

# **STATE OF OHIO**

## **EMS BOARD**

### **Emergency Medical Services Pediatric Guidelines and Procedures Manual**

#### **INTRODUCTION**

On behalf of the State Board of Emergency Medical Services, the Ohio Emergency Medical Services for Children Program was charged with drafting proposed pediatric guidelines that EMS agencies could use in setting a standard for emergency medical services to the children of Ohio.

Please note that the proposed guidelines are not mandatory for Ohio EMS agencies. The guidelines and procedures manual is meant to assist in the development of local protocols. It is the Board's hope that individual regions or agencies will review these guidelines with their medical directors and legal counsel when drafting their own individualized protocols.

Revised July 16, 2008

## USING THE PEDIATRIC GUIDELINES

The pediatric guidelines are color coded for quick and easy reference, and represent the scope of practice as recommended by the Ohio EMSC Committee. In some cases, this differs from Ohio's scope of practice. Consult your medical director should questions arise regarding scope of practice.

Please see the color coded key below to determine how to use the guidelines.

**PARAMEDICS** may perform all instructions coded:



**EMT INTERMEDIATES** may perform all instructions coded:



**EMT BASICS** may perform all instructions coded:



**FIRST RESPONDERS** may perform all instructions coded:



**MEDICAL CONTROL** should be contacted to perform instructions coded:



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**PEDIATRIC  
ALTERED LEVEL OF CONSCIOUSNESS**

**FIRST RESPONDER**

- A. Assess ABC's. Manually stabilize cervical spine as per Multiple Trauma Protocol if cause of unconsciousness is unknown.
- B. If not breathing, assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.
- C. If breathing, administer 100% oxygen by NRB mask.
- D. Evaluate patient's general appearance, relevant history of condition and determine:

Allergies

Medication

Past Medical History - especially, diabetic, seizures, stroke, head injury, drug abuse

Last Meal

Events leading to present illness

**EMT-B**

- A. Determine blood sugar level by available means.
    - 1. If blood sugar is less than 70 mg/dl, administer oral glucose if alert. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl.
- PATIENT MUST HAVE A GAG REFLEX.**
- 2. If blood sugar is greater than 400 mg/dl, TRANSPORT.
  - B. If unable to check blood sugar or blood sugar is between 70 mg/dl and 400 mg/dl, establish communications with Medical Control and advise of patient condition.
  - C. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.
  - D. Apply monitor

**EMT-I**

- A. Assist EMT; obtain patient condition and circumstances.
- B. Check heart rhythm.
- C. Start IV saline, TKO.
- D. If any of the following are present: patient is unresponsive, appears dry, tachycardic, has a low BP, poor capillary refill and/or blood sugar is above 400 mg/dl, IV fluid bolus 20cc/kg of saline.

PEDIATRIC ALTERED LEVEL OF CONSCIOUSNESS (cont'd)

- E. Determine blood sugar level by available means. Treat accordingly:
1. Blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2ml/kg of 25% dextrose (D25)
    - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl
  2. Blood sugar greater than 400 mg/dl and signs of hypoperfusion are present, administer an IV fluid bolus:
    - a. 20cc/kg of saline
    - b. May be repeated if no response in 10 minutes.
- F. If blood sugar is normal, respirations are impaired, or patient does not respond to dextrose or fluid bolus, administer Narcan 0.1 mg/kg IV, IO, intranasal, or ET. Refer to most current version of length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage.
- If patient improves somewhat with Narcan but is not fully awake, contact Medical Control for repeat dose.
- G. Re-evaluate patient condition, contact Medical Control, and transport to the hospital.
- H. In some cases, patient may require restraint, and should not be transported until appropriately restrained.

DO NOT DELAY TRANSPORT

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Assess airway adequacy and assist ventilation with bag-valve-mask while administering 100% oxygen. May consider intubation.
- C. Check rhythm.
- D. Start IV/IO saline. If any of the following are present: patient is unresponsive, appears dry, tachycardic, has a low BP, or poor capillary refill, try a fluid challenge of 20cc/kg saline IV/IO push.
- E. Determine blood sugar level by available means. Treat accordingly:
1. Blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2ml/kg of 25% dextrose (D25)
    - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl
  2. Blood sugar greater than 400 mg/dl and signs of hypoperfusion are present, administer an IV fluid bolus:
    - a. 20cc/kg of saline
    - b. May be repeated if no response in 10 minutes.

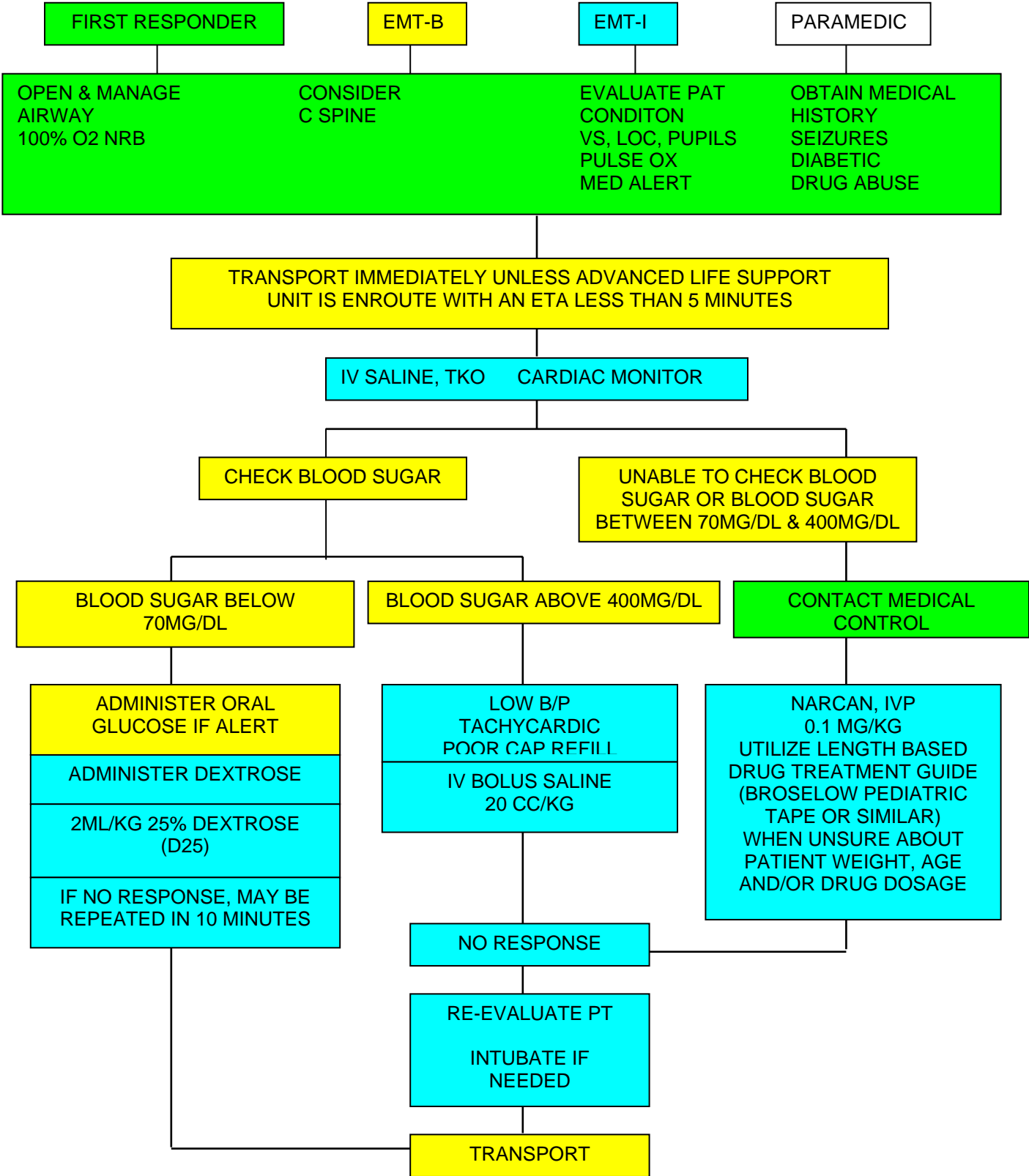
## PEDIATRIC ALTERED LEVEL OF CONSCIOUSNESS (cont'd)

- F. If blood sugar is normal, respirations are impaired, or patient does not respond to dextrose or fluid bolus, administer Narcan 0.1 mg/kg IV, IO, intranasal, or ET. Refer to most current version of length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage.

If patient improves somewhat with narcan but is not fully awake, contact Medical Control for repeat dose.

- G. Re-evaluate patient condition, contact Medical Control, and transport to the hospital.
- H. In some cases, patient may require restraint, and should not be transported until appropriately restrained.

**PEDIATRIC  
ALTERED LEVEL OF CONSCIOUSNESS**



## PEDIATRIC ARRHYTHMIAS

### GENERAL CONSIDERATIONS

- A. In the treatment of cardiac arrhythmia, current American Heart Association guidelines were referred to for protocol development.
- B. Life-threatening cardiac rhythm disturbances in children are more frequently the result rather than the cause of acute cardiovascular emergencies
- C. In infants and children, arrhythmia should be treated as an emergency only if:
  - 1. the arrhythmia compromises cardiac output, or
  - 2. the arrhythmia has the potential for degenerating into a rhythm that compromises cardiac output
- D. Initial therapy in children will consist of proper ventilation and oxygenation, along with the assessment of cardiac output
- E. Transport is essential when advanced cardiac life support is not available within ten minutes of receipt of the call
- F. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage.

### FIRST RESPONDER

- A. Per current American Heart Association Pediatric Basic Life Support guidelines, establish unresponsiveness, give two quick breaths, assess pulse and begin compressions if indicated. Immobilize cervical spine if indicated.
- B. Assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.

### EMT-B

- A. Open and manage the airway and provide 100% oxygen by NRB mask
  - 1. Assist ventilations if rate is below or above normal limits and signs of hypoxia are present
  - 2. Apply pulse oximeter and obtain reading
- B. If patient show signs of decreased cardiac output (decreased LOC, poor capillary refill, low blood pressure,) and a heart rate less than 60 bpm does not respond to oxygenation, start CPR.
- C. Evaluate patient's general appearance and determine:
  - 1. Vital signs
  - 2. Level of consciousness
  - 3. Cardiac output
  - 4. Lung sounds
- D. Obtain relevant history of current condition.
- E. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.
- F. If cardiac monitor is available, and patient has an unusual and/or irregular heart rate or pulse, apply monitor and run a strip for interpretation by ED physician, during transport only.

PEDIATRIC ARRHYTHMIAS (cont'd)

EMT-I

- A. Start IV saline, TKO using pediatric IV tubing set-up if available.
- B. Assess airway adequacy and assist ventilation with bag-valve-mask while administering 100% oxygen. May consider intubation.
- C. Apply monitor and determine arrhythmia.
- D. Treat arrhythmias as follows:
  - 1. Bradycardia. Treat only if:
    - a. Infant or child's heart rate < 60 BPM. and patient has decreased cardiac output.
    - b. Airway management and 100% oxygenation does not improve patient condition.
      - i. Begin CPR
      - ii. Transport immediately

PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Assess airway adequacy and assist ventilation with bag-valve-mask while administering 100% oxygen. May consider intubation.
- C. Apply monitor and determine arrhythmia.
- D. Treat arrhythmias as follows:
  - 1. Bradycardia. Treat only if:
    - a. Infant or child's heart rate < 60 BPM. and patient has decreased cardiac output.
    - c. Airway management and 100% oxygenation does not improve patient condition.
      - ii. Begin CPR
      - ii. Administer epinephrine IV, IO, or ET every three to five minutes or until cardiac output improves
        - (a) When IV or IO routes are available, administer 0.01mg/kg (0.1mL/kg) of 1:10,000
        - (b) When administering through ET tube use 0.1mg/kg (0.1 mL/kg) of 1,000 ET epinephrine must be diluted with 3-5cc of NS.
      - iii. If no response, administer atropine
        - (a) When IV or IO routes are available, 0.02mg/kg. (Minimum dose 0.1mg)
        - (b) When administering through ET tube, administer 0.04mg/kg

## PEDIATRIC ARRHYTHMIAS (cont'd)

- (c) Atropine may be repeated one time in 3-5 minutes
    - (d) Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage.
  - iv. Transport and contact Medical Control for possible cardiac pacing
- 2. Narrow Complex Tachycardia:
  - a. If patient is asymptomatic, transport immediately.
  - b. Consider normal pulse for age of patient
  - d. Consider hypovolemia and follow Hypovolemic Shock Protocol.
  - d. Request history of Wolfe Parkinson White syndrome, if present, transport
  - e. Consider vagal maneuver. Success of vagal maneuvers are variable and depend upon the presence of underlying conditions, the patient's level of cooperation, and age. Regardless of what type of vagal maneuver is attempted, obtain an ECG tracing before and during the attempt. The following vagal maneuvers may be attempted in pediatric patients:
    - Ice water applied to the face
    - Crushed ice in a plastic bag/glove applied to the face without obstructing ventilation
    - Have child blow through a straw
  - f. If patient is symptomatic (poor perfusion, shock, hypotension, respiratory difficulty, SOB, signs of CHF, altered LOC) and rate is greater than 240 bpm:
    - i. Administer adenosine, 0.1mg/kg (maximum 6mg) RAPID IV bolus over 1 to 3 seconds followed IMMEDIATELY with a 5-10cc bolus of saline. Adenosine works best if the IV is in a central vein (the closer to the heart the better).
    - ii. If no conversion, repeat adenosine in 1-2 minutes, 0.2mg/kg (maximum 12mg) RAPID IV bolus followed IMMEDIATELY with a 5-10cc bolus of saline
    - iii. Contact Medical Control
    - iv. Consider sedation Valium/Versed 0.2mg/kg IV
    - v. Synchronous cardioversion at
      - (a) 0.5 joules (or biphasic equivalent)
      - (b) 1.0 joules/kg (or biphasic equivalent)
      - (c) 2.0 joules/kg (or biphasic equivalent)
- 3. Wide Complex Tachycardia (With a pulse)
  - Assess patient's perfusion. Signs/symptoms of poor perfusion include
    - Shock
    - Hypotension
    - Respiratory difficulty
    - Altered LOC
    - CHF/Pulmonary Edema

## PEDIATRIC ARRHYTHMIAS (cont'd)

### a. Good perfusion

#### i. Administer an antiarrhythmic.

Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone, lidocaine, or procainamide. The choice of the antiarrhythmic to be administered should be predetermined by the Medical Director for your organization. If the patient is stable or has a history of congenital heart disease, please discuss with the medical control physician at the receiving facility prior to administration of an antiarrhythmic. Otherwise, follow these guidelines for administration.

- Amiodarone 5mg/kg IV over 20-60 minutes
- Lidocaine 1.0mg/kg IVP
  - If no response in five minutes-Repeat lidocaine 0.5mg/kg IV every five minutes to a 3mg/kg maximum
  - At any time during treatment the rhythm converts, continue lidocaine, 0.5 mg/kg IV every 20 minutes
- Procainamide IV infusion of 15mg/kg over 30-60 minutes
  - Max dose is 15mg/kg
  - Discontinue infusion if hypotension develops, development of a prolonged QRS complex greater than 50%, or the max dose of 15mg/kg has been administered.

**\*\*NOTE: If at anytime the patient becomes unstable with poor perfusion, go directly to synchronous cardioversion.**

**\*\*NOTE: Do not administer more than one antiarrhythmic to a patient. The choice of the antiarrhythmic to be administered should be predetermined by the Medical Director for your organization.**

#### ii. Consider sedation Valium/Versed 0.2mg/kg IV

#### iii. Synchronous cardioversion at:

- (a) 0.5 joules/kg (or biphasic equivalent)
- (b) 1.0 joules/kg (or biphasic equivalent)
- (c) 2.0 joules/kg (or biphasic equivalent)

### b. Poor perfusion (with a pulse):

#### i. Prepare for immediate cardioversion

#### ii. Consider sedation Valium/Versed 0.2mg/kg IV

#### iii. Synchronous cardioversion at:

- (a) 0.5 joules/kg (or biphasic equivalent)
- (b) 1.0 joules/kg (or biphasic equivalent)
- (c) 2.0 joules/kg (or biphasic equivalent)

#### iv. Administer an antiarrhythmic

Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone, lidocaine, or procainamide. The choice of the antiarrhythmic to be administered should be predetermined by the Medical Director for your organization. If the patient is stable or has a history of congenital heart disease, please discuss with the medical control

physician at the receiving facility prior to the administration of any antiarrhythmic.

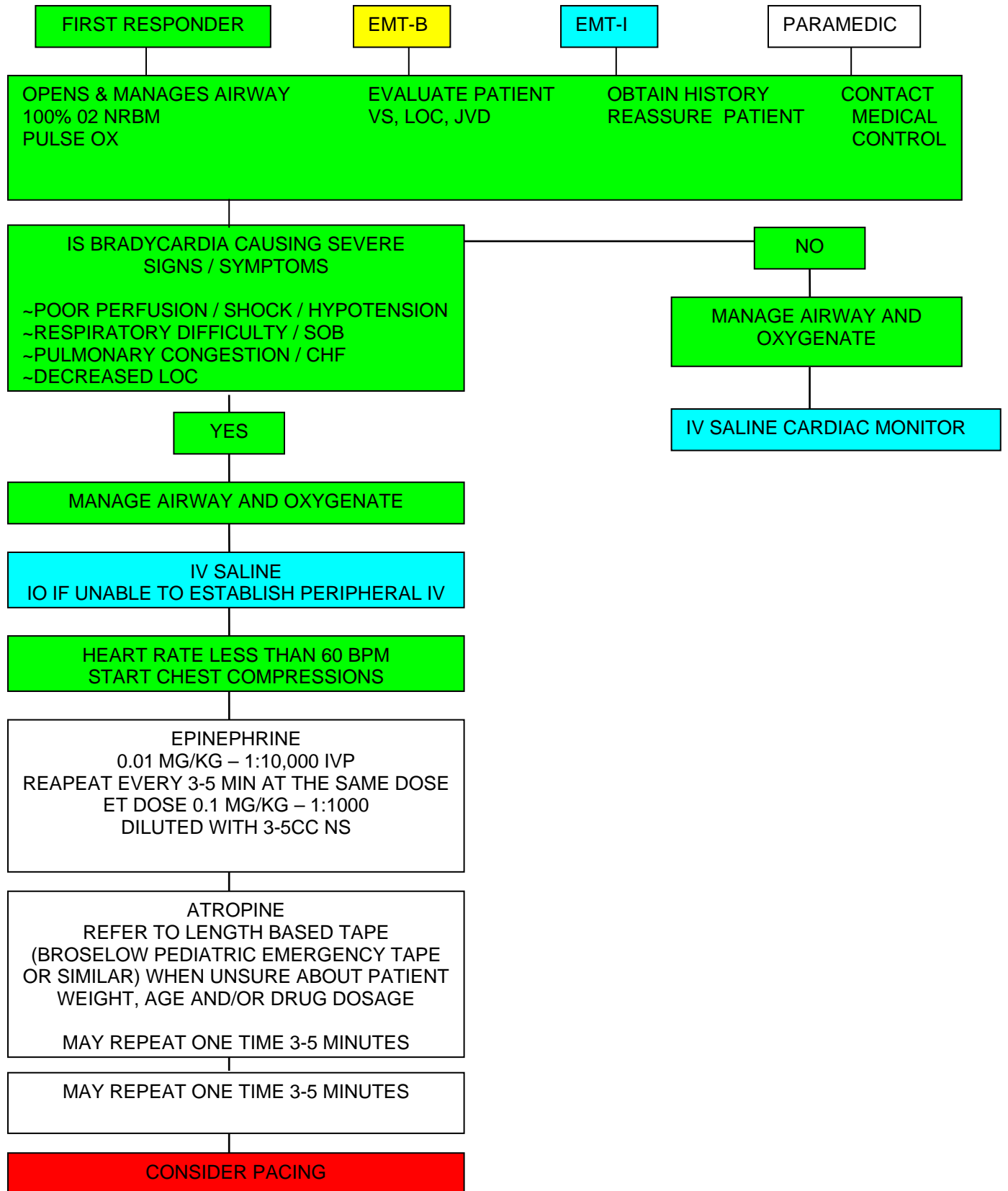
#### PEDIATRIC ARRHYTHMIAS (cont'd)

Otherwise, follow these guidelines for the administration.

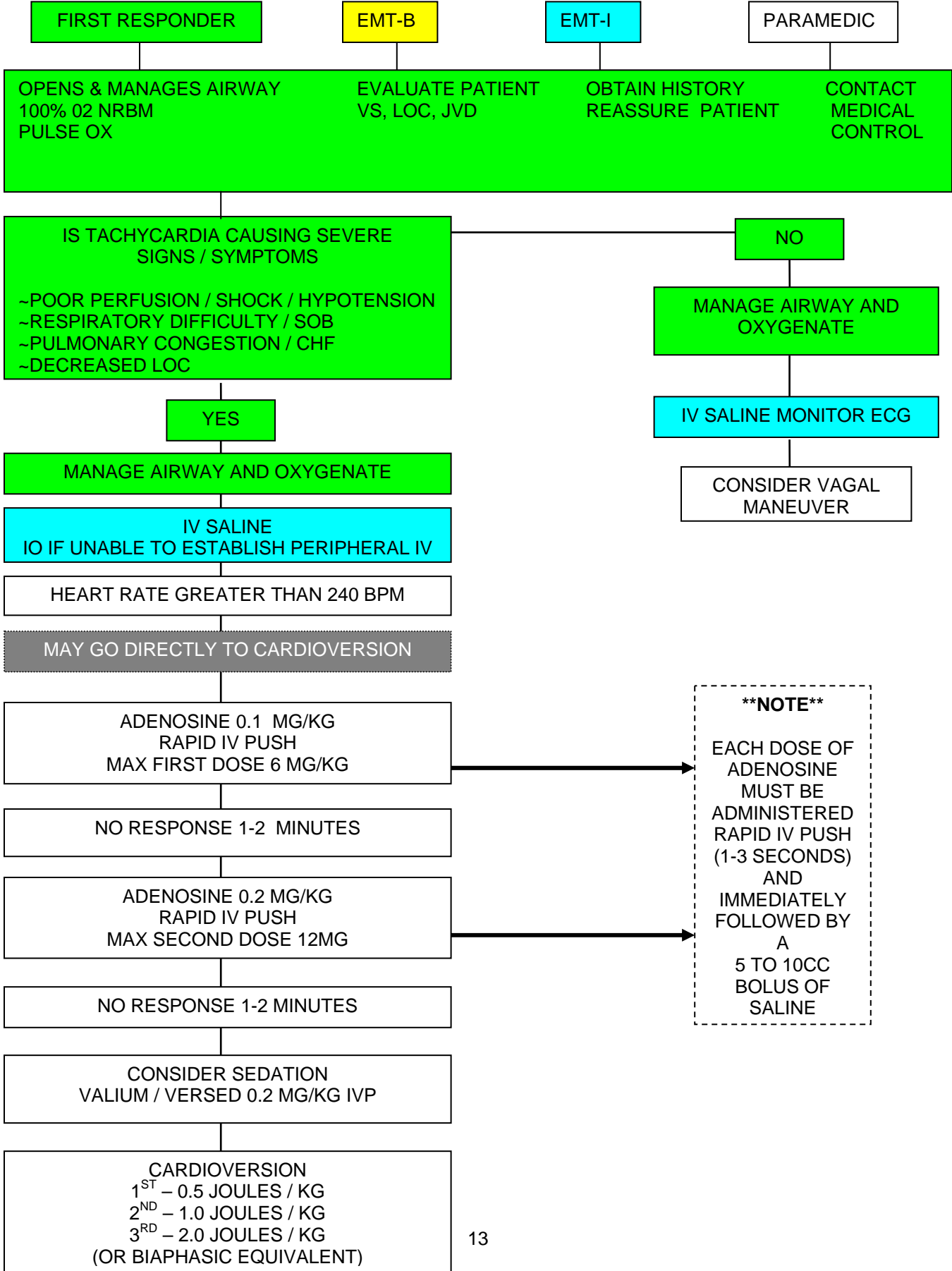
- Amiodarone 5mg/kg IV over 20-60 minutes
- Lidocaine 1.0mg/kg IVP
  - If no response in five minutes-Repeat lidocaine 0.5mg/kg IV every five minutes to a 3mg/kg maximum
  - At any time during treatment the rhythm converts, continue lidocaine, 0.5 mg/kg IV every 20 minutes
- Procainamide IV infusion of 15mg/kg over 30-60 minutes
  - Max dose is 15mg/kg
  - Discontinue infusion if hypotension develops, development of a prolonged QRS complex greater than 50%, or the max dose of 15mg/kg has been administered.

**\*\*NOTE: Do not administer more than one antiarrhythmic to a patient. The choice of the antiarrhythmic should be predetermined by the Medical Director for your organization.**

# PEDIATRIC ARRHYTHMIA BRADYCARDIA

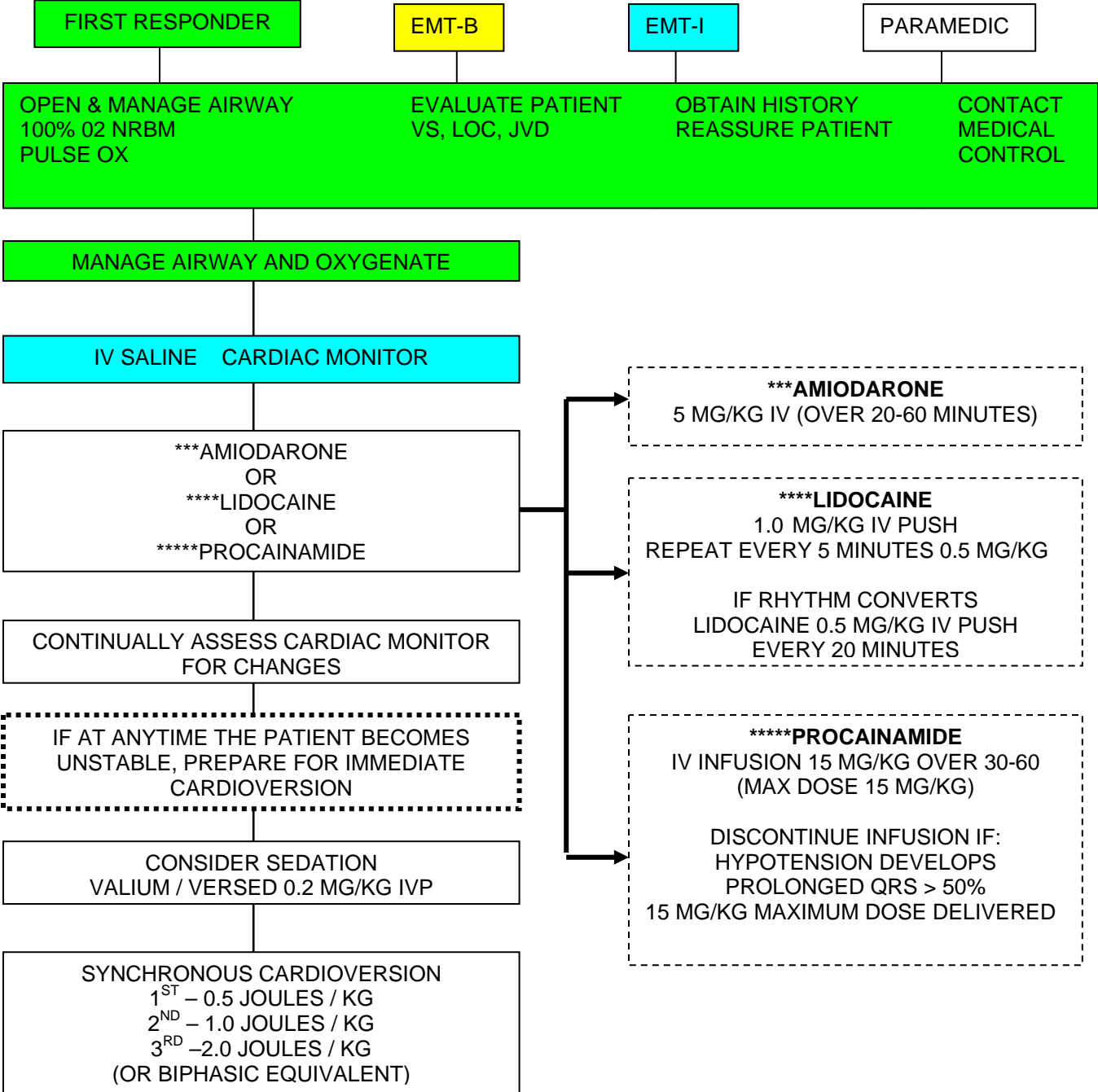


# PEDIATRIC ARRHYTHMIA NARROW COMPLEX TACHYCARDIA



**PEDIATRIC ARRHYTHMIAS  
STABLE WIDE COMPLEX TACHYCARDIA**

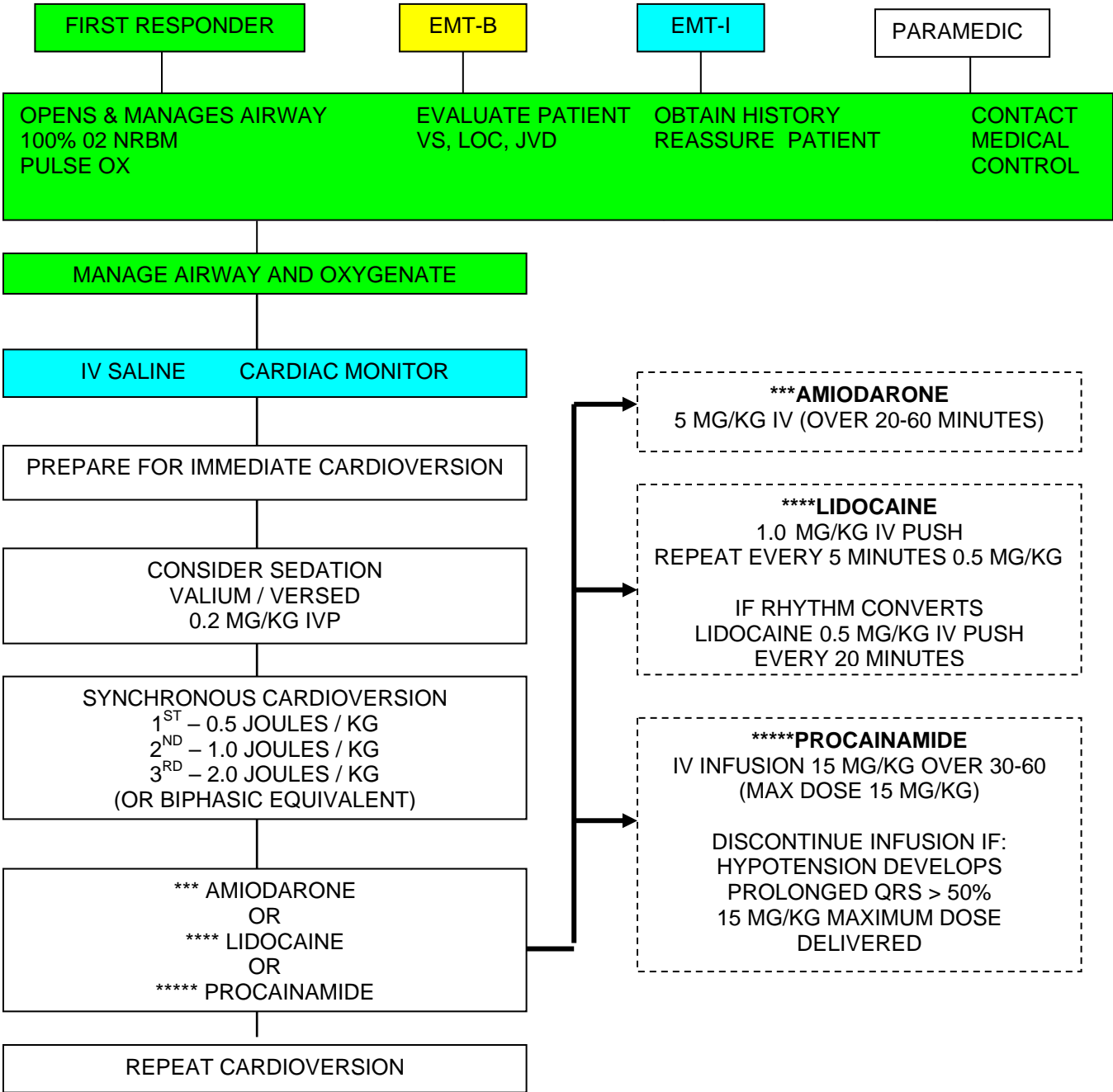
**PATIENTS WITH A GOOD PULSE, FOOD PERFUSION, WHO ARE ALERT AND ORIENTED ARE CONSIDERED STABLE**



**DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC TO A PATIENT**

**PEDIATRIC ARRHYTHMIAS  
UNSTABLE WIDE COMPLEX TACHYCARDIAS**

**PATIENTS WITH POOR PERFUSION / SHOCK / HYPOTENSION, RESPIRATORY DIFFICULTY, PULMONARY CONGESTION, AND/OR ALTERED LOC ARE CONSIDERED UNSTABLE**



**DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC TO A PATIENT**

### **Implementation of the 2005 American Heart Association Guidelines**

In 2005, the American Heart Association instituted changes in their cardiopulmonary resuscitation (CPR), automated external defibrillator (AED), Advanced Cardiac Life Support, and Pediatric Advanced Life Support guidelines. The changes included alterations in chest compression and rescue breath rates and ratios, levels of energy delivered during defibrillation, and administration of medications, defibrillations, and cardioversions.

At the time of the implementation of the 2005, guidelines, the American Heart Association announced that there would be a delay in the availability of instructor and student training materials, specifically textbooks, due to the lack of publishing companies capable of producing their products. As a result, the training materials did not become available until December 2006.

The Ohio Department of Public Safety, Division of EMS is sensitive to these factors. We also realize that there inherently will be a lag time for EMS agencies to complete the training of all EMS providers in the 2005 American Heart Association guidelines. Time also needs to be allotted for EMS agencies to have the software of their defibrillators and AEDs updated by their manufacturers and vendors. Some of the defibrillators and AEDs that are currently in use may not have software that is capable of being updated and will eventually need to be replaced.

In the interest of maintaining patient care, the State of Ohio EMS Guidelines and Procedures and State of Ohio Pediatric EMS Guidelines and Procedures Manuals will provide the updated resuscitation guidelines and retain the former guidelines until December 31, 2009. The former guidelines will be removed from these manuals on January 1, 2010. This grace period will allow EMS agencies to complete the training of their EMS providers and to update or replace their defibrillators and AEDs in order for these devices to be capable to comply with the new guidelines. ***EMS agencies that have completed these tasks should begin to utilize the updated resuscitation guidelines immediately.***

## PEDIATRIC CARDIAC ARREST

### GENERAL CONSIDERATIONS

- A. Cardiac arrest in children is primarily due to the lack of an adequate airway, resulting in hypoxia.
- B. All EMT personnel must concentrate on opening and maintaining the airway and providing 100% oxygenation.
- C. When using BVM ventilation, cricoid pressure can be applied to occlude the esophagus and prevent gastric distention. Cricoid pressure can be applied until an ET tube can be inserted.
- D. Transport immediately when excessive hemorrhage or hypothermia is present. Advanced life support measures should be carried out during transportation.
- E. For BLS responders use AED for children 8 years of age and above. See page 19. (Cardiac Arrest-AED)
- F. If peripheral IVs cannot be established, access should be obtained by Intraosseous route (IO)
- G. If IV or IO access cannot be established, administer appropriate medications through the endotracheal tube.
- H. If Sudden Infant Death Syndrome (SIDS) is suspected:
  - 1. Initiate basic and advanced life support, unless apparent rigor mortis or signs of lividity are present.
  - 2. Reassure parents they are not at fault.
  - 3. Encourage family to have friends or neighbors accompany them to the hospital.
  - 4. If infant is not resuscitated, refer parents to local Social Services or Bereavement Services to initiate counseling.
  - 5. Notify local law enforcement while on-scene.
- I. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage.

### FIRST RESPONDER

- A. Open and maintain airway with sniffing position.
- B. Assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.
- C. Initiate CPR. Use AED if available for children 8 and above. See page 19. (Cardiac Arrest – AED)

### EMT-B

- A. Open and maintain airway with sniffing position.
- B. Assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.
- C. Initiate CPR. Use AED if available for children 8 and above. See page 19. (Cardiac Arrest – AED)

PEDIATRIC CARDIAC ARREST (cont'd)

- D. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.
- E. Apply monitor.

EMT-I

- A. Assume charge and confer with EMT as to patient condition and circumstances.
- B. Assess airway and intubate patient if needed.
- C. Check rhythm.
  - 1. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:
    - a. Defibrillate 2 joules/kg (or biphasic equivalent)
    - b. If no change, defibrillate 4 joules/kg (or biphasic equivalent)
    - c. If no change, defibrillate 4 joules/kg (or biphasic equivalent)
    - d. If no change, continue CPR and transport
- D. Start IV or IO of saline with pediatric IV tubing set-up, if available, and give fluid bolus of 20cc/kg. IV should be accomplished enroute to hospital.

DO NOT DELAY TRANSPORT

- 2. Asystole/pulseless electrical activity (PEA)
  - a. Confirm asystole by two different lead positions
  - b. If rhythm is unclear and possibly ventricular fibrillation, follow Ventricular Fibrillation Protocol
  - c. Consider treatable causes:
    - Hypovolemia, give fluid boluses (20cc/kg)
    - Hypoxia, adequate airway management
    - Hypothermia, aggressively warm patient
    - Hypoglycemia, administer D50
    -
  - d. Begin CPR and transport

PARAMEDIC

- A. Assume charge and confer with EMTs as to patient condition and circumstances.

- B. If EMT-I is in a cycle of defibrillation, complete cycle before continuing.

#### PEDIATRIC CARDIAC ARREST (cont'd)

- C. Assess airway and intubate patient if needed.
- D. Immediately establish IV or IO.
- E. Apply monitor. If one of the following conditions exists, treat as follows:

1. Ventricular fibrillation or pulseless ventricular tachycardia:
  - a. Defibrillate 2 joules/kg
  - b. If no response, defibrillate 4 joules/kg (or biphasic equivalent)
  - c. If no response, defibrillate 4 joules/kg (or biphasic equivalent)
  - d. If no response, CPR and administer epinephrine IV, IO, or ET every 3 minutes
    - i. When IV or IO routes are available, administer epinephrine 0.01mg/kg (0.1 mL/kg) of 1:10,000 every 3-5 minutes
    - ii. When administering through ET tube administer epinephrine 0.1mg/kg (0.1mL/kg) of 1:1,000 ET. Epinephrine must be diluted with 3-5cc of saline
  - e. If no response, defibrillate 4 joules/kg (or biphasic equivalent)
  - f. If no response, administer an antiarrhythmic

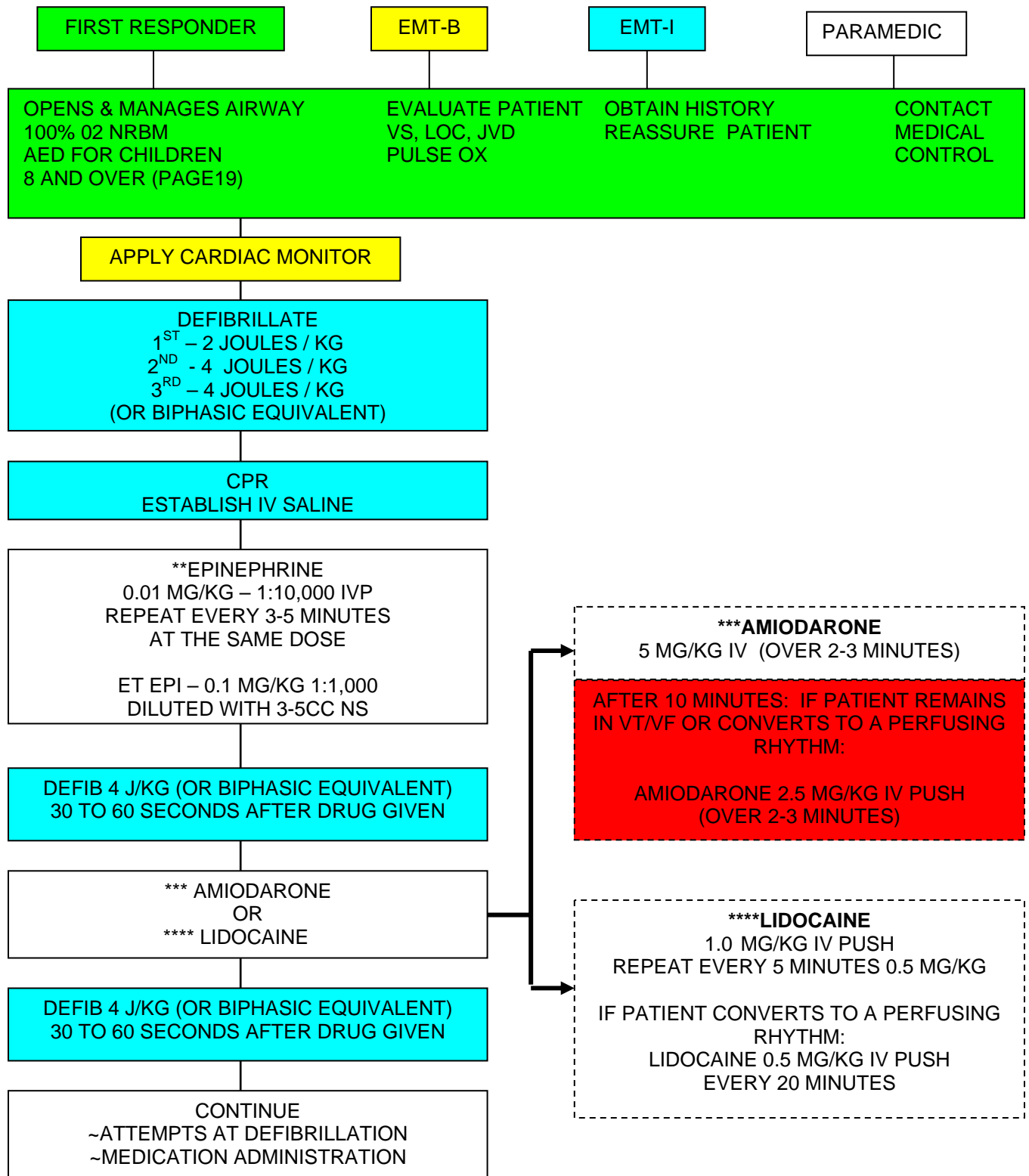
Antiarrhythmics that are indicated for pulseless VT/VF are amiodarone or lidocaine. The choice of the antiarrhythmic to be administered should be predetermined by the Medical Director for your organization. Please follow these guidelines for the administration.

- Amiodarone 5mg/kg IV over 2-3 minutes.
    - If after ten minutes the patient remains in VT/VF or converts to a perfusing rhythm, a second dose of amiodarone of 2.5mg/kg IV push can be administered by medical control order only.
  - Lidocaine 1.0mg/kg IVP
    - If no response in five minutes-Repeat lidocaine 0.5mg/kg IVP every five minutes to a 3mg/kg maximum
    - At any time during treatment the rhythm converts, continue lidocaine 0.5mg/kg IVP every 20 minutes
- g. If no response, defibrillate 4 joules/kg (or biphasic equivalent)
  - h. If no response, CPR and TRANSPORT. Continue medication administration and attempts at defibrillation
2. Asystole/pulseless electrical activity (PEA)
    - a. Confirm asystole by two different lead positions
    - b. If rhythm is unclear and possibly ventricular fibrillation, follow Ventricular Fibrillation Protocol

## PEDIATRIC CARDIAC ARREST (cont'd)

- c. Consider treatable causes:
  - Hypovolemia, give fluid boluses (20cc/kg)
  - Hypoxia, adequate airway management
  - Hyperkalemia, consider Sodium Bicarb
  - Hypothermia, aggressively warm patient
  - Tension pneumothorax, perform chest decompression
  - Tricyclic over dose, consider Sodium Bicarb.
  - Hypoglycemia, administer D50
- d. CPR and administer epinephrine IV, IO, or ET
  - i. When IV or IO routes are available, administer epinephrine 0.01mg/kg of 1:10,000 every 3-5 minutes
  - ii. When administering through ET tube use 0.1mg/kg of 1:1,000. Epinephrine must be diluted with 3-5cc of saline.
- e. If no response, IV fluid bolus, 20cc/kg of NS
- f. Check blood sugar. If less than 70 mg/dl administer 2ml/kg 25% dextrose IV
- g. If no response, CPR and TRANSPORT

**PEDIATRIC CARDIAC ARREST  
V-FIB / PULSELESS V - TACH**



**DO NOT ADMINISTER MORE THAN ONE ANTIARRHYTHMIC TO A PATIENT**

**PEDIATRIC CARDIAC ARREST  
ASYSTOLE / PEA**

**FIRST RESPONDER**

**EMT-B**

**EMT-I**

**PARAMEDIC**

OPENS & MANAGES AIRWAY SNIFFING POSITION INITIATES CPR	VENTILATE PATIENT BVM/PPV CRICOID PRESSURE	CONTACT MEDICAL CONTROL
--	--	-------------------------------

APPLY CARDIAC MONITOR

IV SALINE IO IF UNABLE TO ESTABLISH PERIPHERAL IV

**CONSIDER TREATABLE CAUSES**  
 ~ HYPOVOLEMIA > GIVE FLUID BOLUS  
 ~ HYPOXIA > ADEQUATE AIRWAY MANAGEMENT  
 ~ HYPOTHERMIA > AGGRESSIVELY WARM PATIENT

**\*\*NOTE\*\***  
 CONFIRM  
 ASYSTOLE IN  
 TWO LEADS

**CONSIDER ADDITIONAL TREATABLE CAUSES**  
 ~ HYPERKALEMIA > CONSIDER SODIUM BICARB  
 ~ TENSION PNEUMOTHORAX > CHEST DECOMPRESSION  
 ~ TOXINS / POISONS / DRUGS > CONSIDER SODIUM BICARB

EPINEPHRINE  
 0.01MG/KG – 1:10,000 IVP  
 REPEAT EVERY 3-5 MINUTES  
 AT THE SAME DOSE  
  
 ET EPI – 0.1 MG/KG 1:000  
 DILUTED WITH 3-5CC NS

IV FLUID BOLUSES  
 20 CC/KG

BLOOD SUGAR LESS THAN  
 70 MG/DL  
  
 25% DEXTROSE – 2ML/KG

**CARDIAC ARREST – AED USE  
FOR CHILDREN 8 AND OVER**

FIRST RESPONDER

EMT-B

EMT-I

PARAMEDIC

ASSESS PATIENT FOR RESPIRATORY AND CARDIAC ARREST

ACTIVATE ACLS

APPLY AED

DELIVER THREE STACKED SHOCKS  
200J / 300-360J / 360J  
(OR BIPHASIC EQUIVALENT)  
NO PULSE CHECK BETWEEN SHOCKS

MANAGE AIRWAY  
CPR FOR ONE MINUTE

DELIVER THREE STACKED SHOCKS  
360J  
(OR BIPHASIC EQUIVALENT)  
NO PULSE CHECK BETWEEN SHOCKS

MAINTAIN CPR / AIRWAY  
MOVE PATIENT TO AMBULANCE

DELIVER THREE STACKED SHOCKS  
360J  
(OR BIPHASIC EQUIVALENT)  
NO PULSE CHECK BETWEEN SHOCKS

TRANSPORT

ESTABLISH IV SALINE

**PEDIATRIC CARDIAC ARREST**  
**2005 AHA Guidelines**

**GENERAL CONSIDERATIONS**

- A. Cardiac arrest in children is primarily due to lack of an adequate airway, resulting in hypoxia
- B. All EMT personnel must concentrate on opening and maintaining the airway and providing 100% oxygenation
- C. When using BVM ventilation, cricoid pressure can be applied to occlude the esophagus and prevent gastric distention. Cricoid pressure can be applied until an ET tube can be inserted
- D. Transport IMMEDIATELY when excessive hemorrhage or hypothermia is present. ALS measures should be carried out during transport
- E. If peripheral IVs cannot be established, venous access should be obtained by intraosseous route
- F. If IV or IO access cannot be established, administer appropriate medications through the ET tube
- G. If Sudden Infant Death Syndrome (SIDS) is suspected:
  - 1. Initiate basic and advanced life support, unless apparent rigor mortis or signs of lividity are present
  - 2. Reassure the parents
  - 3. Encourage family to have friends or neighbors accompany them to the hospital
  - 4. If infant is not resuscitated, refer parents to Social Services at the nearest appropriate emergency department to initiate counseling
- H. Refer to BROSELOW PEDIATRIC EMERGENCY TAPE when unsure about patient weight, age and/or drug dosage

**EMT-B**

- A. Open and maintain airway in sniffing position
- B. Ventilate with 100% oxygen via BVM with oxygen reservoir
- C. Initiate cardiac compressions in accordance with American Heart Association guidelines (15:2) at a rate of 100 compressions per minute
- D. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless ALS unit is en route and has an ETA of less than 5 minutes

Cardiac arrest [2005 AHA Guidelines] (cont)

E. If an Automated External Defibrillator (AED) is available:

1. Assess patient for respirations and cardiac arrest
2. Apply AED and activate the device.

**NOTE:** AEDs should not be used on patients under one year of age. Pediatric AED pads are preferred for patients between the ages of 1 and 8 years of age. Adult AED pads should be used for patients greater than 8 years of age.

3. Start verbal documentation that must include:
  - EMS unit delivering care and ID of EMT
  - Initial call information (i.e. accidental ingestion, drowning, etc.)
  - Initial patient assessment, findings, and impression
  - Care given to this point
  - Ongoing outcomes of care delivered to patient
- a. "No Shock Advised"
  - i. Continue CPR (15:2) at 100 compressions per minute
  - ii. Continue ventilation with 100% oxygen via BVM with oxygen reservoir
  - iii. Contact medical control and transport IMMEDIATELY
- b. "Shock Advised"
  - i. Deliver a single shock
  - ii. Resume CPR (15:2) at 100 compressions per minute and administer five cycles of CPR
  - iii. Contact medical control, advise of cardiac arrest, and transport IMMEDIATELY
  - iv. After five cycles of CPR, activate AED to assess rhythm and deliver a single shock if indicated
  - v. Resume CPR (15:2) at 100 compressions per minute

**"TURN AED OFF DURING MOVEMENT OF PATIENT"**

**EMT-I**

- A. Assume charge and confer with EMTs as to patient condition and circumstances
- B. Apply cardiac monitor
- C. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:
  1. Defibrillate at 2 joules/kg
  2. If no response, Five cycles of CPR
  3. Defibrillate at 4 joules/kg
  4. If no response, CPR and TRANSPORT
  - 5.

Cardiac arrest [2005 AHA Guidelines] (cont)

- D. Start IV or IO of saline with pediatric IV tubing set-up, if available, and give fluid bolus of 20 ml/kg. IV access should be accomplished en route to hospital

**DO NOT DELAY TRANSPORT**

**EMT-P**

- A. Assume charge and confer with EMTs as to patient condition and circumstances
- B. If EMT-I is in a cycle of defibrillation, allow to complete cycle
- C. Assess airway and intubate if needed
- D. Establish IV or IO, whichever is quickest
- E. Apply monitor. If one of the following conditions exists, treat as follows:
1. Ventricular Fibrillation or Pulseless Ventricular Tachycardia
    - a. Defibrillate at 2 joules/kg
    - b. If no response, perform 5 cycles of CPR
    - c. Defibrillate at 4 joules/kg
    - d. If no response, continue CPR
    - e. Administer Epinephrine IV, IO or ET every 3 minutes
      - IV / IO doses – 0.01mg/kg of 1:10,000 (0.1 ml/kg)
      - ET tube doses – 0.1mg/kg of 1:1,000 (0.1 ml/kg) diluted with 1-2 ml of saline
    - f. If no response, defibrillate at 4 joules/kg
    - g. If no response, continue CPR
    - h. Administer one antiarrhythmic
      - Amiodarone 5mg/kg IV/IO
      - Lidocaine 1 mg/kg IV/IO (second dose 0.5 IV/IO)
      - Magnesium 25-50 mg/kg IV/IO [(for torsades de pointes) Max of 2 g]
    - i. If no response, continue CPR and TRANSPORT

Cardiac arrest [2005 AHA Guidelines] (cont)

2. Asystole / Pulseless Electrical Activity (PEA)
  - a. Confirm asystole in two different leads
  - b. If rhythm is unclear and possibly ventricular fibrillation, follow Ventricular Fibrillation Protocol
  - c. Consider treatable causes:
    - Hypovolemia: Administer 20 ml/kg NS fluid boluses
    - Hypoxia: Perform and maintain adequate airway management
    - Hyperkalemia: Consider sodium bicarbonate administration
    - Hypothermia: Aggressively warm the patient
    - Tension pneumothorax: Perform chest decompression
    - Tricyclic overdose: Consider sodium bicarbonate administration
    - Hypoglycemia: Administer 2 ml/kg of D25 IV/IO for children under 50 pounds or 1 ml/kg of D50 IV/IO for children over 50 pounds
    - Hydrogen ion (acidosis): Consider sodium bicarbonate administration
  - d. Continue CPR and administer epinephrine IV, IO or ET every 3 minutes
    - i. IV/IO doses – 0.01 mg/kg of 1:10,000 (0.1 ml/kg)
    - ii. ET tube doses – 0.1 mg/kg of 1:1,000 (0.1 ml/kg) diluted with 1-2 ml of saline
  - e. If no response, Continue CPR and administer an IV fluid bolus of 20ml/kg of saline
  - f. If no response, continue CPR. Check blood sugar and if less than 80 administer:
    - i. 2 ml/kg of D25 IV/IO for children under 50 pounds
    - ii. 1 ml/kg of D50 IV/IO for children over 50 pounds
  - g. If no response, CPR and TRANSPORT

**PEDIATRIC CARDIAC ARREST 2005 AHA Guidelines**

**EMT-B**

**EMT-I**

**EMT-P**

**OPEN AIRWAY  
SNIFFING  
POSITION**

**100% O2 BVM  
CRICOID PRESSURE  
ORAL/NASAL AIRWAY**

**CARDIAC  
COMPRESSIONS**

**CONTACT  
MEDICAL  
CONTROL**

**INTUBATE AND VENTILATE**

**TRANSPORT**

**APPLY AED  
(PEDIATRIC PADS FOR AGES 1-8)**

**IV SALINE TKO APPLY MONITOR IO IF UNABLE TO GET IV**

**ASYSTOLE / PEA**

**EPINEPHRINE 1:10,000  
0.01mg/kg IV/IO  
or  
EPINEPHRINE 1:1,000  
0.1MG/KG ET  
DILUTED WITH 1-2ML NS**

**REPEAT EPINEPHRINE  
IV/IO or ET DOSES  
EVERY 3-5 MINUTES**

**IV FLUID BOLUS  
20 ml/kg NS**

**BLOOD SUGAR < 80**

**2ml/kg D25 FOR CHILD  
LESS THAN 50 POUNDS**

**1ml/kg D50 FOR CHILD  
OVER 50 POUNDS**

**CONSIDER TREATABLE CAUSES  
HYPOVOLEMIA: FLUID BOLUS  
HYPOXIA: AIRWAY MANAGEMENT  
HYPERKALEMIA: CONSIDER  
SODIUM BICARB  
HYPOTHERMIA: WARM PATIENT  
TENSION PNEUMOTHORAX:  
CHEST DECOMPRESSION  
TRICYCLIC OVERDOSE:  
CONSIDER SODIUM BICARB  
HYPOGLYCEMIA  
HYDROGEN ION (ACIDOSIS):  
CONSIDER SODIUM BICARB**

**EPINEPHRINE  
IV/IO or ET DOSES  
EVERY 3 MINUTES  
AND DEFIBRILLATE  
WITH SUSTAINED  
V FIB**

**V FIB  
PULSELESS V TACH**

**DEFIBRILLATE  
2 JOULES/KG**

**FIVE CYCLES OF CPR**

**DEFIB 4 j/kg, CONTINUE CPR**

**EPINEPHRINE 1:10,000  
0.01mg/kg IV/IO  
OR  
EPINEPHRINE 1:1,000  
0.1mg/kg ET ROUTE  
DILUTED WITH 1-2CC NS  
Repeat every 3-5 minutes, CONTINUE CPR**

**LIDOCAINE 1mg/kg**

**DEFIB 4 j/kg, CONTINUE CPR**

**LIDOCAINE 1mg/kg**

**DEFIB 4 j/kg**

**CPR AND TRANSPORT**

**AFTER AN ADVANCED AIRWAY IS PLACED  
RESCUERS NO LONGER DELIVER "CYCLES"  
OF CPR. GIVE CONTINUOUS CHEST  
COMPRESSIONS WITHOUT PAUSES FOR  
BREATHS. GIVE 8 TO 10 BREATHS/MINUTE.  
CHECK RHYTHM EVERY TWO MINUTES.**

**CHILD ABUSE / NEGLECT**

**GENERAL CONSIDERATIONS**

- A. Child abuse/neglect are widespread enough that nearly all EMTs and paramedics will see these problems at some time. The first step in recognizing abuse or neglect is to accept that they exist and to learn the signs and symptoms.
- B. Initiate treatment as necessary for situation using established protocols.
- C. If possible remove child from scene, transporting to hospital even if there is no medical reason for transport.
- D. If parents refuse permission to transport, notify law enforcement for appropriate disposition. If patient is in immediate danger, let law enforcement handle scene.
- E. Advise parents to go to hospital. **AVOID ACCUSATIONS** as this may delay transport. Adult with child may not be the abuser.
- F. Carefully document findings and report to physicians at the hospital. An EMT must also report or assure that actual or suspected child abuse/neglect is reported to the local law enforcement agency or the Children's Services Board.

**DOCUMENT THIS NOTIFICATION**

**DO NOT JEOPARDIZE YOUR SAFETY**

## FEVER

### GENERAL CONSIDERATIONS

- A. If febrile, remove excess clothing, but take great care to avoid shivering. Consider environment and temperature of vehicle.
- B. DO NOT sponge child unless treating for heat exposure. (This includes use of moist towels to “cool” the child)
- C. Suggest transport or urgent medical attention for all infants < 8 weeks of age with a reported temperature > 100.4F (38C) or < 96F (35.5C).

## PEDIATRIC FLUID AND DRUG ADMINISTRATION

### EMT-I

- A. Peripheral venous access lines will be the first route for fluid and drug administration for any life or limb threatening emergency situation.
- B. Unless there are compelling factors, no more than two attempts at peripheral access should be made in the pediatric patient.
- C. In a **life threatening situation** where venous access appears futile, immediately establish intraosseous access.
- D. Intraosseous Infusion
  - 1. The following are guidelines for the UNSTABLE child requiring alternative vascular access AFTER insuring that the airway and ventilations are established:
    - a. **Indications:** Intraosseous access should be established if you cannot rapidly achieve venous access in a patient in decompensated shock.
    - b. **Contra-indications:** Recently fractured bone, known bone disorder, unsuccessful prior attempt. Relative Contra-indication: cellulitis or infected burn at site
    - c. **Equipment:** Bone marrow aspiration needle, iodine and alcohol preps, 5cc syringe.
- E. Fluid of choice is normal saline or Lactated Ringers, utilizing a macrodrip administration set. If child is less than 2 years old a microdrip set should be used if available.

### PARAMEDIC

- A. When peripheral or IO access is not available for administering medications:
  - 1. If an ET tube is in place, the ET tube should be the route of administration for
    - Lidocaine
    - Atropine
    - Narcan
    - Epinephrine
  - 2. Intramuscular (IM) route may be used for Versed or morphine.
  - 3. Rectal route may be used for Valium (diazepam).

## MULTI-TRAUMA

### GENERAL CONSIDERATIONS

- A. The basics of trauma care apply to pediatric patients and should primarily follow the general adult trauma protocol.
- B. Areas where special focus should occur:
  - 1. May involve both respiratory failure and shock.
  - 2. Assessment and support of cardiopulmonary function is fundamental.
- C. Common errors of pediatric trauma resuscitation are:
  - 1. Failure to open and maintain the airway.
  - 2. Failure to provide appropriate fluid resuscitation to children with head injury.
  - 3. Failure to recognize and treat internal hemorrhage.
- D. IO infusion is indicated in the trauma setting when shock needs to be treated and rapid venous access is unobtainable.
- E. The proper size equipment is very important to resuscitation care. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR GUIDE) when unsure about patient weight, age and/or drug dosage and when choosing equipment size.
- F. MAST devices are not indicated except for the treatment of shock associated with unstable pelvic fractures. Do not inflate abdominal cavity of trousers.

**\*\*NOTE: FOLLOW APPLICABLE REGIONAL  
PEDIATRIC TRAUMA TRIAGE PROTOCOL.**

# NEWBORN RESUSCITATION

## GENERAL CONSIDERATIONS

A. The five initial questions to assess in every newborn are as follows:

- Is the baby full term and how many babies are expected?
- Is there THICK meconium present?
- Is the baby breathing or crying?
- Does the baby have good muscle tone?
- Is the baby's color pink?

These questions will help determine the amount of intervention needed. Most term healthy infants do not require ALS intervention. This initial assessment should be completed within 30 seconds.

- B. Body heat must always be maintained. As soon as the baby is born, wipe the baby dry and place in a warm environment. Cover the infant's head, place against mother's skin, and cover both. Use indirect heated, humidified oxygen, if available. Avoid direct application of cold oxygen to infant's face as this may cause respiratory depression.
- C. Position infant in sniffing position (with a 1 inch towel under the shoulders). This will provide and optimally opened airway and adequate drainage of secretions.
- D. Suction secretions from the mouth and then nose.
- E. Open and manage airway
- F. Meconium aspiration is major cause of death and morbidity among infants. If THICK meconium is present and not removed, 60% of these infants will aspirate the meconium. If meconium is present, suction the newborn's mouth and nose immediately upon delivery of the head (before delivery of the body). If THICK meconium is present, it may be necessary to visualize the trachea and suction the lower airway. Lower airway suction is achieved by intubating the infant and suctioning directly through the ET tube. Each time this suctioning is done, the infant will have to be re-intubated with a new tube. Watery or thin meconium does not require suctioning of the lower airway.
- G. If drying and suction has not provided enough stimulation, try rubbing the infant's back or flicking their feet. If the infant still has poor respiratory effort, poor tone, or central cyanosis, consider them to be distressed. Most distressed infants will respond quickly to 100% oxygen via BVM.
- H. The Apgar score should be used in the initial assessment of normal newborns and is a measure of the effectiveness of interventions for the distressed newborn. Scoring must not delay intervention in the distressed newborn. The score is completed at 1 and 5 minutes after delivery. If the 5-minute score is less than 7, repeat every 5 minutes for the next 20 minutes.

### APGAR SCORE

Sign	0	1	2
Color	Blue / Pale	Pink Body, Blue Extremities	Completely Pink
Heart Rate	Absent	Below 100	Above 100
Irritability (response to stimulation)	No Response	Grimace	Cries
Muscle Tone	Limp	Flexion of Extremities	Active Motion
Respiratory Effort	Absent	Slow and Regular	Strong Cry

- I. Refer to length based drug treatment guide (e.g. BROWSELOW PEDIATRIC EMERGENCY TAPE OR SIMILAR) when unsure about patient weight or drug dosage.

FIRST RESPONDER

- A. After delivery of the newborn's head, but prior to delivery of the body, quickly and thoroughly suction the mouth and oropharynx followed by the nose with a bulb syringe.
- B. After delivery of the infant, assess airway and breathing while drying and positioning head down. If amniotic fluid NOT clear, continue to suction PRIOR to ventilating and stimulating. Keep infant warm. Wrap in dry blankets.
- C. If infant not breathing, assist ventilations via mouth to mouth using barrier device.
- D. If no pulse or pulse below 60 bpm, begin CPR.
- E. Keep infant warm. Wrap in dry blankets.

EMT-B

- A. If heart rate is < 100 bpm, BVM ventilation is necessary to increase heart rate.
- B. If heart rate is < 60 bpm despite adequate ventilation, cardiac compressions should be initiated.
- C. BVM ventilation is also indicated for apnea and persistent central cyanosis.
- D. BVM ventilation rate should be between 40 and 60 breaths per minute. Cardiac compression rate should be at a rate of 120 times per minute. (COMPRESSION TO BREATH RATIO OF 3:1)
- E. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

EMT-I

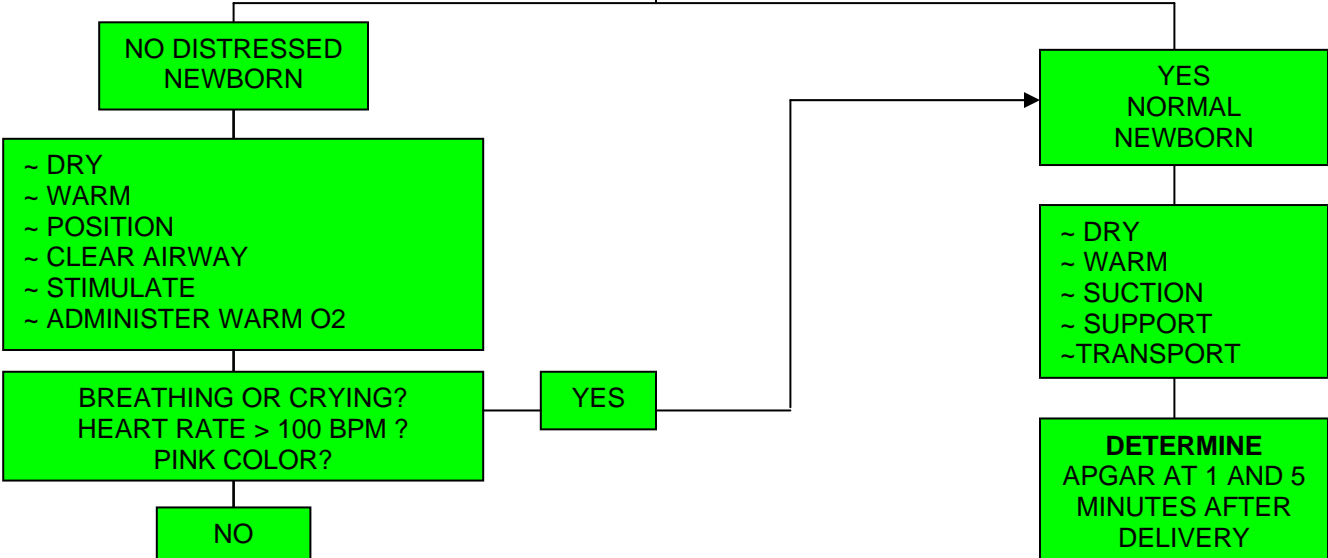
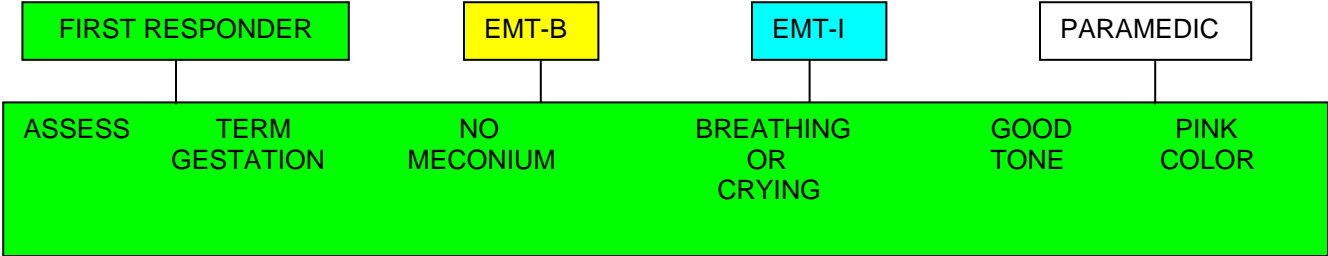
- A. Assume charge of situation and confer with EMT-Bs about condition of patient and situation.
- B. Intubate patient if thick meconium is present in lower airway; suction through ET tube using a meconium aspirator and re-intubate with new tube.
- C. Apply monitor and check rhythm.
- D. Establish IV or IO.
- E. If infant shows signs of hypovolemia, administer normal saline 10 cc/kg IV over 5 minutes
- F. Consider Narcan administration if respirations are depressed and narcotic dependence is suspected. 0.1mg/kg repeated every 3 minutes until respirations improve.
- G. Check blood sugar level and administer 1cc/kg of 12.5% dextrose if level is below 40 mg/dl
- H. Transport to hospital.

## NEWBORN RESUSCITATION (cont'd)

PARAMEDIC
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- A. Assume charge of situation and confer with EMT-Is about condition of patient and situation
- B. Intubate patient if thick meconium is present in lower airway; suction through ET tube using a meconium aspirator and re-intubate with new tube.
- C. Apply monitor and check rhythm.
- D. Establish IV or IO.
- E. If asystole or spontaneous heart rate is less than 60 despite adequate ventilation:
  - 1. Administer epinephrine 0.01-0.03 mg/kg (0.1-0.3 mL/kg) of 1:10,000 via IV, IO, or ET. If ET dilute with NS to 1 ml or follow with 0.5 to 1ml NS flush.
  - 2. If no response, repeat every 3-5 minutes.
- F. If infant shows signs of hypovolemia, administer normal saline 10 cc/kg IV over 5 minutes
- G. Consider Narcan administration if respirations are depressed and narcotic dependence is suspected. 0.1mg/kg repeated every 3 minutes until respirations improve.
- H. Check blood sugar level and administer 1cc/kg of 12.5% dextrose if level is below 40 mg/dl
- I. Transport to hospital.

# NEWBORN RESUSCITATION



BVM 100% O2  
40 - 60 BREATH/MIN

HEART RATE > 60 BPM?

CONTINUE BVM  
START CHEST COMPRESSIONS  
120/MIN

HEART RATE > 60 BPM ?

NO

~ MANAGE AIRWAY  
~ ESTABLISH IV / IO

EPINEPHRINE 0.01 MG/KG  
 1:10,000 IVP  
 REPEAT EVERY 3-5 MINUTES  
 AT THE SAME DOSE  
  
 ET EPI - 0.1MG/KG 1:1000  
 DILUTED WITH 3-5CC NS  
 TO 0.5 - 1 CC NS

CONSIDER: 1. HYPOVOLEMIA - FLUID BOLUS NS 10CC/KG  
 2. SUSPECTED NARCOTIC DEPENDENCE-  
 NARCAN 0.1MG/KG Q 3 MIN.  
 3. HYPOGLYCEMIA - BLOOD SUGAR < 40 MG/DL  
 1CC/KG OF 12.5% DEXTROSE

## NEWBORN RESUSCITATION 2005 AHA Guidelines

### GENERAL CONSIDERATIONS

E. The five initial questions to assess in every newborn are as follows:

- Is the baby full term and how many babies are expected?
- Is there THICK meconium present?
- Is the baby breathing or crying?
- Does the baby have good muscle tone?
- Is the baby's color pink?

These questions will help determine the amount of intervention needed. Most term healthy infants do not require ALS intervention. This initial assessment should be completed within 30 seconds.

- F. Body heat must always be maintained. As soon as the baby is born, wipe the baby dry and place in a warm environment. Cover the infant's head, place against mother's skin, and cover both. Use indirect heated, humidified oxygen, if available. Avoid direct application of cold oxygen to infant's face as this may cause respiratory depression. Avoid inducing hyperthermia (elevated body temperature) in babies who may have had a hypoxic-ischemic event.
- G. Position infant in sniffing position (with a 1 inch towel under the shoulders). This will provide an optimally opened airway and adequate drainage of secretions.
- H. Suction secretions from the mouth and then nose.
- E. Open and manage airway
- F. Meconium aspiration is a major cause of death and morbidity among infants. If THICK meconium is present and not removed, 60% of these infants will aspirate the meconium. If meconium staining of the amniotic fluid is present, *routine intrapartum oropharyngeal and nasopharyngeal suctioning for infants is not advised*. Endotracheal suctioning for the presence of meconium or meconium staining should be reserved for infants who are not vigorous and should be performed immediately after birth. If THICK meconium is present, it may be necessary to visualize the trachea and suction the lower airway. Lower airway suction is achieved by intubating the infant and suctioning directly through the ET tube. Each time this suctioning is done, the infant will have to be re-intubated with a new tube if available. If a new ETT of the appropriate size is not available, the ETT should be flushed with normal saline or sterile water and reused. Watery or thin meconium does not require suctioning of the lower airway.
- G. If drying and suctioning has not provided enough stimulation, try rubbing the infant's back or flicking their feet. If the infant still has poor respiratory effort, poor tone or central cyanosis, consider them to be distressed. Most distressed infants will respond quickly to 100% oxygen via BVM or T-piece.
- H. The Apgar score should be used in the initial assessment of normal newborns and is a measure of the effectiveness of interventions for the distressed newborn. Scoring must not delay intervention in the distressed newborn. The score is completed at 1 and 5 minutes after delivery. If the 5-minute score is less than 7, repeat every 5 minutes for the next 20 minutes.

**APGAR SCORE**

<b>Sign</b>	<b>0</b>	<b>1</b>	<b>2</b>
Color	Blue / Pale	Pink Body, Blue Extremities	Completely Pink
Heart Rate	Absent	Below 100	Above 100
Irritability (response to stimulation)	No Response	Grimace	Cries
Muscle Tone	Limp	Flexion of Extremities	Active Motion
Respiratory Effort	Absent	Slow and Regular	Strong Cry

- I. Refer to length based drug treatment guide (e.g. Broselow® Pediatric emergency tape or similar device) when unsure about patient weight or drug dosage.

**FIRST RESPONDER**

- A. After delivery of the newborn's head, but prior to delivery of the body, manually remove any amniotic membranes that may obstruct the airway.
- B. After delivery of the infant, assess airway and breathing while drying and positioning head down. If thick meconium is present or the infant is not vigorous, suction the nasopharynx and oropharynx with a bulb syringe PRIOR to ventilating and stimulating. Keep infant warm. Wrap in dry blankets.
- C. If infant not breathing, assist ventilations via mouth to mouth using barrier device.
- D. If no pulse or pulse below 60 bpm, begin CPR.
- E. Keep infant warm. Wrap in dry blankets.

NEWBORN RESUSCITATION [2005 AHA Guidelines] (cont'd)

EMT-B

- A. If heart rate is < 100 bpm, BVM or T-piece ventilation is necessary to increase heart rate.
- B. If heart rate is < 60 bpm despite adequate ventilation, cardiac compressions should be initiated.
- C. BVM or T-piece ventilation is also indicated for apnea and persistent central cyanosis.
- D. BVM or T-piece ventilation rate should be between 40 and 60 breaths per minute. Cardiac compression rate should be at a rate of 120 times per minute. (COMPRESSION TO BREATH RATIO OF 3:1)
- E. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

EMT-I

- A. Assume charge of situation and confer with EMT-Bs about condition of patient and situation.
- B. Intubate patient if thick meconium is present in lower airway; suction through ET tube using a meconium aspirator and re-intubate with new tube.
- C. Apply monitor and check rhythm.
- D. Establish IV or IO.
- E. If infant shows signs of hypovolemia, administer normal saline 10 ml/kg IV over 5 minutes
- F. Narcan administration should not be administered during the initial resuscitation and should be avoided in babies whose mothers are suspected of having had long-term exposure to opioids. If respirations remain absent or depressed, administer 0.1 mg/kg IV and repeat every 3 minutes until respirations improve.
- G. Check blood sugar level and administer 1 ml/kg of 12.5% dextrose if level is below 40 mg/dl
- H. Transport to hospital.

NEWBORN RESUSCITATION [2005 AHA Guidelines] (cont'd)

PARAMEDIC

- A. Assume charge of situation and confer with EMT-Is about condition of patient and situation
- B. Intubate patient if thick meconium is present in lower airway; suction through ET tube using a meconium aspirator and re-intubate with new tube.
- C. Apply monitor and check rhythm.
- D. Establish IV or IO.
- E. If asystole or spontaneous heart rate is less than 60 despite adequate ventilation:
  - 1. Administer epinephrine 0.01-0.03 mg/kg (0.1-0.3 ml/kg) of 1:10,000 via IV, IO, or up to 0.1 mg/kg ET.
  - 2. If no response, repeat every 3-5 minutes.
- F. If infant shows signs of hypovolemia, administer normal saline 10 ml/kg IV over 5 minutes
- G. Narcan administration should not be administered during the initial resuscitation and should be avoided in babies whose mothers are suspected of having had long-term exposure to opioids. If respirations remain absent or depressed, administer 0.1 mg/kg IV or IM and repeat every 3 minutes until respirations improve.
- H. Check blood sugar level and administer 1 ml/kg of 12.5% dextrose if level is below 40 mg/dl
- I. Transport to hospital.

**NEWBORN RESUSCITATION**  
2005 AHA Guidelines

FIRST RESPONDER

EMT-B

EMT-I

PARAMEDIC

ASSESS TERM GESTATION NO MECONIUM BREATHING OR CRYING GOOD TONE PINK COLOR

NO DISTRESSED NEWBORN

- DRY
- WARM
- POSITION
- CLEAR AIRWAY MANUALLY
- STIMULATE
- ADMINISTER WARM O2

BREATHING OR CRYING?  
HEART RATE > 100 BPM?  
PINK COLOR?

NO

BVM OR T-PIECE 100% O2 AT 40 – 60 BREATH/MIN  
(CONSIDER SUCTIONING OF AIRWAY)

HEART RATE > 60 BPM?

YES

CONTINUE UNTIL HR > 100 BPM

NO

CONTINUE BVM OR T-PIECE  
START CHEST COMPRESSIONS  
120/MIN

HEART RATE > 60 BPM ?

YES

CONTINUE UNTIL  
SPONTANEOUS BREATHING  
AND HR > 100 BPM

NO

- MANAGE AIRWAY  
- ESTABLISH IV / IO

EPINEPHRINE 0.01 MG/KG 1:10,000 IV/IO  
OR UP TO 0.1 MG/KG ET  
REPEAT EVERY 3-5 MINUTES  
AT THE SAME DOSE

CONSIDER: 1. HYPOVOLEMIA – FLUID BOLUS NS 10 ML/KG  
2. NARCAN 0.1MG/KG Q 3 MIN. FOR APNEA  
AVOID IN SUSPECTED MATERNAL NARCOTIC  
DEPENDENCE  
3. HYPOGLYCEMIA – BLOOD SUGAR < 40 MG/DL

YES  
NORMAL  
NEWBORN

- DRY
- WARM
- SUPPORT
- TRANSPORT

DETERMINE  
APGAR AT 1 AND 5  
MINUTES AFTER  
DELIVERY

## PEDIATRIC RESPIRATORY DISTRESS

### GENERAL CONSIDERATIONS

- A. In children, open airway by using the sniffing position.
- B. In suspected cases of upper airway obstructions, DO NOT attempt to visualize the airway; unless a foreign body is suspected. Keep patient calm and transport upright.
- C. If BVM ventilation is necessary, cricoid pressure can be applied to minimize gastric distention until airway is secured.
- D. Refer to length based drug treatment guide (e.g. BROSELOW PEDIATRIC EMERGENCY TAPE) when unsure about patient weight, age and/or drug dosage.
- E. Evaluate patient's general appearance, relevant history of condition and determine:

Allergies

Medication

Past Medical History – especially RESPIRATORY

Last Meal

Events leading to present illness

### UPPER AIRWAY OBSTRUCTION

Stridor, gagging or choking in the breathing patient with respiratory distress may indicate upper airway obstruction.

### FIRST RESPONDER

- A. Quickly obtain history and non-invasive respiratory assessment.
  - 1. Total Airway Obstruction/History of foreign body airway.
    - a. Manual clearing only if foreign body is visible - NO BLIND FINGER SWEEP
    - b. Backblows and chest thrust in children less than 1 yr.
    - c. Abdominal and/or chest thrusts in children over 1 yr.
    - d. If airway cannot be cleared in 60 seconds:
      - i) Transport immediately to nearest hospital.
      - ii) Do not take history.
      - iii) Do not make further physical assessment.
  - 2. Partial Airway Obstruction
    - a. DO NOT AGITATE CHILD, DO NOT EXAMINE THROAT.
    - b. Administer oxygen by NRB if tolerated or by “blow-by”.

## PEDIATRIC AIRWAY OBSTRUCTION (cont'd)

- B. Allow the child to assume a position of comfort. The child may assume the tripod position. Encourage parent to hold the in a secure position. Keep child and parent (or caregiver) CALM. Do not agitate child.

### EMT-B

- A. Transport the child in a secure upright position immediately to the nearest appropriate hospital.

### EMT-I

- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Reassess breath sounds and treat as follows:
  1. Do not establish IV access unless child is in arrest. DO NOT agitate child.
  2. If foreign body in airway is suspected in unconscious patient with complete obstruction and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope.
  3. Do not attempt invasive airway unless child has respiratory arrest. Bag-valve mask ventilation is acceptable.
  4. If foreign body in airway is suspected in unconscious patient with complete obstruction, and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope and remove with Magill forceps.

### PARAMEDIC

- A. Assume charge of situation and confer with EMTs about condition of patient and situation
- B. Reassess breath sounds and treat as follows:
  1. If cause of upper airway obstruction is unknown and child is calm, a normal saline aerosol may be administered. DO NOT further agitate child.
  2. Do not attempt invasive airway unless child has respiratory arrest. Bag-valve mask ventilation is acceptable.
  3. If foreign body in airway is suspected in unconscious patient with complete obstruction, and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope and remove with Magill forceps.
  4. If airway is completely obstructed, a needle, or surgical cricothyrotomy may be life saving. Contact medical control. If patient has a tracheostomy tube, see page 40.

## LOWER AIRWAY OBSTRUCTION

Wheezing in the breathing patient with respiratory distress indicates lower airway disease, which may come from a variety of causes. The patient with severe lower airway disease may have altered LOC, be unable to talk, may have absent or markedly decreased breath sounds and severe retractions with accessory muscle use.

### FIRST RESPONDER

- A. Place child in position of comfort, encourage parent to hold child secure position. Keep child and parent CALM.
- B. Quickly obtain history and non-invasive respiratory assessment.
- C. Administer 100% Oxygen in the least threatening manner.
- D. If respiratory effort is insufficient or patient is becoming unconscious, assist ventilations with bag-valve-mask.
  1. If allergic reaction is suspected:
    - a. Secure airway and support with oxygen.
    - b. Ask patient or bystanders if epinephrine by auto-injector has been prescribed for these situations, assist with the administration of medication per protocol, then transport patient immediately.

### EMT-B

- A. IF MEDICATION IS NOT AVAILABLE- Transport immediately, unless ALS unit is enroute and has an ETA of less than 5 minutes
- B. Ask patient or bystanders if a bronchial dilator by inhaler has been prescribed for these situations. If they have the medication with them, assist with the administration of medication per protocol, then transport patient.

### EMT-I

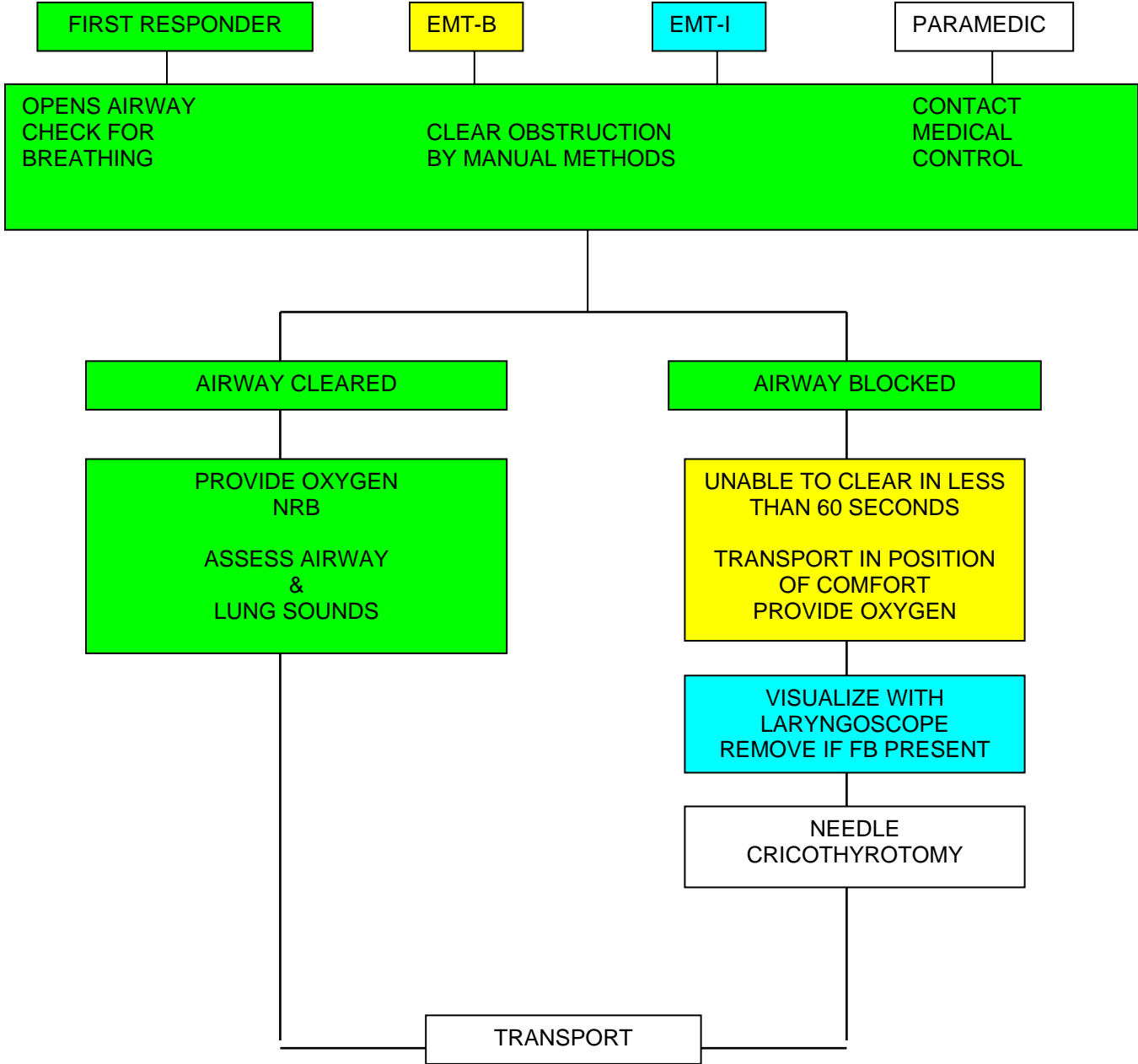
- A. Assume charge of situation.
- B. Reassess breath sounds.
- C. DO NOT establish IV access unless child is in arrest. Do not agitate child.
  1. If allergic reaction is suspected.
    - a. Give 0.01 mg/kg (0.01 mL/kg) of 1:1000 epinephrine by subcutaneous injections MAX Dose 0.3mg (0.3mL)
  2. For other causes of wheezing:
    - a. Administer 2.5 mg albuterol aerosol with 6 L/min oxygen over 10-15 minutes. Observe and document child's response. If no improvement, notify receiving facility or Medical Control.
    - b. DO NOT attempt invasive airway unless child has respiratory arrest.

## LOWER AIRWAY OBSTRUCTION (cont'd)

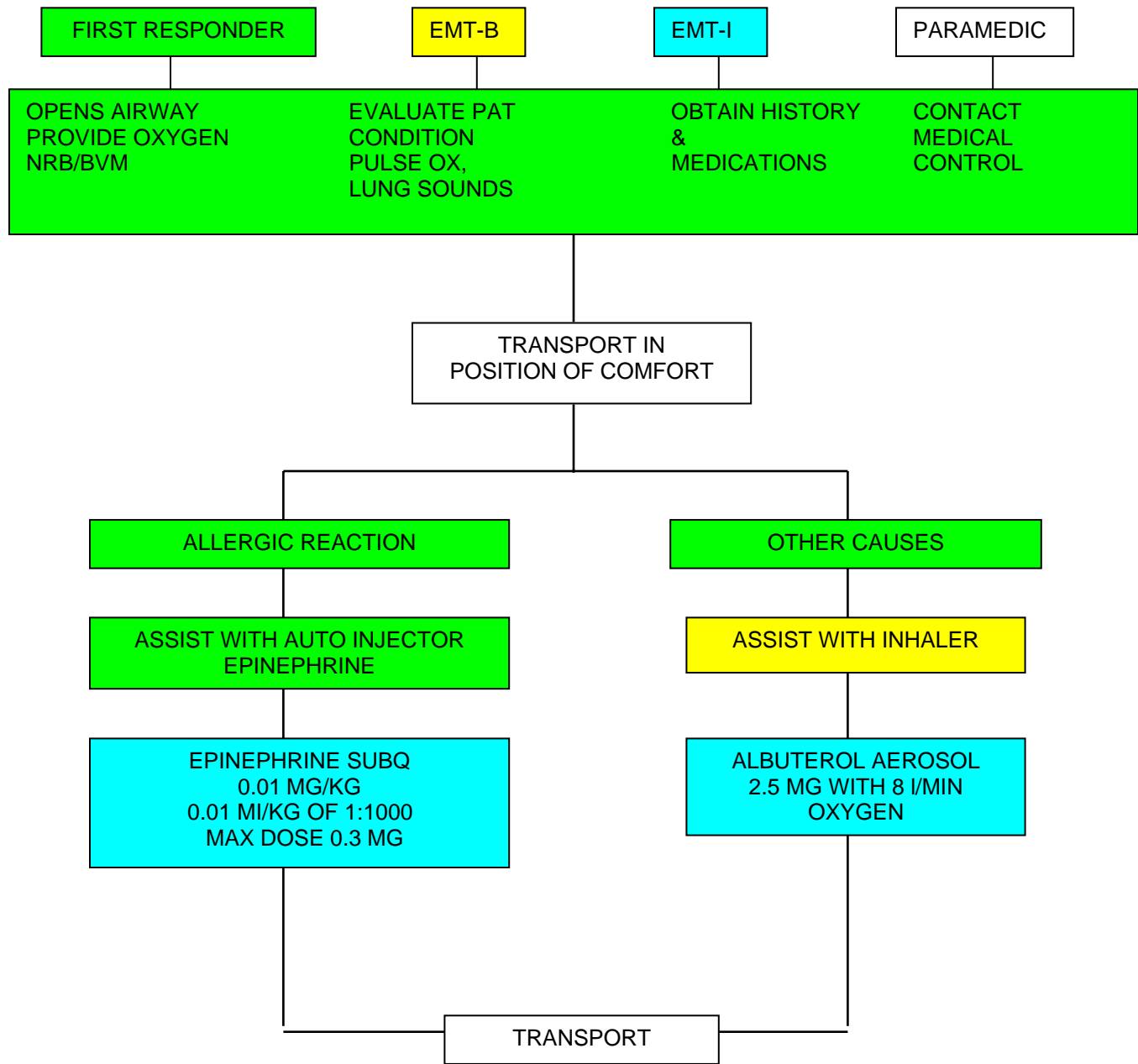
PARAMEDIC
-----------

- A. Assume charge of situation and confer with EMTs about condition of patient and situations.
- B. Reassess breath sounds and treat as follows
  - 1. If allergic reaction is suspected:
    - a. Give 0.01 mg/kg (0.01 mL/kg) of 1:1000 epinephrine by subcutaneous injection. MAX dose 0.3mg (0.3mL)
  - 2. For other causes of wheezing:
    - a. Administer 2.5 mg albuterol aerosol with 6 L/min oxygen over 10-15 minutes. Observe and document child's response. If no improvement, notify receiving facility or Medical Control.
    - b. DO NOT attempt invasive airway unless child has respiratory arrest.

**PEDIATRIC RESPIRATORY DISTRESS  
UPPER AIRWAY OBSTRUCTION**



**PEDIATRIC RESPIRATORY DISTRESS  
LOWER AIRWAY DISEASE**



## PEDIATRIC SEIZURE

### GENERAL CONSIDERATIONS

- A. The seizure may be stopped by the time the EMS personnel arrive. The patient will normally be in the postictal state.
- B. The basic rule with seizures is to "protect and support" the patient.
- C. Aspiration precautions should include:
  - 1. Coma position: a left side-lying position with the head lowered 15 to 30 degrees.
  - 2. Suction readily available.
  - 3. Clear mouth of foreign bodies (food, gum, etc.)
- D. Febrile Seizures (seizures with fever) are common in children and should be treated like other seizures.

### FIRST RESPONDER

- A. Place patient away from objects on which they might injure themselves; protect but do not restrain them.
- B. Clear and maintain airway; consider C-spine injury.
- C. Administer 100% oxygen with NRB as needed for ventilation.
- D. Obtain history from family and/or bystanders:
  - 1. Seizure history
  - 2. Description of onset of seizure
  - 3. Medication
  - 4. Other known medical history, especially fever, head trauma, diabetes, drugs
- E. Evaluate any evidence of injury, especially head trauma.

### EMT-B

- A. Bring any medications with child to the hospital.
- B. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.
- C. Check blood sugar level.

### EMT-I

- A. Assist EMTs, obtain patient condition and circumstances.
- B. Apply cardiac monitor and check rhythm.
- C. If seizure activity persists:
  - 1. Establish airway
  - 2. Start IV

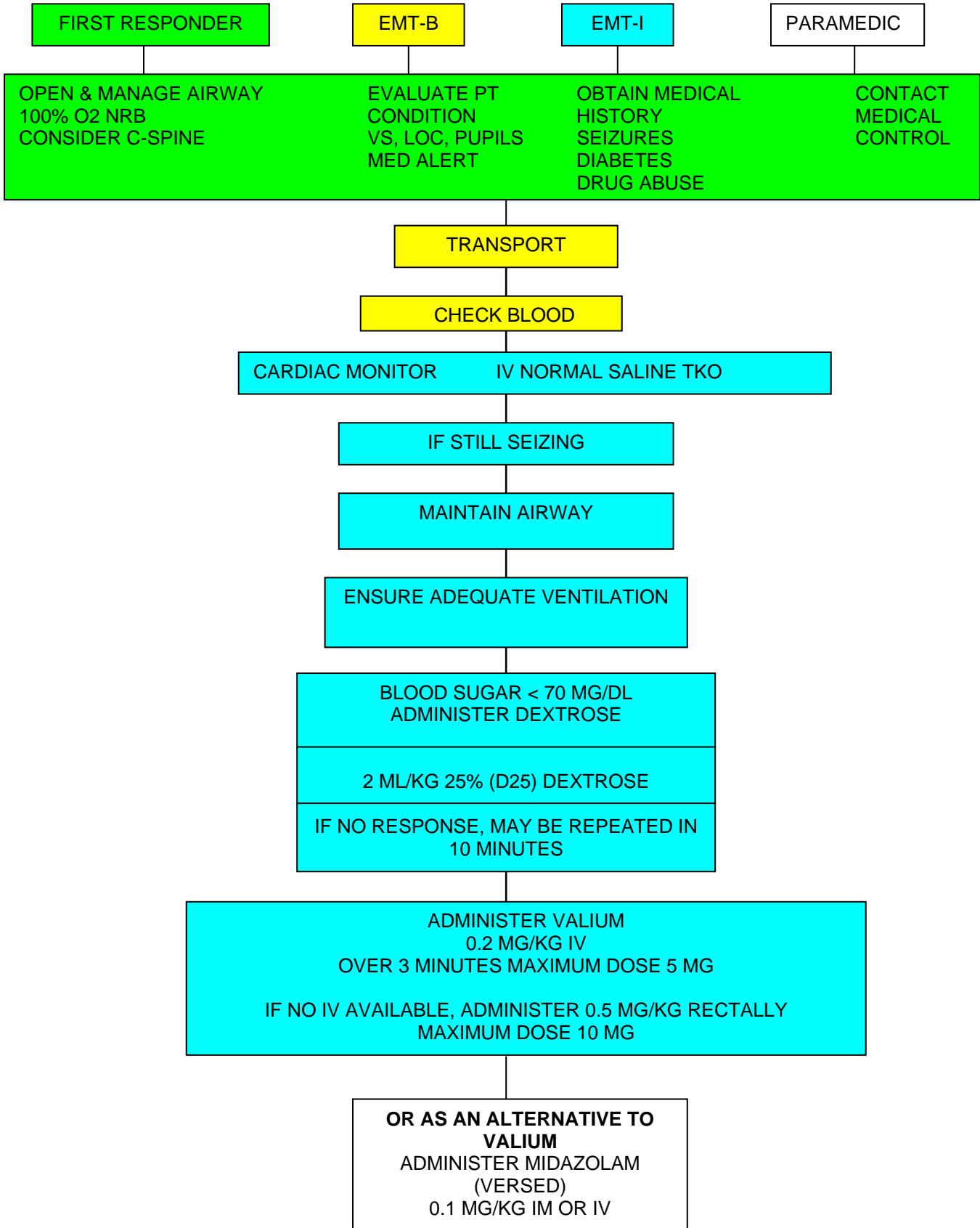
## PEDIATRIC SEIZURE (cont'd)

- D. Check blood sugar level.
  - 1. If the blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2ml/kg of 25% dextrose for children
    - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl
  - 2. Administer Valium, 0.2 mg/kg, slow IV push over three minutes, to a maximum dosage of 5 mg.
    - a. If no IV is available, administer Valium rectally, 0.5 mg/kg, to a maximum dose of 10 mg.

PARAMEDIC
-----------

- A. Assume charge of the situation and confer with EMTs about patient and situation
- B. Make sure patient has good airway. In some cases intubation may be necessary.
- C. If seizure activity persists, determine blood sugar level and treat accordingly
  - 1. Blood sugar less than 70 mg/dl, administer IV bolus:
    - b. 2ml/kg of 25% dextrose for children
    - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl
  - 2. Administer midazolam (Versed) 0.1mg/kg IM **OR**, administer Valium, 0.2 mg/kg, slow IV push over three minutes, to a maximum dosage of 5 mg.
    - a. If no IV is available, administer Valium rectally, 0.5 mg/kg, to a maximum dose of 10 mg.

**PEDIATRIC SEIZURES**





## PEDIATRIC SHOCK

### GENERAL CONSIDERATIONS

- A. Shock is not only caused by blood loss. The EMT must evaluate for fluid loss from other causes such as excessive vomiting and/or diarrhea, heat exposure, severe infection, severe allergic reaction (anaphylaxis), spinal trauma, and heart failure.
- B. Do not use only the patient's blood pressure in evaluating shock; also look for lower body temperature, poor capillary refill, decreased level of consciousness, increased heart rate, and/or poor skin color or turgor. **Tachycardia is often the first sign of shock.**

NOTE: Do NOT depend on blood pressure.

- C. Transport should not be delayed. The airway must be secured and then transport immediately. It is preferable IVs and/or IOs be done during transportation.

### FIRST RESPONDER

- A. Open and maintain the airway with sniffing position and the use of an oral airway if needed.
- B. Control all external bleeding and evaluate for internal hemorrhage and/or dehydration.
- C. Provide 100% oxygen through NRB mask, and if needed assist ventilations with a BVM.
- D. Obtain vital signs: pulse and respirations.

### EMT-B

- A. Establish communications with Medical Control and advise of patient condition. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

### EMT-I

- A. Assist EMT, obtain patient condition and circumstance.
- B. Hypovolemic, Neurogenic or Septic Shock:
  - 1. Start IV of normal saline and apply cardiac monitor during transport to the hospital.

DO NOT DELAY TRANSPORT FOR IV

- 2. Administer IV fluid bolus of 20cc/kg of saline if signs of hypoperfusion or dehydration are present
- 3. Transport. Repeat bolus during transport if patient does not respond to first bolus.

## PEDIATRIC SHOCK (cont'd)

4. Check blood sugar; if less than 70 mg/dl, administer IV bolus:
  - a. 2ml/kg of 25% dextrose (D25).
  - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl.
- C. Anaphylactic shock:
  1. Respiratory distress
    - a. Give 0.01cc/kg (1:1000) epinephrine by injection subcutaneously (maximum dose 0.3mg or 0.3cc).
    - b. Administer Benadryl (diphenhydramine) to be administered 1mg/kg IM or IV (maximum dose 50mg). NOTE: This is especially indicated when drug reactions are suspected.
    - c. When wheezes are present and not cleared by epinephrine, provide albuterol breathing treatment: 1 unit dose, 2.5mg (3cc), by child aerosol mask over 10-15 minutes.
  2. Hives, itching, and/or swelling with normal blood pressure:
    - a. Give 0.01cc/kg 1:1000 epinephrine by injection subcutaneously (maximum dose 0.3mg or 0.3cc).
    - b. Administer Benadryl (diphenhydramine) to be administered 1mg/kg IM or IV (maximum dose 50mg). NOTE: This is especially indicated when drug reactions are suspected.
  3. If breathing difficulty with low blood pressure establish IV saline during transport.
    - a. Give 0.01cc/kg (0.01 ml) 1:1000 epinephrine by injection subcutaneously up to a maximum dose of 0.3mg (0.3ml).
  4. Hives, itching, and/or swelling:
    - a. Give 0.01cc/kg (0.01 mL) 1:1000 epinephrine by injection subcutaneously up to a maximum dose of 0.3mg (0.3ml).
- D. Apply monitor and check rhythm.

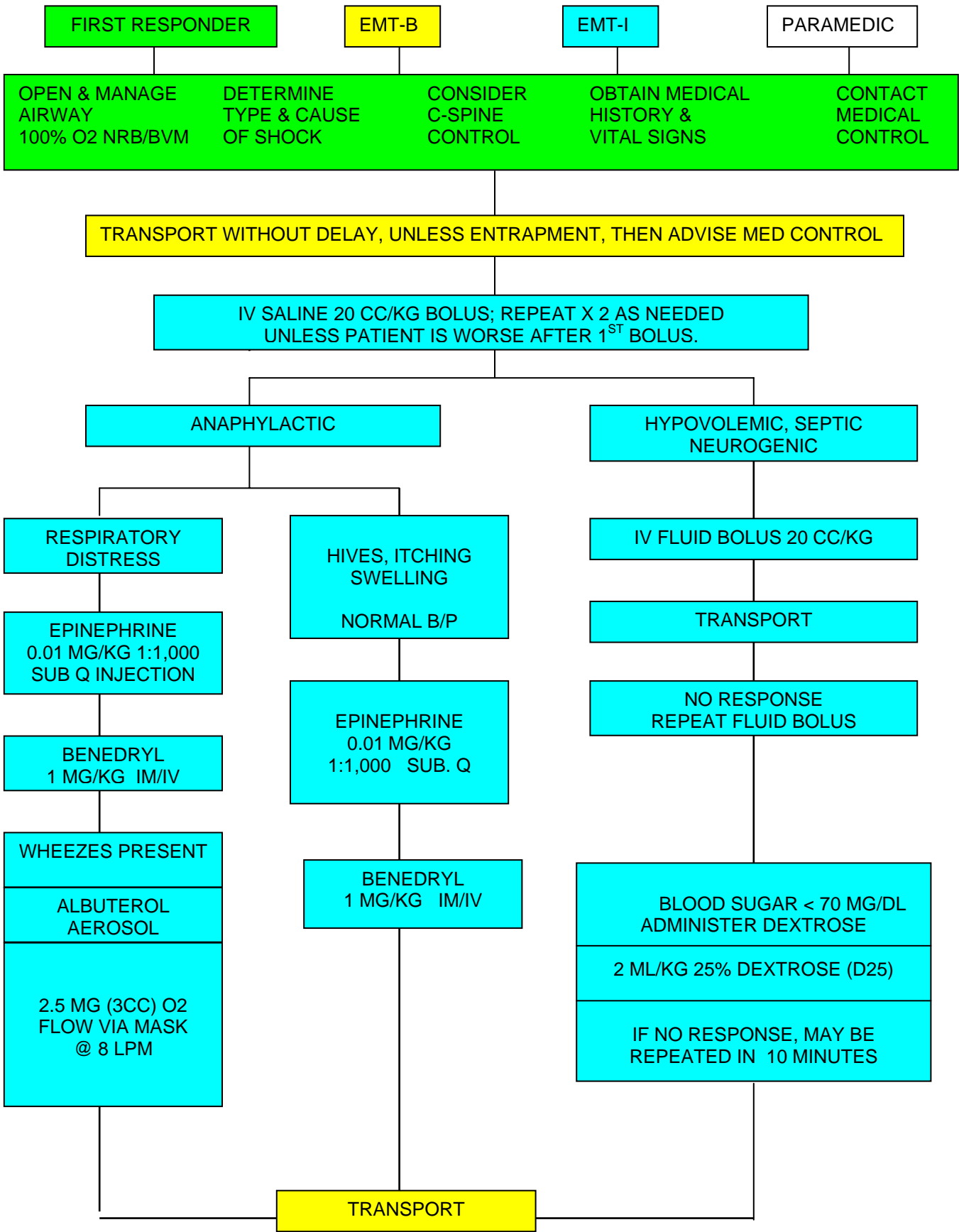
PARAMEDIC
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- A. Assume charge of situation and confer with EMTs about condition of patient and situation.
- B. Apply monitor and follow protocol for Arrhythmias.
- C. Identify type of shock and treat as follows:
  1. Hypovolemic, Neurogenic, Septic:
    - a. Start IV or IO saline and administer fluid bolus of 20cc/kg if sign of hypoperfusion or dehydration are present (low BP, tachycardia, poor capillary refill, poor skin turgor)
    - b. Repeat bolus during transport

## PEDIATRIC SHOCK (cont'd)

- c. Check blood sugar; if less than 70 mg/dl , administer IV bolus:
  - i. 2ml/kg of 25% dextrose (D25).
  - ii. May be repeated in 10 minutes if blood sugar remains below 70 mg/dl.
- 2. Anaphylactic:
  - a. Respiratory distress
    - i. Give 0.01cc/kg (1:1000) epinephrine by injection subcutaneously (maximum dose of 0.3mg or 0.3cc).
    - ii. Administer Benadryl (diphenhydramine) to be administered 1mg/kg IM or IV (maximum dose 50 mg). NOTE: This is especially indicated when drug reactions are suspected.
    - iii. When wheezes are present and not cleared by epinephrine, provide albuterol breathing treatment: 1 unit dose, 2.5mg (3cc), by child aerosol mask over 10-15 minutes.
  - b. Hives, itching, and/or swelling with normal blood pressure:
    - i. Give 0.01cc/kg 1:1000 epinephrine by injection subcutaneously (maximum dose 0.3mg or 0.3cc).
    - ii. Administer Benadryl (diphenhydramine) to be administered 1mg/kg IM or IV (maximum dose 50mg). NOTE: This is especially indicated when drug reactions are suspected.

# PEDIATRIC SHOCK



## **EMS and Children with Special Health Care Needs: The TEAM APPROACH**

The medically fragile child is one who depends on some form of technology assistance. This can be anything from a nasal cannula to a child who requires total ventilatory support. While such a child may not meet one's definition of "normal", he/she is loved and valued by parents and family. Even though the days are filled with uncertainties and the ride on the emotional roller coaster is unending, we count every day as a gift to enjoy the blessing of these special children.

Caring for a medically fragile child requires a full **TEAM** = **T**rust **E**very **A**vailable **M**ember. Do not be concerned about removing the family from the crisis situation but *inform* them about what you are doing and *include* them in your plan of care. In most cases, the parents and/or home care providers can be of great assistance to the EMS providers. It is vitally important that their knowledge and experience is utilized when treating the child. Parents/caregivers can supply valuable and time saving information. When given direction, they can provide an often needed extra pair of hands (e.g. hold the IV bag, bag ventilate, etc.). Most importantly, they can console, comfort and calm their child.

If at all possible, arrange to meet with families of medically fragile children before an emergency arises. This will allow you to become familiar with the child's needs, baseline condition and the parents' capabilities to provide care prior to your arrival. You will know what to expect and will feel more prepared and confident to treat the child in a crisis situation. This will enhance the **TEAM** approach.

This **TEAM** approach produces an outcome that will always be positive for everyone – the EMS providers, the parents, and most importantly, the child.

Thank you for the privilege of being a part of the EMSC team by serving as the parent advocate for the State of Ohio.

*Linda Eckfeld  
Ohio EMSC Parent Advocate*

## CHILDREN WITH SPECIAL NEEDS (CSHCN)

### SPECIAL CONSIDERATIONS

- A. Treat the ABC's first. Treat the child, not the equipment. If the emergency is due to an equipment malfunction, manage the child appropriately using your own equipment.
- B. Children formerly cared for in hospitals or chronic care facilities are often cared for in homes by parents or other caretakers. These children may have self limiting or chronic diseases. There are a multitude of underlying medical conditions that may categorize children as having special needs. Many are often unstable and may frequently involve the EMS system for evaluation, stabilization, and transport. Special needs children include technology-assisted children such as those with tracheostomy tubes with or without assisted ventilation, children with gastrostomy tubes, and children with indwelling central lines. The most serious complications are related to tracheostomy problems.
- C. CSHCN have many allergies. Children with spina bifida are often allergic to latex. Before treating a patient, ask the caregivers if the children are allergic to latex or have any other allergies. If possible, keep latex-free equipment. (Some regularly used equipment that contains latex includes gloves, oxygen masks, IV tubing BVM, blood pressure cuff, IV catheters, etc.)
- D. Knowing which children in a given area have special needs and keeping a log book is encouraged.
- E. Parents and caretakers are usually trained in emergency management and can be of assistance to EMS personnel. Listen carefully to the caregiver and follow his/her guidance regarding the child's treatment.
- F. Children with chronic illnesses often have different physical development from well children. Therefore, their baseline vital signs may differ from normal standards. The size and developmental level may be different from age-based norms and length based tapes used to calculate drug dosages. Ask the caregiver if the child normally has abnormal vital signs. (i.e. a fast heart rate or a low pulse oxymeter reading)
- G. Some CSHCN may have sensory deficits (i.e. they may be hearing impaired or blind) yet may have age-appropriate cognitive abilities. Follow the caregivers' lead in talking to and comforting a child during treatment and transport. Do not assume that a CSHCN is developmentally delayed.
- H. When moving a special needs child, a slow careful transfer with two or more people is preferable. Do not try to straighten or unnecessarily manipulate contracted extremities as it may cause injury or pain to the child. Certain medical conditions will require special care. Again, consult the child's caregiver.
- I. Caregivers of CSHCN often carry "go bags" or diaper bags that contain supplies to use with the child's medical technologies and additional equipment such as extra tracheostomy tubes, adapters for feeding tubes, suction catheters, etc. Before leaving the scene, ask the caregivers if they have a "go bag" and carry it with you.
- J. Caregivers may also carry a brief medical information form or card. The child may be enrolled in a medical alert program whereby emergency personnel can get quick access to the child's medical history. Ask the caregivers if they have an emergency information form or some other form of medical information for their child.
- K. Caregivers of CSHCN often prefer that their child be transported to the hospital where the child is regularly followed or the "home" hospital. When making the decision as to where to transport a CSHCN, take into account: local protocols, the child's condition, capabilities of the local hospital, caregivers' request, ability to transport to certain locations and the ability to request helicopter transport for distant home hospitals.

## EMERGENCIES IN CHILDREN WITH TRACHEOSTOMIES

### GENERAL CONSIDERATIONS

- A. The child should be examined for other possible problems. Do not assume the problem is with the tracheostomy tube.

### FIRST RESPONDER

- A. Examine the child quickly for possible causes of distress which may be easily correctable, such as a detached oxygen source.
- B. Try to establish the child's baseline: the child may never look normal.
- C. If on a ventilator, remove the child from the ventilator and bag the child with a secure oxygen source; there may be a problem with the ventilator or oxygen source.

EMT-B

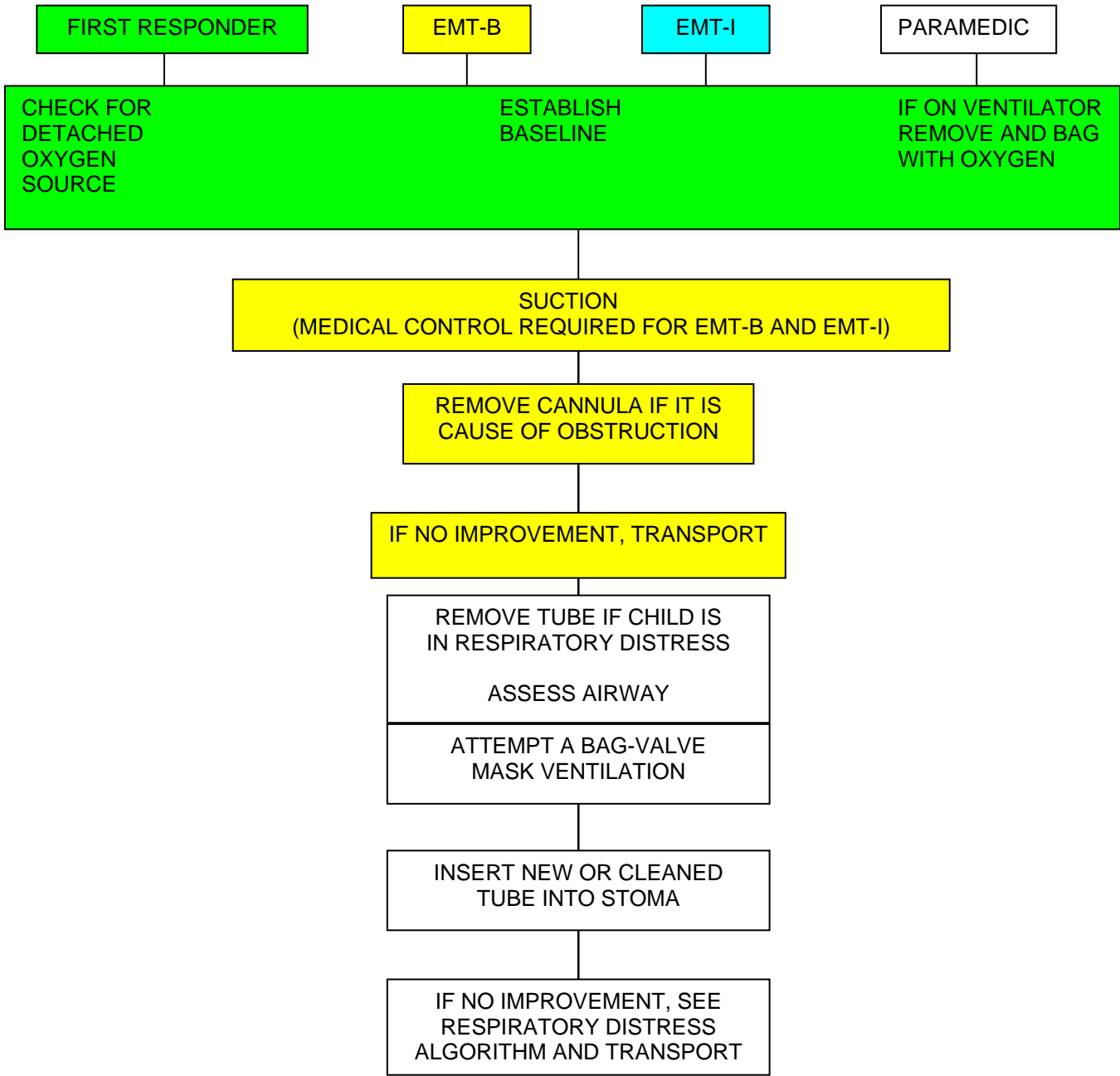
EMT-I

If still no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed. Suction the child if directed by the medical control physician as accumulation of debris is a common cause of obstruction.

### PARAMEDIC

- A. Suction the child as accumulation of debris is a common cause of obstruction; if the tracheostomy tube has a cannula, remove it; if it is the cause of obstruction there should be immediate improvement.
- B. If there is no improvement and the child is in severe respiratory distress, the tube should be removed, attempt a bag-valve mask ventilation; if another tube is available, insert into the stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned.)
- C. If there is still no improvement see the respiratory distress protocol.

**CHILDREN WITH TRACHEOSTOMIES**



## EMERGENCIES IN CHILDREN WITH IN-DWELLING CENTRAL LINES

### GENERAL CONSIDERATIONS

- A. Children may have central lines in several locations and some complications are due to location; some central lines are located under the skin and can be felt but not seen.
- B. The most common emergencies with central lines include, blockage of the line, complete or partial accidental removal, or complete or partial laceration of the line.

### FIRST RESPONDER

- A. Always evaluate child for cardiovascular stability as some complications may be life threatening.
- B. Children may be experiencing complications from their underlying medical condition; ask caretakers about the child's condition.

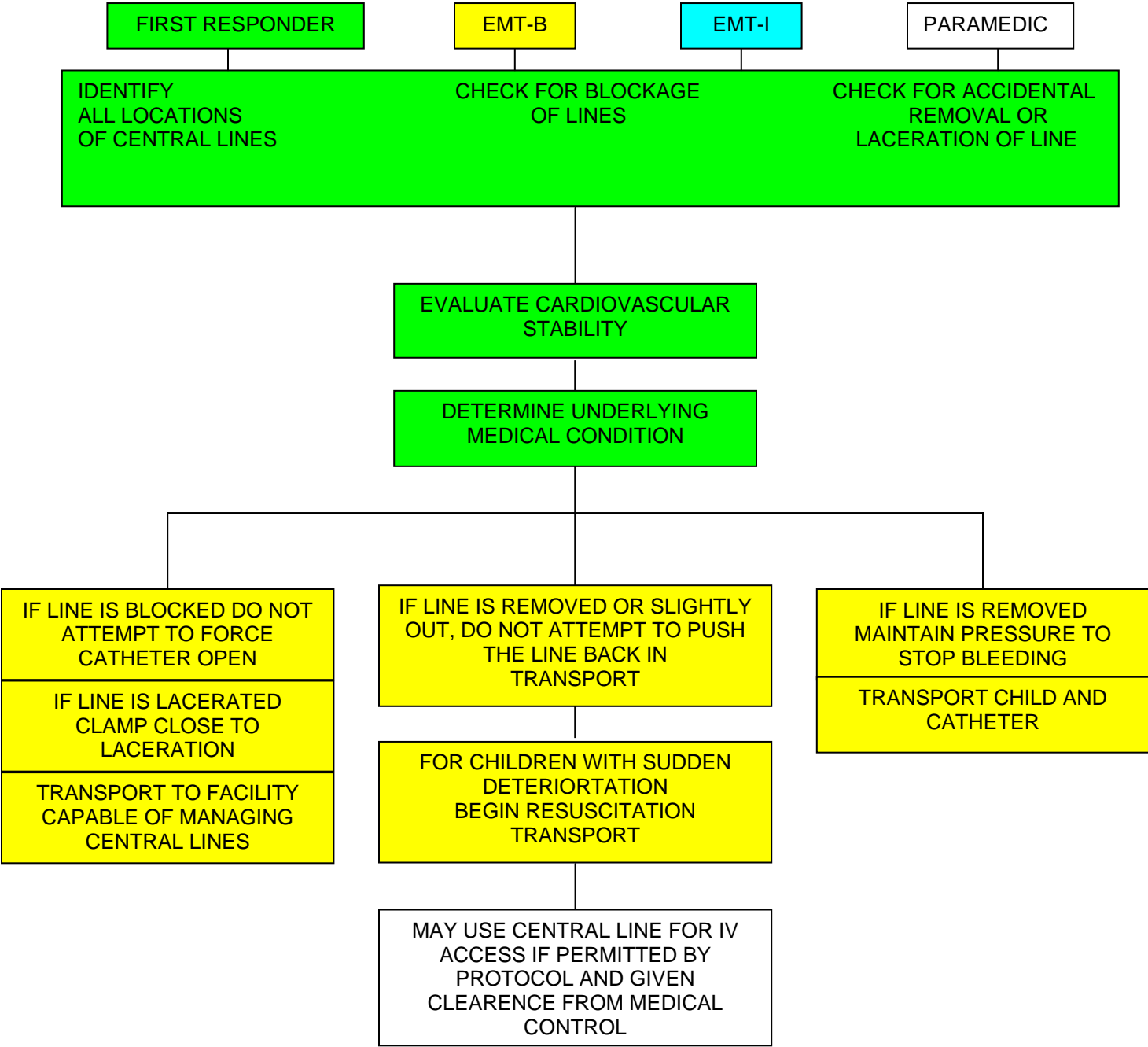
### EMT-B

### EMT-I

### PARAMEDIC

- A. If line is blocked, do not attempt to force the catheter open, transport to a facility capable of managing central lines.
- B. For complete removal, do not attempt to reinsert; transport to the nearest emergency department. Infections are a common complication; don't try to push a line back in, even if it is only slightly out.
- C. For complete removal, maintain pressure on site until bleeding has stopped; transport child and catheter to nearest emergency department (part of the catheter may have broken off.) Always bring the line with you to the hospital.
- D. For partial or complete laceration of the line, clamp proximally to laceration utilizing a padded clamp and transport child and catheter to nearest emergency department.
- E. For children with sudden deterioration begin basic resuscitation and transport to nearest emergency facility (child may have pneumothorax or internal bleeding.)
- F. If there are fluids infusing through the central line, determine the nature of the fluid and the time that the fluid was started.
- G. For paramedic only: May use central line for IV access if permitted by protocol, and given clearance by medical control

**EMERGENCIES IN CHILDREN WITH IN-DWELLING CENTRAL LINES**



## EMERGENCIES IN CHILDREN WITH GASTROSTOMY TUBES

### GENERAL CONSIDERATIONS

- A. Children with gastrostomy tubes may have complications of obstruction or dislodgment; obstruction is usually not an emergency but the child may require transport; dislodgment is not life threatening but the tube should be replaced as soon as possible. Both conditions are easily recognized.
- B. The child should be examined for any other possible problems.

### FIRST RESPONDER

- A. Children who have problems with their tubes may have problems with regurgitation or aspiration.
- B. Be aware of and address any other possible problems from their underlying medical condition.

### EMT-B

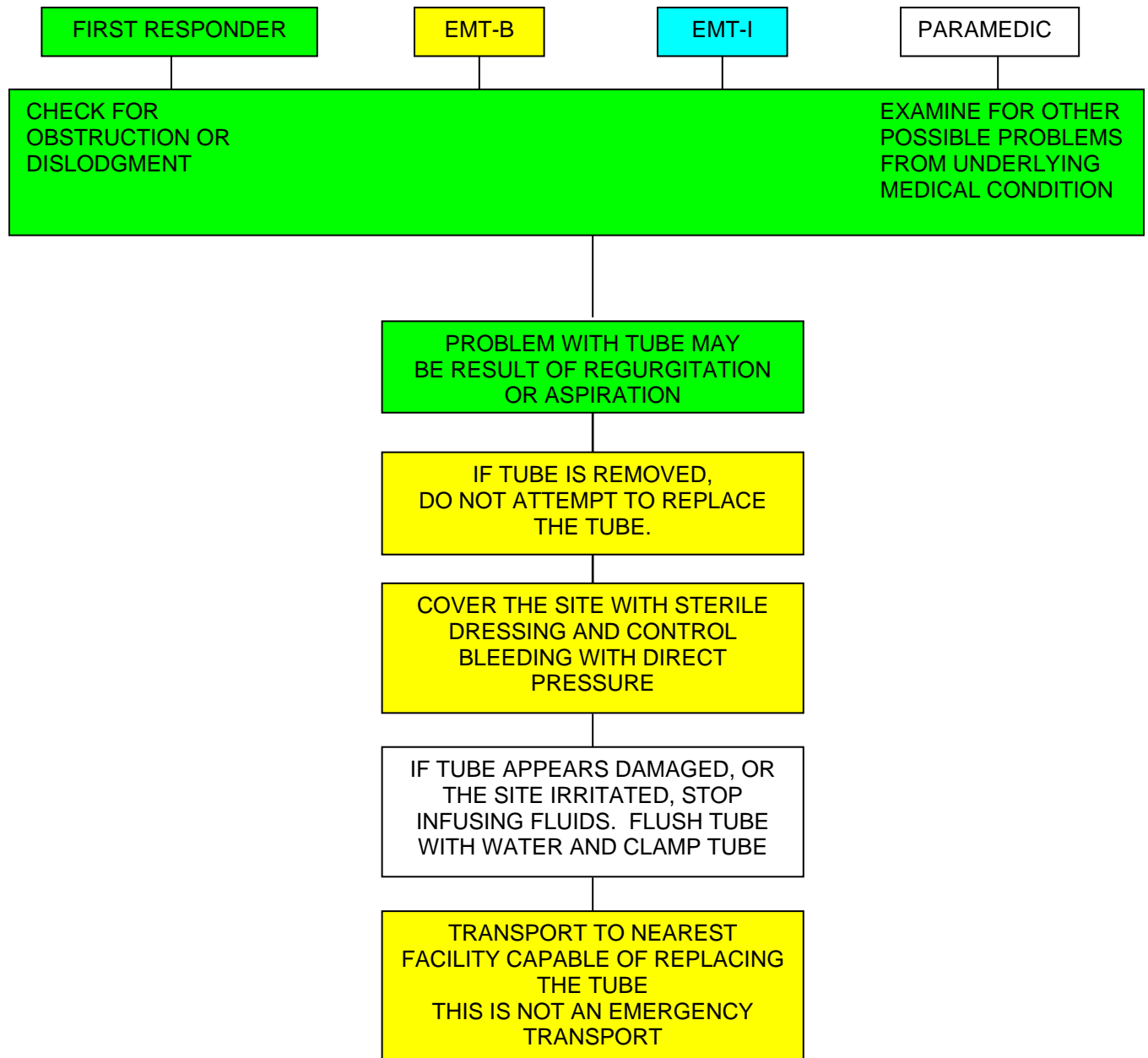
### EMT-I

- A. Transport the child and the tube to the nearest facility capable of replacing the tube; this is not an emergency transport.
- B. Do not attempt to replace the tube; it is not as easy as it seems and there may be other complications.
- C. Cover the site with a sterile dressing and control any bleeding with direct pressure.

### PARAMEDIC

If there are fluids infusing through the feeding tube, determine the nature of the fluids and the time that the fluids were started. If the tube appears damaged, or the site is irritated, stop all infusing fluids, flush the tube with water, and clamp the tube.

# EMERGENCIES IN CHILDREN WITH GASTROSTOMY TUBES



## EMERGENCIES IN CHILDREN ON VENTILATORS

### GENERAL CONSIDERATIONS

- A. Children on mechanical ventilation may exhibit sudden or gradual deterioration, cardiac arrest, increased oxygen demand, increased respiratory rate, retractions, change in mental status.
- B. Examine the child quickly for possible causes of distress which may be easily correctable (e.g. detached oxygen source) the caretakers will often have done this but double check.
- C. Medications the child is presently taking may be the cause of deterioration.
- D. Try to establish the child's baseline; the child may never look normal.

### FIRST RESPONDER

Remove the child from the ventilator and bag the child with a secure oxygen source; if the child improves there may be a problem with the ventilator or oxygen source.

EMT-B

EMT-I

If there is no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed. Suction the child if directed by the medical control physician as accumulation of debris is a common cause of obstruction.

### PARAMEDIC

- A. Suction the child as accumulation of debris is a common cause of obstruction; if the tracheostomy tube has a cannula, remove it; if it is the cause of obstruction, there should be immediate improvement.
- B. If there is no improvement, the tube should be removed; attempt bag-valve mask ventilation; if another tube is available, insert into the stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned.)

# EMERGENCIES IN CHILDREN ON VENTILATORS

FIRST RESPONDER

EMT-B

EMT-I

PARAMEDIC

CHECK FOR CARDIAC ARREST  
INCREASED OXYGEN DEMAND,  
INCREASED RESPIRATORY RATE  
RETRACTIONS, CHANGE IN  
MENTAL STATUS

ESTABLISH BASELINE

CHECK FOR DETACHED  
OXYGEN SOURCE  
MEDICATIONS MAY  
CAUSE DETERIORATION

REMOVE CHILD FROM VENTILATOR  
AND BAG CHILD WITH A SECURE  
OXYGEN SOURCE

IF CHILD IMPROVES, CHECK FOR  
PROBLEM WITH VENTILATOR OR  
OXYGEN SOURCE

SUCTION CHILD  
DEBRIS IS A COMMON CAUSE OF OBSTRUCTION  
(MEDICAL CONTROL REQUIRED FOR EMT-B AND EMT-I)

IF TRACHEOSTOMY TUBE HAS A  
CANNULA, REMOVE IT  
IF IT IS THE CAUSE OF OBSTRUCTION  
THERE WILL BE IMPROVEMENT

IF NO IMPROVEMENT, REMOVE TUBE  
ATTEMPT A BAG-VALVE  
MASK VENTILATION

INSERT NEW OR CLEANED  
TUBE INTO STOMA AND RESUME  
VENTILATION

IF NO IMPROVEMENT, INITIATE  
APPROPRIATE RESUSCITATION AS  
NEEDED AND TRANSPORT

**NORMAL PEDIATRIC VITAL SIGNS<sup>1</sup>**

Age	pulse	Resp	systolic BP*
Preterm , 1 kg	120-160	30-60	36-58
Preterm 1 kg	120-160	30-60	42-66
Preterm 2 kg	120-160	30-60	50-72
Newborn	126-160	30-60	60-70
Up to 1 yo	100-140	30-60	70-80
1-3 yo	100-140	20-40	76-90
4-6 yo	80-120	20-30	80-100
7-9 yo	80-120	16-24	84-110
10-12 yo	60-100	16-20	90-120
13-14 yo	60-90	16-20	90-120
15 + yo	60-90	14-20	90-130

- Blood pressure is a late and unreliable indicator of shock in children

**PEDIATRIC COMA SCORING<sup>2</sup>**

	<b><i>Glasgow</i></b>	<b><i>Glasgow Modified for Infant</i></b>	
<b>Eye opening</b>	Spontaneous	Spontaneous	4
	To voice	To voice	3
	To pain	To pain	2
	None	None	1
<b>Verbal response</b>	Oriented	Coos, babbles	5
	Confused	Irritable cry, inconsolable	4
	Inappropriate	Cries to pain,	3
	Garbled speech	Moans to pain	2
	None	None	1
<b>Motor response*</b>	Obeys commands	Normal movements	6
	Localizes pain	Withdraws to touch	5
	Withdraws to pain	Withdraws to pain	4
	Flexion	Flexion	3
	Extension	Extension	2
	Flaccid	Flaccid	1

**\* NOTE: MOTOR RESPONSE IS MOST INDICATIVE OF LEVEL OF INJURY**

<sup>1</sup> Reference: Children's Hospital Pediatric Reference Code Card, Columbus, Ohio, 1999

<sup>2</sup> A score of < 8 generally is an indication to hyperventilate the child.

## PEDIATRIC PREHOSPITAL MEDICATIONS

<u>Medication</u>	<u>Dose</u>	<u>Route</u>	<u>Remarks</u>
• Acetaminophen (Tylenol)	10 mg/kg	PO	Useful for musculoskeletal pain and fever control
• Activated charcoal	1 gm/kg	PO	Do not give to child with altered level of consciousness
• Adenosine	0.1 mg/kg	IV, IO	Indicated for SVT. First dose 6mg, second dose 6mg. Max dose 12mg
• Albuterol	2.5 mg	Aerosol	Indicated for wheezing as per protocol
• Amiodarone	5mg/kg	IV, IO	Over 20-60 minutes, maximum 15 mg/kg per day. For shock-refractory pulseless VT/VF: 5 mg/kg rapid IV/IO
• Atropine	0.02 mg/kg	IV, IO, ET	Minimum dose 0.1 mg; max dose for child 0.5 mg; max dose for adolescent 1.0 mg; may repeat x1; Also useful before intubating children < 5 years old, blocks bradycardia due to vagal nerve stimulation
• Dextrose 25%	2 mL/kg	IV, IO	Try to obtain bedside glucose level before administering ----administer if blood glucose < 60; dilute 50% 1:1 with sterile water; consult Medical Control if infant < 1 month as solution may need to be further diluted.
• Diazepam (Valium)	0.2-0.3	IV	Indicated for uncontrolled seizure mg/kg activity; anticipate respiratory depression. Max. dose 10 mg.
• Diazepam (Valium)	0.5 mg/kg	Rectal	Indicated for uncontrolled seizure activity; anticipate respiratory depression. Max. dose 10 mg.
• Diphenhydramine (Benadryl)	1 mg/kg	IV	Useful in allergic reactions and anaphylaxis. Max dose 50 mg
• Epinephrine (1:10,000)	0.1 mL/kg (0.01 mg/kg)	IV, IO	Commonly used in cardiac arrest rhythms as first dose. Increase second dose 10 X (may use 1:1,000 solution).
• Epinephrine (1:1,000)	0.1 mL/kg (0.1 mg/kg)	ET, IV, IO	Commonly used in cardiac arrest rhythms. Use for all ET doses, and second and subsequent IV/IO doses. *The ET route has limited absorption, use IV/IO route whenever possible
	0.01ml/kg	SubQ	Used for anaphylaxis. Max dose is 0.3ml
• Lidocaine	1 mg/kg	IV, IO, ET	Can repeat once. If successful start continuous infusion at 20-50 mg/kg/min. Also useful before intubating for cerebral protection and decreases airway reactivity.
• Morphine	0.1 mg/kg	IV/IM	Useful for moderate pain, may cause respiratory depression. Hypotension and reflex bradycardia may develop from histamine release
• Midazolam (Versed)	0.1 mg/kg	IV/IO/IM	Indicated for uncontrolled seizure activity; anticipate respiratory depression Useful to facilitate advanced airway management in combative patients
• Naloxone (Narcan)	0.1 mg/kg	IV, IO, ET	Useful for unknown unconscious, known narcotic overdoses
• Procainamide	15 mg/kg	IV	Over 30-60 minutes. Alternative treatment for recurrent or refractory VT, SVT.

IV = Intravenous

ET = endotracheal

IO = Intraosseous