

# Denver Metropolitan Prehospital Protocols



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The process that that has been initiated in the construction of this revised set of protocols will remain in place. The authors will continue to edit and revise the protocols to reflect the dynamic role of emergency medical services within the medical care community.

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## 0001 GENERAL GUIDELINES: INTRODUCTION

### INTRODUCTION

The following protocols have been developed and approved by the Denver Metro EMS Medical Directors (DMEMSMD) group. These protocols define the standard of care for EMS providers in the Denver Metropolitan area, and delineate the expected practice, actions, and procedures to be followed.

No protocol can account for every clinical scenario encountered, and the DMEMSMD recognize that in rare circumstances deviation from these protocols may be necessary and in a patient's best interest. Variance from protocol should always be done with the patient's best interest in mind and backed by documented clinical reasoning and judgment. Whenever possible, prior approval by direct verbal order from base station physician is preferred. Additionally, all variance from protocol should be documented and submitted for review by agency Medical Director in a timely fashion.

The protocols have a new look and are presented in an algorithm format. An algorithm is intended to reflect real-life decision points visually. An algorithm has certain limitations, and not every clinical scenario can be represented. Although the algorithm implies a specific sequence of actions, it may often be necessary to provide care out of sequence from that described in the algorithm if dictated by clinical needs. An algorithm provides decision-making support, but need not be rigidly adhered to and is no substitute for sound clinical judgment.

In order to keep protocols as uncluttered as possible, and to limit inconsistencies, individual drug dosing has not been included in the algorithms. It is expected the EMTs will be familiar with standard drug doses. Drug dosages are included with the medications section of the protocols as a reference.

If viewing protocol in an electronic version, it will be possible to link directly to a referenced protocol by clicking on the hyperlink, which is underlined.

### PROTOCOL KEY

Boxes without any color fill describe actions applicable to all levels of EMT. Boxes with orange fill are for actions for EMT-Intermediate level or higher, and blue-filled boxes are for EMT-paramedic level. When applicable, actions requiring base contact are identified in the protocol.

**All medication administrations by EMTs require base contact and direct verbal order.**

EMT	EMT-I	Paramedic
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Teaching points deemed sufficiently important to be included in the protocol are separated into grey-filled boxes with a double line border:

• Teaching points
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### PEDIATRIC PROTOCOLS

For the purposes of these clinical care protocols, pediatric patients are those < 12 years of age, except where identified in a specific protocol.

## 0002 GENERAL GUIDELINES: CONFIDENTIALITY

### CONFIDENTIALITY

- A. The patient-physician relationship, the patient-registered nurse relationship, and the patient-EMT relationship are recognized as privileged. This means that the physician, nurse, or EMT may not testify as to confidential communications unless:
  - 1. The patient consents
  - 2. The disclosure is allowable by law (such as Medical Board or Nursing Board proceedings, or criminal or civil litigation in which the patient's medical condition is in issue)
- B. The prehospital provider must keep the patient's medical information confidential. The patient likely has an expectation of privacy, and trusts that personal, medical information will not be disclosed by medical personnel to any person not directly involved in the patient's medical treatment.
  - 1. Exceptions
    - i. The patient is not entitled to confidentiality of information that does not pertain to the medical treatment, medical condition, or is unnecessary for diagnosis or treatment.
    - ii. The patient is not entitled to confidentiality for disclosures made publicly.
    - iii. The patient is not entitled to confidentiality with regard to evidence of a crime.
- C. Additional Considerations:
  - 1. Any disclosure of medical information should not be made unless necessary for the treatment, evaluation or diagnosis of the patient.
  - 2. Any disclosures made by any person, medical personnel, the patient, or law enforcement should be treated as limited disclosures and not authorizing further disclosures to any other person.
  - 3. Any discussions of prehospital care by and between the receiving hospital, the crewmembers in attendance, or at in-services or audits are done strictly for educational or performance improvement purposes. Further disclosures are not authorized.
  - 4. Radio communications should not include disclosure of patient names.
  - 5. This procedure does not preclude or supersede your agency's HIPAA policy and procedures.

## 0003 GENERAL GUIDELINES: CONSENT

### CONSENT

#### General Principles: Adults

- A. An adult in the State of Colorado is 18 years of age or older.
- B. Every adult is presumed capable of making medical treatment decisions. This includes the right to make "bad" decisions that the prehospital provider believes are not in the best interests of the patient.
- C. A person is deemed to have decision-making capacity if he/she has the ability to provide informed consent, i.e., the patient:
  - 1. Understands the nature of the illness/injury or risk of injury/illness
  - 2. Understands the possible consequences of delaying treatment and/or refusing transport
  - 3. Given the risks and options, the patient voluntarily refuses or accepts treatment and/or transport.
- D. A call to 9-1-1 itself does not prevent a patient from refusing treatment. A patient may refuse medical treatment (IVs, oxygen, medications), but you should try to inform the patient of the need for therapies, offer again, and treat to the extent possible.
- E. The odor of alcohol on a patient's breath does not, by itself, prevent a patient from refusing treatment.
- F. **Implied Consent:** An unconscious adult is presumed to consent to treatment for life-threatening injuries/illnesses.
- G. **Involuntary Consent:** a person other than the patient in rare circumstances may authorize Consent. This may include a court order (guardianship), authorization by a law enforcement officer for prisoners in custody or detention, or for persons under a mental health hold or commitment who are a danger to themselves or others or are gravely disabled.

#### Procedure: Adults

- A. Consent may be inferred by the patient's actions or by express statements. If you are not sure that you have consent, clarify with the patient or **CONTACT BASE**. This may include consent for treatment decisions or transport/destination decisions.
- B. Determining whether or not a patient has decision-making capacity to consent or refuse medical treatment in the prehospital setting can be very difficult. Every effort should be made to determine if the patient has decision-making capacity, as defined above.
- C. For patients who do not have decision-making capacity, **CONTACT BASE**.
- D. If the patient lacks decision-making capacity and the patient's life or health is in danger, and there is no reasonable ability to obtain the patient's consent, proceed with transport and treatment of life-threatening injuries/illnesses. If you are not sure how to proceed, **CONTACT BASE**.
- E. For patients who refuse medical treatment, if you are unsure whether or not a situation of involuntary consent applies, **CONTACT BASE**.

#### General Principles: Minors

- A. A parent, including a parent who is a minor, may consent to medical or emergency treatment of his/her child. There are exceptions:
  - 1. Neither the child nor the parent may refuse medical treatment on religious grounds if the child is in imminent danger as a result of not receiving medical treatment, or when the child is in a life-threatening situation, or when the condition will result in serious handicap or disability.
  - 2. The consent of a parent is not necessary to authorize hospital or emergency



## 0003 GENERAL GUIDELINES: CONSENT

health care when an EMT in good faith relies on a minor's consent, if the minor is at least 15 years of age and emancipated or married.

3. Minors may seek treatment for abortion, drug addiction, and venereal disease without consent of parents. Minors > 15 years may seek treatment for mental health.
- B. When in doubt, your actions should be guided by what is in the minor's best interests and base contact.

### **Procedure: Minors**

- A. A parent or legal guardian may provide consent to or refuse treatment in a non- life-threatening situation.
- B. When the parent is not present to consent or refuse:
1. If a minor has an injury or illness, but not a life-threatening medical emergency, you should attempt to contact the parent(s) or legal guardian. If this cannot be done promptly, transport.
  2. If the child does not need transport, they can be left at the scene in the custody of a responsible adult (e.g., teacher, social worker, grandparent). It should only be in very rare circumstances that a child of any age is left at the scene if the parent is not also present.
  3. If the minor has a life-threatening injury or illness, transport and treat per protocols. If the parent objects to treatment, **CONTACT BASE** immediately and treat to the extent allowable, and notify police to respond and assist.

## 0004 GENERAL GUIDELINES: PHYSICIAN AT THE SCENE/MEDICAL DIRECTION

### PHYSICIAN AT THE SCENE/MEDICAL DIRECTION

#### Purpose

- A. To provide guidelines for prehospital personnel who encounter a physician at the scene of an emergency

#### General Principles

- A. The prehospital provider has a duty to respond to an emergency, initiate treatment, and conduct an assessment of the patient to the extent possible.
- B. A physician who voluntarily offers or renders medical assistance at an emergency scene is generally considered a "Good Samaritan." However, once a physician initiates treatment, he/she may feel a physician-patient relationship has been established.
- C. Good patient care should be the focus of any interaction between prehospital care providers and the physician.

#### Procedure

- A. See algorithm below and sample note to physician at the scene

#### Special notes

- A. Every situation may be different, based on the physician, the scene, and the condition of the patient.
- B. **CONTACT BASE** when any question(s) arise.

**0004 GENERAL GUIDELINES: PHYSICIAN AT THE SCENE/MEDICAL DIRECTION**

**Physician at the Scene/Medical Direction Note**

**NOTE TO PHYSICIANS ON INVOLVEMENT WITH EMS PROVIDERS**

THANK YOU FOR OFFERING YOUR ASSISTANCE.

The prehospital personnel at the scene of this emergency operate under standard policies, procedures, and protocols developed by their Medical Director. The drugs carried and procedures allowed are restricted by law and written protocols.

After identifying yourself by name as a physician licensed in the State of Colorado and providing identification, you may be asked to assist in one of the following ways:

1. Offer your assistance or suggestions, but the prehospital care providers will remain under the medical control of their **base** physician, or
2. With the assistance of the prehospital care providers, talk directly to the **base physician** and offer to direct patient care and accompany the patient to the receiving hospital. Prehospital care providers are required to obtain an order directly from the **base physician** for this to occur.

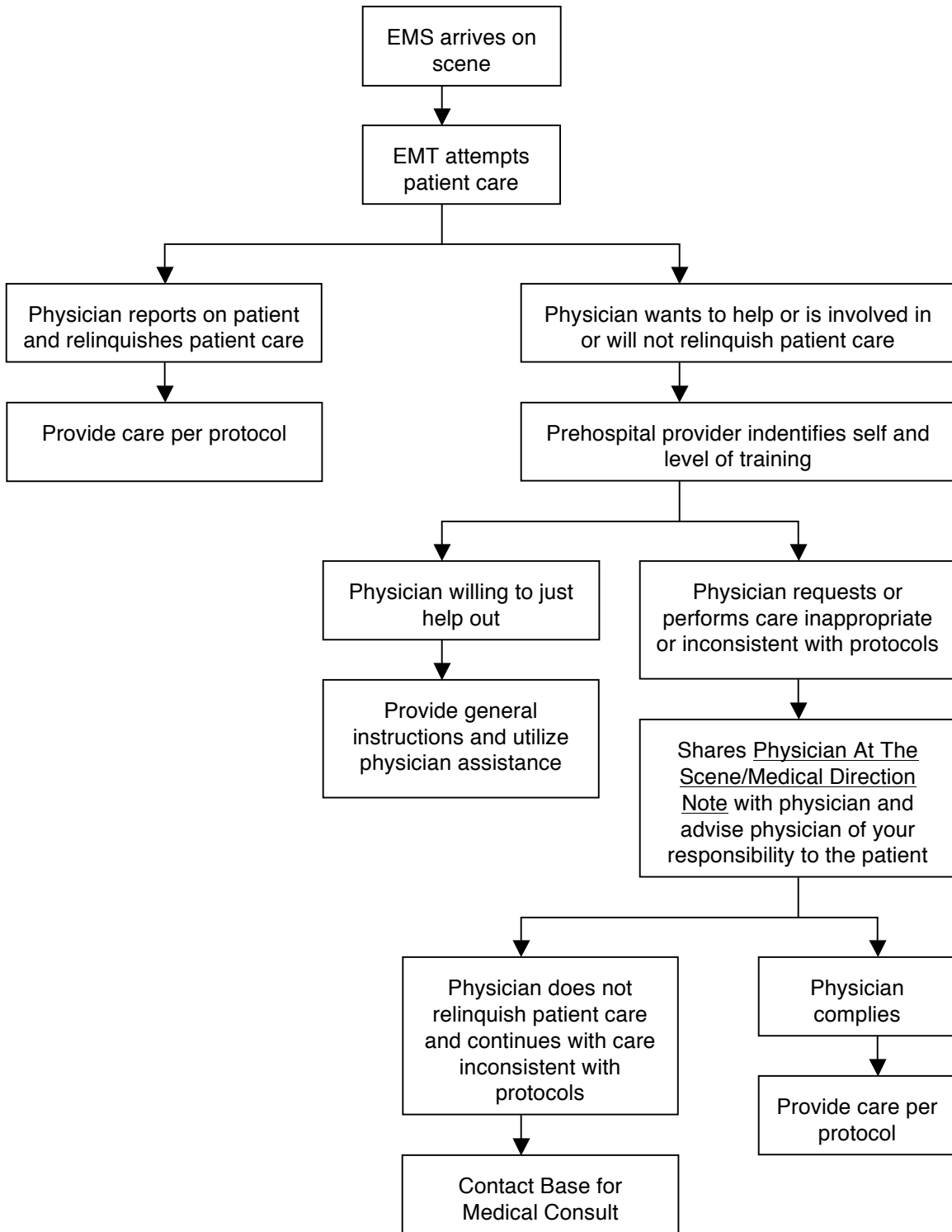
THANK YOU FOR OFFERING YOUR ASSISTANCE DURING THIS EMERGENCY.

\_\_\_\_\_  
Medical Director

\_\_\_\_\_  
Agency

0004 GENERAL GUIDELINES: PHYSICIAN AT THE SCENE/MEDICAL DIRECTION

PHYSICIAN AT THE SCENE/MEDICAL DIRECTION ALGORITHM



## 0005 GENERAL GUIDELINES: TERMINATION OF RESUSCITATION AND FIELD PRONOUNCEMENT GUIDELINES

### Purpose

- A. To provide guidelines for resuscitation and field pronouncement of patients in cardiac arrest in the prehospital setting

### General Principles

- A. Agency policy determines base contact requirements for patients for whom resuscitative efforts are being withheld.
- B. Attempt resuscitation for all patients found pulseless and apneic, unless any of the following are present:
  1. Physician orders as specified on the Colorado Medical Orders for Scope of Treatment (MOST) form: "No CPR. Do Not Resuscitate/DNR/Allow Natural Death", present with the patient
  2. A valid CPR directive present with the patient
  3. Dependent lividity or rigor mortis
  4. Decomposition
  5. Decapitation
  6. Evidence of massive blunt head, chest, or abdominal trauma
  7. Third degree burns over more than 90% of the total body surface area

### Termination of Resuscitation (TOR)

- A. All cases described below require contact with a base physician to approve termination of resuscitation (TOR).
  1. **Blunt Trauma Arrest:**
    - a. Contact Base for TOR if patient found apneic and pulseless and no response to BLS care including chest compressions and bag valve mask ventilations.
  2. **Penetrating Trauma Arrest:**
    - a. Resuscitate and transport to a trauma facility.
      - i. If time of arrest suspected to be > 10 minutes, and no signs of life or response to BLS care (as above), consider base contact for TOR.
  3. **Medical Pulseless Arrest:**
    - a. Resuscitate according to Universal Pulseless Arrest Algorithm on scene (unless unsafe) until one of the following end-points met:
      - i. Return of spontaneous circulation (ROSC).
      - ii. No ROSC despite 15 minutes of provision of ALS care or BLS care with an AED. If shockable rhythm still present, continue resuscitation and transport to closest emergency department.
      - iii. Contact base for TOR at any point if continuous asystole for at least 15 minutes in any patient despite adequate CPR with ventilation and no reversible causes have been identified.
    - b. For BLS-only providers, contact Base for TOR when all of the following criteria met:
      - i. No AED shock advised
      - ii. No ROSC
      - iii. Arrest unwitnessed by either EMS or bystanders
      - iv. No bystander CPR before EMS arrival
    - c. The following patients found pulseless and apneic warrant resuscitation efforts beyond 30 minutes and should be transported:
      - i. Hypothermia

**0005 GENERAL GUIDELINES: TERMINATION OF RESUSCITATION AND FIELD  
PRONOUNCEMENT GUIDELINES**

- ii. Drowning with hypothermia and submersion < 60 minutes
  - iii. Pregnant patient with estimated gestational age  $\geq$  20 weeks
4. After pronouncement, do not alter condition in any way or remove equipment (lines, tubes, etc.), as the patient is now a potential coroner's case.

## 0006 GENERAL GUIDELINES: ADVANCED MEDICAL DIRECTIVES

### Advance Medical Directives

- A. These guidelines apply to both adult and pediatric patients.
- B. There are several types of advance medical directives (documents in which a patient identifies the treatment to be withheld in the event the patient is unable to communicate or participate in medical treatment decisions).
- C. Some patients may have specific physician orders on a Colorado Medical Orders for Scope of Treatment (MOST) form. A MOST form order to withhold CPR or resuscitation should be honored by EMS.
- D. Resuscitation may be withheld from, or terminated for, a patient who has a valid CPR Directive, Do Not Resuscitate Order (DNR), or other advance medical directive when:
  - 1. It is clear to the prehospital provider from the document that resuscitation is refused by the patient or by the patient's attending physician who has signed the document; and
  - 2. Base physician has approved withholding of or ceasing resuscitation.
- E. Suspected suicide does not necessarily negate an otherwise valid CPR Directive, DNR order or other advanced medical directive. **CONTACT BASE**
- F. The **Colorado CPR Directive** directs EMS providers to withhold CPR in the event of cardiac or respiratory arrest or malfunction.
  - 1. "Cardiopulmonary Resuscitation" (CPR) means measures to restore cardiac function or to support breathing in the event of cardiac or respiratory arrest or malfunction. "CPR" includes, but is not limited to, artificial ventilation, chest compression, delivering electric shock, placing tubes in the airway to assist breathing or other basic and advanced resuscitative therapies.
  - 2. CPR Directive bracelet or necklace may be used by an individual and shall be complied with in the same manner as a written CPR Directive.
  - 3. A signed CPR directive form that has been photocopied, scanned, faxed is valid.
- G. A Living Will ("Declaration as to Medical or Surgical Treatment") requires a patient to have a terminal condition, as certified in the patient's hospital chart by two physicians.
- H. Other types of advance directives may be a "Durable Medical Power of Attorney," or "Health Care Proxy". Each of these documents can be very complex and require careful review and verification of validity and application to the patient's existing circumstances. Therefore, the consensus is that resuscitation should be initiated until a physician can review the document or field personnel can discuss the patient's situation with the base physician. **If there is disagreement at the scene about what should be done, CONTACT BASE for guidance.**
- I. Verbal DNR "orders" are not to be accepted by the prehospital provider. In the event family or an attending physician directs resuscitation be ceased, the prehospital provider should immediately **CONTACT BASE**. The prehospital provider should accept verbal orders to cease resuscitation only from the **Base physician**.
- J. There may be times in which the prehospital provider feels compelled to perform or continue resuscitation, such as a hostile scene environment, family members adamant that "everything be done," or other highly emotional or volatile situations. In such circumstances, the prehospital provider should attempt to confer with the base for direction and if this is not possible, the prehospital provider must use his or her best judgment in deciding what is reasonable and appropriate, including transport, based on the clinical and environmental conditions, and establish base contact as soon as possible.

### Additional Considerations:

- A. Patients with valid DNR orders or advanced medical directives should receive supportive or comfort care, e.g. medication by any route, positioning and other measures to relieve

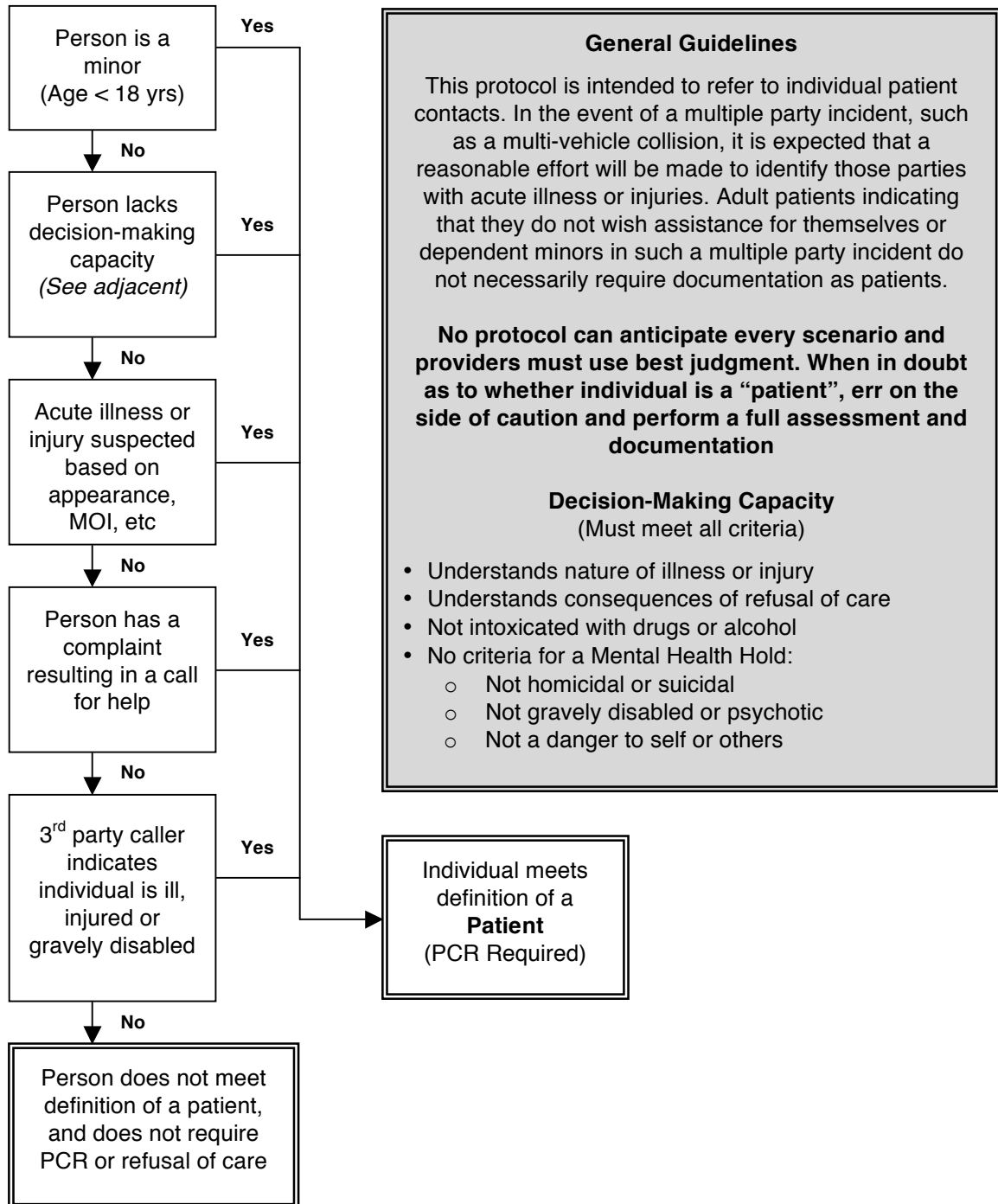
## 0006 GENERAL GUIDELINES: ADVANCED MEDICAL DIRECTIVES

pain and suffering. Also the use of oxygen, suction and manual treatment of an airway obstruction as needed for comfort.

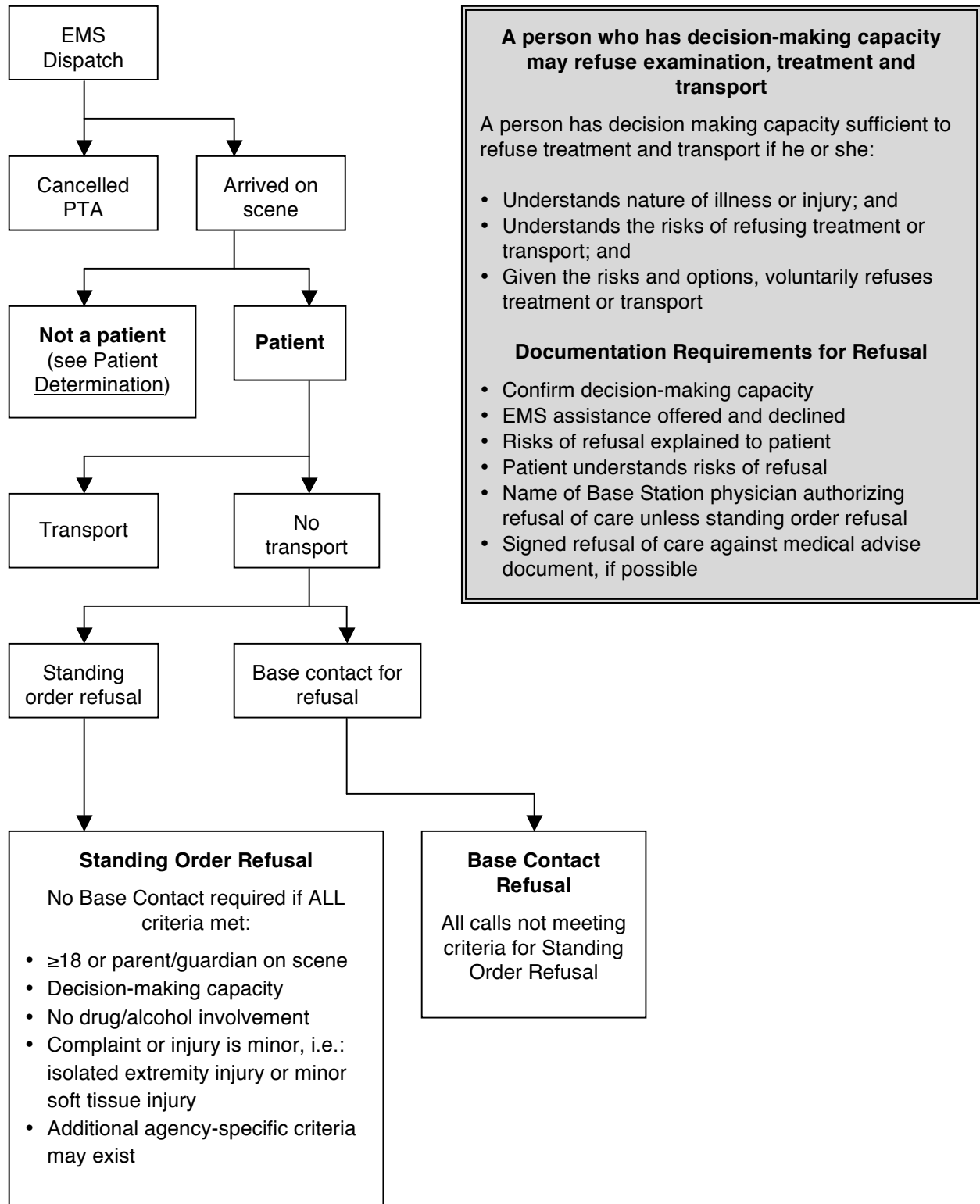
- B. Mass casualty incidents are not covered in detail by these guidelines. (See Colorado State Unified Disaster Tag and Triage System: A Guide to MCI).
- C. If the situation appears to be a potential crime scene, EMS providers should disturb the scene as little as possible and communicate with law enforcement regarding any items that are moved or removed from the scene.
- D. Mechanisms for disposition of bodies by means other than EMS providers and vehicles should be prospectively established in each county or locale.
  - 1. In all cases of unattended deaths occurring outside of a medical facility, the coroner should be contacted immediately.



**0007 GENERAL GUIDELINES: PATIENT DETERMINATION: “PATIENT OR NO PATIENT”**



**0008 GENERAL GUIDELINES: PATIENT NON-TRANSPORT OR REFUSAL**



**A person who has decision-making capacity may refuse examination, treatment and transport**

A person has decision making capacity sufficient to refuse treatment and transport if he or she:

- Understands nature of illness or injury; and
- Understands the risks of refusing treatment or transport; and
- Given the risks and options, voluntarily refuses treatment or transport

**Documentation Requirements for Refusal**

- Confirm decision-making capacity
- EMS assistance offered and declined
- Risks of refusal explained to patient
- Patient understands risks of refusal
- Name of Base Station physician authorizing refusal of care unless standing order refusal
- Signed refusal of care against medical advise document, if possible

## 0009 GENERAL GUIDELINES: EMERGENCY DEPARTMENT DIVERT AND ADVISORY

### Purpose

- A. To provide a standard approach to ambulance diversion that is practical for field use
- B. To facilitate unobstructed access to hospital emergency departments for ambulance patients
- C. To allow for optimal destination policies in keeping with general EMS principles and Colorado State Trauma System Rules and Regulations

### General Principles

- A. *EMSystem*, an internet-based tracking system, is used to manage diversion in the Denver Metro area
- B. The State Trauma Triage Algorithms should be followed
- C. The only time an ambulance can be diverted from a hospital is when that hospital is posted on *EMSystem* as being on official divert (RED) status.
- D. Overriding factors: the following are appropriate reasons for a paramedic to override ED Divert and, therefore, deliver a patient to an emergency department that is on ED divert:
  - 1. Cardiopulmonary arrest
  - 2. Imminent cardiopulmonary arrest
  - 3. Unmanageable airway emergencies
  - 4. Unstable trauma and burn patients transported to Level I and Level II Trauma Centers
  - 5. Patients meeting "Cardiac Alert" criteria (participating hospitals)
  - 6. Patients meeting "Stroke Alert" criteria (participating hospitals)
  - 7. Imminent delivery
- E. Prehospital personnel should honor advisory categories, when possible, considering patient's condition, travel time, and weather. Patients with specific problems that fall under an advisory category should be transported to a hospital not on that specific advisory when feasible.
- F. There are several categories that are considered advisory (yellow) alert categories. These categories are informational only and should alert field personnel that a hospital listed as being on an advisory alert may not be able to optimally care for a patient that falls under that advisory category.
- G. The following are advisory (yellow) categories recognized by the State. Individual facilities may not utilize these categories often, or ever:
  - 1. ICU (Intensive Care Unit)
  - 2. Psych (Psychiatric)
- H. Zone saturation exists when all hospitals within that zone are on ED Divert.
- I. A Zone Master is the designated hospital within a Zone responsible for determining and tracking hospital assignments when the zone is saturated.
- J. When an ambulance is transporting a patient that the paramedic feels cannot go outside the zone due to patient acuity or other concerns, the paramedic should contact the Zone Master and request a destination assignment.
- K. In general, patients contacted within a zone should be transported to an appropriate facility within the zone. Patients may be transported out of the primary zone at the paramedic's discretion, if it is in the patient's best interest or if the transport to an appropriate facility is shorter.
- L. The zones, hospitals in each zone, Zone Masters, and the Zone Master contact phone numbers are listed on *EMSystem*.

## 0100 PROCEDURE PROTOCOL: OROTRACHEAL INTUBATION

### Indications:

EMT-I	Paramedic
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- Respiratory failure
- Absence of protective airway reflexes
- Present or impending complete airway obstruction
- Anticipated prolonged need for positive pressure ventilation

### Contraindications:

- There are no absolute contraindications. However, in general the primary goals of airway management are adequate oxygenation and ventilation, and these should be achieved in the least invasive manner possible
  - Orotracheal intubation is associated with worse outcomes among pediatric patients and head injured patients when compared to BLS airway maneuvers. Therefore, it is relatively contraindicated in these populations
  - Intubation is associated with interruptions in chest compressions during CPR, which is associated with worse patient outcomes. Additionally, intubation itself has not been shown to improve outcomes in cardiac arrest

### Technique:

1. Initiate BLS airway sequence
2. Suction airway and pre-oxygenate with BVM ventilations, if possible
3. Check equipment and position patient:
  - a. If trauma: have assistant hold in-line spinal immobilization in neutral position
  - b. If no trauma, sniffing position or slight cervical hyperextension is preferred
4. Perform laryngoscopy
  - a. To improve laryngeal view, use right hand to manipulate larynx, or have assistant apply backwards, upwards, rightward pressure (BURP)
5. Place ETT. Confirm tracheal location and appropriate depth and secure tube
  - a. Correct tube depth may be estimated as 3 times the internal diameter of tube at teeth or gums (e.g: 7.0 ETT is positioned at 21 cm at teeth)
6. Confirm and document tracheal location by:
  - a. ETCO<sub>2</sub>
  - b. Presence and symmetry of breath sounds
  - c. Rising SpO<sub>2</sub>
  - d. Other means as needed
7. Ventilate with BVM. Assess adequacy of ventilations
8. During transport, continually reassess ventilation, oxygenation and tube position with continuous ETCO<sub>2</sub> and SpO<sub>2</sub>

### Precautions:

- Ventilate at age-appropriate rates. Do not hyperventilate
- If the intubated patient deteriorates, think “DOPE”
  - **D**islodgement
  - **O**bstruction
  - **P**neumothorax
  - **E**quipment failure (no oxygen)
- Reconfirm and document correct tube position after moving patient and before disconnecting from monitor in ED
- Unsuccessful intubation does not equal failed airway management. Many patients cannot be intubated without paralytics. Use King airway or BVM ventilations if 2 attempts at intubation unsuccessful.

## 0110 PROCEDURE PROTOCOL: NASOTRACHEAL INTUBATION

Paramedic

### Indications:

- Age  $\geq$  12 years spontaneously breathing patient with indication for intubation who cannot tolerate either supine position or laryngoscopy
- Present or impending airway obstruction
- Lack of protective airway reflexes
- Anticipated prolonged need for positive pressure ventilation

### Contraindications:

- Apnea
- Severe mid-face trauma

### Technique:

1. Initiate BLS airway sequence
2. Suction airway and pre-oxygenate with BVM ventilations, if possible
3. Check equipment, choose correct ETT size (usually 7.0 in adult, limit is size of naris)
4. Position patient with head in midline, neutral position
5. If trauma: cervical collar may be in place, or assistant may hold in-line stabilization in neutral position
6. If no trauma, patient may be sitting upright
7. Administer phenylephrine nasal drops in each nostril
8. Lubricate ETT with Lidocaine jelly or other water-soluble lubricant
9. With gentle steady pressure, advance the tube through the nose to the posterior pharynx. Use the largest nostril. Abandon procedure if significant resistance is felt
10. Keeping the curve of the tube exactly in midline, continue advancing slowly
11. There will be slight resistance just before entering trachea. Wait for an inspiratory effort before final passage through cords. Listen for loss of breath sounds
12. Continue advancing tube until air is definitely exchanging through tube, then advance 2 cm more and inflate cuff
13. Note tube depth and tape securely
14. Confirm and document endotracheal location by:
  - a. ETCO<sub>2</sub>
  - b. Presence and symmetry of breath sounds
  - c. Rising SpO<sub>2</sub>
  - d. Other means as needed
15. Ventilate with BVM. Assess adequacy of ventilations
16. During transport, continually reassess ventilation, oxygenation and tube position with continuous ETCO<sub>2</sub> and SpO<sub>2</sub>

### Precautions:

- Before performing BNTI, consider if patient can be safely ventilated with non-invasive means such as CPAP or BVM
- Ventilate at age-appropriate rates. Do not hyperventilate
- If the intubated patient deteriorates, think "DOPE"
  - Dislodgement
  - Obstruction
  - Pneumothorax
  - Equipment failure (no oxygen)
- Reconfirm and document correct tube position after moving patient and before disconnecting from monitor in ED

## **0110 PROCEDURE PROTOCOL: NASOTRACHEAL INTUBATION**

- Blind nasotracheal intubation is a very gentle technique. The secret to success is perfect positioning and patience.

## 0120 PROCEDURE PROTOCOL: PERCUTANEOUS CRICOTHYROTOMY

Paramedic

### **Introduction:**

- Percutaneous cricothyrotomy is a difficult and hazardous procedure that is to be used only in extraordinary circumstances as defined below. The reason for performing this procedure must be documented and submitted for review to the EMS Medical Director within 24 hours.

### **Indications:**

- A life-threatening condition exists AND advanced airway management is indicated, **AND** adequate oxygenation and ventilation cannot be accomplished by other less invasive means.

### **Contraindications:**

- Anterior neck hematoma is a relative contraindication
- Age < 12 is a relative contraindication

### **Technique:**

1. Prepare skin using aseptic solution
2. Position the patient in a supine position, with in-line spinal immobilization if indicated. If cervical spine injury not suspected, neck extension will improve anatomic view
3. Perform cricothyrotomy according to manufacturer's instructions for selected device
4. Confirm and document tube placement by:
  - a. ETCO<sub>2</sub>
  - b. Breath sounds
  - c. Rising pulse oximetry
  - d. Other means as needed
5. Ventilate with BVM assessing adequacy of ventilation
6. Observe for subcutaneous air, which may indicate tracheal injury or extra- tracheal tube position
7. Secure tube with tube ties or device
8. Continually reassess ventilation, oxygenation and tube placement

### **Precautions:**

- Success of procedure is dependent on correct identification of cricothyroid membrane
- Bleeding will occur, even with correct technique. Straying from the midline is dangerous and likely to cause hemorrhage

## 0130 PROCEDURE PROTOCOL: KING AIRWAY

EMT	EMT-I	Paramedic
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### Indications:

- Rescue airway if unable to intubate a patient in need of airway protection
- Primary airway if intubation anticipated to be difficult and rapid airway control is necessary
- Primary airway in pulseless arrest, when attempts at intubation are likely to interrupt CPR
- Designated advanced airway for EMTs

### Contraindications:

- Intact gag reflex
- Caustic ingestion

### Technique

1. Initiate BLS airway sequence
2. Select proper size King airway based on patient height:
  - a. 4'-5' tall = #3
  - b. 5'-6' tall = #4
  - c. > 6' tall = #5
3. Assemble equipment, note correct volume for inflation marked on tube itself, test balloon for leaks, lubricate posterior aspect distal tip with water-soluble lubricant (included)
4. Suction airway and pre-oxygenate with BVM ventilations, if possible
5. If trauma: have assistant hold in-line spinal immobilization in neutral position
6. If no trauma, sniffing position or slight cervical hyperextension is preferred
7. Hold King tube in dominant hand at the connector. With other hand, open mouth and lift chin
8. Rotate King tube so blue index line is facing corner of mouth
9. Introduce tip into mouth and advance airway behind tongue into the hypopharynx
10. As tube passes tongue, rotate King so that blue index line is again facing the chin
11. Without excessive force, advance King so that base is aligned with teeth or gums
12. Using supplied syringe, inflate cuff balloon with correct volume of air (marked on King tube):
  - a. Size 3 = 50 mL
  - b. Size 4 = 70 mL
  - c. Size 5 = 80 mL
13. Attach bag to King and begin ventilating patient. While bagging, slowly and slightly withdraw King until ventilations are easy and chest rise is adequate
14. Confirm tube placement by auscultation, chest movement, and ETCO<sub>2</sub>
15. Monitor patient for vomiting and aspiration
16. Continuously monitor ETCO<sub>2</sub>, SpO<sub>2</sub>, vital signs

### Precautions:

1. If patient < 4' tall, an appropriately sized pediatric King tube must be used (*At the time of this version of Denver Metro Protocol, Pediatric King tubes are by waiver only*)
2. Use with caution in patients with broken teeth, which may lacerate balloon
3. Use with caution in patients with known esophageal disease
4. Do not remove a properly functioning King tube in order to attempt intubation



## 0140 PROCEDURE PROTOCOL: CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

### Indications:

- Symptomatic patients with moderate-to-severe respiratory distress as evidenced by at least two (2) of the following:
  - Rales (crackles)
  - Dyspnea with hypoxia ( $SpO_2 < 90\%$  despite  $O_2$ )
  - Dyspnea with verbal impairment – i.e. cannot speak in full sentences
  - Accessory muscle use
  - Respiratory rate  $> 24$ /minute despite  $O_2$
  - Diminished tidal volume

EMT-I	Paramedic
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### Contraindications:

- Respiratory or cardiac arrest
- Systolic BP  $< 90$ mmHg
- Lack of airway protective reflexes
- Significant altered level of consciousness such that unable to follow verbal instructions or signal distress
- Vomiting or active upper GI bleed
- Suspected pneumothorax
- Trauma
- Patient size or anatomy prevents adequate mask seal

### Technique:

1. Place patient in a seated position and explain the procedure to him or her
2. Assess vital signs (BP, HR, RR,  $SpO_2$ , and  $ETCO_2$ )
3. Apply the CPAP mask and secure with provided straps, progressively tightening as tolerated to minimize air leak
4. Operate CPAP device according to manufacturer specifications
5. For oxygen flow driven devices such as Boussignac device:
  - a. Adjust oxygen flow to 15 Lpm initially. Monitor patient continuously, recording vital signs every 5 minutes
  - b. Start with the lowest continuous pressure that appears to be effective. Adjust pressure following manufacturer instructions to achieve the most stable respiratory status utilizing the signs described below as a guide
6. Assess patient for improvement as evidenced by the following:
  - a. Reduced dyspnea
  - b. Reduced verbal impairment, respiratory rate and heart rate
  - c. Increased  $SpO_2$
  - d. Stabilized blood pressure
  - e. Appropriate  $ETCO_2$  values and waveforms
  - f. Increased tidal volume
7. Observe for signs of deterioration or failure of response to CPAP:
  - a. Decrease in level of consciousness
  - b. Sustained or increased heart rate, respiratory rate or increased blood pressure
  - c. Sustained low or decreasing  $SpO_2$  readings
  - d. Rising  $ETCO_2$  levels or other  $ETCO_2$  evidence of ventilatory failure
  - e. Diminished or no improvement in tidal volume

### Precautions:

- Should patient deteriorate on CPAP:
  - Troubleshoot equipment
  - Consider endotracheal intubation
  - Assess need for possible chest decompression due to pneumothorax
  - Assess for possibility of hypotension due to significantly reduced preload from positive pressure ventilation
- In-line nebulized medications may be given during CPAP as indicated and in accordance with

**0140 PROCEDURE PROTOCOL: CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)**

manufacturer guidelines

## 0150 PROCEDURE PROTOCOL: CAPNOGRAPHY

EMT	EMT-I	Paramedic
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### **Indications:**

- MANDATORY: to rule out esophageal intubation and confirm endotracheal tube position in all intubated patients.
- To identify late endotracheal tube dislodgement
- To monitor ventilation and perfusion in any ill or injured patient

### **Contraindications:**

- None

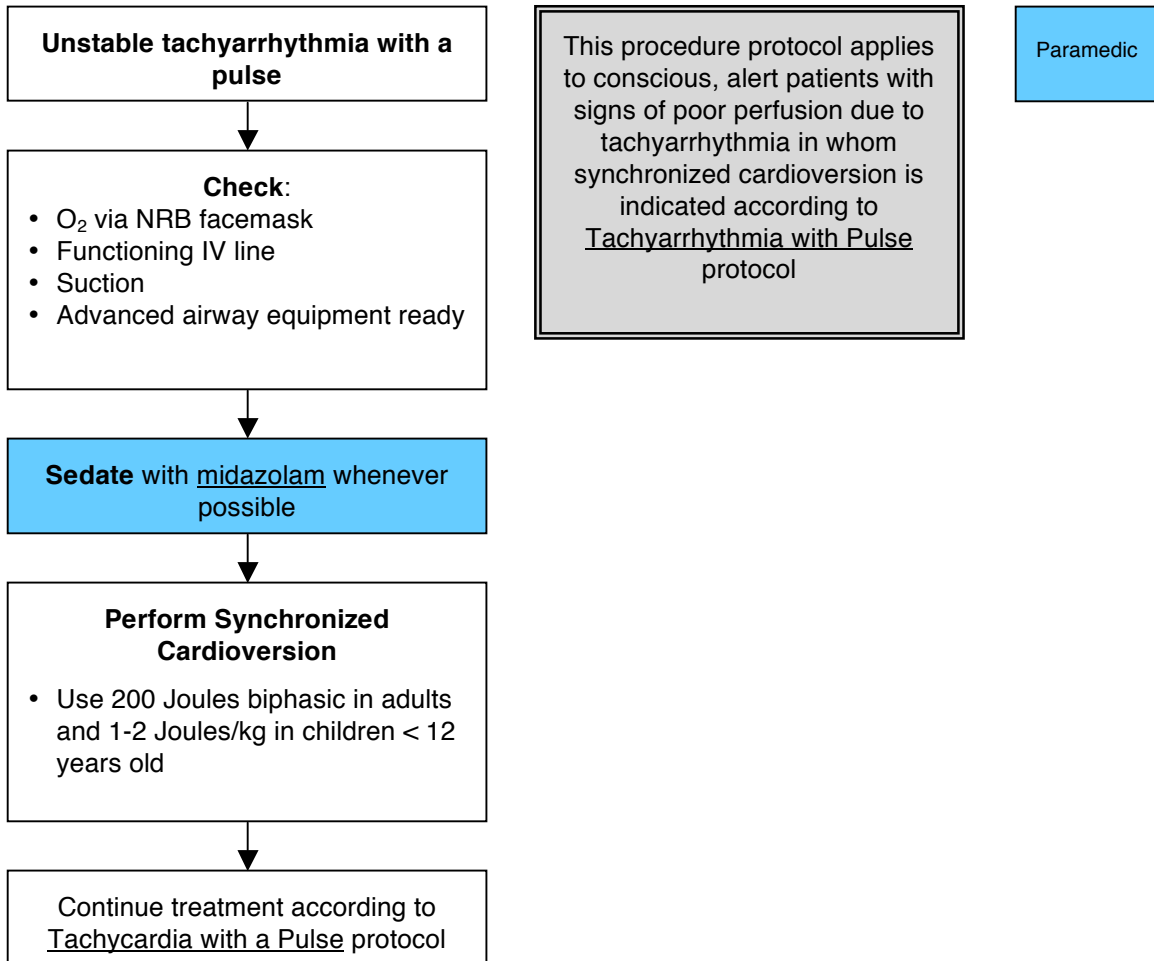
### **Technique:**

1. In patient with ETT or advanced airway: place ETCO<sub>2</sub> detector in-line between airway adaptor and BVM after airway positioned and secured
2. Patients without ETT or advanced airway in place: place ETCO<sub>2</sub> cannula on patient. May be placed under CPAP or NRB facemask
3. Assess and document both capnography waveform and ETCO<sub>2</sub> value

### **Precautions:**

1. To understand and interpret capnography, remember the 3 determinants of ETCO<sub>2</sub>:
  - a. Alveolar ventilation
  - b. Pulmonary perfusion
  - c. Metabolism
2. Sudden loss of ETCO<sub>2</sub>:
  - a. Tube dislodged
  - b. Circuit disconnected
  - c. Cardiac arrest
3. High ETCO<sub>2</sub> (> 45)
  - a. Hypoventilation/CO<sub>2</sub> retention
4. Low ETCO<sub>2</sub> (< 25)
  - a. Hyperventilation
  - b. Low perfusion: shock, PE, sepsis
5. Cardiac Arrest:
  - a. In low-pulmonary blood flow states, such as cardiac arrest, the primary determinant of ETCO<sub>2</sub> is blood flow, so ETCO<sub>2</sub> is a good indicator of quality of CPR
  - b. If ETCO<sub>2</sub> is dropping, change out person doing chest compressions
  - c. In cardiac arrest, if ETCO<sub>2</sub> not > 10 mmHg after 20 minutes of good CPR, this likely reflects very low CO<sub>2</sub> production (dead body) and is a 100% predictor of mortality

## 0160 PROCEDURE PROTOCOL: SYNCHRONIZED CARIOVERSION



### Precautions:

- If rhythm is AV nodal reentrant tachycardia (AVNRT, historically referred to as “PSVT”) it is preferred to attempt a trial of adenosine prior to electrical cardioversion, even if signs of poor perfusion are present, due to rapid action of adenosine
- If defibrillator does not discharge in “synch” mode, then deactivate “synch” and reattempt
- If sinus rhythm achieved, however briefly, then dysrhythmia resumes immediately, repeated attempts at cardioversion at higher energies are unlikely to be helpful. First correct hypoxia, hypovolemia, etc. prior to further attempts at cardioversion
- If pulseless, treat according to Universal Pulseless Arrest Algorithm
- Chronic atrial fibrillation is rarely a cause of hemodynamic instability, especially if rate is < 150 bpm. First correct hypoxia, hypovolemia, before considering cardioversion of chronic atrial fibrillation, which may be difficult, or impossible and poses risk of stroke
- Sinus tachycardia rarely exceeds 150 bpm in adults or 220 bpm in children < 8 years and does not require or respond to cardioversion. Treat underlying causes.
- Transient dysrhythmias or ectopy are common immediately following cardioversion and rarely require specific treatment other than supportive care

## 0170 PROCEDURE PROTOCOL: TRANSCUTANEOUS CARDIAC PACING

EMT-I	Paramedic
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### Indications

1. Symptomatic bradyarrhythmias (includes A-V block) not responsive to medical therapy

### Precautions

2. Conscious patient will experience discomfort; consider midazolam if blood pressure allows.

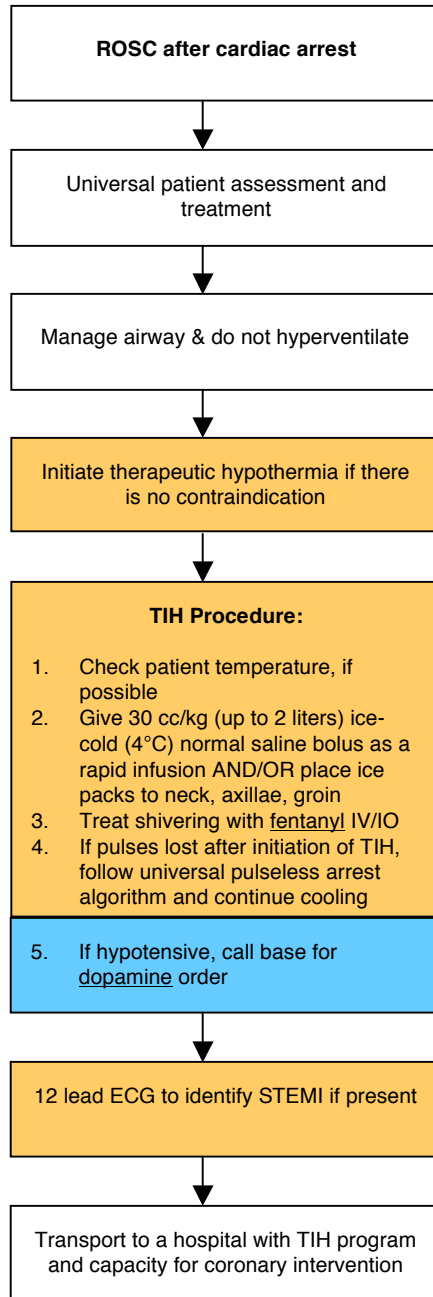
### Technique

1. Apply electrodes as per manufacturer specifications: (-) left anterior, (+) left posterior.
2. Turn pacer unit on.
3. Set initial current to 40 mAmps .
4. Select pacing rate at 80 beats per minute (BPM)
5. Start pacing unit.
6. Confirm that pacer senses intrinsic cardiac activity by adjusting ECG size.
7. Increase current 10 mAmps every 10-15 seconds until capture or 200 mAmps (usually captures around 100 mAmps).
8. If there is electrical capture, check for femoral pulse.
9. If no capture occurs with maximum output, discontinue pacing and resume ACLS.
10. If there are no pulses with capture treat PEA

### Complications

1. Ventricular fibrillation and ventricular tachycardia are rare complications, but follow appropriate protocols if either occur.
2. Pacing is rarely indicated in patients under the age of 12 years.
3. Muscle tremors may complicate evaluation of pulses, femoral pulse may be more accurate.
4. Pacing may cause diaphragmatic stimulation and apparent hiccups.
5. CPR is safe during pacing. A mild shock may be felt if direct active electrode contact is made.

# 0180 PROCEDURE PROTOCOL: THERAPEUTIC INDUCED HYPOTHERMIA AFTER CARDIAC ARREST



EMT	EMT-I	Paramedic
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**Return of spontaneous circulation (ROSC) criteria:**

- Pulse and measurable blood pressure
- Increase in ET<sub>CO</sub><sub>2</sub> on capnography

**Contraindications to TIH:**

- Purposeful response to painful stimuli
- Age < 12 years
- Active bleeding
- Traumatic arrest
- Definite pregnancy
- Temperature < 34° C (93.2° F) or suspected hypothermia

**Document:**

- Time of arrest (or time last seen normal)
- Witnessed vs. unwitnessed arrest
- Initial rhythm shockable vs. non-shockable
- Bystander CPR given
- Time of ROSC
- GCS after ROSC
- Initial temperature if TIH patient

**Consider and Contact Base For Other Indications For Cooling:**

- Drowning
- Hanging or asphyxiation
- Hyperthermia

## 0190 PROCEDURE PROTOCOL: RESTRAINT PROTOCOL

### Indications:

EMT	EMT-I	Paramedic
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- A. Physical restraint of patients is permissible and encouraged if the patient poses a danger to him or herself or to others. Only reasonable force is allowable, i.e., the minimum amount of force necessary to control the patient and prevent harm to the patient or others. Try alternative methods first (e.g., verbal de-escalation should be used first if the situation allows).
- B. **Paramedic:** Consider pharmacological treatment (sedation) of agitation in patients that require transport and are behaving in a manner that poses a threat to him or herself or others.
  1. See Agitated/Combative Patient Protocol: (The term “chemical restraint” is no longer preferred)
- C. Restraints may be indicated for patients who meet the following criteria:
  1. A patient who is significantly impaired (e.g. intoxication, medical illness, injury, psychiatric condition, etc) and lacks decision-making capacity regarding his or her own care.
  2. A patient who exhibits violent, combative or uncooperative behavior who does not respond to verbal deescalation.
  3. A patient who is suicidal and considered to be a risk for behavior dangerous to his or herself or to healthcare providers.
  4. A patient who is on a mental health hold.

### Precautions:

- A. When appropriate, involve law enforcement
- B. Restraints shall be used only when necessary to prevent a patient from seriously injuring him or herself or others (including the ambulance crew), and only if safe transportation and treatment of the patient cannot be accomplished without restraints. They may not be used as punishment, or for the convenience of the crew.
- C. Any attempt to restrain a patient involves risk to the patient and the prehospital provider. Efforts to restrain a patient should only be done with adequate assistance present.
- D. Be sure to evaluate the patient adequately to determine his or her medical condition, mental status and decision-making capacity.
- E. Do not use hobble restraints and do not restrain the patient in the prone position or any position that is impairing the airway or breathing.
- F. Search the patient for weapons.
- G. Handcuffs are not appropriate medical restraints and should only be placed by law enforcement personnel. See Handcuff Protocol.

### Technique:

- A. Treat the patient with respect. Attempts to verbally reassure or calm the patient should be done prior to the use of restraints. To the extent possible, explain what is being done and why.
- B. Have all equipment and personnel ready (restraints, suction, a means to promptly remove restraints).
- C. Use assistance such that, if possible, 1 rescuer handles each limb and 1 manages the head or supervises the application of restraints.
- D. Apply restraints to the extent necessary to allow treatment of, and prevent injury to, the patient. **Under-restraint may place patient and provider at greater risk.**
- E. After application of restraints, check all limbs for circulation. During the time that a patient is in restraints, continuous attention to the patient’s airway, circulation and vital signs is mandatory. A restrained patient may never be left unattended.

## 0190 PROCEDURE PROTOCOL: RESTRAINT PROTOCOL

### **Documentation :**

Document the following in all cases of restraint:

- A. Description of the facts justifying restraint
- B. Efforts to de-escalate prior to restraint
- C. Type of restraints used
- D. Condition of the patient while restrained, including reevaluations during transport
- E. Condition of the patient at the time of transfer of care to emergency department staff
- F. Any injury to patient or to EMS personnel

### **Complications:**

- A. Aspiration: continually monitor patient's airway
- B. Nerve injury: assess neurovascular status of patient's limbs during transport
- C. Complications of medical conditions associated with need for restraint
  - 1. Patients may have underlying trauma, hypoxia, hypoglycemia, hyperthermia, hypothermia, drug ingestion, intoxication or other medical conditions
- D. Excited Delirium Syndrome. This is a life-threatening medical emergency. These patients are truly out of control. They will have some or all of the following symptoms: paranoia, disorientation, hyper-aggression, hallucination, tachycardia, increased strength, and hyperthermia.



## 0200 PROCEDURE PROTOCOL: TOURNIQUET PROTOCOL

### Indications

- A. A tourniquet may be used to control potentially fatal hemorrhage only after other means of hemorrhage control have failed.

EMT	EMT-I	Paramedic
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### Precautions

- A. A tourniquet applied incorrectly can increase blood loss.
- B. Applying a tourniquet can cause nerve and tissue damage whether applied correctly or not. Proper patient selection is of utmost importance.
- C. Injury due to tourniquet is unlikely if the tourniquet is removed within 1 hour. In cases of life-threatening bleeding benefit outweighs theoretical risk.
- D. A commercially made tourniquet is the preferred tourniquet. If none is available, a blood pressure cuff inflated to a pressure sufficient to stop bleeding is an acceptable alternative. Other improvised tourniquets are not allowed.

### Technique

- A. First attempt to control hemorrhage by using direct pressure over bleeding area.
- B. If a discrete bleeding vessel can be identified, point pressure over bleeding vessel is more effective than a large bandage and diffuse pressure.
- C. If unable to control hemorrhage using direct pressure, apply tourniquet according to manufacturer specifications and using the steps below:
  - 1. Cut away any clothing so that the tourniquet will be clearly visible. NEVER obscure a tourniquet with clothing or bandages.
  - 2. Apply tourniquet proximal to the wound and not across any joints.
  - 3. Tighten tourniquet until bleeding stops. Applying tourniquet too loosely will only increase blood loss by inhibiting venous return.
  - 4. Mark the time and date of application on the patient's skin next to the tourniquet.
  - 5. Keep tourniquet on throughout hospital transport – a correctly applied tourniquet should only be removed by the receiving hospital.

**0210 PROCEDURE PROTOCOL: NEEDLE THORACOSTOMY FOR TENSION  
PNEUMOTHORAX DECOMPRESSION**

EMT-I	Paramedic
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**Indication:**

- A. Needle decompression of tension pneumothorax is a standing order for EMT-I and Paramedics.
- B. **All** of the following clinical indicators must be present:
  - 1. Severe respiratory distress
  - 2. Hypotension
  - 3. Unilateral absent or decreased breath sounds

**Technique:**

- A. Expose entire chest
- B. Clean skin overlying site with available skin prep
- C. Insert largest, longest available angiocath either at 2<sup>nd</sup> intercostal space at midclavicular line, or 5<sup>th</sup> intercostal space at midaxillary line
  - 1. Either approach is acceptable, generally the site with the least soft tissue overlying ribs is preferred
- D. Notify receiving hospital of needle decompression attempt

**Precautions:**

- A. Angiocath may become occluded with blood or by soft tissue
- B. A simple pneumothorax is NOT an indication for needle decompression
- C. Do not attempt more than once per lung

## 0220 PROCEDURE PROTOCOL: INTRAOSSEUS CATHETER PLACEMENT

EMT-I	Paramedic
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### **Indications (must meet all criteria):**

- A. Rescue or primary vascular access device when peripheral IV access not obtainable in a patient with critical illness defined as:
  - 1. Cardiopulmonary arrest or impending arrest
  - 2. Profound shock with severe hypotension and poor perfusion
- B. Utilization of IO access for all other patients requires base station contact
  - 1. E.g.: Hypoglycemia with severe symptoms (e.g. unresponsive) and no venous access
- C. IO placement may be considered prior to peripheral IV attempts in critical patients without identifiable peripheral veins

### **Technique:**

- A. Site of choice – tibial plateau: 2 fingerbreadths below the tibial tuberosity on the anteromedial surface of tibia.
  - 1. Alternative sites (e.g. humeral head in adults) are device-specific and require authorization from the agency Medical Director.
- B. Clean skin with povidone-iodine.
- C. Place intraosseous needle perpendicular to the bone.
- D. Follow manufacturer's guidelines specific to the device being used for insertion.
- E. Entrance into the bone marrow is indicated by a sudden loss of resistance.
- F. Flush line with 10 cc saline. Do not attempt to aspirate marrow
  - a. If patient conscious, administer lidocaine for pain control before infusing any other fluids
- G. Secure line
  - 1. Even if properly placed, the needle will not be secure. The needle must be secured and the IV tubing taped. The IO needle should be stabilized at all times.
- H. Observe for signs of limb swelling, decreased perfusion to distal extremity that would indicate a malpositioned IO catheter or other complication. If limb becomes tense or malperfused, disconnect IO tubing immediately and leave IO in place.
- I. A person should be assigned to monitor the IV at the scene and en route to the hospital.
- J. Do not make more than one IO placement attempt per bone.
- K. Do not remove IO needles in the field.
- L. Notify hospital staff of all insertion sites/attempts and apply patient wristband included with kit to identify IO patient.

### **Complications:**

- A. Fracture
- B. Compartment syndrome
- C. Infection

### **Contraindications:**

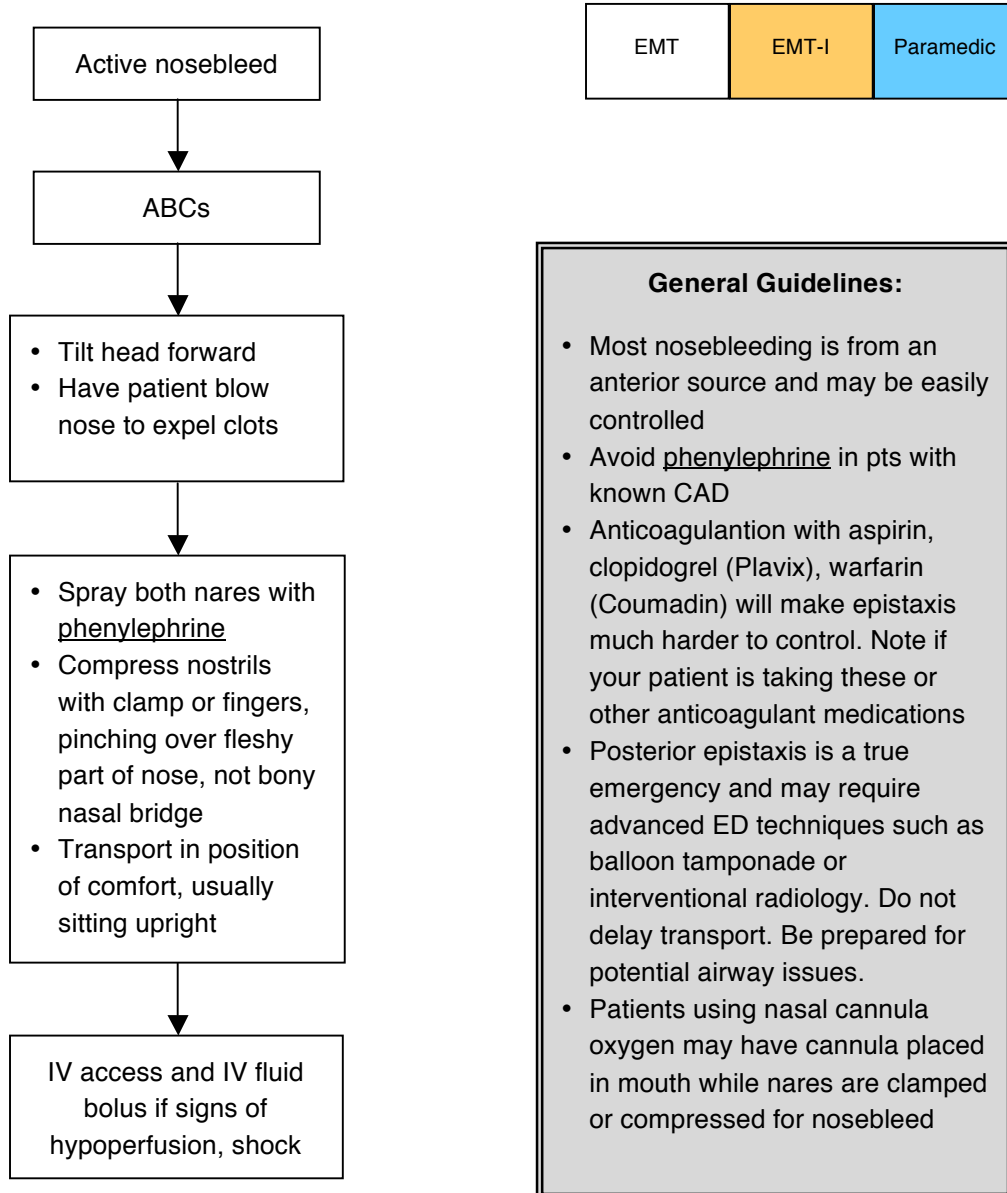
- A. Fracture of target bone
- B. Cellulitis (skin infection overlying insertion site)
- C. Osteogenesis imperfecta (rare condition predisposing to fractures with minimal trauma)
- D. Total knee replacement (hardware will prevent placement)

### **Side Effects and Special Notes:**

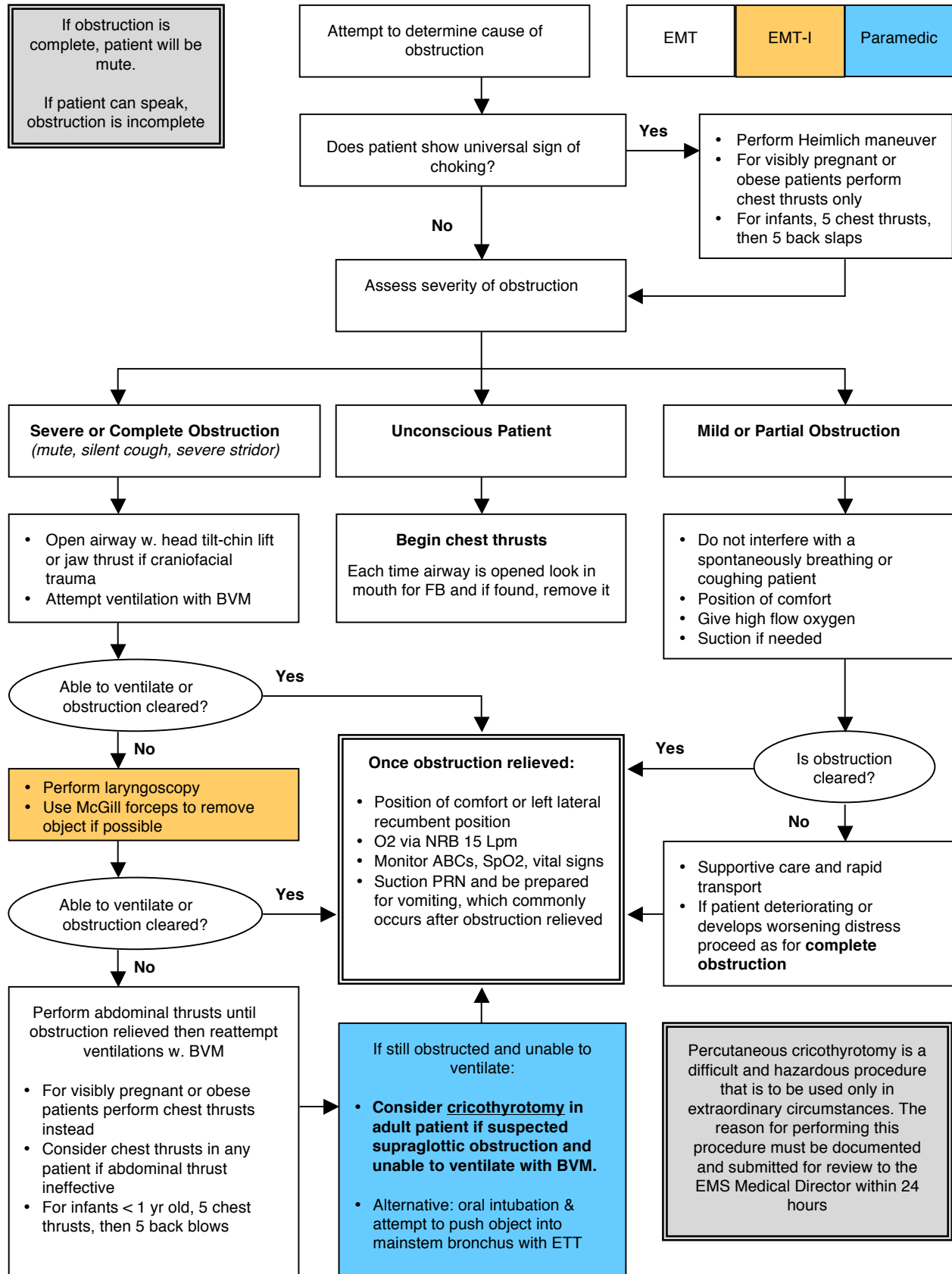
## **0220 PROCEDURE PROTOCOL: INTRAOSSEUS CATHETER PLACEMENT**

- A. Some authorities recommend aspiration of marrow fluid or tissue to confirm needle location. This is not recommended for field procedures, as it increases the risk of plugging the needle.
- B. Expect flow rates to be slower than peripheral IVs. Pressure bags may be needed. Any drug or IV fluid may be infused.
- C. Some manufacturers recommend the use of lidocaine for the treatment of pain associated with fluid administration. Check with your manufacturer and Medical Director for further guidance

## 0230 PROCEDURE PROTOCOL: EPISTAXIS MANAGEMENT



# 1010 OBSTRUCTED AIRWAY



## 2000 ADULT (AGE ≥ 12 years) CARDIAC ARREST GENERAL PRINCIPLES

### **Specific Information Needed For Patient Care Report**

- Onset (witnessed or unwitnessed), preceding symptoms, bystander CPR, downtime before CPR and duration of CPR
- Past History: medications, medical history, suspicion of ingestion, trauma, environmental factors (hypothermia, inhalation, asphyxiation)

### **Document Specific Objective Findings**

- Unconscious, unresponsive
- Agonal, or absent respirations
- Absent pulses
- Any signs of trauma, blood loss
- Skin temperature

### **General Guidelines: Chest Compressions**

- 1 cycle of CPR = 30:2 chest compressions: breaths
- 5 cycles CPR = 2 minutes chest compressions
- Push hard and push fast (at least 100/minute)
- Ensure full chest recoil
- Rotate compressors every 2 minutes with rhythm checks
- During CPR, any interruption in chest compressions deprives heart and brain of necessary blood flow and lessens chance of successful defibrillation
  - Continue CPR while defibrillator is charging, and resume CPR immediately after all shocks. Do not check pulses except at end of CPR cycle and if rhythm is organized at rhythm check

### **General Guidelines: Defibrillation**

- In unwitnessed cardiac arrest, give first 2 minutes of CPR without interruptions for ventilation. During this time period passive oxygenation is preferred with OPA and NRB facemask. If arrest is witnessed by EMS, immediate defibrillation is first priority
- All shocks should be given as single maximum energy shocks
  - Manual biphasic: follow device-specific recommendations for defibrillation. If uncertain, give maximum energy (e.g. 200J)
  - Manual monophasic: 360J
  - AED: device specific

### **General Guidelines: Ventilation during CPR**

- If suspected cardiac etiology of arrest, during first approximately 5 minutes of VT/VF arrest, passive oxygenation with OPA and NRB facemask is preferred to positive pressure ventilation with BVM or advanced airway
- EMS personnel must use good judgment in assessing likely cause of pulseless arrest. In patients suspected of having a primary respiratory cause of cardiopulmonary arrest, (e.g.: COPD or status asthmaticus), adequate ventilation and oxygenation are a priority
- In general, patients with cardiac arrest initially have adequately oxygenated blood, but are in circulatory arrest. Therefore, chest compressions are initially more important than ventilation to provide perfusion to coronary arteries
- Do not interrupt chest compressions and do not hyperventilate. Hyperventilation decreases effectiveness of CPR and worsens outcome

### **General Guidelines: Timing Of Placement Of Advanced Airway**

**2000 ADULT (AGE ≥ 12 years) CARDIAC ARREST  
GENERAL PRINCIPLES**

- Advanced airway (e.g. King, LMA, ETT) may be placed at any time after initial 2 rounds of chest compressions and rhythm analysis, provided placement does not interrupt chest compressions
- Once an advanced airway is in place, compressions are given continuously and breaths given asynchronously at 8-10 per minute
- Always confirm advanced airway placement with ET $\text{CO}_2$ 
  - Use continuous waveform capnography if available. In low flow states such as cardiac arrest, colorimetric  $\text{CO}_2$  detector may be inaccurate and not sense very low  $\text{CO}_2$  level

**General Guidelines: Pacing**

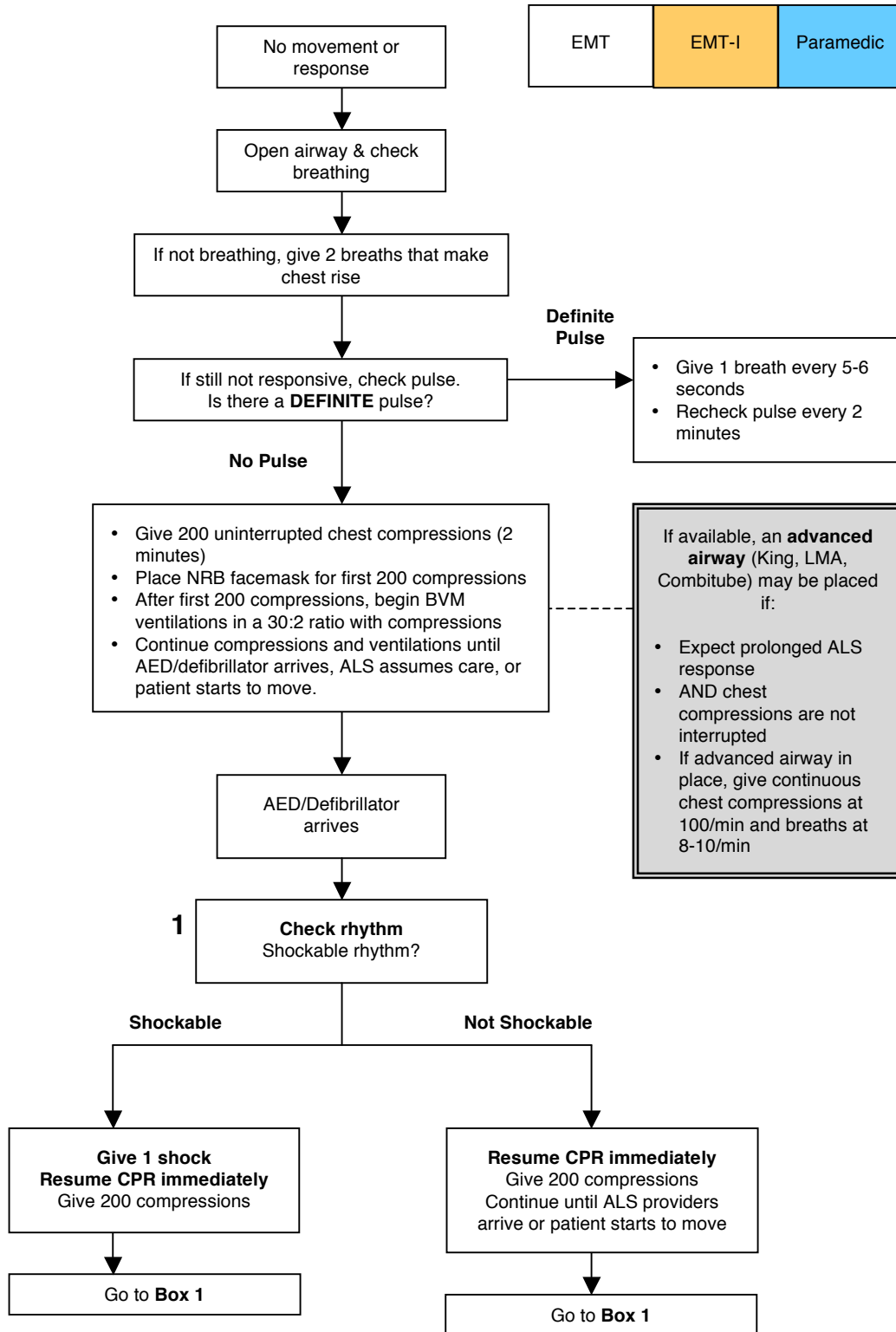
- Pacing is not indicated for asystole and PEA. Instead start chest compressions according to Universal Pulseless Arrest Algorithm.
- Pacing should **not** be undertaken if it follows unsuccessful defibrillation of VT/VF as it will only interfere with CPR and is not effective

**General Guidelines: ICD/Pacemaker patients**

- If cardiac arrest patient has an implantable cardioverter defibrillator (ICD) or pacemaker: place pacer/defib pads at least 1 inch from device. Biaxillary or anterior posterior pad placement may be used

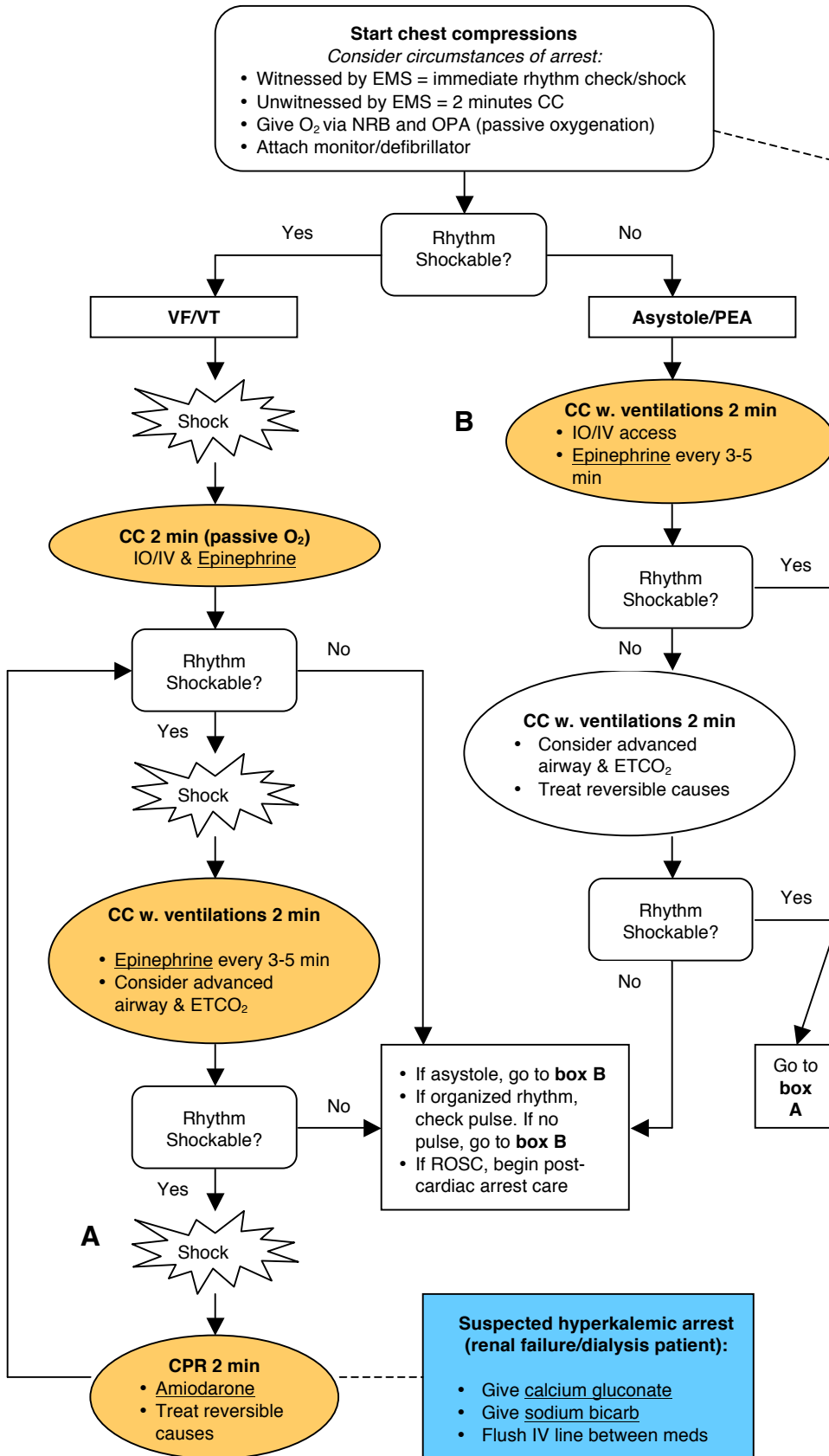


## 2010 ADULT (AGE ≥ 12 YEARS) BLS PULSELESS ARREST ALGORITHM



# 2020 ADULT (AGE ≥ 12 YEARS) PULSELESS ARREST ALS ALGORITHM

EMT	EMT-I	Paramedic
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**CPR Quality:**

- Push hard (≥ 2 inches) and fast and allow complete chest recoil
- Do not ventilate excessively
- Ventilatory rate = 8-10/min
- Change CC provider every 2 minutes
- If ETCO<sub>2</sub> < 10, attempt to improve CPR quality
- Additional emphasis may be placed on ventilations in appropriate clinical scenario: i.e. presumed asphyxia/hypoxic arrest

**Shock Energy:**

- All shocks max energy

**Advanced Airway:**

- Either King/supraglottic airway or endotracheal intubation
- Advanced airway should be deferred until after initial 2 cycles of CPR

**Drug therapy:**

- Atropine not indicated in pulseless arrest
- Magnesium indicated only for Torsades de Pointes
- Calcium and bicarb only indicated if suspected hyper K+

**ROSC:**

- Pulse and blood pressure
- Abrupt sustained increase PETCO<sub>2</sub> (usually > 40)

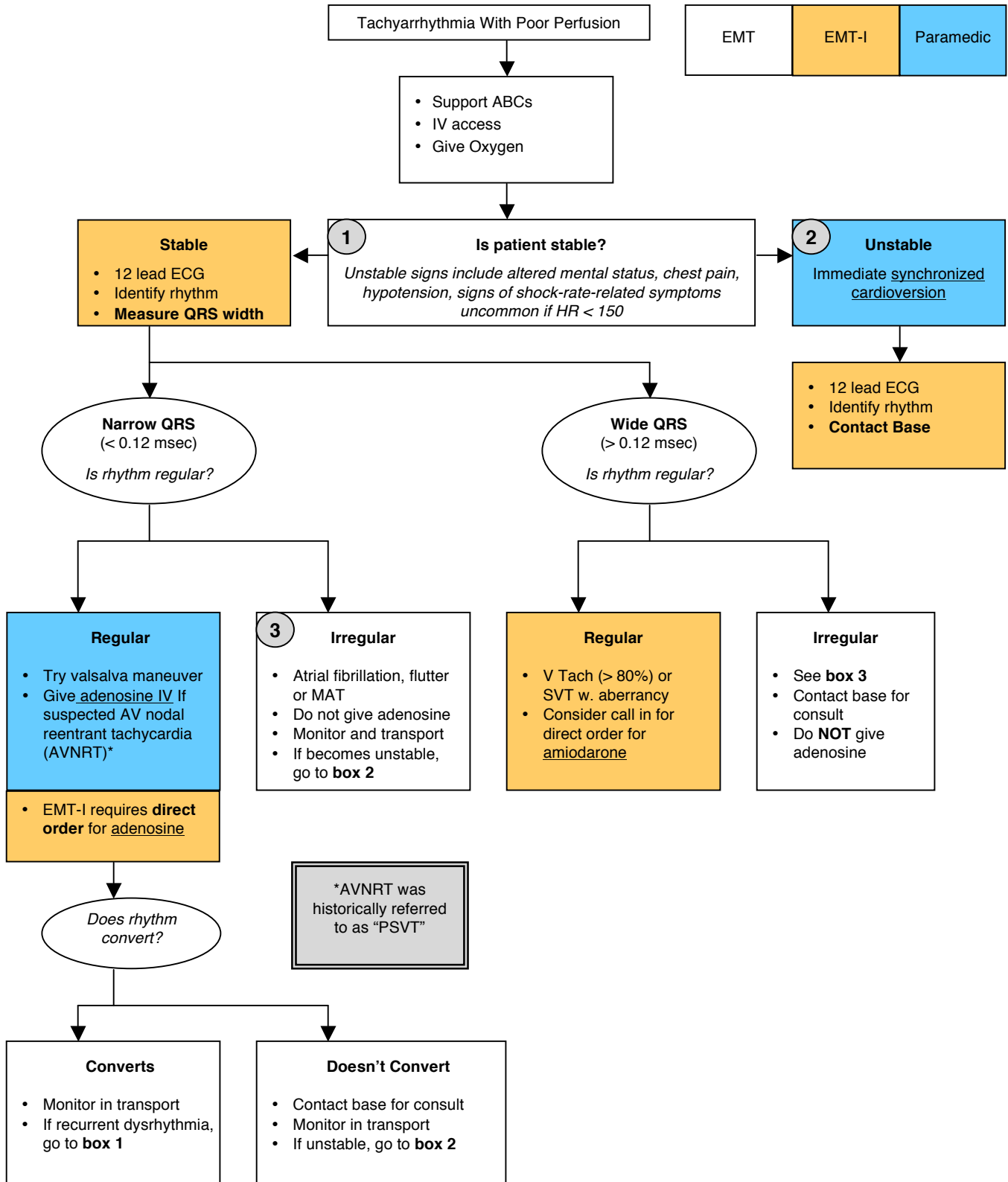
**Reversible causes:**

- Hypovolemia
- Hypoxia
- H+: Acidosis
- Hypo/hyperkalemia
- Hypothermia
- Tension pneumo
- Tamponade, cardiac
- Toxins
- Thrombosis: PE, AMI

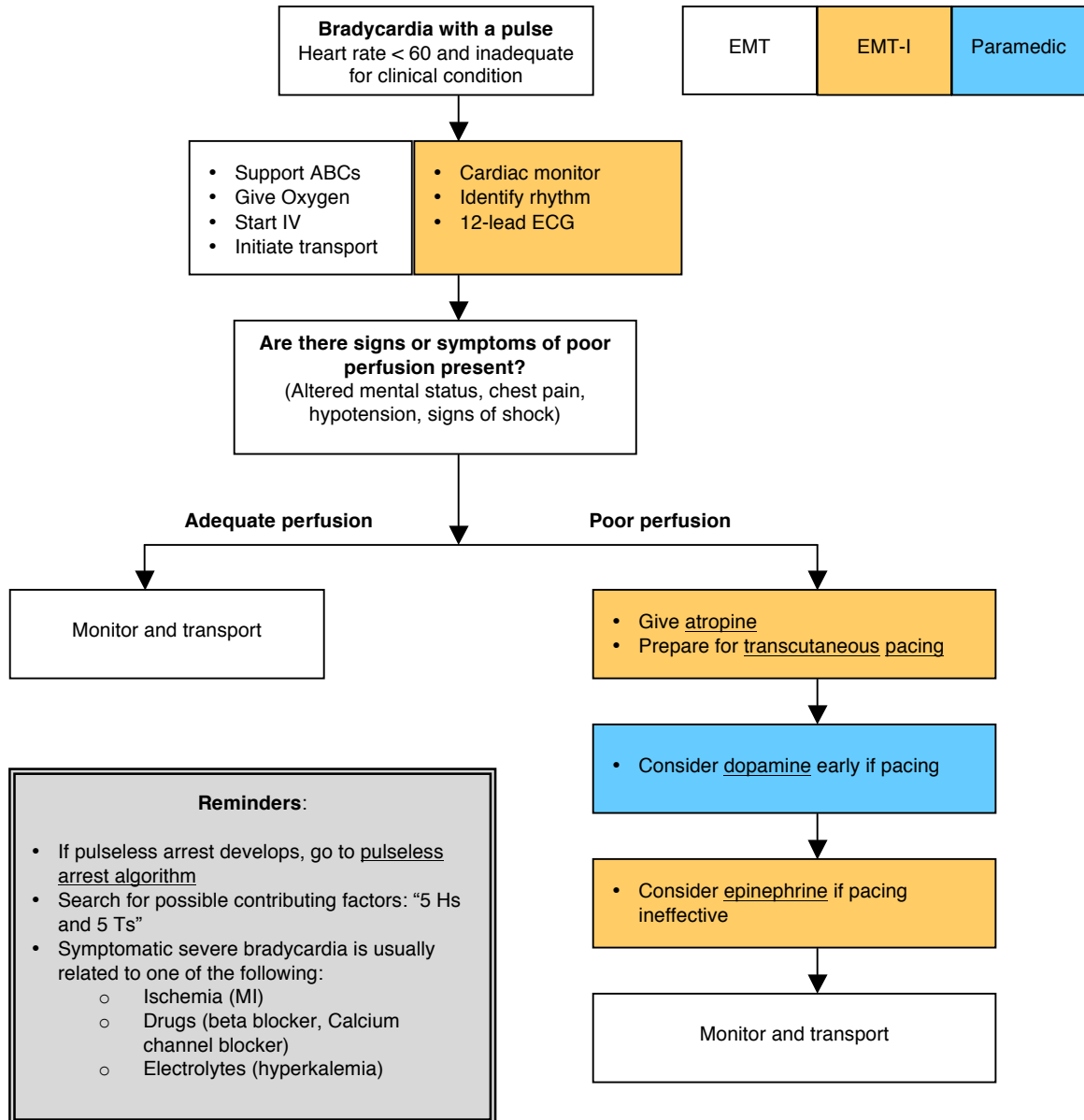
**Suspected hyperkalemic arrest (renal failure/dialysis patient):**

- Give calcium gluconate
- Give sodium bicarb
- Flush IV line between meds

## 2030 ADULT (≥ 12 YEARS) TACHYARRHYTHMIA WITH POOR PERFUSION



## 2040 ADULT (AGE ≥ 12 YEARS) BRADYARRHYTHMIA WITH POOR PERFUSION



## 2050 ADULT CHEST PAIN

### General:

EMT	EMT-I	Paramedic
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- A. Consider life-threatening causes of chest pain first in all patients:
  1. Acute coronary syndromes (ACS)
  2. Pulmonary embolism (PE)
  3. Thoracic aortic dissection (TAD)
  4. Tension pneumothorax (PTX)
- B. Do not delay obtaining 12 lead ECG, if available, and notify receiving facility *immediately* if Cardiac Alert criteria met.

### Document specific findings:

- A. Complete set of vital signs
- B. General appearance: skin color, diaphoresis
- C. Cardiovascular exam: presence of irregular heart sounds, JVD, murmur, pulse asymmetry, dependent edema
- D. Pulmonary exam: crackles/râles and/or wheezes/rhonchi
- E. Chest wall and abdominal tenderness

### Treatment:

- A. ABCs
- B. Reassure patient and place in position of comfort
- C. Place patient on cardiac monitor
- D. Administer oxygen
- E. Start IV
- F. EMT-Intermediates and paramedics:
  1. Obtain 12-lead ECG.
    - a. If patient has at least 1 mm ST segment elevation (STE) in at least 2 anatomically contiguous leads, notify receiving hospital and request **CARDIAC ALERT** (see Cardiac Alert Protocol).
  2. If history and physical exam suggest possible ACS:
    - a. Administer 4 chewable 81mg aspirin
    - b. Administer nitroglycerine 0.4mg SL or spray if SBP > 100. Repeat dose every 5 minutes, up to a maximum of 3 doses, holding if SBP < 100.
    - c. Administer fentanyl IV for persistent pain that is not relieved by 3 doses SL nitroglycerine, unless contraindicated.
      - i. Alternative: morphine may be used in lieu of fentanyl per Medical Director preference
  3. Consider base station contact for additional medication orders if pain persists.
- G. EMT-Basics:
  1. Contact base for verbal order for patient-assisted and supplied nitroglycerine, if applicable

### Precautions:

- A. If inferior MI diagnosed (ST elevation in II, III, aVF), consider possibility of right ventricular infarct. Do not delay transport or receiving hospital contact, however, obtain right-sided ECG leads en route if time and conditions allow in order to identify right ventricular infarct.
- B. If RV infarct pattern present (ST elevation in right-sided precordial leads, typically RV<sub>4</sub>), give nitroglycerine with extreme caution as hypotension common.

## 2050 ADULT CHEST PAIN

- C. If hypotension develops following nitroglycerine administration in any patient, treat with 250cc NS boluses.
- D. Nitroglycerine is contraindicated in patients taking medication for erectile dysfunction (phosphodiesterase inhibitors, e.g.: Viagra, Cialis).

## 2051 CARDIAC ALERT

EMT-I	Paramedic
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### **Goal:**

- To identify patients with ST-segment elevation myocardial infarction (STEMI) in the prehospital setting and provide advanced receiving hospital notification in order to minimize door-to-balloon times for percutaneous coronary intervention (PCI)

### **Inclusion Criteria:**

- Symptoms compatible with ACS (chest pain, diaphoresis, dyspnea, etc)
- 12-lead ECG showing ST-segment elevation (STE) at least 1 mm in two or more anatomically contiguous leads
- Age 35-85 years old (If STEMI patient outside age criteria, contact receiving hospital for consult)

### **Exclusion Criteria:**

- Wide complex QRS (paced rhythm, BBB, other)
- Symptoms NOT suggestive of ACS (e.g.: asymptomatic patient)
- If unsure if patient is appropriate for Cardiac Alert, discuss with receiving hospital MD

### **Actions:**

- Treat according to chest pain protocol en route (cardiac monitor, oxygen, aspirin, nitroglycerine and opioid)
- Notify receiving hospital ASAP with ETA and request CARDIAC ALERT. Do not delay hospital notification. If possible, notify ED before leaving scene
- Start 2 large bore peripheral IVs
- Rapid transport
- If patient does not meet inclusion criteria, or has exclusion criteria, yet clinical scenario and ECG suggests true STEMI, request medical consult with receiving hospital emergency physician

### **Additional Documentation Requirements:**

- Time of first patient contact
- Time of first ECG

## 2100 HYPERTENSION

EMT-I

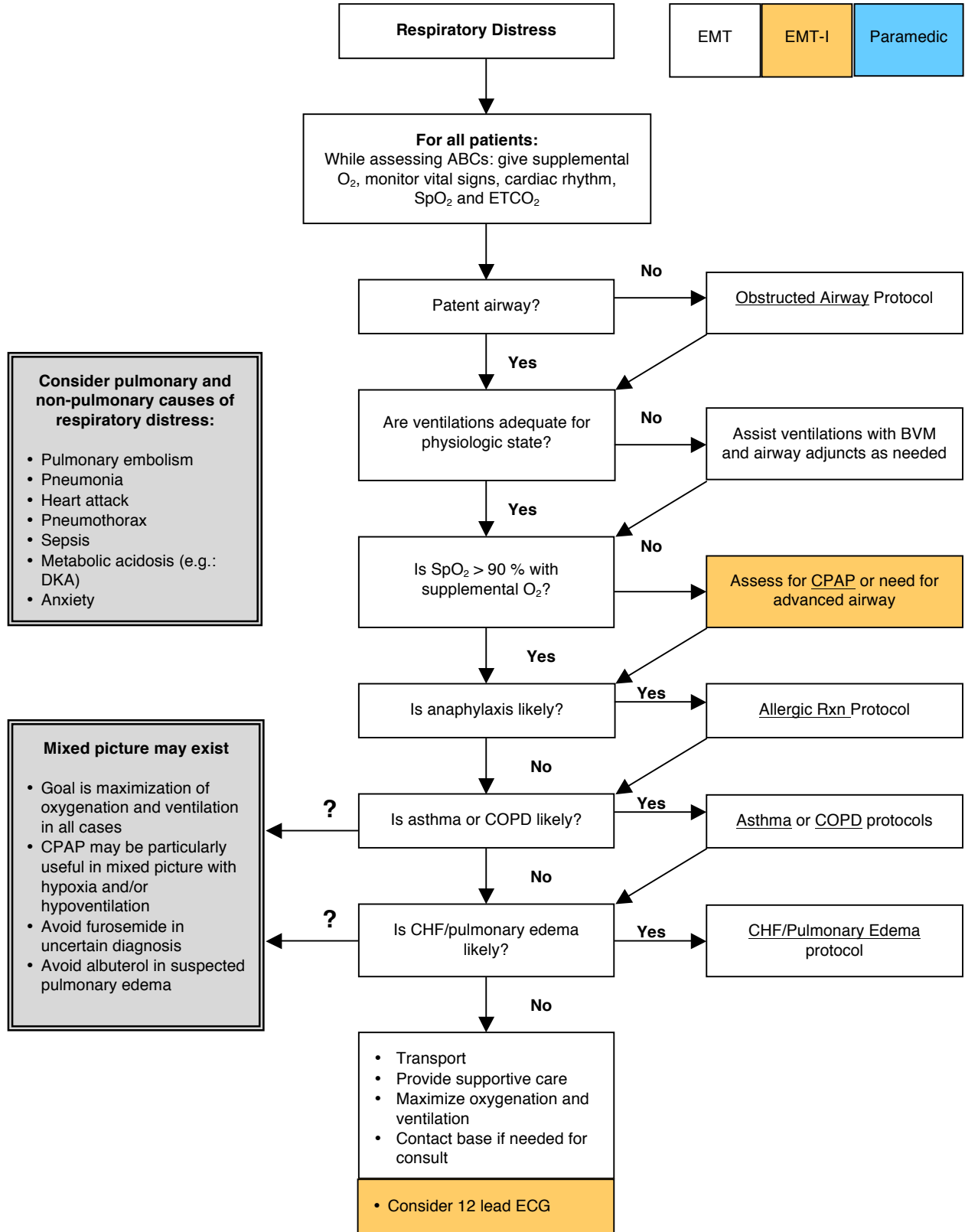
Paramedic

### Intent:

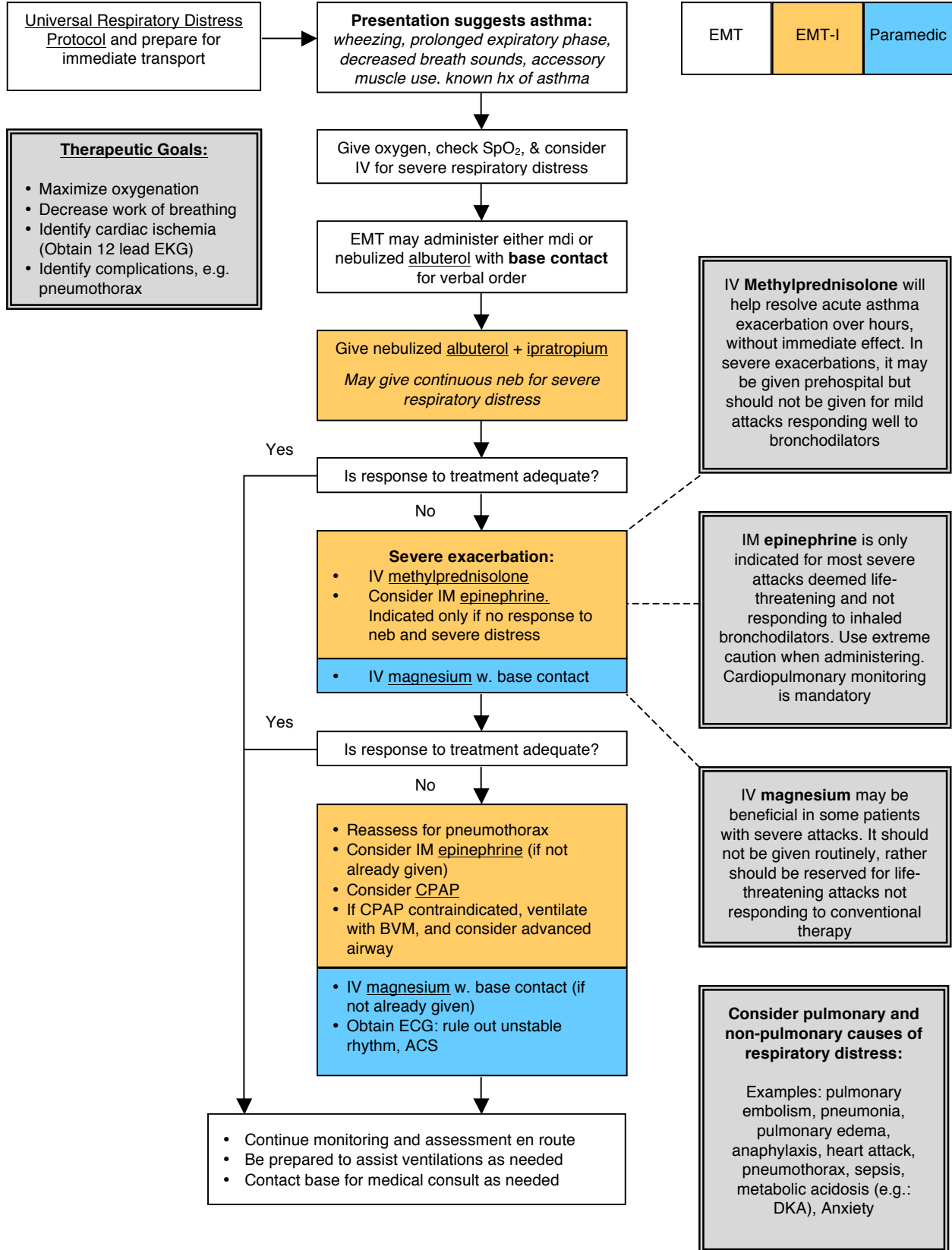
- A. Even with extremes of blood pressure, treat the medical emergency **associated** with hypertension (“treat the patient, not the number”)
  - 1. Treat chest pain, pulmonary edema, or stroke according to standard protocols (pain control will usually improve BP significantly)
- B. Do not use medication to treat asymptomatic hypertension
- C. Do not treat hypertension in acute stroke



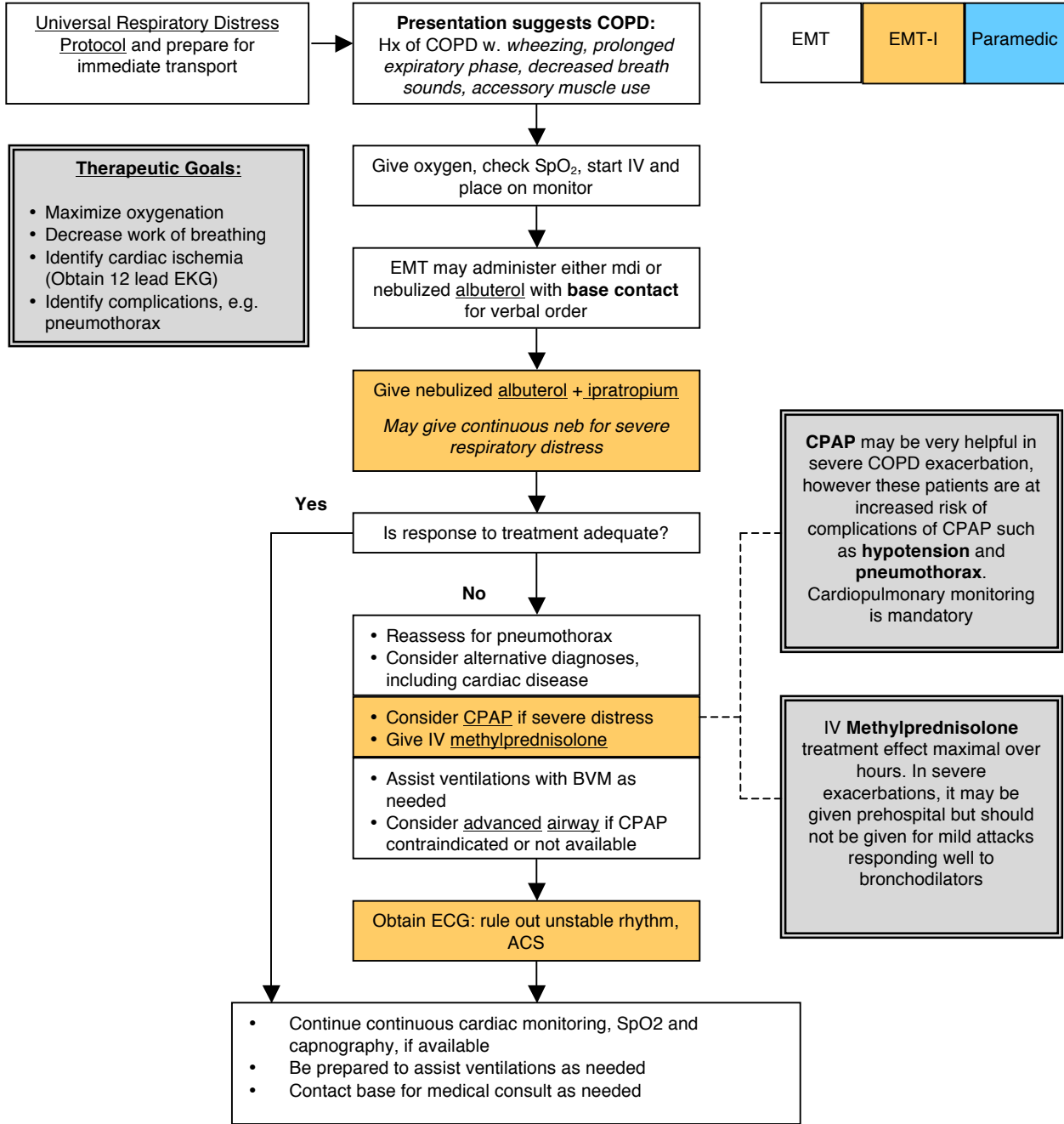
# 3010 ADULT (AGE ≥ 12 YEARS) UNIVERSAL RESPIRATORY DISTRESS ALGORITHM



## 3020 ADULT (AGE ≥ 12 YEARS) ASTHMA



## 3030 COPD



**CPAP** may be very helpful in severe COPD exacerbation, however these patients are at increased risk of complications of CPAP such as **hypotension** and **pneumothorax**. Cardiopulmonary monitoring is mandatory

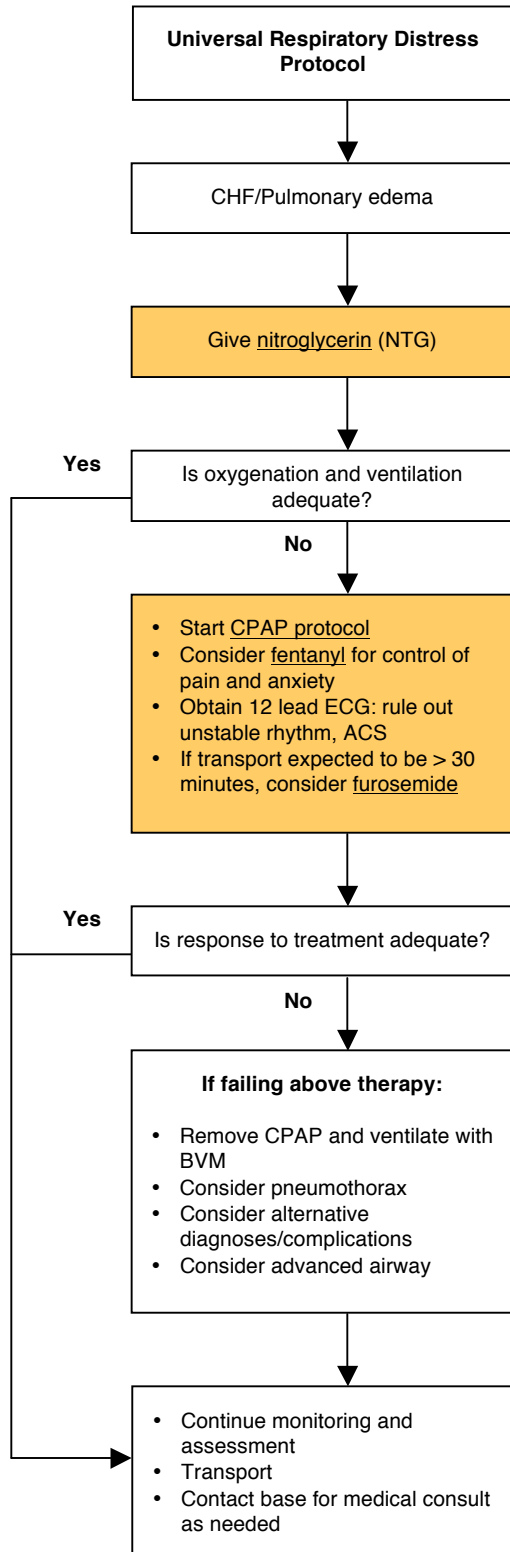
**IV Methylprednisolone** treatment effect maximal over hours. In severe exacerbations, it may be given prehospital but should not be given for mild attacks responding well to bronchodilators

**Special Notes:**

- Correct hypoxia:** do not withhold maximum oxygen for fear of CO<sub>2</sub> retention
- Consider pulmonary and non-pulmonary causes of respiratory distress:** Examples: pulmonary embolism, pneumonia, pulmonary edema, anaphylaxis, heart attack, pneumothorax, sepsis, metabolic acidosis (e.g.: DKA), Anxiety
- Patients with COPD are older and have comorbidities, including heart disease.
- Wheezing may be a presentation of pulmonary edema, "cardiac asthma"
- Common triggers for COPD exacerbations include: Infection, dysrhythmia (e.g.: atrial fibrillation), myocardial ischemia

### 3050 CHF/PULMONARY EDEMA

EMT	EMT-I	Paramedic
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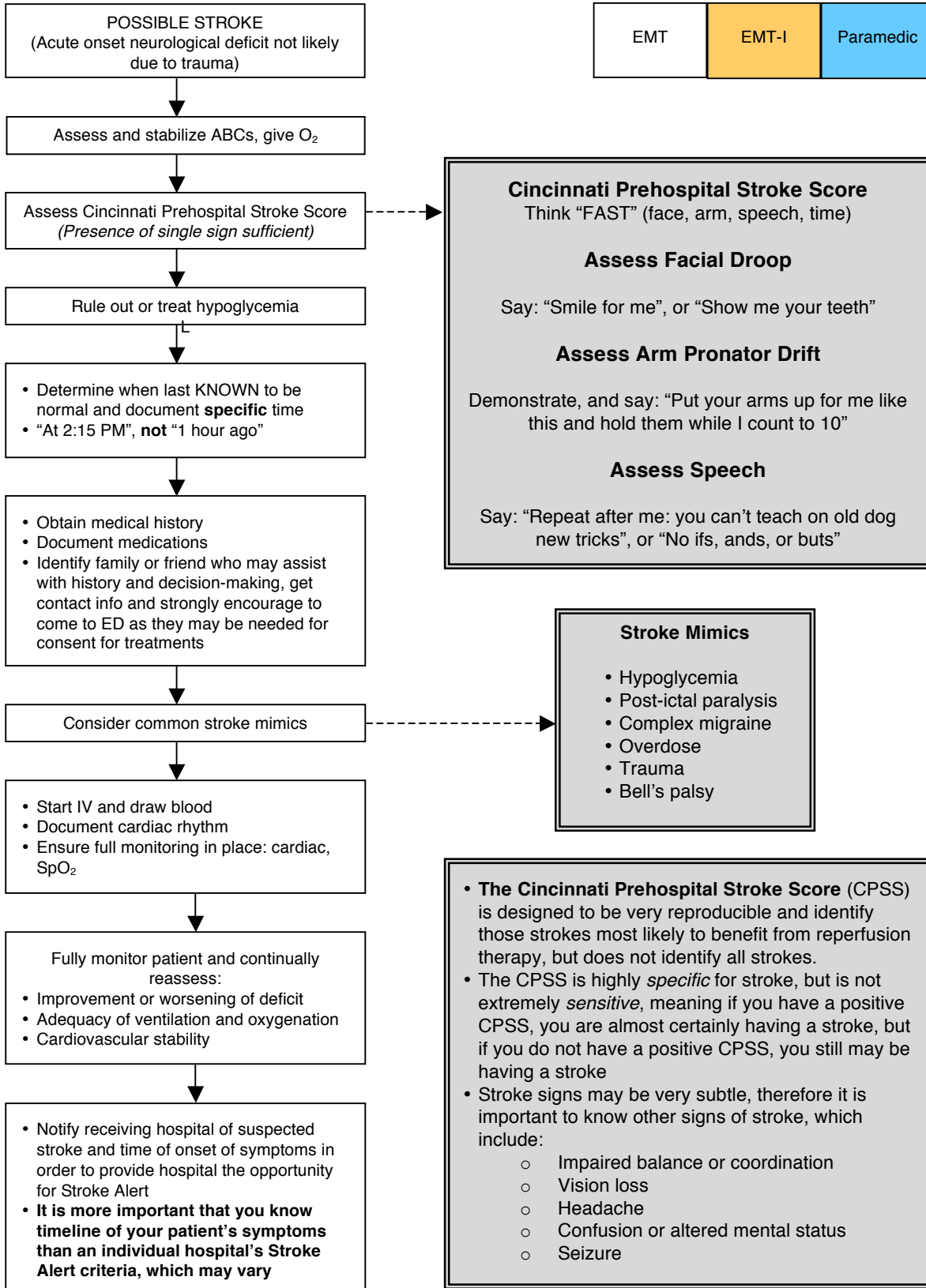
**Therapeutic Goals:**

- Maximize oxygenation
- Decrease work of breathing
- Identify cardiac ischemia (Obtain 12 lead ECG)

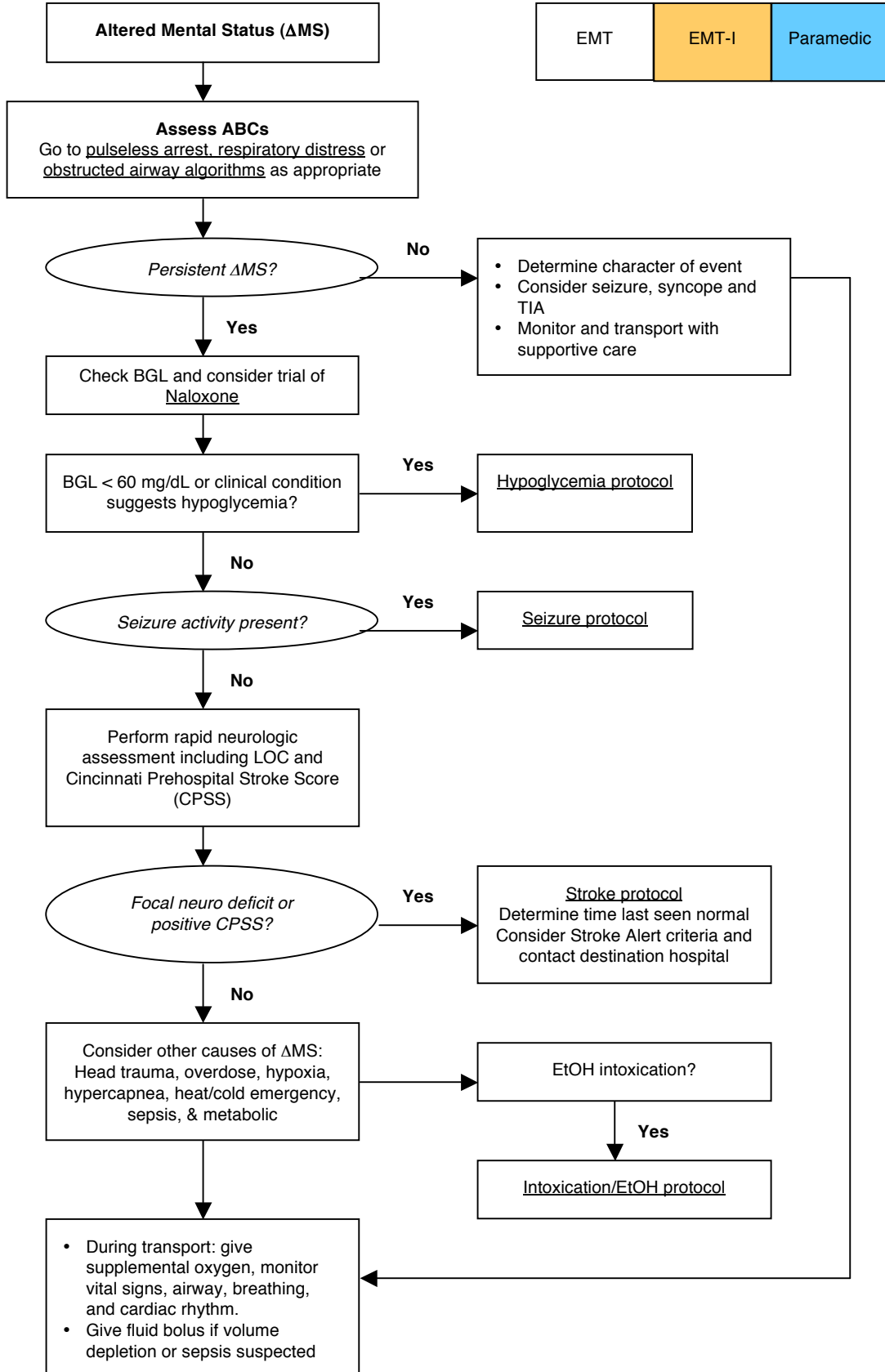
**Special Notes:**

- In general diuretics have little role in initial treatment of acute pulmonary edema.
- Consider furosemide (Lasix) only for transport times of greater than 30 minutes

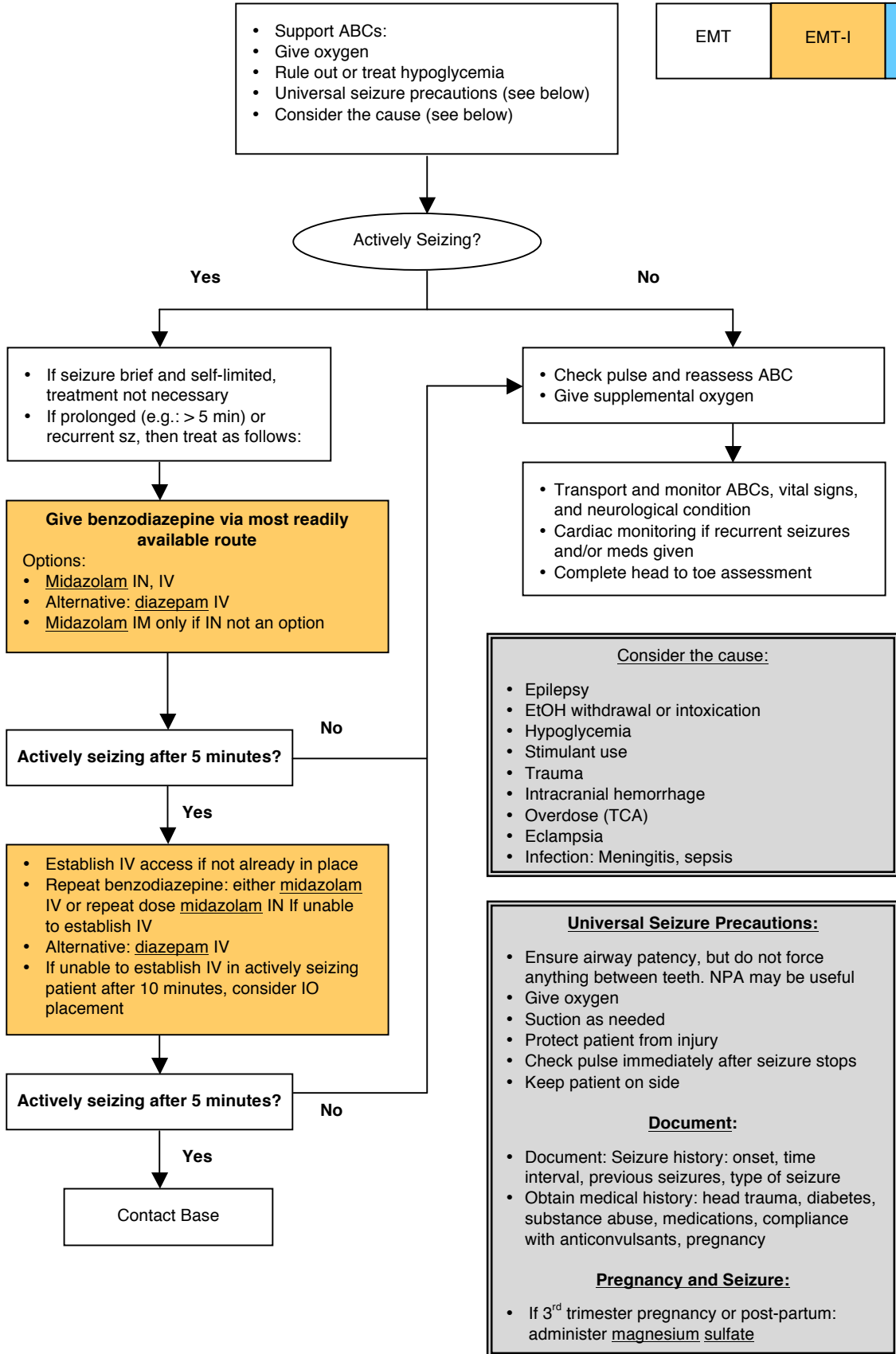
# 4011 STROKE



# 4012 UNIVERSAL ALTERED MENTAL STATUS



# 4013 ADULT (≥ 12 YEARS) SEIZURE



# 4014 HYPOGLYCEMIA

EMT	EMT-I	Paramedic
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**Check blood glucose level in ANY patient with signs or symptoms consistent with hypoglycemia**

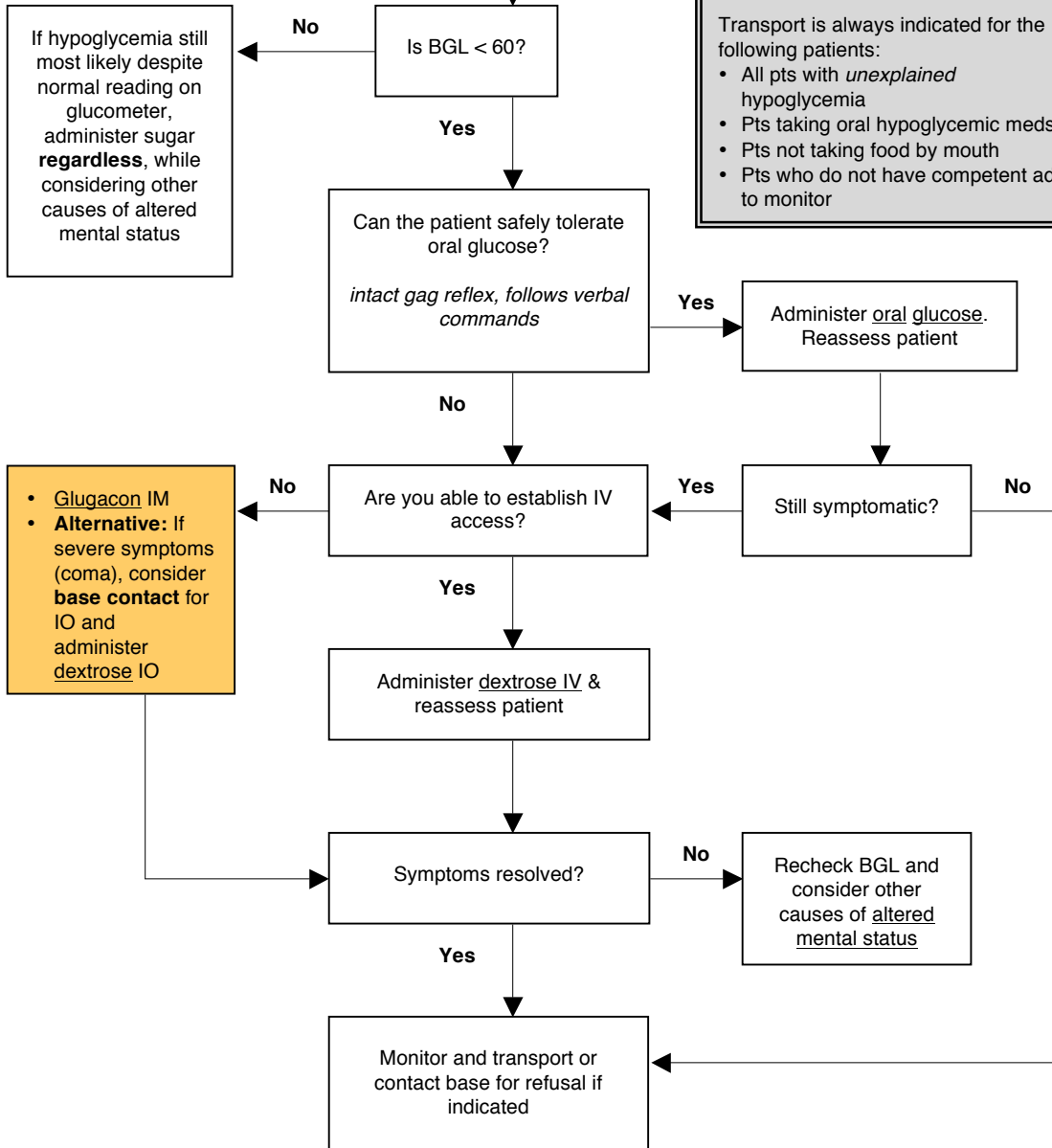
Examples:  
*Altered MS, agitation, focal neurologic deficit, seizure, weakness, diaphoresis, decreased motor tone, pallor*

**Regarding refusals after a hypoglycemic episode:**

See Patient Refusal protocol

Transport is always indicated for the following patients:

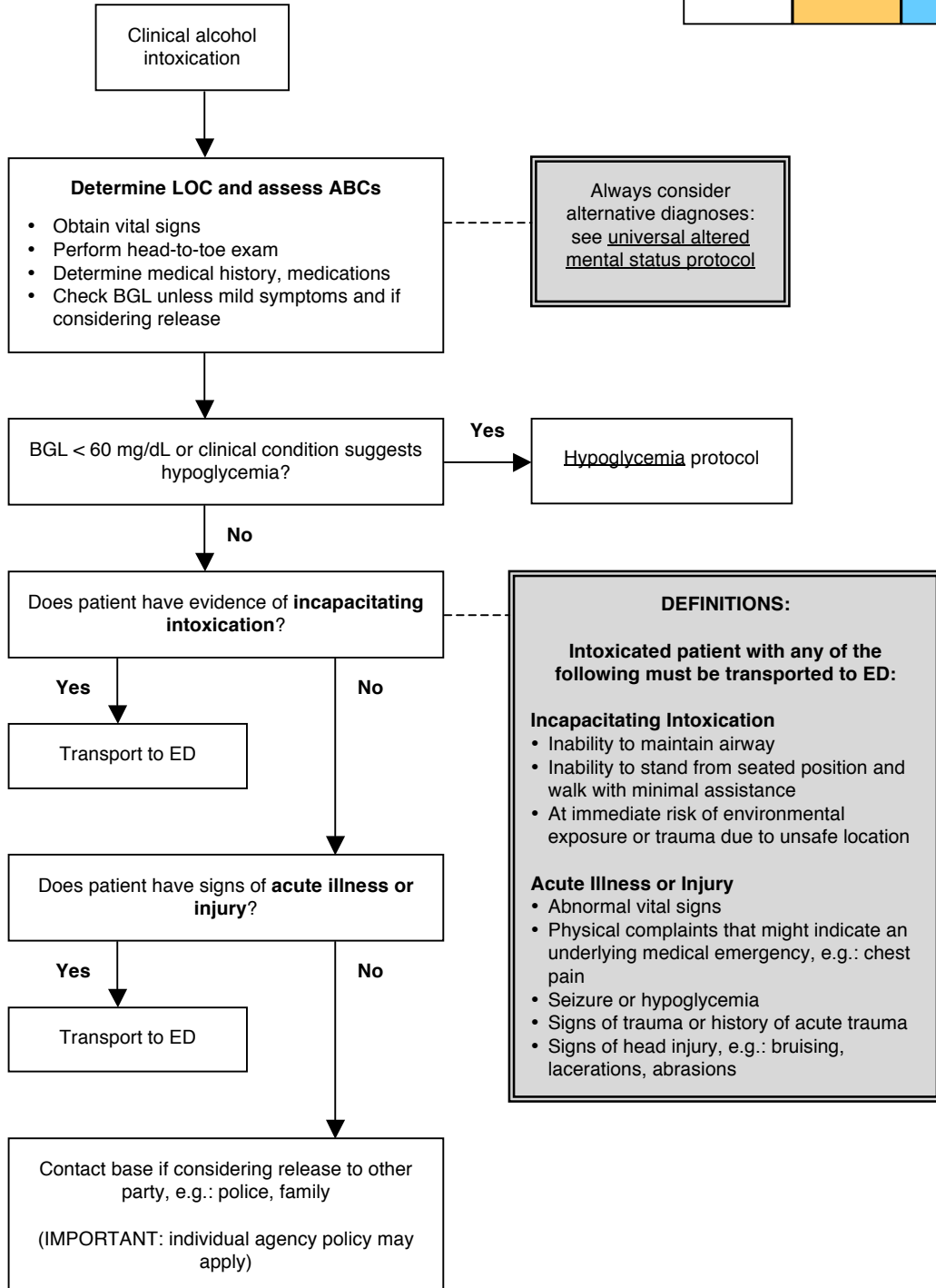
- All pts with *unexplained* hypoglycemia
- Pts taking oral hypoglycemic meds
- Pts not taking food by mouth
- Pts who do not have competent adult to monitor



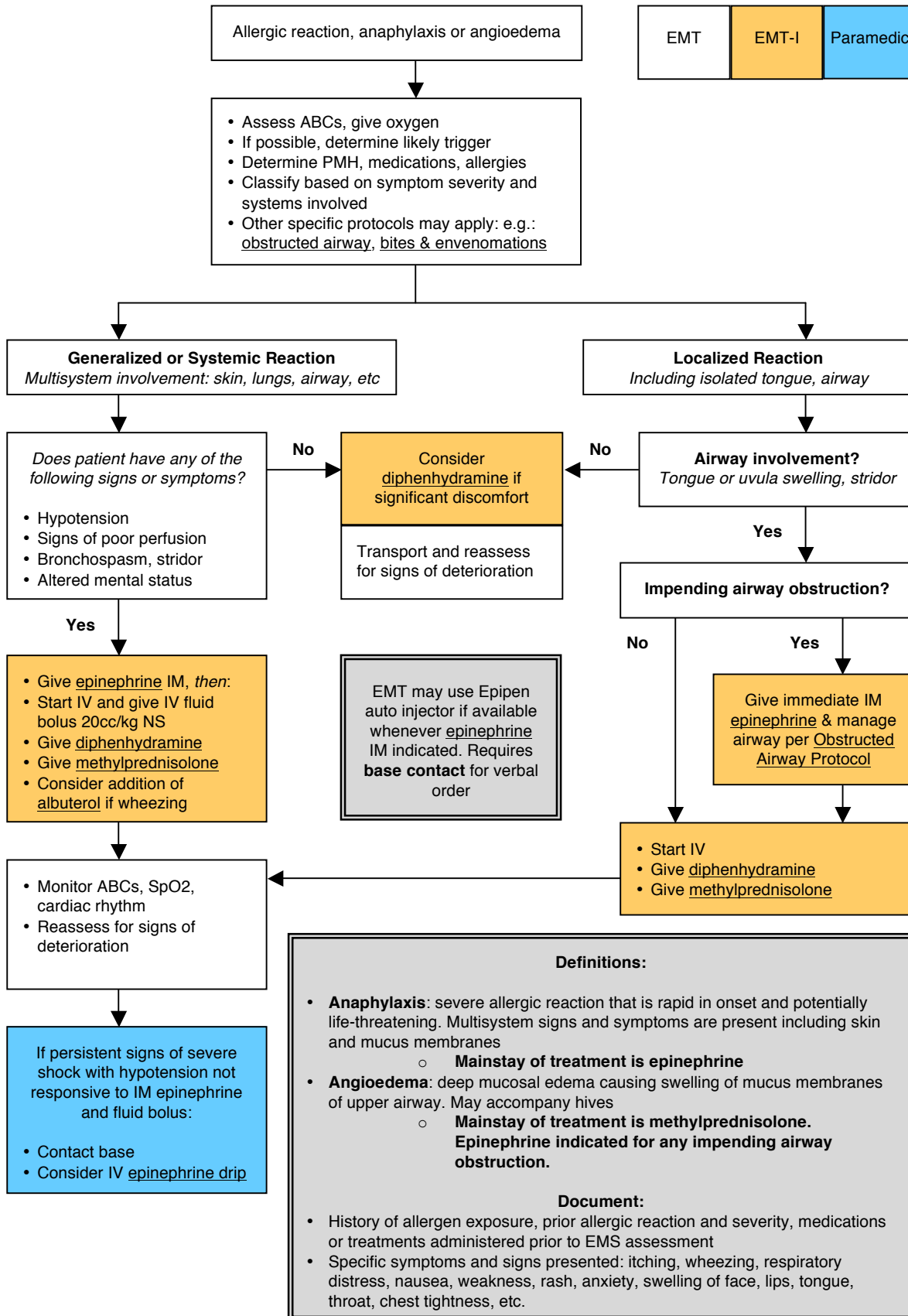


# 4015 ALCOHOL INTOXICATION

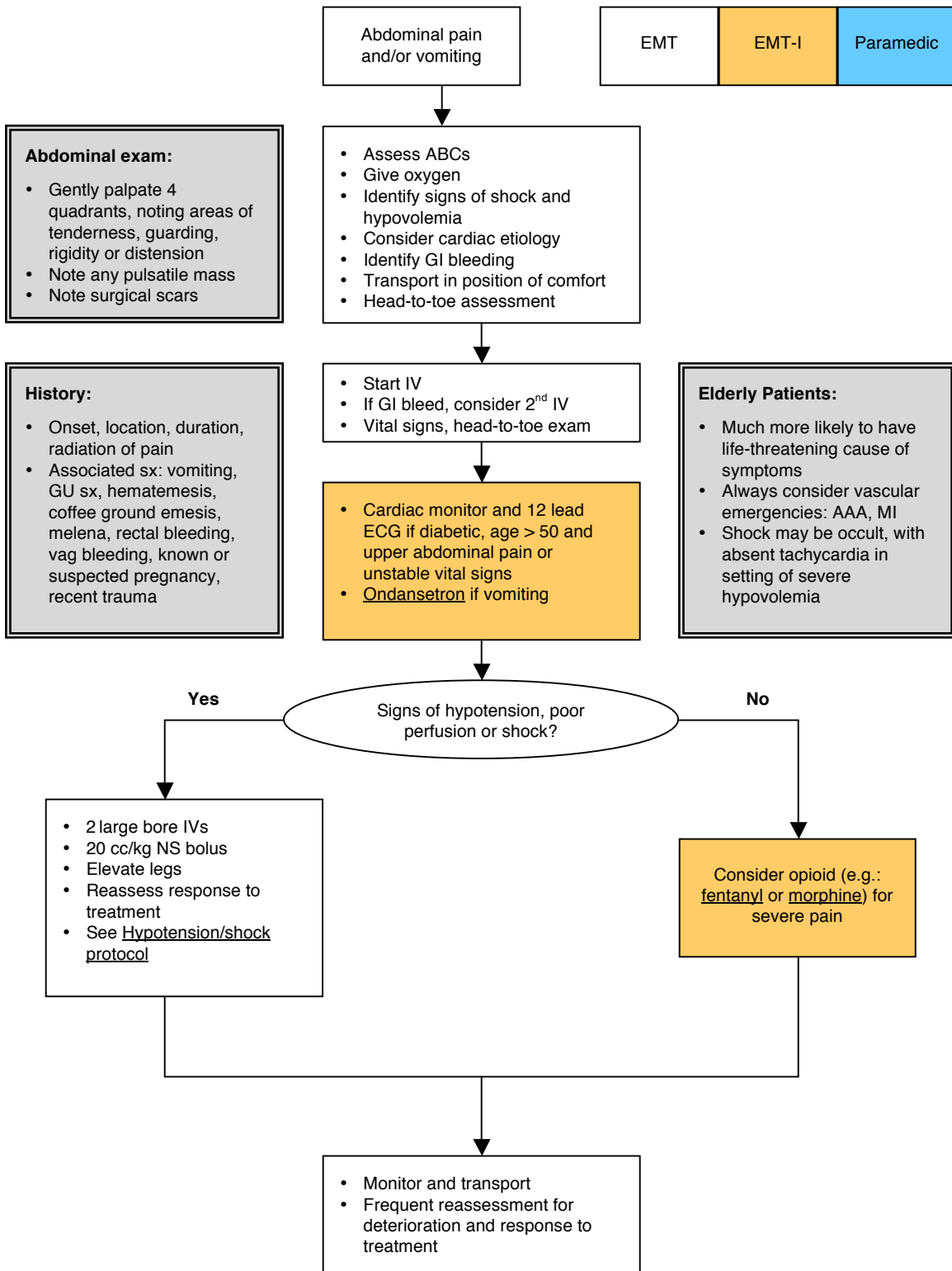
EMT	EMT-I	Paramedic
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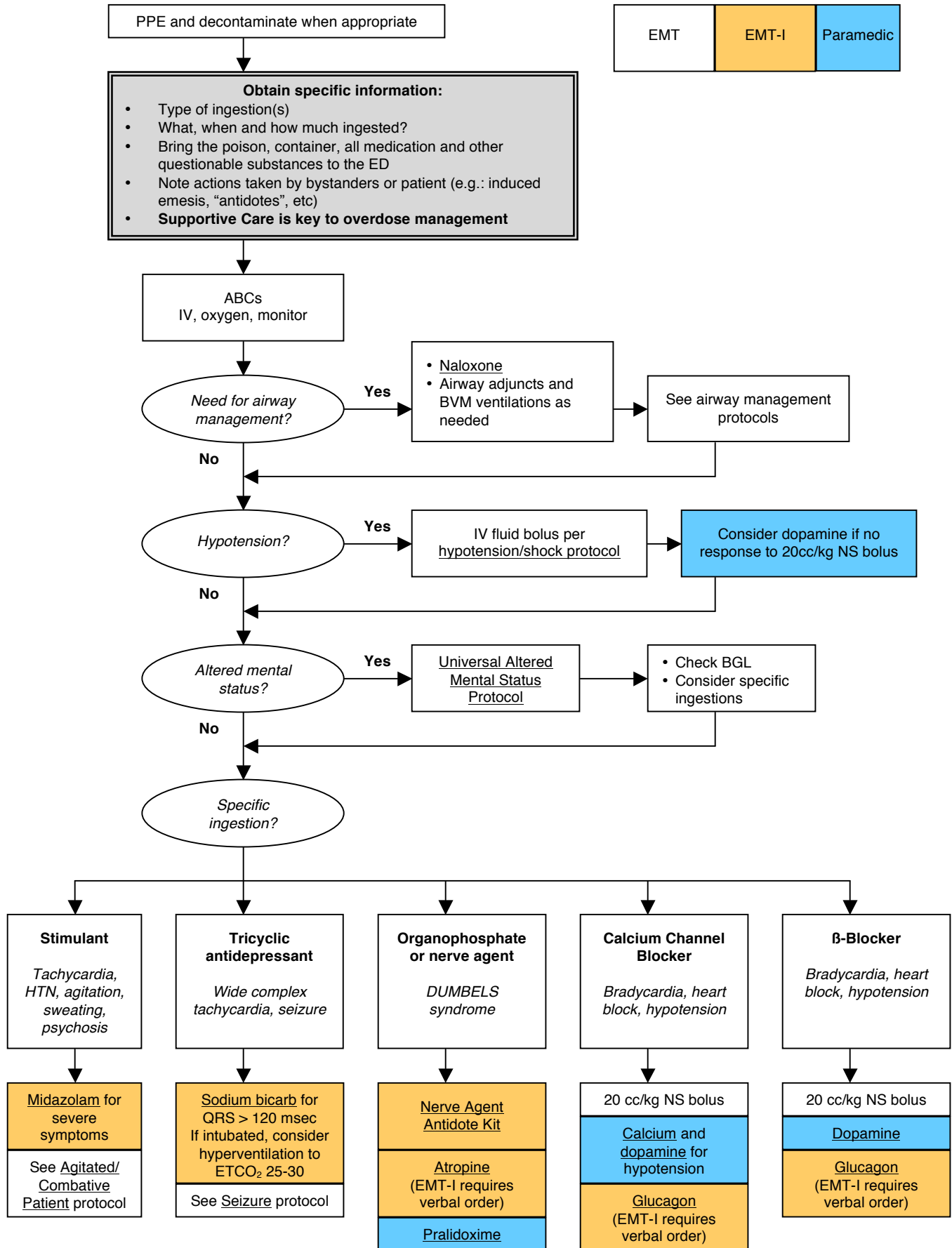
## 4020 ALLERGY AND ANAPHYLAXIS



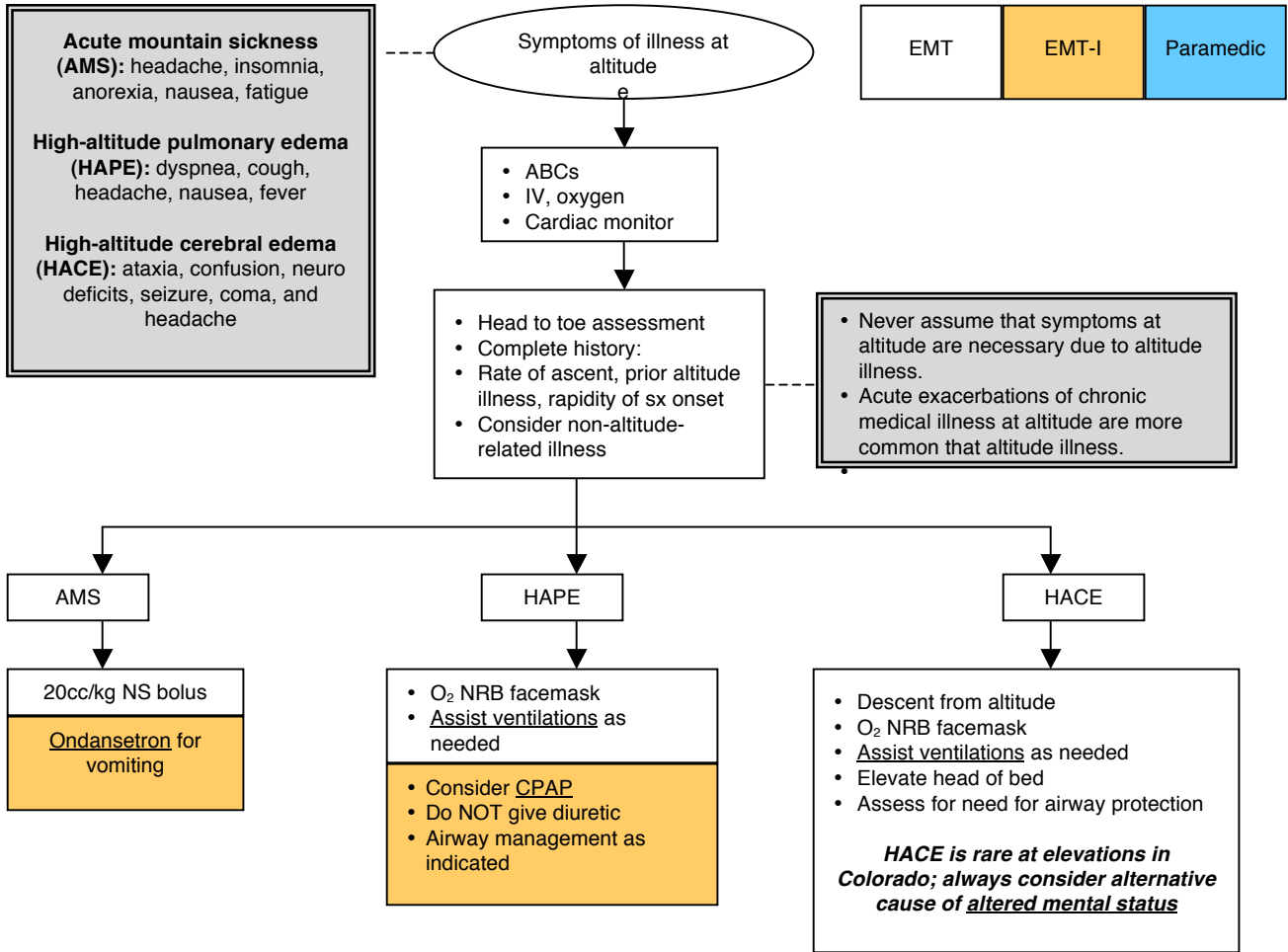
## 4030 ABDOMINAL PAIN/VOMITING



# 4040 OVERDOSE AND ACUTE POISONING



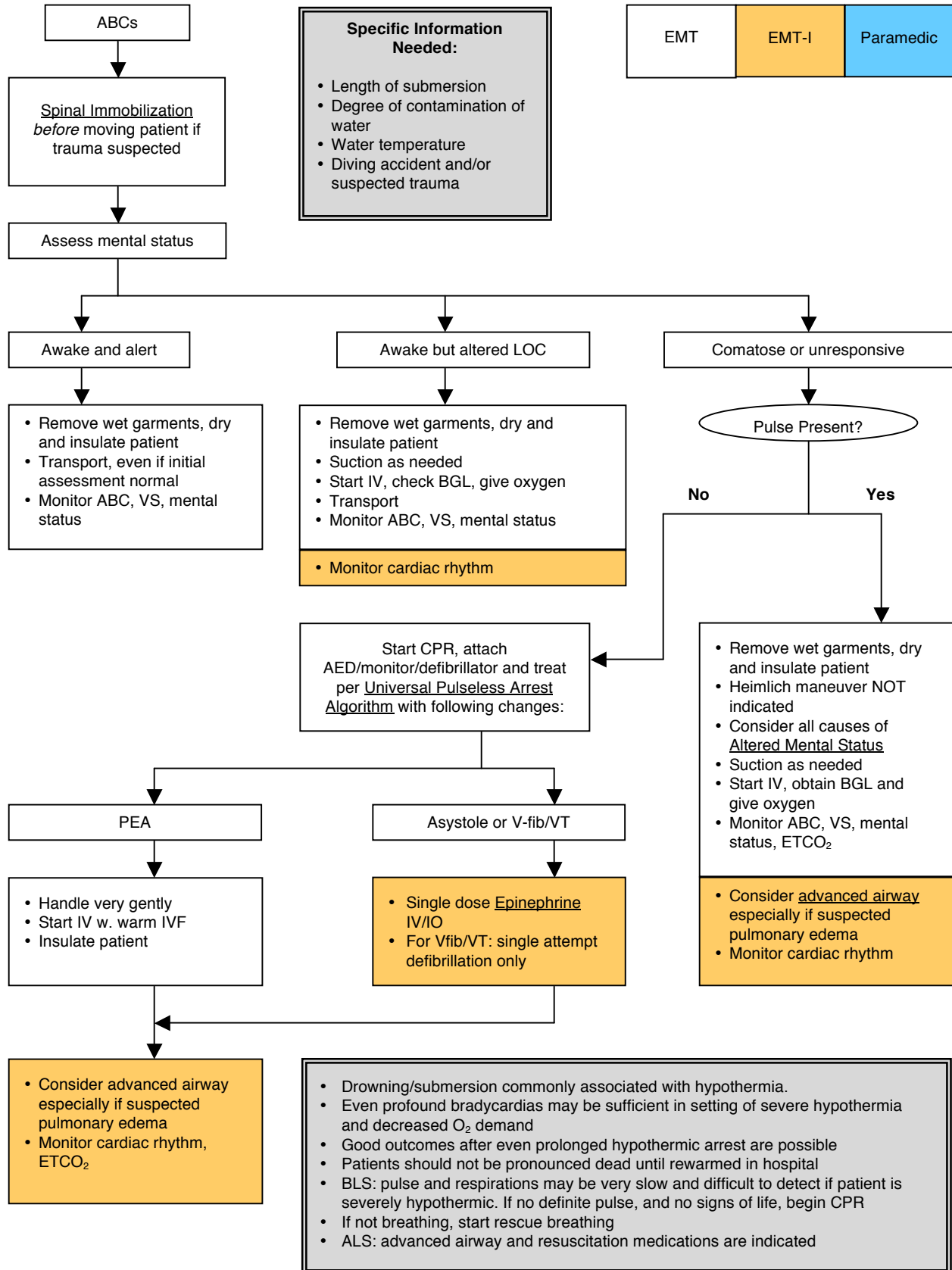
## 4051 HIGH ALTITUDE ILLNESS



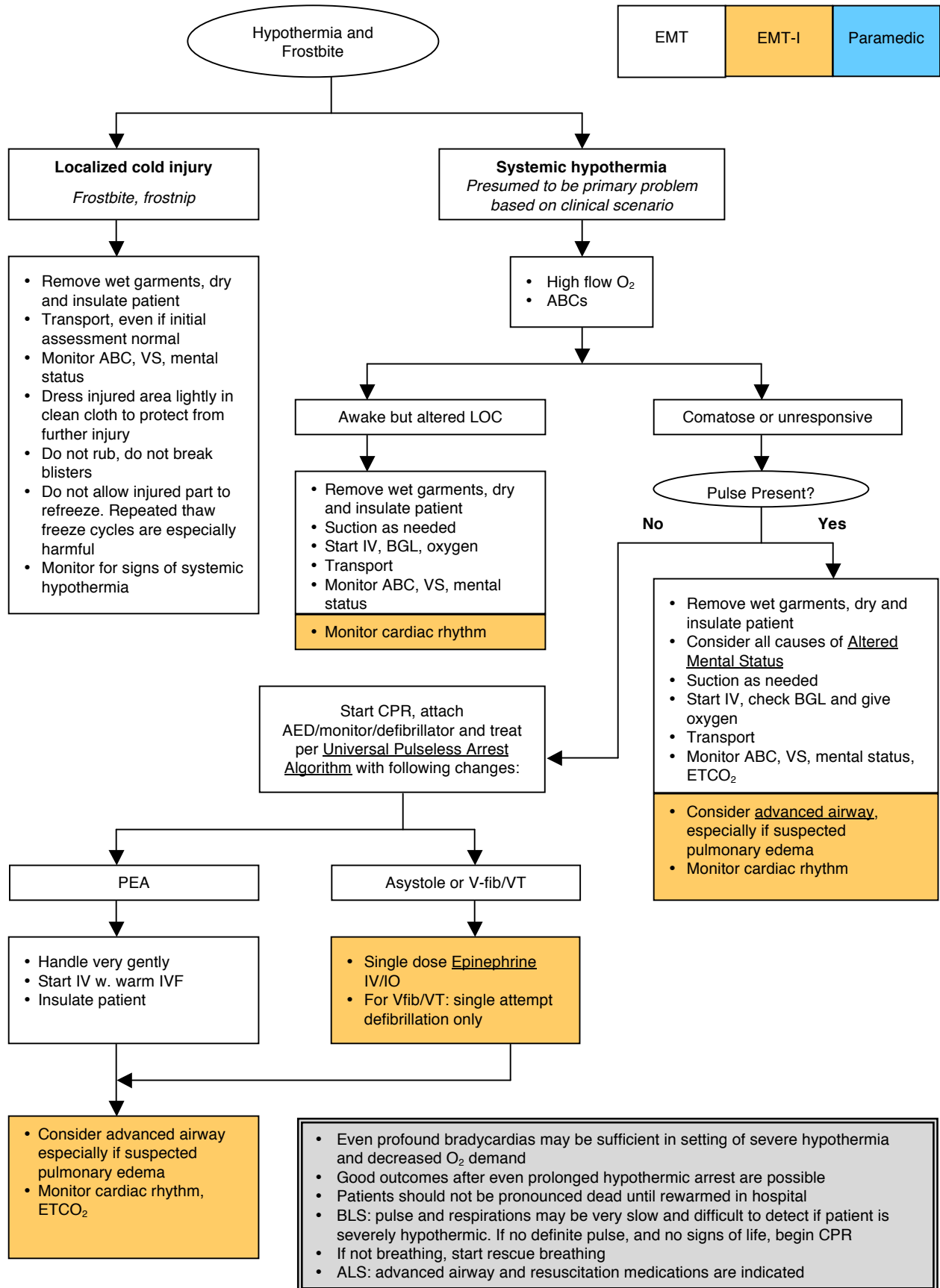
**Special Notes:**

- There are no specific factors that accurately predict susceptibility to altitude sickness, but symptoms are worsened by exertion, dehydration, and alcohol ingestion.
- Acute Mountain Sickness (AMS) can begin to appear at around 6,500 ft above sea level, although most people will tolerate up to 8000 ft without difficulty. Altitude illness should not be suspected below 6,500 ft. AMS is the most frequent type of altitude sickness encountered. Symptoms often manifest themselves six to ten hours after ascent and generally subside in one to two days, but they occasionally develop into the more serious conditions.
- High altitude pulmonary edema (HAPE) and cerebral edema (HACE) are the most severe forms of high altitude illness. The rate of ascent, altitude attained, exertion, and individual susceptibility are contributing factors to the onset and severity of high-altitude illness
- Mild HAPE may be managed with high-flow oxygen and supportive care, and does not necessarily require descent from altitude.
- More severe forms of HAPE and all forms of HACE require descent

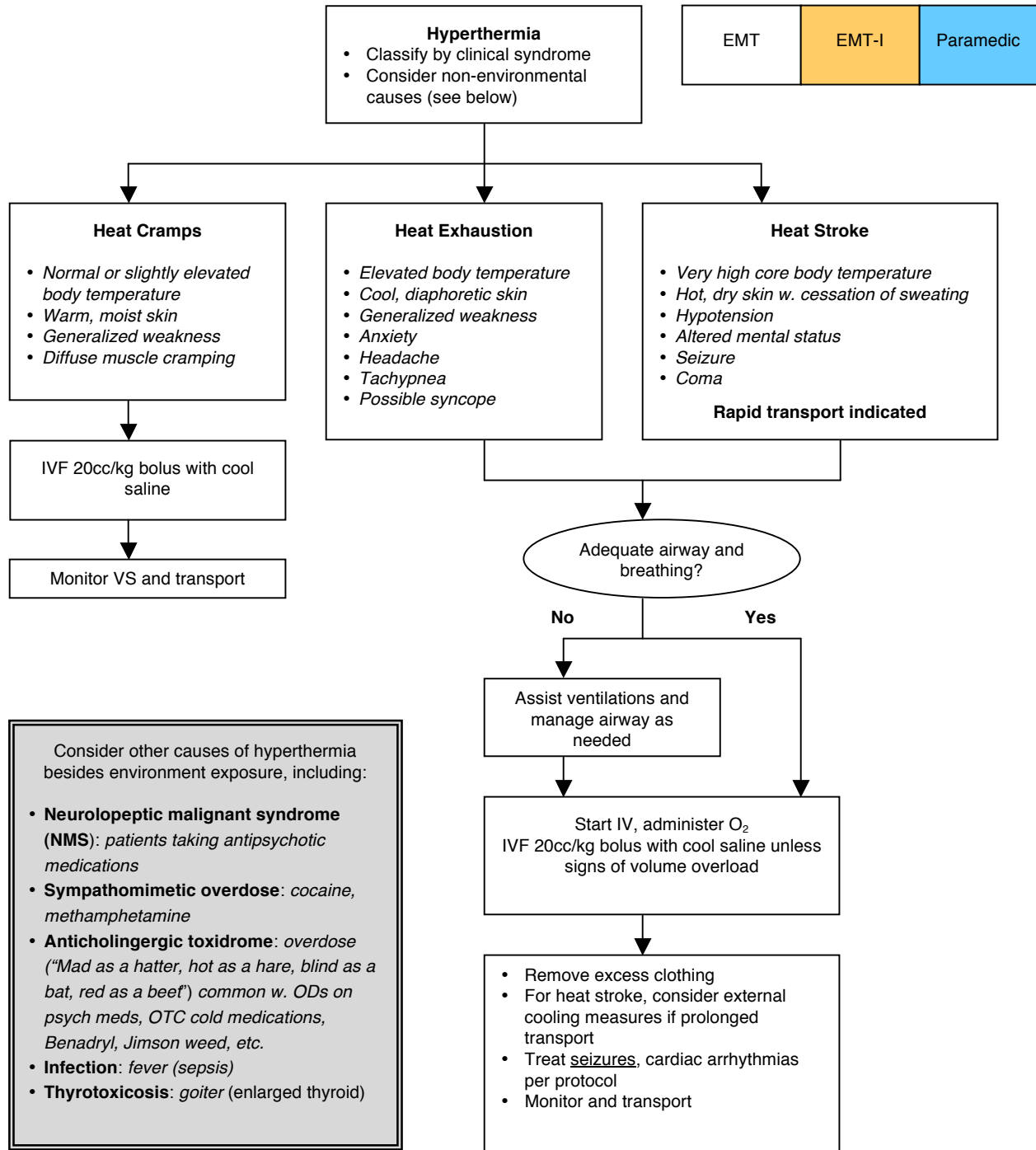
# 4052 DROWNING



# 4053 HYPOTHERMIA

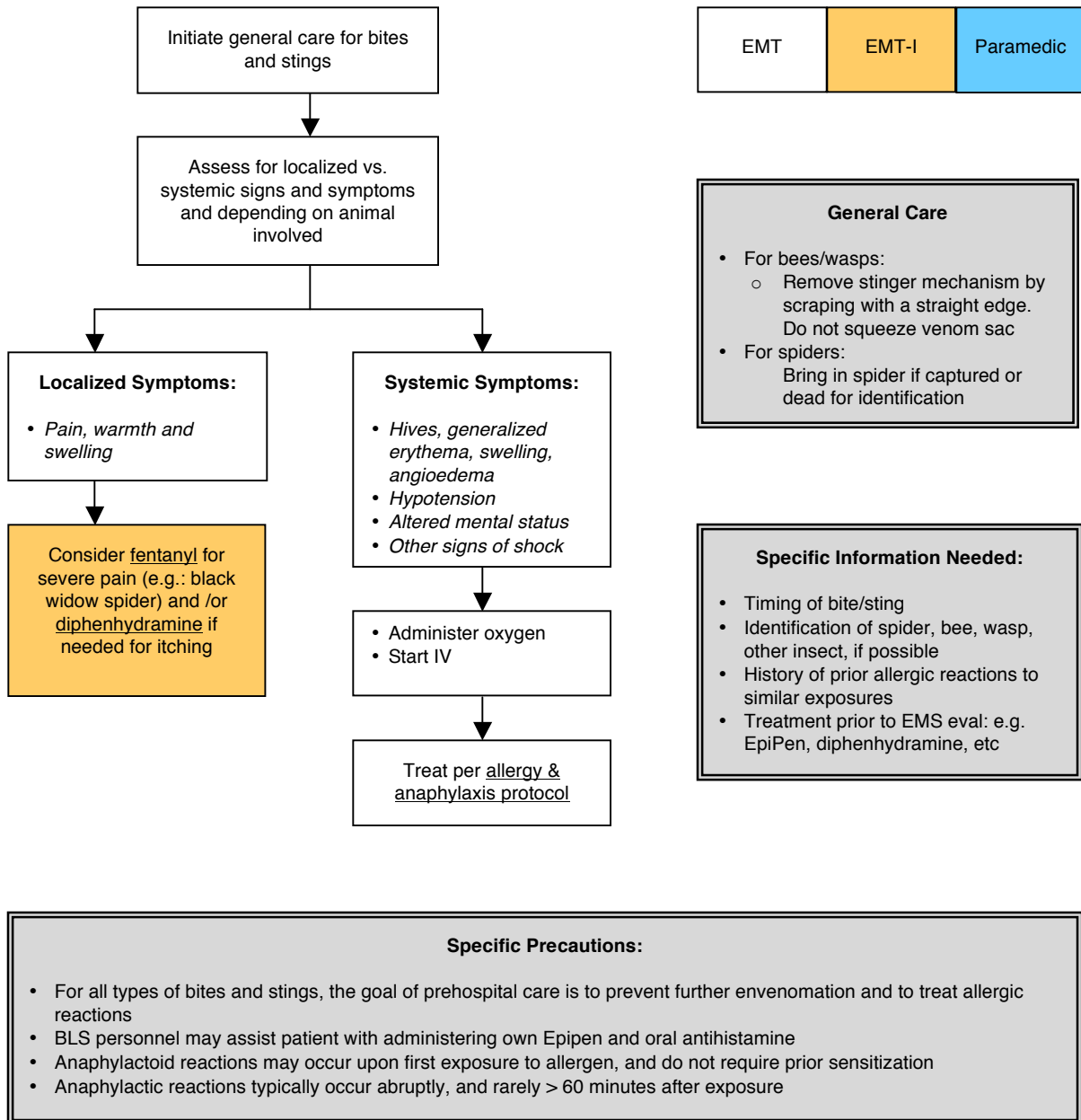


# 4054 ENVIRONMENTAL HYPERTHERMIA





## 4055 INSECT/ARACHNID STINGS AND BITES PROTOCOL

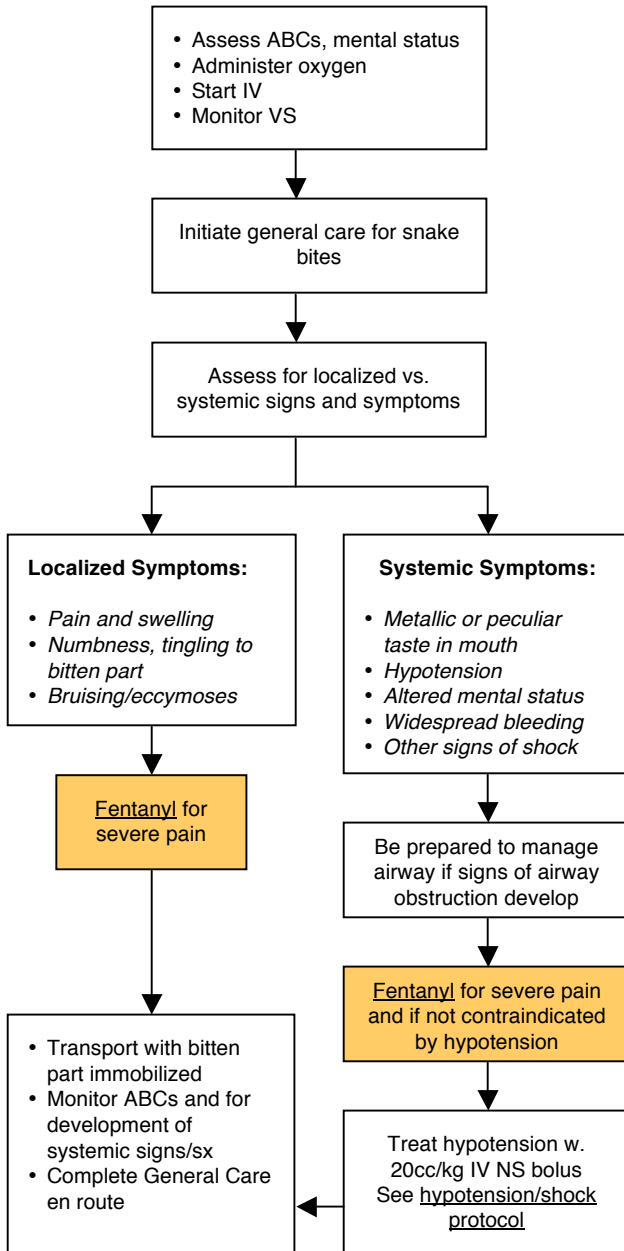


**Specific Precautions:**

- For all types of bites and stings, the goal of prehospital care is to prevent further envenomation and to treat allergic reactions
- BLS personnel may assist patient with administering own EpiPen and oral antihistamine
- Anaphylactoid reactions may occur upon first exposure to allergen, and do not require prior sensitization
- Anaphylactic reactions typically occur abruptly, and rarely > 60 minutes after exposure

# 4056 SNAKE BITE PROTOCOL

EMT	EMT-I	Paramedic
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**General Care:**

- Remove patient from proximity to snake
- Remove all constricting items from bitten limb (e.g.: rings, jewelry, watch, etc.)
- Immobilize bitten part
- Initiate prompt transport
- Do NOT use ice, refrigerants, tourniquets, scalpels or suction devices
- Mark margins of erythema and/or edema with pen or marker and include time measured

**Obtain specific information:**

- Appearance of snake (rattle, color, thermal pit, elliptical pupils)
- Appearance of wound: location, # of fangs vs. entire jaw imprint
- Timing of bite
- Prior 1<sup>st</sup> aid
- To help with identification of snake, photograph snake, if possible. Include image of head, tail, and any distinctive markings.
- Do not bring snake to ED

**Specific Precautions:**

- The prairie rattlesnake is native to Denver Metro region and is most common venomous snake bite in region
- Exotic venomous snakes, such as pets or zoo animals, may have different signs and symptoms than those of pit vipers. In case of exotic snake bite, contact base and consult zoo staff or poison center for direction.
- If adequate photo can be taken, it is not necessary to bring snake to ED.
- Never pick up a presumed-to-be-dead snake by hand. Rather, use a shovel or stick. A dead snake may reflexively bite and envenomate.
- > 25% of snake bites are “dry bites”, without envenomations.
- Conversely, initial appearance of bite may be deceiving as to severity of envenomation.
- Fang marks are characteristic of pit viper bites (e.g. rattlesnakes).
- Jaw prints, without fang marks, are more characteristic of non-venomous species.

## 4060 MEDICAL HYPOTENSION/SHOCK PROTOCOL

EMT	EMT-I	Paramedic
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**Shock** is a state of decreased tissue oxygenation. Significant vital organ hypoperfusion may be present without hypotension. Home medications and/or comorbidities may also limit development of tachycardia

\*\*

**Goal** is to maximize **oxygen delivery** with supplemental oxygen and assisted ventilations (if needed), and to maximize **perfusion** with IV fluids

**Septic Shock**  
Defined by:

1. Presence of Systemic Inflammatory Response Syndrome (SIRS)

AND

2. Suspected infection

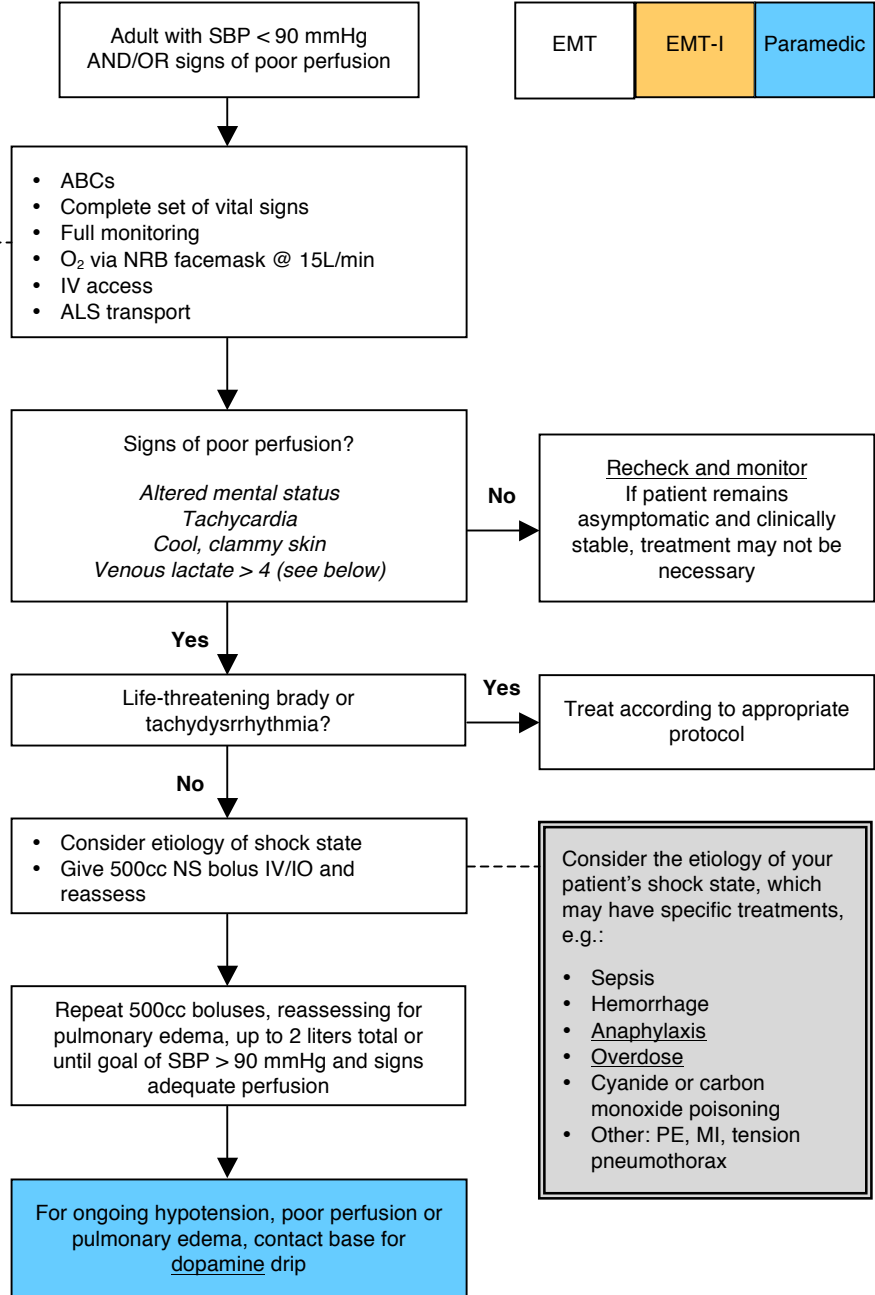
AND

3. Signs of hypoperfusion (hypotension or elevated venous lactate)

**SIRS criteria:**

- HR > 110
- RR > 24
- Temp > 100.4° or < 96.8° F

The initial treatment of septic shock involves maximizing perfusion with IVF boluses, not vasopressors



Consider the etiology of your patient's shock state, which may have specific treatments, e.g.:

- Sepsis
- Hemorrhage
- Anaphylaxis
- Overdose
- Cyanide or carbon monoxide poisoning
- Other: PE, MI, tension pneumothorax

**Lactate Measurement**

At this time there is insufficient evidence to recommend for or against routine point of care measurement of lactate by EMS. Although it shows promise for improved detection of hypoperfusion, lactate measurement is not considered mandatory or standard of care by the Denver Metro EMS Medical Directors. Its use will be governed by individual agency Medical Director policy

## 4070 PSYCHIATRIC/BEHAVIORAL PATIENT PROTOCOL

### **Scene Safety**

- A. Scene safety and provider safety are a priority. Consider police contact if scene safety is a concern.
- B. Refer to restraint protocol as needed, especially as it relates to A.

EMT	EMT-I	Paramedic
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### **Specific Information Needed**

- A. Obtain history of current event; inquire about recent crisis, toxic exposure, drugs, alcohol, emotional trauma, and suicidal or homicidal ideation.
- B. Obtain past history; inquire about previous psychiatric and medical problems, medications.

### **Specific Objective Findings**

- A. Evaluate general appearance
  1. E.g.: Well groomed, disheveled, debilitated, bizarrely dressed
- B. Evaluate vital signs.
  1. Is a particular toxidrome suggested, e.g.: sympathomimetic?
- C. Note medic alert tags, breath odors suggesting intoxication.
- D. Determine ability to relate to reality.
  1. Does the patient know who she is, where she is, who you are and why you are there?
  2. Does the patient appear to be hallucinating or responding to internal stimuli?
- E. Note behavior. Consider known predictors of violence:
  1. Is the patient male, intoxicated, paranoid or displaying aggressive or threatening behavior or language?

### **Treatment**

- A. If patient agitated or combative, see Agitated/Combative Patient Protocol
- B. Attempt to establish rapport
- C. Assess ABCs
- D. Transport to closest Emergency Department
- E. Be alert for possible elopement
- F. Consider organic causes of abnormal behavior (trauma, overdose, intoxication, hypoglycemia)
- G. If patient restraint considered necessary for patient or EMS safety, refer to Restraint Protocol.
- H. Check blood sugar
- I. If altered mental status or unstable vital signs:
  1. Administer oxygen.
  2. Establish venous access.
  3. Refer to Universal Altered Mental Status Protocol.

### **Mental Health Holds**

- A. If a patient has an isolated mental health complaint (e.g. suicidality), and does not have a medical complaint or need specific medical intervention, then that patient may be appropriately transported by law enforcement according to their protocols.
- B. If a patient has a psychiatric complaint with associated illness or injury (e.g. overdose, altered mental status, chest pain, etc), then the patient should be transported by EMS
- C. If a patient with a psychiatric complaint is intoxicated or otherwise lacks decision making capacity for any other reason then no Mental Health Hold is needed and such a patient should be brought to an emergency department for evaluation and stabilization with implied consent.
- D. If EMS is called to evaluate a patient with an isolated psychiatric complaint who is not

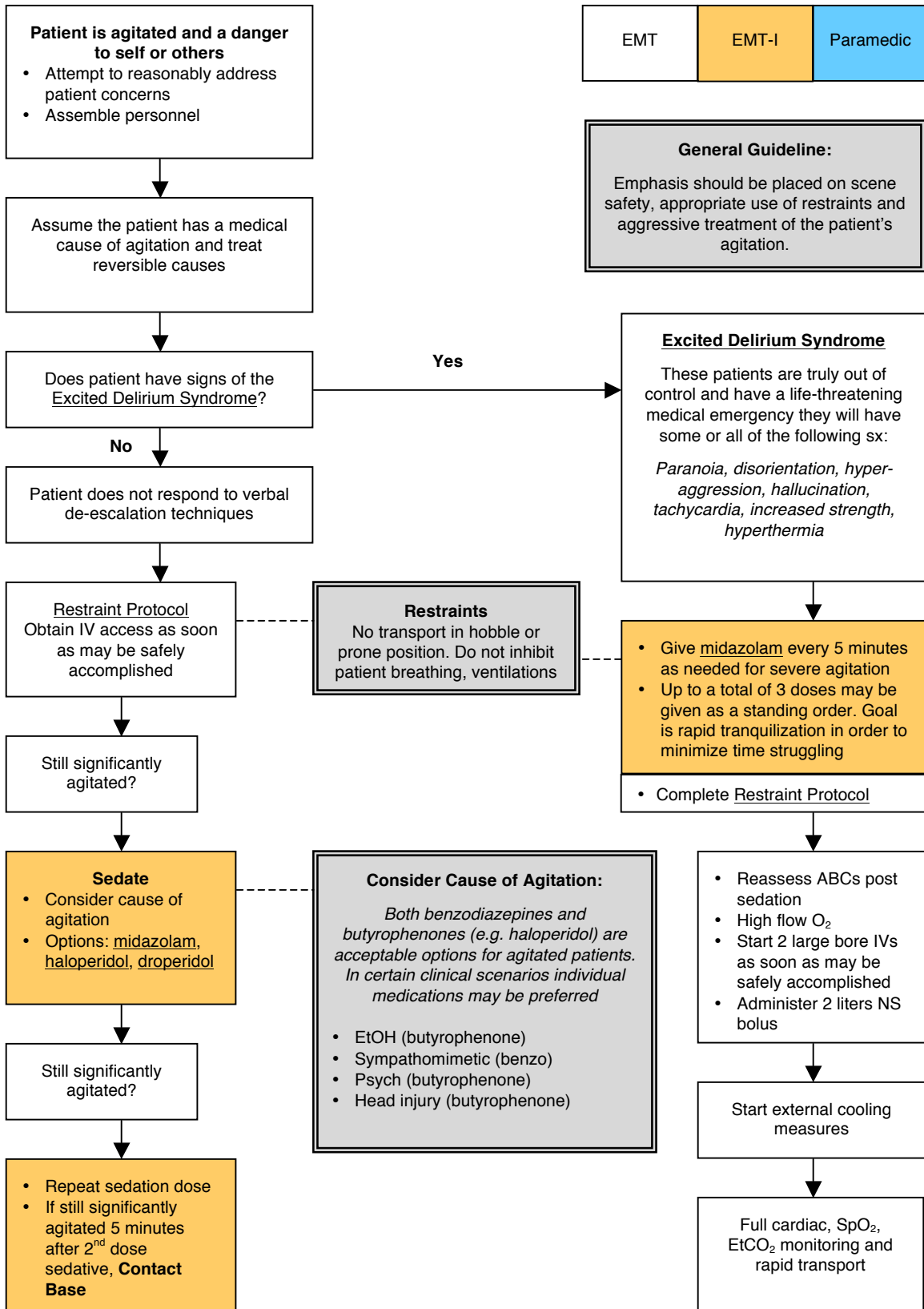
## 4070 PSYCHIATRIC/BEHAVIORAL PATIENT PROTOCOL

- intoxicated, or otherwise lacking decision making capacity, and who refuses treatment or transport, *and* law enforcement are not willing to transport patient, then EMS should contact agency Base Station for medical consult with **BASE PHYSICIAN**.
- E. If there is a reasonable concern for suicidal or homicidal ideation, or grave disability from another mental health condition, then **BASE PHYSICIAN** may give a verbal order placing the patient on a Mental Health Hold and direct EMS personnel to transport the patient against his or her will in accordance with Colorado State statutes. The physician's name, and time and date of the Mental Health Hold must be recorded on the PCR. Effort should be made to obtain consent for transport from the patient, and to preserve the patient's dignity throughout the process.
  - F. A patient being transported on a Mental Health Hold may be transported to any appropriate receiving emergency department, as it may not be operationally feasible to transport exclusively to the Base Station hospital, although this is preferred if time and conditions allow.
  - G. It is expected that receiving facilities will receive such patients and perform an appropriate evaluation to determine if continuation of a Mental Health Hold is indicated at the time of their assessment.
  - H. Although there is always a risk of accusations of kidnapping or assault in such cases, such accusations are extremely rare, and the Denver Metropolitan EMS Medical Directors feel strongly that the risk of abandonment of a potentially suicidal or otherwise gravely impaired patient far outweigh any theoretical risk of allegations of kidnapping when actions are taken in the interest of patient safety.

### Specific Precautions

- A. Psychiatric patients often have an organic basis for mental disturbances. Be suspicious of hypoglycemia, hypoxia, head injury, intoxication, or toxic ingestion.
- B. If emergency treatment is unnecessary, do as little as possible except to reassure while transporting. Try not to violate the patient's personal space.
- C. If the situation appears threatening, consider a show of force involving police before attempting to restrain.
- D. Beware of weapons. These patients can become very violent.
- E. An EMT, Intermediate or paramedic may initiate a Mental Health Hold only by direct verbal order from the **BASE PHYSICIAN**.
- F. Document name of **BASE PHYSICIAN**.

## 4075 AGITATED/COMBATIVE PATIENT PROTOCOL



## 4076 TRANSPORT OF THE HANDCUFFED PATIENT

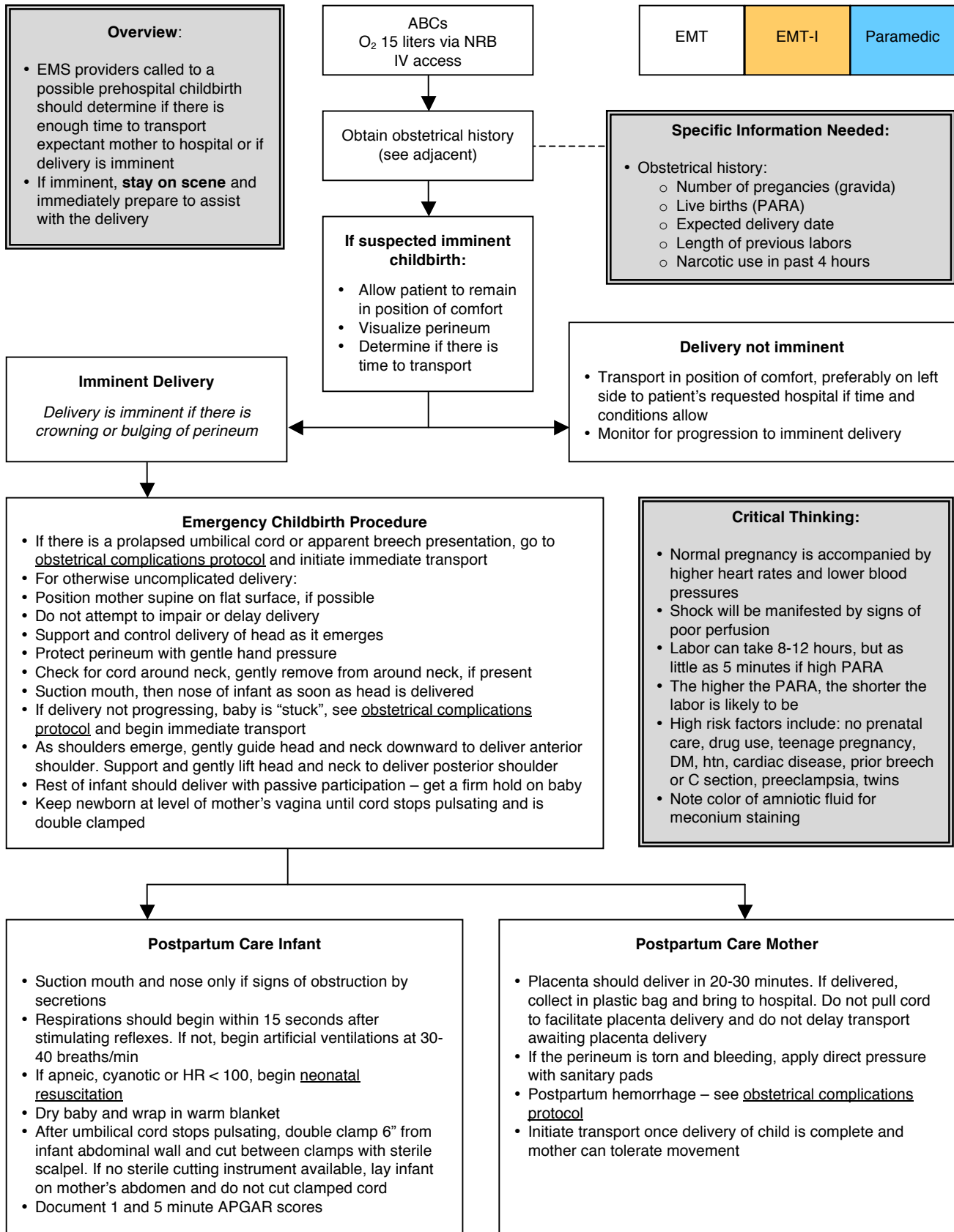
### **Purpose:**

1. Guideline for transport of patients in handcuffs placed by law enforcement

### **Guideline:**

1. Handcuffs are only to be placed by law enforcement. EMS personnel are not permitted to use handcuffs.
2. Request that law enforcement remain with the patient in the ambulance, if possible. If not possible, request that police ride behind ambulance so as to be readily available to remove handcuffs if needed in an emergency situation to facilitate medical care of the patient.
3. EMS personnel are not responsible for the law enforcement hold on these patients.
4. Handcuffed patients will not be placed in the prone position.
5. Handcuffs may be used with spinal immobilization. Medical priorities should take priority in the positioning of the handcuffs.

## 4080 CHILDBIRTH PROTOCOL





# 4081 OBSTETRICAL COMPLICATIONS

EMT	EMT-I	Paramedic
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**For All Patients with obstetrical complications**

- Do not delay: immediate rapid transport
- Give high-flow oxygen
- Start IV en route if time and conditions allow. Treat signs of shock w. IV fluid boluses per Medical Hypotension/Shock Protocol

**Possible actions for specific complications (below)**

- The following actions may not be feasible in every case, nor may every obstetrical complication be anticipated or effectively managed in the field. These should be considered “best advice” for rare, difficult scenarios. In every case, initiate immediate transport to definite care at hospital

**Prolapsed Umbilical Cord**

- Discourage pushing by mother
- Position mother in Trendelenberg or supine with hips elevated
- Place gloved hand in mother’s vagina and elevate the presenting fetal part off of cord until relieved by physician
- Feel for cord pulsations
- Keep exposed cord moist and warm

**Breech Delivery**

- Never attempt to pull infant from vagina by legs
- IF legs are delivered gently elevate trunk and legs to aid delivery of head
- Head should deliver in 30 seconds. If not, reach 2 fingers into vagina to locate infant’s mouth. Press vaginal wall away from baby’s mouth to access an airway
- Apply gentle abdominal pressure to uterine fundus
- IF infant delivered see childbirth protocol – Postpartum care of infant and mother

**Postpartum Hemorrhage**

- Massage abdomen (uterine fundus) until firm
- Initiate rapid transport
- Note type and amount of bleeding
- Treat signs of shock with IV fluid boluses

**Complications of Late Pregnancy**

**3<sup>rd</sup> Trimester Bleeding (6-8 months)**

- High flow O<sub>2</sub> via NRB, IV access
- Suspect placental abruption or placenta previa
- Initiate rapid transport
- Position patient on left side
- Note type and amount of bleeding
- IV NS bolus for significant bleeding or shock

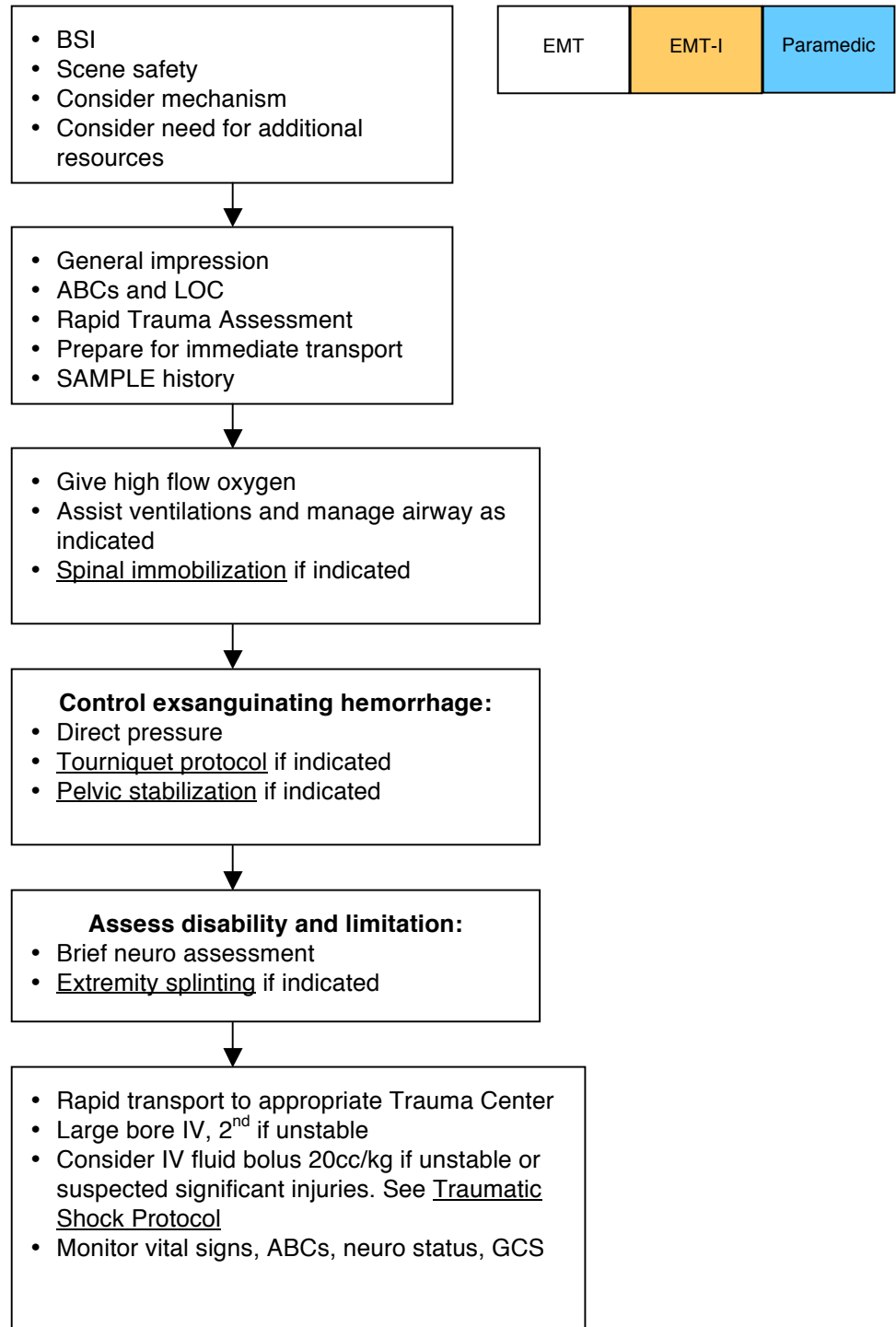
**Eclampsia/Toxemia**

- High flow O<sub>2</sub> via NRB, IV access
- SBP > 140, DBP > 90, peripheral edema, headache, seizure
- Transport position of comfort
- Treat seizures with 6 gm of Magnesium sulfate IV over 10 minutes
- See seizure protocol

**Shoulder Dystocia**

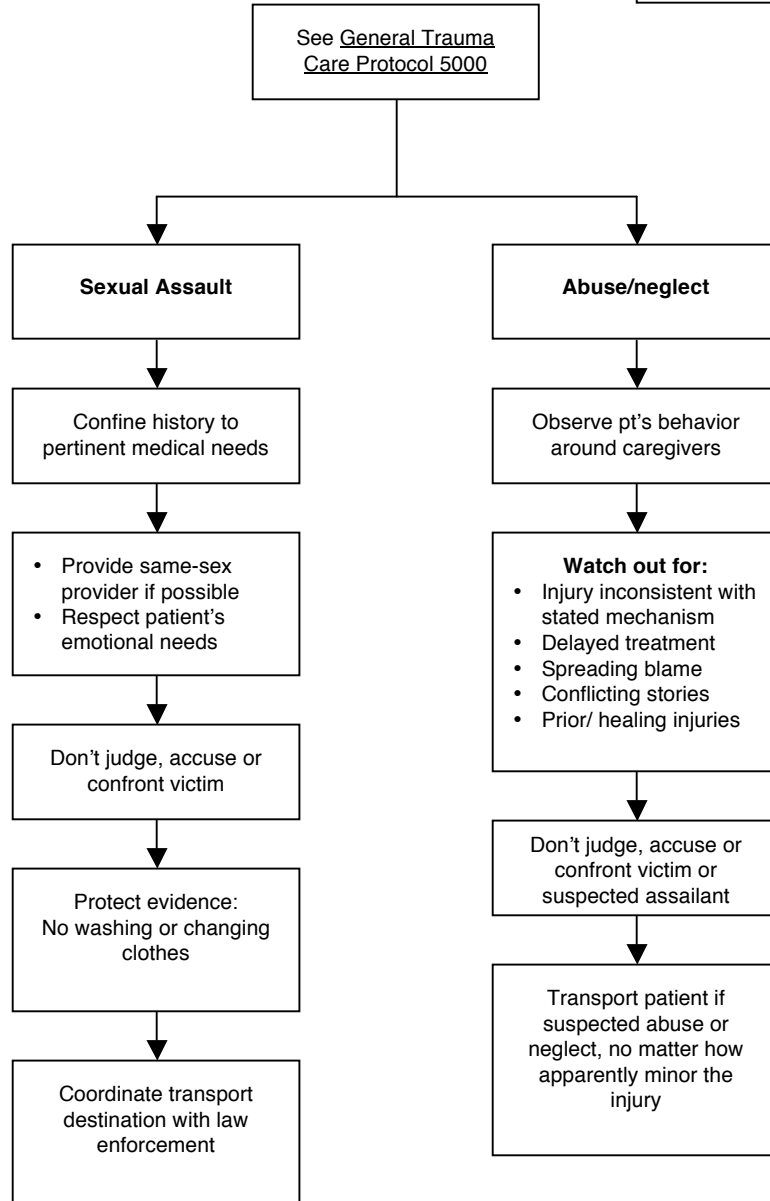
- Support baby’s head
- Suction oral and nasal passages
- DO NOT pull on head
- May facilitate delivery by placing mother with buttocks just off the end of bed, flex her thighs upward and gentle open hand pressure above the pubic bone
- IF infant delivered see childbirth protocol – Postpartum care of infant and mother

## 5000 GENERAL TRAUMA CARE



# 5005 SPECIAL TRAUMA SCENARIOS PROTOCOL

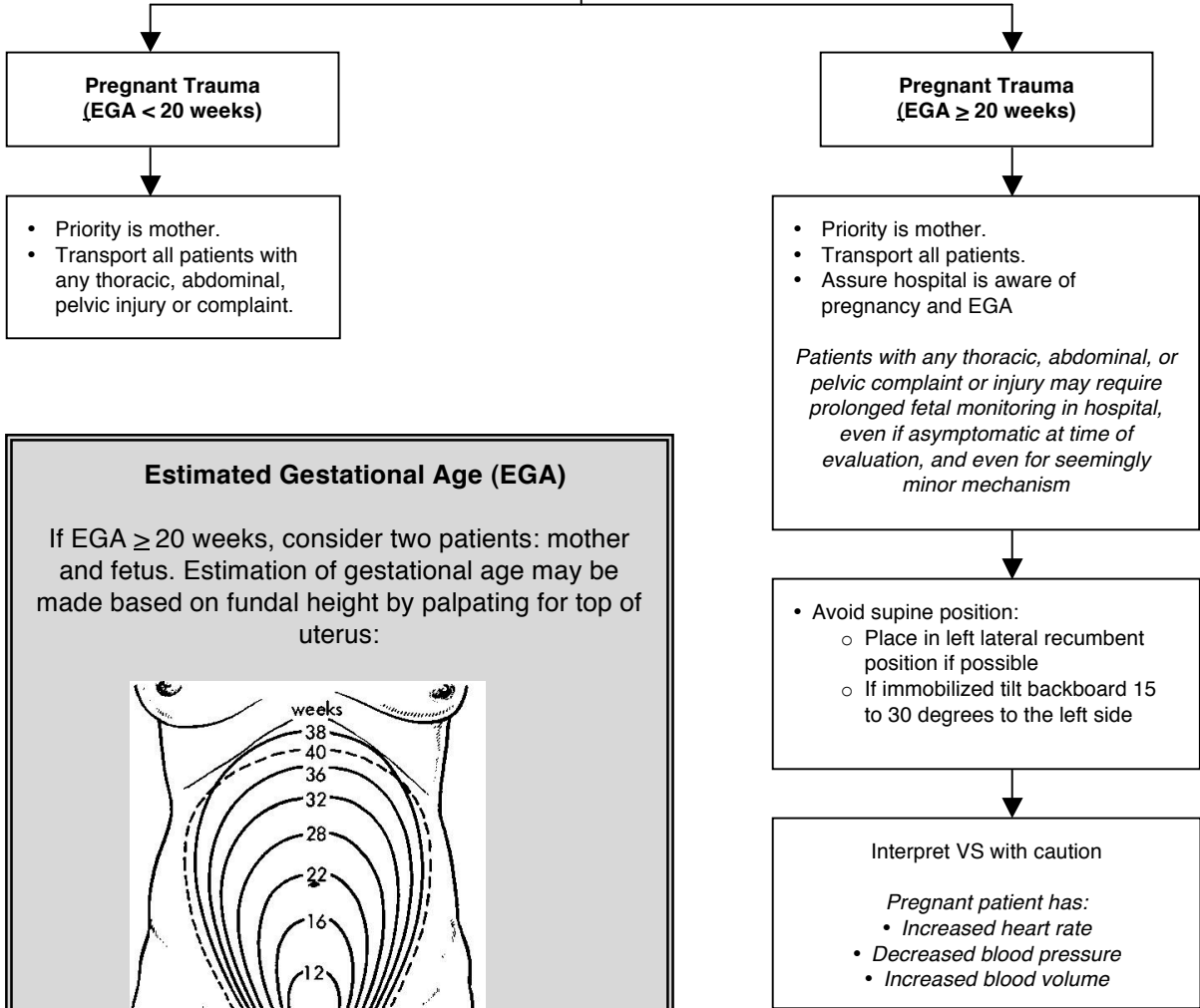
EMT	EMT-I	Paramedic
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# 5006 TRAUMA IN PREGNANCY

EMT	EMT-I	Paramedic
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See General Trauma Care Protocol 5000



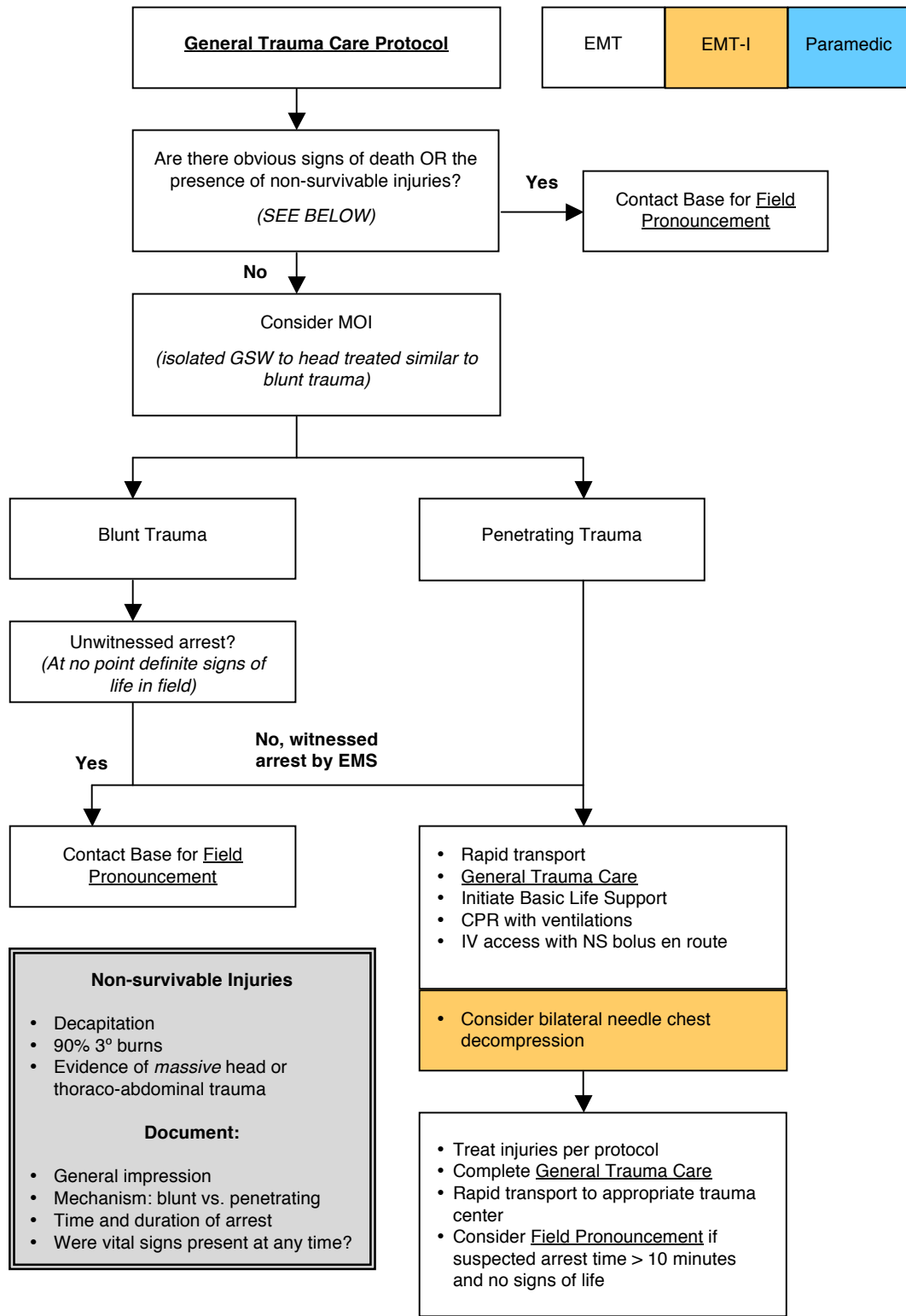
**Estimated Gestational Age (EGA)**

If EGA ≥ 20 weeks, consider two patients: mother and fetus. Estimation of gestational age may be made based on fundal height by palpating for top of uterus:

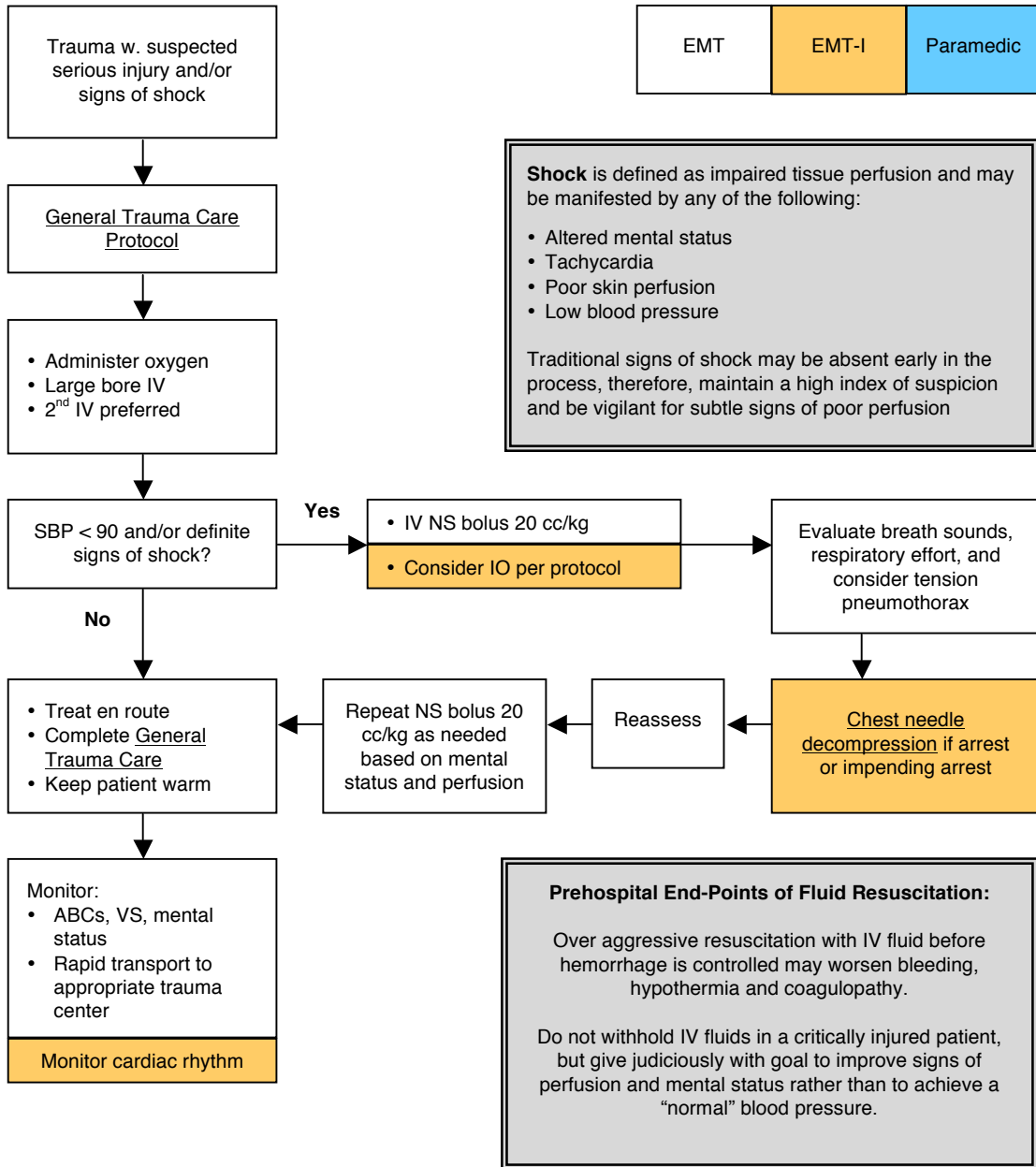
***If uterus is at umbilicus then EGA > 20 weeks***

Estimation by Last Menstrual Period:  
 Due Date = LMP + 9 months + 7 days  
 EGA = due date – current date

## 5010 ADULT (AGE ≥ 12 YEARS) TRAUMATIC PULSELESS ARREST

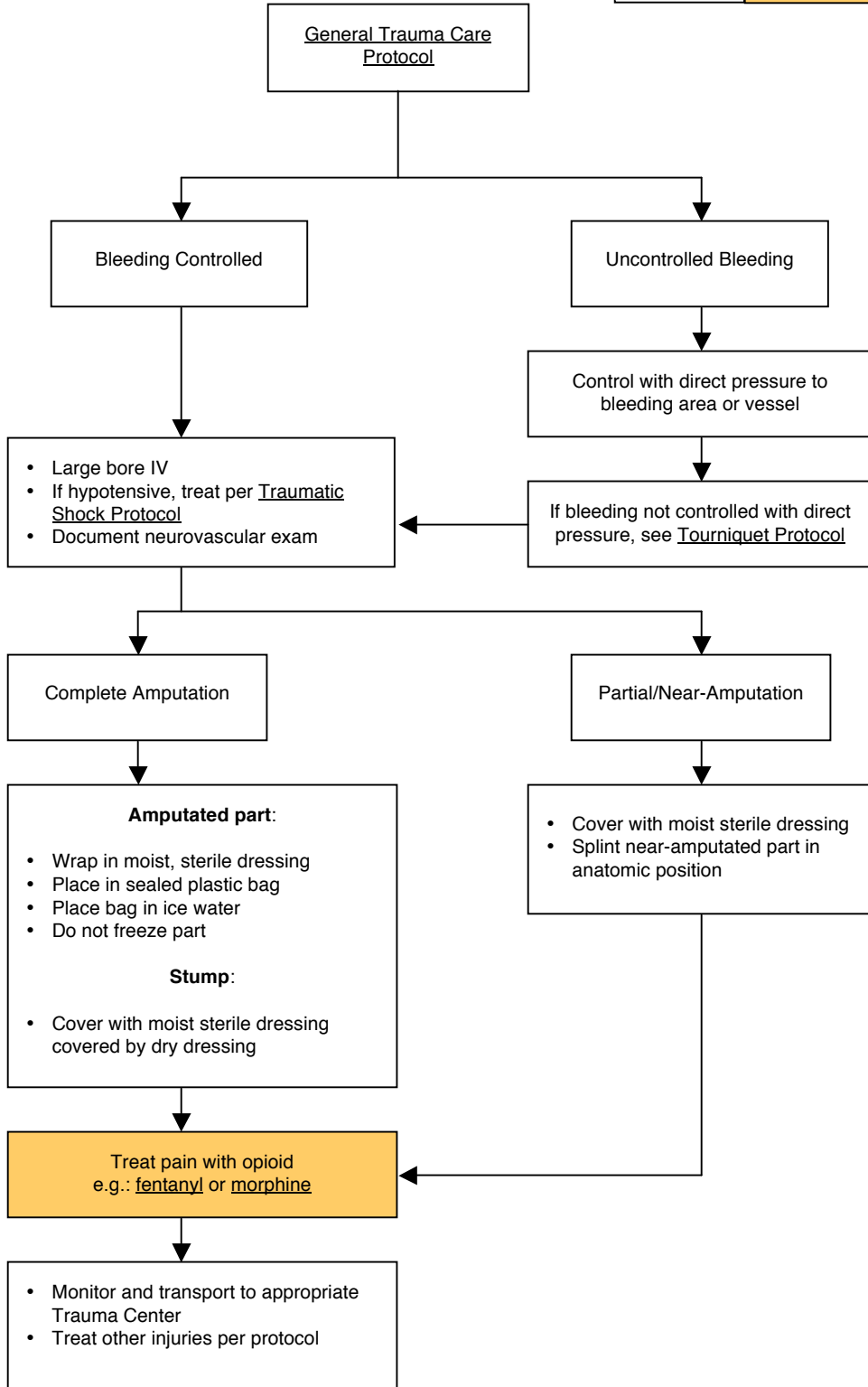


## 5015 ADULT (AGE ≥ 12 YEARS) TRAUMATIC SHOCK PROTOCOL

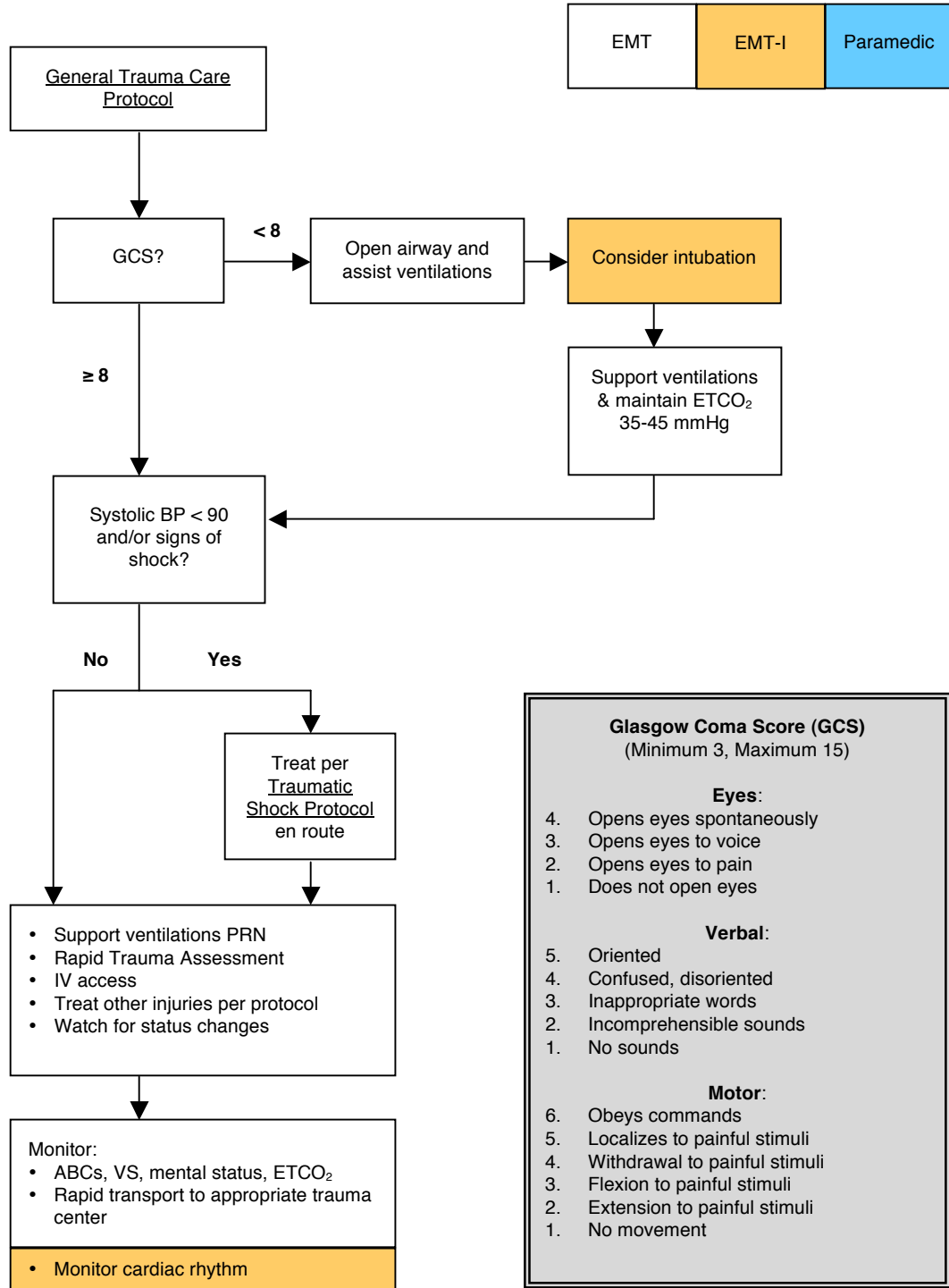


# 5020 AMPUTATIONS

EMT	EMT-I	Paramedic
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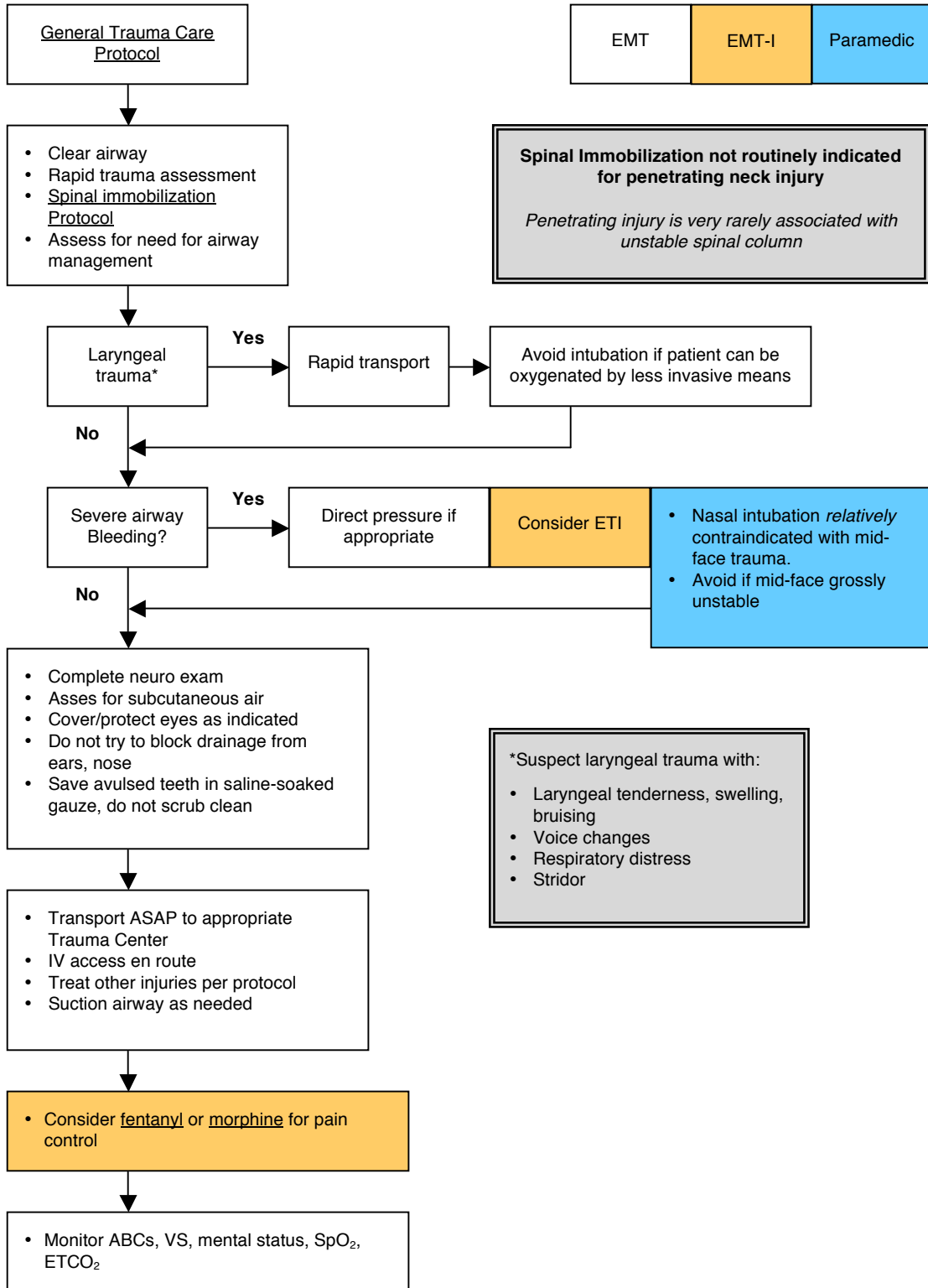


# 5030 HEAD TRAUMA PROTOCOL

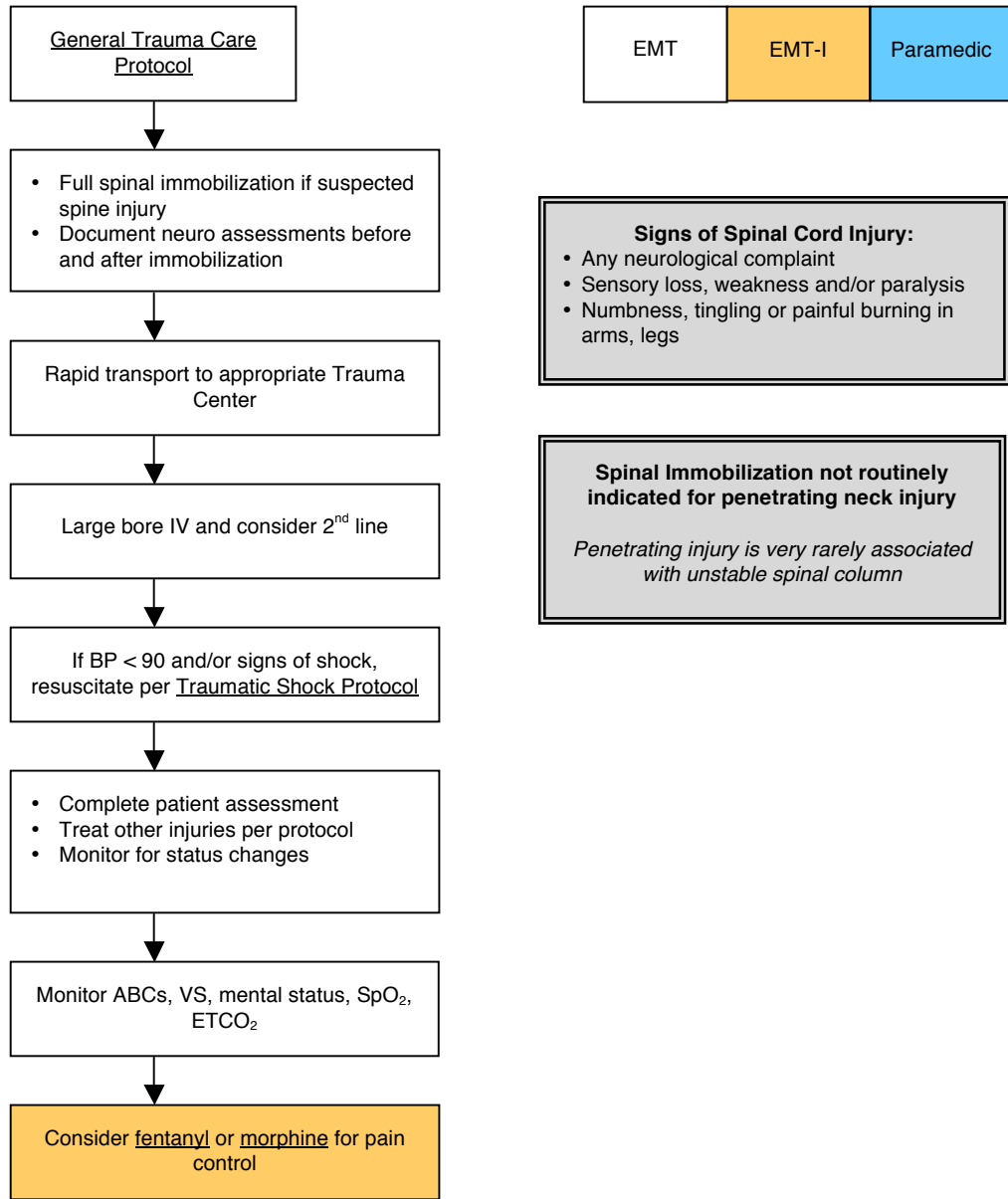




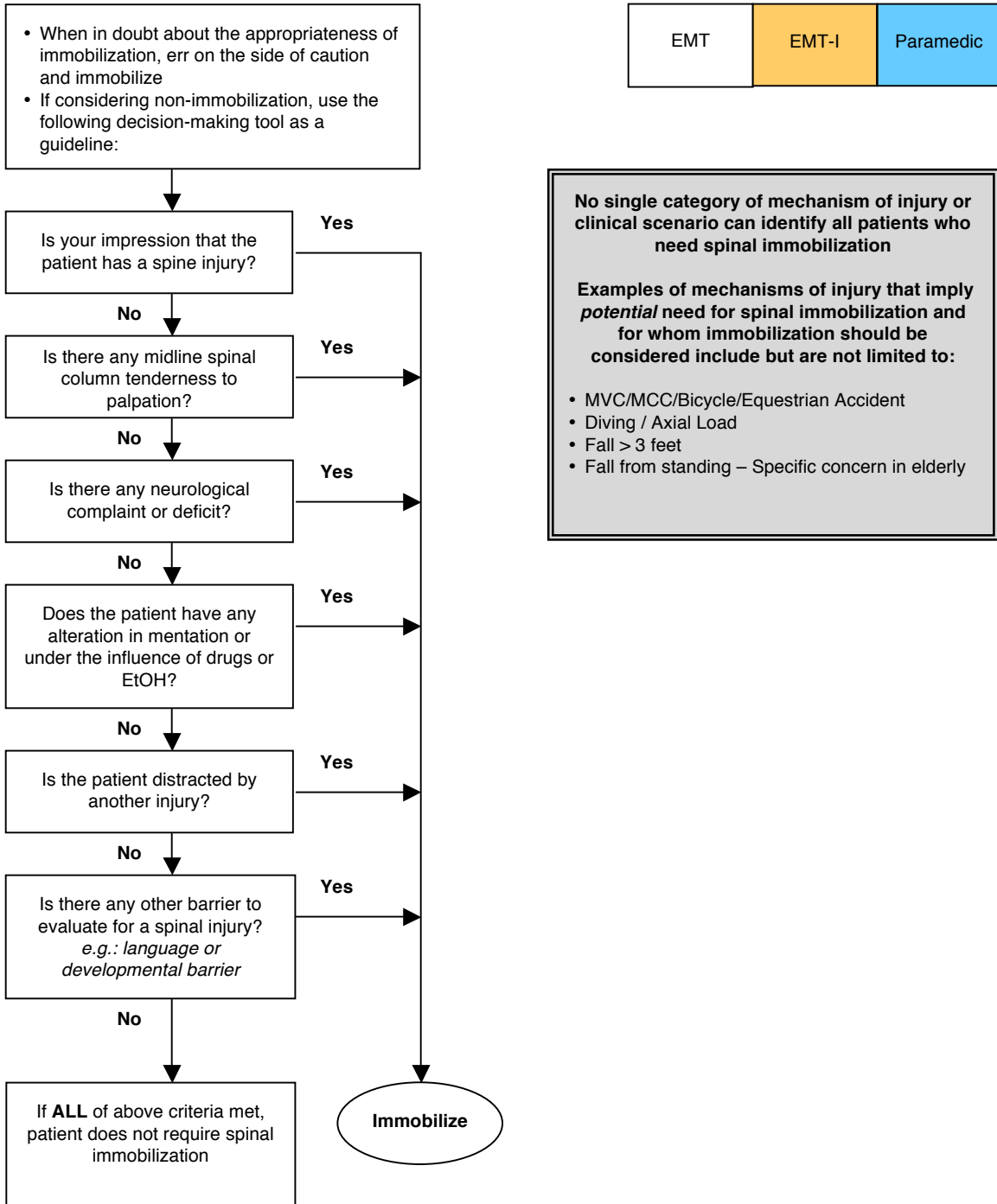
# 5040 FACE AND NECK TRAUMA



# 5050 ADULT SPINAL TRAUMA

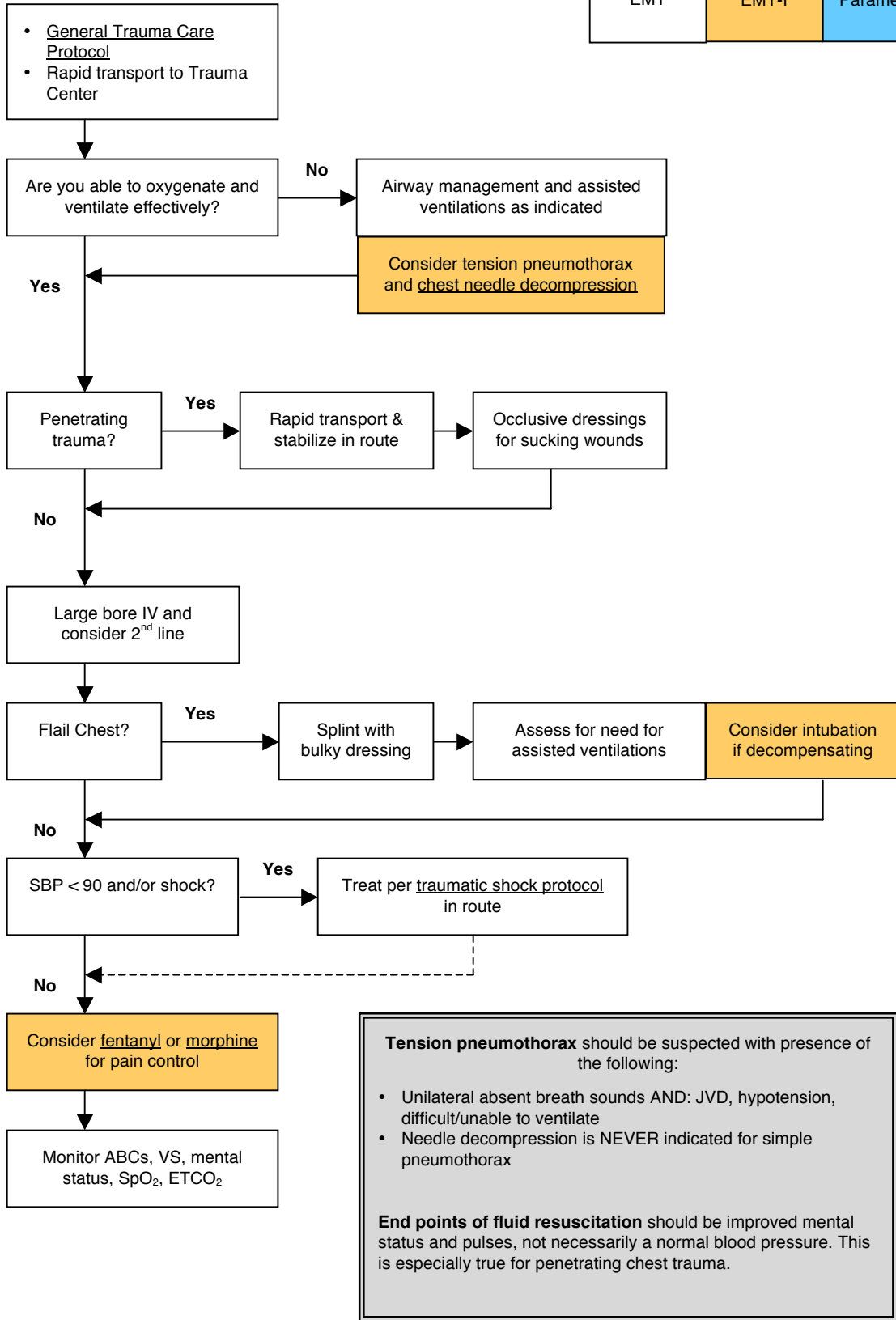


## 5055 ADULT (AGE ≥ 12 YEARS) SPINAL IMMOBILIZATION PROTOCOL

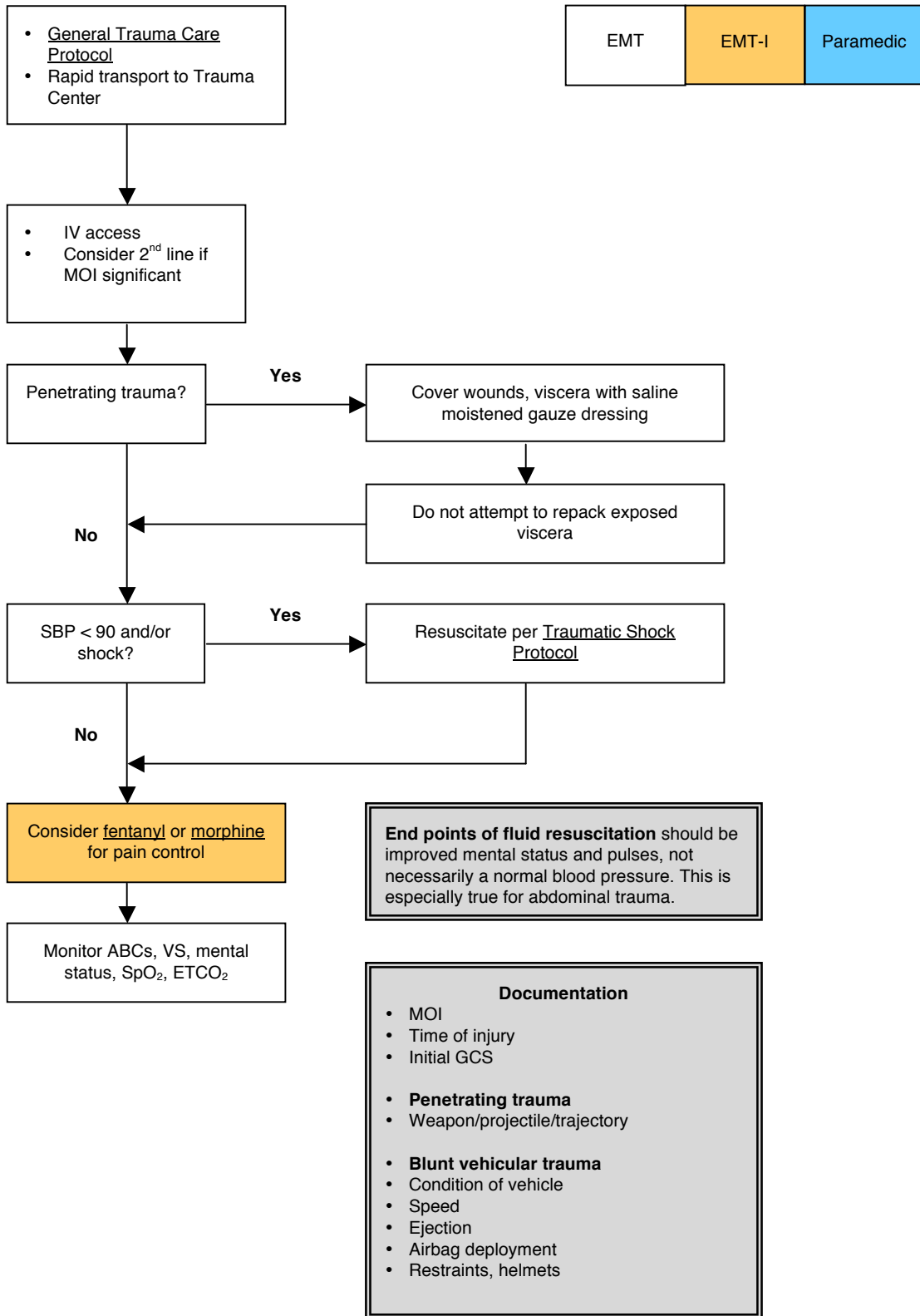


# 5060 CHEST TRAUMA

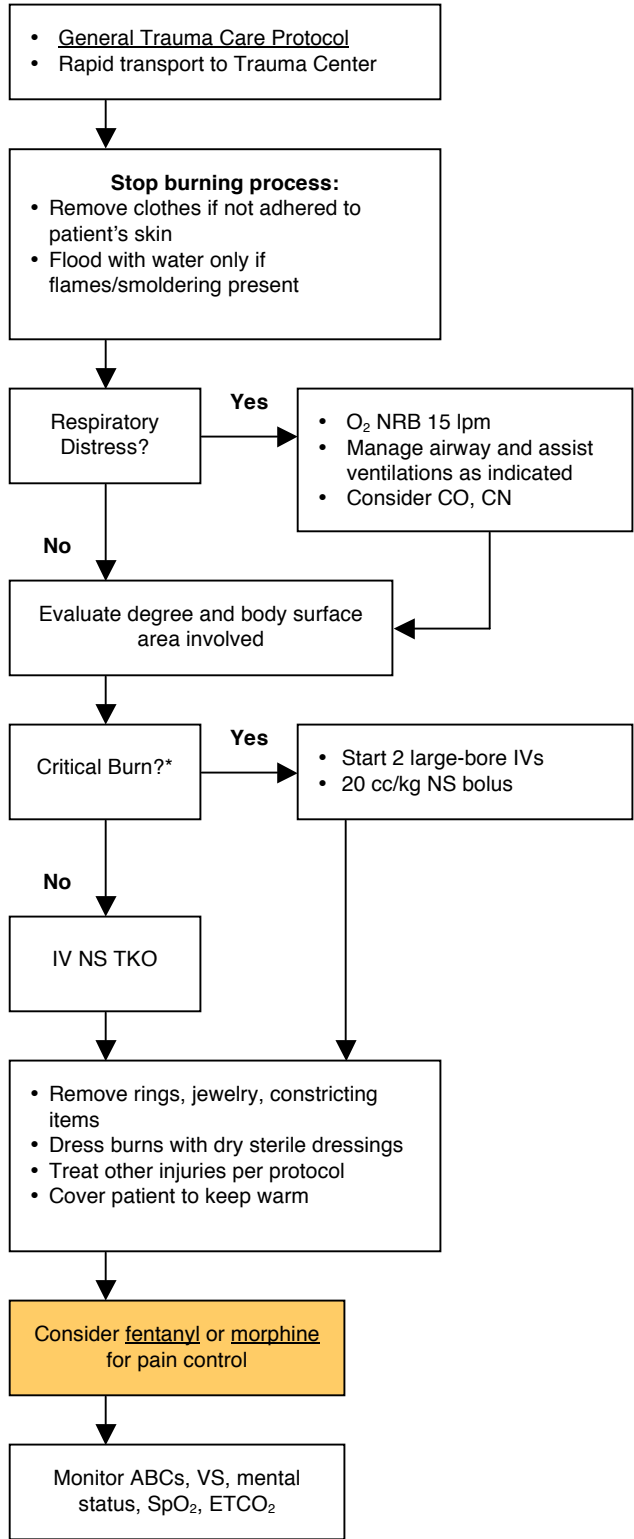
EMT	EMT-I	Paramedic
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# 5070 ABDOMINAL TRAUMA



# 5090 BURNS



EMT	EMT-I	Paramedic
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- Document:**
- Type and degree of burn(s)
  - % BSA
  - Respiratory status
  - Singed nares, soot in mouth
  - SpO<sub>2</sub>
  - PMH
  - Confined space

- \*Critical Burn:**
- 2° > 30% BSA
  - 3° > 10% BSA
  - Respiratory injury, facial burn
  - Associated injuries, electrical or deep chemical burns, underlying PMH (cardiac, DM), age < 10 or > 50 yrs

- Types of Burns:**
- **Thermal:** remove from environment, put out fire
  - **Chemical:** brush off or dilute chemical. Consider HAZMAT
  - **Electrical:** make sure victim is de-energized and suspect internal injuries
  - **Consider CO** if enclosed space
  - **Consider CN** if plastics, shock, pulseless arrest

- Designated Regional Burn Centers**  
*Consider direct transport of isolated burns if time and conditions allow*
- Age ≤ 12 Children's Hospital Colorado
  - Age ≥ 13 University of Colorado Hospital

## 6000 GENERAL GUIDELINES FOR PEDIATRIC PATIENTS

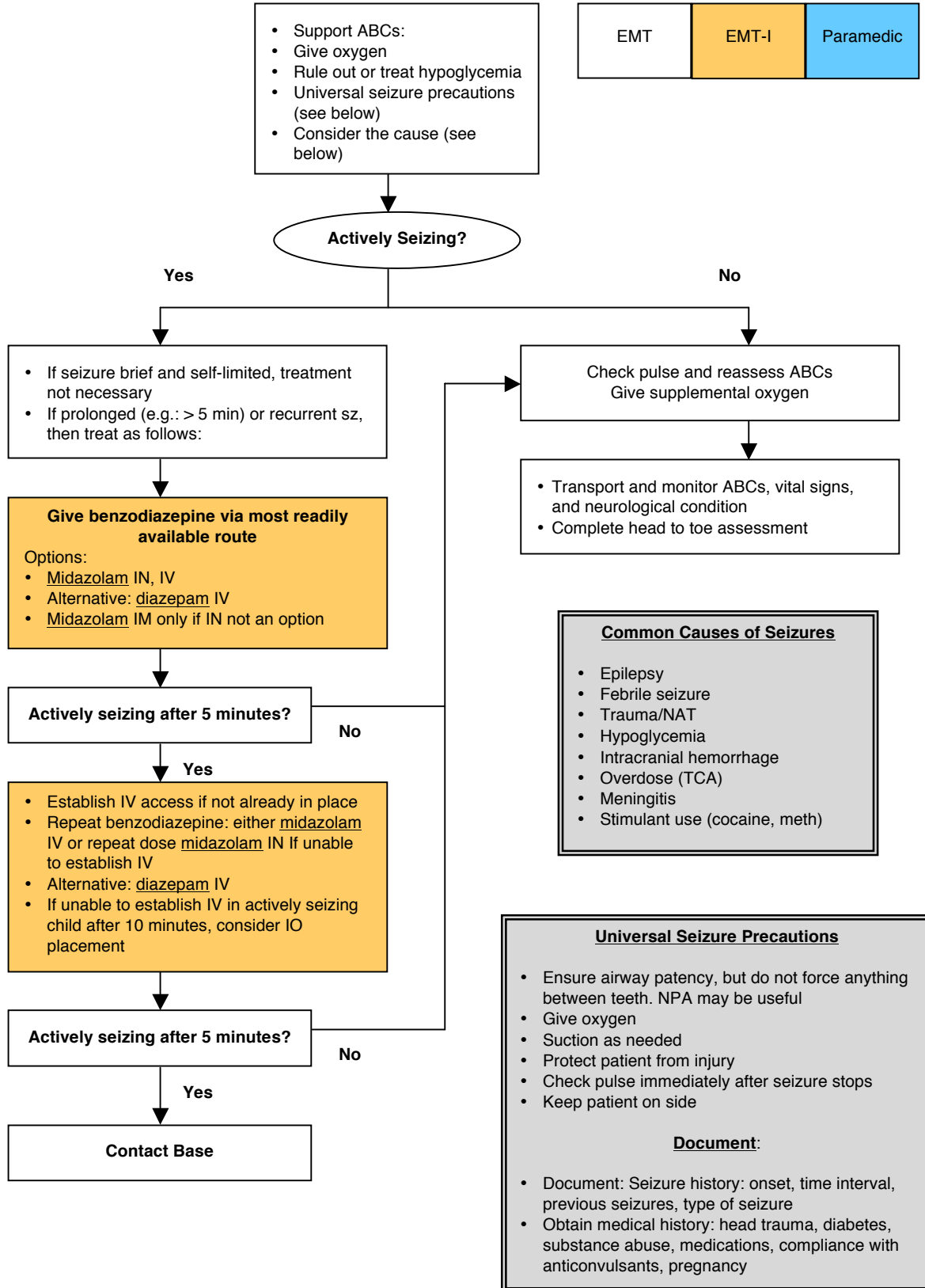
### General Guideline:

- A. Pediatric patients, defined as age < 12 years for the purpose of these protocols, have unique anatomy, physiology, and developmental needs that affect prehospital care. Because children make up a small percentage of total calls and few pediatric calls are critically ill or injured, it is important to stay attuned to these differences to provide good care. Therefore, **CONTACT BASE** early for guidance when treating pediatric patients with significant complaints, including abnormalities of vital signs. Pediatric emergencies are usually not preceded by chronic disease. If recognition of compromise occurs early, and intervention is swift and effective, the child will often be restored to full health.

### Specific Considerations:

- A. The following should be kept in mind during the care of children in the prehospital setting:
  1. Airways are smaller, softer, and easier to obstruct or collapse.
  2. Respiratory reserves are small. A minor insult like improper position, vomiting, or airway narrowing can result in major deficits in ventilation and oxygenation.
  3. Circulatory reserves are also small. The loss of as little as one unit of blood can produce severe shock in an infant. Conversely, it is difficult to fluid overload most children. You can be confident that a good hands-on circulation assessment will determine fluid needs accurately.
  4. Assessment of the pediatric patient can be done using your knowledge of the anatomy and physiology specific to infants and children.
  5. Listen to the parents' assessment of the patient's problem. They often can detect small changes in their child's condition. This is particularly true if the patient has chronic disease.
  6. The proper equipment is very important when dealing with the pediatric patient. A complete selection of pediatric airway management equipment, IV catheters, cervical collars, and drugs has been mandated by the state. This equipment should be stored separately to minimize confusion.

## 6005 PEDIATRIC SEIZURE (< 12 YEARS)





## 6010 PEDIATRIC (AGE < 12 YEARS) CARDIAC ARREST-GENERAL PRINCIPLES

### General Guideline:

- A. Pediatric cardiac arrest more frequently represents progressive respiratory deterioration or shock rather than primary cardiac etiologies. Unrecognized deterioration may lead to bradycardia, agonal breathing, and ultimately asystole. Resulting hypoxic and ischemic insult to the brain and other vital organs make neurologic recovery extremely unlikely, even in the doubtful event that the child survives the arrest. Children who respond to rapid intervention with ventilation and oxygenation alone or to less than 5 minutes of advanced life support are much more likely to survive neurologically intact. Therefore, it is essential to recognize the child who is at risk for progressing to cardiopulmonary arrest and to provide aggressive intervention before asystole occurs

### Specific Information Needed For Patient Care Report

- A. Onset (witnessed or unwitnessed), preceding symptoms, bystander CPR, downtime before CPR and duration of CPR
- B. Past History: medications, medical history, suspicion of ingestion, trauma, environmental factors (hypothermia, inhalation, asphyxiation)

### Document Specific Objective Findings

- A. Unconscious, unresponsive
- B. Agonal, or absent respirations
- C. Absent pulses
- D. Any signs of trauma, blood loss
- E. Skin temperature

### General Treatment Guidelines

- A. Treat according to Pediatric BLS and ALS pulseless arrest algorithms
- B. Primary cardiac arrest from ventricular arrhythmia, while less common than in adults, does occur in children. If history suggests primary cardiac event (e.g.: sudden collapse during exercise), then rapid defibrillation is most effective treatment
- C. Most pediatric pulseless arrest is the result of primary asphyxial event, therefore initial sequence is chest compressions **with** ventilations, unlike adult pulseless arrest
- D. Call for ALS assistance if not already on scene or responding

### General Guidelines: Chest Compressions for 2 Rescuers

Once advanced airway in place, chest compressions should be given continually with ventilations at 8-10/minute

#### **Neonate ( $\leq$ 1 month old)**

- A. 1 cycle of CPR = 3:1 chest compressions: breaths.
- B. Push hard and fast at a compression rate of 100/minute
- C. Minimize interruption to chest compressions
  - a. Continue CPR while defibrillator is charging, and resume CPR immediately after all shocks. Do not check pulses except at end of CPR cycle and if rhythm is organized at rhythm check

#### **Infant and Child (1 month to 12 years old)**

- A. 1 cycle of CPR = 15:2 chest compressions: breaths

## 6010 PEDIATRIC (AGE < 12 YEARS) CARDIAC ARREST-GENERAL PRINCIPLES

- b. Increase in compression interruption correlates with decrease in likelihood of successful defibrillation
- D. Ensure full chest recoil
  - a. Represents diastolic phase for cardiac filling due to negative intrathoracic pressure
- E. Avoid hyperventilation
  - a. Associated with barotrauma and air trapping
  - b. Makes CPR less effective by inhibiting cardiac output by increasing intrathoracic pressure and decreasing venous return to the heart
- F. Rotate compressors every 2 minutes during rhythm checks

### **General Guidelines: Defibrillation**

- A. First shock delivered at 2 J/kg biphasic
- B. All subsequent shocks delivered at 4 J/kg biphasic

### **General Guidelines: Ventilation during CPR**

- A. Do not interrupt chest compressions and do not hyperventilate
- B. Contrary to adult cardiac arrest, pediatric arrest is much more likely to be asphyxial and prolonged. During this period, blood continues to flow to the tissues causing oxygen saturation to decrease and carbon dioxide to increase. Pediatric patients need both prompt ventilation and chest compressions.
- C. Hyperventilation decreases effectiveness of CPR and worsens outcome

### **General Guidelines: Timing Of Placement Of Advanced Airway**

- A. ***BVM is preferred method of ventilation in all pediatric patients age < 8 years***
- B. A supraglottic airway (e.g. King) may be placed at any point in resuscitation in patients ≥ 8 years old and may be considered equivalent to, but not superior to, BVM for ages 8-12
- C. Do not hyperventilate
- D. Always confirm advanced airway placement by objective criteria: ETCO<sub>2</sub>
  - a. Use continuous waveform capnography if available

### **General Guidelines: Pacing**

- A. Effectiveness of transcutaneous pediatric pacing has not been established and is not recommended

### **General Guidelines: ICD/Pacemaker patients**

- A. If cardiac arrest patient has an implantable cardioverter defibrillator (ICD) or pacemaker: place pacer/defib pads at least 1 inch from device. Biaxillary pad placement may be used

### **Special Notes:**

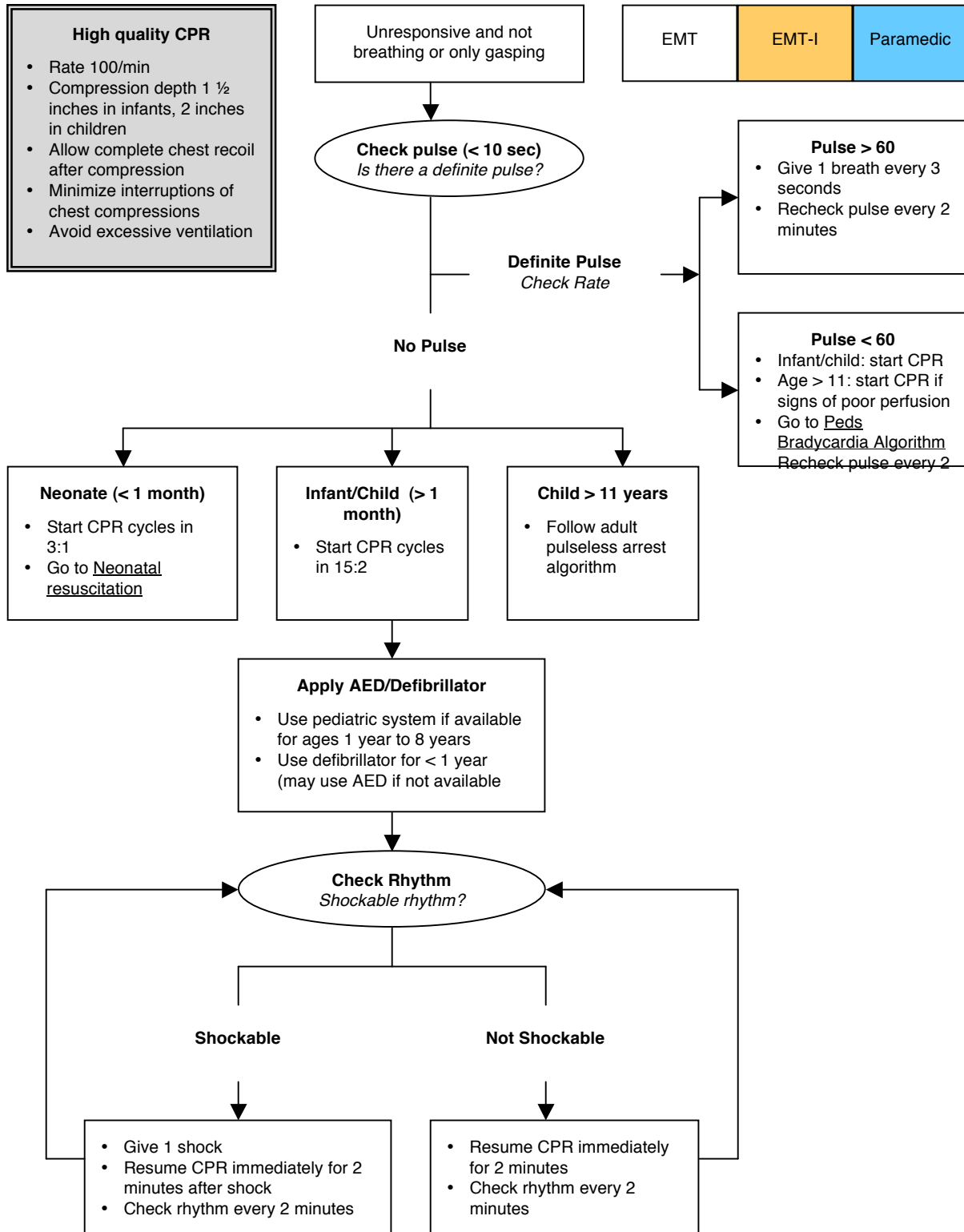
- A. Consider reversible causes of cardiac arrest (“Hs And Ts”):

Hypovolemia	IV Fluid bolus
Hypoxia	Ventilation
Hydrogen Ion (acidosis)	Ventilation
Hyperkalemia	Sodium bicarbonate
Hypothermia	See hypothermia protocol

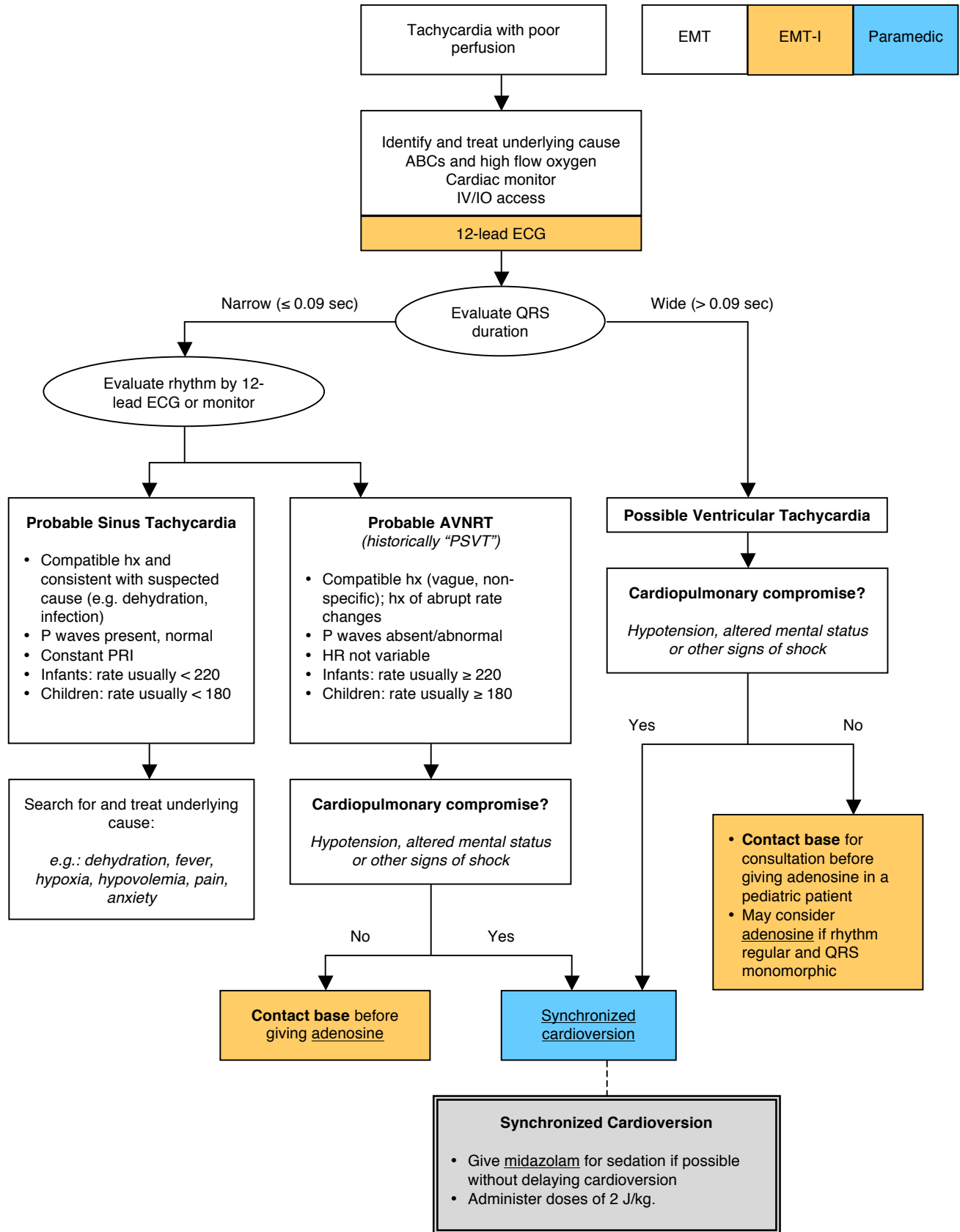
**6010 PEDIATRIC (AGE < 12 YEARS) CARDIAC ARREST-GENERAL PRINCIPLES**

Toxins: e.g.: opioid overdose	Naloxone 2mg IVP
Tamponade (cardiac)	
Tension pneumothorax	Needle thoracostomy
Thrombosis (coronary)	
Trauma	

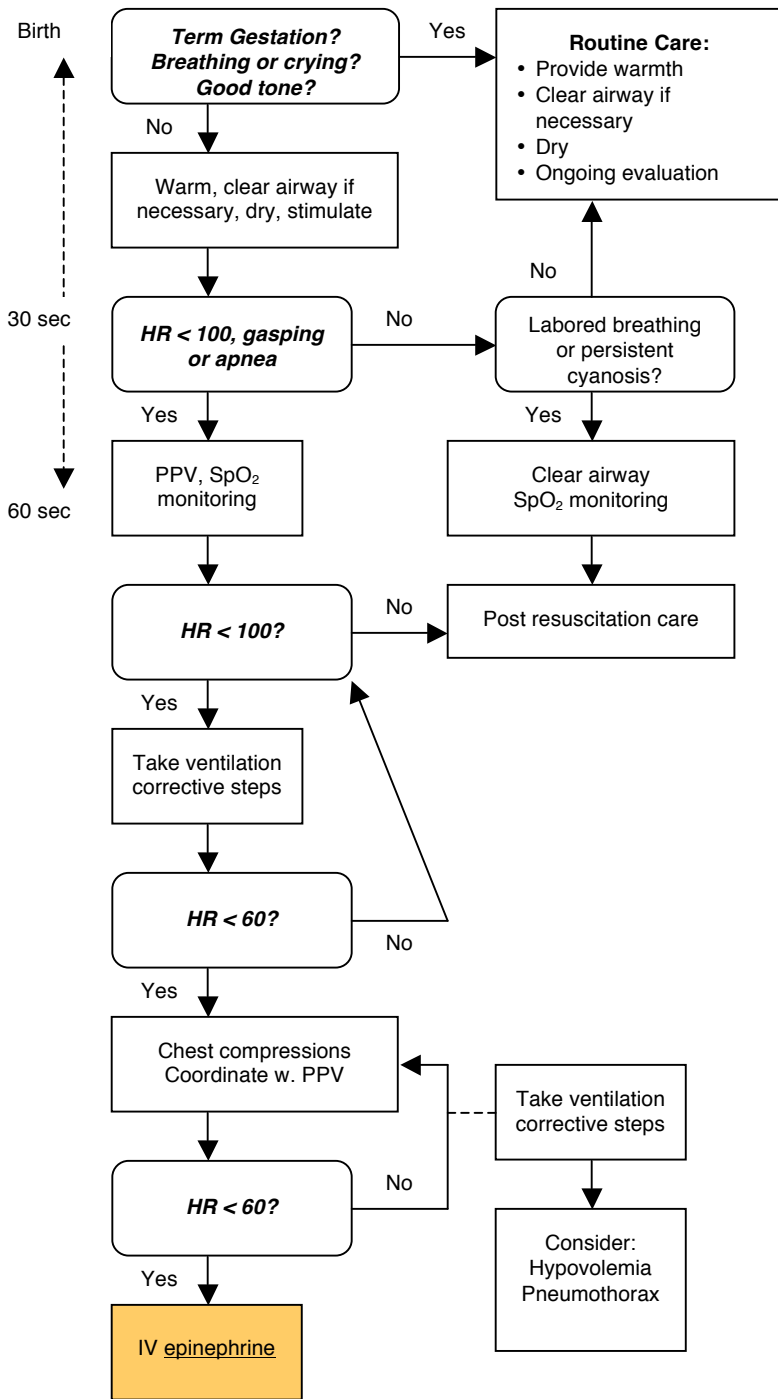
## 6015 PEDIATRIC (AGE < 12 YEARS) PULSELESS ARREST BLS/AED ALGORITHM



## 6020 PEDIATRIC (AGE < 12 YEARS) TACHYCARDIA WITH POOR PERFUSSION



## 6025 NEONATAL RESUSCITATION



EMT	EMT-I	Paramedic
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**General Considerations**  
(From 2010 AHA Guidelines)

- Newborn infants who do not require resuscitation can be identified generally based on 3 questions:
  - Term gestation?
  - Crying or breathing?
  - Good muscle tone?
- If answer to all 3 questions is “yes” then baby does not require resuscitation and should be dried, placed skin-to-skin on mother and covered to keep warm
- If answer to any of 3 questions is “no” then infant should receive 1 or more of following 4 categories of intervention in sequence:
  - Initial steps in stabilization (warm, clear airway, dry, stimulate)
  - Ventilation
  - Chest compression
  - Administration of epinephrine and/or volume expansion
- It should take approx. 60 seconds to complete initial steps
- The decision to progress beyond initial steps is based on an assessment of respirations (apnea, gasping, labored or unlabored breathing) and heart rate (>/< 100 bpm)

**Assisting Ventilations:**

- Assist ventilations at rate of 40-60 breaths per minute to maintain HR > 100

**Chest compressions:**

- Indicated for HR < 60 despite adequate ventilation w. supplemental O<sub>2</sub> for 30 seconds
- 2 thumb – encircling hands technique preferred
- Allow chest recoil
- Coordinate with ventilations so not delivered simultaneously
- 3:1 ratio of compressions to ventilations w. exhalation occurring during 1<sup>st</sup> compression after each ventilation

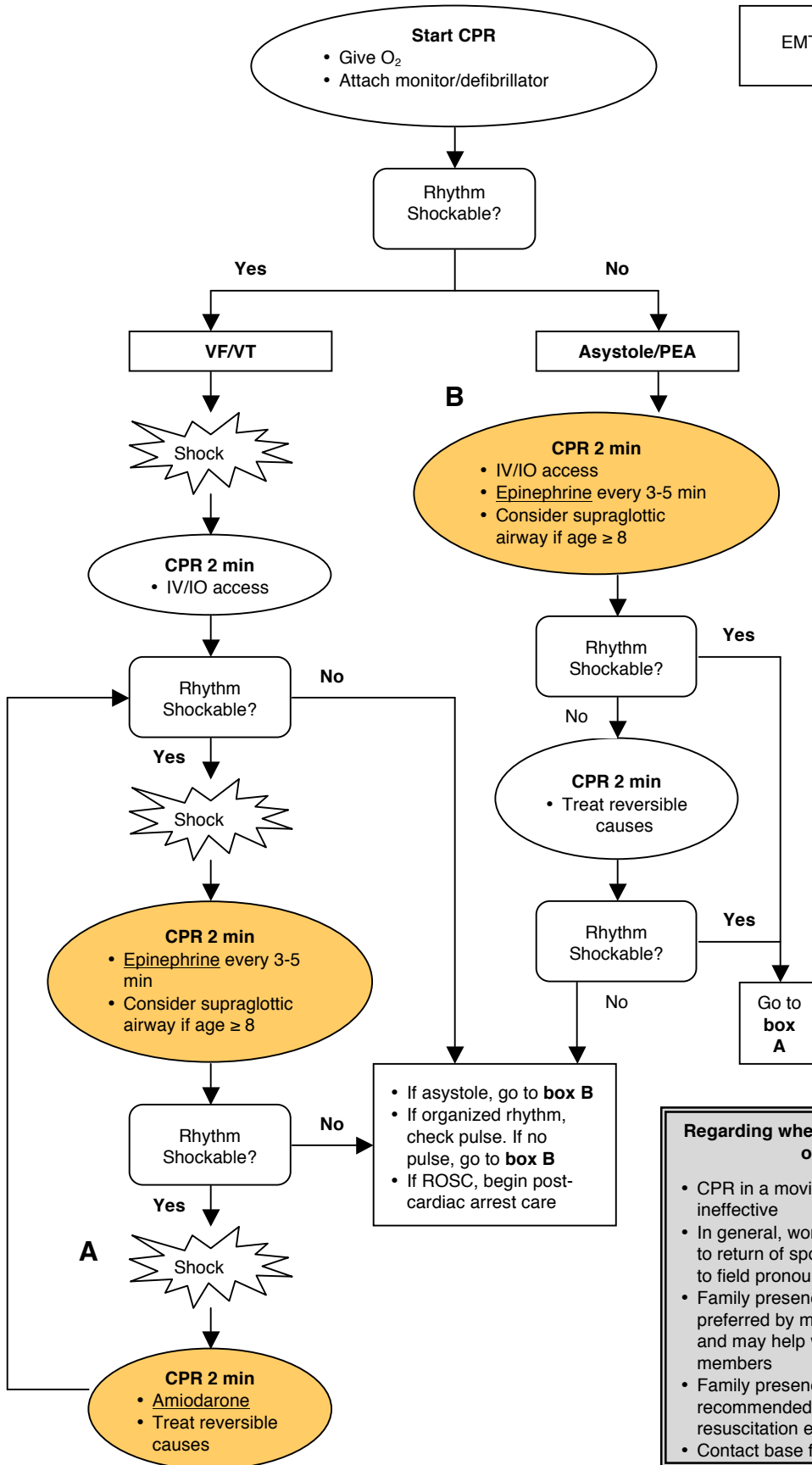
## 6026 NEONATAL CONSIDERATIONS

### General Considerations:

- A. A neonate refers to a newly born child under the age of 30 days. While most neonates transition to post-natal life without difficulty, 10% will require medical assistance. Respiratory insufficiency is the most common complication observed in the newly born.
- B. Neonates born precipitously may exhibit signs of stress such as apnea, grunting respirations, lethargy or poor tone
  - 1. Provide warmth, bulb suction mouth and then nose, and dry the infant
  - 2. If breathing spontaneously, HR >100 and infant is vigorous, continue to monitor
  - 3. If apneic, cyanotic, lethargic, or HR <100, provide 100% oxygen via BVM ventilations at a rate of 40-60 bpm
  - 4. If HR < 60, begin CPR at 3:1 compression:ventilation ratio.
- C. For neonates who do not respond to initial interventions as above:
  - 1. Obtain blood glucose level and if < 60, administer dextrose IV/IO (D10 4 mL/kg)
  - 2. Administer epinephrine IV for persistent HR < 60
  - 3. Consider hypovolemia and administer 10-20ml/kg NS over 5-10 minutes
- D. Neonates with congenital heart disease may not be detected prior to hospital discharge after delivery. Consider a cardiac cause of shock in the neonate who remains hypoxic or has persistent cyanosis despite 100% oxygen. These neonates may decompensate precipitously and fluid administration should be used judiciously (10ml/kg NS)
- E. Newborns are at high risk for hypothermia. Provide early warming measures, keep covered as much as possible (especially the head) and increase the temperature in the ambulance
- F. Acrocyanosis (cyanosis of only the hands and feet) is normal in newborns and does not require intervention
- G. Prolonged apnea without bradycardia or cyanosis may indicate respiratory depression caused by narcotics. However, naloxone should be avoided in infants of a known or suspected narcotic-addicted mother as this may induce a withdrawal reaction. Respiratory support alone is recommended
- H. Obtain pregnancy history, gestational age of the neonate, pregnancy complications, and any illicit drug use during pregnancy.

# 6030 PEDIATRIC (AGE < 12 YEARS) PULSELESS ARREST ALS ALGORITHM

EMT	EMT-I	Paramedic
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**CPR, Ventilation and Advanced Airway:**

- No intubation for cardiac arrest < age 12
- BVM preferred for all patients < 8 years old and is appropriate as primary means of ventilation in all pediatric patients
- An appropriately-sized supraglottic airway (e.g. King) may be placed if available at any point in resuscitation in children ≥ 8 years old
- If no advanced airway, alternate ventilations and compressions in 15:2 ratio
- If advanced airway in place, ventilate continuously at 8-10 breaths/minute
- Avoid excessive ventilation

**Shock energy for defibrillation:**

- 1<sup>st</sup> shock 2 J/kg, subsequent shocks 4 J/kg

**ROSC:**

- Return of spontaneous circulation
- Pulse and blood pressure

**Regarding where to work arrest and presence of family members**

- CPR in a moving ambulance or pram is ineffective
- In general, work cardiac arrest on scene either to return of spontaneous circulation (ROSC), or to field pronouncement, unless scene unsafe
- Family presence during resuscitation is preferred by most families, is rarely disruptive, and may help with grieving process for family members
- Family presence during resuscitation is recommended, unless disruptive to resuscitation efforts
- Contact base for termination of resuscitation



## 6040 CARE OF THE CHILD WITH SPECIAL NEEDS

### **General Guideline:**

- A. Children with special health care needs include those with chronic physical, developmental, behavioral or emotional health issues. These children often have complex medical needs and may be technology-dependent. Parents or caregivers for such children can be a wealth of knowledge about their child's care and may carry a reference care sheet. Contact Base Station for any concerns.

### **Feeding Tubes:**

- A. Feedings tubes are used for administration of medications and to provide feeds to children with an impaired ability to take oral feeds. Always ask caretaker the type of feeding tube (does the tube end in the stomach or jejunum?) and when it was placed
- B. Tubes may be placed through the nose, mouth or abdomen and end in the stomach or jejunum (upper intestine)
- C. Consider venting and/or gently aspirating the feeding tube in a child with respiratory or abdominal distress to allow removal of gastric contents and decompression
- D. Feeding tubes that have been placed less than 6 weeks ago are not well established and may close within 1 hour of tube removal. If transport time is prolonged, place an 8 Fr suction catheter tube 2 inches into the stoma to maintain patency. Do NOT use the tube.

### **Tracheostomy:**

- A. A tracheostomy is a surgical opening between the trachea and the anterior surface of the neck. Its purpose is to bypass the upper airway for chronically ventilated patients, upper airway obstructions, or to facilitate secretion removal in those with ineffective gag or swallow reflexes.
- B. Use bag-valve attached to the tracheostomy to assist ventilations if needed. May also attempt BVM with gloved finger over the tracheostomy
- C. Inability to ventilate and/or signs of respiratory distress (nasal flaring, retractions, hypoxia, etc) may indicate tracheostomy obstruction. Suction tracheostomy, passing the suction catheter no further than 6 cm. Limit suctioning time to minimum amount of time necessary to accomplish effective suctioning. Oxygenate between passes with the suction catheter.
- D. 0.5ml of saline may be instilled into the tracheostomy to assist suctioning of thick secretions
- E. If unable to ventilate through the tracheostomy tube and patient is apneic, bradycardic, or in pulseless arrest, remove tracheostomy tube and pass an appropriately sized endotracheal tube through the stoma approximately 1-2 inches, secure and ventilate. Appropriate depth must be based upon breath sounds, as right mainstem intubation is likely.
- F. Remember that caregivers are often the best people to change and suction a tracheostomy tube. Use them as your resource when possible.

### **Central Venous Catheters (CVCs):**

- A. Because of their size and location, a much greater risk of serious bacterial infections exist with CVCs compared to peripheral intravenous lines. Special care must be used when accessing such lines
- B. Prior to accessing a CVC, hands should be washed and gloves worn. Vigorously scrub the CVC hub with an alcohol swab. While alcohol possesses some antimicrobial properties, the friction produced by scrubbing is the most effective

## 6040 CARE OF THE CHILD WITH SPECIAL NEEDS

- C. A port is an implanted venous central venous catheter (below the surface of the skin). These devices require a non-coring (e.g. Huber) needle for accessing and should not be accessed in the field

# 6050 PEDIATRIC UNIVERSAL RESPIRATORY DISTRESS ALGORITHM (AGE < 12 YEARS)

EMT	EMT-I	Paramedic
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**All patients:**

- Give oxygen to all patients w. respiratory distress via least distressing means, either blow-by or NRB facemask
- Minimize patient discomfort and avoid agitation. Transport in position of comfort

**Inadequate ventilations?**

- Assist with BVM per Assisted Ventilations Protocol
- Reposition airway, place oral airway if unconscious
- Normal RR by age: neonates > 40, infants > 20, children > 12

**Inadequate ventilations and unable to ventilate with BVM?**

- Perform laryngoscopy
- Remove FB, if present, w. Magill forceps
- **Consider ETI in a child ONLY if unable to adequately ventilate with BVM and oral airway**
- If ETT placed, confirm position with ETCO<sub>2</sub> per Oral Endotracheal Intubation Protocol

**General Assessment:**

- Attempt to determine cause of respiratory distress based on clinical scenario, age, past history and exam
- Assess Airway, Breathing, perfusion and mental status in all patients

**Airway Assessment**

- If obstructed, see Obstructed Airway Protocol
- Observe for stridor, hoarseness, drooling
- Consider foreign body if sudden onset stridor in young child
- Early suctioning of secretions may dramatically improve respiratory distress in bronchiolitis

**Breathing Assessment**

- Note rate and effort (“work of breathing”)
- Listen for upper airway abnormal sounds which may mimic wheezing: stridor, hoarseness, barking cough (suggests croup)
- Note grunting, nasal flaring, head bobbing, chest wall movement, retractions, accessory muscle use
- Auscultate breath sounds for wheezing, crackles, decreased air movement (suggests bronchospasm)

**Treat specific conditions**

**Croup**  
Age 6 months to 5 years w. stridor, barking cough, URI sx. Sx often rapid, nocturnal onset

- Transport in position of comfort w. parent
- Blow-by O<sub>2</sub>

**Bronchiolitis**  
Age < 2 yrs w. cough, fever, resp. distress, +/- wheezing, crackles

- Transport in position of comfort w. parent
- Blow-by O<sub>2</sub>

**Asthma**  
EMT may administer either mdi or nebulized albuterol with **base contact** for verbal order

**Severe symptoms?**

- Stridor at rest
- Severe retractions
- Cyanosis
- Altered LOC

**Severe symptoms?**

- Hypoxia despite O<sub>2</sub>
- Severe retractions
- Cyanosis
- Altered LOC

**Severe symptoms?**

- Give albuterol by nebulizer
- If age > 2 yrs, add ipratropium
- Repeat as needed, may use continuous nebulization for respiratory distress

• Give nebulized racemic epinephrine or 1:1000 L-epinephrine

• Nasal suctioning  
• Give nebulized racemic epinephrine or 1:1000 L-epinephrine

**Severe symptoms?**

- Hypoxia despite O<sub>2</sub>
- Severe retractions
- Cyanosis
- Altered LOC

**Inadequate response to treatment?**  
Contact base for consult

**Inadequate response to treatment?**  
Contact base for consult

**Inadequate response to treatment?**

- Give epinephrine IM
- Give methylprednisolone IV
- Contact base for consult

**Consider pulmonary and non-pulmonary causes of respiratory distress in all cases:**  
**Common:** croup, bronchiolitis, asthma. **Less common:** foreign body aspiration, allergic reaction, pneumonia. **Rare:** epiglottitis, bacterial tracheitis. **Also:** Congenital heart disease (CHF), sepsis, other metabolic acidosis (e.g.: DKA, inborn error of metabolism)

## 6060 PEDIATRIC APPARENT LIFE-THREATENING EVENT (ALTE)

**DEFINITION:**  
An infant < 1 year of age with episode frightening to the observer characterized by apnea, choking/gagging, color change or change in muscle tone

EMT	EMT-I	Paramedic
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Support ABCs as necessary

Obtain detailed history of event and medical history

Complete head-to-toe assessment

- Any child with an ALTE should be transported to ED for evaluation
- Monitor vital signs en route

### Clinical history to obtain from observer of event:

- Document **observer's** impression of the infant's color, respirations and muscle tone
- For example, was the child apneic, or cyanotic or limp during event?
- Was there seizure-like activity noted?
- Was any resuscitation attempted or required, or did event resolve spontaneously?
- How long did the event last?

### Past Medical History:

- Recent trauma, infection (e.g. fever, cough)
- History of GERD
- History of Congenital Heart Disease
- History of Seizures
- Medication history

### Examination/Assessment

- Head to toe exam for trauma, bruising, or skin lesions
- Check anterior fontanelle: is it bulging, flat or sunken?
- Pupillary exam
- Respiratory exam for rate, pattern, work of breathing and lung sounds
- Cardiovascular exam for murmurs and symmetry of brachial and femoral pulses
- Neuro exam for level of consciousness, responsiveness and any focal weakness

## 6070 PEDIATRIC TRAUMA CONSIDERATIONS (AGE < 12 YEARS)

EMT	EMT-I	Paramedic
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### Spinal Immobilization

- A. Context/Special Considerations:
- B. 60-80% of spine injuries in children occur at the cervical level
- C. Children < 8 age year are more likely to sustain high C1-C3 injuries
- D. Less force is required to injure the cervical spine in children than adults
- E. Children with Down Syndrome are at risk for cervical spine injury
- F. Avoid strapping abdomen- children are abdominal breathers
- G. Use age/size appropriate immobilization devices
- H. Proper immobilization of pediatric patients should **prevent**:
  - 1. Flexion/extension, rotation, lateral bending or axial loading of the neck (car seats do not prevent axial loading and are not considered proper immobilization technique)
  - 2. Non-neutral alignment or alteration in normal curves of the spine for age (consider the large occiput)
  - 3. Twisting, sliding or bending of the body during transport or care

### Spinal Immobilization criteria:

- A. Be conservative. Children are difficult to assess and “clinical clearance” criteria are not well established, as in adults
- B. Immobilize the following patients as well as any child you suspect clinically may have a spine injury:
  - 1. Altered Mental Status (GCS < 15, AVPU < A, or intoxication)
  - 2. Focal neurologic findings (paresthesias, loss of sensation, weakness)
  - 3. Non-ambulatory patient
  - 4. Any complaint of neck pain
  - 5. Torticollis (limited range of motion, difficulty moving neck in history or physical)
  - 6. Substantial torso Injury (thorax, abdomen, pelvis)
  - 7. High Risk MVC (head on collision, rollover, ejected from the vehicle, death in the same crash, or speed > 55 m/h)
  - 8. Diving accident

## 7010 MEDICATIONS

### **ADENOSINE (ADENOCARD)**

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#### **Description**

Adenosine transiently blocks conduction through the AV node thereby terminating reentrant tachycardias involving the AV node. It is the drug of choice for AV nodal reentrant tachycardia (AVNRT, often referred to as "PSVT"). It will not terminate dysrhythmias that do not involve the AV node as a reentrant limb (e.g. atrial fibrillation).

---

#### **Onset & Duration**

- Onset: almost immediate
  - Duration: 10 sec
- 

#### **Indications**

- Narrow-complex supraventricular tachyarrhythmia
  - Stable, undifferentiated, **regular**, monomorphic wide-complex tachycardia
  - Pediatric administration requires call in for direct verbal order
- 

#### **Contraindications**

- Any irregular tachycardia. Specifically never administer to an irregular wide-complex tachycardia, which may be lethal
- 

#### **Adverse Reactions**

- Chest pain
  - Shortness of breath
  - Diaphoresis
  - Palpitations
  - Lightheadedness
- 

#### **Drug Interactions**

- Methylxanthines (e.g. caffeine) antagonize adenosine, a higher dose may be required
  - Dipyridamole (persantine) potentiates the effect of adenosine; reduction of adenosine dose may be required
  - Carbamazepine may potentiate the AV-nodal blocking effect of adenosine
- 

#### **Dosage and Administration**

##### **Adult:**

6.0 mg IV bolus, rapidly, followed by a normal saline flush.  
Additional dose of 12 mg IV bolus, rapidly, followed by a normal saline flush.  
Contact medical control for further considerations

**NOTE:** Total maximum dose should not exceed 18 mg.

##### **Pediatric (Requires Call in and direct verbal order):**

0.1 mg/kg IV/IO bolus, rapidly followed by normal saline flush.  
Additional dose of 0.2 mg/kg rapid IV/IO bolus, followed by normal saline flush  
Contact medical control for further considerations

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## 7010 MEDICATIONS

### Protocol

- Adult Tachyarrhythmia with Poor Perfusion
  - Pediatric Tachyarrhythmia with Poor Perfusion
- 

### Special Considerations

- Reliably causes short lived but very unpleasant chest discomfort. Always warn your patient of this before giving medication and explain that it will be a very brief sensation
- May produce bronchospasm in patients with asthma
- Transient asystole and AV blocks are common at the time of cardioversion
- Adenosine is not effective in atrial flutter or fibrillation
- Adenosine is safe in patients with a history of Wolff-Parkinson-White syndrome if the rhythm is regular and QRS complex is narrow
- A 12-lead EKG should be performed and documented, when available
- Adenosine requires continuous EKG monitoring throughout administration

## 7010 MEDICATIONS

### **ALBUTEROL SULFATE (PROVENTIL, VENTOLIN)**

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#### **Description**

Albuterol is a selective  $\beta$ -2 adrenergic receptor agonist. It is a bronchodilator and positive chronotrope.

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#### **Onset & Duration**

- Onset: 5-15 min. after inhalation
  - Duration: 3-4 hours after inhalation
- 

#### **Indications**

- Bronchospasm
- 

#### **Contraindications**

- Severe tachycardia is a relative contraindication
- 

#### **Adverse Reactions**

- Tachycardia
  - Palpitations
  - Dysrhythmias
- 

#### **Drug Interactions**

- Sympathomimetics may exacerbate adverse cardiovascular effects.
  - $\beta$ -blockers may antagonize albuterol.
- 

#### **How Supplied**

**MDI:** 90 mcg/metered spray (17-g canister with 200 inhalations)

**Pre-diluted nebulized solution:** 2.5 mg in 3 ml NS (0.083%)

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#### **Dosage and Administration**

##### **Asthma**

##### **Adult:**

##### **Single Neb dose**

Albuterol sulfate solution 0.083% (one unit dose bottle of 3.0 ml), by nebulizer, at a flow rate (6-8 lpm) that will deliver the solution over 5 to 15 minutes. May be repeated twice (total of 3 doses).

##### **Continuous Neb dose**

In more severe cases, place 3 premixed containers of albuterol (2.5 mg/3ml) for a total dose of 7.5 mg in 9 ml, into an oxygen-powered nebulizer and run a continuous neb at 6-8 lpm.

##### **Pediatric:**

##### **Single Neb dose**

Albuterol sulfate 0.083% (one unit dose bottle of 3.0 ml), by nebulizer, at a flow rate (6-8 lpm) that will deliver the solution over 5-15 minutes. May be repeated twice during transport (total of 3 doses).

---

#### **Protocol**



## 7010 MEDICATIONS

- Asthma
  - COPD
  - Pediatric Respiratory Distress
  - Allergy and Anaphylaxis
- 

### **Special Considerations**

- Consider inline nebs for patients requiring endotracheal intubation or CPAP.
- May precipitate angina pectoris and dysrhythmias
- Should be used with caution in patients with suspected or known coronary disease, diabetes mellitus, hyperthyroidism, prostatic hypertrophy, or seizure disorder
- Wheezing associated with anaphylaxis should first be treated with epinephrine IM.

## 7010 MEDICATIONS

### **AMIODARONE (CORDARONE)**

---

#### **Description**

Amiodarone has multiple effects showing Class I, II, III and IV actions with a quick onset. The dominant effect is prolongation of the action potential duration and the refractory period.

---

#### **Indications**

- Cardiac arrest in patients with shock refractory VF/VT
  - Stable wide complex tachycardia
  - Following successful cardioversion of VF/VT
- 

#### **Precautions**

- Wide complex irregular tachycardia
  - Sympathomimetic toxidromes, i.e. cocaine or amphetamine overdose
  - NOT to be used to treat ventricular escape beats or accelerated idioventricular rhythms
- 

#### **Contraindications**

- 2<sup>nd</sup> or 3<sup>rd</sup> degree AV block
  - Cardiogenic shock
- 

#### **Adverse Reactions**

- Severe hypotension
  - Bradycardia
- 

#### **Dosage and Administration**

##### **Adult:**

##### **Pulseless Arrest (Refractory VT/VF)**

300 mg IV bolus.

Repeat once 150 mg IV bolus in 3-5 minutes.

##### **Post arrest following successful conversion of VT/VF**

150 mg IV bolus infusion over 10 minutes

##### **Wide Complex tachycardia with poor perfusion (CONTACT BASE)**

150 mg IV bolus infusion over 10 minutes.

##### **Pediatric:**

##### **Pulseless Arrest (Refractory VT/VF)**

5mg/kg IV over 3-5 minutes. (**CONTACT BASE** for additional doses)

---

#### **Protocol**

- [Adult Universal Pulseless Arrest Algorithm](#)
  - [Pediatric Universal Pulseless Arrest Algorithm](#)
  - [Adult Tachycardia with Poor Perfusion](#)
- 

#### **Special Considerations**

- A 12-lead EKG should be performed and documented, when available.

## 7010 MEDICATIONS

### **ASPIRIN (ASA)**

---

#### **Description**

Aspirin inhibits platelet aggregation and blood clotting and is indicated for treatment of acute coronary syndrome in which platelet aggregation is a major component of the pathophysiology. It is also an analgesic and antipyretic

---

#### **Indications**

- Suspected acute coronary syndrome.
- 

#### **Contraindications**

- **Active** gastrointestinal bleeding
  - Aspirin allergy
- 

#### **How Supplied**

Chewable tablets 81mg

---

#### **Dosage and Administration**

- 324mg PO
- 

#### **Protocol**

- Chest Pain
- 

#### **Special Considerations**

- Patients with suspected acute coronary syndrome taking warfarin (Coumadin) or clopidogrel (Plavix) may still be given aspirin

## 7010 MEDICATIONS

### ATROPINE SULFATE

---

#### Description

Atropine is an endogenous antimuscarinic, anticholinergic substance. It is the prototypical anticholinergic medication with the following effects:

- Increased heart rate and AV node conduction
  - Decreased GI motility
  - Urinary retention
  - Pupillary dilation (mydriasis)
  - Decreased sweat, tear and saliva production (dry skin, dry eyes, dry mouth)
- 

#### Indications

- Symptomatic bradycardia
  - 2nd and 3rd degree heart block
  - Organophosphate poisoning
- 

#### Precautions

- Should not be used without medical control direction for stable bradycardias
  - Closed angle glaucoma
- 

#### Adverse Reactions

- Anticholinergic toxidrome in overdose, think “blind as a bat, mad as a hatter, dry as a bone, red as a beet”
- 

#### Dosage and Administration

##### Hemodynamically Unstable Bradycardia

###### Adult:

0.5 mg IV/IO bolus.

Repeat if needed at 3-5 minute intervals to a maximum dose of 3 mg. (Stop at ventricular rate which provides adequate mentation and blood pressure)

###### Pediatric:

0.02 mg/kg IV/IO bolus. Minimum dose is 0.1 mg, maximum single dose 0.5 mg

##### Stable Bradycardia and Poisoning/Overdose

###### CONTACT BASE

---

#### Protocol

- [Bradycardia](#)
  - [Neonatal Resuscitation](#)
  - [Poisoning/Overdose](#)
- 

#### Special Considerations

- Atropine causes pupil dilation, even in cardiac arrest settings

## 7010 MEDICATIONS

### ***CALCIUM GLUCONATE***

---

#### **Description**

- Cardioprotective agent in hyperkalemia.
  - 10% calcium gluconate solution contains 1 g calcium gluconate per 10 mL, which is only 90mg of elemental calcium.
  - Doses below refer to dose of calcium gluconate solution, not elemental calcium.
- 

#### **Indications**

- Adult pulseless arrest associated with any of the following clinical conditions:
    - Known hyperkalemia
    - Renal failure with or without hemodialysis history
    - Calcium channel blocker overdose
  - **Not indicated for routine treatment of pulseless arrest**
  - Adult or pediatric calcium channel blocker overdose with hypotension, bradycardia
- 

#### **Contraindications**

- Known hypercalcemia
  - Suspected digoxin toxicity (i.e. digoxin overdose)
- 

#### **Side Effects/Notes**

- Must give in separate line from IV sodium bicarb to prevent precipitation/formation of calcium carbonate
  - Extravasation may cause tissue necrosis
  - In setting of digoxin toxicity, may worsen cardiovascular function
- 

#### **Dosage and Administration**

##### **Adult:**

- **Pulseless arrest assumed due to hyperkalemia:**
  - 1 g slow IV push
- **Calcium channel blocker overdose:**
  - **Contact base** for order. 3 g slow IV/IO push over 2-3 minutes. Dose may be repeated every 10 minutes for total of 3 doses

##### **Pediatric:**

- **Calcium channel blocker overdose:**
    - **Contact Base.** 60 mg/kg (0.6 mL/kg), not to exceed 1 g slow IV/IO push, may repeat every 10 minutes for total of 3 doses
- 

#### **Protocol**

- Adult Universal Pulseless Arrest ALS Algorithm
- Poisoning/Overdose

## 7010 MEDICATIONS

### **DEXTROSE 50%**

#### **Description**

Glucose is the body's basic fuel and is required for cellular metabolism. A sudden drop in blood sugar level will result in disturbances of normal metabolism, manifested clinically as a decrease in mental status, sweating and tachycardia. Further decreases in blood sugar may result in coma, seizures, and cardiac arrhythmias. Serum glucose is regulated by insulin, which stimulates storage of excess glucose from the blood stream, and glucagon, which mobilizes stored glucose into the blood stream.

#### **Indications**

- Hypoglycemia
- The unconscious or altered mental status patient with an unknown etiology.

#### **Precautions**

- None

#### **Dosage and Administration**

##### **Adult:**

25 gm (50 ml of a 50% solution) IV/IO bolus

##### **Pediatric:**

1-8 years: 2-4 ml/kg of a 25% solution

<1 year: 2-4 ml/kg of a 10% solution

#### **Protocol**

- Universal Altered Mental Status
- Seizures
- Poisoning/Overdose
- Psych/Behavioral
- Neonatal Resuscitation

#### **Special Considerations**

- The risk to the patient with ongoing hypoglycemia is enormous. With profound hypoglycemia and no IV access consider IO insertion.
- Draw blood sample before administration if possible.
- Use glucometer before administration, if possible.
- Extravasation may cause tissue necrosis; use a large vein and aspirate occasionally to ensure route patency.
- Dextrose can be irritable to the vein and the vein should be flushed after administration.
- Dextrose should be diluted 1:1 with normal saline (to create D<sub>25</sub>W) for patient 1-8 years old.

## 7010 MEDICATIONS

### **DIAZEPAM (VALIUM)**

---

#### **Description**

Benzodiazepine class sedative-hypnotic and anticonvulsant

---

#### **Indications**

- Status epilepticus
  - Combative or severely agitated patients
  - Sympathomimetic overdose (e.g. cocaine, methamphetamine)
  - Severe musculoskeletal back spasms
  - Sedation for cardioversion or transcutaneous pacing (TCP)
- 

#### **Precautions**

CNS and cardiovascular side effects are compounded with patients under the influence of drugs or alcohol.

---

#### **Adverse Reactions**

- Respiratory depression
  - Loss of protective airway reflexes
- 

#### **Dosage and Administration**

##### **Adult:**

5 mg IV/IO bolus slowly.

##### **Pediatric:**

0.3 mg/kg IV/IO bolus, slowly, over 2 minutes

BASE CONTACT is required for all situations except status epilepticus

---

#### **Protocol**

- [Synchronized Cardioversion](#)
  - [Adult Seizures](#)
  - [Pediatric Seizures](#)
  - [Poisoning/Overdose](#)
  - [Agitated/Combative Patient](#)
- 

#### **Special Considerations**

- Since diazepam can cause respiratory depression and/or hypotension, the patient should be monitored closely (vital signs, cardiac monitor, pulse oximeter).
- Diazepam should be used with caution in any patient under the influence of alcohol.

## 7010 MEDICATIONS

### **DIPHENHYDRAMINE (BENADRYL)**

---

#### **Description**

Antihistamine for treating histamine-mediated symptoms of allergic reaction. Also Anticholinergic and antiparkinsonian effects used for treating dystonic reactions caused by antipsychotic and antiemetic medications (e.g.: haloperidol, droperidol, compazine, etc).

---

#### **Indications**

- Allergic reaction
  - Dystonic medication reactions or akathisia (restlessness)
- 

#### **Precautions**

- Asthma or COPD, thickens bronchial secretions
  - Narrow-angle glaucoma
- 

#### **Side effects**

- Drowsiness
  - Dilated pupils
  - Dry mouth and throat
  - Flushing
- 

#### **Drug Interactions**

- CNS depressants and alcohol may have additive effects.
  - MAO inhibitors may prolong and intensify anticholinergic effects of antihistamines.
- 

#### **Dosage and Administration**

##### **Adults:**

50 mg IV/IO/IM

##### **Pediatrics:**

<8 years: 1-2 mg/kg slow IV/IO/IM (not to exceed 50 mg)

---

#### **Protocol**

Allergy/Anaphylaxis



## 7010 MEDICATIONS

### **DOPAMINE (INTROPIN)**

---

#### **Description**

Endogenous catecholamine chemically related to epinephrine and norepinephrine. Increases blood pressure through combination of dopamine, alpha and beta receptor effects leading to increased heart rate, contractility and peripheral vasoconstriction.

---

#### **Indications**

- Hypotension refractory to adequate fluid resuscitation
  - Symptomatic bradycardia with signs of poor perfusion
- 

#### **Contraindications**

- Hypovolemia
  - Hemorrhagic shock
- 

#### **Adverse Reactions**

- Tachydysrhythmias
  - Hypertension
  - Increased myocardial oxygen demand
- 

#### **Dosage and Administration**

**CONTACT BASE** for direct physician order

**Mix:** 400 mg in 250 ml NS or 800 mg in 500 ml NS to produce concentration of 1600 mcg/ml.

##### **Adult IV/IO:**

2~20 mcg/kg/min, Start at 5 mcg/kg/min, Titrate dose up 5 mcg/kg/min every 5 min to a max of 20 mcg/kg/min to achieve desired effect.

##### **Pediatrics IV/IO:**

2~20 mcg/kg/min, Start at 5 mcg/kg/min, Titrate dose up 5 mcg/kg/min every 5 min to a max of 20 mcg/kg/min to achieve desired effect.

---

#### **Protocol**

- [Medical Hypotension/Shock Protocol](#)
  - [Adult Bradycardia](#)
- 

#### **Special Considerations**

- May become ineffective if added to alkaline solution.
- Tissue extravasation at the IV site can cause skin sloughing due to vasoconstriction. Be sure to make Emergency Department personnel aware if there has been any extravasation of dopamine-containing solutions so that proper treatment can be instituted.

## 7010 MEDICATIONS

### INTRAVENOUS DRIP RATES FOR DOPAMINE

Concentration: 1600 mcg/ml

Weight	Dose (mcg/kg/min)				
	5	10	15	20	
50 kg	10	20	30	40	microdrips/min
60 kg	10	25	35	45	
70 kg	15	25	40	50	
80 kg	15	30	45	60	
90 kg	15	35	50	70	
100 kg	20	35	55	75	
110 kg	20	40	60	85	

## 7010 MEDICATIONS

### **EPINEPHRINE (ADRENALIN)**

---

#### **Description**

Endogenous catecholamine alpha, beta-1, and beta-2 adrenergic receptor agonist. Causes dose-related increase in heart rate, myocardial contractility and oxygen demand, peripheral vasoconstriction and bronchodilation.

---

#### **Indications**

- Pulseless Arrest
  - Anaphylaxis
  - Asthma
  - Bradycardia with poor perfusion
- 

#### **Adverse Reactions**

- Tachycardia and tachydysrhythmia
  - Hypertension
  - Anxiety
  - May precipitate angina pectoris
- 

#### **Drug Interactions**

- Should not be added to sodium bicarbonate or other alkaloids as epinephrine will be inactivated at higher pH.
- 

#### **Dosage and Administration**

##### **Adult:**

##### **Pulseless Arrest**

1 mg (10 ml of a 1:10,000 solution), IV/IO bolus.  
Repeat every 3-5 minutes.

##### **Bradycardia/ hypotension refractory to other interventions (Contact Base):**

Continuous infusion titrated to effect: 1 mg in 250 ml of Normal Saline IV/IO infused at 2 mcg/min until desired BP of > 90 mmHg systolic achieved.

##### **Asthma:**

0.3 mg (0.3 ml of a 1:1,000 solution) IM. May repeat dose x 1.

##### **Systemic allergic reaction:**

0.3 mg (0.3 ml of a 1:1,000 solution) IM. May repeat dose x 1.

##### **Severe systemic allergic reaction (Anaphylaxis) refractory to IM epi (Contact Base):**

Continuous infusion titrated to effect: 1 mg in 250 ml of Normal Saline IV/IO infused at 2 mcg/min until desired BP of > 90 mmHg systolic achieved

**ALTERNATIVE to racemic epinephrine:** (for epiglottitis, miscellaneous causes of stridor)  
5 mL of 1:1000 epinephrine via nebulizer x 1

**Epinephrine Auto-Injector:** requires **BASE CONTACT** for EMT administration

##### **Systemic allergic reaction:**

Adult: 0.3 mg IM with autoinjector (adult EpiPen)  
Pediatric: 0.15 mg IM with autoinjector (EpiPen Jr.)

##### **Pediatric:**

## 7010 MEDICATIONS

### **Cardiac arrest:**

0.01 mg/kg IV/IO (0.1 ml/kg of 1:10,000 solution).

Subsequent doses repeated every 3-5min: 0.01 mg/kg IV/IO (0.1 ml/kg of 1:10,000 solution)

### **Bradycardia (CONTACT BASE)**

0.01 mg/kg (0.1 ml/kg of 1:10,000 solution) IV/IO

### **Asthma**

0.01 mg/kg (0.01 ml/kg of 1:1,000 solution) IM

### **Moderate to Severe Allergic Reactions**

0.01 mg/kg (0.01 ml/kg of 1:1,000 solution) IM

### **Severe systemic allergic reaction (Anaphylaxis) refractory to IM epi (Contact Base):**

0.01 mg/kg (0.1 ml/kg of 1:10,000 solution) IV/IO

**ALTERNATIVE to racemic epinephrine:** (for bronchiolitis, croup, epiglottitis, miscellaneous causes of stridor)

5 mL of 1:1000 epinephrine via nebulizer x 1

---

### **Protocol**

- [Adult Universal Pulseless Arrest Algorithm](#)
- [Pediatric Pulseless Arrest ALS Algorithm](#)
- [Adult Bradycardia](#)
- [Neonatal Resuscitation](#)
- [Allergy and Anaphylaxis Protocol](#)
- [Bradycardia with Poor Perfusion](#)
- [Pediatric Respiratory Distress](#)

---

### **Special Considerations**

- May increase myocardial oxygen demand and angina pectoris. Use with caution in patients with known or suspected CAD

## 7010 MEDICATIONS

### **FENTANYL (SUBLIMAZE)**

---

#### **Description**

Potent synthetic opioid analgesic. Fentanyl is 100 times more potent than morphine.

---

#### **Onset & Duration**

- Onset: Within 2~3 minutes
  - Duration: 30 minutes
- 

#### **Indications**

- Moderate to severe pain associated with medical or traumatic conditions
    - Includes cardiac conditions e.g. angina, CHF, etc
  - The objective of pain management is not the removal of all pain, but rather, to make the patient's pain tolerable enough to allow for adequate assessment, treatment and transport
  - Treatment of shivering after therapeutic induced hypothermia (TIH).
- 

#### **Contraindications**

- Hypotension, hemodynamic instability or shock
  - Respiratory depression
- 

#### **Side Effects**

- Respiratory depression, including apnea: May occur suddenly, and more commonly in children and the elderly
  - Hypotension, especially when used in combination with other sedatives such as alcohol or benzodiazepines.
  - Can increase intracranial pressure
  - Chest wall rigidity has been reported with rapid administration
  - Pediatric patients may develop apnea without manifesting significant mental status changes
- 

#### **Dosage and Administration**

##### **Adult:**

**IV/IO route:** 1-2 mcg/kg, SLOW IV/IO bolus.

Dose may be repeated after 10 minutes and titrated to clinical effect to a maximum cumulative dose 200mcg

Additional dosing requires BASE CONTACT

##### **IN route:**

1-2 mcg/kg IN single dose.

Repeat dosing only via IV route, and 10 minutes after initial IN dose up to a maximum cumulative dose of 200mcg

Additional dosing requires BASE CONTACT

Consider initial lower dose of 0.5-1 mcg/kg in elderly

##### **Pediatric (1-12 years):**

##### **IV/IO route:**

1 mcg/kg SLOW IV/IO bolus.

## 7010 MEDICATIONS

Dose may be repeated after 10 minutes and titrated to clinical effect to a maximum cumulative dose of 3 mcg/kg

**IN route:**

1 mcg/kg IN single dose.

Repeat dosing only via IV route, and 10 minutes after initial IN dose up to a maximum cumulative dose of 3 mcg/kg

**IN route requires BASE CONTACT and approval for any patient < 5 years old, or any patient < 12 years old with indication other than isolated orthopedic injury or burns**

**Pediatric < 1 year: BASE CONTACT**

NOTE: IV route is preferred for more accurate titration. Continuous pulse oximetry is mandatory. Frequent evaluation of the patient's vital signs is also indicated. Emergency resuscitation equipment and naloxone must be immediately available.

---

**Protocol**

Extremity Injuries

Adult Chest Pain

Therapeutic Induced hypothermia

Abdominal Pain

Amputations

Burns

## 7010 MEDICATIONS

### **FUROSEMIDE (LASIX)**

---

#### **Description**

Rapid acting, potent loop diuretic; inhibits reabsorption of sodium chloride. It is also a venous dilator that decreases preload and causes venous pooling and subsequent hypotension.

---

#### **Indications**

- Cardiogenic Pulmonary Edema and only with prolonged transport times (>30 min)
- 

#### **Contraindications**

- Pregnancy
  - Dehydration or shock
- 

#### **Side Effects**

- Hypotension
- 

#### **Dosage and Administration**

20-80 mg IV bolus. Patients not on Lasix should receive 20 mg. Patients taking lasix chronically should receive higher doses in the 40-80 mg range

---

#### **Protocol**

CHF/Pulmonary edema

## 7010 MEDICATIONS

### **GLUCAGON**

---

#### **Description**

Increases blood sugar concentration by converting liver glycogen to glucose. Glucagon also causes relaxation of smooth muscle of the stomach, duodenum, small bowel, and colon.

---

#### **Onset & Duration**

- Onset: variable
- 

#### **Indications**

- Altered level of consciousness where hypoglycemia is suspected and IV access is unavailable.
  - Hypotension, bradycardia from beta-blocker or calcium channel overdose.
- 

#### **Side Effects**

- Tachycardia
  - Headache
  - Nausea and vomiting
- 

#### **Dosage and Administration**

##### **Adult:**

Hypoglycemia 1.0 mg, IM

Beta Blocker/Calcium Channel overdose 2.0 mg IV bolus (Contact Base)

##### **Pediatric:**

Hypoglycemia 0.1 mg/kg IM. Maximum dose 1.0 mg

Beta Blocker/Calcium Channel overdose 2.0 mg IV bolus (Contact Base)

---

#### **Protocol**

Seizure

Poisoning/Overdose

Hypoglycemia



## 7010 MEDICATIONS

### **HALOPERIDOL (HALDOL)**

---

#### **Description**

Haloperidol is a dopamine antagonist antipsychotic medication. Haloperidol produces a dopaminergic blockade, a mild alpha-adrenergic blockade, and causes peripheral vasodilation. Its major actions are sedation and tranquilization.

---

#### **Onset & Duration**

- Onset: Within 10 minutes after IM administration. Peak effect within 30 minutes
  - Duration: 2-4 hours (may be longer in some individuals)
- 

#### **Indications**

- Sedation of a severely agitated combative patient
- 

#### **Contraindications**

- Suspected myocardial infarction
  - Hypotension
  - Respiratory or CNS depression
  - Pregnancy
  - Children < 8 years old
- 

#### **Precautions**

- Haldol may cause hypotension, tachycardia, and prolongation of the QT interval. Use with caution in severe cardiovascular disease.
  - Cardiac monitor and establish an IV as soon as possible with all administrations.
  - Some patients may experience unpleasant sensations manifested as restlessness, hyperactivity, or anxiety following haloperidol administration.
  - Rare instances of neuroleptic malignant syndrome (very high fever, muscular rigidity) have been known to occur after the use of haloperidol.
- 

#### **Dosage and Administration**

Adults and Pediatrics > 8 years old  
5 - 10 mg IM

**BASE CONTACT** must be made for additional doses (consider if no effects within 10 minutes)

---

#### **Special Considerations**

- Extra-pyramidal reactions have been noted hours to days after treatment, usually presenting as spasm of the muscles of the tongue, face, neck, and back. This may be treated with diphenhydramine.
  - Hypotension and tachycardia secondary to haloperidol are usually self-limiting and should be treated with IV fluid bolus.
  - Use reduced dose in patients age ≥ 65
- 

#### **Protocol**

Agitated/Combative Patient Protocol

---

## 7010 MEDICATIONS

### ***IPRATROPIUM BROMIDE (ATROVENT)***

---

#### **Description**

Ipratropium is a anticholinergic antimuscarinic bronchodilator chemically related to atropine.

---

#### **Onset & Duration**

- Onset: 5-15 min. after inhalation
  - Duration: 6-8 hr. after inhalation
- 

#### **Indications**

- Bronchospasm
- 

#### **Contraindications**

- Do not administer to children < 2 years
  - Soy or peanut allergy is a contraindication to use of Atrovent metered dose inhaler, not the nebulized solution, which does not have the allergen contained in propellant
- 

#### **Adverse Reactions**

- Palpitations
  - Tremors
  - Dry mouth
- 

#### **How Supplied**

Premixed Container: 0.5 mg in 2.5ml NS

---

#### **Dosage and Administration**

##### **Adult**

##### **Bronchospasm:**

Ipratropium (0.5 mg/2.5 ml) along with albuterol in a nebulizer

##### **Child (2yrs – 12yrs)**

##### **Mod and Severe Bronchospasm**

Ipratropium (0.5 mg/2.5 ml) along with albuterol in a nebulizer

**Not indicated for repetitive dose or continuous neb use**

---

#### **Protocol**

- Asthma
- COPD
- Pediatric Respiratory Distress

## 7010 MEDICATIONS

### **LIDOCAINE 2% SOLUTION**

---

#### **Description**

Local anesthetic for relief of pain during intraosseous fluid administration.

---

#### **Indications**

- Analgesic for intraosseous infusion
- 

#### **Side Effects**

- Seizures
  - Drowsiness
  - Tachycardia
  - Bradycardia
  - Confusion
  - Hypotension
- 

#### **Precautions**

- Lidocaine is metabolized in the liver and therefore, elderly patients and those with liver disease or poor liver perfusion secondary to shock or congestive heart failure are more likely to experience side effects
- 

#### **Dosage and Administration**

0.5 mg/kg IO bolus, slowly, maximum dose is 50 mg

---

#### **Protocol**

Intraosseous Administration

---

#### **Special Notes**

- Seizure from lidocaine toxicity likely to be brief and self-limited. If prolonged, or status epilepticus, treat per seizure protocol
- Treat dysrhythmias according to specific protocol

## 7010 MEDICATIONS

### **MAGNESIUM SULFATE**

---

#### **Description**

Magnesium sulfate reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction. In cardiac patients, it stabilizes the potassium pump, correcting repolarization. It also shortens the Q-T interval in the presence of ventricular arrhythmias due to drug toxicity or electrolyte imbalance. In respiratory patients, it may act as a bronchodilator in acute bronchospasm due to asthma or other bronchospastic diseases. In patients suffering from eclampsia, it controls seizures by blocking neuromuscular transmission and lowers blood pressure as well as decreases cerebral vasospasm.

---

#### **Indications**

##### **Antiarrhythmic**

- Torsade de pointes associated with prolonged QT interval

##### **Respiratory**

- Severe bronchospasm unresponsive to continuous albuterol, ipratropium, and IM epinephrine.

##### **Obstetrics**

- Eclampsia: Pregnancy > 20 weeks gestational age or post partum with seizures
- 

#### **Precautions**

- Bradycardia
  - Hypotension
  - Respiratory depression
- 

#### **Adverse Reactions**

- Bradycardia
  - Hypotension
  - Respiratory depression
- 

#### **Dosage and Administration**

**Torsades de Pointes suspected caused by prolonged QT interval:**

2 gm, IV bolus.

**Refractory Severe Bronchospasm:**

2 gm, IV bolus, over 2 minutes **CONTACT BASE** for order.

**Eclampsia:**

Mix 6 gm, IV drip, diluted in 50 ml of Normal Saline (0.9 NS), over 15-30 minutes. **CONTACT BASE** for order.

---

#### **Protocol**

- Adult Universal Pulseless Arrest Algorithm
- COPD
- Asthma
- Obstetric Complications

## 7010 MEDICATIONS

### **METOCLOPRAMIDE (REGLAN)**

---

#### **Description**

- Metoclopramide is a dopamine antagonist that works by blocking the CNS vomiting chemoreceptor trigger zone (CRT)
- 

#### **Onset & Duration**

Onset: 1-3 minutes, IV and 10-15 min for IM  
Duration: 1-2 hours

---

#### **Indications**

- Vomiting
- 

#### **Contraindications**

- Children under the age of 8 years
- 

#### **Adverse Reactions**

- Restlessness
  - Hyperactivity
  - Anxiety
  - Sedation
  - Increased GI motility, use with caution in suspected bowel obstruction
  - Extra-pyramidal reactions have been noted hours to days after treatment, usually presenting as spasm of the muscles of the tongue, face, neck and back
- 

#### **Dosage and Administration**

##### **Adult:**

10 mg slow IV bolus over 1-2 minutes or IM

##### **Pediatric (8-12 years)**

5 mg slow IV bolus over 1-2 minutes or IM

---

#### **Protocol**

- Abdominal Pain/Vomiting
- 

#### **Special Considerations**

- Is photo-sensitive and needs to be protected from light
- If extrapyramidal effects occur, give diphenhydramine 50 mg IV/IM

## 7010 MEDICATIONS

### **METHYLPREDNISOLONE (SOLU-MEDROL)**

---

#### **Description**

Methylprednisolone is a synthetic steroid that suppresses acute and chronic inflammation and may alter the immune response. In addition, it potentiates vascular smooth muscle relaxation by beta-adrenergic agonists and may alter airway hyperactivity.

---

#### **Indications**

- Anaphylaxis
  - Severe asthma
  - COPD
- 

#### **Contraindications**

- Evidence of active GI bleed
- 

#### **Adverse Reactions**

Most adverse reactions are a result of long-term therapy and include:

- Gastrointestinal bleeding
  - Hypertension
  - Hyperglycemia
- 

#### **Dosage and Administration**

##### **Adult:**

125 mg, IV bolus, slowly, over 2 minutes

##### **Pediatric:**

2 mg/kg, IV bolus, slowly, over 2 minutes

---

#### **Protocol**

- Asthma
  - Allergy and Anaphylaxis
  - Chronic Obstructive Pulmonary Disease
- 

#### **Special Considerations**

- Must be reconstituted and used immediately
- The effect of methylprednisolone is generally delayed for several hours.
- Methylprednisolone is not considered a first line drug. Be sure to attend to the patient's primary treatment priorities (i.e. airway, ventilation, beta-agonist nebulization) first. If primary treatment priorities have been completed and there is time while in route to the hospital, then methylprednisolone can be administered. Do not delay transport to administer this drug

## 7010 MEDICATIONS

### **MIDAZOLAM (VERSED)**

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#### **Description**

Midazolam HCl is a water-soluble short acting benzodiazepine sedative-hypnotic. It is believed that benzodiazepines exert their effect on the GABA receptor to create anxiolysis, sedation and muscle relaxation.

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#### **Indications**

- Status epilepticus
  - Sedation of the severely agitated/combatative patient
  - Sedation for cardioversion or transcutaneous pacing (TCP)
- 

#### **Contraindications**

- Hypotension
- 

#### **Adverse Reactions**

- Respiratory depression, including apnea
  - Hypotension
  - Sedative effect of midazolam may be heightened by associated use of opioids, alcohol, or other CNS depressants.
- 

#### **Dosage and Administration**

##### **Seizure**

##### **Adult:**

2 mg IV or 5 mg IN or IM (IN preferred). Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

##### **Pediatric:**

0.1 mg/kg IV or 0.2 mg/kg IN or IM (IN preferred). Maximum single dose is 2 mg IV or 5 mg IN or IM. Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

##### **Sedation of severely agitated or combative patient**

##### **Adult:**

2 mg IV or 5 mg IN or IM (IN preferred) if no IV in place. Dose may be repeated x 1 after 5 minutes. **Contact base** for more than 2 doses, unless **Excited Delirium Syndrome** present, in which case up to 3 doses may be given as standing order)

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#### **Protocol**

- Synchronized Cardioversion
  - Transcutaneous Pacing
  - Adult Seizure
  - Pediatric Seizure
  - Agitated/Combative Patient
- 

#### **Special Considerations**

## 7010 MEDICATIONS

- Onset of action for midazolam IM may be up to 15 minutes and peak serum levels may not be reached for up to 30 minutes. For this reason, intranasal (IN) route preferred over IM if no IV available.
- Provide continuous cardiac and pulse-oximetry monitoring, and ETCO<sub>2</sub> if available
- Have resuscitation equipment readily at hand.
- In elderly patients > 65 years old or small adults < 50kg, lower doses may be sufficient and effective.



## 7010 MEDICATIONS

### **MORPHINE SULFATE**

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#### **Description**

Morphine sulfate is an opioid analgesic. Morphine causes analgesia, euphoria, respiratory depression and complex hemodynamic effects, including hypotension caused by histamine release.

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#### **Onset & Duration**

Onset: Immediate  
Duration: 2-7 hr

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#### **Indications**

- Pain management
  - Cardiogenic pulmonary edema
- 

#### **Contraindications**

- Hypovolemia
  - Hypotension (relative)
- 

#### **Side effects**

- Respiratory depression
  - Hypotension
  - Nausea and vomiting
  - Itching (histamine release)
- 

#### **Dosage and Administration**

##### **Adult:**

Initial dose 4 mg IV/IM/IO. Repeat doses of 2.0 mg, up to 10 mg.  
**CONTACT BASE** for any single or cumulative dose >10 mg.

##### **Pediatric:**

0.1 mg/kg IV/IM/IO **SLOWLY**. Maximum single dose is 5.0 mg.  
**CONTACT BASE** for any single or cumulative dose > 5mg

---

#### **Protocol**

- [Adult Chest Pain](#)
  - [CHF/Pulmonary Edema](#)
  - [Abdominal Pain/Vomiting](#)
  - [Extremity Injuries](#)
  - [Amputations](#)
  - [Burns](#)
- 

#### **Special Considerations**

- IV is the preferred route for all indications. IM should only be used if an IV cannot be obtained **and** IN fentanyl is not available or contraindicated
- Provide continuous monitoring of respiratory and cardiac function. Naloxone and resuscitation equipment should be readily available if administering morphine or other opioid analgesics

## 7010 MEDICATIONS

### **NALOXONE (NARCAN)**

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#### **Description**

Naloxone is a competitive opioid receptor antagonist

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#### **Onset & Duration**

Onset: Within 5 minutes

Duration: 1-4 hours

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#### **Indications**

- For reversal of suspected opioid-induced CNS and respiratory depression
  - Coma of unknown origin
  - Seizure of unknown etiology (rule out narcotic overdose, specifically propoxyphene )
- 

#### **Adverse Reactions**

- Tachycardia
  - Nausea and vomiting
  - Pulmonary Edema
- 

#### **Dosage and Administration**

##### **Adult:**

0.5 mg IV/IO/IM/IN and titrate to desired effect, up to 2 mg total

In cases of severe respiratory compromise or arrest, 2 mg bolus IV/IO/IM is appropriate, otherwise drug should be titrated

##### **Pediatrics:**

0.5 mg IV/IO/IM/IN and titrate to desired effect, up to 2 mg total

---

#### **Protocol**

- Universal Altered Mental Status Protocol
  - Poisoning/Overdose
- 

#### **Special Considerations**

- Patients receiving naloxone **must** be transported to a hospital
- Narcotic-dependent patients may experience violent withdrawal symptoms. Before administering naloxone to a suspected opioid overdose, consider if supportive care alone may be adequate.

## 7010 MEDICATIONS

### ***NITROGLYCERINE (NITROSTAT, NITROQUICK, etc)***

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#### **Description**

Short-acting peripheral venodilator decreasing cardiac preload and afterload

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#### **Onset & Duration**

Onset: 1-3 min.

Duration: 20-30 min.

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#### **Indications**

- Pain or discomfort due to suspected Acute Coronary Syndrome
  - Pulmonary edema due to congestive heart failure
- 

#### **Contraindications**

- Suspected right ventricular ST-segment elevation MI (Inferior STEMI pattern plus ST elevation in right sided-precordial leads)
  - Hypotension SBP < 100
  - Recent use of erectile dysfunction (ED) medication (e.g. Viagra, Cialis)
- 

#### **Adverse Reactions**

- Hypotension
  - Headache
  - Syncope
- 

#### **Dosage and Administration**

0.4 mg (1/150 gr) sublingually or spray, every 5 minutes  
PRN up to a total of 3 doses for persistent CP.

Nitropaste: system specific protocol

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#### **Protocol**

- Adult Chest Pain
  - CHF/Pulmonary Edema
-

## 7010 MEDICATIONS

### **ONDANSETRON (ZOFTRAN)**

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#### **Description**

Ondansetron is a selective serotonin 5-HT<sub>3</sub> receptor antagonist antiemetic.

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#### **Indications**

- Nausea and vomiting
- 

#### **Contraindications**

- None
- 

#### **Dosage and Administration**

##### **Adult:**

4 mg IV/IM/PO/ODT. May repeat x 1 dose as needed.

##### **Pediatric less than 4 years old:**

2 mg IV/PO/ODT

##### **Pediatric greater than 4 years old:**

4 mg IV/PO/ODT

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#### **Protocol**

- Abdominal Pain/Vomiting

## 7010 MEDICATIONS

### **ORAL GLUCOSE (GLUCOSE, INSTA-GLUCOSE)**

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#### **Description**

Glucose is the body's basic fuel and is required for cellular metabolism

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#### **Indications**

- Known or suspected hypoglycemia and able to take PO
- 

#### **Contraindications**

Inability to swallow or protect airway  
Unable to take PO meds for another reason

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#### **Administration**

One full tube 15 g buccal.

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#### **Protocol**

- Universal Altered Mental Status Protocol
  - Hypoglycemia
-

## 7010 MEDICATIONS

### OXYGEN

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#### Description

Oxygen added to the inspired air increases the amount of oxygen in the blood, and thereby increases the amount delivered to the tissue. Tissue hypoxia causes cell damage and death. Breathing, in most people, is regulated by small changes in the acid-base balance and CO<sub>2</sub> levels. It takes relatively large decreases in oxygen concentration to stimulate respiration.

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#### Indications

- Suspected hypoxemia or respiratory distress from any cause
  - Acute chest or abdominal pain
  - Hypotension/shock states from any cause
  - Trauma
  - Suspected carbon monoxide poisoning
  - Obstetrical complications, childbirth
- 

#### Precautions

- If the patient is not breathing adequately, the treatment of choice is assisted ventilation, not just oxygen.
  - When pulse oximetry is available, titrate SpO<sub>2</sub> to ≥ 90%. This may take some time.
  - Do not withhold oxygen from a COPD patient out of concerns for loss of hypoxic respiratory drive. This is never a concern in the prehospital setting with short transport times
- 

#### Administration

<b>Flow</b>	<b>LPM Dosage</b>	<b>Indications</b>
Low Flow	1-2 LPM	Minor medical / trauma
Moderate Flow	3-9 LPM	Moderate medical / trauma
High Flow	10-15 LPM	Severe medical / trauma

---

#### Special Notes

- Do not use permanently mounted humidifiers. If the patient warrants humidified oxygen, use a single patient use device.
- Adequate oxygenation is assessed clinically and with the SpO<sub>2</sub> while adequate ventilation is assessed with clinically and with ETCO<sub>2</sub>.

## 7010 MEDICATIONS

OXYGEN FLOW RATES		
METHOD	FLOW RATE	OXYGEN INSPIRED AIR (approximate)
Room Air		21%
Nasal Cannula	1 LPM 2 LPM 6 LPM	24% 28% 44%
Simple Face Mask	8 - 10 LPM	40-60%
Non-rebreather Mask	10 LPM	90%
Mouth to Mask	10 LPM 15 LPM	80% 50%
Bag/Valve/Mask (BVM)	Room Air 12 LPM	21% 40%
Bag/Valve/Mask with Reservoir	10-15 LPM	90-100%
OXYGEN -powered breathing device	hand-regulated	100%

## 7010 MEDICATIONS

### ***PHENYLEPHRINE (INTRANASAL)***

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#### **Description**

Used for topical nasal administration, phenylephrine primarily exhibits alpha adrenergic stimulation. This stimulation can produce moderate to marked vasoconstriction and subsequent nasal decongestion.

---

#### **Indications**

- Prior to nasotracheal intubation to induce vasoconstriction of the nasal mucosa
  - Nose bleed
- 

#### **Precautions**

- Avoid administration into the eyes, which will dilate pupil
- 

#### **Dosage and Administration**

- Instill two drops of 1% solution in the nostril prior to attempting nasotracheal intubation
  - Administer 2 sprays in affected naris in patient with active nosebleed after having patient blow nose to expel clots.
- 

#### **Protocol**

- Nasotracheal intubation



## 7010 MEDICATIONS

### ***RACEMIC EPINEPHRINE (VAPONEPHRINE)***

---

#### **Description**

Racemic epinephrine is an epinephrine preparation in a 1:1000 dilution for use by **oral inhalation only**. Inhalation causes local effects on the upper airway as well as systemic effects from absorption. Vasoconstriction may reduce swelling in the upper airway, and  $\beta$  effects on bronchial smooth muscle may relieve bronchospasm.

---

#### **Onset & Duration**

- Onset: 1-5 minutes
  - Duration: 1-3 hours
- 

#### **Indications**

- Bronchospasm in bronchiolitis
  - Stridor at rest in croup
  - Suspected epiglottitis in adults or children
  - Stridor from miscellaneous causes in adults
- 

#### **Side Effects**

- Tachycardia
  - Palpitations
- 

#### **Dosage and Administration**

0.5 ml racemic epinephrine (acceptable dose for all ages) mixed in 2 ml saline, via nebulizer at 6-8 LPM to create a fine mist

---

#### **Protocol**

- Pediatric Respiratory Distress
- 

#### **Special Considerations**

- Racemic epi is heat and photo-sensitive
- Do not confuse the side effects with respiratory failure or imminent respiratory arrest.

## 7010 MEDICATIONS

### **SODIUM BICARBONATE**

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#### **Description**

Sodium bicarbonate is an alkalotic solution, which neutralizes acids found in the body. Acids are increased when body tissues become hypoxic due to cardiac or respiratory arrest.

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#### **Indications**

- Tricyclic overdose with arrhythmias, widened QRS complex, hypotension, seizures
  - Suspected hyperkalemic pulseless arrest: consider in patients with renal failure
- 

#### **Contraindications**

- Metabolic and respiratory alkalosis
  - Hypocalcemia
  - Hypokalemia
- 

#### **Adverse Reactions**

- Metabolic alkalosis
  - Hyperosmolarity may occur, causing cerebral impairment
- 

#### **Drug Interactions**

- May precipitate in calcium solutions.
  - Alkalization of urine may increase half-lives of certain drugs.
  - Vasopressors may be deactivated.
- 

#### **Dosage and Administration**

##### **Adults and children (>10 kg), 8.4%**

Tricyclic OD with hypotension or prolonged QRS > 0.10 sec or suspected hyperkalemia-related pulseless arrest:

1.0 mEq/kg slow IV push

Repeat if needed in 10 minutes.

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#### **Protocol**

- [Adult Universal Pulseless Arrest Algorithm](#)
  - [Poisoning/Overdose](#)
- 

#### **Special Considerations**

- Sodium bicarbonate administration increases CO<sub>2</sub> which rapidly enters cells, causing a paradoxical intracellular acidosis.
- Sodium bicarb is no longer recommended for routine use in prolonged cardiac arrest. Its use in pulseless arrest should be limited to known or suspected hyperkalemia (e.g. dialysis patient).

## 7010 MEDICATIONS

### ***TOPICAL OPHTHALMIC ANESTHETICS***

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#### **Description**

Used for topical administration as a pain reliever for eye irritation. Only proparacaine and tetracaine are approved for use.

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#### **Indications**

- Pain secondary to eye injuries and corneal abrasions
  - Topical anesthetic to facilitate eye irrigation
- 

#### **Contraindications**

- Known allergy to local anesthetics
  - Globe lacerations or rupture
- 

#### **Precautions**

- Transient burning/stinging when initially applied
- 

#### **Dosage and Administration**

Instill two drops into affected eye.  
Repeat only with Base Contact and physician consult

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#### **Protocol**

- May be used for the above listed indications as needed
- 

#### **Special Considerations**

- This is single patient use. Unused portions are to be discarded and only new bottles are to be used.
- Do not administer until patient consents to transport and transport has begun
- Topical ophthalmic anesthetics should never be given to a patient for self-administration