



**DENVER HEALTH  
PARAMEDIC DIVISION  
PROTOCOLS  
March 2020**

# 0001 COVID-19 Protocol Amendments

**Purpose:** During the current COVID-19 pandemic, protocols are adjusted to better ensure the safety of the provider. The following changes supersede the standard protocols and are effective until further notice.

**Nasal Intubation (1010 PROCEDURE PROTOCOL: NASOTRACHEAL INTUBATION)** - nasal intubation is not to be performed by Denver Paramedics during COVID pandemic.

**Nebulizers (9020 MEDICATIONS), ( 9120 MEDICATIONS), (9170 MEDICATIONS), (2030 ADULT WHEEZING),( 2040 PEDIATRIC WHEEZING), (9270 MEDICATIONS)** - Administration of albuterol both pediatric and adult will be exclusively delivered by an MDI with spacer. We will not be administering Ipratropium Bromide or Epinephrine via nebulizer either. Nebulizers are only authorized for Pediatric racemic epinephrine **(see 0003 MEDICATIONS METERED DOSE INHALER EMERGENCY TREATMENT PROTOCOL - COVID - 19)**.

**CPAP (1060 PROCEDURE PROTOCOL: CONTINUOUS POSITIVE AIRWAY PRESSURE)**- The use of aerosolizing should be reserved for patients in critical need of the procedures.

**Oral Endotracheal Intubation (1000 PROCEDURE PROTOCOL: OROTRACHEAL INTUBATION)** - The use of aerosolizing should be reserved for patients in critical need of the procedures. Intubation should be reserved for situations where neither BVM nor an i-gel® provide sufficient ventilation.

**Bag Valve Mask (BVM)** - The use of aerosolizing should be reserved for patients in critical need of the procedures. Respiratory arrest will be treated with BVM as the first option. A good seal is important; consider two-person bagging whenever feasible.

**Supraglottic Airway (i-gel®) (1050 PROCEDURE PROTOCOL: SUPRAGLOTTIC AIRWAY (IGEL)** - Respiratory arrest will be treated with BVM as the first option followed by i-gel® if needed. Intubation should be reserved for situations where neither BVM nor an i-gel® provide sufficient ventilation.

**Respiratory Arrest** - We will continue to BVM or use i-gel® in all respiratory arrest/ respiratory failure patients unless care is thought to be futile.

**Cardiac Arrest (3000 UNIVERSAL PULSELESS ARREST ALGORITHM), (3010 UNIVERSAL PULSELESS ARREST CONSIDERATIONS)**- Cardiac arrest management has not changed. CPR is considered an aerosolizing procedure.

**Respiratory Distress (2010 ADULT UNIVERSAL RESPIRATORY DISTRESS)** - All patients with respiratory distress will be treated with rapid assessment and rapid transport. The use of aerosolizing procedures (CPAP, i-gel®, intubation and aggressive suctioning) should be reserved for patients in critical need of the procedures.

**Retired - COVID-19 NON-TRANSPORT PROTOCOL**

**0003 MEDICATIONS: METERED DOSE INHALER**  
**EMERGENCY TREATMENT PROTOCOL - COVID - 19**

**ALBUTEROL SULFATE (PROVENTIL, VENTOLIN)**

**Description**

- Albuterol metered dose inhalers with spacer or mask will be utilized in lieu of nebulized albuterol.
- Patients with respiratory distress from COVID 19 can have a wide range of pulmonary findings but do not usually respond to albuterol. As such, it should not be routinely used in these patients.
- MDI albuterol doses may be repeated as needed on standing order.
- Albuterol is a selective  $\beta$ -2 adrenergic receptor agonist. It is a bronchodilator and positive chronotrope.

**Onset & Duration**

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

**Indications**

- Albuterol meter dose inhaler should be reserved for patients with severe respiratory distress and a history of asthma or COPD where the clinical presentation is most concerning for primary reactive airways disease.
- A trial of treatment with MDI can be considered in a patient with presentation concerning for COVID 19, however the following 3 criteria *must* be met if suspected COVID-19:
  - Should be reserved for those patients with a documented history of asthma or COPD
  - Must have a pulmonary exam consistent with reactive airways disease
  - Must be in severe respiratory distress

**Contraindications**

- Severe tachycardia is a relative contraindication

**Adverse Reactions**

- Tachycardia
- Palpitations
- Dysrhythmias

**Drug Interactions**

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

**How Supplied**

- MDI: 90 mcg/metered spray (8.5-g canister with 200 inhalations) single patient use
- Anti-static valved holding chamber (spacer) single patient use

## **Dosage and Administration**

- Adult and Pediatric: Metered Dose Inhaler with spacer 6 puffs into spacer and then inhaled by patient. May repeat every 5 minutes as needed.
- Occasionally, pediatric patients may have difficulty utilizing the MDI with spacer. In this case, remove the mask from the pediatric BVM and discard BVM. Use the mask with MDI and spacer, 6 puffs into spacer and then inhaled by patient via mask covering nose and mouth.
- Use of the patient's ALBUTEROL SULFATE (PROVENTIL, VENTOLIN) MDI with spacer is preferred due to limited resources in current national pandemic emergency.

## **Special Considerations**

- MDI and spacer should be delivered with transported patients and handed over to hospital staff
- In the rare instance that a patient is treated with an MDI and then refuses transport, discard MDI and spacer after use.
- 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.

**Approved by**

**Medical Director, Denver Health Paramedic Division:** Kevin McVaney, M.D.

**Associate Medical Directors:**

Aaron Eberhardt, M.D.

Whitney Barrett, M.D.

Laura Rappaport, M.D.

**Chief Paramedic:** Gary Bryskiewicz

**Denver Health Paramedic Division Medical Review Board:**

Assistant Director, Clinical Performance: David Edwards

EMS Captain, Quality Management: Steve Hulac

EMS Lieutenant: Tim Brown

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. The authors would like to acknowledge the following for their contribution, talent and time in this revision of the Denver Metro EMS protocols. Special thanks to the protocol revision workgroup and the reviewers for their time in the July 2016 protocol update.

**July 2016 Denver Metro EMS Medical Directors**

Kathleen Adelgais, M.D.  
Jonathan Apfelbaum, M.D.  
Jeff Beckman, M.D.  
JP Brewer, M.D.  
Erica Douglass, M.D.  
Eugene Eby, M.D.  
Eric Hill, M.D.  
Dylan Luyten, M.D.  
Maria Mandt, M.D.

Kevin McVaney, M.D.  
Tom Paluska, M.D.  
Gilbert Pineda, M.D.  
Lara Rappaport, M.D.  
John Riccio, M.D.  
Fred Severyn, M.D.  
Gina Soriya, M.D.  
W. Peter Vellman, M.D.  
Gary Witt, M.D.

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DJ Head  
Jordan Ourada  
Ralph Vickrey  
Mark Wilcox

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## 0010 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 the agency's Medical Director in a timely fashion.

The protocols 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.

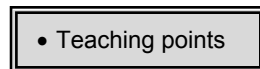
In order to keep protocols as uncluttered as possible, and to limit inconsistencies, individual drug dosing has not been included in the algorithms. It is expected the EMTs will be familiar with standard drug doses. Drug dosages are included with the medications section of the protocols as a reference.

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 certification levels. Boxes with orange fill are for actions for intermediate level or higher, and blue-filled boxes are for Paramedic level. When applicable, actions requiring **Base Contact** are identified in the protocol.

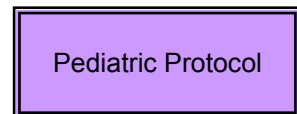
EMT	AEMT
Intermediate	Paramedic



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 less than 12 years of age. Infant is defined as less than 1 year of age. Neonate is defined as less than one month of age. Pediatric specific indications will be noted by a purple box.



### TRAINING AND EDUCATION

These protocols define the treatments, procedures, and policies approved by the Denver Metro EMS Physician Group. In Colorado, the scope of practice and acts allowed for EMT, EMT-IV, AEMT, EMT-I and Paramedic certifications are defined by the Colorado Department of Public Health and Environment, Chapter Two - Rules Pertaining to EMS Practice and Medical Director Oversight. These protocols do not supersede Chapter Two allowances, but in some instances may vary from Chapter Two depending on medical directors' preference.

The curriculum for initial EMS provider training may not cover some of the treatments, procedures and medications included in these protocols. Therefore, it is the responsibility of the EMS agency and Medical Director to ensure the initial training, verification, and maintenance of these skills falling outside traditional EMS education with all agency providers. This may be of additional importance when training and orienting newly hired providers prior to independent practice.

## 0020 GENERAL GUIDELINES: CONFIDENTIALITY

### CONFIDENTIALITY

- A. The patient-physician relationship, the patient-registered nurse relationship, and the patient-EMT relationship are recognized as privileged. This means that the physician, nurse, or EMT may not testify as to confidential communications unless:
  1. The patient consents
  2. The disclosure is allowable by law (such as Medical Board or Nursing Board proceedings, or criminal or civil litigation in which the patient's medical condition is in issue)
- B. The prehospital provider must keep the patient's medical information confidential. The patient likely has an expectation of privacy, and trusts that personal, medical information will not be disclosed by medical personnel to any person not directly involved in the patient's medical treatment.
  1. Exceptions
    - i. The patient is not entitled to confidentiality of information that does not pertain to the medical treatment, medical condition, or is unnecessary for diagnosis or treatment.
    - ii. The patient is not entitled to confidentiality for disclosures made publicly.
    - iii. The patient is not entitled to confidentiality with regard to evidence of a crime.
- C. Additional Considerations:
  1. Any disclosure of medical information should not be made unless necessary for the treatment, evaluation or diagnosis of the patient.
  2. Any disclosures made by any person, medical personnel, the patient, or law enforcement should be treated as limited disclosures and not authorizing further disclosures to any other person.
  3. Any discussions of prehospital care by and between the receiving hospital, the crewmembers in attendance, or at in-services or audits which are done strictly for educational or performance improvement purposes, will fall under the "Carol J. Shanaberger Act" Colorado Revised Statutes §25-3.5-901 et seq., provided that all appropriate criteria have been met for the agencies peer protection program. 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.

## 0030 GENERAL GUIDELINES: 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. Not intoxicated with drugs and/or alcohol
  - 4. 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.

## 0040 GENERAL GUIDELINES: 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.

**0040 GENERAL GUIDELINES: PHYSICIAN AT THE SCENE/MEDICAL DIRECTION**

**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.

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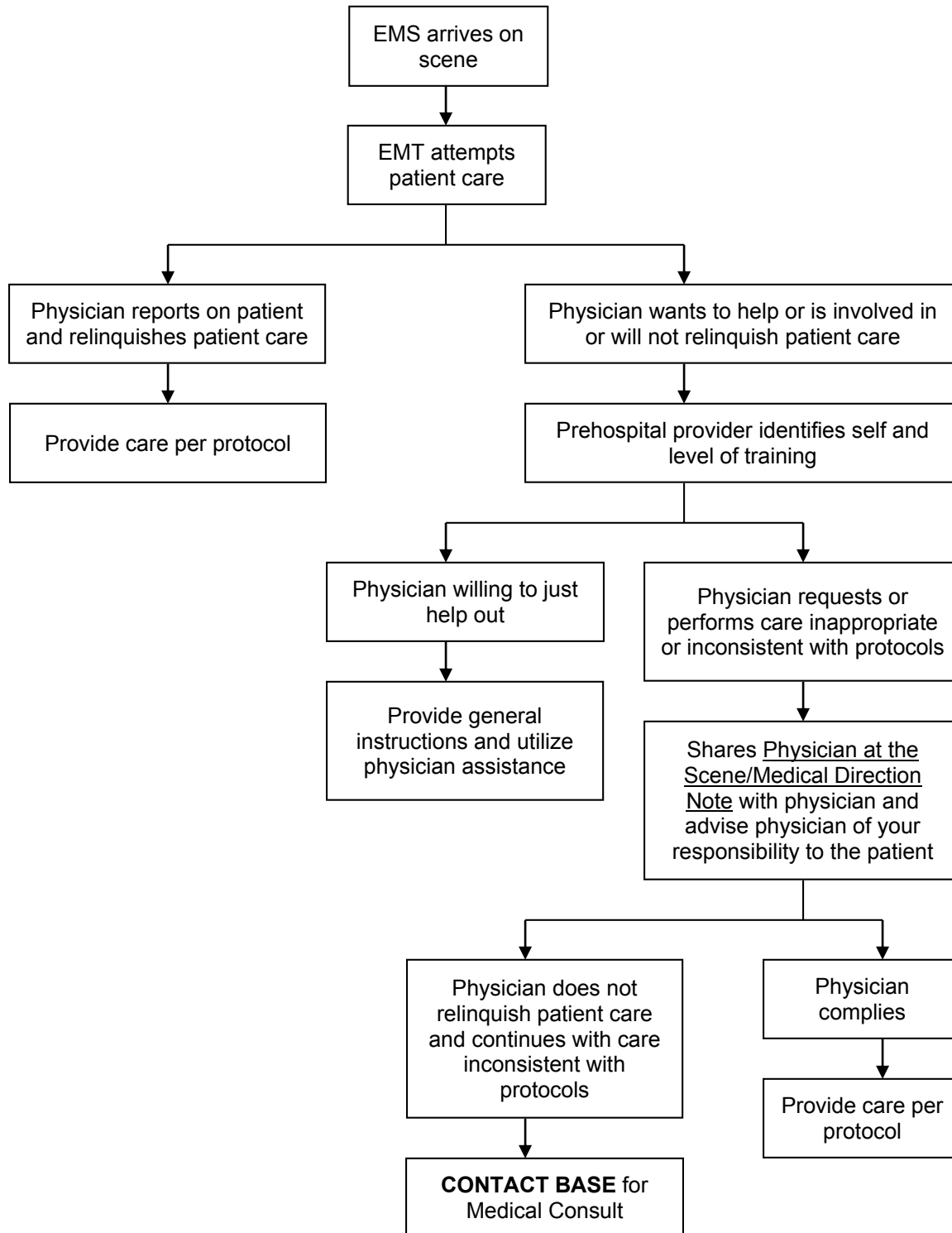
Medical Director

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Agency

0040 GENERAL GUIDELINES: PHYSICIAN AT THE SCENE/MEDICAL DIRECTION

PHYSICIAN AT THE SCENE/MEDICAL DIRECTION ALGORITHM





## 0050 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. Do not resuscitate patients if 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)

All cases described below require contact with a base physician to approve termination of resuscitation (TOR). Pediatric patients (<14 years): treatment and transport should be initiated in all pediatric trauma arrests unless obvious signs of death.

1. **Blunt Trauma Arrest:**
  - a. **Contact Base** for TOR if patient found apneic and pulseless despite basic airway maneuvers and no signs of life witnessed by Denver Paramedic on scene (spontaneous movement, pupillary response, respiratory effort, or pulse).
2. **Penetrating Trauma Arrest:**
  - a. Resuscitate and transport to a trauma facility.
    - i. **Contact Base** for TOR if time of arrest suspected to be > 10 minutes and no signs of life (spontaneous movement, pupillary response, respiratory effort, or pulse).
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. For unwitnessed arrest, no shock, and no ROSC, base may be consulted for TOR after approximately 20 minutes of prehospital care (BLS or ALS), if no reversible causes have been identified.
    - iii. For witnessed arrest, shock during resuscitation, and/or ROSC during resuscitation, base may be consulted for TOR after approximately 30 minutes of prehospital care (BLS or ALS), if no reversible causes have been identified.
    - iv. If shockable rhythm or narrow organized PEA still present, continue resuscitation and consider transport to closest emergency department.
  - 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  $\geq$  20 weeks
    - iv. Lightning strike & electrocutions
    - v. Avalanche victim
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.

## 0060 GENERAL GUIDELINES: ADVANCED MEDICAL DIRECTIVES

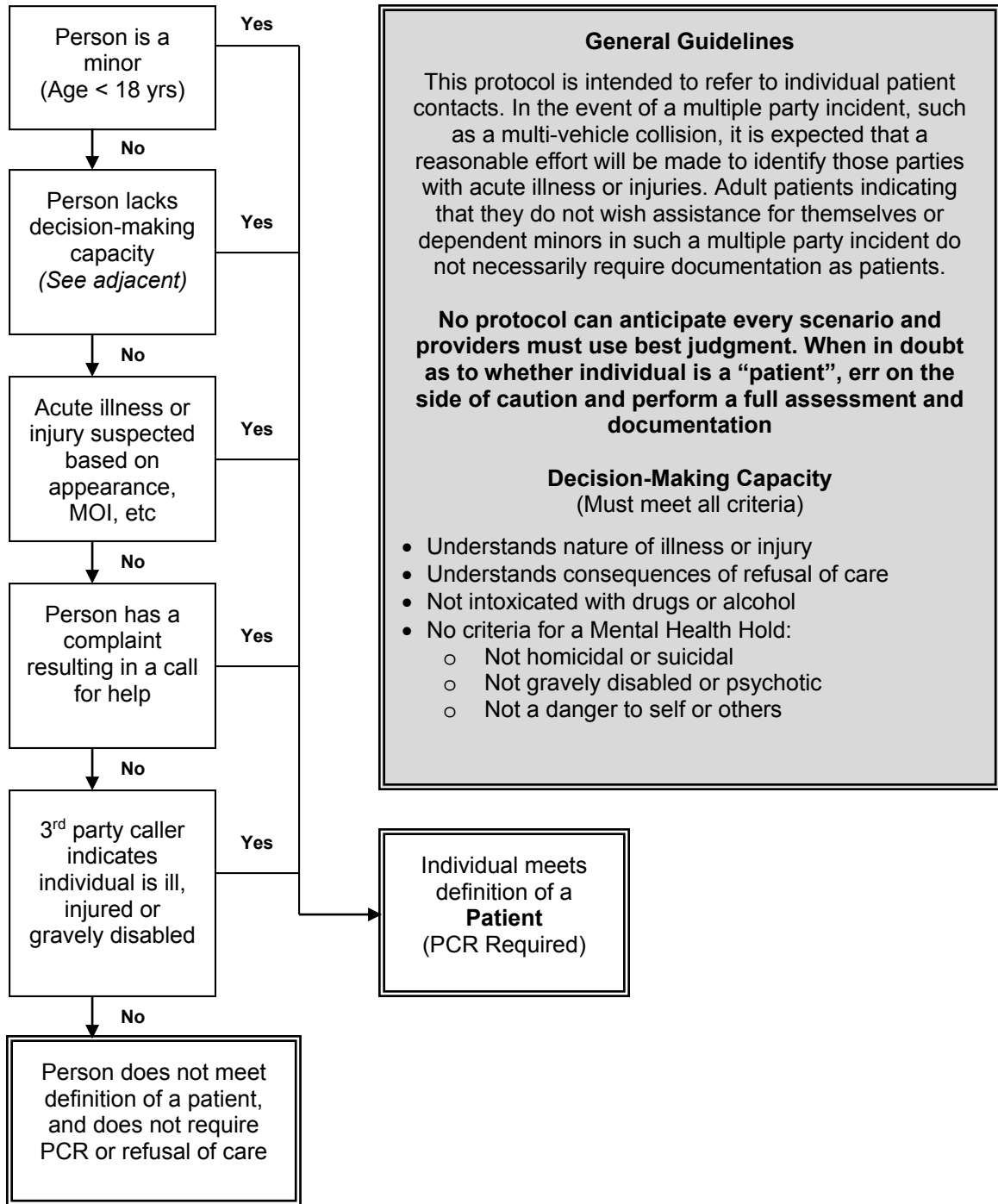
### Advance Medical Directives

- 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.

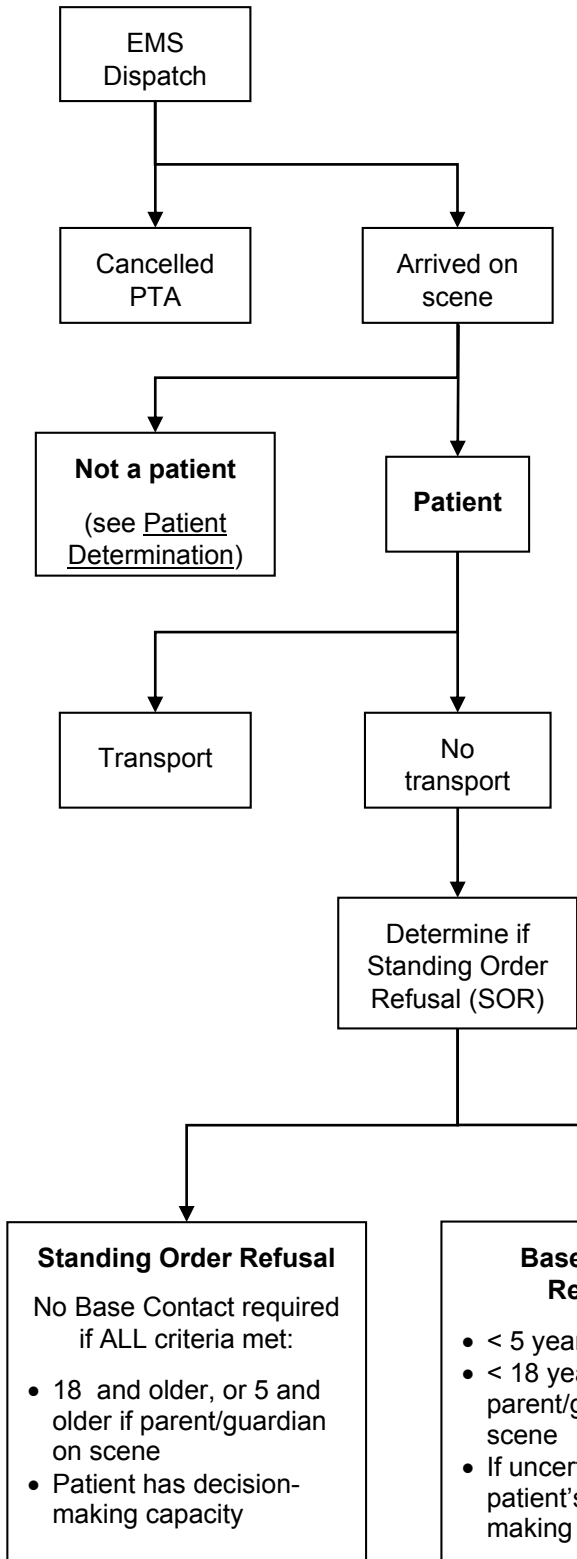
### Additional Considerations:

- 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.

**0070 GENERAL GUIDELINES: PATIENT DETERMINATION: "PATIENT OR NO PATIENT"**



**0080 GENERAL GUIDELINES: PATIENT NON-TRANSPORT OR REFUSAL**



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

Refer to General Guidelines: Consent for complete decision-making capacity guidelines

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.

If in doubt about patient decision-making capacity, **CONTACT BASE** for physician consult.

For potentially intoxicated patients, refer to Alcohol Intoxication

**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 advice document, if possible
- Any minor with any complaint/injury is a patient and requires a PCR

**High Risk Patients**

Base contact is required whenever, in the clinical judgement of the EMS provider, the patient is at high risk of deterioration without medical intervention.

## **0090 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. EMSsystem, 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 EMSsystem 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 EMSsystem.

## 0120 GENERAL GUIDELINES: BASE CONTACT FOR PHYSICIAN CONSULTATION

### Purpose

- A. To explain the Medical Directors expectations regarding base physician contact.

### General Principles

- A. The protocols function as standing order treatment guidelines designed to reflect CDPHE Chapter 2 Rules pertaining to EMS practice and Medical Director oversight. Protocols are to be used as guidelines and cannot account for every patient scenario. Deviation from protocol may at times be justified and in the patient's best interest. The Medical Directors place great faith in the training and expertise of our EMS colleagues and therefore wide latitude is granted throughout the protocol.
- B. Base contact for physician consultation is not the same as emergency department pre-notification of patient arrival and handoff. Base contact may be used in multiple care scenarios including but not limited to: forewarning of unstable or complicated patients, patient refusal, and medical consultation and discussion.
- C. Throughout the protocol patient "**BASE CONTACT**" is used to signify the need for call in. These algorithm points are set and agreed upon by the medical directors and reflect critical decision points in care where communication with physician support is expected.

### Preferred Base Contact Times.

- A. The physicians group feels strongly that access to medical consultation should be readily available at all times and utilized in the following circumstances:
  - 1. Any time "**BASE CONTACT**" is required or recommended per protocol.
  - 2. Unusual presentations or patient care situations not covered by set protocol and outside the scope of practice or comfort level of care by individual prehospital provider.
  - 3. Necessary deviation from protocol deemed to be in the best interest of the patient.
  - 4. For selected patient care refusals as indicated by General Guidelines: Patient Non-Transport or Refusal.
  - 5. During the care of critically ill patient who is not responding to protocol/algorithmic treatment.

## 0130 GENERAL GUIDELINES: TRANSPORTATION OF THE PEDIATRIC PATIENT

### General Principles:

For the purpose of the protocols, pediatric patients are defined as <12 years of age. The unique anatomy, physiology and developmental needs of children in this age range affect prehospital care. Several specific differences include:

- A. Airways are smaller, softer and easier to obstruct or collapse. Actions such as neck hyperflexion, hyperextension, or cricoid pressure may create an upper airway obstruction in a child
- B. Respiratory reserves are small, resulting in the possibility of rapid desaturation in the setting of increased demand. One of the earliest signs of physiologic stress in a child may be an unexplained increase in respiratory rate
- C. Infants and young children utilize their abdominal musculature to assist with respirations. Tight, abdominally-placed straps used to secure children to spine boards may result in onset of or worsening respiratory distress
- D. Circulatory reserves are small. The loss of as little as one unit of blood can produce severe shock in an infant.
- E. Fluid overload is not a concern in children. 20 mL/kg boluses are always considered safe as the initial fluid resuscitation.
- F. The developmental stage of a child impacts his/her ability to cooperate. The perception and memory of pain is escalated by anxiety. Discuss or forewarn what will be done with any child over 2 years of age. Infants, especially those under 6 months of age, tolerate painful procedures better if allowed to suck on a pacifier (especially if dipped in D25W) during the procedure. Utilize the parent or familiar guardian whenever possible to distract/comfort (tell a story, sing a song, etc.) for all pediatric patients during painful procedures.

### Specific Consideration: Transportation safety

Children represent a unique challenge for safe transportation in emergency vehicles. The National Highway Traffic Safety Administration has established guidelines to ensure the safe restraint and positioning of children in emergency vehicles. Children should be restrained during transport. Transport of a child in a restrained adult's arms is not recommended, but may be considered in special circumstances (i.e. severe croup, newborn). Transportation of children on the side bench seat in the rear compartment is also not recommended. The published goals are to prevent forward motion/ejection of the child, secure the torso, and protect the head, neck and spine in each of the following scenarios:

1. **For a child who is not a patient, but requires transport to a facility**  
All reasonable effort should be made to transport children who are not patients in a vehicle other than the ambulance. If transport in a vehicle other than an ambulance is not possible, transport in a size-appropriate child restraint system in the front passenger seat or rear-facing EMS provider's seat in the ground ambulance
2. **For a child who is injured/ill and whose condition does not require continuous monitoring or interventions**  
Transport child in a size-appropriate child restraint system secured appropriately on a cot (rear-facing) or in an integrated seat in the EMS provider's seat. Do not use a rear-facing child restraint system in a rear-facing EMS provider's seat. If no child restraint system is available, secure the child on the cot using three horizontal restraints across the child's chest, waist and knees and one vertical restraint across each of the child's shoulders. Remove any bulky clothing on child before restraining. Use blankets to maintain warmth.
3. **For a child whose condition requires continuous or intensive monitoring or interventions**  
Transport child in a size-appropriate child restraint secured appropriately on a cot. If no child restraint system is available, secure the child on the cot using three horizontal restraints across the child's chest, waist and knees and one vertical restraint across each of the child's shoulders.
4. **For a child whose condition requires spinal precautions or lying flat**  
Perform spinal immobilization procedure per protocol. Three points of restraint with shoulder straps is the optimal for the patient. Avoid placing any restraints across the abdomen. Secure the patient, not just the immobilization device to the stretcher. We do not recommend utilizing the child restraint system if spinal immobilization is required, as upright positioning places additional axial load on the patient's neck and emergent airway intervention is not possible.

## 0130 GENERAL GUIDELINES: TRANSPORTATION OF THE PEDIATRIC PATIENT

5. **For a child requiring transport as part of a multiple patient transport (newborn with mother, multiple children, etc.)**

If possible, transport each as a single patient. When available resources prevent single patient transportation, transport patients using safe, designated space available exercising extreme caution and driving at reduced speeds. For mother and newborn, the newborn should be transported in a rear-facing EMS provider seat using a convertible or integrated child restraint system. Do not use a rear-facing child restraint system in a rear-facing EMS provider's seat.

### **Transportation of the child with special health care needs:**

Treat the child, not the equipment. Starting with the ABCs still applies to medically complicated or medical technology-assisted children.

- A. The parent/guardian of a special needs child is the expert on that child and knows the details of that illness, typical responses, and baseline interactions better than anyone. Utilize and trust his/her knowledge and concerns. This may include vital signs, medication responses, or physical positioning (i.e. of contracted limbs) that may not be typical.
- B. Medically complicated children are often given healthcare notes describing their unique medical history and emergency healthcare needs. Ask the parent/guardian for an emergency information sheet, emergency healthcare form, or QR code.
- C. Ask the parent/guardian for the "go bag" for medical technology-assisted children. This will contain the child's spare equipment and supplies that may be needed on scene, during transport or in the hospital
- D. Transport the child to their medical "home" hospital whenever possible



# 1000 PROCEDURE PROTOCOL: OROTRACHEAL INTUBATION

## 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, and BLS airway is preferred unless patient cannot be oxygenated or ventilated by other means.
  - 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. Intubation should only be performed during pulseless arrest if it does not cause interruptions in chest compressions.

## Technique:

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

## Precautions:

- Ventilate at age-appropriate rates. Do not hyperventilate
- If the intubated patient deteriorates, think "DOPE"
  - **D**islodgement
  - **O**bstruction
  - **P**neumothorax
  - **E**quipment failure (no oxygen)
- Reconfirm and document correct tube position, with waveform capnography, 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. Abandon further attempts at intubation and use supraglottic airway or BVM ventilations if 2 attempts at intubation unsuccessful.

ETCO<sub>2</sub> < 10 mm Hg: "Less than ten, check again"

ETCO<sub>2</sub> < 8 mm Hg: "Less than eight, extubate"

## 1010 PROCEDURE PROTOCOL: NASOTRACHEAL INTUBATION

### Indications:

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

### Contraindications:

- Apnea
- Severe mid-face trauma

### Technique:

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

### Precautions:

- Before performing BNTI, consider if patient can be safely ventilated with non-invasive means such as CPAP or BVM
- Ventilate at age-appropriate rates. Do not hyperventilate
- If the intubated patient deteriorates, think "DOPE"
  - Dislodgement
  - Obstruction
  - Pneumothorax
  - Equipment failure (no oxygen)
- Reconfirm and document correct tube position, with waveform capnography, after moving patient and before disconnecting from monitor in ED
- Blind nasotracheal intubation is a very gentle technique. The secret to success is perfect positioning and patience.

ETCO<sub>2</sub> < 10 mm Hg: "Less than ten, check again"

ETCO<sub>2</sub> < 8 mm Hg: "Less than eight, extubate"

## 1030 PROCEDURE PROTOCOL: BOUGIE ASSISTED SURGICAL CRICOTHYROTOMY

### 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. (“Cannot intubate/cannot ventilate”)

### Contraindications:

- Surgical cricothyrotomy is contraindicated in patients less than 12 years of age 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<sub>2</sub> (preferably with waveform capnography) 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.

## 1050 PROCEDURE PROTOCOL: SUPRAGLOTTIC AIRWAY (iGEL)

### 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
- Preferred advanced airway in the pediatric patient

### Contraindications:

- Intact gag reflex
- Caustic ingestion

### Technique:

1. Initiate BLS airway sequence
2. Select proper size supraglottic airway based on manufacturer's specifications
3. Assemble equipment, lubricate the back, sides, and front with water soluble lubricant
4. Suction airway and maximize oxygenation with BVM ventilations
5. If trauma: have assistant hold in-line spinal immobilization in neutral position
6. If no trauma: sniffing position or slight cervical hyperextension in neutral position
7. Place supraglottic airway utilizing device specific technique:
8. Secure the device
9. Confirm tube placement by auscultation, chest movement, capnometry, and waveform capnography
10. Continuously monitor ETCO<sub>2</sub> with waveform capnography, SpO<sub>2</sub>, vital signs

### Precautions:

1. Do not remove a properly functioning supraglottic airway in order to attempt intubation
2. Correct sizing of supraglottic airways is critical for correct function
3. Supraglottic airways are safe and effective in pediatric patients, provided the correct size is selected. The age-range for pediatric supraglottic airway use is provided in the Handtevy reference book.
4. Use with caution in patients with broken teeth
5. Use with caution in patients with known esophageal disease who are at increased risk of esophageal injury

iGel Package Color	Weight	Size
Yellow	30-60 kg (66-132 lbs)	3.0
Green	50-90 kg (110-198 lbs)	4.0
Orange	90+ kg (>198 lbs)	5.0

## 1060 PROCEDURE PROTOCOL: CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)

### **Indications:**

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

### **Contraindications:**

- Respiratory or cardiac arrest
- Systolic BP less than 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<sub>2</sub>, and ETCO<sub>2</sub>)
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. 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. Monitor patient continuously, record vital signs every 5 minutes.
7. Assess patient for improvement as evidenced by the following:
  - a. Reduced dyspnea
  - b. Reduced verbal impairment, respiratory rate and heart rate
  - c. Increased SpO<sub>2</sub>
  - d. Stabilized blood pressure
  - e. Appropriate ETCO<sub>2</sub> values and waveforms
  - f. Increased tidal volume
8. 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 decreased blood pressure
  - c. Sustained low or decreasing SpO<sub>2</sub> readings
  - d. Rising ETCO<sub>2</sub> levels or other ETCO<sub>2</sub> 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
- Some fixed pressure CPAP devices do not have FiO<sub>2</sub> adjustment and will only administer up to 30% oxygen. If no improvement in oxygenation with a fixed pressure CPAP device, consider adding supplemental oxygen.

## 1070 PROCEDURE PROTOCOL: CAPNOGRAPHY

### **Indications:**

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

### **Contraindications:**

- A. None

### **Technique:**

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

### **Precautions:**

- A. To understand and interpret capnography, remember the 3 determinants of ETCO<sub>2</sub>:
  1. Alveolar ventilation
  2. Pulmonary perfusion
  3. Metabolism
- B. Sudden loss of ETCO<sub>2</sub>:
  1. Tube dislodged
  2. Circuit disconnected
  3. Cardiac arrest
- C. High ETCO<sub>2</sub> (> 45)
  1. Hypoventilation/CO<sub>2</sub> retention
- D. Low ETCO<sub>2</sub> (< 25)
  1. Hyperventilation
  2. Low perfusion: shock, PE, sepsis
- E. Cardiac Arrest:
  1. In low-pulmonary blood flow states, such as cardiac arrest, the primary determinant of ETCO<sub>2</sub> is blood flow, so ETCO<sub>2</sub> is a good indicator of quality of CPR
  2. If ETCO<sub>2</sub> is dropping, change out person doing chest compressions
  3. In cardiac arrest, if ETCO<sub>2</sub> not > 10 mmHg after 20 minutes of good CPR, this likely reflects very low CO<sub>2</sub> production and is associated with poor outcome
  4. Sudden rise in EtCO<sub>2</sub> may be an indicator of ROSC

**1080 PROCEDURE PROTOCOL: NEEDLE THORACOSTOMY FOR TENSION  
PNEUMOTHORAX DECOMPRESSION**

**Indication:**

- A. Needle decompression of tension pneumothorax is a standing order for penetrating trauma and requires base contact for use in blunt trauma
- B. **All** of the following clinical indicators must be present:
  - 1. Severe respiratory distress
  - 2. Hypotension
  - 3. Unilateral absent or decreased breath sounds

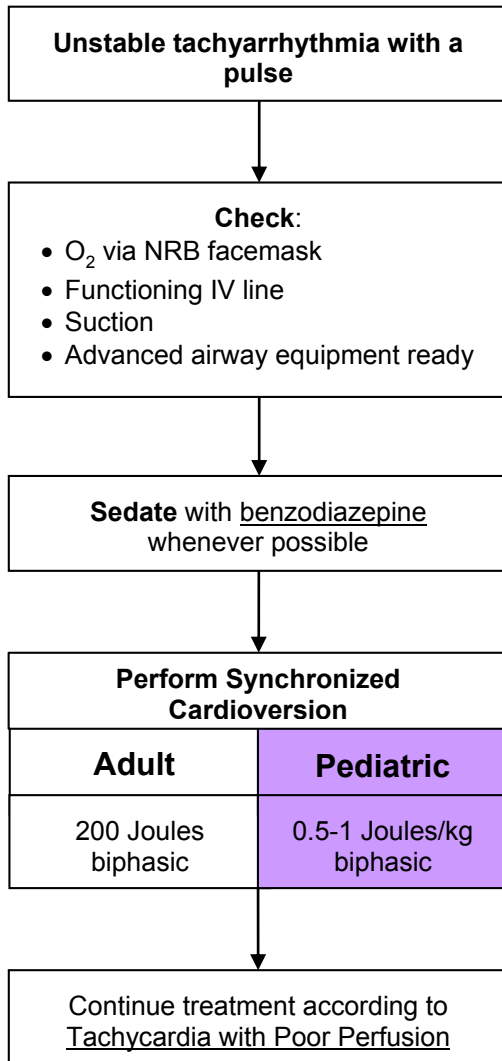
**Technique:**

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

## 1090 PROCEDURE PROTOCOL: SYNCHRONIZED CARIOVERSION



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 Poor Perfusion protocol

### 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



## 1100 PROCEDURE PROTOCOL: TRANSCUTANEOUS CARDIAC PACING

### 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.

### Contraindications

1. Pacing is contraindicated in pulseless arrest.

### Technique

1. Apply electrodes as per manufacturer specifications: (-) left anterior, (+) left posterior.
2. Turn pacer unit on.
3. Set initial current to 80 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. If no initial capture, increase current 10 mAmps every 10-15 seconds until capture or 200 mAmps (usually captures around 100 mAmps).
8. Check for femoral pulse once there is electrical capture.
9. If no capture occurs with maximum output, discontinue pacing and resume ACLS.

### 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.

## 1110 PROCEDURE PROTOCOL: INTRAOSSEOUS CATHETER PLACEMENT

### **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
  - 3. Hypoglycemia with severe symptoms (e.g. unresponsive) and no venous access
- B. Utilization of IO access for all other patients requires base station contact
- C. IO placement may be considered prior to peripheral IV attempts in critical patients without identifiable peripheral veins

### **Technique:**

- A. Site – proximal tibia or proximal humerus (adult only).
- B. Clean skin with povidone-iodine.
- C. For proximal tibia, insert needle into the tibial plateau at a 90 degree angle.
  - 1. For infants less than 6 months consider manual insertion of needle rather than powered device to avoid puncturing through both sides of the bone.
- D. For proximal humerus, insert needle into the humeral head at a 45 degree angle.
- E. Follow manufacturer's guidelines specific to the device being used for insertion.
- F. Entrance into the bone marrow is indicated by a sudden loss of resistance.
- G. Flush line with 10 mL saline. Do not attempt to aspirate marrow
- H. 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.
- I. 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.
- J. A person should be assigned to monitor the IO at the scene and en route to the hospital.
- K. Do not make more than one IO placement attempt per bone.
- L. Do not remove IO needles in the field.
- M. 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/shoulder replacement (hardware will prevent placement)
- E. Proximal humerus site should not be attempted on pediatric patients

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

- 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.

## 1120 PROCEDURE PROTOCOL: TOURNIQUET PROTOCOL

### **Indications**

- A. A tourniquet should be used for initial control of life threatening hemorrhage.

### **Precautions**

- A. In cases of life-threatening bleeding, benefit of tourniquet use outweighs any theoretical risk of limb ischemia.
- B. 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.

### **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. If bleeding is not controlled with the application of a single tourniquet, a 2<sup>nd</sup> can be applied adjacent to the 1<sup>st</sup>.
  - 5. Mark the time and date of application on the patient's skin next to the tourniquet.
  - 6. Keep tourniquet on throughout hospital transport – a correctly applied tourniquet should only be removed by the receiving hospital.
  - 7. Pain management as needed.

## 1130 PROCEDURE PROTOCOL: RESTRAINT PROTOCOL

### Indications:

- A. Physical restraint of patients is permissible and encouraged if the patient poses a danger to him/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 sedation for agitated patients that require transport and are behaving in a manner that poses a threat to him/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 de-escalation.
  - 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/herself or others (including the EMS providers), 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 impairs 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 Transport of Handcuffed Patient Protocol.

### Technique:

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

### 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.

## 1150 PROCEDURE PROTOCOL: TASER® PROBE REMOVAL

### Indications

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

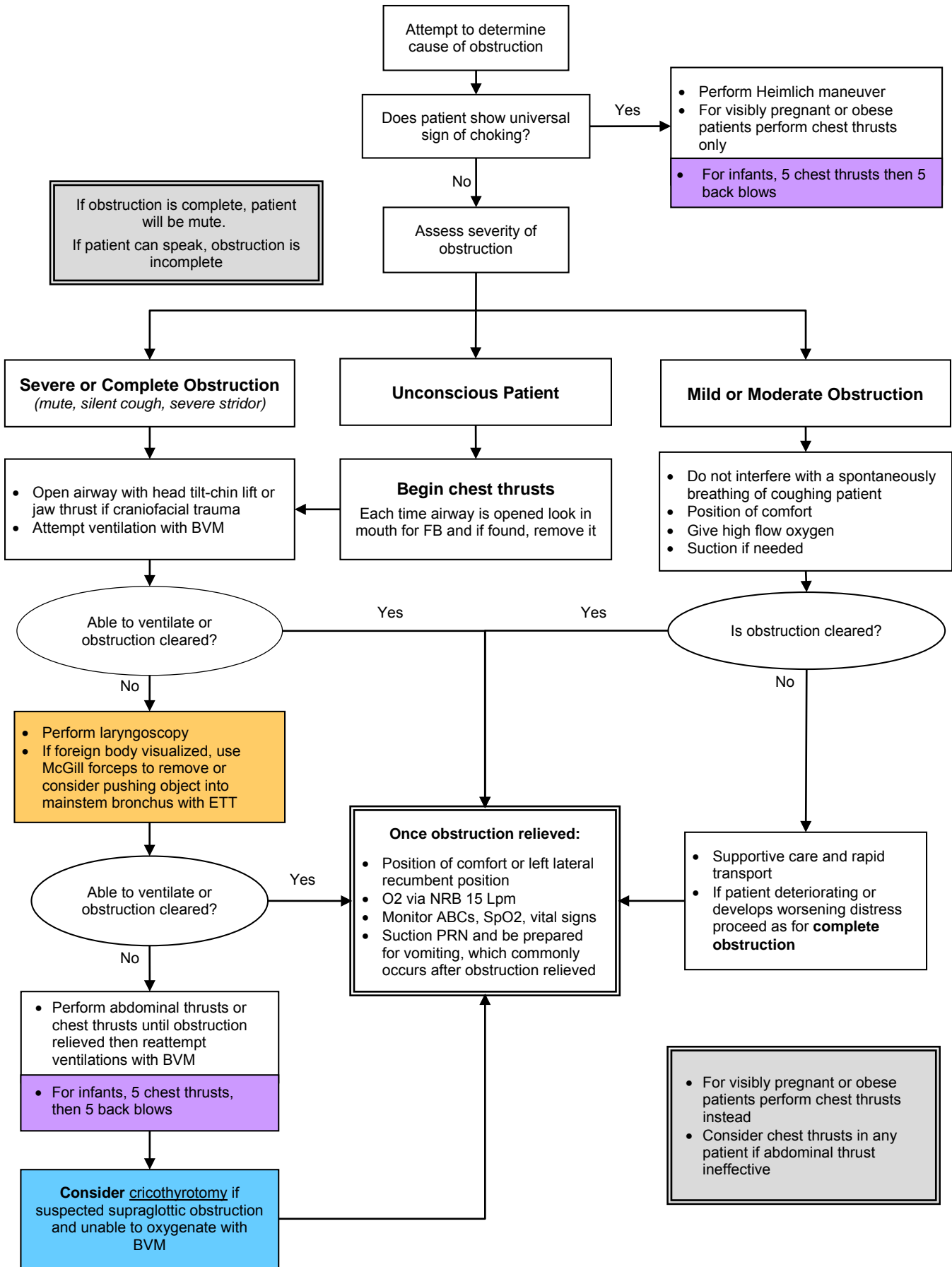
### Contraindications

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

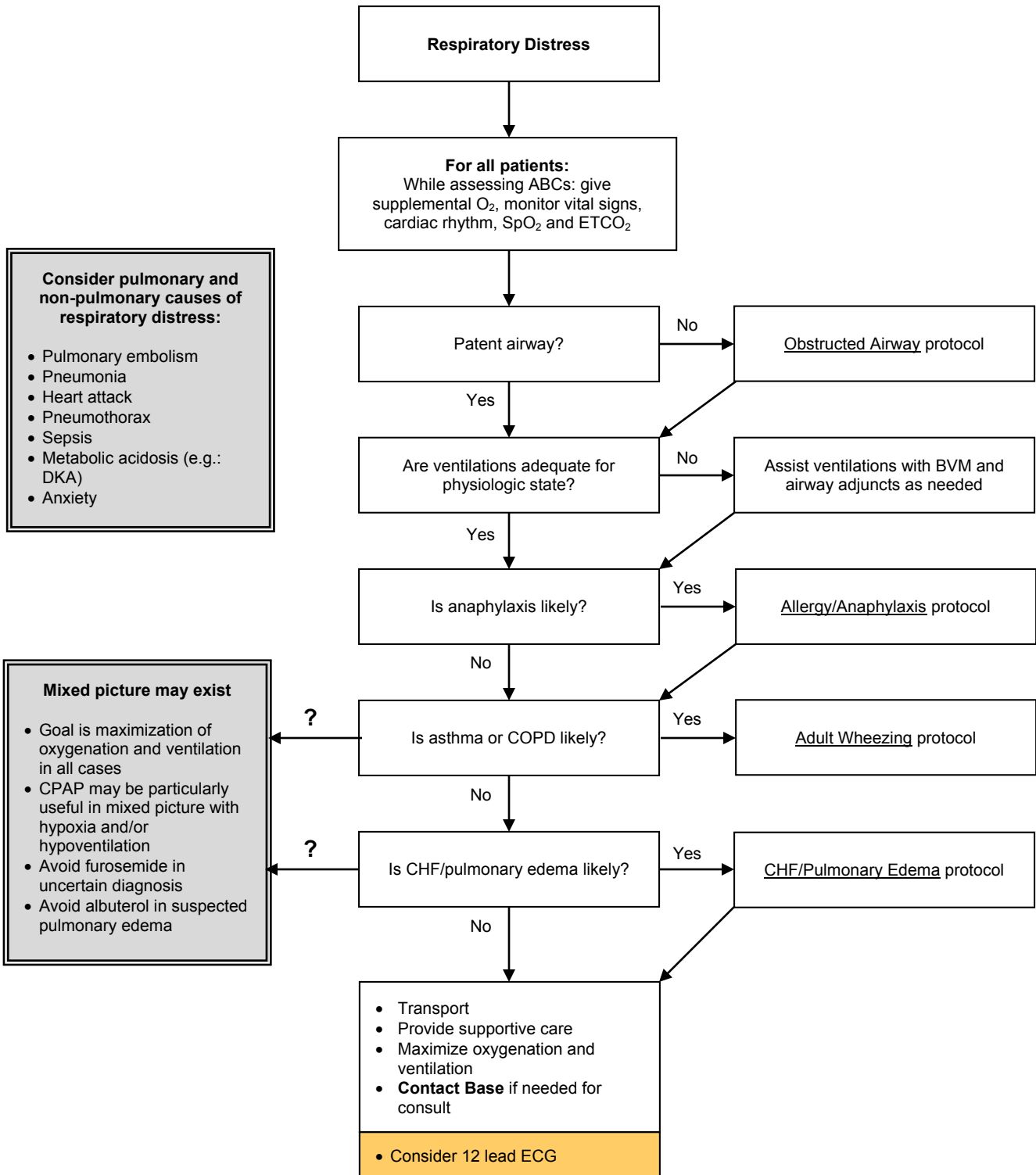
### Technique

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.

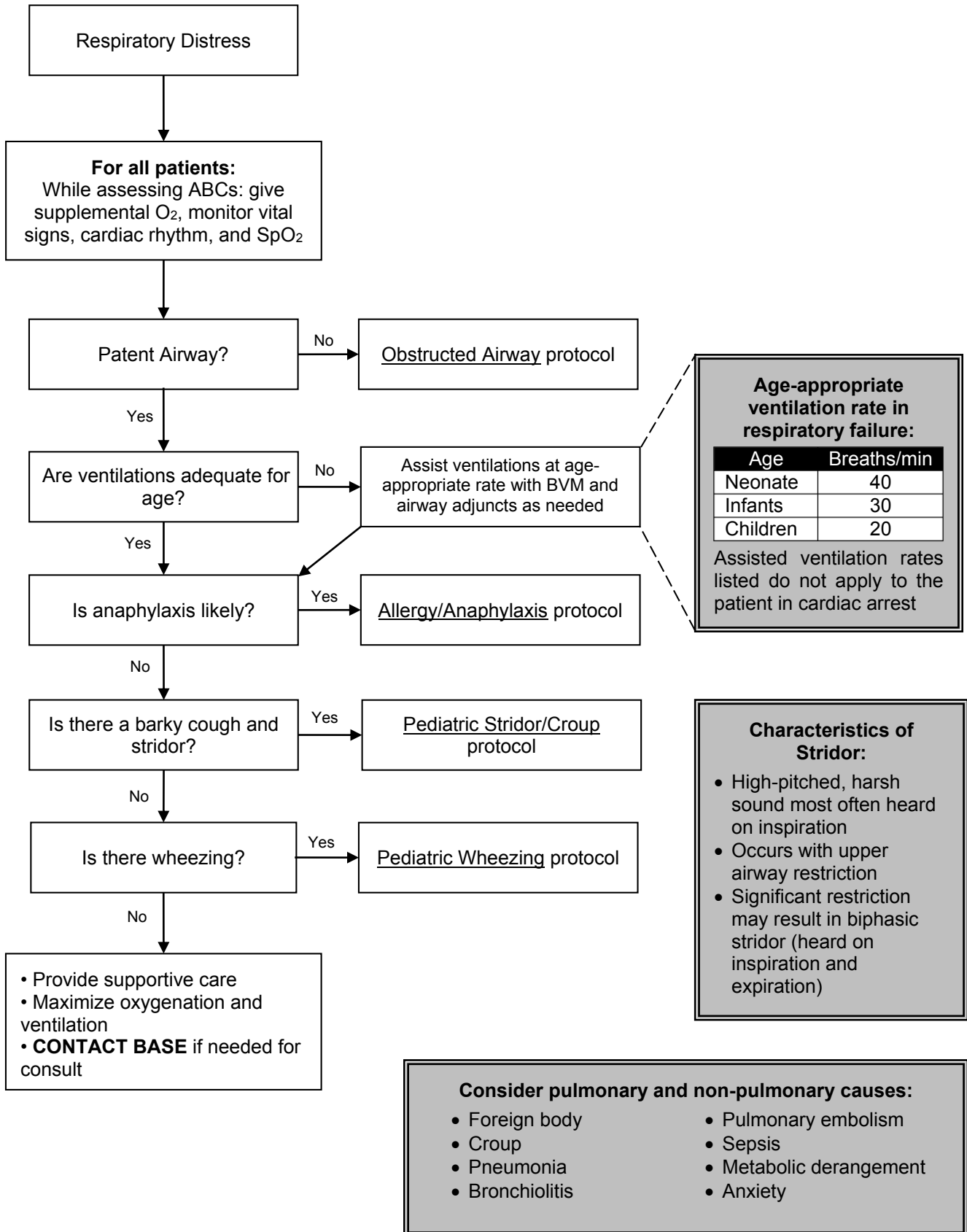
## 2000 OBSTRUCTED AIRWAY



## 2010 ADULT UNIVERSAL RESPIRATORY DISTRESS

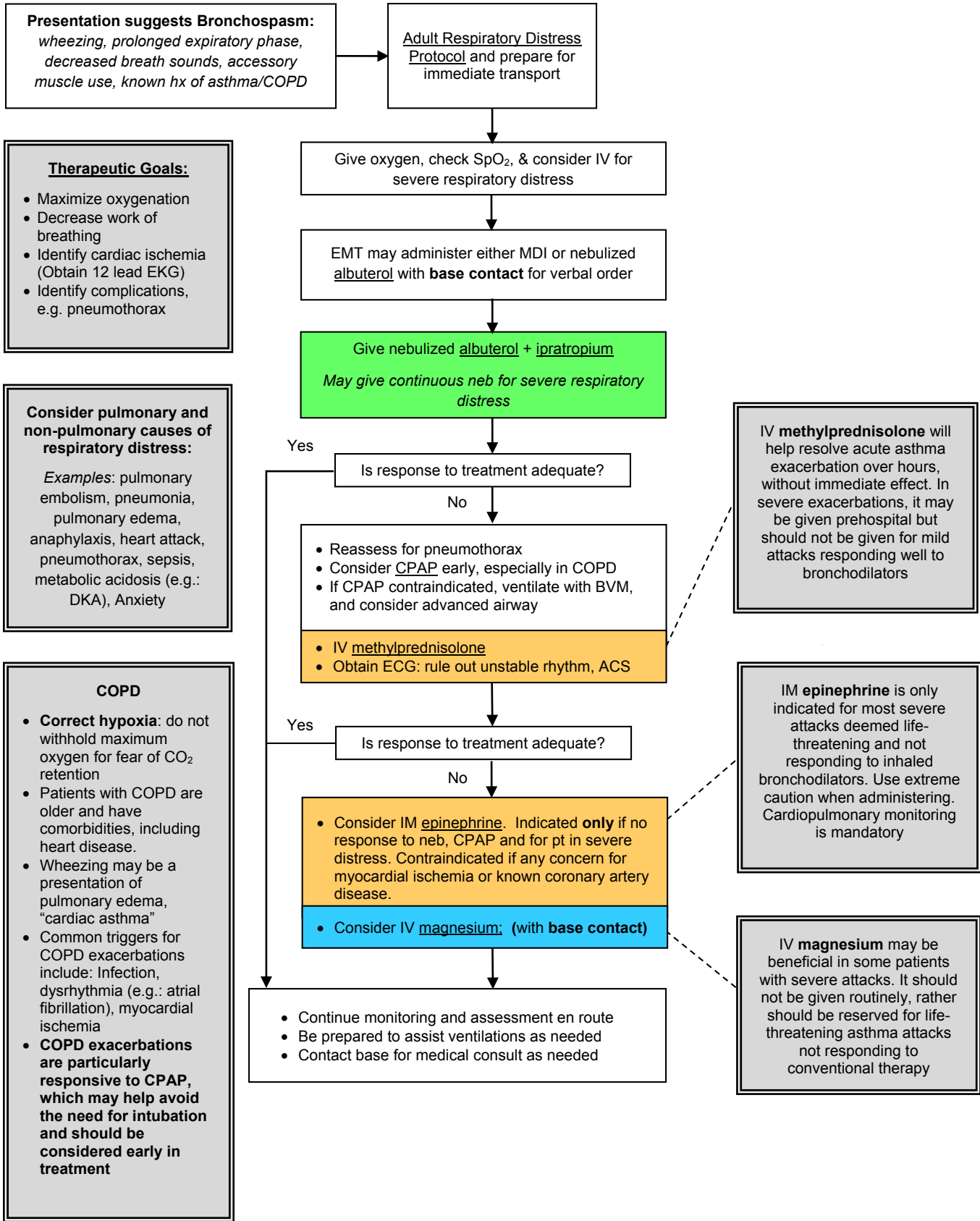


## 2020 PEDIATRIC UNIVERSAL RESPIRATORY DISTRESS





## 2030 ADULT WHEEZING



**Therapeutic Goals:**

- Maximize oxygenation
- Decrease work of breathing
- Identify cardiac ischemia (Obtain 12 lead EKG)
- Identify complications, e.g. pneumothorax

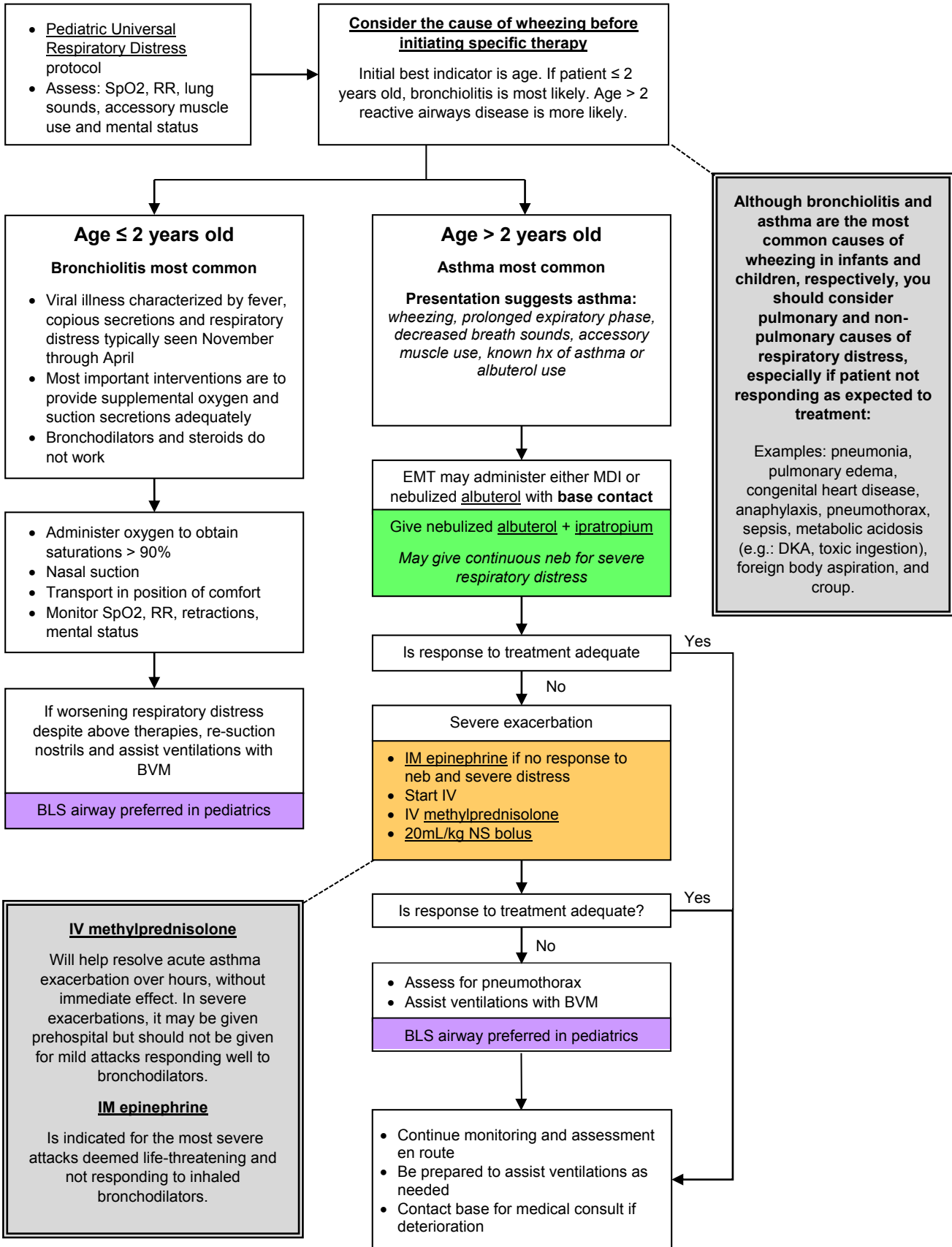
**Consider pulmonary and non-pulmonary causes of respiratory distress:**

*Examples: pulmonary embolism, pneumonia, pulmonary edema, anaphylaxis, heart attack, pneumothorax, sepsis, metabolic acidosis (e.g.: DKA), Anxiety*

**COPD**

- **Correct hypoxia:** do not withhold maximum oxygen for fear of CO<sub>2</sub> retention
- 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
- **COPD exacerbations are particularly responsive to CPAP, which may help avoid the need for intubation and should be considered early in treatment**

# 2040 PEDIATRIC WHEEZING



- Pediatric Universal Respiratory Distress protocol
- Assess: SpO<sub>2</sub>, RR, lung sounds, accessory muscle use and mental status

**Consider the cause of wheezing before initiating specific therapy**

Initial best indicator is age. If patient ≤ 2 years old, bronchiolitis is most likely. Age > 2 reactive airways disease is more likely.

**Age ≤ 2 years old**

**Bronchiolitis most common**

- Viral illness characterized by fever, copious secretions and respiratory distress typically seen November through April
- Most important interventions are to provide supplemental oxygen and suction secretions adequately
- Bronchodilators and steroids do not work

- Administer oxygen to obtain saturations > 90%
- Nasal suction
- Transport in position of comfort
- Monitor SpO<sub>2</sub>, RR, retractions, mental status

If worsening respiratory distress despite above therapies, re-suction nostrils and assist ventilations with BVM

BLS airway preferred in pediatrics

**Age > 2 years old**

**Asthma most common**

**Presentation suggests asthma:**  
*wheezing, prolonged expiratory phase, decreased breath sounds, accessory muscle use, known hx of asthma or albuterol use*

EMT may administer either MDI or nebulized albuterol with **base contact**

Give nebulized albuterol + ipratropium

May give continuous neb for severe respiratory distress

Is response to treatment adequate?

**Severe exacerbation**

- **IM epinephrine** if no response to neb and severe distress
- Start IV
- IV methylprednisolone
- 20mL/kg NS bolus

Is response to treatment adequate?

- Assess for pneumothorax
  - Assist ventilations with BVM
- BLS airway preferred in pediatrics

- Continue monitoring and assessment en route
- Be prepared to assist ventilations as needed
- Contact base for medical consult if deterioration

Although bronchiolitis and asthma are the most common causes of wheezing in infants and children, respectively, you should consider pulmonary and non-pulmonary causes of respiratory distress, especially if patient not responding as expected to treatment:

Examples: pneumonia, pulmonary edema, congenital heart disease, anaphylaxis, pneumothorax, sepsis, metabolic acidosis (e.g.: DKA, toxic ingestion), foreign body aspiration, and croup.

**IV methylprednisolone**

Will help resolve acute asthma exacerbation over hours, without immediate effect. In severe exacerbations, it may be given prehospital but should not be given for mild attacks responding well to bronchodilators.

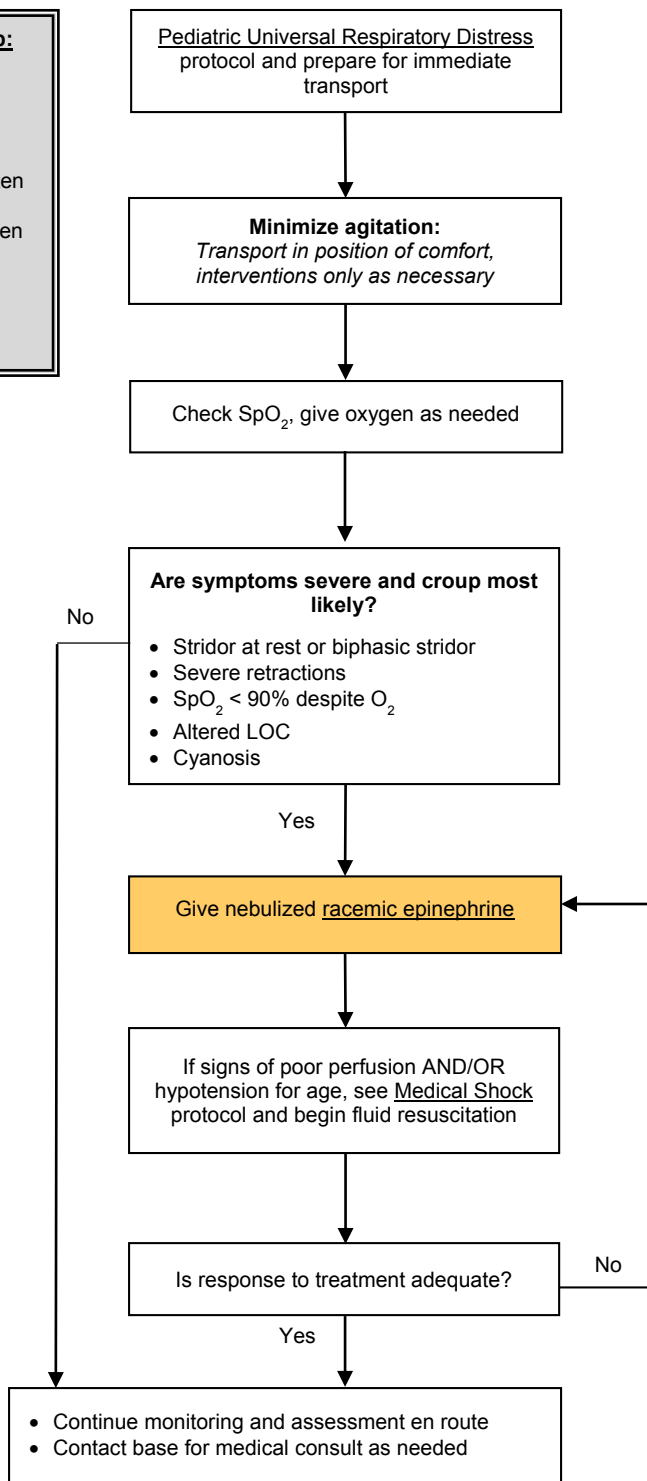
**IM epinephrine**

Is indicated for the most severe attacks deemed life-threatening and not responding to inhaled bronchodilators.

## 2050 PEDIATRIC STRIDOR/CROUP

**Characteristics of Croup:**

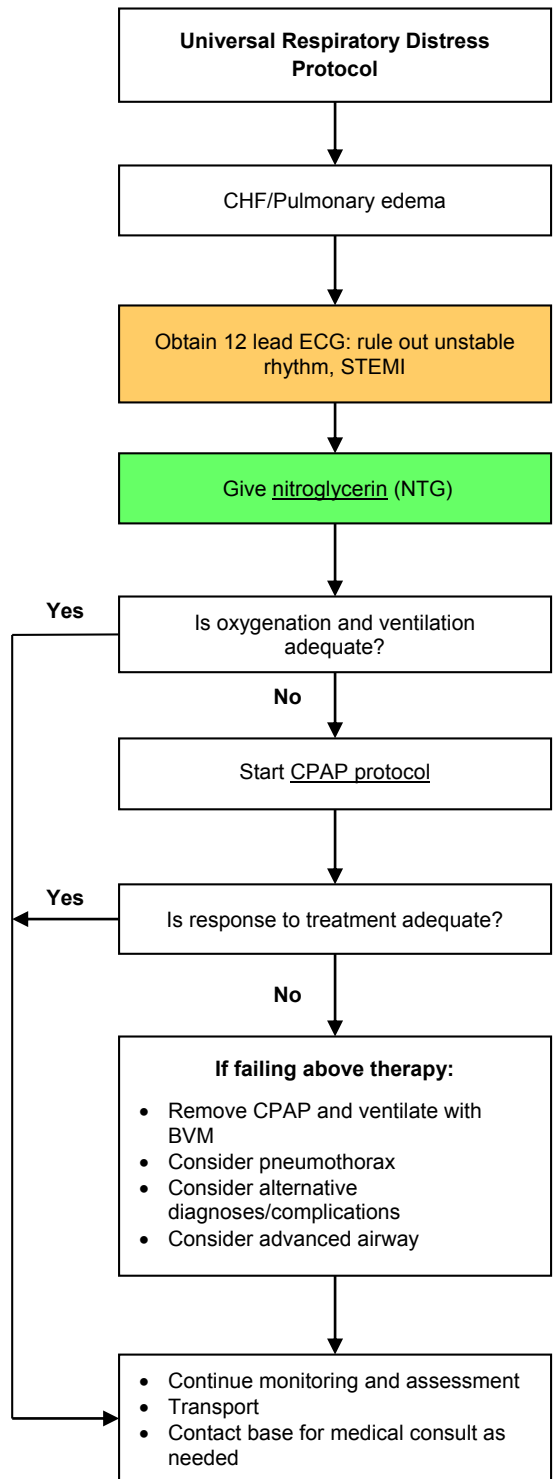
- Most common cause of stridor in children
- Child will have stridor, barking cough, and URI symptoms of sudden, often nocturnal onset
- Most often seen in children < 9 years old
- Agitation worsens the stridor and respiratory distress



**Considerations with Stridor:**

- Stridor is a harsh, usually inspiratory sound caused by narrowing or obstruction of the upper airway
- Causes include croup, foreign body aspiration, allergic reactions, trauma, infection, mass
- Epiglottitis is exceedingly rare. May consider in the unimmunized child. Treatment is minimization of agitation. Airway manipulation is best done in the hospital.

## 2060 CHF/PULMONARY EDEMA



### 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

# 3000 UNIVERSAL PULSELESS ARREST ALGORITHM

See **3010 Universal Pulseless Arrest Considerations** for additional pulseless arrest guidelines, including:

- Compressions
- Defibrillation
- Epinephrine
- Ventilations
- Airway
- ROSC

Pulseless Arrest

Move patient to a workable space, ideally:

- With 4 feet on all sides
- In 60 seconds or less

- Initiate chest compressions
- Attach cardiac monitor
- Deliver oxygen

## Box A

Perform rhythm check every two minutes, ideally:

- Pre-charging the monitor
- Switching compressors
- Pausing for ≤ 5 seconds

Yes

VT/VF

Shockable Rhythm?

No

Asystole/PEA

Shock, then resume CPR

Resume CPR

Every two minutes, return to **Box A**

For shock-refractory or recurrent VT/VF:  
Administer Amiodarone

- For frequency and dosing, refer to protocol guidelines

- Start IV/IO
- Administer Epinephrine
  - For frequency and dosing, refer to protocol guidelines
- Consider positive pressure ventilation, if not already initiated

- If organized rhythm, check pulse.
- If ROSC, begin post-cardiac arrest care

- If indicated, place advanced airway
- Treat reversible causes ("Hs & Ts")

### Reversible Causes:

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypo/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis (pulmonary, coronary)

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

- Administer Calcium
- Administer Bicarb
- Flush line between medications

## 3010 UNIVERSAL PULSELESS ARREST CONSIDERATIONS

### ADULT PATIENT

#### Compressions

- Follow current ACLS guidelines for chest compressions
- Minimize interruptions, resume compressions immediately after shocks, rhythm checks. Check pulses only if organized rhythm
- Push hard ( $\geq 2$  inches) and fast (100-120/min) and allow complete chest recoil
- If available, use metronome to monitor compression rate
- Assess quality of CPR with continuous waveform capnography
- If  $ETCO_2 < 10$ , improve quality of compressions
- If using automated CPR devices, use manufacturer's specifications

#### Defibrillation

- Recommended energy dosing is 360 J
- For shockable rhythms refractory to defibrillation and medication administration, consider changing the placement of electrode pads
- When monitor is charged but shock is not indicated, clear patient before discharge

#### Epinephrine

- The first dose of Epinephrine should be administered as soon as possible
- Subsequent doses should be administered every 3 cycles of compressions or every 6 minutes
- After 3 doses, additional Epinephrine is not routinely recommended

#### Ventilations

- Open the airway, place NPA/OPA, place NRB facemask with  $O_2$  at 15 L/min for initial phase of resuscitation, unless hypoxic arrest suspected (e.g.: asphyxiation, overdose, status asthmaticus), in which case begin ventilations immediately
- Regardless of airway type (BLS, iGel, ETT), ventilate every 10 compressions, without pausing compressions
- Do not over ventilate

#### Airway

- An advanced airway (iGel, ETT) may be placed at any time after initial phase passive oxygenation, if applicable, or as soon as possible if asphyxial arrest suspected, provided placement does not interrupt compressions.
- ETT is preferred for adults

#### ROSC

- Pulse and blood pressure
- Sustained abrupt rise in  $ETCO_2$ , typically  $> 40$

### PEDIATRIC PATIENT

#### Compressions

- Follow current PALS guidelines for chest compressions
- Minimize interruptions, resume compressions immediately after shocks, rhythm checks. Check pulses only if organized rhythm
- Push hard ( $\geq 1/3$  of anteroposterior chest diameter) and fast (100-120/min) and allow complete chest recoil
- If available, use metronome to monitor compression rate
- Assess quality of CPR with continuous waveform capnography

#### Defibrillation

- Follow Handtevy guidelines for energy dosing
- EMT use AED
- Paramedic use manual defibrillator

#### Epinephrine

- The first dose of Epinephrine should be administered as soon as possible
- Subsequent doses should be administered every 3 cycles of compressions or every 6 minutes
- After 3 doses, additional Epinephrine is not routinely recommended

#### Ventilations

- Regardless of airway type (BLS, iGel, ETT), ventilate every 10 compressions, without pausing compressions
- Do not over ventilate

#### Airway

- BVM preferred for all pediatric patients
- An appropriately-sized supraglottic airway (iGel) or ETT may be placed as an alternative if BVM ventilations are inadequate

#### ROSC

- Pulse and blood pressure
- Sustained abrupt rise in  $ETCO_2$ , typically  $> 40$

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

- 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

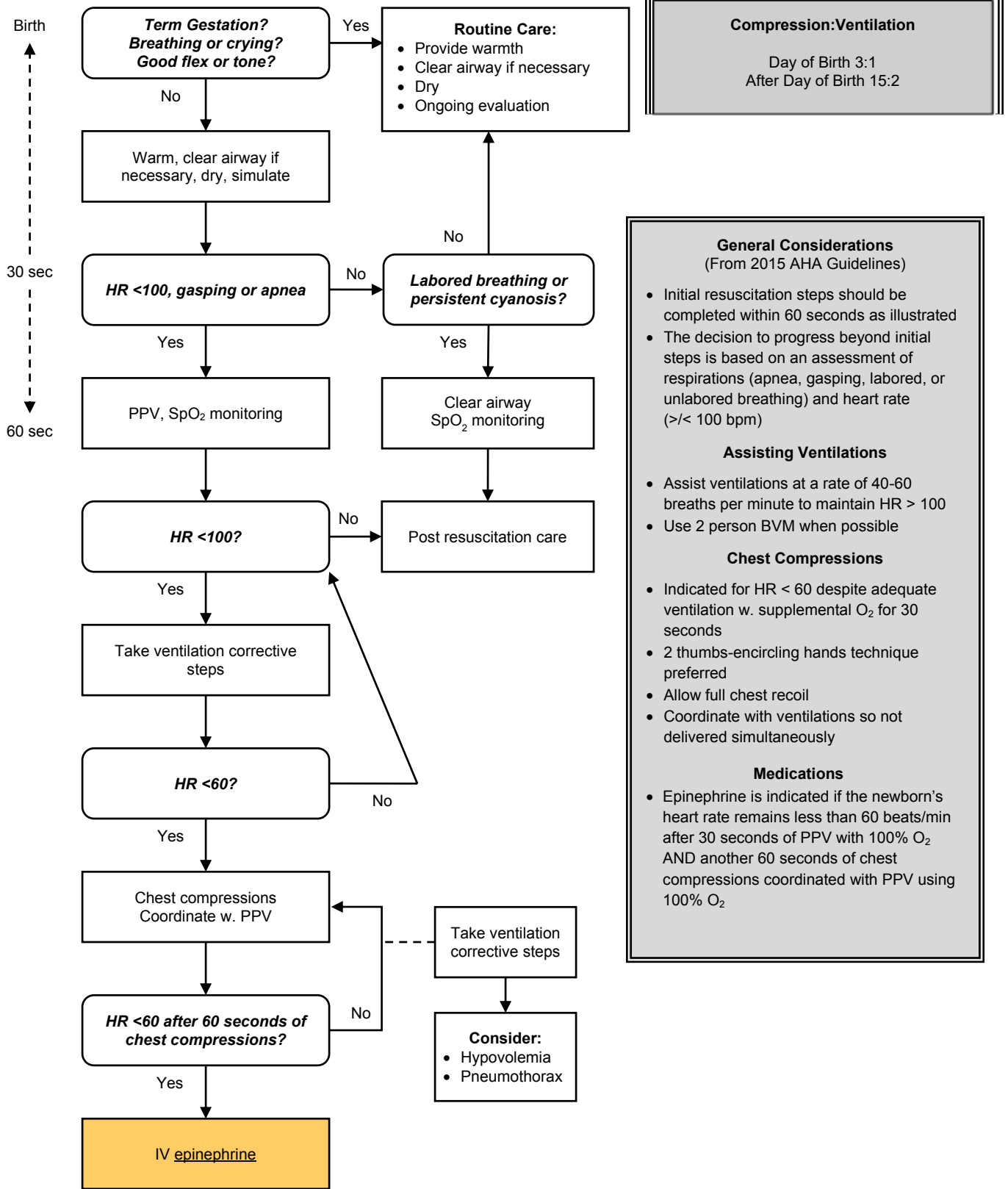
### **Pacing**

- 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

### **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

# 3020 NEONATAL RESUSCITATION



### 3030 POST-RESUSCITATION CARE WITH ROSC

**Post-Cardiac Care**

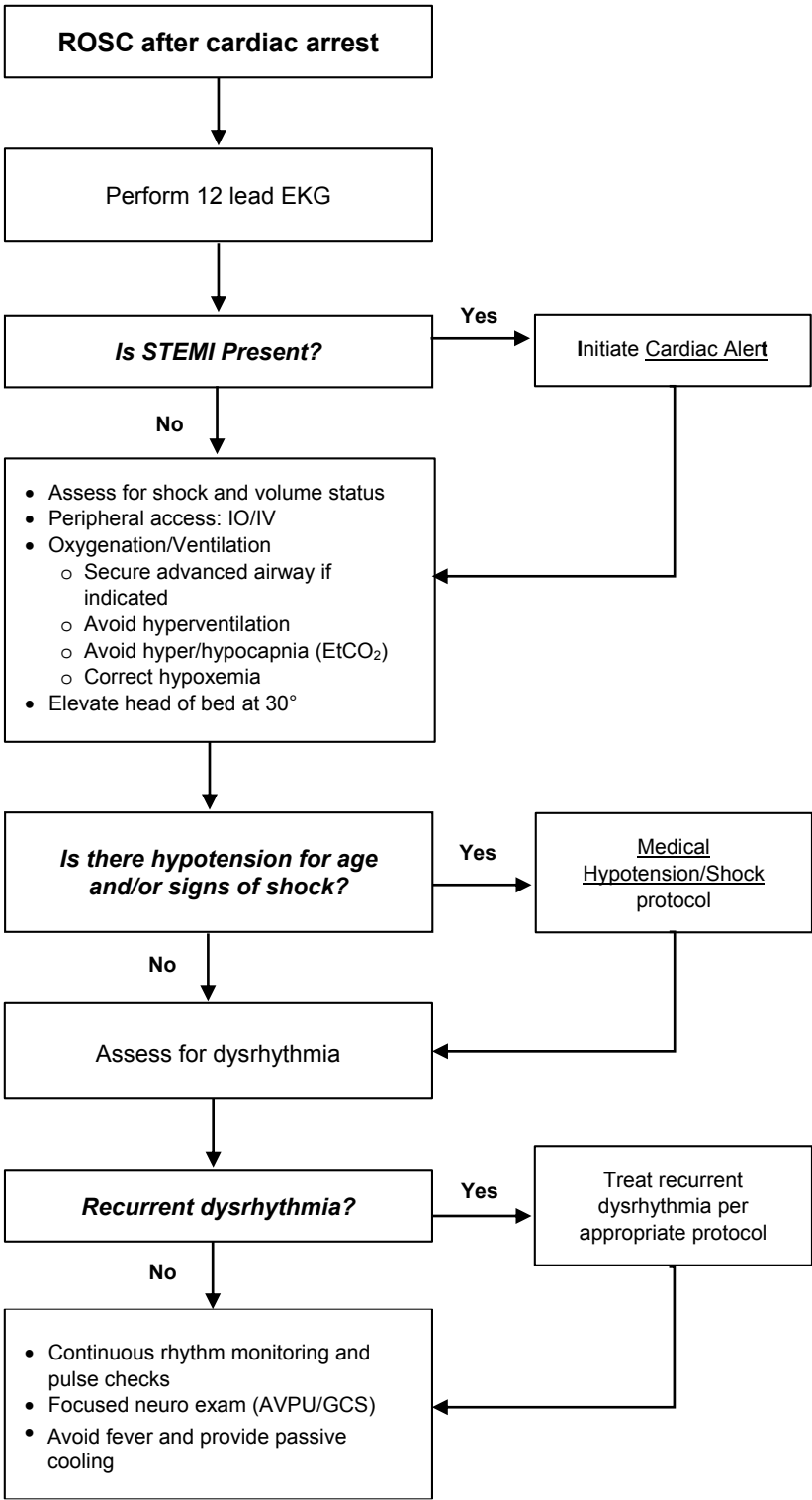
- Following ROSC, several simultaneous and stepwise interventions must be performed to optimize care and maximize patient outcome
- Survival and neurologic outcome worsen with fever, hypoxia, hypo/hypercapnia, and hypotension. Post-ROSC care should focus on prevention of these elements

**Return of spontaneous circulation (ROSC) criteria:**

Pulse and measurable blood pressure  
Increase in  $EtCO_2$  on capnography

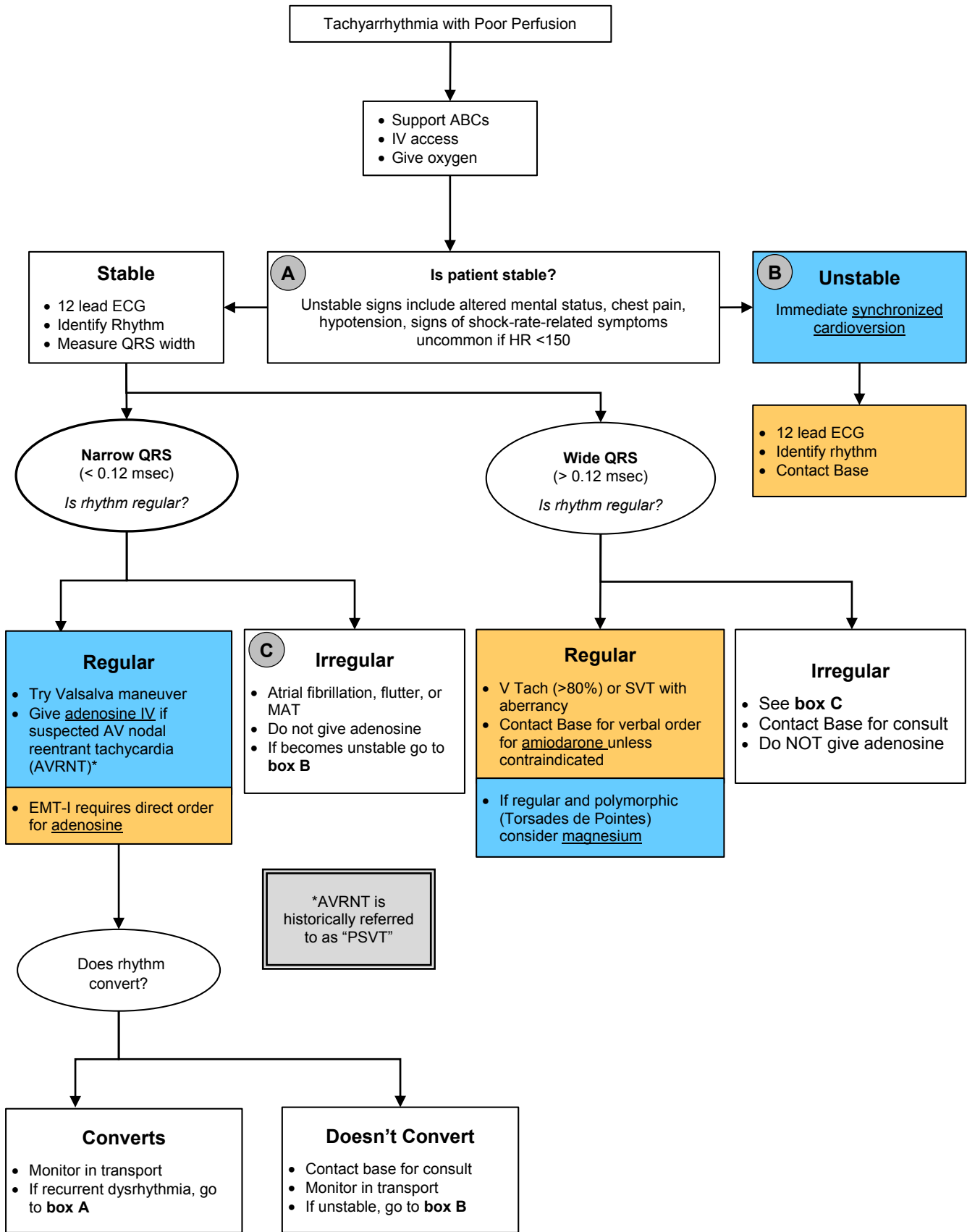
**Document:**

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

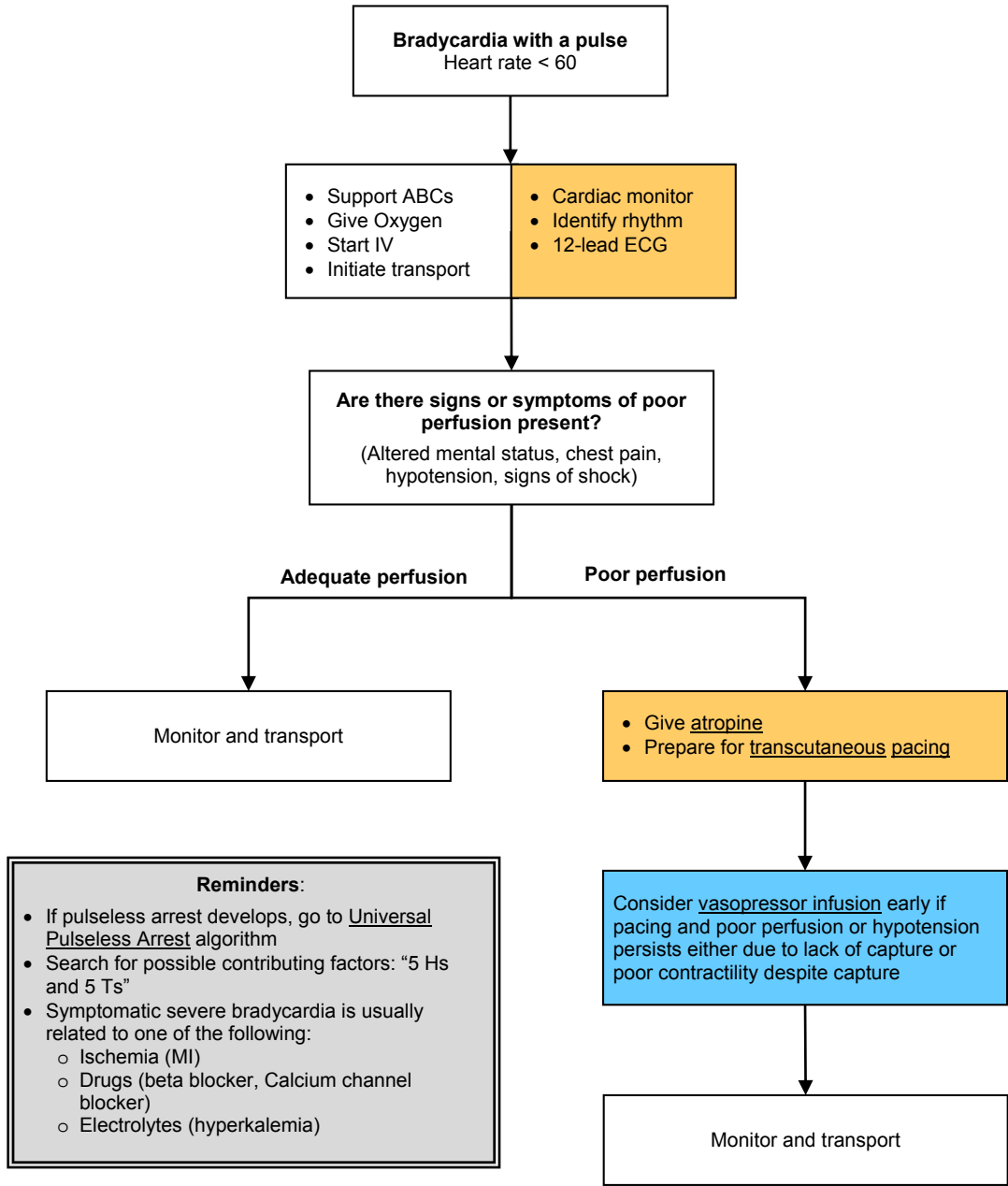




# 3040 TACHYARRHYTHMIA WITH POOR PERFUSION



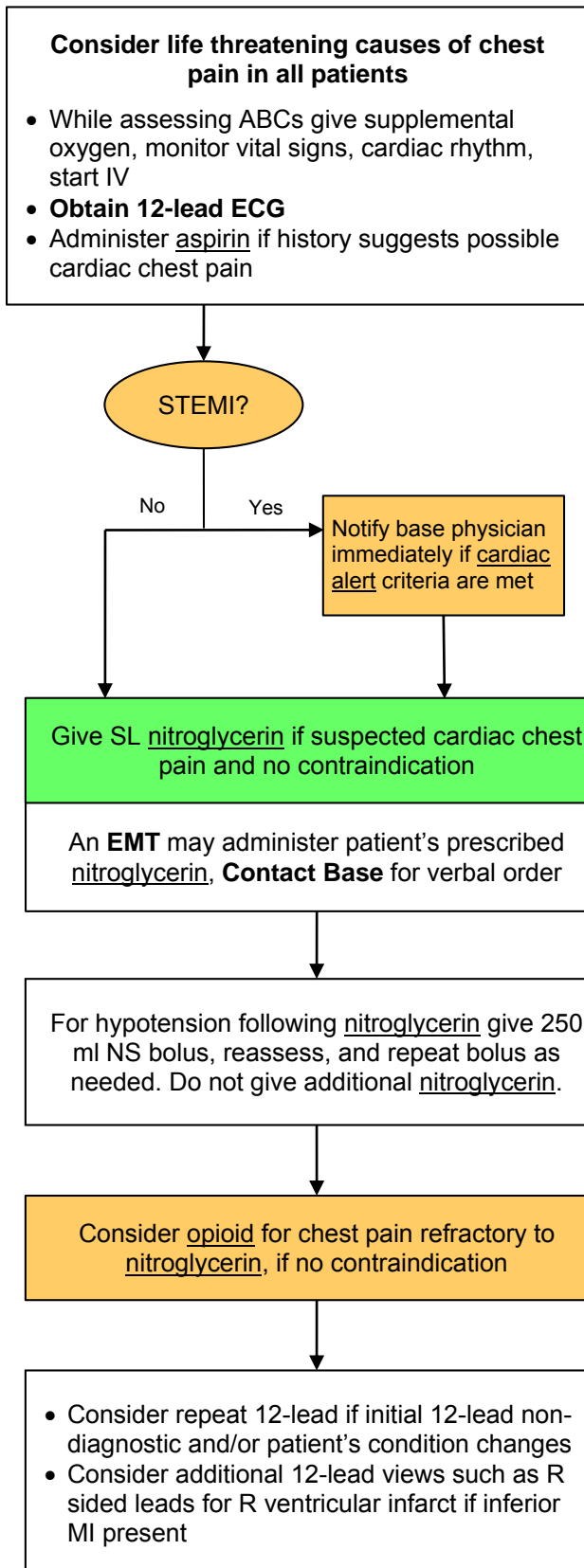
### 3050 BRADYARRHYTHMIA WITH POOR PERFUSION



**Reminders:**

- If pulseless arrest develops, go to Universal Pulseless Arrest algorithm
- Search for possible contributing factors: "5 Hs and 5 Ts"
- Symptomatic severe bradycardia is usually related to one of the following:
  - o Ischemia (MI)
  - o Drugs (beta blocker, Calcium channel blocker)
  - o Electrolytes (hyperkalemia)

## 3060 CHEST PAIN



### Life threatening causes of chest pain:

- Acute coronary syndrome (ACS)
- Pulmonary embolism
- Thoracic aortic dissection
- Tension pneumothorax

### Nitroglycerin Contraindications:

- Suspected right ventricular ST-segment elevation MI (inferior STEMI pattern plus ST elevation in right-sided precordial leads e.g. V4R)
- Hypotension SBP < 100
- Recent use of erectile dysfunction (ED) medication (e.g. Viagra, Cialis)

### Causes of Chest Pain in Children:

- Costochondritis
- Pulmonary Causes
- Ischemia Is rare but can be seen with a history of Kawasaki's disease with coronary aneurysms
- Cyanotic or Congenital Heart Disease
- Myocarditis
- Pericarditis
- Arrhythmia
- Anxiety
- Abdominal Causes

## 3070 CARDIAC ALERT

### **Goal:**

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

### **Inclusion Criteria:**

- Symptoms consistent with ACS
- 12-lead ECG showing ST-segment elevation (STE) at least 1 mm in two or more anatomically contiguous leads
- Age 35 years or older (If STEMI patient outside age criteria, contact **base** 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 base physician

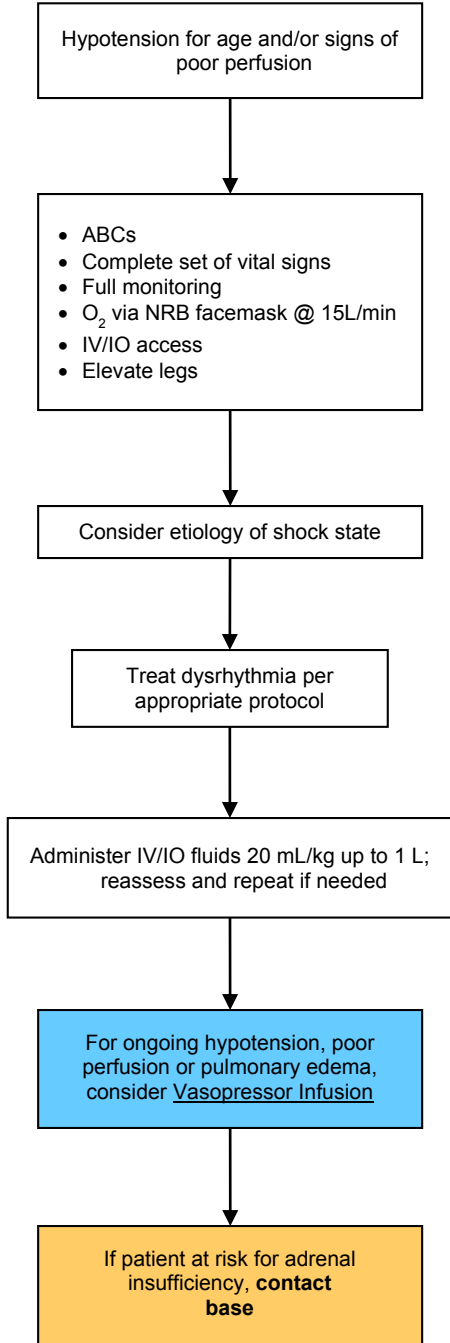
### **Actions:**

- Treat according to chest pain protocol en route (cardiac monitor, oxygen, aspirin, nitroglycerin and opioid as needed for pain control).
- Notify base physician ASAP with ETA and request CARDIAC ALERT. Do not delay hospital notification. If possible, notify dispatch by radio of cardiac alert 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 base physician.

### **Additional Documentation Requirements:**

- Time of first patient contact
- Time of first ECG

# 4000 MEDICAL SHOCK PROTOCOL



Hypotension for Age	
Age	Blood Pressure
<1 year	<70 mmHg
1-10 years	<70 + (2 x age in years)
>10 years	<90 mmHg

Tachycardia for Age	
Age	Heart Rate
<1 year	>160 bpm
1-2 years	>150 bpm
2-5 years	>140 bpm
5-12 years	>120 bpm
>12 years	>100 bpm

- Etiologies of Shock**
- Dysrhythmia, myocardial ischemia
  - Sepsis
  - Hemorrhage
  - Anaphylaxis
  - Overdose
  - Cyanide or carbon monoxide poisoning
  - Other: PE, MI, tension pneumothorax

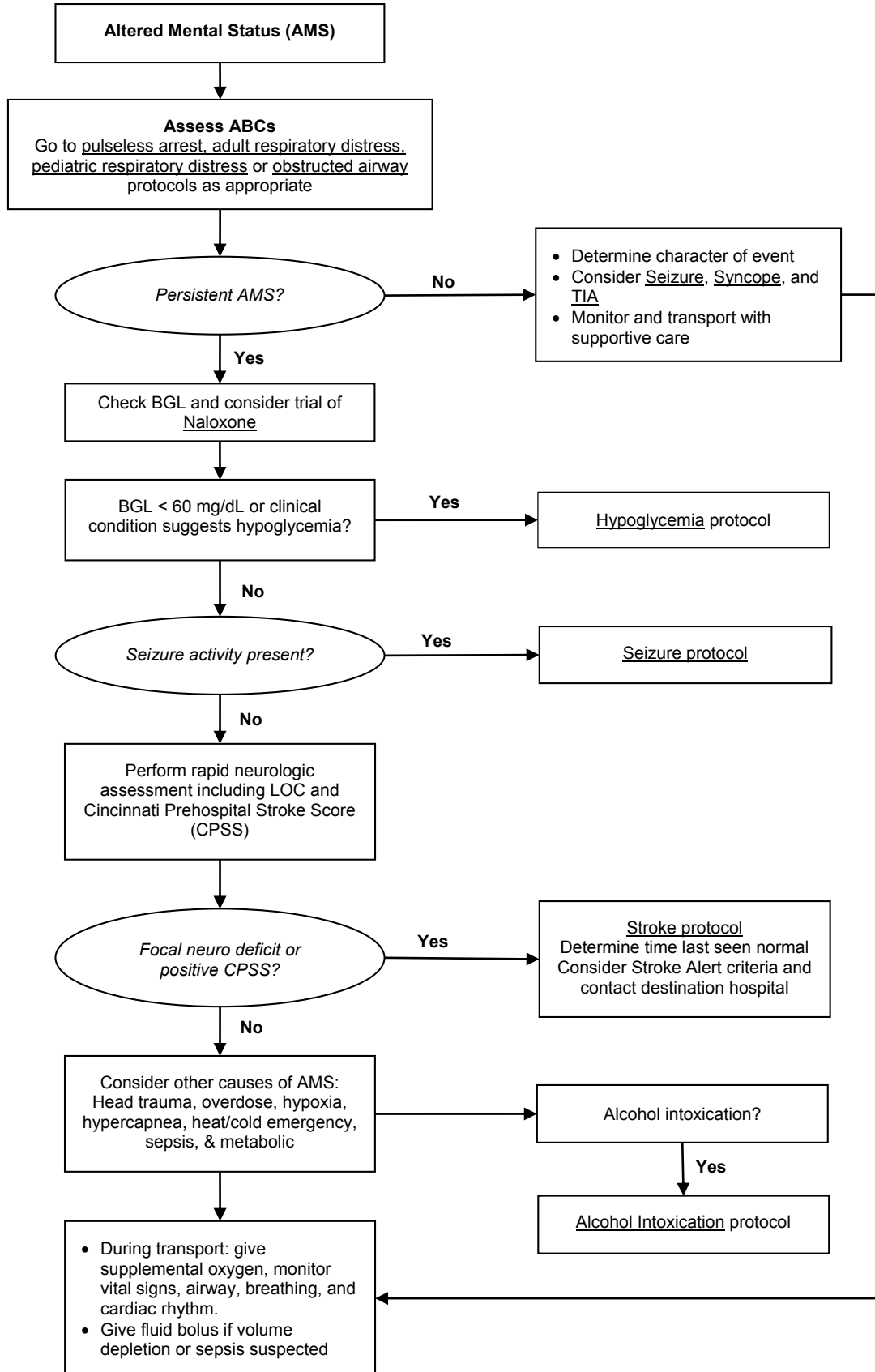
**Pediatric Fluid Administration**

- Hand pull/push fluid with a 60 mL syringe utilizing a 3 way stop cock
- The treatment of compensated shock requires aggressive fluid replacement of up to 20 mL/kg up to 3 boluses..
- Goal of therapy is normalization of vital signs within the first hour
- Hypotension is a late sign in pediatric shock patients

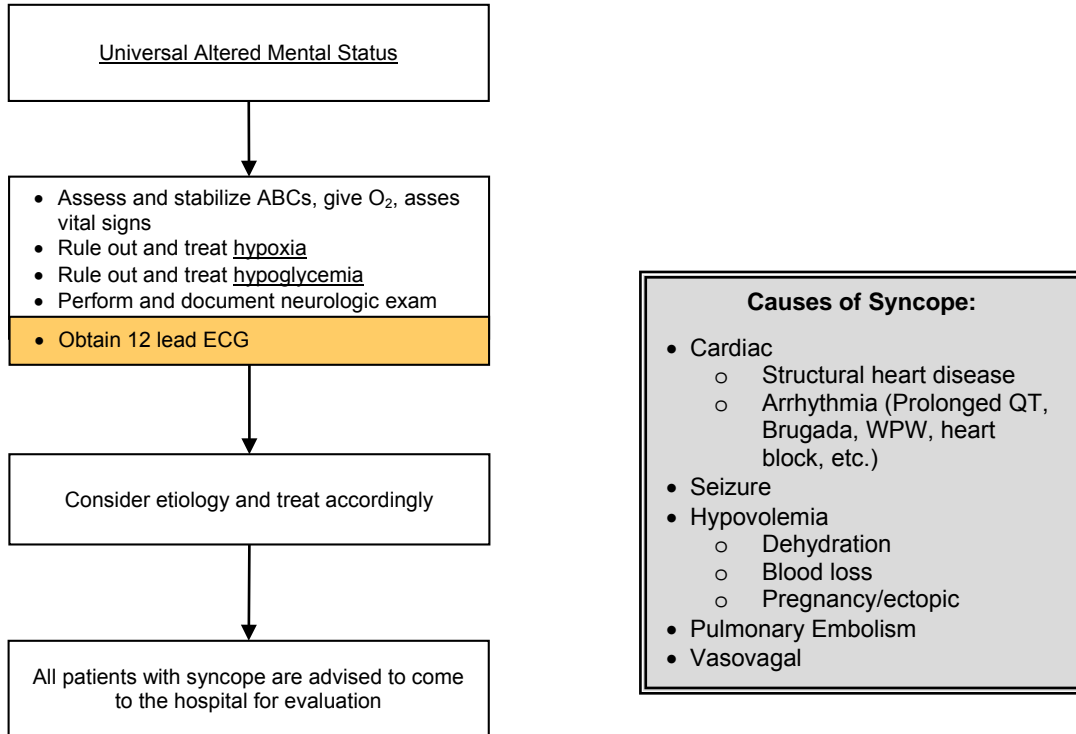
**Pediatric Shock**

<p><b>Signs of Compensated Shock</b></p> <ul style="list-style-type: none"> <li>• Normal mental status</li> <li>• Normal systolic blood pressure</li> <li>• Tachycardia</li> <li>• Prolonged (&gt;2 seconds) capillary refill</li> <li>• Tachypnea</li> <li>• Cool and pale distal extremities</li> <li>• Weak peripheral pulse</li> </ul>	<p><b>Signs of Decompensated Shock</b></p> <ul style="list-style-type: none"> <li>• Decrease mental status</li> <li>• Weak central pulses</li> <li>• Poor color</li> <li>• <u>Hypotension for age</u></li> </ul>
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## 4010 UNIVERSAL ALTERED MENTAL STATUS



## 4020 SYNCOPE



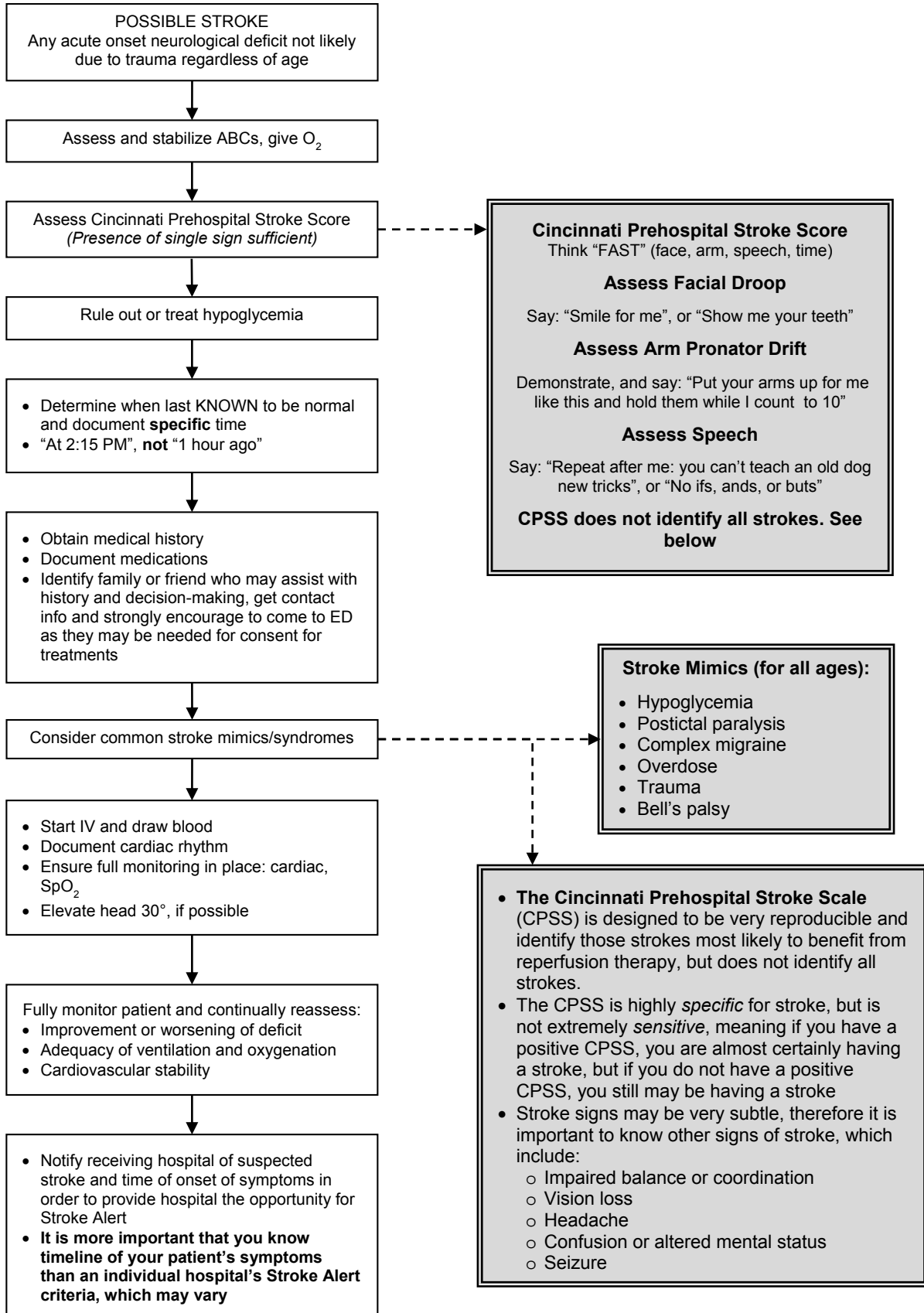
### General Information:

- Syncope is defined as transient loss of consciousness accompanied by loss of postural tone.
- A syncopal episode will generally be very brief and have a rapid recovery with no postictal confusion.
- Convulsive movements called myoclonic jerks may occur with syncope. This is often confused with seizures, but should not be accompanied by a post-ictal phase, incontinence or tongue biting.
- Elderly syncope has a high risk of morbidity and mortality

### Pediatric Considerations:

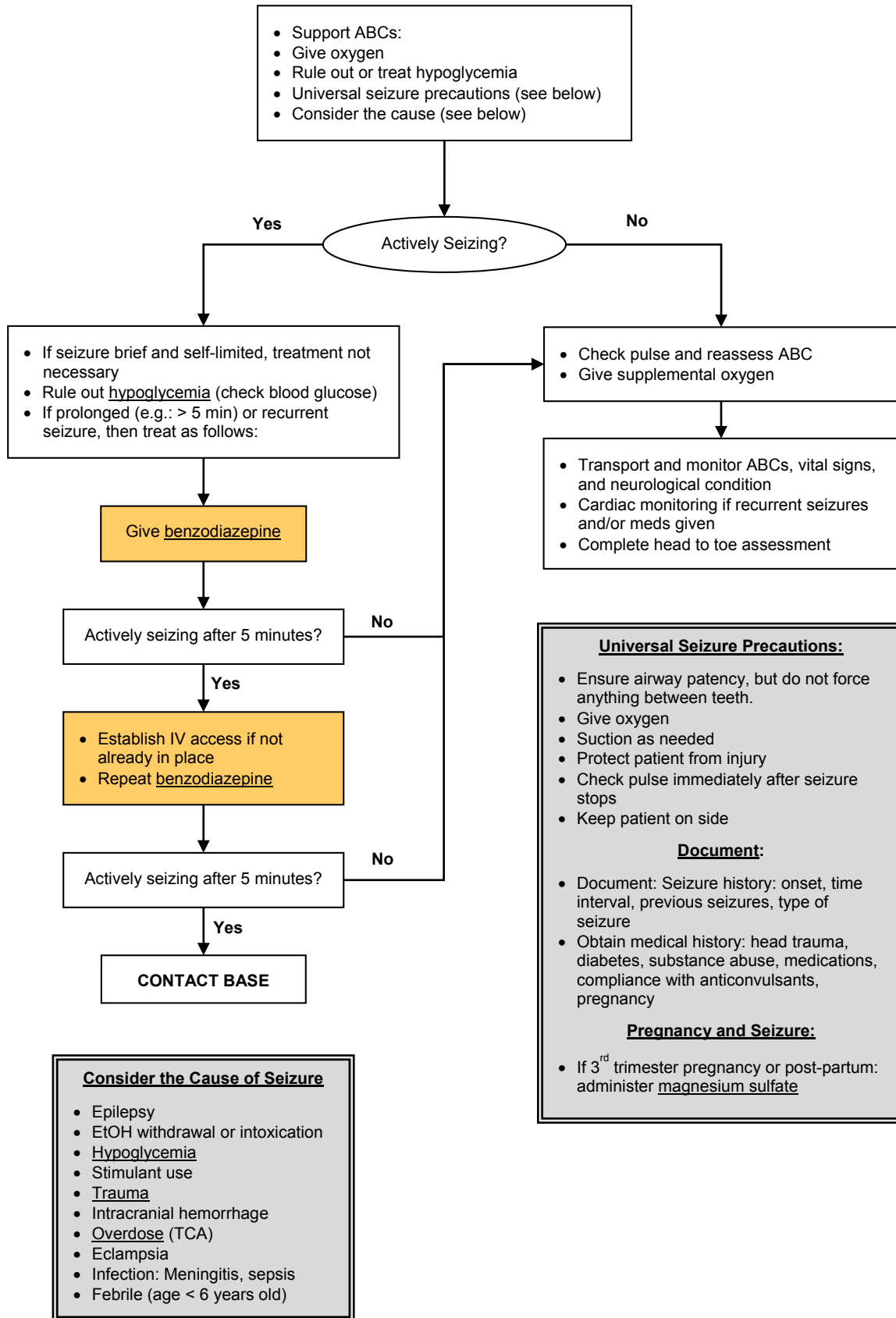
- Life-threatening causes of pediatric syncope are usually cardiac in etiology (arrhythmia, cardiomyopathy, myocarditis, or previously unrecognized structural lesions)
- In addition to the causes listed above, consider the following in the pediatric patient:
  - Seizure
  - Heat intolerance
  - Breath holding spells
  - BRUE (Brief Resolved Unexplained Events, formerly ALTE)
  - Toxins (marijuana, opioids, cocaine, CO, etc.)
- Important historical features of pediatric syncope include: color change, seizure activity, incontinence, post-ictal state, and events immediately prior to syncope event

# 4030 STROKE





# 4040 SEIZURE



- Support ABCs:
- Give oxygen
- Rule out or treat hypoglycemia
- Universal seizure precautions (see below)
- Consider the cause (see below)

Actively Seizing?

- If seizure brief and self-limited, treatment not necessary
- Rule out hypoglycemia (check blood glucose)
- If prolonged (e.g.: > 5 min) or recurrent seizure, then treat as follows:

Give benzodiazepine

Actively seizing after 5 minutes?

- Establish IV access if not already in place
- Repeat benzodiazepine

Actively seizing after 5 minutes?

CONTACT BASE

- Check pulse and reassess ABC
- Give supplemental oxygen

- Transport and monitor ABCs, vital signs, and neurological condition
- Cardiac monitoring if recurrent seizures and/or meds given
- Complete head to toe assessment

**Universal Seizure Precautions:**

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

**Document:**

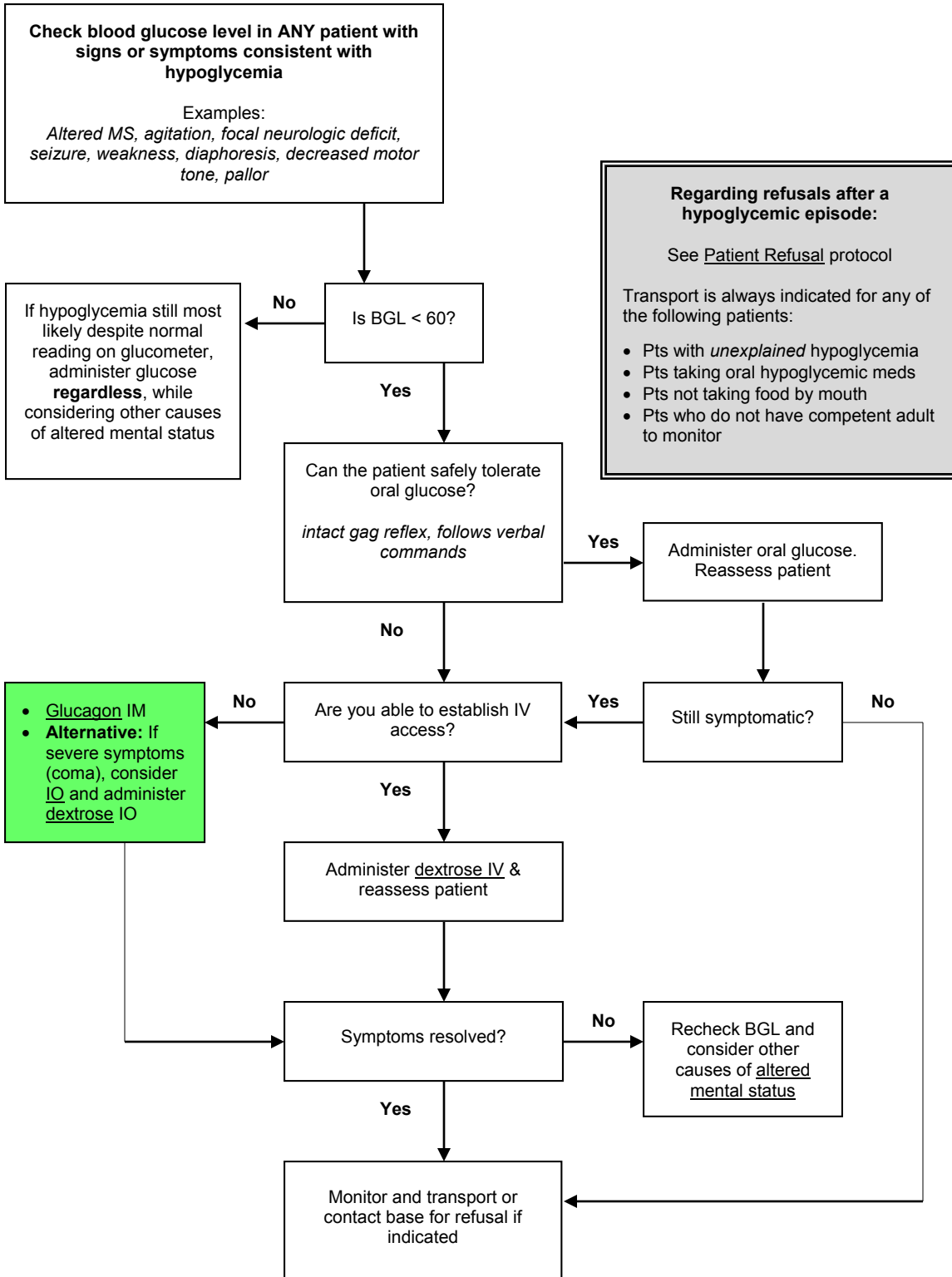
- Document: Seizure history: onset, time interval, previous seizures, type of seizure
- Obtain medical history: head trauma, diabetes, substance abuse, medications, compliance with anticonvulsants, pregnancy

**Pregnancy and Seizure:**

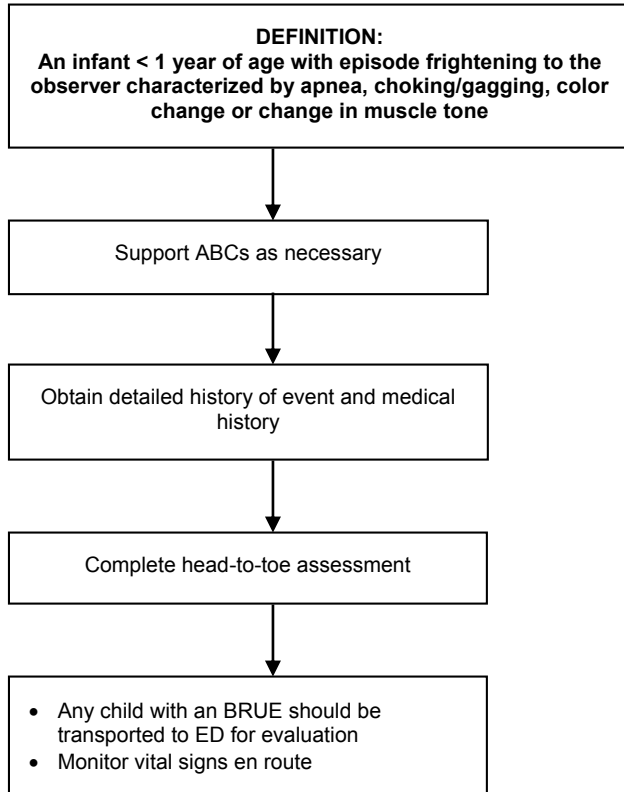
- If 3<sup>rd</sup> trimester pregnancy or post-partum: administer magnesium sulfate

- Consider the Cause of Seizure**
- Epilepsy
  - ETOH withdrawal or intoxication
  - Hypoglycemia
  - Stimulant use
  - Trauma
  - Intracranial hemorrhage
  - Overdose (TCA)
  - Eclampsia
  - Infection: Meningitis, sepsis
  - Febrile (age < 6 years old)

## 4050 HYPOGLYCEMIA



**4060 PEDIATRIC BRIEF RESOLVED UNEXPLAINED EVENTS (BRUE)  
(FORMERLY ALTE)**



**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?

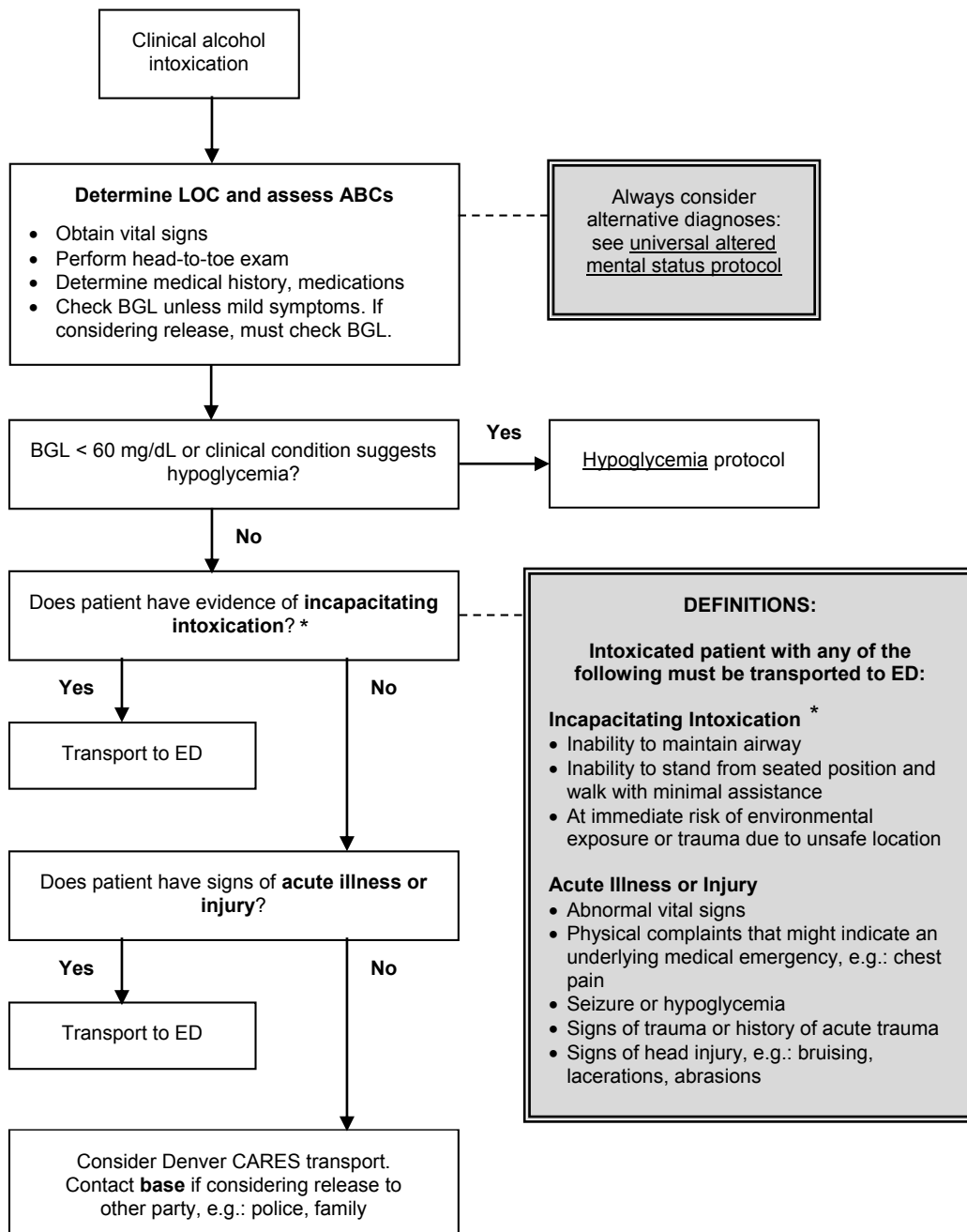
**Past Medical History:**

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

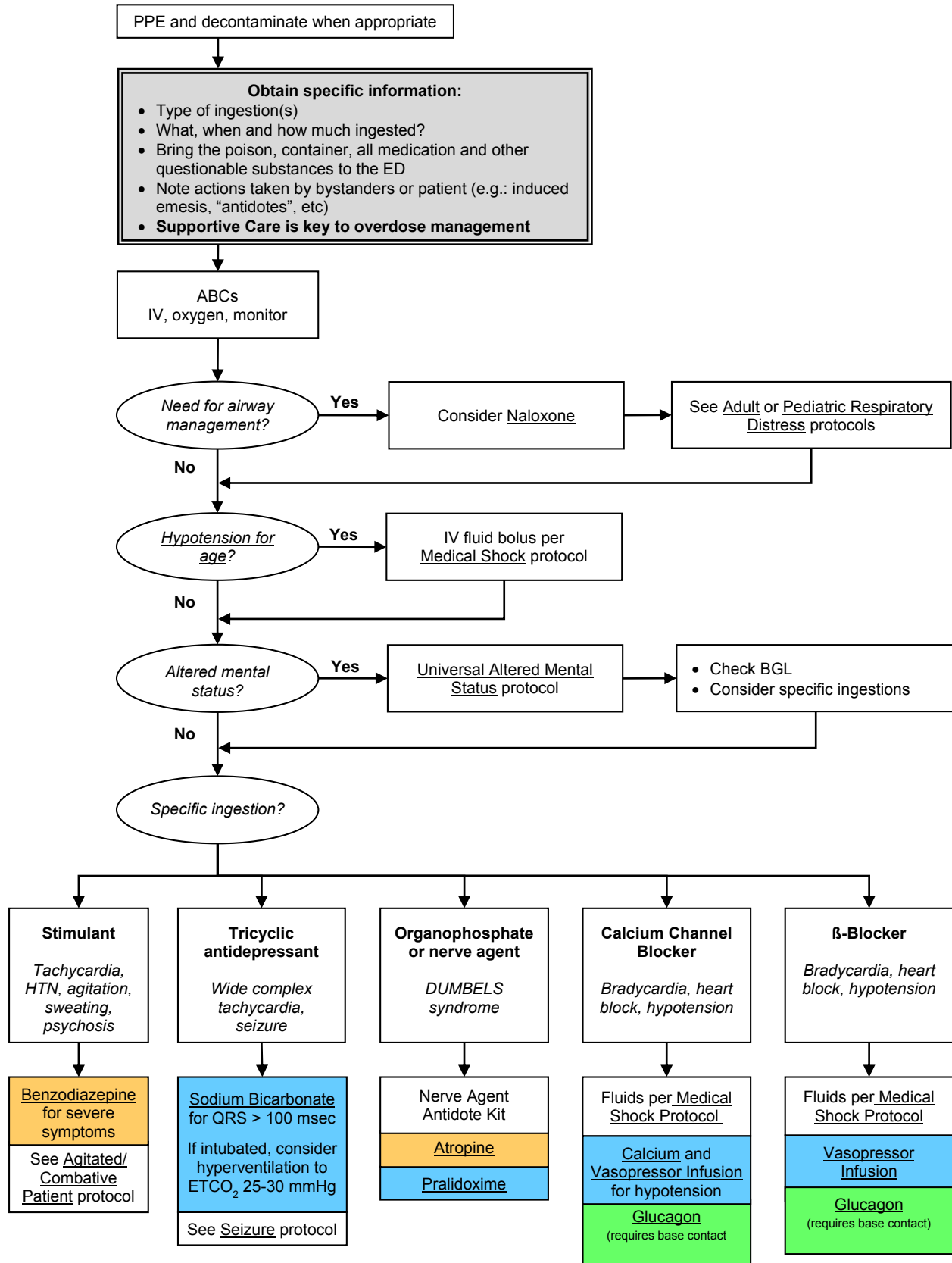
**Examination/Assessment**

- 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

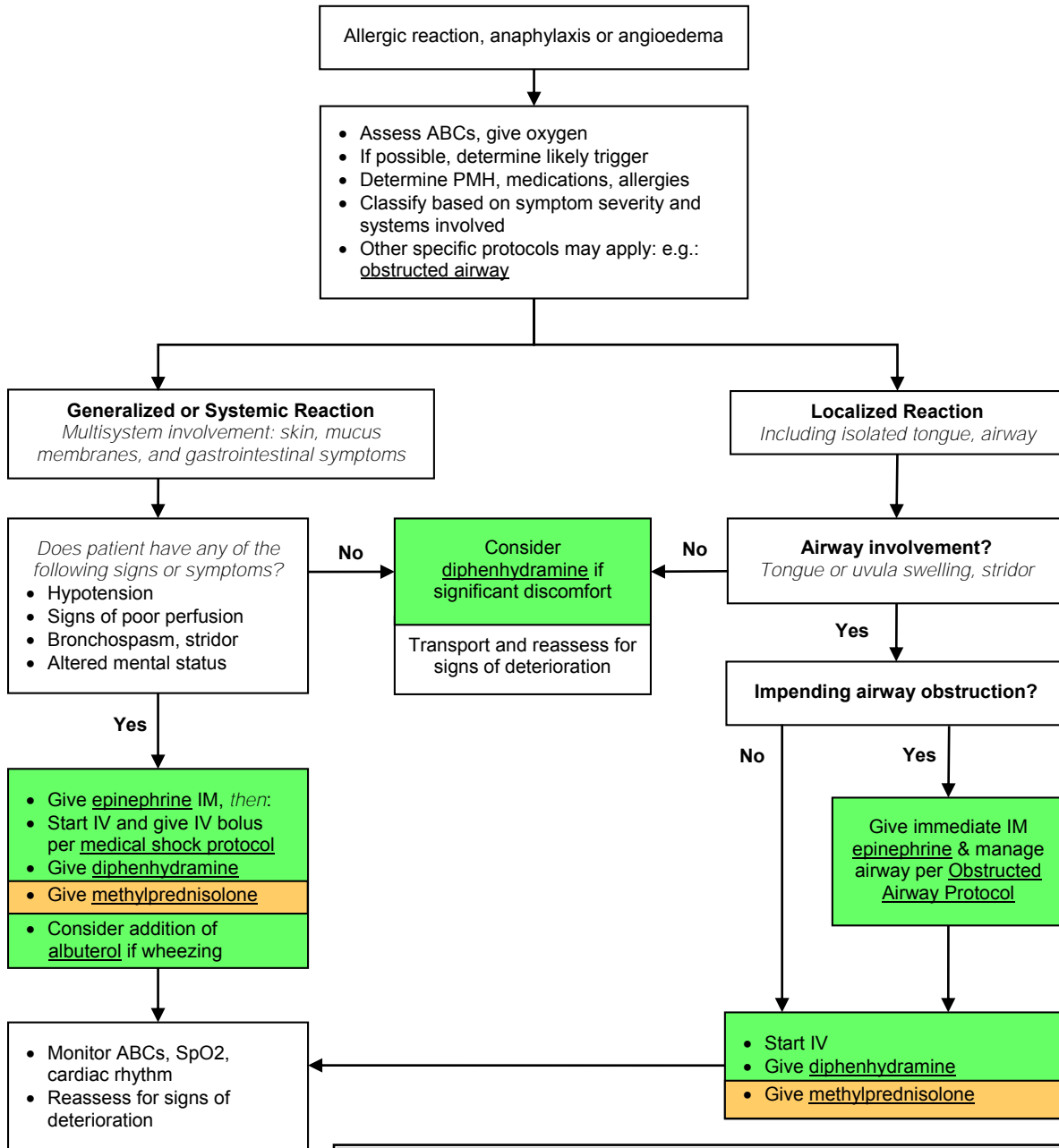
## 4070 ALCOHOL INTOXICATION



## 4080 OVERDOSE AND ACUTE POISONING



## 4090 ALLERGY AND ANAPHYLAXIS



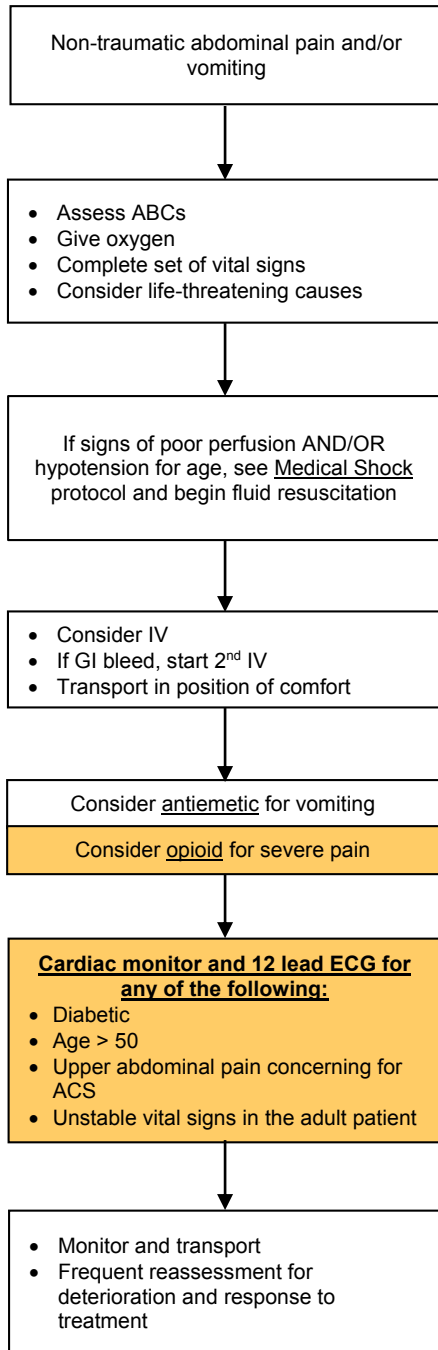
### Definitions:

- Anaphylaxis:** severe allergic reaction that is rapid in onset and potentially life-threatening. Multisystem signs and symptoms are present including skin and mucus membranes
  - o **Mainstay of treatment is epinephrine**
- Angioedema:** deep mucosal edema causing swelling of mucus membranes of upper airway. May accompany hives
  - o **Mainstay of treatment is methylprednisolone. Epinephrine indicated for any impending airway obstruction.**

### Document:

- History of allergen exposure, prior allergic reaction and severity, medications or treatments administered prior to EMS assessment
- Specific symptoms and signs presented: itching, wheezing, respiratory distress, nausea, weakness, rash, anxiety, swelling of face, lips, tongue, throat, chest tightness, etc.

## 4100 NON-TRAUMATIC ABDOMINAL PAIN/VOMITING



### Life-threatening causes:

- Cardiac etiology: MI, ischemia
- Vascular etiology: AAA, dissection
- GI bleed
- Gynecologic etiology: ectopic pregnancy

### History:

- Onset, location, duration, radiation of pain
- Associated sx: vomiting, bilious emesis, GU sx, hematemesis, coffee ground emesis, melena, rectal bleeding, vaginal bleeding, known or suspected pregnancy, recent trauma

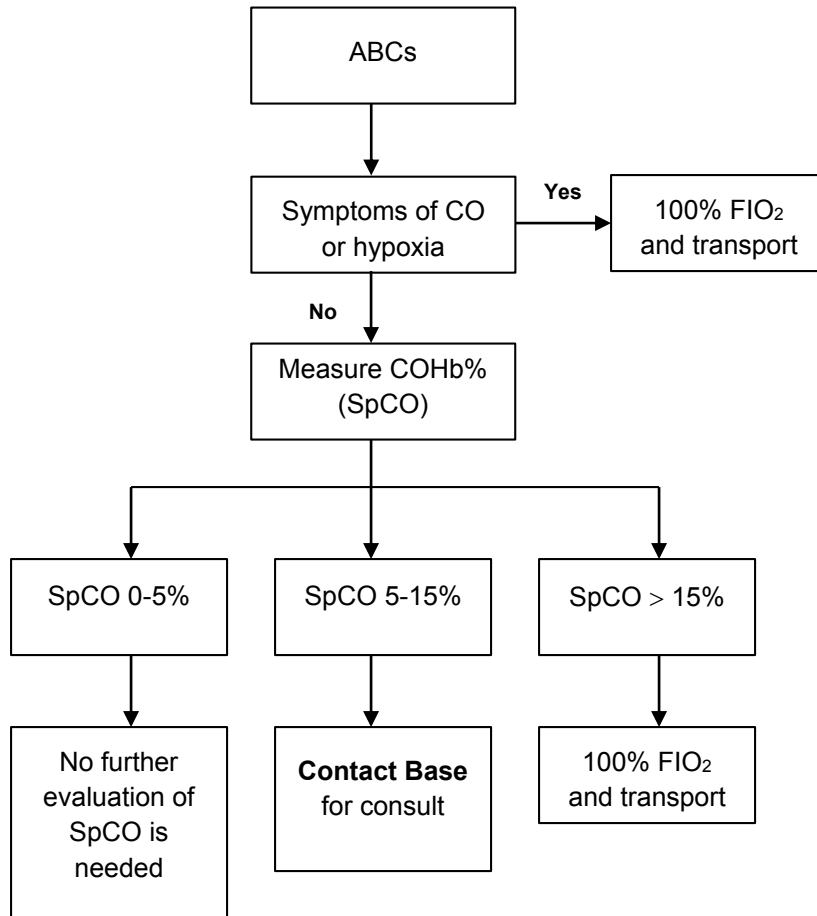
### Pediatric Patients:

- Life-threatening causes vary by age. Consider occult or non-accidental trauma, toxic ingestion, button battery ingestion, GI bleed, peritonitis
- For most pediatric patients without signs of shock, no IV is required and pharmacologic pain management should be limited

### Elderly Patients:

- Much more likely to have life-threatening cause of symptoms
- Shock may be occult, with absent tachycardia in setting of severe hypovolemia

## 4110 SUSPECTED CARBON MONOXIDE EXPOSURE



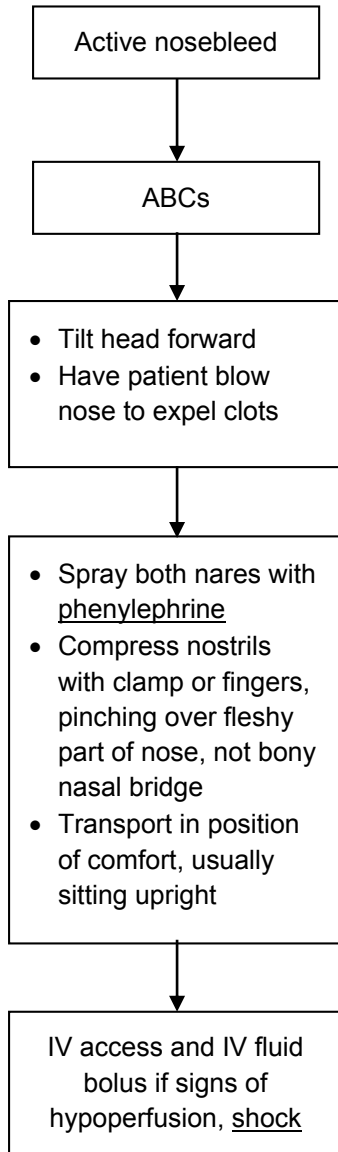
**General Guidelines:**

- *Signs and Symptoms of CO exposure include:* Headache, dizziness, coma, altered mentation, seizures, visual changes, chest pain, tachycardia, arrhythmias, dyspnea, N/V, “flu-like illness”
- The absence or low readings of COHb is not a reliable predictor of toxicity of other fire byproducts
- In smoke inhalation victims, consider cyanide treatment with Hydroxycobalamin as per indications
- The fetus of a pregnant woman is at higher risk due to the greater affinity of fetal hemoglobin to CO. With CO exposure, the pregnant woman may be asymptomatic while the fetus may be in distress. In general, pregnant patients exposed to CO should be transported.
- Cigarette smokers' COHb is normally higher than nonsmokers; >10% is clinically significant

COHb	Severity	Signs and Symptoms
<15-20%	Mild	Headache, nausea, vomiting, dizziness, blurred vision
21-40%	Moderate	Confusion, syncope, chest pain, dyspnea, tachycardia, tachypnea, weakness
41-59%	Severe	Dysrhythmias, hypotension, cardiac ischemia, palpitations, respiratory arrest, pulmonary edema, seizures, coma, cardiac arrest
>60%	Fatal	Death



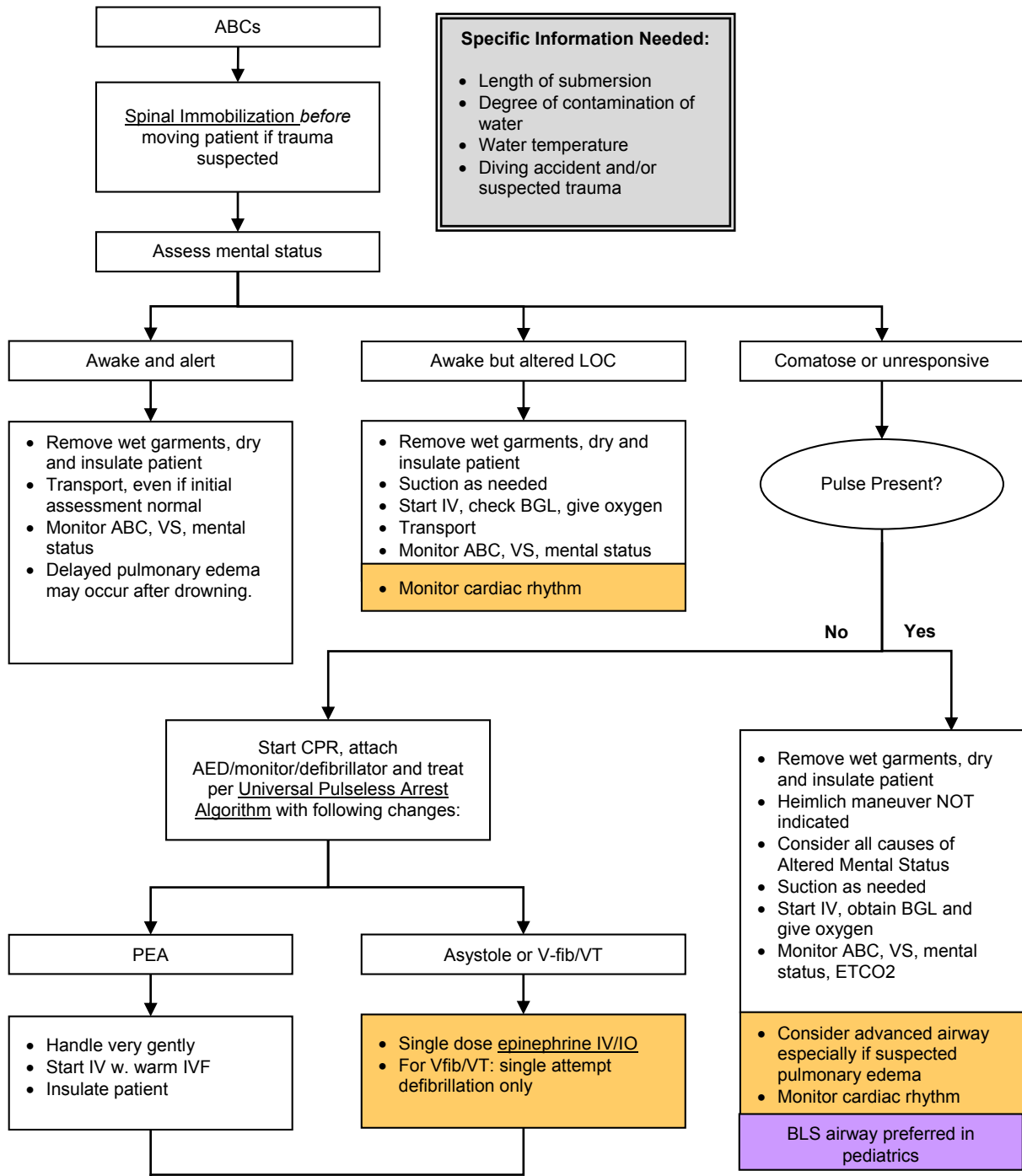
## 4130 EPISTAXIS MANAGEMENT



### General Guidelines:

- Most nose bleeding is from an anterior source and may be easily controlled.
- Avoid phenylephrine in pts with known CAD.
- Anticoagulation 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.
- For patients on home oxygen via nasal cannula, place the cannula in the patient's mouth while nares are clamped or compressed for nosebleed.

# 5000 DROWNING

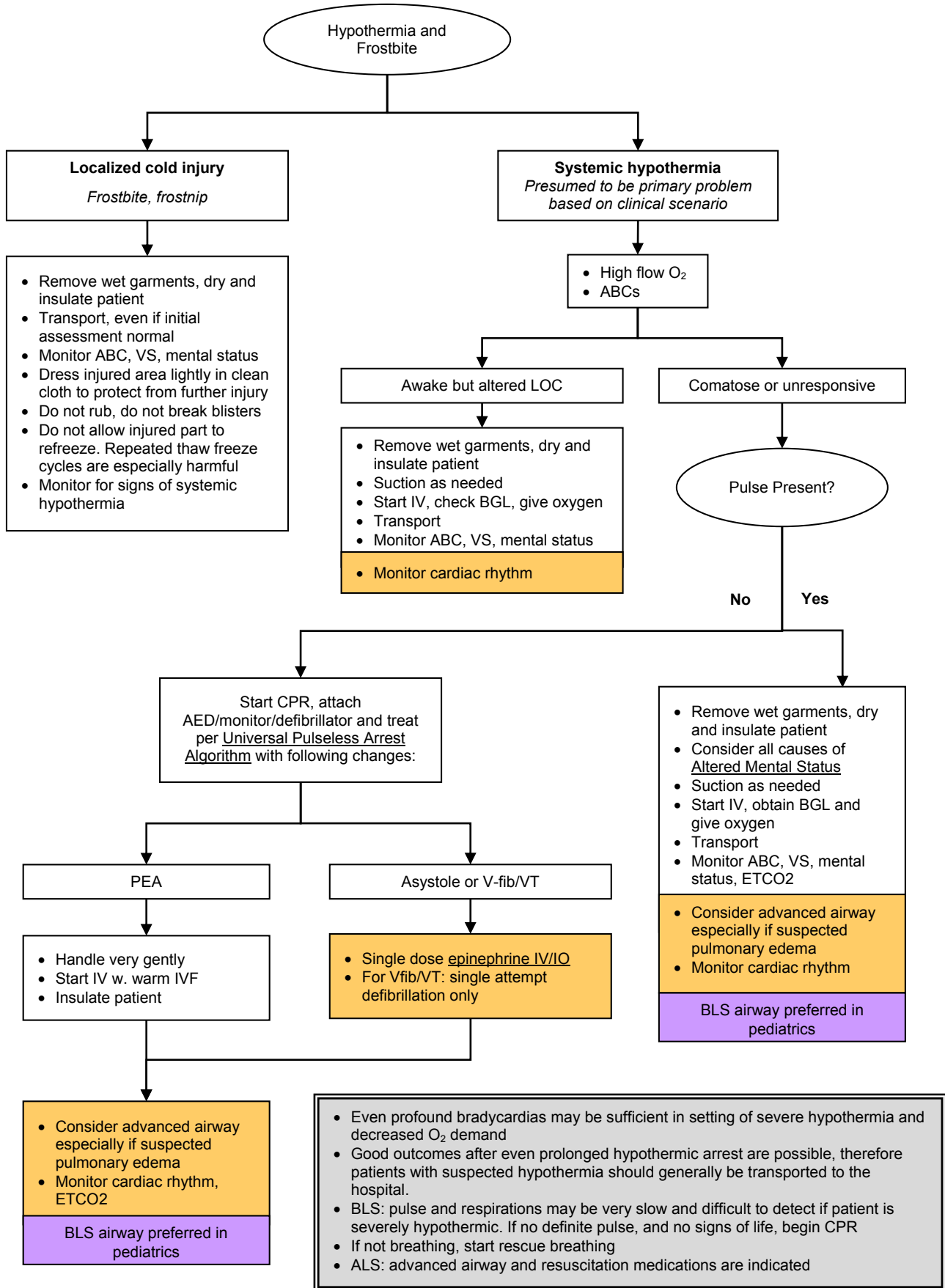


**Specific Information Needed:**

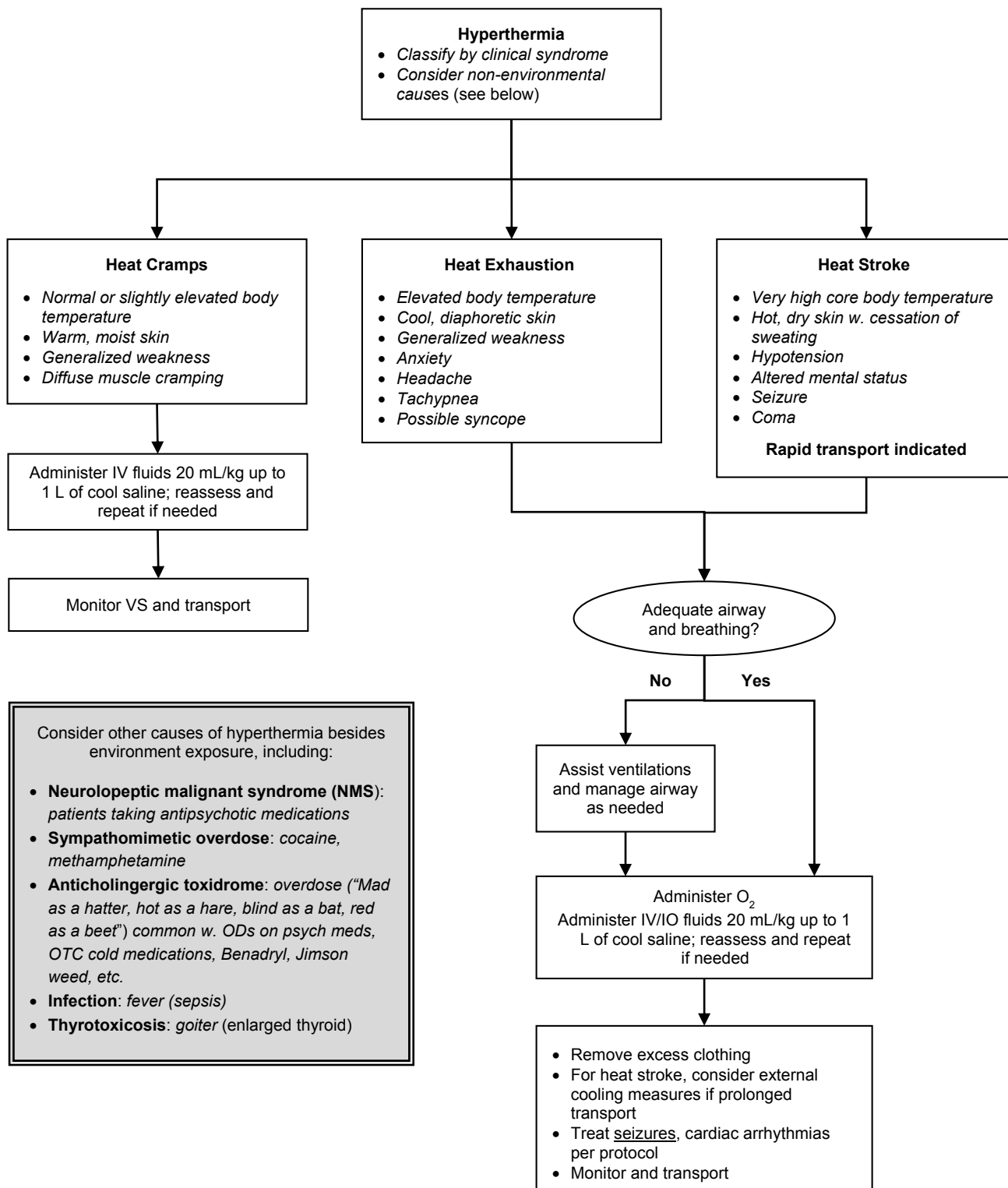
- Length of submersion
- Degree of contamination of water
- Water temperature
- Diving accident and/or suspected trauma

- Drowning/submersion commonly associated with hypothermia.
- Even profound bradycardias may be sufficient in setting of severe hypothermia and decreased O<sub>2</sub> demand
- Good outcomes after even prolonged hypothermic arrest are possible, therefore patients with suspected hypothermia should generally be transported to the hospital.
- BLS: pulse and respirations may be very slow and difficult to detect if patient is severely hypothermic. If no definite pulse, and no signs of life, begin CPR
- If not breathing, start rescue breathing
- ALS: advanced airway and resuscitation medications are indicated

# 5010 HYPOTHERMIA



## 5020 HYPERTHERMIA



## 6000 PSYCHIATRIC/BEHAVIORAL PATIENT PROTOCOL

### Scene Safety

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

### Specific Information Needed

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

### Specific Objective Findings

- A. Evaluate general appearance
  - 1. E.g.: Well groomed, disheveled, debilitated, bizarrely dressed
- B. Evaluate vital signs.
  - 1. Is a particular toxidrome suggested, e.g.: sympathomimetic?
- C. Note medic alert tags, breath odors suggesting intoxication.
- D. Determine ability to relate to reality.
  - 1. Does the patient know who s/he is, where s/he 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 appropriate 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.

### Transporting Patients Who Have a Psychiatric Complaint

- 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. Reasonable concern for suicidal or homicidal ideation, or grave disability from psychiatric decompensation, is sufficient to assume that the patient may lack medical decision-making capacity to refuse ambulance transport. Effort should be made to obtain consent for transport from the patient, and to preserve the patient's dignity throughout the process. However, the patient may be transported over his or her objections and treated under implied consent if patient does not comply.
- D. A patient being transported for psychiatric evaluation may be transported to any appropriate receiving emergency department.
- E. Accusations of kidnapping or assault of the patient are only theoretical and rarely occur. The Denver Metropolitan EMS Medical Directors feel strongly that the risk of abandonment of a potentially suicidal or otherwise gravely impaired patient is far greater. Be sure to document your reason for taking the patient over their objections, that you believe that you are acting in the patient's best interests, and be sure to consult a BASE PHYSICIAN if there are concerns.

## 6000 PSYCHIATRIC/BEHAVIORAL PATIENT PROTOCOL

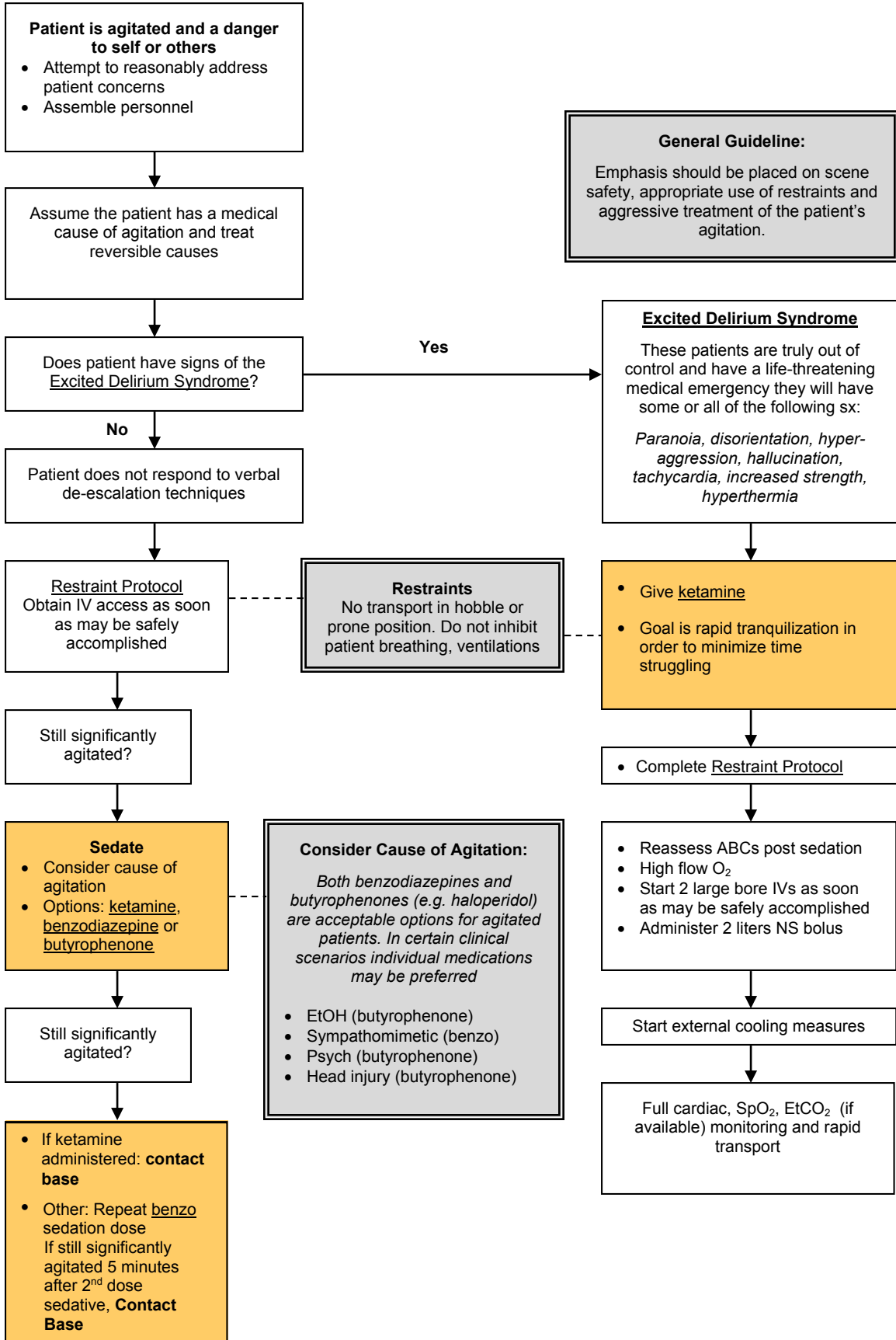
### **Specific Precautions**

- A. Patients presenting with psychiatric decompensation often have an organic etiology. Be suspicious for hypoglycemia, hypoxia, head injury, intoxication, or toxic ingestion.
- B. Providers transporting a patient over his or her objections should reassure the patient. The provider should strongly consider whether the patient may need restraint and/or sedation for safety. Beware of weapons. These patients can become combative.

### **Transporting Patients on a Mental Health Hold**

- A. By law, patients detained on a mental health hold may not refuse transport. Similarly, by law, patients on a mental health hold are required to be evaluated by a physician or psychologist and must be transported.
- B. Although it is commonly believed that the original copy of the mental health hold (form M-1) is required to accompany the patient, a legible copy of the M-1 is also sufficient if the original cannot be found.
- C. The M-1 form documenting the mental health hold should be as complete as possible, including the correct date and time that the patient was detained. The narrative portion should be completed. A signature and license or badge number is also required. Assure that the form is complete before departing.
- D. The mental health hold does not need to be started on patients who are intoxicated on drugs and/or alcohol. Nor is it required for patients who are physically incapable of eloping from care, such as those who are intubated, or physically unable.
- E. The patient rights form (M-2) does not need to accompany the patient. The receiving facility may complete this form if there are concerns.
- F. If possible, seek direction from the sending facility regarding whether the patient may require sedation and restraint. Consider ALS transport if this is the case.
- G. Recall that patients who are a danger to self/others or gravely disabled due to mental illness may be transported by EMS without a mental health hold, under implied consent.

# 6010 AGITATED/COMBATIVE PATIENT PROTOCOL



## 6020 TRANSPORT OF THE HANDCUFFED PATIENT

### **Purpose:**

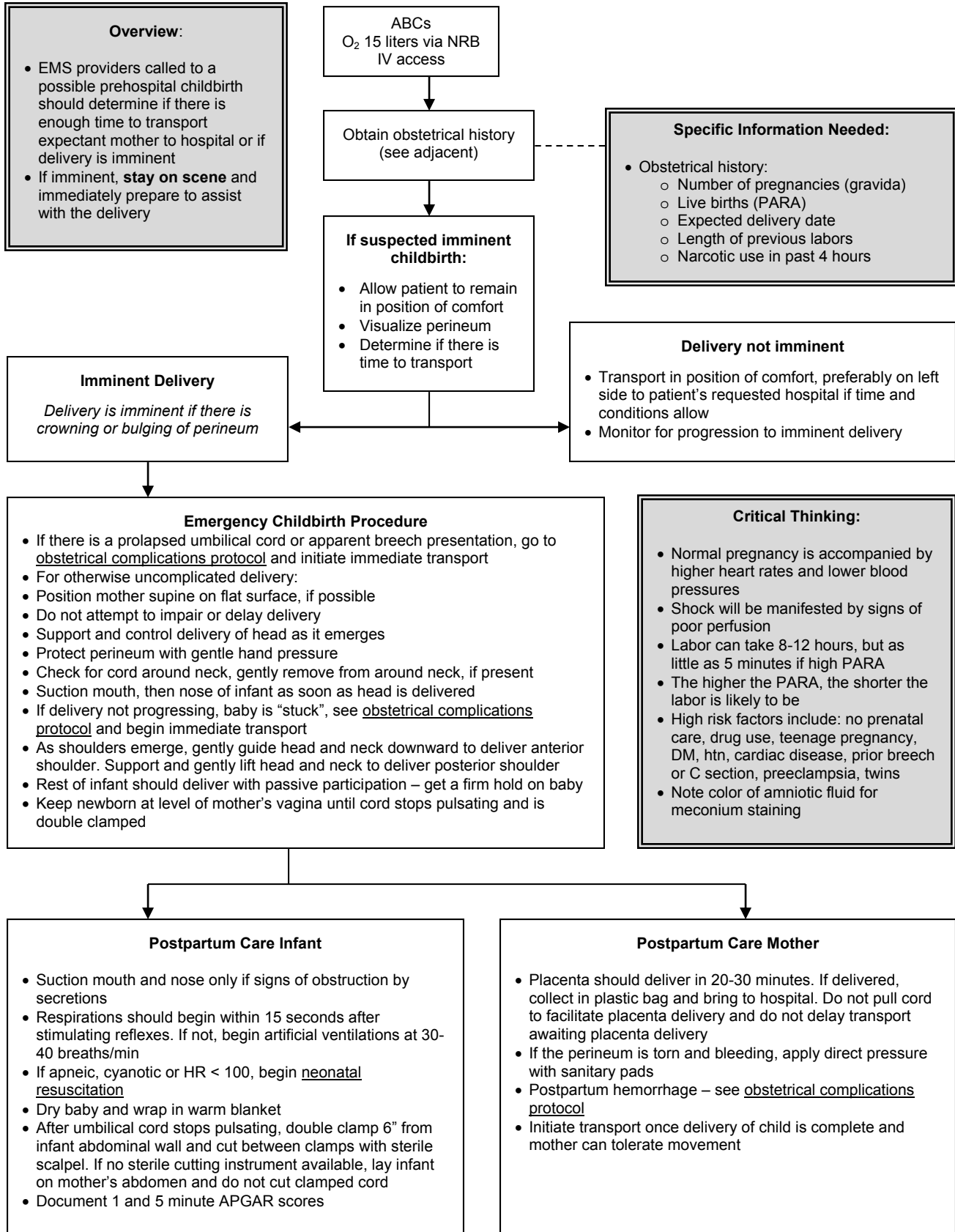
1. Guideline for transport of patients in handcuffs placed by law enforcement

### **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.



# 7000 CHILDBIRTH PROTOCOL



## 7010 OBSTETRICAL COMPLICATIONS

### For All Patients with obstetrical complications

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

### Possible actions for specific complications (below)

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

### Prolapsed Umbilical Cord

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

### Breech Delivery

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

### Postpartum Hemorrhage

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

### Complications of Late Pregnancy

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

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

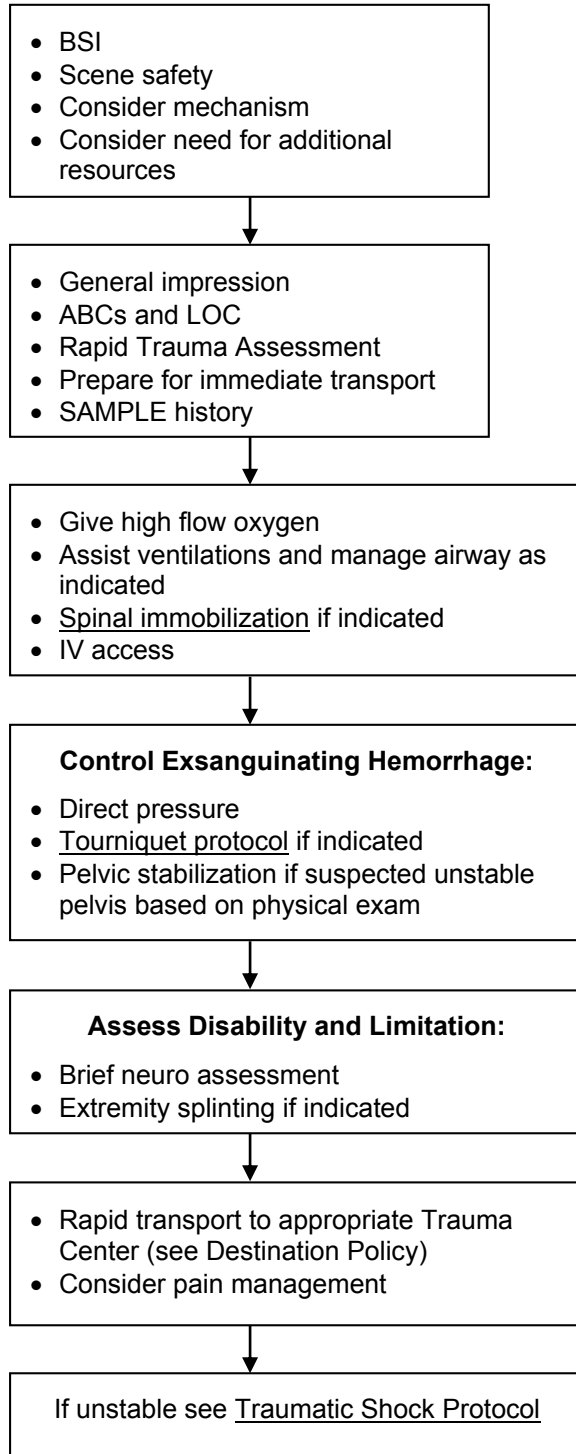
#### Eclampsia/Toxemia

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

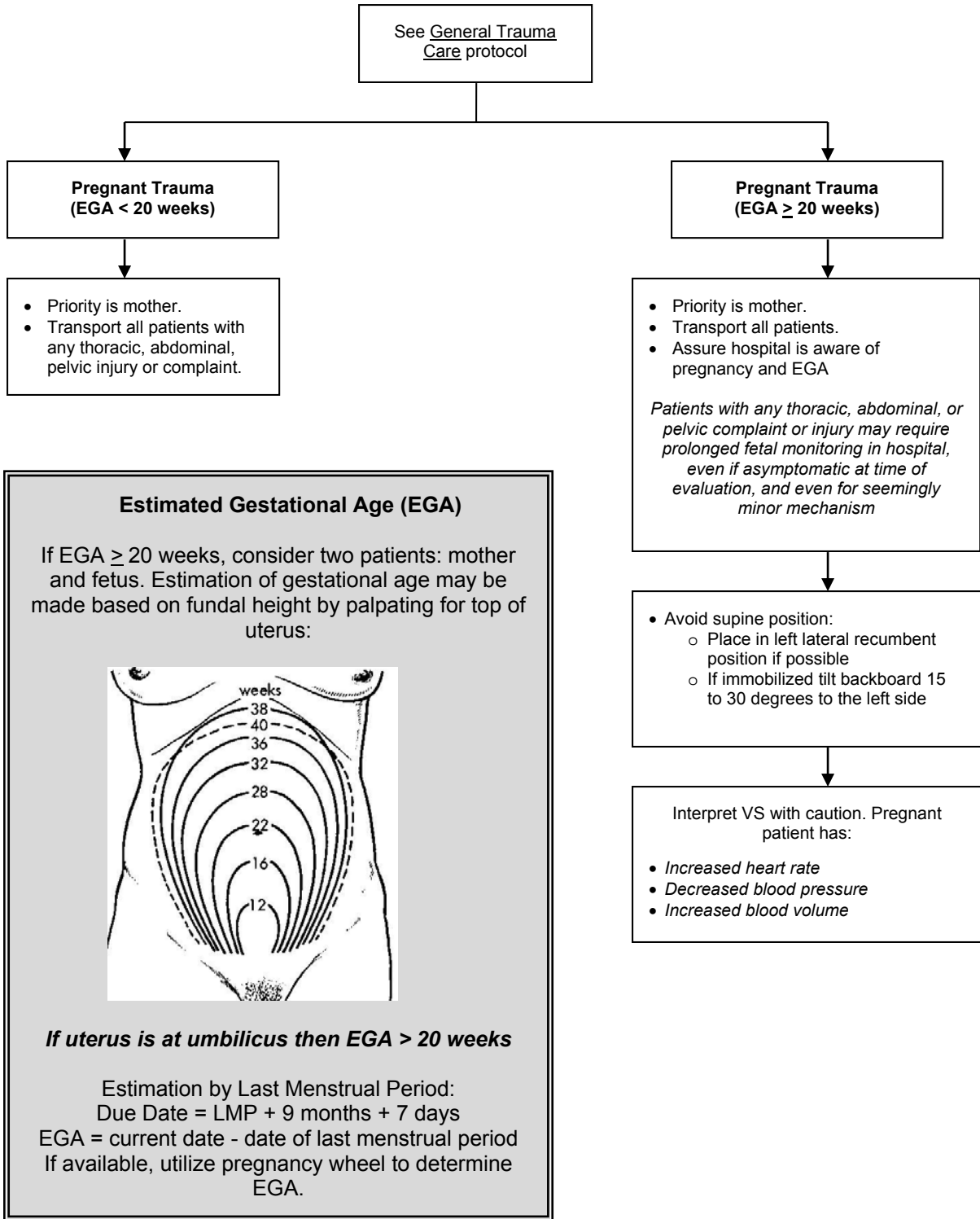
### Shoulder Dystocia

- 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

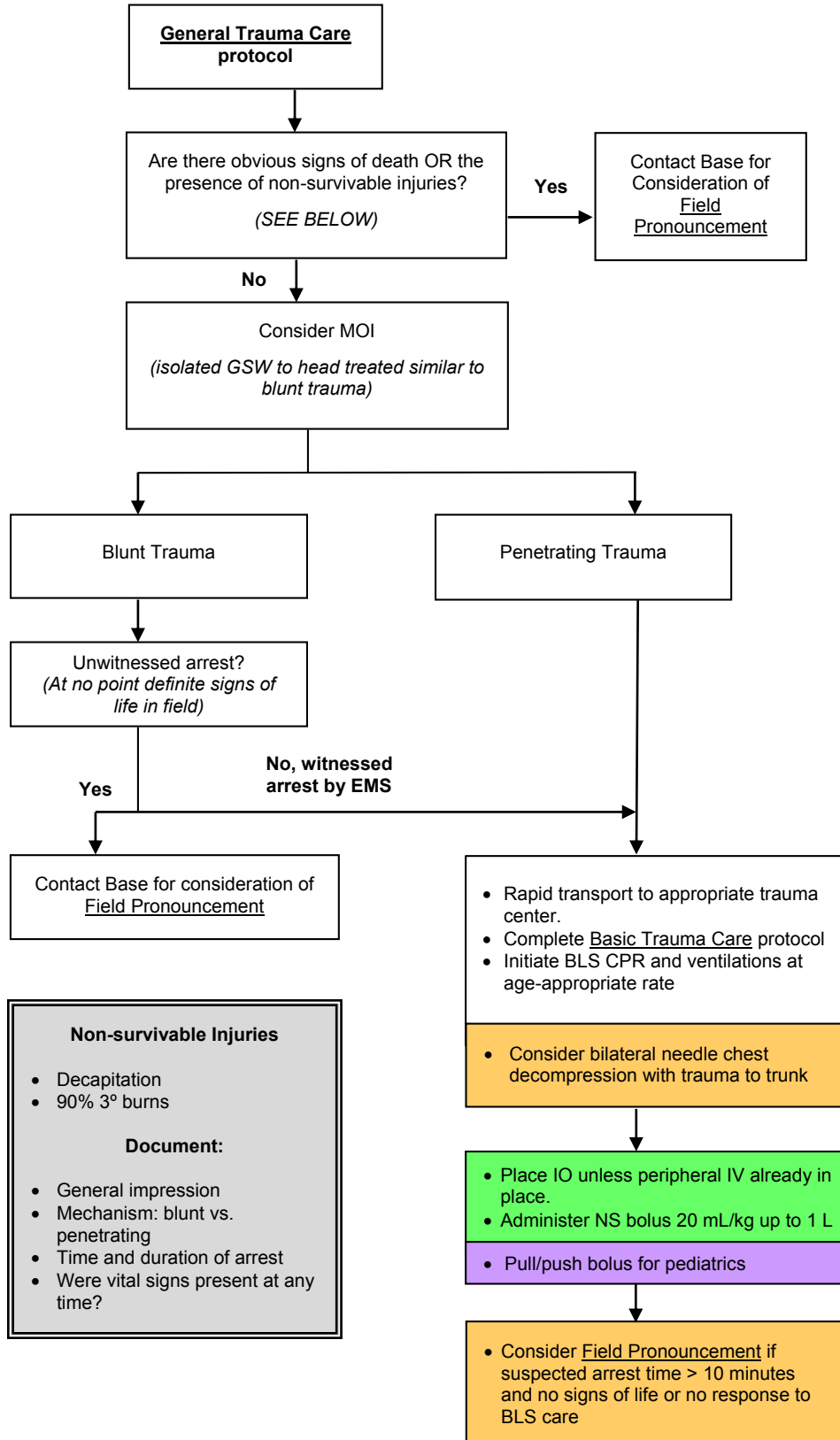
## 8000 GENERAL TRAUMA CARE



# 8020 TRAUMA IN PREGNANCY



# 8030 TRAUMATIC PULSELESS ARREST



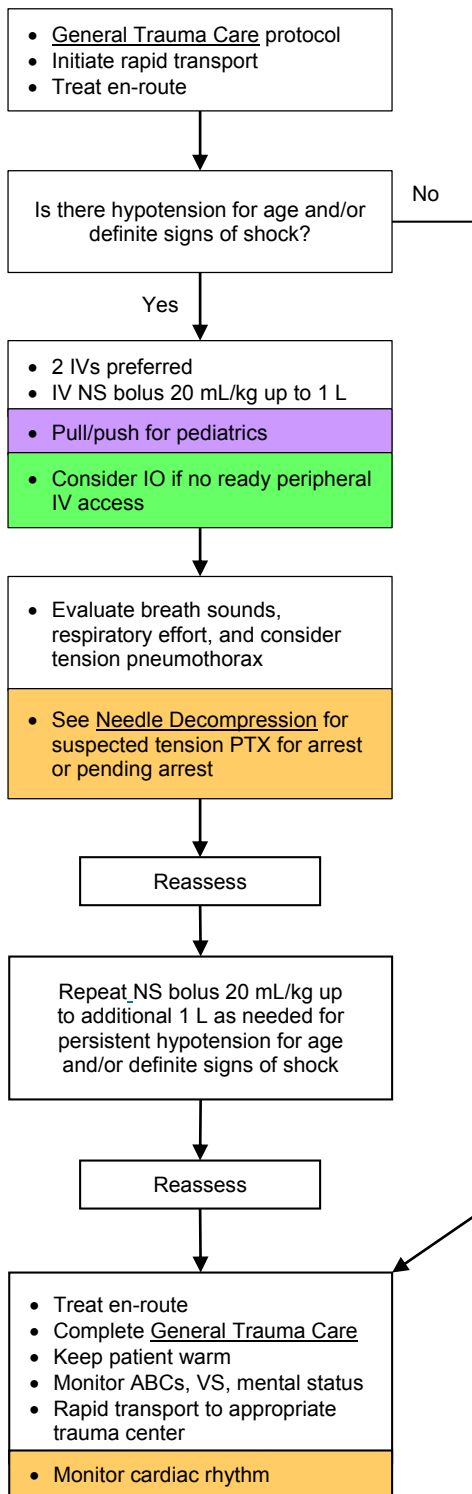
**Non-survivable Injuries**

- Decapitation
- 90% 3° burns

**Document:**

- General impression
- Mechanism: blunt vs. penetrating
- Time and duration of arrest
- Were vital signs present at any time?

# 8040 TRAUMATIC SHOCK



Hypotension for Age	
Age	Blood Pressure
<1 year	<70 mmHg
1-10 years	<70 + (2 x age in years)
>10 years	<90 mmHg

Tachycardia for Age	
Age	Heart Rate
<1 year	>160 bpm
1-2 years	>150 bpm
2-5 years	>140 bpm
5-12 years	>120 bpm
>12 years	>100 bpm

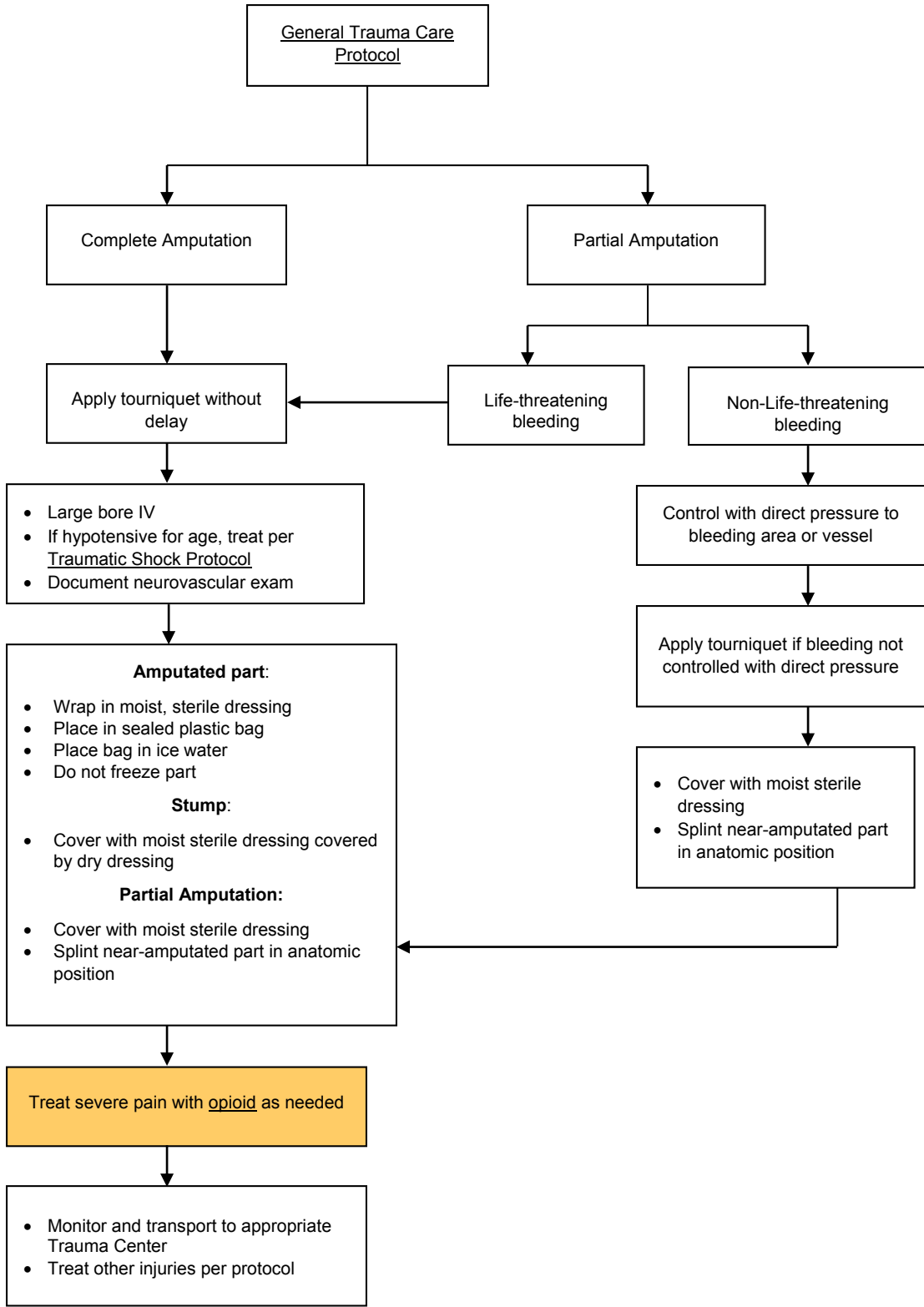
**Pediatric Fluid Administration**

- For children <40 kg or longer than length based tape, hand pull/push fluid with a 60 mL syringe utilizing a 3 way stop cock
- The treatment of compensated shock requires aggressive fluid replacement of 20 mL/kg up to 3 boluses.
- Goal of therapy is normalization of vital signs within the first hour
- Hypotension is a late sign in pediatric shock patients

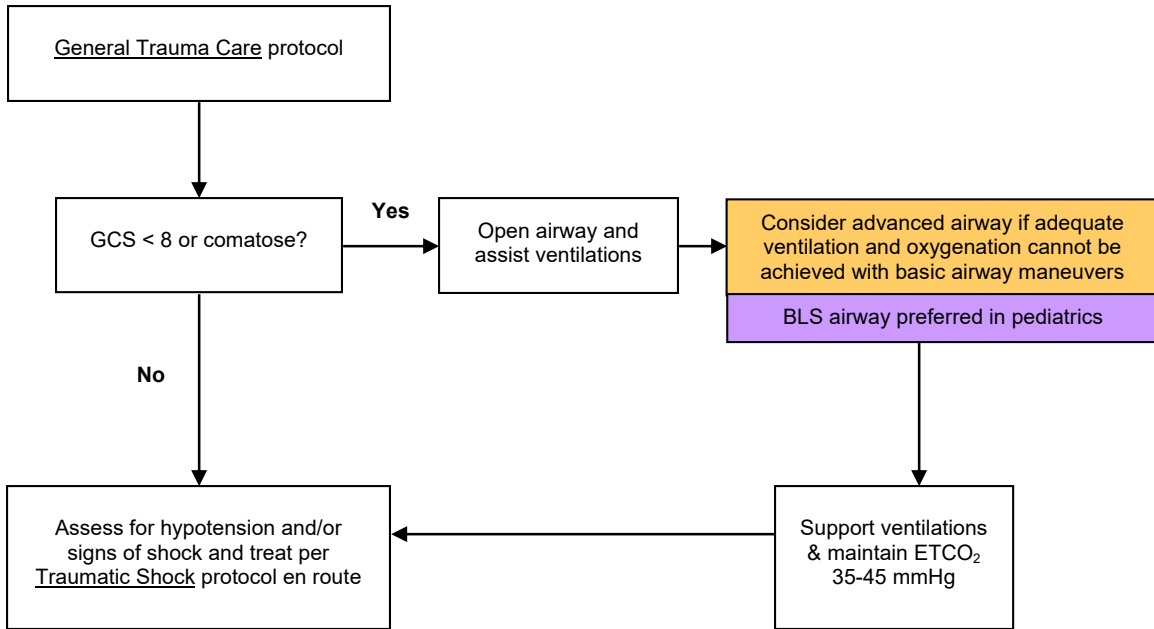
**Pediatric Shock**

Signs of Compensated Shock	Signs of Decompensated Shock
• Normal mental status	• Decrease mental status
• Normal systolic blood pressure	• Weak central pulses
• Tachycardia	• Poor color
• Prolonged (>2 seconds) capillary refill	• <u>Hypotension for age</u>
• Tachypnea	
• Cool and pale distal extremities	
• Weak peripheral pulse	

# 8050 AMPUTATIONS



# 8060 HEAD TRAUMA PROTOCOL



- Obtain IV access
- Support ventilations PRN
- Correct hypoxia
- Treat hypotension
- Decrease ICP by elevating head 30° if possible. Use reverse Trendelenburg if spinal precautions needed
- Complete Rapid Trauma Assessment en route to hospital
- Treat other injuries per protocol

- Monitor:
- ABCs, VS, mental status, ETCO<sub>2</sub>
  - Rapid transport to appropriate trauma center
- Monitor cardiac rhythm

**Glasgow Coma Score (GCS)**  
(Minimum 3, Maximum 15)

**Eyes:**

1. Does not open eyes
2. Opens eyes to pain
3. Opens eyes to voice
4. Opens eyes spontaneously

**Verbal:**

1. No sounds
2. Incomprehensible sounds
3. Inappropriate words
4. Confused, disoriented
5. Oriented

**Motor:**

1. No movement
2. Extension to painful stimuli
3. Flexion to painful stimuli
4. Withdrawal to painful stimuli
5. Localizes to painful stimuli
6. Obeys commands

**Pediatric GCS**  
(Minimum 3, Maximum 15)

**Eyes:**

1. Does not open eyes
2. Opens eyes to pain
3. Opens eyes to voice
4. Opens eyes spontaneously

**Verbal:**

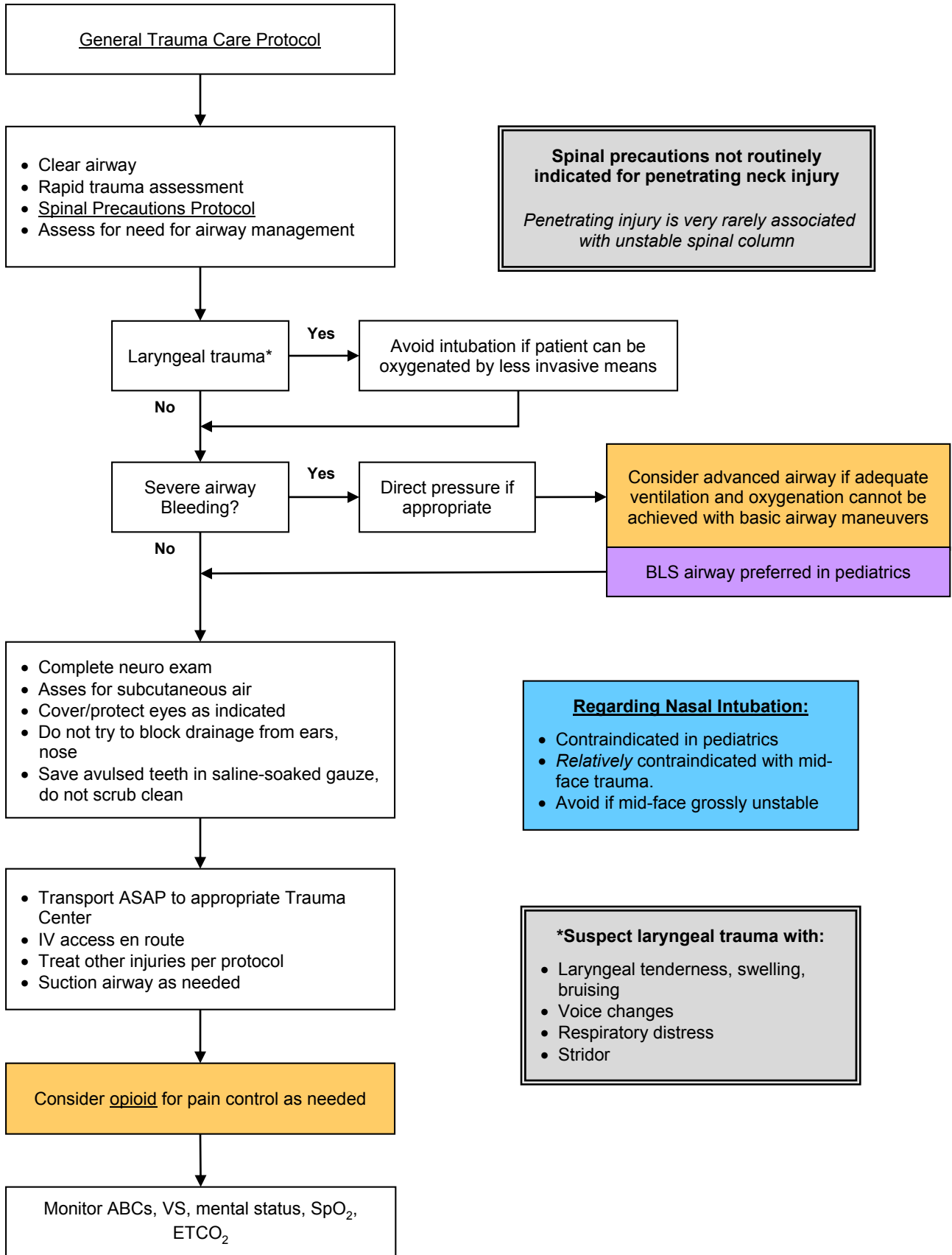
1. No vocal response
2. Inconsolable, agitated
3. Inconsistently consolable, moaning.
4. Cries but consolable, inappropriate interactions.
5. Smiles, oriented to sounds, follows objects, interacts

**Motor:**

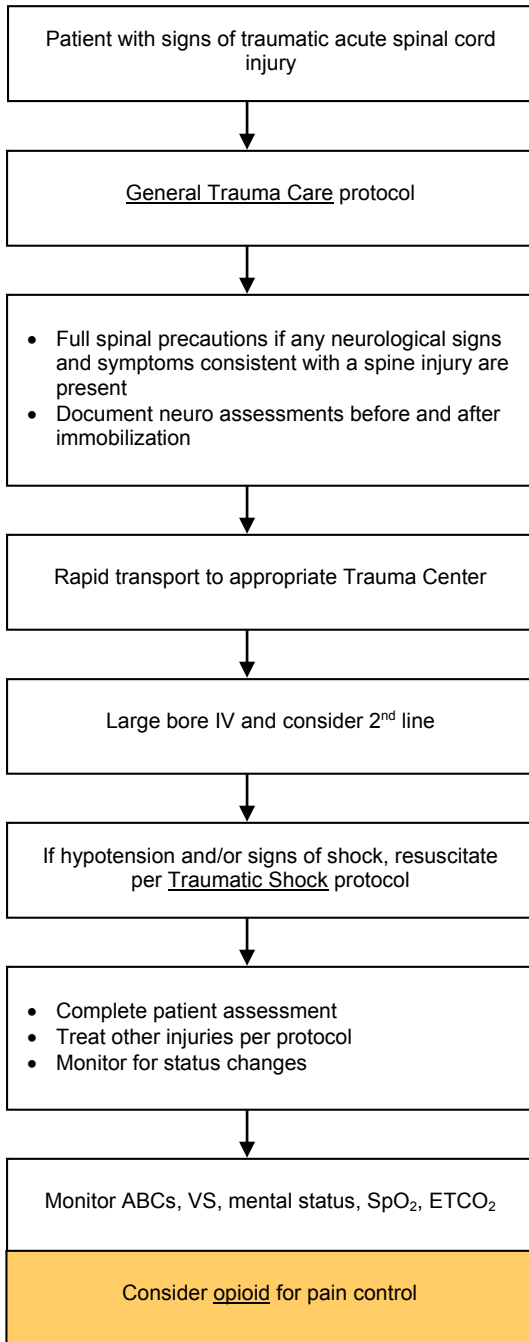
1. No motor response.
2. Extension to pain.
3. Flexion to pain.
4. Withdrawal from pain
5. Localizes pain.
6. Obeys Commands.



## 8070 FACE AND NECK TRAUMA



## 8080 SPINAL TRAUMA



### Signs of Spinal Cord Injury:

- Sensory loss, weakness and/or paralysis
- Typically bilateral, but may be asymmetrical
- Sensory changes typically have a level, corresponding to the level of the injury
- Numbness, tingling or painful burning in arms, legs
- **Central cord syndrome** is an incomplete spinal cord injury and causes painful burning or sensory changes in shoulders and upper extremities bilaterally and spares the lower extremities. It may be subtle

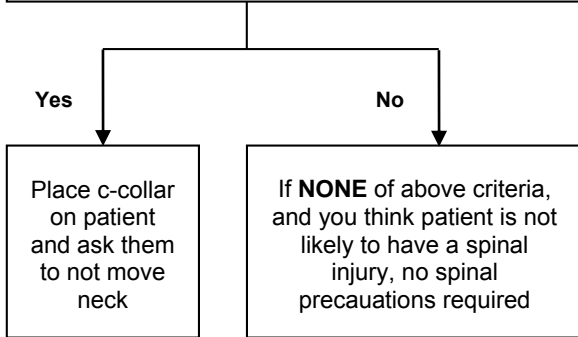
### Spinal Immobilization not routinely indicated for penetrating neck injury

*Penetrating injury is very rarely associated with unstable spinal column*

## 8090 SPINAL PRECAUTIONS PROTOCOL

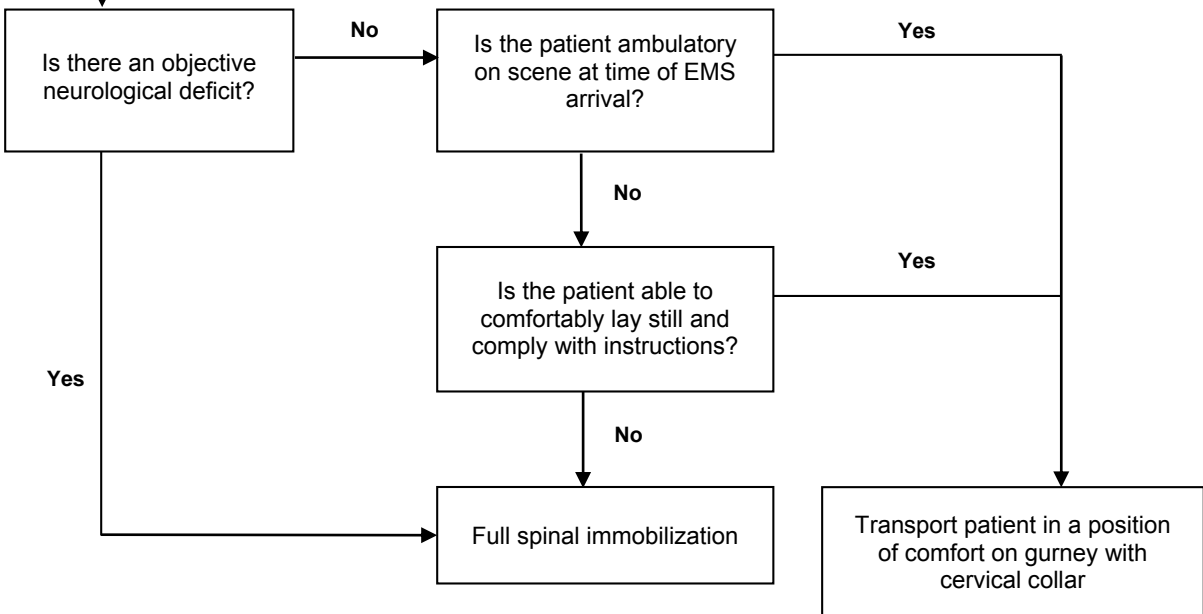
**Does patient have/complain of any of the following:**

- Midline C/T/L spine tenderness on palpation
- Neurologic complaints or deficits
- Other injuries which are potentially distracting
- Alteration in mentation or under influence of drugs or EtOH
- Barrier to evaluate for spinal injury (e.g. language or developmental barrier)

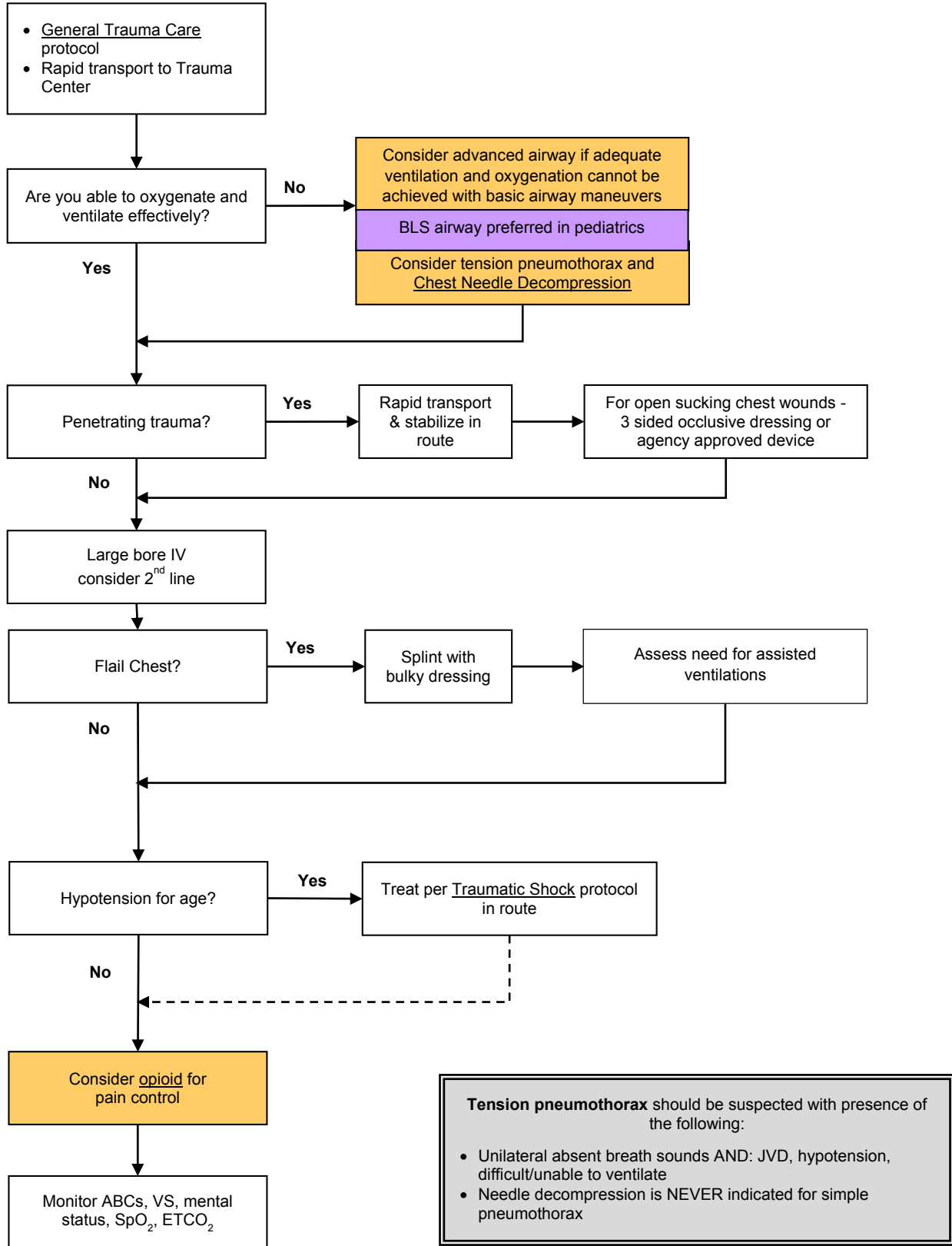


**Notes:**

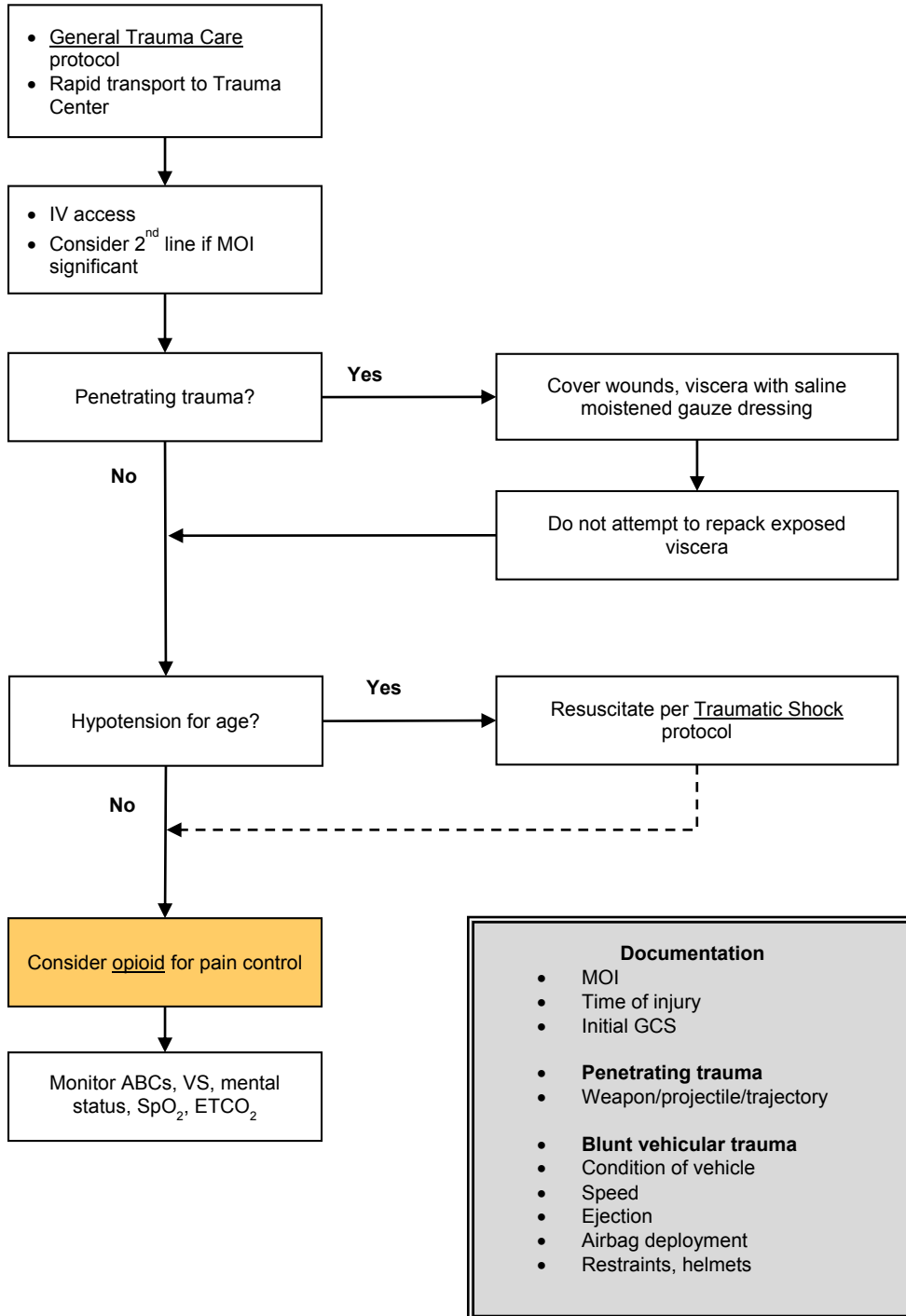
- Backboards have not been shown to be any benefit for spinal injuries, and may cause harm.
- Backboards/scoops are useful tools for carrying non-ambulatory patients to a gurney. Patients who do not need a backboard should be gently slid off of backboard/scoop onto gurney.
- Self-extrication from a vehicle with assistance is likely better than standard extrication procedures.
- Vacuum mattresses should be used preferentially over a backboard if readily available.
- Use caution when assessing for spinal injury in elderly patients, who are at much higher risk and may have minimal symptoms.
- Consider improvised cervical spine immobilization such as towel rolls and tape or a SAM splint if needed to prevent airway compromise or worsening spinal injury if the rigid cervical collar cannot be correctly sized to the patient
- Neurological exam documentation is MANDATORY in patients with potential spinal trauma, including serial exams.
- Cervical collar contraindicated in penetrating trauma.
- Full spinal immobilization includes backboard, scoop, vacuum splint, or agency approved device



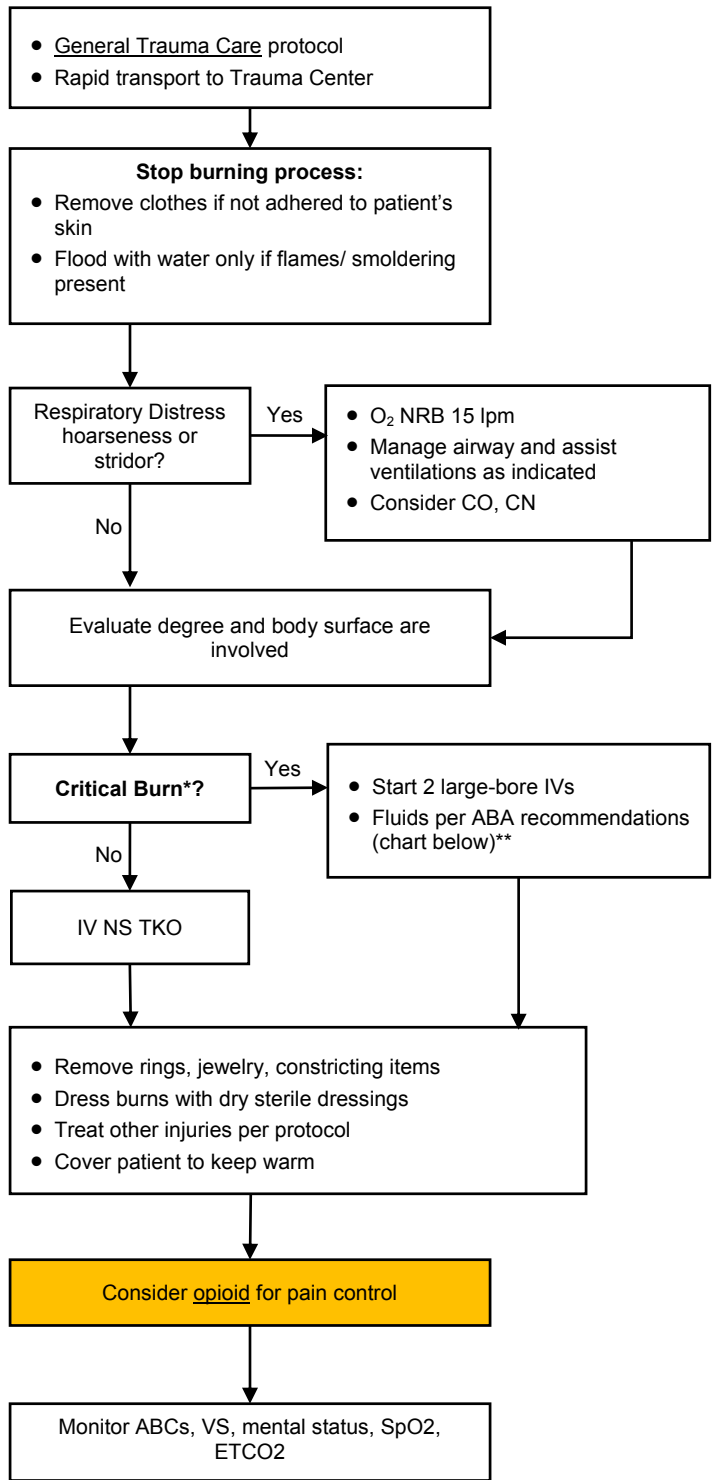
# 8110 CHEST TRAUMA



## 8120 ABDOMINAL TRAUMA



# 8130 BURNS



- Document:**
- Type and degree of burn(s)
  - % BSA
  - Respiratory status including any voice changes (hoarseness)
  - Singed nares, soot in mouth
  - SpO<sub>2</sub>
  - PMH
  - Confined space (assume CO)

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

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

**Designated Regional Burn Centers**

*Consider direct transport of isolated burns if time and conditions allow*

**\*\* ABA Recommended Prehospital Fluid Therapy**

14 and older	500 mL/hr NS or LR
5 - 13 years	250 mL/hr NS or LR
Younger than 5	125 mL/hr D5W, NS or LR

If no signs of clinical hypovolemia or shock, large volume of IV fluid not needed. For typical 30 minute prehospital time, give 250cc bolus for patient age ≥ 14.

## 9000 GENERAL GUIDELINES: MEDICATION ADMINISTRATION

### Purpose

- A. Provide guidance to EMS providers in the principles of administration, delivery, and safety of approved medications

### General Principles

- A. The appropriate procedure for safe medication administration includes:
  - 1. Verification of the “Six Rights” of medication administration (right patient, right drug, right dose, right route, right time, right documentation)
  - 2. Medication administration cross-check with practice partner verifying the Six Rights prior to drug administration. This should include verbal repeat-back of the order by the practice partner.
- B. Pediatric medication dosing and equipment size recommendations vary by length and/or weight. As such, an assessment tool such as a length-based tape should be utilized on every pediatric patient to guide medication dosing and equipment size
- C. Optional routes of medication administration are vast and appropriateness given the clinical situation should be considered. Specific considerations include:
  - 1. Intranasal (IN) administration often results in more rapid resolution or improvement in symptoms compared to IV or intramuscular (IM) administration
  - 2. IM drug absorption and onset of action is often the slowest, as vascular absorption from fat tissue is prolonged
- D. EMS agencies should work to establish a system of Just Culture. This is an approach to work place safety that assumes humans, despite their best intentions to do the right thing, will make errors. Change and care improvement does not happen without accurate, honest reporting of error. A report of error should be treated with respect and examination of root cause, and not punitive action

## 9010 MEDICATIONS

### 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 after obtaining 12 lead ECG (This may be the only documented copy of the AVRNT rhythm)
  - 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  
**with Base Contact.** Contact medical control for further considerations

##### Pediatric: (Requires **CALL IN** and **DIRECT VERBAL ORDER**)

See Handtevy

---



## 9010 MEDICATIONS

### Protocol

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

### Special Considerations

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

## 9020 MEDICATIONS

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

---

#### **Description**

- Albuterol is a selective  $\beta$ -2 adrenergic receptor agonist. It is a bronchodilator and positive chronotrope.
  - Because of its  $\beta$  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 minutes 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.
  - $\beta$ -blockers may antagonize albuterol.
- 

#### **How Supplied**

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

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

---

#### **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:**

See Handtevy

## 9020 MEDICATIONS

---

### Protocol

- Adult Wheezing
  - Pediatric Wheezing
  - 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.

## 9030 MEDICATIONS

### **AMIODARONE (CORDARONE)**

---

#### **Description**

Amiodarone has multiple effects showing Vaughn-Williams 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**

- Pulseless arrest in patients with shock-refractory or recurrent VF/VT
  - Wide complex tachycardia not requiring immediate cardioversion due to hemodynamic instability
- 

#### **Precautions**

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

#### **Contraindications**

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

#### **Adverse Reactions**

- Hypotension
  - Bradycardia
- 

#### **Dosage and Administration**

##### **Adult:**

- **Pulseless Arrest (Refractory VT/VF):**
  - 300 mg IV bolus.
  - Administer additional 150 mg IV bolus in 3-5 minutes if shock refractory or recurrent VF/VT.
- **Symptomatic VT and undifferentiated wide complex tachycardia with a pulse (CONTACT BASE):**
  - 150 mg IV bolus infusion over 10 minutes.

##### **Pediatric:**

- **Pulseless Arrest (Refractory VT/VF):**
    - See Handtevy
    - **CONTACT BASE** for additional doses.
- 

#### **Protocol**

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

#### **Special Considerations**

- A 12-lead EKG should be performed and documented, when available.
- Amiodarone is preferred to adenosine for treatment of undifferentiated WCT with a pulse.

## 9040 MEDICATIONS

### ***ANTIEMETICS: ONDANSETRON (ZOFTRAN)***

---

#### **Description**

- Ondansetron is a selective serotonin 5-HT<sub>3</sub> receptor antagonist antiemetic. Ondansetron is the preferred antiemetic, if available.
- 

#### **Indications**

- Nausea and vomiting
- 

#### **Contraindications**

- Ondansetron: No absolute contraindication. Should be used with caution in first trimester of pregnancy and should be reserved for only those patient with severe dehydration and intractable vomiting
- 

#### **Adverse Effects:**

- Ondansetron: Very low rate of adverse effects, very well tolerated.
- 

#### **Dosage and Administration**

##### **Ondansetron**

##### **Adult:**

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

##### **Pediatric < 4 years old:**

See Handtevy

##### **Pediatric ≥ 4 years old:**

See Handtevy

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#### **Protocol**

- Abdominal Pain/Vomiting

## 9050 MEDICATIONS

### ASPIRIN (ASA)

---

#### Description

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

---

#### Indications

- Suspected acute coronary syndrome
- 

#### Contraindications

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

#### How Supplied

Chewable tablets 81mg

---

#### Dosage and Administration

- 324mg PO
- 

#### Protocol

- Chest Pain
- 

#### Special Considerations

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

## 9060 MEDICATIONS

### ATROPINE SULFATE

---

#### Description

Atropine is a naturally occurring antimuscarinic, anticholinergic substance. It is the prototypical anticholinergic medication with the following effects:

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

#### Indications

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

#### Precautions

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

#### Adverse Reactions

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

#### Dosage and Administration

##### Hemodynamically Unstable Bradycardia

###### Adult:

0.5 mg IV/IO bolus.

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

###### Pediatric:

See Handtevy

##### Stable Bradycardia and Poisoning/Overdose

**CONTACT BASE**

---

#### Protocol

- Bradycardia with poor perfusion
  - Poisoning/Overdose
- 

#### Special Considerations

- Atropine causes pupil dilation, even in cardiac arrest settings

## 9070 MEDICATIONS

### ***BENZODIAZEPINES - (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.
- 

#### **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.
  - IM administration has the slowest time of onset.
- 

#### **Indications**

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

#### **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: 2.5 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:**

See Handtevy



## 9070 MEDICATIONS

### Sedation of severely agitated or combative patient

#### Adult:

IV route: 2.5 mg

IN/IM route: 5 mg

- Dose may be repeated x 1 after 5 minutes. **Contact base** for more than 2 doses,

#### Pediatric:

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

### Post-intubation sedation

#### Adult:

IV/IO route: 2.5 -- 5 mg

---

### Protocol

- Synchronized Cardioversion
- Transcutaneous Pacing
- Seizure
- 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.

## 9080 MEDICATIONS

### **CALCIUM**

---

#### **Description**

- Cardioprotective agent in hyperkalemia.
  - Calcium chloride contains 3 times the amount of elemental calcium contained in the same volume of calcium gluconate. Therefore, 1 g (10 mL) vial of calcium chloride 10% solution contain 273 mg of elemental calcium, whereas 1 g (10 mL) of 10% calcium gluconate contains 90 mg of elemental calcium. For this reason, larger doses of calcium gluconate are required.
  - Doses below refer to dose of calcium 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**
  - Calcium channel blocker overdose with hypotension and bradycardia
- 

#### **Contraindications**

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

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

- Extravasation of calcium chloride solution may cause tissue necrosis.
  - Because of the risk of medication error, if calcium chloride is stocked, consider limiting to 1 amp per medication kit to avoid accidental overdose. Calcium gluconate solution will require 3 amp supply for equivalent dose.
  - Must give in separate line from IV sodium bicarb to prevent precipitation/formation of calcium carbonate.
  - In setting of digoxin toxicity, may worsen cardiovascular function.
- 

#### **Dosage and Administration**

##### **Calcium Gluconate 10% Solution**

###### **Adult:**

- **Pulseless arrest assumed due to hyperkalemia:**
  - 3 g (30 mL) slow IV/IO push
- **Calcium channel blocker overdose with hypotension and bradycardia:**
  - **Contact Base** for order. 3 g (30 mL) slow IV/IO push.

###### **Pediatric:**

- **Calcium channel blocker overdose with hypotension for age and bradycardia:**
    - **Contact Base** for order. See Handtevy, **not to exceed 1 g** slow IV/IO push not to exceed 2 mL/minute, may repeat every 10 minutes for total of 3 doses
- 

#### **Protocol**

- Universal Pulseless Arrest
- Poisoning/Overdose

## 9090 MEDICATIONS

### DEXTROSE

---

#### 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 (250 mL of a 10% solution) IV/IO infusion; titrating dose to clinical effect

##### Pediatric:

See Handtevy

---

#### Protocol

- Hypoglycemia
  - Universal Altered Mental Status
  - Seizures
  - Poisoning/Overdose
  - Psych/Behavioral
- 

#### 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.

## 9100 MEDICATIONS

### **DIPHENHYDRAMINE (BENADRYL)**

---

#### **Description**

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

---

#### **Indications**

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

#### **Precautions**

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

#### **Side effects**

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

#### **Drug Interactions**

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

#### **Dosage and Administration**

##### **Adults:**

50 mg IV/IO/IM

##### **Pediatrics:**

See Handtevy

---

#### **Protocol**

- Allergy/Anaphylaxis

## 9105 MEDICATIONS

### **DuoDote™ (NERVE AGENT ANTIDOTE KIT)**

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#### **Description**

Nerve agents can enter the body by inhalation, ingestion, and through skin. These agents are absorbed rapidly and can produce injury or death within minutes. The DuoDote™ Nerve Agent Antidote kit consists of one auto-injector for self and/or buddy administration. One Injector contains 2.1mg atropine and 600mg pralidoxime chloride (2-PAM)

---



#### **Indications**

Suspected nerve agent exposure accompanied with signs and symptoms of nerve agent poisoning

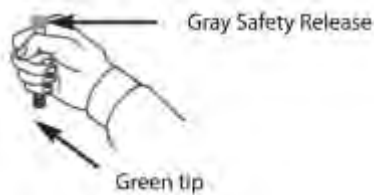
---

#### **Injection sites:**

Outer thigh- mid-lateral thigh (preferred site)

Buttocks- upper lateral quadrant of buttock (gluteal) in thin individuals

Place the auto-injector in the dominate hand. Firmly grasp the center of the auto injector with the green tip (needle end) pointing down.

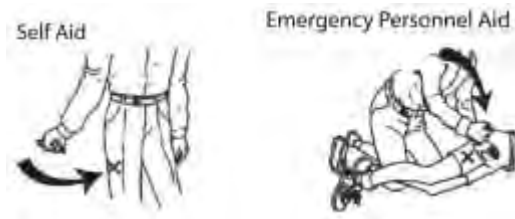


With the other hand, pull off the gray safety release. The DuoDote™ auto-injector is now ready to be administered.



## 7010 MEDICATIONS

The injection site is the mid-outer thigh. The DuoDote™ auto-injector can inject through clothing. However, make sure pockets at the injection site are empty.



Swing and firmly push the green tip at a 90 degree angle against the mid-outer thigh. Continue to firmly push until you feel the auto injector trigger.



No more than three (3) sets of antidote should be administered.

---

### **Special Considerations:**

Presence of tachycardia is not a reliable indicator of effective treatment due to potential nicotinic effects of nerve agent exposure. The end point of treatment is clear dry lung sounds.  
Attempt to decontaminate skin and clothing between injections.

---

### **Protocol:**

[Overdose and Acute Poisoning](#)

## 9120 MEDICATIONS

### EPINEPHRINE (ADRENALIN)

---

#### Description

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

---

#### Indications

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

#### Adverse Reactions

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

#### Drug Interactions

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

#### Dosage and Administration

##### Adult:

##### **Pulseless Arrest**

1 mg (10 ml of a 1:10,000 solution), IV/IO bolus.

Repeat every 3 compression cycles or 6 minutes. After 3 mg, additional doses are not routinely recommended.

##### **Bradycardia with hypotension and poor perfusion refractory to other interventions**

Continuous infusion titrated to effect: see Vasopressorinfusion

##### **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 epinephrine:**

Continuous infusion titrated to effect: see Vasopressorinfusion

##### **ALTERNATIVE to racemic epinephrine: (for stridor at rest)**

5 mL of 1:1,000 epinephrine via nebulizer x 1

##### **Epinephrine Auto-Injector:**

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

Adult: 0.3 mg IM with autoinjector (adult EpiPen, Auvi-Q)

Pediatric: 0.15 mg IM with autoinjector (EpiPen Jr., Auvi-Q)

##### **Pediatric:**

##### **Pulseless arrest:**

See Handtevy for dose.

Repeat every 3 compression cycles or 6 minutes. After 3 doses, additional doses are not routinely recommended.

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

See Handtevy

##### **Asthma**

See Handtevy

## 9120 MEDICATIONS

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

See Handtevy

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

See Handtevy

### **ALTERNATIVE to racemic epinephrine: (for stridor at rest)**

See Handtevy

---

### **Protocol**

- Universal Pulseless Arrest Algorithm
- Bradycardia with poor perfusion
- Neonatal Resuscitation
- Allergy and Anaphylaxis Protocol
- Adult Wheezing
- Pediatric Wheezing
- Vasopressor Infusion

---

### **Special Considerations**

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



## 9130 MEDICATIONS

### GLUCAGON

---

#### Description

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

---

#### Onset & Duration

- Onset: variable
- 

#### Indications

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

#### Side Effects

- Tachycardia
  - Headache
  - Nausea and vomiting
- 

#### Dosage and Administration

##### Adult:

Hypoglycemia:

- 1 mg IM

Beta Blocker/Calcium Channel overdose with hypotension and bradycardia:

- 2 mg IV bolus; **contact base**

##### Pediatric:

Hypoglycemia:

- See Handtevy

Beta Blocker/Calcium Channel overdose with hypotension for age, signs of poor perfusion and bradycardia:

- See Handtevy; **contact base**
- 

#### Protocol

- Hypoglycemia
- Poisoning/Overdose

## 9140 MEDICATIONS

### HALOPERIDOL (HALDOL)

---

#### Description

Haloperidol is a butyrophenone 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 and/or 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/IV

**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 one half dose in patients age ≥ 65 who are at increased risk of complications.
- 

#### Protocol

- Agitated/Combative Patient Protocol

## 9150 MEDICATIONS

### **HEMOSTATIC AGENT (QuickClot, Celox, Bloodstop, Actcel, HemCon, ChitoGauze)**

---

#### **Description**

QuickClot Combat Gauze is a standard roller or Z-fold gauze impregnated with a clotting agent such as kaolin (a clay containing the active ingredient aluminum silicate) which works on contact with blood to initiate the clotting process (intrinsic pathway) by activating factor XII. This reaction leads to the transformation of factor XII to its' activated form XIIa, which triggers the clotting cascade.

Mucoadhesive agents such as HemCon, ChitoGauze and Celox utilize a granular chitosan salt derived from the shells of marine arthropods (which are positively charged) to react with and bind to negatively charged red blood cells rapidly forming a cross-linked barrier clot to seal the injured vessels.

Used in conjunction with direct pressure and wound packing these products lead to hemostasis.

---

#### **Onset and Duration**

- Onset of action is 3-5 minutes after wound exposure and clotting action remains unless the dressing and/or the clot is disturbed.
- 

#### **Indications**

- Active bleeding from open wounds with that cannot be controlled with direct pressure. Most often involving wounds to the scalp, face, neck, axilla, groin or buttocks.
- 

#### **Contraindications**

- Not to be used to treat internal bleeding such as intra-abdominal, intra-thoracic or vaginal bleeding.
  - Not to be used for minor bleeding that can be controlled by direct pressure.
- 

#### **Precautions**

- Bleeding control is achieved via combination of direct pressure and hemostatic gauze packing for a minimum of 3-5 minutes.
  - If bleeding soaks through the dressing, apply additional dressings while continuing direct pressure. **Do not remove dressings from the injured site.** This will disrupt any clots that have already formed.
  - Stabilize patient per General Trauma Care Protocol.
  - If a tourniquet is indicated (refer to Tourniquet Protocol), it should be applied first, before application of hemostatic agent.
  - **DO NOT USE LOOSE GRANULAR OR POWDERED HEMOSTATIC AGENTS.** These are out date and will produce exothermic reactions that may cause burns and additional tissue damage.
- 

#### **Procedure**

1. Deploy the hemostatic agent via external application, or wound packing directly onto the wound and then apply direct consistent pressure for at least 3 minutes over the bleeding source. **DO NOT lift or remove the dressing** once it has been applied.
2. Wrap the hemostatic dressing with another suitable dressing such as Kerlex roller gauze, ace wraps, etc. in order to maintain direct pressure.
3. Place the empty hemostatic agent packaging into the outer dressing to notify the receiving facility of it's presence.

## 9160 MEDICATIONS

### HYDROXYCOBALAMIN (CYANOKIT)

---

#### Description

- Cyanide inhibits cytochrome oxidase, thereby arresting cellular respiration and forcing anaerobic metabolism, which leads to lactate production and acidosis and ultimately death. Hydroxycobalamin 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

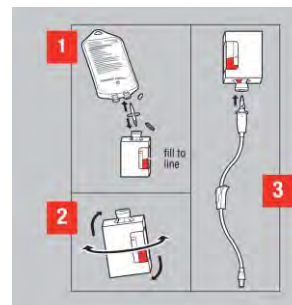
- Administer only after basic life support measures have been initiated and always in conjunction with other supportive treatment modalities.
- 

#### Adverse Reactions

- Hypertension
  - Allergic reaction/anaphylaxis
- 

#### Dosage and Administration

- **Adult** dose is 5 gm IV
- **Pediatric dosing is in the rear cover of the Handtevy Reference**
  - 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 1<sup>st</sup> vial: Use vented intravenous tubing, hang and infuse desired dose over 7.5 min.
  4. Infuse 2<sup>nd</sup> vial (repeat steps 1 and 2 before 2<sup>nd</sup> 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.
- 

#### Protocols

- Carbon Monoxide Exposure
- Burns

## 9170 MEDICATIONS

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

---

#### **Description**

Ipratropium is an anticholinergic bronchodilator chemically related to atropine.

---

#### **Onset & Duration**

- Onset: 5-15 minutes.
  - Duration: 6-8 hours.
- 

#### **Indications**

- Bronchospasm
- 

#### **Contraindications**

- Do not administer to children < 2 years
  - Soy or peanut allergy is a contraindication to the 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 (2 yrs – 12 yrs)**

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

See Handtevy

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

---

#### **Protocol**

- Adult Wheezing
- Pediatric Wheezing

## 9172 MEDICATIONS

### **KETAMINE** (Excited Delirium/Severe Agitation)

---

#### **Description**

Ketamine is a non-competitive NMDA receptor antagonist and dissociative, amnestic, analgesic anesthetic agent.

---

#### **Onset & Duration**

- Onset: 1-5 minutes after IM administration.
  - Duration: 10-15 minutes
- 

#### **Indications**

- Adult patient with signs of excited delirium where the safety of patient and/or providers is of substantial concern
- 

#### **Contraindications**

- Relatively contraindicated in penetrating eye trauma
  - Relative contraindication in patients with known cardiovascular disease. (ketamine causes tachycardia)
- 

#### **Side Effects**

- Laryngospasm: this very rare adverse reaction presents with stridor and respiratory distress.
  - Emergence reaction: presents as anxiety, agitation, apparent hallucinations or nightmares as ketamine is wearing off. For severe reactions, consider benzodiazepine.
  - Nausea and Vomiting: always have suction available after ketamine administration. Give antiemetic as needed.
  - Hypersalivation: Suction usually sufficient. If profound hypersalivation causing airway difficulty, administer atropine 0.5 mg IV.
- 

#### **Dosage and Administration**

Adults:

- 5 mg/kg IM, **500 mg maximum dose**
- Contact base for additional doses

Pediatric:

- Excited delirium is not reported in children under 13 years old and use of ketamine is not expected in these patients
  - **Contact Base** for pediatric Patients >13 years old
- 

#### **Special Considerations**

**After every administration of Ketamine:**

- Prepare to provide respiratory support including bag-valve-mask ventilation and suction which are generally sufficient in rare cases of laryngospasm.
  - Institute cardiac monitoring, pulse oximetry and continuous waveform capnography
  - Establish IV or IO access, check blood glucose
  - Establish and maintain physical restraint
- Excited delirium is a medical emergency. Expedite rapid and safe transport.
  - Ketamine is provided for IM administration in 100 mg/mL concentration
  - All cases of ketamine use will be reviewed by the Medical Director.
- 

#### **Protocol**

- Agitated/Combative Patient Protocol
- Psychiatric/Behavioral Protocol
- Restraints
- Benzodiazepine

## 9172 MEDICATIONS

### **KETAMINE** (Analgesia)

---

#### **Description**

Ketamine is a non-competitive NMDA receptor antagonist and dissociative, amnestic, analgesic anesthetic agent.

---

#### **Onset & Duration**

- Onset: 1-5 minutes after IM administration.
  - Duration: 10-15 minutes
- 

#### **Indications**

- Fentanyl remains the mainstay for management of acute pain
  - Consider Ketamine if:
    1. Contraindication to fentanyl (allergy or intolerance)
    2. Opiate dependence in acute pain
  - NOT to be used for procedural sedation
- 

#### **Contraindications**

- Known allergy
  - Relative contraindication in patients with known cardiovascular disease. (ketamine causes tachycardia)
  - Altered Mental Status
  - SBP <90
  - Age <18 or > 65
  - Known history of severe behavioral disorder
- 

#### **Dosage and Administration**

Adults:

- 0.3mg/kg IV Administer in 50cc of D5W or NS over 5 minutes  
Range for typical adult is 20mg-30mg
  - 0.5mg/kg IM/IN  
Dose for typical adult is 30mg-50mg
  - Typical duration of action is 20 minutes. May repeat after 20 minutes for a total of 2 doses
  - Additional analgesia requires Base Contact
- 

#### **Precautions**

- Potential increase in heart rate and blood pressure
  - May provoke hyper-salivation, typically controlled by suctioning (not usually seen at analgesic dose)
  - May cause hallucinations, euphoria, and dysphoria
- 

#### **Protocol**

Amputations

Burns

Face and Neck Trauma

Chest Trauma

Abdominal Trauma

Spinal Trauma

## 9190 MEDICATIONS

### **MAGNESIUM SULFATE**

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#### **Description**

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

---

#### **Indications**

##### **Antiarrhythmic**

- Torsade de pointes associated with prolonged QT interval

##### **Respiratory**

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

##### **Obstetrics**

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

#### **Precautions**

- Bradycardia
  - Hypotension
  - Respiratory depression
- 

#### **Adverse Reactions**

- Bradycardia
  - Hypotension
  - Respiratory depression
- 

#### **Dosage and Administration**

- **Torsades de Pointes suspected caused by prolonged QT interval:**
    - 2 g, IV bolus.
  - **Refractory Severe Bronchospasm:**
    - 2 g, IV bolus, over 2 minutes; **contact base**
  - **Eclampsia:**
    - 2 g, IV bolus slowly
    - Mix 4 g, diluted in 50 ml of Normal Saline (0.9 NS), IV drip over 15-30 minutes.
- 

#### **Protocol**

- Universal Pulseless Arrest Algorithm
- Adult wheezing
- Obstetric Complications



## 9200 MEDICATIONS

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

---

#### **Description**

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

---

#### **Indications**

- Anaphylaxis
  - Severe asthma
  - COPD
  - 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:**

See Handtevy

---

#### **Protocol**

- [Adult Wheezing](#)
  - [Pediatric Wheezing](#)
  - [Allergy and Anaphylaxis](#)
  - [Medical Hypotension/shock](#)
- 

#### **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

## 9210 MEDICATIONS

### NALOXONE (NARCAN)

---

#### Description

Naloxone is a competitive opioid receptor antagonist

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#### Onset & Duration

Onset: Within 5 minutes

Duration: 1-4 hours

---

#### Indications

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

#### 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:

See Handtevy

---

#### Protocol

- Universal Altered Mental Status
  - 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

## 9220 MEDICATIONS

### **NITROGLYCERIN (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**

- **Chest Pain:** 0.4 mg (1/150 gr) sublingually, every 5 minutes PRN up to a total of 3 doses for persistent CP
  - **Pulmonary Edema:** 0.4 mg (1/150 gr) sublingually or spray, every 5 minutes PRN titrated to symptoms and blood pressure
  - **Nitropaste:** 1 inch of Nitropaste on the patient's left anterior chest for CHF/Pulmonary Edema
- 

#### **Protocol**

- Chest Pain
  - CHF/Pulmonary Edema
-

## 9230 MEDICATIONS

### OPIOIDS (FENTANYL)

---

#### 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.
- 

#### Contraindications

- 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.**
  - Chest wall rigidity has been reported with rapid administration of fentanyl
- 

#### Dosage and Administration

##### FENTANYL:

##### Adult:

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

- Dose may be repeated after 5 minutes and titrated to clinical effect to a maximum cumulative dose of 300 mcg
- Additional analgesia requires **BASE CONTACT**

**IN route:** 1-2 mcg/kg.

- Dose may be repeated after 5 minutes after initial IN dose to a maximum cumulative dose of 300 mcg. IV route is preferred for repeat dosing.
- Additional analgesia requires **BASE CONTACT**

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

**IV/IO route:** See Handtevy

- Dose may be repeated after 5 minutes and titrated to clinical effect to a maximum cumulative dose of 3 mcg/kg.
- Additional analgesia requires **BASE CONTACT**

## 9230 MEDICATIONS

**IN route:** See Handtevy

- Administer a **maximum of 1 ml of fluid** per nostril
- Dose may be repeated after 5 minutes after initial IN dose to a maximum cumulative dose of 3 mcg/kg. IV route is preferred for repeat dosing.

**Pediatric < 1 year: BASE CONTACT**

### **MORPHINE:**

**Adult:**

**IV/IO/IM routes:** 5-10 mg.

- Dose may be repeated after 10 minutes and titrated to clinical effect to a maximum cumulative dose of 10 mg.
- Additional analgesia after cumulative morphine dose > 10 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 or 10 mg.
- Additional analgesia requires **BASE CONTACT**.
- **Morphine may not be given IN as it is poorly absorbed**

**Pediatric < 1 year: BASE CONTACT**

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

Chest Pain

Abdominal Pain

Amputations

Burns

Face and Neck Trauma

Chest Trauma

Abdominal Trauma

Spinal Trauma

## 9250 MEDICATIONS

### 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<sub>2</sub> 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<sub>2</sub> to ≥ 90%. This may take some time.
  - Do not withhold oxygen from a COPD patient out of concerns for loss of hypoxic respiratory drive. This is never a concern in the prehospital setting with short transport times
- 

#### Administration

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<sub>2</sub> while adequate ventilation is assessed with clinically and with ETCO<sub>2</sub>.

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%
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%

## 9260 MEDICATIONS

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

---

#### **Description**

- Phenylephrine is an alpha adrenergic agonist. When administered intranasally, it causes vasoconstriction in the nasal mucosa and subsequently decreased bleeding and nasal decongestion.
- 

#### **Indications**

- Prior to nasotracheal intubation to induce vasoconstriction of the nasal mucosa
  - Nosebleed (epistaxis).
- 

#### **Precautions**

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

#### **Dosage and Administration**

- Instill two drops of 1% solution, or 2 sprays, in the nostril prior to attempting nasotracheal intubation.
  - For patients with active nosebleed, first have patient blow nose to expel clots. Then, administer 2 sprays into affected naris(es).
- 

#### **Protocol**

- Nasotracheal intubation
- Epistaxis

## 9270 MEDICATIONS

### ***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 **inhalation only**. Inhalation causes local effects on the upper airway as well as systemic effects from absorption. Vasoconstriction may reduce swelling in the upper airway, and  $\beta$  effects on bronchial smooth muscle may relieve bronchospasm.

---

#### **Onset & Duration**

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

#### **Indications**

- Stridor at rest
- 

#### **Side Effects**

- Tachycardia
  - Palpitations
  - Muscle tremors
- 

#### **Dosage and Administration**

0.5 ml racemic epinephrine (acceptable dose for all ages) mixed in 3 mL saline, via nebulizer at 6-8 LPM to create a fine mist and administer over 15 minutes.

---

#### **Protocol**

- Pediatric Stridor/Croup
- 

#### **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.
- If no racemic epinephrine is available, consider 5 mL of 1:1,000 epinephrine x 1 via nebulizer at 6-8 LPM to create a fine mist and administer over 15 minutes.



## 9280 MEDICATIONS

### **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 or hypotension.
  - Suspected hyperkalemic pulseless arrest: consider in patients with known renal failure/dialysis.
- 

#### **Contraindications**

- Metabolic and respiratory alkalosis
  - Hypocalcemia
  - Hypokalemia
- 

#### **Adverse Reactions**

- Metabolic alkalosis
  - Paradoxical cerebral intracellular acidosis
  - Sodium bolus can lead to volume overload
- 

#### **Drug Interactions**

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

#### **Dosage and Administration**

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

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

- 1 mEq/kg slow IV/IO push. Repeat if needed in 10 minutes.

**Peds:** See Handtevy

---

#### **Protocol**

- [UniversalPulselessArrest](#)
  - [Poisoning/Overdose](#)
- 

#### **Special Considerations**

- Sodium bicarbonate administration increases CO<sub>2</sub> which rapidly enters cells, causing a paradoxical intracellular acidosis.
- Sodium bicarbonate administration in pulseless arrest should be limited to known or suspected hyperkalemia (e.g. dialysis patient), or arrest following tricyclic overdose.

## 9290 MEDICATIONS

### **TOPICAL OPHTHALMIC ANESTHETICS**

---

#### **Description**

Proparacaine and tetracaine are local anesthetics approved for ocular administration for relief of eye pain caused by corneal abrasion or chemical injury.

---

#### **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 2 drops into affected eye. **Contact Base** for repeat dosing.
- 

#### **Special Considerations**

- This is single patient use. Unused portions should be discarded and only new bottles may 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.

## 9300 MEDICATIONS

### VASOPRESSOR CONTINUOUS INFUSION – ADULT PATIENTS ONLY

---

#### Description:

**Epinephrine:** Preferred vasopressor for all indications.

- 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:

**Epinephrine:**

- Severe Allergic Reaction/Anaphylaxis
- Hypotension with poor perfusion refractory to adequate fluid resuscitation (typically 30 mL/kg crystalloid)
- Bradycardia with signs of poor perfusion

#### Contraindications:

- **Do not use vasopressor infusion in PEDIATRIC patients (age less than 12 years)**
- 

#### Adverse Reactions

- Dysrhythmia
  - Hypertension
  - Anxiety
  - Angina
- 

#### Drug Interactions

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

#### Dosage and Administration:

**Epinephrine:**

- **Mix:** inject 1 mg epinephrine into 1000 mL Normal Saline bag to achieve 1mcg/mL concentration (This means 1 mL of 1:1000 or 10 mL of 1:10,000 – either way 1 mg of drug). Use macro drip set.
  - **Adult IV/IO:** Begin IV/IO infusion wide open to gravity to give small aliquots of fluid. **Typical volumes are less than 100 mL of total fluid**, as typical doses are expected to be < 100 mcg. Titrate to desired hemodynamic effect with goal BP of > 90 mmHg systolic, improved respiratory status (bronchodilation), and improved perfusion/mentation.
- 

#### Protocol

- Post-Resuscitation Care with ROSC
  - Bradycardia with Poor Perfusion
  - Allergy and Anaphylaxis
  - Medical Hypotension/Shock
  - Overdose and Acute Poisoning
- 

#### Special Considerations

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