl, Morphine
Routine Medical care, BLS Medication administration


Annex 2

EL DORADO COUNTY EMS AGENCY FIELD PROCEDURES

Effective: July 1, 2013

Reviewed: July 2013, 2017, 2019

Revised: July, 2017



EMS Agency Medical Director

12 LEAD EKG

PURPOSE:

The 12-lead EKG shall be performed as part of a complete patient assessment when medical history and/or presenting complaints consistent with acute coronary syndrome are present within adult and pediatric patients. The acquiring of a 12-lead EKG should not delay immediate treatment needs or delay transport.

INDICATIONS:

A 12-lead EKG will be considered on adult and pediatric patients with the following presentations:

- Chest, jaw, arm or shoulder pain/discomfort
- Dysrhythmia
- Shortness of breath / dyspnea
- General weakness
- Syncope or near-syncope
- Suspected CVA/stroke
- Epigastric discomfort
- Diaphoresis inconsistent with environment
- Diabetic patients with unusual complaints
- Patients with a history of CHF, coronary artery disease, or cardiac transplant
- Resuscitated cardiac arrest patient
- Other signs or symptoms suggestive of acute coronary syndrome
- Any patient the paramedic feels would benefit from a 12-lead assessment

CONTRAINDICATIONS:

- Patients who have been subjected to trauma prior to initiating transport
- Cardiac arrest (on-going)

PROCEDURE:

1. The patient's age, first initial, and full last name must be programmed into the monitor before the EKG is acquired. This will prevent ID patient errors.
2. Treatment / 12 Lead EKG / transport destination decision should occur concurrently. In order to reduce on scene times, First Responders should attempt to place the EKG electrodes prior to the arrival of the medic unit, whenever practical.
3. EKGs must be transmitted to the respective base hospital for physician interpretation.

Acquiring 12-lead:

1. Place patient in supine position whenever possible.
2. Bare the chest and prepare the patient's skin for electrode placement. Dry the skin if it is excessively moist.
3. For EKGs on female patients please be sensitive when exposing or touching the breast. If possible, the bra should be left on. Always place V3 - V6 under the breast, rather than on the breast. If needed, encourage the female patient to assist you in displacing her left breast. If

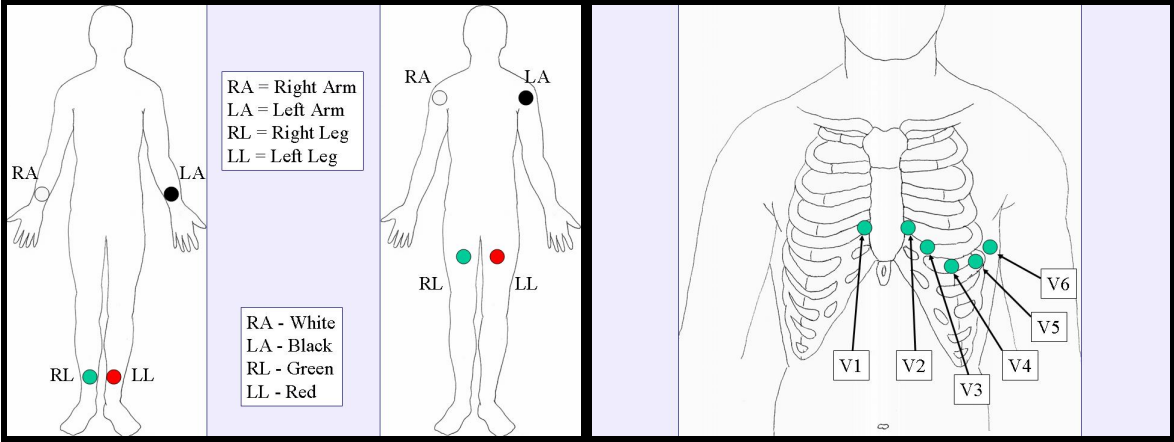
you must assist the female patient with displacement of her breast, always use the back of your hand and never the palm.

4. Place the electrodes on the limbs. The limb leads can be placed anywhere from the shoulders to the wrists and the thighs to the ankles – not the torso.
5. Place the electrodes on the chest. The six precordial (chest) lead electrodes must be placed in specific locations. Locating the V1 position (fourth intercostals space) is the first step and it is the reference point.
 - o V1: 4th intercostal space, just right of the sternum
 - o V2: 4th intercostal space, just left of the sternum
 - o V3: halfway between V2 and V4
 - o V4: 5th intercostal space, left mid-clavicular line
 - o V5: in-line between V4 and V6, anterior axillary line
 - o V6: 5th intercostal space, left mid-axillary line
6. A copy will be included on the PCR.
7. A copy will be left with the emergency department via electronic transfer or hard copy if transfer was not complete.
8. Document both the paramedic's rhythm interpretation and the monitor's rhythm interpretation on the PCR.

Patient Treatment:

1. If not detrimental to the patient's condition the initial 12 Lead should be performed prior to medication administration.
2. Patient Communication: If the EKG interpretation is "Acute MI Suspected", the patient should be told that "according to the EKG you may be having a heart attack".
3. If the EKG interpretation is anything else, **the patient should NOT be told the EKG is normal or "you are not having a heart attack"**.
4. If the patient asks what the EKG shows, tell him/her that a final reading will be completed by the emergency department MD.
5. Interpretation should be relayed to receiving hospital during patient report. Document "Obtained 12-lead EKG." on PCR and attach a copy.

**For destination decision information refer to the STEMI Destination policy.
12 lead electrode placement diagrams:**



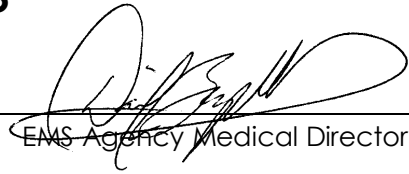
Annex 3

EL DORADO COUNTY EMS AGENCY FIELD POLICIES

Effective: July 1, 2015

Reviewed: July, 2017

Revised: July, 2019



EMS Agency Medical Director

STEMI DESTINATION

PURPOSE:

A Cardiovascular STEMI Receiving Center (SRC) will be the preferred destination for patients who access the 9-1-1 system meeting defined criteria and who show evidence of a ST-elevation myocardial infarction (STEMI) on a 12 Lead electrocardiogram.

POLICY:

The following factors should be considered with regards to choice of destination for STEMI patients:

1. An EDCEMSA designated SRC should be considered as the destination of choice when the following criteria are met:
 - Identified STEMI patients based on machine interpretation of field 12 Lead ECG, verified by paramedics and, via telemetry, by the base hospital physician(s).
 - 12 Lead ECG machine interpretations reading "Acute MI", "Acute MI Suspected", "ST Elevation Criteria Met", or "STEMI" are accepted as consistent with an acute MI.
 - **Total estimated time is 45 minutes or less from confirmation of STEMI to the arrival at the SRC**
 - Consideration should be given to traffic, weather, road conditions, and other possible travel time factors.
2. Patients who are in **extremis** should be transported to the closest hospital.
3. Patients with a history of **high risk indicators** who are outside the 45 minute SRC transport window may be considered for transport directly to the SRC despite being outside the 45 minute transport window. **Contact the base hospital for consultation in this situation.**

High risk indicators:

- Active internal bleeding
 - Surgery within the last 14 days
 - Pregnancy
 - History of cerebrovascular accident (CVA) within the last three(3) months
 - Intracranial or intraspinal surgery or trauma within the past two (2) months
 - Known intracranial neoplasm, arteriovenous malformation, or aneurysm
 - Known bleeding disorder
 - Severe uncontrolled hypertension
4. Air ambulance/rescue helicopter transport may be considered for remote areas if the time window of 45 minutes from STEMI confirmation to arrival at the SRC can be maintained. **The base hospital should be included in the decision to fly a STEMI patient to a SRC.**
 5. Selection of which SRC the patient is transported to will be based on paramedic discretion **AND:**
 - Proximity and travel time to the closest SRC
 - Patient's hospital preference

- Helipad if transporting by air ambulance
6. Paramedic Responsibilities:
- Notify the base hospital physician of a “STEMI ALERT” as soon as STEMI is identified.
 - Begin transporting towards the most appropriate SRC as soon as possible with base hospital communications conducted while enroute.
 - Transmit 12 lead EKG to Base Hospital – Confirm the EKG was received.
 - Contact Base Hospital - Give patient report to include: age, sex, history, anticoagulants, Insulin, erectile dysfunction or other critical medications, allergies, vital signs, and treatment and ETA to SRC.
 - Identify the SRC the patient is being transported to and Transmit/Fax EKG as quickly as possible as this will expedite activation of the Cath Lab Team.
 - Call report to the SRC 10 minutes out.
7. Base Hospital Responsibilities
- The base hospital should confirm they have received the correct EKG by verifying the time, date, patient last name, age of patient, and medic unit ID number on the EKG
 - Base Physician will interpret EKG and confirm or cancel STEMI Alert
 - If STEMI is cancelled base hospital will direct to nearest facility
 - MICN will fax copy of 12 lead EKG to SRC
 - MICN will notify SRC of **STEMI ALERT** and pending patient arrival to include brief patient report, medic unit, ETA and **Confirm receipt of 12 lead EKG**

Approved SRC List:**Helipad**

UC Davis
Sutter Roseville
Mercy San Juan
Carson Tahoe

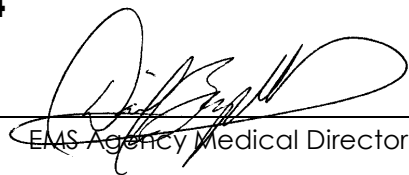
No Helipad

Kaiser Roseville
Sutter Medical Center (Sac)
Mercy General

Annex 4

EL DORADO COUNTY EMS AGENCY ADMINISTRATIVE POLICIES

Effective: July 1, 2017



EMS Agency Medical Director

CARDIOVASCULAR “STEMI” RECEIVING CENTER DESIGNATION

PURPOSE:

A Cardiovascular STEMI Receiving Center (SRC) will be the preferred destination for patients who access the 9-1-1 system meeting defined criteria and who show evidence of an ST-elevation myocardial infarction on a 12 Lead electrocardiogram.

DEFINITIONS:

Percutaneous Coronary Intervention (PCI) - A broad group of percutaneous techniques utilized for the diagnosis and treatment of patients with STEMI.

STEMI - An acute myocardial infarction that generates a specific type of ST-segment elevation on a 12-lead ECG.

STEMI Receiving Centers (SRC) - EDCEMS designated facilities that have emergency PCI capabilities.

STEMI Referral Hospital (SRH) - An acute care hospital that is non-PCI capable, but may refer STEMI patients to an SRC.

POLICY:

The following requirements must be met for a hospital to be recognized as a Cardiovascular STEMI Receiving Center by EDCEMSA:

1. All criteria established by their respective certifying local EMS Agency must be met, including:
 - a. Licensure as a Cardiac Catheterization Laboratory.
 - b. Intra-aortic balloon pump capability.
 - c. Cardiovascular surgical services permit:
This requirement may be waived by the local EMS Agency Medical Director when appropriate for patient or system needs. The local Medical Director will evaluate conformance with existing American College of Cardiology / American Heart Association or other existing professional guidelines for standards.
 - d. Communication system for notification of incoming STEMI patients, available twenty four (24) hours per day, seven (7) days per week including a dedicated 12 Lead ECG receiving station and an in-house paging system.
 - e. Provide public education about STEMI warning signs and importance of early utilization of the 9-1-1 system.
 - f. All hospital minimum staffing requirements as per the respective certifying agency.

DATA COLLECTION / CONTINUOUS QUALITY IMPROVEMENT PROGRAM / PERFORMANCE STANDARDS

EDCEMSA recognized SRC's shall comply with all data collection, continuous quality improvement and performance standards as defined in individual SRC facility MOUs. These requirements will be the same for each SRC.

RECOGNITION

1. The Cardiovascular STEMI Receiving Center shall be recognized by EDCEMSA as per their respective certifying local EMS agencies.
2. Failure to comply with the criteria and performance standards outlined in this policy and individual SRC facility MOUs may result in rescission of SRC recognition by EDCEMSA. Compliance will be solely determined by the EDCEMSA.

Annex 5

EL DORADO COUNTY EMS AGENCY FIELD POLICIES

Effective: July 2012

Reviewed: July 2015

Revised: July, 2017, 2019



EMS Agency Medical Director

PATIENT DESTINATION

PURPOSE:

This policy is intended to assist the paramedic and the base station in selecting the appropriate destination and mode of transportation for Trauma and Non Trauma patients.

DEFINITIONS:

Nearest Hospital – The nearest receiving hospital (in minutes) as estimated by the paramedic crew, taking into consideration factors such as traffic and/or road conditions that may affect transport time.

- **No Base contact is required unless orders are needed for continued patient care.**

Nearest Most Appropriate Hospital – The facility that has the best capabilities for a particular patient. (E.g., burns, pediatrics, trauma, PCI, etc.). Bypassing the closest hospital requires base station contact.

Trauma Patient – Meets established trauma criteria. **See Trauma Triage Algorithm on page 3.**

POLICY:

All Patients will be transported to the nearest hospital. Destination and mode of transport decisions shall be made in collaboration with the base station hospital.

- Contact the Base Hospital for patients that desire transport to another facility of their choice.
- Unstable patients including cardiac arrest shall be transported to **the nearest most appropriate hospital.**
- If unable to establish and maintain an airway, the patient will be transported to the nearest hospital for definitive airway management.
- If the nearest hospital is on diversion or internal disaster the stable patient shall be transported to the next nearest hospital.
- Certain patients may be accepted by hospitals that are on diversion, such as labor and delivery cases. In these situations, the Base Hospital MICN will notify the desired receiving facility and the medic unit crew of the patients transport disposition.
- If specialized care may be needed and is not available at the nearest hospital consult the base station, e.g., CT scan out of service.
- The Transporting medic unit will provide a patient report directly to the receiving facility that consists of: ETA, age, chief complaint, vital signs, significant findings and current treatments.
- The base station may override these guidelines when a hospital is unable to meet resource standards or application of these standards would unnecessarily delay definitive medical or surgical treatment or specialty care.
- For communication failure, the paramedic will determine destination and mode of transport. Base Station Contact will then be made as soon as within range. A completed EMS Event Analysis Form shall be forward with a copy of the Patient Care Report to the EMS Agency Medical Director and Base Hospital Coordinator within 24-hours of the incident.

TRAUMA PATIENTS:

- A "Trauma Pre-Alert" advisory for patient with potential trauma criteria shall be made to the Base Hospital by the responding medic unit.
- The Critical Trauma Report Form shall be sent via electronic or hard copy to the Trauma Coordinator at the paramedic's respective base hospital within twenty-four (24) hours for all patients entered into the trauma system.
- Trauma criteria used to determine destination will be documented in the PCR.
- For a mass casualty/disaster event the MCI plan take precedence over these guidelines.

Contact the base station for any situations encountered that are not addressed in this policy.

TRAUMA TRIAGE ALGORITHM

DECLARE TRAUMA ALERT

PHYSIOLOGIC CRITERIA		
UNCONTROLLED AIRWAY RAPIDLY DETERIORATING	Yes →	TRANSPORT TO NEAREST ER Consider Base contact to bypass nearest ER and transport to trauma center
NO ↓		
SIGNIFICANT HEAD INJURY GCS 13 OR LESS PARALYSIS	Yes →	TRANSPORT TO NEAREST LEVEL I OR II TRAUMA CENTER
NO ↓		
SBP < 100 SBP < 110 OVER AGE 65 RESPIRATORY DISTRESS	Yes →	TRANSPORT TO NEAREST APPROPRIATE TRAUMA CENTER
ANATOMIC CRITERIA		
All Penetrating injuries to head, neck, torso, and extremities proximal to elbow and knee Chest wall instability, Flail chest Two or more proximal Long-bone fractures Crushed, degloved, or mangled extremity Amputation proximal to wrist and ankle Pelvic fractures	YES →	TRANSPORT TO NEAREST APPROPRIATE TRAUMA CENTER
MECHANISM OF INJURY		
FALLS: Adults - > 20 feet (One story = 10 feet) Children - > 10 feet or 2-3 times child's height HIGH-RISK AUTO CRASH: Intrusion, including roof - occupant site >12", any site >18" Ejection, partial or complete Death in same passenger compartment AUTO VS PED/BICYCLIST: Thrown, run over or with significant impact MOTORCYCLE CRASH: > 20 MPH SPORTING ACCIDENTS: Sustaining Significant Impact including: Equestrian, Bicycle, Boating, Skiing/Snowboarding or Skateboarding	YES →	TRANSPORT TO NEAREST APPROPRIATE TRAUMA CENTER
SPECIAL CONSIDERATIONS		
OLDER ADULTS Risk of injury or death increases after age 55 Low impact mechanism may result in severe injury (i.e. ground level falls) CHILDREN – Should be triaged preferentially to a Peds Trauma Center ANTICOAGULANT & BLEEDING DISORDERS Patients with Head Injury are at high risk for rapid deterioration PREGNANCY > 20 WEEKS SIGNIFICANT BURNS EMS PROVIDER JUDGEMENT	YES →	CONSULT WITH BASE HOSPITAL MEDICAL CONTROL