

STATE OF OHIO

EMERGENCY, MEDICAL, FIRE, AND TRANSPORTATION SERVICES BOARD

PEDIATRIC EMERGENCY MEDICAL SERVICES GUIDELINES AND PROCEDURES MANUAL

INTRODUCTION

Ohio emergency medical services (EMS) providers strive every day to deliver the highest standard of emergency medical services to the people of Ohio. On behalf of the State Board of Emergency Medical, Fire, and Transportation Services (EMFTS Board), the Ohio Emergency Medical Services for Children Program was charged with drafting proposed guidelines that EMS agencies could use in setting that standard.

Within the Ohio EMS scope of practice that has been approved by the EMFTS Board, there are two categories of authorized services, “core competencies” and “added competencies.” Core competencies are services that are required to be taught and are included in the statewide approved initial training curricula of Ohio EMS education institutions for emergency medical responders (EMRs), emergency medical technicians (EMTs), advanced emergency medical technicians (AEMTs), and Paramedics. Added competencies are elective services that are not required to be taught and are not included in the statewide approved initial training curricula for EMRs, EMTs, AEMTs, and Paramedics. For services classified as added competencies, the medical director is responsible for providing the education for each specific service he or she elects to authorize. Analogous to core competencies, the medical director must also provide training, a written protocol, continuing education, and a quality assurance program for each added competency. The State of Ohio Pediatric EMS Guidelines and Procedures Manual solely addresses authorized services that are core competencies. Added competencies are not included in this document.

The original State of Ohio Pediatric EMS Guidelines and Procedures Manual was created in 2013. In 2016, the EMFTS Board approved utilization of the National Association of State EMS Officials (NASEMSO) National Model EMS Clinical Guidelines, the first evidence-based, consensus-based, and patient-centric EMS guideline document ever created, as a foundation for all of the State of Ohio EMS guideline documents. The EMFTS Board approved the first edition of the State of Ohio Pediatric EMS Guidelines and Procedures Manual that incorporated elements of the NASEMSO National Model EMS Clinical Guidelines on February 11, 2021, and this action will continue to support the EMFTS Board’s goal to adopt evidence-based measures that demonstrate improved patient care and outcomes.

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. The guidelines will be periodically reviewed by the Emergency Medical Services for Children Committee in order to maintain the most current information available.

Reviewed by: Emergency Medical Services for Children Committee

Approved by: State Board of Emergency Medical, Fire, and Transportation Services
February 11, 2021

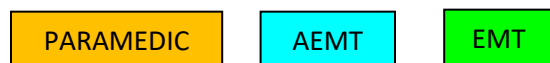
Updated June 16, 2021, October 18, 2023, December 11, 2024, June 17, 2026

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:



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ANAPHYLAXIS/ALLERGIC REACTIONS

GENERAL CONSIDERATIONS

- A. Allergic reactions and anaphylaxis are serious and potentially life-threatening medical emergencies. It is the body's adverse reaction to a foreign protein (e.g. food, medicine, pollen, insect sting or any ingested, inhaled, or injected substance). A localized allergic reaction (e.g. urticaria or angioedema that does not compromise the airway) may be treated with antihistamine therapy. When anaphylaxis is suspected, EMS personnel should always consider epinephrine as first-line treatment. Cardiovascular collapse may occur abruptly, without the prior development of skin or respiratory symptoms. Constant monitoring of the patient's airway and breathing is essential.
- B. Contrary to common belief is that all cases of anaphylaxis present with cutaneous manifestations, such as urticaria or mucocutaneous swelling. A significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, most fatal reactions to food-induced anaphylaxis in children are not associated with cutaneous manifestations.

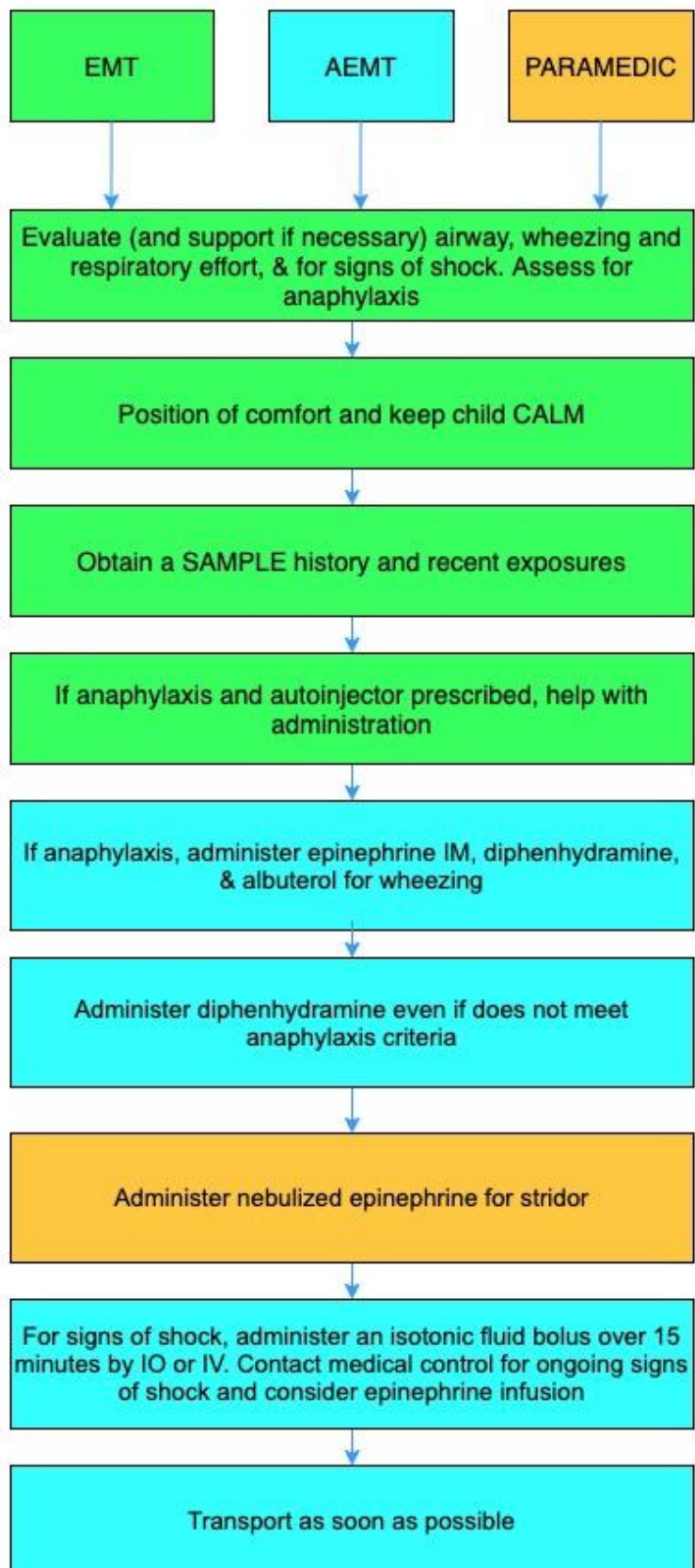
EMT

- A. Evaluate:
 - 1. For patent airway and presence of oropharyngeal edema
 - 2. Auscultate for wheezing and assess level of respiratory effort
 - 3. Assess for adequacy of perfusion
 - 4. Assess for presence of signs of anaphylaxis -- more severe allergic reaction characterized by two or more of the following occurring rapidly after an exposure:
 - a. Skin and/or mucosal involvement (urticaria, itchy, swollen tongue/lips)
 - b. Respiratory compromise (dyspnea, wheeze, stridor, hypoxemia)
 - c. Persistent gastrointestinal symptoms (vomiting, abdominal pain, diarrhea)
 - d. Hypotension or associated symptoms (syncope, hypotonia, incontinence)
- B. Place child in position of comfort, encourage parent to help keep child calm.
- C. Quickly obtain history including any recent intake of any known allergens, recent medication intake, and/or insect bites or stings.
- D. Assess vital signs, airway, breathing, and perfusion.
- E. If respiratory effort is insufficient or patient is becoming unconscious, assist ventilations with a bag valve mask (BVM)
- F. Determine if the allergic reaction meets criteria for anaphylaxis.
 - 1. If meets criteria for anaphylaxis:
 - a. Ensure patent airway and support with non-rebreather mask oxygen unless they require BVM ventilation instead.
 - b. Ask patient or bystanders if an epinephrine injector has been prescribed for these situations. If they have the medication with them, assist with the administration of medication per protocol, then transport patient.
 - c. If epinephrine is not available, transport immediately unless ALS unit is en route and has an ETA of less than 5 minutes.

AEMT/ PARAMEDIC

- A. Assume charge of situation.
- B. Reassess airway, breath sounds, and perfusion.
- C. Obtain vital signs.
- D. If patient meets criteria for anaphylactic allergic reaction:
 - 1. Epinephrine 1 mg/mL (1:1,000)
 - a. 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 in anterolateral thigh.
 - b. If auto-injectors are not available, administer epinephrine 1 mg/mL 0.01 mg/kg (0.01 mL/kg) IM (maximum dose 0.3 mg [0.3 mL] in anterolateral thigh).
 - 2. Diphenhydramine 1 mg/kg IM or IV (maximum dose 50 mg) after epinephrine administration.
 - 3. Albuterol 2.5 mg, nebulized if respiratory distress with wheezing is present.
 - 4. Epinephrine 1 mg/mL, 0.5 mL mixed in 2.5 mL of normal saline, nebulized if respiratory distress with stridor is present.
- E. Even if the patient does not meet anaphylaxis criteria, administer diphenhydramine 1 mg/kg IM, IV, PO (maximum dose 50 mg) if it has not been administered already.
- F. Do not attempt placement of an advanced airway unless the child has a respiratory arrest.
- G. If signs of anaphylaxis and hypoperfusion persist following the first dose of epinephrine, additional IM epinephrine can be repeated every 5 minutes.
- H. For signs of shock, administer 20 mL/kg isotonic fluid (normal saline or lactated Ringer's) over 15 minutes via IV or IO, and repeat as needed for ongoing hypoperfusion. Contact medical direction for patients with ongoing hypoperfusion despite IM epinephrine and a 20 mL/kg bolus of isotonic fluids. Consider epinephrine infusion IV if continued hypotension (epinephrine IV continuous dose 0.1 to 1 mcg/kg/min, titrate to effect).
- I. Transport as soon as possible, and perform ongoing assessment. Cardiac monitoring is not required, but should be considered for those with known heart problems or those who received multiple doses of epinephrine.

ANAPHYLAXIS/ALLERGIC REACTIONS



ALTERED LEVEL OF CONSCIOUSNESS

EMT

- A. Assess ABCs. Manually stabilize cervical spine as per the Trauma Protocol if cause of unconsciousness is unknown.
- B. If not breathing, assist ventilation with BVM while administering 100% oxygen.
- C. If breathing effectively, administer 100% oxygen by non-rebreather (NRB) mask.
- D. Evaluate patient's general appearance, relevant history of condition and determine:

Symptoms

Allergies

Medication

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

Last Meal

Events leading to present illness

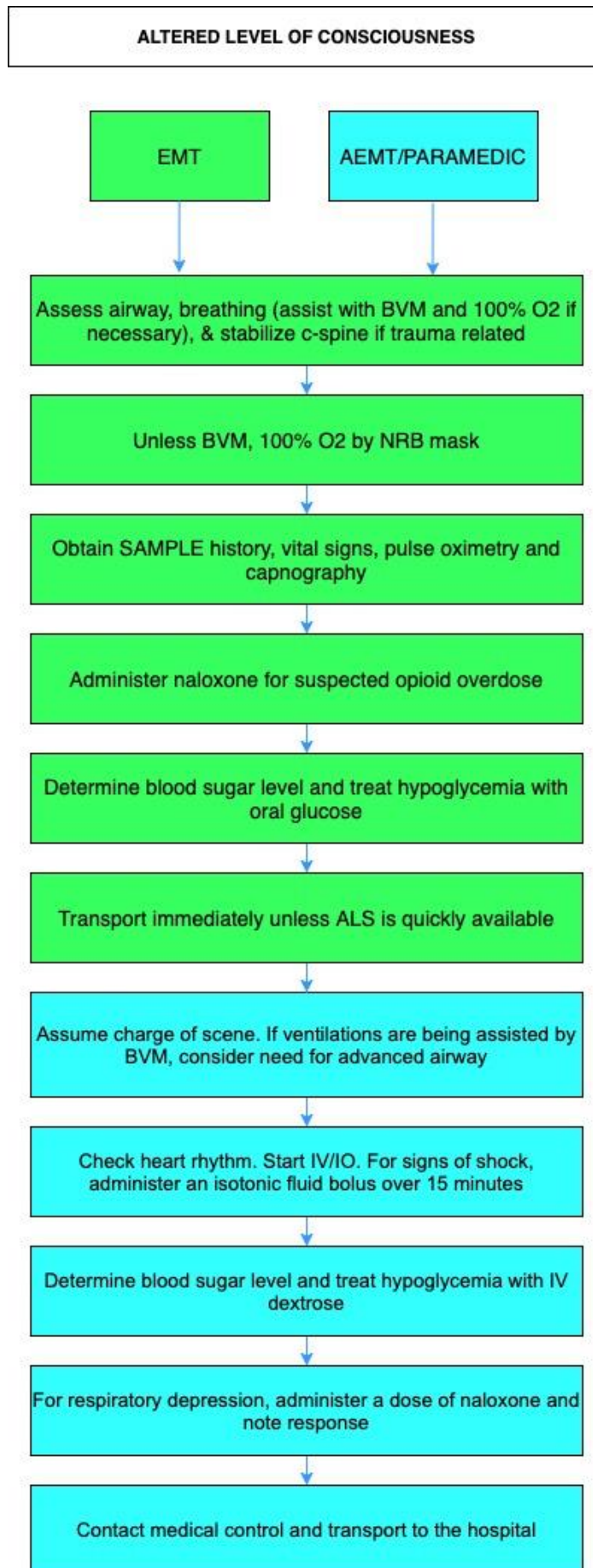
- E. Obtain and document a pulse oximetry and capnography measurement.
- F. If an opioid overdose is suspected and respirations are impaired, administer naloxone (Narcan®) 0.1 mg/kg (maximum 4 mg) IN (maximum volume of 1 mL per nostril) or naloxone 2 mg per auto-injector IM (EVZIO®). Pulseless patients 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.
- G. Determine blood sugar level by available means.
 - 1. If blood sugar is less than 60 mg/dL, administer oral glucose if patient is alert. May be repeated in 10 minutes if blood sugar remains below 60 mg/dL.
 - 2. If blood sugar is greater than 400 mg/dL, initiate transport.
 - 3. If unable to check blood sugar or blood sugar is between 60 mg/dL and 400 mg/dL, establish communications with medical direction and advise of patient condition.
- H. 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 2 mg per auto-injector IM (EVZIO®). Refer to a pediatric body weight estimating device (e.g., Broselow® pediatric emergency tape) 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.
- I. Transport **immediately** unless an advanced life support unit is en route and has an ETA of less than 5 minutes to the scene.

AEMT/ 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 BVM while administering 100% oxygen. May consider intubation.

ALTERED LEVEL OF CONSCIOUSNESS (Continued)

- C. Check heart rhythm.
- D. Start IV/IO. 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:
 - 1. Blood sugar less than 60 mg/dL, administer an IV bolus:
 - a. 5 mL/kg of 10% dextrose (D10W), maximum 250 mL
 - b. May be repeated in 10 minutes if blood sugar remains below 60 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, maximum 1 L
 - 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, ETT, IM, or IN (maximum volume of 1 mL per nostril) or naloxone 2 mg per auto-injector IM (EVZIO®). Refer a pediatric body weight estimating device (e.g., Broselow® pediatric emergency tape) when unsure about patient weight, age, and/or drug dosage. If patient improves somewhat with naloxone but is not fully awake, contact medical direction 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 direction, and transport to the hospital.
- H. In some cases, patient may require restraint, and should not be transported until appropriately restrained.



CHILD ABUSE AND NEGLECT

GENERAL CONSIDERATIONS

- A. Child abuse and neglect happen in all socioeconomic, racial, cultural, or religious boundaries. Out-of-hospital 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 patient care report**, and communicate them clearly to the healthcare providers upon arriving at the receiving facility.
- B. Recognize any act or series of acts of commission or omission by a caregiver or person in a position of power over the patient that results in harm, potential harm, or threat of harm to a patient.
- C. Initiate treatment as necessary for the situation using established protocols.
- D. If possible, remove the child from the scene, transporting to the hospital **even** if no medical reason for transport is identified.
- E. If parents refuse permission to transport, **notify law enforcement** for appropriate disposition. Let law enforcement handle the scene if the patient is in immediate danger.
- F. Advise the caregiver to go to the hospital. **Avoid accusations**, as this may delay transport. The adult with the child may not be the abuser. Caregivers that are apathetic, overreact or give inconsistent stories for a pattern of injury observed should be identified to law enforcement.
- G. Carefully document findings and report to physicians at the hospital. An EMS professional must also report or ensure that actual or suspected child abuse/neglect is reported to the local law enforcement agency or the Children's Protective Services Board.
- H. Bruises in infants younger than 9 months and those not yet ambulating should alert you to consider illness or abuse. This is particularly true of bruises on the back, chest, forearm, or face.

EMT/AEMT/ PARAMEDIC

- A. Evaluate
 - 1. Start with a primary survey and identify and treat any potentially life-threatening issues
 - 2. Document a thorough secondary survey to identify clues of potential abuse/maltreatment:
 - a. Inability to communicate due to developmental age, language and/or cultural barrier
 - b. Injuries with no history, a history that changes, or a history that does not make sense
 - c. Bruising in a non-mobile infant or bruising in a toddler to the ears, torso, or neck
 - d. Patterned burns, bruises, or scars suggestive of specific weaponry or objects used
 - e. Oral injuries or subconjunctival hemorrhages in non-mobile infants
 - f. Fussiness, seizures, or lethargy in infants, particularly under 6 months of age
 - g. Age-inappropriate behavior (e.g. notable submissiveness or fear, children who act in a sexually inappropriate way)
 - h. Evidence of medical neglect for injuries, infections, or chronic medical conditions
 - i. Evidence of malnourishment and/or serious dental problems
 - j. Injury in a child occurring due to a domestic dispute between adults
 - k. Adolescents under 13 years old endorsing any sexual activity, or adolescents under 16 years old having sexual contact with adults
 - l. Unexplained anogenital injuries or complaints (e.g., discharge, bleeding)
 - 3. Assess physical issues and avoid extensive investigation of the specifics of abuse or maltreatment, but document any statements made spontaneously by patient
 - a. Avoid asking directed questions of a child beyond what is necessary for immediate medical treatment
- B. Remove the patient to a safe place even if there is no medical indication for transport.

CHILD ABUSE AND NEGLECT (Continued)

- C. If a caregiver impedes your ability to assess/transport the patient or refuses care for the patient, especially in life-threatening situations, report concerns about potential abuse/maltreatment to law enforcement and/or Child Protective Services immediately, in accordance with state law.
- D. For patients transported, report concerns to the hospital. Per mandatory reporting laws, report suspicions of maltreatment to law enforcement and/or Child Protective Services personnel.

SEXUAL ASSAULT

Although a high proportion of pediatric sexual assaults occur in adolescents, patients of age 12 years or less, particularly those within the non-verbal age, are particularly vulnerable. Sexual Assault Forensic Examiner (SAFE) programs have been developed to provide specialized coordinated emergent and ongoing outpatient care for survivors of sexual assault. Hospitals that have engaged in SAFE programs provide sexual assault nurse examiners (SANE) as an integral resource within their emergency departments. All of the general considerations for victims of abuse and neglect apply with the following additional recommended measures.

1. Provide trauma-informed care to prevent re-traumatization of the patient. This includes, but is not limited to:
 - A. Actively listen to the patient and avoid interviewing them especially patients of age 12 years or less
 - B. Validate, rather than questioning or casting doubt, upon their experience
 - C. Request permission prior to performing a physical examination
 - D. Permit a support person to be present during the physical examination
2. In the absence of hemorrhage, visualization of the genitalia by EMS is rarely needed
3. Documentation on the patient care report is critical information for the healthcare team. In addition, omitted or inaccurate findings can erode the patient's credibility in a court of law. Patient complaints and physical findings should be written in the narrative if correlating entries do not exist within an electronic medical record. For example, tenderness noted on palpation of a limb that has no visible evidence of trauma should be not be documented as "normal". If the patient is distraught or sobbing, this should be documented even if the patient's mental status is otherwise alert and age appropriately "normal".
4. Evidence preservation includes the following measures:
 - A. Don gloves prior to patient contact and during patient care and transport
 - B. Use paper bags rather than plastic bags to place and transport of evidence
 - C. Transport the patient "as found"
 - D. Discourage showering, removing or changing clothes, brushing teeth, using mouthwash, smoking, eating, drinking, washing or cleaning their hands
 - E. Do not remove the patient's clothing unless absolutely necessary.
 - F. If removal of clothing is necessary, avoid cutting through holes or other areas of damage to the fabric, stains, or where blood or body fluids are visible or suspected to be present within a 6-inch margin if possible
 - G. If strangulation is involved, cut the rope while leaving the knot in place
 - H. Clothing, ropes, and ligatures that have been removed prior to arrival or by EMS should be placed in paper bags
 - I. If a patient needs to vomit or urinate, the emesis and urine should be collected in a clean container for forensic analysis for drug-facilitated sexual assaults
 - J. If necessary, apply sterile gauze to wounds and avoid irrigation, washing, or application of topical ointments
 - K. For patients of age 12 years or less, their bedding should be collected and transported for evidence collection
 - L. Ambulance linens should be placed in a paper bag and submitted for evidence collection
 - M. A chain of custody must be maintained for all evidence collected. All evidence collected at the scene should remain in the possession of the patient or law enforcement
5. Transport
 - A. Avoid the administration of anxiolytics or sedation if possible
 - B. Transport the patient to a pediatric hospital with an established SAFE program if available

CHILD ABUSE AND NEGLECT (Continued)

- C. If strangulation is reported and there is concern for an airway injury, transport the patient to a pediatric trauma center if available

HUMAN TRAFFICKING

Human trafficking is the abduction or coercion of a person, of any age, into service. According to the U.S. Department of Homeland Security, human trafficking is our nation's second fastest-growing criminal industry, with drug trafficking currently maintaining the lead. Coercion is not a requirement for minors to be considered trafficking victims.

Many sex trafficking survivors do not see themselves as victims and may not know what "trafficking" means. They may consider themselves voluntary participants in sex acts or commercial sex work and may not want to leave that lifestyle even if identified by medical providers. A trafficker can be a family member or romantic partner whom the victim trusts. Adolescents and young adults with a history of homelessness, foster care, or minority status are at elevated risk of trafficking, though victims can be from any population.

Emergency departments are a major source of medical care for victims, either because victims do not have access to a primary medical home or because an ED facilitates the avoidance of detection and tracking. If present, a trafficker might present himself/herself as the victim's relative (e.g. sibling) or spouse to provide a more viable reason to remain with the victim during patient transport or medical care. If a victim presents alone, the victim may request a brief and/or accelerated evaluation or to be discharged after a brief period of time due to threats from the trafficker if time limits are exceeded or if the trafficker is monitoring the victim from a remote location.

Physical Clues on Patient Assessment

- A. Multiple injuries (ex. bruises, fractures, lacerations), or injuries without a plausible history
- B. Age-inappropriate behavior (e.g. adults who are submissive or fearful, children who act in a sexually inappropriate way)
- C. Patterned burns, bruises, or scars suggestive of specific weaponry or objects used
- D. Evidence of medical neglect for injuries, infections, or chronic medical conditions
- E. Unexplained trauma to genitourinary systems or frequent infections to this system
- F. Evidence of malnourishment and/or serious dental problems
- G. Tattoos and/or branding can be seen in victims of human trafficking as they are placed by the trafficker as a label of ownership. While some traffickers use their initials for a tattoo, there has been a trend to use barcode-like tattoos. In addition to the chest, neck, or extremities, traffickers may use less visible sites, such as the inferior surface of the victim's tongue, to place a tattoo symbolizing ownership.

Clues Arising from the Caregiver or Patient

- A. Apathy about patient's current situation
- B. Overreaction to questions about situation
- C. Inconsistent histories from caregivers or bystanders regarding what happened
- D. Information provided by caregivers or patient that is not consistent with injury patterns
- E. Caregiver not allowing adult patient to speak for themselves, or who appears controlling

Environment Clues

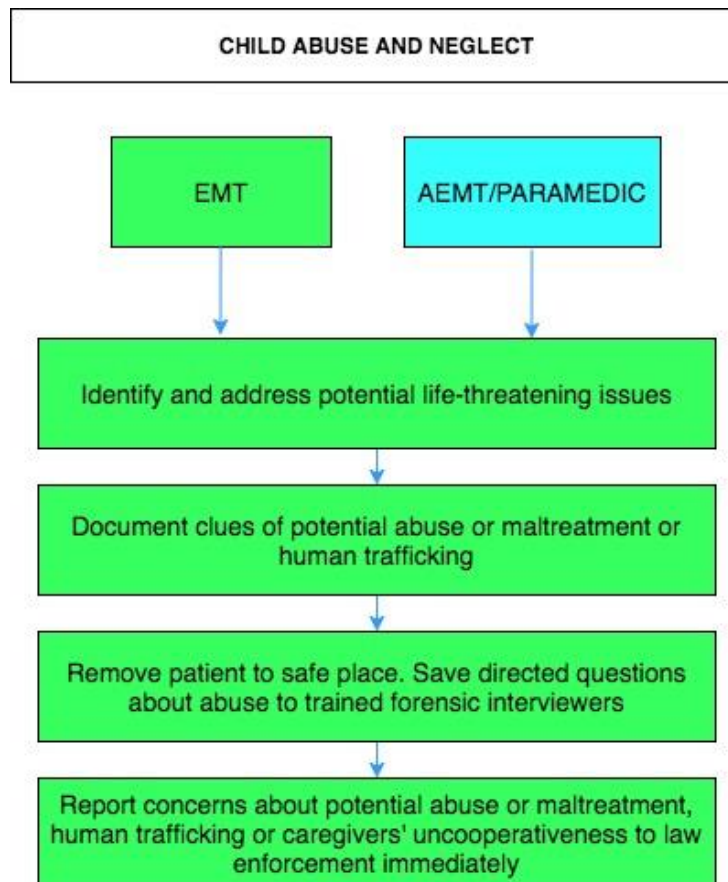
- A. Inadequate safety precautions or facilities where the patient lives
- B. A state of squalor in the residence
- C. Evidence of security measures that appear to confine the patient inappropriately (e.g. interior doors with padlocks or missing doorknobs, boards or other obstructive objects over intact windows)
- D. Adolescents who are residing outside their guardians' or family's home (i.e. hotels, friends' or partners' homes) or who endorse running away from home

Reporting Abuse and Maltreatment

- A. It is imperative for EMS professionals to communicate and document all information to the emergency department and/or receiving facility's staff including, but not limited to, the patient's physical findings and emotional condition, the caregiver's demeanor and interactions, and the condition and abnormal findings of the environment noted while on scene

CHILD ABUSE AND NEGLECT (Continued)

- B. Reporting of suspected or confirmed child abuse and/or maltreatment is mandatory by Ohio law and provides civil immunity to the individual who files the report
- C. Currently, there is no immunity provided for reporting suspected or confirmed abuse and/or maltreatment of adults; however, it is highly unlikely to be sued successfully for initiating an investigation unless it is an act of willful or wanton misconduct by the reporter
- D. Adult Protective Services and Child Protective Services are excellent resources to initiate a report of suspected or confirmed abuse and/or maltreatment, particularly in cases where patient transport is ultimately refused. A request placed to the EMS medical director to acquire social services consultation for the patient is another option.
- E. Law enforcement agencies are also excellent resources to initiate a report of suspected or confirmed abuse and/or maltreatment particularly when it involves human trafficking or financial, physical or sexual abuse.



ARRHYTHMIAS

GENERAL CONSIDERATIONS

- A. In the treatment of cardiac arrhythmias, the current American Heart Association PALS and ACLS guidelines were referenced for guideline development.
- B. Always provide oxygen support, make the patient comfortable, and provide reassurance.
- C. Transport is essential when Pediatric Advanced Life Support or Advanced Cardiac Life Support resources are not available within 10 minutes of receipt of the call.

EMT / AEMT

- A. Open and manage the airway and provide 100% oxygen by NRB mask. Apply pulse oximeter.
- B. Make patient comfortable and provide reassurance.
- C. Evaluate patient's general appearance, relevant history of condition and determine:

Onset of the event
Provocation or palliation
Quality of the pain
Region and radiation
Severity
Time

Signs and symptoms
Allergies
Medications
Past Medical History - especially, recent surgery, any abnormal related ingestion, previous trauma, related medical diseases
Last oral intake
Events leading to present illness

- D. If patient is experiencing an unusual and/or irregular heart rate or pulse, if available, application of the cardiac monitor may be applied by the AEMT with assistance from the EMT if necessary. The AEMT may obtain a monitor strip for evaluation by the physician at the emergency department. This should only be done during transport, and the EMS professional must advise the patient the monitor strip is being obtained solely for the physician and the EMS professional cannot provide the patient with an interpretation of the strip.
- E. Consider obtaining a diagnostic (e.g., 12-lead) EKG.
- F. Establish communications with medical direction and advise them of patient condition. Transport immediately unless an advanced life support unit is in route and has an ETA of less than 5 minutes to the scene.

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. Apply cardiac monitor and determine arrhythmia.
- C. Start IV/IO normal saline (NS) at a "keep vein open" (KVO) rate.

ARRHYTHMIAS (Continued)

D. Treat arrhythmia as follows:

1. Bradycardia

NOTE: If heart rate is <100 for infants, <80 for children and <60 for adolescents assess patient's perfusion. The most common cause of pathologic pediatric bradycardia is hypoxia. Signs or symptoms of poor perfusion include:

- Hypotension
- Acutely altered mental status
- Signs of shock
- Acute heart failure

Common causes of bradycardia in pediatric patients:

- Hypoxia, acidosis, hypothermia, hypoglycemia, electrolyte disorder, hypothyroidism, athletic conditioning, vasovagal reaction/syncope, trauma/increased intracranial pressure, ventriculoperitoneal (VP) shunt malfunction, toxins/overdoses (i.e., calcium channel blockers, beta blockers, opioids, digoxin, organophosphates), heart block, history of congenital or acquired heart condition, pacemaker, or heart surgery

a. Good perfusion

i. Transport

- ###### ii.
- If second-degree heart block type II or third-degree heart block, prepare patient for external pacing by applying external pacer pads. If the patient develops signs of poor perfusion, initiate external pacing.

b. Poor perfusion

- ###### i.
- Initiate quality CPR (15:2 with two rescuers, 30:2 with one rescuer) if the heart rate is <60 despite oxygenation and ventilation, administer supplemental oxygen via NRB if breathing. Assist ventilation with bag-mask ventilation if poor respiratory effort.
- ###### ii.
- Epinephrine 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration) IO/IV with maximum dose of 1 mg. Repeat every 3-5 minutes. If no IO/IV access but endotracheal tube (ETT) in place, give 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration) via ETT.
- ###### iii.
- If increased vagal tone, second-degree type I AV block (Wenckebach), or concern for cholinergic drug toxicity, give atropine 0.02 mg/kg (minimum dose 0.1 mg, maximum single dose 0.5 mg) rapid IVP, may repeat once in 5 minutes to achieve age-appropriate heart rate and adequate systolic blood pressure (SBP) for age. (SBP greater than 2x age in years + 70 mmHg) with an adequate level of consciousness.
- ###### iv.
- Administer 20 mL/kg bolus of normal saline or lactated ringers. If concerned for underlying cardiac pathology, start with 10 mL/kg and assess for signs of fluid overload.
- ###### v.
- If bradycardia persists after adequate ventilation and administration of maximum doses of atropine and epinephrine, consider transcutaneous pacing. Indicated for known congenital or acquired heart diseases. Consider sedation or analgesia medications prior to pacing. Avoid placing pacing pads directly over implanted pacemakers or defibrillators.

2. Narrow complex tachycardia

NOTE: If P waves are present and the heart rate for infants is < 220 per minute for infants and < 180 per minutes for children, sinus tachycardia is the most probable cardiac rhythm, and the care provider should search for and treat the cause. If P waves are absent or abnormal and the heart rate is ≥ 220 beats per minute for infants, ≥ 180 beats per minute for children, supraventricular tachycardia is the probable cardiac rhythm particularly if there is a history of an abrupt rate change. Assess the patient's perfusion. ECG will have a QRS in normal duration for age (< 0.08 milliseconds) which is a narrow complex.

ARRHYTHMIAS (Continued)

Signs/symptoms of poor perfusion include:

- Hypotension
- Acutely altered mental status
- Signs of shock (delayed capillary refill, weak pulses, hypoxia, altered mental status)
- Acute heart failure
- Acute chest pain
- History of arrhythmia
- History of cardiac surgery

a. Adequate perfusion

- i. Maintain adequate oxygenation, ventilation, and perfusion
- ii. Vagal maneuver or carotid massage or knees to chest
- iii. Adenosine 0.1 mg/kg or maximum dose of 6 mg rapid IV push followed immediately by a 10 mL flush of normal saline.
- iv. If no response in 1-2 minutes, adenosine 0.2 mg/kg or maximum dose of 12 mg rapid IV push followed immediately by a 10 mL flush of normal saline.
- v. If the patient does not respond to adenosine, consider contacting medical direction for orders for additional medications.
- vi. If patient remains stable, observe and transport.

NOTE: If the patient becomes unstable at any time with poor perfusion, go directly to synchronized cardioversion.

b. Poor perfusion

NOTE: Based on assessment findings, the Paramedic may choose to administer adenosine before attempting synchronized cardioversion if the ventricular complexes (QRS waves) are regular and narrow. If the patient is unstable with poor perfusion, the Paramedic may omit adenosine administration and proceed immediately to synchronized cardioversion.

- i. Adenosine 0.1 mg/kg or maximum dose of 6 mg rapid IV/IO push followed immediately by a rapid 10 mL NS flush IV/IO.
- ii. If no response in 1-2 minutes, adenosine 0.2 mg/kg or maximum dose of 12 mg rapid IV/IO push followed immediately by a rapid 10 mL NS flush IV/IO.
- iii. Consider analgesia with fentanyl 1.5 mcg/kg IN or 1 mcg/kg IV/IO/IM (maximum dose 100 mcg) or sedation with midazolam 0.1 mg/kg (max 2 mg) IV/IO administered over 2-5 minutes.
- iv. Initial synchronized cardioversion:
 - (a) 0.5-1 J/kg to a maximum of 50-100 J (monophasic or biphasic) for narrow regular complex tachycardia or if adult size, the energy recommended by the manufacturer.
 - (b) If not effective, increase to 2 J/kg or maximum of 200 J monophasic or 120-200 J biphasic for narrow complex tachycardia. Follow the manufacturer's recommendations for adult-sized patients.
- v. If poor perfusion persists, contact medical direction and/or written protocol for potential administration of amiodarone

3. Wide complex tachycardia with adequate perfusion

Signs or symptoms of poor perfusion include:

- Hypotension
- Acutely altered mental status
- Signs of shock
- Ischemic chest discomfort
- Acute heart failure
- History of congenital heart disease
- History of arrhythmia

ARRHYTHMIAS (Continued)

- a. Antiarrhythmic medications that are indicated for wide-complex tachycardia with adequate perfusion are amiodarone and adenosine. The choice of antiarrhythmic to be administered and whether or not administration requires online medical direction should be predetermined by the medical director for your organization. Please follow these guidelines for the administration.
 - i. Amiodarone 5 mg/kg IV/IO (maximum dose of 300 mg), may repeat dose (maximum of 150 mg IV/IO) up to 2 times for refractory ventricular fibrillation or pulseless ventricular tachycardia 5 mg/kg to maximum of 300 mg IV
NOTE: Do not administer amiodarone to patients with a prolonged QT interval or with other antiarrhythmic medications.
 - ii. If the rhythm is regular and the QRS is monomorphic, consider the administration of adenosine 0.1 mg/kg or maximum dose of 6 mg rapid IV/IO push followed by a 10 mL NS flush. Do not administer adenosine for irregular wide complex tachycardias. If monomorphic regular tachycardia continues, give adenosine 0.2 mg/kg to a maximum dose of 12 mg rapid IV/IO push, followed rapidly by 10 mL NS flush.

NOTE: Do not administer more than one antiarrhythmic simultaneously to a patient. The choice of the antiarrhythmic to be administered should be predetermined by the medical director of your organization.

NOTE: If the patient becomes unstable and/or has poor perfusion at any time, go directly to synchronized cardioversion.
 - iii. Prior to synchronized cardioversion, consider sedation with midazolam 0.1 mg/kg (max 5 mg) IV/IO administered over 2-5 minutes.
 - v. Initial synchronized cardioversion: 0.5-1 J/kg to a maximum of 50-100 J (monophasic or biphasic) for wide complex tachycardia. For adult-sized patients, utilize the energy recommended by the manufacturer.

NOTE: Wide irregular complexes are not typically associated with a stable patient with normal perfusion. Contact medical direction for advice on these rare cases.

4. Wide complex tachycardia with poor perfusion

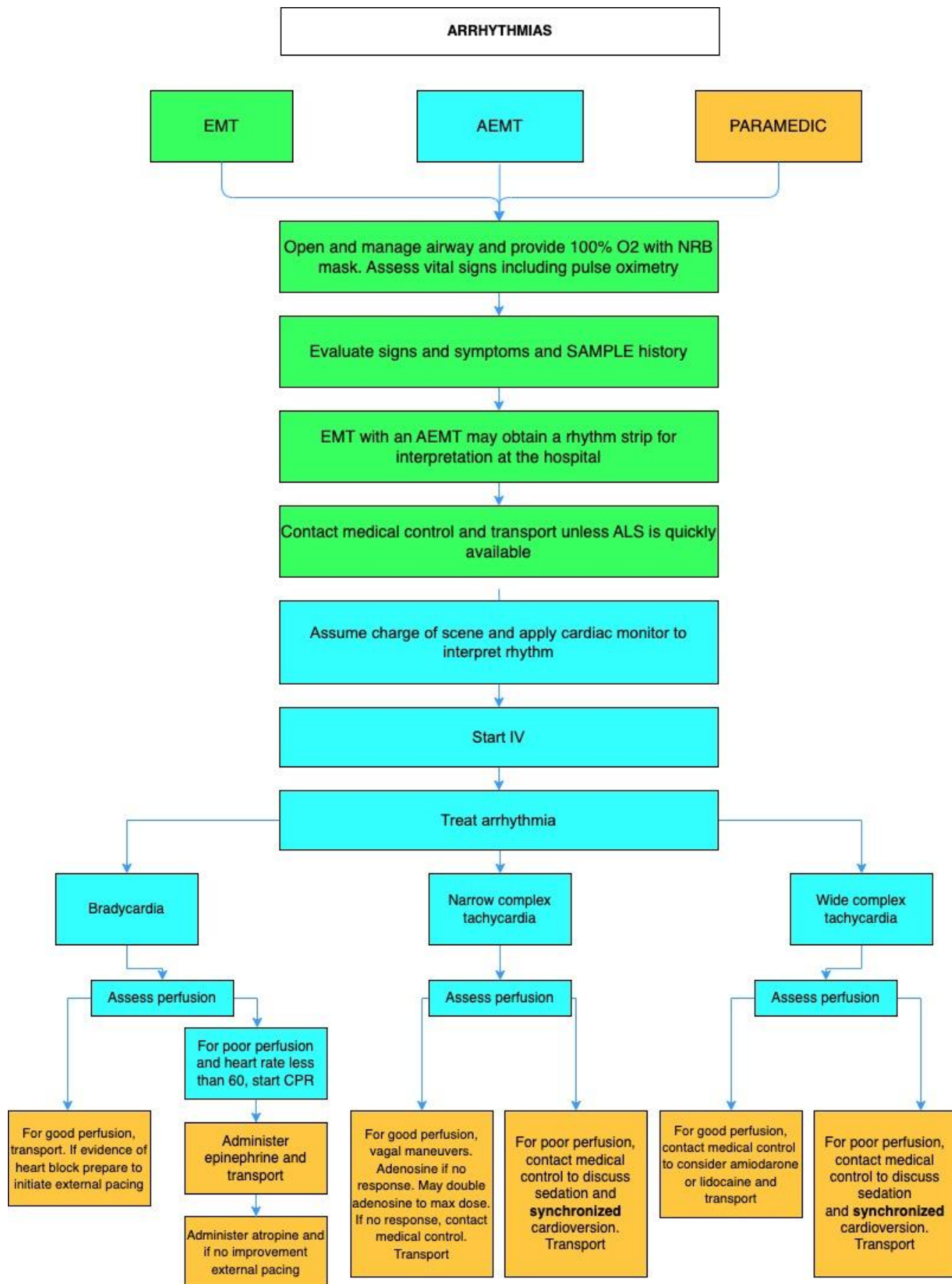
- a. Prepare for immediate synchronized cardioversion
 - i. Consider sedation with midazolam 0.1 mg/kg (max 5 mg) IV/IO administered over 2-5 minutes.
- b. Synchronized cardioversion
 - i. 2 J/kg or maximum of 100 J (monophasic or biphasic) for wide regular complexes or at the energy recommended by the manufacturer. Increase to 4 J/kg if not effective.
 - ii. Defibrillation with high-energy (or 4 J/kg) (unsynchronized) shocks for ventricular fibrillation or irregular wide complex tachycardia in which defibrillator is unable to synchronize.
- c. Administer an antiarrhythmic. Antiarrhythmic medications that are indicated for a wide complex tachycardia with poor perfusion 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
 - i. Amiodarone 5 mg/kg IV/IO (maximum dose of 300 mg), may repeat dose (maximum of 150 mg IV/IO) up to 2 times for refractory ventricular fibrillation or pulseless ventricular tachycardia 5 mg/kg or maximum dose of 300 mg.

ARRHYTHMIAS (Continued)

- ii. Lidocaine 1 mg/kg IVP. May repeat the dose every 5 minutes to a maximum dose of 3 doses IV/IO push

NOTE: Do not administer more than one antiarrhythmic simultaneously to a patient. The choice of the antiarrhythmic to be administered should be predetermined by the medical director for your organization.

- d. Repeat synchronized cardioversion if the patient has a pulse and ongoing poor perfusion.



BURNS

GENERAL INFORMATION

- A. The first priority is to assure scene safety and then remove the patient from heat and flame, electrical, or chemical exposure.
- B. Airway, breathing, and circulation must be stabilized before attending to the burn.
- C. Patient with extensive burns must be monitored for hypothermia and the use of ice and/or prolonged cold compresses should be avoided. When in doubt, always cover with dry dressing.
- D. In caring for the burn, the EMS professional should:
 - 1. Stop the burning
 - 2. Reduce the pain
 - 3. Prevent contamination
- E. Patients with critical burns must be transported per local protocol.
- F. When dealing with contaminated environments, EMS professionals must have appropriate protective clothing. If not available, contact appropriate hazardous materials (HAZMAT) service for such equipment.
- G. Gross decontamination must be done at the scene. Advise receiving facility if complete decontamination was not done at the scene, and be prepared to transport to decontamination area.

EMT

- A. Open and manage airway and provide oxygen as appropriate.
- B. Determine type of burn and treat as follows:
 - 1. Thermal (dry and moist):
 - a. Stop burning process: i.e. remove patient from heat source, cool skin (but do not freeze it), remove clothing.
 - b. If patient starts to shiver or skin is cool, stop cooling process.
 - c. Estimate extent (% of total body surface area) and depth of burn (see chart).
 - d. Cover burn areas with sterile dressing
 - 2. Radiation Burns:
 - a. Treat as thermal burns except when the burn is contaminated with a radioactive source. If contaminated with radioactive material, treat as chemical burn.
 - b. Wear appropriate protective clothing when dealing with contamination.
 - c. Contact HAZMAT team for assistance in contamination cases.

BURNS (Continued)

3. Chemical Burns:
 - a. EMS professionals must wear appropriate protective clothing and respirators.
 - b. Remove patient from contaminated area and move the patient to the decontamination site (Do not move the patient directly into the squad).
 - c. Determine chemicals involved; contact appropriate agency for chemical Information.
 - d. Remove patient's clothing and flush skin.
 - e. Leave contaminated clothes at scene. Cover patient over and under before loading into squad.
 - f. Patient should be transported by personnel not involved in decontamination process.
 - g. Determine severity (see chart), contact medical direction and transport accordingly.
 - h. Relay type of substance involved to medical direction.
 4. Electrical Burns
 - a. Shut down electrical source; do not attempt to remove patient until electricity is confirmed to be completely turned off.
 - b. Assess for visible entrance and exit wounds and treat as thermal burns.
 - c. Assess for internal injury, i.e., vascular damage, tissue damage, fractures, and treat accordingly.
 - d. Determine severity of burn, contact medical direction and transport accordingly.
 5. Inhalation Burns:
 - a. Always suspect inhalation burns when the patient is found in closed smoky environment and/or exhibits any of the following: burns to face/neck, singed nasal hairs, cough and/or stridor, soot in sputum.
 - b. Provide oxygen therapy, contact medical direction and transport.
- C. Contact medical direction and transport accordingly.

AEMT

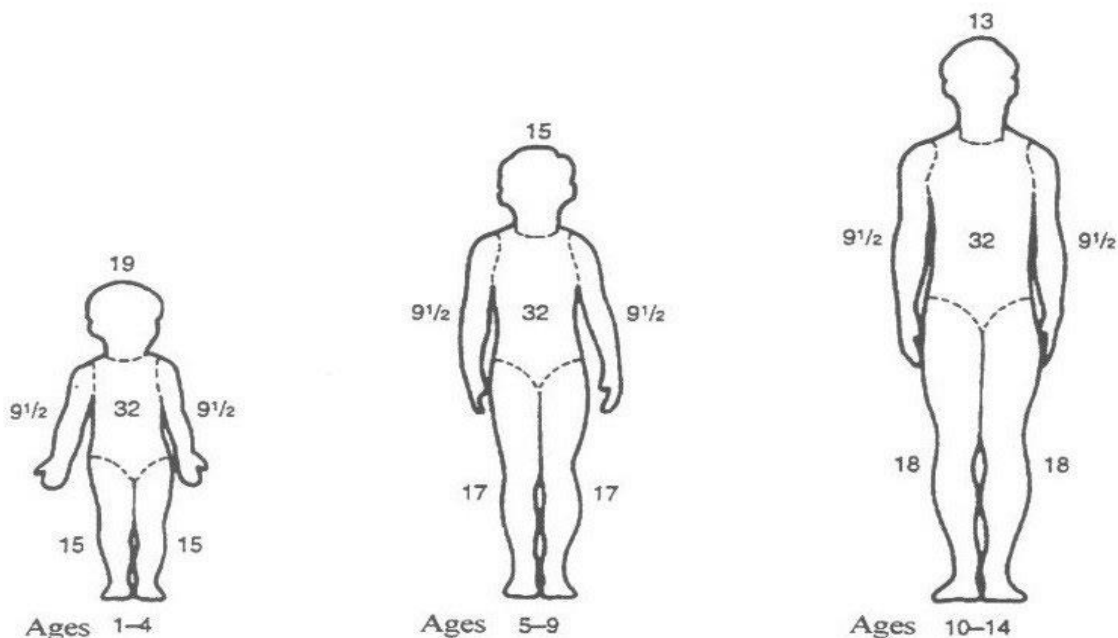
- A. Assist EMS professional with airway. Intubate if necessary.
- B. Assist in determining type of burn and its treatment.
- C. For hypovolemia, start IV per shock guideline.

DO NOT DELAY TRANSPORT FOR IV PLACEMENT

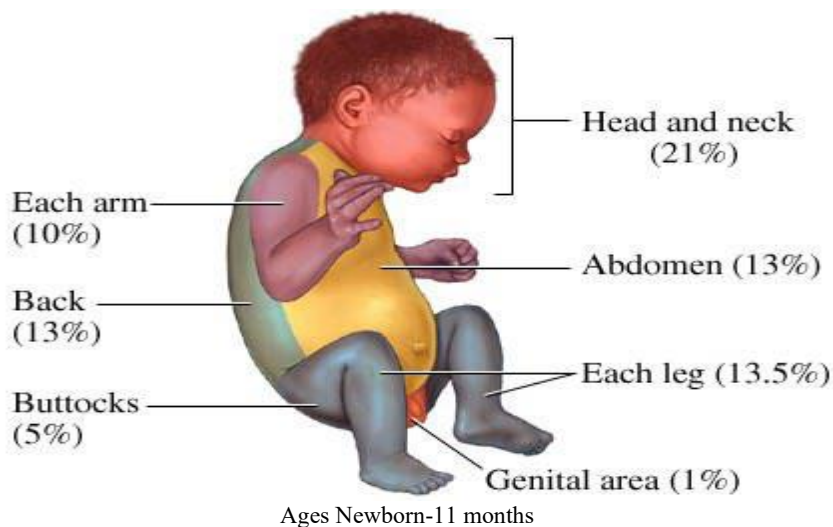
PARAMEDIC

- A. Assume charge and confer with EMS professionals about patient condition and circumstances.
- B. Apply cardiac monitor and treat arrhythmia, especially with electrical burns.
- C. Provide endotracheal intubation per the endotracheal intubation guideline if clinically indicated.
- D. Consider pain relief per local protocol.

RULE OF NINES



NOTE: 1% is equal to the surface of the palm of the patient's hand. If unsure of %, describe injured area.



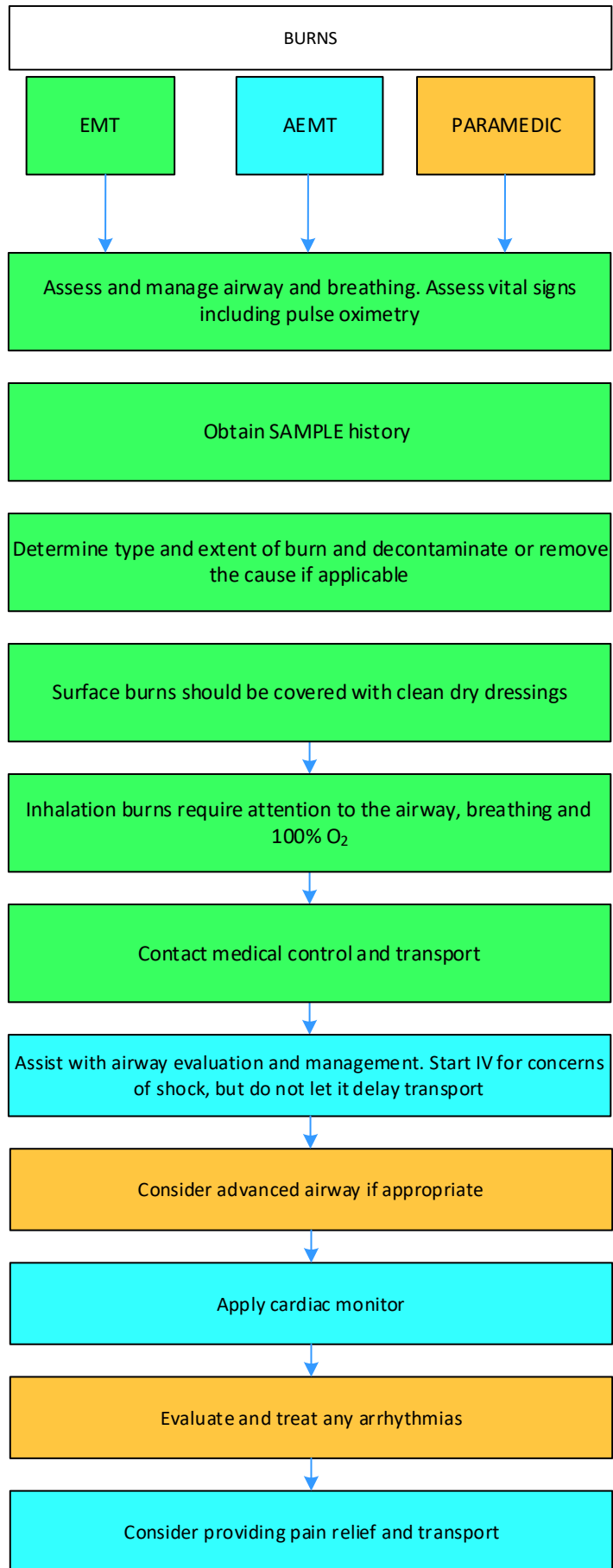
SERIOUSNESS OF BURNS

MINOR
 1st degree < 70%
 2nd degree < 10%
 *3rd degree < 2%

MODERATE
 1st degree > 70%
 *2nd degree 10-30%

CRITICAL
 2nd degree > 30%
 3rd degree > 2%
 Any burns with trauma.
 Any burns with involvement
 of head, face, hands,
 feet, or genitalia

*Only if face, hands, feet or genitalia are **not** involved.



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. Passive ventilation: High flow oxygen is applied via a non-rebreather mask with an oropharyngeal airway. Some oxygen will be entrained with each decompression of the chest. This may be applied for the first 3-4 compression cycles (6-8 minutes), after which one may consider BVM ventilation or placement of an advanced airway.
- D. Quality CPR consists of performing chest compressions with the 2 thumb-encircling hands technique for infants or pushing hard with the heel of one hand over the lower third of the sternum above the xyphoid process for children or larger infants. The recommended depth with compression of the chest for infants is 1.5 inches (4 cm) at a rate of 100 to 120 per minute and allowing complete chest recoil. The recommended compression depth for children is $\geq 1/3$ of the anteroposterior diameter of the chest (2 inches/5 cm). 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.
- E. 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, 12-20 breaths per minute (1 breath every 3-5 seconds) should be administered with continuous chest compressions.
- F. Interruptions in CPR should be minimized and limited to less than 10 seconds
- G. 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.
- H. Transport **immediately** when excessive hemorrhage or hypothermia is present. ALS measures should be carried out during transport.
- I. If peripheral IVs cannot be established, venous access should be obtained by the intraosseous route.
- J. If IV or IO access cannot be established, administer appropriate medications through the ET tube.

NOTE: Automated external defibrillators (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. Shocks should be delivered as soon as device is ready if indicated.
- K. 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.
- L. Refer to a pediatric body weight estimating device (e.g., Broselow® pediatric emergency tape) when unsure about patient weight, age and/or drug dosage.

EMT

- A. Open and maintain airway in sniffing position.
- B. Consider passive ventilations.
- C. Ventilate with 100% oxygen via BVM with oxygen reservoir.
- D. Initiate quality CPR in accordance with American Heart Association guidelines.
- E. Establish communications with medical direction and advise of patient condition. Transport IMMEDIATELY unless ALS unit is en route and has an ETA of less than 5 minutes.
- F. 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 direction and transport **immediately**.
 - b. “Shock Advised”
 - i. Deliver a single shock.
 - ii. Resume quality CPR for two minutes.
 - iii. Contact medical direction, advise of cardiac arrest, and transport **immediately**.
 - c. After each two-minute cycle of quality CPR, activate AED to assess rhythm and deliver a single shock if indicated.
 - d. Resume quality CPR.

TURN AED OFF DURING PATIENT MOVEMENT

AEMT

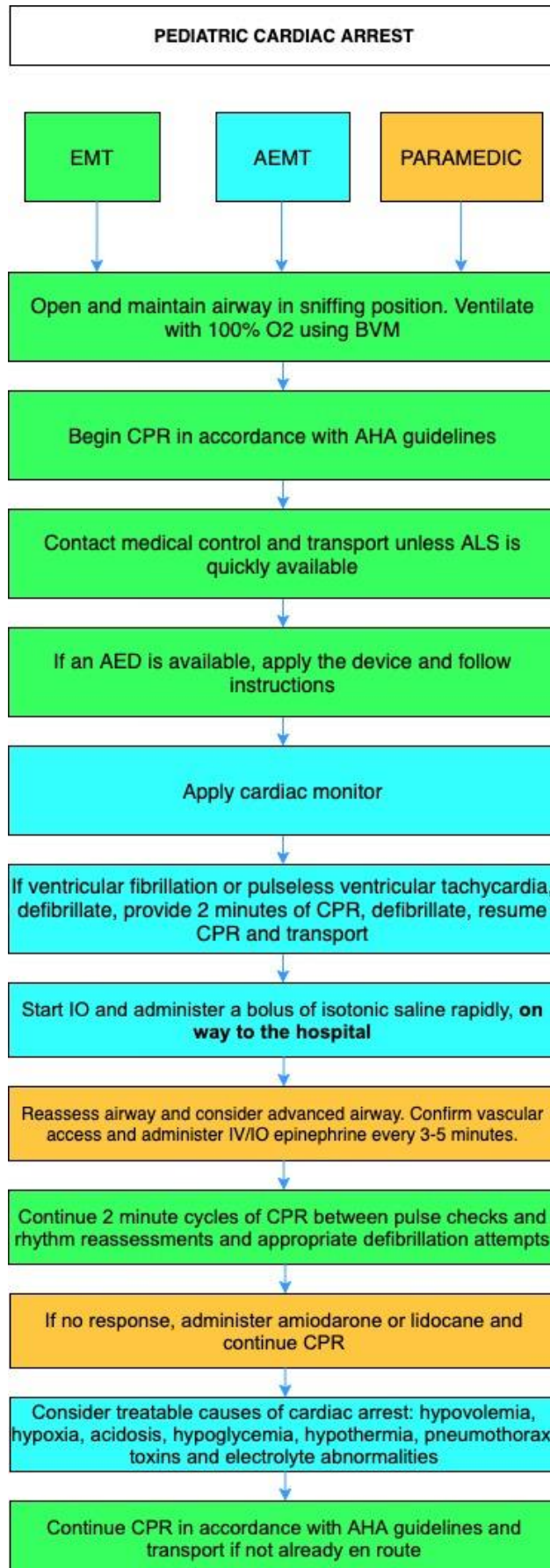
- A. Assume charge and confer with EMS professionals to patient condition and circumstances.
- B. Apply cardiac monitor.
- C. If monitor shows ventricular fibrillation or pulseless ventricular tachycardia:
 - 1. Defibrillate at 2 joules/kg (round up)
 - 2. Five cycles (2 minutes) of quality CPR.
 - 3. If no response, defibrillate at 4 joules/kg (round up)
 - 4. 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.

PARAMEDIC

- 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 faster.
- 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 (round up)
 - b. If no response, quality CPR for 2 minutes.
 - c. Defibrillate at 4 joules/kg (round up) (maximum of 360J for monophasic devices).
 - d. If no response, continue quality CPR for 2 minutes.
 - e. Administer epinephrine IV or IO access every 3-5 minutes
 - IV / IO doses – 0.01 mg/kg of 0.1 mg/mL (0.1 mL/kg), maximum 1 mg
 - f. If no response, defibrillate at ≥ 4 joules/kg to a maximum of 10 joules/kg or the adult dose.
 - g. If no response, continue quality CPR for 2 minutes.
 - h. Administer one antiarrhythmic:
 - Amiodarone 5 mg/kg IV/IO (maximum dose of 300 mg), may repeat dose (maximum of 150 mg IV/IO) up to 2 times for refractory ventricular fibrillation or pulseless ventricular tachycardia **or**
 - Lidocaine 1 mg/kg IV/IO push.
 - 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 D25W IV/IO for children under 20 kg or 1 mL/kg (maximum 50 mL) of D50 IV/IO for children over 20 kg if the blood glucose is less than 60 mg/dL
 - 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
 - c. Continue quality CPR for two minutes and administer epinephrine as soon as possible after establishing IV or IO access with repeat doses administered every 3-5 minutes
 - d. IV/IO doses: 0.01 mg/kg of 0.1 mg/mL (0.1 mL/kg), maximum 1 mg
 - e. Confirm asystole in two different leads
 - f. If rhythm is unclear and possibly ventricular fibrillation, follow ventricular fibrillation/pulseless ventricular tachycardia guideline

PEDIATRIC CARDIAC ARREST (Continued)

- g. Consider treatable causes:
 - Hypovolemia: administer 20 mL/kg NS IV boluses
 - Hypoxia
 - Hydrogen ion (acidosis)
 - Hypoglycemia: administer 2 mL/kg of D25W IV/IO for children under 20 kg or 1 mL/kg (maximum 50 mL) of D50 IV/IO for children over 20 kg if the blood glucose is less than 60 mg/dL
 - Hypokalemia/hyperkalemia
 - Hypothermia
 - Tension Pneumothorax
 - Tamponade, cardiac
 - Toxins
 - Thrombosis, pulmonary
 - Thrombosis, coronary
- h. If no response, continue quality CPR and **transport**.



NEWBORN RESUSCITATION

GENERAL CONSIDERATIONS

- A. Hypothermia is common in newborns and worsens outcomes of nearly all post-natal complications
 1. Ensure heat retention by drying the infant thoroughly, covering the head, and wrapping the baby in dry cloth
 2. When it does not encumber necessary assessment or required interventions, “kangaroo care” (i.e. placing the infant skin-to-skin directly against mother's chest and wrapping them together) is an effective warming technique
 3. Newborn infants are prone to hypothermia which may lead to hypoglycemia, hypoxia and lethargy. Aggressive warming techniques should be initiated including drying, swaddling, and warm blankets covering body and head. Check blood glucose and follow hypoglycemia guidelines as appropriate.
- B. During transport, neonate should be appropriately secured in seat or isolette and mother should be appropriately secured
- C. Approximately 10% of newly born infants require some assistance to begin breathing
- D. Deliveries complicated by maternal bleeding (placenta previa, vas previa, or placental abruption) place the infant at risk for hypovolemia secondary to blood loss
- E. Low birth weight infants are at high risk for hypothermia due to heat loss
- F. If pulse oximetry is used as an adjunct, the preferred placement place of the probe is the right arm, preferably wrist or medial surface of the palm. Normalization of blood oxygen levels (SaO₂ 85-95%) will not be achieved until approximately 10 minutes following birth
- G. Both hypoxia and excess oxygen administration can result in harm to the infant. If prolonged oxygen use is required, titrate to maintain an oxygen saturation of 85-95%
- H. While not ideal, a larger facemask than indicated for patient size may be used to provide bag-valve-mask ventilation if an appropriately sized mask is not available - avoid pressure over the eyes as this may result in bradycardia
- I. Increase in heart rate is the most reliable indicator of effective resuscitative efforts
- J. A multiple gestation delivery may require additional resources and/or providers

EMT

- A. History
 1. Date and time of birth
 2. Onset of symptoms
 3. Prenatal history (prenatal care, substance abuse, multiple gestation, maternal illness)
 4. Birth history (maternal fever, presence of meconium, prolapsed or nuchal cord, maternal bleeding)
 5. Estimated gestational age (may be based on last menstrual period)
- B. Exam
 1. Respiratory rate and effort (strong, weak, or absent; regular or irregular)
 2. Signs of respiratory distress (grunting, nasal flaring, retractions, gasping, apnea)
 3. Heart rate (fast, slow, or absent)
 - i. Precordium, umbilical stump or brachial pulse may be used
 - ii. Auscultation of chest is preferred since palpation of umbilical stump is less accurate
 4. Muscle tone (poor or strong)
 5. Color/Appearance (central cyanosis, acrocyanosis, pallor, normal)
 6. APGAR score (appearance, pulse, grimace, activity, respiratory effort) - may be calculated for

NEWBORN RESUSCITIATION (Continued)

documentation, but not necessary to guide resuscitative efforts

7. Estimated gestational age (term, late preterm, premature)
8. Pulse oximetry should be considered if prolonged resuscitative efforts or if supplemental oxygen is administered - goal: oxygen saturation at 10 minutes is 85-95%

C. Treatment

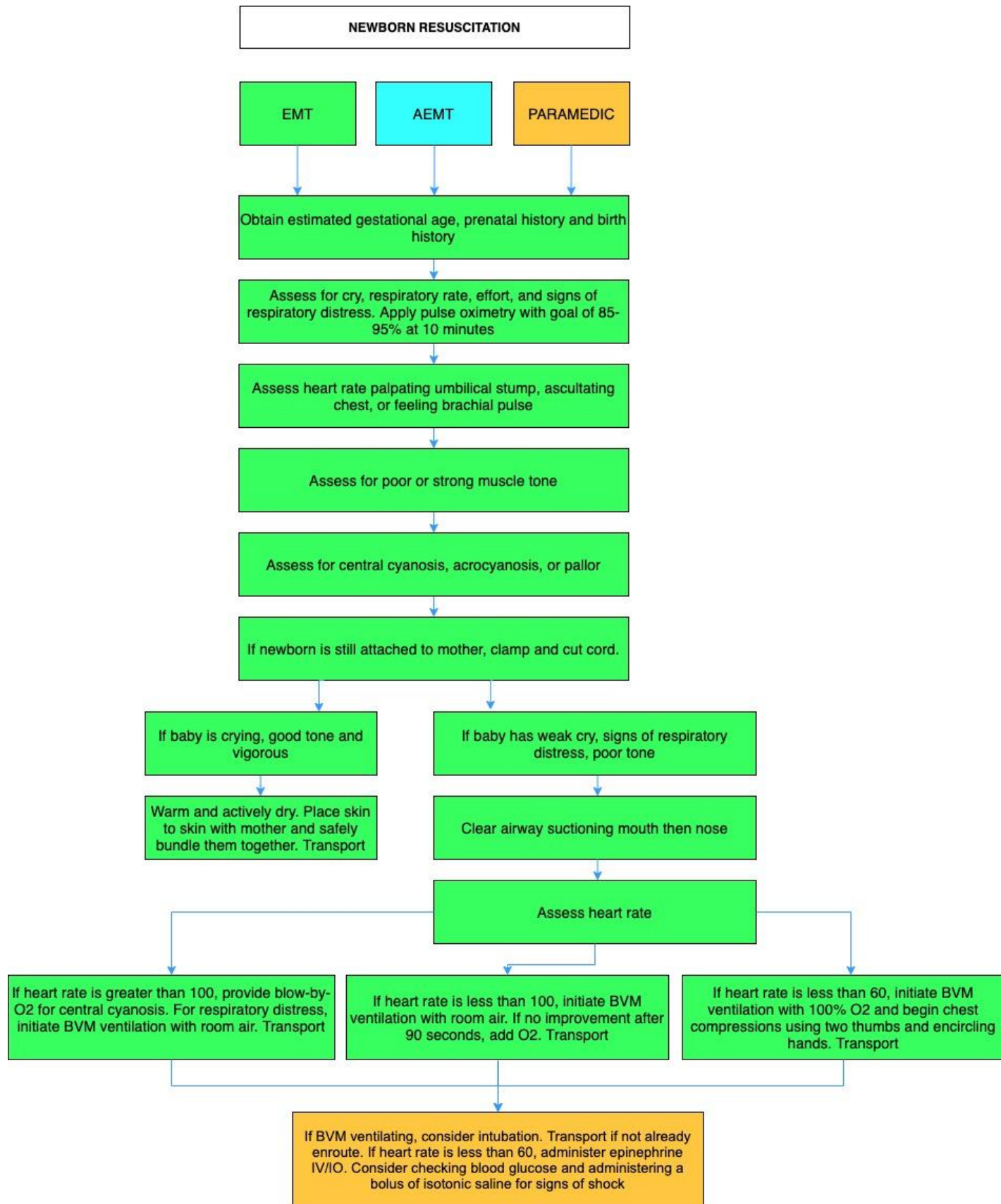
1. For full-term newborns with low APGAR scores or late pre-term infants (≥ 35 weeks gestation), intact umbilical cord milking is reasonable rather than immediate cord clamping. For newborn infants who do not require immediate resuscitation, deferred cord clamping for at least 60 seconds is beneficial when compared to immediate cord clamping.
2. Warm, dry, and stimulate
 - a. Wrap infant in dry towel or thermal blanket to keep infant as warm as possible during resuscitation; keep head covered if possible
 - b. If strong cry, regular respiratory effort, good tone, and term gestation, infant should be placed skin-to-skin with mother and covered with dry linen
3. If weak cry, signs of respiratory distress, poor tone, or preterm gestation then position airway (sniffing position) and clear airway as needed - if thick meconium or secretions present and signs of respiratory distress, suction mouth then nose
4. If heart rate greater than 100 beats per minute
 - a. Monitor for central cyanosis - provide blow-by oxygen as needed
 - b. Monitor for signs of respiratory distress. If apneic or in significant respiratory distress:
 - i. Initiate bag-valve-mask ventilation with room air at 30-60 breaths per minute
5. If heart rate less than 100 beats per minute
 - a. Initiate bag-valve-mask ventilation with room air at 30-60 breaths per minute
 - i. Primary indicator of effective ventilation is improvement in heart rate
 - ii. Rates and volumes of ventilation required can be variable, only use the minimum necessary rate and volume to achieve chest rise and a change in heart rate
 - b. If no improvement after 90 seconds, change oxygen delivery to 30% FiO₂ if blender available, otherwise 100% FiO₂ until heart rate normalizes
6. If heart rate less than 60 beats per minute
 - a. Ensure effective ventilations with supplementary oxygen and adequate chest rise
 - b. If no improvement after 30 seconds, initiate chest compressions over the lower third of the sternum above the xyphoid process. The 2 thumb-encircling hands technique is preferred
 - c. Coordinate chest compressions with positive pressure ventilation (3:1 ratio, 90 compressions and 30 breaths per minute). Change compressors every 2-5 minutes to maintain quality CPR

AEMT/ PARAMEDIC

- d. For persistent poor ventilation, laryngeal mask airway placement is a reasonable alternative to endotracheal intubation for newborns ≥ 34 weeks gestation. For endotracheal intubation at any gestational age, video laryngoscopy is preferred if available
 - e. Administer epinephrine (0.1 mg/mL) 0.01 mg/kg IV/IO (preferable if access obtained) or 0.1 mg/kg via the ETT using 1 mg/mL concentration (if unable to obtain access)
7. Consider checking a blood glucose for ongoing resuscitation, maternal history of diabetes, ill appearing or unable to feed
8. Administer 10 mL/kg normal saline bolus IV/IO for signs of shock or post-resuscitative care

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



BRIEF RESOLVED UNEXPLAINED EVENT (BRUE)

EMT

A. General Considerations

1. An event in an infant less than 1 year old reported by a bystander as sudden, brief (less than 1 min), **completely resolved upon EMS arrival** that includes one or more of the following:
 - a. Absent, decreased, or irregular breathing
 - b. Color change (central cyanosis or pallor)
 - c. Marked change in muscle tone (hyper- or hypotonia)
 - d. Altered level of responsiveness
2. BRUE is a group of symptoms, not a disease process.
3. All patients should be transported to an ED
4. Contact medical direction if parent/guardian is refusing medical care and/or transport, especially if any high-risk criteria are present: less than 2 months of age, history of prematurity, & more than 1 BRUE, now or in the past.

B. Evaluate

1. Vital signs
2. Signs of respiratory distress (grunting, nasal flaring, retracting)
3. Color (pallor, cyanosis, normal)
4. Mental status (alert, tired, lethargic, unresponsive, irritability)
5. Head to toe exam, including:
 - a. Physical exam for signs of trauma or neglect
 - b. Pupillary response

C. History

1. History of circumstances and symptoms before, during, and after the event, including duration, interventions done, and patient color, tone, breathing, feeding, position, location, activity, level of consciousness
2. Other concurrent symptoms (fever, congestion, cough, rhinorrhea, vomiting, diarrhea, rash, labored breathing, fussy, less active, poor sleep, poor feeding)
3. Prior history of BRUE
4. Past medical history (prematurity, prenatal/birth complications, gastric reflux, congenital heart disease, developmental delay, airway abnormalities, noisy breathing, prior hospitalizations, surgeries, injuries, poor growth, recent immunizations, medications including over the counter ones)
5. Family history of sudden unexplained death or cardiac arrhythmia in other children or young adults
6. Social history: who lives at home, recent household stressors, exposure to toxins/drugs/smoke, sick contacts
7. Considerations for possible child abuse (multiple/changing versions of the story; reported mechanism of injury does not seem plausible, especially for child's developmental stage, unexplained bruising)

D. Management

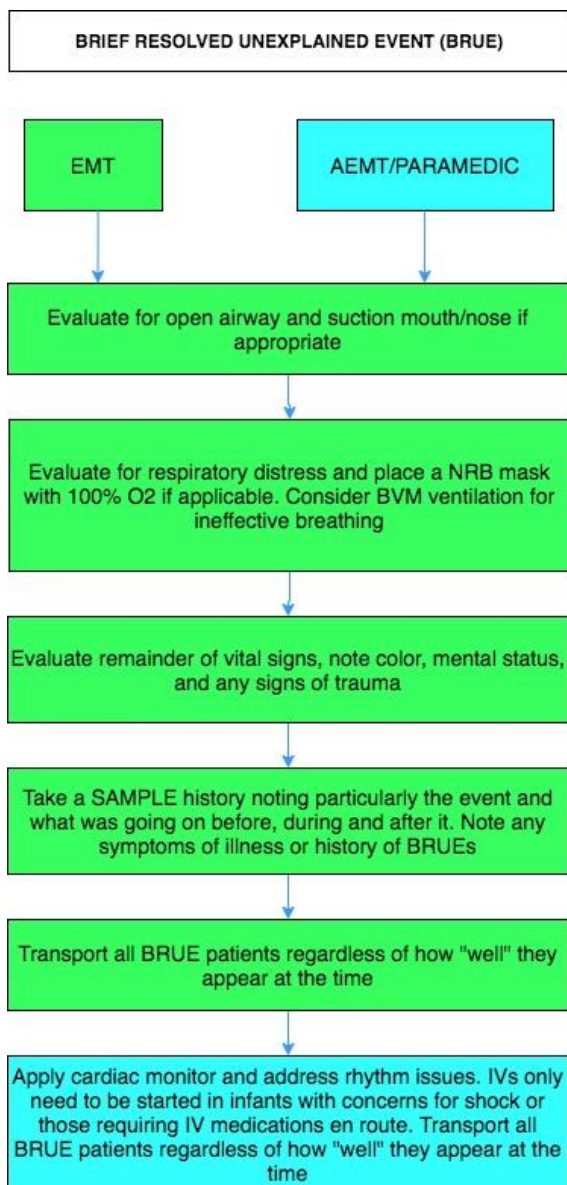
1. Monitoring
 - a. Continuous pulse oximetry
 - b. Check blood glucose if altered mental status and treat per Altered Mental Status guideline
 - c. Serial observations during transport for change in condition

BRIEF RESOLVED UNEXPLAINED EVENT (BRUE) (Continued)

2. Airway
 - a. Give supplemental oxygen via non-rebreather for signs of respiratory distress or hypoxemia.
 - b. Suction the nose and/or mouth (via bulb, suction catheter) if excessive secretions are present.
3. Breathing
 - a. Support respirations with bag value mask if ineffectively ventilating and oxygenating.

AEMT/ PARAMEDIC

1. Assist EMS professional, obtain patient condition and circumstance.
2. Apply cardiac monitor and check rhythm.
3. IV placement and fluids:
 - a. Routine IVs should not be placed in all BRUE patients.
 - b. IVs should only be placed in children for clinical concerns of shock, or when administering IV medications.



PEDIATRIC PAIN MANAGEMENT

GENERAL CONSIDERATIONS

- A. The practice of EMS medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from myriad injuries and illnesses. Approaches to pain relief must be designed to be safe and effective in the dynamic out-of-hospital environment. The degree of pain and the hemodynamic status of the patient will determine the urgency and extent of analgesic interventions.
- B. All patients should have drug allergies identified prior to administration of pain medication.
- C. Administer opioids with caution to patients with GCS less than 15, hypotension, identified medication allergy, hypoxia (oxygen saturation less than 90%) after maximal supplemental oxygen therapy, signs of hypoventilation, or multi-system trauma.
- D. Avoid non-steroidal anti-inflammatory drugs (NSAID) such as ketorolac in patients with NSAID allergy, aspirin-sensitive asthma, renal insufficiency, pregnancy, or known peptic ulcer disease. Ketorolac, specifically, should not be used in patients with hypotension (due to renal toxicity) or patients who could potentially be pregnant (last menstrual period >1 month ago). For these patients, opioids are preferred for severe pain.
- E. Use of splinting techniques and application of ice should be done to reduce the total amount of medication used to keep the patient comfortable.
- F. Pain severity should be recorded before and after analgesic administration.

EMT

- A. Determine patient's pain score assessment using standard pain scale.
 - 1. Less than 4 years old: Observational scale (e.g. Faces, Legs, Arms, Cry, Consolably [FLACC] or Children's Hospital of Eastern Ontario Pain Scale (CHEOPS))
 - 2. 4-12 years old: Self-report scale (e.g. Wong Baker Faces, Faces Pain Scale [FPS], Faces Pain Scale Revised [FPS-R])
 - 3. Greater than 12 years old: Self-report scale (Numeric Rating Scale [NRS])
- B. If available, consider the use of non-pharmaceutical pain management techniques.
 - 1. Placement of the patient in a position of comfort (including in parents/guardian's lap).
 - 2. Application of ice packs and/or splints for pain secondary to trauma.
 - 3. Verbal reassurance to control anxiety.
 - 4. Distraction techniques.

AEMT/ PARAMEDIC

- A. Apply a cardiac monitor and pulse oximetry if indicated based upon patient assessment.
 - 1. If not improved and the patient is experiencing **moderate** discomfort or for adjunct treatment to severe pain consider use of analgesics as available and as permitted by medical direction.
 - a. Acetaminophen 15 mg/kg PO (maximum dose 1000 mg). Acetaminophen has an opioid-sparing effect.
 - b. Ibuprofen 10 mg/kg PO for patients greater than 6 months of age (maximum dose 800 mg) **or** ketorolac 0.5 mg/kg IV or IM (maximum dose 30 mg IM, 15 mg IV) for patients greater than 2 years of age

PEDIATRIC PAIN MANAGEMENT (Continued)

2. Establish IV of normal saline per patient assessment.
3. If the patient is experiencing **severe** pain, administer analgesics as available and as permitted by medical direction.
 - a. Morphine sulfate: 0.1 mg/kg IV or IO (maximum initial dose 5 mg) over at least 3 minutes
 - b. Fentanyl: 1 mcg/kg IN, IV, or IO (maximum initial dose 100 mcg) over at least 3 minutes to prevent rigid chest
 - c. Hydromorphone 0.015 mg/kg IM, IV or IO (maximum initial dose 2 mg, maximum cumulative dose 4 mg)
 - d. Ketamine 0.25 mg/kg IM, IV or IO (maximum initial dose 25 mg, maximum cumulative dose 100 mg). Be aware that ketamine has slower uptake when delivered IM.
4. Consider administration of oral, sublingual, or IV antiemetics to prevent nausea in high risk patients.
5. Consider use of non-invasive capnography for detection of hypoventilation for opioids/ketamine.
6. Intranasal route of opioid analgesics is preferred if IV access is problematic
7. If indicated based on pain assessment, and vital signs allow, repeat pain medication administration (excluding acetaminophen and NSAID) after 15 minutes of the previous dose.
8. Transport in position of comfort and reassess as indicated.

Adult nonverbal pain scale University of Rochester Medical Center			
Categories	0	1	2
Face	No particular expression or smile.	Occasional grimace, tearing, frowning, wrinkled forehead.	Frequent grimace, tearing, frowning, wrinkled forehead.
Activity (movement)	Lying quietly, normal position.	Seeking attention through movement or slow, cautious movement.	Restless, excessive activity and/or withdrawal reflexes.
Guarding	Lying quietly, no positioning of hands over areas of body.	Splinting areas of the body, tense.	Rigid, stiff.
Physiology (vital signs)	Stable vital signs	Change in any of the following: * SBP > 20 mm Hg. * HR > 20/minute.	Change in any of the following: * SBP > 30 mm Hg. * HR > 25/minute.
Respiratory	Baseline RR/SpO ₂ Compliant with ventilator	RR > 10 above baseline, or 5% ↓ SpO ₂ mild asynchrony with ventilator	RR > 20 above baseline, or 10% ↓ SpO ₂ severe asynchrony with ventilator

Abbreviations: HR, heart rate; RR, respiratory rate; SBP, systolic blood pressure; SpO₂, pulse oximetry.
 Instructions: Each of the 5 categories is scored from 0-2, which results in a total score between 0 and 10. Document total score by adding numbers from each of the 5 categories. Scores of 0-2 indicate no pain, 3-6 moderate pain, and 7-10 severe pain. Document assessment every 4 hours on nursing flow-sheet and complete assessment before and after intervention to maximize patient comfort. Sepsis, hypovolemia, hypoxia need to be excluded before interventions.

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From: Odhner M, Wegman D, Freeland N, Ingersoll G. Evaluation of a newly developed non-verbal pain scale (NVPS) for assessment of pain in sedated critically ill patients. Available at: [http://www.aacn.org/AACN/NTIPoster.nsf/vwdoc/2004NTI Posters](http://www.aacn.org/AACN/NTIPoster.nsf/vwdoc/2004NTI%20Posters). Accessed July 18, 2017.

PEDIATRIC PAIN MANAGEMENT (Continued)

Universal Pain Assessment Tool

Verbal Descriptor Scale						
	No Pain	Mild Pain	Moderate Pain	Severe Pain	Very Severe Pain	Excruciating Pain

Wong-Baker FACES®	The Wong-Baker FACES® Foundation requires permission to allow others to use or reproduce their pain rating scale. Although we are citing it as a resource, if you wish to use the Scale in your guidelines/protocols publication, please go to www.wongbakerfaces.org where you will find instructions on the use of this diagram.					
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Descriptive Scale						
	Alert Smiling	No Humor Serious, Flat	Furrowed Brow Pursed Lips Breath Holding	Wrinkled Nose Raised Upper Lip Rapid Breathing	Slow Blink Open Mouth	Eyes Closed Moaning Crying

Activity Tolerance Scale	No Pain	Can be Ignored	Interferes with Tasks	Interferes with Concentration	Interferes with Basic Needs	Bed Rest Required
Spanish	Nada de Dolor	Un Poquito de Dolor	Un Dolor Leve	Dolor Fuerte	Dolor Desmasiado Fuerte	Un Dolor Insoportable

Source: Hybrid of scales by authors. Reproduction of the Wong-Baker FACES® material requires licensing at www.wongbakerfaces.org.

Faces, Legs, Activity, Cry, Consolability (FLACC) Behavioral Scale

Appropriate age for use (per guideline): less than 4 years

Categories	Scoring		
	0	1	2
Face	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, clenched jaw, quivering chin
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking, or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers, occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being talked to, distractible	Difficult to console or comfort
<i>Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.</i>			

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Instructions:

- Patients who are awake:** Observe for at least 1-2 minutes. Observe legs and body uncovered. Reposition patient or observe activity, assess body for tenseness and tone. Initiate consoling interventions if needed
- Patients who are asleep:** Observe for at least 2 minutes or longer. Observe body and legs uncovered. If possible, reposition the patient. Touch the body and assess for tenseness and tone.

Face

- Score 0 point if patient has a relaxed face, eye contact and interest in surroundings
- Score 1 point if patient has a worried look to face, with eyebrows lowered, eyes partially closed, cheeks raised, mouth pursed
- Score 2 points if patient has deep furrows in the forehead, with closed eyes, open mouth and deep lines around nose/lips

Legs

- Score 0 points if patient has usual tone and motion to limbs (legs and arms)
- Score 1 point if patient has increase tone, rigidity, tense, intermittent flexion/extension of limbs
- Score 2 points if patient has hyper tonicity, legs pulled tight, exaggerated flexion/extension of limbs, tremors

PEDIATRIC PAIN MANAGEMENT (Continued)

Activity

1. Score 0 points if patient moves easily and freely, normal activity/restrictions
2. Score 1 point if patient shifts positions, hesitant to move, guarding, tense torso, pressure on body part
3. Score 2 points if patient is in fixed position, rocking, side-to-side head movement, rubbing body part

Cry

1. Score 0 points if patient has no cry/moan awake or asleep
2. Score 1 point if patient has occasional moans, cries, whimpers, sighs
3. Score 2 points if patient has frequent/continuous moans, cries, grunts

Consolability

1. Score 0 points if patient is calm and does not require consoling
2. Score 1 point if patient responds to comfort by touch or talk in ½ - 1 minute
3. Score 2 points if patient require constant consoling or is inconsolable after an extended time

Whenever feasible, behavioral measurement of pain should be used in conjunction with self-report.

When self-report is not possible, interpretation of pain behaviors and decision-making regarding treatment of pain requires careful consideration of the context in which the pain behaviors were observed.

Each category is scored on a 0-2 scale, which results in a total score of 0-10

Assessment of Behavioral Score:

- 0 = Relaxed and comfortable
- 1-3 = Mild discomfort
- 4-6 = Moderate pain
- 7-10 = Severe discomfort/pain

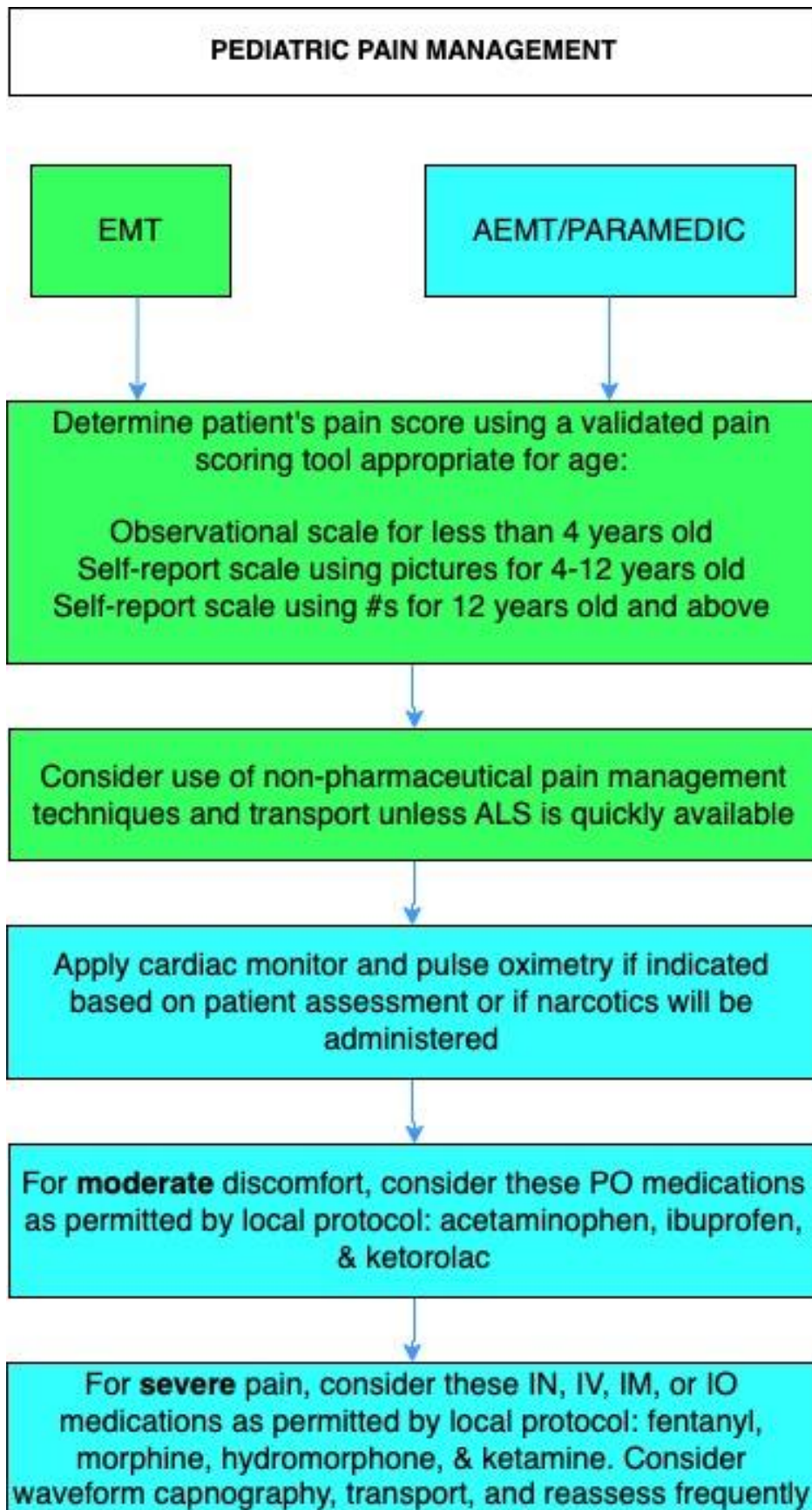
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Source: *The FLACC: A behavioral scale for scoring postoperative pain in young children*, by S Merkel and others, 1997, *Pediatr Nurse* 23(3), p. 293–297.

Faces Pain Scale – Revised (FPS-R)

Diagram Removed for this Distribution Version of the Guidelines

The International Association for the Study of Pain® (IASP) has permitted NASEMSO to reproduce the Faces Pain Scale Revised (FPS-R) for the NASEMSO website PDF version of the Guidelines. However, this diagram has been removed from this distribution version of the Guidelines, because NASEMSO does not have permission to allow others to reproduce it. To obtain permission to reproduce this diagram for your guidelines/protocols, please write to: iaspdesk@iasp-pain.org



PEDIATRIC POISONING

GENERAL CONSIDERATIONS

- A. EMS professionals should consider the possibility of accidental or self-poisoning under the following conditions:
1. History of observed or admitted accidental or intentional ingestion
 2. Coma
 3. History of known suicide gesture
 4. Suggestive intoxicated behavior (hyperactive, hypoactive, unstable walk, lethargic)
- B. Common toxidromes and symptomatology :
1. Anticholinergic: Red as a beet (flushed skin), hot as a pistol (fever), dry as a bone (dry skin), mad as a hatter (altered mental state), blind as a bat (mydriasis), and full as a flask (urinary retention). May also see CNS effects: fasciculations, muscle weakness, respiratory depression, seizures.
 2. Cholinergic: DUMBELS (mnemonic) – Diarrhea, Urination, Miosis/Muscle weakness, Bronchospasm/Bronchorrhea/Bradycardia (*the killer Bs*), Emesis, Lacrimation, Salivation/Sweating/Seizures.
 3. Opioids: respiratory depression, miosis, altered mental state, decreased bowel sounds
 4. Sympathomimetic: Tachycardia, hypertension, diaphoresis, delusional, seizures, hyperthermia, mydriasis
 5. Serotonin syndrome: Agitation, ataxia, diaphoresis, diarrhea, hyperreflexia, mental status changes, myoclonus, tremor/shivering, hyperthermia, tachycardia
- C. Consider alerting Poison Control to aid in potential therapies and to track patient outcomes: (800) 222-1222

EMT

- D. Establish airway.
- E. Obtain relevant history.
1. What, when, why taken (if known)
 2. Quantity, dose, and time taken (if known)
 3. Patient's age and weight
- F. Secure the container the substance came from and bring to the hospital, along with readily obtainable samples of medication, unless this results in an unreasonable delay of transport.
- G. Evaluate the patient's:
1. Breath sounds (rales)
 2. Level of consciousness
 3. Pupil size
 4. Evidence of head injury
- H. Depending on route poison entered body apply the following:
1. Ingested poisons – Transport (contact medical direction for prolonged transports >30 minutes or for recommendation for charcoal administration)
 2. Inhaled poisons
 - a. Remove from toxic area
 - b. Secure airway, support with 100% oxygen
 - c. Assist in ventilation if necessary

PEDIATRIC POISONING (Continued)

3. Absorbed poisons
 - a. Remove patient from hazardous environment
 - b. Identify substance
 - c. Flush skin with water before and during transport if possible – at least 10-15 minutes
 - d. If eyes are involved flush with water or saline for 10-15 minutes
4. Injected poisons
 - a. Secure and maintain airway
 - b. Find substance and introduction system, if possible
 - c. For snake bites, do not suction the wound or apply constricting bands, tourniquets, or ice

AEMT

- I. Assist EMS professionals, obtain patient condition and circumstance
- J. Apply monitor and check rhythm
- K. Start heprelock/saline lock or IV normal saline at KVO while en route to hospital. Obtain blood glucose level. Do not delay transport

PARAMEDIC

- L. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- M. If patient has an altered mental status, follow the altered level of consciousness guideline.
- N. Start heprelock/saline lock or IV normal saline at KVO. Consider fluid bolus (20 mL/kg lactated ringer's or normal saline) if evidence of hypoperfusion.
- O. Contact medical direction for prolonged transports anticipated to be greater than 30 minutes and to discuss if charcoal administration is recommended.
- P. Specific antidotes/therapies for select toxidromes:
 1. Acetylcholinesterase exposure (e.g. pesticides, nerve agents, carbamates) :
 - a. Atropine (commercially available as AtroPen® in 0.25 mg (< 7 kg patients) and 0.5 mg (7-18 kg patients) dosages given IM). < 7 kg: 0.25 mg/dose, 7-18 kg: 0.5 mg/dose, >18-41 kg: 1 mg/dose, & > 41 kg: 2 mg/dose. Doses of atropine may be repeated every 5-10 minutes. Do not administer more than 3 doses.
 - b. Pralidoxime chloride (2-PAM) (auto-injectors contain 600 mg of pralidoxime chloride given IM). Doses of 2-PAM may be repeated every 15 minutes to a maximum total of 3 doses and a 600 mg dose is suggested in patients weighing ≥ 40 kg. For patients weighing < 40 kg, dosing is 15 mg/kg/dose IM every 15 minutes to a maximum total of 3 doses.
 - c. Duodote® is a commercially available auto-injector containing 2.1 mg atropine and 600 mg pralidoxime chloride that is given IM for patients >41 kg.
 - d. Benzodiazepines should be administered if seizures are noted. See Seizure Protocol.
 2. Sympathomimetics/Stimulants (e.g. cocaine, methamphetamine, PCP, bath salts, bupropion, K2, Spice, MDMA ecstasy):
 - a. If there is complaint of chest pain, obtain EKG and look specifically for a prolonged QTc or evidence of a STEMI.
 - b. Monitor for potential arrhythmias and treat accordingly.
 - c. Expect hypertension and hyperthermia. Consider benzodiazepines for critical hypertension and external cooling measures.
 - d. Maintain vigilance for EMS personnel safety.

PEDIATRIC POISONING (Continued)

3. Opioid overdose (e.g., fentanyl, heroin, hydrocodone, carfentanil, morphine, suboxone, methadone):
 - a. Support airway with BVM and 100% O₂ as needed. Consider intubation if GCS < 8.
 - b. For patients < 5 years or ≤ 20 kg: administer naloxone 0.1 mg/kg IV/IM/IO/ETT (max dose 2 mg IV/IM/ETT) or 4 mg IN.
For patients > 20 kg and adolescents: administer naloxone 2 mg IV/IM/IO/ETT or 8 mg IN.
Repeat doses every 2-3 minutes as necessary for symptom recurrence.
 - c. Naloxone may precipitate withdrawal and resultant agitation or seizures. See Seizure protocol. Ensure EMS personnel safety measures.
4. Carbon monoxide exposure:
 - a. Remove patient from exposure/enclosed environments. Carbon monoxide is odorless. Look for sources of exposures, combustion of propane or kerosene, combustion of charcoal stoves, heaters, generators, lawn mowers, and cars. Cyanide exposure can also occur with fires.
 - b. Know that pulse oximetry can be falsely high since carbon monoxide competes with oxygen to bind hemoglobin. Symptoms can include nausea, fatigue, tachypnea, tachycardia, and cardiopulmonary arrest.
 - c. Carbon monoxide can also affect the neurologic system causing headaches, confusion, vertigo, or seizures.
 - d. Ensure EMS personnel safety by affixing a carbon monoxide detector to an equipment bag before entering a scene. If the detector detects carbon monoxide, don the appropriate PPE and direct bystanders from the scene.
 - e. Care goals
 - 1) Ensure adequate oxygenation and ventilation. Provide 100% O₂ NRB. Provide BVM if needed.
 - 2) The administration of 100% O₂ will help displace carbon monoxide from hemoglobin and it should be provided to the patient even if pulse oximetry seems adequate.
 - 3) Treat any resultant hypoperfusion.
 - 4) Look for arrhythmias with EKG and rhythm strip.
 - 5) Consider transport to receiving center specializing in hyperbaric oxygen treatment if no other trauma is present.
 - 6) Remove patient from environmental exposure and ensure EMS personnel don PPE.
 - 7) Clear and maintain airway, provide 100% NRB and provide BVM to support ventilation as needed.
 - 8) Obtain history from family/bystanders, including symptom onset and time of exposure.
 - 9) Evaluate for any sign of injury, specifically head trauma.
 - 10) Obtain history and patient past medical history from family/bystanders.
 - 11) Establish communications with medical direction and advise of patient's condition. Transport.
 - 12) Set up cardiac monitoring, pulse oximetry, and capnography (if available). Obtain temperature.
 - 13) Check glucose level.
 - 14) Assist EMS professionals, obtain patient condition and circumstances, and transport.
 - 15) If hypotensive or hypoperfused, place IV/IO and give 20 mL/kg normal saline bolus over 10 minutes. Reassess vitals.
 - 16) If hypoglycemic (glucose < 60 mg/dL), administer 2 mL/kg 25% dextrose (maximum 100 mL of D25W) IV and recheck glucose. May repeat dextrose bolus if mental status and hypoglycemia do not improve.
 - 17) Give midazolam (Versed®) 0.1 mg/kg IV (max dose 5 mg) if displaying seizure activity. May repeat midazolam 0.1 mg/kg IV (max dose 5 mg) for ongoing seizure activity > 5 minutes. EMS professionals should be aware of potential respiratory compromise with continued seizures and or additive doses of midazolam. See Seizure Protocol.

PEDIATRIC POISONING (Continued)

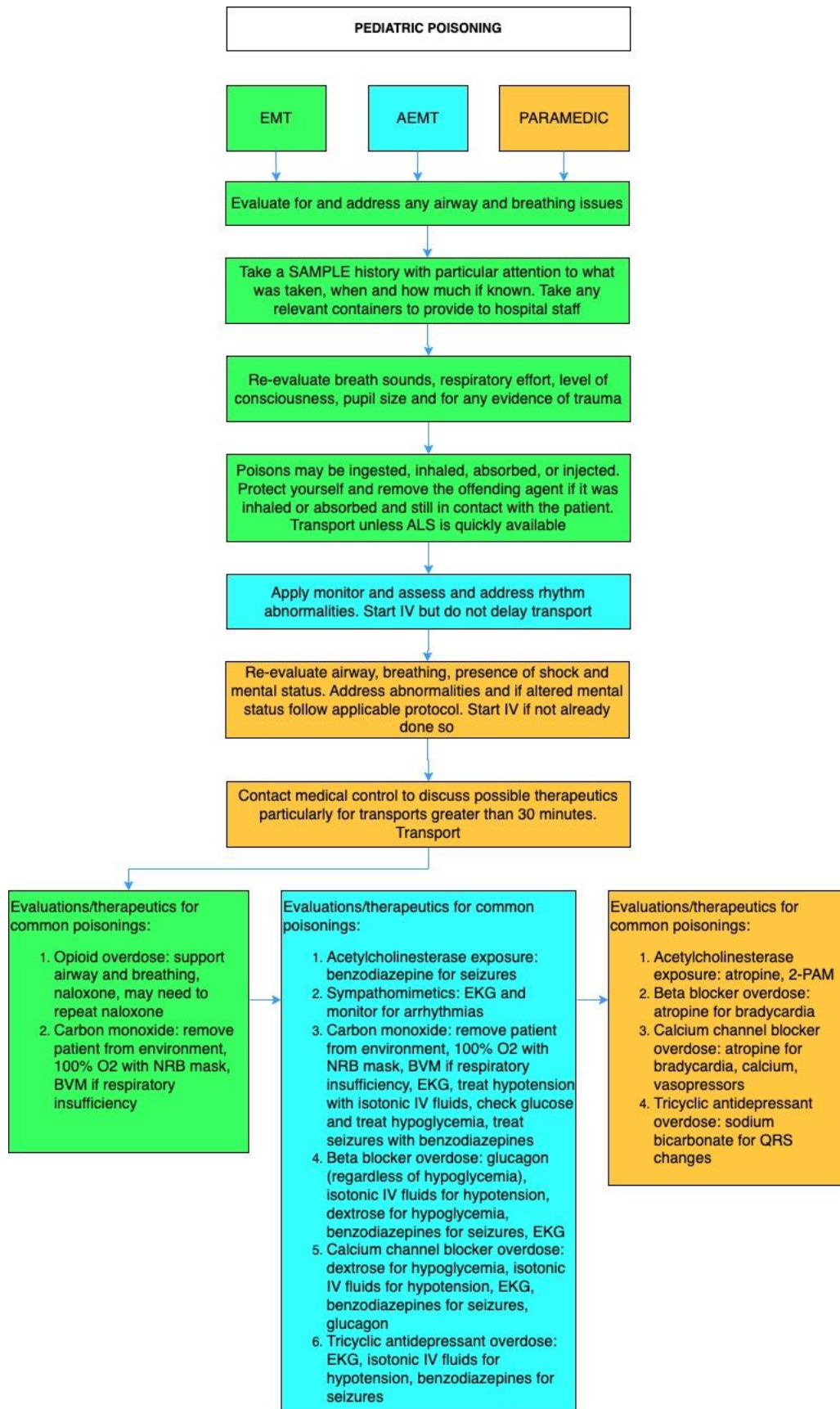
- 18) Obtain EKG. Obtain vital signs every 15 minutes.
 - 19) If patient continues to be hypotensive, continue fluid boluses (20 mL/kg normal saline bolus dose) and consider starting vasopressors if requiring > 60 mL/kg of fluid support.
 - 20) Consider intubation if GCS < 8 and ESPECIALLY if requiring ongoing blood pressure support with fluid boluses or vasopressors or has evidence of singed nares or soot-tinged sputum.
5. Beta blocker overdose
- a. Beta blocking agents: atenolol (Tenormin®), metoprolol (Lopressor®, Toprol XL®), nadolol (Corgard®), propranolol (Inderal®, InnoPran®), sotalol hydrochloride (Betapace®)
 - b. Beta-adrenergic blocking agents: carvedilol (Coreg®), labetalol hydrochloride (Trandate®, Normodyne®)
 - c. Overdose symptoms: Bradycardia, hypotension, shortness of breath, weakness, altered mental state, seizures, cardiovascular collapse
 - d. Widened QRS similar to tricyclic antidepressant (TCA) toxicity may occur with propranolol. Acebutolol and propranolol may increase QRS duration. Sotalol may increase QTc and induce ventricular dysrhythmias.
 - e. Care goals
 - 1) Be prepared to protect airway as patients may rapidly decompensate with severe bradycardia and hypotension.
 - 2) Reduce GI absorption and further toxicity, especially if extended-release formulation (e.g. administration of activated charcoal 1 g/kg). Charcoal should never be used in the out-of-hospital setting in patients with altered mental status or who are at risk for altered mental status without clear directions from a physician. Charcoal in an unprotected airway can be deadly.
 - 3) Assess respirations and perfusion.
 - 4) Set up cardiac monitor, pulse oximetry, and capnography (if available).
 - 5) Clear and maintain airway, provide 100% NRB and provide BVM to support ventilation as needed. Use a nasopharyngeal airway if needed, consider use of an oral airway (only if patient is obtunded, as a conscious patient may vomit with an oral airway in place).
 - 6) Obtain history from family/bystanders, including symptom onset and time of exposure.
 - 7) Secure medications ingested for transport with patient to hospital.
 - 8) Obtain history and patient past medical history (especially pertinent cardiac history) from family/bystanders.
 - 9) Establish communications with medical direction and advise of patient's condition. Transport.
 - 10) Check glucose level.
 - 11) If hypotensive or hypoperfused, place IV/IO and give 20 mL/kg normal saline bolus over 10 minutes. Reassess vitals.
 - 12) If bradycardic and hypotensive, consider giving glucagon. Anticipate vomiting.
 - i. Infants and children: 0.05 mg/kg IV glucagon
 - ii. Adolescents: 5-10 mg IV glucagon
 - 13) If hypoglycemic (glucose < 60 mg/dL), administer 2 mL/kg 25% dextrose (maximum 100 mL of D25W) IV and recheck glucose. May repeat dextrose bolus if mental status and hypoglycemia do not improve.

PEDIATRIC POISONING (Continued)

- 14) If displaying seizure activity, give midazolam (Versed®) 0.1 mg/kg IV (max dose 5 mg). May repeat midazolam 0.1 mg/kg IV (max dose 5 mg) for ongoing seizure activity > 5 minutes. EMS professionals should be aware of potential respiratory compromise with continued seizures and or additive doses of midazolam. See Seizure Protocol.
 - 15) Obtain EKG. Obtain vital signs every 15 minutes.
 - 16) Give atropine to treat bradycardia
 - i. Adults: atropine 1 mg rapid IV push q 5 minutes (maximum total dose 3 mg)
 - ii. Pediatrics: atropine 0.02 mg/kg rapid IV push (minimum dose 0.1 mg and max dose 0.5 mg) q 5 minutes (maximum total dose 1 mg)
 - 17) Consider transcutaneous pacing if refractory bradycardia with hypotension.
 - i. Transcutaneous pacing may not always capture nor correct hypotension when capture is successful.
 - 18) If patient continues to be hypotensive, continue fluid boluses (20 mL/kg normal saline bolus dose) and consider starting vasopressors if requiring > 60 mL/kg of fluid support. See Shock Protocol
 - 19) Consider intubation if GCS < 8 and especially if requiring ongoing blood pressure support with fluid boluses or vasopressors.
6. Calcium channel blocker overdose
- a. Calcium channel blocking agents: amlodipine (Norvasc®), diltiazem (Cardizem®, Tiazac®), isradipine, felodipine, nifedipine (Adalat CC®, Afeditab CR®, Procardia®), nisoldipine (Sular®), verapamil (Calan®, Verelan®)
 - b. Overdose symptoms: Bradycardia, hypotension, decreased AV nodal conduction, cardiogenic shock, hyperglycemia. Mental status may be surprisingly clear initially, due to neuroprotective effects of calcium channel blockers.
 - c. Calcium channel blockers can cause many rhythm disturbances, from sinus bradycardia to complete heart block.
 - d. Care goals
 - 1) Reduce GI absorption and further toxicity, especially if extended release formulation (e.g. administration of activated charcoal 1 g/kg). Charcoal should never be used in the out-of-hospital setting in patients with altered mental status or who are at risk for altered mental status without clear directions from a physician. Charcoal in an unprotected airway can be deadly.
 - 2) Be prepared to protect airway, as patients may rapidly decompensate.
 - 3) Obtain EKG. Obtain vital signs every 15 minutes.
 - 4) Support vitals such as bradycardia and hypoperfusion:
 - i. If hypotensive or hypoperfused, place IV/IO and give 20 mL/kg normal saline bolus. Reassess vitals. Give atropine to treat bradycardia - Adults: atropine 1 mg rapid IV push q 5 minutes (maximum total dose 3 mg) Pediatrics: atropine 0.02 mg/kg rapid IV push (minimum dose 0.1 mg and max dose 0.5 mg) q 5 minutes (maximum total dose 1 mg)
 - 5) Assess respirations and perfusion. Set up cardiac monitoring, pulse oximetry, and capnography.
 - 6) Clear and maintain airway, provide 100% NRB and provide BVM to support ventilation as needed. Use a nasopharyngeal airway if needed, consider use of an oral airway (only if patient is obtunded, as a conscious patient may vomit with an oral airway in place).
 - 7) Obtain history from family/bystanders, including symptom onset and time of exposure.
 - 8) Secure medications ingested for transport with patient to hospital.
 - 9) Establish communications with medical direction and advise of patient's condition. Transport.
 - 10) Assist EMS professionals, obtain patient condition and circumstances. Transport.
 - 11) If bradycardic and hypotensive, consult Shock protocol and update medical direction.

PEDIATRIC POISONING (Continued)

- 12) If displaying seizure activity, give midazolam (Versed®) 0.1 mg/kg IV (max dose 5 mg). May repeat midazolam 0.1 mg/kg midazolam (max dose 5 mg) for ongoing seizure activity > 5 minutes. EMS professionals should be aware of potential respiratory compromise with continued seizures and or additive doses of midazolam. See Seizure Protocol.
 - 13) If ongoing bradycardia, consider calcium gluconate or calcium chloride:
 - 14) Calcium gluconate
 - i. Adult: calcium gluconate 2-6 g slow IV over 10 minutes
 - ii. Pediatrics: calcium gluconate 60 mg/kg (maximum 3 g) IV over 10 minutes
 - 15) Calcium chloride: (central line or IO administration preferred due to risk of tissue damage)
 - i. Adult: calcium chloride 1-2 g IV over 5-10 minutes
 - ii. Pediatrics: calcium chloride 20 mg/kg (maximum 2 g) IV over 5-10 minutes
 - 16) If patient continues to be hypotensive, continue fluid boluses (20 mL/kg normal saline bolus dose) and consider starting vasopressors if requiring > 60 mL/kg of fluid support. See Shock Protocol.
 - 17) If continued poor perfusion or bradycardia despite atropine, calcium, and vasopressors consider glucagon. Anticipate vomiting.
 - i. Infants and children: 0.05 mg/kg IV
 - ii. Adolescents: 5-10 mg IV
 - 18) Consider transcutaneous pacing if refractory bradycardia with hypotension.
 - i. Transcutaneous pacing may not always capture nor correct hypotension when capture is successful.
 - 19) Consider intubation if GCS < 8 and especially if requiring ongoing blood pressure support with fluid boluses or vasopressors.
7. Tricyclic antidepressant (TCA) overdose:
- a. Amitriptyline (Elavil), doxepin (Silenor or Sinequan), nortriptyline (Pamelor), imipramine (Tofranil)
 - b. Overdose symptoms: confusion, coma, seizures, tachycardia, hypotension, conduction abnormalities, dilated pupils, hyperthermia and flushing
 - c. Cardiac: QRS > 100 msec likely reflects severe toxicity and risk for ventricular tachycardia or ventricular fibrillation
 - d. Care goals
 - 1) Be prepared to protect airway, as patients are often obtunded and can decompensate quickly.
 - 2) Obtain EKG. Obtain vital signs every 15 minutes.
 - 3) If QRS > 100 msec or ventricular arrhythmia, give sodium bicarbonate 1-2 mEq/kg IV over 1-2 minutes in pediatric patients. Give 50-100 mEq IV sodium bicarbonate to adolescent/adult patients.
 - 4) Support vitals such as bradycardia and hypoperfusion:
 - 5) If hypotensive or hypoperfused, place IV/IO and give 20 mL/kg normal saline bolus. Reassess vitals.
 - 6) If hypotension refractory after 60 mL/kg of fluid boluses, norepinephrine is the preferred vasoactive. See Shock Protocol and update medical direction.
 - 7) If displaying seizure activity or severe agitation, give midazolam (Versed®) 0.1 mg/kg IV (max dose 5 mg). May repeat midazolam 0.1 mg/kg IV (max dose 5 mg) for ongoing seizure activity > 5 minutes. EMS professionals should be aware of potential respiratory compromise with continued seizures and or additive doses of midazolam. Ensure safety of EMS personnel. See Seizure Protocol.



EMT

A. General Considerations

1. Maximize and maintain safety for the patient, EMS personnel, and others.
2. Applies to patients who are exhibiting agitated, violent, or uncooperative behavior or who are a danger to self or others.
3. Medical direction should be contacted at any time for advice, especially when patient's level of agitation is such that transport may place all parties at risk.
4. Transport by air is not advised.
5. Stretchers with adequate foam padding, particularly around the head, facilitates patient's ability to self-position the head and neck to maintain airway patency.
6. For patients with key-locking devices, applied by another agency, consider the following options:
 - a. Remove device and replace it with a device that does not require a key
 - b. Administer pharmacologic management medication then remove and replace device with another non-key-locking device after patient has become more cooperative
 - c. Transport patient, accompanied in patient compartment by person who has device key
 - d. Transport patient in vehicle of person with device key if medical condition of patient is deemed stable, direct medical direction so authorizes, and law allows

B. Evaluate

1. Note medications/substances on scene that may contribute to the agitation, or may be relevant to the treatment of a contributing medical condition.
2. Assess and support airway if necessary.
3. Note respiratory rate and effort.
4. Assess circulatory status:
 - a. Blood pressure (if possible)
 - b. Pulse rate
 - c. Capillary refill
5. Assess mental status.
6. Check blood glucose (if possible).
7. Obtain temperature (if possible).
8. Assess for evidence of traumatic injuries.
9. Use a validated risk assessment tool such as RASS (Richmond Agitation Sedation Score), AMSS (Altered Mental Status Score), or BARS (Behavioral Activity Rating Scale) to risk stratify violent patients to help guide interventions.

C. Establish patient rapport

1. Attempt verbal reassurance and calm patient prior to use of pharmacologic and/or physical management devices.
2. Engage family members/loved ones to encourage patient cooperation if their presence does not exacerbate the patient's agitation.
3. Continued verbal reassurance and calming of patient following use of chemical/physical management devices.

AEMT/ PARAMEDIC

A. Pharmacologic management

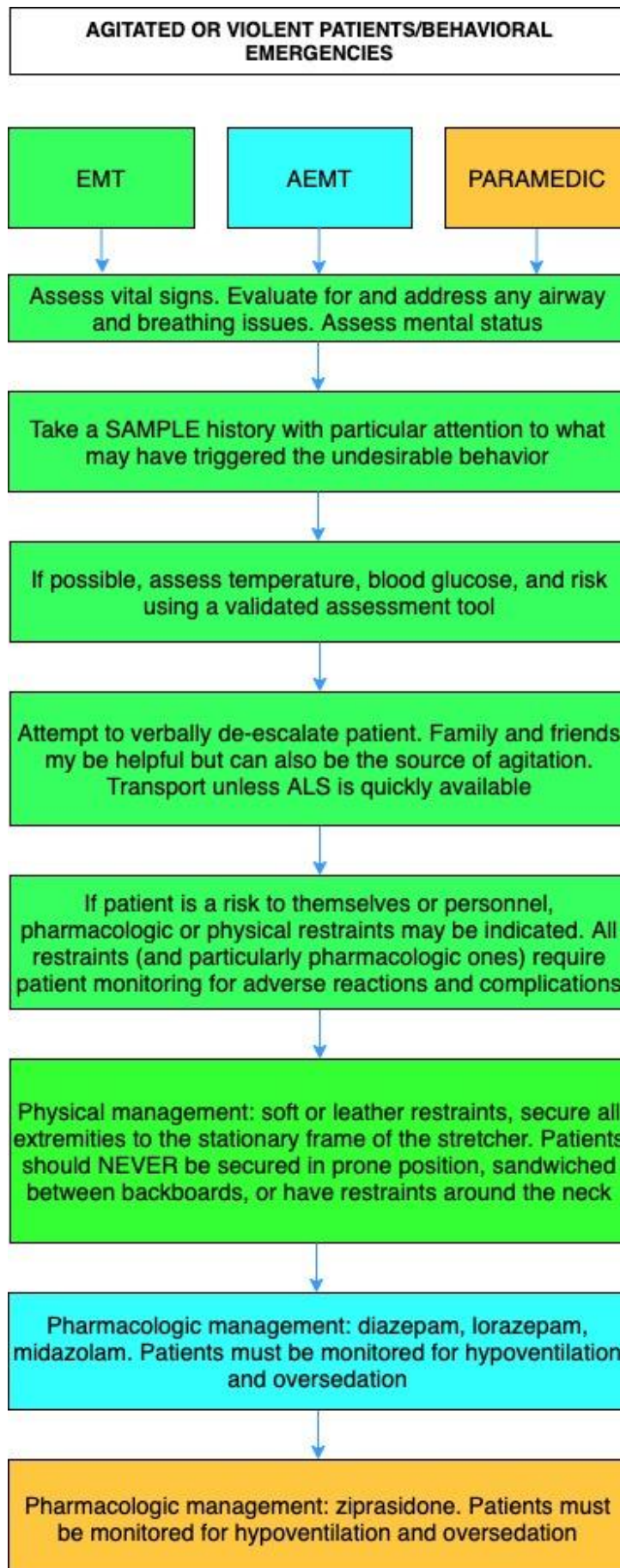
1. Selection of medications for pharmacologic management should be based upon the patient's clinical condition, current medications, and allergies in addition to EMS resources and medical direction.

AGITATED OR VIOLENT PATIENT/BEHAVIORAL EMERGENCIES (Continued)

2. The medications are annotated to indicate when they are preferred for patients that are particularly high risk for violence as assessed by a validated scale – note that the dosing can be adjusted to achieve different levels of sedation.
 - a. Benzodiazepines
 - i. Diazepam: 0.05-0.1 mg/kg IV over 3-5 minutes (maximum dose is 5 mg) 2-5 minute onset of action
or 0.1-0.2 mg/kg IM (maximum dose is 10 mg) 15-30 minute onset of action
 - ii. Lorazepam: 0.05 mg/kg IV over 3-5 minutes (maximum dose is 2 mg) 2-5 minute onset of action **or** 0.5-2 mg IM (maximum dose is 4 mg) 15-30 minute onset of action
 - iii. Midazolam: 0.05-0.1 mg/kg IV over 3-5 minutes (maximum dose 5 mg) 3-5 minute onset of action **or** 0.1mg/kg IM (maximum dose is 5 mg) 10-15 minute onset of action **or** 0.2mg/kg IN (maximum dose is 5 mg) 3-5 minute onset of action
 - b. Antipsychotics: Ziprasidone:
 - i. Age 5-11 years old: 10 mg IM (*limited data available for pediatric use*) 30-45 minute onset of action.
 - ii. Age 12-18 years old: 10-20 mg IM 30-45 minute onset of action
- B. Physical Management Devices
 1. Body
 - a. Stretcher straps should be applied as the standard procedure for all patients during transport.
 - b. Physical management devices, including stretcher straps, should never restrict the patient's chest wall motion.
 - c. If necessary, sheets may be used as improvised supplemental stretcher straps. Other forms of improvised physical management devices should be discouraged.
 - d. Supplemental straps or sheets may be necessary to prevent flexion/extension of torso, hips, legs by being placed around the lower lumbar region, below the buttocks, and over the thighs, knees, and legs.
 2. Extremities
 - a. Soft or leather devices should not require a key to release them.
 - b. Secure all four extremities to maximize safety for patient, staff, and others.
 - c. Secure all extremities to the stationary frame of the stretcher.
 - d. Multiple knots should not be used to secure a device.
- C. Patient Safety Considerations
 1. The management of violent patients requires a constant reevaluation of the risk/benefit balance for the patient and bystanders in order to provide the safest care for all involved. These are complex and high-risk encounters. There is no one size fits all solution for addressing these patients.
 2. Don PPE.
 3. Do not attempt to enter or control a scene where physical violence or weapons are present.
 4. Dispatch law enforcement immediately to secure and maintain scene safety.
 5. Urgent de-escalation of patient agitation is imperative in the interest of patient safety as well as for EMS personnel and others on scene.
 6. Uncontrolled or poorly controlled patient agitation and physical violence can place the patient at risk for sudden cardiopulmonary arrest due to the following etiologies:
 - a. Excited delirium/exhaustive mania: A postmortem diagnosis of exclusion for sudden death thought to result from metabolic acidosis (most likely from lactate) stemming from physical agitation or physical control measures and potentially exacerbated by stimulant drugs (e.g. cocaine) or alcohol withdrawal
 - b. Positional asphyxia: Sudden death from restriction of chest wall movement and/or obstruction of the airway secondary to restricted head or neck positioning resulting in hypercarbia and/or hypoxia
 7. Apply a cardiac monitor as soon as possible, particularly when pharmacologic management medications have been administered.

AGITATED OR VIOLENT PATIENT/BEHAVIORAL EMERGENCIES (Continued)

8. All patients who have received pharmacologic management medications must be monitored closely for the development of hypoventilation and oversedation. Utilize capnography if available.
9. Patients who have received antipsychotic medication for pharmacologic management must be monitored closely for the potential development of:
 - a. Dystonic reactions (this can easily be treated with diphenhydramine)
 - b. Mydriasis (dilated pupils)
 - c. Ataxia
 - d. Cessation of perspiration
 - e. Dry mucous membranes
 - f. Cardiac arrhythmias (particularly QT prolongation)
10. Placement of stretcher in sitting position prevents aspiration and reduces the patient's physical strength by placing the abdominal muscles in the flexed position.
11. Patients who are more physically uncooperative should be physically secured with one arm above the head and the other arm below the waist, and both lower extremities individually secured.
12. The following techniques should be expressly **prohibited by** EMS providers:
 - a. Secure or transport in a prone position with or without hands and feet behind the back (hobbling or "hog-tying")
 - b. "Sandwiching" patients between backboards
 - c. Techniques that constrict the neck or compromise the airway
 - d. EMS provider use of weapons as adjuncts in managing a patient
 - e. Concurrent use of IM/IV benzodiazepines and olanzapine IM is not recommended as fatalities have been reported



PEDIATRIC RESPIRATORY DISTRESS - CROUP

GENERAL CONSIDERATIONS

- A. Alleviate respiratory distress.
- B. Promptly identify respiratory distress, respiratory failure, and respiratory arrest, and intervene for patients who require escalation of therapy.
- C. Deliver appropriate therapy by differentiating other causes of pediatric respiratory distress.

EMT

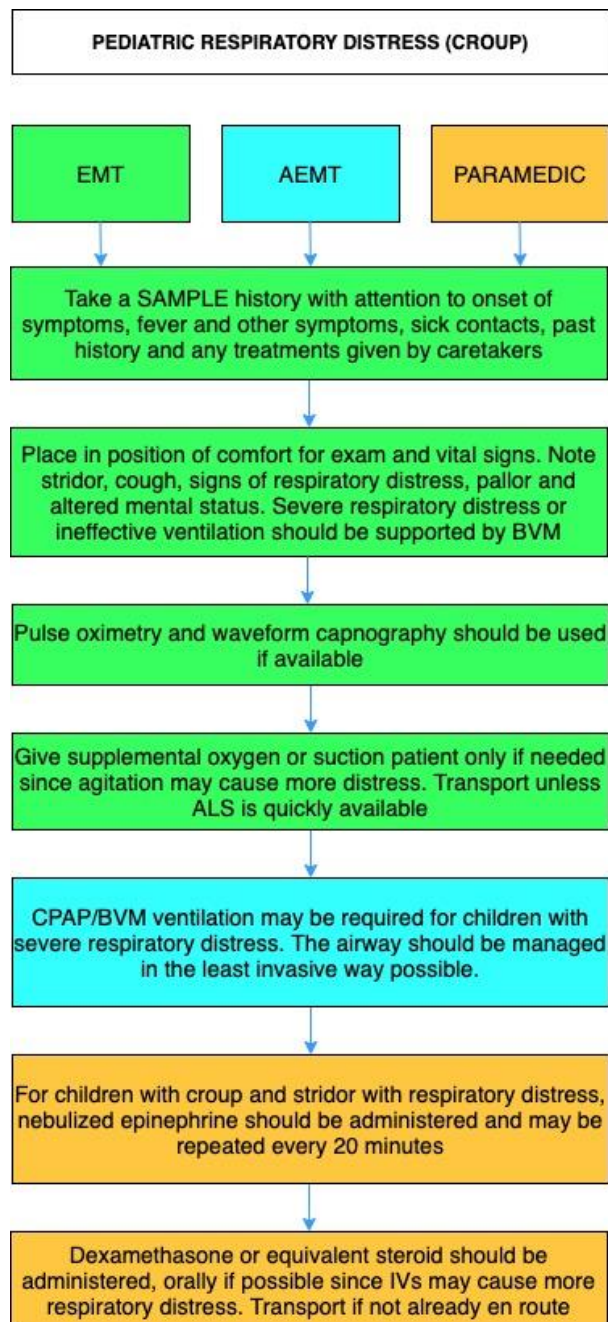
- A. Evaluate
 - 1. History:
 - a. Onset of symptoms (history of choking)
 - b. Concurrent symptoms (fever, cough, rhinorrhea, tongue/lip swelling, rash, labored breathing, foreign body aspiration)
 - c. Sick contacts
 - d. Treatments given
 - e. Personal history of asthma, wheezing, or croup in past
 - 2. Exam:
 - a. Place patient in position of comfort (lap of guardian may be necessary)
 - b. Full set of vital signs (T, BP, RR, P, O₂ saturation)
 - c. Presence of stridor at rest or when agitated
 - d. Description of cough
 - e. Other signs of distress (grunting, nasal flaring, retracting)
 - f. Color (pallor, cyanosis, normal)
 - g. Mental status (alert, tired, lethargic, unresponsive)
- B. Management
 - 1. Monitoring
 - 2. Pulse oximetry and end-tidal CO₂ (ETCO₂) should be routinely used as an adjunct to other forms of respiratory monitoring
- C. Airway
 - 1. Give supplemental oxygen. Escalate from a nasal cannula to a simple face mask to a non-breather mask as needed, in order to maintain normal oxygenation
 - 2. Suction the nose and/or mouth (via bulb, Yankauer®, or suction catheter) if excessive secretions are present and patient will tolerate

AEMT/ PARAMEDIC

- A. Inhaled medications:
 - 1. Epinephrine 5 mL of 1 mg/mL (5 mg) nebulized, should be administered to all children with croup in respiratory distress with signs of stridor at rest - this medication can be repeated at this dose every 20 minutes if the child persists with stridor at rest. Use repeated doses with caution as there are case reports of arrhythmias associated with this.
 - 2. Humidified oxygen or mist therapy is **not** indicated.
- B. Medications – dexamethasone 0.6 mg/kg oral, IV, or IM to maximum dose of 16 mg should be administered to patients with suspected croup (other equivalently dosed steroids are acceptable). The injectable formulation of dexamethasone may be given orally to decrease the volume required.
- C. Utility of IV placement and fluids - IVs should only be placed in children with respiratory distress for clinical concerns of dehydration, or when administering IV medications.

PEDIATRIC RESPIRATORY DISTRESS - CROUP (Continued)

- D. Improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts:
1. Continuous positive airway pressure (CPAP) should be administered for severe respiratory distress.
 2. Bag-valve-mask ventilation should be utilized in children with respiratory failure.
- E. Supraglottic devices and intubation - supraglottic devices and intubation should be utilized only if bag-valve-mask ventilation fails. The airway should be managed in the least invasive way possible.



PEDIATRIC RESPIRATORY DISTRESS - BRONCHIOLITIS

GENERAL CONSIDERATIONS

- A. Alleviate respiratory distress.
- B. Promptly identify respiratory distress, failure, and/or arrest, and intervene for patients who require escalation of therapy.
- C. Deliver appropriate therapy by differentiating other causes of pediatric respiratory distress.
- D. Child less than 2 years old typically with diffuse rhonchi or an otherwise undifferentiated illness characterized by rhinorrhea, cough, fever, tachypnea, and/or respiratory distress.

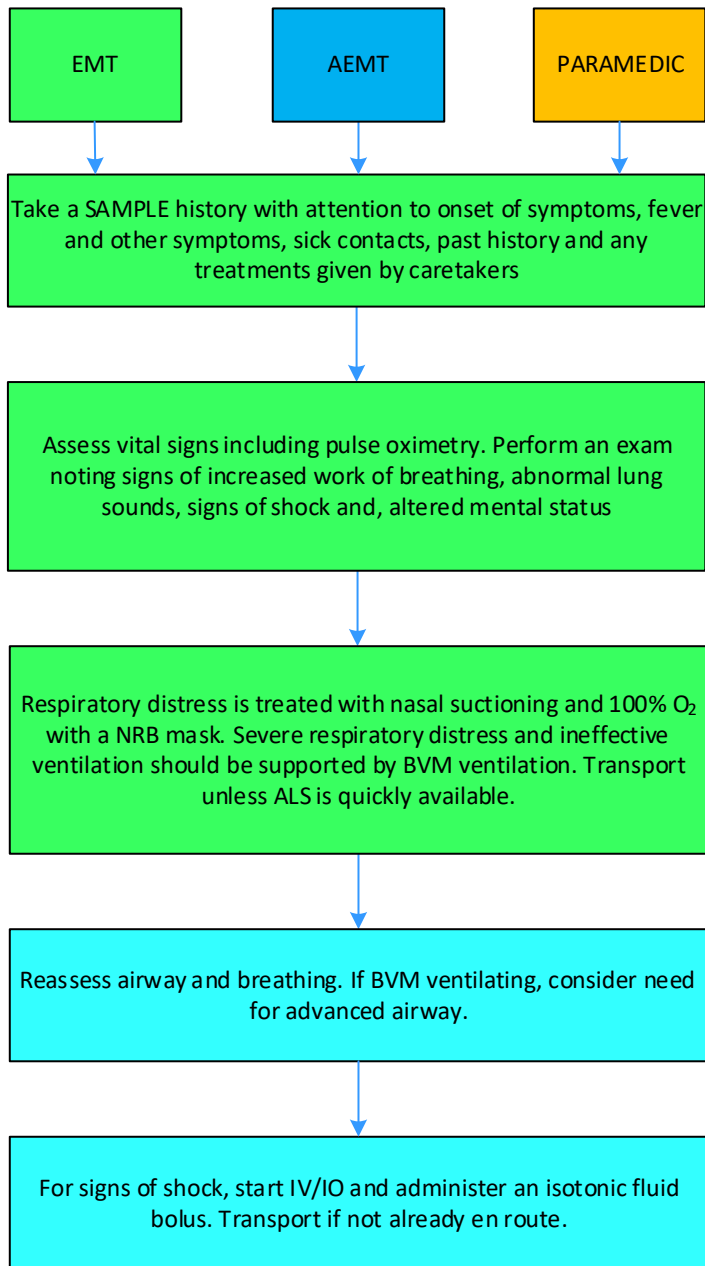
EMT

- A. Evaluate
 - 1. History
 - a. Onset of symptoms
 - b. Concurrent symptoms (e.g. fever, cough, rhinorrhea, tongue/lip swelling, rash, labored breathing, foreign body aspiration)
 - c. Sick contacts
 - d. History of wheezing
 - e. Treatments given
 - f. Number of emergency department visits in the past year
 - g. Number of admissions in the past year
 - h. Number of ICU admissions ever
 - i. History of prematurity
 - j. Family history of asthma, eczema, or allergies
 - 2. Exam
 - a. Full set of vital signs (T, BP, RR, P, O₂ saturation)
 - b. Air entry (normal vs. diminished)
 - c. Breath sounds (wheezes, crackles, rales, rhonchi, diminished, clear)
 - d. Signs of distress (grunting, nasal flaring, retracting, stridor)
 - e. Weak cry or inability to speak full sentences (sign of shortness of breath)
 - f. Color (pallor, cyanosis, normal)
 - g. Mental status (alert, tired, lethargic, unresponsive)
 - h. Signs of dehydration (sunken eyes, delayed capillary refill, dry mucous membranes, sunken fontanel in infants)
- B. Treatment and Interventions
 - 1. Pulse oximetry and end-tidal CO₂ (ETCO₂) should be routinely used as an adjunct to other forms of respiratory monitoring
 - 2. Perform EKG only if there are no signs of clinical improvement after treating respiratory distress
 - 3. Airway
 - a. Give supplemental oxygen – escalate from a nasal cannula to a simple face mask to a non-breather mask as needed, in order to maintain normal oxygenation
 - b. Suction the nose and/or mouth (via bulb, nasal suction tip (e.g., BBG), or suction catheter) if excessive secretions are present
 - 4. Utility of IV placement and fluids - IVs should only be placed in children with respiratory distress for clinical concerns of dehydration, or when administering IV medications
 - 5. Steroids are generally not efficacious, and not given in the out-of-hospital setting
 - 6. Improvement of oxygenation and/or respiratory distress with non-invasive airway adjuncts
 - a. Continuous positive airway pressure (CPAP) or high flow nasal cannula (HFNC) should be administered, when available, for severe respiratory distress
 - b. Bag-valve-mask ventilation should be utilized in children with respiratory failure

PEDIATRIC RESPIRATORY DISTRESS - BRONCHIOLITIS (Continued)

7. Supraglottic devices and intubation
 - a. Supraglottic devices and intubation should be utilized only if bag-valve-mask ventilation fails
 - b. The airway should be managed in the least invasive way possible
- C. Key Considerations
 1. Suctioning can be a very effective intervention to alleviate distress, since infants are obligate nose breathers.
 2. Insufficient data exist to recommend the use of inhaled steam or nebulized saline.
 3. Though albuterol has previously been a consideration, the most recent evidence does not demonstrate a benefit in using it for bronchiolitis.
 4. Ipratropium and other anticholinergic agents should not be given to children with bronchiolitis in the out-of-hospital setting.
 5. Though nebulized hypertonic saline has been shown to decrease hospital length of stay when used for bronchiolitis, it does not provide immediate relief of distress and should not be administered to children in respiratory distress in the out-of-hospital setting.

BRONCHIOLITIS (RESPIRATORY DISTRESS TYPICALLY IN CHILDREN LESS THAN 2 YEARS OF AGE)



RESPIRATORY DISTRESS - ASTHMA

GENERAL CONSIDERATIONS

- A. Wheezing in the 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.
- B. Asthma is typically an illness of children greater than 2 years of age. Under 2 years of age, wheezing is more commonly associated with bronchiolitis
- C. Respiratory distress with wheezing or decreased air entry in patients 2 years or older, may be presumed to be due to bronchospasm from reactive airway disease or asthma. These patients may have a history of recurrent wheezing that improves with beta-agonist inhalers/nebulizers such as albuterol or levalbuterol
- D. Inhaled magnesium sulfate should not be administered
- E. Nebulizer droplets can carry viral particles, so additional PPE should be considered, including placement of a surgical mask over the nebulizer to limit droplet spread
- F. In the asthmatic patient, pharmacologic intervention should take priority over CPAP/BiPAP and be given in line with CPAP/BiPAP
- G. Giving positive pressure in the setting of bronchoconstriction, either via a supraglottic airway or intubation, increases the risk of air trapping which can lead to pneumothorax and cardiovascular collapse. These interventions should be reserved for situations of respiratory failure

EMT

A. History

- a. Onset of symptoms
- b. Concurrent symptoms (fever, cough, rhinorrhea, tongue/lip swelling, rash, labored breathing, foreign body aspiration)
- c. Usual triggers of symptoms (cigarette smoke, change in weather, upper respiratory infections)
- d. Sick contacts
- e. Treatments given
- f. Previously intubated
- g. Number of emergency department visits in the past year
- h. Number of admissions in the past year
- i. Number of ICU admissions
- j. History of prematurity
- k. Family history of asthma, eczema, or allergies

B. Exam

- a. Full set of vital signs (T, BP, RR, P, O₂ saturation)
- b. Air entry (normal vs. diminished, prolonged expiratory phase)
- c. Breath sounds (wheezes, crackles, rales, rhonchi, diminished, clear)
- d. Signs of distress (grunting, nasal flaring, retracting, stridor)
- e. Weak cry or Inability to speak full sentences (sign of shortness of breath)
- f. Color (pallor, cyanosis, normal)
- g. Mental status (alert, tired, lethargic, unresponsive)-If respiratory effort is insufficient or patient is becoming unconscious, assist ventilations with BVM.
- h. Hydration status (+/- sunken eyes, delayed capillary refill, mucus membranes moist vs. tacky, fontanel flat vs. sunken)
- i. Signs of distress include:
 - i. Apprehension, anxiety, combativeness
 - ii. Hypoxia (< 90% oxygen saturation)
 - iii. Intercostal/subcostal/supraclavicular retractions
 - iv. Nasal flaring
 - v. Cyanosis

RESPIRATORY DISTRESS – ASTHMA (Continued)

- C. Place child in position of comfort, encourage parent to hold child secure position. Keep child and parent calm.
- D. Give supplemental oxygen. Escalate from a nasal cannula to a simple face mask to a non-rebreather mask as needed, in order to maintain normal oxygenation. For severe respiratory distress and/or persistent low pulse oximetry, provide non-invasive positive pressure ventilation via continuous positive airway pressure (CPAP). Bag-valve-mask ventilation should be utilized in children with respiratory failure.

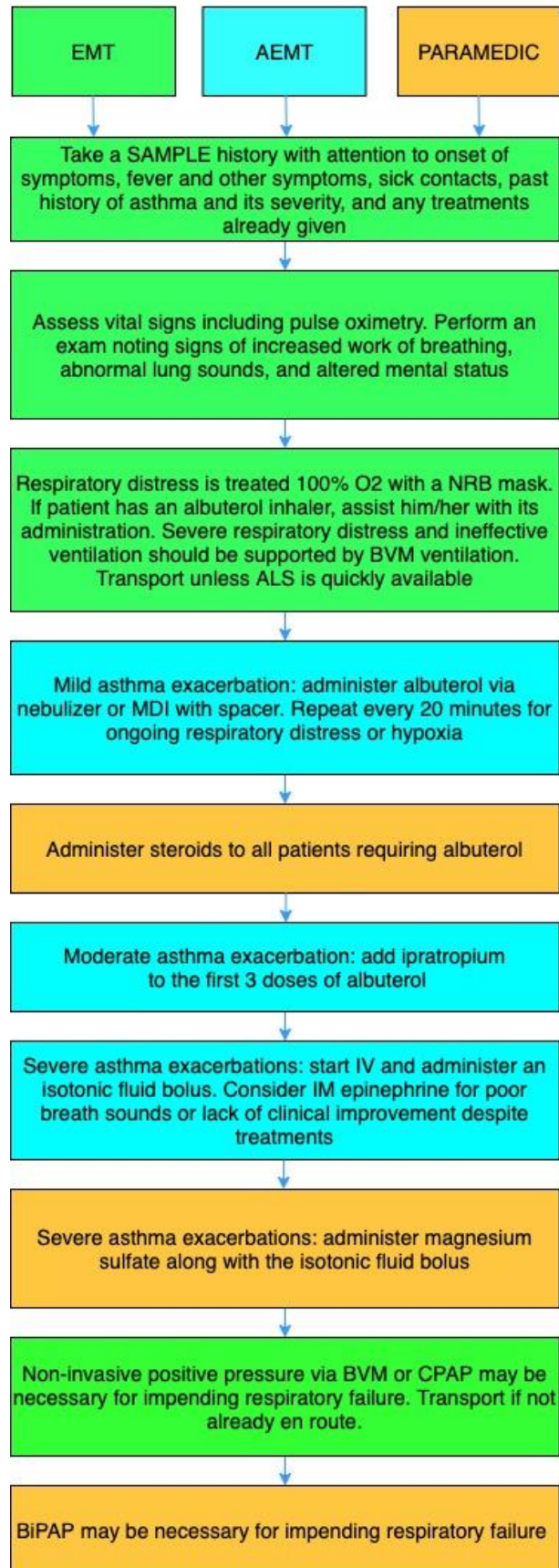
AEMT

- A. Monitoring
 - a. Pulse oximetry and end-tidal CO₂ (ETCO₂) should be routinely used as an adjunct to other forms of respiratory monitoring
 - b. Check an EKG only if there are no signs of clinical improvement after treating respiratory distress
- B. Airway (Administer 100% oxygen in the least threatening manner.)
 - a. Give supplemental oxygen. Escalate from a nasal cannula to a simple face mask to a non-rebreather mask as needed, in order to maintain normal oxygenation
 - b. Suction the nose and/or mouth (via bulb, Yankauer®, suction catheter) if excessive secretions are present
- C. Inhaled medications for asthma
 - a. Albuterol 5 mg nebulized (or 6 puffs metered dose inhaler) should be administered to all patients in respiratory distress with signs of bronchospasm either by BLS or ALS providers - this medication can be repeated at this dose q 20 minutes for ongoing distress
 - b. Ipratropium 0.5 mg nebulized should be given every 20 minutes up to 3 doses, in conjunction with albuterol
- D. Utility of IV placement and fluids - IVs should be placed when there are clinical concerns of dehydration in order to administer fluids, or when administering IV medications
- E. Epinephrine (0.01 mg/kg of 1 mg/mL IM, maximum dose of 0.3 mg) should only be administered for impending respiratory failure as adjunctive therapy (or if anaphylaxis is a possibility) when there are no clinical signs of improvement

PARAMEDIC

- F. Steroids – methylprednisolone (2 mg/kg, maximum dose 125 mg) IV/IM or dexamethasone (0.6 mg/kg, maximum dose of 16 mg) IV/IM/PO may be administered in the out-of-hospital setting. Other steroids at equivalent doses may be given as alternatives (steroids are not efficacious for bronchiolitis)
- G. Magnesium sulfate (40 mg/kg IV, maximum dose of 2 g) should be administered over 10-15 minutes for severe bronchoconstriction and concern for impending respiratory failure. Anticipate hypotension. Administer with a 20 mL/kg NS bolus IV if patient has not yet received fluids.
- H. Supraglottic devices and intubation – should be utilized only if CPAP, bi-level positive airway pressure (BiPAP), or bag-valve-mask ventilation fails. The airway should be managed in the least invasive way possible

**ASTHMA (RESPIRATORY DISTRESS TYPICALLY IN CHILDREN
GREATER THAN 2 YEARS OF AGE)**



RESPIRATORY DISTRESS - Upper Airway Obstruction

GENERAL CONSIDERATIONS

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

EMT

- A. Quickly obtain SAMPLE history and non-invasive respiratory assessment.
 - 1. Total airway obstruction/Suspected foreign body in airway
 - a. Manual clearing only if foreign body is visible - NO BLIND FINGER SWEEP
 - b. Five back blows alternating with five chest thrusts repeatedly in children less than 1 year of age until the foreign body is expelled or the child becomes unconscious.
 - c. Five abdominal thrusts alternating with five chest thrusts repeatedly in children over 1 year of age until the foreign body is expelled or the child becomes unconscious.
 - 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.
 - iv) Resume chest thrust and back blows/abdominal thrusts if patient is conscious
 - v) Begin CPR if the patient is unconscious
 - 2. Partial Airway Obstruction
 - a. Do not agitate the child and do not examine the throat.
 - b. Administer oxygen "blow-by" or, if tolerate, non-rebreathing face mask
- 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.
- C. Transport the child in a secure upright position immediately to the nearest appropriate hospital.

AEMT

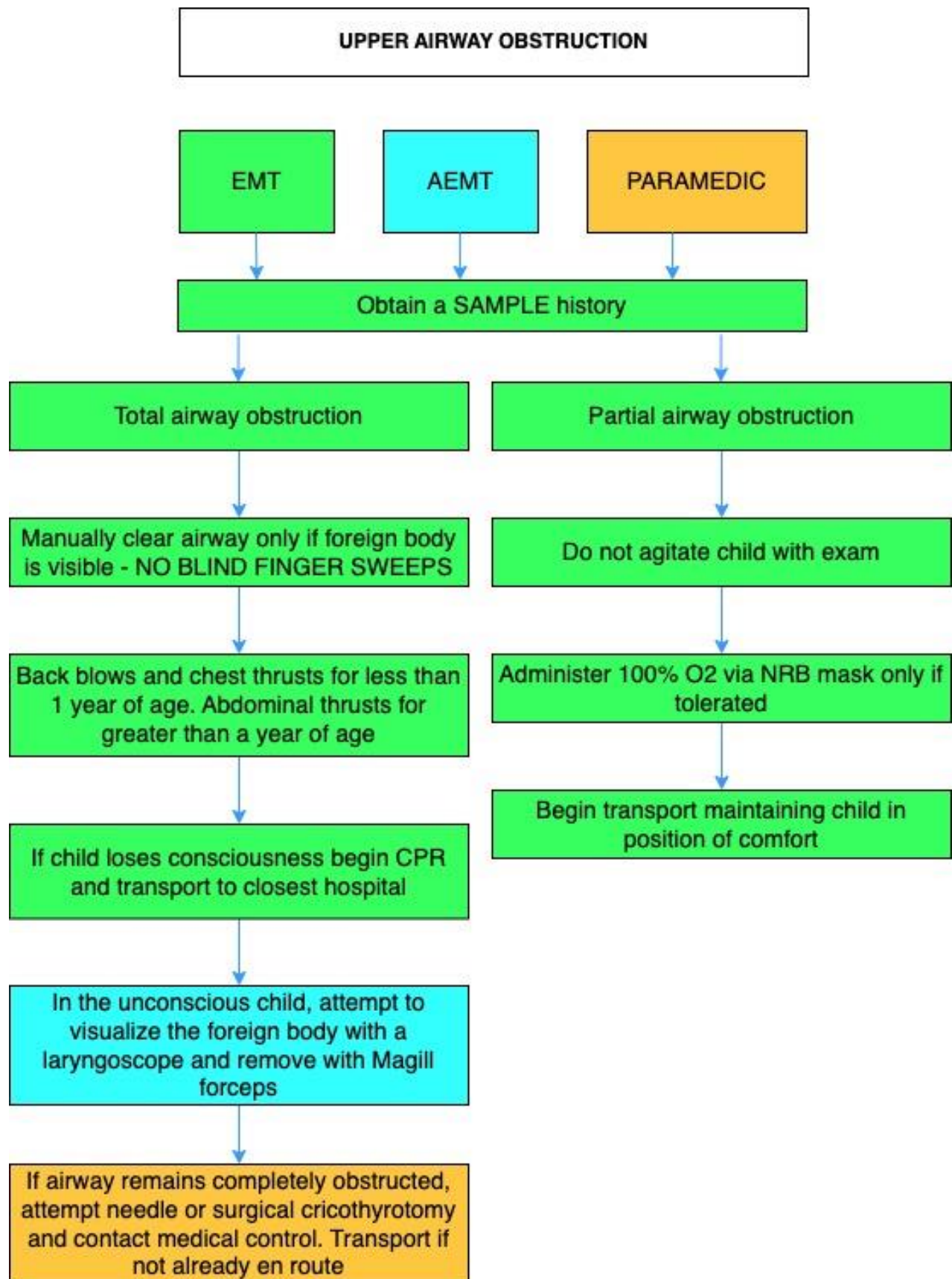
- D. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- E. Reassess breath sounds and treat as follows:
 - 1. Do not establish IV access unless child is in arrest. Do not agitate the child.
 - 2. If foreign body with complete airway obstruction is suspected in an unconscious patient and basic procedures are unsuccessful, try to visualize obstruction with laryngoscope.
 - 3. Do not attempt invasive airway exploratory maneuvers 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

- F. Assume charge of situation and confer with EMS professionals about condition of patient and situation
- G. 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 the child.
 - 2. Do not attempt invasive airway unless child has respiratory arrest. Bag-valve mask ventilation is acceptable.

RESPIRATORY DISTRESS-Upper Airway Obstruction (Continued)

3. If foreign body with complete airway obstruction is suspected in an unconscious patient 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 lifesaving. Contact medical direction.



PEDIATRIC SEIZURES

GENERAL CONSIDERATIONS

- A. Seizures usually have resolved by the time the EMS professionals arrive (postictal state).
- B. The basic rule with seizures is to "protect and support" the patient. If trauma, consider appropriate cervical spinal care.
- C. Minimize adverse events in the treatment of seizures and seizure recurrence during transport.
- D. Prompt cessation of seizures in the out-of-hospital setting decreases morbidity.

EMT

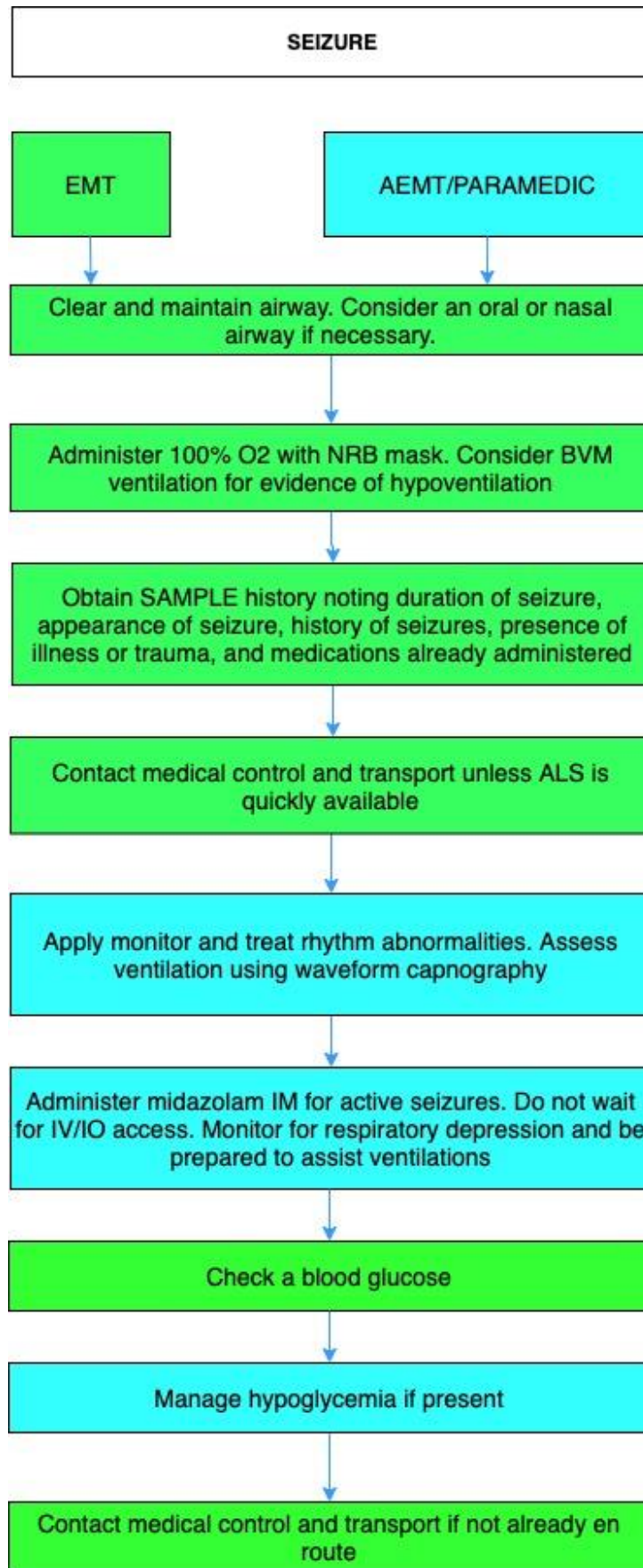
- A. Place patient away from objects on which they might injure themselves; protect but do not restrain them.
- B. Clear and maintain airway, consider cervical spine injury. If signs of airway obstruction are present and not alleviated by a chin-lift, jaw thrust, positioning, and/or suctioning, place an oropharyngeal airway (if gag reflex is absent) or nasopharyngeal airway.
- C. Administer 100% oxygen with NRB mask. Use BVM ventilation if oxygenation/ventilation are compromised.
- D. Obtain history from bystanders:
 - 1. Duration of current seizure
 - 2. Prior history of seizures, diabetes, or hypoglycemia
 - 3. Typical appearance of seizures
 - 4. Baseline seizure frequency and duration
 - 5. Focality of onset, direction of eye deviation
 - 6. Concurrent symptoms of apnea, cyanosis, vomiting, bowel/bladder incontinence, or fever
 - 7. Bystander administration of medications to stop the seizure
 - 8. Current medications, including anticonvulsants
 - 9. Recent dose changes or non-compliance with anticonvulsants
 - 10. History of trauma, pregnancy, heat exposure, or toxin exposure
- E. Evaluate:
 - 1. For evidence of head trauma
 - 2. Airway patency
 - 3. Breath sounds, respiratory rate and chest-rise-fall
 - 4. Signs of perfusion (pulses, capillary refill, color)
 - 5. Neurologic status (GCS or AVPU, nystagmus, pupil size, focal neurologic deficits or movements)
- F. Bring medication with patient if available.
- G. Establish communications with medical direction and advise of patient condition. Transport immediately unless an advanced life support unit is en route and has an ETA of less than 5 minutes.

AEMT

- A. Assist EMS professionals, obtain patient condition and circumstance
- B. Apply monitor and check the rhythm. Place pulse oximeter and waveform capnography to monitor oxygenation/ventilation. Goal oxygen saturation is 94-98%. Goal ETCO₂ is 40-45.
- C. Determine blood sugar level.
Blood sugar < 60 mg/dL, administer 0.5 gm/kg of dextrose IV push immediately or glucagon.
Glucagon: Infants, Children, and Adolescents: IM, IV, SQ: <20 kg: 0.5 mg; if no response in 15 minutes, may repeat dose. ≥20 kg: 1 mg; if no response in 15 minutes, may repeat dose.
- D. In repeated seizure activity administer midazolam 0.2 mg/kg (maximum dose 10 mg), IM preferred, or IN.
Do not wait for IV access, but if available, instead give one of the following:
 - 1. Diazepam 0.1 mg/kg IV or IO over 2-5 minutes, maximum 10 mg
 - 2. Lorazepam 0.1 mg/kg IV or IO over 2-5 minutes, maximum 4 mg
 - 3. Midazolam 0.1 mg/kg IV or IO over 2-5 minutes, maximum 5 mg
- E. After benzodiazepine administration, monitor airway and be prepared to intubate and/or assist ventilation with BVM.
- F. IV placement is not necessary for treatment of seizures, but could be obtained if needed for other reasons. Do not delay transport.
- G. Contact medical direction for seizures not corrected with benzodiazepine or dextrose, if applicable.

PARAMEDIC

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



PEDIATRIC STROKE

GENERAL CONSIDERATIONS

- A. The incidence of stroke in the pediatric population is rare. However, infants and children, analogous to adults, are eligible for thrombolysis with acute ischemic stroke or thrombectomy for large vessel occlusions.
- B. Stroke is a time-critical diagnosis for which these therapeutic interventions result in improved patient outcomes when initiated within a narrow window of time from symptom onset. While children may exhibit the same warning signs as adults (facial droop, extremity weakness, or speech difficulty), warning signs for pediatric stroke often include the following symptoms:
 - 1. Sudden severe headache, especially with vomiting and sleepiness
 - 2. New onset of seizures, usually on one side of the body
 - 3. Sudden confusion, difficulty speaking or understanding others
 - 4. Sudden trouble seeing in one or both eyes, and/or
 - 5. Sudden difficulty walking, dizziness, loss of balance or coordination
- C. Risk factors for perinatal stroke in during the third trimester of pregnancy to neonates of age 1 month or less include blood clotting disorders, congenital heart disease, infections (e.g., meningitis), or placental disorders.
- D. Risk factors of childhood stroke from age 1 month to 18 years include autoimmune disorders, cerebral arterial diseases, congenital heart disease, head trauma, infections affecting the brain or other organs, or sickle cell anemia.
- E. Adult stroke scales and stroke severity tools are not applicable to children. While there are various pediatric stroke scales, there is currently insufficient research available to determine if one pediatric stroke scale is superior to another. As such, EMS providers should utilize the pediatric stroke scale that is in the written protocol from their local medical director, if available.
- F. Pediatric patients with acute stroke symptoms should be transported immediately to a pediatric stroke center, if available, or to a hospital that has to perform CT and/or MRI imaging and resources to obtain a radiologic interpretation of the images emergently.
- G. Due to the time-critical nature of stroke, it is imperative that the EMS providers immediately notify the hospital, preferably while on scene or when transport is initiated, to expedite the receiving facility's ability to prepare to perform CT and/or MRI imaging emergently.

EMT

- A. Assess the patient's airway for patency.
 - 1. If concerned about airway patency, help open and maintain the airway with head tilt/chin lift position.
 - 2. Consider placing a nasal airway or oral airway only if a patient is obtunded, due to risk of inducing vomiting in an awake patient.
 - 3. Oral suction if needed.
- B. Assess breathing. Obtain vital signs, especially oxygen saturation and respiratory rate.
 - 1. If breathing is adequate, continue to monitor patient for onset of respiratory distress or decreased oxygen saturation.
 - 2. If concerned for patient's breathing, provide 100% oxygen through NRB mask. If breathing is inadequate, assist ventilations with a BVM.
- C. Obtain a blood glucose
 - 1. If blood sugar is less than 60 mg/dL, administer oral glucose if patient is alert. May be repeated in 10 minutes if blood sugar remains below 60 mg/dL.
- D. Contact medical direction to advise of the patient condition and transport to the appropriate facility immediately.

STROKE (Continued).

AEMT

- A. Apply a cardiac monitor.
- B. Establish an IV.
- C. If the blood sugar less than 60 mg/dL, administer 5 mL/kg of 10% dextrose (D10W). May be repeated in 10 minutes if blood sugar remains below 60 mg/dL.
- D. Contact medical direction to advise of the patient condition and transport to the appropriate facility immediately.

PARAMEDIC

- A. If breathing remains inadequate and/or oxygen saturation does not improve with ventilation via BVM, perform endotracheal intubation
- B. Contact medical direction to advise of the patient condition and transport to the appropriate facility immediately.

PEDIATRIC STROKE

EMT

AEMT

PARAMEDIC

ASSESS AIRWAY PATENCY AND APPLY PULSE
OXIMETER

OPEN AND MAINTAIN AIRWAY WITH HEAD TILT/CHIN LIFT
SUCTION IF NECESSARY

IF OBTUNDED, PLACE NASOPHARYNGEAL OR OROPHARYNGEAL AIRWAY AND
PROVIDE 100% OXYGEN VIA BVM

OBTAIN BLOOD GLUCOSE. IF < 60 MG/DL,
ADMINISTER ORAL GLUCOSE IF ALERT AND REPEAT BLOOD GLUCOSE IN 5 MINUTES

APPLY CARDIAC MONITOR AND OBTAIN IV ACCESS
ADMINISTER DEXTROSE 10% 5 ML/KG IV IF BLOOD GLUCOSE < 60 MG/DL
REPEAT DOSE IN 10 MINUTES IF NECESSARY

IF BREATHING IS INADEQUATE AND/OR OXYGEN SATURATION IS UNIMPROVED,
ENDOTRACHEAL INTUBATION AND BVM VENTILATION

CONTACT MEDICAL DIRECTION AND
TRANSPORT IMMEDIATELY TO THE APPROPRIATE FACILITY

SHOCK

GENERAL CONSIDERATIONS

- A. Shock is inadequate perfusion to vital organs. Shock is not only caused by blood loss (hemorrhagic shock), but it can also be caused by infection (septic shock), maldistribution of blood flow (anaphylaxis), heart failure (cardiogenic shock), or spinal cord injury (neurogenic shock). Though shock management always starts with rapid administration of isotonic intravenous fluids, the EMS professional should differentiate between causes of shock to initiate additional therapies.
- B. Most pediatric patients can compensate their blood pressure during shock, so the EMS professional must evaluate for other signs of shock: low body temperature or fever, altered mental status, delayed (>2 seconds) or flash capillary refill, increased heart rate for age, abnormal respiratory rate for age/hypoxia, and/or poor skin color or mottling. Tachycardia is often the first sign of shock. ***Do not depend on blood pressure to determine shock.***
- 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.

EMT

- D. Assess the patient's airway for patency. Evaluate for signs of airway obstruction.
 - D. If concerned about airway patency, help open and maintain the airway with head tilt/chin lift position.
 - E. Consider placing a nasal airway or oral airway only if a patient is obtunded, due to risk of inducing vomiting in an awake patient.
 - F. Oral suction if needed.
- C. Assess breathing. Obtain vital signs, especially oxygen saturation and respiratory rate.
- 3. If breathing is adequate, administer 100% concentration oxygen as necessary. Use a non-rebreather mask or blow-by as tolerated.
 - 4. If concerned for patient's breathing, provide 100% oxygen through NRB mask. If breathing is inadequate, assist ventilations with a BVM.
- D. Control all external bleeding and evaluate for dehydration/poor perfusion. Obtain history from family, especially fever or allergic exposures.
- E. For anaphylactic shock, the EMT may administer epinephrine auto-injectors IM. Consult Pediatric Anaphylaxis/Allergy guideline.
- F. Establish communication with medical direction and advise of patient condition. Transport **immediately** unless an advanced life support unit is en route and has an ETA of less than 5 minutes to the scene.

AEMT

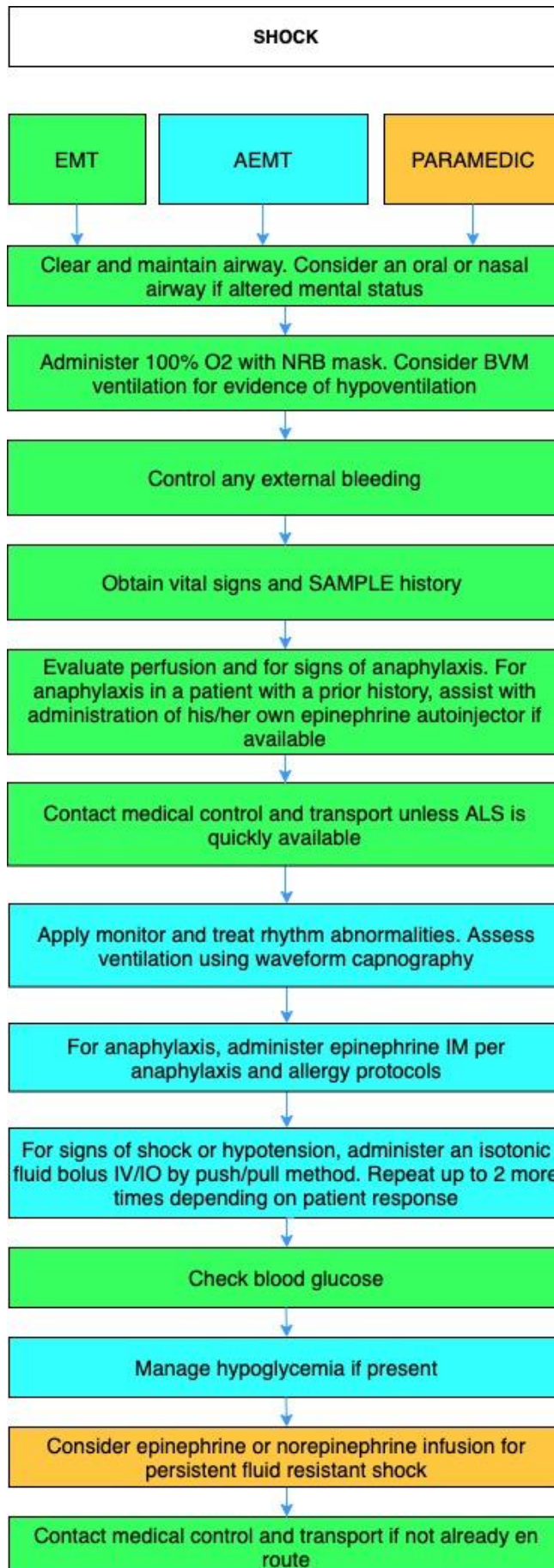
- A. Assist EMS professionals, obtain patient condition and history. Begin transport.
- B. Apply cardiac monitor, pulse oximetry, and capnography during transport.
- C. Provide supplemental oxygenation and, if necessary, assist with BVM ventilation.
- D. For anaphylactic shock, treat per Pediatric Anaphylaxis/Allergy guideline.
- E. Initiate fluid resuscitation: if unable to obtain an IV within 2 attempts or less than 90 seconds, place an IO needle. Do not delay transport for IV.
 - 1. IV push fluid bolus of 20 mL/kg normal saline if signs of hypoperfusion or shock are present.
 - 2. May repeat fluid bolus, using a push-pull method, up to 3 times during transport (60 mL/kg total; give within 15 minutes if hypotensive) based on patient condition.

SHOCK (Continued)

3. If concerned for cardiogenic shock (murmur, rales, enlarged liver, or by history), administer IV fluid bolus of 10 mL/kg of NS if signs of hypoperfusion or shock are present. EMS providers must be aware that fluids can sometimes worsen cardiogenic shock. Confer with medical direction and advise of patient condition if this occurs.
- F. Check blood sugar and treat if hypoglycemic (<60). Treatment with 5 mL/kg of 10% Dextrose if indicated.

PARAMEDIC

- A. Assume charge of situation and confer with EMS professionals about condition of patient and situation.
- B. Airway
1. Intubation of a patient with shock is very high risk and may result in abrupt decompensation. Temporizing measures such as 100% O₂ via NRB or ventilation via BVM are preferred when possible.
 2. If intubation is absolutely necessary for respiratory failure or unresponsiveness, give fluid bolus before/during intubation attempt and be prepared for decompensation, bradycardic or hypoxic arrest. Ketamine is the recommended induction agent.
- C. Vasopressors (for shock unresponsive to fluids) given IV or IO.
1. Septic shock:
 - a. Norepinephrine is first-line for warm septic shock the symptoms of which include flash capillary refill, bounding pulses, and warm or flushed skin (initial dose 0.05-0.5 mcg/kg/min IV continuous infusion).
 - b. Epinephrine is first-line for cold septic shock the symptoms of which include mottled skin, cool/cold to touch, delayed capillary refill (initial dose 0.05-0.3 mcg/kg/min IV continuous infusion). May give epinephrine through peripheral IV if there is no central access.
 2. Cardiogenic shock: epinephrine 0.05-0.3 mcg/kg/min IV continuous infusion with medical direction advisement
 3. Neurogenic shock: norepinephrine (0.05-0.5 mcg/kg/min IV continuous infusion)
- D. If there is a history of adrenal insufficiency or long-term steroid dependence and patient is hypotensive in persistent shock despite fluids and vasopressors, consider giving hydrocortisone succinate, 2 mg/kg (maximum 100 mg) IV/IM.
- E. Consider antipyretics for fever:
1. Acetaminophen (15 mg/kg PO; maximum dose 1000 mg)
 2. Ibuprofen if greater than 6 months of age (10 mg/kg PO; maximum dose 800 mg)



TRAUMA EMERGENCIES

GENERAL CONSIDERATIONS

- A. Assure scene is safe, initiate body substance isolation (BSI) by donning the appropriate personal protective equipment (PPE), determine the mechanism of injury, determine the number of patients, and request additional help if needed.
- B. If patient is entrapped or inaccessible, contact medical direction and advise of condition and circumstances.
- C. **Rapid triage and transport are critical!**
 - 1. Rapid assessment and recognition of major trauma/multiple system trauma is essential to the subsequent treatment.
 - 2. Once the patient is determined to be an actual or potential major/multiple system trauma patient, personnel on scene and/or medical direction must quickly determine the appropriate course of action including:
 - a. Refer to the pediatric component of the **Ohio Prehospital Trauma Triage Decision Tree**
 - i. Consider transport directly to a pediatric burn center children ages 0-15 years with partial or full thickness burns involving greater than 10% total body surface area (TSBA), involvement of hands/feet, genitalia, face, and/or circumferential burns
 - ii. Consider transport directly to a pediatric trauma center children ages 0-15 years with moderate to severe traumatic brain injury (GCS 3-13) and those with signs of spinal cord injury.
 - b. Requesting air medical evacuation from scene (see air medical transport guideline)
 - c. Ground transportation directly to an appropriate facility. (When requesting bypass of nearest facility, this action must be approved by medical direction)
 - i. In cases where the victim will be transported by ground units, every effort should be made to limit on scene time to 10 minutes or less to minimize transport time
- D. Pediatric trauma clinical care considerations
 - 1. Each infant and child should be evaluated by the Pediatric Glasgow Coma Scale and the score relayed to medical direction.
 - 2. The proper size equipment is very important to resuscitation care. Refer to a pediatric body weight estimating device (e.g., Broselow® pediatric emergency tape) when unsure about patient weight, age and/or drug dosage and when choosing equipment size.
 - 3. Common errors of pediatric trauma resuscitation are:
 - a. Failure to open and maintain the airway
 - b. Failure to provide appropriate fluid resuscitation to children with head injury
 - c. Failure to recognize and treat internal hemorrhage

EMT

- A. Pediatric Trauma Assessment
 - 1. Identify life threats through a rapid initial assessment of airway, breathing, circulation and neurologic status. Life threats should be addressed first. The assessment provides a general impression of patient condition and prioritization for interventions and transport.
 - a. Hemorrhage control - assess for and stop severe hemorrhage
 - b. Airway
 - i. Assess airway patency by asking the patient to talk to assess stridor and ease of air movement
 - ii. Look for injuries that may lead to airway obstruction including unstable facial fractures, expanding neck hematoma, blood or vomitus in the airway, facial burns/inhalation injury
 - iii. Evaluate mental status for ability to protect airway (patients with a GCS less than or equal to 8 are likely to require airway protection)

TRAUMA EMERGENCIES (Continued)

- c. Breathing
 - i. Assess respiratory rate and pattern
 - ii. Assess symmetry of chest wall movement
 - iii. Listen bilaterally on lateral chest wall for breath sounds
 - d. Circulation
 - i. Assess blood pressure and heart rate
 - ii. Signs of hemorrhagic shock include: tachycardia, hypotension, pale, cool clammy skin, capillary refill > 2 seconds
 - e. Disability
 - i. Perform neurologic status assessment and assign GCS or AVPU
 - ii. Assess gross motor movement of extremities
 - iii. Evaluate for clinical signs of traumatic brain injury with herniation including:
 - (a) Unequal pupils
 - (b) Lateralizing motor signs
 - (c) Posturing
 - f. Exposure
 - i. Rapid evaluation of entire body to identify sites of penetrating wounds or other blunt injuries. Be sure to roll patient and examine the back
 - ii. Prevent hypothermia
 - g. Obtain baseline vital signs and SAMPLE history.
- 2. Urgent patient
 - a. Children with airway or breathing compromise, major hemorrhage, hemodynamic instability, penetrating torso trauma, or signs of traumatic brain injury often require rapid critical care stabilization. Minimize scene time (goal is under 10 minutes) and initiate rapid transport to the highest level of care within the trauma system.
 - b. Decisions regarding transport destination should be based on the **Ohio Prehospital Trauma Triage Decision Tree** or local out-of-hospital trauma triage guideline
 - c. Detailed physical exam and ongoing assessment - Evaluate patient head-to-toe and assess effectiveness of treatments to this point
 - 3. Non-Urgent patient
 - a. Single and/or non-life-threatening injuries
 - b. Focused physical exam of injured area and management of the situation
 - c. Transport patient. Decisions regarding transport destination should be based on the **Ohio Prehospital Trauma Triage Decision Tree** or local out-of-hospital trauma triage guideline.
- B. Urgent trauma treatment
- 1. Airway
 - a. Establish patent airway with cervical spinal motion restriction (see **Spinal Injury**)
 - b. If patient is unable to maintain airway, consider oral airway (nasal airway should not be used with significant facial injury or possible basilar skull fracture)
 - 2. Breathing
 - a. Monitor oxygen saturation
 - i. Provide supplemental oxygen
 - ii. Maintain oxygen saturation greater than 93%
 - b. If respiratory effort is inadequate, assist with bag-mask ventilation
 - c. Monitor capnography, if available
 - i. Maintain end tidal CO₂ between 35-40 mmHg
 - d. For open chest wound, place semi-occlusive dressing
 - 3. Hemorrhage control
 - a. Apply direct pressure to bleeding site followed by pressure dressing.
 - b. If direct pressure/pressure dressing is ineffective or impractical:
 - i. If the bleeding site is amenable to tourniquet placement, apply tourniquet to extremity

TRAUMA EMERGENCIES (Continued)

- (a) Tourniquet should be placed 2-3 inches proximal to wound, not over a joint, and tightened until bleeding stops and distal pulse is eliminated
 - (b) If bleeding continues, place a second tourniquet proximal to the first
 - (c) For thigh wounds, consider placement of two tourniquets, side-by-side, and tighten sequentially to eliminate distal pulse
 - ii. If the bleeding site is not amenable to tourniquet placement (i.e. junctional injury), pack wound tightly with a hemostatic gauze and apply direct pressure
 - c. Groin/axillary injury
 - i. Apply direct pressure to wound
 - ii. If still bleeding, pack wound tightly with hemostatic gauze and apply direct pressure
 - iii. Consider using a junctional hemostatic device if available
 - 4. Circulation
 - a. If pelvis is unstable and patient is hypotensive, place pelvic binder or sheet to stabilize pelvis
 - 5. Disability
 - a. See **Head Injury** and **Spine Injury** sections
 - b. Provide spinal motion restriction per **Spine Injury** assessment and guideline
 - c. If clinical signs of severe traumatic brain injury, consider elevating the head of the gurney 30 degrees
 - d. If signs of herniation (GCS 3, abnormal respiratory pattern, asymmetric pupils, bradycardia with hypertension, and posturing), consider brief periods of hyperventilation (end tidal CO₂ 30-35 mmHg)
 - 6. Exposure
 - a. Avoid hypothermia
 - i. Remove wet clothing
 - ii. Cover patient to prevent further heat loss
- C. Non-urgent trauma treatment
- 1. Splint all fracture(s)
 - a. Monitor pulses distal to the fracture site
 - b. Monitor distal skin color, temperature, neurological status

AEMT

Assist EMS professionals; obtain patient condition and circumstance.

- A. Urgent trauma treatment
- 1. Airway and Breathing
 - a. If impending airway obstruction altered mental status resulting in inability to maintain airway patency or respiratory arrest, insert an oropharyngeal airway and perform ventilation with a BVM
 - b. If absent or diminished breath sounds in a hypotensive patient, consider tension pneumothorax and perform needle decompression
 - 2. Circulation
 - a. An IO infusion is indicated in the trauma setting when shock needs to be treated and rapid venous access is unobtainable.
 - b. Hypotension is a LATE finding in children with shock
 - c. If child demonstrates tachycardia for age with signs of poor perfusion (low BP, greater than 2-second capillary refill, altered mental status, hypoxia, weak pulses, pallor, or mottled/cool skin), give 20 mL/kg crystalloid bolus and reassess.
 - d. Maintain SBP as follows:
 - i. less than 1 month: greater than 60 mmHg
 - ii. 1-12 months: greater than 70 mmHg
 - iii. 1-10 years: greater than 70 mmHg + 2 times the patient's age in years

TRAUMA EMERGENCIES (Continued)

3. Consider fentanyl or other analgesic per local protocols. Use those agents known to cause hypotension (i.e. morphine) with caution.

PARAMEDIC

Assume charge of situation and confer with EMS professionals about condition of patient and situation.

- A. Urgent trauma treatment
 1. If unable to secure airway through orotracheal intubation, perform needle or surgical cricothyrotomy.

SPECIFIC INJURIES

- A. Chest Wounds
 1. For sucking chest wounds or an open pneumothorax, cover the wound with a non-porous dressing sealing 3 sides, apply a vented chest seal, or leave the wound open.
 2. Stabilize flail chest with trauma dressing.
- B. Evisceration
 1. Cover organs with sterile dressing moistened with saline.
 2. Lay the patient flat and elevate the knees.
- C. Complete Amputations
 1. Control bleeding by the most appropriate method. Rapid application of a tourniquet can be life-saving for arterial bleeding.
 2. Always take time to find the avulsed part, but do not delay patient transport. Transport the avulsed body part to the hospital as follows:
 - a. Put avulsed body part in a cool, dry sterile dressing
 - b. Avoid direct contact with ice
- D. Pneumothorax / Hemothorax / Tension Pneumothorax
 1. If awake alert and stable, transport patient in position of comfort and watch for signs of a tension pneumothorax.
 2. Symptoms of tension pneumothorax include tachycardia, jugular venous distention, hypotension, hyperresonance on affected side, diminished or absent breath sounds on affected side, tracheal deviation away from affected side (late sign).
 3. **AEMT or Paramedic may perform needle decompression of chest.**
- E. Head Injury
 1. Perform neurologic status assessment.
 - a. Pupil size and reaction to light
 - b. Grade level of consciousness using GCS or AVPU
 - i. Brain injury severity guideline:
 - (a) Mild: GCS 13-15 / AVPU = (A)
 - (b) Moderate: GCS 9-12 / AVPU = (V)
 - (c) Severe: GCS 3-8 / AVPU = (P) or (U)
 - c. Assess motor strength and sensation in all four extremities
 2. If endotracheal intubation or invasive airways are used, continuous waveform capnography is required to document proper tube placement and assure proper ventilation rate.
 3. Recognize and treat herniation.
 - a. Signs of herniation
 - i. Decreasing mental status
 - ii. Abnormal respiratory pattern
 - iii. Asymmetric/unreactive pupils
 - iv. Decorticate posturing
 - v. Cushing's response (bradycardia and hypertension)

TRAUMA EMERGENCIES (Continued)

- vi. Decerebrate posturing
- b. Treatment options
 - i. Elevate the head of the gurney by 30 degrees
 - ii. Episodic hyperventilation

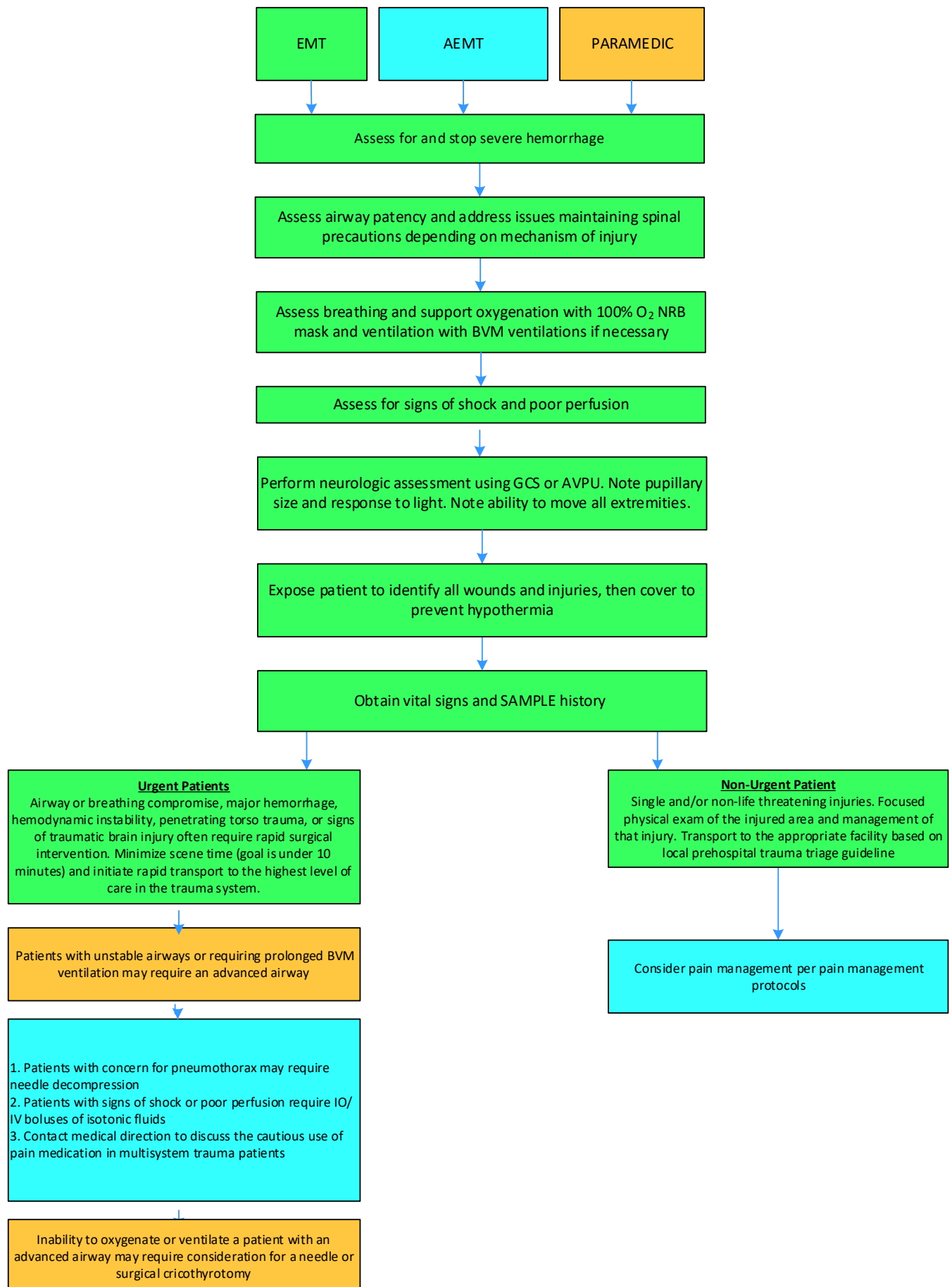
F. Spinal Injury

1. Mechanism alone should not determine if a patient requires spinal motion restriction; however, the mechanisms listed below have been associated with a higher risk of injury:
 - a. Motor vehicle crashes (including automobiles, all-terrain vehicles, and snowmobiles)
 - b. Axial loading injuries to the spine
 - c. Falls greater than 10 feet
2. Place patient in a cervical collar if any of the following are present:
 - a. Any abnormal mental status (including extreme agitation and intoxication)
 - b. Complaint of midline neck or spine pain
 - c. Any midline neck or spinal tenderness with palpation
 - d. Limited range of neck motion by report or exam
 - e. Another severe injury is present, particularly torso injuries
 - f. Focal or neurologic deficit
3. If none of the above apply, the patient may be managed without a cervical collar.
4. Patients with penetrating injury to the neck should not be placed in a cervical collar or other spine precautions regardless of whether they are exhibiting neurologic symptoms or not. Doing so can lead to delayed identification of injury or airway compromised and has been associated with increased mortality.
5. If patient is wearing a helmet, follow the helmet removal guideline in the **Special Procedures** chapter.
6. Do not transport patients on rigid long boards unless the clinical situation warrants long board use. An example of this may be facilitation of immobilization of multiple extremity injuries or an unstable patient where removal of a board after transfer to the gurney will delay transport and/or other treatment priorities. In these situations, long boards should ideally be padded or have a vacuum mattress applied to minimize secondary injury to the patient.
7. Patient with severe kyphosis or ankylosing spondylitis may not tolerate a cervical collar. These patients should be immobilized in a position of comfort using towel rolls or sand bags.
8. Always contact medical direction and relay information regarding patient with potential spinal injury to the hospital. Patients with spinal injuries may need to be delivered to another facility if the hospital initially contacted does not have the resources to adequately manage this injury.
9. If patient is alert and complaining of severe pain, consider pain relief per local protocol.

Modified Glasgow Coma Scale for Infants and Children

	Child	Infant	Score
Eye opening	Spontaneous	Spontaneous	4
	To speech	To speech	3
	To pain only	To pain only	2
	No response	No response	1
Best verbal response	Oriented, appropriate	Coos and babbles	5
	Confused	Irritable cries	4
	Inappropriate words	Cries to pain	3
	Incomprehensible sounds	Moans to pain	2
	No response	No response	1
Best motor response*	Obeys commands	Moves spontaneously and purposefully	6
	Localizes painful stimulus	Withdraws to touch	5
	Withdraws in response to pain	Withdraws to response in pain	4
	Flexion in response to pain	Abnormal flexion posture to pain	3
	Extension in response to pain	Abnormal extension posture to pain	2
	No response	No response	1

*If patient is intubated, unconscious, or preverbal, the most important part of this scale is motor response. Motor response should be carefully evaluated.



PEDIATRIC AIRWAY MANAGEMENT

INDICATION

To provide effective oxygenation and ventilation when severe respiratory distress or respiratory failure are identified in a pediatric patient.

NOTE: Orotracheal intubation is outside of the Ohio EMS scope of practice for EMTs and AEMTs although the insertion of dual lumen or extraglottic airways is permitted in patients who are apneic and pulseless for EMTs and in patients who are apneic or apneic and pulseless for AEMTs.

PATIENT MANAGEMENT

A. Assessment

1. History – Assess for:
 - a. Time of onset of symptoms
 - b. Associated symptoms
 - c. History of asthma or other breathing disorders
 - d. Choking or other evidence of upper airway obstruction
 - e. History of trauma

B. Physical Examination – Assess for:

1. Shortness of breath
2. Abnormal respiratory rate and/or effort
3. Use of accessory muscles
4. Quality of air exchange, including depth and equality of breath sounds
5. Wheezing, rhonchi, rales, or stridor
6. Cough
7. Abnormal color (cyanosis or pallor)
8. Abnormal mental status
9. Evidence of hypoxemia
10. Signs of a difficult airway (short jaw or limited jaw thrust, small thyromental space, upper airway obstruction, large tongue, obesity, large tonsils, large neck, craniofacial abnormalities, excessive facial hair)

C. Treatment and interventions

1. Non-invasive ventilation techniques
 - a. Maintain airway and administer oxygen as appropriate with a target of achieving 94-98% saturation
 - b. For severe respiratory distress or impending respiratory failure, use of continuous positive airway pressure (CPAP) is permitted at the EMT level and above. Paramedics may also consider the application of bilevel positive airway pressure (BiPAP), intermittent positive pressure breathing (IPPB), or oxygen via high-flow nasal cannula
 - c. Use bag-valve mask (BVM) ventilation in the setting of respiratory failure or arrest. Two-person, two-thumbs-up BVM ventilation is more effective than one-person technique and should be used when additional providers are available
2. Oropharyngeal airways (OPA) and nasopharyngeal airways (NPA) - Consider the addition of an OPA and/or NPA to make BVM ventilation more effective, especially in patients with altered mental status.
3. Supraglottic airways (SGA) or extraglottic devices (EGD) - Consider the use of a SGA or EGD if BVM is not effective in maintaining oxygenation and/or ventilation. Examples include, but are not limited to the laryngeal mask airway (LMA) or a blind insertion airway device (BIAD). This is especially important in children since endotracheal intubation is an infrequently performed skill in this age group and has not been shown to improve outcomes.

PEDIATRIC AIRWAY MANAGEMENT (Continued)

4. Endotracheal intubation
 - a. When less-invasive methods (BVM, SGA/EGD placement) are ineffective, use endotracheal intubation to maintain oxygenation and/or ventilation
 - b. Other indications may include potential airway obstructions, severe burns, multiple traumatic injuries, altered mental status or loss of normal protective airway reflexes
 - c. Monitor clinical signs, pulse oximetry, cardiac rhythm, blood pressure, and capnography for the intubated patient
 - d. Video laryngoscopy may enhance intubation success rates, and should be used when available. Consider using a bougie, especially when video laryngoscopy is unavailable and glottic opening is difficult to visualize with direct laryngoscope.
5. Post-intubation management
 - a. Confirm placement of advanced airway (endotracheal tube, SGA, or EGD) with waveform capnography, absent gastric sounds, and bilateral breath sounds
 - b. Continuously monitor placement with waveform capnography during treatment and transport
 - c. Continuously secure tube manually until tube secured with tape, twill, or commercial device
 - i. Note measurement of tube at incisors or gum line and monitor frequently for tube movement/displacement
 - ii. Cervical collar and/or cervical immobilization device may help reduce neck movement and risk of tube displacement
 - d. Inflate endotracheal tube cuff with minimum air to seal airway. An ETT cuff manometer can be used to measure and adjust the ETT cuff pressure to a recommended 20 cm H₂O pressure
 - e. Ventilation
 - i. Tidal volume
 - (a) Ventilate with minimal volume to see chest rise, approximately 6-7 mL/kg ideal body weight
 - (b) Over-inflation may be detrimental
 - ii. Rate
 - (a) Adult: 10-12 breaths/minute
 - (b) Child: 20 breaths/minute
 - (c) Infant: 30 breaths/minute
 - iii. Continuously monitor ET_{CO}₂ to maintain ET_{CO}₂ of 35-40 mmHg - in head injury with signs of herniation (unilateral dilated pupil or decerebrate posturing), modestly hyperventilate to ET_{CO}₂ 30 mmHg
 - f. Consider sedation with sedative or opioid medications if agitated
6. Gastric decompression may improve oxygenation and ventilation, so it should be considered when there is obvious gastric distention.
7. When patients cannot be oxygenated/ventilated effectively by previously mentioned interventions, the provider should consider needle cricothyroidotomy if the risk of death for not escalating airway management seems to outweigh the risk of a procedural complication.
8. Transport to the closest appropriate hospital for airway stabilization when respiratory failure cannot be successfully managed in the out-of-hospital setting.

PEDIATRIC AIRWAY MANAGEMENT (Continued)

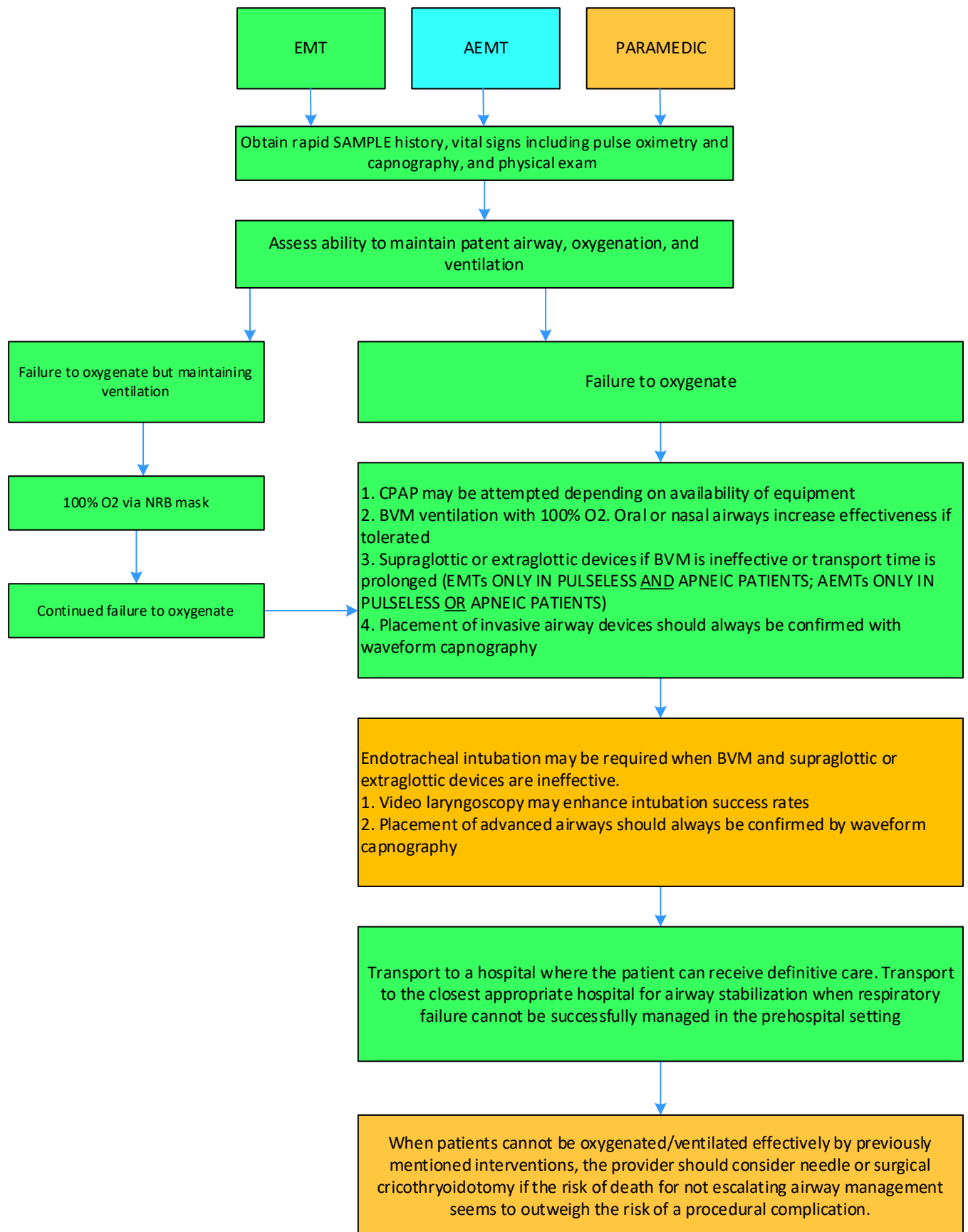
E. Key Considerations

1. When compared to the management of adults with cardiac arrest, paramedics are less likely to attempt endotracheal intubation in children with cardiac arrest. Further, paramedics are more likely to be unsuccessful when intubating children in cardiac arrest and complications such as malposition of the ETT or aspiration can be nearly three times as common in children as compared to adults.
2. Use continuous waveform capnography to detect end-tidal carbon dioxide (ETCO₂). This is an important adjunct in the monitoring of patients with respiratory distress, respiratory failure, and those treated with positive pressure ventilation. It should be used as the standard to confirm SGA, EGD, and endotracheal tube placement. Effective January 1, 2021, the utilization of waveform capnography is mandatory for all patients requiring invasive airway devices (including dual lumen and extraglottic devices) with the exception of stable patients with no cardiac or pulmonary complaints or symptoms unless ordered by the transferring physician.
3. CPAP, BiPAP, high flow nasal cannula:
 - a. Contraindications to these non-invasive ventilator techniques include intolerance of the device, severely impaired consciousness, increased secretions inhibiting a proper seal, or recent gastrointestinal and/or airway surgery
4. Bag-valve-mask:
 - a. Appropriately-sized masks should completely cover the nose and mouth and maintain an effective seal around the cheeks and chin
 - b. Ventilation should be delivered with only sufficient volume to achieve chest rise
 - c. Ventilation rate:
 - i. During CPR, ventilation rate should be 10 breaths per minute, one breath every 10 compressions (or one breath every 6 seconds). When advanced airway is in place, ideally ventilations should be on upstroke between two chest compressions
 - ii. In adults who are not in cardiac arrest, ventilate at rate of 12 breaths per minute
 - iii. In children, ventilating breaths should be delivered over one second, with a two second pause between breaths (20 breaths/minute) in children
5. Orotracheal intubation
 - a. Endotracheal tube sizes

Age	Size (mm) Uncuffed	Size (mm) Cuffed
Premature	2.5	
Term to 3 months	3.0	
3-7 months	3.5	3.0
7-15 months	4.0	3.5
15-24 months	4.5	3.5
2-15 years	$[\text{age}(\text{yr})/4] + 4$	$[\text{age}(\text{yr})/4] + 3.5$

PEDIATRIC AIRWAY MANAGEMENT (Continued)

- b. Approximate depth of insertion = (3) x (endotracheal tube size)
 - c. In addition to preoxygenation, apneic oxygenation (high-flow oxygen by nasal cannula) may prolong the period before hypoxia during an intubation attempt
 - d. Positive pressure ventilation after intubation can decrease preload and subsequently lead to hypotension - consider providing vasopressor support for hypotension
 - e. Appropriate attention should be paid to adequate preoxygenation to avoid peri-intubation hypoxia and subsequent cardiac arrest
 - f. Prompt suctioning of soiled airways before intubation attempt may improve first pass success
 - g. Confirm successful placement with waveform capnography. Less optimal methods of confirmation include bilateral chest rise, bilateral breath sounds, and maintenance of adequate oxygenation. Color change on end-tidal CO₂ is less accurate than clinical assessment, and wave-form capnography is superior. Misting observed in the tube is not a reliable method of confirmation. Visualization with video laryngoscopy, when available, may assist in confirming placement when unclear due to capnography failure or conflicting information.
 - h. Ongoing education and hands-on practice is essential to maintain skills. This is especially true for children since pediatric intubation is an infrequently utilized skill for many EMS professionals.
 - i. Video laryngoscopy may be helpful, if available, to assist with endotracheal intubation
6. Consideration should be made to dispatch the highest-level provider for an EMS system given the potential need for advanced airway placement for patients with severe respiratory distress or failure



CHILDREN WITH SPECIAL HEALTH CARE NEEDS (CSHCN)

GENERAL 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 oximeter 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.

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.

EMT

- A. Examine the child quickly for possible causes of distress which may be easily correctable, such as a detached oxygen source, or dislodgement of the tracheostomy from the stoma. Make sure to directly visualize the tracheostomy tube to make sure it remains properly seated in the stoma.
- B. If the child is on a ventilator and in respiratory distress, 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.
- C. If still no improvement, initiate transport to the nearest medical facility and provide appropriate resuscitation as needed.
- D. Suction the tracheostomy tube as accumulation of debris is a common cause of obstruction. Administer oxygen at 15 L/minute over the nose/mouth and stoma during the procedure to avoid hypoxia.
- E. Consider having the child's caregiver change out the tracheostomy tube if there is persistent distress.

AEMT/ PARAMEDIC

- A. If suctioning does not relieve the obstruction and the tracheostomy tube has an inner cannula, remove it. If it is the cause of obstruction, there should be immediate improvement. An inner cannula 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.
- B. If there is no improvement after suctioning and/or removal of the inner cannula and the child is in severe respiratory distress, perform an emergent tracheostomy change with the assistance of the child's caregiver. If no replacement tracheostomy tube is available, an endotracheal tube of the same size or smaller may be used. After placement, confirm correct placement with capnography, chest rise, and breath sounds.
- C. Consider pneumothorax as a possible source of respiratory distress in ventilated patients. Consider needle decompression if the patient exhibits signs of tension pneumothorax.
- D. If there is still no improvement, see the respiratory distress protocol.

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.

EMT/ AEMT/ PARAMEDIC

- A. Always evaluate the 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.
- C. If the line is blocked, do not attempt to vigorously flush or force open the central line; transport to a facility capable of managing central lines.
- D. For central lines that have been completely removed, do not attempt to reinsert. Hold pressure over the site until bleeding has completely stopped and transport to the nearest emergency department. Attempting to re-insert a partially removed line can cause an infection. Do not attempt to push the line back in. Stabilize the central line where it is and transport patient to an emergency department. If there is bleeding around a line that is partially out, maintain pressure on the site until bleeding has stopped and transport the child to nearest emergency department. Part of the central line may have broken off; always bring the central line with you to the hospital.
- E. For partial or complete fracture of the line, clamp proximal to the fracture utilizing a padded clamp (add padding by using gauze) and transport child and central line to nearest emergency department.
- F. For children with sudden deterioration, begin basic resuscitation and transport to nearest emergency facility (child may have pneumothorax or internal bleeding.)
- G. If there are fluids infusing through the central line, determine the nature of the fluid and the time that the fluid was started. Some children are dependent on these fluids to maintain their glucose levels. Check with parents and ensure immediate IV access and initiation of dextrose containing fluids if indicated.
- H. For paramedics only: May use the central line for IV access if permitted by protocol, and given clearance by medical direction. Prior to using the central line, make sure to clean ports with appropriate antiseptic.

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 still require transport have it fixed. Dislodgment is also not life threatening but the tube should be replaced as soon as possible. Both conditions are easily recognized and typically identified by the family or caregiver.
- B. The child should be examined for any other contributing factors.

EMT/ AEMT

- A. Children experiencing acute issues 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.
- C. Transport the child to the nearest facility capable of replacing the tube. Request the family bring along a spare tube if one is available so it can be provided to facility in case they don't have that specific one.
- D. If the tube was placed over 4 weeks ago, you may attempt to keep the hole open by gently inserting a Foley catheter or nasopharyngeal airway into the site. Do not force anything, if it does not easily slide in, then do not make additional attempts. Nothing should be given through the tube until placement has been confirmed at a medical facility.
- E. If the tube was placed less than 4 weeks ago, do not attempt to replace the tube or place anything into the hole. There may be complications to doing so including creation of a false tract.
- F. Cover the site with a sterile dressing and control any bleeding with direct pressure.

PARAMEDIC

- A. If there are fluids infusing through the feeding tube, determine the type 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.
- B. If there is concern for obstruction and the family or caregiver has not yet done so, flush the tube with warm water and a syringe. If this does not resolve obstruction, do not make further attempts.
- C. If a child with a gastrostomy tube is receiving BVM ventilation, it is helpful to open the tube to keep the stomach from getting distended

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 appear to have normal or non-labored breathing.

EMT

- 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.
- B. 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/ PARAMEDIC

- 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.
- B. 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 or supraglottic airway should be attempted with manual covering of the stoma. 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.)
- C. If there is still no improvement see the respiratory distress protocol.

INTERACTING WITH NEURODIVERSE CHILDREN

GENERAL CONSIDERATIONS

- A. Neurodiverse children (e.g., autism) may have difficulties with social interactions, communication, and understanding others' points of view. They may have extreme difficulty with change and are often very literal thinkers. Speech delay may be a prominent feature, but because these patients' capabilities are on a spectrum of severity, there may be a lot of variability.
- B. Do not assume a patient's intellectual capacity and ability to communicate solely by their appearance to you.
- C. Repetitive behaviors and motions may be characteristic of neurodiverse children and may become more pronounced under stress and anxiety. They may have enhanced sensitivity to sound, light, touch, and other external stimuli.
- D. Neurodiverse children often perform comforting self-stimulating activities that should be allowed to continue unless it will actively compromise their care.

EMT/ AEMT/ Paramedic

- A. Ensure scene safety for you and your patient.
- B. If possible, utilize family or a caregiver to better understand the patient's communication needs, particularly if it is difficult to understand what the patient is saying.
 - 1. If they use an adaptive communication device (i.e., paper and pencil or electronic tablet), keep it with the patient.
 - 2. Preserve personal space distance and ask the patient one question at a time, allowing the patient time and opportunity to answer questions.
 - 3. Even if the patient does not seem to be focusing on you, maintain your eye contact with them.
- C. Confirm medical history with family or a caregiver if they are available.
- D. Inquire to family or a caregiver what external stimuli tend to be negative behavioral triggers for the patient. Attempt to limit these stimuli unless they are critical to caring for the child.
 - 1. Maintain as quiet an environment as possible without distraction or unneeded stimuli.
 - 2. Avoid the use of lights and sirens when possible for those hypersensitive to them.
 - 3. Specify one individual to be the main communicator with the patient and limit the number of others in close proximity so as not to overwhelm the patient.
- E. When evaluating and treating the patient, consider these important tips
 - 1. Because many of these patients have such difficulty with change, extra effort should be spent building predictability into your assessment (i.e., step-by-step instructions and counting down before procedures).
 - 2. Inform the patient before touching them because of potential tactile sensitivities.
 - 3. Give direct requests using simple language instead of asking questions (e.g., Can I listen to your chest? Instead, choose, I am going to listen to your chest gently and quietly.)
 - 4. Over-explain procedures you anticipate to be distressing before you begin and make sure that any procedure is absolutely necessary and not "just in case."
 - 5. These patients may not respond to pain in the same way a neurotypical child may. Commonly used pain scale instruments may not be accurate.
 - 6. Caution against using exaggerations because these children can be so literal-thinking. Saying, "This will just feel like a little bee sting," may evoke terror and perseveration on the danger of bees, even if none are around.

INTERACTING WITH NEURODIVERSE CHILDREN (Continued)

7. Aggressive and violent behavior is typically from anxiety, fear, communication frustrations, or feeling ill and is rarely mean-spirited or premeditated. Family and caregivers are instrumental in understanding these behaviors and strategies for de-escalating them. The use of restraints should only be considered if there is imminent danger to the patient or others, just as would be standard with any neurotypical child.

SPECIALTY CARE WITHIN THE PRACTICE OF EMS MEDICINE

As its foundation has solidified, the depth and breadth of the capabilities and responsibilities of EMS has significantly expanded and matured. The health care delivery by EMS personnel is no longer limited to the confines of an ambulance.

Specialty care within the practice of EMS has been in existence for many years. This chapter was added to the State of Ohio Adult EMS Guidelines and Procedures Manual in 2018 and, analogous to the other chapters, will be dynamic over time. This chapter is not all-inclusive of the sectors of specialty care within EMS. The content of this chapter is solely directed at the sectors that have been formally cited by the EMFTS Board or within the Ohio Revised Code or Ohio Administrative Code.

Various institutions and organizations offer specialty care education and training, and some programs provide documentation of course completion or certification. Regardless of these documents or the training provided, the EMS provider certifications and professional titles recognized and legislatively established in the State of Ohio are emergency medical responder, emergency medical technician, advanced emergency medical technician, and paramedic. The terms or descriptors such as “community paramedic”, “critical care paramedic”, or “tactical EMS” do not exist in Ohio EMS legislation or regulation and are not recognized by the EMFTS Board. Regardless of the specialty care education or training provided, a certified Ohio EMS provider must comply with the following:

1. Function under the authority of a medical director who meets the qualifications cited in Ohio Administrative Code 4765-3-05
2. Restrict the performance of skills to the Ohio EMS scope of practice authorized by the EMFTS Board for the associated level of Ohio EMS certification.

In addition, the EMS medical director must provide authorization, a written protocol, training, continuing education, and a quality assurance program for all of the skills performed by the EMS providers under his or her medical direction. Regardless of the training or education provided, the EMS medical director may not permit skills that exceed the Ohio EMS scope of practice authorized by the EMFTS Board for the associated level of Ohio EMS certification.

MOBILE INTEGRATED HEALTHCARE

In August 1996, the National Highway Transportation Safety Administration, the agency overseeing federal EMS, published a pinnacle report, Emergency Medical Services: Agenda for the Future. At the beginning of this document, a statement titled “The Vision” has been embraced as EMS’s overarching quest and purpose. “The Vision” states, “Emergency medical services (EMS) of the future will be community-based health management that is fully integrated with the overall health care system. It will have the ability to identify and modify illness and injury risks, provide acute illness and injury care and follow-up, and contribute to the treatment of chronic conditions and community health monitoring. This new entity will be developed by redistributing existing healthcare resources and integrated with other healthcare providers and public health and public safety agencies. It will improve community health and result in more appropriate use of acute health care resources. EMS will remain the public’s emergency medical safety net.” With respect to the integration of health services, the Agenda for the Future provided the following recommendations for EMS:

- Expand the role of EMS in public health
- Involve EMS in community health monitoring activities
- Integrate EMS with other healthcare providers and provider networks
- Incorporate EMS within health care networks’ structure to deliver quality care
- Be cognizant of the special needs of the entire population
- Incorporate health systems within EMS that address the special needs of all segments of the population

Emergency Medical Services at the Crossroads, a report published by the Institute of Medicine of the National Academies in June 2006, noted that the EMS systems remain fragmented. The report, like the Agenda for the Future, continued to support the evolution and incorporation of EMS as an integral component of the overall healthcare system. One of the recommendations was for the Department of Health and Human Services, the Department of Transportation, and the Department of Homeland Security to jointly undertake a detailed assessment of the emergency and trauma workforce capacity, trends, and future needs and develop strategies to meet these needs in the future. The report describes a vision of a 21st-century emergency care and trauma system where 9-1-1 dispatchers, EMS personnel, medical providers, public safety officers, and public health officials are interconnected and united to ensure that each patient receives the most appropriate care, at the optimal location, with minimal delay.

Over the past several decades, the medical care delivery model has shifted significantly from the inpatient to the outpatient setting. The stimuli for the generation of this model include but are not limited to, advancements in medical technology and treatment modalities, a need for improved fiscal oversight and allocation of resources, and the desire of the general public to access and receive care without enduring separation from their residential environment. In addition, our nation’s philosophy of acceptable healthcare has shifted its focus, emphasizing health maintenance and illness and injury prevention.

Mobile integrated healthcare is another step toward more aggressive maintenance of health and wellness in an outpatient setting, and EMS providers play an integral role in its administrative and operational framework. Secondary benefits of an effective mobile integrated healthcare system include the creation of a closer relationship between a patient and their local healthcare assets and the potential reduction in the need for inpatient care.

On June 30, 2015, the Ohio Revised Code was amended to allow Ohio EMS providers to perform services in non-emergency settings. The new law, Ohio Revised Code 4765.31, created a path for mobile integrated healthcare to exist in Ohio. Per this law, Ohio EMS personnel, including but not limited to community paramedics, providing non-emergency care must:

MOBILE INTEGRATED HEALTHCARE (Continued)

1. Function within the Ohio EMS scope of practice that is determined by the State of Ohio Board of Emergency Medical, Fire, and Transportation Services Board (EMFTS Board)
2. Function under the authority of a medical director that meets the qualifications cited in the Ohio Administrative Code 4765-3-05.

While both organizations can offer support, it is not the directive nor is it the desire of the EMFTS Board or the Ohio Department of Public Safety, Division of EMS to be prescriptive or to mandate the structure of a mobile integrated healthcare system. There are several advisories that have been approved by the National EMS Advisory Council and presented to the Federal Interagency Committee on EMS that support key supportive and operational elements related to mobile integrated healthcare such as reimbursement for services provided and the completion of a practice analysis to guide education, provider qualifications, and scopes of practice specific to the specialty.

The foundation of a mobile integrated healthcare system is based solely in the heart of the community. The local healthcare consumers and providers are in the best position to identify the deficiencies in medical resources and access to care. Therefore, a community's caregivers, consumers, patients, and healthcare stakeholders must unite in a spirit of collaboration to build a mobile integrated healthcare system that fills the existing gaps in medical care delivery and best meets the identified needs. Mobile integrated healthcare is a team sport, and the contributions of allied healthcare professionals, including EMS providers, are essential elements required for creation and launch of a successful system.

TACTICAL EMERGENCY CASUALTY CARE

Austere environments can be encountered when dispatched to any scene or may unpredictably evolve after arrival on scene. Lessons learned from military experience and historic tragic events in the civilian setting have taught us that the identification and rapid treatment of life-threatening injuries saves lives. The patient treatment measures that were first crafted by the military as Tactical Combat Casualty Care has evolved into the civilian model, Tactical Emergency Casualty Care (TECC) which was created by the Committee on Tactical Emergency Casualty Care (C-TECC). While the TCCC model was primarily based on relatively healthy and young military personnel, the guidelines offered within TECC encompass the needs of the entire population which includes pediatric and geriatric patients and those with co-morbid conditions.

The patient care measures cited within TECC were created for all EMS providers. The use of TECC is not limited to specialty care teams such as rescue task forces or tactical EMS units. TECC can be utilized by all persons who are willing and able to respond, including non-medical personnel such as law enforcement personnel (First Responders with a Duty to Act) and civilians (active Bystanders), to a level appropriate to their respective training and/or scope of practice.

Children are at a disproportionate disadvantage when they become injured in the prehospital environment. This is especially true when their injuries involve hemorrhage, hypothermia, head injury, and severe emotional trauma. Responders need to recognize and mitigate these conditions proactively to optimize patient outcomes. The pediatric C-TECC guidelines are complementary to the general C-TECC Guidelines and the principles of pediatric resuscitation. They are intended to be used as a tool for departments and agencies to prepare to respond to the needs of patients of all ages in unique high-threat environments.

As demonstrated by many events involving austere environments in the civilian setting, the initial effective emergency care is frequently provided by the Active Bystander (formerly known as the layperson). Their basic actions have been the critical factor in preserving life until EMS arrives and the patient is transported to an appropriate facility for definitive interventions. While the C-TECC has produced guidelines for several levels of responders, the following guidelines were written specifically for those trained and authorized to provide basic or advanced life support. It is important to note that, within an austere environment, the reference to the “patient” and the associated treatment interventions encompasses any injured person on scene including the victim, a fellow EMS professional, law enforcement officer, or alleged perpetrator as well as self-care. In addition, Active Bystanders and/or First Responders with a Duty to Act should be tasked to provision of TECC to patients, at the level appropriate with their skill and training, rather than being dismissed upon the arrival of EMS clinicians. Additional lives can be saved with their additional manpower and assistance in the provision of basic life-saving TECC measures to patients unless the threat warrants evacuation of the TECC providers from the scene.

The guidelines for patient care by EMS are first driven by definition of the zone in which patient care is needed. These zones are as follows:

Hot Zone – An area of direct or immediate threat

Warm Zone – An area of indirect threat where the site has been cleared by law enforcement personnel, but not secured

Cold Zone – An area where there is no known threat

Within austere environments, all responders must be prepared for unanticipated dynamic changes in the classification of the zone (e.g., a cold zone suddenly becoming a hot zone), which will alter the associated patient care measures provided, until all sources of threat have been eliminated or secured.

The current TECC guidelines for rapid life-saving treatment in hot and warm zones, modified to align with the Ohio EMS scope of practice, are cited below. The patient care provided in the cold zone should be the standard traditional care based upon the patient's injury or illness and the patient's condition. The vast majority of these patient care measures can be performed by all Ohio EMS providers except where noted due to

TACTICAL EMERGENCY CASUALTY CARE (Continued)

the parameters of the Ohio EMS scope of practice. All patient care measures require authorization, a written protocol, training, continuing education, and a quality assurance program from the EMS medical director.

Regardless of the alignment of the TECC guidelines with the Ohio EMS scope of practice, the goals of the three phases of threat care remain unchanged. These goals are as follows:

Direct Threat Care - Accomplish the mission objectives while mitigating the risk to the injured, to responders, and to the public

Indirect Threat Care - Leverage this phase of *relative* safety to rapidly stabilize additional time-sensitive life-threatening injuries to the patient to permit safe extraction to more definitive treatment and evacuation. The threat remains at this point and as such, so does the need for heightened awareness to the safety and security of the responders and the patients.

Evacuation Care - Now that the patient and providers are removed from the probability of ongoing injuries from the threat, the top priority is the maintenance and improvement of the lifesaving interventions initiated during the Direct and Indirect Threat phases of care. Additionally, a more comprehensive patient management approach can be taken to identify and treat any remaining threats to the patient's health. The focus continues toward moving the patient to definitive care with minimal delays

NOTE: Data is extremely limited as to the comparative effectiveness of commercial tourniquet use in the pediatric population. A 2021 American Heart Association consensus statement suggests the use of a windlass tourniquet for life-threatening bleeding in the pediatric population but does not recommend for or against other styles of tourniquet. For children with extremities that do not allow adequate tightening of a windlass tourniquet, the recommendation is for direct manual pressure and the use of hemostatic dressing. A 2021 systematic review found that commercial windlass tourniquets were typically able to obtain hemostasis in children as young as 2 years old with minimal arm circumference of 13 cm (5.1 inches). Responders must be familiar with the limitations and use of the equipment they carry and have a plan for exsanguinating hemorrhage in a patient with small extremities.

Direct Threat Care/Hot Zone

- A. Execute a rescue plan to reduce the risk to the injured from ongoing direct threat by using one or more of these strategies:
 1. Direct the pediatric patient to self-extract to a safer position using simple, age-appropriate commands. Use simple phrases that are understandable by a child, and which are actionable (e.g., "Look at my face and crawl to me right now").
 2. Mitigate the risk to the patient and responders.
 3. Direct another person to assist with extricating the pediatric patient to a safer position.
 4. Consider a rescue plan for a patient who is unable to be extricated by other means (e.g., unresponsive, inaccessible, or otherwise unable to move).
- B. Stop life-threatening external hemorrhage.
 1. Apply immediate, purposeful, focused manual pressure to the bleeding source.
 2. Apply junctional or proximal pressure if needed to supplement previous attempt.
 - a) Apply a tourniquet to the patient with uncontrolled severe extremity bleeding or an amputation. (Note: Some tourniquets may not function as intended on small limbs. Know your equipment limitations.)
 - b) Apply the tourniquet as high (proximal) on the limb as possible.
 - c) Apply to bare skin if possible.
 - d) If necessary, apply a second tourniquet to an extremity that continues to bleed; apply proximal to the existing tourniquet if possible and apply to bare skin.
 3. Continue applying manual pressure to the source or a junctional location as needed.

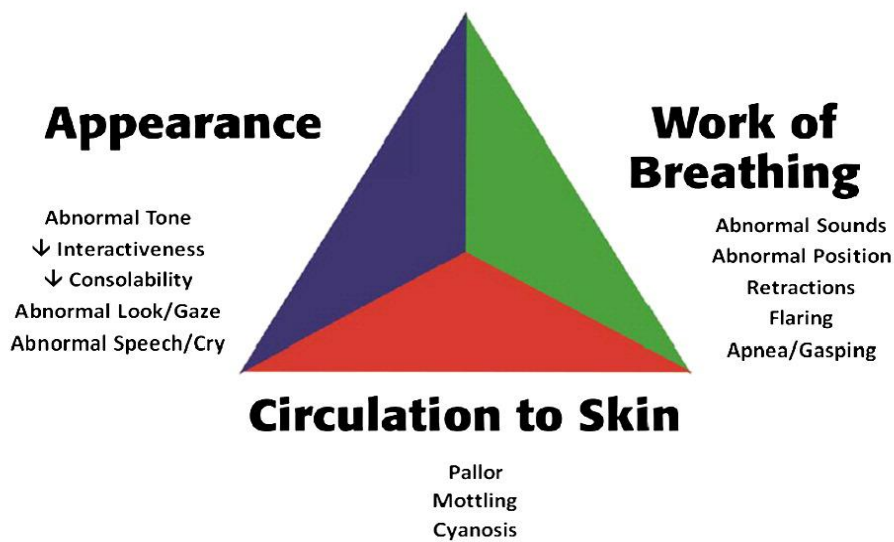
TACTICAL EMERGENCY CASUALTY CARE (Continued)

C. Support the airway.

1. Place or direct the patient to be placed into the best position to protect the airway (e.g., recovery position or sitting up).
2. If needed, consider rapid, high-yield airway interventions, such as manual positioning and/or placement of an airway adjunct.

Indirect Threat Care/Warm Zone

- A. Assess the patient using the Pediatric Assessment Triangle to identify major deficits in general appearance, work of breathing, and circulation to the skin.



B. Massive Hemorrhage (Bleeding):

1. Expose, assess for, and control any uncontrolled/unrecognized major bleeding.
2. Expose skin and apply a tourniquet 2-3 inches above the wound for severe extremity bleeding if not already done (see Section B in Direct Threat Care/Hot Zone).
 - a) Most commercial tourniquets will be adequate for most pediatric patients.
3. Use pressure dressings to control bleeding at the source.
 - a) If available, hemostatic trauma dressings are appropriate for pediatric patients. Apply them using a deep wound packing technique and place a pressure dressing over the packed wound.
4. Reassess any tourniquets that were already applied to the patient.
 - a) Assess for continued bleeding or distal pulses on extremities with tourniquets applied and tighten the device if present.
 - b) Expose and clearly mark the tourniquet site with the time of application if possible.
5. For prolonged care under Indirect Threat, consider a tourniquet conversion if
 - a) The delay to definitive care will be longer than two hours and:
 - (1) The patient is not in hemorrhagic shock.
 - (2) The bleeding wound can be visualized and accessed.
 - (3) The tourniquet is not being used to manage a partial or complete amputation.
 - (4) The patient has not already had a tourniquet downgrade attempted.
 - b) Apply a new tourniquet proximal to the existing device and be prepared to tighten if necessary.
 - c) Expose and pack the previously bleeding wound site. Use a hemostatic (preferred) or other gauze dressing if available, apply requisite manual pressure post-packing, and apply a pressure dressing to the wound site.
 - d) Slowly remove the first tourniquet and continuously assess for bleeding. If bleeding recurs, tighten the new tourniquet until bleeding stops.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

C. Airway Management:

1. Assess patient for adequacy of airway and respiratory effort; look, listen, and feel and consider pulse oximetry if available with a goal of over 94% on room air.
2. If necessary, intervene to open and maintain a patent airway. Consider these interventions:
 - a) Manually position the airway by head-tilt/chin-lift or manual jaw thrust (open mouth first.)
 - b) Suction airway. (Avoid putting fingers in mouth and use caution for vasovagal response from aggressively suctioning hypopharynx).
 - c) Allow the patient to assume the most comfortable position, which may be lateral recumbent (recovery) or sitting up. For recumbent infants and younger children, elevate the shoulders with gentle support (e.g., folded towel) to optimize airway positioning.
 - d) Maintain a high index of suspicion for potential airway worsening in a patient with inhalational burns or other injuries.
3. Support ventilation as needed.
 - a) A basic airway adjunct (nasopharyngeal or oropharyngeal airway) and effective bag-valve-mask ventilation are the initial interventions. A PEEP valve and manometer on a bag valve mask should be used, if available.
 - b) Consider administering oxygen as soon as it is available.
 - c) Avoid overinflation and hyperventilation with assisted ventilation

PARAMEDIC

- d) If unable to ventilate, consider more advanced airway support.
 - (1) Extraglottic (supraglottic) airway.
 - (2) If a surgical airway is indicated, needle cricothyroidotomy is recommended over the surgical approach for pediatric patients.
 - (3) Intubation if unable to manage airway with extraglottic airway.
4. Consider the need to prevent or treat a tension pneumothorax in unstable patients with ineffective or deteriorating respiratory effort.
 - a) Apply a seal to any open chest, back, or neck wounds, ideally a vented commercial chest seal.
 - b) Monitor the patient for possible development of tension pneumothorax, especially if a non-vented chest seal is applied.

AEMT

- c) Perform needle decompression on the side of the injury.
 - (1) Infants and smaller children require a smaller needle than adults for decompression. Consider a normal (1.5 inches/3.8 cm) 14 or 16g needle.
 - (2) Landmarks for insertion are the 5th intercostal space at the anterior axillary line (first choice) and the 2nd intercostal space at the mid-clavicular line (second choice).
- d) Consider bilateral needle decompression for the patient in traumatic arrest or peri-arrest.

D. Circulation (Shock Management/Resuscitation):

1. For a patient in suspected shock:
 - a) Ensure that external hemorrhage is being aggressively controlled.

AEMT

- b) Obtain IV/IO access promptly; warm fluids are preferred.
 - c) If signs or symptoms of shock are present, administer a 20 mL/kg IV or IO bolus of normal saline or lactated Ringer's solution
 - d) If the patient still shows signs or symptoms of shock, administer repeat IV or IO boluses up to a maximum of 60 mL/kg.
 - e) Continually assess patient and slow the rate of IV fluid administration if patient improves or recovers to minimal blood pressure range for age or recovers a strong peripheral pulse. The systolic blood pressure goals are as follows: 60 mmHg <1 month of age, 70 mmHg + [2x age in years] in children 1 month to 10 years of age, 90 mmHg in children 10 years of age or older.
2. Consider the use of tranexamic acid (TXA) in patients with suspected or actual massive hemorrhage.

AEMT

- a) TXA use should only be undertaken in a pediatric trauma system-of-care setting where pre-event coordination with local medical infrastructure has occurred.
- b) Suggested dose: 15 mg/kg loading dose followed by 2 mg/kg/hour for 8 hours.
- c) Only initiate if less than 3 hours from the time of injury, but ideally within the first 30 minutes from the time of injury.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

- d) Consider administering TXA after resuscitation with whole blood has occurred.
- 3. While hypocalcemia in the pediatric trauma patient is well established and likely correlates with increased mortality, there is extremely limited information about the use of calcium in pediatric field trauma resuscitation. The treatment of hypocalcemia is variable in the pediatric patient and can be complex. Consult local medical direction.
- 4. Cardiopulmonary resuscitation (CPR) and defibrillation are typically not successful in patients of any age who have suffered traumatic cardiac arrest or blast injuries. In certain circumstances (e.g., electrical injuries, drowning, suffocation, etc.), CPR may be of benefit and should be considered in the context of available resources.

E. Hypothermia Prevention:

- 1. Reduce heat loss from conduction with the ground.
- 2. Remove wet clothing and dry the patient.
- 3. Cover the patient with warm, dry, insulating material with a barrier to keep it dry.

F. Hypoglycemia Prevention:

- 1. Check fingerstick blood glucose, if possible, as low blood sugar is a common comorbidity in injured children. Consider using 70 mg/dl as the threshold for hypoglycemia in infants and children.
- 2. Treatment could involve:
 - a) Oral intake of high-carbohydrate food

AEMT

- b) Dextrose 2 mg/kg IV. D10W is the preferred formulation for pediatric dosing.

G. Analgesia:

- 1. Assess the pain level.
- 2. Consider oral acetaminophen (15 mg/kg) every four hours for mild to moderate pain.
- 3. In patients over 3 months old, consider ketamine for analgesia for moderate to severe pain as it has a favorable risk profile.² Use weight-based dosing and administer slowly to mitigate possible side effects.

AEMT

- a) Suggested oral (PO) dose is 0.2-0.5 mg/kg every 8 hours.
 - b) Suggested IM dose is 0.2-0.5 mg/kg.
 - c) Suggested IV dose is 0.1-0.2 mg/kg slow push.
- 4. In an infant, sugar is a proven analgesic. If the airway is patent and the child is awake, dip a pacifier or gloved finger into a sugary solution (not honey) and offer as often as needed.
- 5. Opioid pain medications are also appropriate for use in the pediatric population under local protocol guidance, with IV, IM, and intranasal (IN) options available. Use estimated weight-based dosing and ensure immediate access to the reversal agent naloxone. Suggested dosages:

AEMT

- a) Fentanyl IM/IN: 1 mcg/kg (not to exceed 100 mcg).
 - b) Fentanyl IV/IO: 1 mcg/kg titrate to effect at a rate of 50 mcg/min slow IVP (not to exceed 100 mcg).
 - c) Morphine IM: 0.1 mg/kg.
 - d) Morphine IV/IO: 0.1 mg/kg titrate to effect at a rate of 2 mg/min slow IVP (not to exceed 20 mg).
 - e) Suggested naloxone initial dosages are 0.1 mg/kg IV or IN for infants and children < 5 years old. For older children, 2 mg IV or IN.
- 6. Consider the use of ondansetron if nausea or vomiting occurs

AEMT

- a) Suggested dose: 0.1 mg/kg IV for patients 4 years-12 years.
 - b) Suggested dose: 4 mg IV for patients over 12 years.
 - c) Suggested dose: 4 mg PO children 4-12 years.
 - d) Suggested dose: 8 mg PO children over 12 years.

H. Head Injury:

- 1. Consider use of a pediatric-modified GCS scale for infants and children in patients with traumatic head injuries (see appendix below)

TACTICAL EMERGENCY CASUALTY CARE (Continued)

- a) Pediatric GCS ≤ 12 suggests non-mild traumatic brain injury.
 - b) Pediatric GCS ≤ 8 suggests need for airway support.
 - c) Pediatric GCS ≤ 6 suggests need for surgical management of TBI.
 2. Restrict cervical spine motion if indicated based on mechanism of injury; in the absence of commercial immobilization devices, consider manual stabilization, a towel roll, or other improvised technique.
 3. Avoid hypoxia (see above).
 4. Avoid hyperventilation or hypoventilation as the goal is normocarbica (ETCO₂ of 35-40 mmHg).
 5. Consider elevating the head to about 30°.
 6. Treat aggressively for shock if present. Hypotension can double the mortality associated with traumatic brain injury.
 7. Avoid hypothermia.
- I. Prepare patient for movement:
1. Use a movement assistive device if possible (basket, portable stretcher, wheeled litter).
 2. Minimize unnecessary movement.
 3. Ensure patient is well secured and is ready for the anticipated mode of extraction.
 4. Prevent hypothermia.
- J. Minimize psychosocial impact:
1. As detailed above, it is important in children of all ages to express empathy. Tell them the truth about what to expect, warn them if something will hurt, and describe what you are doing to help them.
 2. Encourage, reassure, and explain care. If not altered, awake, and able to follow commands, patient may drink clear liquids if conscious, can swallow, and there is a confirmed delay in evacuation to care.
 3. Talk to the child directly if possible.
 4. Keep the patient with the caregiver to the extent possible.

Evacuation Care/Cold Zone

- A. Assess patient using the Pediatric Assessment Triangle to identify major deficits in general appearance, work of breathing, and circulation to skin.
- B. Massive Hemorrhage (Bleeding):
1. Expose, assess for, and control any uncontrolled/unrecognized major bleeding.
 2. Apply a tourniquet if necessary.
 3. Use trauma dressings to control bleeding at the source.
 - a) Hemostatic trauma dressings are appropriate to use in pediatric patients if available. Apply using deep wound packing technique and place a pressure dressing over the packed wound.
 4. Reassess any tourniquets that were already applied to the patient.
 - a) Assess for distal pulses on extremities with tourniquets applied and tighten device if present.
 - b) Expose skin and apply a tourniquet 2-3 inches above wound for severe extremity bleeding if not already done (see Section B in Direct Threat/Hot Zone).
 - c) Expose and clearly mark tourniquet site with the time of application if possible.
 5. For prolonged care under Indirect Threat, consider a tourniquet conversion.
 - a) If the delay to definitive care will be longer than two hours and:
 - (1) The patient is not in hemorrhagic shock.
 - (2) The bleeding wound can be visualized and accessed.
 - (3) The tourniquet is not controlling bleeding from a partial or complete amputation.
 - (4) The patient has not already had a tourniquet downgrade attempted.
 - b) Apply a new tourniquet proximal to the existing device and be prepared to tighten if necessary.
 - c) Expose and pack the previously bleeding wound site. Use a hemostatic trauma dressing if available and apply a pressure dressing to the wound site.
 - d) Slowly remove the first tourniquet and continuously assess for bleeding. If bleeding recurs, tighten the new tourniquet until hemostasis is obtained.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

C. Airway Management and Breathing:

1. Assess patient for adequacy of airway and respiratory effort; look, listen, and feel and consider pulse oximetry if available with a goal of over 94% on room air.
2. If necessary, intervene to open and maintain a patent airway. Consider these interventions:
 - a) Manually position the airway by head-tilt/chin-lift or manual jaw thrust (open mouth first).
 - b) Suction airway (avoid putting fingers in mouth and use caution for vasovagal response from aggressively suctioning hypopharynx).
 - c) Allow the patient to assume the most comfortable position, which may be lateral recumbent (recovery) or sitting up. For recumbent infants and younger children, elevate the shoulders with gentle support (e.g., folded towel) to optimize airway positioning.
3. Support ventilation as needed.
 - a) A basic airway adjunct (nasopharyngeal or oropharyngeal airway) and effective bag-valve-mask ventilation are the initial interventions. A PEEP valve and manometer on a bag valve mask should be used, if available.
 - b) Consider administering oxygen as soon as it is available.
 - c) Avoid overinflation and hyperventilation with assisted ventilation

PARAMEDIC

- d) If unable to ventilate, consider more advanced airway support.
 - (1) Extraglottic (supraglottic) airway.
 - (2) If a surgical airway is indicated, needle cricothyroidotomy is recommended over the surgical approach for pediatric patients.
 - (3) Intubation if unable to manage airway with extraglottic airway.
4. Consider the need to prevent or treat a tension pneumothorax in unstable patients with ineffective or deteriorating respiratory effort.
 - a) Apply a seal to any open chest, back, or neck wounds, ideally a vented commercial chest seal.
 - b) Monitor the patient for possible development of tension pneumothorax, especially if a non-vented chest seal is applied.

AEMT

- c) Perform needle decompression on the side of the injury.
 - (1) Infants and smaller children require a smaller needle than adults for decompression. Consider a normal (1.5 inches/3.8 cm) 14 or 16g needle.
 - (2) Landmarks for insertion are the 5th intercostal space at the anterior axillary line (first choice) and the 2nd intercostal space at the mid-clavicular line (second choice).
- d) Consider bilateral needle decompression for the patient in traumatic arrest or peri-arrest.

D. Circulation:

1. For a patient in suspected shock:
 - a) Ensure that external hemorrhage is being aggressively controlled.

AEMT

- b) Obtain IV/IO access promptly; warm fluids are preferred.
 - c) If signs or symptoms of shock are present, administer a 20 mL/kg IV or IO bolus of normal saline or lactated Ringer's solution
 - d) If the patient still shows signs or symptoms of shock, administer repeat IV or IO boluses up to a maximum of 60 mL/kg.
 - e) Continually assess patient and slow the rate of IV fluid administration if patient improves or recovers to minimal blood pressure range for age or recovers a strong peripheral pulse. The systolic blood pressure goals are as follows: 60 mmHg <1 month of age, 70 mmHg + [2x age in years] in children 1 month to 10 years of age, 90 mmHg in children 10 years of age or older.
2. Consider the use of tranexamic acid (TXA) in patients with suspected or actual massive hemorrhage.

AEMT

- a) TXA use should only be undertaken in a pediatric trauma system-of-care setting where pre-event coordination with local medical infrastructure has occurred.
- b) Suggested dose: 15 mg/kg loading dose followed by 2 mg/kg/hour for 8 hours.
- c) Only initiate if less than 3 hours from the time of injury, but ideally within the first 30 minutes from the time of injury.
- d) Consider administering TXA after resuscitation with whole blood has occurred.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

3. While hypocalcemia in the pediatric trauma patient is well established and likely correlates with increased mortality, there is extremely limited information about the use of calcium in pediatric field trauma resuscitation. The treatment of hypocalcemia is variable in the pediatric patient and can be complex. Consult local medical direction.
4. Cardiopulmonary resuscitation (CPR) and defibrillation are typically not successful in patients of any age who have suffered traumatic cardiac arrest or blast injuries. In certain circumstances (e.g., electrical injuries, drowning, suffocation, etc.), CPR may be of benefit and should be considered in the context of available resources.
5. Oral intake of fluids may be encouraged if the patient is conscious and the airway is patent.

E. Hypothermia Prevention:

1. As soon as possible, place the patient onto an insulated surface to decrease conductive heat loss to the cold ground.
2. Replace wet clothing with dry if possible.
3. Cover the patient with dry blankets, jackets, poncho liners, sleeping bags, commercial warming devices or anything that will retain heat and keep the patient dry.

F. Hypoglycemia Prevention:

1. Check fingerstick blood glucose, if possible, as low blood sugar is a common comorbidity in injured children. Consider using 70 mg/dl as the threshold for hypoglycemia in infants and children.
2. Treatment could involve:
 - a) Oral intake of high-carbohydrate food

AEMT

- b) Dextrose 2 mg/kg IV. D10W is the preferred formulation for pediatric dosing.

G. Analgesia:

1. Assess the pain level.
2. Consider oral acetaminophen (15 mg/kg) every four hours for mild to moderate pain.
3. In patients over 3 months old, consider ketamine for analgesia for moderate to severe pain as it has a favorable risk profile.² Use weight-based dosing and administer slowly to mitigate possible side effects.

AEMT

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4. In an infant, sugar is a proven analgesic. If the airway is patent and the child is awake, dip a pacifier or gloved finger into a sugary solution (not honey) and offer as often as needed.
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 - c) Suggested dose: 4 mg PO children 4-12 years.
 - d) Suggested dose: 8 mg PO children over 12 years.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

H. Antibiotics:

PARAMEDIC

1. Consider the use of antibiotics for patients with penetrating trauma, including eye injuries, if not contraindicated.
2. For situations where extraction will be delayed beyond several hours, consider the one-time administration of an antibiotic under local protocol guidance to reduce the risk of infectious complications.
 - a) Cefazolin 30mg/kg IV (up to 2 g) for open extremity or thoracic injuries.
 - b) Levofloxacin 16 mg/kg IV/PO (up to 750 mg) for penetrating eye injuries.
 - c) Cefazolin (as above) plus metronidazole 15 mg/kg IV loading dose for maxillofacial trauma or involvement of the esophagus, stomach, or intestinal tract.

I. Head Injury:

1. Consider use of a pediatric-modified GCS scale for infants and children in patients with traumatic head injuries (see appendix below)
 - a) Pediatric GCS ≤ 12 suggests non-mild traumatic brain injury.
 - b) Pediatric GCS ≤ 8 suggests need for airway support.
 - c) Pediatric GCS ≤ 6 suggests need for surgical management of TBI.
2. Restrict cervical spine motion if indicated based on mechanism of injury; in the absence of commercial immobilization devices, consider manual stabilization, a towel roll, or other improvised technique.
3. Avoid hypoxia (see above).
4. Avoid hyper-ventilation or hypoventilation- the goal is normocarbida (ETCO₂ of 35-40 mmHg).
5. Consider elevating the head to about 30°.
6. Treat aggressively for shock if present. Hypotension can double the mortality associated with traumatic brain injury.
7. Avoid hypothermia.

J. Burns.

1. Aggressively monitor airway and respiratory status.
2. Have a low threshold for intubation if airway burns are suspected.
3. Apply high-flow oxygen via non-rebreather mask if carbon monoxide toxicity is suspected.
4. Have a low threshold for suspecting cyanide toxicity.
 - a) Symptoms are non-specific and may be similar to carbon monoxide (CO) toxicity in cases that occur indoors. Patients may have a cherry red appearance to their skin.
 - b) Treatment includes oxygen and the use of an antidote:

PARAMEDIC

- (1) Cyanide antidote kit: In pediatric patients, consider administering only the sodium thiosulfate component of the kit at 1.5 mL/kg up to 50 mL IV. The other components of the kit contain nitrates which can cause complications in children with smoke inhalation.
- (2) Hydroxocobalamin is frequently and effectively used off-label in children at a dose of 70 mg/kg up to 5 g IV over 15 minutes.
5. Manage burns. Use the "Rule of Nines" in infants and children or estimate the burned surface area using the surface area of the patient's palm, which represents approximately 1% of the total body surface area (TBSA).
 - a) Cover burned areas with dry, clean dressings (sterile if possible).
 - b) Aggressively mitigate hypothermia (see above).
 - c) For burns $>20\%$ TBSA, begin fluid resuscitation. A suggested strategy is:
 - (1) If the patient is suffering from hemorrhagic shock as well, this condition takes priority for fluid resuscitation strategy.
 - (2) For TBSA $\geq 20\%$ and a weight < 30 kg, calculate estimated intravenous fluid needs:

AEMT

- (a) For a patient weight >10 kg, preferably administer lactated Ringers and for a patient weight < 10 kg use D5LR if available. Otherwise, administer normal saline.
- (b) The total volume of fluid that should be administered is (3 mL) x (weight in kg) x (%TBSA)
- (c) Include previously administered fluids in the total fluid amount.

TACTICAL EMERGENCY CASUALTY CARE (Continued)

- (d) Administer half of calculated amount over the first 8 hours post burn (from time of injury) and administer remaining amount over the next 16 hours.
- (e) In addition to burn resuscitation fluid requirements, also infuse maintenance IV fluids of D5LR. Administer 4 mL/kg/hr for the first 10 kg of body weight, then 2 mL/kg/hr for the next 10 kg of body weight, then 1 mL/kg/hr for the remaining kg of body weight.
- d) Proactively monitor and maintain normal blood sugars.
- e) For children who weigh >30 kg, use adult strategy for burn resuscitation.

K. Prepare patient for movement:

1. Ensure that proper restraints are fully applied to the victim before initiating air or ground transport:
 - a) Forward/deceleration restraints over the shoulders should be included.
 - b) Infants and very young children should be transported in a car safety seat if stable.
 - c) Providers should be restrained as well.
 - d) Equipment must be secured.
2. Arrive safely. Be judicious with the use of lights and sirens as they are a significant cause of patient and provider injuries and fatalities.
3. When considering atypical transport platforms:
 - a) Address preventable causes of death prior to initiating transport.
 - b) If possible, the patient should remain under care by a rescuer or responder (other than the vehicle operator) during transport. Maintain any lifesaving intervention initiated during prior phases.
 - c) Ideally, the patient transport platform is enclosed, optimizes safety, and minimizes environmental threats to the patient.
 - d) The patient and EMS provider should be safely restrained to the extent possible, and the equipment secured.
4. Consider the most appropriate receiving facility and notify them.

L. Minimize Psychosocial Impact:

1. With all children of all ages, it is important to express empathy. Tell them the truth about what to expect, warn them if something will hurt, and describe what you are doing to help them.
2. Talk to the child directly if possible.
3. Keep the patient with the caregiver to the extent possible. Contact the caregiver if they are not with the child.
4. Use techniques of distraction as needed. For infants, use keys, a penlight, a pacifier, or blanket. For older children, use conversation, a toy, jokes, and electronic devices.
5. Do not make promises you cannot keep.
6. Be calm around the patient.

NORMAL PEDIATRIC VITAL SIGNS

Age	Pulse	Respiratory Rate	Systolic BP*
Preterm < 1 kg	120-160	30-60	39-59
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

Notes:

1. Blood pressure is a late and unreliable indicator of shock in children
2. Lowest acceptable systolic blood pressure for 1 year of age and older may be remembered using the formula: $70 + (\text{age in years}) \times 2$

PEDIATRIC GLASGOW SCALE SCORING TOOL

		>1 year	<1 year	
Eye Opening	4	Spontaneously	Spontaneously	
	3	To verbal command	To shout	
	2	To pain	To pain	
	1	No response	No response	
		>1 year	<1 year	
Best Motor Response*	6	Obeys	Spontaneous movements	
	5	Localizes pain	Localizes pain	
	4	Flexion – withdrawal	Flexion – normal	
	3	Flexion – abnormal (decorticate rigidity)	Flexion – abnormal (decorticate rigidity)	
	2	Extension – (decorticate rigidity)	Extension – (decorticate rigidity)	
	1	No response	No response	
		>5 years	2-5 years	0-23 months
Best Verbal Response	5	Oriented and converses	Appropriate words and phrases	Smiles, coos, cries appropriately
	4	Disoriented and converses	Inappropriate words	Cries
	3	Inappropriate words	Cries and/or screams	Inappropriate crying and/or screaming
	2	Incomprehensible sounds	Grunts	Grunts
	1	No response	No response	No response

* Motor response is most indicative of level of injury