Denver Metropolitan
Prehospital Protocols

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The process 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.

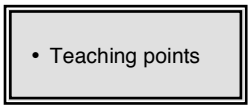
In order to keep protocols as uncluttered as possible, and to limit inconsistencies, individual drug dosing has not been included in the algorithms. It is expected the EMTs will be familiar with standard drug doses. Drug dosages are included with the medications section of the protocols as a reference.

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.

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



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.

Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

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.

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

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.

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.

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:

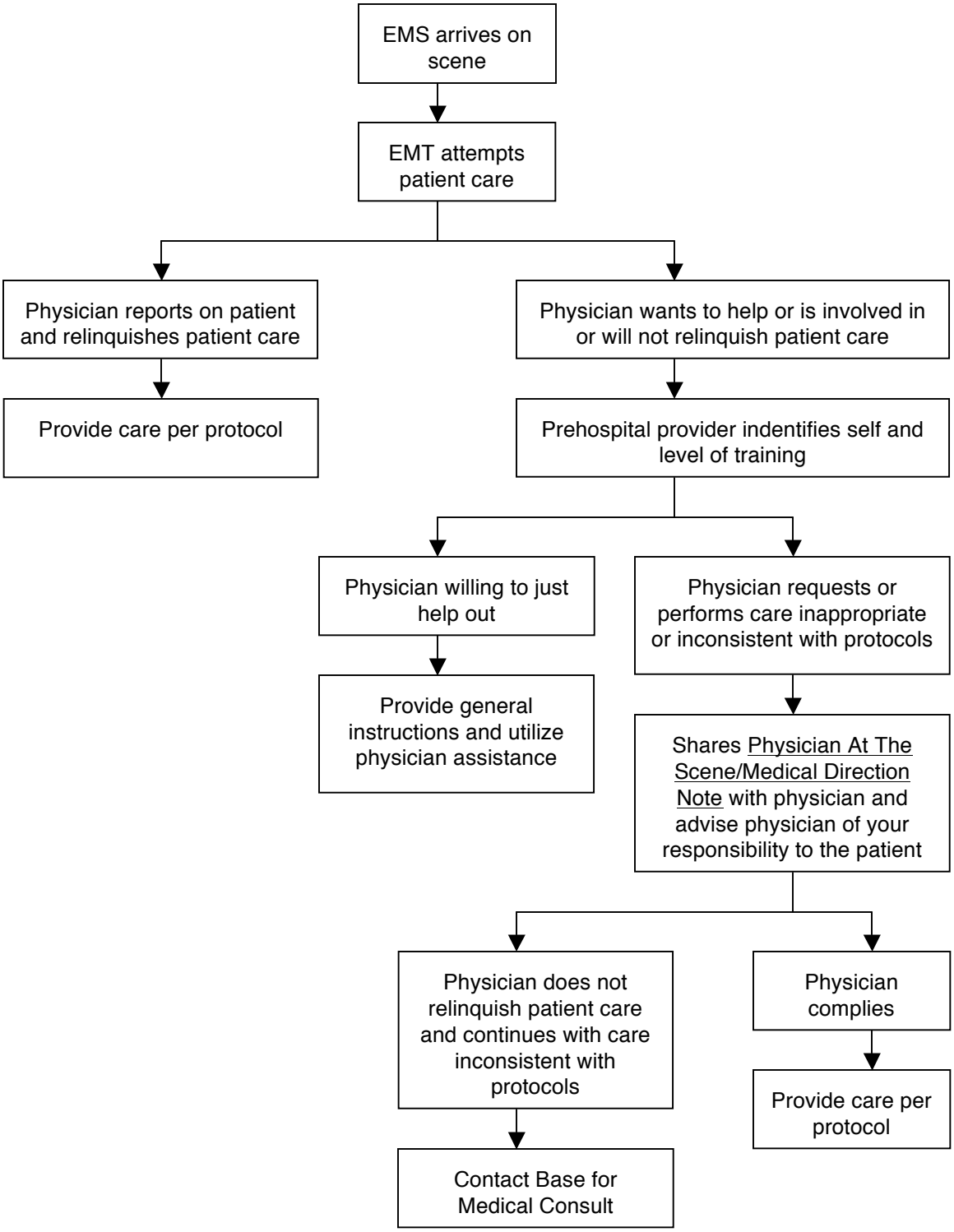
1. Offer your assistance or suggestions, but the prehospital care providers will remain under the medical control of their **base** physician, or
2. With the assistance of the prehospital care providers, talk directly to the **base physician** and offer to direct patient care and accompany the patient 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

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

   ii. Drowning with hypothermia and submersion < 60 minutes
   iii. Pregnant patient with estimated gestational age ≥ 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.

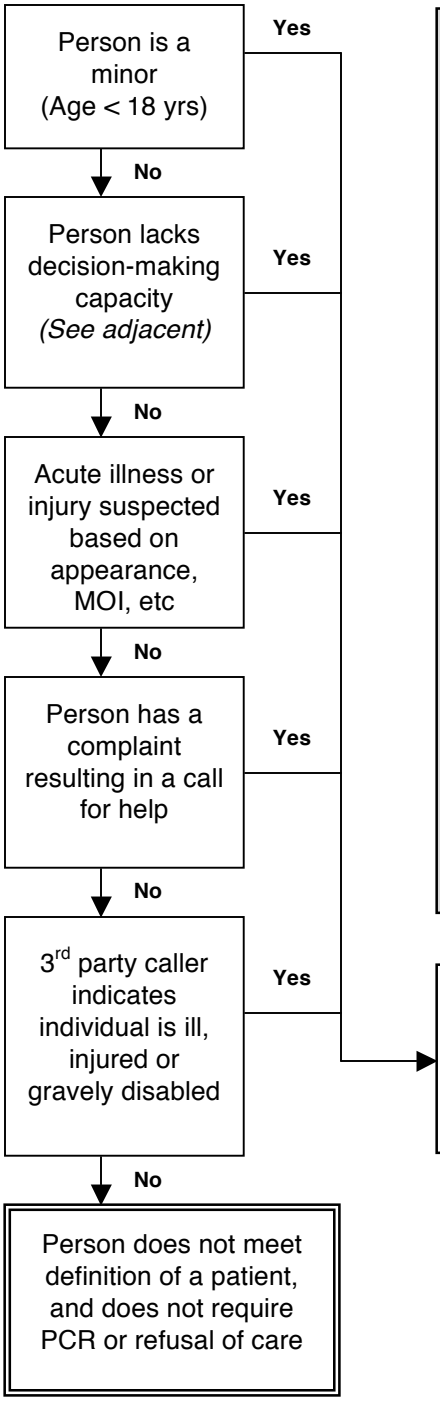
Additional Considerations:

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 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 State Trauma Triage Algorithm).
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*"



General Guidelines

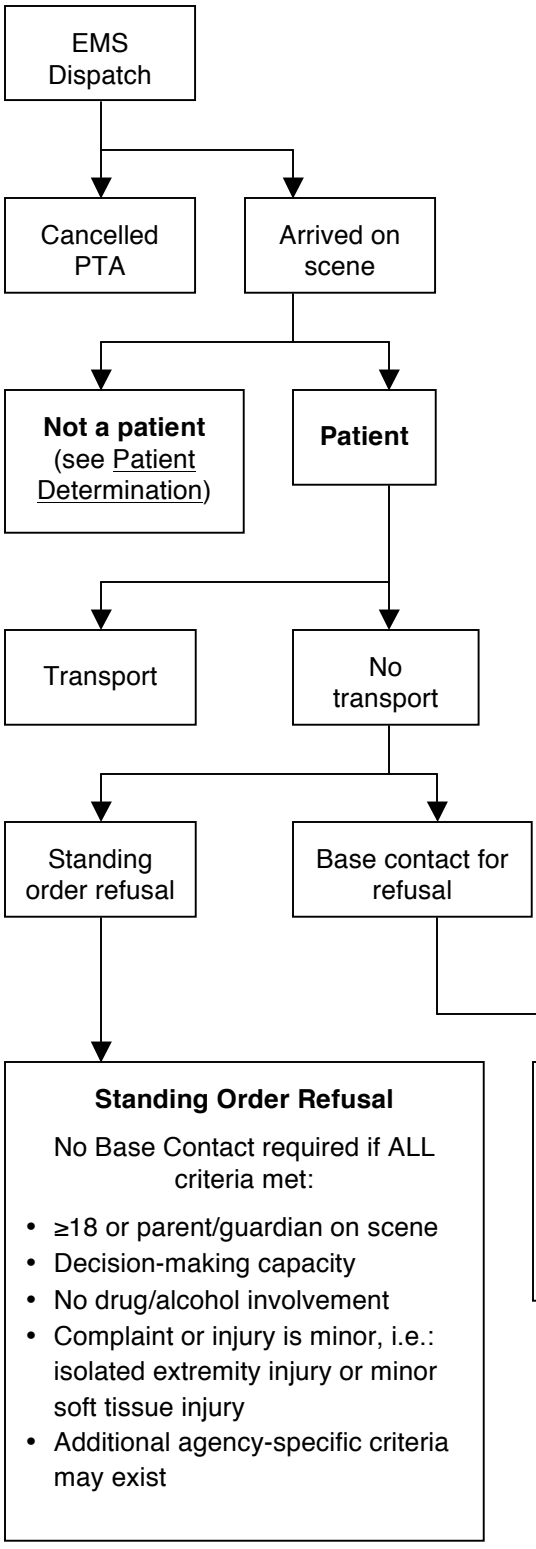
This protocol is intended to refer to individual patient contacts. In the event of a multiple party incident, such as a multi-vehicle collision, it is expected that a reasonable effort will be made to identify those parties with acute illness or injuries. Adult patients indicating that they do not wish assistance for themselves or dependent minors in such a multiple party incident do not necessarily require documentation as patients.

No protocol can anticipate every scenario and providers must use best judgment. When in doubt as to whether individual is a "patient", err on the side of caution and perform a full assessment and documentation

Decision-Making Capacity
(Must meet all criteria)

- Understands nature of illness or injury
- Understands consequences of refusal of care
- Not intoxicated with drugs or alcohol
- No criteria for a Mental Health Hold:
  - Not homicidal or suicidal
  - Not gravely disabled or psychotic
  - Not a danger to self or others

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

Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

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.*

0010 GENERAL GUIDELINES: MANDATORY REPORTING OF ABUSE PATIENTS

Purpose

A. To provide guidelines for the reporting of suspected abuse patients.

General Principles

A. At-risk adult or pediatric patients who are suspected to be victims of abuse or exploitation, as defined in State Statute and Rule, should be reported in a manner consistent with agency guidelines/procedures.

0100 PROCEDURE PROTOCOL: OROTRACHEAL INTUBATION

EMT-I	Paramedic

Indications:

- 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. $ETCO_2$
    b. Presence and symmetry of breath sounds
    c. Rising SpO_2
    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 $ETCO_2$ and SpO_2

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.

Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

0110 PROCEDURE PROTOCOL: NASOTRACHEAL INTUBATION

Paramedic

Indications:

- Age ≥ 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. $ETCO_2$
    b. Presence and symmetry of breath sounds
    c. Rising SpO_2
    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 $ETCO_2$ and SpO_2

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”
    - **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

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- 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. $ETCO_2$
    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

0121 PROCEDURE PROTOCOL: BOUGIE ASSISTED SURGICAL CRICOTHYROTOMY

Paramedic

Introduction:

- Surgical 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. Surgical cricothyrotomy is to be performed only by paramedics trained in this procedure.
- An endotracheal tube introducer ("bougie") facilitates this procedure and has the advantage of additional confirmation of tube position and ease of endotracheal tube placement. If no bougie is available the procedure may be performed without a bougie by introducing endotracheal tube or tracheostomy tube directly into cricothyroid membrane.
- Given the rarity and relative unfamiliarity of this procedure it may be helpful to have a medical consult on the phone during the procedure. Consider contacting base for all cricothyroidotomy procedures. Individual Medical Directors may mandate base contact before initiating the procedure. Individual agency policy and procedures apply and providers are responsible for knowing and following these policies.

Indications:

- A life-threatening condition exists AND advanced airway management is indicated ***AND*** you are unable to establish an airway or ventilate the patient by any other means.

Contraindications:

- Age < 12 years: for children a percutaneous needle cricothryrotomy with large angiocath is preferred surgical airway for anatomic reasons

Technique:

1. Position the patient supine, with in-line spinal immobilization if indicated. If cervical spine injury not suspected, neck extension will improve anatomic view.
2. Using an aseptic technique (betadine/alcohol wipes), cleanse the area.
3. Standing on the left side of the patient, stabilize the larynx with the thumb and middle finger of your left hand, and identify the cricothyroid membrane, typically 4 finger-breadths below mandible
4. Using a scalpel, make a 3 cm centimeter vertical incision 0.5 cm deep through the skin and fascia, over the cricothyroid membrane. With finger, dissect the tissue and locate the cricothyroid membrane.
5. Make a horizontal incision through the cricothyroid membrane with the scalpel blade oriented caudal and away from the cords.
6. Insert the bougie curved-tip first through the incision and angled towards the patient's feet
    a. If no bougie available, use tracheal hook instrument to lift caudal edge of incision to facilitate visualization and introduction of ETT directly into trachea and skip to # 9.
7. Advance the bougie into the trachea feeling for "clicks" of tracheal rings and until "hangup" when it cannot be advanced any further. This confirms tracheal position.
8. Advance a 6-0 endotracheal tube over the bougie and into the trachea. It is very easy to place tube in right mainstem bronchus, so carefully assess for symmetry of breath sounds. Remove bougie while stabilizing ETT ensuring it does not become dislodged
9. Ventilate with BVM and 100% oxygen

10. Confirm and document tracheal tube placement as with all advanced airways: $ETCO_2$ as well as clinical indicators e.g.: symmetry of breath sounds, rising pulse oximetry, etc.
11. Secure tube with ties.
12. Observe for subcutaneous air, which may indicate tracheal injury or extra- tracheal tube position
13. 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 from the carotid or jugular vessels, or their branches.

0130 PROCEDURE PROTOCOL: KING AIRWAY

EMT	AEMT	EMT-I	Paramedic

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 $ETCO_2$
15. Monitor patient for vomiting and aspiration
16. Continuously monitor $ETCO_2$, SpO_2, 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

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0140 PROCEDURE PROTOCOL: CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

EMT	AEMT
EMT-I	Paramedic

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

Contraindications:

- Respiratory or cardiac arrest
- Systolic BP < 90mmHg
- 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 manufacturer guidelines

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0150 PROCEDURE PROTOCOL: CAPNOGRAPHY

EMT	AEMT	EMT-I	Paramedic

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 $ETCO_2$ detector in-line between airway adaptor and BVM after airway positioned and secured
2. Patients without ETT or advanced airway in place: place $ETCO_2$ cannula on patient. May be placed under CPAP or NRB facemask
3. Assess and document both capnography waveform and $ETCO_2$ value

Precautions:

1. To understand and interpret capnography, remember the 3 determinants of $ETCO_2$:
    a. Alveolar ventilation
    b. Pulmonary perfusion
    c. Metabolism
2. Sudden loss of $ETCO_2$:
    a. Tube dislodged
    b. Circuit disconnected
    c. Cardiac arrest
3. High $ETCO_2$ (> 45)
    a. Hypoventilation/CO_2 retention
4. Low $ETCO_2$ (< 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 $ETCO_2$ is blood flow, so $ETCO_2$ is a good indicator of quality of CPR
    b. If $ETCO_2$ is dropping, change out person doing chest compressions
    c. In cardiac arrest, if $ETCO_2$ not > 10 mmHg after 20 minutes of good CPR, this likely reflects very low CO_2 production (dead body) and is a 100% predictor of mortality

0160 PROCEDURE PROTOCOL: SYNCHRONIZED CARDIOVERSION

Unstable tachyarrhythmia with a pulse

↓

Check:
- O_2 via NRB facemask
- Functioning IV line
- Suction
- Advanced airway equipment ready

↓

Sedate with benzodiazepine whenever possible

↓

Perform Synchronized Cardioversion
- Use 200 Joules biphasic in adults and 1-2 Joules/kg in children < 12 years old

↓

Continue treatment according to Tachycardia with a Pulse protocol

This procedure protocol applies to conscious, alert patients with signs of poor perfusion due to tachyarrhythmia in whom synchronized cardioversion is indicated according to Tachyarrhythmia with Pulse protocol

Paramedic

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

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0170 PROCEDURE PROTOCOL: TRANSCUTANEOUS CARDIAC PACING

EMT-I	Paramedic

Indications

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

Precautions

1. Conscious patient will experience discomfort; consider sedation with benzodiazepine if blood pressure allows.

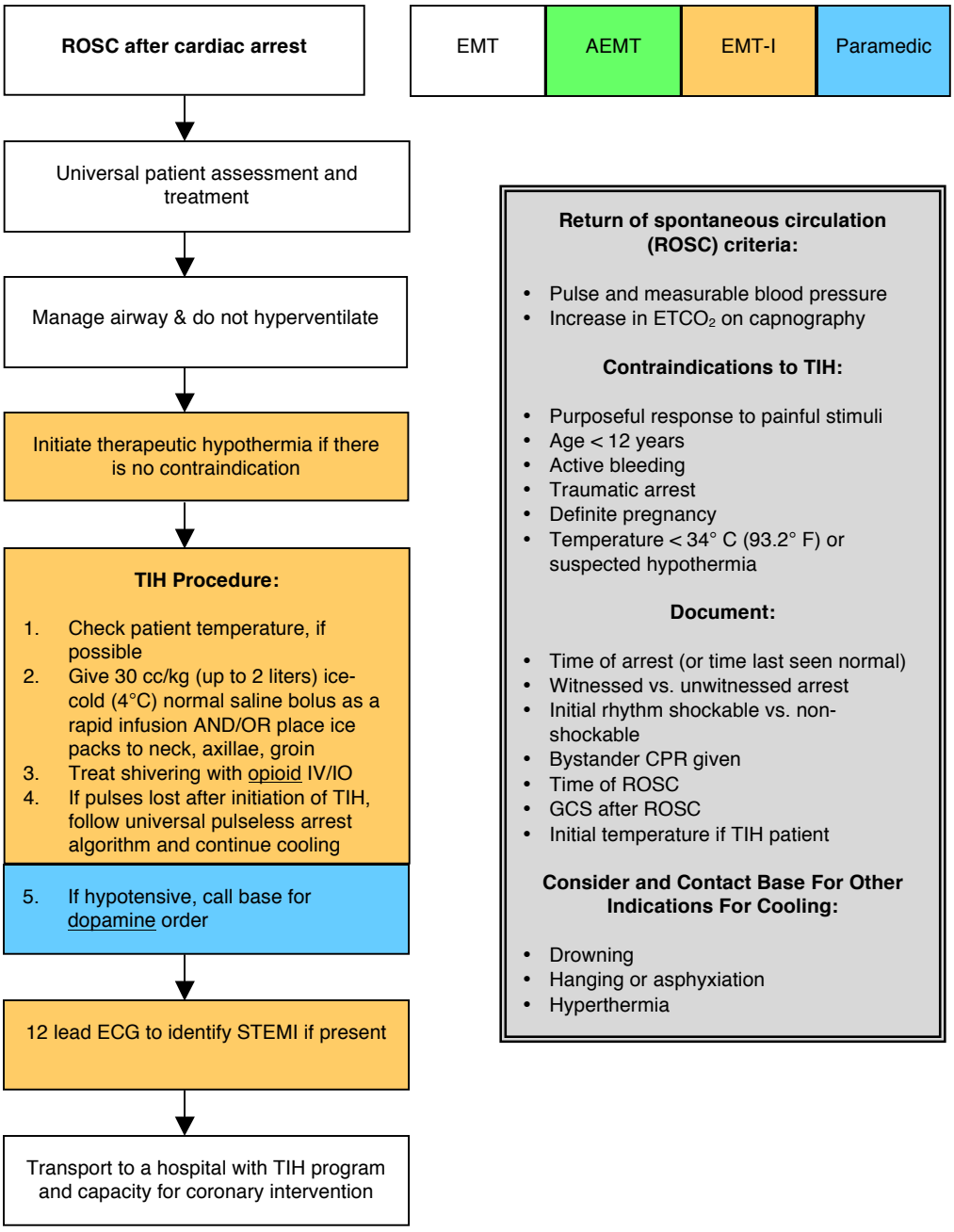
Technique

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



0190 PROCEDURE PROTOCOL: RESTRAINT PROTOCOL

Indications:

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 in

mandatory. A restrained patient may never be left unattended.

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

EMT	AEMT
EMT-I	Paramedic

Indications

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

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

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 2nd intercostal space at midclavicular line, or 5th 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

0220 PROCEDURE PROTOCOL: INTRAOSSEUS CATHETER PLACEMENT

AEMT	EMT-I	Paramedic

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:

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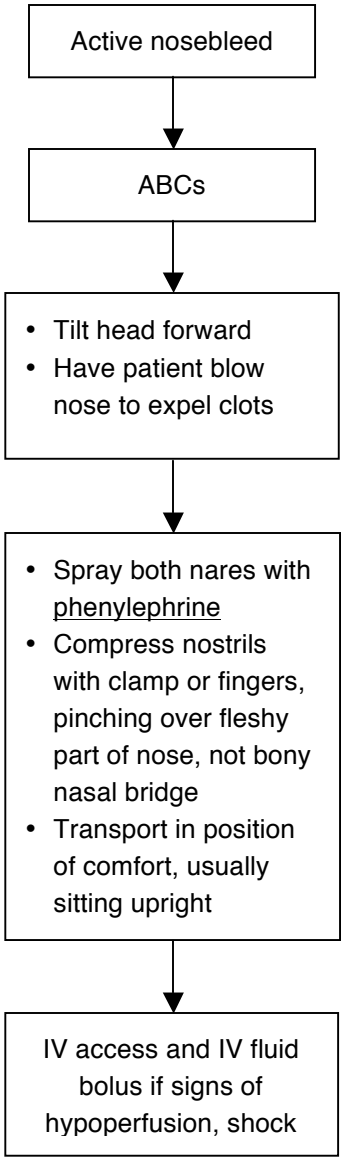
A. Some authorities recommend aspiration of marrow fluid or tissue to confirm needle location. This is not recommended for field procedures, as it increases the risk of plugging the needle.
B. Expect flow rates to be slower than peripheral IVs. Pressure bags may be needed. Any drug or IV fluid may be 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



EMT	AEMT
EMT-I	Paramedic

General Guidelines:

- Most nosebleeding is from an anterior source and may be easily controlled
- Avoid phenylephrine in pts with known CAD
- Anticoagulantion with aspirin, clopidogrel (Plavix), warfarin (Coumadin) will make epistaxis much harder to control. Note if your patient is taking these or other anticoagulant medications
- Posterior epistaxis is a true emergency and may require advanced ED techniques such as balloon tamponade or interventional radiology. Do not delay transport. Be prepared for potential airway issues.
- Patients using nasal cannula oxygen may have cannula placed in mouth while nares are clamped or compressed for nosebleed

0240 PROCEDURE PROTOCOL: TASER PROBE REMOVAL

EMT	AEMT
EMT-I	Paramedic

Indications

- Patient with TASER probe(s) embedded in skin.

Contraindications

- TASER probe embedded in the eye or genitals. In such cases, transport patient to an emergency department for removal.

Technique

1. Confirm the TASER has been shut off and the barb cartridge has been disconnected. .
2. Using a pair of shears cut the TASER wires at the base of the probe.
3. Place one hand on the patient in area where the probe is embedded and stabilize the skin surrounding the puncture site. Using the other hand (or use pliers) firmly grasp the probe.
4. In one uninterrupted motion, pull the probe out of the puncture site maintaining a 90° angle to the skin. Avoid twisting or bending the probe.
5. Repeat the process for any additional probes.
6. Once the probes are removed, inspect and assure they have been removed intact. In the event the probe is not removed intact or there is suspicion of a retained probe, the patient must be transported to the emergency department for evaluation.
7. Cleanse the probe site and surrounding skin with betadine and apply sterile dressing.
8. Advise patient to watch for signs of infection including increased pain at the site, redness swelling or fever.

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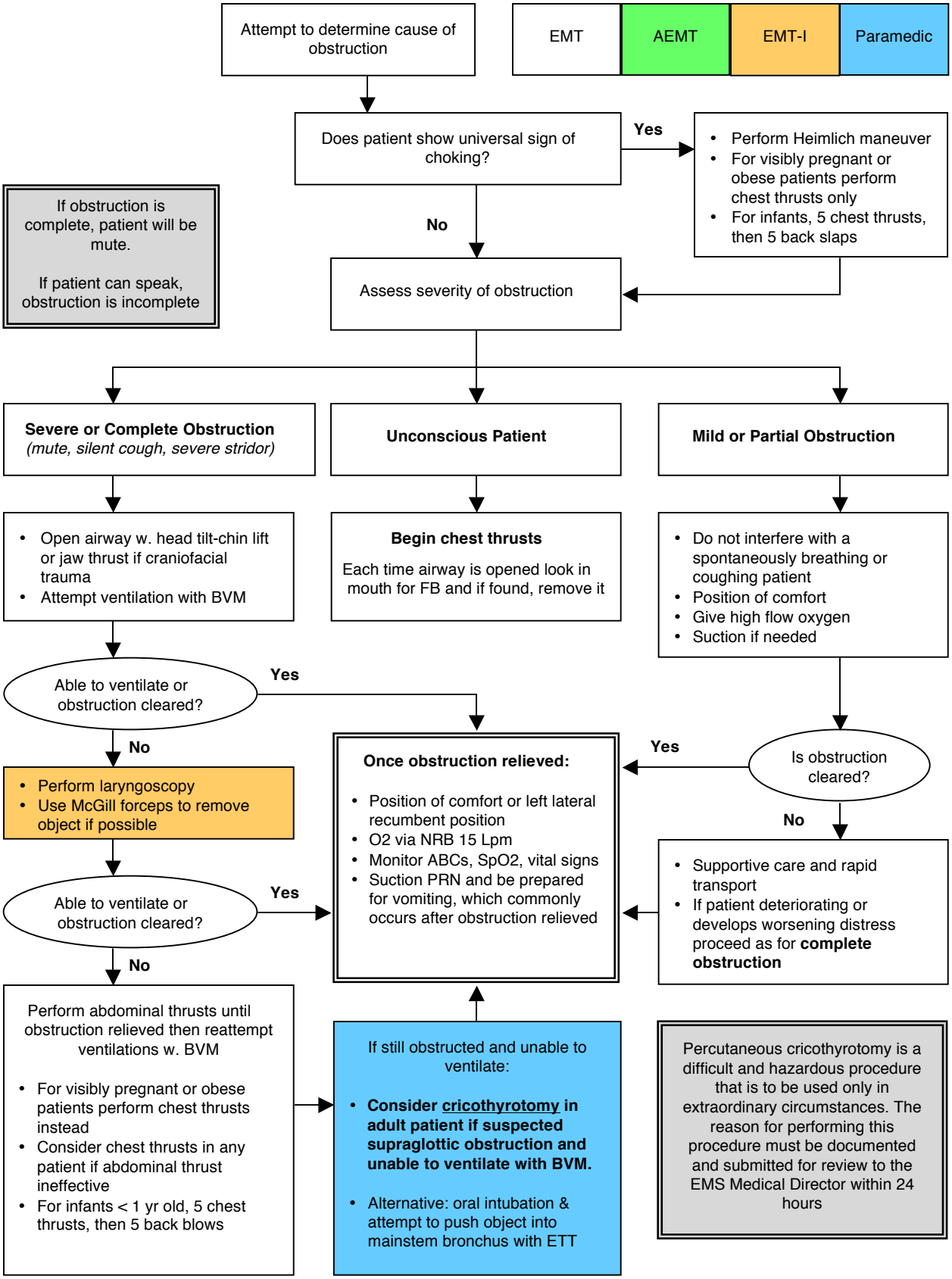
1010 OBSTRUCTED AIRWAY



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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

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

General Guidelines: Timing Of Placement Of Advanced Airway

- 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 $ETCO_2$
    - Use continuous waveform capnography if available. In low flow states such as cardiac arrest, colorimetric CO_2 detector may be inaccurate and not sense very low CO_2 level

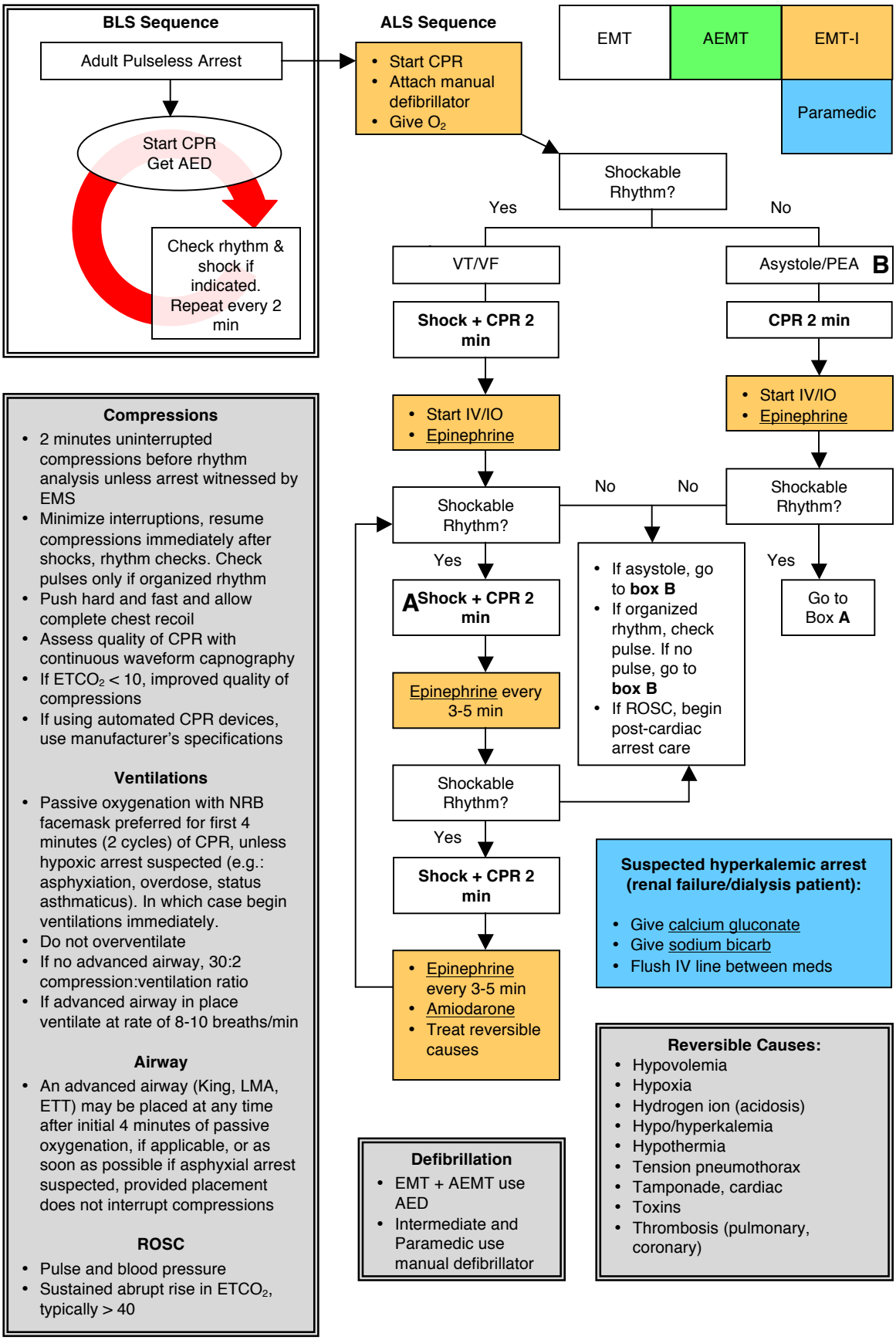
General Guidelines: Pacing

- 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

2020 ADULT (AGE ≥ 12 YEARS) UNIVERSAL PULSELESS ARREST ALGORITHM



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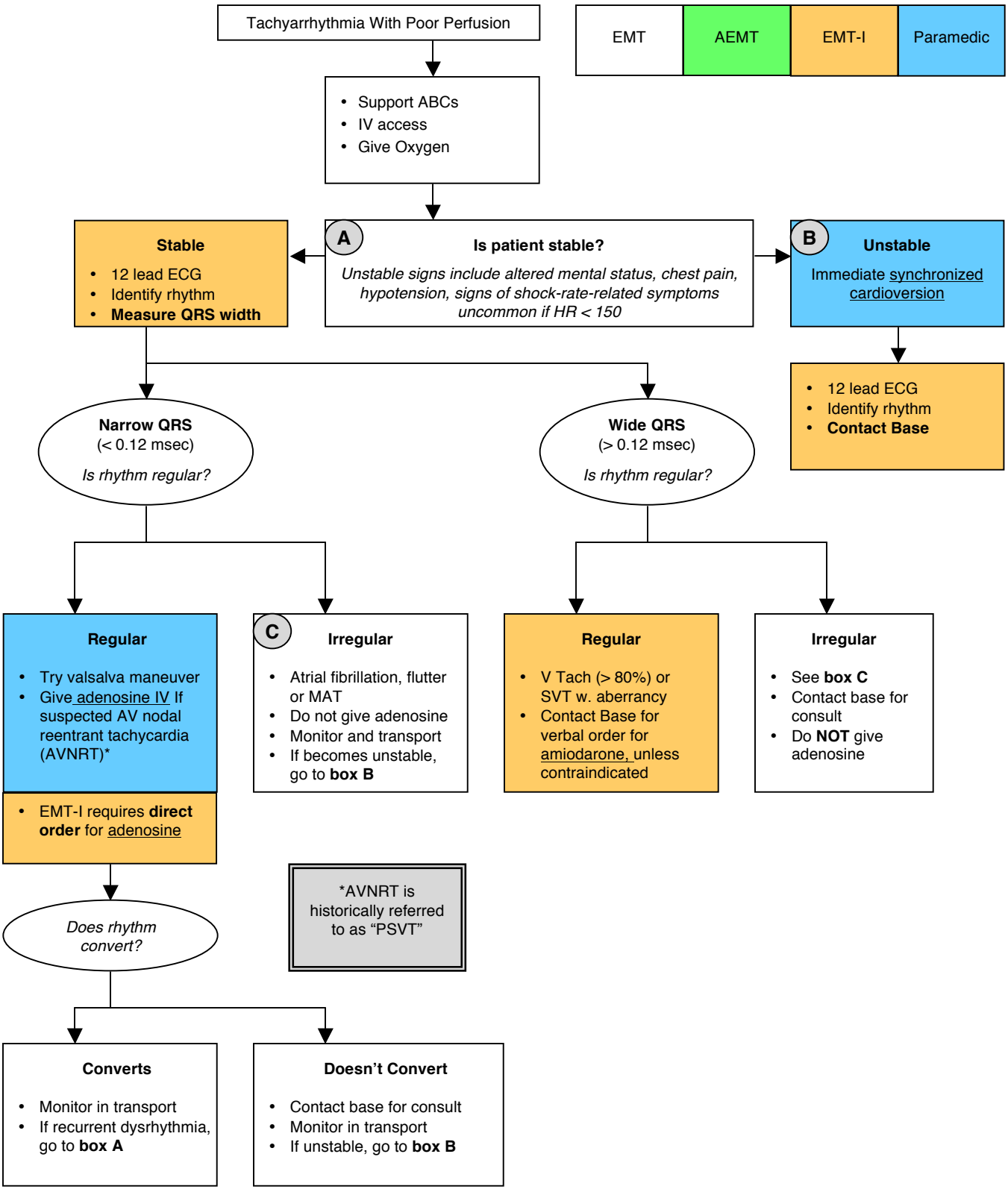
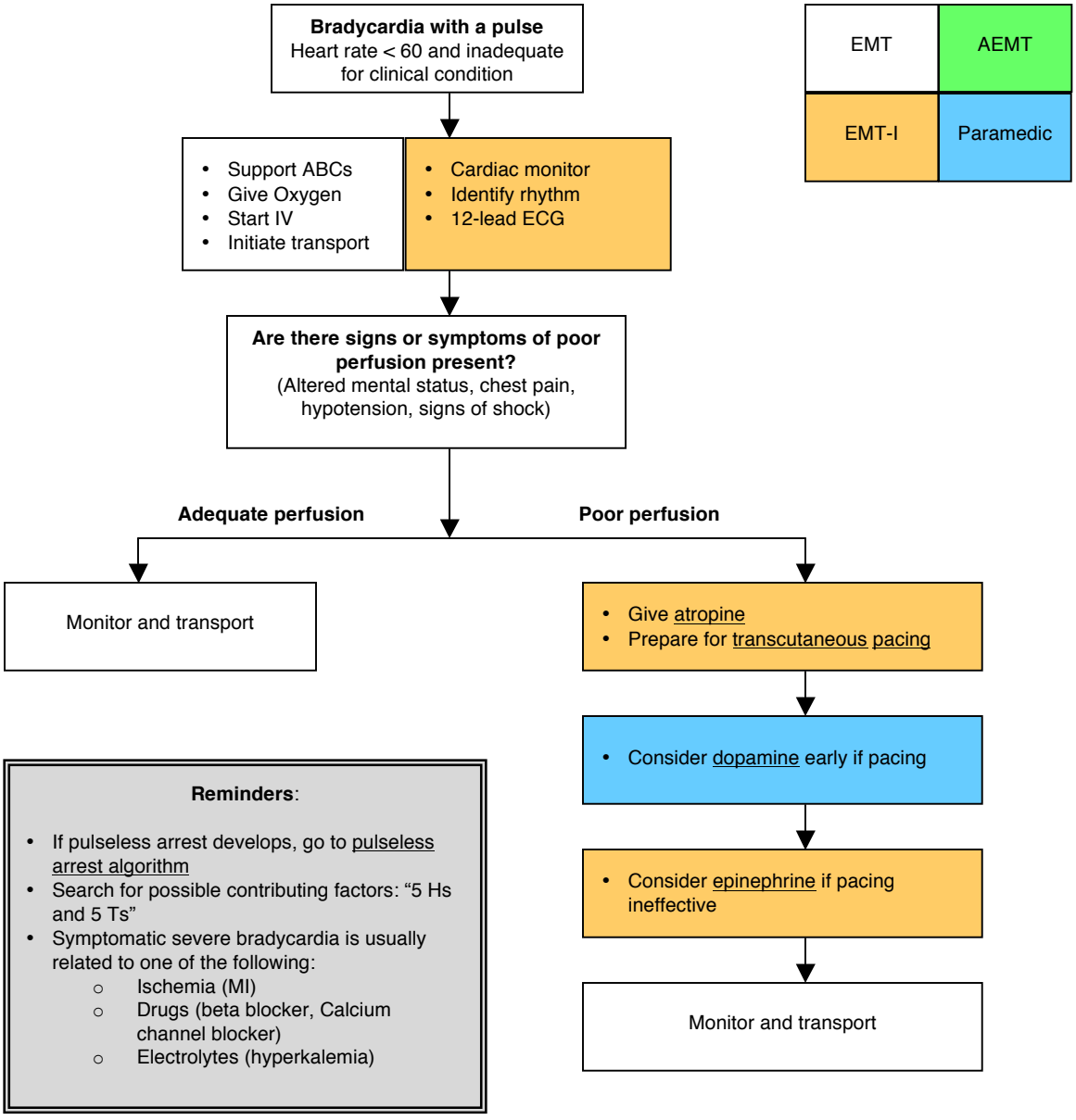
2030 ADULT (≥ 12 YEARS) TACHYARRHYTHMIA WITH POOR PERFUSION



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



2050 ADULT CHEST PAIN

EMT	AEMT	EMT-I	Paramedic

General:

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:
    1. If history suggests possible ACS:
        a. Administer 4 chewable 81mg aspirin
        b. In patients already taking nitroglycerin, contact base for verbal order for patient-assisted nitroglycerin up to 3 doses total, if not already taken.
G. AEMT:
    1. If history suggests possible ACS:
        a. Administer 4 chewable 81mg aspirin
        a. 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
H. EMT-Intermediates and paramedics:
    2. 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).
    3. If history and physical exam suggest possible ACS:
        a. Administer 4 chewable 81mg aspirin
        b. Administer nitroglycerin 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. Consider opioid IV for persistent pain, unless contraindicated. Opioid may be administered at any point if not responding adequately to SL nitroglycerin.
    4. Consider base station contact for additional medication orders if pain persists.

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_4), give nitroglycerin with extreme caution as hypotension common.
C. If hypotension develops following nitroglycerine administration in any patient, treat with 250cc NS boluses.
D. Nitroglycerin is contraindicated in patients taking medication for erectile dysfunction (phosphodiesterase inhibitors, e.g.: Viagra, Cialis).

2051 CARDIAC ALERT

EMT-I	Paramedic

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

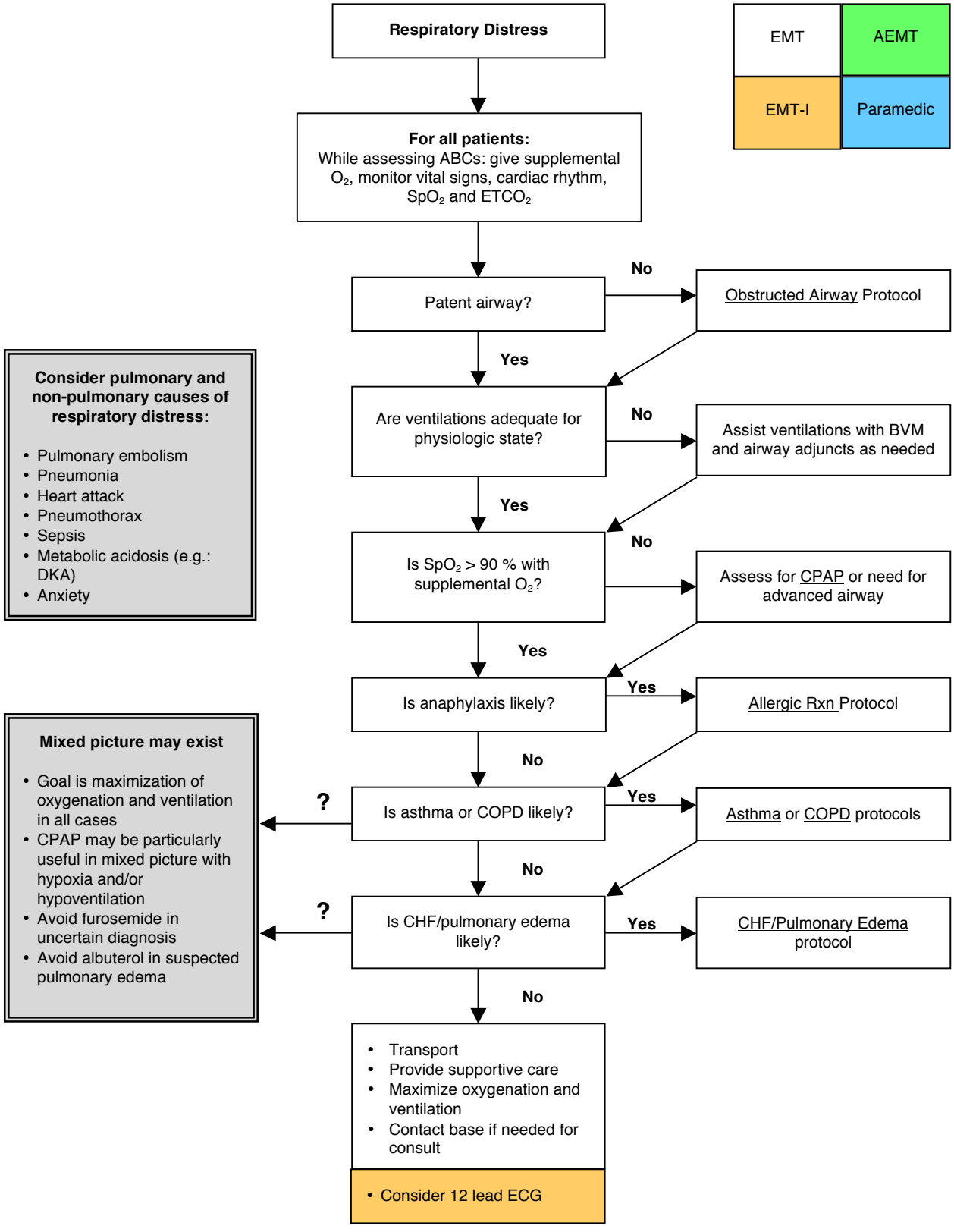
2100 HYPERTENSION

AEMT	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



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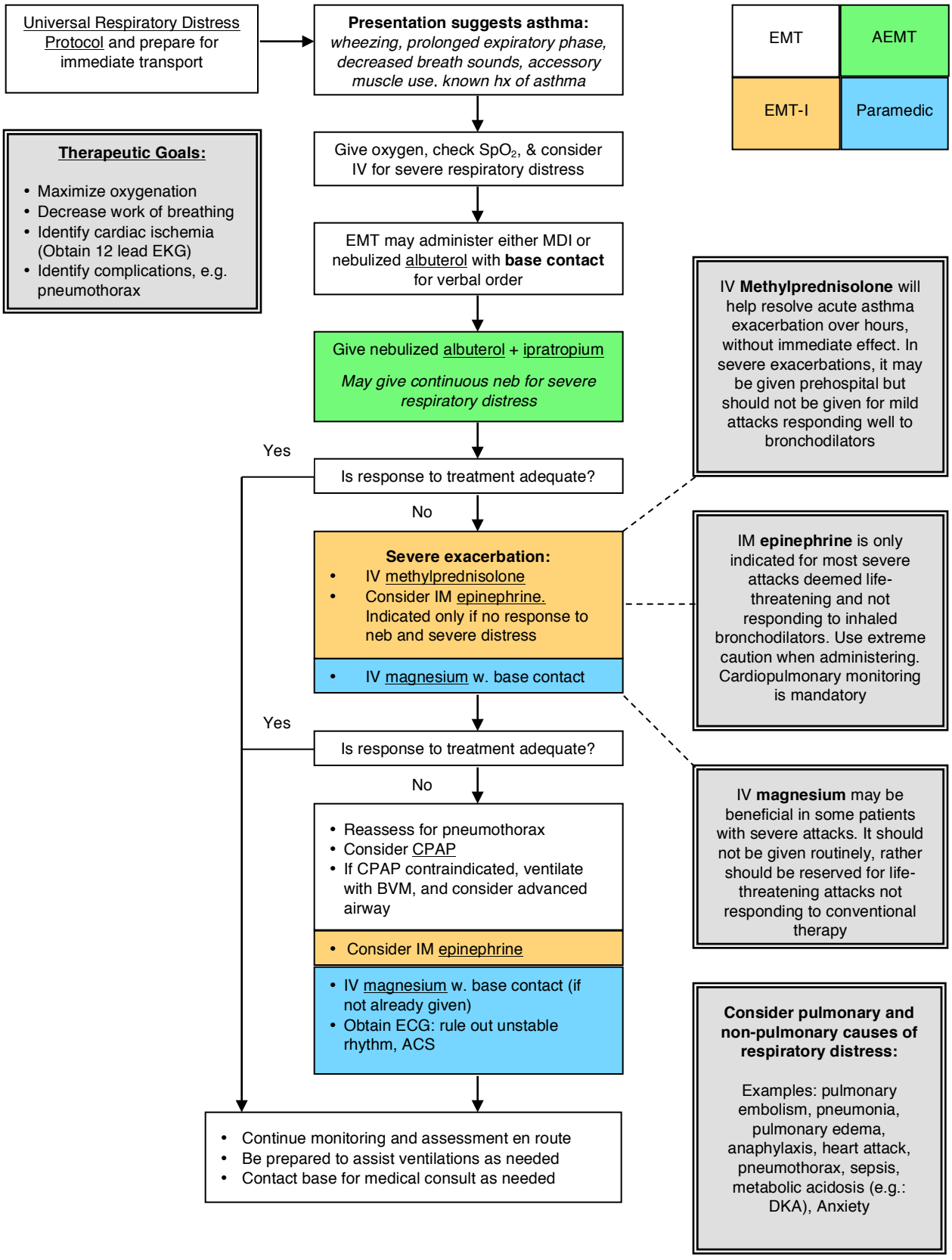
3020 ADULT (AGE ≥ 12 YEARS) ASTHMA



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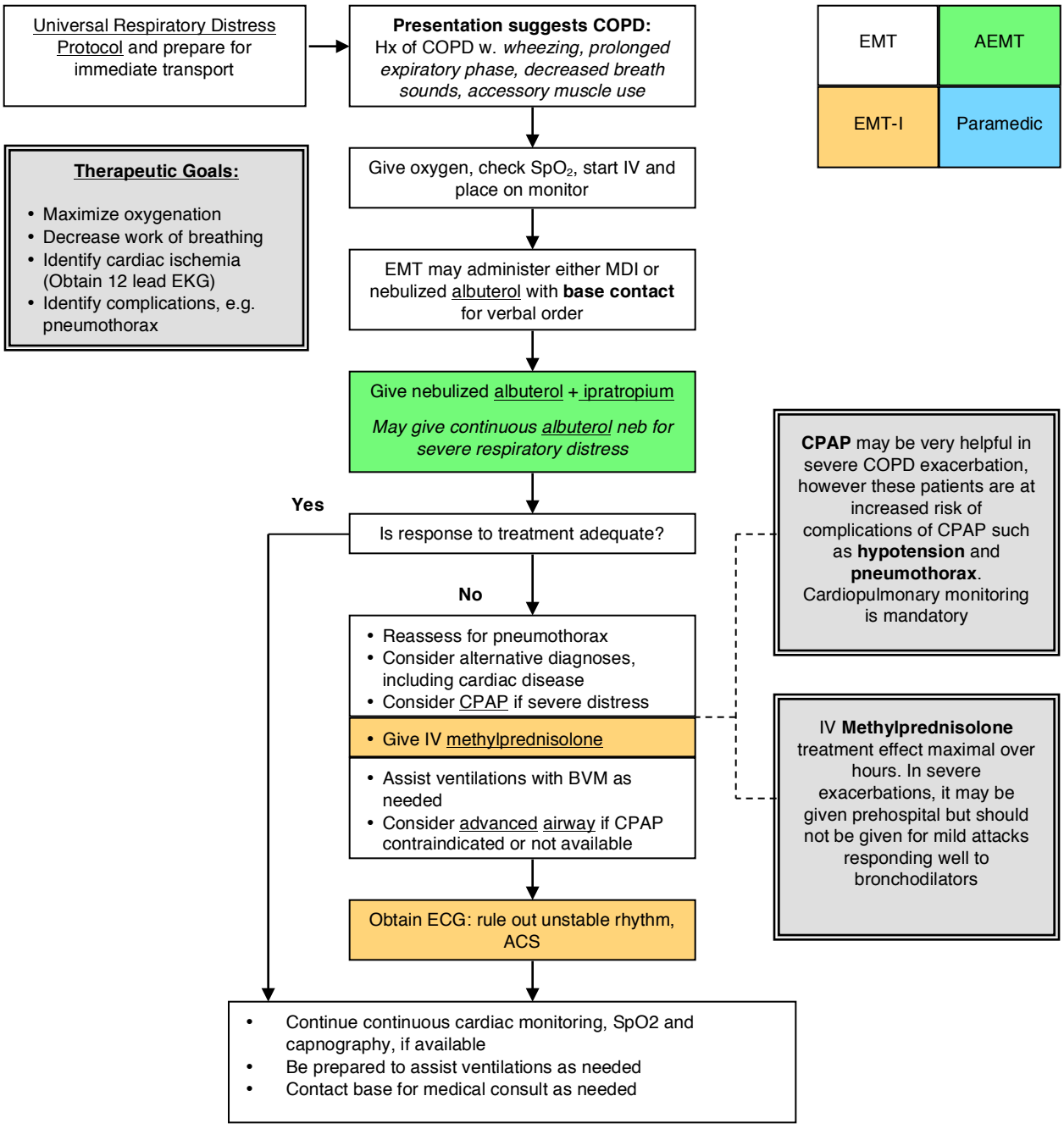
3030 COPD



Special Notes:

- **Correct hypoxia**: do not withhold maximum oxygen for fear of CO_2 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

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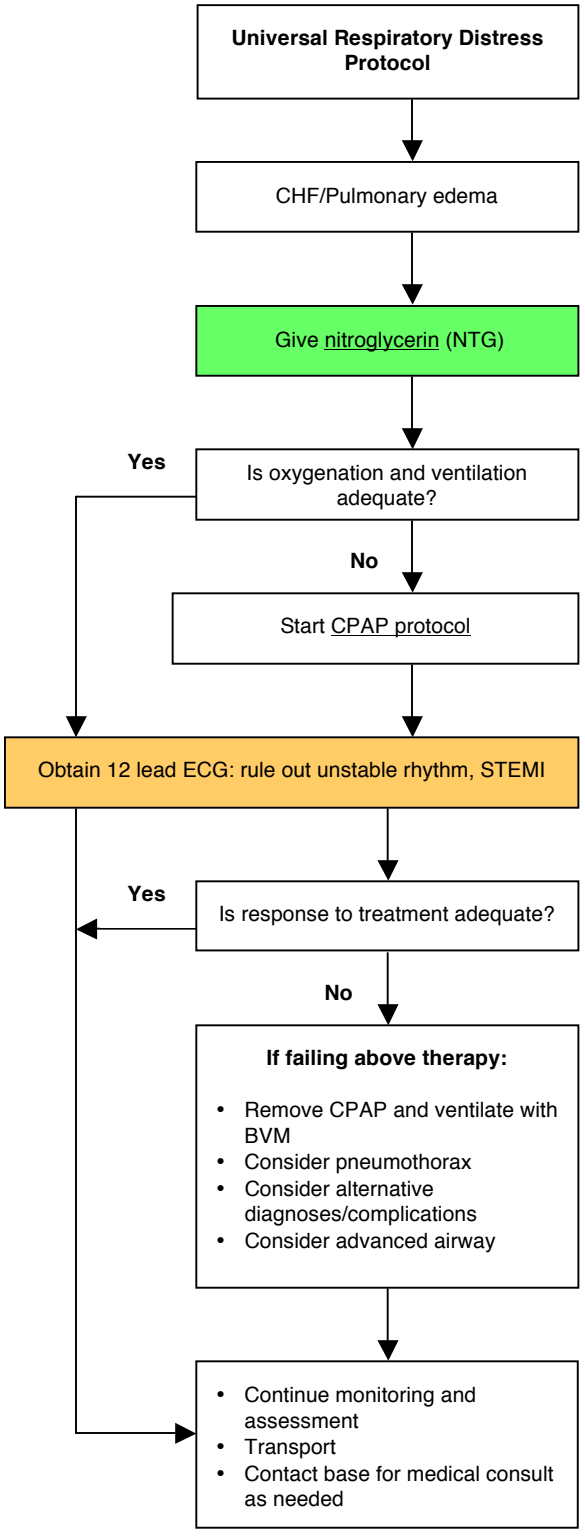
3050 CHF/PULMONARY EDEMA

EMT	AEMT
EMT-I	Paramedic



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 and are no longer considered first line therapy.
- Morphine has been associated with worse outcomes in patients with CHF and is no longer preferred

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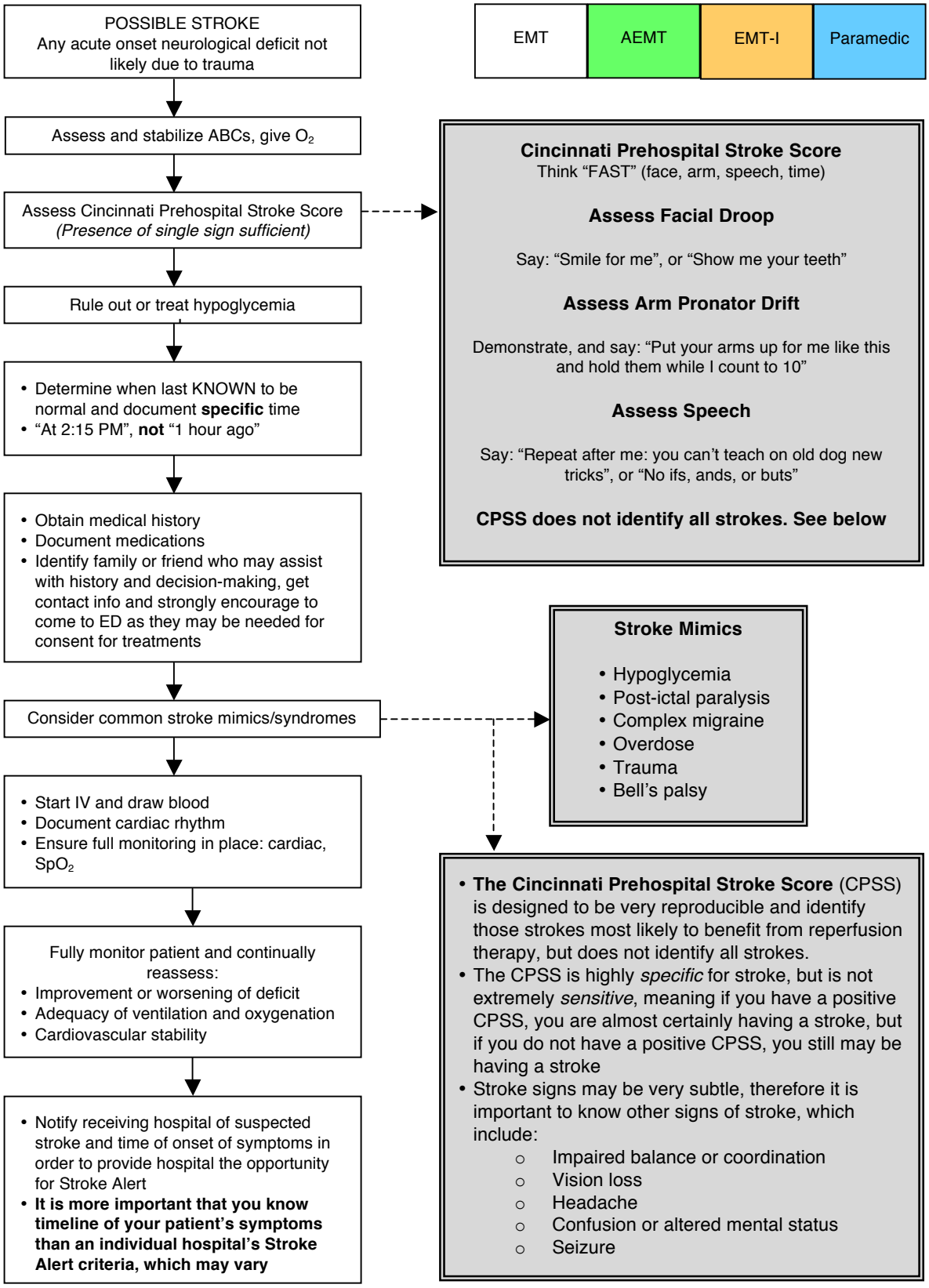
4011 STROKE



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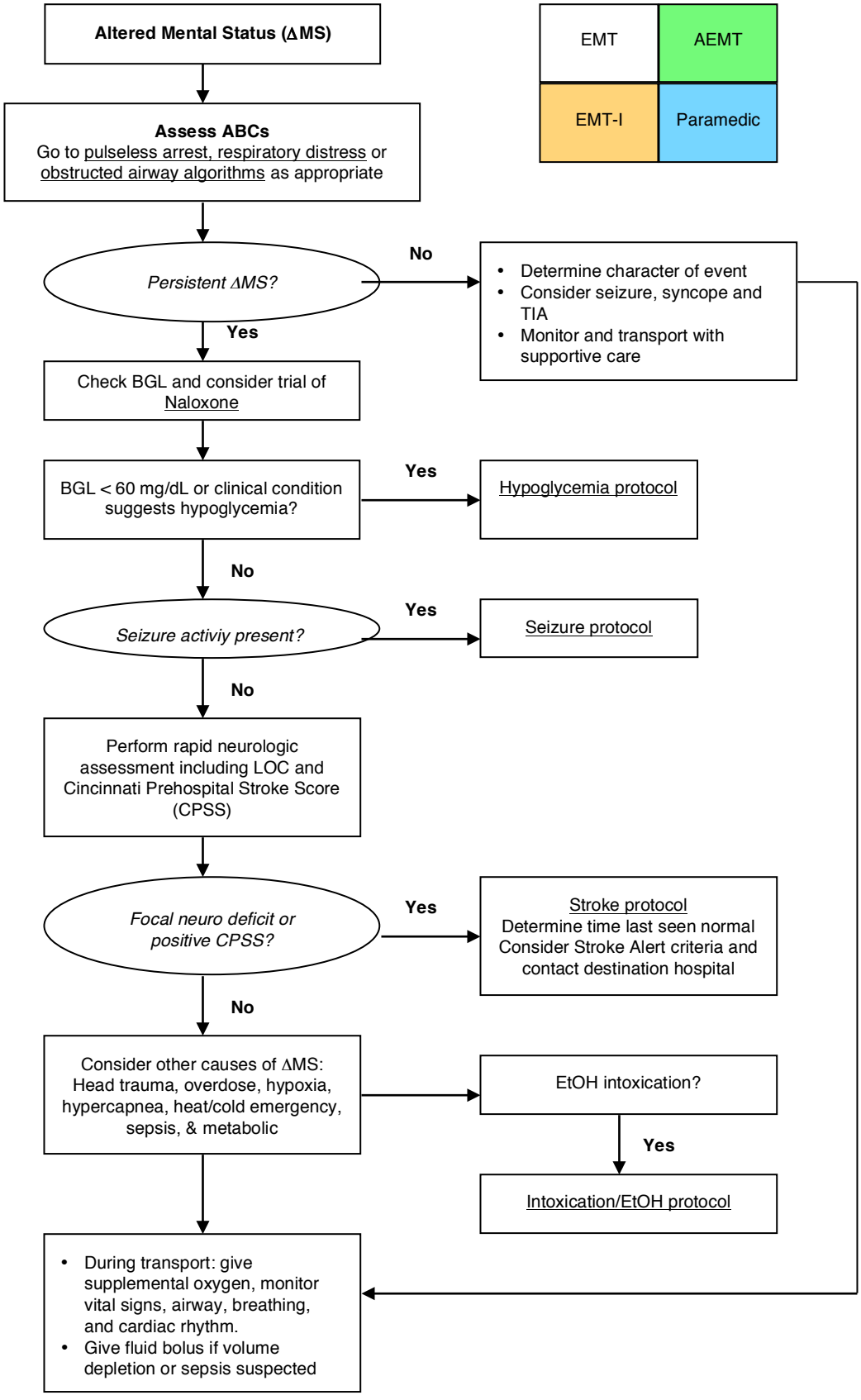
4012 UNIVERSAL ALTERED MENTAL STATUS



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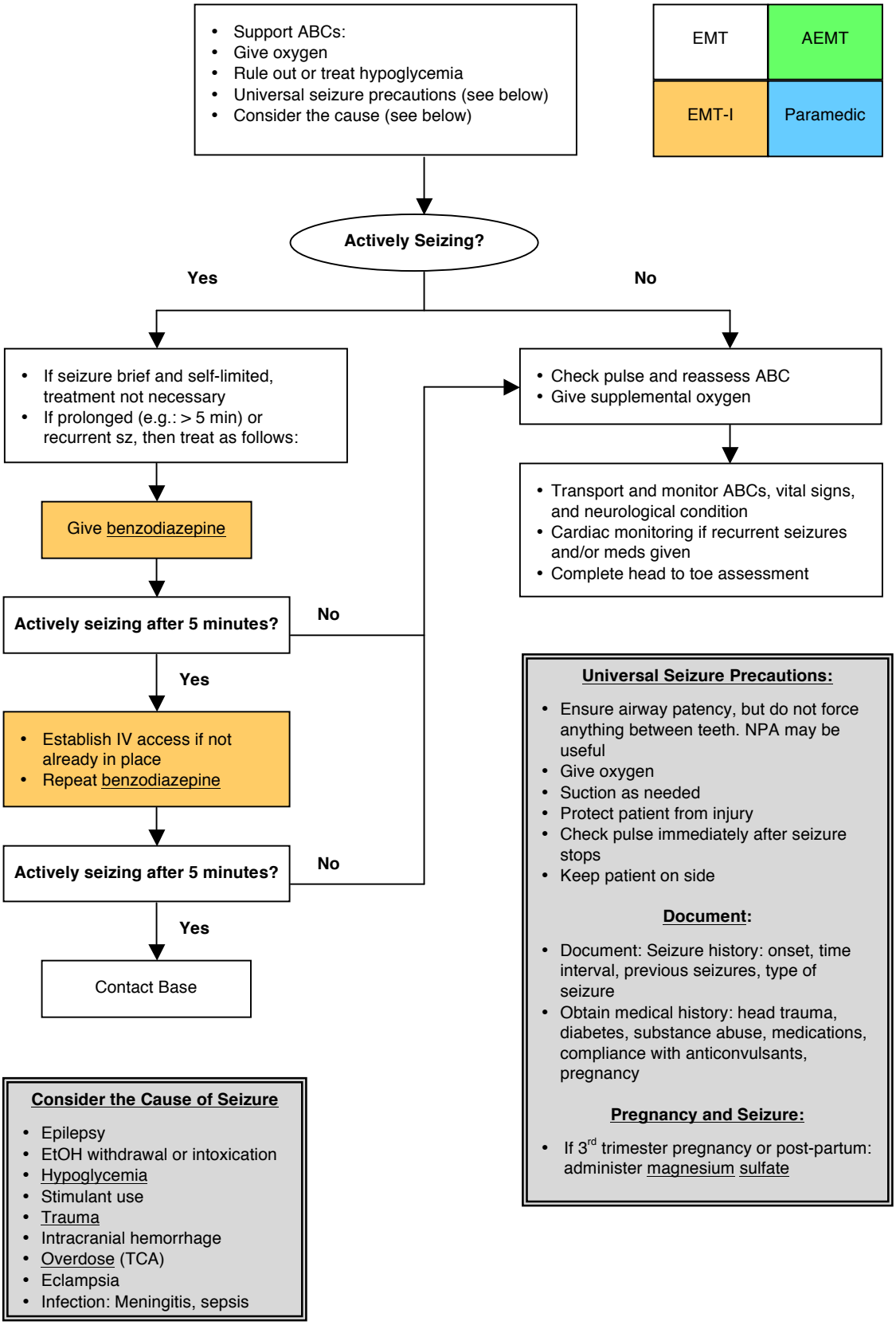
4013 ADULT (≥ 12 YEARS) SEIZURE



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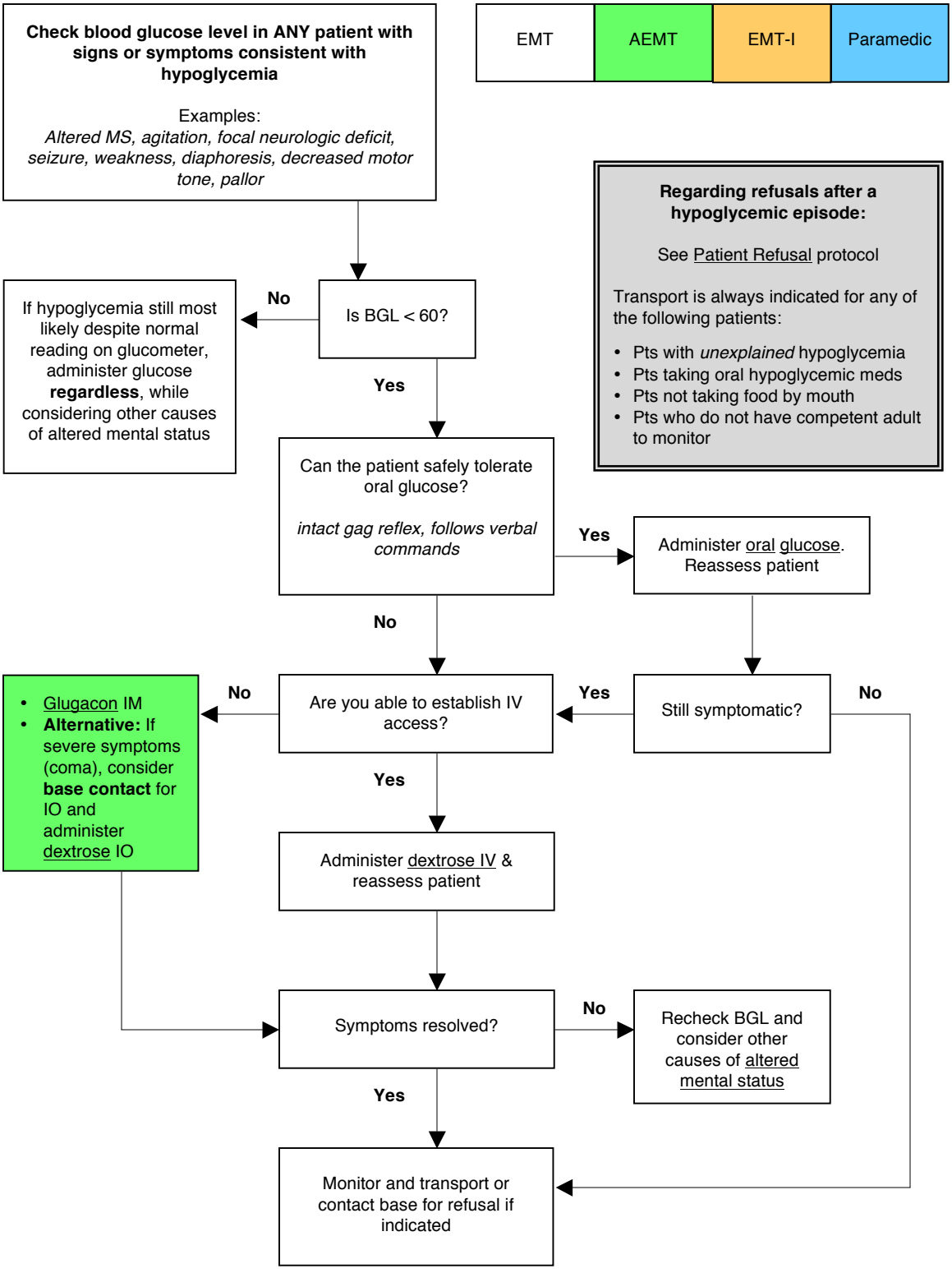
4014 HYPOGLYCEMIA



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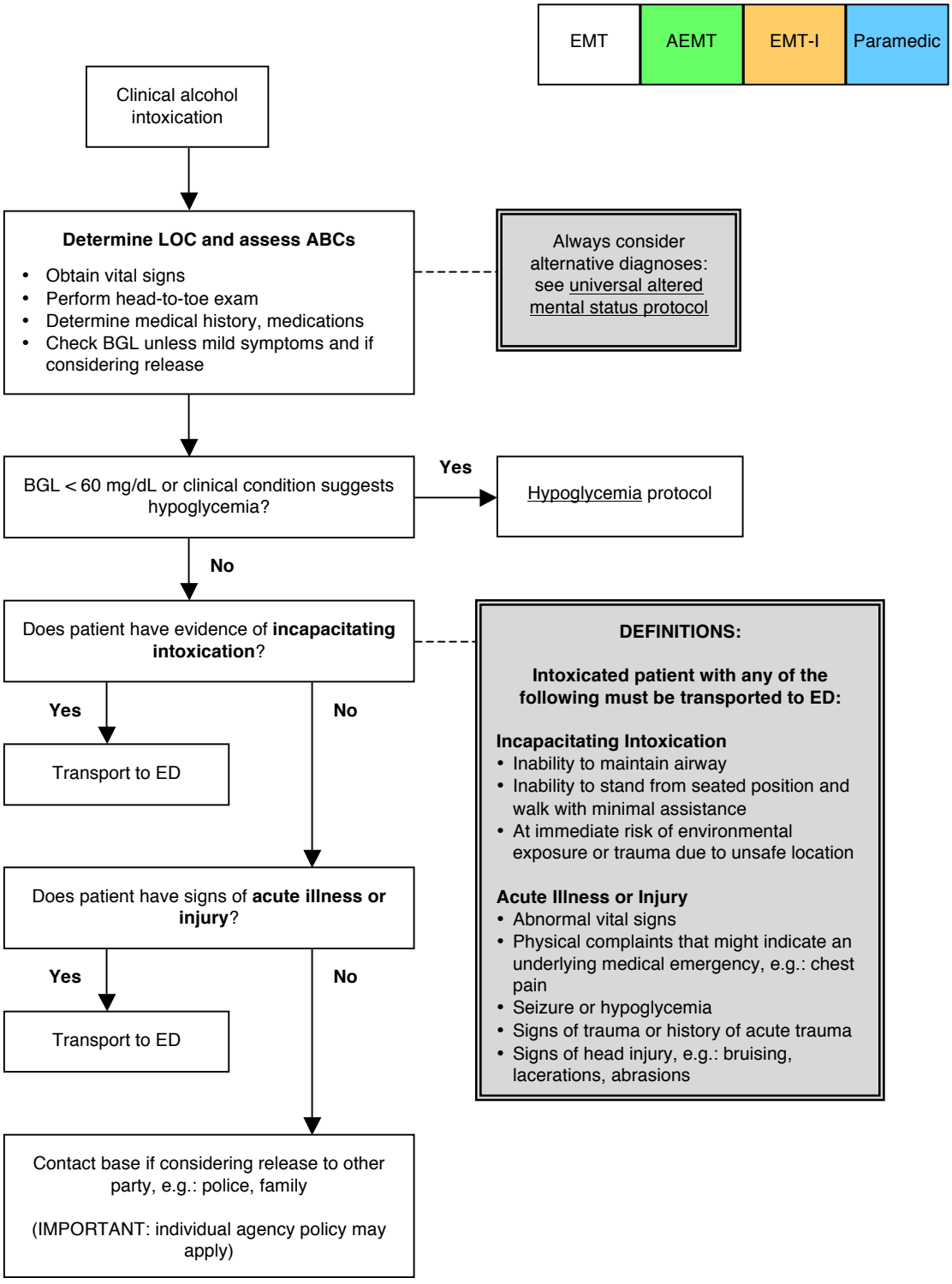
4015 ALCOHOL INTOXICATION



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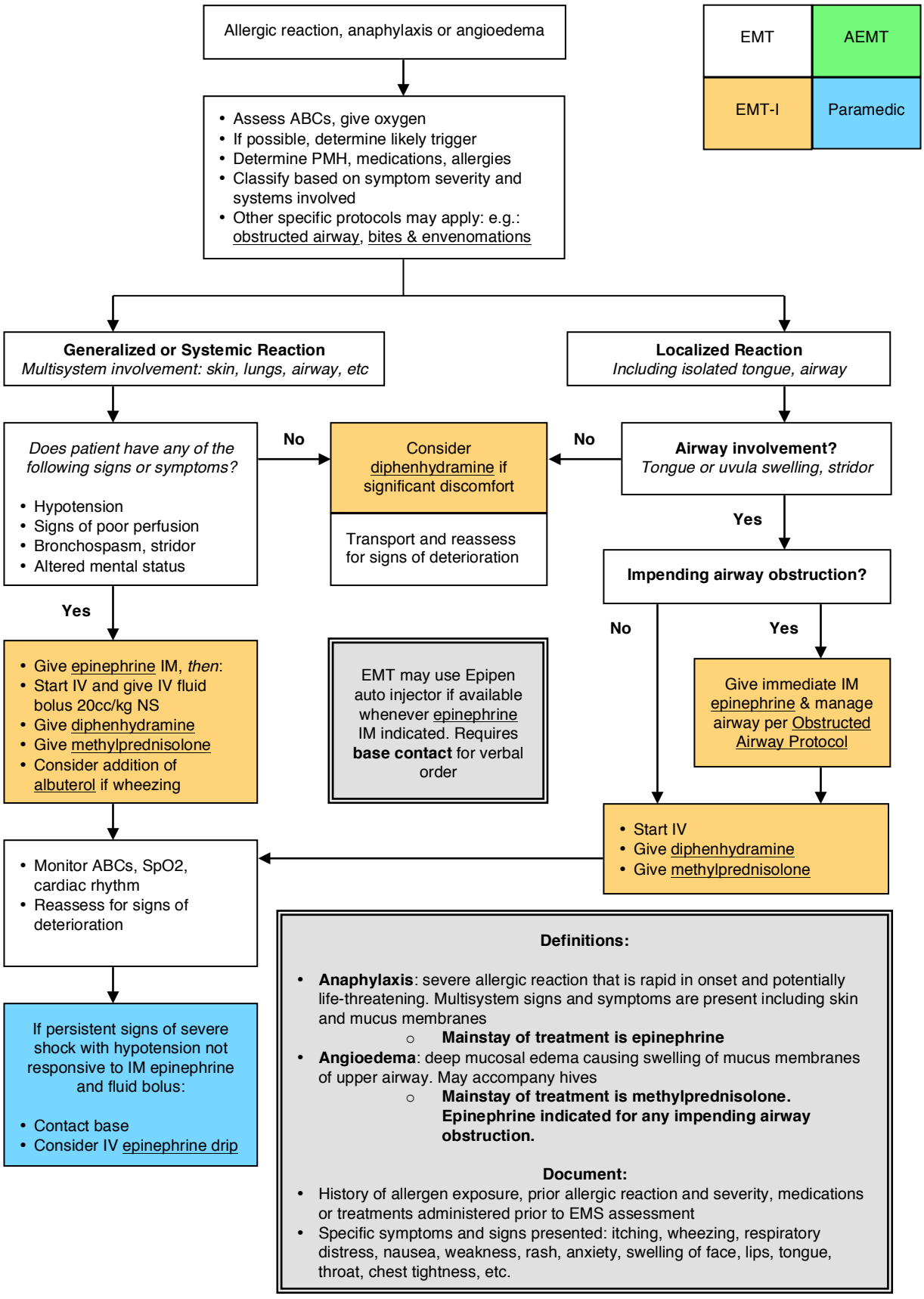
4020 ALLERGY AND ANAPHYLAXIS



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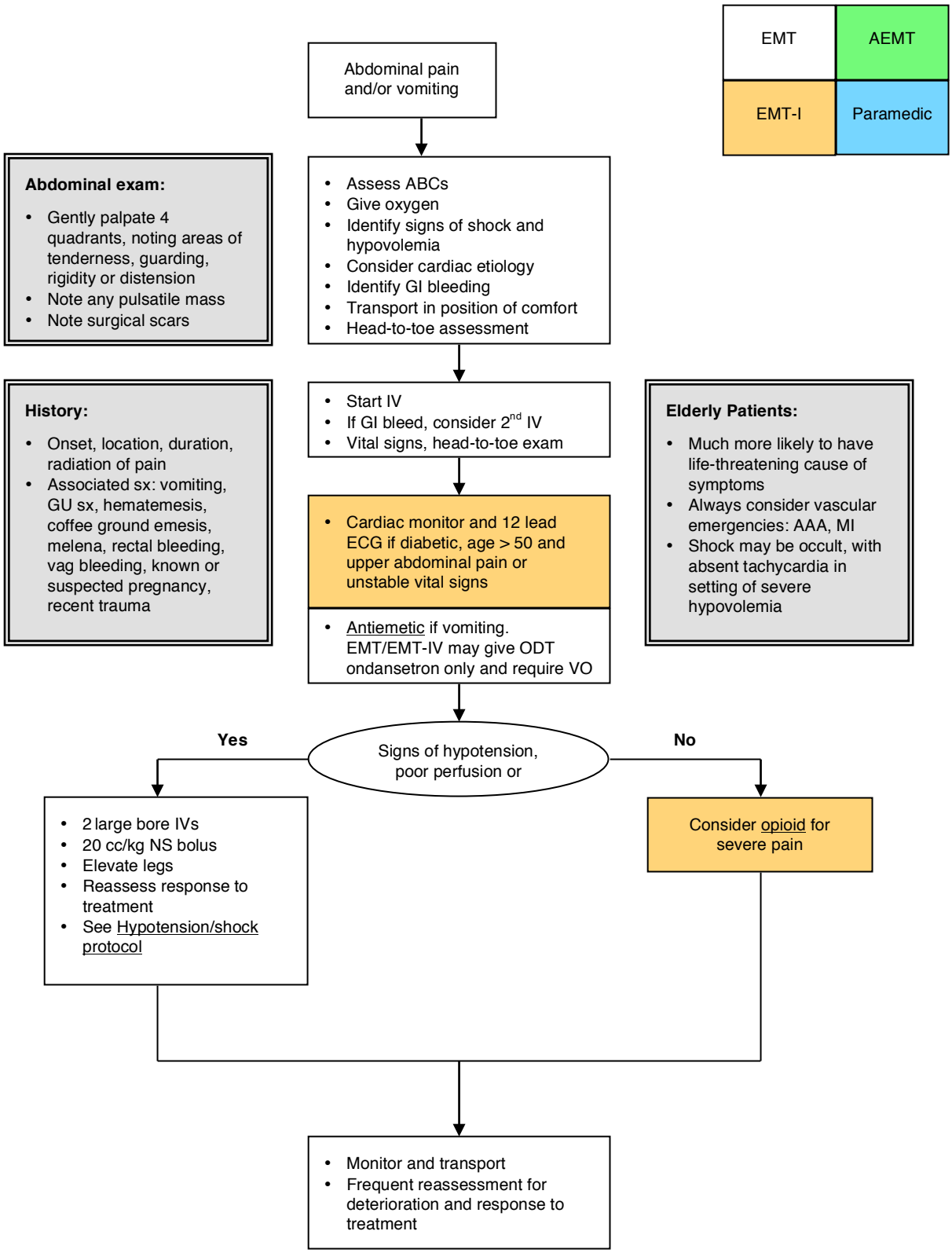
4030 ABDOMINAL PAIN/VOMITING



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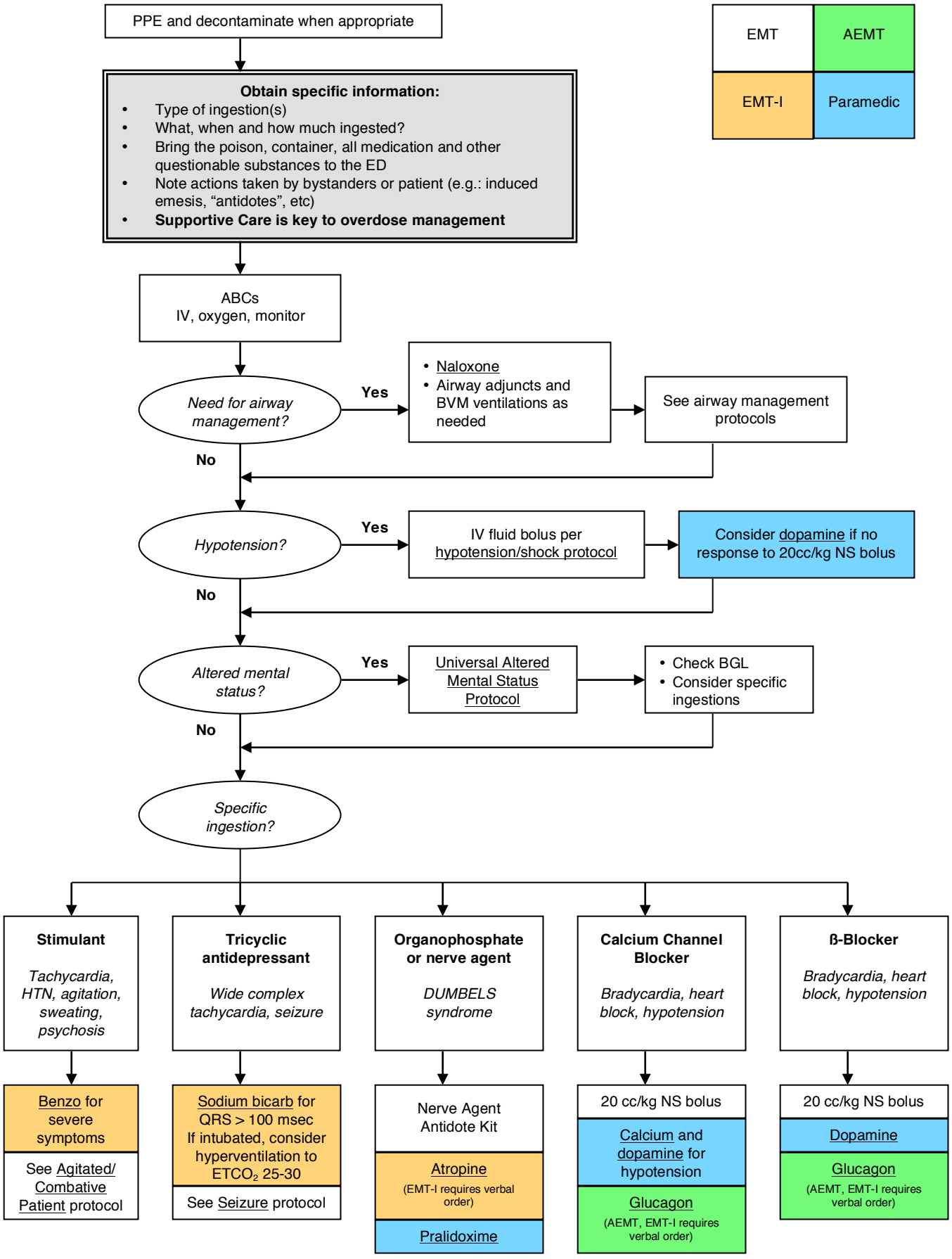
4040 OVERDOSE AND ACUTE POISONING



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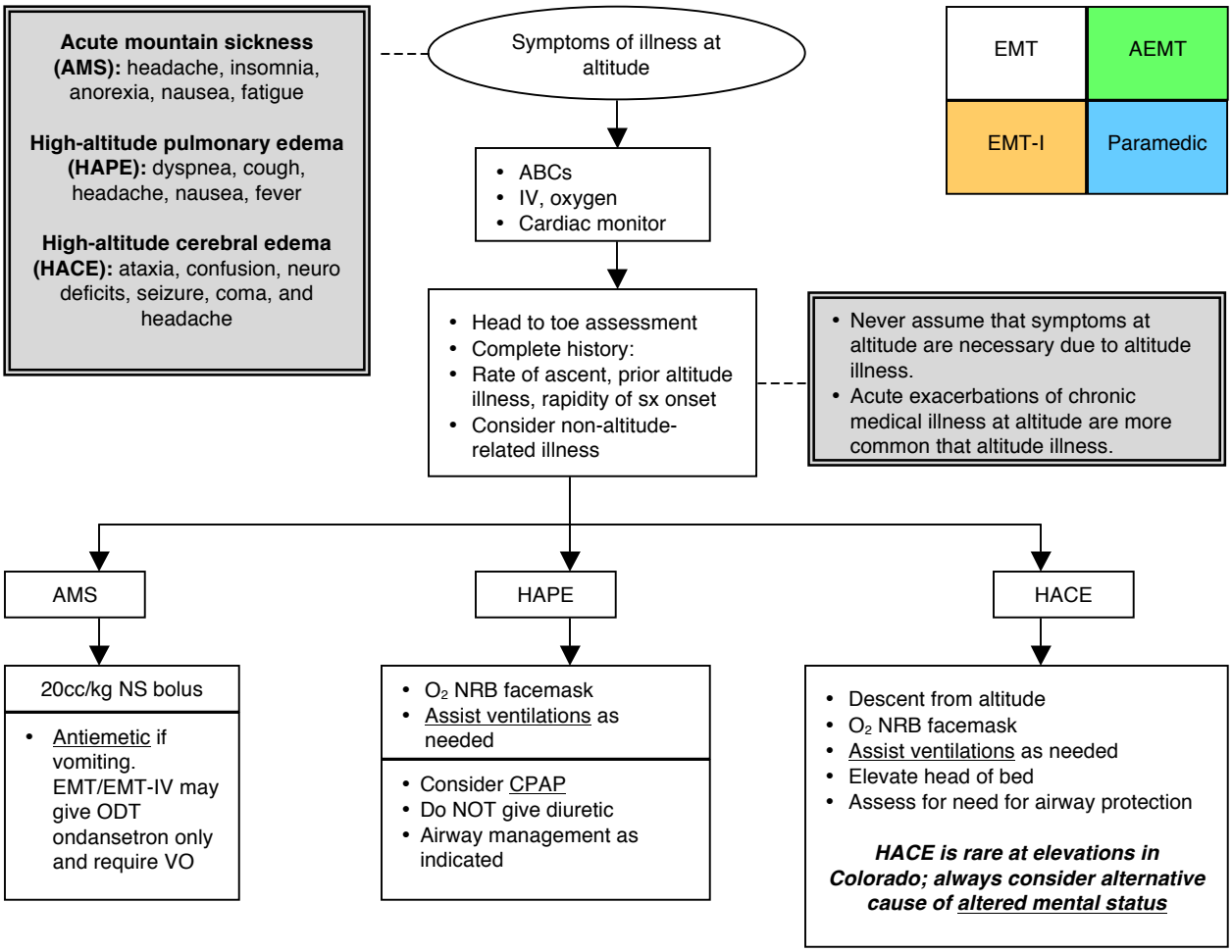
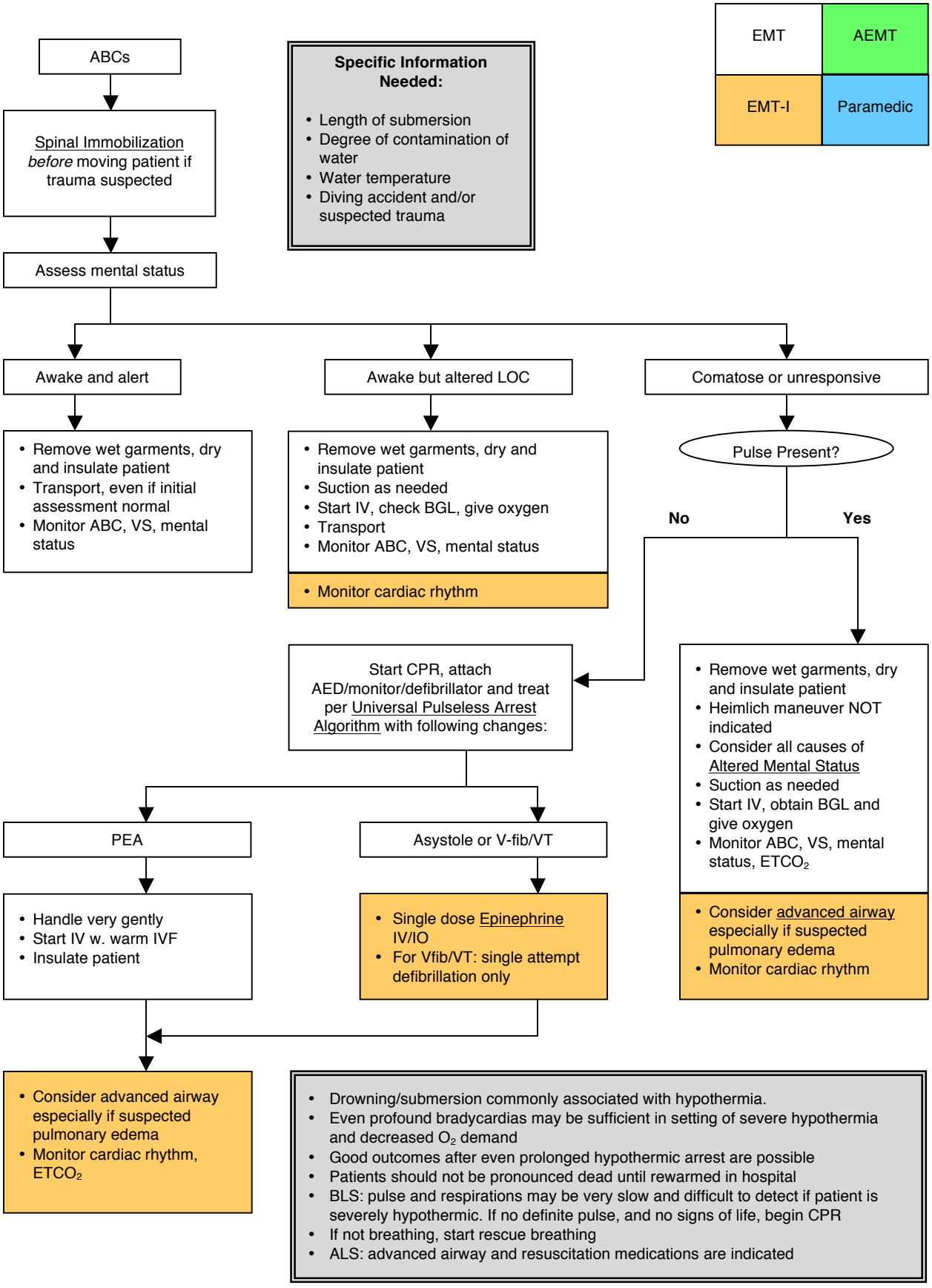
4051 HIGH ALTITUDE ILLNESS



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



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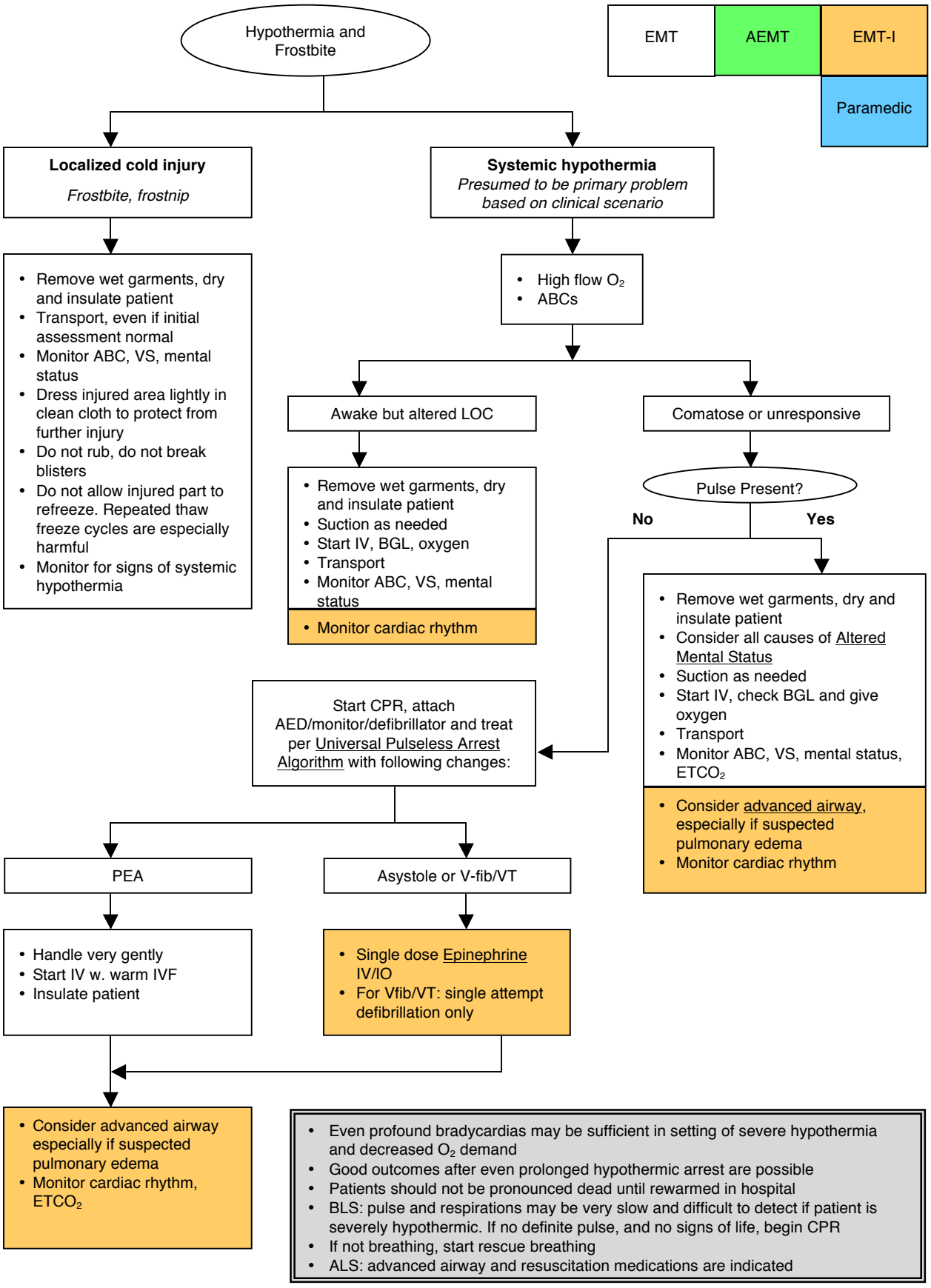
4053 HYPOTHERMIA



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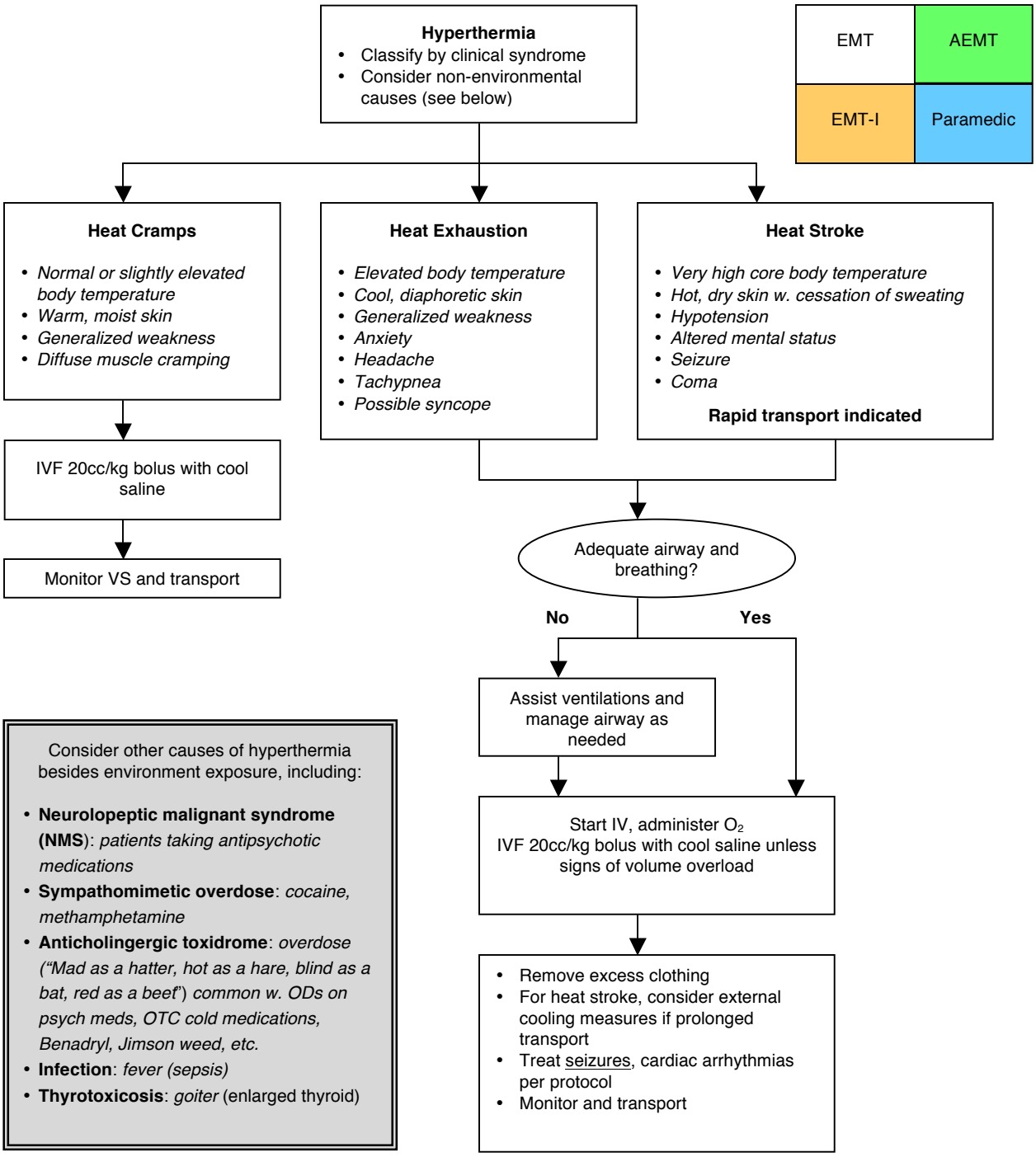
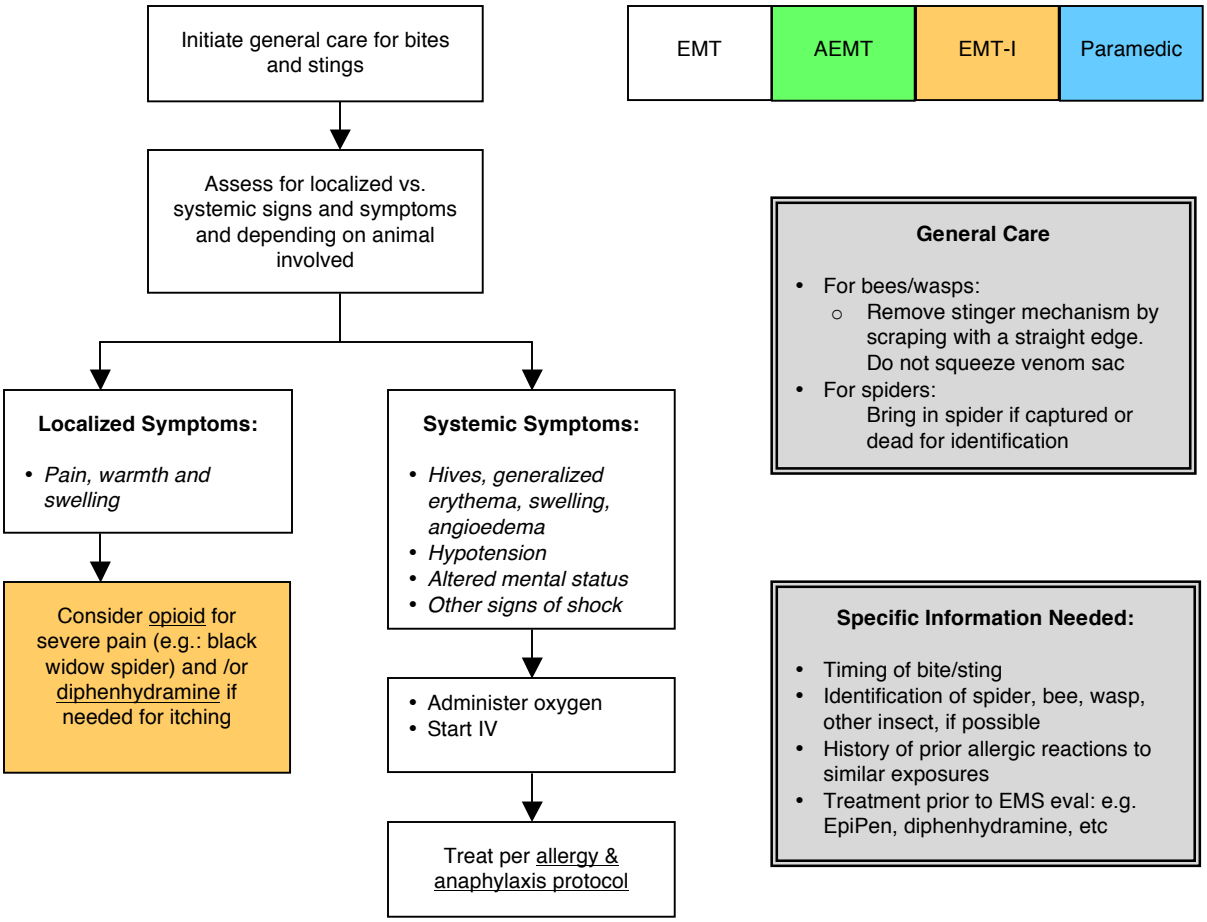
4054 ENVIRONMENTAL HYPERTHERMIA



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	AEMT	EMT-I	Paramedic

- Assess ABCs, mental status
- Administer oxygen
- Start IV
- Monitor VS

Initiate general care for snake bites

Assess for localized vs. systemic signs and symptoms

Localized Symptoms:

- *Pain and swelling*
- *Numbness, tingling to bitten part*
- *Bruising/eccymoses*

Opioid for severe pain

- Transport with bitten part immobilized
- Monitor ABCs and for development of systemic signs/sx
- Complete General Care en route

Systemic Symptoms:

- *Metallic or peculiar taste in mouth*
- *Hypotension*
- *Altered mental status*
- *Widespread bleeding*
- *Other signs of shock*

Be prepared to manage airway if signs of airway obstruction develop

Opioid for severe pain and if not contraindicated by hypotension

Treat hypotension w. 20cc/kg IV NS bolus
See hypotension/shock protocol

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 1st 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.

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4060 MEDICAL HYPOTENSION/SHOCK PROTOCOL

EMT	AEMT
EMT-I	Paramedic

Adult with SBP < 90 mmHg
AND/OR signs of poor perfusion

- ABCs
- Complete set of vital signs
- Full monitoring
- O_2 via NRB facemask @ 15L/min
- IV access
- ALS transport

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

Signs of poor perfusion?

Altered mental status
Tachycardia
Cool, clammy skin
Venous lactate > 4 (see below)

No → Recheck and monitor
If patient remains asymptomatic and clinically stable, treatment may not be necessary

Yes

Life-threatening brady or tachydysrrhythmia?

Yes → Treat according to appropriate protocol

No

- Consider etiology of shock state
- Give 500cc NS bolus IV/IO and reassess

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

Repeat 500cc boluses, reassessing for pulmonary edema, up to 2 liters total or until goal of SBP > 90 mmHg and signs adequate perfusion

For ongoing hypotension, poor perfusion or pulmonary edema, contact base for dopamine drip

If patient at risk for adrenal insufficiency, see Adrenal Insufficiency protocol

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

Adrenal Insufficiency
Patients at risk include:

- Chronic steroid use
- Addison's disease
- Congenital adrenal hyperplasia
- Other patients identified as such by family, medical record, or physician note

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

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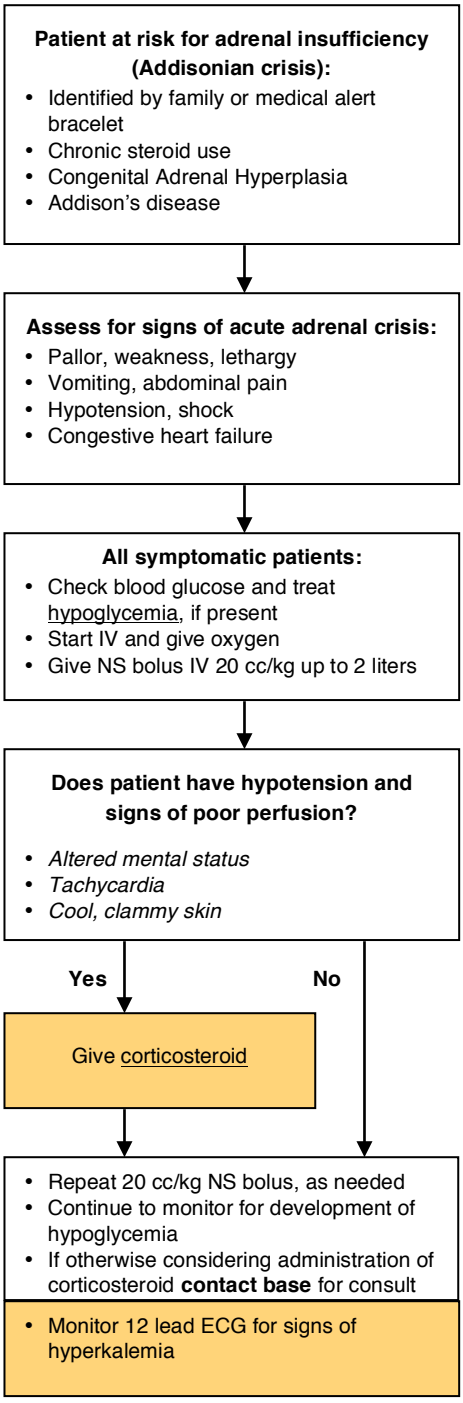
4061 ADRENAL INSUFFICIENCY PROTOCOL



EMT	AEMT
EMT-I	Paramedic

Corticosteroid Administration

- **Adult** (Age 12 years or older):
  - Methylprednisolone 125 mg IV/IM x 1
- **Pediatric** (age < 12 years):
  - Methylprednisolone 2 mg/kg IV/IM up to a maximum dose of 125 mg x 1

- If the patient is confirmed to have a disease (such as congenital adrenal hyperplasia or chronic use of systemic steroids) that could lead to acute adrenal insufficiency or Addisonian crisis, then the administration of steroids may be life-saving and necessary for reversing shock or preventing cardiovascular collapse
- Patients at risk for adrenal insufficiency may develop Addisonian crisis when under physiologic stress which would not lead to cardiovascular collapse in normal patients. Such triggers may include trauma, dehydration, infection, myocardial ischemia, etc.
- If no corticosteroid is available during transport, notify receiving hospital of need for immediate corticosteroid upon arrival
- Under Chapter 2 Rule: specialized prescription medications to address an acute crisis may be given by all levels with a direct VO, given the route of administration is within the scope of the provider. This applies to giving hydrocortisone for adrenal crisis, for instance if a patient or family member has this medication available on scene. Contact base for direct verbal order

4070 PSYCHIATRIC/BEHAVIORAL PATIENT PROTOCOL

EMT	AEMT
EMT-I	Paramedic

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.

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.: symphathomimetic?
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

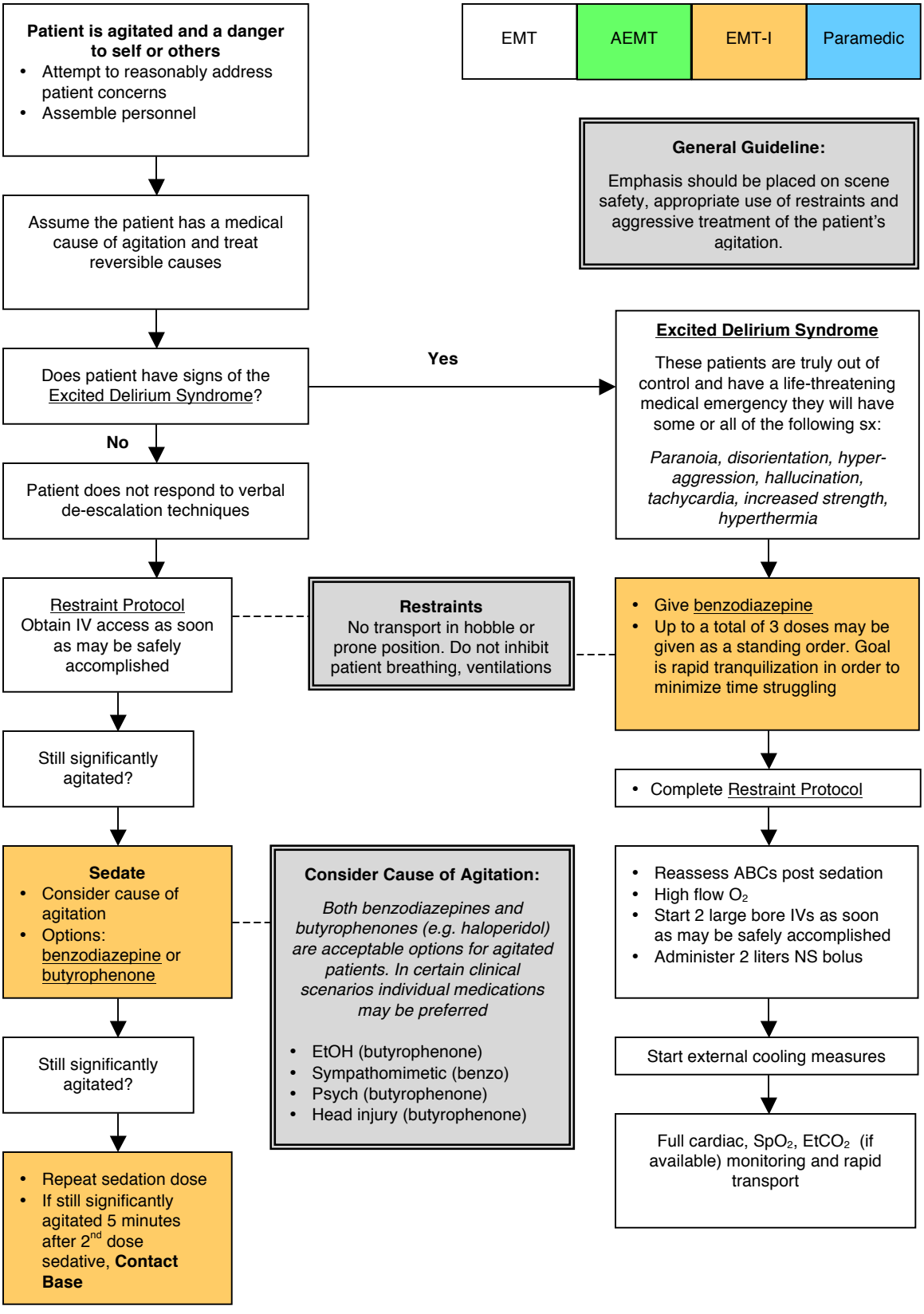
intoxicated, or otherwise lacking decision making capacity, and who refuses treatment or transport, *and* law enforcement are not willing to transport patient, then EMS should contact agency Base Station for medical consult with **BASE PHYSICIAN**.

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, AEMT, 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



Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

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

Overview:

- EMS providers called to a possible prehospital childbirth should determine if there is enough time to transport expectant mother to hospital or if delivery is imminent
- If imminent, **stay on scene** and immediately prepare to assist with the delivery

ABCs
O_2 15 liters via NRB
IV access

EMT	AEMT	EMT-I	Paramedic

Obtain obstetrical history (see adjacent)

Specific Information Needed:

- Obstetrical history:
  - Number of pregancies (gravida)
  - Live births (PARA)
  - Expected delivery date
  - Length of previous labors
  - Narcotic use in past 4 hours

If suspected imminent childbirth:

- Allow patient to remain in position of comfort
- Visualize perineum
- Determine if there is time to transport

Imminent Delivery

Delivery is imminent if there is crowning or bulging of perineum

Delivery not imminent

- Transport in position of comfort, preferably on left side to patient's requested hospital if time and conditions allow
- Monitor for progression to imminent delivery

Emergency Childbirth Procedure

- If there is a prolapsed umbilical cord or apparent breech presentation, go to obstetrical complications protocol and initiate immediate transport
- For otherwise uncomplicated delivery:
- Position mother supine on flat surface, if possible
- Do not attempt to impair or delay delivery
- Support and control delivery of head as it emerges
- Protect perineum with gentle hand pressure
- Check for cord around neck, gently remove from around neck, if present
- Suction mouth, then nose of infant as soon as head is delivered
- If delivery not progressing, baby is "stuck", see obstetrical complications protocol and begin immediate transport
- As shoulders emerge, gently guide head and neck downward to deliver anterior shoulder. Support and gently lift head and neck to deliver posterior shoulder
- Rest of infant should deliver with passive participation – get a firm hold on baby
- Keep newborn at level of mother's vagina until cord stops pulsating and is double clamped

Critical Thinking:

- Normal pregnancy is accompanied by higher heart rates and lower blood pressures
- Shock will be manifested by signs of poor perfusion
- Labor can take 8-12 hours, but as little as 5 minutes if high PARA
- The higher the PARA, the shorter the labor is likely to be
- High risk factors include: no prenatal care, drug use, teenage pregnancy, DM, htn, cardiac disease, prior breech or C section, preeclampsia, twins
- Note color of amniotic fluid for meconium staining

Postpartum Care Infant

- Suction mouth and nose only if signs of obstruction by secretions
- Respirations should begin within 15 seconds after stimulating reflexes. If not, begin artificial ventilations at 30-40 breaths/min
- If apneic, cyanotic or HR < 100, begin neonatal resuscitation
- Dry baby and wrap in warm blanket
- After umbilical cord stops pulsating, double clamp 6" from infant abdominal wall and cut between clamps with sterile scalpel. If no sterile cutting instrument available, lay infant on mother's abdomen and do not cut clamped cord
- Document 1 and 5 minute APGAR scores

Postpartum Care Mother

- Placenta should deliver in 20-30 minutes. If delivered, collect in plastic bag and bring to hospital. Do not pull cord to facilitate placenta delivery and do not delay transport awaiting placenta delivery
- If the perineum is torn and bleeding, apply direct pressure with sanitary pads
- Postpartum hemorrhage – see obstetrical complications protocol
- Initiate transport once delivery of child is complete and mother can tolerate movement

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4081 OBSTETRICAL COMPLICATIONS

EMT	AEMT	EMT-I	Paramedic

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 by 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

3rd Trimester Bleeding (6-8 months)

- High flow O_2 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

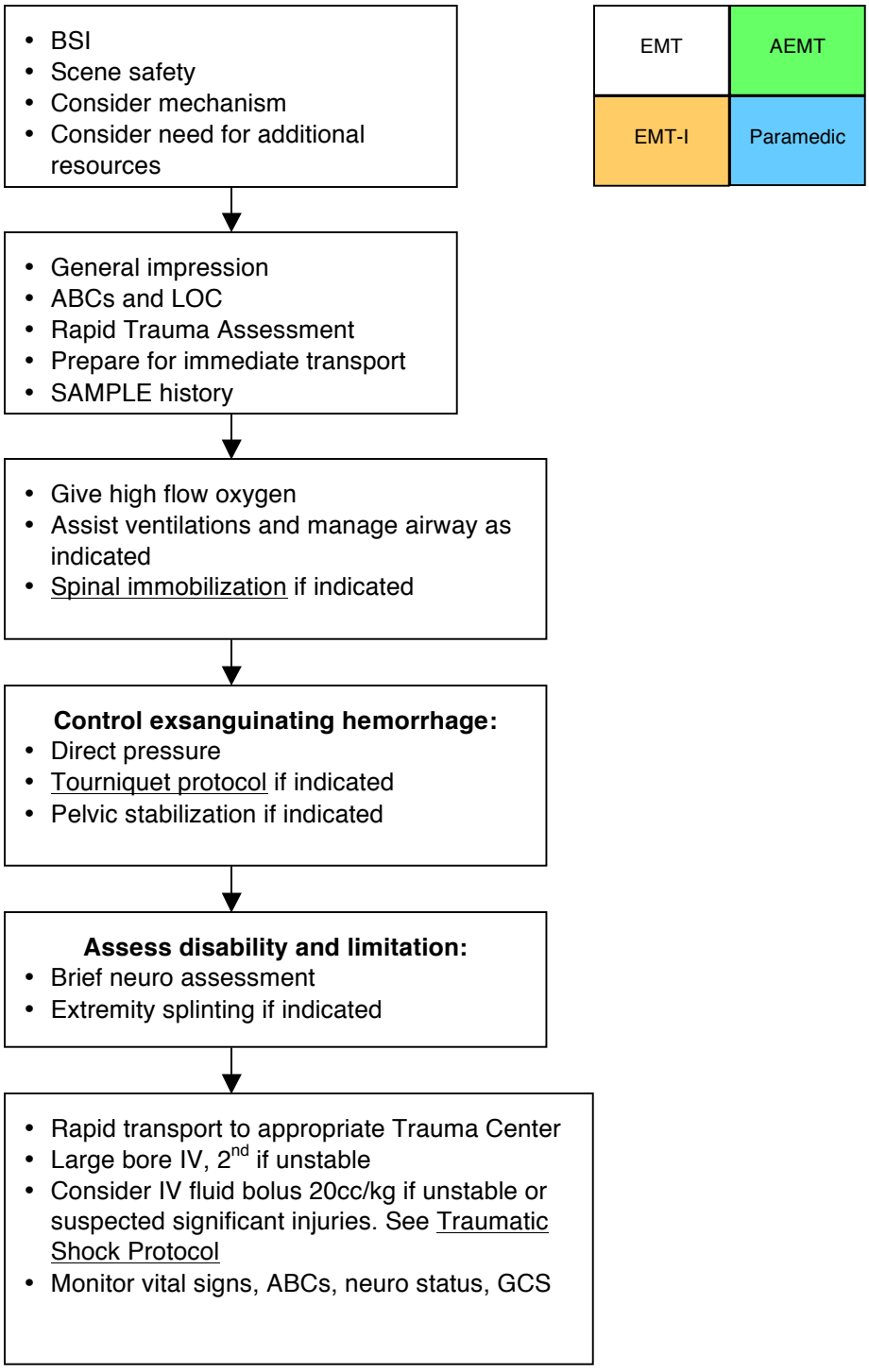
Eclampsia/Toxemia

- High flow O_2 via NRB, IV access
- SBP > 140, DBP > 90, peripheral edema, headache, seizure
- Transport position of comfort
- Treat seizures with Magnesium Sulfate 2 gm slow IV push followed by 4 gm IV over 15-30 minutes (total 6 gm)
- See seizure protocol

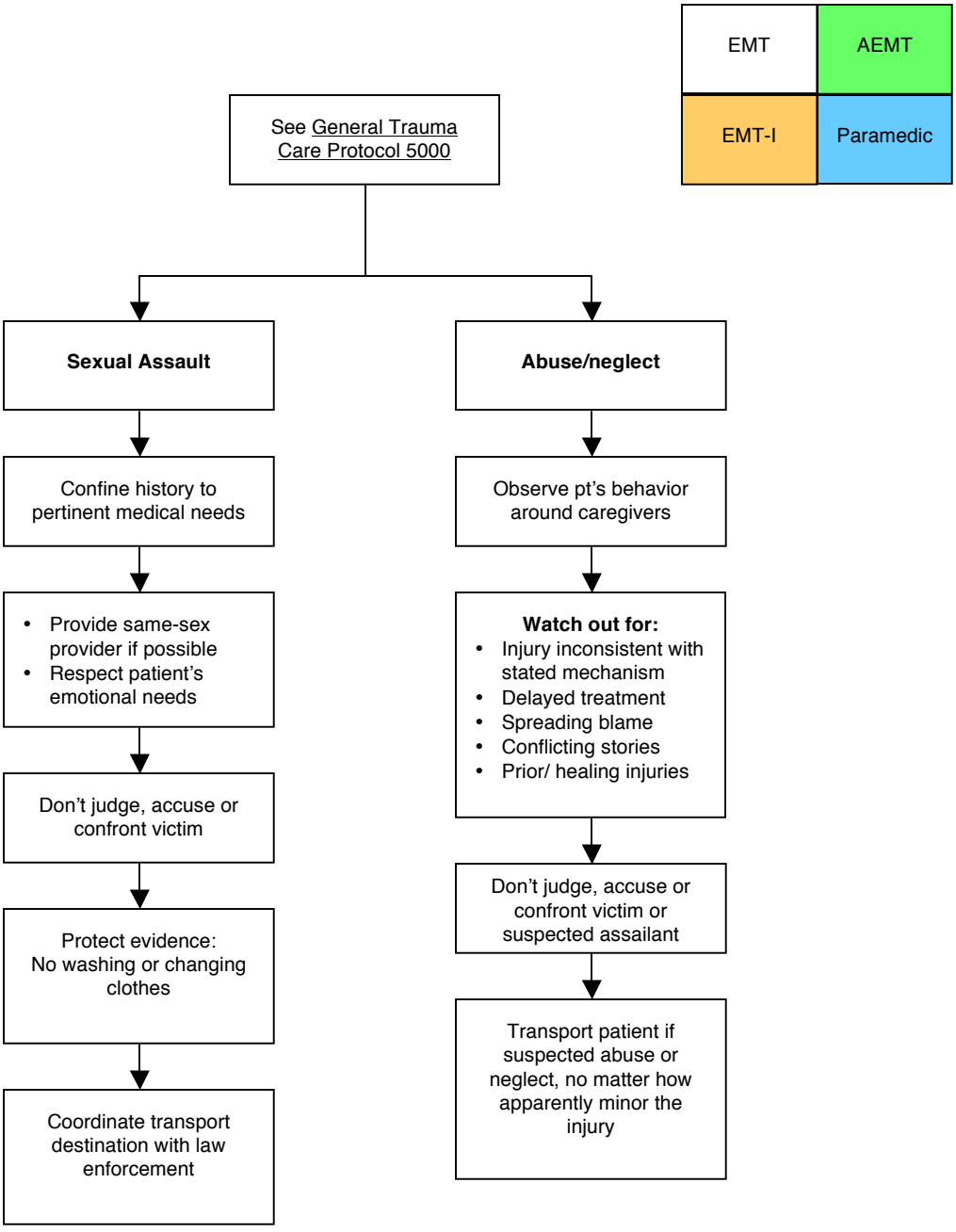
Shoulder Dystocia

- 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



5006 TRAUMA IN PREGNANCY

EMT	AEMT
EMT-I	Paramedic

See General Trauma Care Protocol 5000

Pregnant Trauma (EGA < 20 weeks)

- Priority is mother.
- Transport all patients with any thoracic, abdominal, pelvic injury or complaint.

Pregnant Trauma (EGA ≥ 20 weeks)

- Priority is mother.
- Transport all patients.
- Assure hospital is aware of pregnancy and EGA

Patients with any thoracic, abdominal, or pelvic complaint or injury may require prolonged fetal monitoring in hospital, even if asymptomatic at time of evaluation, and even for seemingly minor mechanism

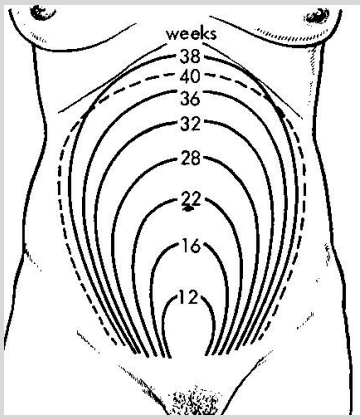
- Avoid supine position:
  - Place in left lateral recumbent position if possible
  - If immobilized tilt backboard 15 to 30 degrees to the left side

Interpret VS with caution. Pregnant patient has:

- *Increased heart rate*
- *Decreased blood pressure*
- *Increased blood volume*

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

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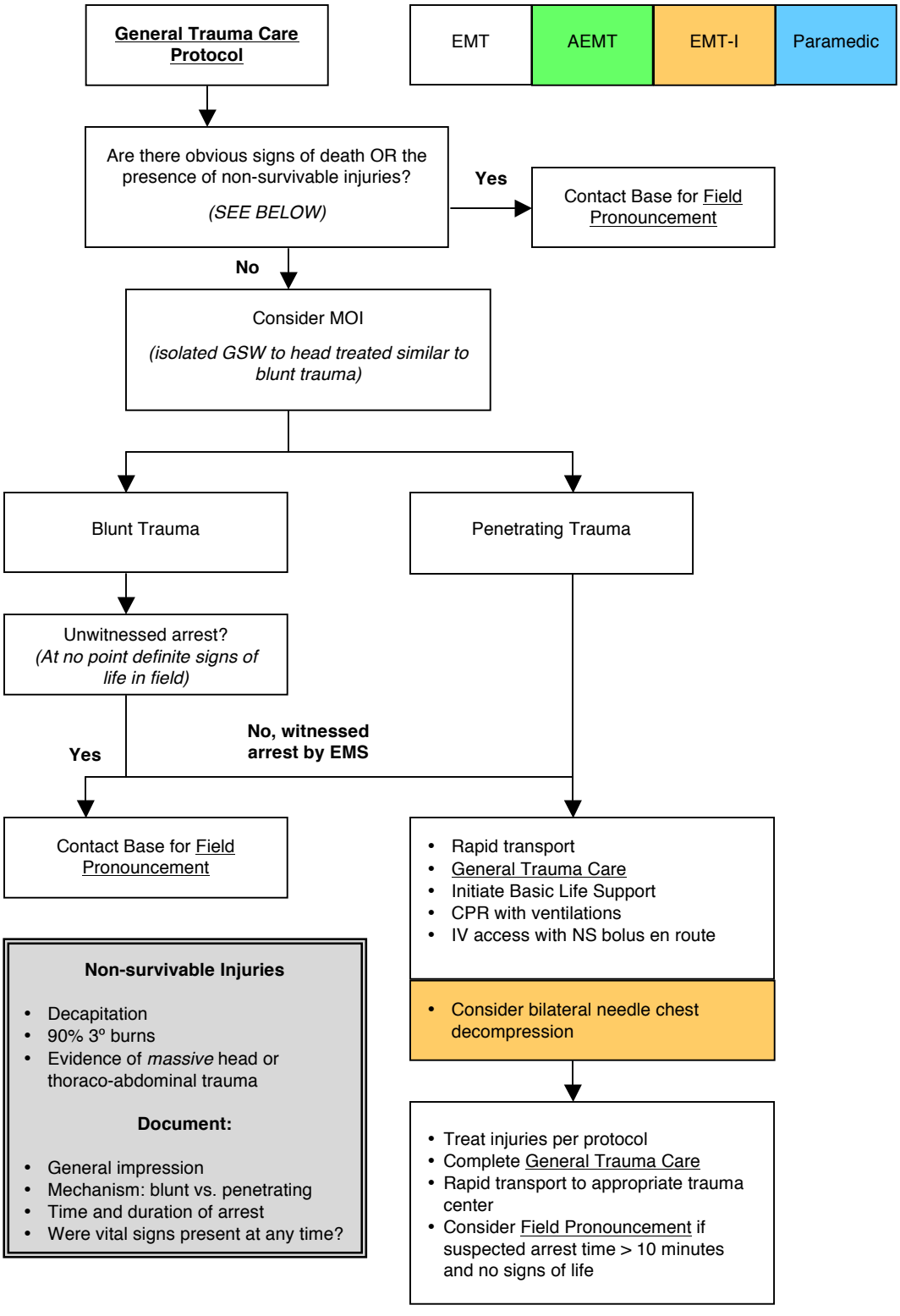
5010 ADULT (AGE ≥ 12 YEARS) TRAUMATIC PULSELESS ARREST



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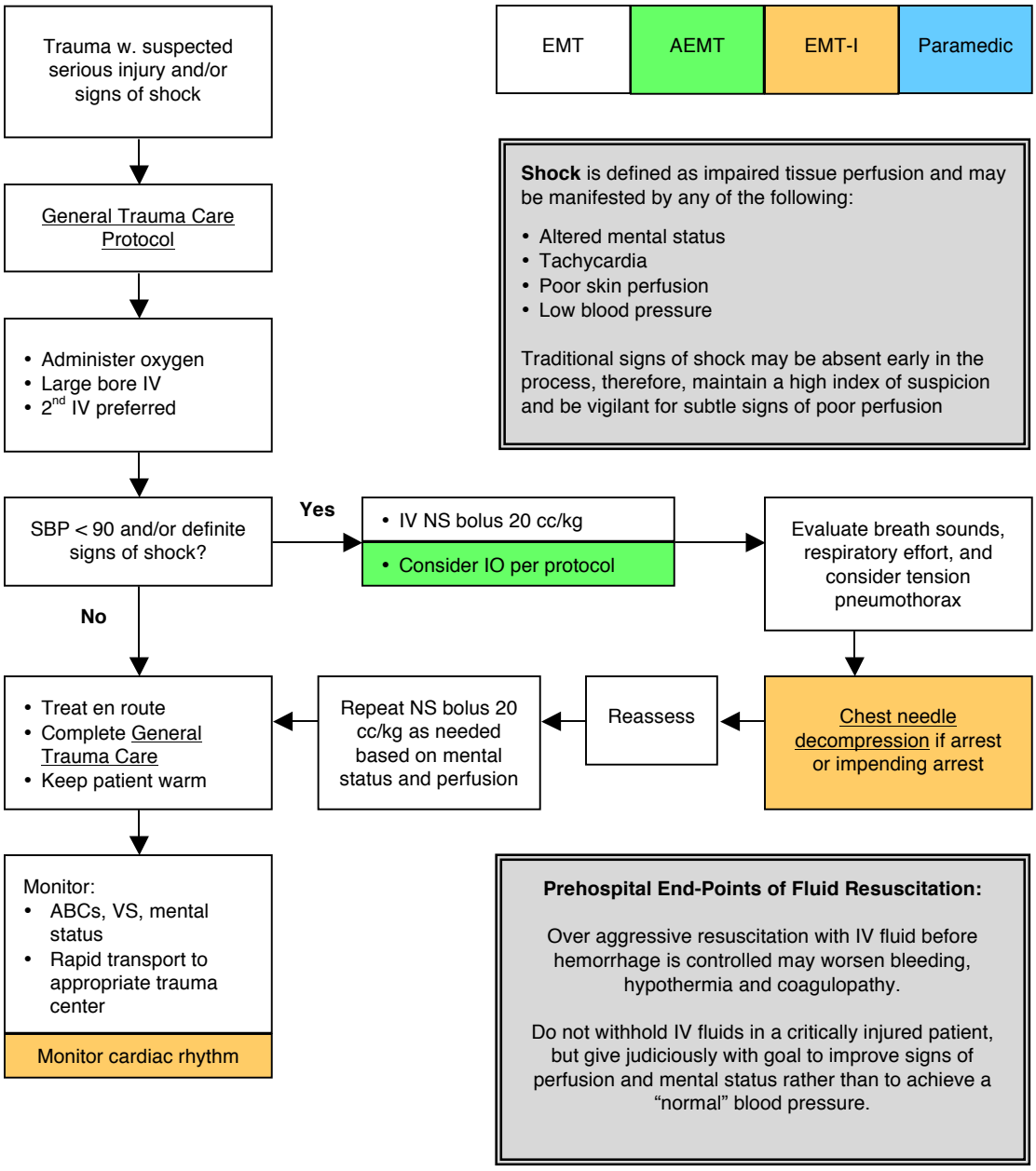
5015 ADULT (AGE ≥ 12 YEARS) TRAUMATIC SHOCK PROTOCOL



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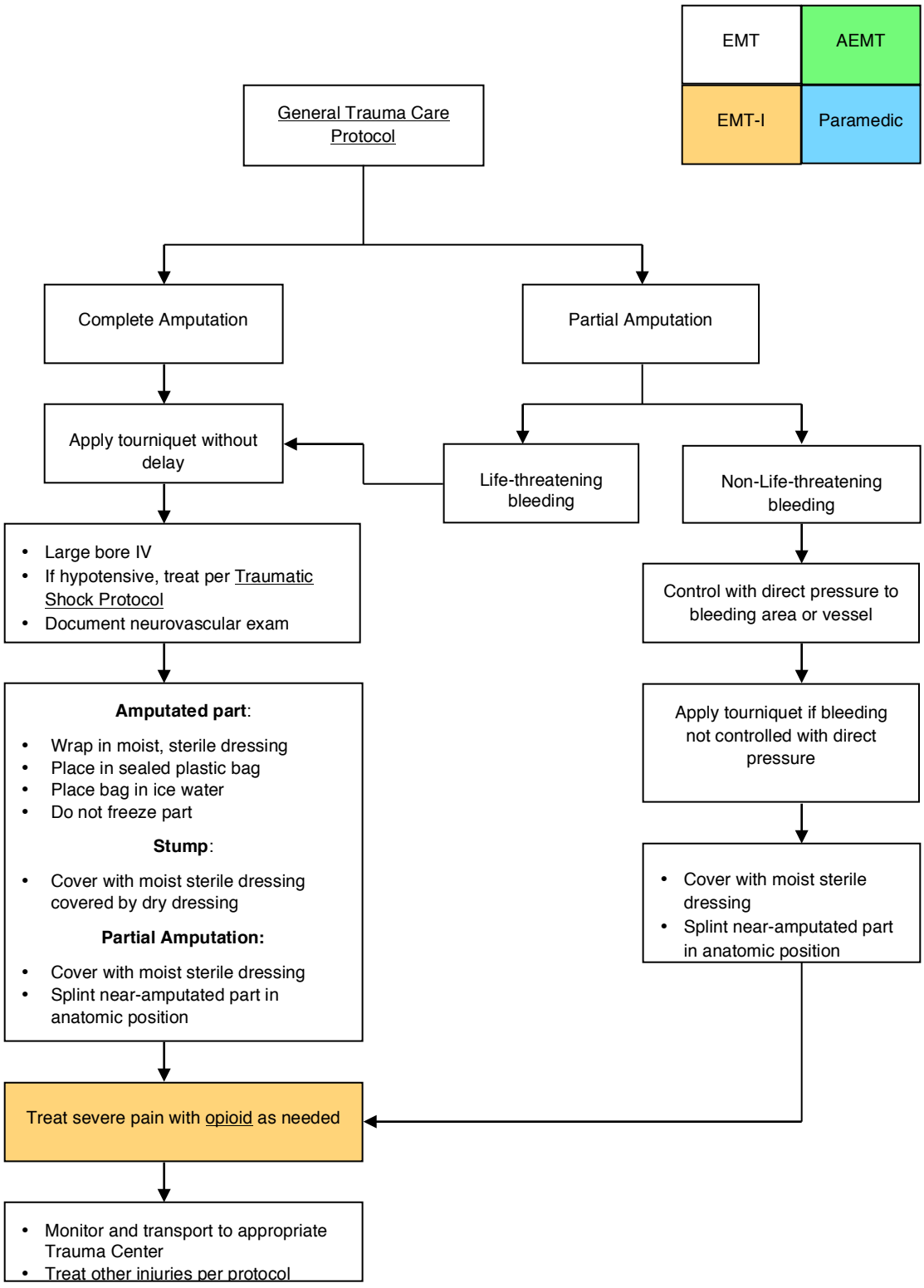
5020 AMPUTATIONS



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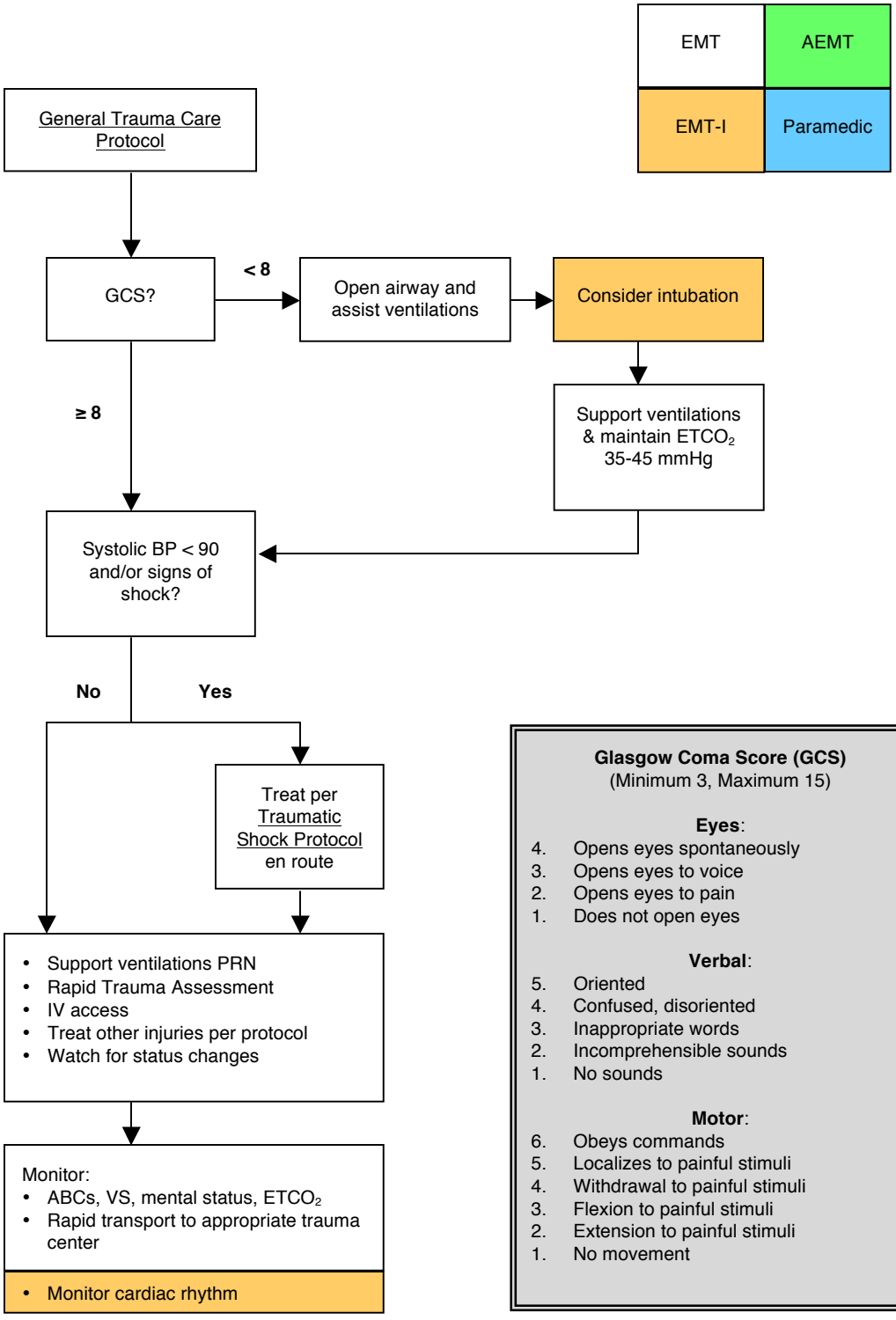
5030 HEAD TRAUMA PROTOCOL



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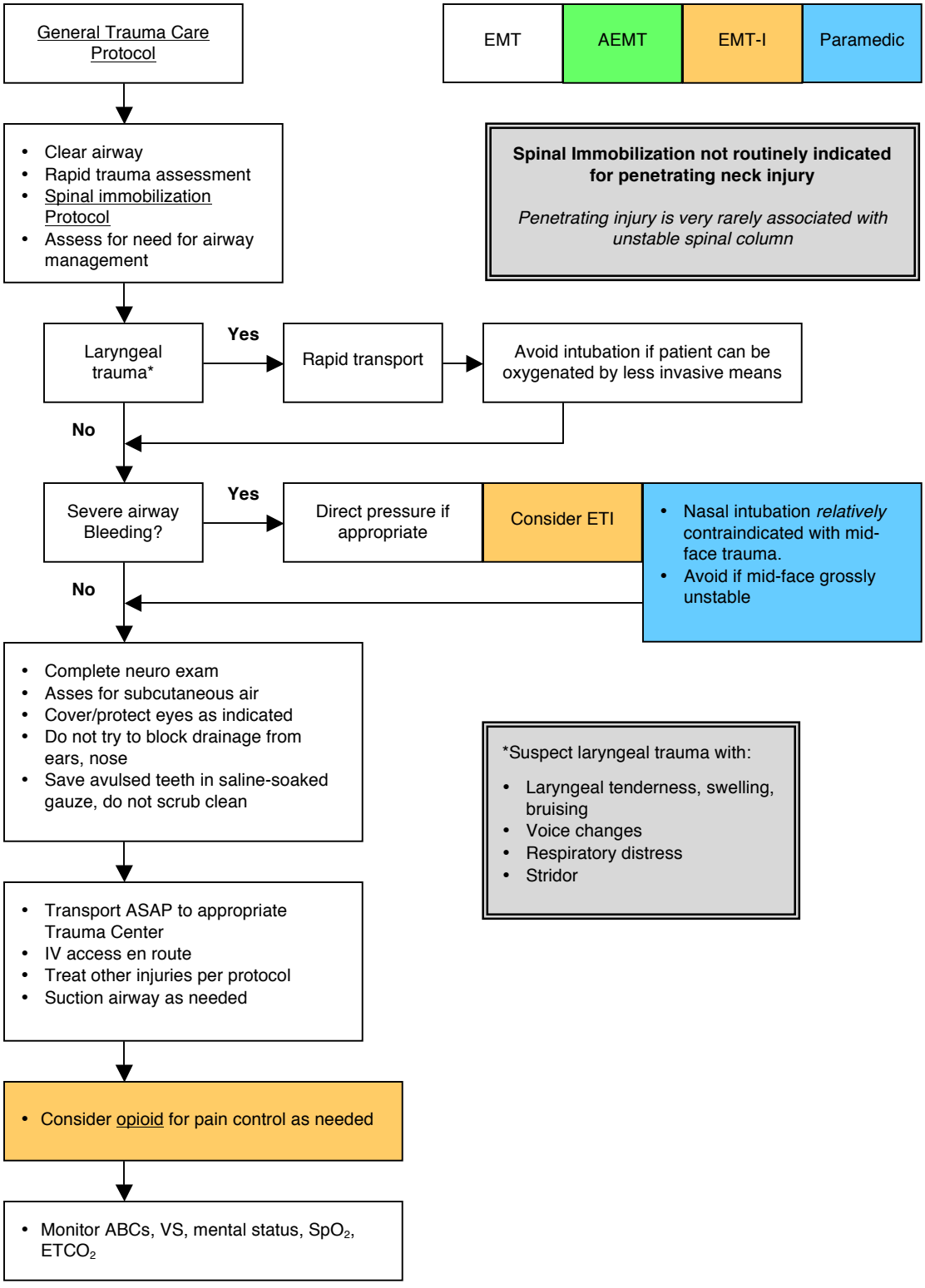
5040 FACE AND NECK TRAUMA



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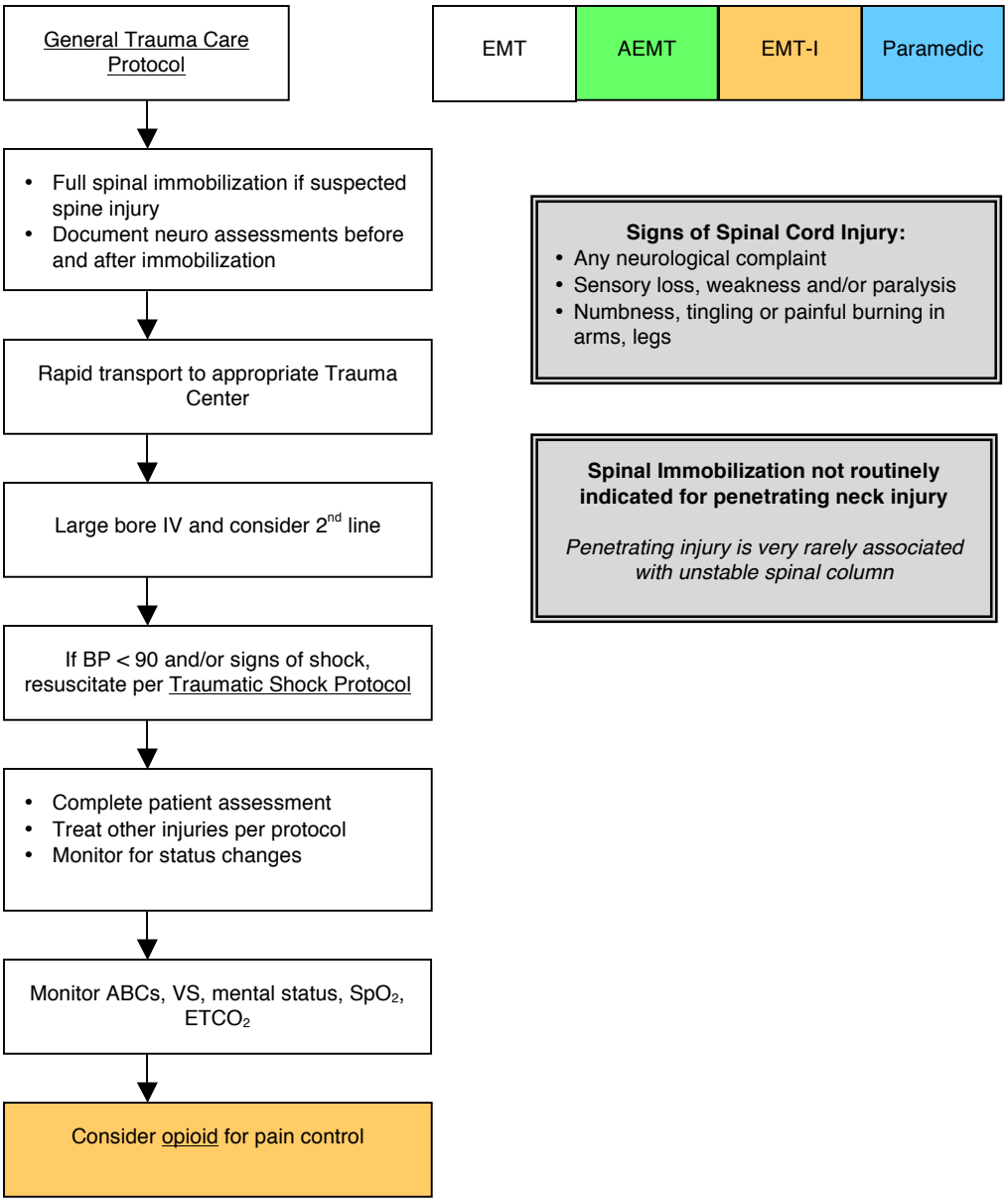
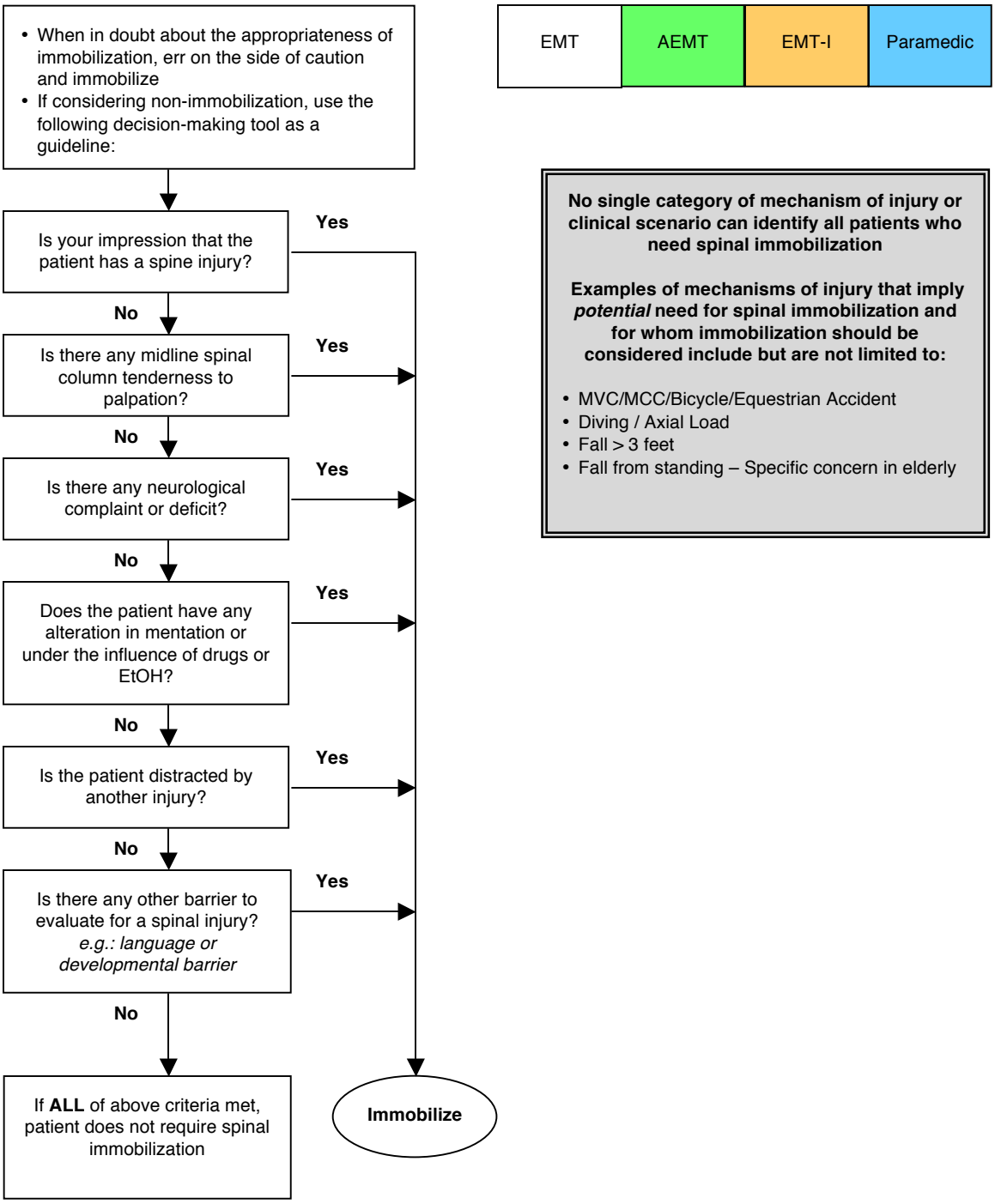
5050 ADULT SPINAL TRAUMA



5055 ADULT (AGE ≥ 12 YEARS) SPINAL IMMOBILIZATION PROTOCOL



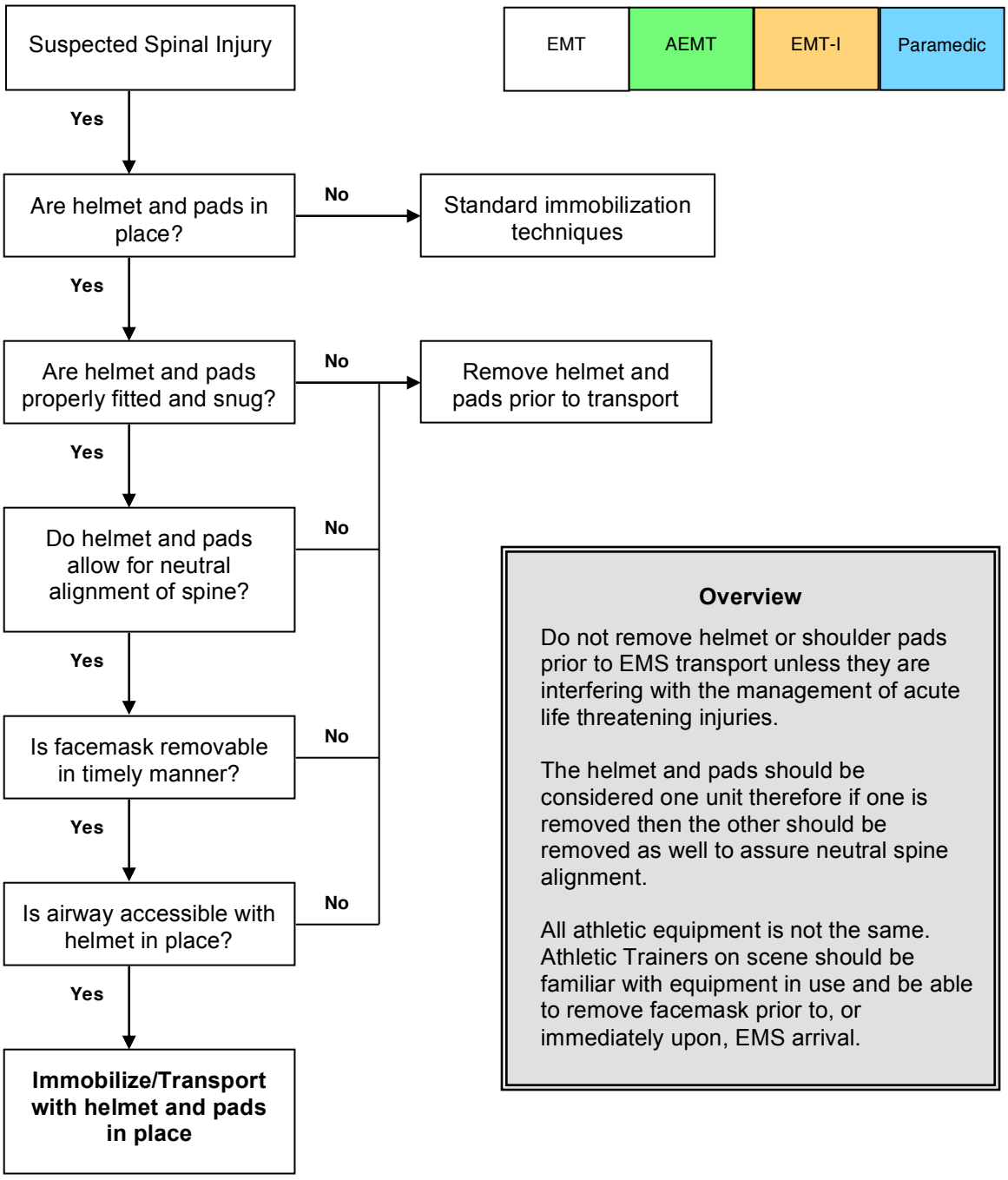
EMT	AEMT	EMT-I	Paramedic

No single category of mechanism of injury or clinical scenario can identify all patients who need spinal immobilization

Examples of mechanisms of injury that imply *potential* need for spinal immobilization and for whom immobilization should be considered include but are not limited to:

- MVC/MCC/Bicycle/Equestrian Accident
- Diving / Axial Load
- Fall > 3 feet
- Fall from standing – Specific concern in elderly

5056 SUSPECTED SPINAL INJURY WITH PROTECTIVE ATHLETIC EQUIPMENT IN PLACE



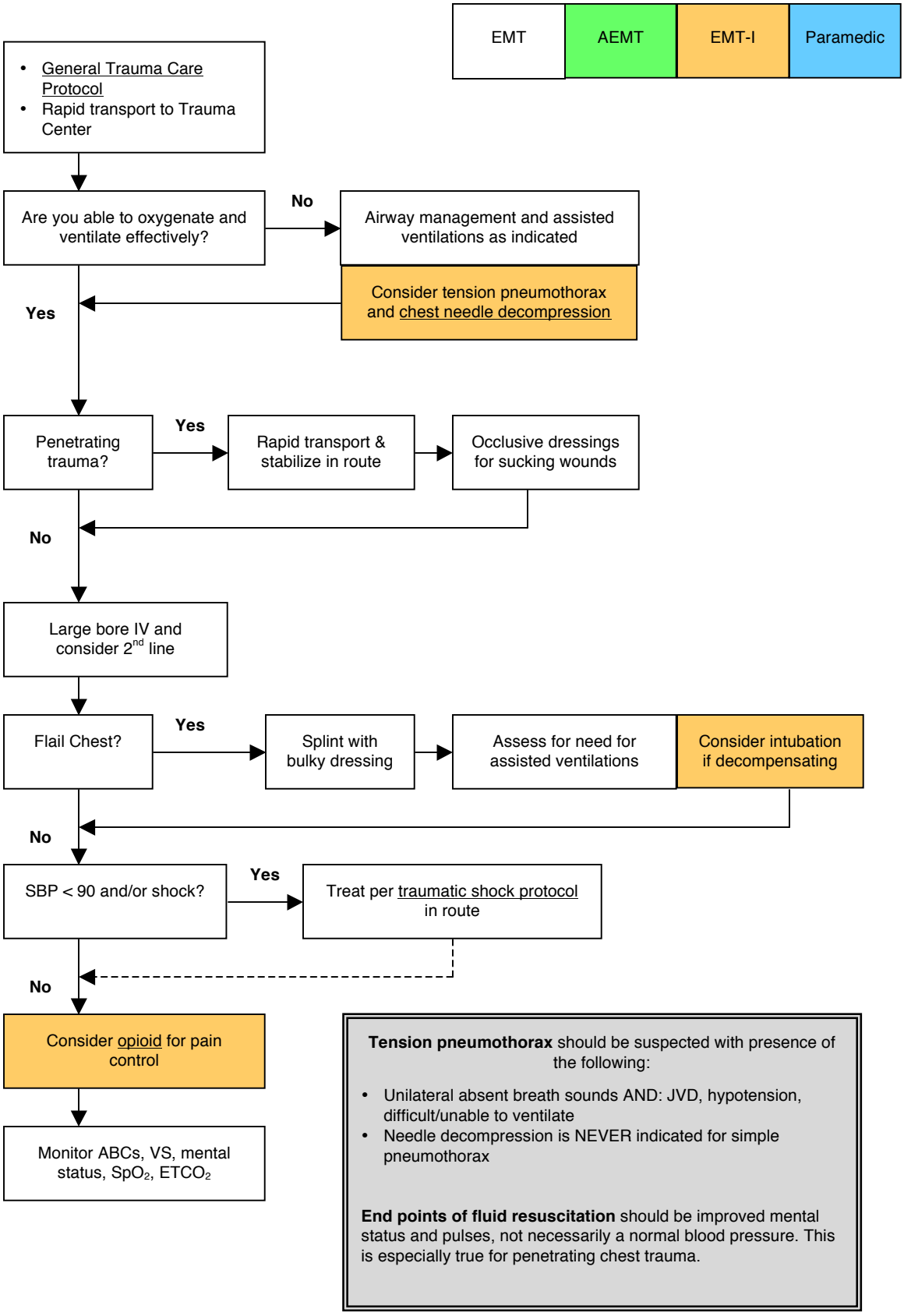
Overview

Do not remove helmet or shoulder pads prior to EMS transport unless they are interfering with the management of acute life threatening injuries.

The helmet and pads should be considered one unit therefore if one is removed then the other should be removed as well to assure neutral spine alignment.

All athletic equipment is not the same. Athletic Trainers on scene should be familiar with equipment in use and be able to remove facemask prior to, or immediately upon, EMS arrival.

5060 CHEST TRAUMA



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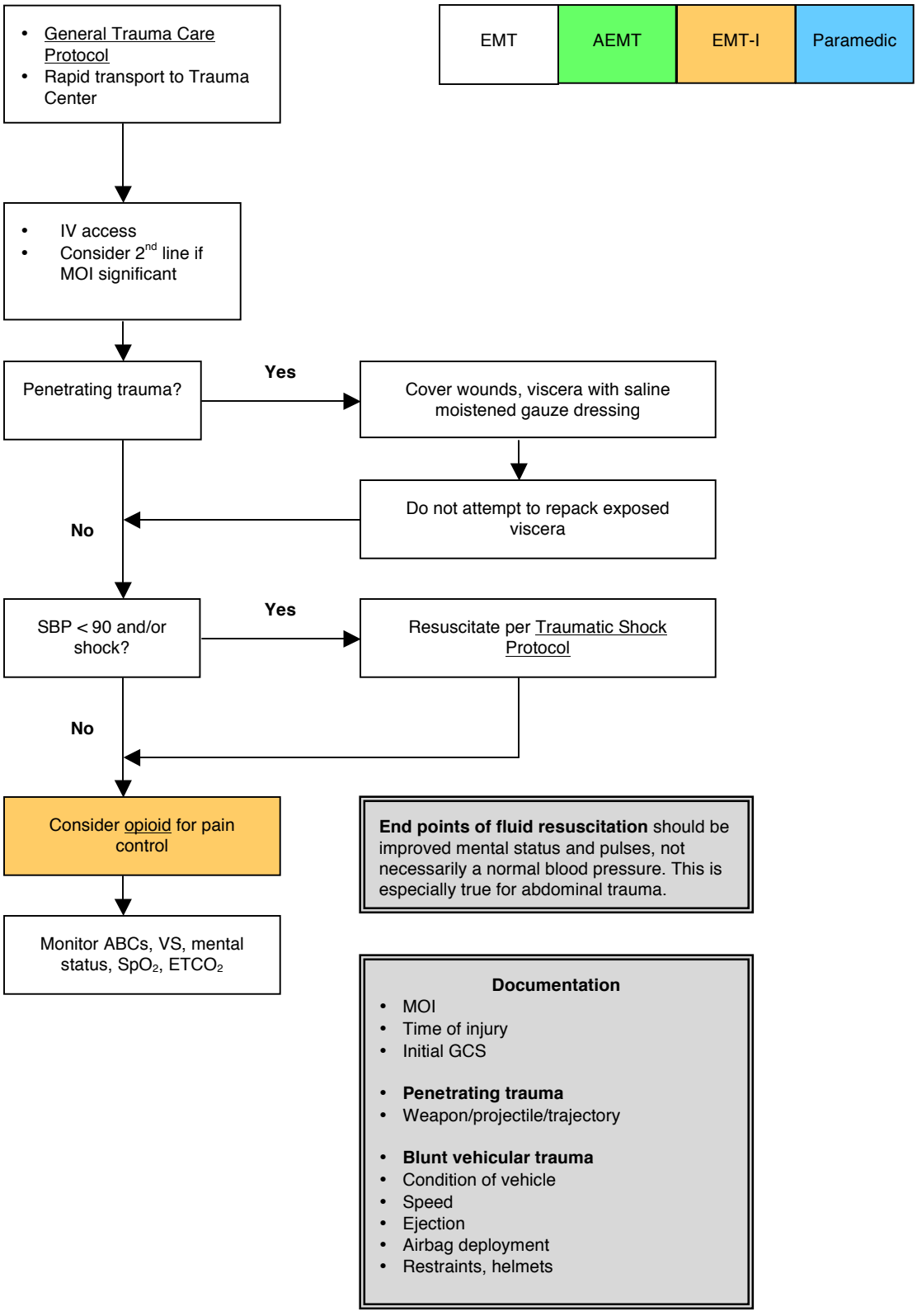
5070 ABDOMINAL TRAUMA



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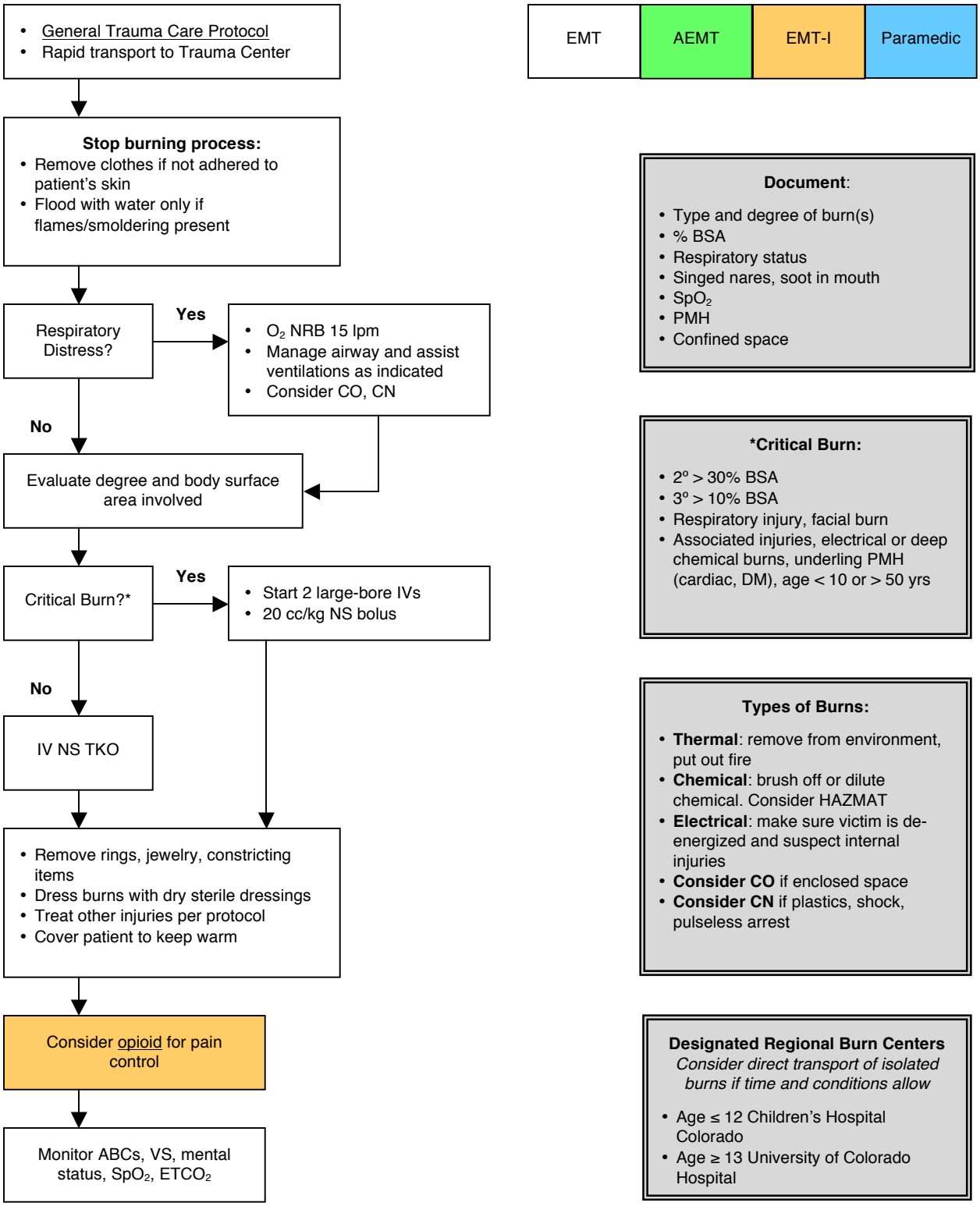
5090 BURNS


EMT
AEMT
EMT-I
Paramedic
• General Trauma Care Protocol
• Rapid transport to Trauma Center
Stop burning process:
• Remove clothes if not adhered to patient's skin
• Flood with water only if flames/smoldering present
Respiratory Distress?
Yes
• O_2 NRB 15 lpm
• Manage airway and assist ventilations as indicated
• Consider CO, CN
No
Evaluate degree and body surface area involved
Critical Burn?*
Yes
• Start 2 large-bore IVs
• 20 cc/kg NS bolus
No
IV NS TKO
• Remove rings, jewelry, constricting items
• Dress burns with dry sterile dressings
• Treat other injuries per protocol
• Cover patient to keep warm
Consider opioid for pain control
Monitor ABCs, VS, mental status, SpO_2, $ETCO_2$
Document:
• Type and degree of burn(s)
• % BSA
• Respiratory status
• Singed nares, soot in mouth
• SpO_2
• PMH
• Confined space
*Critical Burn:
• 2° > 30% BSA
• 3° > 10% BSA
• Respiratory injury, facial burn
• Associated injuries, electrical or deep chemical burns, underling 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

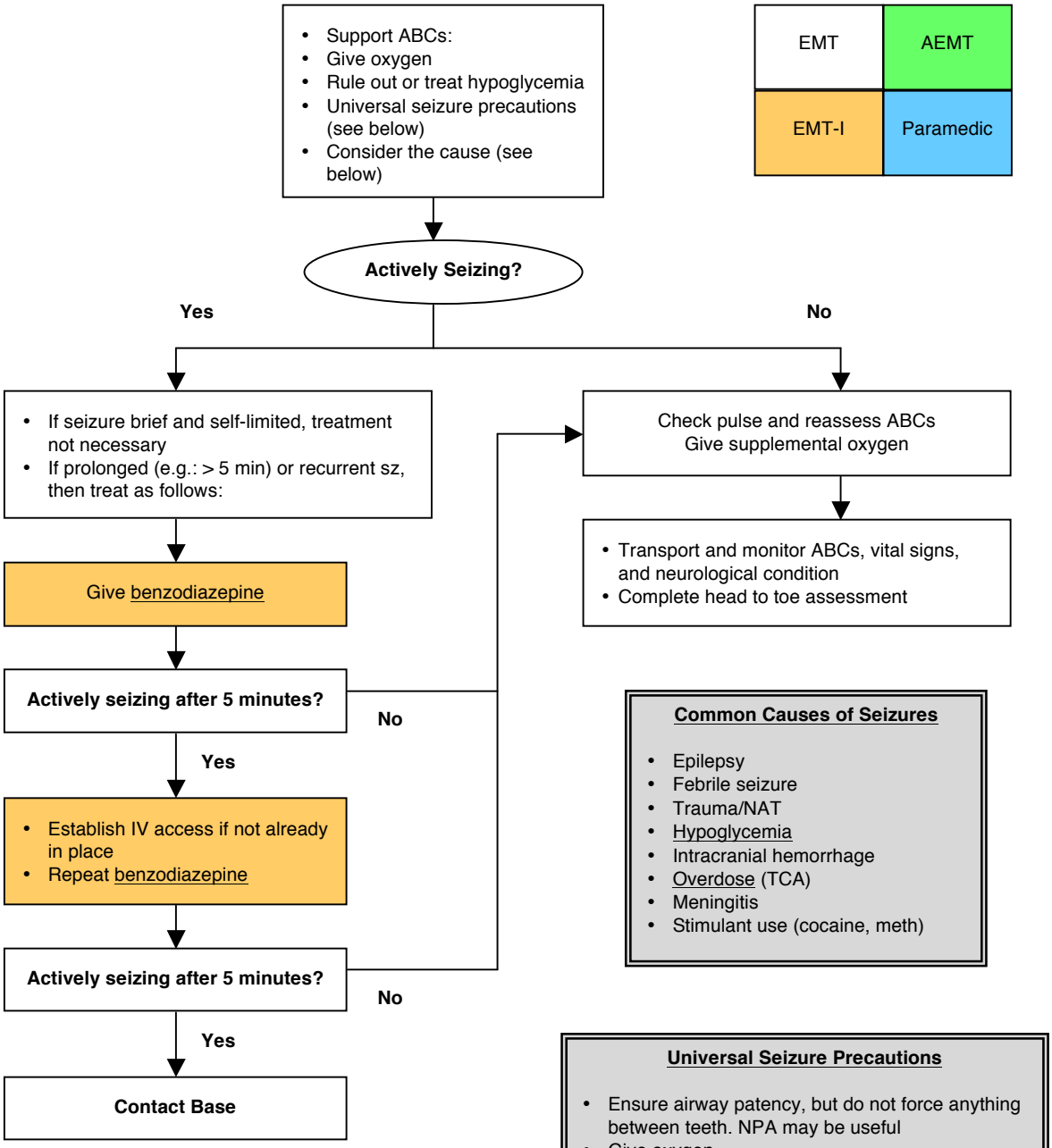
General Guideline:

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)



Common Causes of Seizures

- Epilepsy
- Febrile seizure
- Trauma/NAT
- Hypoglycemia
- Intracranial hemorrhage
- Overdose (TCA)
- Meningitis
- Stimulant use (cocaine, meth)

Universal Seizure Precautions

- Ensure airway patency, but do not force anything between teeth. NPA may be useful
- Give oxygen
- Suction as needed
- Protect patient from injury
- Check pulse immediately after seizure stops
- Keep patient on side

Document:

- Document: Seizure history: onset, time interval, previous seizures, type of seizure
- Obtain medical history: head trauma, diabetes, substance abuse, medications, compliance with anticonvulsants, pregnancy

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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 (≤ 1 month old)

A. 1 cycle of CPR = 3:1 chest compressions: breaths.

Infant and Child (1 month to 12 years old)

A. 1 cycle of CPR = 15:2 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

   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: $ETCO_2$
   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

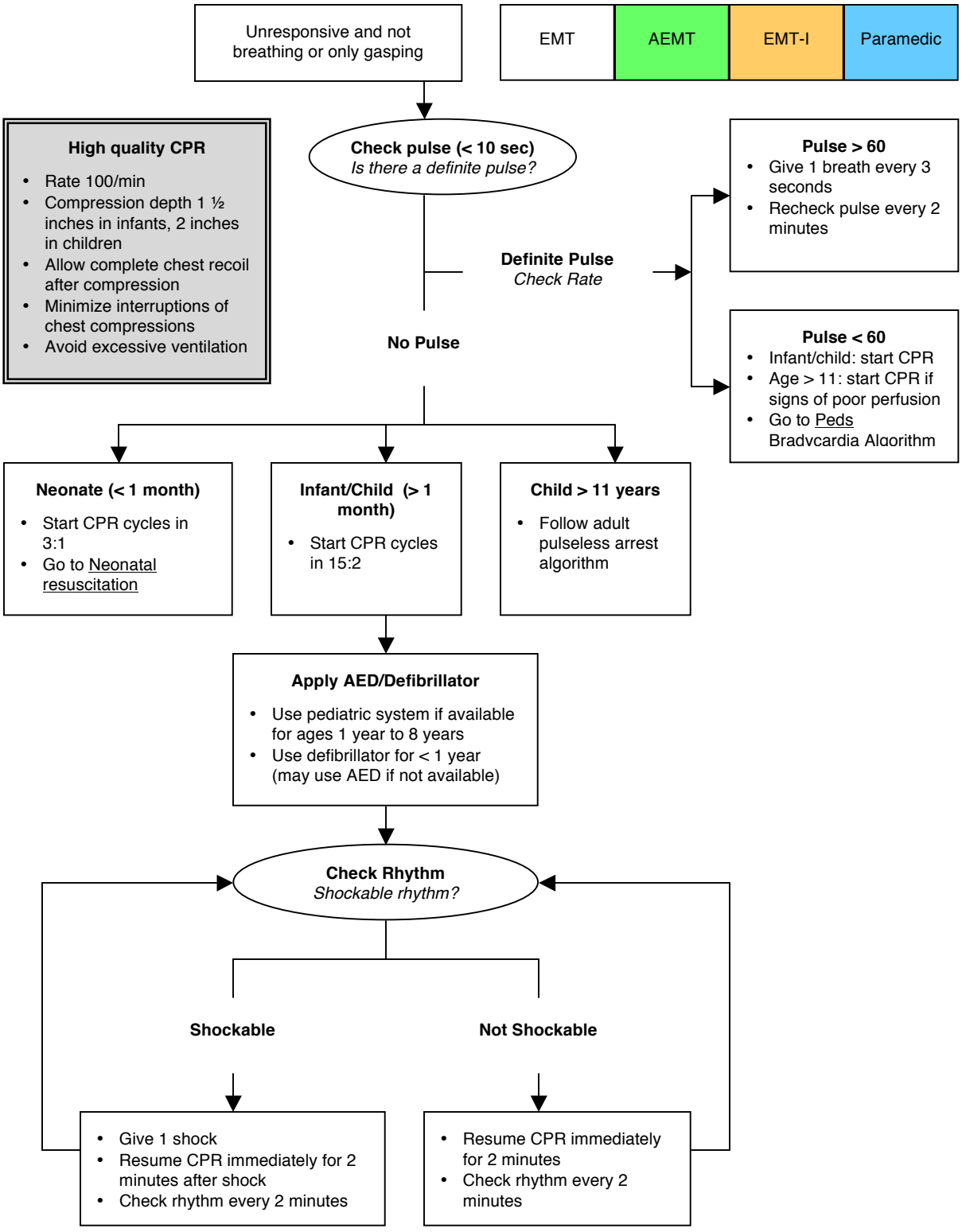
Special Notes:

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

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



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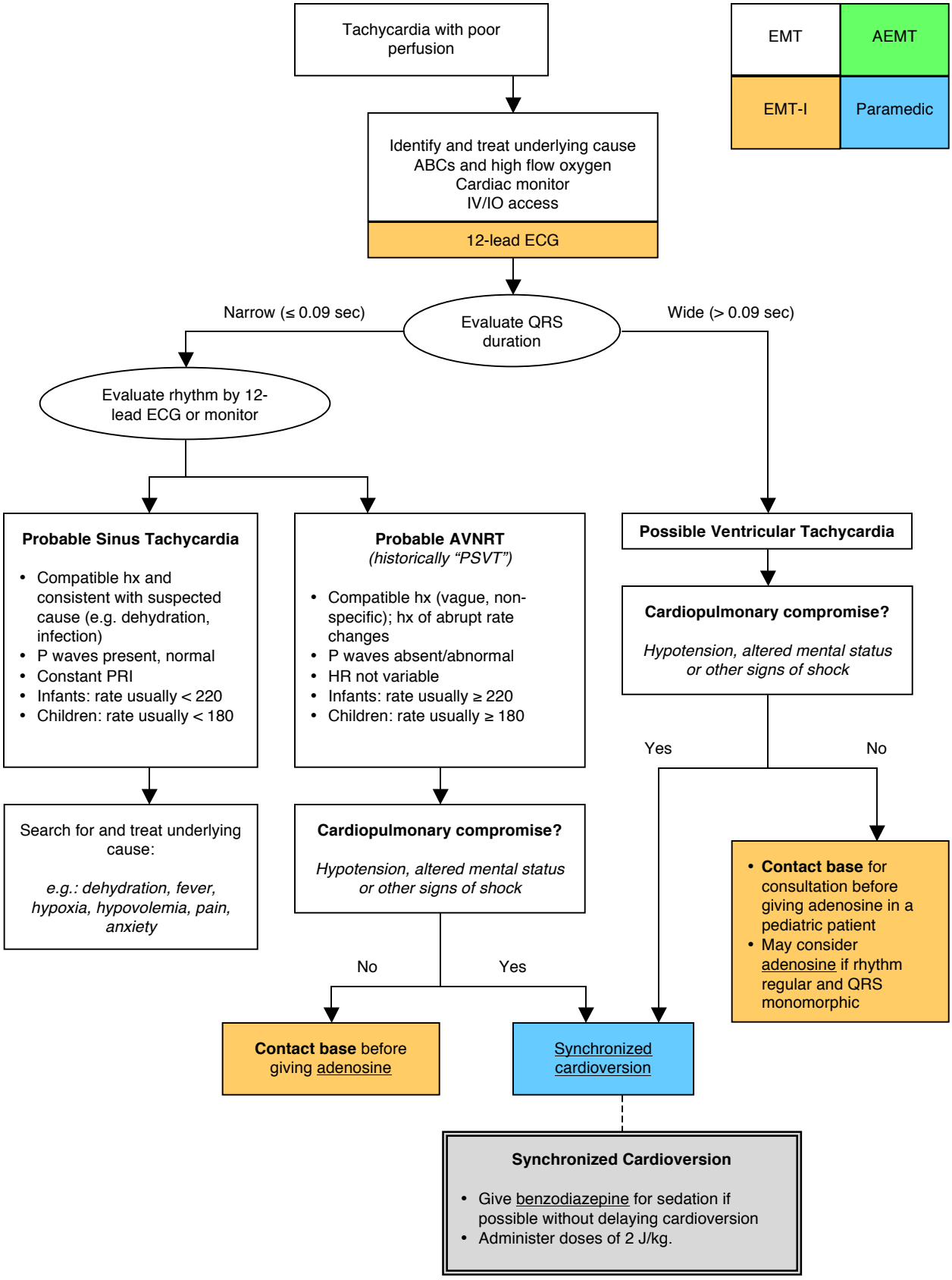
6020 PEDIATRIC (AGE < 12 YEARS) TACHYCARDIA WITH POOR PERFUSION



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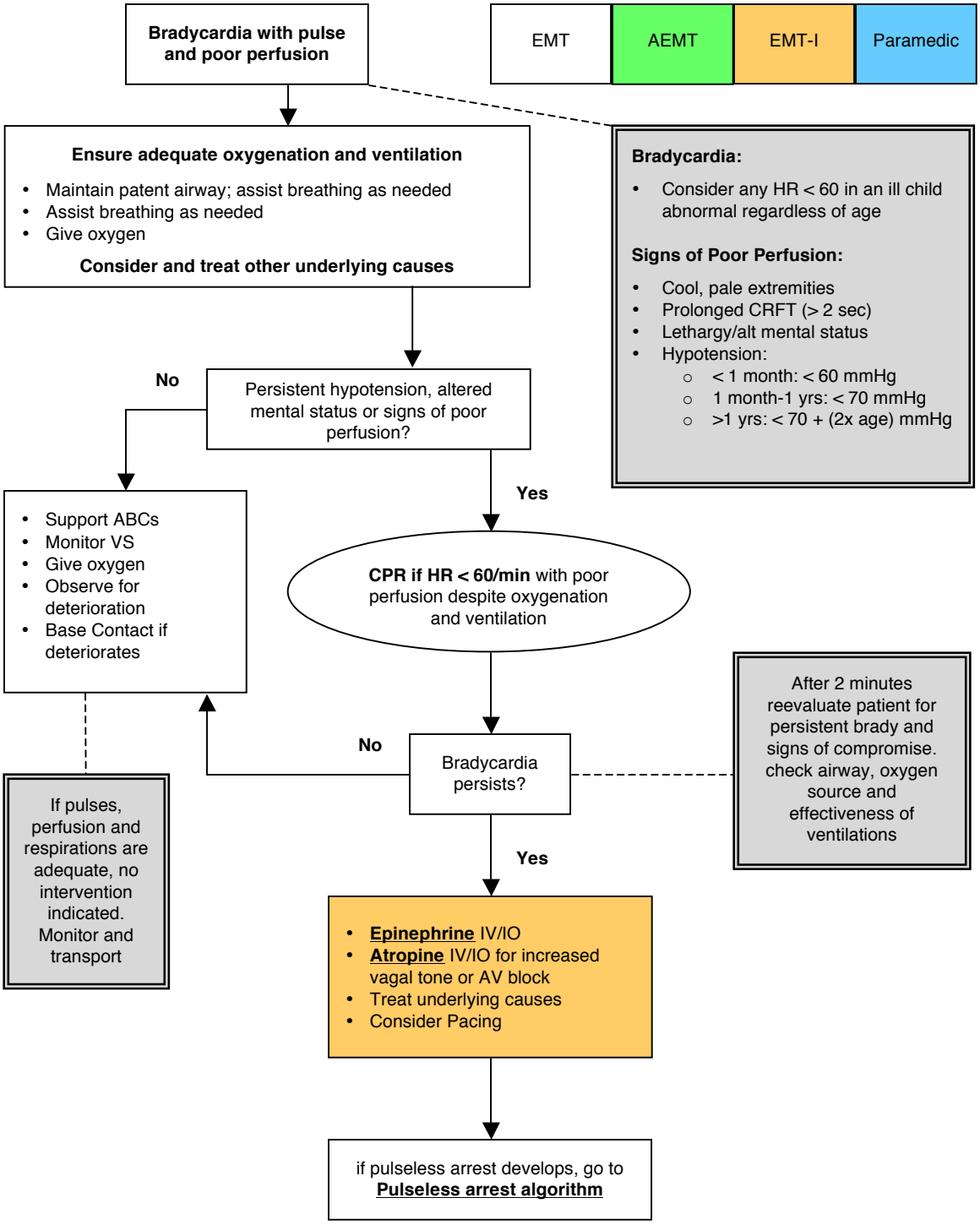
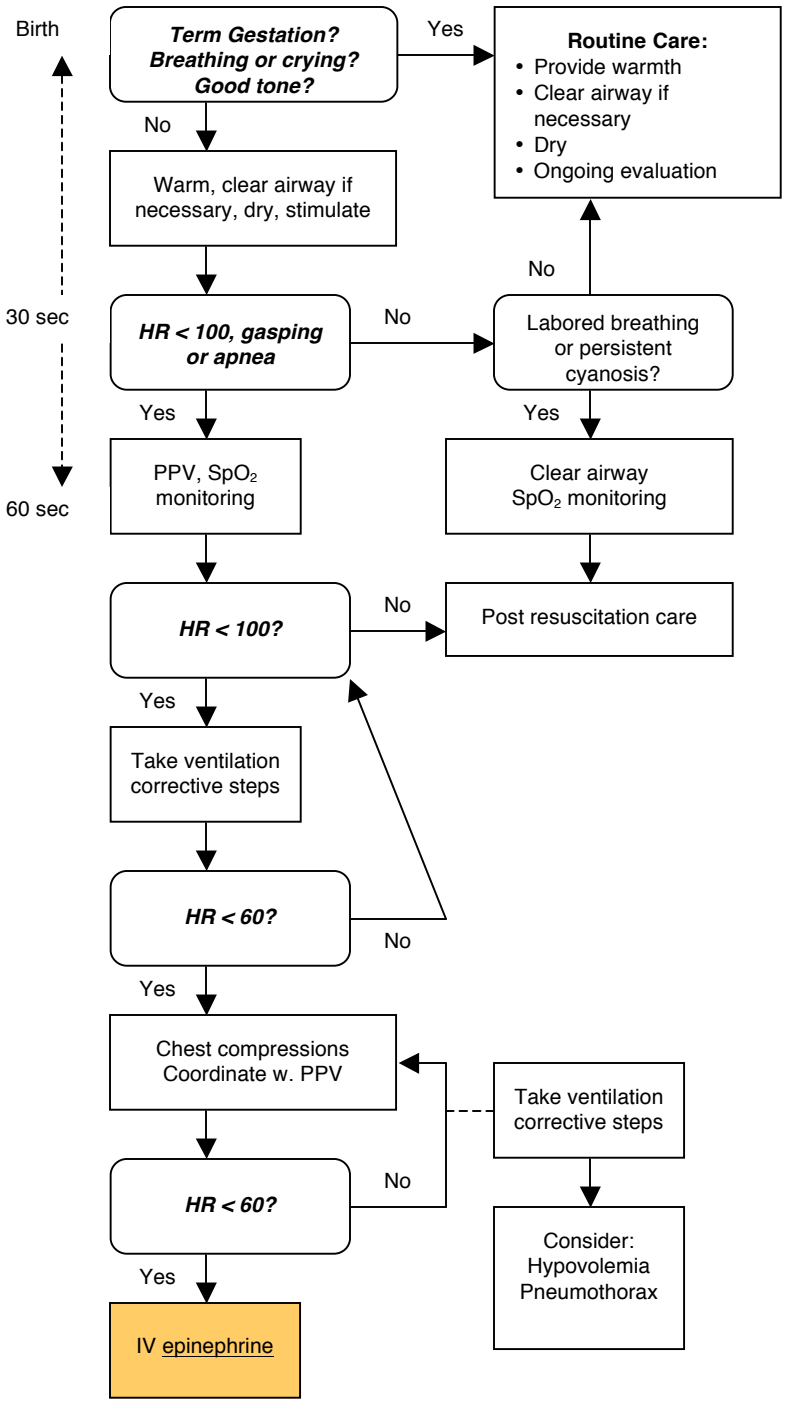
6021 PEDIATRIC (AGE < 12 YEARS) BRADYCARDIA WITH POOR PERFUSION



6025 NEONATAL RESUSCITATION



EMT	AEMT
EMT-I	Paramedic

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_2 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 1st compression after each ventilation

Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

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)

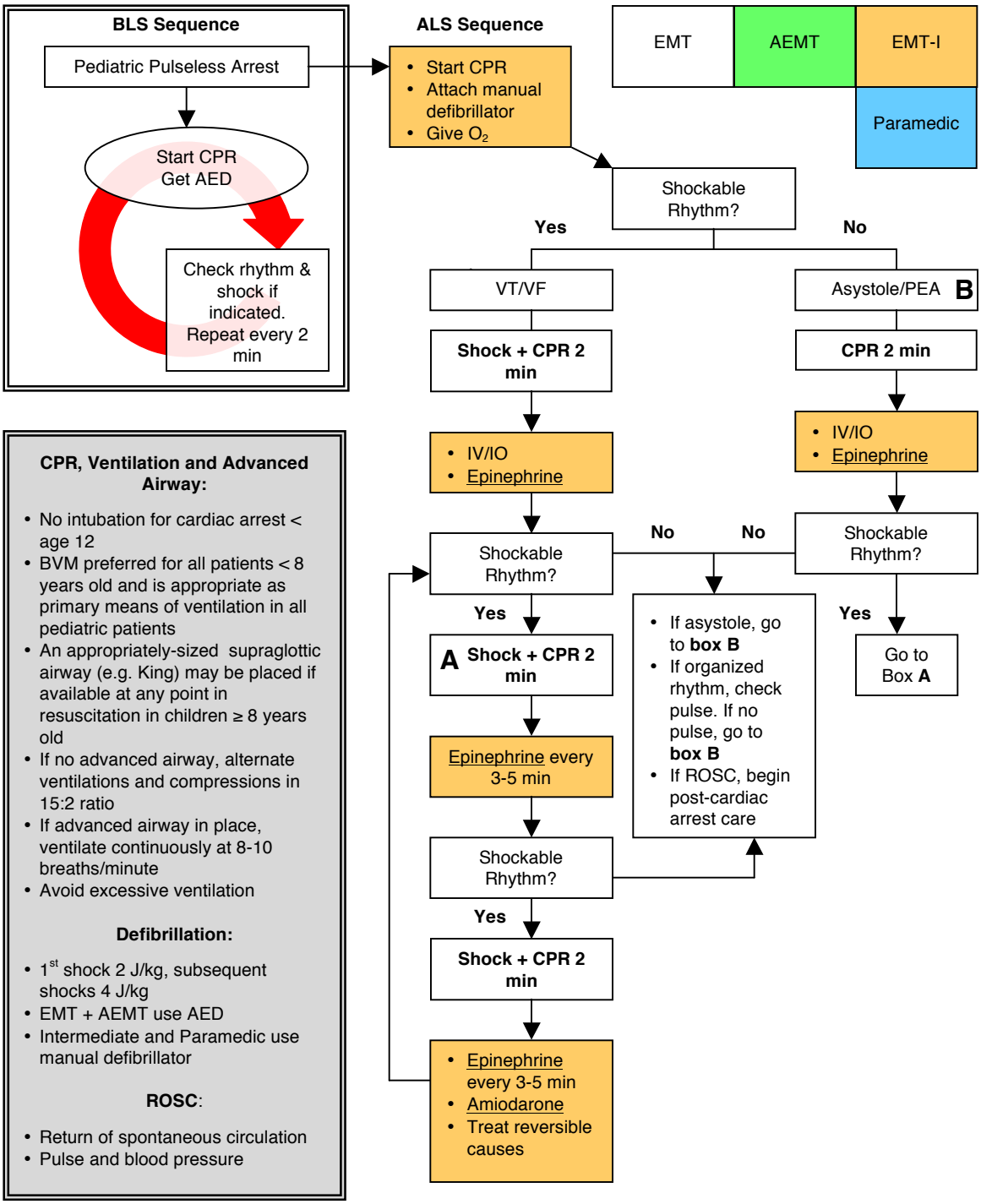
E. Newborns are at high risk for hypothermia. Provide early warming measures, keep covered as much as possible (especially the head) and increase the temperature in the ambulance

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



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

Approved by Denver Metro EMS Medical Directors July 1, 2013. Next review January 2014

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.
B. Under Chapter 2 Rule: specialized prescription medications to address an acute crisis may be given by all levels with a direct VO, given the route of administration is within the scope of the provider. This applies to giving hydrocortisone for adrenal crisis, for instance if a patient or family member has this medication available on scene. Contact base for direct verbal order

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
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	AEMT	EMT-I	Paramedic

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?
- Place in neutral position with towel roll beneath shoulders if age <8 years
- Place oral airway if unconscious
- Assist with BVM per Assisted Ventilations Protocol

Inadequate ventilations and unable to ventilate with BVM?
- **Consider ETI in a child ONLY if unable to adequately ventilate with BVM and oral airway**
- Reposition airway, check technique and equipment. If still unable to oxygenate and ventilate, proceed with Oral Endotracheal Intubation Protocol

Treat specific conditions

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")
- Normal RR neonate >40, infants >20, child > 12bpm
- Listen for upper airway abnormal sounds which may mimic wheezing: stridor, hoarseness, barky 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)

Croup

6 months - 5 years w. stridor, barky cough, URI sx. Sx often rapid, nocturnal onset
- Transport in position of comfort w. parent
- Blow-by O_2

For severe symptoms

Stridor at rest, severe retractions, cyanosis, altered LOC
- Give nebulized racemic epinephrine or 1:1000 L-epinephrine

Inadequate response to treatment?

Contact base for consult

Bronchiolitis

Age < 2 yrs w. cough, fever, resp. distress, +/- wheezing
- Transport in position of comfort w. parent
- Blow-by O_2

For severe symptoms

Hypoxia despite O_2, severe retractions, cyanosis, altered LOC
- Nasal suctioning
- Give nebulized racemic epinephrine or 1:1000 L-epinephrine

Inadequate response to treatment?

Contact base for consult

Asthma

EMT may administer either MDI or nebulized albuterol with **base contact** for verbal order
- Give albuterol by nebulizer
- If age > 2 yrs, add ipratropium
- Repeat as needed, may use continuous nebulization for severe respiratory distress

For severe symptoms and inadequate response to all above treatment

Hypoxia despite O_2, severe retractions, cyanosis, altered LOC
- 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)

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6060 PEDIATRIC APPARENT LIFE-THREATENING EVENT (ALTE)

EMT	AEMT
EMT-I	Paramedic

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

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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

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6070 PEDIATRIC TRAUMA CONSIDERATIONS (AGE < 12 YEARS)

EMT	AEMT	EMT-I	Paramedic

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

ADENOSINE (ADENOCARD)

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
- Heart transplant

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:

12 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

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

0.2 mg/kg IV bolus (max 6 mg), rapidly followed by normal saline flush.
Additional dose of 0.2 mg/kg (max 12 mg) rapid IV bolus, followed by normal saline flush
Contact medical control for further considerations

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

ALBUTEROL SULFATE (PROVENTIL, VENTOLIN)

Description

- Albuterol is a selective ß-2 adrenergic receptor agonist. It is a bronchodilator and positive chronotrope.
- Because of its ß agonist properties, it causes potassium to move across cell membranes inside cells. This lowers serum potassium concentration and makes albuterol an effective temporizing treatment for unstable patients with hyperkalemia.

Onset & Duration

- Onset: 5-15 minute after inhalation
- Duration: 3-4 hours after inhalation

Indications

- Bronchospasm
- Known or suspected hyperkalemia with ECG changes (i.e.: peaked T waves, QRS widening)

Contraindications

- Severe tachycardia is a relative contraindication

Adverse Reactions

- Tachycardia
- Palpitations
- Dysrhythmias

Drug Interactions

- Sympathomimetics may exacerbate adverse cardiovascular effects.
- ß-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%)

Dosage and Administration

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

- 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.

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
- Wide complex tachycardia not requiring immediate cardioversion due to hemodynamic instability
- 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

- 2nd or 3rd 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
Symptomatic wide complex tachycardia with a pulse (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.

ANTIEMETICS: ONDANSETRON (ZOFRAN), PROMETHAZINE (PHENERGAN), METACLOPRAMIDE (REGLAN)

Description

- Ondansetron is a selective serotonin 5-HT3 receptor antagonist antiemetic. Ondansetron is the preferred antiemetic, if available.
- Promethazine is a non-selective central and peripheral H-1 type histamine antagonist with anticholinergic properties resulting in antiemetic and sedative effects.
- Metaclopramide is a dopamine antagonist that works by blocking the CNS vomiting chemoreceptor trigger zone (CRT).

Indications

- Nausea and vomiting

Contraindications

- Ondansetron: none.
- Promethazine: age < 2 years, patients with respiratory or CNS depression or allergy to sulfites.
- Metaclopramide: age < 8 years or suspected bowel obstruction.

Adverse Effects:

- Ondansetron: very low rate of adverse effects, very well tolerated
- Promethazine: hypotension, CNS depression, altered mental status, pain on injection, including tissue necrosis with extravasation, extrapyramidal symptoms, urinary retention
- Metoclopramide: restlessness, agitation, extrapyramidal symptoms, sedation. Increased GI motility – do not use if suspected bowel obstruction.

Dosage and Administration
Ondansetron:

Adult:
4 mg IV/IM/PO/ODT. May repeat x 1 dose as needed. EMT/EMT-IV may give ODT only and require direct verbal order.

Pediatric < 4 years old:
2 mg IV/PO/ODT

Pediatric ≥ 4 years old:
4 mg IV/PO/ODT

Promethazine:
Adult:
6.25 mg IV/IM. May repeat x 1 dose as needed.

Pediatric > 2 years old:
0.25-0.5 mg/kg IV/IM to a maximum of 6.25 mg.

Metaclopramide:
Adult:
10 mg IV/IM.

Pediatric 8-12 years old:
5 mg IV/IM.

Protocol

- Abdominal Pain/Vomiting
- Altitude Illness

Promethazine and Metaclopramide Side effects/Special Notes:

- Drowsiness, dizziness, dry mouth and blurred or double vision are common.
- If hypotension occurs, administer fluid bolus.
- Dystonia and akathisia may occur, and should be treated with diphenhydramine.
- Elderly may become agitated or disoriented. Consider reducing the dose in elderly patients.

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

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 toxidome 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

BENZODIAZEPINES (DIAZEPAM, LORAZEPAM, MIDAZOLAM)

Description

- Benzodiazepines are sedative-hypnotics that act by increasing GABA activity in the brain. GABA is the major inhibitory neurotransmitter, so increased GABA activity *inhibits* cellular excitation. Benzodiazepine effects include anticonvulsant, anxiolytic, sedative, amnestic and muscle relaxant properties. Each individual benzodiazepine has unique pharmacokinetics related to its relative lipid or water solubility.
- Selection of specific agent as preferred benzodiazepine is at individual agency Medical Director discretion.

Onset & Duration

- Any agent given IV will have the fastest onset of action, typical time of onset 2-3 minutes
- Intranasal administration has slower onset and is less predictable compared to IV administration, however it may still be preferred if an IV cannot be safely or rapidly obtained. Intranasal route has faster onset compared to intramuscular route.
    - Diazepam is not absorbed well IN.
- IM administration has the slowest time of onset.

Indications

- Status epilepticus
- Sedation of the severely agitated/combative patient
- Sedation for cardioversion or transcutaneous pacing (TCP)
- Adjunctive agent for treatment of severe pain (e.g. back spasms) in adults that is uncontrolled by maximum opioid dose – **WITH CALL IN ONLY**

Contraindications

- Hypotension
- Respiratory depression

Adverse Reactions

- Respiratory depression, including apnea
- Hypotension
- Consider ½ dosing in the elderly for all benzodiazepines

Dosage and Administration

MIDAZOLAM:

Seizure or sedation for cardioversion or transcutaneous pacing:

Adult:

IV/IO route: 2 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

IN/IM route (intranasal preferred): 5 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

Pediatric:

IV/IO route 0.1 mg/kg

- Maximum single dose is 2 mg IV. Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses.

IN/IM route (intranasal preferred): 0.2 mg/kg.

- Maximum single dose is 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:

IV route: 2 mg

IN/IM route: 5 mg

- 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 a total of 3 doses may be given as standing order in order to rapidly sedate patient.

Pediatric:

- **CONTACT BASE** before any consideration of sedation of severely agitated/combative child

DIAZEPAM:

Seizure or sedation for cardioversion or transcutaneous pacing:

Adult:

IV/IO route: 5 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

Pediatric:

IV/IO route 0.3 mg/kg

- Maximum single dose is 5 mg IV. 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:

IV route: 5 mg

- 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 a total of 3 doses may be given as standing order in order to rapidly sedate patient

Pediatric:

- **CONTACT BASE** before any consideration of sedation of severely agitated/combative child

LORAZEPAM:

Seizure or sedation for cardioversion or transcutaneous pacing:

Adult:

IV/IO route: 1 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

IN/IM route (intranasal preferred): 2 mg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

Pediatric:

IV route: 0.05 mg/kg

- Dose may be repeated x 1 after 5 minutes if still seizing. **Contact Base** for more than 2 doses

IN/IM route (intranasal preferred): 0.1 mg/kg

- 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:

IV route: 2 mg

IN/IM route 2 mg

- 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 a total of 3 doses may be given as standing order in order to rapidly sedate patient

Pediatric:

- **CONTACT BASE** before any consideration of sedation of severely agitated/combative child

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Protocol

- Synchronized Cardioversion
- Transcutaneous Pacing
- Adult Seizure
- Pediatric Seizure
- Pediatric tachycardia with poor perfusion
- Agitated/Combative Patient
- Poisoning/Overdose

Special Considerations

- All patients receiving benzodiazepines must have cardiac, pulse oximetry monitoring during transport. Continuous waveform capnography recommended.
- Sedative effects of benzodiazepines are increased in combination with opioids, alcohol, or other CNS depressants.
- Coadministration of opioids and benzodiazepines is discouraged and may only be done with direct physician verbal order.
- In elderly patients > 65 years old or small adults < 50kg, lower doses may be sufficient and effective. Consider ½ dosing in these patients.

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. 1 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

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 $D_{25}W$) for patient 1-8 years old.

DIPHENHYDRAMINE (BENADRYL)

Description

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

Indications

- Allergic reaction
- Dystonic medication reactions or akathesia (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
Pediatics:
<8 years: 1-2 mg/kg slow IV/IO/IM (not to exceed 50 mg)

Protocol

Allergy/Anaphylaxis

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.

INTRAVENOUS DRIP RATES FOR DOPAMINE

Concentration: 1600 mcg/ml

Weight		Dose (mcg/kd/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	

DROPERIDOL (INAPSINE)

Description

- Droperidol is a butyrophenone derivative closely related to haloperidol. Droperidol produces a dopaminergic blockage, a mild alpha-adrenergic blockage, and causes peripheral vasodilation. Its major actions are sedation, tranquilization, and potent anti-emetic effect.

Onset & Duration

- Onset: 3-10 minutes after IM administration.
- Duration: 2-3 hours

Indications

- Primary use for management of agitated/combative patients.
- Second line medication for management of intractable vomiting requiring base contact.
- Combative head injured patients.

Contraindications

- Any patient with:
  - Suspected acute myocardial infarction/ACS
  - Systolic blood pressure under 100 mm/Hg, or the absence of a palpable radial pulse
  - Signs of respiratory depression

Side Effects

- Due to the vasodilation effect, droperidol can cause a transient hypotension that is usually self limiting and can be treated effectively with leg elevated position and IV fluids. Droperidol may cause tachycardia which usually does not require pharmacologic intervention.
- Some patient's may experience unpleasant sensations manifested as restlessness, hyperactivity, or anxiety following droperidol administration.
- Extra-pyramidal reactions have been noted hours to days after treatment.
- Rare instances of neuroleptic malignant syndrome have been known to occur following treatment using droperidol.

Dosage and Administration

Agitation/Combative

Adult:
IV/IM route: 5.0 mg slow IV/IM administration, after 10 minutes if desired effect is not achieved contact base to consider a second dose. **Pediatric:**
Under the age of 12 Contact Base

Antiemetic: Contact base for orders

IV/IM route:
Adult: 1.25 mg slow push.
Pediatric: 0.05 mg/kg slow push.

Special Considerations

- Due to droperidol's potential effect on QT interval prolongation, all patients receiving droperidol should be placed on the cardiac monitor. Though it is understood that obtaining an ECG on the combative or agitated patient may be difficult, every effort should be made to do so.
- Avoid droperidol in frail or elderly patients due to increased risk of prolonged and over-sedation as well as increased risk of hypotension and prolonged QT. If it must be given, administer ½ typical dose.

Protocol

- Agitated/Combative Patient Protocol

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:

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

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

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

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

HYDROXYCOBALAMIN (CYANOKIT)

Description

- Cyanide inhibits cytochrome oxidase, thereby arresting cellular respiration and forcing anaerobic metabolism, which leads to lactate production and acidosis. Hydoxycobalamin binds cyanide ions to form cyanocobalamin which is excreted in urine.

Indications

- Adult or pediatric patient with suspected cyanide poisoning from any route, including smoke inhalation in an enclosed space, with any of the following clinical signs:
  - Pulseless arrest
  - Coma/unresponsiveness
  - Signs of shock

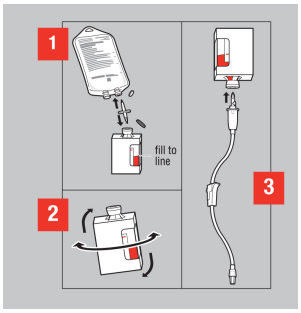
Precautions

- Administer only after basic life support measures have been initiated and always in conjunction with other supportive treatment modalities

Adverse Reactions

- Hypertension
- Allergic reaction/anaphylaxis

Dosage and Administration



- **Adult** dose is 5 gm IV
- **Pediatric** dose is 70mg/kg up to 5 gm IV
  - Cyanokit consists of either a single 5 gm vial or 2 x 250 mL vials each containing 2.5 gm of hydroxycobalamin.
- Single 5 gm vial Instructions:
  1. Reconstitute: Place the vial in an upright position. Add 200 mL of 0.9% Sodium Chloride Injection* to the vial using the transfer spike. Fill to the line. *0.9% Sodium Chloride Injection is the recommended diluent (diluent not included in the kit). Lactated Ringer's Solution and 5% Dextrose Injection have also been found to be compatible with hydroxocobalamin.
  2. Mix: The vial should be repeatedly inverted or rocked, not shaken, for at least 60 seconds prior to infusion.
  3. Infuse Vial: Use vented intravenous tubing, hang and infuse desired dose over 15 minutes.
- 2 x 2.5 gm vials instructions:
  1. Reconstitute: Add 100 mL of 0.9% Sodium Chloride Injection* to the vial using the transfer spike. Fill to the line.
  2. Mix: The vials should be repeatedly inverted or rocked, not shaken, for at least 30 seconds prior to infusion.
  3. Infuse 1st vial: Use vented intravenous tubing, hang and infuse desired dose over 7.5 min.
  4. Infuse 2nd vial (repeat steps 1 and 2 before 2nd infusion) to desired dose over 7.5 min.

Special Considerations

- It is understood that Cyanokit may not be available to all agencies at all times and therefore is not considered standard of care. Notify receiving facility if Cyanokit used.

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

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

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

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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:**
  - 2 gm, IV bolus slowly
  - Mix 4 gm, diluted in 50 ml of Normal Saline (0.9 NS), IV drip over 15-30 minutes.

Protocol

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

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
- Suspected Addisonian crisis (cardiovascular collapse in patient at risk for adrenal insufficiency)

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/IO bolus, slowly, over 2 minutes

Pediatric:

2 mg/kg, IV/IO bolus, slowly, over 2 minutes to max dose of 125 mg

Protocol

- Asthma
- Allergy and Anaphylaxis
- Chronic Obstructive Pulmonary Disease
- Adult hypotension/shock
- Adrenal Insufficiency

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

NALOXONE (NARCAN)

Description

Naloxone is a competitive opioid receptor antagonist

Onset & Duration

Onset: Within 5 minutes
Duration: 1-4 hours

Indications

- For reversal of suspected opioid-inducted CNS and respiratory depression
- Coma of unknown origin with impaired airway reflexes or respiratory depression

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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

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Protocol

- Universal Altered Mental Status Protocol
- Poisoning/Overdose

Special Considerations

- Not intended for use unless respiratory depression or impaired airway reflexes are present. Reversal of suspected mild-moderate opioid toxicity is not indicated in the field as it may greatly complicate treatment and transport as narcotic-dependent patients may experience violent withdrawal symptoms
- Patients receiving naloxone **must** be transported to a hospital

NITROGLYCERINE (NITROSTAT, NITROQUICK, etc)

Description

Short-acting peripheral venodilator decreasing cardiac preload and afterload

Onset & Duration

Onset: 1-3 min.
Duration: 20-30 min.

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

Protocol

- Adult Chest Pain
- CHF/Pulmonary Edema

OPIOIDS (FENTANYL, MORPHINE, HYDROMORPHONE)

Description

Opioid analgesics with desired effects of analgesia, euphoria and sedation as well as undesired effects of respiratory depression and hypotension. A synthetic opioid, fentanyl is 100 times more potent than morphine, and is less likely to cause histamine release.

Indications

- Treatment of hemodynamically stable patients with moderate to severe pain due to traumatic or medical conditions, including cardiac conditions, abdominal pain, back pain, etc.
- Treatment of shivering after therapeutic induced hypothermia (TIH).

Contraindications

- Hypotension, hemodynamic instability or shock
- Respiratory depression

Caution/Comments:

- Opioids should only be given to hemodynamically stable patients and titrated slowly to effect.
- 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
- Respiratory depression, including apnea, may occur suddenly and without warning, and is more common in children and the elderly. **Start with ½ traditional dose in the elderly.**
- Coadministration of opioids and benzodiazepines is discouraged and may only be done with direct physician verbal order.
- Chest wall rigidity has been reported with rapid administration of fentanyl

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Dosage and Administration

FENTANYL:

- **Adult doses may be rounded to nearest 25 mcg increment**
- **Initial dose in adults typically 100 mcg**
- **Strongly consider ½ typical dosing in elderly or frail patient**

Adult:

IV/IO route: 1 mcg/kg.

- Dose may be repeated after 10 minutes and titrated to clinical effect to a maximum cumulative dose of 3 mcg/kg
- Additional dosing requires BASE CONTACT

IN route: 1 mcg/kg.

- Dose may be repeated after 10 minutes after initial IN dose to a maximum cumulative dose of 3 mcg/kg. IV route is preferred for repeat dosing.
- Additional dosing requires BASE CONTACT

Pediatric (1-12 years):

IV/IO route: 1 mcg/kg.

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

- Additional dosing requires BASE CONTACT

IN route: 1 mcg/kg.
- Dose may be repeated after 10 minutes after initial IN dose to a maximum cumulative dose of 3 mcg/kg. IV route is preferred for repeat dosing.
- **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

MORPHINE:

Adult:

IV/IO/IM routes: 6 mg.
- Dose may be repeated after 10 minutes and titrated to clinical effect to a maximum cumulative dose of 10 mg.
- Additional cumulative dosing > 12 mg requires BASE CONTACT.
- **Morphine may not be given IN as it is poorly absorbed**

Pediatric (1-12 years):

IV/IO/IM routes: 0.1 mg/kg. Maximum single dose is 6 mg
- Dose may be repeated after 10 minutes and titrated to clinical effect up to maximum cumulative dose of 0.2 mg/kg.
- Additional cumulative dosing requires BASE CONTACT.
- **Morphine may not be given IN as it is poorly absorbed**

Pediatric < 1 year: BASE CONTACT

HYDROMORPHONE:

Adult:

IV/IO/IM routes: 0.5 mg
- Dose may be repeated after 10 minutes and titrated to clinical effect up to maximum cumulative dose of 1.5 mg.
- Additional cumulative dosing requires BASE CONTACT.

Pediatric 1-12 years and ≥ 10kg:

IV/IO/IM routes: 0.2 mg
- Repeat dosing requires BASE CONTACT.

Pediatric < 1 years or < 10kg:

IV/IO/IM routes: with verbal order only. BASE CONTACT for any administration

NOTE: IV route is preferred for all opioid administration because of more accurate titration and maximal clinical effect. IO/IN/IM are acceptable alternatives when IV access is not readily available. Repeat doses of IN Fentanyl can be given if IV access cannot be established. However greater volumes and repeat IN administration are associated with greater drug run off and may therefore be less effective. Continuous pulse oximetry monitoring 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

7010 MEDICATIONS

Abdominal Pain
Amputations
Burns
Bites/Stings
Snake Bites
Face and Neck Trauma
Chest Trauma
Abdominal Trauma
Spinal Trauma

ORAL GLUCOSE (GLUTOSE, INSTA-GLUCOSE)

Description

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

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

Administration

One full tube 15 g buccal.

Protocol

- Universal Altered Mental Status Protocol
- Hypoglycemia

OXYGEN

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_2 levels. It takes relatively large decreases in oxygen concentration to stimulate respiration.

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_2 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

Flow	LPM Dosage	Indications
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_2 while adequate ventilation is assessed with clinically and with $ETCO_2$.

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%

PHENYLEPHRINE (INTRANASAL)

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
- Epistaxis

RACEMIC EPINEPHRINE

Description

Racemic epinephrine 2.25% is an aqueous solution that delivers 11.25 mg of racemic epinephrine per 0.5mL 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 ß 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

Side Effects

- Tachycardia
- Palpitations
- Muscle tremors

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 and administer over 15 minutes.

Protocol

- Pediatric Respiratory Distress

Special Considerations

- Racemic epi is heat and photo-sensitive
- Once removed from the refrigerator, the unopened package is stable at room temperature until the expiration date stated on the package.
- Do not confuse the side effects with respiratory failure or imminent respiratory arrest.

SODIUM BICARBONATE

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.

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.

Protocol

- Adult Universal Pulseless Arrest Algorithm
- Poisoning/Overdose

Special Considerations

- Sodium bicarbonate administration increases CO_2 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).

TOPICAL OPHTHALMIC ANESTHETICS

Description

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

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

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