

# **STATE OF OHIO**

## **EMFTS BOARD**

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

#### **INTRODUCTION**

On behalf of the State Board of Emergency Medical, Fire, and Transportation 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.

October 16, 2013

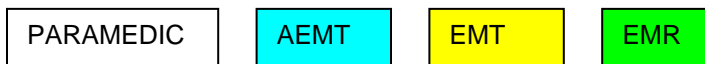
Revised June 18, 2014, December 16, 2015

## USING THE PEDIATRIC GUIDELINES

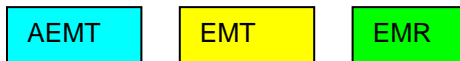
The pediatric guidelines are color coded for quick and easy reference, and represent the scope of practice as recommended by the Ohio EMSC Committee. In some cases, this differs from Ohio's scope of practice. Consult your medical director should questions arise regarding scope of practice.

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

**PARAMEDICS** may perform all instructions coded:



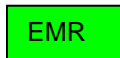
**ADVANCED EMERGENCY MEDICAL TECHNICIANS (AEMT)** may perform all instructions coded:



**EMERGENCY MEDICAL TECHNICIANS (EMT)** may perform all instructions coded:



**EMERGENCY MEDICAL RESPONDERS (EMR)** may perform all instructions coded:



**MEDICAL CONTROL RECOMMENDATION**



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**PEDIATRIC  
ALTERED LEVEL OF CONSCIOUSNESS**

**EMR**

- A. Assess ABCs. 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
- E. Obtain and document a pulse oximetry and/or capnography measurement.
- F. If an opioid overdose is suspected and respirations are impaired, administer naloxone (Narcan®) 0.1 mg/kg IN (maximum volume of 1 ml per nostril) or naloxone 0.4 mg per auto-injector (EVZIO®). Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.

**EMT**

- 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. If blood sugar is normal, respirations are impaired, or patient does not respond to dextrose, administer naloxone (Narcan®) 0.1 mg/kg IN (maximum volume of 1 ml per nostril) or naloxone 0.4 mg per auto-injector (EVZIO®). 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. Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.
- D. Transport IMMEDIATELY unless an advanced life support unit is enroute and has an ETA of less than 5 minutes to the scene.

PEDIATRIC ALTERED LEVEL OF CONSCIOUSNESS (cont'd)

AEMT

- A. Assist EMS professionals; obtain patient condition and circumstances.
- B. Check heart rhythm.
- C. Start IV saline, TKO.
- D. If any of the following are present: unresponsiveness, dehydrated or dry appearance, tachycardia, low BP, poor capillary refill and/or blood sugar is above 400 mg/dl, IV fluid bolus 20 ml/kg of normal saline.
- E. Determine blood sugar level by available means. Treat accordingly:
  - 1. Blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2 ml/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. 20 ml/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 naloxone (Narcan®) 0.1 mg/kg IV, IO, ET, IM, or IN (maximum volume of 1 ml per nostril) or naloxone 0.4 mg per auto-injector (EVZIO®). 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 the patient improves somewhat with naloxone but is not fully awake, contact medical control for repeat dosing. Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.
- 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

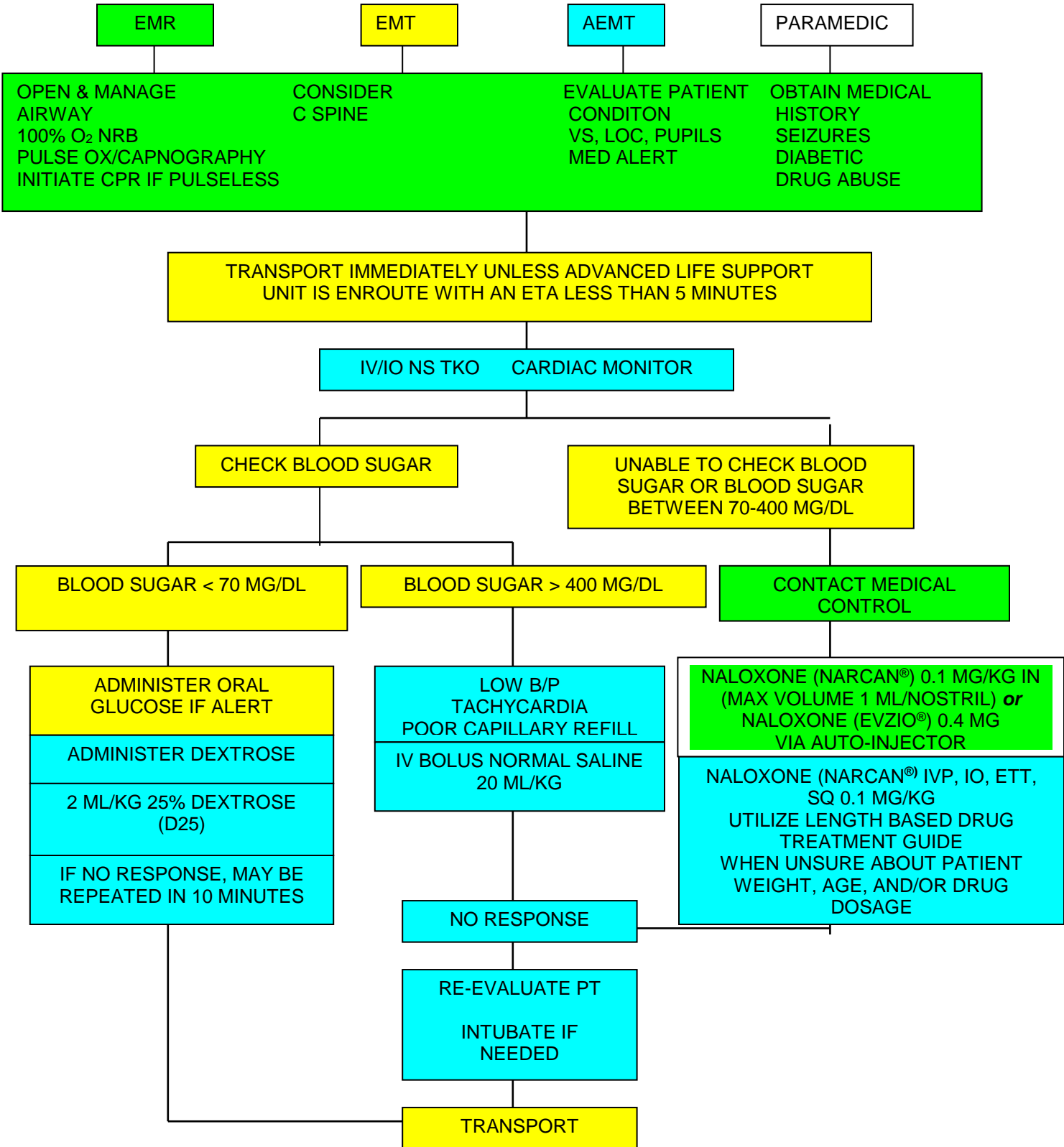
PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals 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 heart rhythm.
- D. Start IV/IO of normal saline. If any of the following are present: unresponsiveness, dehydrated or dry appearance, tachycardia, low BP, or poor capillary refill, administer a fluid bolus of 20 ml/kg normal saline IV/IO push.
- E. Determine blood sugar level by available means. Treat accordingly:

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

1. Blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2 ml/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. 20 ml/kg of normal 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 naloxone (Narcan®) 0.1 mg/kg IV, IO, ET, IM, or IN (maximum volume of 1 ml per nostril) or naloxone 0.4 mg per auto-injector (EVZIO®). 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 naloxone but is not fully awake, contact medical control for repeat dose. Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.
- 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 with hypoxia being the primary cause.
- C. In infants and children, an arrhythmia should be treated if:
  - 1. the arrhythmia compromises cardiac output (poor perfusion), 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. Quality CPR consists of pushing hard with compression of the chest to  $\geq 1/3$  of the anteroposterior diameter of the chest, compressions of 100 to 120 per minute, and allowing complete chest recoil. In children who have reached puberty, i.e. adolescents, the recommended adult compression depth of 2 inches (5 cm) to 2.4 inches (6 cm) should be used.
- F. For two-person CPR, the rate of chest compressions without the presence of an advanced airway is 3:1 in newborns with a suspected primary etiology of respiratory compromise, and 15:2 in children and newborns in arrest with a suspected cardiac etiology. If an advanced airway is in place, 10 breaths per minute should be administered with continuous chest compressions.
- G. Transport is essential when advanced cardiac life support is not available within ten minutes of receipt of the call
- H. 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.

## EMR

- A. Per current American Heart Association Pediatric Basic Life Support guidelines, establish unresponsiveness, activate the emergency response system, get the AED/defibrillator, and check for a pulse.
- B. If the patient has a pulse and is not breathing or only gasping, give one breath every three minutes and recheck the pulse every 2 minutes. Assist ventilation with bag-valve-mask while administering 100% oxygen or provide mouth to mouth ventilation using barrier device.
- C. If the patient does not have a pulse, immediately provide quality CPR for two minutes, apply the AED, analyze the rhythm, and deliver a shock if indicated. If the patient remains unresponsive, resume quality CPR for two minutes and analyze the rhythm after each two minute cycle of CPR until the patient starts to Move or ALS providers assume care
- D. Immobilize the patient's cervical spine only if clinically indicated.

## EMT

- 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 that is unimproved with oxygenation, start quality CPR.



## PEDIATRIC ARRHYTHMIAS (cont'd)

- 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, may assist the AEMT or Paramedic with the application of a cardiac monitor and the acquisition of a strip for interpretation by ED physician, during transport only.

### AEMT

- A. Start IV normal saline (NS), TKO.
- 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 the patient has poor perfusion.
    - b. Airway management and 100% oxygenation does not improve patient condition.
      - i. Begin quality CPR
      - ii. Transport immediately

### PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. Assess airway adequacy and assist ventilation with bag-valve-mask while administering 100% oxygen. Perform appropriate airway management (airway adjuncts or intubation).
- C. Apply monitor and determine arrhythmia.
- D. Treat arrhythmias as follows:
  - 1. Bradycardia. Treat if:
    - a. Infant or child's heart rate < 60 bpm and patient has poor perfusion.
    - c. Airway management and 100% oxygenation does not improve patient condition.
      - i. Begin quality CPR

## PEDIATRIC ARRHYTHMIAS (cont'd)

- ii. Administer epinephrine IV, IO, or ET every three to five minutes or until perfusion improves
    - (a) When IV or IO routes are available, administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000
    - (b) When administering through ET tube, use 0.1 mg/kg (0.1 mL/kg) of epinephrine 1:1,000 ET that must be diluted with 3-5 ml of NS.
  - iii. If no response, administer atropine
    - (a) When IV or IO routes are available, 0.02 mg/kg. (minimum dose 0.1 mg, maximum single dose 0.5 mg)
    - (b) When administering through ET tube, administer 0.04 mg/kg
    - (c) Atropine may be repeated once if the patient is not improved 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. Inquire about a history of Wolfe Parkinson White syndrome or other arrhythmias.
  - e. Consider vagal maneuver. Success of vagal maneuvers is variable and depends upon the presence of underlying conditions, the patient's level of cooperation, and age. Regardless of what type of vagal maneuver is attempted, obtain a cardiac monitor 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 heart rate is  $\geq 220$ /minute in an infant or  $\geq 180$ /minute in a child:
    - i. Administer adenosine, 0.1 mg/kg (maximum 6mg) RAPID IV bolus over 1 to 3 seconds followed IMMEDIATELY with a 5-10 ml NS bolus IV.

## PEDIATRIC ARRHYTHMIAS (cont'd)

- ii. If the first dose is ineffective, repeat adenosine in 1-2 minutes, 0.2 mg/kg (maximum 12 mg) RAPID IV bolus followed IMMEDIATELY with a 5-10 ml NS bolus IV.
- iii. Contact medical control
- iv. Consider sedation diazepam (Valium®)/midazolam (Versed®) 0.2 mg/kg IV
- v. Synchronous cardioversion at
  - (a) 1<sup>st</sup>: 0.5-1 joules (monophasic or biphasic)
  - (b) 2<sup>nd</sup>: 2 joules/kg (monophasic or biphasic)
  - (c) If the second synchronized cardioversion is unsuccessful, consider contacting medical control for an antiarrhythmic (amiodarone, procainamide, or lidocaine if amiodarone is not available)

### 3. Wide Complex Tachycardia (With a pulse)

Assess patient's perfusion. Signs/symptoms of poor perfusion include

- Hypotension
- Acutely altered mental status
- Signs of shock

#### a. Good perfusion

i. If the rhythm is regular and the QRS complex is monomorphic, consider the administration of adenosine 0.1 mg/kg (maximum 6 mg) RAPID IV bolus over 1 to 3 seconds followed IMMEDIATELY with a 5-10 ml NS bolus IV. If the first dose is ineffective, repeat adenosine in 1-2 minutes, 0.2 mg/kg (maximum 12 mg) RAPID IV bolus followed IMMEDIATELY with a 5-10 ml NS bolus IV.

Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone or procainamide. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization. Do not routinely administer amiodarone and procainamide together. 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:

ii. If the rhythm is not regular and/or the QRS complex is not monomorphic or the EMT is unsure about the rhythm, contact medical direction for potential orders for an antiarrhythmic.

- Amiodarone 5 mg/kg IV over 20-60 minutes
- Procainamide IV infusion of 15 mg/kg over 30-60 minutes
  - Max dose is 15 mg/kg
  - Discontinue infusion if hypotension develops, development of a prolonged QRS complex greater than 50%, the arrhythmia resolves, or the maximum dose of 15 mg/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 diazepam (Valium®)/midazolam (Versed®) 0.2 mg/kg IV

## PEDIATRIC ARRHYTHMIAS (cont'd)

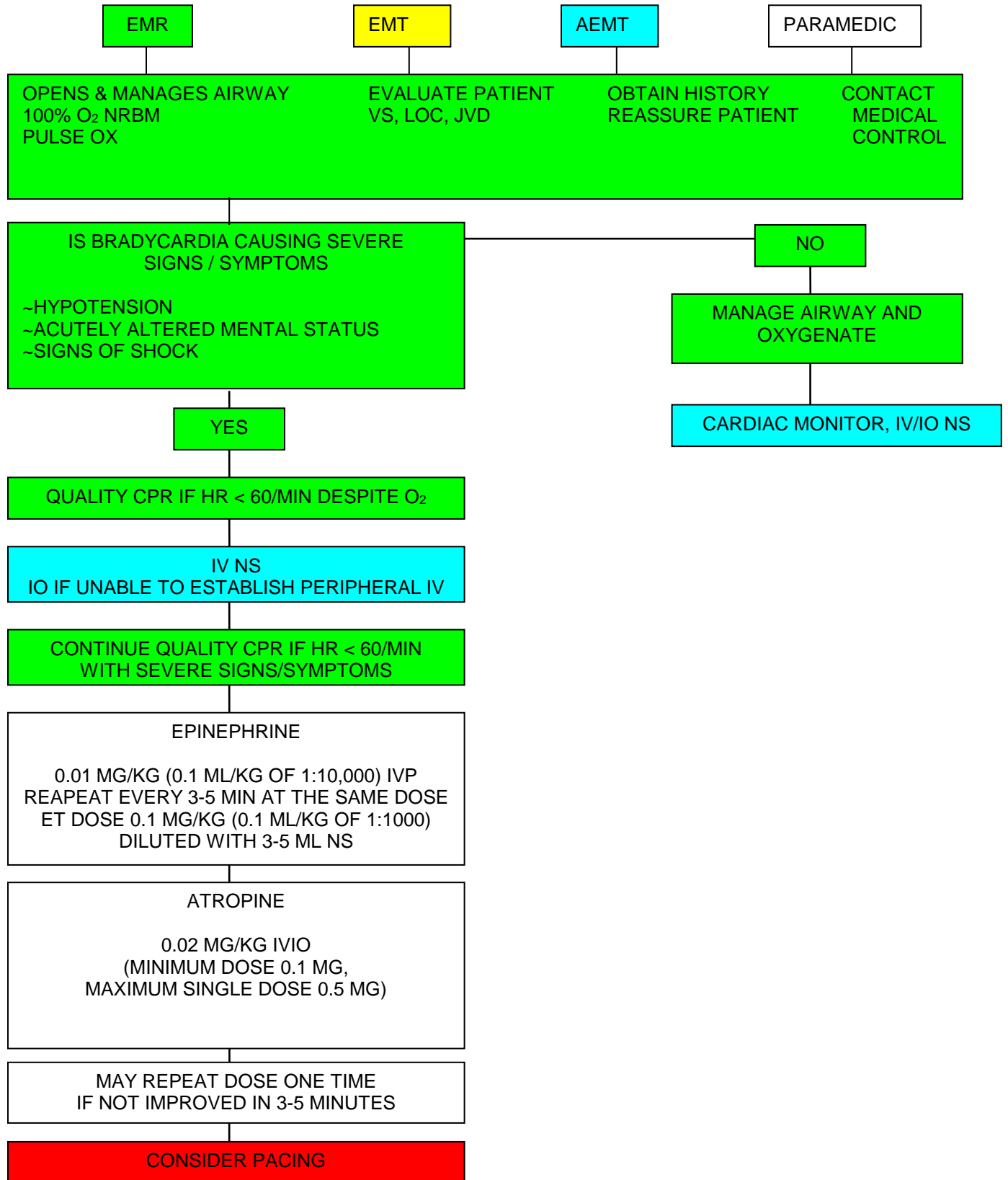
- iii. Synchronous cardioversion at:
  - (a) 1<sup>st</sup>: 0.5-1 joules/kg (monophasic or biphasic)
  - (b) 2<sup>nd</sup>: 2 joules/kg (monophasic or biphasic)
- b. Poor perfusion (with a pulse):
  - i. Prepare for immediate cardioversion
  - ii. Consider sedation diazepam (Valium®)/midazolam (Versed®) 0.2 mg/kg IV
  - iii. Synchronous cardioversion at:
    - (a) 1<sup>st</sup>: 0.5 joules/kg (monophasic or biphasic)
    - (b) 2<sup>nd</sup>: 2 joules/kg (monophasic or biphasic)
  - iv. Administer an antiarrhythmic

Antiarrhythmics that are indicated for a wide complex tachycardia are amiodarone, procainamide, or lidocaine if amiodarone is not available. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization. Do not routinely administer amiodarone and procainamide together. 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 5 mg/kg IV over 20-60 minutes
- Procainamide IV infusion of 15 mg/kg over 30-60 minutes
  - Maximum dose is 15 mg/kg
  - Discontinue infusion if hypotension develops, development of a prolonged QRS complex greater than 50%, if the arrhythmia resolves, or the maximum dose of 15 mg/kg has been administered.
- Lidocaine 1 mg/kg IV/IO IV bolus with an infusion at 0.2-0.5 mg/kg/min IV/IO or 2-3 mg/kg ET

**\*\*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

EMR

EMT

AEMT

PARAMEDIC

OPENS & MANAGES AIRWAY 100% O <sub>2</sub> NRBM PULSE OX	EVALUATE PATIENT VS, LOC, JVD	OBTAIN HISTORY REASSURE PATIENT	CONTACT MEDICAL CONTROL
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**IS TACHYCARDIA CAUSING SEVERE  
SIGNS / SYMPTOMS**  
  
 ~HYPOTENSION  
 ~ACUTELY ALTERED MENTAL STATUS  
 ~SIGNS OF SHOCK

NO

MANAGE AIRWAY AND  
 OXYGENATE

CARDIAC MONITOR, IV/IO NS

CONSIDER VAGAL  
 MANEUVER

YES

MANAGE AIRWAY AND OXYGENATE

CARDIAC MONITOR, IV/IO NS

HEART RATE ≥ 220/MIN (INFANT) or ≥ 180/MIN (CHILD)

MAY GO DIRECTLY TO SYNCHRONIZED CARIOVERSION

ADENOSINE 0.1 MG/KG  
 RAPID IV PUSH  
 MAX FIRST DOSE 6 MG/KG

NO RESPONSE 1-2 MINUTES

ADENOSINE 0.2 MG/KG  
 RAPID IV PUSH  
 MAX SECOND DOSE 12MG

NO RESPONSE 1-2 MINUTES

CONSIDER SEDATION  
 DIAZEPAM / MIDAZOLAM 0.2 MG/KG IVP

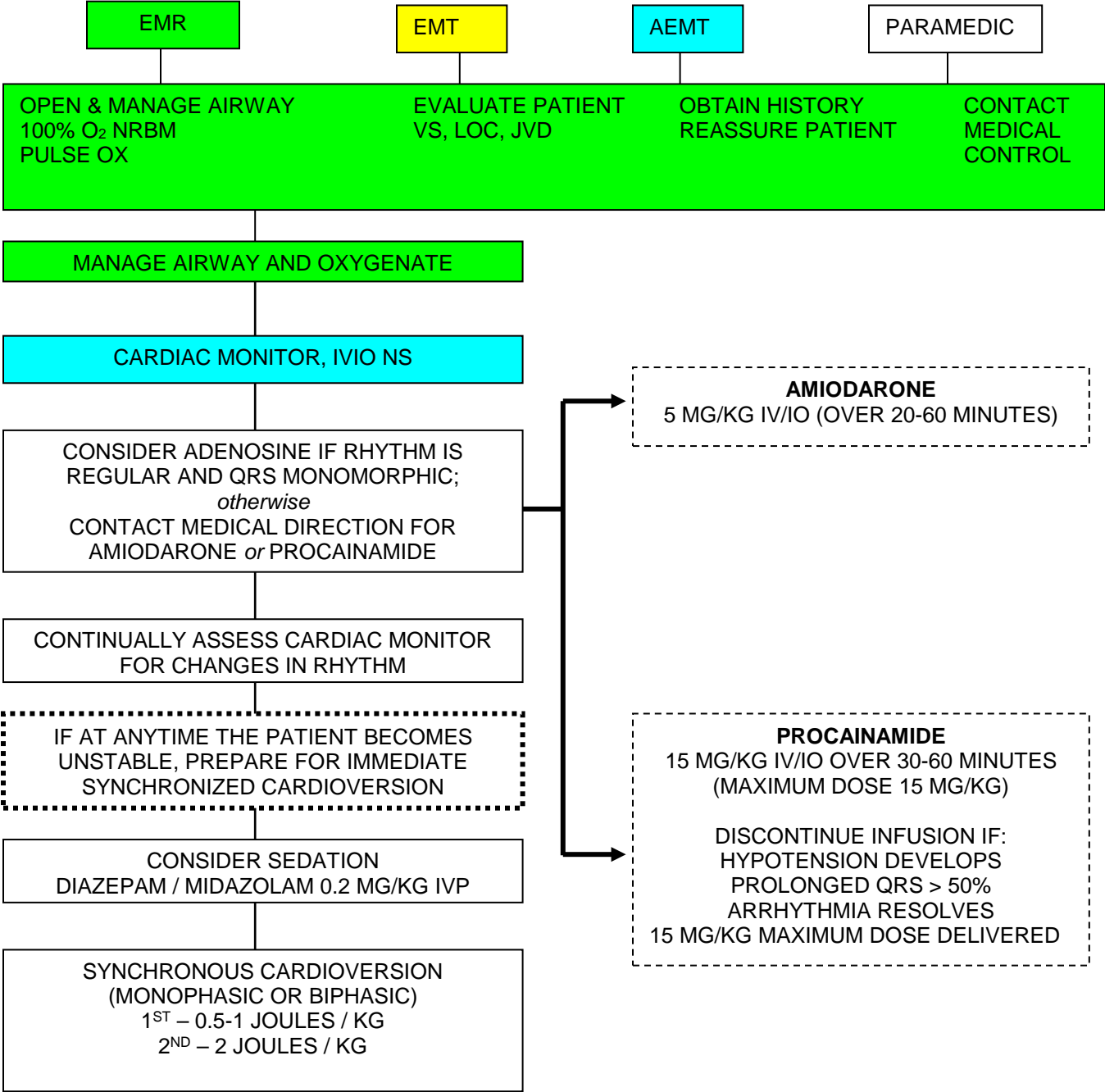
CARIOVERSION (MONOPHASIC OR BIPHASIC)  
 1<sup>ST</sup> – 0.5 -1 JOULES / KG  
 2<sup>ND</sup> – 2 JOULES / KG  
 CONTACT MEDICAL DIRECTION FOR  
 ANTIARRHYTHMIC ORDERS

**\*\*NOTE\*\***

EACH DOSE OF  
ADENOSINE  
MUST BE  
ADMINISTERED  
RAPID IV PUSH  
(1-3 SECONDS)  
AND  
IMMEDIATELY  
FOLLOWED BY  
A  
5 TO 10 ML  
BOLUS OF  
SALINE

**PEDIATRIC ARRHYTHMIAS  
STABLE WIDE COMPLEX TACHYCARDIA**

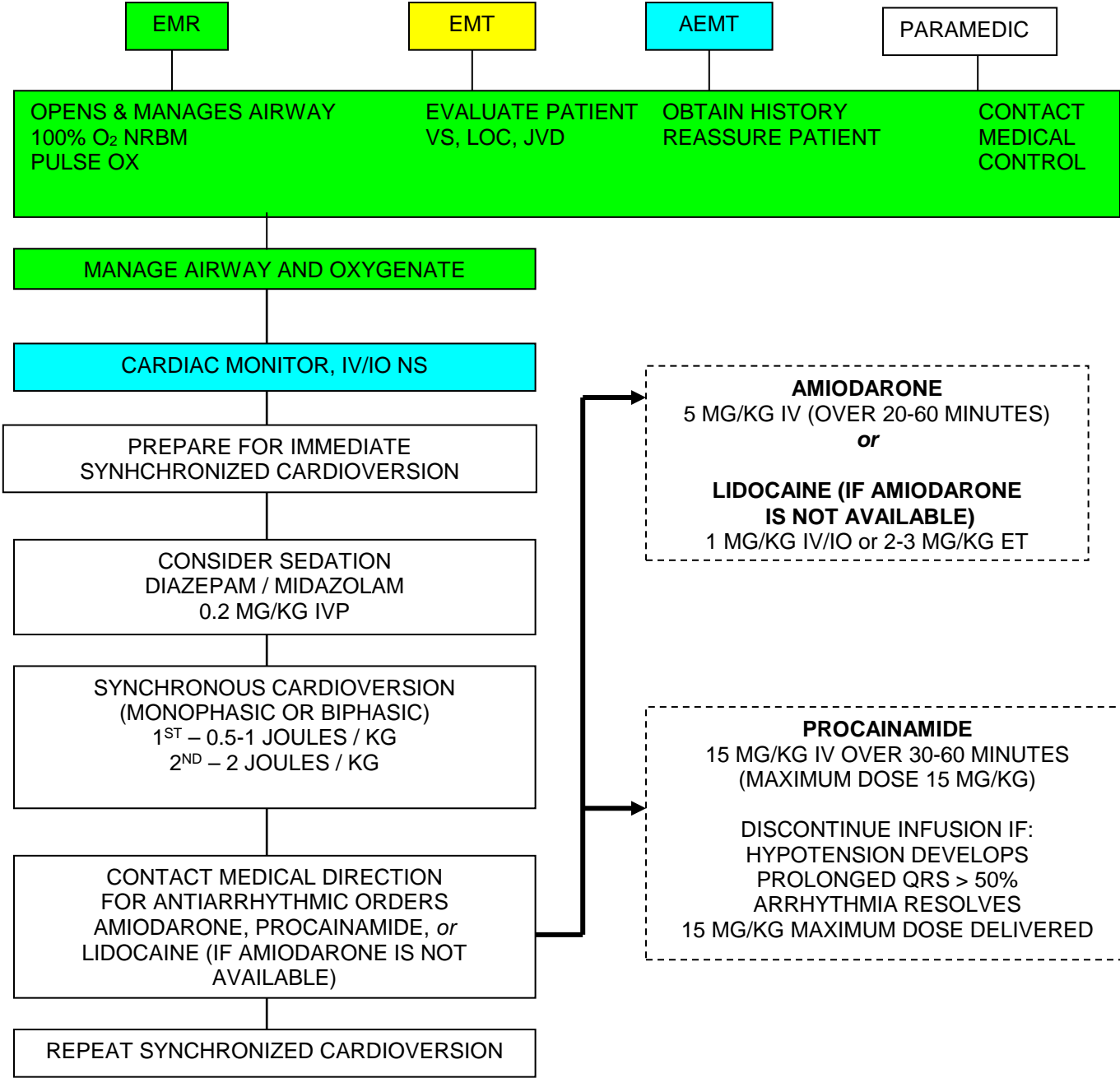
**PATIENTS WITH A GOOD PULSE, FOOD PERFUSION, WHO ARE ALERT AND ORIENTED ARE CONSIDERED STABLE**



**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**



## PEDIATRIC CARDIAC ARREST

### GENERAL CONSIDERATIONS

- A. Cardiac arrest in children is primarily due to lack of an adequate airway, resulting in hypoxia
- B. All EMS professionals must concentrate on opening and maintaining the airway and providing 100% oxygen
- C. Quality CPR consists of pushing hard with compression of the chest to  $\geq 1/3$  of the anteroposterior diameter of the chest, compressions of 100 to 120 per minute, and allowing complete chest recoil. In children who have reached puberty, i.e. adolescents, the recommended adult compression depth of 2 inches (5 cm) to 2.4 inches (6 cm) should be used.
- D. For two-person CPR, the rate of chest compressions without the presence of an advanced airway is 3:1 in newborns with a suspected primary etiology of respiratory compromise, and 15:2 in children and newborns in arrest with a suspected cardiac etiology. If an advanced airway is in place, 10 breaths per minute should be administered with continuous chest compressions.
- E. Pulseless patients or those with a weak or slow pulse following a known or suspected opioid overdose should be managed as cardiac arrest patients. Standard resuscitative measures should be initiated immediately and should take priority over naloxone administration or waiting for a response from previously administered naloxone.
- F. During BVM ventilation or endotracheal intubation, routine cricoid pressure to prevent aspiration is no longer recommended.
- G. Transport IMMEDIATELY when excessive hemorrhage or hypothermia is present. ALS measures should be carried out during transport
- H. If peripheral IVs cannot be established, venous access should be obtained by the intraosseous route
- I. If IV or IO access cannot be established, administer appropriate medications through the ET tube
- I. **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. Adult AED pads should be used for patients greater than 8 years of age, but they may be used in patients between the ages of 1 and 8 years of age if pediatric AED pads are unavailable.
- J. 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. Communicate with and 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
- K. Refer to BROSELOW® PEDIATRIC EMERGENCY TAPE when unsure about patient weight, age and/or drug dosage

### EMT

- A. Open and maintain airway in sniffing position
- B. Ventilate with 100% oxygen via BVM with oxygen reservoir
- C. Initiate quality CPR in accordance with American Heart Association guidelines

CARDIAC ARREST (cont'd)

- 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
- E. If an Automated External Defibrillator (AED) is available:
1. Assess patient for respirations and cardiac arrest
  2. Apply AED and activate the device.
  3. Start documentation that must include:
    - EMS unit delivering care and ID of EMS professionals
    - 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 quality CPR for two minutes
  - 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 quality CPR for two minutes
  - iii. Contact medical control, advise of cardiac arrest, and transport IMMEDIATELY
  - iv. After each two minute cycle of quality CPR, activate AED to assess rhythm and deliver a single shock if indicated
  - v. Resume quality CPR

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

**AEMT**

- A. Assume charge and confer with EMS professionals 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 quality CPR
  3. Defibrillate at 4 joules/kg
  4. If no response, resume quality CPR and TRANSPORT
- D. Start IV or IO of saline and give 20 ml/kg NS IV bolus. IV access should be accomplished en route to hospital.

**DO NOT DELAY TRANSPORT**

**EMT-P**

- A. Assume charge and confer with EMS professionals as to patient condition and circumstances
- B. If an AEMT 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, quality CPR for two minutes
    - c. Defibrillate at 4 joules/kg
    - d. If no response, continue quality CPR for two minutes
    - e. Administer epinephrine IV, IO or ET every 3-5 minutes
      - IV / IO doses – 0.01 mg/kg of 1:10,000 (0.1 ml/kg)
      - ET tube doses – 0.1 mg/kg of 1:1,000 (0.1 ml/kg) diluted with 1-2 ml of saline
    - f. If no response, defibrillate at  $\geq 4$  joules/kg to a maximum of 10 joules/kg or the adult dose
    - g. If no response, continue quality CPR for two minutes
    - h. Administer one antiarrhythmic
      - Amiodarone 5 mg/kg IV/IO, may repeat dose up to 2 times for refractory ventricular fibrillation or pulseless ventricular tachycardia **or**
      - Lidocaine 1 mg/kg IV/IO as a bolus followed by an infusion at 0.2-0.5 mg/kg/min IV/IO or 2-3 mg/kg ET
    - i. If no response, continue quality CPR and TRANSPORT
    - j. Consider the treatment of reversible causes
      - Hypovolemia: administer 20 ml/kg NS IV fluid boluses
      - Hypoxia
      - Hydrogen ion (acidosis)
      - Hypoglycemia: administer 2 ml/kg of D25 IV/IO for children under 20 kg or 1 ml/kg of D50 IV/IO for children over 20 kg if the blood glucose is less than 80
      - Hypokalemia/hyperkalemia
      - Hypothermia
      - Tension pneumothorax
      - Tamponade, cardiac
      - Toxins
      - Thrombosis, pulmonary
      - Thrombosis, coronary
  2. Asystole / Pulseless Electrical Activity (PEA)
    - a. Begin quality CPR immediately
    - b. Obtain IV/IO access

## CARDIAC ARREST (cont'd)

- c. Continue quality CPR for two minutes and administer epinephrine IV, IO or ET every 3-5 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
- c. Confirm asystole in two different leads
- d. If rhythm is unclear and possibly ventricular fibrillation, follow ventricular fibrillation/pulseless ventricular tachycardia guideline
- e. Consider treatable causes:
  - Hypovolemia: administer 20 ml/kg NS IV boluses
  - Hypoxia
  - Hydrogen ion (acidosis)
  - Hypoglycemia: administer 2 ml/kg of D25 IV/IO for children under 20 kg or 1 ml/kg of D50 IV/IO for children over 20 kg if the blood glucose is less than 80
  - Hypokalemia/hyperkalemia
  - Hypothermia
  - Tension Pneumothorax
  - Tamponade, cardiac
  - Toxins
  - Thrombosis, pulmonary
  - Thrombosis, coronary
- f. If no response, continue quality CPR and TRANSPORT

**CARDIAC ARREST – AED USE  
FOR CHILDREN 1 TO 8 YEARS OF AGE**

EMR

EMT

AEMT

PARAMEDIC

ASSESS PATIENT FOR RESPIRATORY AND CARDIAC ARREST

ACTIVATE ACLS

**START QUALITY CPR**

APPLY AED

ANALYZE THE RHYTHM  
DELIVER 2 J/KG  
(BIPHASIC OR MONOPHASIC)  
IF A SHOCK IS INDICATED

RESUME QUALITY CPR FOR TWO MINUTES  
MAINTAIN AIRWAY  
ADMINISTER OXYGEN

ANALYZE THE RHYTHM  
DELIVER 4 J/KG  
(BIPHASIC OR MONOPHASIC)  
IF A SHOCK IS INDICATED

RESUME QUALITY CPR  
MAINTAIN AIRWAY  
MOVE PATIENT TO AMBULANCE

ANALYZE THE RHYTHM  
DELIVER  $\geq 4$  J/KG (MAX 10 J/KG OR ADULT DOSE)  
(BIPHASIC OR MONOPHASIC)  
IF A SHOCK IS INDICATED

TRANSPORT WITH QUALITY CPR IN PROGRESS

ESTABLISH IV/IO NS

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

EMR

EMT

AEMT

PARAMEDIC

ASSESS PATIENT FOR RESPIRATORY AND CARDIAC ARREST

ACTIVATE ACLS

**START QUALITY CPR**

APPLY AED

ANALYZE THE RHYTHM  
DELIVER 120 J - 200 J BIPHASIC  
(OR 360 J MONOPHASIC)  
IF A SHOCK IS INDICATED

RESUME QUALITY CPR FOR TWO MINUTES  
MAINTAIN AIRWAY  
ADMINISTER OXYGEN

ANALYZE THE RHYTHM  
DELIVER 120 J-200 J BIPHASIC  
(OR 360 J MONOPHASIC)  
IF A SHOCK IS INDICATED

RESUME QUALITY CPR  
MAINTAIN AIRWAY  
MOVE PATIENT TO AMBULANCE

ANALYZE THE RHYTHM  
DELIVER 120 J-200 J BIPHASIC  
(OR 360 J MONOPHASIC)  
IF A SHOCK IS INDICATED

TRANSPORT WITH QUALITY CPR IN PROGRESS

ESTABLISH IV/IO NS

**PEDIATRIC CARDIAC ARREST**

**EMT**

**AEMT**

**EMT-P**

**START  
QUALITY  
CPR**

**OPEN AND  
MAINTAIN  
AIRWAY**

**ADMINISTER  
100% OXYGEN  
VIA BVM**

**CONTACT  
MEDICAL  
CONTROL**

**QUALITY CPR IN 2 MINUTE CYCLES**

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

**QUALITY CPR FOR 2 MINUTES  
REPEAT EPINEPHRINE IV/IO or ET  
DOSES EVERY 3-5 MINUTES**

**IV FLUID BOLUS  
20 ML/KG NS**

**BLOOD SUGAR < 80**

**2 ML/KG D25 FOR CHILD  
LESS THAN 20 KG  
1 ML/KG D50 FOR CHILD  
GREATER THAN 20 KG**

**CONSIDER TREATABLE CAUSES  
HYPOVOLEMIA  
HYPOXIA  
HYDROGEN ION (ACIDOSIS)  
HYPOGLYCEMIA  
HYPOKALEMIA/HYPERKALEMIA  
HYPOTHERMIA  
TENSION PNEUMOTHORAX  
TAMPONADE, CARDIAC  
TOXINS  
THROMBOSIS, PULMONARY  
THROMBOSIS, CORONARY**

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

**V FIB  
PULSELESS V TACH**

**DEFIBRILLATE  
2 J/KG**

**CPR FOR 2 MINUTES**

**DEFIBRILLATE 4 J/KG**

**QUALITY CPR FOR 2 MINUTES  
EPINEPHRINE 1:10,000  
0.01 MG/KG IV/IO or  
EPINEPHRINE 1:1,000  
0.1 MG/KG ET ROUTE  
DILUTED WITH 1-2 ML NS  
Repeat every 3-5 minutes**

**AMIODARONE 5 MG/KG IV/IO or LIDOCAINE 1 MG/KG IV/IO or 2-3 MG/KG ET**

**CPR FOR 2 MINUTES**

**AMIODARONE 5 MG/KG IV/IO or LIDOCAINE 1 MG/KG IV/IO or 2-3 MG/KG ET**

**DEFIBRILLATE ≥4 J/KG (MAX 10 J/KG OR ADULT DOSE)**

**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 10 BREATHS/MINUTE.  
CHECK RHYTHM EVERY TWO MINUTES.**

# CHILD ABUSE / NEGLECT

## GENERAL CONSIDERATIONS

- A. Child abuse and neglect are widespread enough that nearly all EMS professionals 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 EMS professional 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

## SIGNS AND SYMPTOMS

The incidence of child abuse and neglect has no socioeconomic, racial, cultural, or religious boundaries. Child abuse and neglect occurs in all segments of our population. Prehospital personnel are in a unique position in their ability to make the initial identification of these victims. EMS professionals should always believe what the child says, document the exact statements on the prehospital care report, and communicate them clearly to the healthcare providers upon arriving to the receiving facility.

The signs and symptoms of child abuse and neglect may include the following:

### Physical Abuse

- A. Bruises
  - i. Infants rarely bruise accidentally
  - ii. Active children normally sustain bruises on the front of the body (knees, shins, elbows, foreheads)
  - iii. Bruises in recognizable shape of an object are suspicious
  - iv. Multiple bruises in different stages of healing are suspicious
- B. Skin injuries-cuts, scrapes, bruises, burns, bites, redness, swelling



## CHILD ABUSE/NEGLECT (cont'd)

### C. Burns

- i. Scald burns are common
- ii. Immersion burns characterized by clear lines of demarcation (accidental burns are more likely to have a splash pattern due to the child's withdrawal from the heat source)
- iii. Inflicted contact burn (recognizable by a shape of the object used to produce it)
- iv. Burns in less exposed or unexposed areas, deeper or larger burns

### D. Bites

- i. Adult human bite marks
- ii. Multiple, random, or well-defined bite marks
- v. Multiple defined tooth marks (differ from animal bites)

### E. Fractures

- i. Suspected fractures discovered "accidentally" by the guardian
- ii. Skeletal injury inconsistent with history
- iii. Multiple fractures in different stages of healing
- iv. Suspected fractures accompanied by other injuries

### F. Reported or alleged falls

- i. Falls from a standing position or low object (less than child's height) rarely result in serious injuries
- ii. Falls from greater than child's height are usually required to sustain serious injury

### G. Injuries to face and head

- i. Unintentional injuries usually involve the front of body
- ii. Injuries to the side of the face, the cheeks, or the ears are suspicious for abuse
- iii. Direct blows to the mouth usually results in lip injuries, possibly with fractures to the jaw or teeth
- iv. Considerable force is required to cause severe head trauma

### H. Hair loss

- i. Can be sign of child abuse from dragging by the hair
- ii. May simply be the result of excessive force during hair brushing or from certain types of hair braiding
- iii. May be self-inflicted to relieve stress
- iv. Blood may be seen at the surface or beneath the scalp

### I. Shaken baby syndrome

- i. Most common in children less than 2 years old
- ii. There may be no external evidence of trauma
- iii. Possible signs include decreased consciousness, seizures, vomiting,
- iv. other signs of head injury, unusual cry
- v. Altered mental status may be the only sign
- vi. Recognition of the possibility of this syndrome should trigger suspicion of abuse

## Sexual Abuse

- A. Signs of recent abuse may include pain, bleeding, or discharge from urethra, vagina, or rectum
- B. Signs of chronic or concealed abuse occurring over weeks or months may include nonspecific abdominal pain, vaginal inflammation, or painful urination
- C. The physical examination is normal in most cases

## Emotional Abuse

- A. A component of all forms of child abuse
- B. Most cases are mild, but early recognition is important
- C. Signs
  - i. Encouragement of destructive or antisocial behaviors
  - ii. Verbal assault of the child or verbal attacks on the child's development of self and social competence
  - iii. Humiliation of the child
  - iv. Ignoring the child

## CHILD ABUSE/NEGLECT (cont'd)

- v. Isolation of the child
- vi. Rejection of the child's needs and requests

### Neglect

- A. Most common form of child abuse, yet it is the most under-recognized and under-reported form of child abuse
- B. Signs
  - i. Inadequate care, including inadequate provision of food, clothing, or shelter
  - ii. Inadequate medical attention, including delay in seeking care for known illness
  - iii. Poor personal hygiene
  - iv. Unsanitary conditions
  - v. Inadequate sleeping arrangements
  - vi. Lack of supervision
  - vii. Evidence of substance abuse
  - viii. Structural, fire, environmental hazards

## 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. Transport all infants < 8 weeks of age with a reported temperature > 100.4° F (38° C) or < 96° F (35.5° C)

**PEDIATRIC  
FLUID AND DRUG ADMINISTRATION**

**AEMT**

- A. Peripheral venous access, in the form of an IV or an IO, 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 assess should be established if you cannot rapidly achieve venous access in a patient in decompensated shock or cardiopulmonary arrest.
    - c. **Contraindications:** Recently fractured bone, known bone disorder, previous unsuccessful attempt of IO placement at site.
    - d. **Relative contraindications:** cellulitis or infected burn at site.
    - c. **Equipment:** Bone marrow aspiration needle, iodine and alcohol preps, 5 ml 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
    - Naloxone
    - Epinephrine
  - 2. Intramuscular (IM) route may be used for midazolam (Versed®) or morphine.
  - 3. Rectal route may be used for diazepam (Valium®).

## MULTIPLE TRAUMA

### GENERAL CONSIDERATIONS

- A. The basics of trauma care apply to pediatric patients and should primarily follow the general adult trauma protocol.
- B. Drowning is classified as trauma in Ohio. Victims of drowning or near drowning that could require admission to a hospital should be transferred to the appropriate trauma center.
- C. Areas where special focus should occur:
  - 1. May involve both respiratory failure and shock.
  - 2. Assessment and support of cardiopulmonary function is fundamental.
- D. 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.
- E. An IO infusion is indicated in the trauma setting when shock needs to be treated and rapid venous access is unobtainable.
- F. 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.

**\*\*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. Avoid inducing hyperthermia (elevated body temperature) in babies who may have had a hypoxic-ischemic event.
- C. 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.
- D. Suction secretions with a bulb syringe from the mouth and then nose for newborns who have obvious obstruction to spontaneous breathing or who require positive pressure ventilation.
- 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*. The patient's airway should be supported and oxygen administered using positive pressure ventilation if necessary. Endotracheal suctioning and/or endotracheal intubation should be reserved for infants with thick meconium that is obstructing the airway. If thick meconium is present that is obstructing the airway, 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. Prolonged and/or unsuccessful attempts at intubation may result in bradycardia. Ventilation with BVM should be considered, particularly if there is persistent bradycardia.
- 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. Continuous positive airway pressure (CPAP) should be considered for persistent labored breathing, cyanosis, or low pulse oximetry.
- 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.

EMR

- A. The EMR may assist in the management of emergency childbirth.
- 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 oropharynx and nasopharynx with a bulb syringe prior to ventilation and stimulation. Keep infant warm. Wrap in dry blankets.
- C. If infant not breathing, assist ventilations via mouth to mouth using barrier device or a bag valve mask.
- D. If no pulse or pulse < 60 bpm, begin quality CPR.
- E. Keep infant warm. Wrap in dry blankets.

EMT

- 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, quality CPR 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 with a 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.

AEMT

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. For meconium or meconium staining, suction the naso-oropharynx, support the airway, and administer oxygen using positive pressure ventilation if necessary. Reserve endotracheal suctioning and/or intubation for thick meconium that is obstructing the airway. For these patients, suction through ET tube using a meconium aspirator and re-intubate with new tube if the obstruction persists.
- 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/IO over 5 minutes
- E. Naloxone 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 opiates. Heart rate and oxygenation should be resorted by supporting ventilation.
- G. Check blood sugar level and administer 1 ml/kg of 12.5% dextrose the blood sugar is < 40.
- H. Transport to hospital.



## NEWBORN RESUSCITATION (cont'd)

PARAMEDIC
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- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. For meconium or meconium staining, suction the naso-oropharynx, support the airway, and administer oxygen using positive pressure ventilation if necessary. Reserve endotracheal suctioning and/or intubation for thick meconium that is obstructing the airway. For these patients, suction through ET tube using a meconium aspirator and re-intubate with new tube if the obstruction persists.
- C. Apply monitor and check rhythm.
- D. Establish IV or IO.
- E. If asystole or spontaneous heart rate is < 60 bpm 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 (0.1 mg/kg) of 1:1,000 ET.
  - 2. If no response, repeat epinephrine administration every 3-5 minutes.
- F. If infant shows signs of hypovolemia, administer normal saline 10 ml/kg IV/IO 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 opiates. Heart rate and oxygenation should be resorted by supporting ventilation.
- H. Check blood sugar level and administer 1 ml/kg of 12.5% dextrose if level is < 40.
- I. Transport to hospital.

# NEWBORN RESUSCITATION

EMR

EMT

AEMT

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 O<sub>2</sub>

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

NO

BVM OR T-PIECE 100% O<sub>2</sub> AT 40-60 BREATHS/MIN  
 SUCTION FOR OBVIOUS OBSTRUCTION OR MECONIUM

HEART RATE > 60 BPM?

YES

CONTINUE UNTIL HR > 100 BPM

NO

CONTINUE BVM OR T-PIECE  
 START QUALITY CPR FOR HR < 60 BPM

HEART RATE > 60 BPM ?

YES

CONTINUE AIRWAY MANAGEMENT  
 UNTIL SPONTANEOUSLY BREATHING  
 AND HR > 100 BPM

NO

MANAGE AIRWAY (CONSIDER CPAP FOR PERSISTENT  
 LABORED BREATHING OR CYANOSIS) AND ESTABLISH IV/IO

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

CONSIDER: 1. HYPOVOLEMIA – 10 ML/KG NS IVIO BOLUS  
 2. HYPOGLYCEMIA – BLOOD SUGAR < 40 MG/DL  
 1 ML/KG OF 12.5% DEXTROSE IN WATER

## 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.

#### EMR

- 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 year of age.
    - c. Abdominal and/or chest thrusts in children over 1 year of age.
    - d. If airway cannot be cleared in 60 seconds:
      - i) Activate the emergency response system for immediate transport immediately to the 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 child in a secure position. Keep child and parent (or caregiver) CALM. Do not agitate child.

### EMT

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

### AEMT

- A. Assume charge of situation and confer with EMS professionals 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 EMS professionals 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.

### EMR

- 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. If the patient has been prescribed an epinephrine auto-injector for these situations and requests assistance, assist with the administration of the epinephrine auto-injector or verbally contact on-line medical direction for orders to administer EMS-provided epinephrine.
    - c. Activate the emergency response system immediately.

### EMT

- 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.

### AEMT

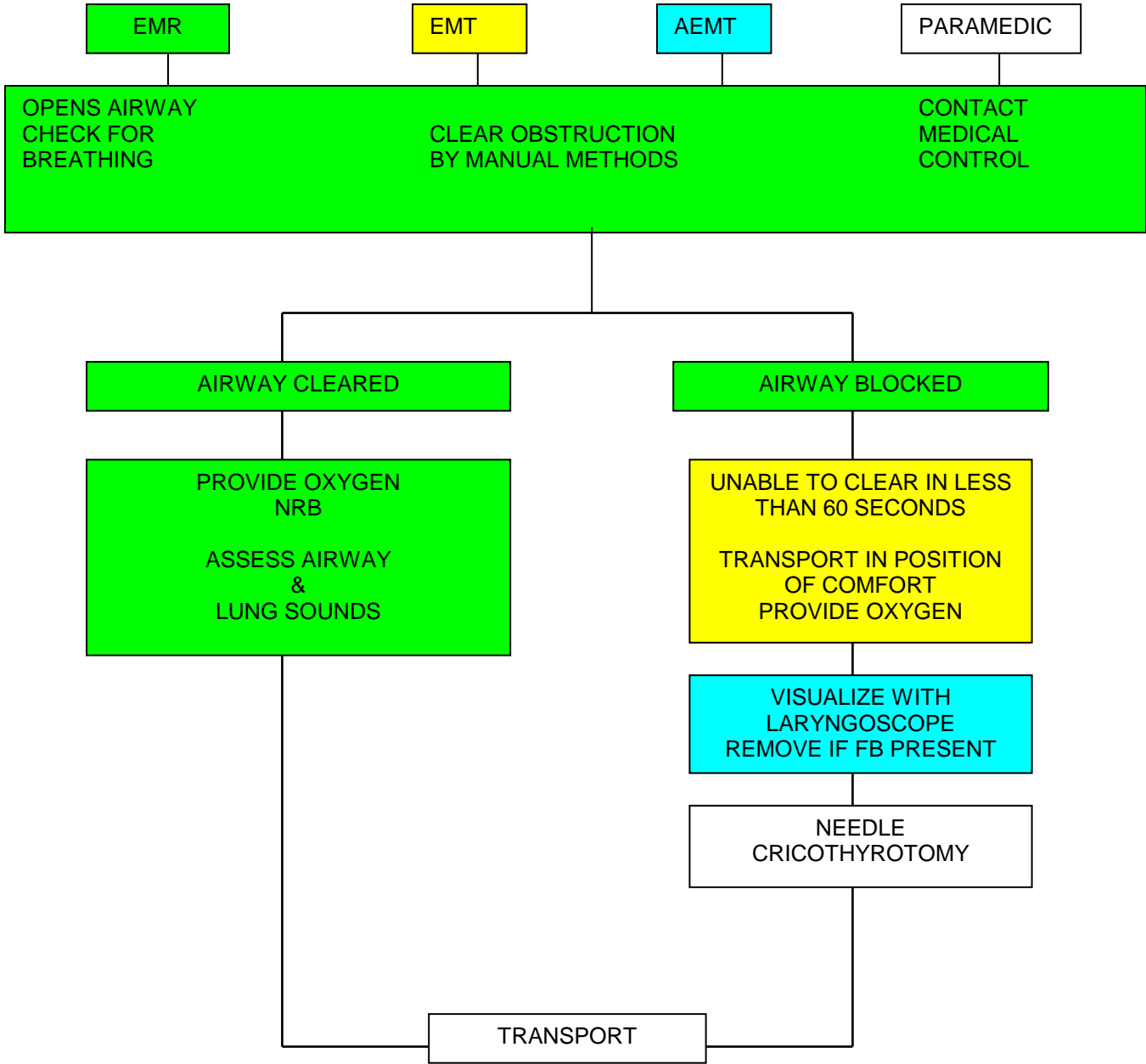
- A. Assume charge of situation.
- B. Reassess breath sounds.
- C. DO NOT establish IV access unless child is in arrest. Do not agitate child.
  1. If allergic reaction is suspected.
    - a. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml))
  2. For other causes 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)

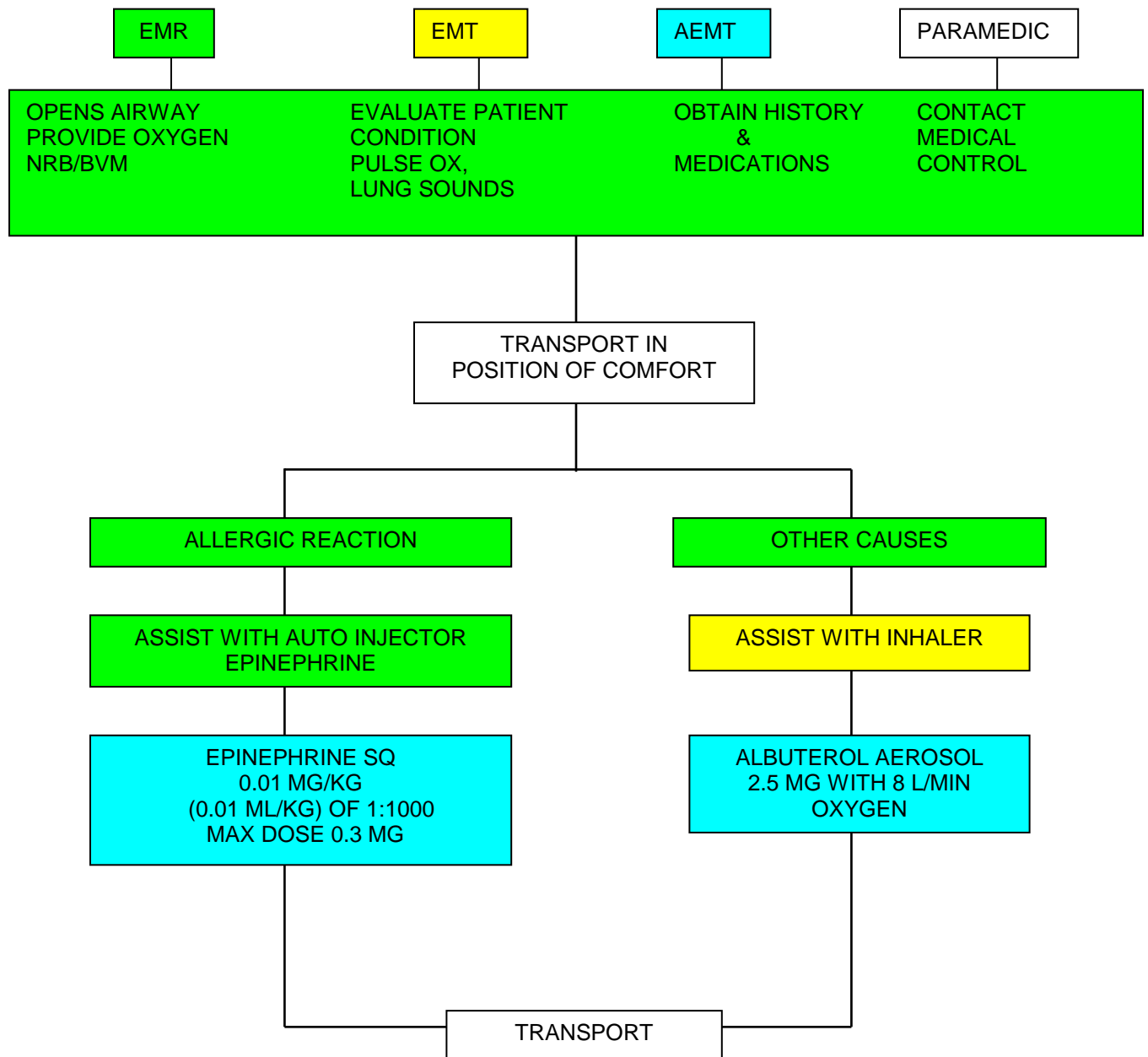
PARAMEDIC
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- A. Assume charge of situation and confer with EMS professionals about condition of patient and situations.
- B. Reassess breath sounds and treat as follows
  - 1. If allergic reaction is suspected:
    - a. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose 0.3 mg (0.3 ml)) as the primary treatment of symptoms of anaphylaxis or as the secondary treatment following Benadryl® administration for worsening symptoms of an allergic reaction
    - b. Administer Benadryl® (diphenhydramine) 1 mg/kg IM or IV (maximum dose 50 mg)  
NOTE: This is especially indicated when drug reactions are suspected.
  - 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 professionals 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.

### EMR

- A. Place patient away from objects on which they might injure themselves; protect but do not restrain them.
- B. Clear and maintain airway; consider cervical 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

- 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.

### AEMT

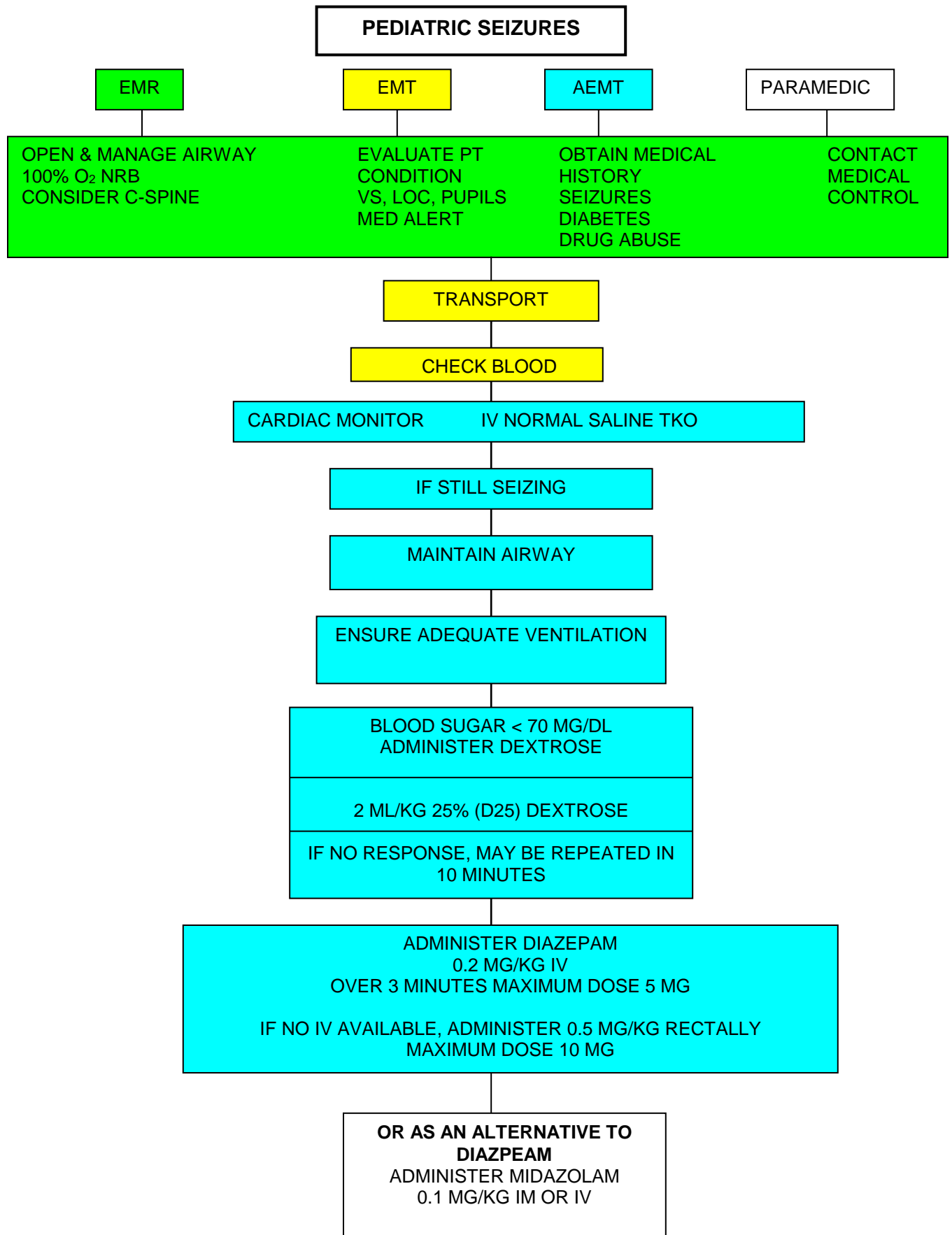
- A. Assist EMS professionals, obtain patient condition and circumstances.
- B. Apply cardiac monitor and check rhythm.
- C. If seizure activity persists:
  - 1. Establish airway
  - 2. Start IV

## PEDIATRIC SEIZURE (cont'd)

- D. Check blood sugar level.
  - 1. If the blood sugar less than 70 mg/dl, administer IV bolus:
    - a. 2 ml/kg of 25% dextrose for children
    - b. May be repeated in 10 minutes if blood sugar remains below 70 mg/d
  - 3. Administer diazepam (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 diazepam (Valium®) rectally, 0.5 mg/kg, to a maximum dose of 10 mg.

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

- A. Assume charge of the situation and confer with EMS professionals 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:
    - a. 2 ml/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®) 0.1 mg/kg IM **OR**, administer diazepam (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 diazepam (Valium®) rectally, 0.5 mg/kg, to a maximum dose of 10 mg.



## PEDIATRIC SHOCK

### GENERAL CONSIDERATIONS

- A. Shock is not only caused by blood loss. The EMS professional 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.

### EMR

- 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.
- E. For anaphylactic shock, the EMR may administer the contents of epinephrine 1:1,000 auto-injectors. If epinephrine auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 kg or less and 0.3 mg IM to patients who weigh greater than 15 kg.

### EMT

- 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.

### AEMT

- A. Assist EMS professionals, 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 20 ml/kg of NS if signs of hypoperfusion or dehydration are present

## PEDIATRIC SHOCK (cont'd)

3. Transport. Repeat bolus during transport if patient does not respond to first bolus.
  4. Check blood sugar; if less than 70 mg/dl, administer IV bolus:
    - a. 2 ml/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. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 kg or less and 0.3 mg IM to patients who weigh greater than 15 kg.
    - b. Administer Benadryl® (diphenhydramine) to be administered 1 mg/kg IM or IV (maximum dose 50 mg). 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, 2.5 mg (3 ml), by child aerosol mask over 10-15 minutes.
  2. Hives, itching, and/or swelling with normal blood pressure:
    - a. If the patient is having oropharyngeal swelling or breathing difficulty, administer epinephrine 1:1,000 0.01 ml/kg (0.01 mg/kg) SQ (maximum dose 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 kg or less and 0.3 mg IM to patients who weigh greater than 15 kg.
    - b. Administer Benadryl® (diphenhydramine) to be administered 1 mg/kg IM or IV (maximum dose 50 mg). NOTE: This is especially indicated when drug reactions are suspected.
  3. If breathing difficulty with low blood pressure establish IV saline during transport.
    - a. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 mg or less and 0.3 mg to patients who weigh greater than 15 kg.
  4. Hives, itching, and/or swelling:
    - a. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 mg or less and 0.3 mg to patients who weigh greater than 15 kg.
- F. Apply monitor and check rhythm.

PARAMEDIC
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- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. Apply monitor and follow protocol for arrhythmias.

## PEDIATRIC SHOCK (cont'd)

### C. Identify type of shock and treat as follows:

#### 1. Hypovolemic, neurogenic, septic:

- a. Start IV or IO and administer NS fluid bolus of 20 ml/kg if sign of hypoperfusion or dehydration are present (low BP, tachycardia, poor capillary refill, poor skin turgor)
- b. Repeat bolus during transport
- c. Check blood sugar; if less than 70 mg/dl , administer IV bolus:
  - i. 2 ml/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. Administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 kg or less and 0.3 mg IM to patients who weigh greater than 15 kg.
  - ii. Administer Benadryl® (diphenhydramine) to be administered 1 mg/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, 2.5 mg (3 ml), by child aerosol mask over 10-15 minutes.
- b. Hives, itching, and/or swelling with normal blood pressure:
  - i. If the patient is having oropharyngeal swelling or breathing difficulty, administer epinephrine 1:1,000 0.01 mg/kg (0.01 ml/kg) SQ (maximum dose of 0.3 mg (0.3 ml)). If epinephrine 1:1,000 auto-injectors are available, administer 0.15 mg IM to patients who weigh 15 kg or less and 0.3 mg IM to patients who weigh greater than 15 kg.
  - ii. Administer Benadryl® (diphenhydramine) to be administered 1 mg/kg IM or IV (maximum dose 50 mg). NOTE: This is especially indicated when drug reactions are suspected.

# PEDIATRIC SHOCK

EMR

EMT

AEMT

PARAMEDIC

OPEN & MANAGE AIRWAY 100% O <sub>2</sub> NRB/BVM	DETERMINE TYPE & CAUSE OF SHOCK	CONSIDER C-SPINE CONTROL	OBTAIN MEDICAL HISTORY & VITAL SIGNS	CONTACT MEDICAL CONTROL
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TRANSPORT WITHOUT DELAY, UNLESS ENTRAPMENT, THEN ADVISE MED CONTROL

IV NS 20 ML/KG BOLUS; REPEAT X 2 AS NEEDED UNLESS PATIENT IS WORSE AFTER 1<sup>ST</sup> BOLUS.

ANAPHYLACTIC

HYPOVOLEMIC, SEPTIC  
NEUROGENIC

RESPIRATORY DISTRESS

HIVES, ITCHING SWELLING  
NORMAL B/P

IV FLUID BOLUS 20 ML/KG

EPINEPHRINE 1:1,000  
0.01 MG/KG SQ *or*  
0.15 MG or 0.3 MG  
AUTO-INJECTOR

EPINEPHRINE 1:1,000  
0.01 MG/KG SQ  
*or*  
0.15 MG or 0.3 MG  
AUTO-INJECTOR

TRANSPORT

NO RESPONSE  
REPEAT FLUID BOLUS

BENADRYL®  
1 MG/KG IM/IV

BENADRYL®  
1 MG/KG IM/IV

BLOOD SUGAR < 70 MG/DL  
ADMINISTER DEXTROSE  
2 ML/KG 25% DEXTROSE (D25)  
IF NO RESPONSE, MAY BE  
REPEATED IN 10 MINUTES

WHEEZES PRESENT

ALBUTEROL  
AEROSOL

2.5 MG (3 ML) O<sub>2</sub>  
FLOW VIA MASK  
@ 8 LPM

TRANSPORT

## **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 ABCs 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 due to the high risk of airway compromise and resultant hypoxia.
- 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.

### EMR

- 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

- A. If still no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed. Suction the child through the previously established endotracheal airway device or stoma as accumulation of debris is a common cause of obstruction.

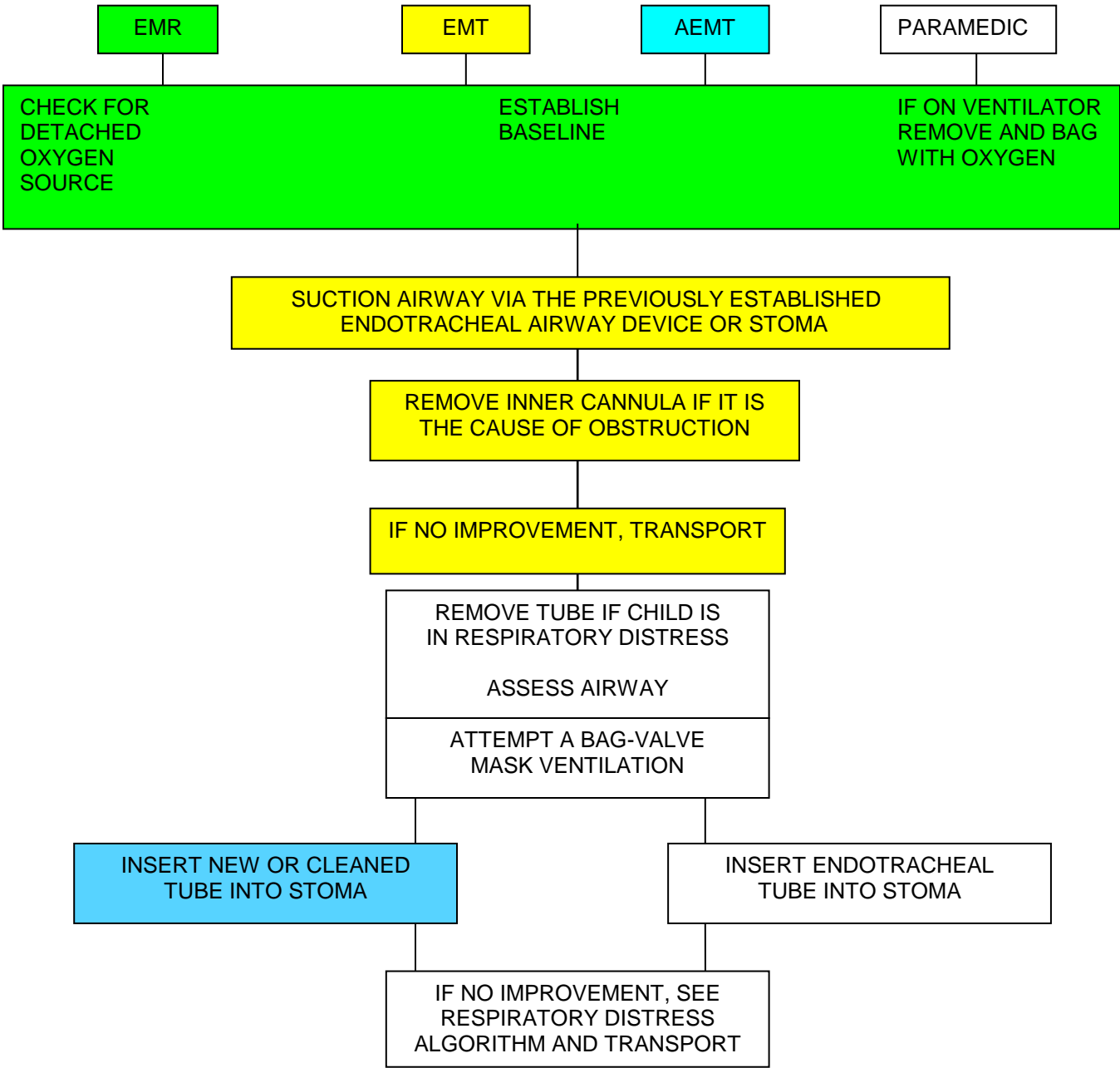
### AEMT

- A. If suctioning does not relieve the obstruction and the tracheostomy tube has a cannula, remove it. If it is the cause of obstruction, there should be immediate improvement. A tracheostomy tube that has been previously removed may be replaced after ensuring that the lumen has been cleaned and all obstructive debris has been cleared from the lumen.

### PARAMEDIC

- A. If there is no improvement after suctioning and/or removal of the inner cannula and the child is in severe respiratory distress, an occluded tracheostomy tube should be removed and ventilation via bag valve mask and should be attempted. The removal of endotracheal devices following recent surgical placement should be avoided due to increased potential of airway collapse and resultant respiratory compromise. If an endotracheal or tracheostomy tube is available, insert it into the stoma and resume ventilation (a previously used tracheostomy tube following cleansing and removal of any obstructive debris from the lumen can be inserted.)
- B. 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, complete or partial laceration of the line, or possible infection in the central line which may lead to sepsis.

### EMR

- 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.

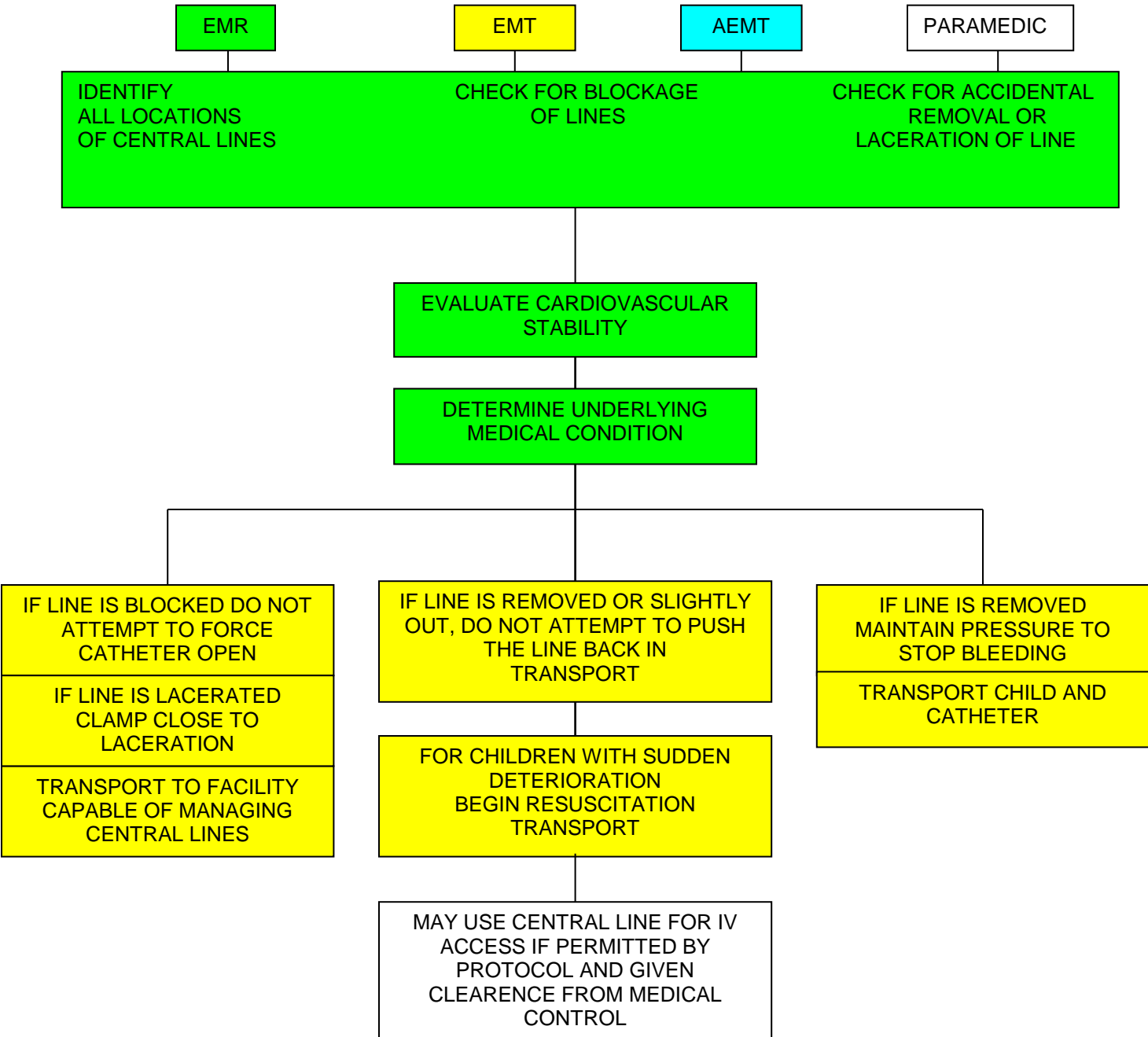
### EMT

### AEMT

### 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.

### EMR

- 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

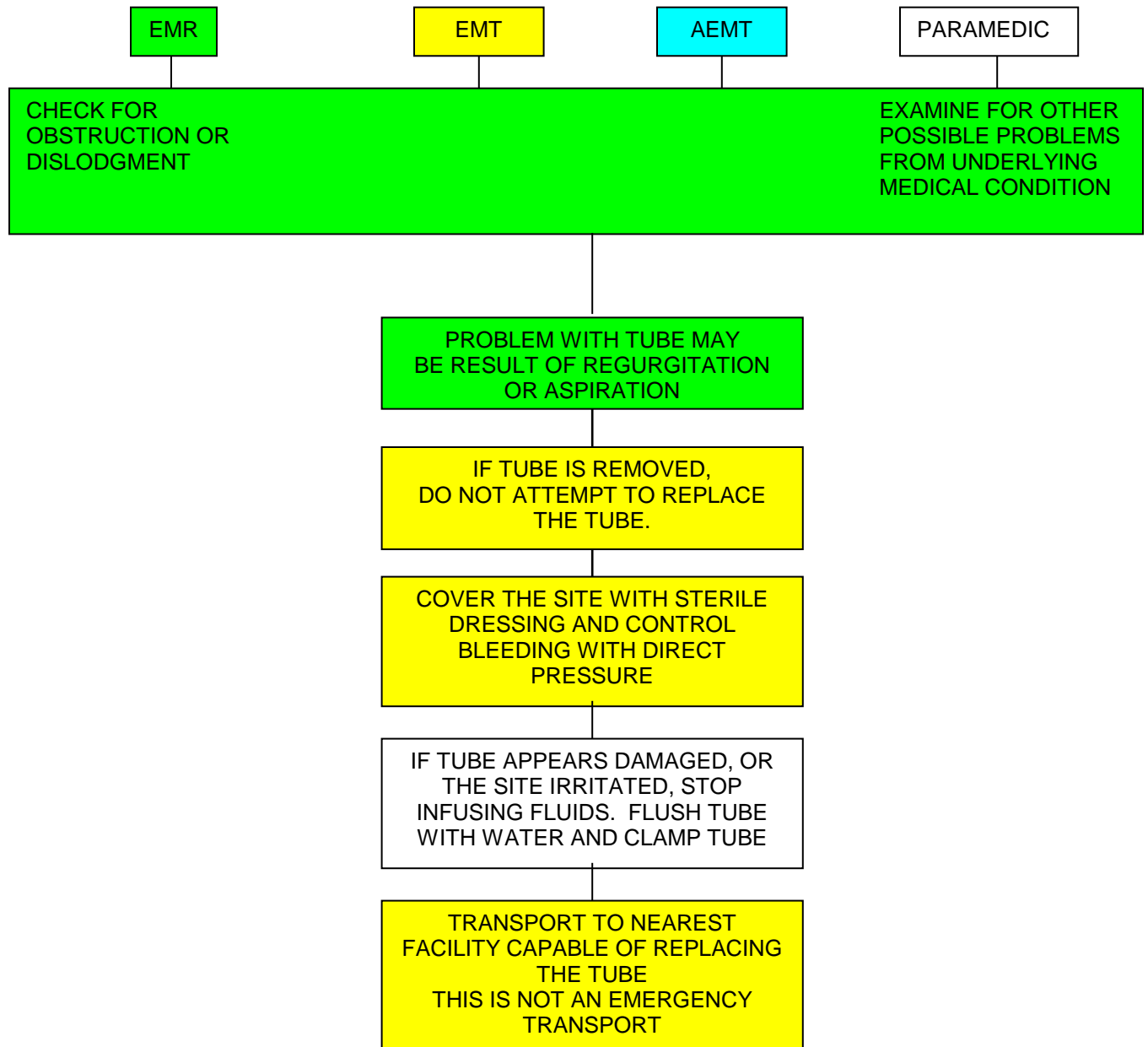
### AEMT

- A. Transport the child and the tube to the nearest facility capable of replacing the tube; this is not an emergency transport.
- C. Do not attempt to replace the tube; it is not as easy as it seems and there may be other complications.
- D. 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, or 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.

### EMR

- A. 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

- A. If there is no improvement immediately transport to the nearest medical facility; initiate appropriate resuscitation as needed. Suction the child through a previously established endotracheal device as accumulation of debris is a common cause of obstruction.

### AEMT

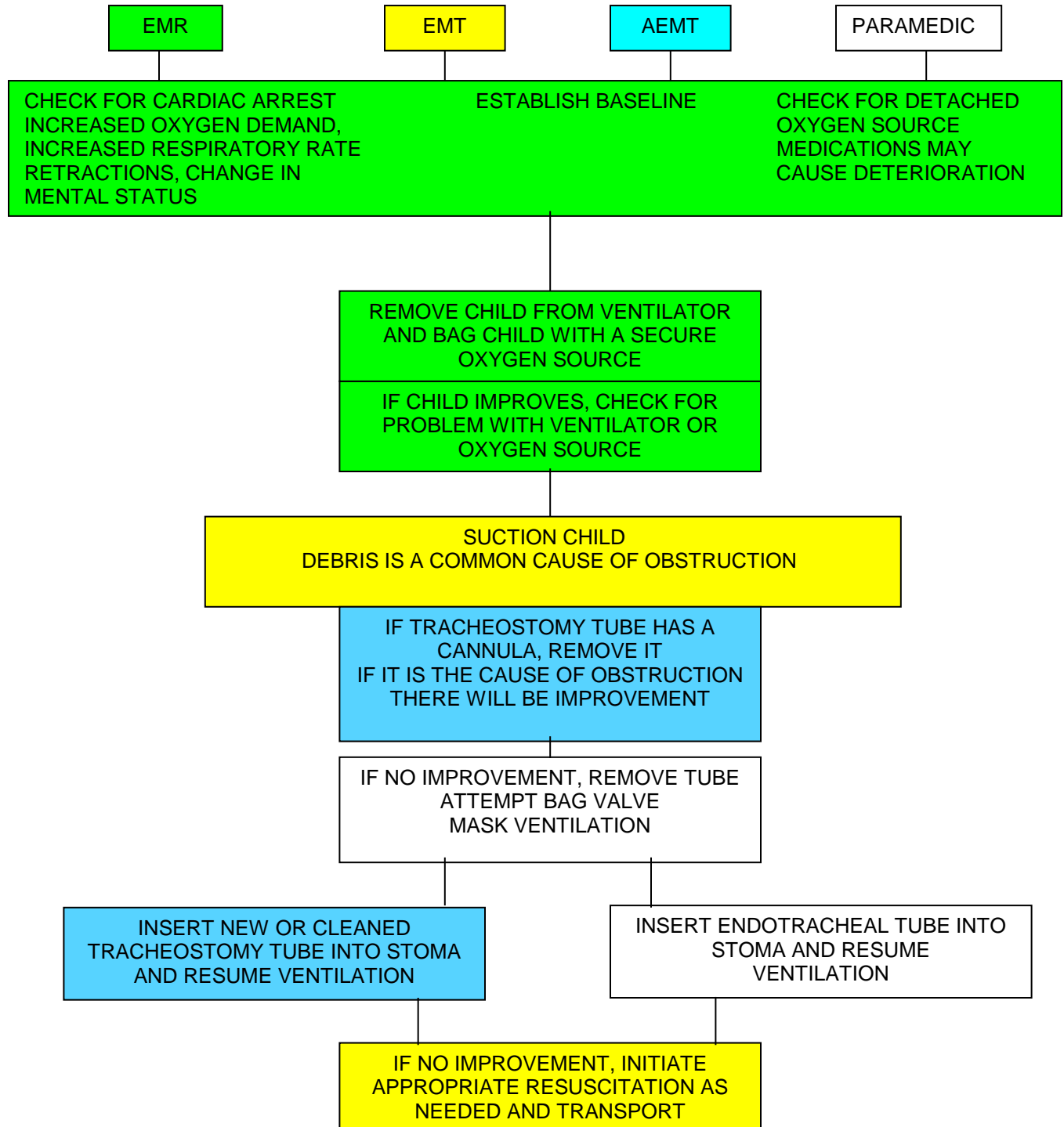
- A. If suctioning does not relieve the obstruction and the patient has a tracheostomy tube, remove the inner cannula. If it is the cause of obstruction, there should be immediate improvement. A tracheostomy tube that has been previously removed may be replaced after ensuring that the lumen has been cleaned and all obstructive debris has been cleared from the lumen.

### PARAMEDIC

- A. If there is no improvement after suctioning and/or removal of the inner cannula and the child is in severe respiratory distress, an occluded endotracheal or tracheostomy tube should be removed and ventilation via bag valve mask and should be attempted. The removal of endotracheal devices following recent surgical placement should be avoided due to increased potential of airway collapse and resultant respiratory compromise. If another endotracheal or tracheostomy tube is available, insert into the stoma and resume ventilation (a previously used tracheostomy tube following cleansing and removal of any obstructive debris from the lumen can be inserted.)
- B. If there is still no improvement see the respiratory distress protocol.



# EMERGENCIES IN CHILDREN ON VENTILATORS



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

Age	Pulse	Respiratory Rate	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 year	100-140	30-60	70-80
1-3 years	100-140	20-40	76-90
4-6 years	80-120	20-30	80-100
7-9 years	80-120	16-24	84-110
10-12 years	60-100	16-20	90-120
13-14 years	60-90	16-20	90-120
15 years and older	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 is 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	5 mg/kg	IV, IO	Over 20-60 minutes, maximum 15 mg/kg per day. For shock-refractory VF or pulseless VT: 5 mg/kg rapid IV/IO. Max. dose 300 mg
• 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 mg/kg	IV	Indicated for uncontrolled seizure 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. Max. dose 1 mg Increase second dose 10 X (may use 1:1,000 solution).
• Epinephrine (1:1,000)	0.1 ml/kg (0.1 mg/kg)	ET only	Commonly used in cardiac arrest rhythms. Use for all ET doses. May repeat every 3-5 minutes. Max. dose 2.5 mg *The ET route has limited absorption; use epinephrine 1:10,000 via IV/IO route whenever possible
	0.01ml/kg	IM or SQ	Used for anaphylaxis. Max dose is 0.3 mg (0.3 ml)
• Lidocaine	1 mg/kg	IV, IO, ET	Administered when amiodarone is not available. For shock-refractory VF or pulseless VT: 1 mg/kg IV/IO bolus followed by an infusion at 0.2-0.5 mg/kg/minute or 2-3 mg/kg ET
• 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, IN	Useful for unknown unconscious, known narcotic overdoses. Max. dose 2 mg. Max volume of 1 mL per nostril for IN route.
Naloxone (EVZIO®)	0.4 mg	Auto-injector	The manufacturer recommends pinching the thigh prior to administration of naloxone via auto-injector at this injection site.
• Procainamide	15 mg/kg	IV	Over 30-60 minutes. Alternative treatment for recurrent or refractory VT, SVT.

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ET = endotracheal IM = intramuscular injection IO = intraosseous IV = Intravenous SQ = subcutaneous injection