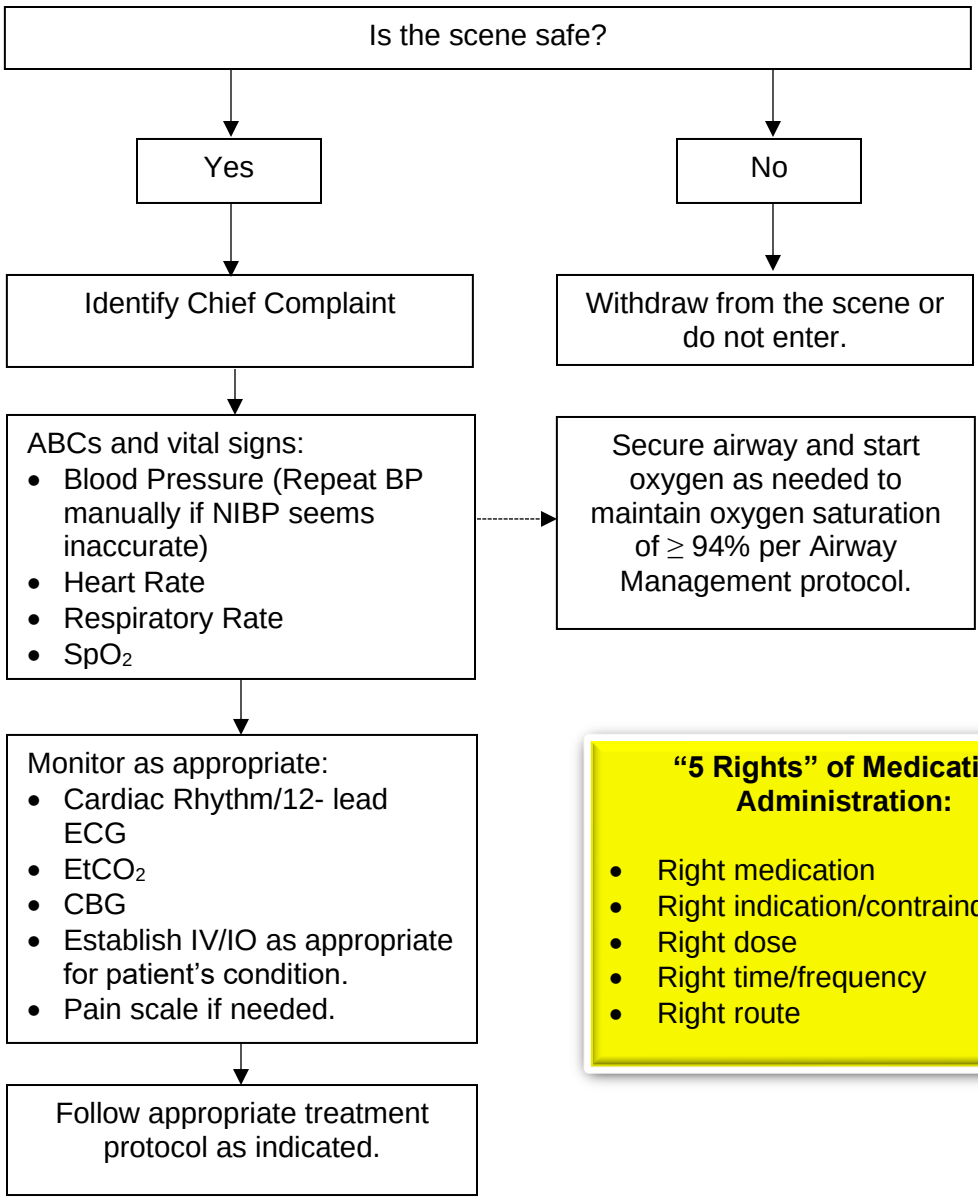
Treatment

Universal Patient Care – 10.005



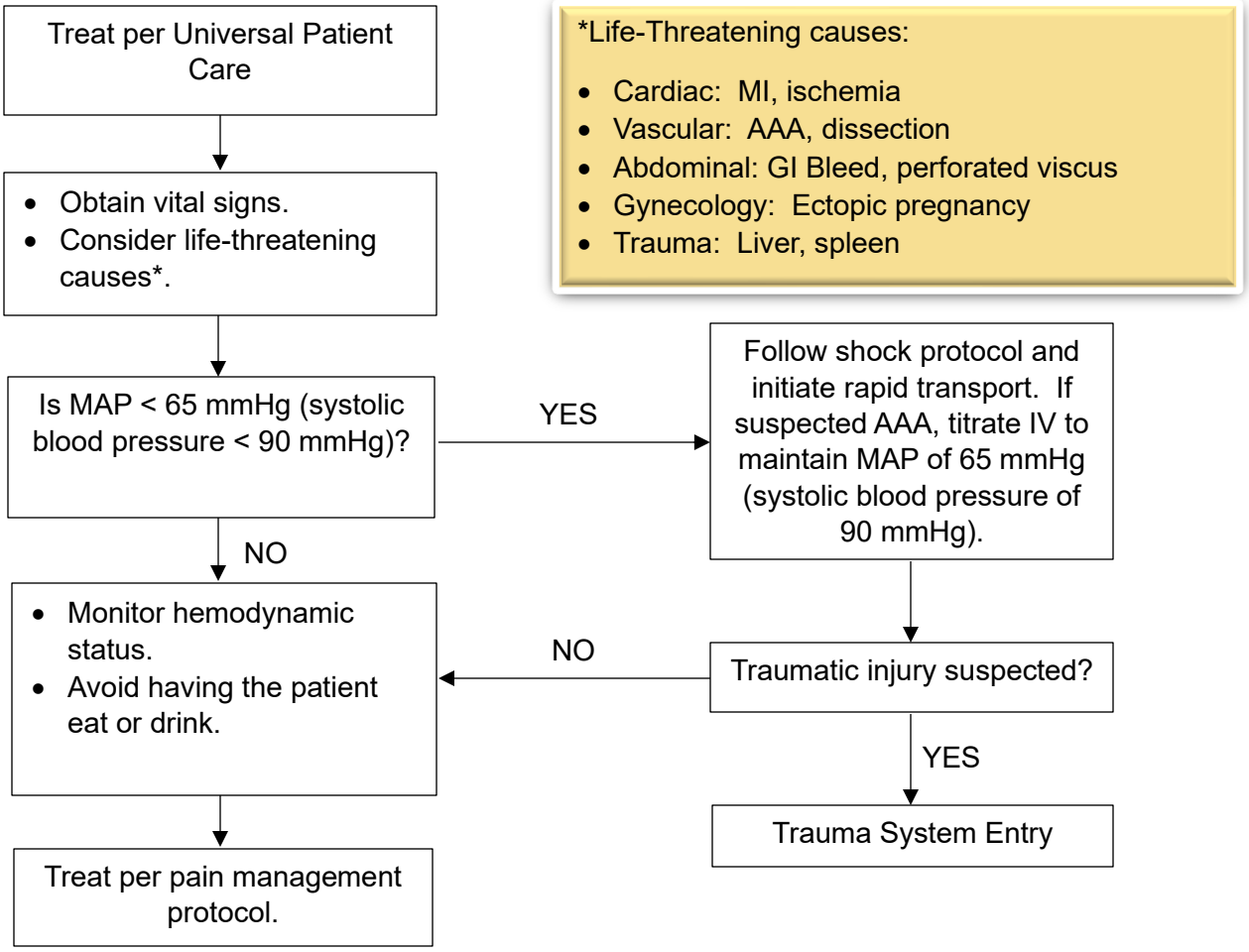
"5 Rights" of Medication Administration:

- Right medication
- Right indication/contraindication
- Right dose
- Right time/frequency
- Right route

NOTES & PRECAUTIONS

- If patient is unable to provide medical history, check for medical bracelets and necklaces, which can provide critical medical information and treatment.
- If any uncertainty exists about the gender of a patient, ask for and use preferred pronouns. In certain conditions such as abdominal pain, you may also need to ask about the menstrual history (e.g., female to male transgender). When obtaining a 12-lead ECG, use the sex assigned at birth for computerized interpretations.

Abdominal Pain – 10.010



NOTES & PRECAUTIONS:

- Abdominal pain may be the first sign of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscus, etc.).
- Monitor the patient closely for signs of shock.
- For transgender and non-binary patients, ask about the presence of intact reproductive organs and consider gynecological (i.e., pregnancy issues) or urological (i.e., testicular torsion) related complications in your differential diagnosis.

PEDIATRIC PATIENTS:

- Consider non-accidental trauma.
- Closely monitor vital signs; blood pressure may drop quickly.
- If systolic BP is inappropriate for age, treat per Shock protocol.

Lowest normal pediatric systolic blood pressure by age:

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

Agitated Patient – 10.015

Treat per Universal Patient Care and determine threat assessment utilizing Broset Violence Assessment Checklist and Richmond Agitation Sedation Scale. **PROVIDER SAFETY IS TOP PRIORITY**

Broset 0-2 (low to moderate risk)

Preventative measures <u>recommended</u> (e.g., verbal de-escalation, appropriate physical restraint). Determine RASS.

Broset 3+ (high risk)

Preventative measures <u>required</u> (e.g., verbal de-escalation, appropriate level of physical restraint). Determine RASS.

Suspected etiology

- Head injury, other trauma
- Hypoxia
- Hypoglycemia
- Substance use
- Mental health

Treat as appropriate.

Use minimal level of physical restraint required to accomplish patient care and ensure safe transportation.

If combativeness is preventing treatment, consult Pharmacological Sedation Flow chart.

For pediatric and geriatric patients, refer to specific pediatric and geriatric section.

<u>Broset:</u> 1 point for each seen or witnessed in past 24 hours:

- Confusion
- Irritability
- Boisterousness
- Verbal threats
- Physical threats
- Attacks on objects

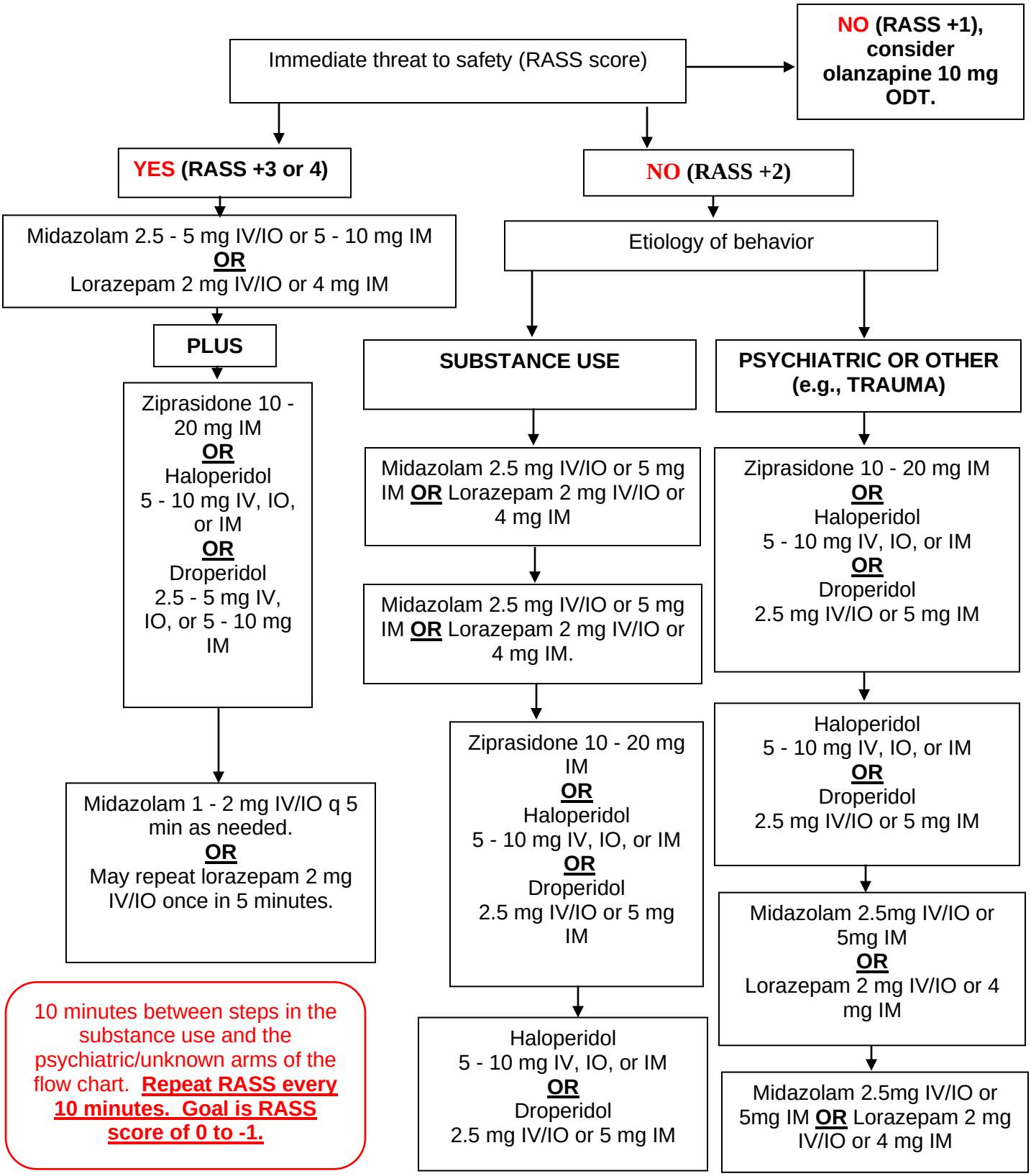
- Physical restraints should not be placed in such a way to preclude evaluation and treatment.
- Place patient supine, **NEVER PRONE.**
- Secure all extremities, typically legs first.
- Evaluate respiratory and cardiac status continually.
- **DO NOT** tighten chest straps.

- Continue to monitor cardiac rhythm, QTc interval and SpO_2.
- Continue to evaluate perfusion in extremities with restraints.

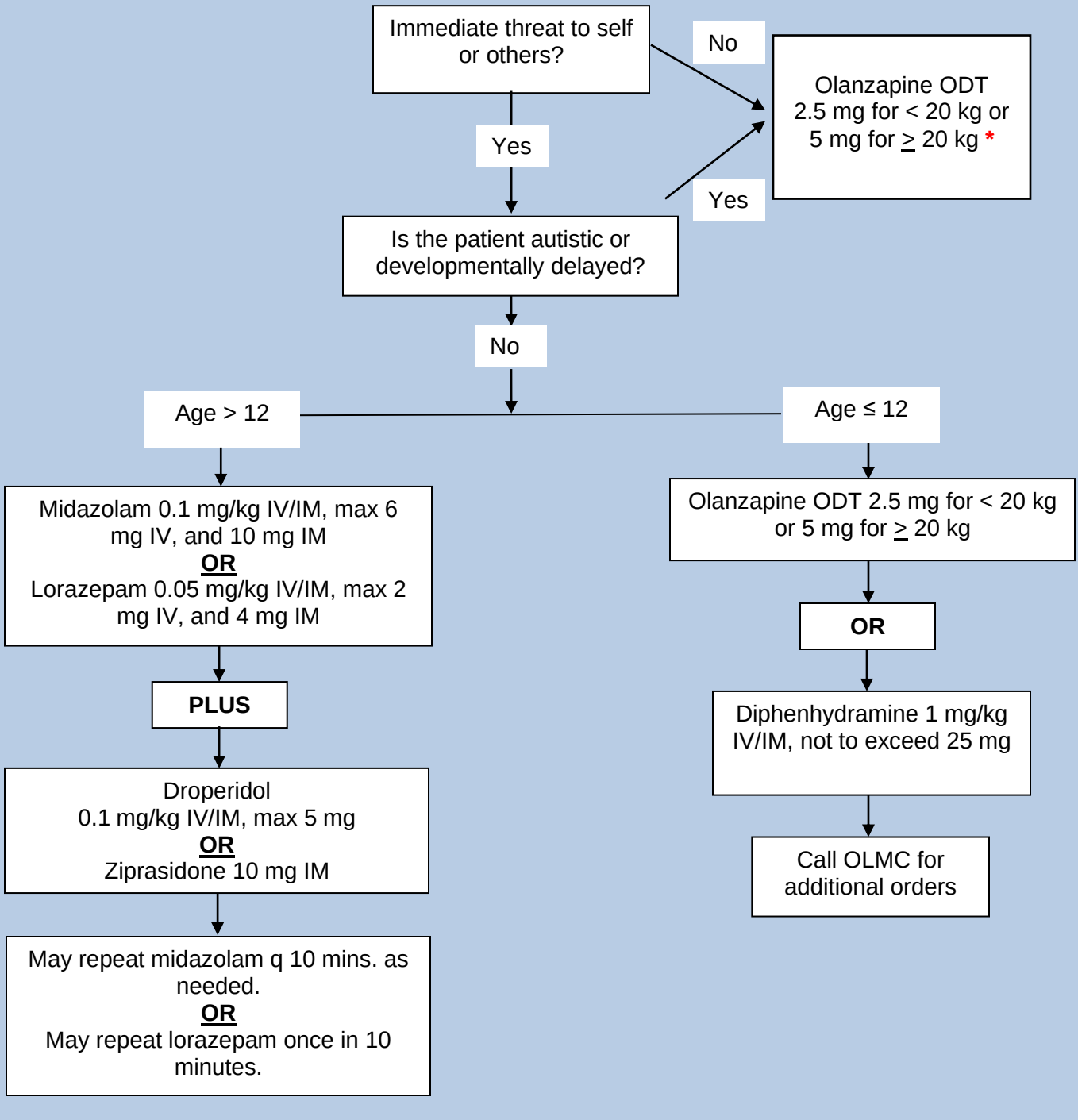
<u>Richmond Agitation Sedation Scale (RASS)</u>

Score	Term	Description
+4	Combative	Overtly combative and violent; immediate danger to EMS
+3	Very agitated	Aggressive; verbally and physically uncooperative towards EMS
+2	Agitated	Frequent non-purposeful movement; agitated when touched or moved
+1	Restless	Anxious but movements not aggressive or dangerous to EMS or self
0	Alert and calm	
-1	Drowsy	Not fully alert, but has sustained awakening (eye opening/eye contact) to voice (≥ 10 seconds)
-2	Light Sedation	Briefly awakens with eye contact to voice (< 10 seconds)
-3	Moderate sedation	Movement or eye opening to voice (but no eye contact)
-4	Deep sedation	No response to voice but movement or eye opening to physical stimulation
-5	Unarousable	No response to voice or physical stimulation

Adult Pharmacological Sedation Flow Chart



Pediatric Pharmacological Sedation Flow Chart



*For children with a history of autism or developmental delays, chances of paradoxical reactions to benzodiazepines and diphenhydramine are higher, however, if the patient is still agitated following olanzapine administration, diphenhydramine 1 mg/kg IV/IM not to exceed 25 mg may be used with this in mind.

Agitated Patient – 10.015

PEDIATRIC PATIENTS:

- Haloperidol should be avoided in children.
- Non-pharmacological considerations:
  - ✓ Clearly introduce yourself, assure patient that you are there to keep them safe.
  - ✓ Allow caregivers to take part (or remove them if they are inciting).
  - ✓ Set firm limits.
  - ✓ Minimize excessive interactions.
  - ✓ Offer choices in treatment.
  - ✓ Offer reward for calmer behavior.
  - ✓ Use distraction.

GERIATRIC PATIENTS (AGE > 65):

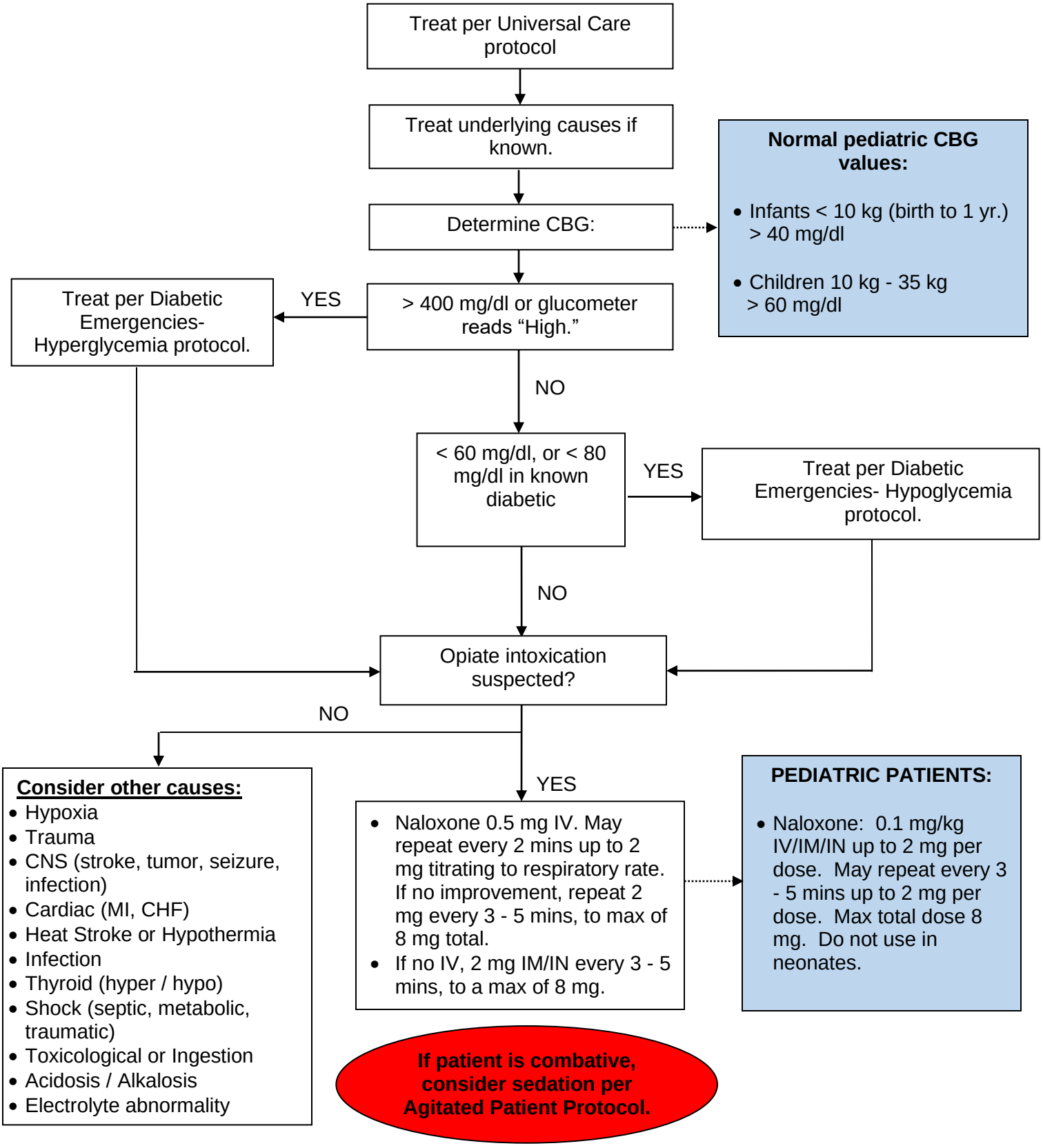
There is an increased risk of using anti-psychotic drugs for patients > 65 years of age, so drug dosing should be adjusted accordingly:

- Droperidol: 2.5 mg IV, IO. May repeat in 5 - 10 minutes. 2.5 – 5 mg IM. May repeat in 10 - 15 minutes.
- Haloperidol: 2 mg IV, IO. May repeat in 15 minutes. 2.5 mg IM. May repeat in 15 - 20 minutes.
- Olanzapine: 2.5 – 5 mg ODT.
- Ziprasidone: 10 mg IM.

NOTES & PRECAUTIONS:

- All patients who receive IV, IO, or IM pharmacological sedation must be fully monitored, when possible, with cardiac monitor, SpO_2, and $EtCO_2$.
- Side effects of droperidol, haloperidol, and ziprasidone may include hypotension, tachycardia, and acute dystonic reactions. If patient shows signs of acute dystonic reaction after receiving ziprasidone, droperidol, or haloperidol, give diphenhydramine 1 mg/kg IV or IM to a maximum of 50 mg.
- Droperidol, haloperidol, and ziprasidone may induce Torsades de Pointes in patients with history of prolonged QTc or patients taking QTc-prolonging drugs. Monitor patient's ECG, if possible. If prolonged QTc is present (> 500 msec.), administer 2 grams magnesium sulfate IV/IO.
- Droperidol, haloperidol, or ziprasidone are preferred for patients with known psychiatric disorders. Midazolam or lorazepam are preferred for patients who are known or suspected to be under the influence of stimulants or other intoxicants, who are in withdrawal, or who are postictal.
- If patient has Parkinson's Disease or takes dopamine agonist medications such as carbidopa-levodopa (Sinemet), pramipexole (Mirapex), or ropinirole (Requip), **do not use** droperidol or haloperidol. In these patients, use olanzapine first (2.5 - 5.0 mg ODT), then midazolam (5 mg IM or 2.5 mg IV/IO) or lorazepam (2 mg IV/IO or 4 mg IM) if needed.

Altered Mental Status & Coma – 10.020



Anaphylaxis and Allergic Reaction – 10.030

*Preferred location for IM administration is the mid-anterolateral aspect of thigh.

Treat per Universal Patient Care

Remove exposure to trigger if known (e.g. stinger, medication).

**Common side effects of epinephrine include anxiety, tremors, palpitations, tachycardia, and headache.

MILD (e.g., skin signs only)

Diphenhydramine 1 mg/kg IV/IM to a maximum of 50 mg.*

Consider dexamethasone 10 mg IV/IM/PO.

If patient's symptoms worsen, treat per appropriate algorithm branch.

MODERATE (e.g., advancing hives, respiratory distress)

- Epinephrine 1:1,000 0.3 - 0.5 mg IM. May repeat once in 5 - 15 minutes if needed. **
- Albuterol 2.5 mg via nebulizer.

Consider:

- Diphenhydramine 1 mg/kg IV/IM to a maximum of 50 mg.
- Dexamethasone 10 mg IV/IM/PO.

SEVERE (e.g., cardiovascular collapse, profound shock)

- Epinephrine 1:1,000 0.3 - 0.5 mg IM. Repeat once in 5 - 15 minutes if patient is still in extremis.
  Or, if IV established,
- Epinephrine 1:10,000, 0.1 mg boluses IV/IO every 5 minutes titrated to effect. Max dose 0.5 mg.
  OR
  Epinephrine infusion IV at 2 mcg/min (2 mcg/ml) titrated to effect.
- Treat with fluid challenge 500 – 1,000 ml. Repeat once if needed.

If time permits, consider:

- Albuterol 2.5 mg via nebulizer.
- Diphenhydramine 1 mg/kg IV/IM to a maximum of 50 mg.
- Dexamethasone 10 mg IV/IO/IM.

Consider OLMC contact.

PEDIATRIC PATIENTS (Treat with the following drug doses):

- **Albuterol:** 2.5 mg via nebulizer
- **Diphenhydramine:** 1 mg/kg IV/IM, max 50 mg
- **Dexamethasone:** 0.6 mg/kg IV/IO/IM/PO, max 10 mg
- **Epinephrine 1:1000:** 0.01 mg/kg IM to a max 0.5 mg. May repeat once in 5 - 15 minutes if needed.
- **Epinephrine 1:10,000:** 0.01 mg/kg IV/IO to max 0.1 mg, every 3 - 5 mins titrated to effect, max total dose 0.5 mg.
- **Epinephrine infusion:** 0.01 mcg/kg/min (2 mcg/ml) titrated to effect.
- **IV fluid Challenge**: 20 ml/kg. Repeat once if needed.

Lowest normal pediatric systolic BP by age:

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

If epinephrine is ineffective in treating anaphylaxis in patients with beta-blockade, 1 mg IV/IM glucagon and isotonic volume expansion (up to several liters of crystalloid) may be necessary.

Brief Resolved Unexplained Event (BRUE) – 10.035

DEFINITION:

Event lasting <1 minute in an infant <1 year of age associated with at least one of the following:

- Cyanosis or pallor
- Absent, decreased, or irregular breathing
- Marked change in muscle tone (hypertonia or hypotonia)
- Altered level of responsiveness

Patient must appear well and be at baseline health.

Follow appropriate airway and/or respiratory protocols.

Obtain and document any complications of pregnancy, birth date and gestational age at birth, fever or recent infection, prior BRUE episodes, and underlying medical conditions.

Obtain and document description of event including symptoms, inciting event, and any resuscitation attempts before EMS arrival.

Obtain vital signs, CBG, and place on cardiac monitor and follow dysrhythmia protocol as needed.

Transport to an emergency department **even** if the infant currently appears in no distress.

Contact OLMC if parents or caregivers cannot be convinced to take the ambulance to the ED for evaluation.

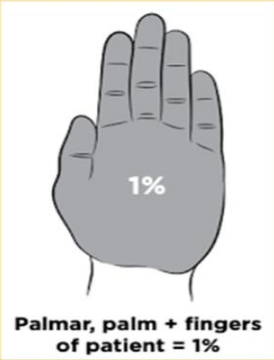
NOTES & PRECAUTIONS:

- BRUE is a group of symptoms, not a specific disease. BRUEs are most common in infants under one year of age but may occur up to two years of age.
- Many infants appear normal by the time EMS arrives.
- Consider non-accidental trauma.
- Serious underlying causes of BRUE can include pneumonia, bronchiolitis, seizures, sepsis, intracranial hemorrhage, and meningitis.
- BRUEs are more frequent in premature infants and infants with other health conditions such as cystic fibrosis, bronchiolitis, and congenital heart disease.

Burns – 10.040

Total Burn Surface Area (TBSA) only includes second and third degree burns and not superficial burns.

Determine TBSA utilizing the "Palm Method":



In patients with moderate to severe flame burns and with suspicion for inhalation injury, **carboxyhemoglobin levels should be checked***, and patients should be placed on high flow oxygen until carbon monoxide poisoning is ruled out.

Burn Center Transport Criteria:

- Partial thickness > 10% TBSA
- Full Thickness
- Burns with significant inhalation injuries
- Chemical burns
- Electrical or lightning strike injuries
- Burns to face, hands, feet, genitalia, perineum, major joints, or circumferential burns
- Burns to high-risk patients (peds, elderly, significant underlying cardiac or respiratory problems)
- Trauma system patients with burns meeting above criteria

Treat per Universal Patient Care

Remove jewelry or other constricting items and clothing that is smoldering or non-adherent to the patient. **Determine TBSA%**

- If MAP < 65 mmHg (systolic BP < 90 mmHg), follow Shock protocol, otherwise follow initial fluid administration rate:
  - ✓ ≤ 5 y/o @ 125 ml/hr
  - ✓ 6 -13 years of age @ 250 ml/hr
  - ✓ ≥ 14 y/o @ 500 ml/hr

Cool burned areas < 5 mins. Cover with clean, warm, and dry sheet or blanket, discontinue if shivering. Leave unbroken blisters intact.

Wound Care:

- Transport using clean, dry sheets or blankets.
- Do not wrap extremities individually.
- Do not use products such as Silvadene or burn gel.
- Do not pack burns with wet towels or do saline soaks.

Maintain patient's core body temperature.

Treat pain per Pain Management protocol

Chemical Burns:

- Consider HazMat Response.
- Protect yourself from contamination.
- Flush contaminated areas with copious amounts of water (carefully brush off first if chemical is dry).
- Do not use a neutralizer.

Electrical Burns:

- Apply Sterile dressings to entry and exit wounds.
- Treat any dysrhythmias.
- Early fluid infusion is important due to risk of rhabdomyolysis.
- Specify arc flash or contact and voltage if known.

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

- Hydroxocobalamin 5 g IV/IO over 15 mins. Repeat once if needed. For cardiac arrest, administer as a rapid bolus. (**Peds**: 70 mg/kg not to exceed adult dose. Call OLMC for second dose)
- If hydroxocobalamin not available, Sodium Thiosulfate 50 ml of a 25% solution over 10 – 20 minutes. Do not administer Sodium Thiosulfate and Hydroxocobalamin together.
- Initiate emergent transport and treat other presenting symptoms.
- Notify receiving facility if either Hydroxocobalamin or Sodium Thiosulfate is administered due to changes in urine and blood color.

AIRWAY CONSIDERATIONS:

- Singed nasal hairs and facial burns alone are not indications for intubation.
- Mild inhalation injuries with normal SpO_2 and no signs of respiratory distress can be safely observed.
- Indications for early intubation:
  - ✓ Respiratory distress, stridor, accessor muscle use
  - ✓ New onset hoarseness
  - ✓ Blisters or edema of oropharynx
  - ✓ Deep burns to lower face or neck

PEDIATRICS:

- Consider non-accidental causes of trauma in children.
- If systolic BP is inappropriate for age, treat per Shock protocol.

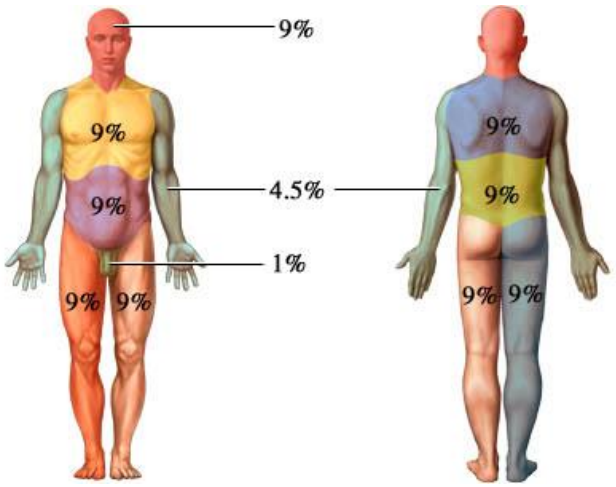
Lowest normal pediatric systolic blood pressure by age:

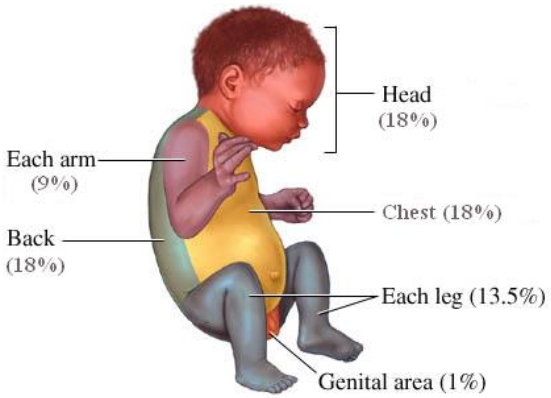
- Less than one month: > 60 mmHg.
- One month to 1 year: > 70 mmHg.
- Greater than 1 year: 70 + 2 x age in years.

NOTES & PRECAUTIONS:

- *Apply carbon monoxide monitor (e.g., Rad-57) if available.
- Remove rings or other constricting items immediately.
- Be prepared to use RSI/DSI early to control the airway.
- For firefighters, consider potential for traumatic injury or MI.

RULE OF NINES





Cardiac Arrest (AED/CPR) – 10.050

CPR GUIDELINES			
Component	Adults and Adolescents	Child 1 year to puberty	Infant under 1 year, excluding neonates
Airway	Head tilt-chin lift. Jaw thrust if suspected cervical trauma.		
Breathing: Without CPR	10 to 12 breaths/min (approximate)	1 breath every 2 - 3 seconds (20 -30 breaths/min) (approximate)	
Breathing: CPR with advanced airway	1 breath every 6 secs. (10 breaths/min) asynchronous with compressions. About 1 second per breath. Visible chest rise. Optional method 30:2 comp./vent. ratio with advanced airway until ROSC.	1 breath every 2 - 3 seconds (approximately 20 - 30 breaths/min) asynchronous with compressions. About 1 second per breath. Visible chest rise. Optional method, 15:2 compression/ventilation ratio with advanced airway until ROSC.	
Foreign Body – Conscious patient	Abdominal thrusts (*use chest thrusts in pregnant and obese patients or if abdominal thrusts are not effective*)		Back blows and chest thrusts
Compression landmarks	Lower half of sternum between nipples		Just below nipple line (lower half of sternum)
Hand Placement	Heel of one hand, other hand on top	As for adults (may use both hands or the heel of one hand depending on the size of patient and rescuer)	2 thumb-encircling hands preferred for two rescuers
Compression depth	At least 2 inches	Approximately one-third anterior/posterior depth of chest. (Approximately 2” in child and 1 ½” in infant)	
Compression rate	100 - 120 per minute		
Compression/Ventilation ratio w/o advanced airway	30:2 **or** 10:1 with continuous compressions	15:2	
AED GUIDELINES			
AED Defibrillation	Use Adult pads	Use pediatric dose-attenuator system for children and infants if available. Use pediatric pads. If unavailable, use adult pads	
NEONATAL GUIDELINES (LESS THAN 1 DAY OLD)			
Assisted ventilations should be delivered at a rate of 40 - 60 breaths/minute to achieve or maintain a heart rate > 100 bpm. The ratio of compressions to ventilations should 3:1, with 90 compressions and 30 breaths to achieve approximately 120 events per minute.			

Cardiac Arrest- Guidelines – 10.050

COMPRESSIONS AND VENTILATIONS

- Use a pit crew approach to assign responders to positions.
- Initiate and maintain high quality chest compressions with limited interruptions (< 10 secs).
- CPR should be provided at a rate of 30:2 or continuous compressions with interposed ventilations every 6 seconds throughout resuscitation until ROSC is achieved or termination of resuscitation.
- There should be no interruptions to CPR when securing an airway. Consider early use of a supraglottic airway to minimize CPR interruptions or when ALS resources are limited.
- If mechanical CPR device is available, avoid extra or prolonged pauses in CPR when applying.

VASCULAR ACCESS

- Preferred order of vascular access in adults is:
  1. Upper extremity IV (or external jugular)
  2. Upper extremity IO
  3. Lower extremity IO
- Preferred access site for pediatrics is the proximal tibia or the distal femur. Humeral IO **not** recommended for infants and toddlers.
- Medications should be administered IV if multiple means of vascular access are established.

ROSC

If patient has return of spontaneous circulation, reassess vital signs to ensure stability before packaging for transport. Follow Cardiac Arrest Post-Resuscitation protocol to include targeted temperature management, obtaining a 12-lead ECG (ideally > 8 mins post ROSC), and managing blood pressure.

TRANSPORT

- In general, continue resuscitation for a minimum of 30 minutes.
- If persistent/refractory VF/pVT, consider early transport, especially if mechanical CPR is available.

EPINEPHRINE ADMINISTRATION

- For patients in a non-shockable rhythm, epinephrine should be administered as soon as feasible, ideally within 5 minutes of EMS arrival to patient side.
- For shockable rhythms, administer epinephrine as soon as feasible after the second defibrillation attempt has failed.

CPR INDUCED CONSCIOUSNESS

- With high quality CPR and the addition of mechanical CPR devices, a growing number of patients have been reported to experience “CPR Induced Consciousness”. Assess for signs of consciousness by checking for spontaneous eye opening, purposeful movement, or verbal response including moaning.
- If signs of CPR Induced Consciousness are present, treat as follows (repeat vital signs between medications):
  1. 50 mcg of fentanyl IV/IO, then
  2. 2.5 mg of midazolam IV/IO OR 1 mg lorazepam IV/IO
  3. May repeat as needed every 5 - 10 minutes. Max total dose for lorazepam is 4 mg.

TERMINATION OF RESUSCITATION

- For patients in whom the asystole protocol has been used throughout the resuscitation, refer to Death and Dying protocol for guidelines regarding termination of resuscitation prior to 30 minutes without OLMC contact.
- Survival from PEA is based on identifying and correcting the responsible factors; consider a broad differential diagnosis, with early and aggressive treatment of possible reversible causes.
- Death in the field for PEA may be determined with $EtCO_2 \leq 10$ after 30 minutes of attempted ACLS resuscitation. For patients with $EtCO_2 > 10$ continue resuscitation and contact OLMC to stop resuscitation.

Cardiac Arrest- Pulseless Arrest – 10.050

Start or continue CPR until monitor and defibrillator pads are attached. Initial pad placement should be A/P if feasible.

→ Analyze heart rhythm.

→ Shockable Rhythm?

Yes

- VF/pVT*
- Shock then CPR X 2 mins.
- Establish vascular access
- Shock then CPR X 2 mins.
- Epinephrine 1 mg IV/IO
- Shock then CPR X 2 mins.
- Amiodarone 300 mg IV/IO **or** Lidocaine 1.5 mg/kg IV/IO
- Shock then CPR X 2 mins. *
- Epinephrine 1 mg IV/IO
- Shock then CPR X 2 mins. *
- Repeat same antidysrhythmic: Amiodarone 150 mg **or** Lidocaine 1.5 mg/kg.
- Shock then CPR X 2 mins. *
- Epinephrine 1 mg IV/IO **(Repeat every 3-5 mins)**
- Shock then CPR X 2 mins. *
- Esmolol 0.5 mg/kg IV/IO. Repeat once in 5 mins.

No

- Asystole/PEA*
- Continue CPR, Start IV/IO
- Epinephrine 1 mg IV/IO **(Repeat every 3-5 mins)**
- Recheck rhythm every 2 mins.
- For PEA, administer up to 2000 ml of a crystalloid solution. **Consider reversable causes for PEA and asystole.**

***If heart rhythm changes, move to appropriate arm of the algorithm.**

Reversable Causes (H's & T's)

- Hypoxia
- Hypo/Hyperkalemia
- Hypo/Hyperthermia
- Hypovolemia
- Tension Pneumothorax
- Tamponade
- Thrombosis
- Toxins

Defibrillations

Analyze every 2 mins and shock if appropriate. * Following third unsuccessful shock, deliver double sequential external defibrillation (DSED) shocks. If second monitor unavailable, change pad vector.

Joule settings:

LP15: 360J
Zoll: 200J

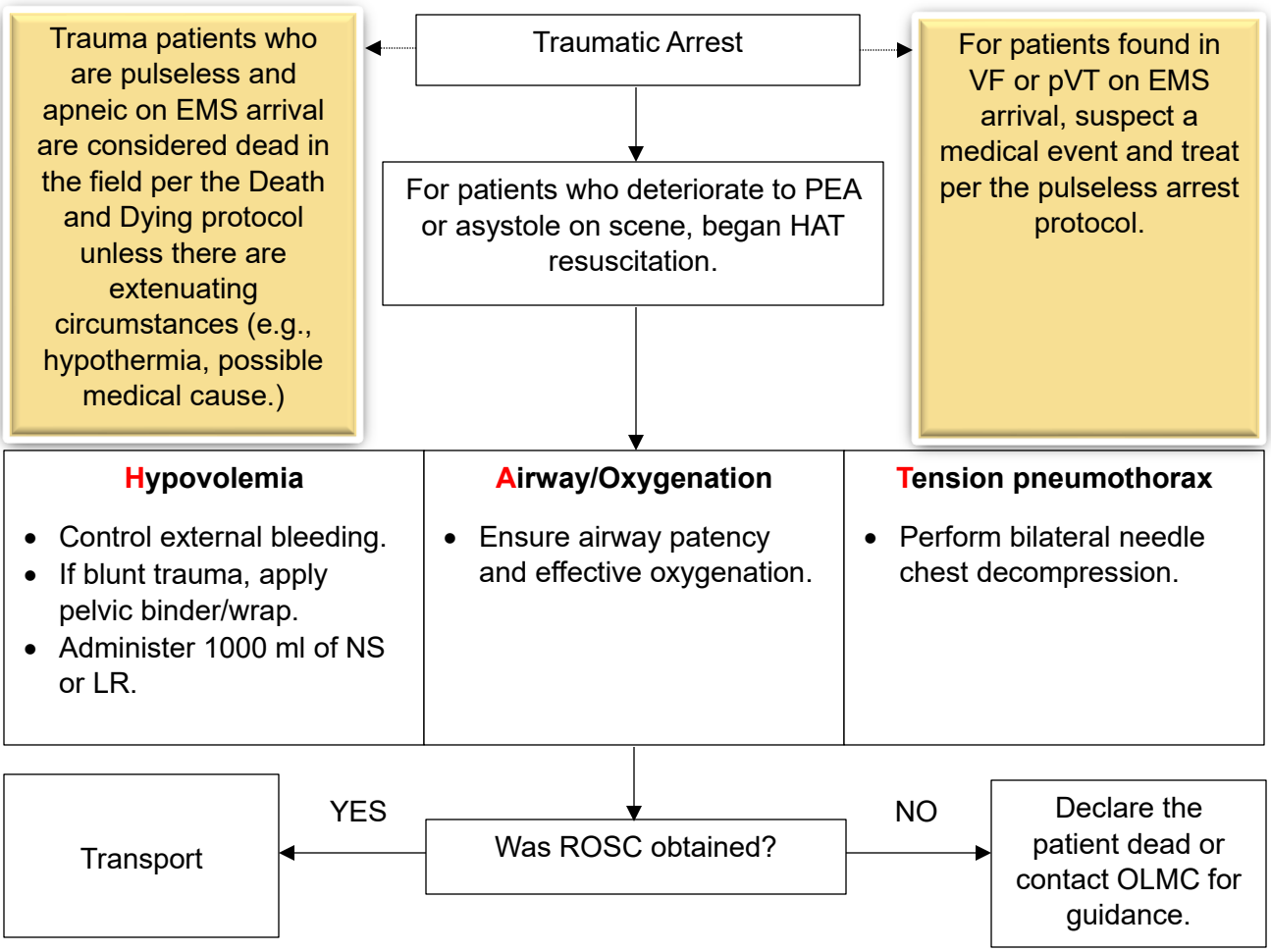
Pediatrics

- Follow adult algorithm with the following drug dosages:
- ✓ Epinephrine 1:10,000 - 0.01 mg/kg IV/IO. Repeat every 3 - 5 minutes.
- ✓ Amiodarone- 5 mg/kg IV/IO. Repeat once with 2.5 mg/kg IV/IO
- ✓ Lidocaine- Follow adult dose.
- ✓ Fluid bolus- 10 - 20 ml/kg
- Defibrillation at 4 j/kg. DSED not indicated for children < 18 but perform vector change after 3rd unsuccessful shock.

Calcium Gluconate and Sodium Bicarbonate

- If cause of arrest is suspected to be hyperkalemia, consider calcium gluconate 3 grams IV/IO push.
- Sodium Bicarbonate is not recommended for the routine cardiac arrest, but early use should be considered with suspected sodium channel blocker OD, suspected hyperkalemia, or pre-existing acidosis. Dose is 1 mEq/kg IV/IO. May repeat 0.5 mEq/kg every 10 mins.

Cardiac Arrest (Trauma) – 10.050



For patients who arrest during transport:

- Initiate HAT resuscitation.
- If within 15 minutes of a trauma center, continue to the trauma center.
- If farther than 15 minutes to the trauma center, consider pulling over for crew safety and personnel resource reasons. If ROSC is not achieved, you may declare the patient dead or contact OLMC for guidance.

NOTES & PRECAUTIONS:

- If the mechanism of injury appears inconsistent with the patient's condition and not severe enough to induce traumatic arrest, consider a primary medical cause for the patient's cardiac arrest.
- If there is concern for a medical cause of the arrest, transport to the nearest cath lab capable facility if ROSC is achieved. If the patient is still in presumed medical cardiac arrest, then transport to the closest facility.
- Perform chest compressions in traumatic arrest, but DO NOT allow compressions to interfere with addressing the reversible causes of a traumatic arrest in the HAT resuscitation.
- Post-ROSC cooling in the traumatic arrest patient should be deferred to the hospital.

Cardiac Arrest with Pregnancy (> 22 weeks) – 10.050

Manage rhythm per Pulseless Arrest Protocol.

CPR with continuous manual left lateral uterine displacement using the two-handed method.

Ensure BVM ventilations are with high flow oxygen utilizing a two-handed technique to prevent gastric inflation. Suction should be readily available.

Early transport is preferable regardless of ROSC status. The gravid uterus must remain displaced during transport. Continue the two-handed technique for uterine displacement (except in the presence of mechanical CPR when the patient can be attached to a board and the board is lifted 30 degrees in left lateral decubitus position). If patient is in cardiac arrest, notify and transport to the closest facility.

IV/IO access should be above the diaphragm (humeral IO or external jugular access is preferred).

Intubation should be managed with an endotracheal tube if possible and be performed by the most experienced provider using VL if available. Consider using an endotracheal tube 1 - 2 sizes smaller than you would normally use.

NOTES & PRECAUTIONS:

- Consider early transport prior to achieving ROSC, especially if a mechanical CPR device is available.
- Alert the receiving facility early to have an OB team present upon arrival in the emergency department. If you have not achieved ROSC, go to the closest facility regardless of OB capabilities.
- If ROSC has been achieved and maintained prior to, or during transport, bypass to an OB and NICU capable facility.
- Lidocaine is preferable (Class B in Pregnancy) to amiodarone (Class C in Pregnancy) in the setting of ventricular fibrillation or pulseless ventricular tachycardia.
- In the setting of ventricular fibrillation or pulseless ventricular tachycardia, no adjustments need to be made to defibrillation energy settings. Immediately following defibrillation, resume the left lateral uterine displacement.
- If mechanical CPR is in place, continue the left lateral uterine displacement by tilting the backboard 30° to the left or by continuing manual displacement.
- If ROSC is achieved, continue left lateral uterine displacement by placing the patient in the left lateral decubitus position or by manually displacing the gravid uterus.
- High flow oxygen needs to be maintained in all peri-arrest patients.
- Consider OG placement when possible.

Cardiac Arrest Post Resuscitation – 10.050

Post Resuscitation Care:

- Following ROSC, several simultaneous and stepwise interventions must be performed to optimize care and maximize patient outcome.
- Survival and neurologic outcome worsen with fever, hypoxia, hypo/hypercapnia, and hypotension. Post-ROSC care should focus on prevention of these elements.
- Observe briefly to ensure stability before packaging for transport. Place LUCAS backplate prior to transport.

Optimize ventilation and oxygenation.

- Intubate as needed.
- Titrate oxygen to achieve an SpO_2 ≥ 94%.
- Monitor $EtCO_2$ (normal is 35 - 40 mmHg). **Do not hyperventilate** (ideal rate is 10 - 12 breaths/minute).

If hypotensive (MAP < 65 mmHg or systolic BP < 90 mmHg) follow Shock protocol. Goal is to maintain a mean arterial pressure (MAP) > 65 mmHg.

Hyperventilation reduces venous return and may cause hypotension. Additional causes of post-resuscitation hypotension include hypovolemia and pneumothorax, especially in the presence of positive pressure ventilation.

Perform 12-lead ECG (ideally no earlier than 8 minutes after ROSC). Use sex assigned at birth for 12-lead ECG computerized interpretation.

If patient meets criteria, consider cooling per Induced Hypothermia protocol for patients ≥ 13 years old.

Was the patient defibrillated during treatment?

NO

YES

Transport

All patients with ROSC should be transported to a hospital with emergent interventional capability.

If needed, provide analgesia with fentanyl and sedation with either midazolam or lorazepam.

If arrest reoccurs, treat per appropriate protocol.

If amiodarone was last:

Re-dose with amiodarone 30 minutes after ROSC with 150 mg over 10 minutes. Max total arrest/post-ROSC dose 450 mg.

If lidocaine was last:

Administer lidocaine 0.75 mg/kg every 10 minutes. Max total arrest/post-ROSC dose 3 mg/kg.

If no antidysrhythmic given, administer lidocaine 1.5 mg/kg. Re-bolus with 0.75 mg/kg every 10 minutes. Max total dose 3.0 mg/kg.

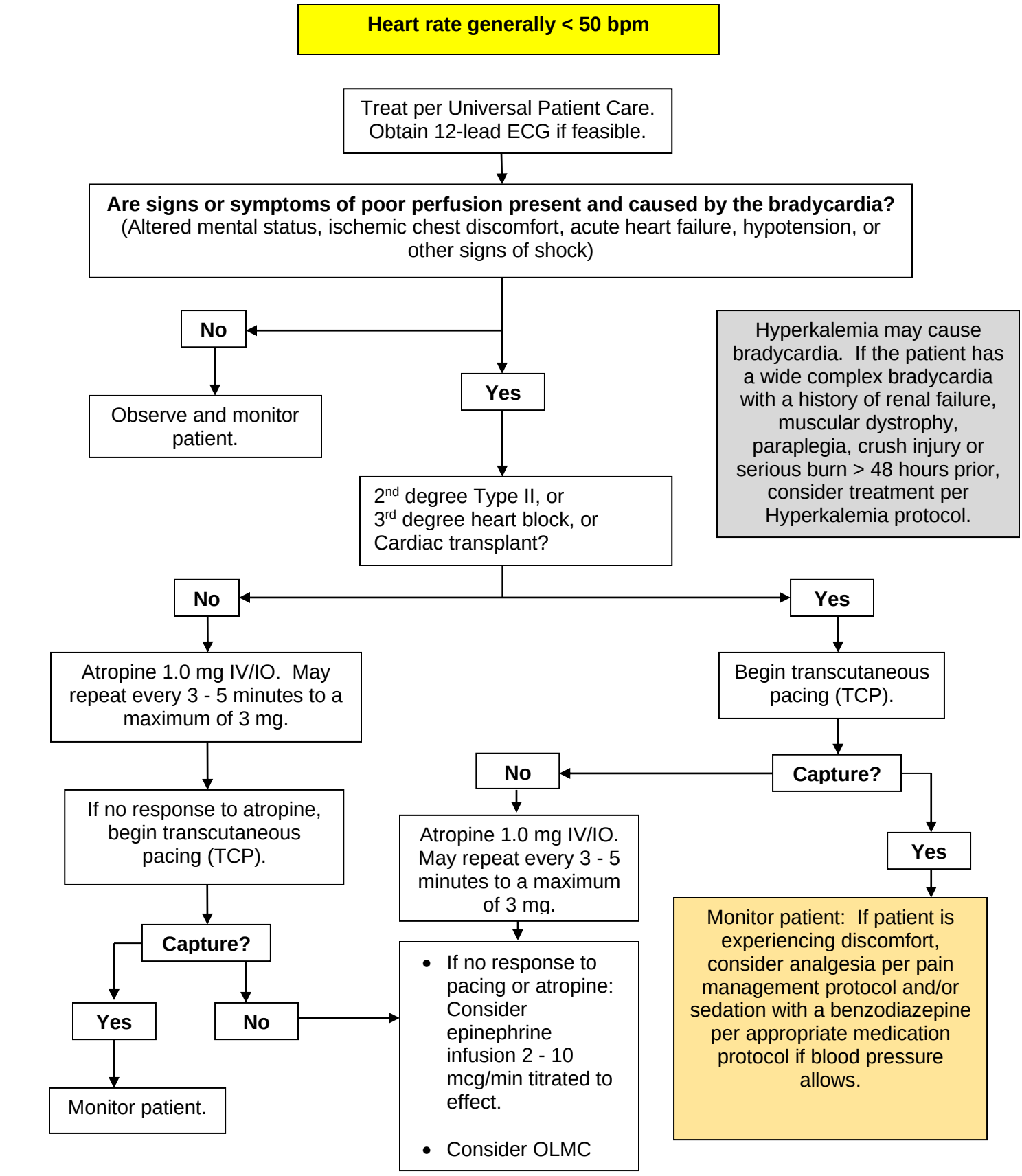
OR

Administer amiodarone 150 mg over 10 minutes.

Do not use amiodarone or lidocaine in perfusing patients without OLMC approval in the following situations:

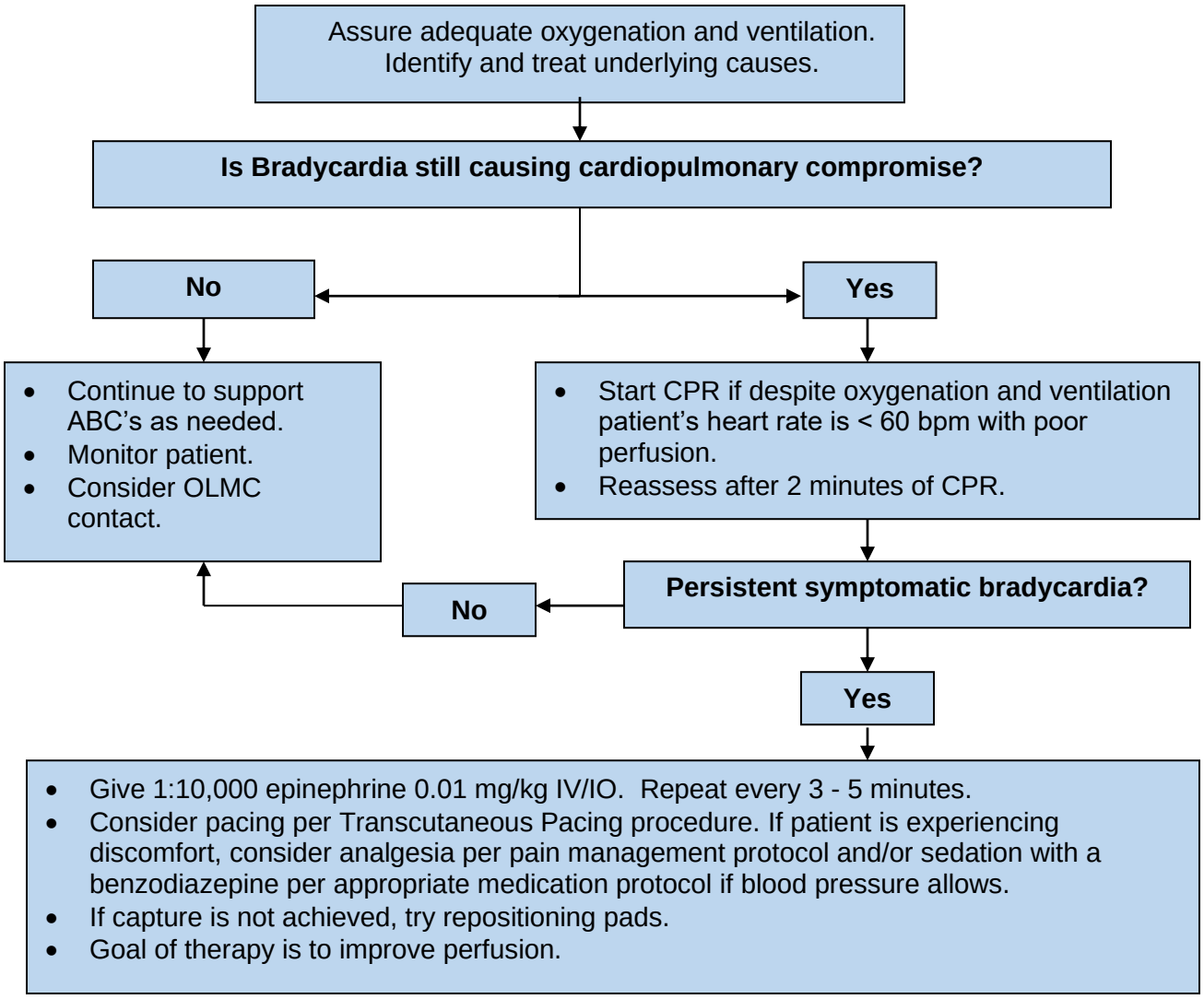
- ✓ Systolic BP is less than 90 mmHg.
- ✓ Heart rate is less than 50 beats per minute.
- ✓ Periods of sinus arrest are present.
- ✓ Second or third-degree heart block are present.

Cardiac Dysrhythmias (Bradycardia) – 10.060



PEDIATRIC PATIENTS:

BRADYCARDIA WITH A PULSE AND POOR PERFUSION



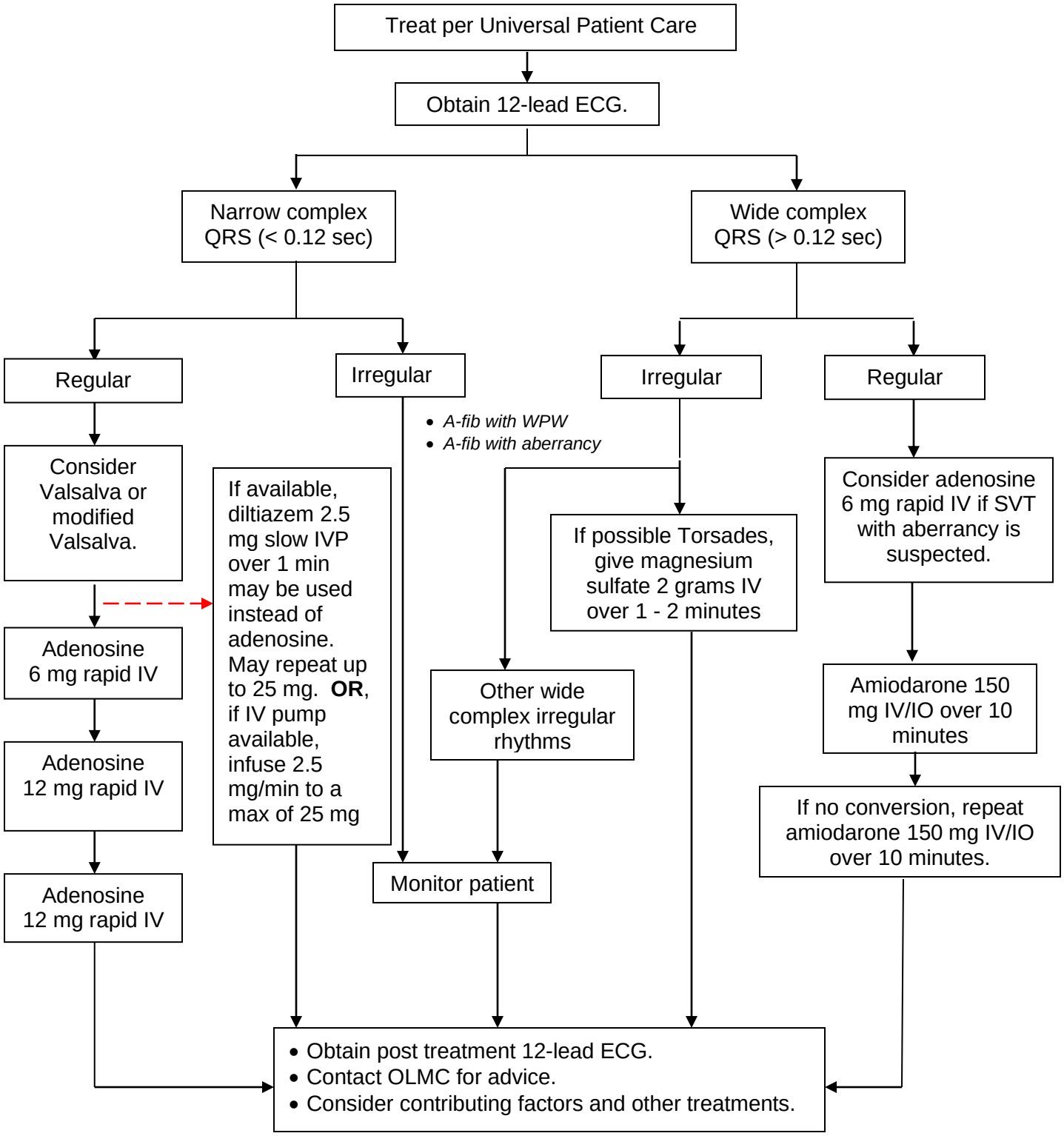
Cardiac Dysrhythmias (Bradycardia) – 10.060

NOTES & PRECAUTIONS:

- Hypoxia is a common cause of bradycardia.
- 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.
- Immediate TCP can be considered in unstable patients when vascular access is not available.
- TCP is at best a temporizing measure and is not useful in asystole.
- If TCP capture is not achieved, try repositioning pads.
- Atropine will likely be ineffective in heart transplant recipients because they lack vagal innervation.
- 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.

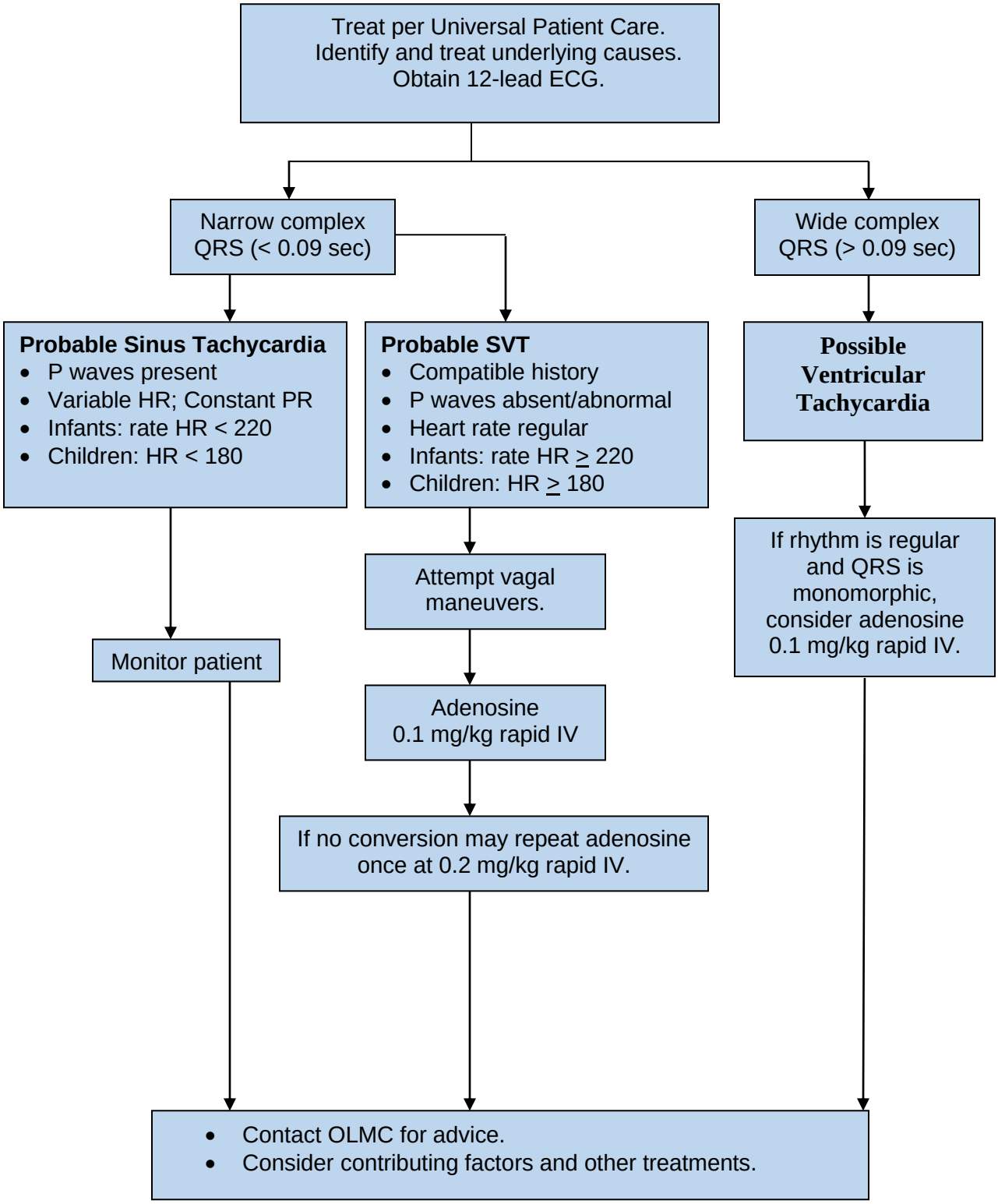
Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

Patient **does not** have signs or symptoms of poor perfusion caused by the dysrhythmia.
(e.g., Altered mental status, ischemic chest discomfort, acute heart failure, hypotension, or other signs of shock)
Rate related symptoms uncommon if HR <150 bpm. Consider other causes.



Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

PEDIATRIC PATIENTS:



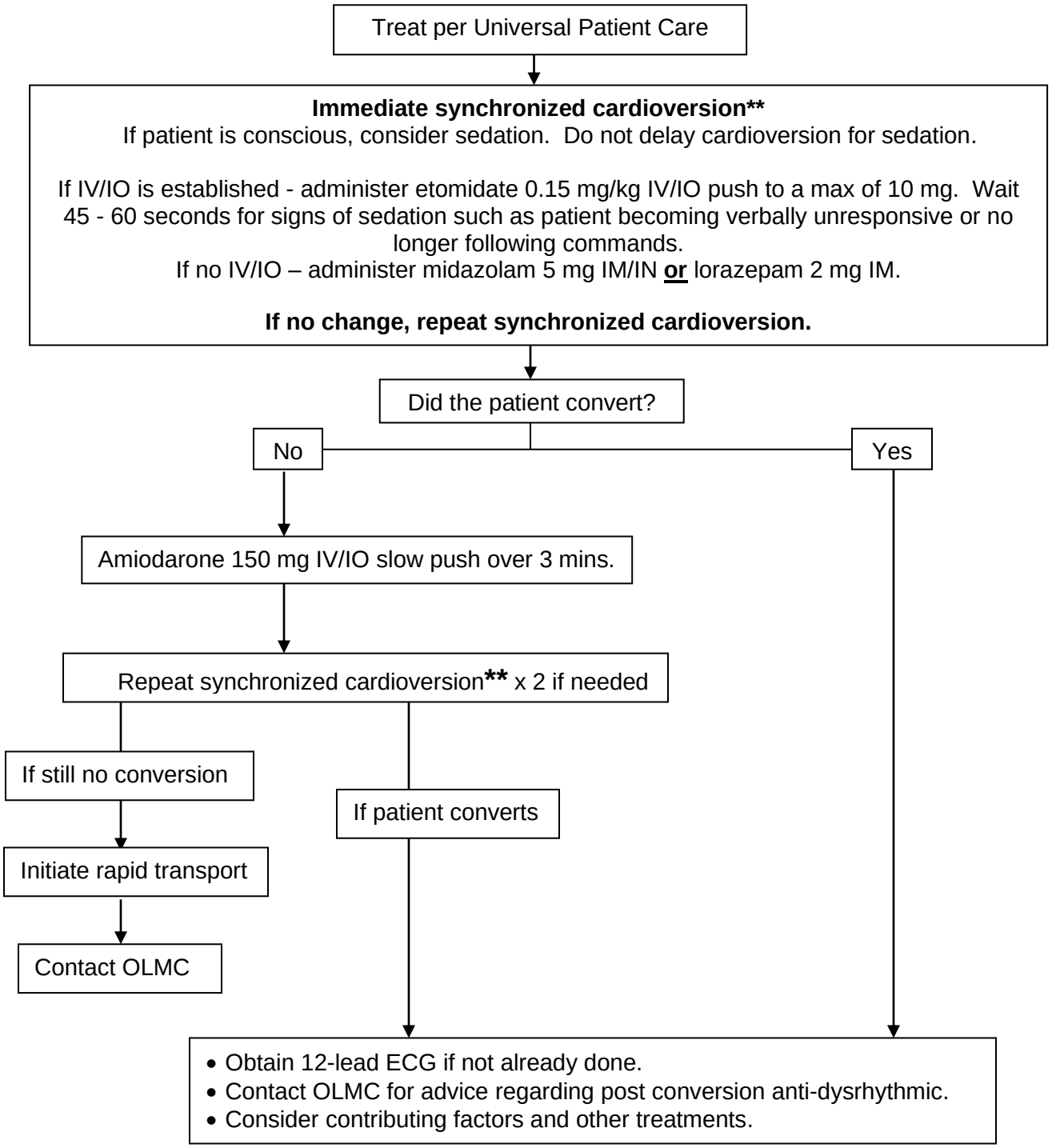
Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

NOTES & PRECAUTIONS:

- In stable wide complex tachycardia, which is monomorphic, consider adenosine if SVT with aberrancy is suspected.
- 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.
- Other possible causes of tachycardia include:
  - ✓ Acidosis
  - ✓ Hypovolemia
  - ✓ Hyperthermia/fever
  - ✓ Hypoxia
  - ✓ Hypo/Hyperkalemia
  - ✓ Hypoglycemia
  - ✓ Infection
  - ✓ Pulmonary embolus
  - ✓ Tamponade
  - ✓ Toxic exposure
  - ✓ Tension pneumothorax
- If pulseless arrest develops, follow appropriate Cardiac Arrest protocol.
- All doses of adenosine should be reduced to one-half (50%) in the following clinical settings:
  - ✓ History of cardiac transplantation.
  - ✓ Patients who are on carbamazepine (Tegretol) and dipyridamole (Persantine, Aggrenox).
  - ✓ Administration through any central line.
- Adenosine may initiate atrial fibrillation with rapid ventricular response in patients with Wolff-Parkinson-White syndrome.
- Adenosine should be used with caution in patients with asthma as it may cause a reactive airway response in some cases.
- The Modified Valsalva Maneuver may increase the likelihood of converting SVT to sinus rhythm. Have the patient sit in an upright position. With the assistance of a 10 ml syringe, encourage the patient to strain for a full 15 seconds, trying to push out the plunger by forced expiration. Lay the patient flat and elevate their legs to 45-90 degrees for 15 seconds. Lay the patient's legs flat for 60 seconds. May repeat x1 if patient has not converted to sinus rhythm.
- Consider the following Valsalva techniques for pediatric patients:
  - ✓ For infants and toddlers, apply ice or chilled IV fluid to the patient's face.
  - ✓ For preschool age and up, have the patient blow on a syringe.

Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

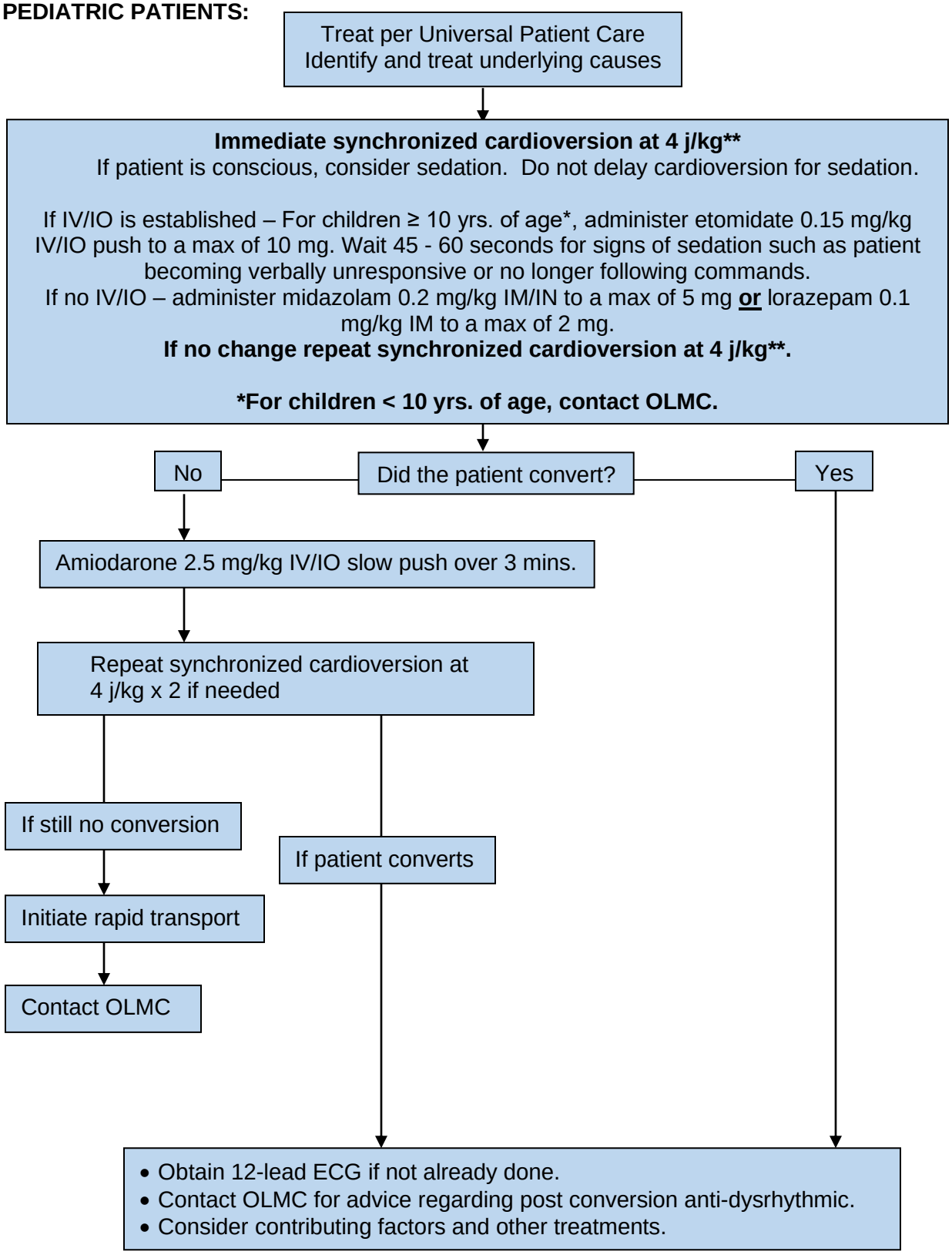
Patient **has** signs or symptoms of poor perfusion caused by the dysrhythmia
(e.g., Altered mental status, ischemic chest discomfort, acute heart failure, hypotension or other signs of shock).
Rate related symptoms uncommon if HR<150 bpm. Consider other causes.



**If patient is in a wide complex irregular tachycardia use defibrillation (un-synchronized).

Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

PEDIATRIC PATIENTS:



Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

NOTES & PRECAUTIONS:

- Possible causes of tachycardia include:
  - ✓ Acidosis
  - ✓ Hypovolemia
  - ✓ Hyperthermia/fever
  - ✓ Hypoxia
  - ✓ Hypo/Hyperkalemia
  - ✓ Hypoglycemia
  - ✓ Infection
  - ✓ Pulmonary embolus
  - ✓ Tamponade
  - ✓ Toxic exposure
  - ✓ Tension pneumothorax
- If pulseless arrest develops, follow Cardiac Arrest protocol.
- Defibrillation is recommended for wide complex irregular tachycardia.
- Etomidate may result in myotonic jerking, apnea and/or pain at the injection site.

.

Heart Monitor Adult Synchronous Cardioversion Settings (Joules)	
Physio LifePak®	360 j
Zoll E/M Series®	200 j

Chest Pain/Acute Coronary Syndromes – 10.065

Life threatening causes of chest pain:

- Acute coronary syndrome (ACS)
  - ✓ Unstable angina
  - ✓ NSTEMI
  - ✓ STEMI
- Pulmonary embolism
- Thoracic aortic dissection
- Tension pneumothorax

Dysrhythmias and PVCs

- Treat any dysrhythmia per appropriate cardiac dysrhythmia protocol.
- Concerning PVCs **in <u>the setting of an acute ischemic event only</u>** may be treated with Amiodarone 150 mg IV/IO over 10 mins.
- Amiodarone should not be used if:
  - ✓BP < 90 mmHg
  - ✓HR < 50 bpm
  - ✓Periods of sinus arrest
  - ✓Presence of 2° or 3° AV block

Treat per Universal Patient Care

↓

Titrate oxygen to lowest level to achieve $SpO_2 \geq 94\%$. (Must have good waveform to ensure accuracy.)

↓

Consider life-threatening causes of chest pain.

↓

Obtain 12-lead ECG, done concurrently with other treatments. If inconclusive, consider repeating every 3-5 minutes.

↓

If STEMI/OMI suspected, notify receiving facility.

↓

Administer 324 mg ASA orally (chewable 81 mg X 4) if not contraindicated (allergy/sensitivity, active bleeding disorder, GI bleed or ulcer, or suspected aortic dissection.)

↓

If BP > 100 mmHg systolic, administer 0.4 mg NTG. Repeat every 5 minutes until chest pain relieved if BP remains > 100 mmHg systolic. *

↓

For pain unrelieved by 3 doses of NTG, consider opioid analgesia per Pain Management protocol. NTG may be continued as well for suspicion of ACS.

***Nitroglycerin Precautions**

- Establish vascular access prior to administration for patients having not previously taken NTG or who are at risk of hemodynamic instability.
- NTG can cause hypotension in 10% of patients.
- **Use with caution in patients with an inferior MI as profound hypotension can occur due to an associated right ventricular infarction (RVI can occur in up to 50% of inferior MIs).**
- 12-lead clues to RVI include STE in III > II or STE ≥ 1 mm in V_4R. Current guidelines recommend avoidance of NTG in RVI.
- Do not administer NTG without OLMC if patient has taken sildenafil (Viagra®), vardenafil (Levitra®) in last 24 hours or tadalafil (Cialis®) in last 48 hours, given risk of profound hypotension with concomitant administration.

Chest Pain/Acute Coronary Syndromes – 10.065

ST Elevation MIs (STEMIs)

- STEMI is defined by:
  - ✓ At least 1 mm ST elevation in two contiguous leads (except V2 and V3) in the absence of a LBBB or paced rhythm.
  - ✓ For leads V2 and V3, ≥ 2.5 mm STE for men < 40, ≥ 2 mm in men ≥ 40, and ≥ 1.5 mm in woman of all ages.
- Field identified STEMI is a 12-lead ECG with:
  - ✓ Automatic ECG interpretation of "Acute MI", or
  - ✓ Paramedic concern for STEMI or OMI based on provider ECG review and clinical presentation.

Occlusive MIs (OMIs)

ECG findings concerning for an ongoing coronary occlusion also warrant cath lab activation. Findings consistent with OMI include:

- Hyperacute T waves
- DeWinter T waves
- Mild inferior STE with reciprocal depression in aVL
- Anterior ST depression in the absence of posterior STE
- LBBB or paced rhythm with Smith-Modified Sgarbossa Criteria
- Wellens syndrome: Deep inverted T waves in V2/V3
- Aslanger's Pattern: Inferior STE in Lead III only, ST depression in any V4-V6 with positive T-Wave, ST segment in V1 > V2.

STEMI/OMI Actions

- If possible, transmit 12-lead ECG to destination hospital.
- Early notification to receiving hospital of "STEMI activation" ideally within 5 mins of identification.
- **Apply defibrillation pads.**
- Rapid transport to destination with cardiac interventional capability.

For pediatrics, consider pleuritic causes or trauma. Contact OLMC for advice

Crush Injury / Entrapment – 10.070

Treat per Universal Patient Care

Spinal motion restriction if indicated and feasible.

Consider pain management.

Evaluate degree of entrapment and viability of extremities (absent pulse, blanched skin, capillary refill, diminished sensation, extremely cold to the touch).

- If one or more extremities are trapped for a prolonged period (> 2 - 4 hours.), and circulation is compromised or absent consider the placement of a tourniquet prior to extrication to reduce reperfusion injuries.
- If extrication of a limb will be prolonged and patient's condition is deteriorating, strongly consider calling Trauma Communications to arrange on-scene management.

During extrication, administer 1000 - 2000 cc NS or LR via IV bolus, then maintain at 500 cc/hr.

Monitor cardiac rhythm for signs of hyperkalemia including peaked T-waves, lowered P-wave amplitude or the loss of the P-wave, prolonged PR interval, second-degree AV block, and a widened QRS. If present, treat per Hyperkalemia protocol.

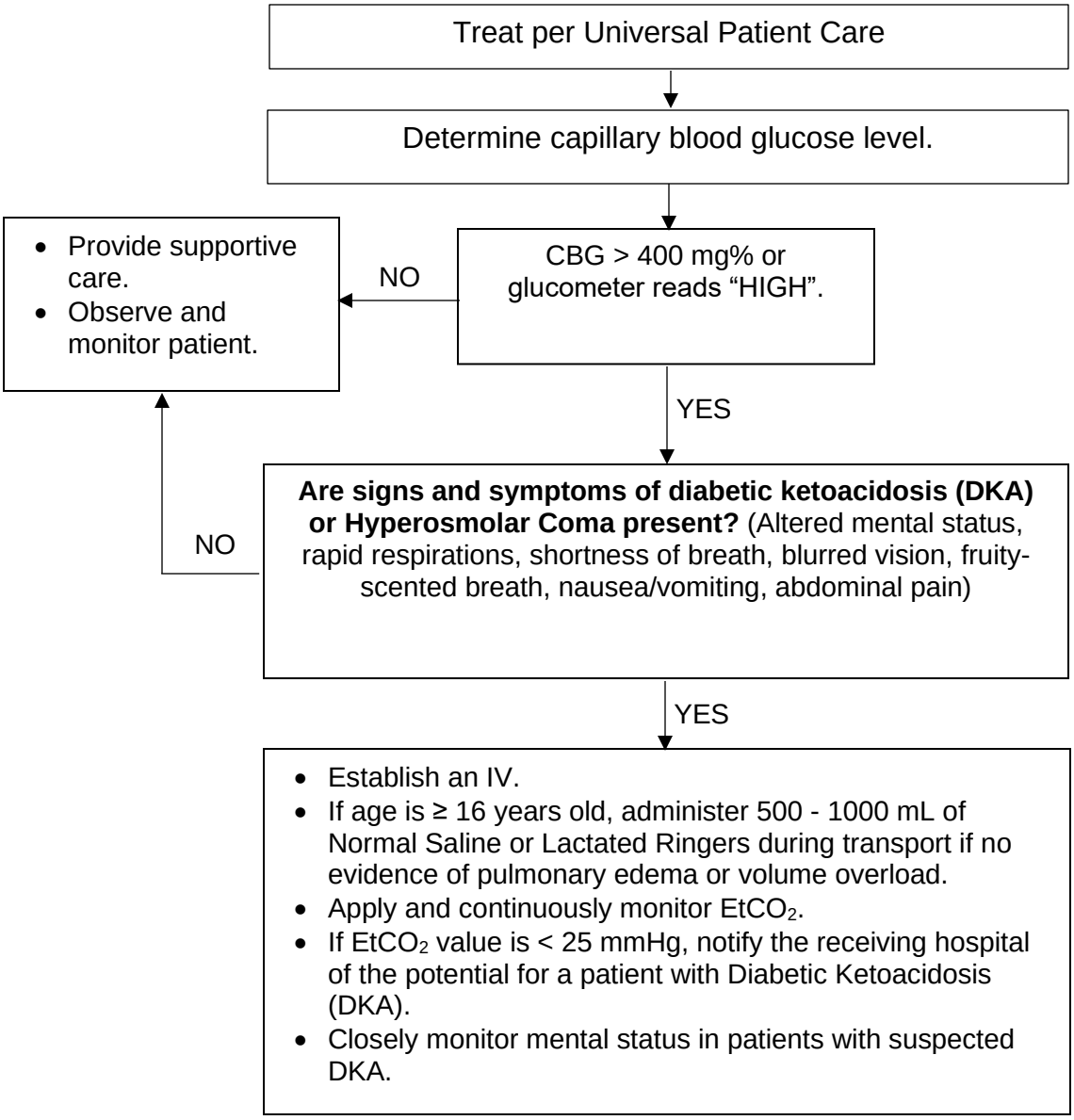
Wound Care

- Remove all restrictive dressings (clothing, jewelry, etc.).
- Monitor distal pulse, motor, and sensation in involved extremity.
- Bandage all open wounds (irrigate if needed).
- Stabilize all protruding foreign bodies (impaled objects).
- Splint/immobilize injured areas.
- For suspected pelvic crushing injuries, apply Pelvic Wrap if indicated.

NOTES & PRECAUTIONS:

- Crush injuries may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse, and shallow respirations.
- Plan extrication activities to allow for periodic patient assessment. Plan for occasional extrication equipment "shut down" to assess vital signs.
- Carefully track vital signs, IV fluids, cardiac rhythm, and medications during extrication.
- Protect patient from environment (rain, snow, direct sun, etc.). If needed, begin warming methods (warm blankets, heated air with blower, warm IV fluids) to prevent hypothermia.
- Carefully assess collateral injuries that may have occurred during event.
- If patient is trapped in a heavy dust environment, consider methods to provide filtered oxygen to the patient. If patient is in respiratory distress, consider dust impaction injuries and prepare to administer nebulized albuterol per OLMC direction.
- Do not allow any personnel into extrication area (inner circle) without proper protective equipment and thorough briefing including review of the evacuation signal.
- Notify the receiving Trauma Center through Trauma Communications early in the extrication process for additional recommendations if needed.

Diabetic Emergencies- Hyperglycemia – 10.072



PEDIATRIC PATIENTS:

- Follow adult algorithm.
- If age is < 16 years old, consider administration of 10 mL/kg of Normal Saline or Lactated Ringers during transport if no evidence of pulmonary edema or volume overload.

NOTES & PRECAUTIONS:

If concern for DKA, avoid intubation unless the patient cannot protect their airway or there is evidence of extreme fatigue with an inability to ventilate or oxygenate. If intubation becomes necessary, the ventilation goal should be to maintain pre-intubation $EtCO_2$ levels.

Diabetic Emergencies- Hypoglycemia – 10.072

Symptoms of hypoglycemia can include the following: Sweating, shakiness, nervousness, hunger, tiredness, dizziness, difficulty thinking, blurred vision, tingling sensation, or heart pounding.

Treat per Universal Patient Care

Determine capillary blood glucose level.

CBG < 60 mg%, or < 80 mg% in a known diabetic

- If patient can protect their own airway, give oral glucose.
- If patient is unable to protect their own airway give:
  - ✓ Dextrose 10%, 10 - 25 grams (100 - 250 ml) IV/IO by infusion
    OR
  - ✓ Dextrose 50%, 25 grams (50 ml) in large vein

Check CBG after 5 minutes and repeat treatment if blood sugar remains low and patient remains symptomatic.

If no IV can be established, give glucagon 1 mg IM.

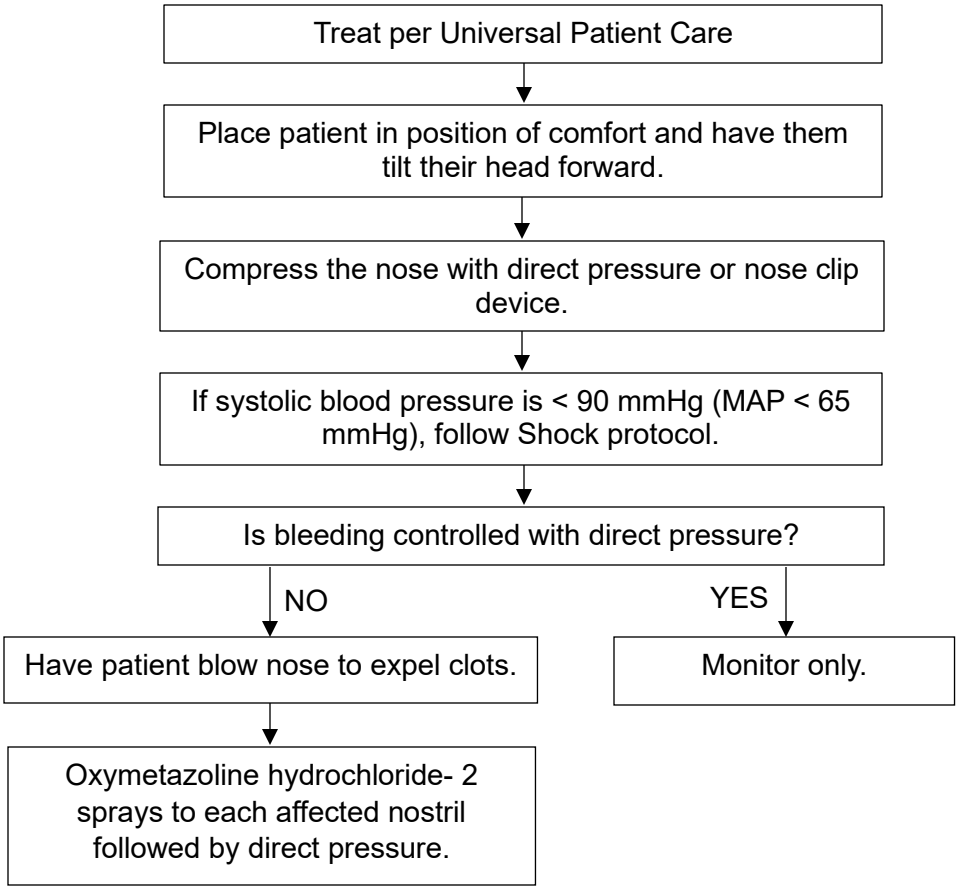
PEDIATRIC PATIENTS:

- For infants < 10 kg (birth to 1 year) with CBG < 40 mg% and children 10 kg - 35 kg with CBG < 60 mg% give:
  - ✓ Dextrose 10%: 5 ml/kg by infusion not to exceed 250 ml total. (Note: for D10% each 10 ml = 1 gram of dextrose), **OR**
  - ✓ Dextrose 12.5% (if diluting D50): 4 ml/kg by infusion not to exceed 200 ml total, **OR**
  - ✓ Glucagon: 0.02 mg/kg IM to a maximum of 1 mg if IV cannot be established.

NOTES & PRECAUTIONS:

- Hypoglycemic patients who receive glucose/dextrose/glucagon often refuse transport. This may be reasonable if **all** the following are present:
  - ✓ The patient's mental status has returned to normal.
  - ✓ There is a clear precipitating cause (e.g., took insulin but forgot to eat).
  - ✓ The patient can eat a meal.
  - ✓ The patient's recent blood sugar control has been otherwise stable.
  - ✓ The patient's blood glucose level is > 80mg%.
  - ✓ A reliable adult will be with the patient.
- Patients with recent evidence of poor glucose control and those who use oral hypoglycemic medications, particularly the sulfonylurea agents (e.g., glyburide, glipizide, glimepiride) are at high risk for recurrent hypoglycemia and should be transported. If these individuals refuse transport, contact OLMC for assistance.

Epistaxis – 10.075



PEDIATRIC PATIENTS:

- Follow adult algorithm.
- Oxymetazoline Hydrochloride should be avoided if child cannot follow instructions to blow their nose or are unable to tolerate the administration of a nasal medication.

NOTES & PRECAUTIONS:

- Blood loss in epistaxis can be hard to quantify.
- Bleeding may be also occurring posteriorly. Evaluate for posterior blood loss by examining the back of the throat.
- Posterior epistaxis may be an emergency and may require advanced ED techniques such as balloon tamponade or interventional radiology. Do not delay transport. Be prepared for potential airway issues.
- Detailed medication history should be obtained to assess for the use of agents such as NSAIDs, antiplatelet agents, or anticoagulant medications that may contribute to bleeding.
- For patients on home oxygen via nasal cannula, place the cannula in the patient's mouth while the nares are compressed for active bleeding.

Eye Emergencies – 10.076

Treat per Universal Patient Care

Treat specific injuries as follows:

Chemical Burns

- Administer proparacaine.
- Irrigate from the center of the eye towards the eyelid with lactated ringers (preferred), isotonic saline, or tap water for at least 30 minutes.
- Do not attempt to neutralize acids or bases.

Direct Trauma to Eye (Suspected Rupture/Penetration of Globe)

- Protect the affected eye and its contents with a hard shield or similar device and cover the other eye.
- Follow Pain Management protocol as indicated and consider ondansetron per Nausea and Vomiting protocol.

Foreign body on outer eye

- Do not wipe eye.
- Administer proparacaine.
- Consider irrigation.

PROPARACAINE ADMINISTRATION:

Instill one drop in the affected eye. If there is no effect within one minute, three additional drops may be instilled at one-minute intervals. For transports longer than 15 minutes, if eye pain returns, 1 - 4 additional drops may be instilled as needed to continue anesthetic effect.

NOTES & PRECAUTIONS:

- Unless contraindicated, patients should be transported in a seated position of at least 30 degrees in order to decrease intraocular pressure.
- Document new onset of blurring, double vision, perceived flashes of light, or other visual changes.
- Contact lenses should be removed, if possible.

Fever Management – 10.077

Treat per Universal Patient Care

↓

Document temperature before administration of antipyretics and provide written documentation of temperature to receiving facility.

↓

Remove heavy blankets or bundling but avoid shivering.

↓

If temperature > 100.4° F (38.0° C) consider, if available:

- Acetaminophen 325 - 1000 mg PO **or** 1000 mg IV slowly over 5 minutes. If given by infusion pump, can be administered over 10 -20 minutes.
  OR
- Ibuprofen 200 - 600 mg PO.

PEDIATRIC PATIENTS:

- **Acetaminophen-**

  15 mg/kg PO liquid only to a maximum of 1000 mg

- **Ibuprofen-**

  10 mg/kg PO liquid only to a maximum of 600 mg. **Do not give ibuprofen to children less than 6 months old or with signs of dehydration.**

NOTES AND PRECAUTIONS:

- There is no evidence that treating fever decreases the likelihood of febrile seizure or has other therapeutic benefit. Treatment of fever is to improve patient comfort and is optional.
- Do not give acetaminophen if known liver disease, alcohol abuse, acute intoxication, or has taken acetaminophen in last 4 hours.
- Do not give ibuprofen to infants under 6 months, or patients with known renal disease, dehydration, ulcer, GI bleeding, gastric reflux disease (heartburn), pregnancy, or if a NSAID has been taken within the last 6 hours.
- Antipyretics are not indicated for environmental hyperthermia.

Hyperkalemia – 10.078

Hyperkalemia Risk Factors:

- Dialysis patient.
- Chronic renal failure/insufficiency.
- Crush injury.
- Serious burns > 48 hours old.
- Muscular dystrophy.
- Paraplegia/quadriplegia.

Treat per Universal Patient Care

Suspicion of hyperkalemia is based on risk factors and physical findings.

ECG changes that may be present with hyperkalemia include:

- Peaked T waves.
- Lowered P wave amplitude or no P waves.
- Prolonged P-R interval (> 0.20 seconds).
- Second degree AV blocks.
- Widened QRS complex.

A 12- Lead ECG may be helpful to determine the presence of hyperkalemia.

If hyperkalemia is suspected based on history and physical findings:

- Administer 10% calcium gluconate 1 - 3 grams IV/IO slowly over 5 - 10 minutes in a proximal port.
- If no change in rhythm following calcium administration and transport time is prolonged, consider alternate therapy:
  - ✓ High dose albuterol (10 mg by nebulizer)
  - ✓ Sodium bicarbonate 50 mEq IV/IO

DO NOT mix sodium bicarbonate solutions with calcium preparations. Slowly flush remaining calcium gluconate from the catheter prior to administering sodium bicarbonate.

PEDIATRIC PATIENTS:

- Calcium gluconate- 0.6 ml/kg IV/IO slowly over 5-10 minutes. Max dose 10 ml.
- Albuterol-
  - ✓ < 25 kg, 2.5 mg via nebulizer
  - ✓ 25-50 kg, 5.0 mg via nebulizer
  - ✓ > 50 kg, 10 mg via nebulizer
- Call OLMC regarding the use of sodium bicarbonate.

Hyperthermia/Heat-Related Emergencies – 10.080

Treat per Universal Patient Care

Differentiate between heat cramps, heat exhaustion, and heat stroke.

Heat Cramps
- Normal or slightly elevated body temperature
- Warm, moist skin
- Generalized weakness
- Diffuse muscle cramping

Heat Exhaustion
- Elevated body temperature
- Cool, diaphoretic skin
- Tachypnea
- Generalized weakness
- Anxiety, headache
- Nausea/vomiting
- Possible syncope

Heat Stroke
- **Altered mental status**
- Very high body temperature
- Hot, dry skin
- Hypotension
- Seizure
- Coma

Remove clothing and begin cooling measures that maximize evaporation (spray bottle with tepid water, cools wipes, and fans). **If available** (such as at athletic events) measure rectal temperature and begin cold water immersion cooling immediately utilizing a tub or basin or by the TACO (Tarp Assisted Cooling with Oscillation) method. The TACO method involves placing a patient onto a tarp and pouring ice and cold water over the patient while simultaneously lifting the tarp and moving it back and forth. Athletic trainers are familiar with rectal temperature monitoring/TACO and can provide assistance.

If MAP < 65 mmHg (90 mmHg systolic), treat per Shock protocol.

NOTES & PRECAUTIONS:

- Heat stroke is a medical emergency. Be aware that heat exhaustion can progress to heat stroke.
- Wet sheets over a patient without good airflow will increase temperature and should be avoided.
- Suspect hyperthermia in patients with altered mental status or seizure on a hot, humid day.
- Consider sepsis and/or contagious disease. Examine patient closely for rashes and nuchal rigidity.

Hypothermia – 10.090

Treat per Universal Patient Care.

Assess ABC's. Allow up to 30 - 45 seconds to confirm respiratory arrest, pulseless cardiac arrest, or bradycardia that is profound enough to require CPR.

Gently remove wet clothes and protect patient from further environmental exposure.

Patient perfusing

Monitor ECG and pulse oximetry. Handle patient gently to avoid precipitating VF.

Warm patient as required:

- Heated blankets
- Warm environment
- Warm air
- Warm (109°F/42.8°C) IV fluids
- Warm packs

Patients with severe hypothermia (Temp < 86°F/30°C) may need internal rewarming. Contact OLMC early for direction.

Cardiac Arrest

VF/pVT/ASYSTOLE

- Begin CPR.
- Treat per Pulseless Arrest protocol.
- Contact OLMC for medication administration.

ORGANIZED RHYTYM

- Handle gently.
- Contact OLMC for direction regarding CPR and medication administration.

FROZEN TISSUE/LIFELESS

- Consider declaring death in the field. If in doubt, consult OLMC for directions.

NOTES & PRECAUTIONS:

- At-risks groups for hypothermia include trauma victims, alcohol and drug abuse patients, houseless persons, elderly, low-income families, infants and small children, and entrapped patients.
- Hypothermia may be preceded by other disorders (alcohol, trauma, OD, hypoglycemia) so look for and treat any underlying conditions while managing the hypothermia.
- The hypothermic heart may be unresponsive to cardiovascular medications, external cardiac pacing, or defibrillation.

Musculoskeletal Trauma – Extremity / Hemorrhage – 10.100

Treat per Universal Patient Care

For external bleeding, control with direct pressure/pressure dressing. If not effective or impractical, apply tourniquet. For wounds not amenable to tourniquet, apply topical hemostatic agent with direct pressure or use XSTAT device for junctional wounds to the groin or axilla.

FRACTURES/SPRAINS/DISLOCATIONS

- Check for pulses, movement, and sensation (PMS), distal to the injury site before and after immobilization.
- Splint fractures/dislocations in the position found. If PMS is compromised distal to fracture, consider applying axial traction to bring extremity into normal anatomical position. If patient complains of increase in pain or resistance is felt, stop, and immobilize. If PMS is compromised distal to dislocation, contact OLMC.
- If fracture/dislocation is open, place a moist sterile dressing over wound and cover with a dry dressing.
- Elevate and/or place cold packs over fracture site if time/injuries allow.
- Apply traction splint to femur shaft fractures.
- For suspected pelvic fractures, utilize pelvic sling and secure to backboard to minimize blood loss.
- Treat per Pain Management protocol.

AMPUTATIONS

- Cover stump or partial amputation with moist sterile dressing.
- Splint partial amputations in anatomical position to avoid torsion and angulation.
- Wrap amputated part in a sterile dressing, and place in a plastic bag to keep dry. Place bag in ice water if available.
- If transport time is prolonged (extended extrication, etc.) consider sending the amputated part ahead to be prepared for reimplantation.
- Treat per Pain Management protocol.

PEDIATRIC PATIENTS:

- Treat pain per Pain Management protocol.
- Consider non-accidental trauma.

NOTES & PRECAUTIONS:

- Use of tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure is ineffective or impractical; use a commercially produced, windlass, pneumatic, or ratcheting device, which has been demonstrated to occlude arterial flow and avoid narrow, elastic, or bungee-type devices. Utilize improvised tourniquets only if no commercial device is available. If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove the improvised tourniquet if operationally feasible. Time tourniquet was placed must be recorded.
- Apply a topical hemostatic agent, in combination with direct pressure, for wounds in anatomical areas where tourniquets cannot be applied, and sustained pressure alone is ineffective or impractical. Only apply topical hemostatic agents in a gauze format that supports wound packing.
- XSTAT is for the control of severe, life-threatening bleeding from junctional wounds in the groin or axilla that are not amenable to tourniquet applications in adults and adolescents. It should only be used for patients at high risk for immediate life-threatening bleeding from hemodynamically significant, non-compressible junctional wounds.

Musculoskeletal Trauma - Spinal Injury – 10.100

Treat per Universal Patient Care

↓

Provide initial cervical spinal motion restriction (SMR) using manual in-line stabilization.

↓

Does the patient have any of the following:

- Neck or spine pain/tenderness on palpation.
- Altered mental status or history of LOC.
- Drug or alcohol intoxication.
- Distracting injury (e.g., fracture, dislocation, any injury requiring pain medication), communication/language barrier, or emotional distress.
- New neurological deficit (e.g., numbness, tingling, weakness, or paralysis).

NO → If **NONE** of the criteria, and you do not think patient has a spinal injury, cervical collar and other SMR may be omitted.

YES ↓

Apply cervical collar and move patient to stretcher while maintaining spinal motion restriction.

↓

- Patient will remain flat on stretcher unless inclined positioning is necessary due to respiratory compromise or patient intolerance.
- A long spine board may be used to facilitate extrication and transfer to the stretcher; in cases of time sensitive injuries, the long spine board can be left in place.

↓

Complete physical and serial neurological exams after spinal motion restriction. Treat per Pain Management protocol

PEDIATRIC PATIENTS:

- For spinal motion restriction, children may require extra padding under the upper torso to maintain neutral cervical alignment.
- Consider using an available child safety restraint device for immobilization (e.g., car seat, Pedi Mate® device).

NOTES & PRECAUTIONS:

- Decreasing the use of long spine boards does not imply eliminating the use of spinal motion restriction. Long spine boards can be an effective tool in selected circumstances.
- Have a very low threshold for placing patients over 65 years of age in spinal precautions, even with a minor mechanism of injury.
- If any spinal motion restriction techniques cause an increase in pain or neurological deficits, nausea, or respiratory distress, immobilize and transport the patient in the position found or position of greatest comfort.
- There is no role for spinal motion restriction in penetrating trauma.
- Patients in the third trimester of pregnancy should be positioned/tilted toward the left side to prevent compression of the vena cava during transport.
- If feasible, especially in prolonged scene transports, pad backboards.
- If sports injury, follow Sports Equipment Removal protocol.

Nausea & Vomiting – 10.110

Treat per Universal Patient Care

↓

Consider IV fluids in patients exhibiting signs of dehydration.

↓

Consider offering patient an isopropyl alcohol swab or other aroma therapy and allowing the patient to self-administer 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.

↓

Give 8 mg ondansetron orally dissolving tablets (Zofran® ODT) or 4 mg ondansetron slow IV push over 2 minutes, or 4 mg IM.

↓

If nausea and/or vomiting are inadequately controlled after 10 minutes, consider:

- Repeating ondansetron **or**
- Administer droperidol 0.625 mg IV or haloperidol 1.25 mg IV/IM

↓

If patient continues to vomit, administer fluid challenge and consider other causes

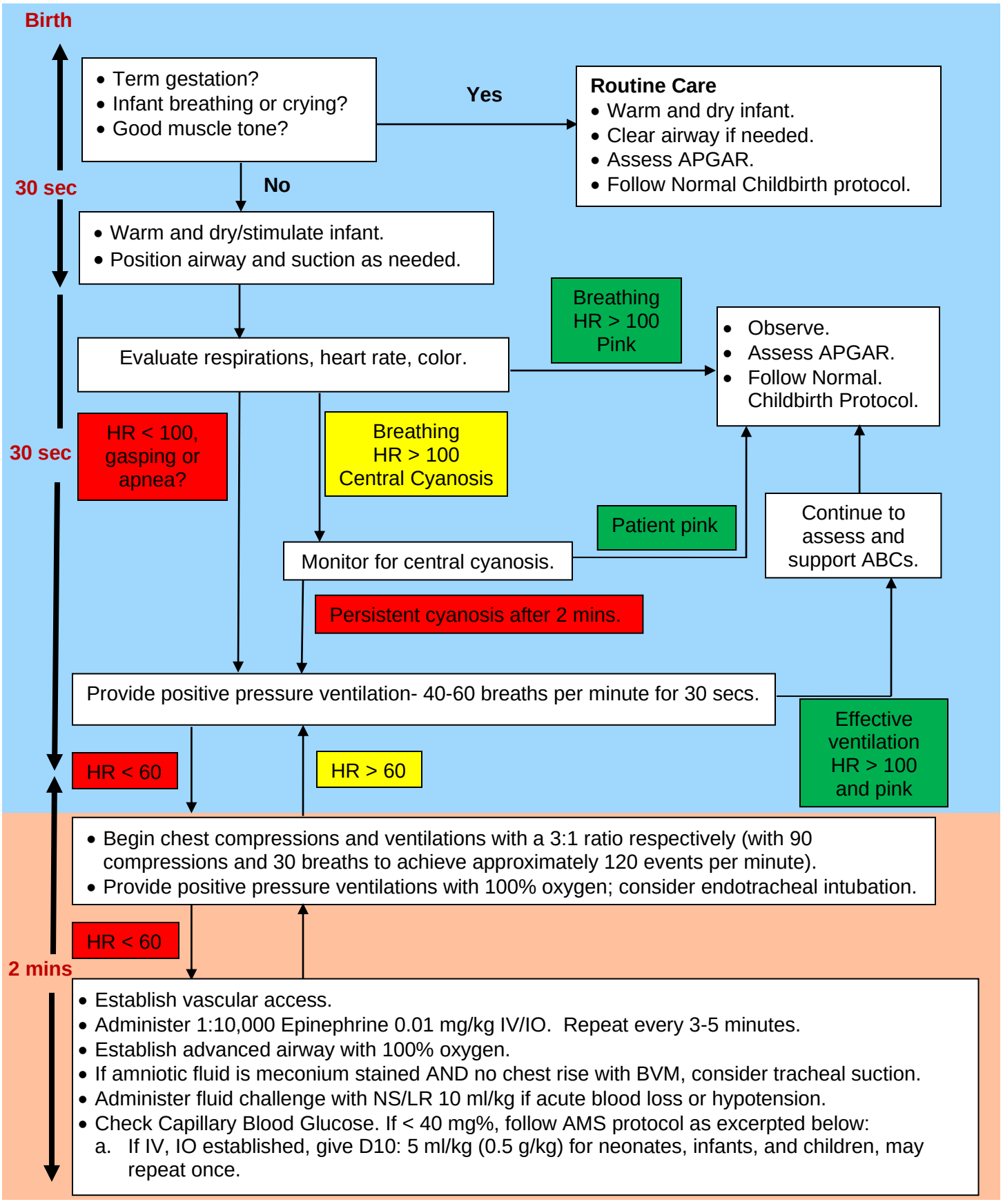
PEDIATRIC PATIENTS:

- Ondansetron use in patients under 6 months of age requires OLMC consultation except for children in spinal immobilization or children receiving chemotherapy.
- For children 6 months - 2 years of age, administer 2 mg ondansetron orally dissolving tablet (Zofran® ODT). For children 2 - 12 years of age, administer 4 mg ondansetron orally dissolving tablet (Zofran® ODT) or administer ondansetron 0.1mg/kg via slow IV push over 2 minutes up to a total maximum single IV dose of 4mg. Consider IM at same dose if unable to start IV and ODT tablet is contraindicated.

NOTES & PRECAUTIONS:

- Do not administer ondansetron (Zofran®) to patients with a hypersensitivity to the drug or other 5-HT_3 type serotonin receptor agonists (e.g., dolasetron, palonosetron, and granisetron.)
- Do not administer alkaline medications or preparations in the same IV as ondansetron as it may cause precipitation.

Neonatal Resuscitation – 10.120



POST RESUCITATION CARE:

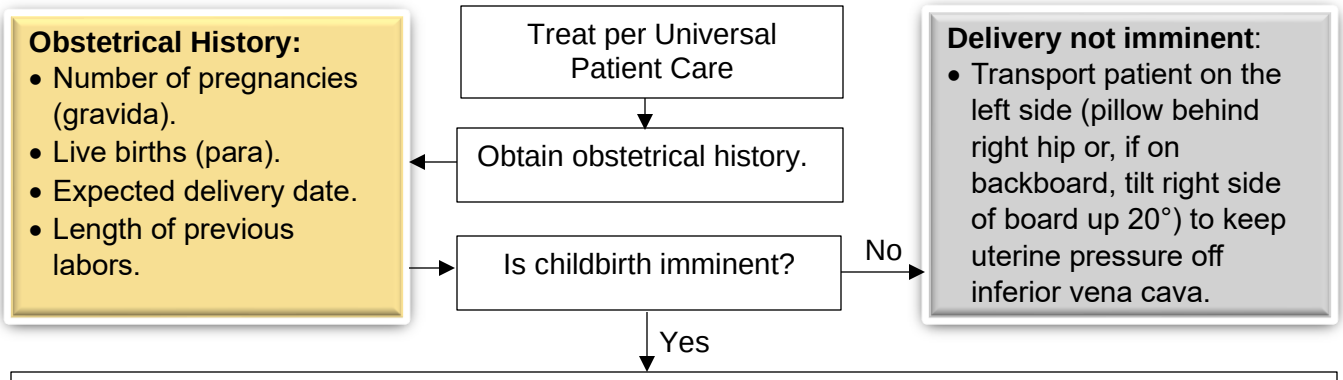
- Continue to provide assisted ventilations as needed.
- Closely monitor respiratory effort, heart rate, blood glucose, and pulse oximetry.
- **Keep newborn normothermic.** Hypothermia significantly increases risk of morbidity.
- Babies who required prolonged PPV, intubation and/or chest compressions are likely to have been severely stressed and are at risk for multi-organ dysfunction that may not be immediately apparent.

NOTES & PRECAUTIONS:

- Tracheal suctioning **is not** indicated in the vigorous infant born with meconium-stained fluid, whatever the consistency. Simply use a bulb syringe or large bore catheter to clear secretions from the mouth and nose as needed. However, if the newborn is having respiratory distress, then meconium aspiration should be performed per suctioning protocol.
- Volume expanders should not be given during resuscitation in the absence of a history or indirect evidence of acute blood loss. Giving a large volume load to a baby whose myocardial function is already compromised by hypoxia can decrease cardiac output. If fluid resuscitation is needed, administer 10 ml/kg NS over 5 - 10 minutes. Contact OLMC for repeat dosing.
- An electronic cardiac monitor is the preferred method for assessing heart rate.
- The ratio of compressions to ventilations should be 3:1, with 90 compressions and 30 breaths to achieve approximately 120 events per minute.
- Pulse oximeter should be applied to the right hand preferentially.
- 100% oxygen should not be used to initiate resuscitation. Begin resuscitation with room air and add supplemental oxygen if infant remains cyanotic or oxygen saturation < 70% after 2 minutes.
- Expected oxygen saturation of full-term newborn:

1 min	60% - 65%
2 min	65% - 70%
3 min	70% - 75%
4 min	75% - 80%
5 min	80% - 85%
10 min	85% - 95%

Obstetrical- Childbirth – 10.130



Normal Childbirth Procedure:

- Ask if the patient has had prenatal ultrasound and the possibility of multiple births. If multiple, or abnormal birth, consider second transport unit.
- Use sterile or clean technique.
- Guide/control but do not retard or hurry delivery.
- Check for cord around neck and gently remove if found.
- After delivery, assess infant per Neonatal Resuscitation protocol. If no resuscitation is needed (term infant, breathing or crying, good muscle tone), proceed as below.
  - ✓ Administer 10 IU oxytocin IV/IM within one minute of delivery when feasible if the neonate is a singleton. For multiple births, administer oxytocin only after last neonate has delivered.
  - ✓ 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.
- Briefly dry infant and place on mother's chest, in skin-to-skin contact. Cover both with a clean, dry blanket.
- 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).
- At 30 - 60 seconds after delivery, clamp and cut the umbilical cord about 6 inches from infant after cord pulsations have ceased. If resuscitation is needed, cord may be clamped and cut as soon as necessary.
- Do not delay transport to deliver the placenta. After the placenta has delivered, gently externally massage uterus to encourage contractions and prevent bleeding.
- If mother has significant postpartum hemorrhage (> 500 ml), administer tranexamic acid 2 g slow IV push.
- Unless infant needs treatment, keep on mother's chest for transport.
- Monitor vital signs of mother and infant during transport.

APGAR SCORE	0	1	2
Appearance	Blue/Pale	Body pink, extremities blue	Completely pink
Pulse	Absent	Slow (<100 bpm)	> 100 bpm
Grimace	No response	Grimace	Cough or sneeze
Activity	Limp	Some flexion	Active motion
Respirations	Absent	Slow, irregular	Good, crying

Obstetrical- Complications – 10.130

Treat per Universal Patient Care

For all patients with obstetrical complications, do not delay, transport to the nearest appropriate hospital. Give receiving hospital earliest possible notification. Contact OLMC for advice.

If in third trimester, transport patient on the left side (pillow under right hip or, if on backboard, tilt right side of board up 20 degrees) to keep uterine pressure off inferior vena cava, unless delivery is imminent.

Start oxygen on all abnormal deliveries.

Vital signs may not be a reliable indicator of shock or respiratory distress in the pregnant patient.

Possible actions for specific complications below:

Pre-eclampsia and Eclampsia

- Acute onset severe hypertension in pregnant and postpartum women.
  - ✓ Includes all pregnant women and up to 6 weeks postpartum with symptoms.
  - ✓ Symptoms include headache, visual disturbances, chest discomfort, shortness of breath, confusion, or abdominal pain.
  - ✓ Notify receiving hospital of patients with a sustained elevation in BP ≥ 140 mmHg systolic and/or ≥ 100 mmHg diastolic that are present for at least 15 minutes or more.
  - ✓ Initiate treatment with labetalol (if available and feasible) if sustained elevation in BP ≥ 160 mmHg systolic and/or ≥ 110 mmHg diastolic (either one or both) persists for at least 15 minutes or more.
    - ➢ Administer Labetalol 10 mg slow IV push over 1 - 2 minutes.
    - ➢ Target systolic BP 140 - 150 mmHg and diastolic BP 90 - 100 mmHg.
    - ➢ Labetalol may be repeated twice (up to 3 total doses) every 15 minutes doubling doses if needed depending on effect of preceding dose; (e.g., 1st dose – 10 mg, 2nd dose – 20 mg, 3rd dose – 40 mg). Maximum dose is 70 mg.
    - ➢ Stop administration if HR < 60 bpm or other adverse effects.
- Eclampsia is defined as the development of seizures in a patient with pre-eclampsia. Follow seizure protocol and contact OLMC for orders to administer magnesium sulfate.

Breech Delivery (buttocks first):

- 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.
- If the head does not deliver within three minutes, suffocation can occur.
  - ✓ Place a gloved hand into the vagina, with your palm toward the baby's face.
  - ✓ 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.
  - ✓ Assess for the presence of pulse in umbilical cord if able.

Limb Presentation

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

Prolapsed Cord

- Place the mother in left lateral Trendelenburg position.
- If the cord is visible, gently displace presenting part of baby off cord and maintain displacement. DO NOT pull or over-handle cord to prevent cord compression and spasm.

Abruptio Placenta

- Occurs in the third trimester of pregnancy when the placenta prematurely separates from the uterine wall leading to intrauterine bleeding.
- The patient experiences lower abdominal pain and the uterus often becomes rigid.
- Shock may develop without significant vaginal bleeding (concealed abruption).

Placenta Previa

- Occurs when the placenta covers the cervical opening, which can result in vaginal bleeding and prevents delivery of the infant through the vagina. The infant needs to be delivered via caesarian section.

Pain Management – 10.135

Treat per Universal Patient Care

- Consider and treat underlying causes of pain.
- Use non-pharmacological pain management (i.e., position of comfort, hot/cold pack, elevation, splinting, padding, wound care, and therapeutic calming and communication).

Determine location of pain and severity using numeric scale (1 - 10) or faces scale.

For mild pain, consider:

- **Acetaminophen** 325 - 1000 mg PO, or
- **Ibuprofen** 200 - 600 mg PO

Controlled medications (opioids and ketamine) are to be avoided in the following patients: Active labor, headache, non-traumatic neck or back pain, any chronic pain (head, neck, back, fibromyalgia, abdominal/pelvic pain), or dental pain. Contact OLMC

- Monitor SpO_2 and $EtCO_2$.
- Document vital signs, response to treatment and pain scale rating prior to and after each administration of pain medication.

Opioids and dissociative medications (ketamine) can be used in the same patient to achieve pain relieve if necessary.

For moderate to severe pain, consider:

Non-Opioid medications

- **Acetaminophen:** 1000 mg IV slow push over 5 minutes or over 10 - 20 mins if given by IV infusion.
- **Ketorolac (patients aged 2 - 80):** 30 mg IM or 15 mg IV. Do not repeat. Use for musculoskeletal pain or flank pain with suspected kidney stones.

Opioid medications

- **Fentanyl:** 50 - 100 mcg IV/IN/IM. May repeat with 25 - 50 mcg for IV/IN and 50 - 100 mcg for IM q 10 - 15 mins to max of 500 mcg. If BP < 100 mmHg or minor AMS or resp. depression, the first dose is 25 mcg all routes, repeating with 25 - 50 mcg q 10 - 15 mins, to max of 500 mcg. Monitor patient closely.
- **Hydromorphone**: 0.25 - 0.5 mg IV or 0.5 - 1.0 mg IM q 15 - 20 mins., to max of 2 mg. Do not administer if systolic BP < 100 mmHg.
- **Morphine:** 2 - 8 mg IV q 15 - 20 mins, to max of 20 mg. Or, 5 - 10 mg IM, repeating with 5 mg q 15 - 20 mins, to a max of 20 mg. Do not administer if systolic BP < 100 mmHg.

Dissociative medications

- **Ketamine:** 12.5 - 25 mg IV/IO slowly over 5 mins, or by IV infusion over 15 mins., or 25 - 50 mg IM. May repeat once in 30 mins., unless patient develops nystagmus, hallucinations, or other psychiatric symptoms. Must be diluted prior to IV or IO administration to a min. of 10 ml for slow IV push or 100 ml for IV infusion. Aternatively,1 mg/kg **VIA BREATH ACTUATED NEBULIZER (BAN)** MAY be used. Add saline for total volume of 5 ml.

PEDIATRIC PATIENTS:

- **Acetaminophen:** 15 mg/kg PO liquid only to a maximum of 1000 mg.
- **Ibuprofen:** 10 mg/kg PO liquid only to a maximum of 600 mg.
- **Ketorolac (age 2 - 16 years):** 1 mg/kg IM to a max of 30 mg or 0.5 mg/kg IV to a max of 15 mg. Do not repeat.
- **Fentanyl** (not to exceed adult dose):
  - ✓ 1 mcg/kg IV. May repeat with 0.5 - 1 mcg/kg every 10 - 15 minutes as needed to a maximum of 4 mcg/kg IV.
  - ✓ 2 mcg/kg IN. May repeat with 1 mcg/kg every 10 - 15 minutes as needed to a maximum of 4 mcg/kg IN.
  - ✓ If no IV/IN, may give fentanyl 1 - 2 mcg/kg IM. May repeat every 10 - 15 minutes to a max of 4 mcg/kg IM.
  - ✓ IN is preferred if no IV.
- **Hydromorphone:** For patients ≥ 12 months**:** 0.01 mg/kg IV/IM not to exceed the adult dose. May repeat every 15 - 20 minutes to a maximum of 2 mg. **Hydromorphone is not preferred in young infants and toddlers if fentanyl or morphine is available.**
- **Morphine:** 0.1 mg/kg IV or IM. (IM may repeat after 15 - 20 minutes). Do not exceed adult dosing.
- **Ketamine**: For children ≥ 15, dose is 0.3 mg/kg IV slow push over 5 minutes, up to a max of 25 mg. Dose must be diluted in normal saline prior to administration. Alternatively, for children ≥ 7, 1 mg/kg **VIA BREATH ACTUATED NEBULIZER (BAN)** MAY be used. Add saline for total volume of 5 ml.
- Do not administer fentanyl or morphine if patient's systolic blood pressure is lower than what is normal for child's age.

  Lowest normal pediatric systolic blood pressure by age:

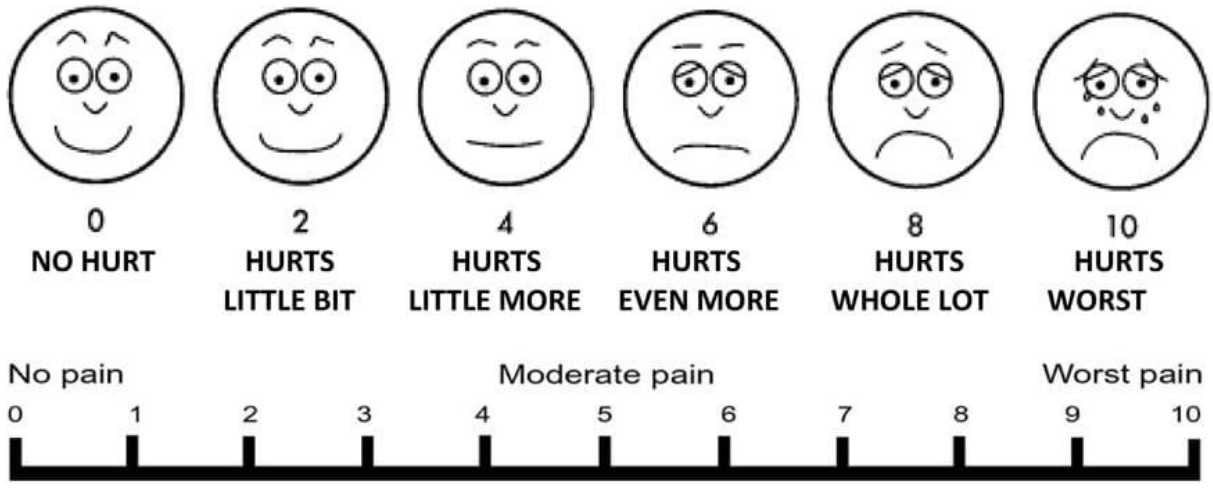
  - Less than one month: > 60 mmHg.
  - One month to 1 year: > 70 mmHg.
  - Greater than 1 year: 70 + 2 x age in years

NOTES AND PRECAUTIONS:

- Acetaminophen potentiates the analgesic effect of opioids, and they can be given together.
- Benzodiazepines do not have an analgesic effect. Their anxiolytic effects may potentiate the analgesic effect of opioids but also increase the likelihood of respiratory depression. OLMC consult is required for use of midazolam or lorazepam along with opioids for pain management.
- Do not give oral medication to patients with abdominal pain or open or obviously angulated fractures.
- Ketorolac should not be used in patients less than 2 or over 80.
- Do not administer ketamine to patients who are pregnant or have non-traumatic chest pain.
- Ketamine should not be given to patients with schizophrenia or history of psychosis due to the potential for exacerbating the mental health condition.

Pediatric Pain Scales:

FLACC Score			
CATEGORY	**0 POINTS**	**1 POINT**	**2 POINTS**
Face	Disinterested	Occasional grimace, withdrawn	Frequent frown, clenched jaw
Legs	No position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Normal position	Squirming, tense	Arched, rigid, or jerking
Cry	No crying	Moans or whimpers	Constant crying, screams or sobs
Consolability	Content, relaxed	Distractible	Inconsolable
SCORES ADD UP IN RANGE FROM 0–10			



Treat per Universal Patient Care

If systolic BP < 90 mmHg, follow Shock Protocol. Goal is to maintain a mean arterial pressure (MAP) ≥ 65 mmHg.

If unknown poison or overdose and the patient has a decreased LOC, treat per Altered Mental Status protocol. Manage airway per the Airway Management protocol. Contact OLMC and/or Poison Center (**1-800-222-1222**) for advice.

Treat specific **symptomatic** poisoning/overdose patient as outlined below. Strongly consider Haz-Mat Team activation when appropriate.

OVERDOSE/POISONING	TREATMENT
Aspirin and/or Acetaminophen	• Activated Charcoal 1 g/kg if < 2 hours since ingestion. Max dose 50 g. • If ingestion involves other substances, contact OLMC. • Avoid intubation for ASA ODs unless necessary. If intubation becomes necessary, the ventilation goal is to maintain pre-intubation $EtCO_2$ levels.
Beta Blockers	Treat bradycardia/hypotension with push dose epinephrine as bridge until an epinephrine drip at 2 - 10 mcg/min can be started. Titrate to effect.
Calcium Channel Blocker	Calcium gluconate, 1 - 3 g slow IV/IO over 5 - 10 minutes.
Carbon Monoxide	• Place all suspected CO poisoning patients on CPAP/BiPAP with high flow O_2. • Recommend NRB with nasal cannula if contraindications to or if patient does not tolerate CPAP/BiPAP. • Measure CO level with SpCO monitor when possible. • All symptomatic patients (e.g., headache, dizziness, nausea) or patients with an SpCO monitor reading ≥ 15% should be transported. Transport patients with severe symptoms (e.g., cardiac ischemia, coma, syncope, seizures, loss of consciousness) to a hyperbaric facility if available, or nearest facility if unavailable. • Treat symptoms per appropriate protocol (e.g., 12-lead ECG for suspected cardiac ischemia.) • If cyanide poisoning is also suspected, consider obtaining SpCO, if possible, before administration of CYANOKIT® since the latter will interfere with the carboxyhemoglobin monitor. • SpCO levels may be elevated in smokers. Levels can range from 3 - 10% depending on the number of packs smoked. • Pulse oximeter may provide a false reading in patients with elevated SpCO levels.

Chlorine Inhalation	Treat symptomatic patients with: • Albuterol- 2.5 mg nebulized. • Dexamethasone- 10 mg IV/IO/IM/PO. • Sodium bicarbonate 8.4%- 2.5 ml via nebulizer.
Cyanide	Hydroxocobalamin (CYANOKIT®) 5 g IV/IO over 15 minutes. Repeat once if needed. For cardiac arrest, hydroxocobalamin should be administered as a rapid bolus.
Hydrofluoric Acid	Dermal: Calcium gluconate 3 g mixed with 5 oz water soluble lubricant and applied to burn.
Organophosphate	• Prepare to handle copious secretions. • In mild to moderate poisonings (e.g., headache, mild bronchorrhea, nausea, vomiting, diarrhea but normal mentation), administer atropine 1 - 2 mg IV/IO/IM every 3 - 5 minutes until symptoms improve. • For severe poisoning (e.g., altered mental status, unconsciousness, seizures), administer atropine 3 - 5 mg IV/IO/IM every 3 - 5 minutes until symptoms begin to improve. • Treat seizures per seizure protocol. • See Haz-Mat Protocol for more specifics of treatment. • For large organophosphate poisonings, refer to HazMat protocol.
Sodium Channel Blocker (TCA, diphenhydramine, Type 1a and 1c antiarrhythmics)	• If patient exhibits arrhythmias or a widening QRS complex, administer sodium bicarbonate 1 mEq/kg IV/IO. • Treat hypotension per Shock protocol.
Do not neutralize acids or alkalis.	
If the patient exhibits extrapyramidal symptoms/Dystonia with a history of phenothiazine use, consider diphenhydramine.	

PEDIATRIC PATIENTS:

- Consider possibility of neglect or abuse.
- For organophosphate poisoning, atropine dose is 0.05 mg/kg IV/IO. Contact OLMC for frequency of dosing.
- Activated charcoal dose is 1 g/kg, max of 50 g.
- For children < 1-year, dilute sodium bicarbonate by one-half with normal saline prior to administration.
- Hydroxocobalamin for cyanide poisoning- 70 mg/kg IV/IO to a max of 5 g over 15 minutes. For cardiac arrest, hydroxocobalamin should be administered as a rapid bolus. Contact OLMC for advice regarding second dose.

TOXIDROME TABLE			
Toxidrome	**Examples**	**Clinical Features**	**Antidotes/Treatment**
Sympathomimetic	Cocaine Methamphetamine Ecstasy/MDMA	Agitation Hyperthermia Diaphoresis Dilated pupils HTN Tachycardia	Midazolam or lorazepam (OLMC)
Opioid	Heroin/Fentanyl Hydromorphone Methadone Oxycodone	Depressed mental status Hypoventilation Constricted pupils	Naloxone
Cholinergic (Anti-cholinesterase)	Pesticides • Carbamates • Organophosphates Nerve agents	Muscarinic* Nicotinic** Central***	Atropine Pralidoxime (2-Pam) Midazolam (Hazmat, OLMC)
Sedative-Hypnotic	Barbiturates Benzodiazepines GHB	Depressed mental status Hypotension Hypothermia	Supportive care
Cardiotoxic drugs	Beta-blockers Calcium channel blockers	Bradycardia Conduction issues Hypotension	Epinephrine Calcium (OLMC)
Anticholinergic	Atropine Jimson Weed Scopolamine Diphenhydramine	Delirium Hyperthermia Tachycardia Warm, dry skin	Supportive treatment Physostigmine (ED)
Sodium channel blockade	Tricyclic antidepressants Antiarrhythmics • Type 1A – quinidine, procainamide • Type 1C – flecainide, propafenone	Altered mental status Hypotension Seizures Wide complex tachycardia	Sodium Bicarbonate (OLMC)
Methemoglobinemia (nitrate/nitrite poisoning)	Contaminated well water (nitrates) Inhalation injuries Topical anesthetics (benzocaine, lidocaine) Amyl Nitrites (poppers)	Cyanosis SpO_2 75-85% despite supp. O_2 Headache Weakness Seizures/Coma Dysrhythmias Chocolate brown blood	Supportive Care O_2 administration Methylene blue (ED)

***Muscarinic:** Diarrhea, urination, miosis, bradycardia, bronchospasm, bronchorrhea, emesis, lacrimation salivation, sweating.
****Nicotinic:** Mydriasis, tachycardia, weakness, hypertension, hyperglycemia, fasciculations.
*****Central:** Confusion, convulsions, coma.

CO Clinical Presentation Transport Matrix				
Carbon Monoxide (Symptomatic or SpCO > 15%)	Yes	Yes	Yes	Yes
Burns	No	Yes	No	Yes
Trauma	No	No	Yes	Yes
Destination	Nearest facility or Hyperbaric Center if available	Burn Center	Trauma Center	Trauma Center

Respiratory Distress- CHF/Pulmonary Edema – 10.160

Treat per Universal Patient Care

Decompensated Heart Failure

Sit patient upright.

Systolic BP > 100 mmHg

YES

Nitroglycerin 0.4 mg SL; repeat every 3 - 5 minutes. *

Consider albuterol 2.5 mg by nebulizer. May repeat as needed.

If the patient remains in respiratory distress, consider CPAP/BiPAP if available.

Furosemide (If systolic BP > 100 and fluid overload state with JVD, edema (peripheral, sacral, abdominal), recent weight gain):

- If patient is not currently taking furosemide, give 20 mg IV.
- If the patient is taking furosemide, give 40 mg IV.

NO

Treat for possible cardiogenic shock per Shock protocol.

"SCAPE" - Sympathetic Crashing Acute Pulmonary Edema (Rapid onset, extreme respiratory distress, diaphoresis markedly elevated systolic blood pressure > 160, tachycardia, decreased oxygen saturation)

Nitroglycerin 0.4 mg SL; repeat every 3 - 5 minutes. *

If the patient remains in severe respiratory distress (e.g., unable to speak more than 1 - 2 words, low SpO_2 (< 90%), respiratory rate > 40), start CPAP/BiPAP if available. (**CPAP/BiPAP can be started prior to SL NTG being given. Once started, do not break the seal of the mask when possible. If CPAP/BiPAP is in place prior to SL nitroglycerin, you can proceed to push dose nitroglycerin directly.)**

Push dose nitroglycerin 1 mg IV, if respiratory distress persists and SBP remains > 160 mmHg systolic. May repeat once in 5 minutes.

- Aggressive management, including early intubation, is appropriate for the patient who does not respond to treatment or is rapidly deteriorating.
- The best indicator for the cause of respiratory distress is the patient's history. If a person has had COPD or CHF in the past, it is likely the person has worsening of the same condition again.
- ***Do not administer nitroglycerin without OLMC approval if patient has taken sildenafil (Viagra®), vardenafil (Levitra®) or other similar drugs in the last 24 hours, or tadalafil (Cialis®) within the last 48 hours.**

Respiratory Distress- COPD/Asthma – 10.160

Treat per Universal Patient Care

Presentation: Wheezing, prolong expiratory phase, decreased breath sounds, accessory muscle use, history of asthma/COPD. **The best indicator for etiology of respiratory distress is the patient's history.**

DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat DuoNeb as needed X 2. Do not administer more than three total DuoNeb treatments.

If additional bronchodilator needed after DuoNeb, repeat albuterol only, 2.5 mg by nebulizer as needed.

If patient has moderate to severe respiratory distress based on Severity Assessment Guide, administer dexamethasone 10 mg IV/IO/IM/PO.

Asthma

If patient is deteriorating, give epinephrine 1:1000 0.3 - 0.5 mg IM. May repeat once in 5 - 15 minutes if patient is still in extremis. Consider using lower dose (0.3 mg) for patients > 40 years old or known coronary artery disease.

If transport time is long and asthma is severe, consider magnesium sulfate 2 grams over 10 - 20 minutes.

Consider CPAP/BiPAP if non-responsive to interventions or impending respiratory failure.

COPD

Consider CPAP/BiPAP if available.

In cases of tachypnea consider causes such as pulmonary embolus, hypoxia, cardiac causes, infection, acidosis (DKA, sepsis), and trauma. Apparent hyperventilation may be a response to a medical problem and should only be considered after these other causes have been excluded. Do not treat hyperventilation by rebreathing CO_2. Reassurance and oxygen via mask are appropriate.

NOTES & PRECAUTIONS:

- Aggressive management, including early intubation, is appropriate for the patient who does not respond to treatment or is rapidly deteriorating.
- COPD and asthma patients receiving CPAP/BiPAP need to be monitored closely due to the higher risk of secondary pneumothorax from positive pressure ventilation.

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 sounds	End expiratory wheezes	Full expiratory wheezes	Wheezes both phases or absent
Accessory muscle use	Not usually	Common	Usually
Alertness	Possibly agitated	Usually agitated	Usually agitated
$EtCO_2$	20 - 30	30 - 40	> 50

Respiratory Distress- Pediatrics – 10.160

Upper Airway (Croup, epiglottitis, laryngeal edema)

In patients 6 months to 6 years of age with audible stridor at rest, administer 5 ml (5 mg) epinephrine 1:1000 via nebulizer, **or** 0.5 ml (11.25 mg) of racepinephrine diluted with 2.5 ml of normal saline via nebulizer. May repeat once in 10 minutes if necessary. Contact OLMC for additional dosing.

- The usual cause of respiratory arrest in children with croup, epiglottitis, or laryngeal edema is exhaustion, not airway obstruction.
  - ✓ If suspected croup, administer dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.
  - ✓ If the child deteriorates, ventilate with a BVM.
  - ✓ If you cannot effectively ventilate with BVM, perform intubation.

If complete obstruction is present and you cannot effectively BVM ventilate the patient and the patient is deteriorating, consider needle cricothyrotomy.

Asthma

- Consider asthma in the following setting:
  - ✓ Prior history of wheezing.
  - ✓ History of eczema and allergies.
  - ✓ Family history of asthma.
  - ✓ Home use of bronchodilator.

- DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat DuoNeb as needed X 2. Do not administer more than three total DuoNeb treatments.
- If additional bronchodilator needed, administer albuterol only 2.5 mg by nebulizer as needed.

- If patient is deteriorating give 1:1000 epinephrine 0.01 mg/kg IM (max dose 0.5 mg). Contact OLMC for additional doses.

If patient has moderate to severe asthma and is not improving with treatment, consider dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.

If transport time is long and asthma is severe, contact OLMC for consideration of magnesium sulfate.

Acute Bronchiolitis (< 2 years old)

If upper airway symptoms such as stridor, dysphagia, unusual drooling, follow upper airway arm of flow chart

Give oxygen via blow-by, nasal cannula or mask to keep SpO_2 > 92%. Monitor $EtCO_2$ if available.

If nasal secretions and/or congestion, use nasal suction with adapter if available. If secretions are thick, may use saline to loosen.

If still wheezing, give albuterol 2.5 mg via nebulizer. If improvement may use every 10 minutes. Discontinue if patient's heart rate is > 200.

If unable to keep SpO_2 > 92% with oxygen or patient has continued significant work of breathing despite treatment, administer 1 lpm/kg of oxygen up to 15 lpm as starting setting (max at 2 lpm/kg or 20 lpm) by High Flow Nasal Cannula (pediatric) oxygen ($HFNCO_2$).

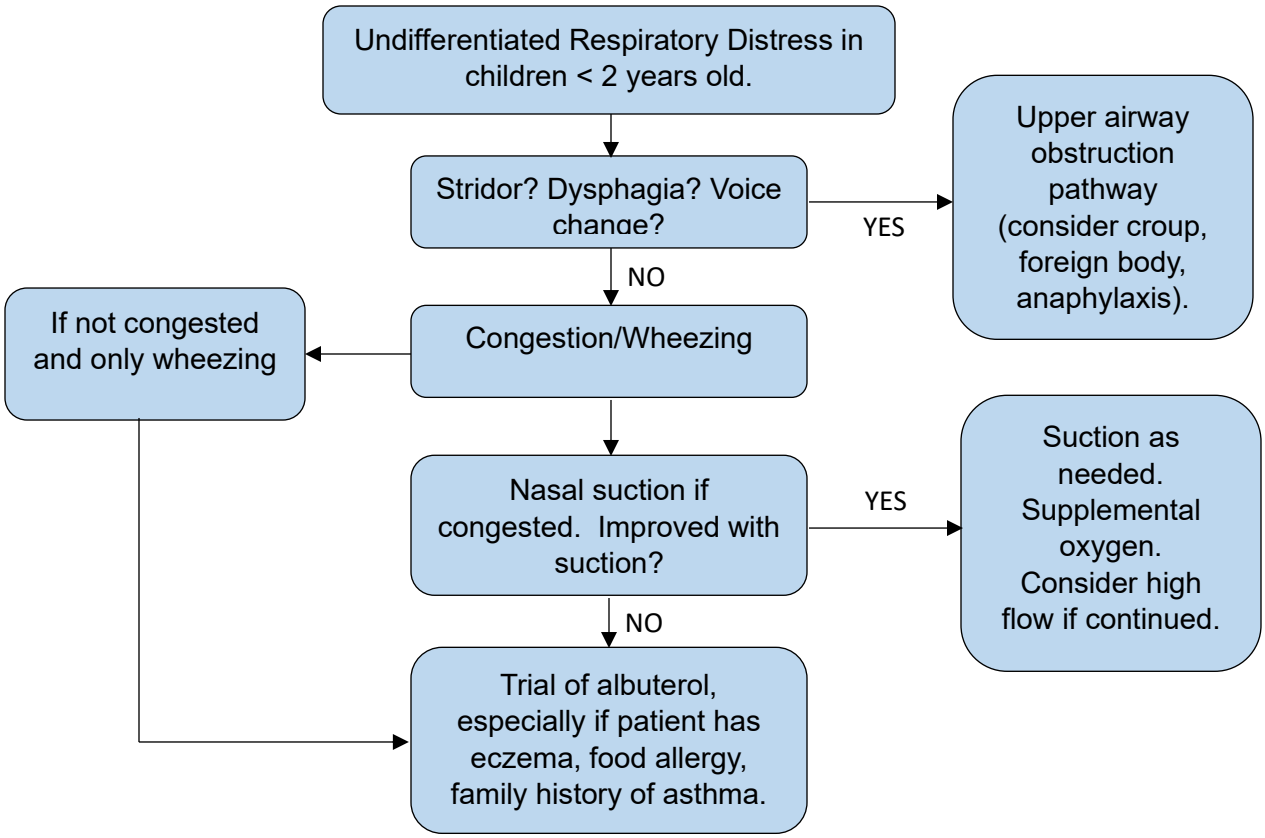
Severe respiratory distress (see Infant Respiratory Distress table below)

- Suction nares as described above.
- Initiate high flow nasal cannula oxygen as described above with $EtCO_2$ monitoring.
- If wheezing, give albuterol 2.5 mg via nebulizer. If improvement, may use every 10 minutes. Discontinue if patient's heart rate is > 200.
- Prepare for positive pressure ventilation with BVM and intubation for apnea, $EtCO_2$ > 55, or inability to maintain SpO_2 > 85%.

Treat anaphylaxis and foreign body obstruction per adult guidelines. Remove object using direct laryngoscopy if complete obstruction exists

Respiratory Distress- Pediatrics – 10.160

INFANT RESPIRATORY DISTRESS ASSESSMENT GUIDE			
	MILD	**MODERATE**	**SEVERE**
Respiratory Rate			
≤ 2 months	≤ 60	61 - 69	≥ 70
2 - 12 months	≤50	51 - 59	≥ 60
1 - 2 years	≤ 40	41 - 44	≥ 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



Seizures – 10.170

Treat per Universal Patient Care

Actively seizing upon EMS arrival or having repetitive seizures without regaining consciousness?

Yes

If no IV:

Midazolam 10 mg IM/IN. Repeat every 5 minutes until seizure stops.

OR

Lorazepam 4 mg IM. Repeat once in 10 minutes if seizure continues. Max 8 mg.

If IV already established:

Midazolam 2.5 - 5 mg IV/IO. Repeat q 5 minutes until seizure stops.

OR

Lorazepam 2 mg IV/IO. Repeat q 5 minutes until seizure stops to max of 8 mg.

Check CBG after first dose of either midazolam or lorazepam. Treat per AMS protocol. Monitor respiratory status closely after medication administration.

If seizure does not stop after two doses of midazolam or lorazepam, transport to closest hospital.

No

- Check pulse and reassess ABCs.
- Provide supplemental oxygen to maintain $SpO_2 \geq 94\%$.
- Check CBG.

Transport may be unnecessary if patient becomes fully oriented, is taking anti-seizure medication as prescribed, has a health care provider, and this is a typical seizure for the patient.

All first-time seizure patients require medical evaluation and should be transported. Contact OLMC if patient refuses.

PEDIATRIC PATIENTS:

- If patient is actively seizing upon EMS arrival or having repetitive seizures without regaining consciousness:
  - ✓ **0 - 11 months** (16 - 29", 0 - 8 kg) **or patient is extremely small for age**: Follow pediatric guide and administer midazolam 0.3 mg/kg IM/IN to a max of 10 mg. Repeat every 5 minutes until seizure stops.
  - ✓ **12 months - 13 years old** (use reported age; if unknown, measure patient and use corresponding length in inches to determine dose):
    - ➢ 12 - 16 months (29.5 - 31.5", 9 kg): 0.25 ml (= 1.25 mg) IM/IN
    - ➢ 17 months - 5 years (32 - 43", 10 - 19 kg): 0.5 ml (= 2.5 mg) IM/IN
    - ➢ 6 - 11 years (43.5 - 56.5", 20 - 37 kg): 1 ml (= 5 mg) IM/IN
    - ➢ 12 - 13 years (≥ 57", ≥ 38 kg): 2 ml (= 10 mg) IM/IN

    Repeat every 5 minutes until seizure stops.
- If an IV/IO is already available, follow pediatric guide and administer midazolam 0.1 mg/kg IV/IO to a max of 5 mg. Repeat every 5 minutes until seizure stops.
- **If midazolam unavailable**, administer lorazepam 0.2 mg/kg IM, max single dose 4 mg. Repeat q 10 mins until seizure stops to a total max of 8 mg, or 0.1 mg/kg IV/IO, max single dose 2 mg. Repeat q 5 minutes until seizure stops, max total dose 8 mg.
- If seizure does not stop after two doses of midazolam or lorazepam, transport to closest hospital. Transport to a non-pediatric hospital may be necessary to get alternative antiepileptics.
- If on arrival, the patient is not actively seizing (post-ictal), an IV is not required.
- All hypoglycemic or first-time pediatric seizures patients should be transported.
- Febrile seizures are typically found between the ages of 6 months - 6 yrs. and are usually brief.

NOTES & PRECAUTIONS:

- Seizures in patients > 50 years of age can be caused by dysrhythmias. Monitor rhythm and treat per appropriate protocol. Remember to check a pulse once a seizure stops.
- The longer status seizure lasts, the more difficult it is to control. Seizures that aren't responsive to midazolam or lorazepam may require alternative antiepileptic agents in a timely manner.
- New onset of seizures in a pregnant patient, especially in the third trimester, may indicate eclampsia. Contact OLMC for consideration of magnesium sulfate. Normal dose is 4 grams IV over 15 - 20 minutes.

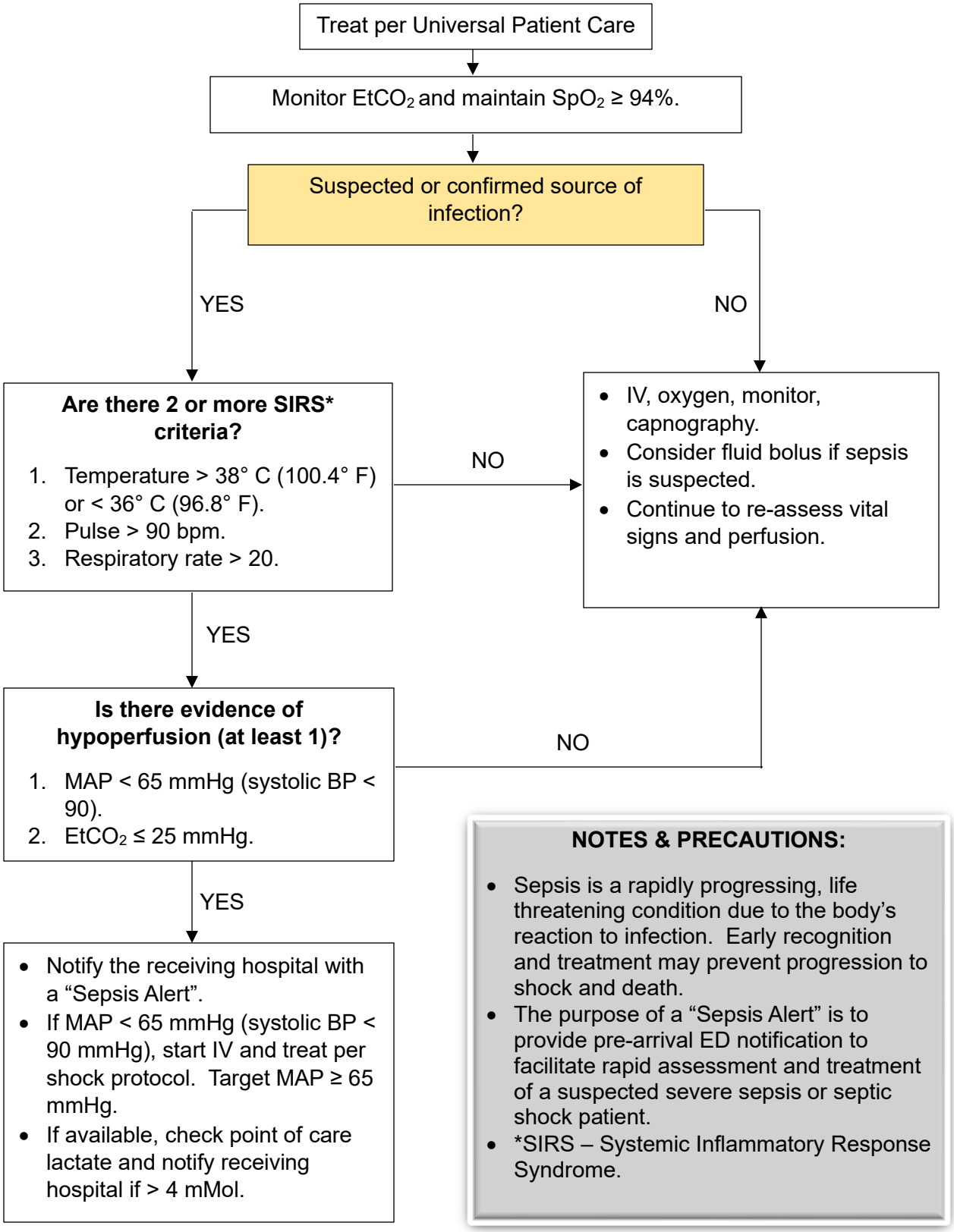
PediDOSE

- Enrollment criteria:
  - ✓ Age ≥ 6 months to ≤ 13 years **AND**
  - ✓ Had a paramedic -witnessed seizure **AND**
  - ✓ Require transport to any hospital
- Exclusion criteria:
  - ✓ A prior history of a benzodiazepine allergy; **OR**
  - ✓ Known or presumed pregnancy; **OR**
  - ✓ Severe growth restriction based on the paramedic's assessment
- If the patient's family has questions about PediDOSE please provide them with the following phone number for them to reach out to the study staff:

503-494-4777

- Following enrollment into the PediDOSE study (enrollment does not require medication to have been administered, but may include self-terminating seizures, if witnessed by a paramedic), scan the QR code below and complete the paramedic self-report:

Sepsis – 10.175



Shock – 10.180

Treat per Universal Patient Care and prepare for rapid transport

↓

Determine type of shock and treat as follows:

↓

Hypovolemic or Hemorrhagic Shock	Obstructive Shock (Tamponade, Pneumothorax, PE)
• Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressing. • Administer 500 - 1000 ml fluid challenge to maintain MAP > 65 mmHg (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and no pulmonary edema. • For shock secondary to trauma or suspect AAA do not over resuscitate. MAP 55 - 65 mmHg (Goal is SBP 70 - 90 mmHg). • If hemorrhagic shock with blunt or penetrating trauma **and** MAP < 50 mmHg (SBP < 70 mmHg), administer 2 grams TXA slow IV/IO push. • Contact OLMC for advice.	• If tension pneumothorax is suspected, decompress per the Tension Pneumothorax Decompression procedure protocol. • Administer 500 - 1000 ml fluid challenge to maintain MAP > 65 mmHg (SBP > 90 mmHg). Repeat fluid boluses if continued signs of shock and no pulmonary edema. • If **not** responding to fluid administration begin norepinephrine infusion at 4 mcg/min. If no response, increase every 5 minutes in 4 mcg/min increments to max of 24 mcg/min. Goal is MAP > 65 mmHg (SBP > 90 mmHg). • While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support. • Contact OLMC for advice.
Cardiogenic Shock (STEMI, cardiomyopathy)	**Distributive Shock (septic, neurogenic, anaphylactic) or unknown type of shock**
• If suspected cardiac event, follow Chest Pain protocol. • Monitor cardiac rhythm and follow Cardiac Dysrhythmia protocol. • Administer 250 - 500 ml fluid challenge to maintain MAP > 65 mmHg (SBP > 90 mmHg). May repeat once if continued signs of shock and no pulmonary edema/volume overload. Max of 1000 ml. • If **not** responding to fluid administration, begin norepinephrine infusion at 4 mcg/min. If no response, increase every 5 minutes in 4 mcg/min increments to max of 24 mcg/min. Goal is MAP > 65 mmHg (SBP > 90 mmHg). • While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support. • Contact OLMC for advice.	• **If anaphylaxis is suspected,** follow Anaphylaxis and Allergic Reaction protocol. • Administer 500 - 1000 ml fluid challenge to maintain MAP > 65 mmHg (SBP > 90 mmHg). Repeat once if continued signs of shock and no pulmonary edema. • If **not** responding to fluid administration, begin norepinephrine infusion at 4 mcg/min. If no response, increase every 5 minutes in 4 mcg/min increments to max of 24 mcg/min. Goal is MAP > 65 mmHg (SBP > 90 mmHg). • While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support. • Contact OLMC for advice.

Shock – 10.180

PEDIATRIC PATIENTS:

Treat per Universal Patient Care and prepare for rapid transport

↓

Determine type of shock and treat as follows:

↓

Hypovolemic or Hemorrhagic Shock

- Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressing.
- Administer 20 ml/kg fluid challenge (10 ml/kg in neonates) to maintain age appropriate SBP. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 ml/kg (30 ml/kg in neonates)
- Contact OLMC for advice.

Lowest normal pediatric systolic blood pressure by age:

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

Obstructive Shock (Tamponade, Pneumothorax, PE)

- If tension pneumothorax is suspected, decompress per the Tension Pneumothorax Decompression procedure protocol.
- Administer 20 ml/kg fluid challenge (10 ml/kg in neonates) to maintain age appropriate SBP. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 ml/kg (30 ml/kg in neonates)
- If **not** responding to fluid administration begin norepinephrine infusion at 0.1 mcg/kg/min. If no response, in 5 minutes, increase to 0.2 mcg/kg/min. If still no response after 5 more minutes, may increase to 0.4 mcg/kg/min. Goal is age appropriate SBP.
- While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
- Contact OLMC for advice.

Cardiogenic Shock (STEMI, cardiomyopathy)

- If suspected cardiac event, follow Chest Pain protocol.
- Monitor cardiac rhythm and follow Cardiac Dysrhythmia protocol.
- Administer 20 ml/kg fluid challenge (10 ml/kg in neonates) to maintain age appropriate SBP. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 ml/kg (30 ml/kg in neonates).
- If blood pressure remains low, begin norepinephrine infusion at 0.1 mcg/kg/min. If no response in 5 minutes, increase to 0.2 mcg/kg/min. If still no response after 5 more minutes, may increase to 0.4 mcg/kg/min. Goal is age appropriate SBP.
- While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
- Contact OLMC for advice.

Distributive Shock (septic, neurogenic, anaphylactic) or unknown type of shock

- **If anaphylaxis is suspected**, follow Anaphylaxis and Allergic Reaction protocol.
- Administer 20 ml/kg fluid challenge (10 ml/kg in neonates) to maintain age appropriate SBP. Repeat twice if continued signs of shock and no pulmonary edema.
- If blood pressure remains low, begin norepinephrine infusion at 0.1 mcg/kg/min. If no response in 5 minutes, increase to 0.2 mcg/kg/min. If still no response after 5 more minutes, may increase to 0.4 mcg/kg/min. Goal is age appropriate SBP.
- While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
- Contact OLMC for advice.

NOTES & PRECAUTIONS:

- Closely monitor patient's respiratory status and vital signs. Avoid fluid overload.
- Mean Arterial Pressure targets:
  - ✓ Uncontrolled traumatic hemorrhagic shock without TBI or suspected AAA, target MAP is 55 - 65 mmHg (SBP 70 - 90).
  - ✓ Uncontrolled traumatic hemorrhagic shock with TBI or shock from all other causes, target MAP is ≥ 65 mmHg (SBP ≥ 90).
- For patients in shock with known or suspected adrenal insufficiency (AI) consider administration of dexamethasone 10 mg (0.6 mg/kg for pediatric patients) in addition to fluids and/or norepinephrine.
- If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove the improvised tourniquet if operationally feasible.

Treat per Universal Patient Care

- Apply cardiac monitor as soon as possible and continuously assess rhythm.
- Place 18g IV or larger in AC when possible.
- Check CBG: If low, treat per Diabetic Emergencies-Hypoglycemia protocol.
- **No oxygen if SpO_2 ≥ 94% with good waveform.**

Complete the **BEFAST stroke assessment** if last known well time is ≤ 24 hours ago.

1 BEFAST STROKE SCREEN

Neurological examination	Normal	Abnormal (any positive)
Balance Symptoms: • Acute loss of balance, coordination, trouble walking Test: • Perform bilateral index finger-to-nose test (FTN test) • Have the patient walk if normally able to (walk next to them in case of gait instability) • If patient unable to walk, have the patient sit up (truncal stability test) Positive findings: • Patient overshoots or undershoots intended target (FTN test) • Patient falls over to one side (truncal instability) • Unsteady gait (shuffling, wide based gait, falling to one side) that the patient reports is acutely abnormal	Normal	Abnormal
Eyes Symptoms: • Acute onset of vision loss, double vision, or part of vision loss (visual field cut) Test: • Ask the patient if they have double vision or loss of vision in one or both eyes • Make sure the patient can move their eyes all the way from left to right up and down (extraocular movements) Positive findings: • Trouble seeing out of one or both eyes or acute onset of double vision or visual field cut • Eyes are deviated together to the left or to the right or are unable to perform full movement	Normal	Abnormal

<table>
<tr><th>Neurological examination</th><th>Normal</th><th colspan="2">Abnormal (any positive)</th></tr>
<tr><td>Face
<u>Symptoms:</u>
• Acute onset facial droop
<u>Test:</u>
• Ask the patient to smile or show their teeth
<u>Positive findings:</u>
• The patient’s face looks uneven, is drooping, or has numbness on one side</td><td>Normal</td><td>Right</td><td>Left</td></tr>
<tr><td>Arms/Legs
<u>Symptoms:</u>
• Acute onset numbness or weakness of the <u>arm/leg on one side of the body</u>
<u>Test:</u>
• Ask the patient to raise and extend both arms with their palms up for 10 seconds, then close their eyes
• Ask the patient to raise one leg at a time for 5 seconds
• Touch each side of the patient’s extremities and ask if they feel each equally
<u>Positive finding:</u>
• One arm or leg drifts downward
• Unequal extremity sensation</td><td>Normal</td><td>Right</td><td>Left</td></tr>
<tr><td>Speech
<u>Symptoms:</u>
• Acute onset slurred speech, trouble speaking, or understanding
<u>Test:</u>
• Ask the patient to repeat the phrase, “The sky is blue.”
• Ask the patient to (1) squeeze AND let go of your hand (2) open AND close their eyes
• Ask the patient to name common objects (e.g., glove, pen, watch)
<u>Positive findings:</u>
• Slurred speech, trouble finding words, unintelligible words
• Patient is unable to follow simple commands
• Patient is unable to recognize common objects</td><td>Normal</td><td colspan="2">Abnormal</td></tr>
<tr><td>Time
• What time was the patient last known well (i.e., last appear normal)?</td><td colspan="3">Last Known Well Time:
_____</td></tr>
</table>

If BEFAST is positive (at least 1 of the neurological examination findings are **ABNORMAL**), the patient is considered to have a **POSITIVE** stroke screen. Continue to **Cincinnati – Stroke Triage Assessment Tool (C-STAT)** to screen for a large vessel occlusion (LVO) stroke.

2 C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL

	Points	
Conjugate Gaze Deviation – Eyes are deviated together to the left or to the right or are unable to perform full movement.		
Absent	0	
Present	2	
Arm Weakness - Cannot hold up one arm for 10 seconds		
Absent	0	
Present	1	
Level of Consciousness - Incorrectly answers at least one of two LOC questions (1) what is your name? (2) what is the month? **AND** does *NOT* follow at least one of two commands (1) squeeze *AND* let go of your hand (2) open *AND* close their eyes.		
Absent	0	
Present	1	

******* POSITIVE C-STAT SCORE IS ≥ 2 *******

POSITIVE C-STAT stroke patients should be transported to the nearest interventional stroke center

- If **BEFAST** and C-STAT positive **(≥ 2**), transport to the **nearest interventional stroke center** *AND* notify the receiving facility of acute stroke alert as soon as feasible.
- If **BEFAST** positive and C-STAT negative, transport to the **nearest stroke center** *AND* notify the receiving facility of acute stroke alert as soon as feasible.
- If **BEFAST** is negative, transport to any receiving facility.
- Notify the receiving facility if the patient is either C-STAT positive or negative.

Transport patient with head elevated at least 30 degrees.

Document serial neurologic examinations.

NOTES & PRECAUTIONS:

- Do not treat hypertension or give aspirin.
- All potential stroke patients should be transported to a stroke center.

Submerged Patient/Drowning– 10.200

Treat per Universal Patient Care

Spinal Motion Restriction is indicated **only** if circumstances suggest possible spinal injury.

Assess mental status.

Awake and alert

Remove wet garments, dry, and insulate patient.

- Transport, even if initial assessment normal.
- Monitor ABCs, vitals, mental status.
- If respiratory distress develops, consider CPAP as delayed pulmonary edema may occur.

Awake but altered LOC

Remove wet garments, dry, and insulate patient.

- Suction as needed.
- Start IV, check CBG, give oxygen if SpO_2 < 94%.
- Transport.
- Monitor ABCs, vitals, mental status.
- Monitor cardiac rhythm.

Comatose or unresponsive

Pulse Present

NO

- CPR (starts with ventilations first). *
- Remove wet garments and dry patient.
- Attach monitor.
- Treat per Pulseless Arrest protocol.
- Handle gently.
- Start IV with warm IV fluids if available.
- Insulate patient.
- Consider advanced airway especially for suspected pulmonary edema.
- Monitor cardiac rhythm, waveform. capnography

Be prepared to manage vomiting.

On-boat CPR may be delivered if rescuers trained in this technique determine that it is feasible and safe to attempt resuscitation. In-water resuscitation (ventilations only) may be delivered if rescuers trained in this technique determine that it is feasible and safe with the equipment available and the distance to shore warrants its use.

YES

- Remove wet garments, dry, and insulate patient.
- Consider all causes of altered mental status.
- Suction as needed.
- Start IV, check CBG and give oxygen if SpO_2 < 94%.
- Monitor ABCs, vitals, mental status, cardiac rhythm, waveform capnography.
- Consider advanced airway especially for suspected pulmonary edema.

***Do not attempt resuscitation if patient has been submerged for more than 30 minutes, with the following exceptions:**

Resuscitation may be initiated if the patient is recovered within 60 minutes if:

- Children < 6 years of age and water temperature at recovery depth of < 40° F.
- Patients who may have been trapped in an underwater air pocket.
- Water temperature at recovery depth is < 40° F and information suggests that patient may have been swimming on the surface for at least 15 minutes prior to becoming submerged.
- Paramedic discretion (contact OLMC).

Traumatic Brain Injury – 10.300

Treat per Universal Patient Care.

Determine GCS to categorize injury severity.

- Mild: GCS 13 - 15
- Moderate: GCS 9 - 12
- Severe: GCS ≤ 8

Place a non-rebreather facemask on ALL patients with potential TBI. **Avoid Hypoxia at all times.**

Prevent hypotension: Goal MAP ≥ 80 mmHg (SBP ≥ 110) **for isolated traumatic brain injuries only**.

- Initiate a bolus of normal saline or lactated ringers.
- Continue fluid boluses to maintain the MAP ≥ 80 mmHg (SBP ≥ 110 mmHg).

AIRWAY CONSIDERATIONS:

- If patient is unable to maintain airway, consider oral airway (nasal airways should not be used in the presence of significant facial injury or possible basal skull fracture).
- Place an advanced airway (oral endotracheal intubation, supraglottic device, surgical airway) if BVM ventilation ineffective in maintaining oxygenation or if airway is continually compromised. Nasal intubation should not be attempted.
- If the patient has an airway placed (oral or advanced), carefully manage ventilations to minimize hyperventilation.
  - ✓ Monitor $EtCO_2$ with goal of $EtCO_2$ of 40 mmHg.
  - ✓ If available, use a pressure-controlled bag (PCB) and ventilation rate timer (VRT).
  - ✓ If a transport ventilator is available, begin with the following settings:
    - ➢ Tidal volume of 7ml/kg,
    - ➢ Rate of 10 BPM. Adjust rate to keep $EtCO_2$ within target range.

If there are signs of herniation, then MILD hyperventilation to an $EtCO_2$ of 35 mmHg may be performed. Signs of herniation include:

- Blown pupil
- Posturing

For moderate to severe blunt or penetrating head trauma: **If available**, administer 2 grams Tranexamic acid (TXA) slow IV/IO push if **both** of the following indications are met:

- Age ≥ 15 (or ≥ 50 kg if age unknown).
- GCS between 3 and 12, with a reactive pupil.

Contraindications to TXA:

- Time of head injury > 2 hours.
- GCS of 3 with no reactive pupil.
- EMS chest compressions at any time (manual or mechanical).
- Patients with a clinical concern for: Epilepsy, seizures, MI, stroke, PE, DVT, renal failure dialysis.
- Known or suspected pregnancy.
- Drowning, hanging, or burns > 20% TBSA.

Consider and treat reversible causes of AMS including hypoxia, hypoglycemia, and overdose.

PEDIATRIC PATIENTS (follow adult flow chart with the following considerations):

- Manage blood pressure. **Avoid hypotension.**
  - ✓ Initiate a 20 ml/kg bolus of normal saline or lactated ringers.
  - ✓ Continue fluid boluses to maintain SBP goals:
    - ➢ Infants/children age < 10: 70 mmHg + (age X 2).
    - ➢ Children age ≥ 10: 110 mmHg (same as adults).

- Pediatric ventilatory rates:
  - ✓ Infants: (age 0 - 24 months): 25 breaths per minute (bpm);
  - ✓ Children: (age 2 - 14): 20 bpm;
  - ✓ 15 years: 10 bpm (same as adults).

NOTES & PRECAUTIONS:

- The main goal is to address the three H's that increase mortality with isolated TBI:
  - ✓ Avoid **H**ypoxia.
  - ✓ Avoid **H**yperventilation.
  - ✓ Avoid **H**ypotension.
- A single episode of hypoxia is independently associated with DOUBLING of the mortality rate.
- Hyperventilation is independently associated with a mortality rate that is between TWO and SIX times higher. Inadvertent hyperventilation happens reliably if not meticulously prevented by proper external means.
- A single episode of hypotension is independently associated with DOUBLING of the mortality rate and persistent hypotension is independently associated with a mortality rate that is eight times higher.