

TREATMENT

Abdominal Pain

HX	PE	DDX
Pain: nature, duration, location, radiation, intensity Associated symptoms: fever, nausea and vomiting, diarrhea, melena, painful urination Last menstrual period	Distension Tenderness Guarding Rigidity Rebound Masses	Diffuse: Perforation, intraabdominal bleeding (trauma, ectopic, AAA), gastroenteritis RUQ: cholecystitis, hepatitis, pancreatitis Epigastric: peptic ulcer, pancreatitis, gastritis LUQ: spleen, pancreatitis, stomach (PUD) Flank: kidney stone, pyelonephritis RLQ: Appendicitis, kidney stone, PID, ovarian cyst, cystitis LLQ: diverticulitis, kidney stone, PID, ovarian cyst, cystitis

Treatment:

- A. Start O₂, follow *Airway Management* procedure.
- B. If shock syndrome is present and BP less than 90 mm/Hg, follow *Shock* protocol, and consider IV/IO, NS, large bore, TKO or as needed. If traumatic event, enter into trauma system. Rapid transport is of primary importance.
- C. Place patient in comfortable position.
- D. Do not allow patient to eat or drink.
- E. Obtain vital signs frequently.

Specific Precautions:

- A. Abdominal pain may be the first warning of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscus, etc.).
- B. Since the bleeding is not apparent, you must think of **volume depletion** and monitor patient closely to recognize shock.

Altered Mental Status and Coma

HX	PE	DDX
Onset / changes LOC	LOC	Hypoglycemia (diabetes)
Recent history: headache, nausea and vomiting, trauma	Evidence of traumatic injury	Hypoxia/hypercarbia/CO
Diabetes	Vital signs	Shock (MI, hypovolemia)
CVA	Pupils	Drug/toxin
Hypertension	Breath odor	Trauma
Seizure	Nuchal rigidity	Cerebrovascular (CVA, intracranial hemorrhage, infection, tumor)
Medications	Neuro deficits (weakness)	Metabolic (e.g., electrolyte imbalance, hypothermia, hyperthermia)
Pregnancy		Seizure (postictal)
		Infection (meningitis/encephalitis)

Treatment:

- A. Determine level of consciousness.
- B. Start O₂, follow ***Airway Management*** procedure. Unless intubated, transport on left side, if possible, to protect airway.
- C. Monitor vital signs and respiratory status during transport.
- D. Start IV/IO as needed.
- E. Monitor cardiac rhythm and follow ***Cardiac Dysrhythmia*** protocol.

Consider underlying causes: Altered mental status has many causes, and may require the use of multiple protocols.

Hypoglycemia:

Determine capillary blood glucose level using blood glucose meter. If the blood glucose reading is less than 60 mg% or glucose less than 100 mg% in a symptomatic patient:

- A. Administer glucose:
 - 1. Do not administer oral glucose to patients without a gag reflex or with a rapidly diminishing level of consciousness.
 - 2. If patient is unable to take sugar orally, administer dextrose 50%, 25-50 mL (in large vein) or dextrose 10%, 125-250 mL.
- B. Repeat capillary blood glucose level after 10 minutes and treat if it remains low.
- C. If unable to administer oral glucose or establish IV/IO, give glucagon 1 mg IM.

Overdose:

- A. Follow **Poisoning and Overdose** protocol, if indicated.
- B. If opioid intoxication is suspected:
 - 1. If no IV/IO has been established, administer naloxone 2 mg IM/IN.
 - 2. If IV/IO already established, administer naloxone 0.5 mg IV/IO and observe for improved respiration, IV/IO dose may be repeated every 2 minutes up to 2 mg.
 - 3. In most instances, a total dose of 2 mg IM/IN or IV/IO will be sufficient to reverse opioid intoxication. In some cases (methadone or designer drugs), larger doses of naloxone may be necessary. In these cases, additional doses of naloxone (2 mg IM/IN or IV/IO every 3-5 minutes) up to a maximum of 8 mg of naloxone may be administered to reverse opioid intoxication.

Psychiatric Disorders:

- A. Almost never cause disorientation or alteration in level of consciousness. If the patient is disoriented, assume a medical cause.
- B. Follow **Psychiatric and Behavioral Disorders** protocol.
- C. If a non-organic cause of coma in adults (over age 16) is suspected, ammonia inhalants or other noxious stimuli may be considered.
 - 1. Response to noxious stimuli does not rule out medical or traumatic causes of initial coma.
 - 2. **Never place inhalants in nostrils or inside O₂ mask.**

Seizure:

Follow **Seizure** protocol.

Stroke:

Follow **Stroke/CVA** protocol.

Toxemia:

Follow **OB/GYN Emergencies** protocol, if indicated.

Trauma:

- A. Maintain spinal precautions.
- B. If GCS score is ≤ 13 , enter patient into the Trauma System.
- C. Perform all treatment possible en route.
- D. Maintain ventilation as per end tidal CO₂ protocol.
 - 1. Secure protected airway if GCS score is < 8 .

Pediatric Considerations:

- 1. Consider etiology and appropriate protocols: shock, toxic exposure, head trauma (consider intentional injury), seizure.
- 2. Vascular access.
- 3. Rapid blood glucose determination. If glucose determination is less than 60 mg% (less than 40 mg% for neonates), administer oral glucose to conscious patient, OR,
 - a. If no IV/IO established and airway protective reflexes are intact, administer D₅₀, or other glucose containing substance, orally.
 - b. If IV/IO established, administer Dextrose 10% (5 mL/**kg**) for neonates, infants, and children, may repeat once.
 - c. If no IV/IO established and airway protective reflexes are not intact, administer glucagon 0.02 mg/**kg** IM to a maximum of 1 mg.
 - d. Repeat blood glucose determination and treat if it remains low.
- 4. If mental status and respiratory effort are depressed, administer naloxone 0.1 mg/**kg**, maximum 2 mg IV/IO/IM.
 - a. **Do Not Administer naloxone to neonates.**
 - b. May repeat every 5 minutes with strong suspicion of opiate overdose, or if partial response is noted.

Anaphylaxis and Allergic Reactions

HX	PE	DDX
Difficulty breathing / speaking (hoarseness)	LOC	Anaphylaxis
Chest tightness	Edema (face, tongue, extremities)	Upper airway infections
Subjective airway impairment or swelling	Respiratory (wheezing, hoarseness, stridor etc.)	Angioedema (medication)
Itching	Rash, flushing, hives	Asthma (bronchospasm)
Exposure: Meds, insects or stings, food / toxic substance	Hypotension/shock	Urticaria
Known allergies		Foreign body
Prior allergic reactions		

Treatment:

- A. Protect airway; suction as needed.
 1. Follow *Airway Management* procedure.
 2. Cricothyrotomy may be required if unable to secure protected airway or ventilate by BVM after epinephrine has been administered.
- B. Start IV/IO as needed. If shock syndrome is present and BP < 90 mm/Hg, follow *Shock* protocol.
- C. Monitor cardiac rhythm and if dysrhythmia is present, follow *Cardiac Dysrhythmia* protocol.
- D. Assess severity of allergic reaction.
 1. Mild (Skin signs only)
 - a. Diphenhydramine 1 mg/**kg** IV/IO/IM to a MAX of 50 mg.
 - b. Consider dexamethasone 10 mg IV/IO/IM/PO.
 2. Moderate (Advancing hives, respiratory distress, etc.)
 - a. Epinephrine 1:1,000 0.3 - 0.5 mg **IM**. May repeat once in 5-15 minutes if needed.
 - b. Albuterol 2.5 mg via nebulizer.
 - c. Consider:
 - i. Diphenhydramine 1 mg/**kg** IV/IO/IM to a MAX of 50 mg.
 - ii. Dexamethasone 10 mg IV/IO/IM/PO.

3. Severe (cardiovascular collapse, profound shock).
 - a. Epinephrine 1:1,000 0.3 - 0.5 mg **IM**. Repeat once in 5-15 minutes if patient is still in shock **Or, if IV/IO established,**
 - b. Epinephrine 1:10,000 0.1 mg boluses **IV/IO** every 3-5 min titrated to effect. MAX dose 0.5 mg.
 - c. If hypotensive, fluid challenge 500–1,000 mL. Repeat once if needed.
 - d. If time permits consider:
 - i. Albuterol 2.5 mg via nebulizer.
 - ii. Diphenhydramine 1 mg/**kg** IV/IO/IM to a MAX of 50 mg.
 - iii. Dexamethasone 10 mg IV/IO/IM/PO.

E. SPECIAL NOTE:

1. If 1:10,000 not available, you may dilute 1 mL of 1:1,000 epinephrine with 9 mL of NS (1 mg/10 mL) and administer 1 mL IV or IO.

Pediatric Considerations:

1. Mild Reaction (Skin Signs Only)

- a. Diphenhydramine 1 mg/**kg** IV/IO/IM to a maximum of 50 mg.
- b. Consider dexamethasone 0.6 mg/**kg** IV/IO/IM/PO to a maximum of 10 mg.

2. Moderate Reaction (Respiratory Signs)

- a. Epinephrine 1:1,000. Administer 0.01 mg/**kg** IM to a max of 0.5 mg.
May repeat once in 5-15 minutes if needed.
- b. Albuterol 2.5 mg via nebulizer.
- c. Consider:
 - i. Diphenhydramine 1 mg/**kg** IV/IO/IM to a maximum of 50 mg.
 - ii. Dexamethasone 0.6 mg/**kg** IV/IO/IM/PO to a maximum of 10 mg.

3. Severe Reaction Shock (BP < for Age)

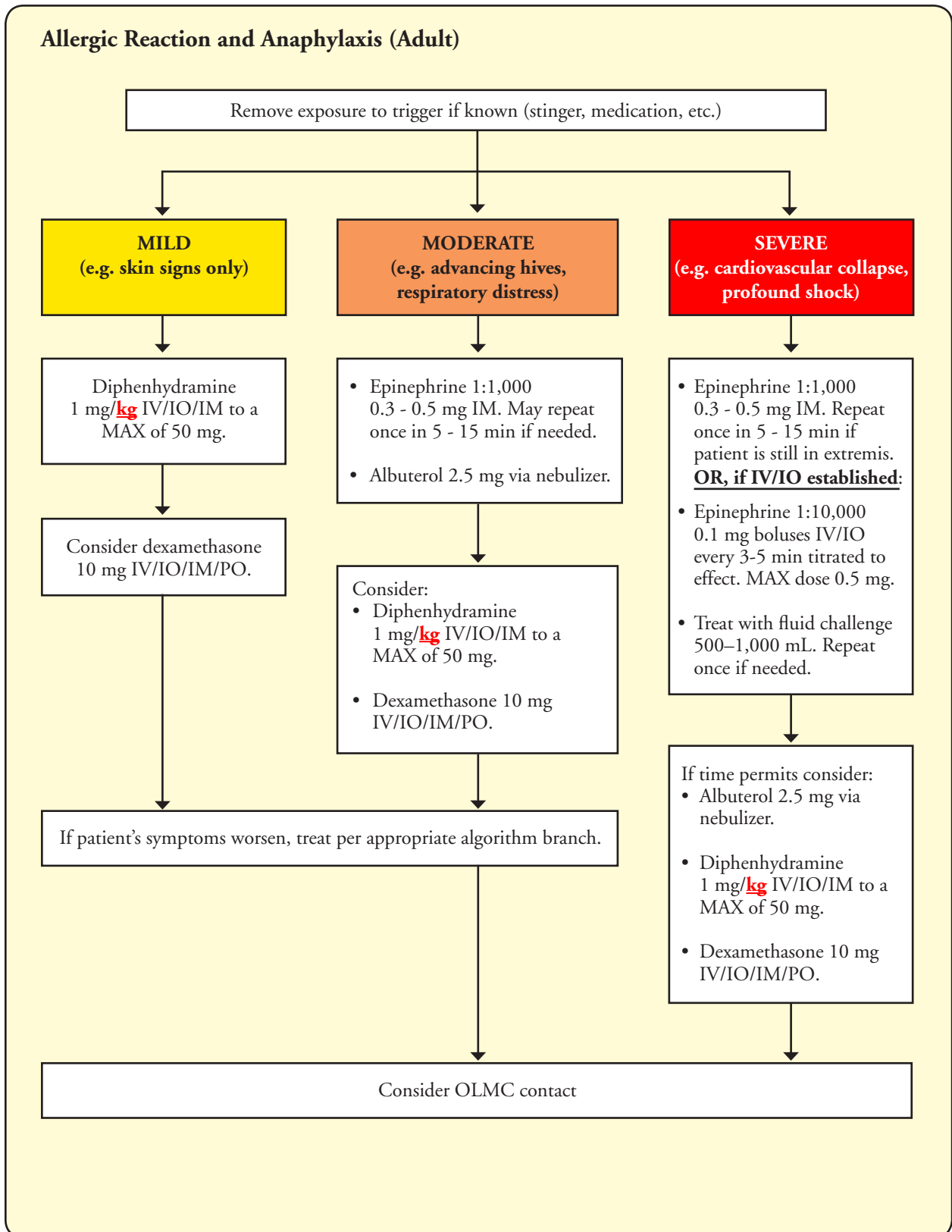
- a. Epinephrine 1:1,000. Administer 0.01 mg/**kg** IM to a max of 0.5 mg.
Repeat once in 5-15 minutes if patient is still in severe shock.

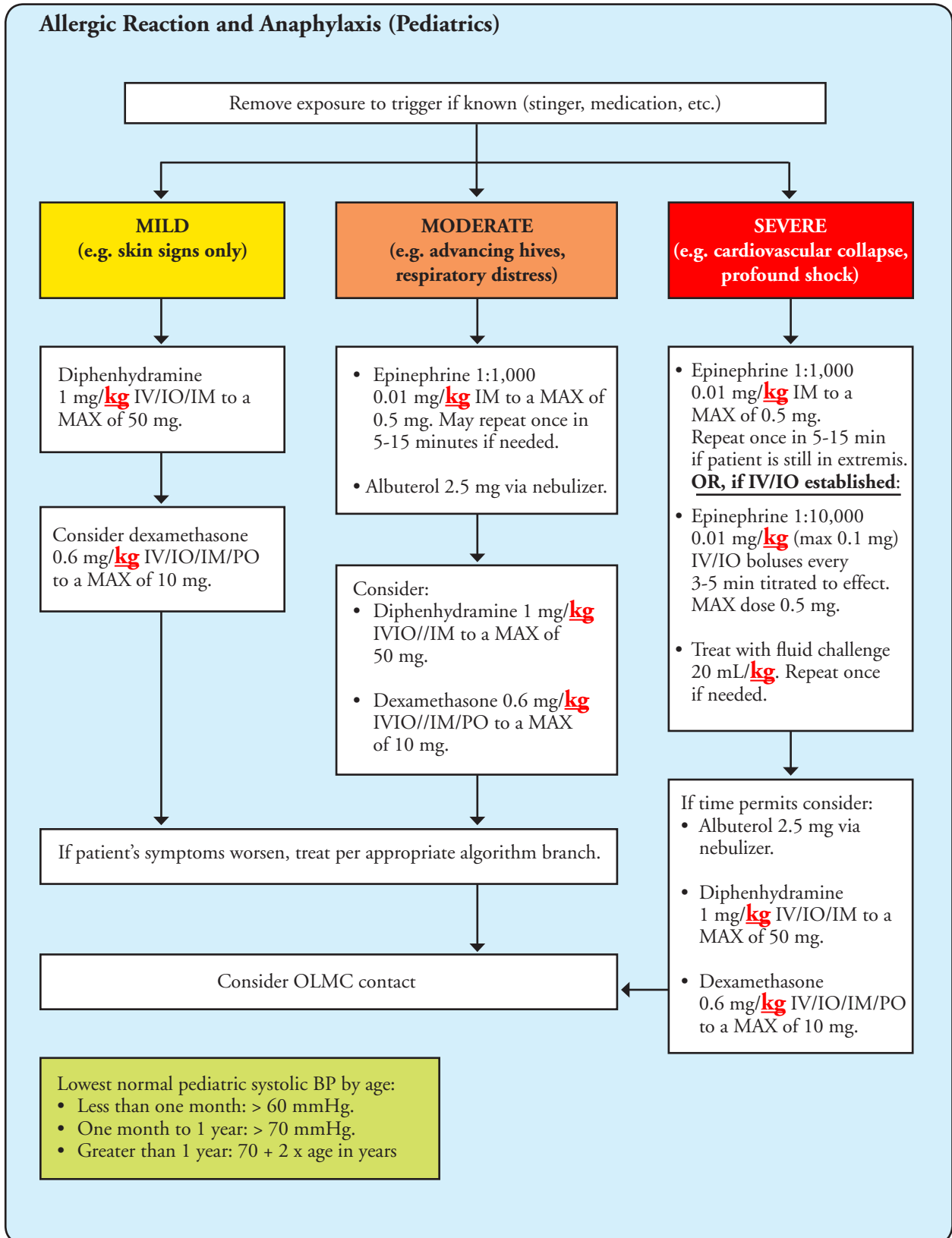
Or, if IV/IO established:

- b. Epinephrine 1:10,000. Administer 0.01 mg/**kg** (max 0.1 mg) IV boluses every 3-5 min titrated to effect. Max total dose 0.5 mg.
- c. Treat with fluid challenge 20 mL/**kg**. Repeat once if needed.
- d. If time permits consider:
 - i. Albuterol 2.5 mg via nebulizer.
 - ii. Diphenhydramine 1 mg/**kg** IV/IO/IM to a maximum of 50 mg.
 - iii. Dexamethasone 0.6 mg/**kg** IV/IO/IM/PO to a maximum of 10 mg.

4. Lowest normal pediatric systolic BP by age:

- a. Less than one month: > 60 mmHg.
- b. One month to 1 year: > 70 mmHg.
- c. Greater than 1 year: 70 + 2 x age in years.





Specific Precautions:

- A. Epinephrine should not be given unless signs of cardiovascular or respiratory distress are present.
- B. Preferred location for IM administration, if feasible, is the mid-anterolateral aspect of thigh.
- C. Common side effects include anxiety, tremor, palpations, tachycardia, and headache.
- D. Acute coronary syndromes (angina, myocardial infarction, arrhythmias) may occur in both treated and untreated patients of all age groups.
- E. Patients presenting with anaphylaxis who are on beta-blockers and ACE inhibitors may have a more severe anaphylaxis presentation and more adverse effects with epinephrine treatment.
 - 1. Epinephrine administered to a patient taking beta-blockers may produce unopposed alpha-adrenergic and reflex vagotonic effects, possibly leading to severe hypertension and the risk of cerebral hemorrhage.
 - 2. Anaphylaxis in a patient on beta-blockers may present with severe bronchospasm, profound hypotension and bradycardia.
 - 3. If epinephrine is ineffective in treating anaphylaxis in patients taking beta-blockers, both glucagon administration (1-5 mg in adults, 20-30 microgram/**kg** (MAX 1 mg) in children (OLMC required) and isotonic volume expansion (in some circumstances, up to several liters of crystalloid) may be necessary.

Burns

HX	PE	DDX
Closed space (how long)	Respiratory distress	Airway
Loss of consciousness	Airway burns (singed hair, soot, erythema, edema)	Carbon monoxide/toxins
Trauma	Lung sounds	Cyanide
Accompanying explosion	Burns (% BSA Rule of 9s)	Trauma
Toxic exposure, fumes	Trauma	
Respiratory complaints		

Treatment:

- A. If possibility of airway burn or closed space start O₂, and follow *Airway Management* procedure.
- B. If **significant** burn or respiratory distress:
 1. If shock syndrome is present and BP is less than 90 mm/Hg, follow *Shock* protocol.
 2. Start IV/IO as needed.
- C. Remove jewelry and clothing that is smoldering or which is non-adherent to the patient.
- D. Burn Center criteria:
 1. Significant burn of 15% or greater of body surface area.
 2. Full thickness burn greater than 5% of body surface area.
 3. Burns with inhalation injuries.
 4. Electrical burns.
 5. Trauma System patients with burns meeting the above criteria.
 6. Facial, hands or feet, genitalia or circumferential burns.
- E. Wound Management:
 1. Cool burned area then cover large burns.
 2. Attempt to leave unbroken blisters intact.
 3. Prevent hypothermia.
- F. Fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a maximum of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a maximum of 400 micrograms.

G. Electrical Burns:

1. Apply sterile dressings to entry and exit burns.
2. Start IV/IO as needed.
3. Monitor cardiac rhythm and if dysrhythmia is present, follow *Cardiac Dysrhythmia* protocol.

H. Chemical Burns: [**Consider HAZMAT Response**]

1. Protect yourself from contamination first.
2. Flush contaminated skin and eyes with copious amounts of water.
3. If chemical is dry, brush off then flush with copious amounts water. If liquid, flush with copious amounts water.

I. Apply Carbon Monoxide Monitor if available.

J. If cyanide toxicity is suspected based on findings of smoke inhalation (soot in mouth, nose, oropharynx, etc.) and patient is comatose, in cardiac or respiratory arrest, or has persistent hypotension despite fluid resuscitation:

1. Administer Cyanokit[®] 5 gram IV/IO as an infusion over 15 minutes and monitor for clinical response. Contact OLMC for advice regarding second 5 gram dose.
2. If Cyanokit[®] is not available, then administer Sodium Thiosulfate 50 mL of 25% solution IV/IO over 10 - 20 minutes. **Hydroxocobalamin (Cyanokit[®]) and sodium thiosulfate may be administered to the same patient but NOT simultaneously.**
3. Treat other presenting symptoms per appropriate protocol.
4. Initiate emergent transport to appropriate facility.

Specific Precautions:

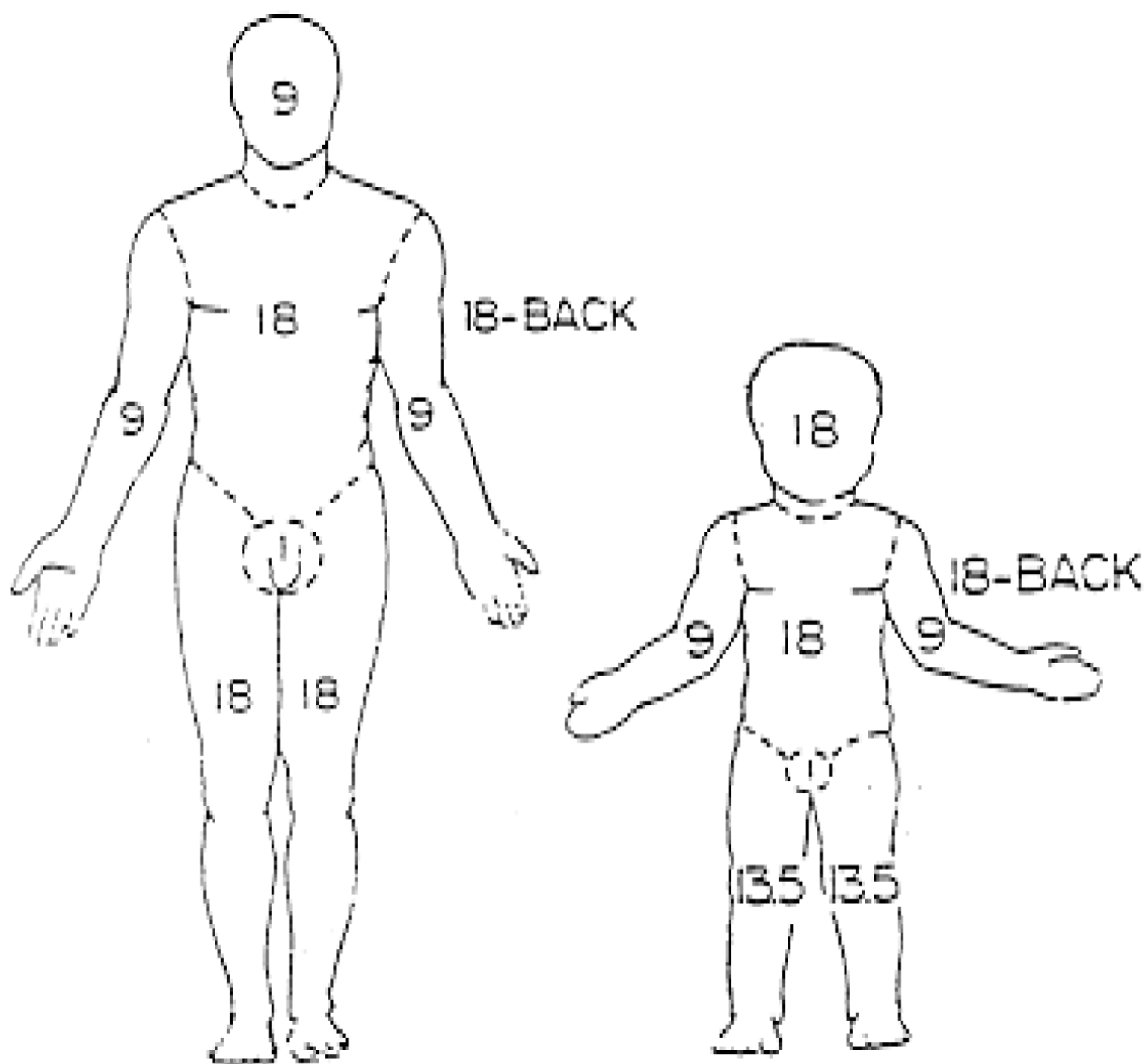
- A. Succinylcholine should be avoided in major burn patients > 48 hours post burn.

Pediatric Considerations:

1. Consider child abuse in pediatric burns (especially burns that show a specific pattern such as partial immersion).
2. Fentanyl dose for children < 40 kg: 1 microgram/**kg** IV, IO, or IN. May repeat with 0.5-1 microgram/**kg** every 3-5 minutes as needed to a maximum total dose of 4 micrograms/**kg**. Or, fentanyl 1-2 micrograms/**kg** IM; may repeat every 15 minutes to a maximum total dose of 4 micrograms/**kg**. Do not exceed adult dosing. If \geq 40 kg follow adult dosing. Contact OLMC for further doses.
3. Administer Cyanokit[®] 70 mg/**kg** IV/IO as an infusion over 15 minutes and monitor for clinical response. Contact OLMC for advice regarding a second 70 mg/**kg** dose.
4. If Cyanokit[®] is not available, then administer sodium thiosulfate 1.65 mL slow IV/IO over 10-20 minutes. **Hydroxocobalamin (Cyanokit[®]) and sodium thiosulfate may be administered to the same patient but NOT simultaneously.**

Rule of Nines:

In adults, most areas of the body can be divided roughly into portions of 9 percent, or multiples of 9. This division, called the “Rule of Nines,” is useful in estimating the percentage of body surface damage an individual has sustained in burn. In the small child, relatively more area is taken up by the head and less by the lower extremities. Accordingly, the Rule of Nines is modified. In each case, the rule gives a useful approximation of body surface.



Cardiac Arrest

Do not delay management to obtain history

HX	PE	DDX
<p>Preceding symptoms</p> <p>Witnessed arrest (yes or no)</p> <p>Down time</p> <p>Presence or absence of bystander CPR</p> <p>Medications/allergies</p> <p>History of cardiac disease or hypertension</p> <p>Evidence of drug ingestion</p> <p>Presence of Advance Directive or DNAR orders</p>	<p>Determine pulselessness and/or apnea</p> <p>Pupil size and reaction</p> <p>Lung sounds (document each time the patient is moved)</p> <p>If present, document:</p> <ul style="list-style-type: none"> o Dependent lividity o Decomposition o Rigor mortis 	<p>Rhythm</p> <p>Asystole</p> <p>VF</p> <p>PEA</p> <p>Etiologies</p> <p>Primary Cardiac</p> <p>Hypovolemia</p> <p>Hypoxia</p> <p>Acidosis</p> <p>Hypoglycemia</p> <p>Hypothermia</p> <p>Toxins</p> <p>Tamponade</p> <p>Tension pneumothorax</p> <p>Thrombosis</p> <p>Trauma</p>

See *Death in the Field, Advance Directives* and *Do Not Attempt Resuscitation Orders* protocols and follow if appropriate.

Treatment:

- A. Initiate CPR. Interruptions in CPR should be avoided. When necessary, interruptions should be < 10 seconds.
- B. Check cardiac rhythm and follow appropriate **Arrest Algorithm**.
- C. Airway should be addressed with NO INTERRUPTION TO CPR. Ventilation rate should be 8-10 breaths/minute.
- D. Start IV/IO.
- E. Initiate *Induced Hypothermia* protocol.
- F. Regardless of cardiac arrest etiology or if ROSC is achieved, if patient is transported, transport to closest hospital with interventional cath lab capability.
- G. OLMC must be contacted prior to discontinuing resuscitation efforts if patient has an organized rhythm and if ET CO_2 is > 10 with wave form without CPR.
- H. Sodium bicarbonate is not recommended for routine cardiac arrest sequence but may be considered in a dose of 1 mEq/kg after prolonged arrest. Half of the original dose may be repeated every 10 minutes, if it is used.
- I. Sodium bicarbonate should be used early in cardiac arrest of known cyclic antidepressant overdose or patients with possible hyperkalemia (high potassium).
- J. If patient is intubated, consider insertion of OG tube to alleviate gastric distention.

Cardiac Arrest Algorithm

Emergency Medical Responder/EMT:

Flow of the algorithm presumes that the initial rhythm is continuing. If the rhythm changes, begin the appropriate care.

ALS backup must be requested, if not responding, for all cardiac arrests. If for any reason this protocol cannot be followed OLMC should be contacted.

ABCs

**If down time estimated at greater than 5 min, CPR for 2 minutes.
If down time less than 5 min, then CPR until AED/SAD is attached.**

1. Press “analyze” and defibrillate, if recommended
2. CPR for 2 minutes
3. Check pulse
4. If no pulse, repeat sequence

NOTES: Follow manufacturer recommendations for appropriate age and/or weight restrictions for AED/SAD.

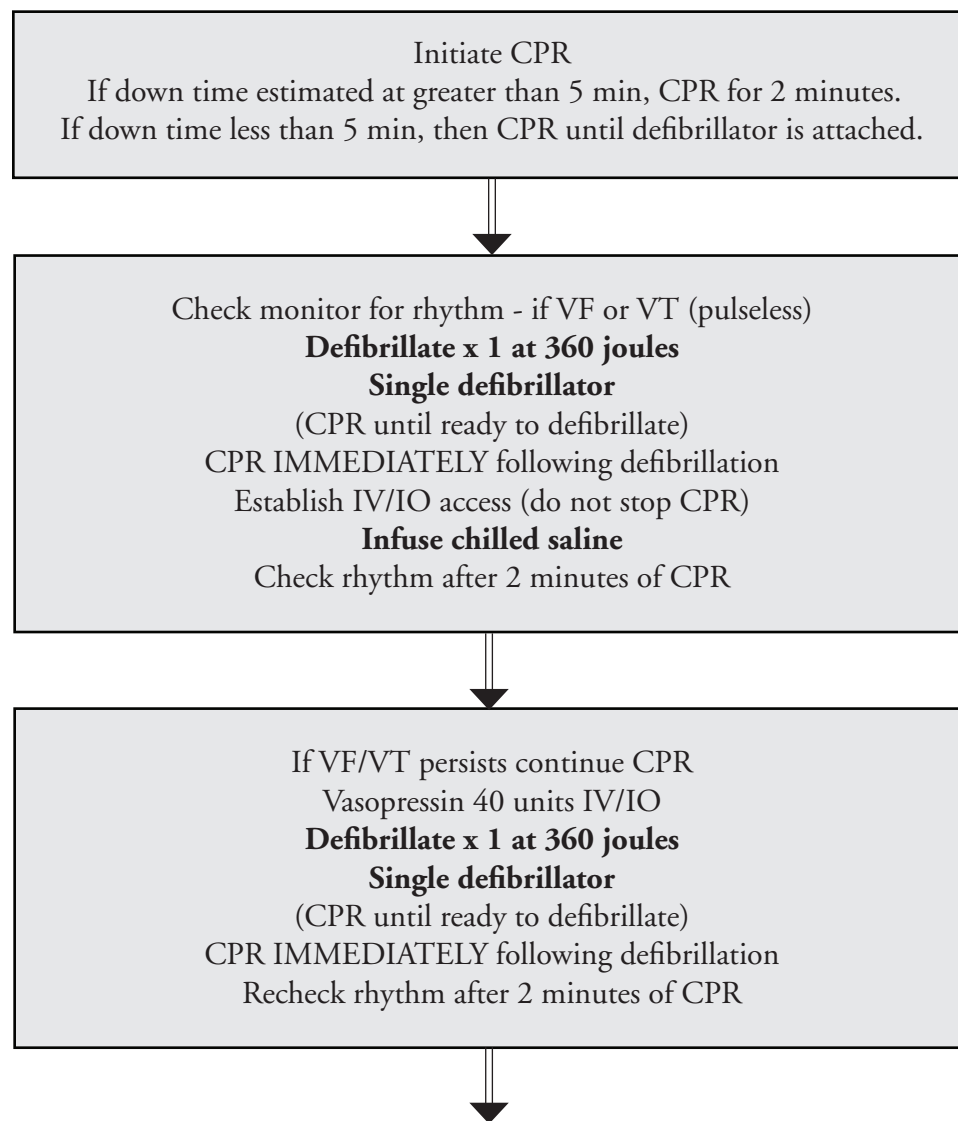
Cardiac Arrest Algorithm

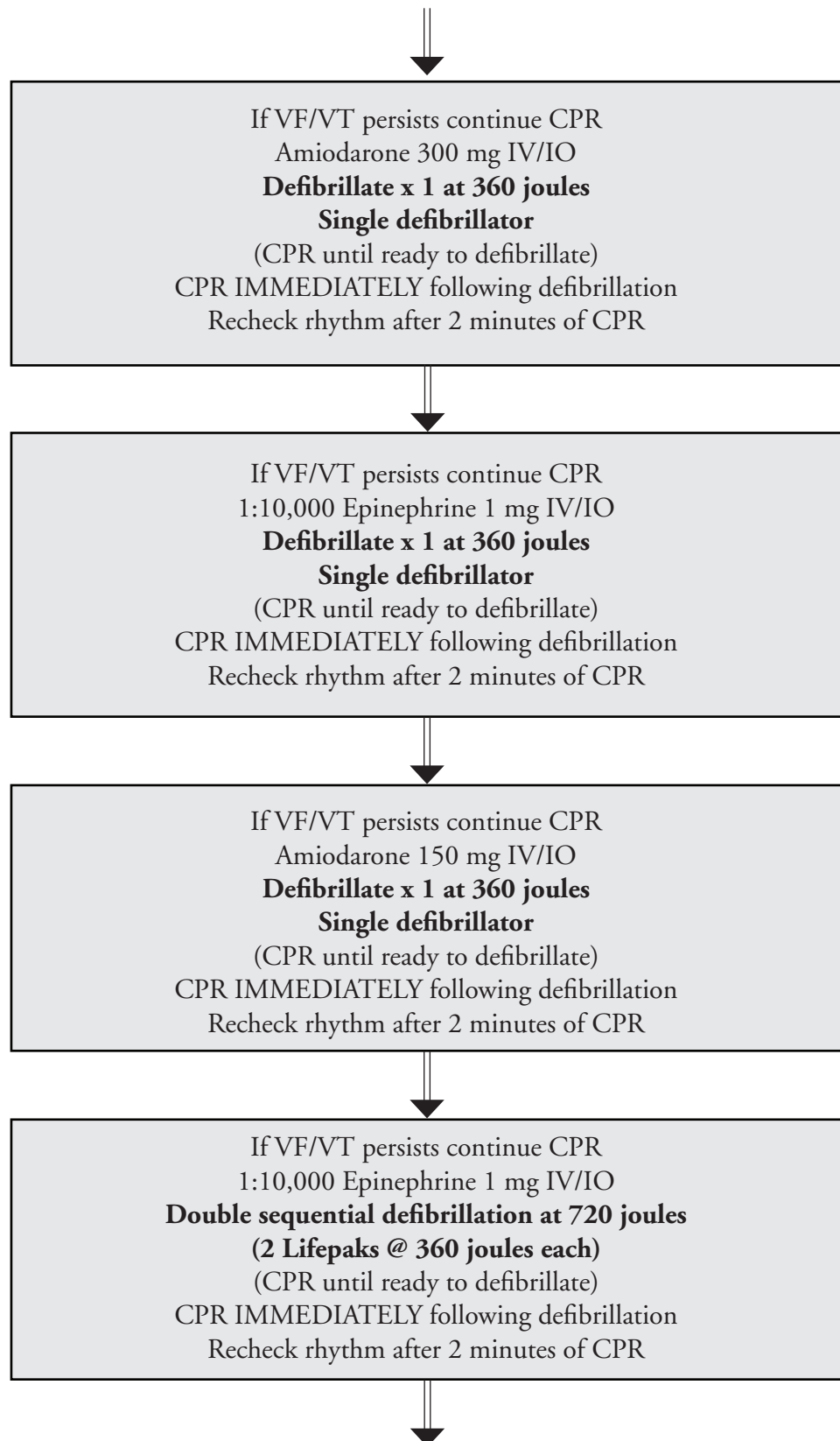
Paramedic/EMT-Intermediate:

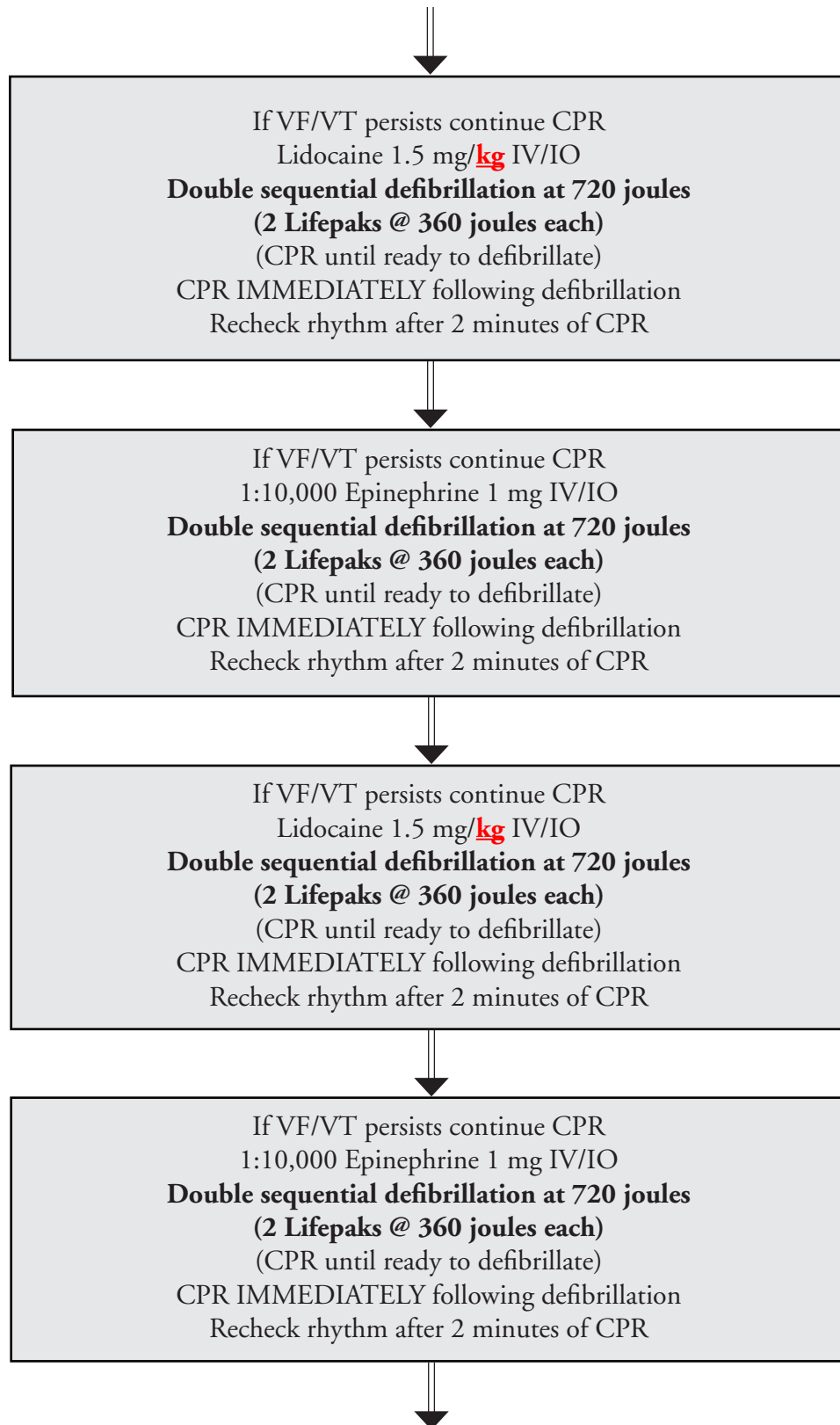
Flow of algorithm presumes that the initial rhythm is continuing. If the rhythm changes, begin the appropriate algorithm.

Interruptions in CPR should be avoided. When necessary, interruptions should be < 10 seconds.

Ventricular Fibrillation and Pulseless Ventricular Tachycardia









If VF/VT persists continue CPR
Magnesium sulfate 2 grams IV/IO
Double sequential defibrillation at 720 joules
(2 Lifepaks @ 360 joules each)
(CPR until ready to defibrillate)
CPR IMMEDIATELY following defibrillation
Recheck rhythm after 2 minutes of CPR

NOTES:

- A. The order of administration of Vasopressin and Epinephrine may be reversed.
- B. If the rhythm is Torsades de Pointes, give magnesium sulfate 2 grams IV/IO.
- C. After successful resuscitation:
 - 1. With no antidysrhythmic: Give a lidocaine bolus (1.5 mg/**kg**) and re-bolus with 0.75 mg/**kg** every 10 minutes.
 - 2. If amiodarone was the last antidysrhythmic given: Re-dose after 30 minutes with amiodarone 150 mg over 10 minutes.
 - 3. If lidocaine or magnesium was the last antidysrhythmic given: Give lidocaine 0.75 mg/**kg** every 10 minutes.
- D. Be cautious with the administration of lidocaine or amiodarone if:
 - 1. Systolic BP is less than 90, OR
 - 2. Heart rate is less than 50 beats per minute, OR
 - 3. Periods of sinus arrest, OR
 - 4. Any A-V block is present.
- E. Second defibrillator should be attached to the patient as early as practical in anticipation of using double sequential after fifth single defibrillation.
- F. Double sequential defibrillation is to be used only for patients 12 years old and above.

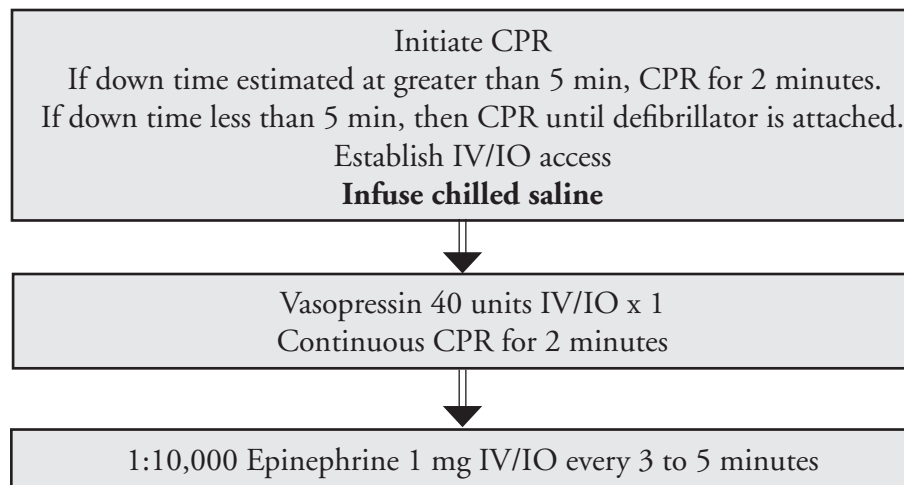
Cardiac Arrest Algorithm

Paramedic/EMT-Intermediate:

Asystole

(Confirm in two leads, increase gain to rule out fine VF; if rhythm is unclear and possibly Ventricular Fibrillation, defibrillate as for VF)

ABCs



NOTES:

The order of administration of Vasopressin and Epinephrine may be reversed.

Consider and treat other possible causes:

Acidosis — consider sodium bicarbonate 1 mEq/**kg** IV/IO

Cardiac Tamponade - immediate transport

Cyclic antidepressants - consider sodium bicarbonate 1 mEq/**kg** IV/IO

Hyperkalemia- consider calcium gluconate or sodium bicarbonate 1 mEq/**kg** IV/IO

Hypothermia- see *Hypothermia* protocol

Hypovolemia- fluid challenge

Hypoxia- oxygenate and ventilate

Pulmonary Embolism - immediate transport

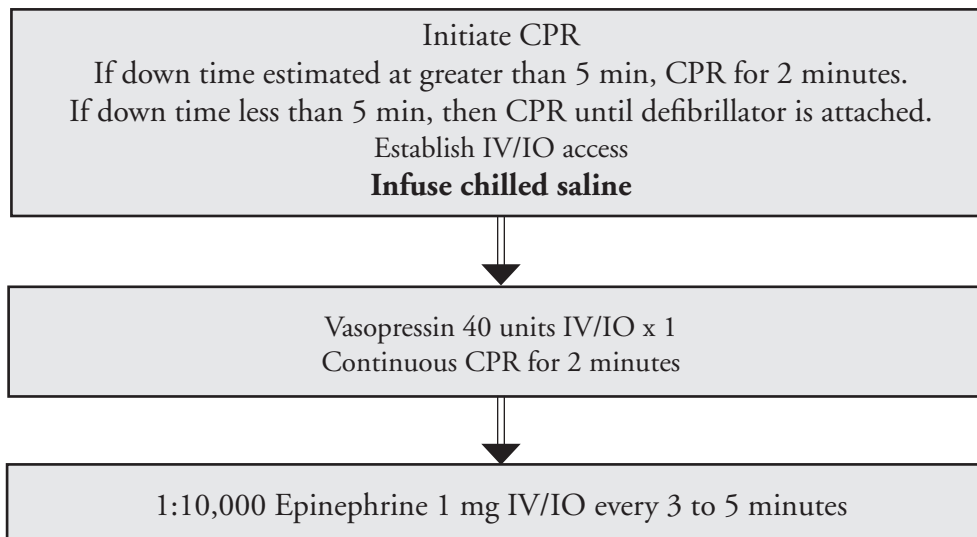
Tension Pneumothorax - needle decompression.

If unresponsive to **at least** epinephrine 3 mg consider termination of efforts if asystole is confirmed in all six limb leads (with full gain).

Pulseless Electrical Activity (PEA)

1. Electromechanical dissociation
2. Idioventricular rhythm
3. Ventricular escape rhythm
4. Pulseless bradycardic rhythm
5. Post defibrillation idioventricular rhythm

ABCs



NOTES:

The order of administration of Vasopressin and Epinephrine may be reversed.

If $ETCO_2 \geq 20$, with organized rhythm, initiate fluids per **Shock** protocol and consider norepinephrine (4-12 micrograms/min). Continue CPR until palpable pulse.

Consider and treat other possible causes:

Acidosis — consider sodium bicarbonate 1 mEq/**kg** IV/IO

Cardiac Tamponade - immediate transport

Cyclic antidepressants - consider sodium bicarbonate 1 mEq/**kg** IV/IO

Hyperkalemia - consider calcium gluconate or sodium bicarbonate 1 mEq/**kg** IV

Hypothermia - see **Hypothermia** protocol

Hypovolemia - fluid challenge

Hypoxia - oxygenate and ventilate

Pulmonary Embolism - immediate transport

Tension Pneumothorax - needle decompression

Cardiac Arrest Algorithm

Paramedic/EMT-Intermediate:

Pediatric Considerations

Cardiac arrest in children is often secondary to respiratory failure. Ventilation may cause spontaneous return of cardiac function!

NO VASOPRESSIN IN PEDIATRICS

Ventricular Fibrillation and Pulseless Ventricular Tachycardia

Follow adult cardiac arrest algorithm except as noted.

Defibrillate at 4 joules/**kg**.

Substitute the following drug dosages.

1. Epinephrine 0.01 mg/**kg** IV/IO; maximum 1 mg (10 mL 1:10,000 IV/IO)
2. Amiodarone 5 mg/**kg** IV/IO repeat once with 2.5 mg/**kg**
3. Lidocaine 1.5 mg/**kg** IV/IO up to 3 mg/**kg**
4. Sodium bicarbonate 1 mEq/**kg** IV/IO then 0.5 mEq/**kg** for subsequent doses.
5. Magnesium sulfate 25 mg/**kg** IV/IO

Asystole

1. Epinephrine every 3-5 minutes

Pulseless Electrical Activity

1. Epinephrine every 3-5 minutes

Consider and treat other possible causes:

Acidosis — consider sodium bicarbonate 1 mEq/**kg** IV/IO

Cardiac Tamponade - immediate transport

Cyclic antidepressants - consider sodium bicarbonate 1 mEq/**kg** IV/IO

Hyperkalemia- consider sodium bicarbonate 1 mEq/**kg** IV/IO or calcium gluconate 0.5 mL/**kg** IV/IO

Hypothermia - see *Hypothermia* protocol

Hypovolemia - fluid challenge

Hypoxia - oxygenate and ventilate

Pulmonary Embolism - immediate transport

Tension Pneumothorax - needle decompression

Quick Reference to Pediatric Drugs - Resuscitation

Table 1: Neonates - Immediate Postnatal Resuscitation

Drug	Indication	Dose
Dextrose, 10% Dilution ratio: 1 part D50 to 4 parts NS.		5 mL/ kg (0.5 gram/ kg) MAX 250 mL
Epinephrine	Bradycardia, Cardiac Arrest	0.01 mg/ kg Repeat every 3-5 minutes
Sodium Bicarbonate (Dilute by 1/2 with NS)	Metabolic Acidosis	1 mEq/ kg

Table 2: Infants And Children

Drug	Indication	Dose
Adenosine	PSVT	0.1 mg/ kg ; 0.2 mg/ kg
Amiodarone	V-fib/Pulseless V-tach V-tach with pulse	5 mg/ kg IV/IO Repeat once with 2.5 mg/ kg 2.5 mg/ kg IV/IO Mix with 2 mL/ kg of NS in Buretrol and infuse over 10 minutes
Atropine	Bradycardia	0.02 mg/ kg - May repeat dose once. Minimum dose: 0.1 (Do not exceed adult dose)
Calcium Gluconate	Antidote for calcium channel blocker OD, HF, iatrogenic magnesium intoxication	0.5 mL/ kg IV/IO
Dextrose, 10%	Hypoglycemia	5 mL/ kg (0.5 gram/ kg)
Epinephrine	V-fib, low cardiac output, Cardiac arrest, asystole, PEA	0.01 mg/ kg Repeat every 3-5 minutes.
Lidocaine	Recurrent Ventricular Fibrillation, Stable VT	Bolus: 1.5 mg/ kg (3 mg/ kg MAX) Maintenance: 0.75 mg/ kg q 10 min.
Midazolam	Pacing - V-tachycardia Seizures	IV or IO: 0.1 mg/ kg IM or IN: 0.2 mg/ kg
Magnesium Sulfate	V-fib/Pulseless V-tach	25 mg/ kg IV/IO
Naloxone	Respiratory depression secondary to narcotics	0.1 mg/ kg - Maximum of 2 mg.
Norepinephrine	Low cardiac output	0.1 to 2 micrograms/ kg /min
Sodium Bicarbonate (Dilute by 1/2 with NS)	Metabolic acidosis, Cyclic antidepressant OD, Hyperkalemia	1 mEq/ kg /dose

Note: Pediatric doses should not exceed adult doses.

Cardiac Dysrhythmias

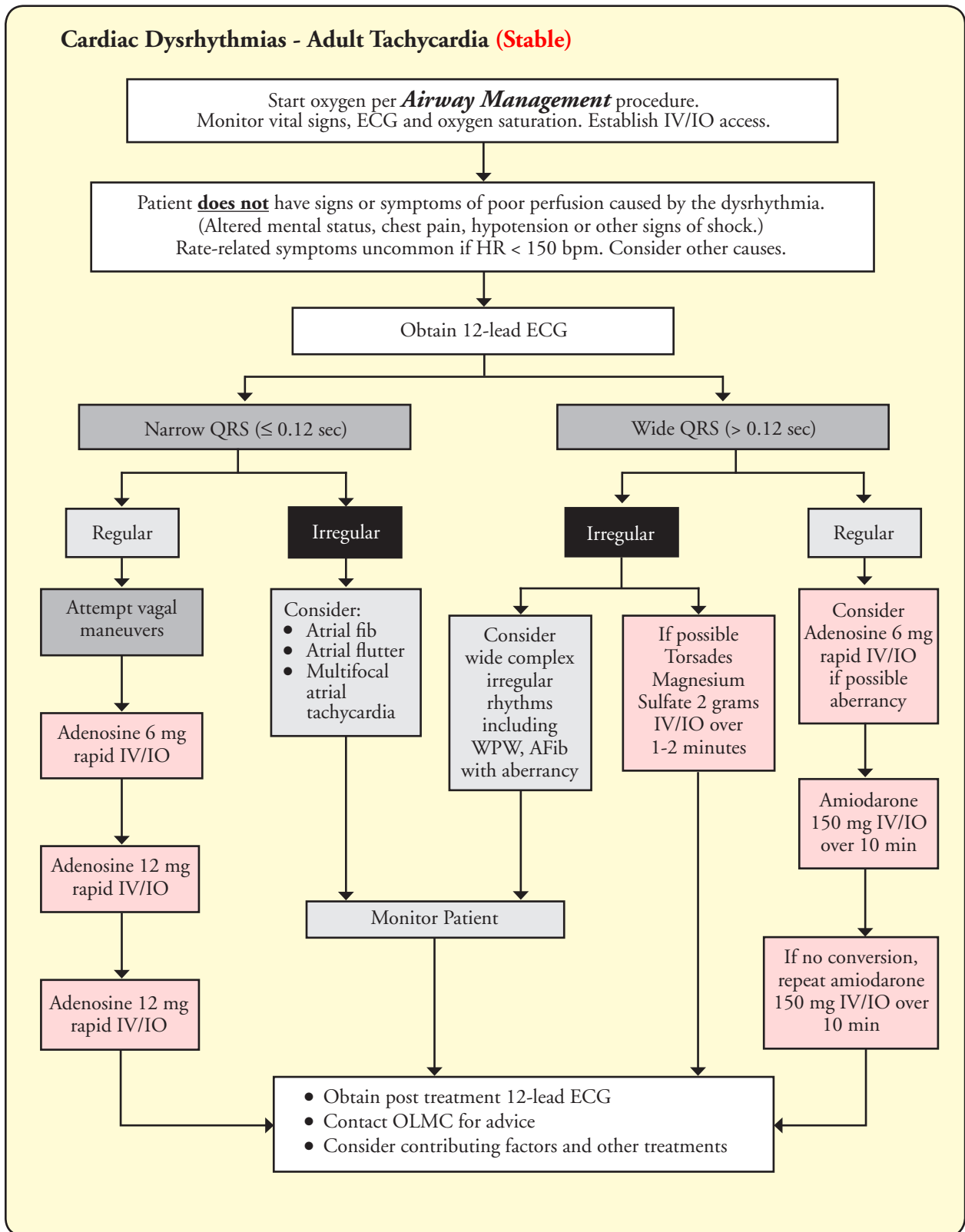
HX	PE	DDX
Past medical history Medications <ul style="list-style-type: none"> • Beta blockers • Calcium Channel blockers • Clonidine • Digitalis Pacemaker	AMS Respiratory distress Hypotension / shock Chest pain CHF Syncope Seizures	Sinus bradycardia AV blocks Acute MI Hypoxia Hypothermia Head injury (increased ICP) Spinal cord lesion Sick sinus Overdose

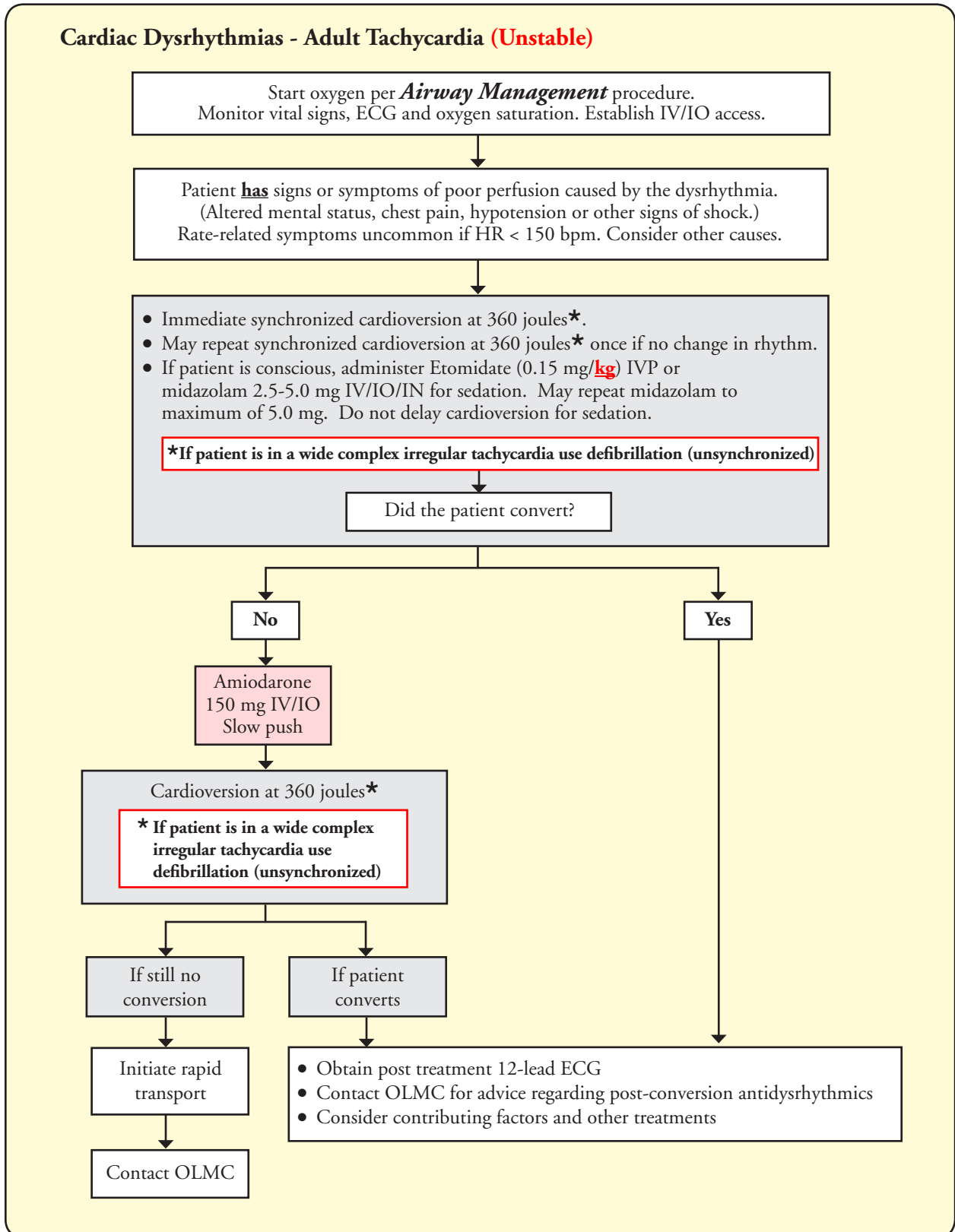
Treatment:

- A.** Start O₂, follow *Airway Management* procedure, and apply pulse oximeter.
- B.** Start IV/IO, NS and follow *Shock* protocol if indicated.
- C.** Monitor cardiac rhythm, see the following cardiac dysrhythmias on the next pages:

NOTES:

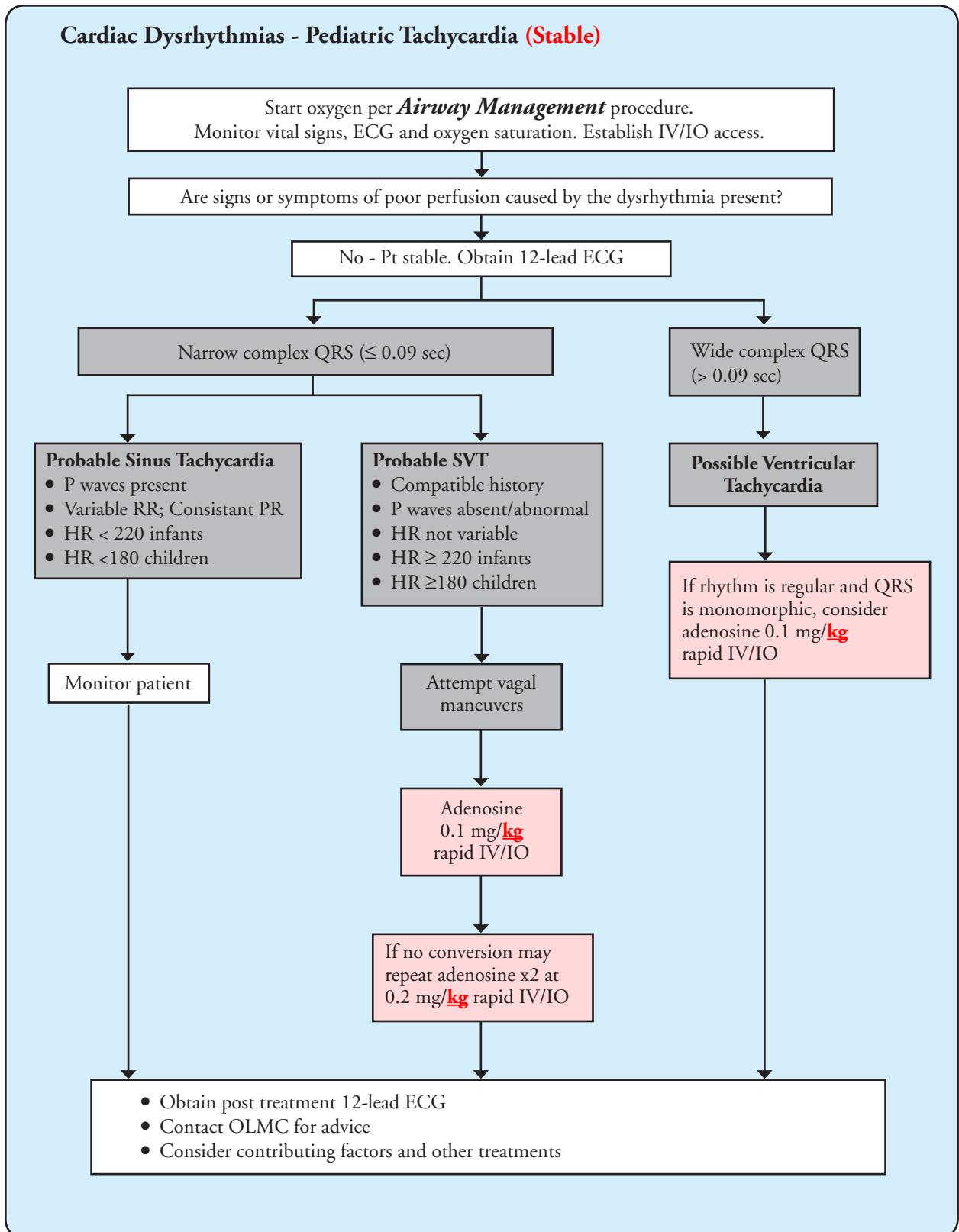
If the patient is asymptomatic, dysrhythmias may not require treatment in the field.



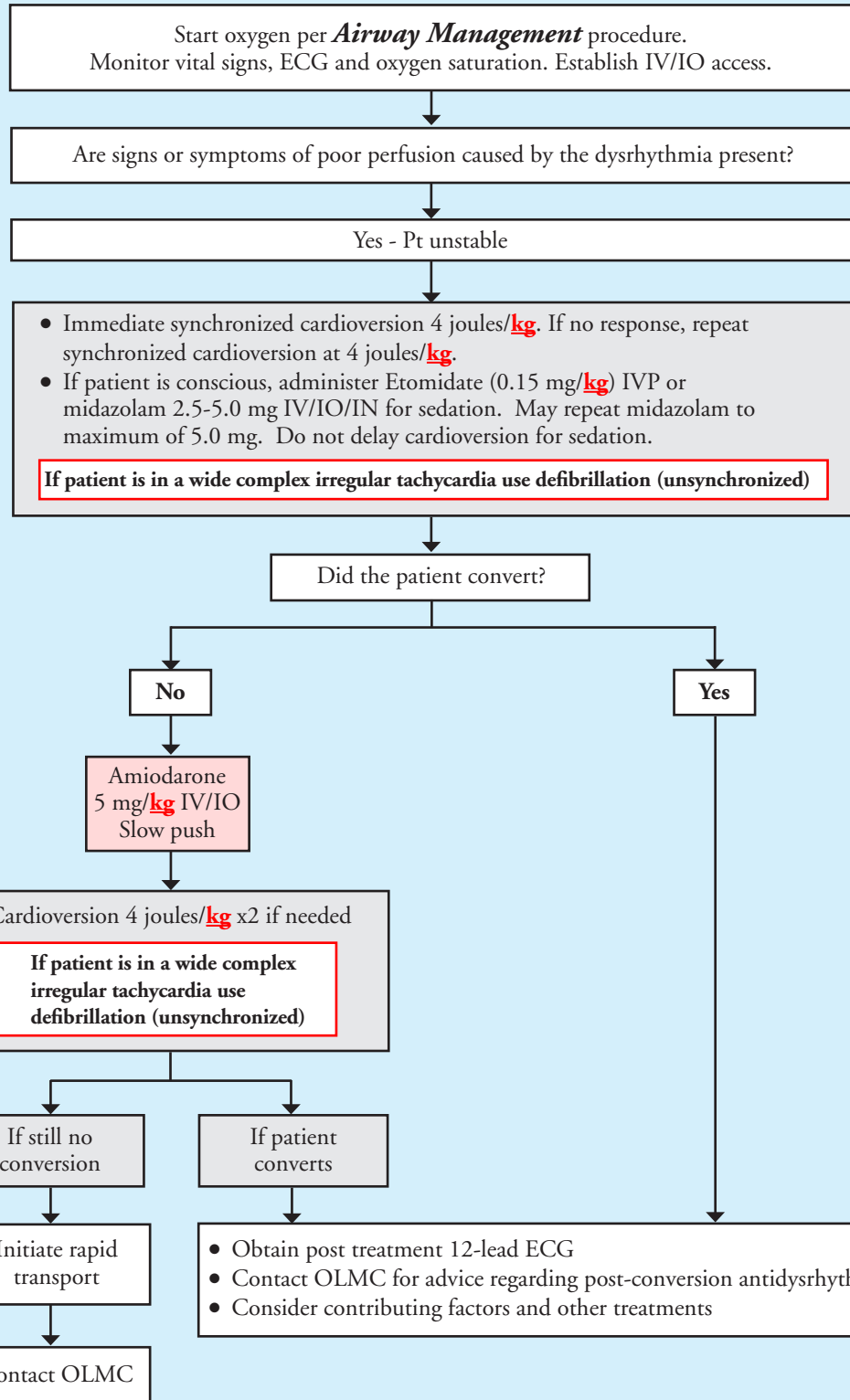


Notes and Precautions: (Tachycardia):

- A.** In stable wide complex tachycardia which is monomorphic, consider adenosine if SVT with aberrancy is suspected.
- B.** If the patient is asymptomatic, tachycardia may not require treatment in the field. Continue to monitor the patient for changes during transport. The acceptable upper limit for heart rate for sinus tachycardia is 220 minus the patient's age.
- C.** Other possible causes of tachycardia include:
 - 1. Acidosis
 - 2. Hypovolemia
 - 3. Hyperthermia/fever
 - 4. Hypoxia
 - 5. Hypo/Hyperkalemia
 - 6. Hypoglycemia
 - 7. Infection
 - 8. Pulmonary embolus
 - 9. Tamponade
 - 10. Toxic exposure
 - 11. Tension pneumothorax
- D.** If pulseless arrest develops, follow *Cardiac Arrest* protocol.
- E.** All doses of adenosine should be reduced to one-half (50%) in the following clinical settings:
 - 1. History of cardiac transplantation.
 - 2. Patients who are on carbamazepine (Tegretol) and dipyridamole (Persantine, Aggrenox).
 - 3. Administration through any central line (Porta Cath, Broviac, Hickman, etc).
- F.** Adenosine may initiate atrial fibrillation with rapid ventricular response in patients with Wolff-Parkinson-White syndrome.
- G.** Adenosine should be used with caution in patients with asthma as it may cause a reactive airways response in some cases.

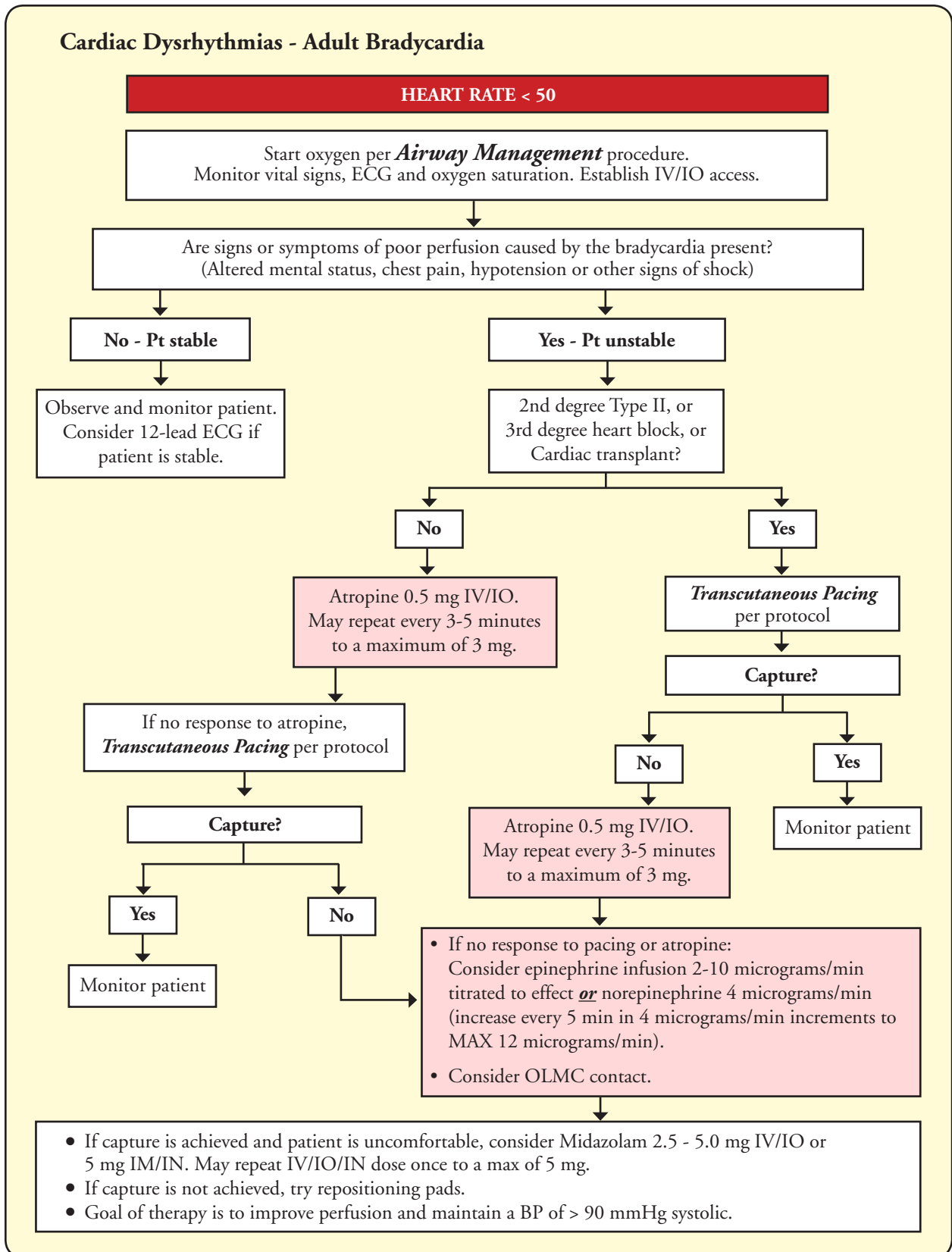


Cardiac Dysrhythmias - Pediatric Tachycardia (Unstable)



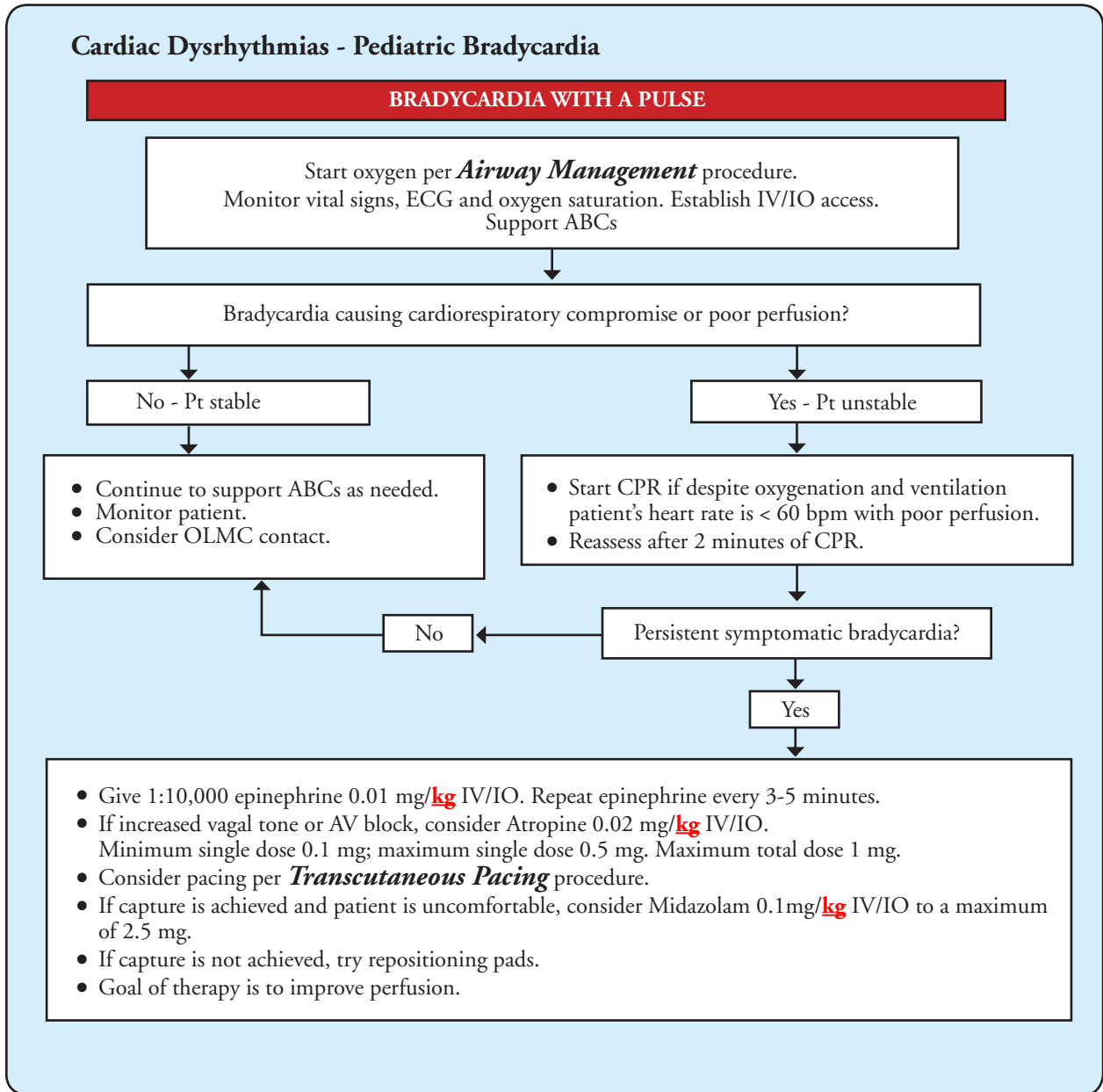
NOTES:

- A. Use pediatric pads for cardioversion for children less than 15 kg.
- B. Place on anterior chest in sternal-apical location.
- C. If pediatric pads are not available, use adult pads placed anterior-posterior on the chest wall with firm contact.
- D. If available defibrillator will not “dial down” to appropriate energy level, use lowest possible energy level available.



Notes and Precautions: (Bradycardia):

- A. Hypoxia is a common cause of bradycardia.
- B. Bradycardia may be protective in the setting of cardiac ischemia and should only be treated if associated with serious signs and symptoms of hypoperfusion. Increasing heart rate may worsen ischemia or increase infarct size.
- C. Hyperkalemia may cause bradycardia. If the patient has a wide complex bradycardia with a history of renal failure, muscular dystrophy, paraplegia, crush injury or serious burn > 48 hours prior, consider treatment per Hyperkalemia protocol.
- D. Immediate *Transcutaneous Pacing* can be considered in unstable patients when vascular access is not available.
- E. *Transcutaneous Pacing* is at best a temporizing measure and is not useful in asystole.
- F. If *Transcutaneous Pacing* capture is not achieved, try repositioning pads.
- G. If capture is achieved with *Transcutaneous Pacing* and patient is experiencing discomfort administer midazolam 2.5 - 5.0 mg IV/IO or 5 mg IM. May repeat IV/IO dose once to a max of 5 mg.
- H. Atropine will likely be ineffective in heart transplant recipients because they lack vagal innervation.
- I. 3rd degree heart blocks with a wide complex QRS (>0.12 sec) are less likely to respond to atropine than those with a narrow complex.



Specific Precautions:

- A. Most pediatric bradycardia is due to hypoxia. Oxygenate and ventilate aggressively.

Premature Ventricular Complexes (PVCs):

- A. Treat only in the setting of a suspected ischemic event.
- B. If PVCs are associated with bradycardia, see section on bradycardia.
- C. Lidocaine for PVCs:
 - 1. Initial bolus of 1.5 mg/kg over 1 to 2 minutes.
 - 2. If no change, administer 0.75mg/kg every 5 minutes up to 3 mg/kg.
 - 3. When PVCs are suppressed administer 0.75 mg/kg every 10 minutes.
 - 4. All doses, **after** initial bolus, must be reduced to 1/4 of initial bolus in patients with congestive heart failure; shock; hepatic disease; or in patients over 70 years of age.
 - 5. Lidocaine should not be used without OLMC direction, if:
 - a. BP is less than 90 mm/Hg.
 - b. Heart rate is less than 50 beats per minute.
 - c. Periods of sinus arrest.
 - d. Presence of second or third degree AV block.

Wide Complex Arrhythmia with HX of Renal Failure (Hyperkalemia)

- A. Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respiration. Typical ECG changes include peaked T-waves, lowered P-wave amplitude or the loss of the P-wave altogether, prolonged PR interval, second degree AV block, and a widened QRS.
 - 1. Administer 10 mL calcium gluconate 10% solution slow IV over 5-10 minutes.
 - 2. If no change in rhythm and transport time is prolonged, consider alternative therapy as per OLMC.
 - a. Glucose and insulin (glucose and insulin may be given if patient is insulin dependent and patient's insulin is available).
 - b. High dose albuterol (10 mg in saline by nebulizer).
 - c. Sodium bicarbonate, one amp (50 mL) IV/IO.

NOTES:

Do not mix sodium bicarbonate with calcium preparations. Administer calcium gluconate at a site proximal to the IV catheter. Slowly flush remaining calcium gluconate from the catheter prior to administering sodium bicarbonate.

Chest Pain / Acute Coronary Syndrome

HX	PE	DDX
Pain (onset, duration, severity, location, radiation, aggravation) (N/V, SOB, diaphoresis, arm pain) Previous MI, angina, HTN, diabetes, COPD Previous cardiac surgeries, stents Medications	Breath sounds Peripheral edema	Acute MI Unstable angina Pulmonary embolus Pneumothorax Aortic dissection Esophageal rupture

Treatment:

- A. Start O₂, follow *Airway Management* procedure.
- B. Monitor vital signs, cardiac rhythm and oxygen saturation. Attempt to maintain O₂ saturation above 95%.
- C. If ischemic event suspected, obtain 12-lead ECG if available. This may be done concurrently with other treatment and should not delay treatment or transport. See below for interpretation.
- D. Start IV/IO prior to administration of nitroglycerin for patients who have never taken nitroglycerin; follow *Shock* protocol if indicated.
- E. Drugs:
 1. Administer aspirin PO (approximately 324 mg) unless contraindicated.
 2. After 12-lead is obtained, nitroglycerin 0.4 mg SL (spray or tablet) every 5 min, if systolic BP is equal to or greater than 100 mm/Hg, or until chest pain is relieved.
 3. For pain unrelieved after 3 nitroglycerin, and if the BP is greater than 100 mm/Hg systolic, administer fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a maximum of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a maximum of 400 micrograms. Nitroglycerin may be continued for strong suspicion of acute coronary syndrome.

Specific Precautions

- A. DO NOT DELAY ADMINISTRATION OF ASPIRIN TO OBTAIN 12 LEAD
- B. NTG administration to patients with an acute inferior wall myocardial infarction should be performed with close monitoring of vital signs and rhythm. NTG in these patients may result in symptomatic hypotension and/or shock which should be treated with usual measures (fluids, changes in position, medications if necessary).
- C. Do not administer nitroglycerin without OLMC if patient has taken Viagra® or other similar drugs in the last 24 hours or Cialis® (tadalafil) within last 48 hours.
- D. Contraindications to administration of aspirin:
 - 1. Allergy to aspirin or aspirin induced asthma.
 - 2. History of active bleeding disorder, (i.e., hemophilia).
 - 3. Current ulcer or GI bleeding.
 - 4. Suspected aortic dissection.

Field Identified ST-elevation MI (STEMI)

Indication

12-lead ECG with:

- Paramedic interpretation of probable STEMI: 1 mm elevation in 2 contiguous limb leads or 2 mm elevation in 2 contiguous chest leads

Action

- A. As soon as STEMI is recognized, prompt and early notification of the receiving facility of “STEMI patient” or “STEMI alert” should be performed.
- B. Rapid transport to destination hospital ED with interventional capability.
- C. Non-diagnostic ECGs with potential “imitators” of ACS or ECGs that are clinically concerning should be described to the receiving hospital or OLMC.

These may include:

 - LBBB or RBBB
 - LVH
 - SVT with aberrancy
 - Paced rhythms
 - Pericarditis
 - Benign early repolarization
 - Digitalis effect

Crush Injury

HX	PE	DDX
Body part entrapped	LOC	Respiratory distress
Mechanism of entrapment	Airway	Dehydration
Length of time entrapped	Extremity pulses, neurologic function	Pain
Function of body part (e.g. able to feel, move extremity)		Hypo and/or hyperthermia

Treatment:

- A. Control/stop hemorrhage.
- B. Airway Management procedure if indicated.
- C. Spinal immobilization if indicated.
- D. Monitor cardiac rhythm for signs of hyperkalemia. (Widening QRS > .08ms, peaked T-waves, sine wave, etc).
- E. Start IV/IO if feasible.
- F. Consider pain management.
- G. Wound care.
 1. Remove all restrictive dressings (clothing, jewelry, etc).
 2. Continually monitor distal pulse, motor and sensation in involved extremity.
 3. Bandage all open wounds. (Irrigate if needed.)
 4. Stabilize all protruding foreign bodies (impaled objects).
 5. Splint/immobilize injured areas.
 6. For suspected pelvic crushing injuries, follow the *Pelvic Wrap* procedure if indicated.
- H. If severe crushing injury/compartment syndrome:
 1. If cardiac monitor is available, treat for hyperkalemia if present.
 2. If feasible, administer 1000 – 2000 mL (pediatric: 10 to 20 mL/**kg**) of isotonic fluid prior to extrication and maintain IV/IO infusion at 500 mL (peds 5 mL/**kg** per hour).
 3. Perform extrication.
 4. Reassess patient and monitor for signs of hyperkalemia.
- I. If hyperkalemia is suspected or present, then:
 1. Administer 10mL calcium gluconate 10% solution slow IV over 5-10 minutes.
 2. High dose albuterol (10mg in saline by nebulizer).
 3. Sodium bicarbonate, one amp (50mL) IV/IO.

Precautions:

- If circumstances warrant, begin warming procedures to prevent hypothermia.
- If patient is trapped in a heavy dust environment, consider methods to provide nebulized oxygen. Consider the use of nebulized albuterol.
- If patient is severely trapped and requires prolonged extrication or potential amputation, contact OLMC for Trauma Surgeon advice and ensure that a technical rescue team is activated.
- During extrication, continually monitor patient condition, if possible.

Notes:

- Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse and shallow respiration. Typical ECG changes include peaked T-waves, lowered P-wave amplitude or the loss of the P-wave altogether, prolonged PR interval, second degree AV block, and a widened QRS.
- A venous tourniquet may have a role during extrication to control the effects of hyperkalemia in crush injuries.

Hyperthermia

HX	PE	DDX
Onset of symptoms	LOC	Heat stroke
Environmental temperature/ humidity	Sweating (present or absent)	Drugs (cocaine etc)
Physical activity	Skin	Sepsis
Muscle cramps	Neuro	CVA
Weakness		Primary seizure disorder
Headache/ syncope		Encephalitis / meningitis
Drugs		Malignant hyperthermia
Medications		See below for heat illness DDX

Treatment:

- A. Undress patient and begin cooling measures that maximize evaporation and convection. (A spray bottle with tepid water works well.)
- B. Start O₂, follow *Airway Management* procedure.
- C. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
- D. Infuse chilled saline fluid bolus (IV/IO) up to 2,000 mL.
- E. If the patient starts shivering, stop cooling measures.
- F. For seizures, follow *Seizure* protocol.

Specific Precautions:

- A. Heat stroke is a medical emergency. Differentiate from heat cramps or heat exhaustion. Be aware that heat exhaustion can progress to heat stroke.
- B. Wet sheets over patient **without** good airflow will tend to increase temperature and should be avoided.
- C. **Do Not Let Cooling in the Field Delay Your Transport;** cool patient if possible while en route.
- D. Suspect hyperthermia in patients with altered mental status or seizures on hot, humid day.

Hypothermia

HX	PE	DDX
Environmental Exposure (submersion, cold environmental) Underlying medical conditions Elderly Infants, neonates Sepsis Shock Starvation Endocrine (diabetes, hypothyroid) Medications Spinal cord injury Burns	LOC Presence or absence of spontaneous respiration, oxygen saturation (if obtainable) Pulse (rate) ECG (underlying rhythm wide/narrow QRS)	Etiology: Increased heat loss (environment, burns, prolonged extrication etc) OR Decrease heat production (starvation, age extremes etc) Severity of hypothermia best assessed by: Mental status Orientated : Mild Confused, disorientated: Moderate Comatose : severe ECG QRS duration Narrow : Mild Sinus brady: Moderate Severe bradycardia (<40), Wide QRS: Severe Consider underlying medical conditions if no environmental factors.

Treatment:

- A. Start O₂, follow *Airway Management* procedure with the following exception:
 1. Manage airway with BVM.
 2. If oral intubation is necessary, proceed carefully.
 - a. If jaw is difficult to open, use BVM.
 - b. Paralytics should not be used in these patients.
- B. Remove all wet clothing as soon as possible and provide patient with warm blankets. Place patient in a heated environment as soon as possible.
- C. Start IV/IO as needed, if possible infuse warmed IV/IO fluids (99° to 113° F).
- D. Patients who are profoundly hypothermic, (Patient “A”), may require pump rewarming; call OLMC for direction.
- E. Apply AED or cardiac monitor, if available, and use the following guidelines.
 1. **Patient “A”** — Disorganized ECG rhythm, no pulses, follow *Arrest Algorithm* for cardiac arrest:
 - a. CPR is advised for these patients.
 - b. Call OLMC for direction regarding resuscitation and before administering any medications.
 2. **Patient “B”** — Organized ECG, with or without palpable pulses, handle gently.
- F. No CPR or pacing if patient is bradycardic, call OLMC for direction regarding resuscitation and before administering any medications.

Specific Precautions:

- A.** In the profoundly hypothermic patient, medications may not be effective until circulation is adequately restored. Repeat dosages of medications commonly given during a standard arrest sequence may not be advised.
- B.** Search and Rescue teams may use protocols that apply to the wilderness environment. It is recognized that they may not be able to contact OLMC for direction when so stated in the protocol.

Musculoskeletal Injuries

HX	PE	DDX
Mechanism of injury (location, time)	LOC	Strain
Area of greatest pain	Neck/ spine pain	Minimal swelling, mild tenderness
Loss of consciousness	Extremity exam (lacerations, swelling, discoloration, deformity, crepitus, angulation, amputation, restriction on range of motion)	Sprain Moderate to severe swelling, severe tenderness, inability to bear weight (weight bearing joints)
Restriction on normal function (i.e. able to walk, move arm etc)	Pulse	Possible fracture
	Capillary refill	All above + Deformity
	Neuro deficit	

Spinal Immobilization

Treatment:

- A. Provide initial cervical spine immobilization using manual in-line stabilization.
- B. Immobilize using a **Full Spinal Immobilization** or **Spinal Motion Restriction** (see *Selective Spinal Immobilization* protocol) if the patient has a mechanism with the potential for causing spinal injury and meets ANY of the following clinical criteria:
 1. Altered mental status.
 2. Evidence of intoxication.
 3. Distracting pain/injury (extremity fracture, drowning, etc.).
 4. Neurological deficit (numbness, tingling, paralysis).
 5. Spinal pain or tenderness.
 6. Distracting situation (communication barrier, emotional distress, etc.).
- C. Complete a secondary exam to include serial neurological status after immobilization.
- D. Treat pain per *Pain Management* protocol.

Specific Precautions:

- A. If any immobilization techniques cause an increase in pain or neurological deficits, immobilize patient in the position found or position of greatest comfort.
- B. Carefully assess the patient's respiratory status during transport. Loosen straps as needed to avoid respiratory compromise.
- C. Comorbid age factors (< 12 or > 65 yrs) may impact the EMS Provider's ability to assess the patient's perception and communication of pain. A conservative approach to immobilizing these patients is strongly recommended.
- D. Patients in the third trimester of pregnancy should have the right side of the backboard elevated six inches.
- E. Pad backboards for all inter-facility transports. Consider padding backboards for prolonged scene transports.
- F. If sports injury, immobilize patient per the *Sports Equipment Removal* procedure.

Amputation:

- A. If amputation is above the wrist or ankle, enter the patient into the **Trauma System**.
- B. Cover stump or partial amputation with sterile dressing, saturate with sterile Normal Saline and cover with dry dressing.
 - 1. Partial amputations should be splinted in anatomical position to avoid torsion and angulation.
 - 2. Control bleeding by direct pressure, indirect pressure and/or elevation, hemostatic dressings and/or tourniquet.
- C. Wrap severed part in sterile dressing, place in plastic bag or wrap in plastic and keep dry.
 - 1. Place bag in ice water combination without salt, if available.
 - 2. Time is of the greatest importance to assure viability, if the transport time will be prolonged due to extrication or other circumstances, consider sending the amputated part ahead to be surgically prepared for reimplantation.

Sprains, Possible Fractures and Dislocations:

- A. Dislocations should not be reduced in the field.
- B. Check for pulses, sensation and movement in the extremity distal to the injury site both before and after immobilization.
- C. Splint fractures in normal anatomical position. Apply axial traction as needed. Follow *Pelvic Wrap* procedure if indicated.
- D. Elevate and apply ice or cold packs if time and extent of other injuries allow.

Open Fractures:

- A. Control bleeding by direct pressure, indirect pressure and/or elevation, hemostatic dressings and/or tourniquet.
- B. Apply sterile dressing.
- C. Saturate with sterile Normal Saline.
- D. Cover with dry dressing.
- E. If the fracture/dislocation is open or involves a joint, splint in place unless neurovascular compromise is present distal to the fracture site.

Femur Shaft Fracture:

Apply traction splint for immobilization.

Pain Control for Isolated Extremity Injuries:

- A. Consider fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a maximum of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a maximum of 400 micrograms.

Pediatric Considerations:

1. Small children may require extra padding under the shoulders.
 - a. Children require extra padding behind the T-spine and shoulders and are best immobilized on a pediatric backboard.
 - b. If using an adult backboard:
 1. Since the pediatric patient is at risk of sliding from side to side on a backboard, it is recommended that the EMS Provider place rolled up blankets or other dense, soft support material on both sides of the pediatric patient prior to securing the chest and hip straps.
 2. The location of the straps on the backboard may have to be adjusted so they securely hold the pediatric patient in place and do not compress the abdomen.
2. Fentanyl dose for children < 40 kg: 1 microgram/**kg** IV, IO, or IN. May repeat with 0.5-1 microgram/**kg** every 3-5 minutes as needed to a maximum total dose of 4 micrograms/**kg**. Or, fentanyl 1-2 micrograms/**kg** IM; may repeat every 15 minutes to a maximum total dose of 4 micrograms/**kg**.
If ≥ 40 kg follow adult dosing.

Nausea and Vomiting

HX	PE	DDX
Onset, duration, total number	LOC	CNS (migraine, CVA)
Blood, bile?	Neuro deficits	Vestibular (vertigo, dizziness, middle ear)
Associated symptoms (abdominal pain, headache, dizziness, pain, neuro symptoms)	Abdominal exam	Cardiac: Acute MI
Pregnancy	Ataxia	Eye (blurred vision)
Medications, allergies		GI (gastroenteritis)
		Pregnancy
		Severe pain (MI, renal stone, fracture, trauma)
		Medication

Treatment:

- A. Start O₂, follow *Airway Management* procedure, as indicated.
- B. Start IV if needed; if shock syndrome is present follow *Shock* protocol.
- C. Consider fluid challenge in patients exhibiting signs of dehydration.
- D. Consider offering patient an isopropyl alcohol swab and allowing the patient to self-administer the swab by inhalation. Emphasize slow deep inhalation. May be repeated up to 2 times (total of 3 administrations) but should not delay the administration of ondansetron.
- E. Administer 8 mg ondansetron orally dissolving tablets (Zofran® ODT) or 8 mg ondansetron slow IV push over 2 minutes or IM.
 - a. If nausea and/or vomiting are inadequately controlled after 10 minutes, may repeat ondansetron for a total of 3 doses.
 - b. If the patient has a known allergy to ondansetron administer diphenhydramine 25 to 50 mg IV/IM.
- F. If patient continues to vomit administer fluid challenge and consider other causes.

Specific Precautions

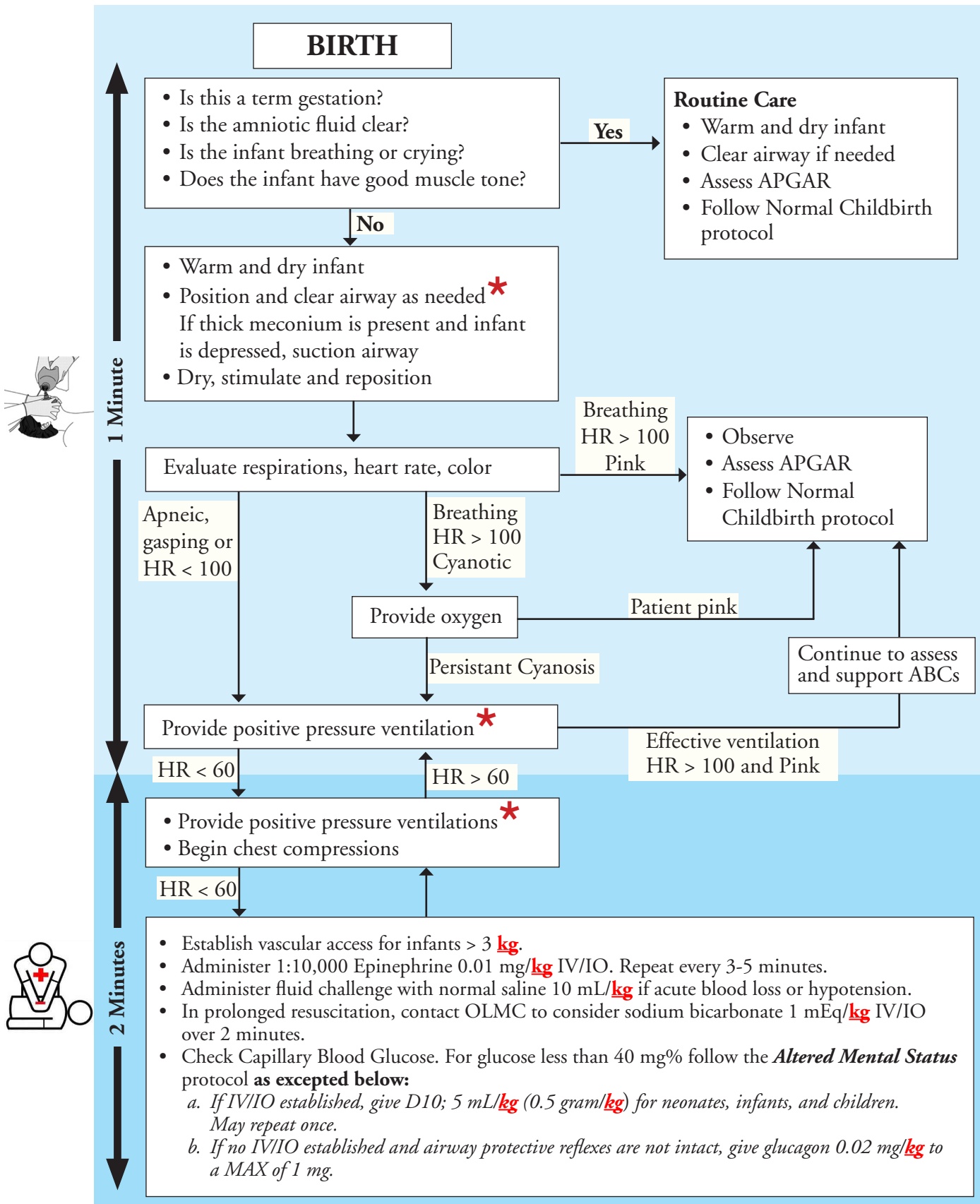
- A.** Do not administer ondansetron (Zofran®) to patients with a hypersensitivity to the drug or other 5-HT₃ type serotonin receptor antagonists (i.e., dolasetron [Anzemet®] and granisetron [Kytril®])
- B.** Do not administer with alkaline medications or preparations, which may cause precipitation.

Pediatric Considerations

1. Ondansetron use in patients under 2 years of age requires OLMC consultation except for children in spinal immobilization or children receiving chemotherapy.
2. For children 2-12 years of age, administer one (1) 4 mg ondansetron orally dissolving tablet (Zofran® ODT) or administer 0.1 mg/**kg** IV/IO to a max of 4 mg. Consider IM at same dose if unable to start IV and ODT tablet is contraindicated.

Neonatal Resuscitation

HX	PE	DDX
<p>Painful bleeding in mother (Abruptio Placentae)</p> <p>Prolonged rupture of membranes</p> <p>Maternal fever, hypertension, edema, seizures</p>	<p>Meconium-stained fluid</p> <p>Prolapsed cord</p> <p>APGAR score</p>	<p>Initial questions:</p> <ul style="list-style-type: none"> • Amniotic fluid clear of meconium? • Breathing or crying? • Good muscle tone? • Pink color? • Term infant? <p>Management priorities:</p> <ul style="list-style-type: none"> • Provide warmth • Clear, open airway • Dry, stimulate infant • Oxygen



* Endotracheal intubation may be considered at several steps.

Notes and Precautions

- A. Do not use Atropine in neonatal resuscitation.
- B. If meconium is lightly stained and infant is vigorous (strong respiratory effort, good muscle tone, heart rate > 100 bpm) endotracheal suctioning should not be performed.
- C. An infant may need resuscitation if intrapartum risk factors for asphyxia are present (prolapsed cord, painful bleeding, prolonged rupture of membranes, maternal fever, multiple births, abnormal presentation, maternal hypo-hypertension or seizure).
- D. To monitor HR, either auscultate heart tones or use 3-lead ECG. Palpation of HR is unreliable and intermittent.

Meconium Aspiration:

Meconium in the amniotic fluid can be aspirated resulting in a potentially fatal course or requiring high-pressure ventilation and resulting chronic lung disease. Many of these complications can at least be attenuated, if not prevented, by suctioning meconium from the airway PRIOR to ventilating. This can be emotionally difficult to do when confronted with a depressed, blue, bradycardic neonate, but direct tracheal suctioning through the ET tube should be considered part of establishing a patent airway in these neonates.

- A. With all infants who have passed meconium, as soon as the baby's head is delivered (before delivery of the shoulders), using a 10 French or larger suction catheter, suction the mouth, pharynx and nose.
- B. After delivery, proceed with intubation for all infants who are depressed and have passed meconium or any infant passing thick, particulate meconium.
 - 1. Check blood glucose and follow *Altered Mental Status and Coma* protocol.
 - 2. Procedure:
 - a. Suction the mouth, nose and posterior pharynx, using a 10 French or larger catheter hooked to machine suction, when the head is delivered and again after the rest of the infant has been delivered.
 - b. Secure protected airway, intubate the infant with the appropriately sized endotracheal tube and suction with a meconium suction adapter or use a specially designed meconium aspiration catheter/endotracheal tube such as a Neovac® type device.
 - c. Suction should not last more than 3 to 5 seconds.
 - i. **Do not suction with your own mouth!**
 - ii. Use the portable machine suction or wall suction if available.
 - 3. In an infant with severe asphyxia, clinical judgment should be used to determine the number of intubation attempts. It may not be possible to clear the trachea of all meconium before initiating other resuscitation measures.

OB/GYN Emergencies

HX	PE	DDX
Last menstrual period	Hypertension	Vaginal bleeding
Pregnancy <ul style="list-style-type: none"> • Single or multiple • Due date • Abdominal pain/contractions (timing/duration) • Ruptured membranes 	Edema	Early pregnancy
	Abdominal exam	Ectopic pregnancy
	Vaginal bleeding	Spontaneous abortion
Seizures	If possibility of delivery exists, inspect perineum for bleeding, fluid (not color), crowning or abnormal presentation	Late pregnancy
Hypertension		Abruptio placenta
Vaginal bleeding	Do not perform a digital exam	Placenta previa
Past medical /OB Hx		HTN/headache/edema/seizures
		Eclampsia/pre-eclampsia

General Treatment:

1. If multiple, or abnormal birth, consider second transport unit.
2. Start O₂ in all abnormal deliveries. Follow **Airway Management** procedure.
3. If in third trimester, transport on left side (pillow under right hip, or, if on backboard, tilt right side of board up 6 inches) to keep uterine pressure off inferior vena cava unless delivery is imminent.
4. Start IV/IO as needed. Vital signs may not be a reliable indicator of shock or respiratory distress in the pregnant patient.
5. **Toxemia of Pregnancy**
 - a. Seizures (eclampsia) follow **Seizure** protocol.
 - b. Consult OLMC for consideration of use of Magnesium Sulfate.

Childbirth:

A. Normal child birth

1. Use sterile or clean technique.
2. Guide and control – but do not retard or hurry – delivery.
3. Check for cord around baby's neck and gently remove if found.
4. After delivery, assess infant per **Neonatal Resuscitation** protocol. Assess infant using APGAR at time of birth and five minutes later. Documentation should describe the infant using criteria rather than giving a numerical score. If no resuscitation is needed (term infant, breathing or crying, good muscle tone), proceed as below.

5. Do not suction infant's nose and mouth unless there is meconium present and the infant is depressed; or there is a need to clear the airway.
6. Briefly dry infant and place on mother's chest, in skin-to-skin contact. Cover both with a clean, dry blanket.
7. At 1 to 3 minutes after delivery, clamp and cut the umbilical cord about 6 inches from infant. If resuscitation is needed, cord may be clamped and cut as soon as necessary.
8. Do not delay transport to deliver the placenta. After the placenta has delivered, gently externally massage uterus to encourage contraction and prevent bleeding.
9. If mother has significant postpartum hemorrhage (> 500 mL), continue uterine massage, treat for shock, and update receiving facility.
10. Unless infant needs treatment, keep on mother's chest for transport. Monitor vital signs of mother and infant during transport.

B. Abnormal Childbirth

1. General:

- a. Transport to nearest appropriate hospital.
- b. Give receiving hospital earliest possible notification.
- c. Contact OLMC for advice.
- d. Transport position as in General Treatment #3 above.

2. Breech Presentation (buttocks first):

- a. If delivery is imminent, prepare the mother as usual and allow the buttocks and trunk to deliver spontaneously, then support the body while the head is delivered.
- b. If the head is not delivered within 3 minutes, suffocation can occur:
 - i. Place your gloved hand in the vagina, with your palm toward the baby's face.
 - ii. Form a "V" with your fingers on either side of the baby's nose and push the vaginal wall away from the baby's face to create airspace for breathing.
- c. Assess for presence of pulse in umbilical cord, if presenting.

3. Prolapsed cord:

- a. With a gloved hand, gently attempt to push the baby up the vagina several inches.
- b. Do not attempt to push the cord back.
- c. Assess for presence of pulse in umbilical cord.
- d. Transport patient in position that best ensures adequate fetal circulation and is safe.

4. Limb presentation:

- a. The presentation of an arm or leg through the vagina is an indication for immediate transport to the hospital.
- b. Assess for presence of pulse in umbilical cord, if presenting.

5. Abruptio Placentae: occurs in the third trimester of pregnancy when the placenta prematurely separates from the uterine wall leading to intrauterine bleeding.

- a. The patient experiences lower abdominal pain and the uterus becomes rigid.
- b. Shock may develop without significant vaginal bleeding.

6. Placenta previa: occurs when the placenta covers the cervical opening and can result in vaginal bleeding and prevents delivery of the infant through the vagina. The infant needs to be delivered via C-section.

Notes and Precautions:

A. Always consider the possibility of ectopic pregnancy in a woman of child-bearing age with abdominal pain or vaginal bleeding. The patient may decompensate quickly due to internal blood loss.

B. APGAR Criteria:

Sign	0	1	2
Appearance:	Blue, pale	Body pink, extremities blue	Completely pink
Pulse:	Absent	Slow (less than 100)	Greater than or equal to 100
Grimace:	No response	Grimace	Cough or sneeze
Activity:	Limp	Some flexion	Active motion of extremities
Respirations:	Absent	Slow, irregular	Good, crying

Pain Management

ACUTE	CHRONIC	PRINCIPLES OF MANAGEMENT
Is a symptom of illness or injury	Is the problem	Pain is best treated early
Serves a biological purpose	Has no biological function	Untreated or under treated pain produces more pain
Is associated with identifiable pathology	May or may not be associated with identifiable pathology	Analgesia and a search for the cause of the pain should happen simultaneously
Is present for less than 6 months	Is present for more than 6 months	Pain scales should be used routinely

Treatment:

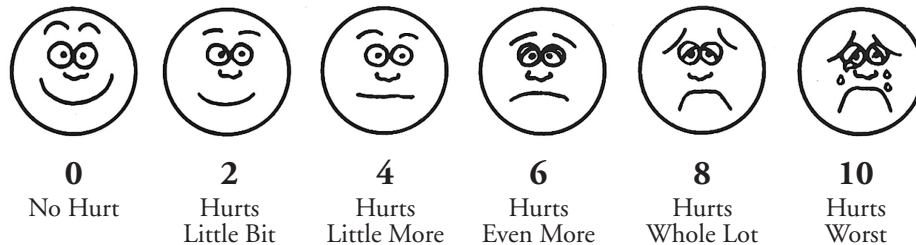
For acute pain and uncontrolled chronic pain:

- A. Consider oxygen per *Airway Management* protocol.
- B. Monitor vital signs and level of consciousness, consider ECG monitor.
- C. Establish venous access if indicated. Determine location of pain and severity using numeric scale (1-10) or Faces scale.
- D. Consider and treat underlying cause of pain.
- E. Use non-pharmacological pain management (i.e., position of comfort, hot/cold pack, elevation, splinting, padding, wound care, therapeutic calming and communication).
- F. Administer pain medication:
 1. Fentanyl 25-100 micrograms IV/IO/IN; may repeat every 3-5 minutes as needed to a maximum of 400 micrograms. Or, fentanyl 25-100 IM; may repeat every 15 minutes to a maximum of 400 micrograms.
 2. For interfacility transfers for patients already administered morphine, administer morphine 2-8 mg IV/IO every 3-5 minutes to a maximum of 20 mg. Or morphine 5-10 mg IM; may repeat 5 mg in 10-15 minutes to a maximum of 20 mg.
 3. If pain not controlled after 400 micrograms of fentanyl or 20 mg of morphine, consider ketamine 15 mg IV/IO/IM. May repeat once after 30 min.
- Do not administer pain medications if any of the following are present:**
 - a. Respiratory distress or O₂ saturation of < 90%
 - b. Known allergy to pain medications
 - c. Altered mental status
 - d. Systolic blood pressure of < 100 mm/Hg
- G. Obtain a full set of vital signs and pain scale rating prior to and after each administration of pain medication.

Pediatric Considerations:

1. Fentanyl dose for children is 1 microgram/**kg** IV, IO, or IN. May repeat with 0.5-1 microgram/**kg** every 3-5 minutes as needed to a maximum total dose of 4 micrograms/**kg**.
OR, fentanyl 1-2 micrograms/**kg** IM; may repeat every 15 minutes to a maximum total dose of 4 micrograms/**kg**. Do not exceed adult dosing.
2. For children under 20 kg morphine 0.1 mg/**kg** IV or IM. May repeat every 3-5 minutes. Do not exceed adult dosing.
3. Contact OLMC if maximum dose of either medication is reached without adequate pain management.

Faces Pain Scale



Poisons and Overdoses

HX	PE	DDX
Type of ingestion or exposure What, when, how much Multiple patients with similar symptoms Reason for ingestion (accidental or intentional) Action by bystanders Previous similar events	LOC Pupils Breath (odor) Temperature (hyper/hypothermic) Neuro status ECG (rate, rhythm, QRS duration)	See toxidromes

Treatment: [Consider HAZMAT Response]

- A. Consider use of any of the following protocols:
 1. **Hazardous Materials -- Multiple Toxic Exposure**
 2. **Hazardous Materials Treatment**, if trained and authorized
 3. **Mass Casualty Incident**
 4. **Staging for High Risk Response**
- B. External Contamination:
 1. Protect medical personnel.
 2. Remove contaminated clothing.
 3. Brush off any solid material from the skin.
 4. Flush contaminated skin and eyes with copious amounts of water.
- C. Internal Ingestion:
 1. Assess and support ABCs.
 2. Start O₂, follow **Airway Management** procedure.
 3. If ingestion is Aspirin (ASA) and/or Tylenol (APAP) only and is less than 2 hours old, administer 1 gram/**kg** activated charcoal if available.
 4. For all other ingestions less than 2 hrs old contact OLMC for consideration of activated charcoal.
 5. For ingestions more than 2 hrs old, activated charcoal is not indicated.
 6. Start IV/IO if needed and follow **Shock** protocol.

- 7. If patient is poorly responsive or has depressed respirations:
 - a. Determine blood glucose and follow *Altered Mental Status and Coma* protocol.
 - b. If no IV/IO has been established, administer naloxone 2 mg IM/IN.
 - c. If IV/IO already established, administer naloxone 0.5 mg IV/IO and observe for improved ventilations, IV/IO dose may be repeated every 2 minutes up to 2 mg.
 - d. In most instances, a total dose of 2 mg IM/IN or IV/IO will be sufficient to reverse opioid intoxication. In some cases (methadone or designer drugs), larger doses of naloxone may be necessary. In these cases, additional doses of naloxone (2 mg IM/IN or IV/IO every 3-5 minutes) up to a maximum of 8 mg of naloxone may be administered to reverse opioid intoxication.
 - 8. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
- D. Specific Poisonings:**
- 1. (See toxidrome table).
 - 2. Carbon Monoxide (CO) poisoning:
 - a. High flow O₂.
 - b. If patient has suspected cyanide poisoning, consider obtaining SpCO, if available, before administration of Cyanokit[®] since the latter will interfere with the carboxyhemoglobin monitor.
 - c. If CO monitor available and CO reading is ≥ 15 , then transport to nearest facility with hyperbaric chamber (unless patient meets burn or trauma center criteria).

	Clinical presentation	Clinical presentation	Clinical presentation	Clinical presentation
Carbon Monoxide	Yes	Yes	Yes	Yes
Burns	No	Yes	No	Yes
Trauma	No	No	Yes	Yes
Destination	Hyperbaric Center	Burn Center	Trauma Center	Trauma Center
Carbon Monoxide = Yes (≥ 15) Burns = Meets Burn Center criteria Trauma = Meets Trauma system criteria				

Pediatric Considerations: [Consider HAZMAT Response]

1. Consider possibility of neglect or abuse.
2. Determine blood glucose and follow *Altered Mental Status & Coma* protocol.
3. Activated charcoal dose is 1 gram/**kg**.
4. Naloxone dose is 0.1 mg/**kg**, max 2 mg per dose.
5. IV/IO Atropine dose, per OLMC, may be very high in children that have orally ingested organophosphate poisons.

Specific Precautions:

- A. Inhalation poisoning, **SLUDGE** symptoms (salivation, lacrimation, urination, defecation, gastrointestinal symptoms and emesis), or acid/alkali exposure may be dangerous to rescuers.
- B. Do not neutralize acids or alkalis.

Table D.1. - Toxidromes

Toxidrome	Examples	Clinical Features	Antidotes
Sympathomimetic	Cocaine Methamphetamine	Agitation Diaphoresis Hypertension Hyperthermia Dilated pupils Tachycardia	Benzodiazepine (OLMC)
Opioid	Heroin Hydromorphone Methadone Oxycodone	Depressed Mental Status Hypoventilation Constricted pupils	Naloxone
Cholinergic (Anti- cholinesterase)	Pesticides <ul style="list-style-type: none"> • Carbamates • Organophosphates Nerve agents	Muscarinic ⁺ Nicotinic ⁺⁺ Central ⁺⁺⁺	Atropine Pralidoxime (HAZMAT, OLMC)
Sedative- Hypnotic	Barbiturates Benzodiazepines GHB	Depressed Mental Status Hypotension Hypothermia	Supportive Therapy (No antidote)
Cardiotoxic Drugs	Beta-blockers Calcium Channel Blockers	Bradycardia Conduction Issues Hypotension	Glucagon (OLMC) Calcium (OLMC)
Anticholinergic	Atropine Jimson Weed Scopolamine Diphenhydramine	Delirium Hyperthermia Tachycardia Warm Dry Skin	Physostigmine (ED)
Sodium Channel Blockade	Tricyclic Antidepressants Anti-arrhythmics <ul style="list-style-type: none"> • Type IA agents (quinidine, procainamide) • Type IC agents (flecainide, propafenone) 	Altered Mental Status Hypotension Seizures Wide-Complex Tachycardia	Sodium Bicarbonate (OLMC)

+Muscarinic:
 Diarrhea
 Urination
 Miosis
 Bradycardia, Bronchospasm,
 Bronchorrhea
 Emesis
 Lacrimation
 Salivation, Secretions, Sweating

++Nicotinic:
 Mydriasis
 Tachycardia
 Weakness
 Hypertension,
 Hyperglycemia
 Fasciculations

+++Central:
 Confusion
 Convulsions
 Coma

Psychiatric and Behavioral Disorders

HX	PE	DDX
Recent crises Behavioral change Suicide/homicidal ideation Past medical, psych history Medications Drugs ETOH	Pupils Orientation Mental status exam appearance, behavior orientation affect/ mood, thought (delusions, illogical etc), hallucinations (visual/auditory) memory (recent/past)	Confusion Metabolic (electrolyte) Infectious (encephalitis, sepsis) Neurologic (CVA, tumor) Medication Drug abuse Psych

Treatment:

- A. Immediate danger to medical personnel or patient:
 1. Follow **Staging for High Risk Response** protocol.
 2. Protect yourself and others.
 3. Summon law enforcement.
- B. No evidence of immediate danger to medical personnel or patient:
 1. Assess ABCs. Follow **Airway Management** procedure, if needed.
 2. Assess orientation and level of consciousness, follow **Altered Mental Status and Coma** protocol if indicated.
- C. General approach to the patient:
 1. Show self-confidence and convey concern for the patient.
 2. One EMS Provider should establish rapport and interact with the patient.
 3. Do not stay alone with the patient. Have enough help to restrain the violent patient.
See **Patient Restraint (Physical)** procedure.
 4. If chemical restraint is indicated, see **Patient Restraint (Chemical)** procedure.

Choice of Destination

- A. Voluntary patient:
 1. Hospital destination is determined by patient preference.
 2. If the patient has no preference, transport to the nearest hospital.
- B. Involuntary patient, patients on Police Officer Mental Hold:
 1. Patients of 9-1-1 incidents, transported by ambulance, must be evaluated at a licensed hospital Emergency Department.

Respiratory Distress

HX	PE	DDX
Recent illness Fever, chills Cough Chest pain PMH (Asthma/CHF/ COPD)	LOC Skin color Stridor Distended neck veins Breath sounds Peripheral edema	Upper airway obstruction Lung <ul style="list-style-type: none"> • Bronchitis • Asthma • COPD • Pneumonia • PE CHF/MI / Tamponade Trauma (pneumothorax / flail chest) Toxins (carbon monoxide, cyanide etc) Metabolic acidosis (diabetic ketoacidosis etc) Sepsis

Breath Sounds in Respiratory Distress

Characteristics

Clear, symmetric
 Crackles, symmetric
 Wheezing, symmetric
 Clear, asymmetric or absent
 Crackles, asymmetric
 Wheezing, asymmetric
 Stridor

Possible Causes

Hyperventilation, MI, metabolic, pulmonary embolus
 Pulmonary edema, extensive pneumonia
 Asthma, pulmonary edema, COPD
 Pneumothorax, pulmonary embolus, COPD
 Pneumonia, pulmonary edema
 Foreign body, pulmonary embolus, COPD
 Croup, epiglottitis, foreign body

Treatment:

- A. Start O₂, follow *Airway Management* procedure, as indicated. Use pulse oximeter.
- B. Start IV/IO as needed.
- C. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
- D. Treat underlying cause as follows:
 1. Upper Airway (croup, epiglottitis, anaphylaxis, foreign body):
 - a. Obstructed airway procedures for complete obstruction.
 - b. Treat anaphylaxis per *Anaphylaxis and Allergic Reaction* protocol.
 - c. **Foreign body:** Remove using direct laryngoscopy if complete obstruction.
 - d. **Complete Obstruction:** If you cannot effectively ventilate the patient and they are deteriorating, consider cricothyrotomy.
 2. Respiratory Distress Unknown Etiology:
 - a. Consider nebulized albuterol (1 unit dose), may repeat as needed.
 - b. If a second and/or third treatment is needed, add ipratropium (1 unit dose) to albuterol treatment.
 3. Pulmonary Edema:
 - a. Sit patient upright.
 - b. If BP less than 100 mm/Hg: Treat possible cardiogenic shock. See *Shock* protocol.
 - c. If BP greater than 100 mm/Hg:
 - i. Nitroglycerine 0.4 mg SL (spray or tablet), repeat nitroglycerine every 3-5 minutes.

NOTES:

Do not administer nitroglycerine without OLMC if patient has taken Viagra® or other similar drugs in the last 24 hours or Cialis® (tadalafil) within last 48 hours.

- ii. If the patient remains in severe respiratory distress (e.g., unable to speak more than one or two words, low O₂ saturation [$< 90\%$], RR > 40) start CPAP if available.
- iii. Consider albuterol 2.5 mg by nebulizer. May repeat as needed.
- iv. Furosemide (if SBP > 100 mmHg and fluid overload state [JVD, rales, peripheral edema, hypertension]).
 - a. If patient is not currently taking furosemide, administer 20 mg IV/IO.
 - b. If patient is taking furosemide, administer 40 mg IV/IO.

4. COPD
 - a. DuoNeb (albuterol and ipratropium) by nebulizer. May repeat twice every 20 minutes if needed.
 - b. If patient has severe respiratory distress administer dexamethasone (Decadron®) 10 mg IV, IO, IM, or PO.
 - c. If the patient remains in moderate to severe respiratory distress (e.g., unable to speak more than one or two words, low O₂ saturation (< 90%), RR > 40) administer **CPAP** if available.
 - d. If continuous nebulized treatment is needed during transport contact OLMC for advice.
5. Asthma:
 - a. DuoNeb (albuterol and ipratropium) by nebulizer. May repeat twice every 20 minutes if needed.
 - b. If patient has moderate to severe asthma based on the Severity Assessment Guide, administer dexamethasone (Decadron®) 10 mg IV, IO, IM, or PO.
 - c. If patient is deteriorating and less than 40 years old, administer 1:1,000 epinephrine 0.3 to 0.5 mg IM.
 - d. If transport time is prolonged and patient's asthma is severe, contact OLMC for consideration of magnesium sulfate (usual dose is 2 grams over 20 minutes).
 - e. If continuous nebulized treatment is needed during transport, contact OLMC for advice.

Asthma Severity Assessment:

ASTHMA SEVERITY ASSESSMENT GUIDE			
	MILD	MODERATE	SEVERE
Short of breath	Walking	Talking	At rest
Able to speak	In sentences	In phrases	In words
Heart rate	< 100	100 - 120	> 120
Respiratory rate	Elevated	Elevated	> 30
Lung sound	End expiratory wheezing	Full expiratory wheezes	Wheezes both phases
Accessory muscle use	Not usually	Common	Usually
Alertness	Possible agitated	Usually agitated	Usually agitated
ECTO₂	20 - 30	30 - 40	> 40

Pediatric Patients:

A. Upper Airway Obstruction

1. In patients 6 months to 6 years of age with audible stridor at rest, administer 5 mL epinephrine 1:1,000 via nebulizer. May repeat in 20 minutes. Contact OLMC for additional dosing.
2. Suspected anaphylaxis or foreign body:
 - a. Treat anaphylaxis and foreign body obstruction per adult guidelines.
3. Suspected croup, epiglottitis, or laryngeal edema:

The usual cause of respiratory arrest in children with croup, epiglottitis or laryngeal edema is exhaustion, not complete obstruction.

 - a. If suspected croup, administer dexamethasone per peds guide.
 - b. If the child deteriorates, perform BVM.
 - c. If unable to ventilate with BVM, perform intubation.
 - d. If intubation unsuccessful and unable to ventilate effectively, perform needle cricothyrotomy.

B. Asthma

1. Administer albuterol and ipratropium per adult guidelines.
2. If patient is deteriorating administer 1:1,000 epinephrine 0.01 mg/kg IM (max dose 0.5 mg). Contact OLMC for additional doses.
3. If patient has Moderate to Severe asthma based on *Asthma Severity Assessment Guide* and is not improving with treatment, consider dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.

C. Acute Bronchiolitis (< 2 years old)

Mild-moderate respiratory distress (see *Infant Respiratory Distress Guide* below)

1. Administer oxygen via blow-by, nasal cannula or mask to keep SpO₂ > 92%. Monitor ETCO₂ if available.
2. If nasal secretions and/or congestion, use nasal suction with adapter if available. If secretions are thick, may use normal saline to loosen.
3. If wheezing, administer albuterol 2.5 mg via nebulizer. If improvement, may use every 10 minutes. Discontinue if patient's heart rate is > 200.
4. If patient worsens and is still wheezing, administer epinephrine 5 mL of 1:1000 via nebulizer. If improvement, may use every 10 minutes. Discontinue if patient's heart rate is > 200.
5. If unable to keep SpO₂ > 92% with oxygen or patient has continued significant work of breathing despite treatment:
 - a. **30-90 days old:** titrate High Flow Nasal Cannula (pediatric) Oxygen (HFNCO) starting at 2 LPM up to 4 LPM.
 - b. **Greater than 90 days old:** titrate High Flow Nasal Cannula Oxygen up to 6 LPM.

D. Severe respiratory distress (see *Infant Respiratory Distress Assessment Guide* below)

1. Suction nares as described above.
2. Initiate high flow nasal cannula oxygen as described above with ETCO₂ monitoring.
3. If wheezing, administer 5 mL epinephrine 1:1,000 via nebulizer. If improvement may use every 10 minutes. Discontinue if patients heart rate is > 200.

4. Prepare for positive pressure ventilation with BVM and intubation for apnea, $\text{ETCO}_2 > 55$ or inability to maintain $\text{SpO}_2 > 85\%$.

E. BRUE (Brief Resolved Unexplained Event)

An episode that is frightening to the observer and is characterized by some combination of apnea, color change (cyanosis or pallor) change in muscle tone (flaccid or rigid), and choking or gagging.

1. BRUE is a group of symptoms, not a disease process.
2. BRUEs are most common in infants under one year of age, but may occur up to two years of age. They are more frequent in premature infants and infants with other health conditions such as cystic fibrosis, bronchiolitis and congenital heart disease.
3. Serious underlying causes can include pneumonia, bronchiolitis, seizure, sepsis, intracranial hemorrhage, and meningitis.
4. Many infants will have returned to normal by the time EMS arrives.
5. Consider non-accidental trauma.
6. Transport via ALS to an ED capable of treating critically ill infants even if the infant currently appears in no distress.

INFANT RESPIRATORY DISTRESS ASSESSMENT GUIDE			
	MILD	MODERATE	SEVERE
Respiratory Rate ≤ 2 months 2-12 months 1-2 years	≤ 60 ≤ 50 ≤ 40	61-69 51-59 41-44	≥ 70 ≥ 60 ≥ 45
Retractions	Subcostal or intercostal	2 of: subcostal, intercostal, substernal retractions, OR nasal flaring	3 of: subcostal, intercostal, substernal, suprasternal, supraclavicular retractions, OR nasal flaring OR head bobbing
Dyspnea	1 of: difficulty feeding, decreased vocalization, or agitation	2 of: difficulty feeding, decreased vocalization, or agitation	Stops feeding, no vocalization OR drowsy and confused
Auscultation	End-expiratory wheeze only	Expiratory wheeze only	Inspiratory and expiratory wheezing OR diminished breath sounds OR both

Key Considerations:

Speed of onset, recent illness/infection, fever, chills or productive cough, medications and allergies, distended neck veins, peripheral edema, lung sounds, medical history (including asthma, CHF, COPD, pneumonia).

Seizures

HX	PE	DDX
Seizure <ul style="list-style-type: none"> • Onset, duration • Type (grand mal, focal etc.) • Fever • Urine/fecal incontinence History <ul style="list-style-type: none"> • Diabetes • Head trauma • Pregnancy • Previous seizure • Current medications (including compliance) • Other (drug/ETOH, fever) • Toxic exposure 	LOC O ₂ saturation Active seizure (focal/grand mal) Neuro deficits Evidence of trauma	Hypoxia Hypoglycemia Febrile Trauma CNS (CVA, meningitis, tumor) Drugs/OD Idiopathic ETOH withdrawal Electrolyte disturbance Cardiac arrest Eclampsia Shock

Treatment:

- A. History of seizure with current altered mental status (postictal) or witnessed seizure.
 1. Move hazardous objects away from patient and protect head; restrain only if necessary.
 2. Start O₂; follow **Airway Management** procedure.
 3. Place patient on left side for transport.
 4. Continue assessment and document level of consciousness every 5 minutes.
 5. Monitor cardiac rhythm and follow **Cardiac Dysrhythmias** protocol.
- B. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness): Proceed as in “A” above, and do the following:
 1. Administer midazolam 2.5 - 5.0 mg IV/IO. Repeat every 5 minutes until seizure stops.
 2. If no IV access, administer midazolam 5 mg IM/IN. Repeat every 5 minutes until seizure stops.
 3. Monitor patient’s respiratory status closely after midazolam administration.
 4. Check blood glucose and treat per **Altered Mental Status and Coma** protocol.

- C. Transport may be unnecessary if the patient:
 - 1. Clears completely and is fully oriented within 20 minutes after arrival of EMS responders, and
 - 2. Is taking prescribed medications, and
 - 3. Has a physician, and
 - 4. Is experiencing the usual frequency of seizures.
- D. If patient is not transported, have the patient (or guardian) sign an **Information Form** and document the patient's mental status (see *Non-Transport* procedure).
- E. The patient should always be encouraged to contact a physician as soon as possible.
- F. All first-time seizure patients require medical evaluation by a physician. Contact OLMC if patient refuses transport.

Pediatric Considerations:

- 1. If patient is in status seizure (continuous seizure or repetitive seizures without regaining consciousness):
 - a. Administer midazolam 0.3 mg/**kg** IM/IN. Repeat every 5 minutes until seizure stops.
 - b. If an IV is available, may administer midazolam 0.1 mg/**kg** IV/IO.
 - c. Monitor patient's respiratory status closely after midazolam administration.
- 2. Febrile seizures are generally found between the ages of 1-6 and are usually short in duration.
- 3. If, on arrival, the patient is not actively seizing (postictal) an IV is not required.
- 4. Check blood glucose and treat per *Altered Mental Status and Coma* protocol.
- 5. All hypoglycemic or first-time pediatric seizure patients should be transported.

Specific Precautions:

- A. Remember to check for a pulse once a seizure terminates. Seizure activity may be the first sign of cerebral hypoxia or dysrhythmia.
- B. New onset seizures in a pregnant woman, especially in the third trimester, may indicate toxemia of pregnancy that is life threatening to the mother and fetus.
- C. Avoid administering vecuronium or rocuronium to patient with status seizures as these may mask continuing seizure activity.
- D. New onset seizures in any patient need medical evaluation.

Shock

HX	PE	DDX
Trauma	Fever	Hypovolemic
Hemorrhage (external / internal)	LOC	Cardiac
Chest pain / SOB	Capillary refill	Septic
Fever / sepsis	Skin appearance (rash, swelling, trauma)	Anaphylactic
Allergy / anaphylaxis	Neck veins	Obstructive (PE/pneumothorax/pericardial tamponade)
Environmental (e.g. heat)	Lung sounds	Spinal
Dehydration	Abdominal tenderness	
	Pelvis	
	Extremity fracture	
	Neuro	

Treatment:

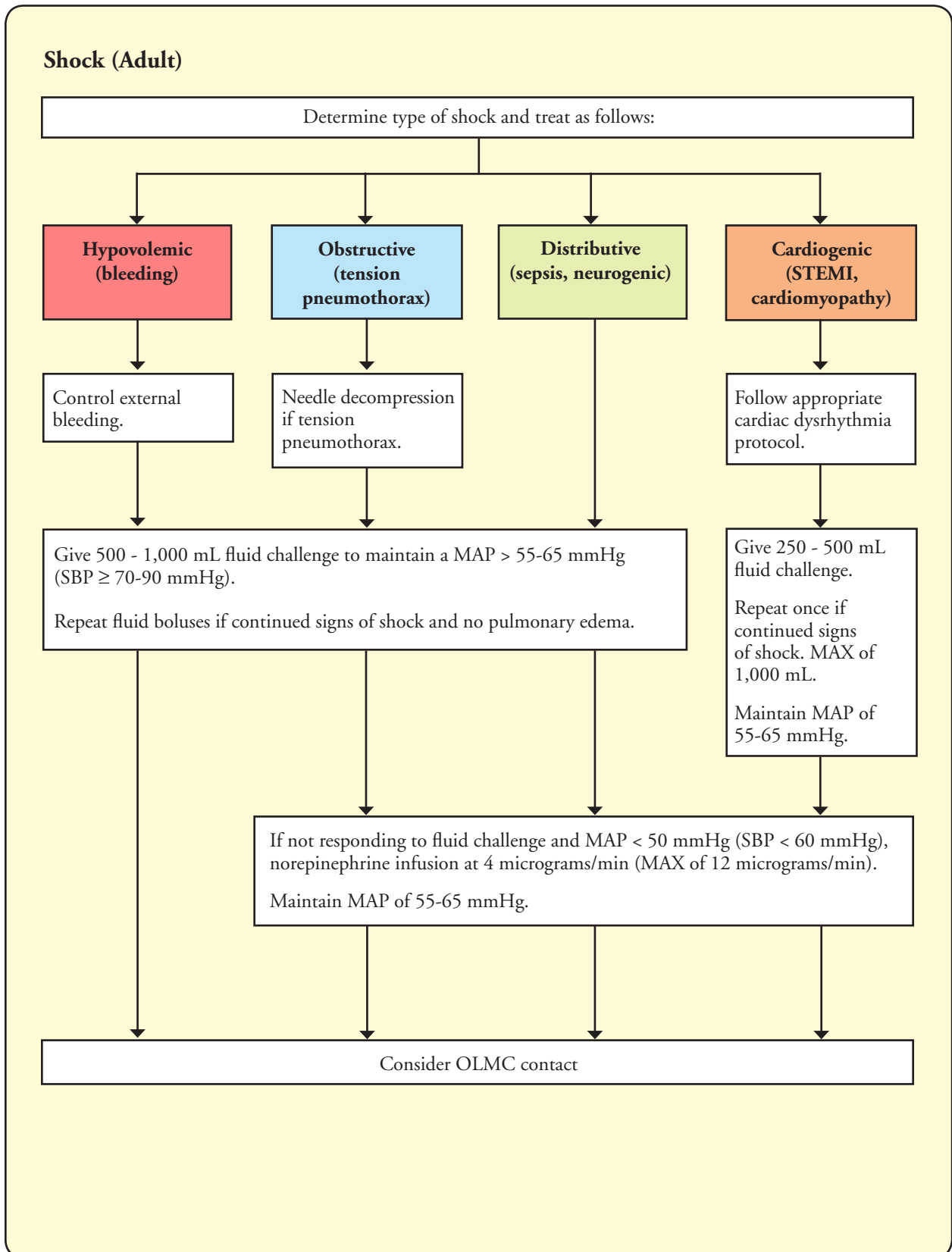
- A. Do not delay transport.
- B. Start O₂, follow *Airway Management* procedure.
- C. Start IV/IO.
- D. Determine type of shock and treat as follows:
 1. Hypovolemic Shock:
 - a. Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressings.
 - b. Administer 500/1000 mL fluid challenge to maintain a MAP > 65 mmHg (SBP > 90 mmHg).
Repeat fluid boluses if continued signs of shock and no pulmonary edema.
 2. Cardiogenic Shock:
 - a. If suspected cardiac event follow *Chest Pain* protocol.
 - b. Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
 - c. Administer 250-500 mL fluid challenge to maintain a MAP > 65 mmHg (SBP of > 90 mmHg).
Repeat once if continued signs of shock and no pulmonary edema.
Max of 1000 mL.
 - d. If MAP < 50 mmHg (SBP < 60 mmHg), administer norepinephrine infusion at 4 micrograms/min and titrate to effect. If no response, increase every 5 minutes in 4 micrograms/min increments to max of 12 micrograms/minute.
Goal is a MAP > 65 mmHg (SBP > 90 mmHg).
 - e. Consider push dose epinephrine until norepinephrine infusion is administered.

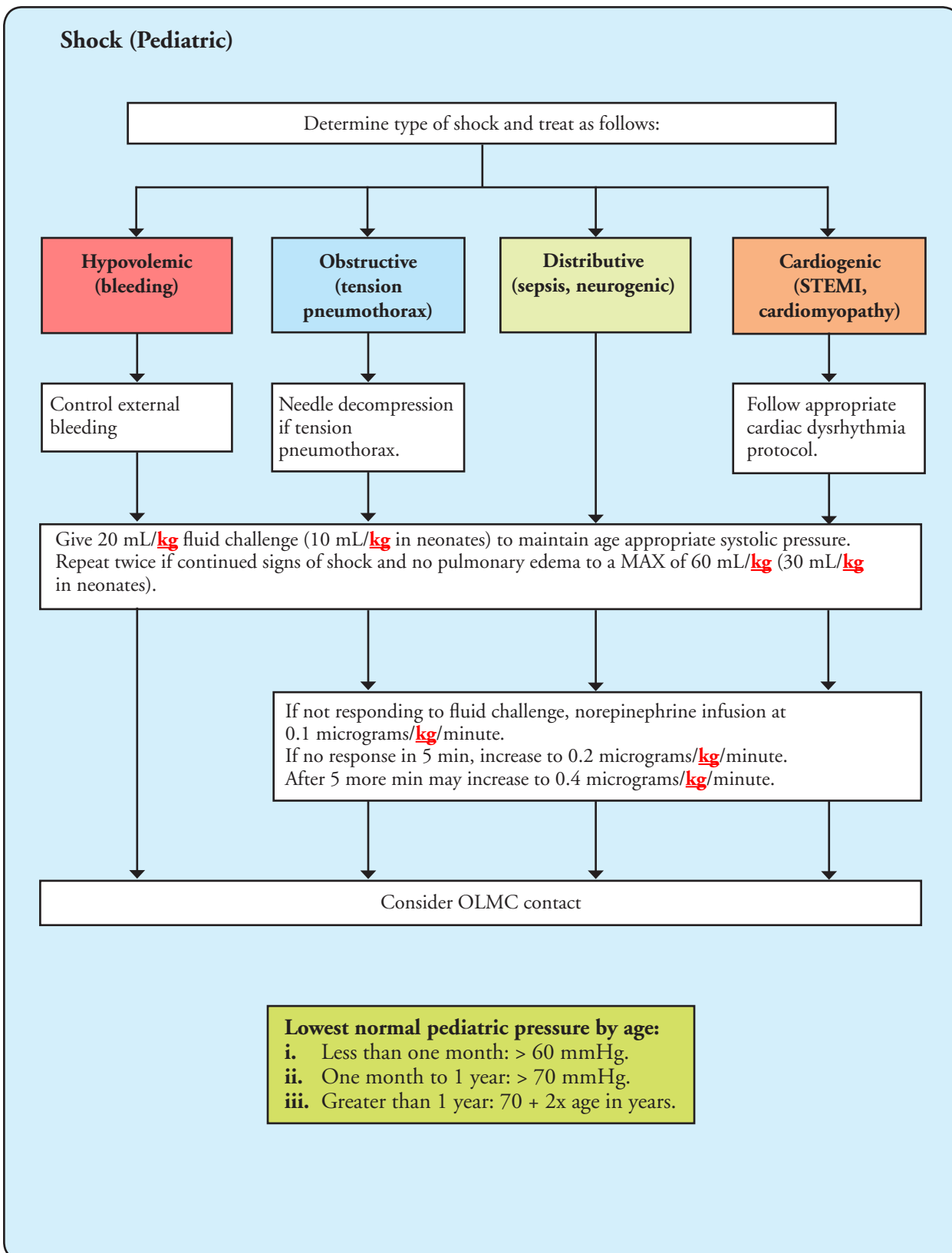
3. Distributive Shock, including anaphylaxis, sepsis, and neurogenic shock.
 - a. If anaphylaxis is suspected, follow *Anaphylaxis and Allergic Reaction* protocol.
 - b. Administer 500-1000 mL fluid challenge to maintain a MAP > 65 mmHg (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and no pulmonary edema.
 - c. If MAP < 50 mmHg (SBP < 60 mmHg), administer norepinephrine infusion at 4 micrograms/minute. If no response, increase every 5 minutes in 4 micrograms/min increments to max of 12 micrograms/minute. Goal is a MAP > 65 mmHg (SBP > 90 mmHg).
 - d. Consider push dose epinephrine until norepinephrine infusion is administered.

4. Obstructive Shock, including suspected cardiac tamponade, tension pneumothorax, dissecting aneurysm, and massive pulmonary embolism.
 - a. Administer 500-1000 mL fluid challenge to maintain a MAP > 65 mmHg (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and no pulmonary edema.
 - b. Tension Pneumothorax — needle decompression.
 - c. If not responding to fluid administration **and** MAP < 50 mmHg (SBP < 60 mmHg), administer norepinephrine infusion at 4 micrograms/minute and titrate to effect. If no response, increase every 5 minutes in 4 micrograms/min increments to MAX of 12 micrograms/minute. Goal is a MAP > 65 mmHg (SBP > 90 mmHg).
 - d. Consider push dose epinephrine until norepinephrine infusion is administered.

Pediatric Considerations:**Treatment:**

- A. Do not delay transport.**
- B.** Start O₂, follow *Airway Management* procedure.
- C.** Start IV/IO.
- D.** Determine type of shock and treat as follows:
 - 1.** Hypovolemic Shock:
 - a.** Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressings.
 - b.** Administer 20 mL/**kg** fluid challenge (10 mL/**kg** in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 mL/**kg** (30 mL/**kg** in neonates).
 - 2.** Cardiogenic Shock:
 - a.** If suspected cardiac event follow *Chest Pain* protocol.
 - b.** Monitor cardiac rhythm and follow *Cardiac Dysrhythmia* protocol.
 - c.** Administer 20 mL/**kg** fluid challenge (10 mL/**kg** in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 mL/**kg** (30 mL/**kg** in neonates).
 - d.** If blood pressure remains low administer norepinephrine infusion at 0.1 micrograms/**kg**/min and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/**kg**/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/**kg**/minute.
 - 3.** Distributive Shock, including anaphylaxis, sepsis, and neurogenic shock.
 - a.** If anaphylaxis is suspected, follow *Anaphylaxis and Allergic Reaction* protocol.
 - b.** Administer 20 mL/**kg** fluid challenge to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema.
 - c.** If blood pressure remains low administer norepinephrine infusion at 0.1 micrograms/**kg**/min and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/**kg**/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/**kg**/minute.
 - 4.** Obstructive Shock, including suspected cardiac tamponade, tension pneumothorax, dissecting aneurysm, and massive pulmonary embolism.
 - a.** Administer 20 mL/**kg** fluid challenge (10 mL/**kg** in neonates) to maintain age appropriate systolic pressure. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 mL/**kg** (30 mL/**kg** in neonates).
 - b.** Tension Pneumothorax — needle decompression.
 - c.** If obstructive shock and not responding to fluid administration administer norepinephrine infusion at 0.1 micrograms/**kg**/min and titrate to effect. If no response in 5 minutes, increase to 0.2 micrograms/**kg**/minute. If still no response after 5 more minutes, may increase to 0.4 micrograms/**kg**/minute.





Notes and Precautions:

- A.** For penetrating trauma or suspected AAA, do not over resuscitate. Goal is MAP 55-65 mmHg (SBP 70-90 mmHg).
- B.** Closely monitor patient's respiratory status and vital signs. Avoid fluid overload.
- C.** For sepsis, neurogenic, and cardiogenic shock, goal is to maintain MAP > 65 mmHg (SBP > 90 mmHg).
- D.** For patients in shock with known or suspected adrenal insufficiency, consider administration of dexamethasone (10 mg adults or 0.6 mg/**kg** pediatrics) in addition to fluids and/or norepinephrine.

Key Considerations:

- A.** Mechanism of injury, medications, recent illness, medical history.

Stroke/CVA

HX	PE	DDX
Time onset (or time last known normal) Current symptoms (weakness, speech, inability to walk, coordination) Trauma or surgery in last 3 months Recent seizure Medications (Coumadin, clopidogrel (Plavix [®]) or Heparin) GI Bleeding Previous stroke / TIA Diabetes Hypertension	LOC Cardiac rhythm Signs of trauma Pupils Neuro exam (see stroke scale)	Hypo/Hyperglycemia Drugs /OD CVA TIA Trauma Seizure (postictal) Hypo/Hyperthermia

Treatment:

- A. Start Oxygen per *Airway Management* protocol.
- B. Monitor vital signs and oxygen saturation.
- C. Check CBG and treat per *Altered Mental Status and Coma* protocol.
- D. Complete **Modified Los Angeles Prehospital Stroke Screen**.
- E. If LAPSS is positive, perform C-STAT evaluation.
- F. If LAPSS and C-STAT is positive, transport to nearest Intervention Stroke Center if it does NOT add more than 20 minutes of transport time. If the difference is greater than 20 minutes, transport to nearest Primary Stroke Center.
- G. If LAPSS is positive and C-STAT is negative, transport to nearest Primary Stroke Center.
- H. Establish IV access (16-18 gauge in proximal site if possible).
- I. Transport patient in supine position with < 15 degree head elevation if tolerated.
- J. Document serial neurologic examinations.

LAPSS - MODIFIED LOS ANGELES PREHOSPITAL STROKE SCREEN			
1. Age over 45 years	Yes	No	Unknown
2. No prior history of seizure disorder	Yes	No	Unknown
3. New onset of neurologic symptoms in last 24 hours	Yes	No	Unknown
4. Patient was ambulatory at baseline (prior to event)	Yes	No	Unknown
5. CBG between 60 & 400	Yes	No	
Neurological examination	Normal	Abnormal	
FACIAL SMILE/GRIMACE (ask patient to smile/show teeth) Normal: both sides of face move equally well Abnormal: one side of face does not move as well as the other	Yes	Right	Left
ARM DRIFT (patient closes eyes and hold both arms out palms up) Normal: both arms move the same or do not move at all Abnormal: One arm does not move or drifts down compared to other	Yes	Right	Left
HAND GRIP (have patient squeeze both hands simultaneously) Normal: equal grip strength Abnormal: unequal grip strength	Yes	Right	Left
If questions 1 – 5 are all answered “Yes” or “Unknown” and at least 1 of the 3 neurological examination findings are abnormal and unilateral, notify the nearest appropriate stroke hospital with an “Acute Stroke.”			

C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL		
	POINTS	DEFINITION
GAZE		Unable to look in certain directions with both eyes.
Absent	0	
Present	2	
ARM WEAKNESS		Cannot hold up arm(s) for 10 seconds.
Absent	0	
Present	1	
LEVEL OF CONSCIOUSNESS		Incorrectly answers at least one of two LOC questions <u>AND</u> does not follow at least one of two commands.
Absent	0	
Present	1	
*** C-STAT positive is defined as a score ≥ 2 ***		

Specific Precautions:

- A. Do not treat hypertension or administer aspirin.
- B. Acute interventions, if indicated, generally must begin within 4.5 hours of symptom onset. All potential stroke patients should go to an appropriate stroke center.

Submerged Patient

HX	PE	DDX
Events leading to submersion: <ul style="list-style-type: none"> • MVA • jumping off bridge • swimming • seizure • diving accident Duration of submersion Estimated water temperature at recovery depth	Mental status Oxygenation Estimated core temperature Skin appearance Lung sounds Neurological exam ECG	Trauma (cervical spine) Hypoxia Hypotension Hypothermia Aspiration pneumonia

Treatment:

- A. Start O₂, follow *Airway Management* procedure.
- B. Take spinal precautions and consider Trauma System entry.
- C. Treat per *Hypothermia* protocol, if indicated.
- D. Consider IV/IO as needed.
- E. Monitor cardiac rhythm and follow *Cardiac Arrest* and/or *Cardiac Dysrhythmia* protocol, *except*:
 Do not resuscitate patients in cardiac arrest if submerged for more than 30 minutes, with the following exceptions:
 Resuscitation may be initiated if the patient is recovered within 60 minutes, if:
 1. Child less than 6 years, and water temperature less than 40° F at recovery depth.
 2. Patient may have been trapped in an underwater air pocket.
 3. Water is less than 40° F at recovery depth and information suggests patient may have been swimming on the surface for at least 15 minutes before becoming submerged.
 4. Paramedic discretion, contact OLMC.

Trauma Patient Evaluation and Treatment

HX	PE	DDX
Mechanism of injury	Vital signs	Interventions
Description of scene	GCS	Control of bleeding
Initial presentation	Identified injuries or abnormalities	Airway
Loss of consciousness		Breathing
Location of identified injuries		Circulation (IV access)
		Immobilization
		Analgesia

Treatment:

Treatment priority should be approached in this order:

- A. Control exsanguinating hemorrhage.
- B. Airway maintenance (including control of the cervical spine). If unable to establish and maintain an adequate airway, the patient should be transported to the nearest acute care facility to obtain definitive airway control.
- C. Breathing.
- D. Control of circulation.
- E. Treatment of shock.
- F. Splinting of fractures.
- G. Neurological examinations.
- H. Detailed patient assessment.

Procedure:

- A. Bleeding Control
 1. Identify hemorrhage:
 - a. Apply direct pressure, or indirect pressure.
 - b. Apply tourniquet if bleeding from an extremity is not controlled by direct pressure, or indirect pressure.
 - c. If bleeding persists or if unable to apply tourniquet apply external clotting agent.
 - d. If hemorrhage in femoral or axillary regions continues in spite of tourniquets/external clotting agents, apply and maintain continuous direct pressure or deploy junctional tourniquets.
- B. Assess and Maintain Airway - Protect Cervical Spine
 1. Support respirations per *Airway Management* procedure.
 2. When feasible, intubate if GCS < 8.
 3. Ventilate patient to maintain EtCO₂ between 35-40 mmHg. If patient exhibits signs of herniation, ventilate to maintain EtCO₂ between 30-35 mmHg.
 4. Maintain oxygen saturation > 90%.

- C. Breathing
 1. Seal open pneumothorax.
 2. Start O₂, follow Airway Management procedure.
 3. Decompress suspected tension pneumothorax(s) in patients with severe respiratory distress or shock.
 4. Perform bilateral chest decompression in patients with witnessed trauma arrest.
- D. Circulatory Control
 1. Initiate two (2) large bore IVs with Lactated Ringer's or Normal Saline during transport. Maintain MAP > 65 mmHg (SBP > 90 mmHg) in patients with head injury. Maintain MAP 55-65 mmHg (SBP 70-90 mmHg) in patients with suspected thoracic, abdominal, or pelvic hemorrhage.
- E. If suspected pelvic fracture with mechanical or hemodynamic instability, apply pelvic splint or pelvic immobilization device.
- F. Perform fracture immobilization per protocol.
 1. For isolated penetrating head, neck, or torso trauma, immobilization of the cervical spine is unnecessary unless there is overt neurologic deficit or an adequate physical examination cannot be performed, e.g., a patient with altered mental status or a patient with distracting injury.
- G. Prevent hypothermia.
- H. If a patient deteriorates to cardiac arrest during transport, perform CPR and notify the trauma facility.