Treatment

TREATMENT:

A. Assess scene safety and use appropriate personal protective equipment.
B. Begin initial patient assessment and determine chief complaint.
C. Monitor blood pressure, heart rate, respiratory rate, and SpO_2. Repeat the BP manually if the NIBP seems inaccurate.
D. Secure airway and start oxygen as needed to maintain oxygen saturation of ≥ 94% per Airway Management protocol.
E. Monitor ECG, $EtCO_2$ and obtain CBG readings as appropriate.
F. Establish vascular access (IV or IO) as appropriate for patient's condition.
G. Obtain pain severity scale if applicable.
H. Follow appropriate Treatment protocol if patient's chief complaint or assessment findings change.

KEY CONSIDERATIONS:

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.

TREATMENT:

A. Treat per Universal Patient Care.
B. Place patient in a position of comfort.
C. If MAP < 65 mmHg (systolic blood pressure < 90 mmHg), follow Shock protocol and initiate rapid transport.
    1. If traumatic injury is suspected, enter patient into Trauma System.
    2. If patient has a suspected abdominal aortic aneurysm, titrate IV to maintain MAP of 65 mmHg (systolic blood pressure of 90 mmHg).
D. Avoid having the patient eat or drink.
E. Treat pain per Pain Management protocol.

PEDIATRIC PATIENTS:

A. Consider non-accidental trauma.
B. Closely monitor vital signs; blood pressure may drop quickly.
C. 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:

A. Abdominal pain may be the first sign of catastrophic internal bleeding (ruptured aneurysm, liver, spleen, ectopic pregnancy, perforated viscous, etc.).
B. Since the bleeding is not apparent, you must think of volume depletion and monitor the patient closely for signs of shock.
C. 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.

KEY CONSIDERATIONS:

Inferior MI, ectopic pregnancy, abdominal aortic aneurysm, recent trauma, perforated viscous, emesis type and amount, last meal, bowel movements, urinary output, ruptured spleen or liver, GI bleed, abnormal vaginal bleeding

Agitated Patient – 10.015

PURPOSE:
Physical restraint and pharmacological sedation are used to medically treat and protect the safety of patients and responders. Patient restraints and sedation should be utilized only when necessary because the patient is exhibiting behavior that presents a danger to themselves and/or others based on an assessment using the Broset checklist.

Does patient represent a risk?

Broset Violence Assessment checklist

Confusion	0 point 1 point
Irritability	0 point 1 point
Boisterousness	0 point 1 point
Verbal Threats	0 point 1 point
Physical Threats	0 point 1 point
Attacks on objects	0 point 1 point

Score 0 = Low risk of violence
Score 1-2 = Moderate risk of violence (preventative measures should be taken)
Score ≥ 3 = High risk of violence (preventative measures are required)

Are physical restraints needed?

A. Use the minimum level of physical restraints required to accomplish patient care and ensure safe transportation (soft restraints may be sufficient). If law enforcement or additional manpower is needed, call for assistance prior to attempting restraint procedures. Do not endanger yourself or your crew.
B. Do not place restraints in such a way as to preclude evaluation of the patient's medical status or interfere with management of the airway.
C. Place patients face up on long backboard or gurney, NEVER PRONE. Closely monitor the patient's respiratory status.
D. Secure ALL extremities to backboard or gurney. Try to restrain lower extremities first using restraints around both ankles. Next, restrain the patient's arms at their sides.
E. If necessary, utilize cervical spine precautions (tape, foam bags, etc.) to control violent head or body movements.
F. If patient is on backboard, secure the backboard onto gurney for transport using additional straps if necessary. Remember to secure additional straps to the upper part of the gurney to avoid restricting the wheel carriage.
G. Evaluate the patient's respiratory and cardiac status continually. Monitor SpO_2 if possible.
H. DO NOT tighten chest straps to the point that they restrict breathing.

Is pharmacological sedation needed?

Sedative and/or antipsychotic agents may be needed to manage the agitated patient. These patients may include alcohol and/or substance abuse patients, intoxicated patients, and restless and combative head-injury patients.

A. Obtain and document initial Richmond Agitation Sedation Score (RASS).

Richmond Agitation Sedation Scale (RASS)

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

B. Evaluate the personnel needed to safely secure and treat the patient.
C. If patient is cooperative (RASS +1), consider olanzapine 10 mg oral dissolving tablet (ODT).
D. If immediate threat (RASS +3 or +4):
    1. Administer midazolam (2.5 - 5 mg IV/IO, or 5 -10 mg IM) **or** lorazepam (2 mg IV/IO or 4 mg IM) **PLUS** ziprasidone (10 - 20 mg IM) **or** haloperidol (5 - 10 mg IV/IM/IO) **or** droperidol (2.5 - 5 mg IV/IO or 5 - 10 mg IM).
    2. For midazolam, titrate 1 - 2 mg IV/IO as needed every 5 minutes to control agitation. For lorazepam, may repeat IV/IO dose once in 5 minutes.
E. If RASS is +2, attempt to determine if the patient's agitation is related to substance abuse, alcohol withdrawal, or medical or psychiatric problem.
F. Repeat RASS score every 10 minutes and at patient hand-off to hospital. Goal is RASS score of 0 to -1.

G. If agitation is likely due to a psychiatric disorder or other (e.g., trauma), administer medications in following sequence per flow chart:

Drug	Initial Dose	Repeat Dose in 10 min	Maximum Dose
Antipsychotic			
Ziprasidone	10 - 20 mg IM	none	20 mg IM
		OR	
Haloperidol	5 - 10 mg IV, IO, or IM	5 - 10 mg IV, IO, or IM	20 mg IV or IM
		OR	
Droperidol	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO, or 5 mg IM	5 mg IV/IO or 10 mg IM
Benzodiazepine*	***(See H below)***		
Midazolam	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM	5 mg IV/IO or 10 mg IM
		OR	
Lorazepam	2 mg IV/IO or 4 mg IM	2 mg IV/IO or 4 mg IM	4 mg IV/IO or 8 mg IM

H. If agitation is likely substance abuse (especially stimulants), withdrawal, or postictal state, administer medications in following sequence per flow chart:

Drug	Initial Dose	Repeat Dose in 10 min	Maximum Dose
Benzodiazepine			
Midazolam	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM	5 mg IV/IO or 10 mg IM
		OR	
Lorazepam	2 mg IV/IO or 4 mg IM	2 mg IV/IO or 4 mg IM	4 mg IV/IO or 8 mg IM
Antipsychotic*	***(See H above)***		
Ziprasidone	10 - 20 mg IM	none	20 mg IM
		OR	
Haloperidol	5 - 10 mg IV, IO, or IM	5 - 10 mg IV or IM	20 mg IV, IO, or IM
		OR	
Droperidol	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM	2.5 mg IV/IO or 5 mg IM

I. Consider and treat medical causes of combativeness (e.g., hypoxia, head injury, hypoglycemia).

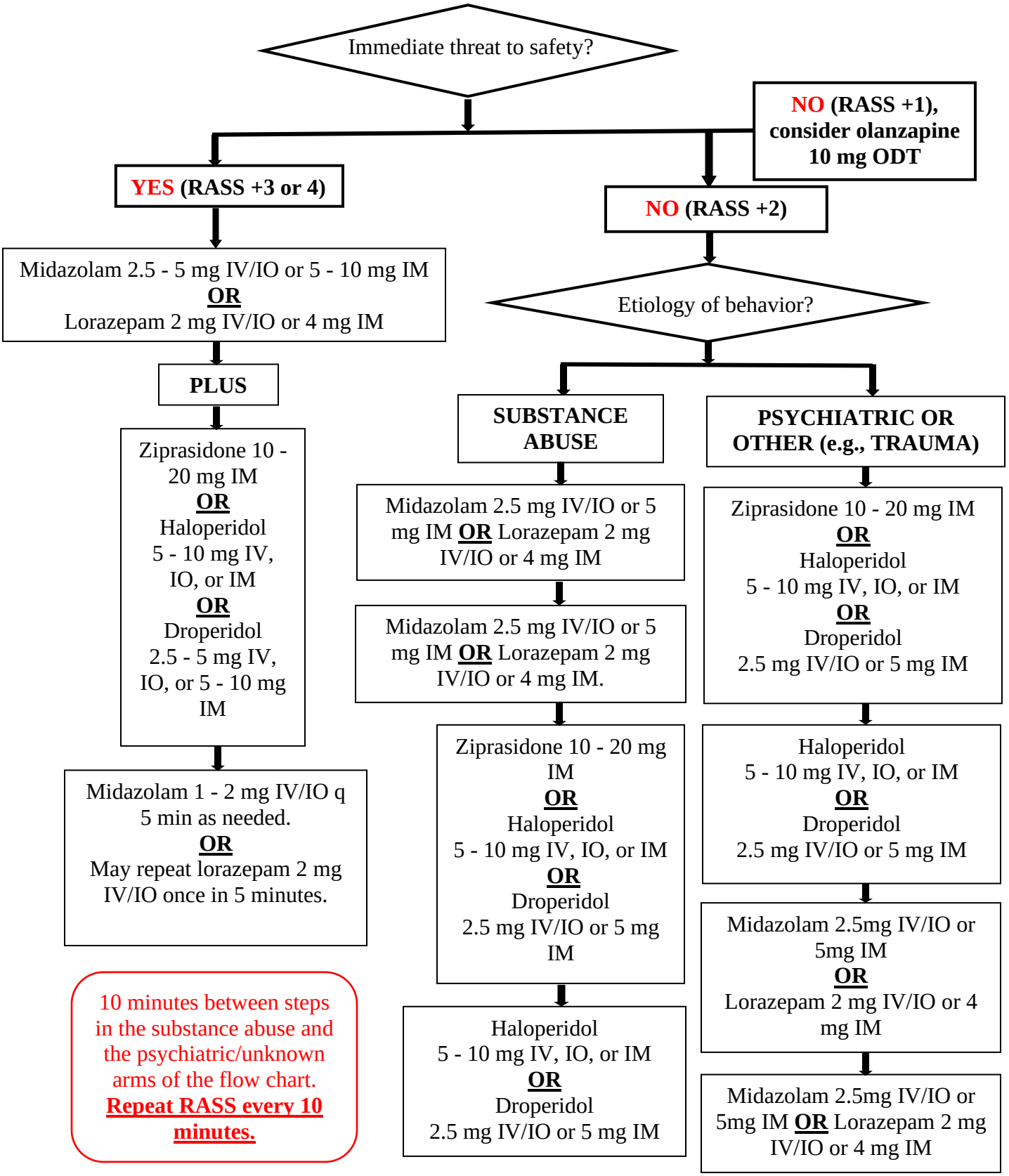
J. If 10 minutes after administration of the second dose (total of 20 minutes) the patient remains combative, move to next drug class as outlined above (e.g., antipsychotic to benzodiazepine or benzodiazepine to antipsychotic).

K. Assess vital signs in first 5 minutes and at least every 10 minutes and before each additional medication, if possible.

L. 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.

M. Monitor patient's ECG (especially QTc interval) and obtain 12-lead if possible.

Pharmacological Sedation Flow Chart



NOTES & PRECAUTIONS:

A. All patients who receive IV, IO, or IM pharmacological sedation must be fully monitored, when possible, with cardiac monitor, SpO_2, and $EtCO_2$.
B. Side effects of droperidol, haloperidol, and ziprasidone may include hypotension, tachycardia, and acute dystonic reactions.
C. 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.
D. 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.
E. 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.

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.

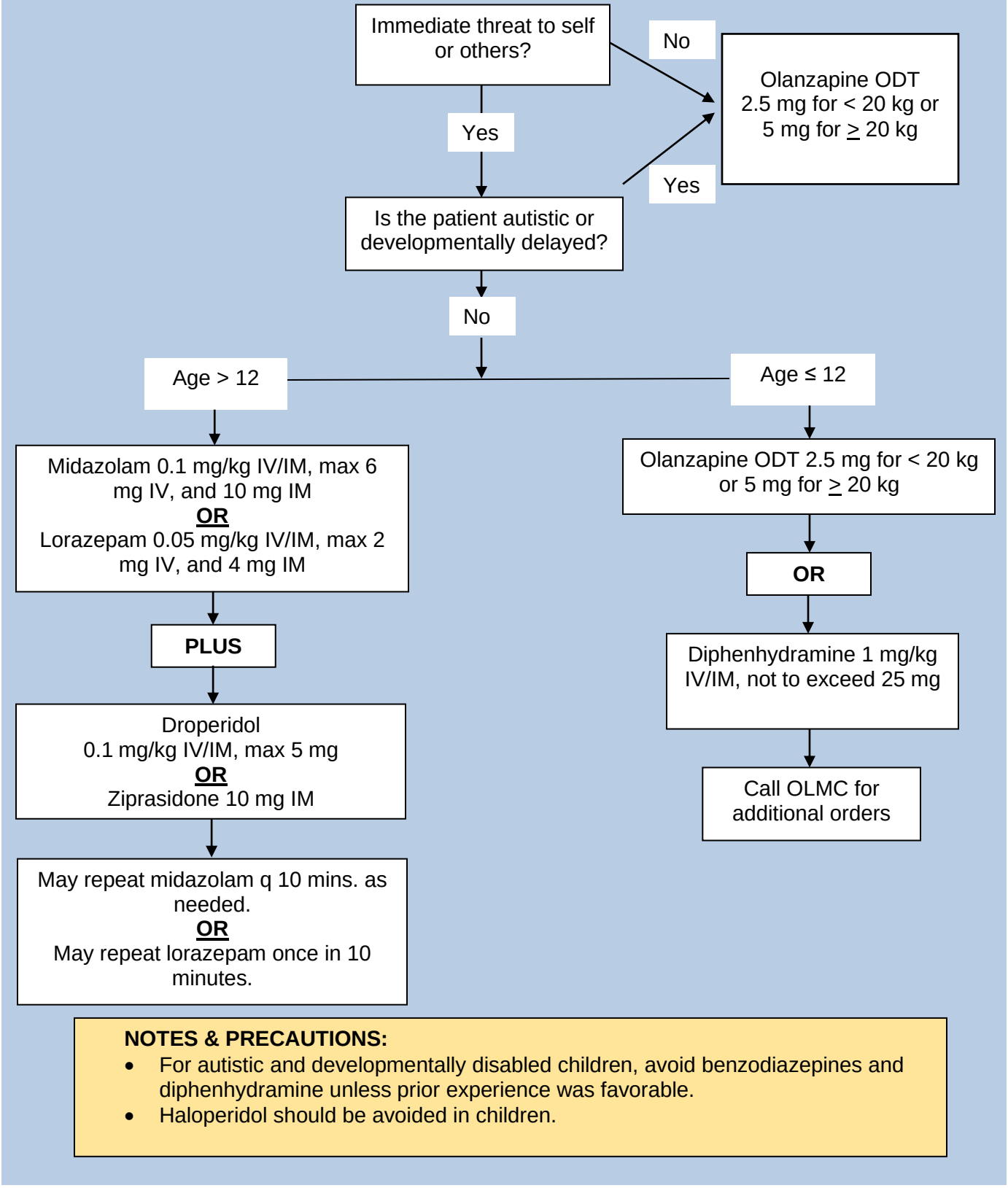
Olanzapine:
2.5 – 5 mg ODT.

Ziprasidone:
10 mg IM.

PEDIATRIC PATIENTS:

A. 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.

Pediatric Pharmacological Sedation Flow Chart



NOTES & PRECAUTIONS:

- For autistic and developmentally disabled children, avoid benzodiazepines and diphenhydramine unless prior experience was favorable.
- Haloperidol should be avoided in children.

TREATMENT:

A. Treat per Universal Patient Care protocol.
B. Treat underlying cause if known.
C. Determine Capillary Blood Glucose level:
    1. If CBG > 400 mg% or if glucometer reads “HIGH”, treat per Diabetic Emergencies protocol.
    2. If CBG < 60 mg%, or < 80 mg% in a known diabetic patient:
        a. If patient can protect their own airway, give oral glucose.
        b. 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
    3. Check CBG after 5 minutes and repeat treatment if blood sugar remains low and patient remains symptomatic.
    4. If no IV can be established, give glucagon 1 mg IM.
    5. Refer to the Diabetic Emergencies protocol in patients who refuse transport.
D. If opiate intoxication suspected:
    1. Administer naloxone 0.5 mg IV. Dose may be repeated every 2 minutes up to 2 mg titrating to respiratory rate. If no improvement and opiate intoxication is still suspected, repeat naloxone 2 mg every 3 - 5 minutes up to a maximum of 8 mg total.
    2. If no IV, give naloxone 2 mg IM/IN every 3 - 5 minutes up to 8 mg.
E. If patient is combative, consider sedation per Agitated Patient protocol.

NOTES & PRECAUTIONS:

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

KEY CONSIDERATIONS:

Hypoxia, trauma, CNS (stroke, tumor, seizure, infection), cardiac (MI, CHF), infection, thyroid (hyper or hypo), shock (septic, metabolic, traumatic), toxicological (carbon monoxide, cyanide), acidosis/alkalosis, heat stroke or hypothermia, electrolyte abnormality

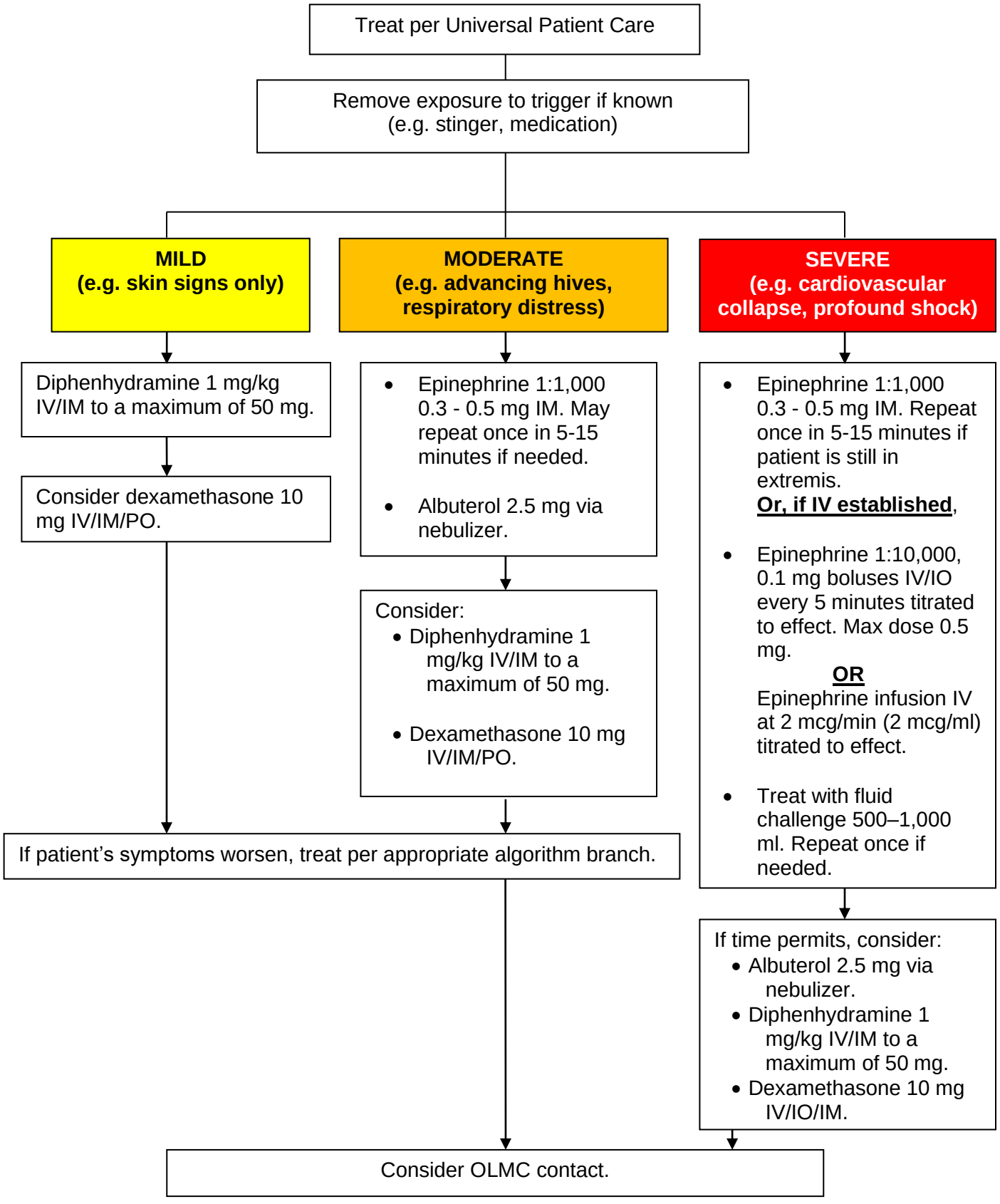
PEDIATRIC MEDICATIONS:

A. Dextrose – 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 (if diluting D50)
   - Dextrose 12.5%, 4 ml/kg by infusion not to exceed 200 ml total.

B. Glucagon: 0.02 mg/kg IM to a maximum of 1 mg.
C. Naloxone: 0.1 mg/kg IV/IM/IN up to 2.0 mg per dose. May repeat q 3 - 5 minutes up to 2 mg per dose. Max total dose 8 mg. Do not use in neonates.

Anaphylaxis and Allergic Reaction – 10.030



Anaphylaxis and Allergic Reaction – 10.030

PEDIATRICS:

Treat per Universal Patient Care

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

MILD (e.g. skin signs only)

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

Consider dexamethasone 0.6 mg/kg IV/IM/PO to a maximum of 10 mg.

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

- Epinephrine 1:1,000 0.01 mg/kg IM to a max of 0.5 mg. 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 0.6 mg/kg IV/IM/PO to a maximum of 10 mg.

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

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

Or, if IV established,

- Epinephrine 1:10,000, 0.01 mg/kg (max 0.1 mg) IV/IO boluses every 3-5 minutes titrated to effect. Max dose 0.5 mg.

OR

Epinephrine infusion IV at 0.01 mcg/kg/min (2 mcg/ml) titrated to effect.

- Treat with fluid challenge 20 ml/kg. 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 0.6 mg/kg IV/IO/IM/PO to a maximum of 10 mg.

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

Consider OLMC Contact.

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.

NOTES & PRECAUTIONS:

A. Preferred location for IM administration is the mid-anterolateral aspect of thigh.
B. Common side effects of epinephrine include anxiety, tremor, palpitations, tachycardia, and headache.
C. If epinephrine is ineffective in treating anaphylaxis in patients with beta-blockade, both 1 mg IV/IM glucagon administration 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:

A. Cyanosis or pallor
B. Absent, decreased, or irregular breathing
C. Marked change in muscle tone (hypertonia or hypotonia)
D. Altered level of responsiveness

Patient must appear well and be at baseline health.

TREATMENT:

A. Follow appropriate airway and/or respiratory protocols.
B. 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.
C. Obtain and document description of event including symptoms, inciting event, and any resuscitation attempts before EMS arrival.
D. Obtain vital signs.
E. Place on cardiac monitor and follow dysrhythmia protocol as needed.
F. Assess blood glucose.
G. Transport via ALS to an emergency department even if the infant currently appears in no distress.
H. Contact OLMC if parents or caregivers cannot be convinced to take the ambulance to the ED for evaluation.

NOTES & PRECAUTIONS:

A. 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.
B. Many infants appear normal by the time EMS arrives.
C. Consider non-accidental trauma.
D. Serious underlying causes can include pneumonia, bronchiolitis, seizures, sepsis, intracranial hemorrhage, and meningitis.
E. BRUEs are more frequent in premature infants and infants with other health conditions such as cystic fibrosis, bronchiolitis, and congenital heart disease.

TREATMENT:

A. Treat per Universal Patient Care.
B. If MAP < 65 mmHg (systolic BP < 90 mmHg), follow Shock protocol, otherwise follow initial fluid administration rate as below.
C. Remove jewelry and clothing that is smoldering or non-adherent to the patient.
D. Burn Classifications:
    1. Superficial thickness: Epidermis only and looks like a sunburn. The skin is erythematous and mildly painful.
    2. Partial thickness (superficial): Beyond the epidermis to include the superficial dermis. These burns can have blisters.
    3. Partial thickness (deep): Beyond the superficial dermis to include the deep dermis.
    4. Full thickness: Burn involves all layers of the skin and subcutaneous tissue, with involvement of underlying fascia.
F. Determine Total Body Surface Area (TBSA) involved utilizing either the rule of nines or palm method. (**Do not include superficial thickness burns in TBSA**)
G. If the patient has the following, transport to the Burn Center:
    1. Partial thickness burn that is 10% or more of total body surface area.
    2. Full thickness burns.
    3. Burns with inhalation injuries.
    4. Chemical burns.
    5. Electrical burns, including lightning injury.
    6. Burns to face, hands, feet, genitalia, perineum, major joints, or circumferential burns.
    7. Burns in high-risk patients (pediatrics, elderly, significant underlying cardiac or respiratory problems).
    8. Trauma system patients with burns meeting the above criteria.
H. Airway consideration in the burn and inhalation injury patient.
    1. Signs such as singed nasal hairs and facial burns alone are not indications for intubation.
    2. Mild inhalation injuries in patients with normal oxygen saturations and no signs of respiratory distress can be safely observed.
    3. Indications for early intubation:
        a. Signs of respiratory distress, stridor, accessory muscle use
        b. New onset of hoarseness
        c. Blisters or edema of oropharynx
        d. Deep burns to lower face or neck
I. Cool burned areas (no more than 5 minutes) then cover with clean, warm, and dry sheet or blanket. Discontinue cooling if patient begins to shiver. Attempt to leave unbroken blisters intact.
J. Wound care:
    1. Transport using clean, dry sheets or blankets.
    2. Do not wrap extremities individually.
    3. Do not use products such as Silvadene or burn gel.
    4. Do not pack burns with wet towels or do saline soaks.
K. Treat pain per Pain Management protocol.

L. Fluid Administration (Ringers Lactate if available). These rates are for patients not in shock.
   1. Initial Fluid Rate:
      a. ≤ 5 years old @ 125 ml/hr
      b. 6-13 years of age @ 250 ml/hr
      c. ≥ 14 years old @ 500 ml/hr
   2. Burns greater than 20% TBSA should have 2 large bore IV's.

M. Apply carbon monoxide (e.g. Rad-57) monitor if available.

N. If chemical burn:
   1. Consider Haz-Mat response.
   2. Protect yourself from contamination. (See Decontamination protocol)
   3. Flush contaminated areas with copious amounts of water.
   4. If chemical is dry, carefully brush off prior to flushing.
   5. Do not use a neutralizer.

O. If electrical burn:
   1. Apply sterile dressings to entry and exit wounds. As with other injuries, keep clean, warm, and dry.
   2. Treat any dysrhythmias per appropriate Cardiac Dysrhythmia protocol.
   3. Electrical injuries have a risk for rhabdomyolysis so early fluid infusion is important.
   4. Specify arc flash or contact and voltage if known.

P. 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:
   1. Hydroxocobalamin (CYANOKIT®) 5 g IV/IO over 15 minutes. Repeat once if needed. For cardiac arrest, hydroxocobalamin should be administered as a rapid fluid bolus.
   2. If Hydroxocobalamin (CYANOKIT®) is not available, then administer Sodium Thiosulfate 50 ml of 25% solution over 10 - 20 minutes. Do NOT administer Hydroxocobalamin (CYANOKIT®) and Sodium Thiosulfate to the same patient.
   3. Treat other presenting symptoms per appropriate protocol.
   4. Initiate emergent transport to appropriate facility.
   5. Make sure to notify receiving facility if either Hydroxocobalamin or Sodium Thiosulfate are administered due to changes in urine and blood color

PEDIATRIC PATIENTS:

A. Treat pain per Pain Management protocol.

B. Consider possibility of non-accidental cause in children.

C. Hydroxocobalamin dose for pediatric patients is 70 mg/kg IV/IO over 15 minutes. Do not exceed adult dosing. For cardiac arrest, hydroxocobalamin should be administered as a rapid fluid bolus. Contact OLMC for advice regarding second dose.

D. 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.

Burns – 10.040

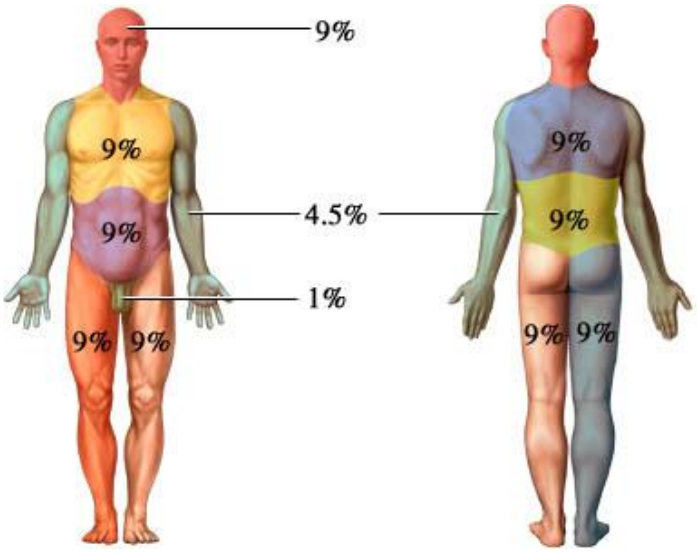
NOTES & PRECAUTIONS:

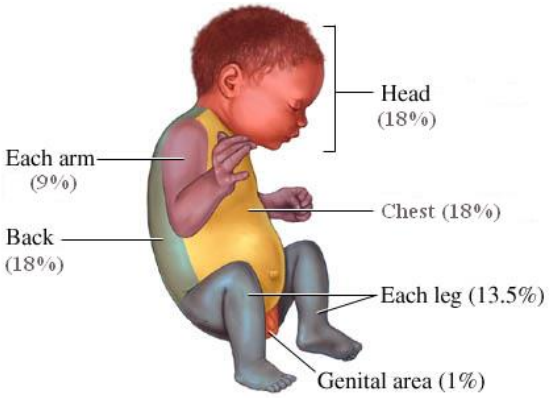
A. Remove rings or other constricting items immediately.
B. Be prepared to use RSI early to control airway if necessary.
C. Maintaining the patient's core body temperature is a priority. EMS transport vehicles should be warmed, and the patient should be covered to prevent hypothermia.
D. For firefighters, consider the potential for other traumatic injury or MI.

KEY CONSIDERATIONS:

Enclosed space, lung sounds, possibility of inhaled toxins, past medical history, CO/Cyanide poisoning, evidence of respiratory burns, extent of burns, explosion or trauma injuries

RULE OF NINES:





PALM METHOD:

The size of the **patient's hand**, including the fingers, represents approximately 1% of his /her total body surface area

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

PURPOSE:
To establish general guidelines for the management of cardiac arrest patients.

INDICATIONS:
Cardiac Arrest

TREATMENT:

A. CPR should be provided at a rate of 30:2 (30 compressions to 2 breaths) or continuous compressions with interposed ventilations every six seconds (approximately 10 compressions to 1 breath) throughout resuscitation until ROSC is achieved or termination of resuscitation.
B. Cardiac arrest rhythms frequently change. If, or when, there is a change in the rhythm, move to the appropriate algorithm.
C. Use a Pit-Crew Approach to assign responders to designated positions.
D. Initiate and maintain high quality chest compressions with limited interruptions (< 10 seconds).
E. There should be no interruptions to CPR when securing a patient's airway. Consider early use of a supraglottic airway to minimize CPR interruptions or when ALS resources are limited.
F. If a mechanical CPR device is available, avoid extra or prolonged pauses in CPR when applying.
G. Preferred order of vascular access in adults is upper extremity IV (or external jugular vein), upper extremity IO, then lower extremity IO. Preferred access site for pediatric patients is the proximal tibia or the distal femur. Humeral IO is **NOT** recommended for infants and toddlers. Medications should be administered IV if multiple means of vascular access are established.
H. Early epinephrine administration is associated with improved patient outcomes.
    1. 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.
    2. For shockable rhythms, administer epinephrine as soon as feasible after second defibrillation attempt has failed.
I. If patient has return of spontaneous circulation, reassess vital signs to ensure stability before packaging for transport. Follow the Cardiac Arrest Post Resuscitation protocol to include targeted temperature management, obtaining a 12-lead ECG, and managing blood pressure.
J. In general, continue resuscitation for a minimum of 30 minutes. Cardiac arrests are best run at location the patient is found until ROSC or until resuscitation attempts cease. Patient movement and transport are associated with low quality compressions unless a mechanical CPR device is available.
K. 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:

1. **50 mcg of fentanyl IV/IO, <u>then</u>**
2. **2.5 mg of midazolam IV/IO <u>OR</u> 1 mg lorazepam IV/IO**
3. **Repeat vital signs between medications.**
4. **May repeat as needed every 5 - 10 minutes. Max total dose for lorazepam is 4 mg.**

L. Refer to the individual algorithms for rhythm specific key considerations.

Cardiac Arrest (Asystole) – 10.050

TREATMENT:

FLOW OF ALGORITHM ASSUMES ASYSTOLE IS CONTINUING

If the heart rhythm changes move to the appropriate algorithm. Interruptions to CPR should be avoided (less than 10 seconds).

Start or continue CPR until monitor and defibrillator pads are attached.

↓

Assess heart rhythm.
1:10,000 Epinephrine 1 mg IV/IO
Continue CPR for two minutes.

↓

If asystole persists, continue two-minute cycles of CPR and rhythm analysis.
Continue 1:10,000 Epinephrine 1 mg IV/IO every 3 - 5 minutes.

PEDIATRIC PATIENTS:

A. Follow adult algorithm.
B. Epinephrine 1:10,000 dose - 0.01 mg/kg IV/IO as soon as possible after cardiac arrest is recognized. Repeat every 3 - 5 minutes.

NOTES & PRECAUTIONS:

A. If unwitnessed arrest and no obvious signs of death, proceed with resuscitation and get further information from family/bystanders.
B. For patients in whom only 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.
C. If cause of arrest is suspected to be hyperkalemia, consider calcium gluconate 3 grams IV/IO.
D. Sodium bicarbonate is not recommended for the routine cardiac arrest sequence but should be used early in cardiac arrest associated with suspected sodium channel blocker overdose (e.g., cyclic antidepressant), suspected hyperkalemia, or acidosis. If used:
    1. Administer 1 mEq/kg IV/IO.
    2. May be repeated at 0.5 mEq/kg every 10 minutes.

KEY CONSIDERATIONS:

Consider and treat possible causes:

- Acidosis - Sodium bicarbonate 1 mEq/kg IV/IO.
- Cardiac tamponade – Initiate rapid transport.
- Hyperkalemia – Treat with calcium gluconate 3 grams IV/IO and sodium bicarbonate 1 mEq/kg IV/IO.

- Hypothermia – Treat per Hypothermia protocol.
- Hypovolemia – Treat with up to 2000 ml of a crystalloid solution.
- Hypoxia/Hypoventilation – Oxygenate and provide normal ventilation. Avoid hypo and hyperventilation.
- Pulmonary embolus – Initiate rapid transport.
- Tension pneumothorax – Needle decompression.
- Tri-cyclic antidepressant overdose – Sodium bicarbonate 1 mEq/kg IV/IO.

Cardiac Arrest (PEA) – 10.050

TREATMENT:

FLOW OF ALGORITHM ASSUMES PEA IS CONTINUING

If the heart rhythm changes move to the appropriate algorithm. Interruptions to CPR should be avoided (less than 10 seconds).

Start or continue CPR until monitor and defibrillator pads are attached.

↓

Assess heart rhythm.
1:10,000 Epinephrine 1 mg IV/IO
Continue CPR for two minutes.

↓

If PEA persists, continue two-minute cycles of CPR and rhythm analysis.
Continue 1:10,000 Epinephrine 1 mg IV/IO every 3 - 5 minutes.

↓

Administer up to 2000 ml of a crystalloid solution.

PEDIATRIC PATIENTS:

A. Follow adult algorithm.
B. Epinephrine 1:10,000 dose - 0.01 mg/kg IV/IO as soon as possible after cardiac arrest is recognized. Repeat every 3-5 minutes.
C. Administer fluid boluses of 10 - 20 ml/kg.

NOTES & PRECAUTIONS:

A. SURVIVAL FROM PEA is based on identifying and correcting the responsible factors: consider a broad differential diagnosis, with early and aggressive treatment of possible causes. **(See Key Considerations)**
B. Death in the field may be determined with $EtCO_2$ of 10 or less in patients with PEA after 30 minutes of attempted ACLS resuscitation. For patients with $EtCO_2$ greater than 10, either continue resuscitation or contact OLMC to stop resuscitation.
C. If cause of arrest is suspected to be hyperkalemia, consider calcium gluconate 3 grams IV/IO.
D. Sodium bicarbonate is not recommended for the routine cardiac arrest sequence but should be used early in cardiac arrest associated with suspected sodium channel blocker overdose (e.g., cyclic antidepressant), suspected hyperkalemia, or acidosis. If used:
    1. Administer 1 mEq/kg IV/IO.
    2. May be repeated at 0.5 mEq/kg every 10 minutes.

Cardiac Arrest (PEA) – 10.050

KEY CONSIDERATIONS:

Consider and treat possible causes:

- Acidosis - Sodium bicarbonate 1 mEq/kg IV/IO.
- Cardiac tamponade – Initiate rapid transport.
- Hyperkalemia – Treat with calcium gluconate 3 grams IV/IO and sodium bicarbonate 1 mEq/kg IV/IO.
- Hypothermia – Treat per Hypothermia protocol.
- Hypovolemia – Treat with up to 2000 ml of a crystalloid solution.
- Hypoxia/Hypoventilation – Oxygenate and provide normal ventilation. Avoid hypo and hyperventilation.
- Pulmonary embolus – Initiate rapid transport.
- Tension pneumothorax – Needle decompression.
- Tri-cyclic antidepressant overdose – Sodium bicarbonate 1 mEq/kg IV/IO.

Cardiac Arrest (V-Fib / Pulseless VT) – 10.050

TREATMENT:

FLOW OF ALGORITHM ASSUMES VF/VT IS CONTINUING

If the heart rhythm changes move to the appropriate algorithm. Interruptions to CPR should be avoided (less than 10 seconds).

Start or continue CPR until monitor and defibrillator pads are attached.

↓

Assess heart rhythm.
Defibrillate

↓

Immediately continue CPR for two minutes
Establish IV/IO access.

↓

Assess heart rhythm.
1:10,000 Epinephrine 1 mg IV/IO
Defibrillate

↓

Immediately continue CPR for two minutes.

↓

Assess heart rhythm.
Amiodarone 300 mg IV/IO or Lidocaine 1.5 mg/kg IV/IO
Defibrillate

↓

Immediately continue CPR for two minutes.

↓

Assess heart rhythm.
1:10,000 Epinephrine 1 mg IV/IO
***Vector change if second defibrillator unavailable or **Double Sequential External Defibrillatin (DSED)**

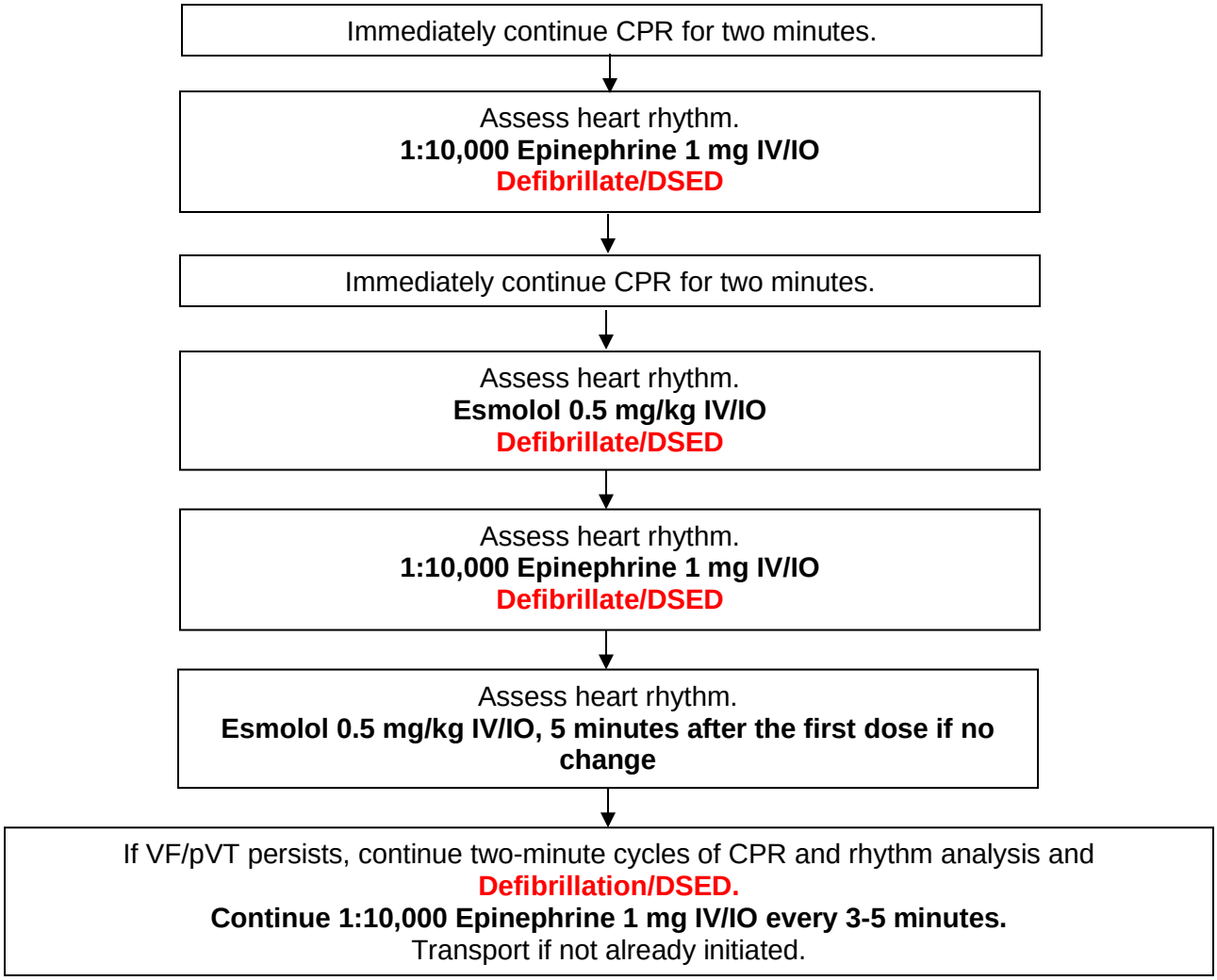
↓

Immediately continue CPR for two minutes.

↓

Assess heart rhythm.
Amiodarone 150 mg IV/IO (If Amiodarone was first anti-dysrhythmic) or Lidocaine 1.5 mg/kg IV/IO (if Lidocaine was first anti-dysrhythmic)
Defibrillate/DSED

Cardiac Arrest (V-Fib / Pulseless VT) – 10.050



PEDIATRIC PATIENTS:

A. Follow adult algorithm flow. Use the following dosing:

- Defibrillation:
  4j/kg

- Drugs:
  1. Epinephrine – 1:10,000 - 0.01 mg/kg IV/IO
  2. Amiodarone – 5 mg/kg IV/IO. May repeat once with 2.5 mg/kg IV/IO.
  3. Lidocaine – Follow adult dosing.

- Induced Hypothermia – Patients ≥ 13 years old after successful return of spontaneous circulation. Follow Induced Hypothermia protocol.

B. **DSED not indicated for children < 18, but vector change should be performed after a 3rd unsuccessful defibrillation.**

Cardiac Arrest (V-Fib / Pulseless VT) – 10.050

NOTES & PRECAUTIONS:

A. Initial pad location should be anterior-posterior if feasible. Second pad location should be anterior-lateral.
B. If persistent/refractory VF/Pulseless VT, consider early transport, especially if mechanical CPR is available.
C. *If second defibrillator unavailable and patient remains in persistent VF/Pulseless VT (greater than three consecutive shocks), reposition defibrillation pads to either anterior/posterior or anterior/lateral depending on initial placement.
D. **Following the third unsuccessful defibrillation, perform Double Sequential External Defibrillation (DSED) for all subsequent defibrillations if second defibrillator is available.
E. If using LUCAS, ensure that the defibrillation pads and wires are not underneath the suction cup.
F. If cause of arrest is suspected to be hyperkalemia, consider calcium gluconate 3 grams IV/IO.

CARDIAC MONITOR JOULE SETTINGS:

Stryker-Physio Control LP15® – 360j all shocks.

Zoll E/X-Series® – 120j, 150j, 200j, and then repeat at 200j as needed.

Cardiac Arrest (Trauma) – 10.050

PURPOSE: Unwitnessed traumatic arrest is almost uniformly fatal while EMS witnessed arrest due to severe hypovolemia, hypoxia, or tension pneumothorax may respond to prehospital resuscitation. The purpose of this protocol is to determine when someone should have an attempt at resuscitation when in traumatic arrest.

DEFINITIONS:

A. Traumatic arrest: Loss of pulses and apnea secondary to trauma, not attributable to medical causes.
B. **HAT** Resuscitation: Treatable causes of witnessed traumatic arrest.

Hypovolemia:
- Control external bleeding.
- If blunt trauma, apply pelvic binder/wrap.
- Administer 1000 ml of Normal Saline or Lactated Ringers.

Airway/Oxygenation:
- Ensure airway patency and effective oxygenation.

Tension Pneumothorax:
- Perform bilateral needle chest decompression.

PROCEDURE:

A. Trauma patients who are pulseless and apneic on EMS arrival are considered dead in the field per the Death and Dying protocol (50.025) unless there are extenuating circumstances (e.g. hypothermia, possible medical cause).
B. For patients found in VF or Pulseless VT on EMS arrival, suspect a medical event and treat per the VF/Pulseless VT protocol.
C. For patients who deteriorate to PEA or asystole on scene, begin HAT resuscitation:
    1. If ROSC is obtained, transport.
    2. If ROSC is not achieved, you may declare the patient dead or contact OLMC for guidance.
D. For patients who arrest during transport, initiate HAT resuscitation and:
    1. If within 15 minutes of a trauma center, continue to the trauma center.
    2. 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 AND PRECAUTIONS:

A. 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.
B. 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.
C. 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.
D. Post-ROSC cooling in the traumatic arrest patient should be deferred to the hospital.

Cardiac Arrest with Pregnancy (> 22 weeks) – 10.050

TREATMENT:

Manage rhythm per appropriate cardiac arrest algorithm (V-Fib/Pulseless VT, PEA, Asystole).

↓

CPR with continuous manual left lateral uterine displacement using the two-handed method shown below (see Note G).

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.

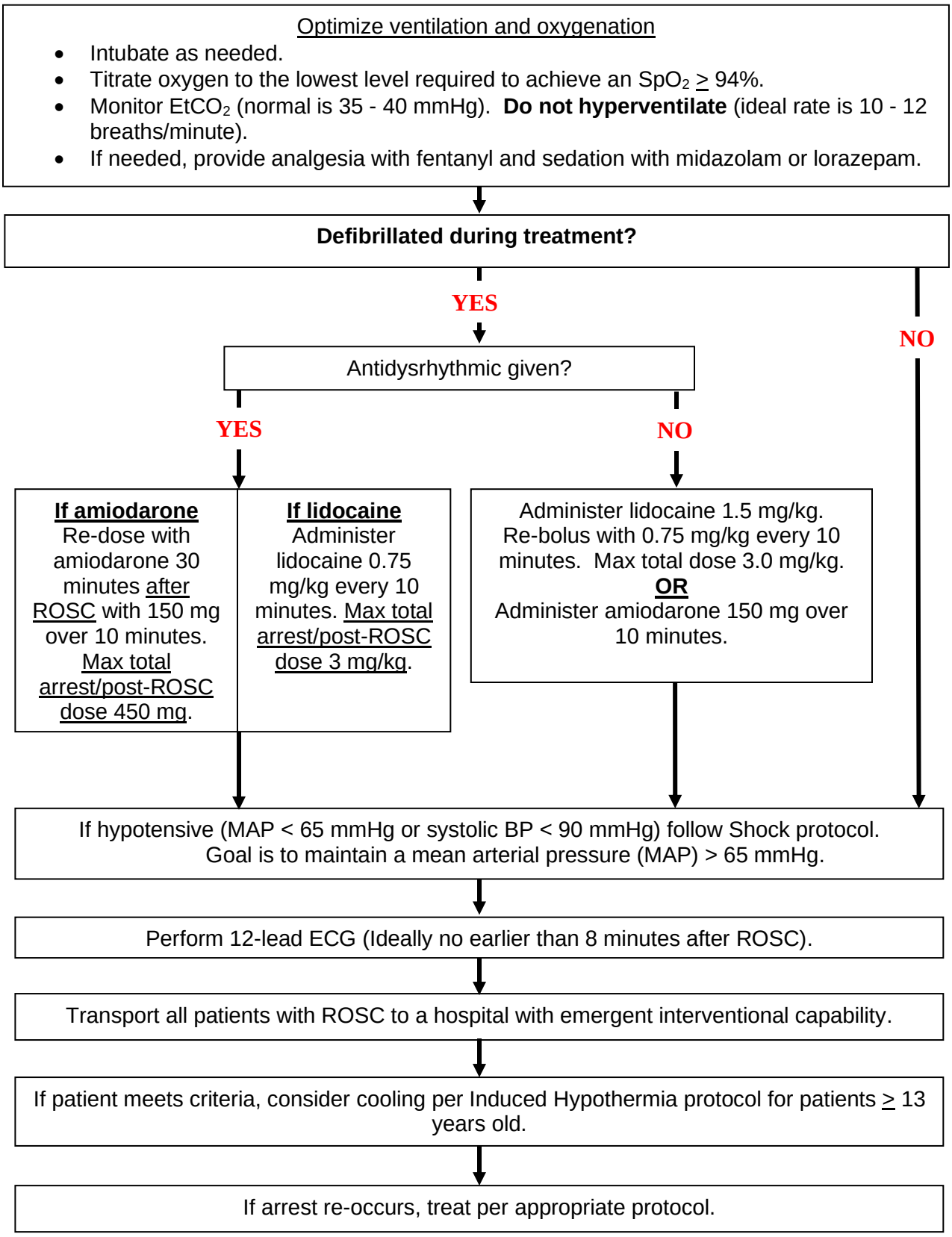
Cardiac Arrest with Pregnancy (> 22 weeks) – 10.050

NOTES & PRECAUTIONS:

A. Consider early transport prior to achieving ROSC, especially if a mechanical CPR device is available.
B. Alert the receiving facility early in order 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.
C. If ROSC has been achieved and maintained prior to, or during transport, bypass to an OB and NICU capable facility.
D. Lidocaine is preferable (Class B in Pregnancy) to amiodarone (Class C in Pregnancy) in the setting of ventricular fibrillation or pulseless ventricular tachycardia.
E. 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.
F. 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.
G. 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.
H. High flow oxygen needs to be maintained in all peri-arrest patients.
I. Consider OG placement when possible.

Cardiac Arrest Post Resuscitation – 10.050

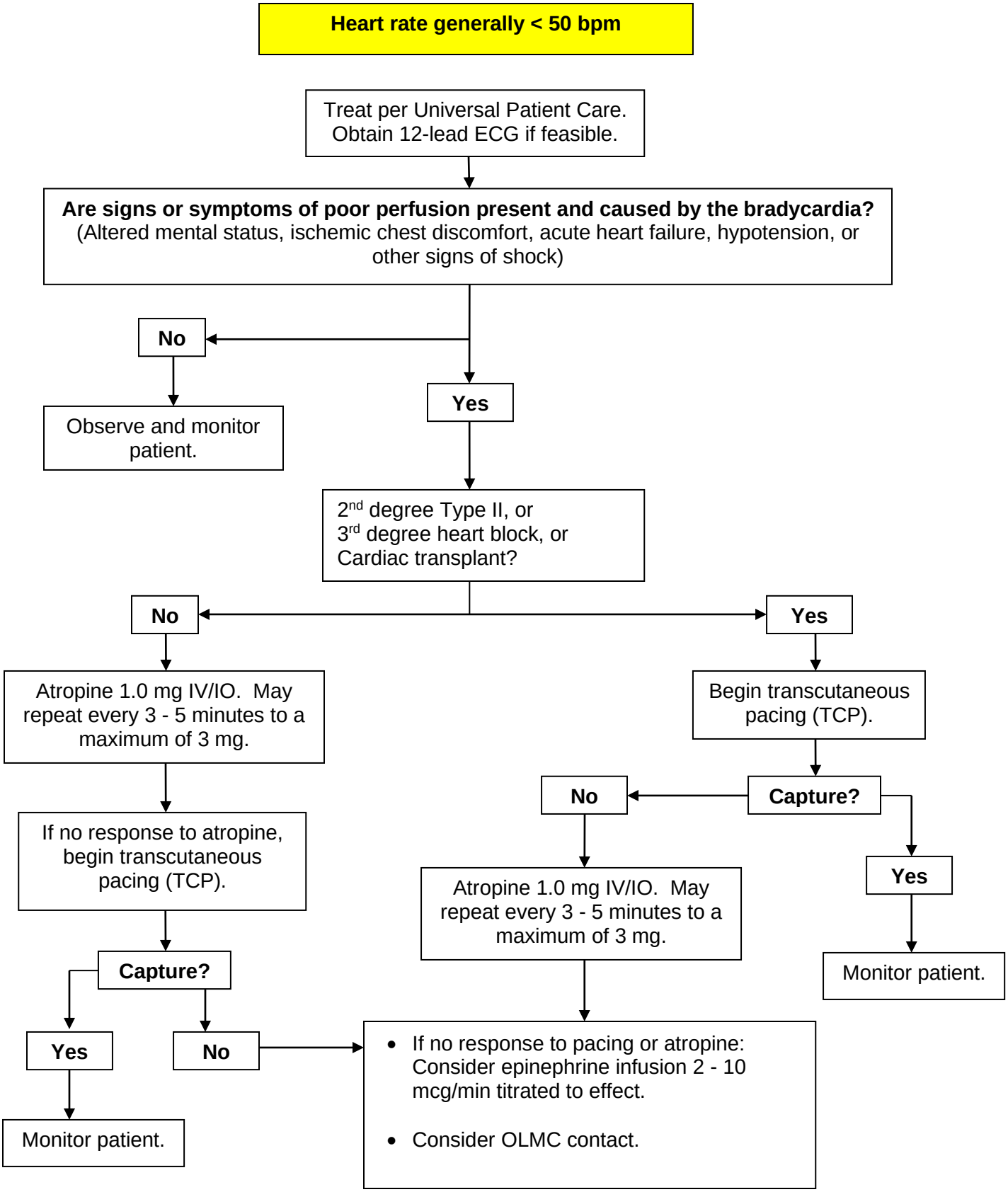
TREATMENT:



NOTES & PRECAUTIONS:

A. If patient has ROSC, observe briefly to ensure stability before packaging for transport.
B. 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.
C. The condition of post-resuscitation patients fluctuates rapidly, and they require close monitoring.
D. Do not use amiodarone or lidocaine in perfusing patients without OLMC approval in the following situations:
    1. Systolic BP is less than 90 mmHg.
    2. Heart rate is less than 50 beats per minute.
    3. Periods of sinus arrest are present.
    4. Second or third-degree heart block are present.
E. For transgender and non-binary patients, use sex assigned at birth for 12-lead ECG computerized interpretation.

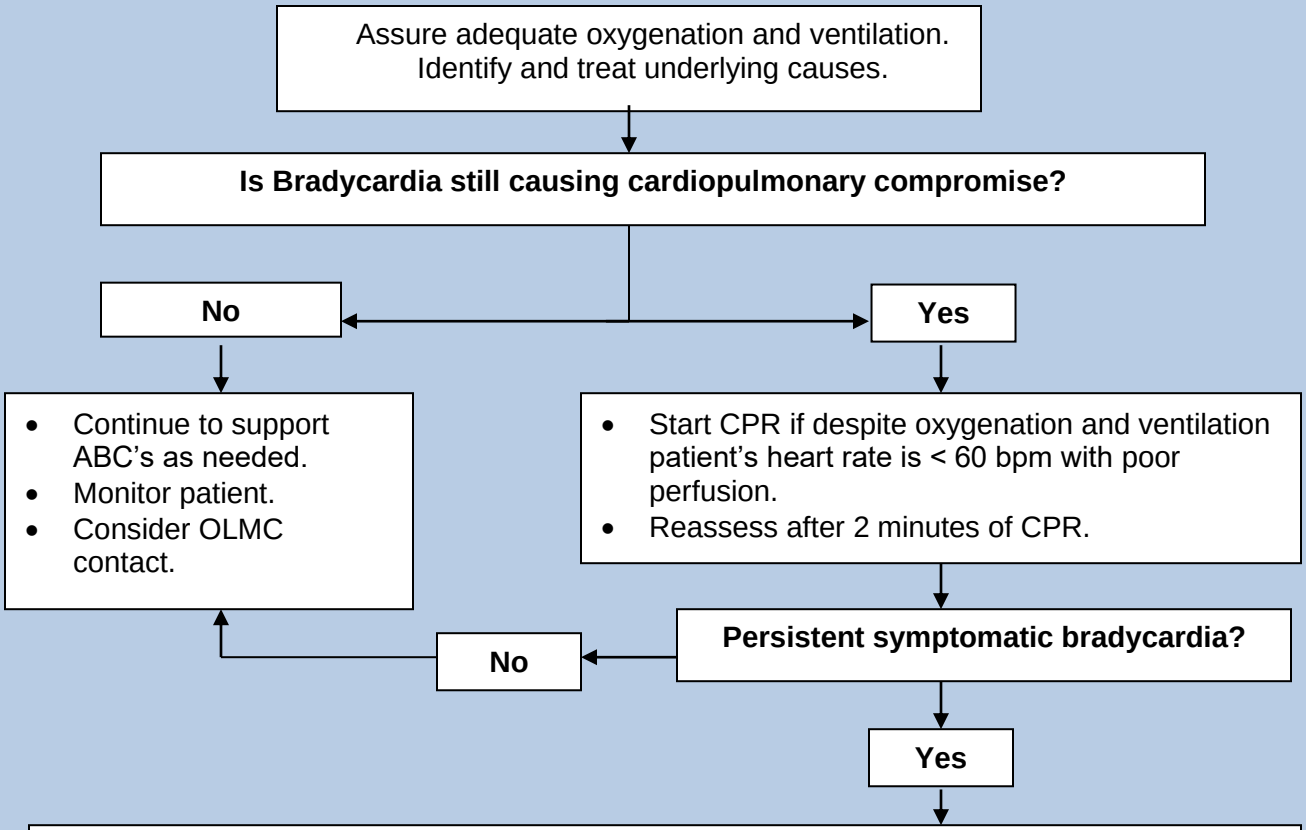
Cardiac Dysrhythmias (Bradycardia) – 10.060



Cardiac Dysrhythmias (Bradycardia) – 10.060

PEDIATRIC PATIENTS:

BRADYCARDIA WITH A PULSE AND POOR PERFUSION



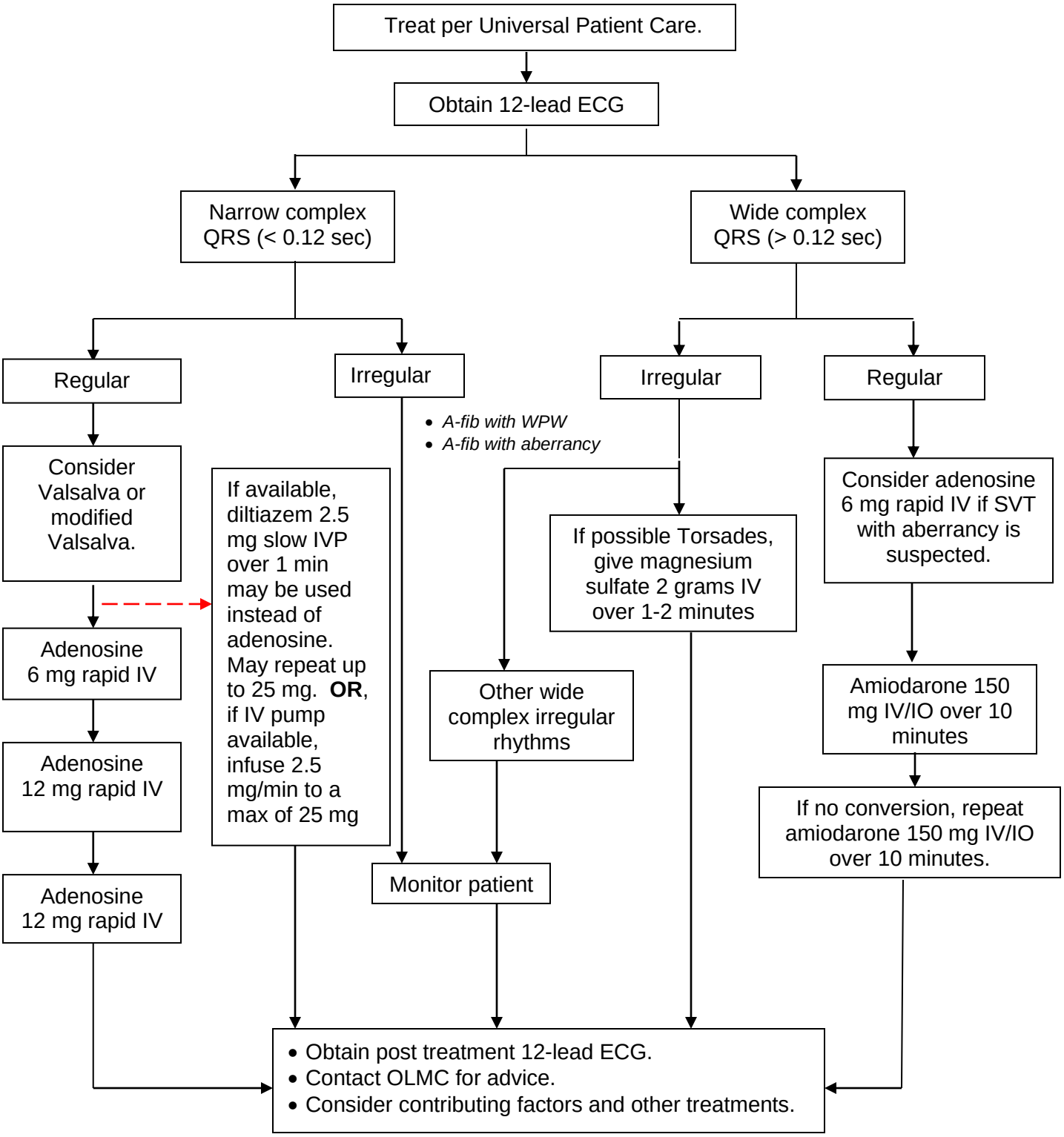
- Give 1:10,000 epinephrine 0.01 mg/kg IV/IO. Repeat every 3 - 5 minutes.
- Consider pacing per Transcutaneous Pacing procedure. If capture is achieved and patient is uncomfortable, consider Midazolam 0.1 mg/kg IV/IO to a MAX of 5 mg, may repeat once in 5 minutes, **or** lorazepam 0.05 mg/kg IV/IO to a max single dose of 2 mg, may repeat every 5 minutes to a max total dose of 4 mg. If no IV, 0.1 mg/kg IM to a max single dose of 2 mg, may repeat once in 10 minutes.
- If capture is not achieved, try repositioning pads.
- Goal of therapy is to improve perfusion.

NOTES & PRECAUTIONS:

A. Hypoxia is a common cause of bradycardia.
B. Bradycardia may be protective in the setting of cardiac ischemia and should only be treated if associated with serious signs and symptoms of hypoperfusion. Increasing heart rate may worsen ischemia or increase infarct size.
C. Hyperkalemia may cause bradycardia. If the patient has a wide complex bradycardia with a history of renal failure, muscular dystrophy, paraplegia, crush injury or serious burn > 48 hours prior, consider treatment per Hyperkalemia protocol.
D. Immediate TCP can be considered in unstable patients when vascular access is not available.
E. TCP is at best a temporizing measure and is not useful in asystole.
F. If TCP capture is not achieved, try repositioning pads.
G. If capture is achieved with TCP and patient is experiencing discomfort, administer either midazolam 2.5 - 5 mg IV/IO or 5 mg IM/IN (may repeat once) **or** lorazepam 1 - 2 mg IV/IO, may repeat every 5 minutes as needed to a max total dose of 4 mg. If no IV, 2 mg IM, may repeat once in 10 minutes. Call OLMC for additional orders.
H. Atropine will likely be ineffective in heart transplant recipients because they lack vagal innervation.
I. 3rd degree heart blocks with a wide complex QRS (>0.12 sec) are less likely to respond to atropine than those with a narrow complex.

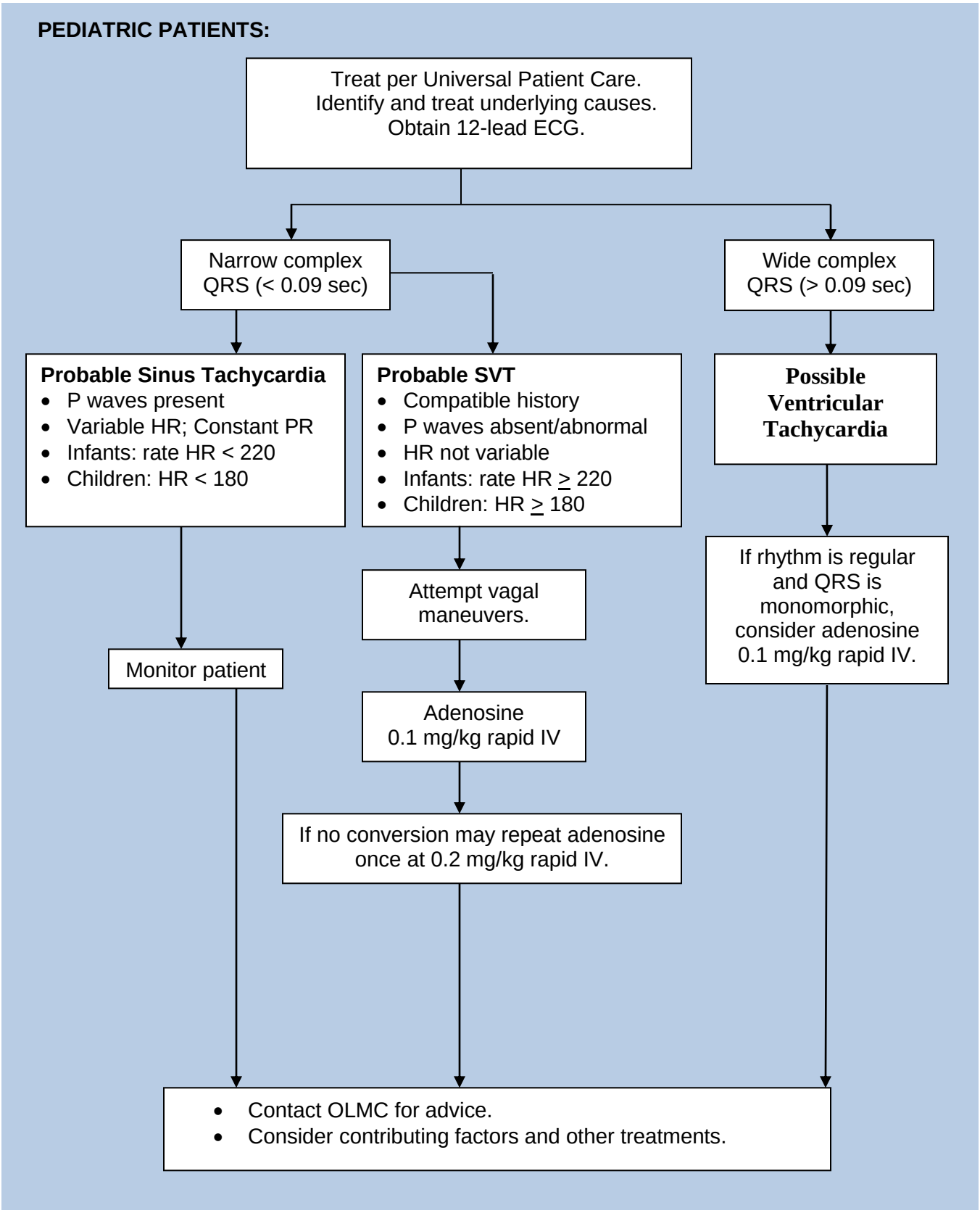
Cardiac Dysrhythmias (Tachycardia Stable) – 10.060

Patient **does not** have signs or symptoms of poor perfusion caused by the dysrhythmia.
(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:

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

Treat per Universal Patient Care

Immediate synchronized cardioversion**
If patient is conscious, consider sedation. Do not delay cardioversion for sedation.

If IV/IO is established - administer etomidate 0.15 mg/kg IV/IO push to a max of 10 mg. Wait 45 - 60 seconds for signs of sedation such as patient becoming verbally unresponsive or no longer following commands.
If no IV/IO – administer midazolam 5 mg IM/IN **or** lorazepam 2 mg IM.

If no change, repeat synchronized cardioversion.

Did the patient convert?

No

Amiodarone 150 mg IV/IO slow push over 3 mins.

Repeat synchronized cardioversion** x 2 if needed

If still no conversion

Initiate rapid transport

Contact OLMC

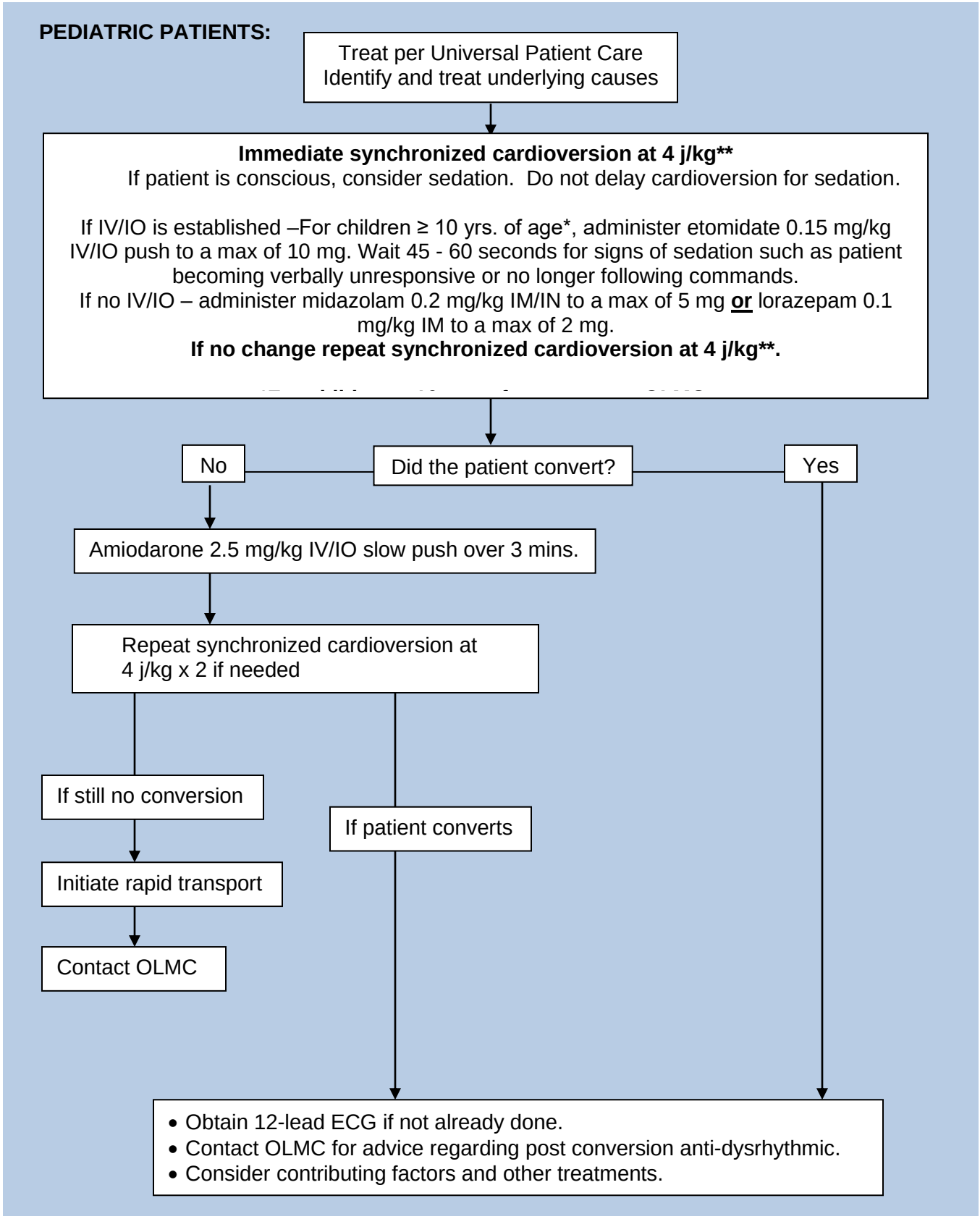
If patient converts

Yes

- Obtain 12-lead ECG if not already done.
- Contact OLMC for advice regarding post conversion anti-dysrhythmic.
- Consider contributing factors and other treatments.

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

Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060



Cardiac Dysrhythmias (Tachycardia Unstable) – 10.060

NOTES & PRECAUTIONS:

A. Possible causes of tachycardia include:
   1. Acidosis
   2. Hypovolemia
   3. Hyperthermia/fever
   4. Hypoxia
   5. Hypo/Hyperkalemia
   6. Hypoglycemia
   7. Infection
   8. Pulmonary embolus
   9. Tamponade
   10. Toxic exposure
   11. Tension pneumothorax

B. If pulseless arrest develops, follow Cardiac Arrest protocol.

C. Defibrillation is recommended for wide complex irregular tachycardia.

D. Etomidate may result in myotonic jerking, apnea and/or pain at the injection site.

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Heart Monitor Adult Synchronous Cardioversion Settings (Joules)	
Physio LifePak®	360 j
Philips MRX®	150 j - 200 j (follow local agency guidelines)
Zoll E/M Series®	200 j

TREATMENT:

A. Treat per Universal Patient Care.
B. Titrate oxygen to the lowest level required to achieve a SpO_2 ≥ 94% (must have good waveform and consistent number to ensure accuracy).
C. If an acute ischemic event is suspected, obtain 12-lead ECG if available. This may be done concurrently with other treatment and should not delay treatment or transport. (**NOTE:** For transgender or non-binary patients, use sex assigned at birth for computerized interpretation).
D. Administer aspirin 324 mg orally unless contraindicated (chewable 81 mg X 4 preferred).
E. If blood pressure is > 100 mmHg systolic, administer nitroglycerin 0.4 mg sublingual. Repeat every 5 minutes until chest pain is relieved if systolic BP remains > 100 mmHg. Establish vascular access prior to nitroglycerin administration in patients who have not taken nitroglycerin previously or who have a potential for hemodynamic instability.
F. For pain unrelieved after three doses of nitroglycerin, consider opioid analgesia per Pain Management protocol. Nitroglycerin may be continued for strong suspicion of acute coronary syndrome.
G. Treat any dysrhythmias per appropriate Cardiac Dysrhythmia protocol.
H. Concerning PVCs (multi-focal, runs of VT, etc.) **in the setting of an acute ischemic event *ONLY*** (i.e., anginal chest pain) may be treated with:
    1. Amiodarone 150 mg IV/IO over 10 minutes.
    2. Amiodarone should not be used if:
        a. BP is less than 90 mmHg.
        b. Heart rate is less than 50 beats per minute.
        c. Periods of sinus arrest.
        d. Presence of second or third-degree AV block.

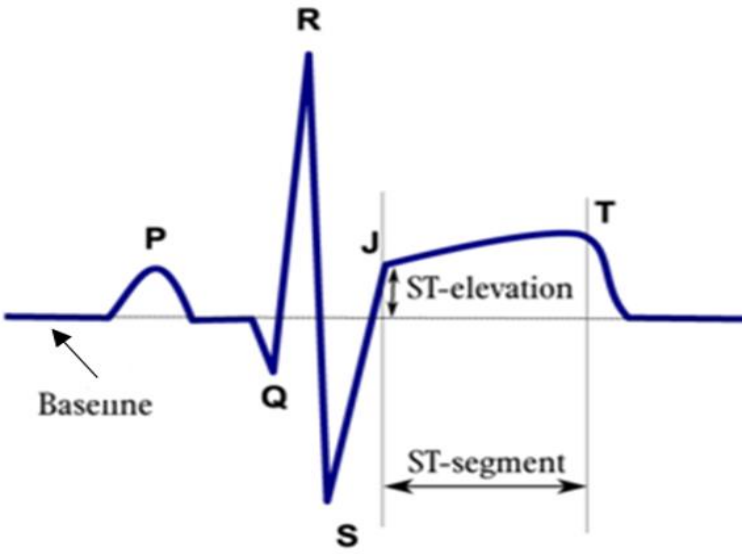
PEDIATRIC PATIENTS:

A. Consider pleuritic causes or trauma.
B. Contact OLMC for advice.

NOTES & PRECAUTIONS:

A. DO NOT DELAY ADMINISTRATION OF ASPIRIN TO OBTAIN 12-LEAD ECG.
B. **Nitroglycerin can cause hypotension in 10% of patients.**
C. **Nitroglycerin should be used with caution in patients with an inferior myocardial infarction (ST elevation in II, III and AVF) as this can result in profound hypotension due to an associated right ventricle infarction (RVI).**
D. RVI may be present in up to 50% of inferior myocardial infarctions. 12-lead ECG clues to RVI include STE in III > II. RVI can also be confirmed with a right sided 12 lead ECG and STE ≥ 1 mm in V_4R. RVI patients are preload dependent and may benefit from IV fluids. Current guidelines recommend avoidance of nitroglycerin in RVI.
E. Do not administer nitroglycerin without OLMC 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 given risk of profound hypotension with concomitant administration.

F. Do not administer aspirin in patients who have an allergy or sensitivity to aspirin, who have a history of an active bleeding disorder, GI bleed or ulcer, or who have a suspected aortic dissection.
G. If initial 12-lead is negative or inconclusive, consider repeating every 3 - 5 minutes if symptoms persist or change.
H. STEMI is defined by having at least 1 mm ST elevation in two contiguous leads (except for V2-V3) **in the absence** of a LBBB or paced rhythm. For leads V2 and V3, the definition is ≥ 2.5 mm of ST elevation for men under 40, ≥ 2 mm in men 40 and older, and ≥ 1.5 mm in women regardless of age. ECG changes can be dynamic and serial ECGs can be very helpful.



How to measure ST elevation?

I. **Occlusion MI (OMI)**: Using STEMI ECG criteria alone will miss up to 40% of patients with acute coronary occlusion, as it is neither sensitive nor specific for this condition.
J. ECG findings concerning for an ongoing coronary occlusion also warrant emergent cath lab activation despite the absence of STE. **Refer to the Patient Treatment Protocol Aids section for examples of ECG findings consistent with occlusive MIs as described below.**

1. Hyperacute T waves.
2. Mild ST elevation with reciprocal depression in aVL.
3. Anterior ST depression (posterior MI) even in the absence of posterior lead ST elevation.
4. De Winter T waves.
5. LBBB or paced rhythm with Smith-Modified Sgarbossa Criteria.
6. Wellens syndrome: Abnormal electrocardiographic (ECG) pattern evidenced by deeply inverted T waves in leads V2 and V3 (secondary to proximal LAD stenosis.)

FIELD IDENTIFIED ST-ELEVATION MI (STEMI)

Indication:

12-lead ECG with:

A. Automatic ECG interpretation of “Acute MI” **OR**
B. Paramedic concern for STEMI or OMI based on field provider ECG review and clinical presentation.

Action:

A. If possible, transmit 12-lead ECG to destination hospital.
B. Early notification of destination hospital and advise the receiving hospital of “STEMI activation”. Target is within 5 minutes of identification.
C. Apply defibrillation pads.
D. Rapid transport to destination hospital ED with cardiac interventional capability.

TREATMENT:

A. Treat per Universal Patient Care.
B. Spinal immobilization if indicated and feasible.
C. Consider pain management.
D. Evaluate degree of entrapment and viability of extremities (absent pulse, blanched skin, capillary refill, diminished sensation, extremely cold to the touch).
    1. 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.
    2. If extrication of a limb will be prolonged and patient's condition is deteriorating, strongly consider calling Trauma Communications to arrange on-scene management.
E. During extrication, administer 1000 - 2000 cc NS or LR via IV bolus, then maintain at 500 cc/hr.
F. 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 with calcium gluconate, high dose albuterol inhalation and sodium bicarbonate.
G. Wound care:
    1. Remove all restrictive dressings (clothing, jewelry, etc.).
    2. Monitor distal pulse, motor, and sensation in involved extremity.
    3. Bandage all open wounds (irrigate if needed).
    4. Stabilize all protruding foreign bodies (impaled objects).
    5. Splint/immobilize injured areas.
    6. For suspected pelvic crushing injuries, follow the Pelvic Wrap procedure if indicated.

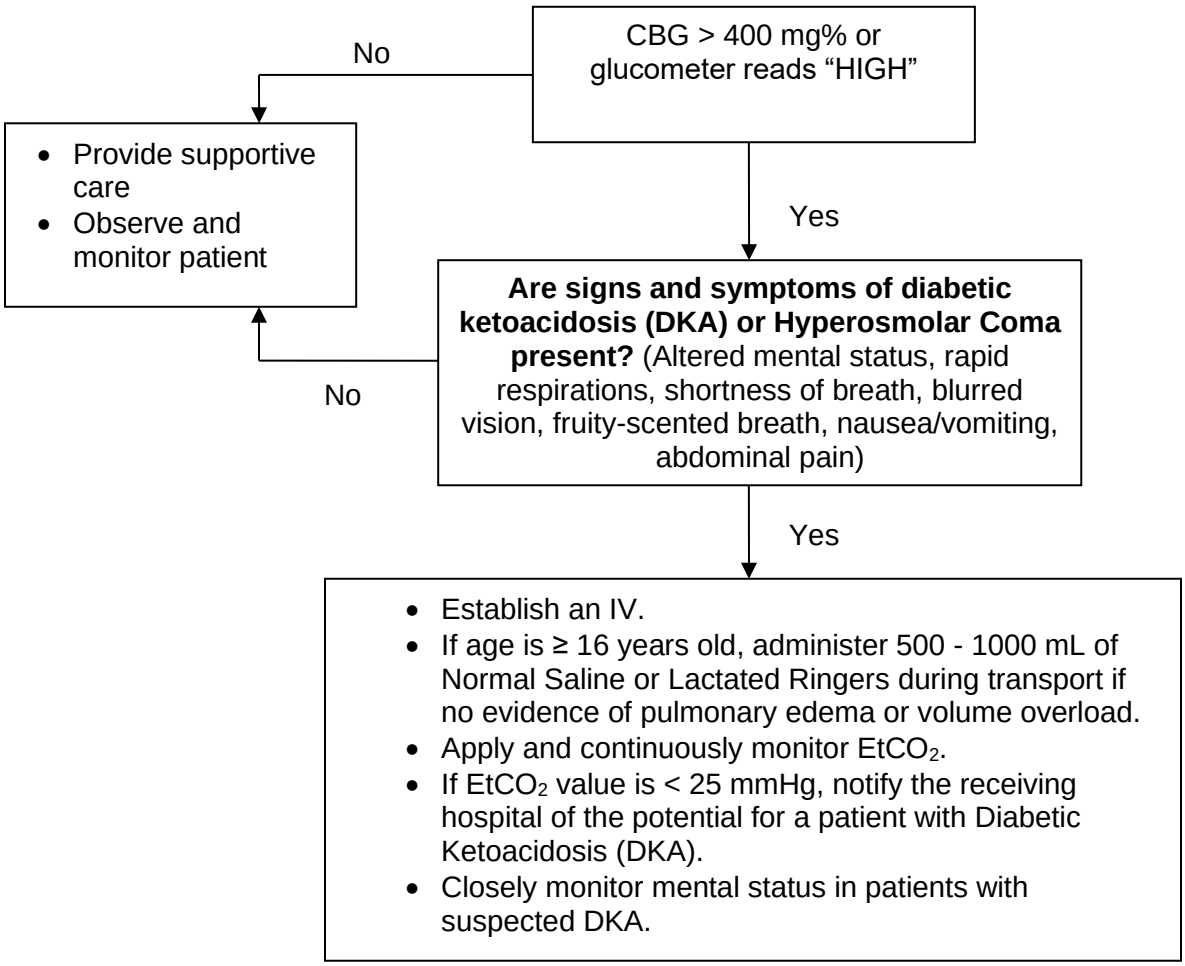
NOTES & PRECAUTIONS:

A. Crush injuries may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse, and shallow respirations.
B. Plan extrication activities to allow for periodic patient assessment. Plan for occasional extrication equipment "shut down" to assess vital signs.
C. Carefully track vital signs, IV fluids, cardiac rhythm, and medications during extrication.
D. Protect patient from environment (rain, snow, direct sun, etc.). If applicable, begin warming methods to prevent hypothermia (warm blankets, heated air with blower, warm IV fluids).
E. Carefully assess collateral injuries that may have occurred during event.
F. 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.
G. Do not allow any personnel into extrication area (inner circle) without proper protective equipment and thorough briefing to include evacuation signal.
H. Notify the receiving Trauma Center through Trauma Communications early in the extrication process to receive additional advice.

Hyperglycemia

TREATMENT:

A. Treat per Universal Patient Care.
B. Determine capillary blood glucose level.



PEDIATRIC PATIENTS:

A. Follow adult algorithm.
B. 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.

Hypoglycemia

TREATMENT:

A. Treat per Universal Patient Care.
B. Determine Capillary Blood Glucose level:
    1. If CBG < 60 mg%, or < 80 mg% in a known diabetic patient:
        a. If patient can protect their own airway, give oral glucose.
        b. 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
    2. Check CBG after 5 minutes and repeat treatment if blood sugar remains low and patient remains symptomatic.
    3. If no IV can be established, give glucagon 1 mg IM.

PEDIATRIC PATIENTS:

Hypoglycemia

A. Dextrose – 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)

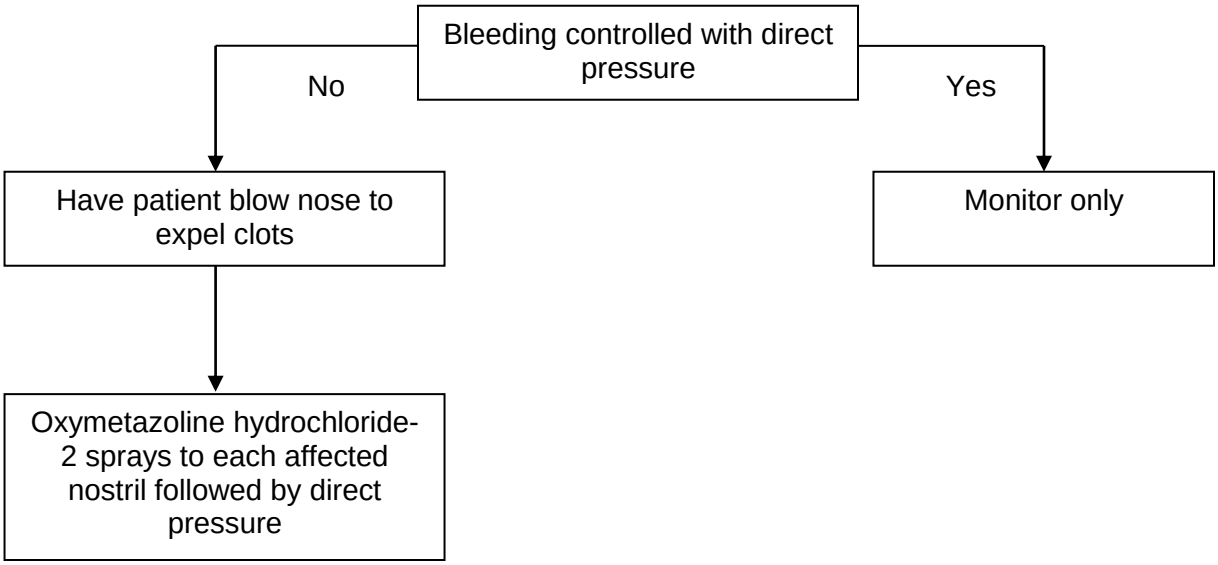
    Or (if diluting D50)
    - Dextrose 12.5%, 4 ml/kg by infusion not to exceed 200 ml total.
B. Glucagon:
    - 0.02 mg/kg IM to a maximum of 1 mg.

NOTES & PRECAUTIONS:

A. Hypoglycemic patients who receive glucose/dextrose/glucagon often refuse transport. This may be reasonable if **all** the following are present:
    1. The patient's mental status has returned to normal.
    2. There is a clear precipitating cause (e.g. took insulin but forgot to eat).
    3. The patient is able to eat a meal.
    4. The patient's recent blood sugar control has been otherwise stable.
    5. The patient's blood glucose level is >80mg%.
    6. A reliable adult will be with the patient.
B. Patients with recent evidence of poor glucose control and those who use oral hypoglycemic medications, in particular 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.
C. Symptoms of hypoglycemia can include the following: Sweating, shakiness, nervousness, hunger, tiredness, dizziness, difficulty thinking, blurred vision, tingling sensation, or heart pounding.

TREATMENT:

A. Treat per Universal Patient Care.
B. Place patient in position of comfort and have them tilt their head forward.
C. Compress the nose with direct pressure or approved nose clip device.
D. If systolic blood pressure is < 90 mmHg (MAP < 65 mmHg), follow Shock protocol.



PEDIATRIC PATIENTS:

A. Follow adult algorithm.
B. 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:

A. It may be difficult to quantify blood loss in epistaxis.
B. Bleeding may be also occurring posteriorly. Evaluate for posterior blood loss by examining the back of the throat.
C. 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.
D. 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.
E. For patients on home oxygen via nasal cannula, place the cannula in the patient's mouth while the nares are compressed for active bleeding.

KEY CONSIDERATIONS:

Age, medications (HTN, anticoagulants, aspirin, clopidogrel, NSAID), previous episodes of epistaxis, trauma, duration of bleeding, quantity of bleeding

TREATMENT:

A. Treat per Universal Patient Care.
B. Unless contraindicated, patients should be transported in a seated position of at least 30 degrees in order to decrease intraocular pressure.
C. Treat specific injuries as follows:
    1. Chemical Burns
        a. Administer proparacaine.
        b. Irrigate from the center of the eye towards the eyelid with lactated ringers (preferred), isotonic saline, or tap water for at least 30 minutes.
        c. Do not attempt to neutralize acids or bases.

    2. Direct Trauma to Eye (Suspected Rupture/Penetration of Globe)
        a. Protect the affected eye and its contents with a hard shield or similar device and cover the other eye.
        b. Follow Pain Management protocol as indicated and consider ondansetron per Nausea and Vomiting protocol.

    3. Foreign body on outer eye
        a. Do not wipe eye.
        b. Administer proparacaine.
        c. 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 to continue anesthetic effect.

NOTES & PRECAUTIONS:

A. Document new onset of blurring, double vision, perceived flashes of light, or other visual changes.
B. Contact lenses should be removed, if possible.

Fever Management – 10.077

TREATMENT:

A. Document temperature before administration of antipyretics and provide written documentation of temperature to receiving facility.
B. Remove heavy blankets or bundling but avoid shivering.
C. For temperature >102°F (38.9°C) consider, if available:
    1. 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
    2. 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:

A. 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.
B. Do not give acetaminophen if known liver disease, alcohol abuse, acute intoxication or has taken acetaminophen in last 4 hours.
C. Do not give ibuprofen in infants under 6 months, or in known renal disease, dehydration, ulcer, GI bleeding, gastric reflux disease (heartburn), pregnancy or has taken within the last 6 hours.
D. Antipyretics are not indicated for environmental hyperthermia.

Hyperkalemia – 10.078

TREATMENT:

A. Treat per Universal Patient Care.
B. If hyperkalemia is suspected based on history and physical findings:
    1. Administer 10% calcium gluconate 1 - 3 gram IV/IO slowly over 5 - 10 minutes in a proximal port.
    2. If no change in rhythm following calcium administration and transport time is prolonged, consider alternate therapy:
        a. High dose albuterol (10 mg by nebulizer).
        b. Sodium bicarbonate 50 mEq IV or IO.

NOTES & PRECAUTIONS:

A. Treatment is going to be based on patient history. Renal failure may elevate blood potassium levels (hyperkalemia) causing bradycardia, hypotension, weakness, weak pulse, and shallow respirations. Other patients who are predisposed to hyperkalemia are those who have muscular dystrophy, paraplegia/quadriplegia, crush injury, or patients who have sustained serious burns > 48 hours. A 12-lead ECG may be helpful.
B. ECG changes that may be present with hyperkalemia include:
    1. Peaked T waves.
    2. Lowered P wave amplitude or no P waves.
    3. Prolonged P-R interval (> 0.20 seconds).
    4. Second degree AV blocks.
    5. Widened QRS complex.
C. DO NOT mix sodium bicarbonate solutions with calcium preparations. Slowly flush remaining calcium gluconate from the catheter prior to administering sodium bicarbonate.

KEY CONSIDERATIONS:

Previous medical history, medications and allergies, trauma

PEDIATRIC PATIENTS:

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

Hyperthermia – 10.080

TREATMENT:

A. Treat per Universal Patient Care.
B. Remove clothing and begin cooling measures that maximize evaporation (spray bottle with tepid water, cool wipes, and fans).
C. If MAP < 65 mmHg (90 mmHg systolic), treat per Shock Protocol.

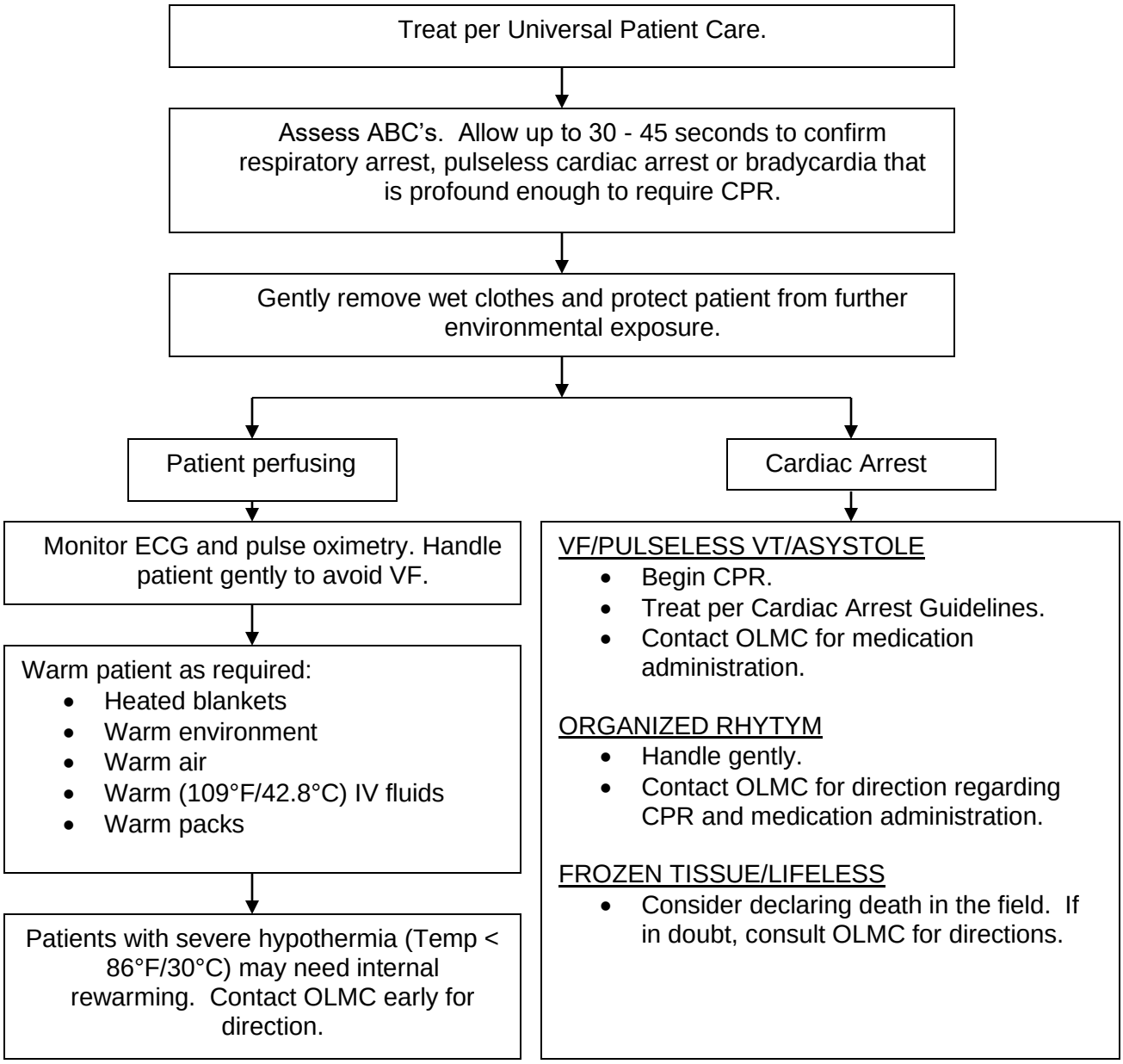
NOTES & PRECAUTIONS:

A. Heat stroke is a medical emergency. Differentiate from heat cramps or heat exhaustion. Be aware that heat exhaustion can progress to heat stroke.
B. Wet sheets over a patient without good airflow will increase temperature and should be avoided.
C. Do not let cooling measures in the field delay transport.
D. Suspect hyperthermia in patients with altered mental status or seizures on a hot, humid day.
E. Consider sepsis and/or contagious disease. Examine patient for rashes or blotches on the skin or nuchal rigidity.

KEY CONSIDERATIONS:

History of onset, sweating, patient's temperature, recent infection/illness, medical history, medications and allergies

Hypothermia – 10.090



NOTES & PRECAUTIONS:

A. At-risks groups for hypothermia include trauma victims, alcohol and drug abuse patients, homeless persons, elderly, low-income families, infants and small children, and entrapped patients.
B. Hypothermia may be preceded by other disorders (alcohol, trauma, OD) look for and treat any underlying conditions while treating the hypothermia.
C. The hypothermic heart may be unresponsive to cardiovascular drugs, pacer stimulation or defibrillation.

KEY CONSIDERATIONS:

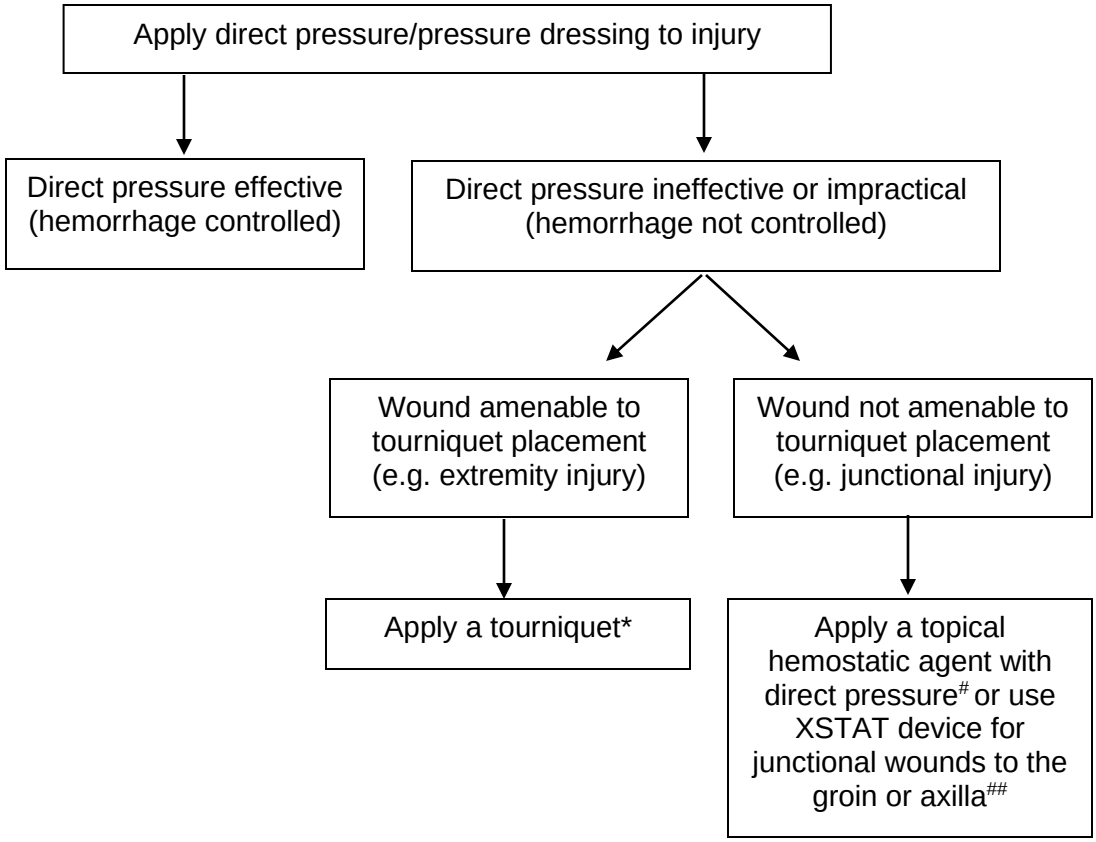
Submersion, cool rainy weather, wind chill, prolonged exposure

Musculoskeletal Trauma – Extremity / Hemorrhage – 10.100

TREATMENT:

A. Treat per Universal Patient Care.

B. External bleeding - Control with direct pressure, elevation, hemostatic dressings, and/or tourniquet per flowchart:



C. Fracture, Sprain or Dislocation:
   1. Check for pulses, movement, and sensation (PMS), distal to the injury site before and after immobilization.
   2. 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.
   3. If fracture/dislocation is open, place a moist sterile dressing over wound and cover with a dry dressing.
   4. Elevate and/or place cold packs over fracture site if time/injuries allow.
   5. Apply traction splint to femur shaft fractures.
   6. For pelvic fractures, utilize pelvic sling and secure patient to a backboard to minimize movement and blood loss.

D. Amputation:
   1. Cover stump or partial amputation with moist sterile dressing.
   2. Splint partial amputations in anatomical position to avoid torsion and angulation.

3. Wrap amputated part in a sterile dressing, and place in a plastic bag to keep dry. Place bag in ice water if available.
4. If transport time is prolonged (extended extrication, etc.) consider sending the amputated part ahead to be prepared for reimplantation.

E. Treat pain per Pain Management protocol.

PEDIATRIC PATIENTS:

A. Treat pain per Pain Management protocol.
B. Consider non-accidental trauma as a cause of injury.

KEY CONSIDERATIONS:

Mechanism of injury, previous medical history, medications and allergies, time of injury, quality of distal pulses, capillary refill

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.

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. Only utilize topical hemostatic agents that have been determined to be effective and safe in a standardized laboratory model.

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

TREATMENT:

A. Treat per Universal Patient Care.
B. Provide initial cervical spinal motion restriction using manual in-line stabilization.
C. Apply cervical collar, and move patient to stretcher while maintaining spinal motion restriction if the patient has a mechanism with the potential for causing spinal injury and meets ANY of the following:
    1. Neck or spine pain/tenderness on palpation.
    2. Altered mental status or history of LOC.
    3. Drug or alcohol intoxication.
    4. Distracting injury (e.g., fracture, dislocation, any injury requiring pain medication), communication/language barrier, or emotional distress.
    5. New neurological deficit (numbness, tingling, weakness, or paralysis).
D. Patient will remain flat on stretcher unless inclined positioning is necessary due to respiratory compromise or patient intolerance.
E. 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.
F. Complete physical and serial neurological exams after spinal motion restriction.
G. Treat per Pain Management protocol.

PEDIATRIC PATIENTS:

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

NOTES & PRECAUTIONS

A. 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.
B. Have a very low threshold for placing patients over 65 years of age in spinal precautions, even with a minor mechanism of injury.
C. 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.
D. There is no role for spinal motion restriction in penetrating trauma.
E. Patients in the third trimester of pregnancy should be positioned/tilted toward the left side to prevent compression of the vena cava during transport.
F. If feasible, especially in prolonged scene transports, pad backboards.
G. If sports injury, follow Sports Equipment Removal protocol.

KEY CONSIDERATIONS:

Mechanism of injury, neurological deficits, PMS before/after spinal motion restriction

TREATMENT:

A. Treat per Universal Patient Care.
B. If shock syndrome is present, follow Shock protocol.
C. Consider IV fluids in patients exhibiting signs of dehydration.
D. 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.
E. Give 8 mg ondansetron orally dissolving tablets (Zofran® ODT) or 4 mg ondansetron slow IV push over 2 minutes, or 4 mg IM.
F. If nausea and/or vomiting are inadequately controlled after 10 minutes, consider:
    1. Repeating ondansetron **or**
    2. Administer haloperidol 1.25 mg IV/IM or droperidol 0.625 mg IV.
G. If patient continues to vomit, administer fluid challenge and consider other causes.

PEDIATRIC PATIENTS:

A. Ondansetron use in patients under 6 months of age requires OLMC consultation except for children in spinal immobilization or children receiving chemotherapy.
B. 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.

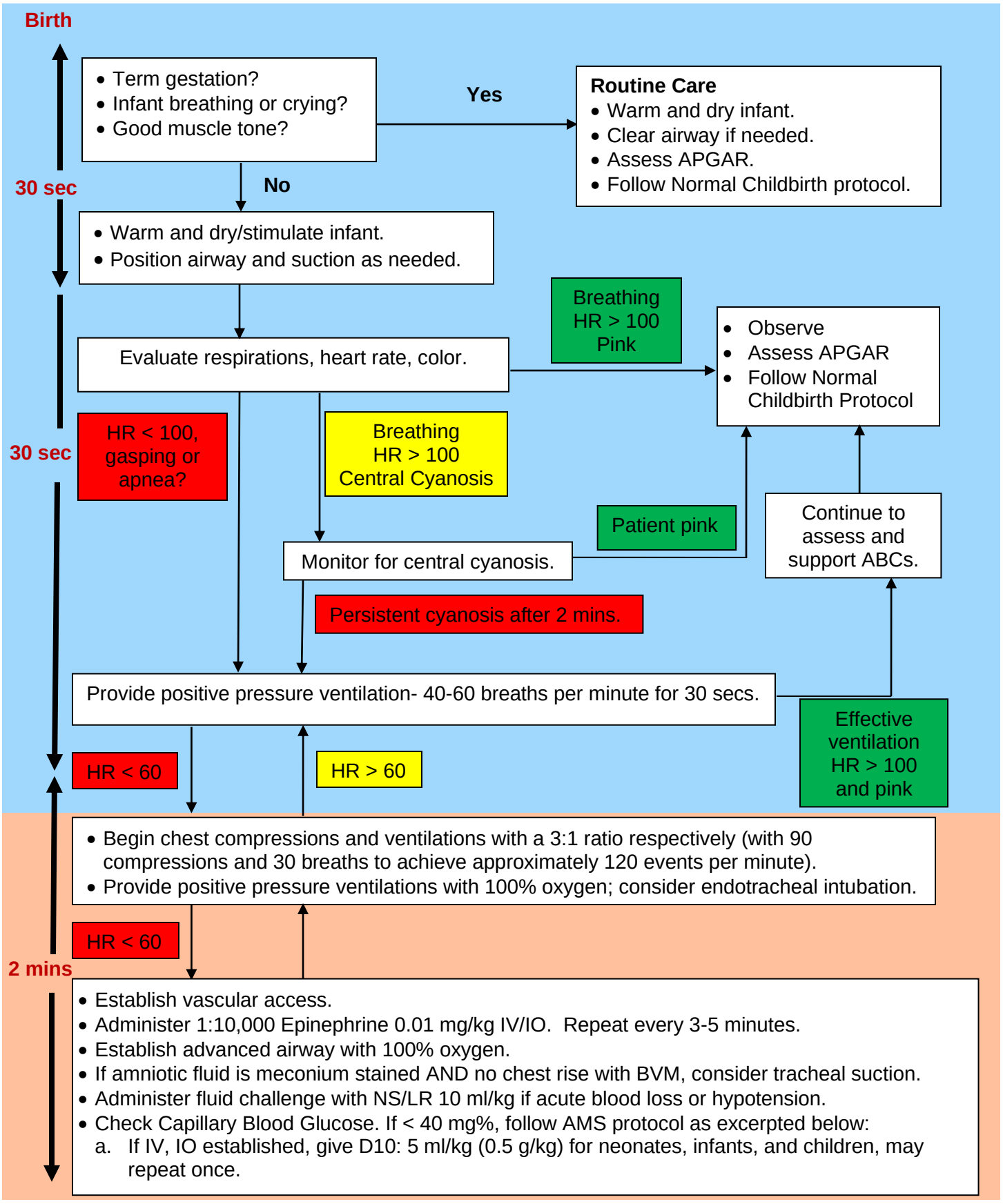
NOTES & PRECAUTIONS:

A. 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.)
B. Do not administer alkaline medications or preparations in the same IV as ondansetron as it may cause precipitation.

KEY CONSIDERATIONS:

Vomiting blood or bile, complaint of nausea, medications and allergies, pregnancy, abdominal pain or trauma, diarrhea, head trauma, orthostatic vital signs

Neonatal Resuscitation – 10.120



POST RESUCITATION CARE:

A. Continue to provide assisted ventilations as needed.
B. Closely monitor respiratory effort, heart rate, blood glucose, and pulse oximetry.
C. **Keep newborn normothermic.** Hypothermia significantly increases risk of morbidity.
D. 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:

A. 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.
B. 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.
C. An electronic cardiac monitor is the preferred method for assessing heart rate.
D. The ratio of compressions to ventilations should be 3:1, with 90 compressions and 30 breaths to achieve approximately 120 events per minute.
E. Pulse oximeter should be applied to the right hand preferentially.
F. 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.
G. Expected oxygen saturation of full-term newborn:

Targeted Pre-ductal SpO_2 After Birth	
1 min	60%-65%
2 min	65%-70%
3 min	70%-75%
4 min	75%-80%
5 min	80%-85%
10 min	85%-95%

TREATMENT:

A. General
   1. Treat per Universal Patient Care.
   2. Start O_2 in all abnormal deliveries.
   3. If multiple, or abnormal birth, consider second transport unit.
   4. 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.
   5. Vital signs may not be a reliable indicator of shock or respiratory distress in the pregnant patient.

B. Pre-eclampsia and Eclampsia
   1. Acute onset severe hypertension in pregnant and postpartum women.
      a. Includes all pregnant women and up to 6 weeks postpartum with symptoms.
      b. Symptoms include headache, visual disturbances, chest discomfort, shortness of breath, confusion, or abdominal pain.
      c. 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.
      d. 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.
         i. Administer Labetalol 10 mg slow IV push over 1 - 2 minutes.
         ii. Target systolic BP 140 - 150 mmHg and diastolic BP 90 - 100 mmHg.
         iii. 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 - 10mg, 2nd dose - 20mg, 3rd dose - 40mg). Maximum dose is 70 mg.
         iv. Stop administration if HR < 60 bpm or other adverse effects.
   2. 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.

C. Normal Childbirth
   1. Ask if the patient has had prenatal ultrasound and the possibility of multiple births.
   2. Use sterile or clean technique.
   3. Guide/control but do not retard or hurry delivery.
   4. Check for cord around neck and gently remove if found.
   5. After delivery, assess infant per Neonatal Resuscitation protocol. If no resuscitation is needed (term infant, breathing or crying, good muscle tone), proceed as below.
   6. Administer 10 IU oxytocin IV/IM within one minute of delivery when feasible if the neonate is a singleton. For multiple births, administer only after last neonate has been delivered.
   7. 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.

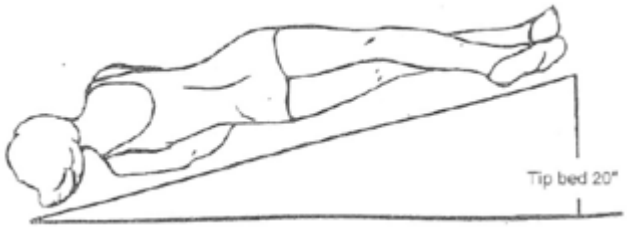
8. Briefly dry infant and place on mother's chest, in skin-to-skin contact. Cover both with a clean, dry blanket.
9. Assess infant using APGAR at time of birth and five minutes later. (Documentation should describe the infant using criteria rather than giving a numerical score).

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

10. 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.
11. Do not delay transport to deliver the placenta. After the placenta has delivered, gently externally massage uterus to encourage contractions and prevent bleeding.
12. If mother has significant postpartum hemorrhage (> 500 ml), administer Tranexamic acid 2 g slow IV push.
13. Unless infant needs treatment, keep on mother's chest for transport.
14. Monitor vital signs of mother and infant during transport.

D. <u>Abnormal Childbirth</u>
   1. General
      a. Transport to nearest appropriate hospital.
      b. Give receiving hospital earliest possible notification.
      c. Contact OLMC for advice.
      d. Transport in position as described in General treatment above.
   2. Breech Presentation (buttocks first)
      a. If delivery is imminent, prepare the mother as usual and allow the buttocks and trunk to deliver spontaneously then support the body while the head is delivered.
      b. If the head does not deliver within three minutes, suffocation can occur.
         1. Place a gloved hand into the vagina, with your palm toward the baby's face.
         2. 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.
         3. Assess for the presence of pulse in umbilical cord if presenting.

E. Prolapsed Cord
   1. Place the mother in left lateral Trendelenburg position.



   2. If the cord is visible, gently displace presenting part of baby off cord and maintain displacement. DO NOT pull or over-handle cord in order to prevent cord compression and spasm.

F. Limb Presentation
   1. The presentation of an arm or leg through the vagina is an indication for immediate transport to the hospital.
   2. Assess for presence of pulse in umbilical cord, if presenting.

G. Abruptio Placentae – Occurs in the third trimester of pregnancy when the placenta prematurely separates from the uterine wall leading to intrauterine bleeding.
   1. The patient experiences lower abdominal pain and the uterus becomes rigid.
   2. Shock may develop without significant vaginal bleeding.

H. 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.

KEY CONSIDERATIONS:
Due date/prenatal care, last menstrual period, previous childbirth history, single or multiple birth, fetal heart tones, ruptured membranes, vaginal bleeding, contractions, cramping, edema or hypertension, abdominal pain, seizures

TREATMENT:

A. Treat per Universal Patient Care.
B. Determine location of pain and severity using numeric scale (1 - 10) or faces scale.
C. Consider and treat underlying causes of pain.
D. Use non-pharmacological pain management (i.e., position of comfort, hot/cold pack, elevation, splinting, padding, wound care, and therapeutic calming and communication).
E. Controlled medications (opioids and ketamine) are to be avoided in the following patients:
    1. Active labor
    2. Headache
    3. Non-traumatic neck or back pain
    4. Any chronic pain (head, neck, back, fibromyalgia, abdominal or pelvic pain)
    5. Dental pain

    For these patients, consultation with OLMC is recommended.
F. For <u>oral</u> medications consider:
    1. Acetaminophen 325 - 1000 mg, **<u>or</u>**
    2. Ibuprofen 200 - 600 mg
G. For <u>parenteral</u> medications consider:
    1. Acetaminophen: 1000 mg IV slowly over 5 minutes. If given by infusion pump, can be administered over 10 -20 minutes.
    2. Ketorolac: 30 mg IM or 15 mg IV. **Do not repeat**. Use only in patients 2-64 years of age, and for musculoskeletal pain or flank pain with suspected kidney stone.
    3. Opioids
        a. Fentanyl:
        50 - 100 mcg IV/IN. May repeat with 25 - 50 mcg every 10 - 15 minutes as needed to a maximum of 500 mcg. If IV/IN not available, give 50 - 100 mcg IM. May repeat IM every 10 - 15 minutes as needed to a maximum 500 mcg. **<u>If BP is less than 100 mmHg and/or patient has minor altered mental status or respiratory depression</u>**, the first dose fentanyl by any route is 25 mcg, may repeat 25 - 50 mcg every 10 - 15 minutes to a maximum of 500 mcg. Monitor patient closely.
        <u>OR</u>
        b. Hydromorphone:
        0.25 - 0.5 mg IV every 15 - 20 minutes to a maximum of 2 mg. If IV not available give hydromorphone 0.5 - 1.0 mg IM. May repeat IM every 15 - 20 minutes to a maximum of 2 mg. **<u>Do not administer hydromorphone if systolic BP is less than 100 mmHg</u>.**
        OR
        c. Morphine:
        2 - 8 mg IV every 15 - 20 minutes to a maximum of 20 mg. If IV not available give morphine 5 - 10 mg IM. May repeat IM with 5 mg every 15 - 20 minutes to a maximum of 20 mg. **<u>Do not administer morphine if systolic BP is less than 100 mmHg</u>.**

4. Ketamine
    a. 12.5 - 25 mg IV/IO **slow push over 5 minutes,** or by IV infusion over 15 minutes**,** or 25 - 50 mg IM. May repeat once after 30 min unless patient develops nystagmus, hallucinations, or other psychiatric symptoms.
    b. **Ketamine must be diluted prior to IV or IO administration for pain management. Either dilute 12.5 mg in 9.75 ml or 25 mg in 9.5 ml of Normal Saline for slow IVP or dilute 12.5 - 25 mg in 100 ml of Normal Saline and infuse over 15 minutes.**
    (Example for IV push: Expel 0.5 ml from a saline flush prior to drawing up 0.5 ml of ketamine.)

H. Monitor SpO_2 and $EtCO_2$.
I. Document vital signs, response to treatment and pain scale rating prior to and after each administration of pain medication.
J. Opioids and ketamine can be used in the same patient to obtain pain relief if necessary.

PEDIATRIC PATIENTS:

A. Acetaminophen 15 mg/kg PO liquid only to a maximum of 1000 mg.
B. Ibuprofen 10 mg/kg PO liquid only to a maximum of 600 mg.
C. 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.
D. Fentanyl dose (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.

E. Hydromorphone dose 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.
NOTE: Hydromorphone is not preferred in young infants and toddlers if fentanyl or morphine is available.
F. Morphine dose is 0.1 mg/kg IV or IM. (IM may repeat after 15 - 20 minutes). Do not exceed adult dosing.
G. Ketamine is not approved for use in pain control in pediatric patients < 15 years of age. 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.
H. 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 & PRECAUTIONS:

A. Acetaminophen potentiates the analgesic effect of opioids, and they can be given together if the patient can take PO.
B. 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.
C. Do not give oral medication to patients with abdominal pain or open or obviously angulated fractures.
D. Ketorolac should not be used in patients less than 2 or over 64.
E. Do not administer ketamine to patients who are pregnant or have non-traumatic chest pain.
F. Ketamine should not be given to patients with schizophrenia or history of psychosis due to the potential for exacerbating the mental health condition.

USE PROPER PRECAUTIONS. DECONTAMINATE PT PRIOR TO TREAMENT/TRANSPORT

TREATMENT:

A. Treat per Universal Patient Care.
B. If systolic BP < 90 mmHg, follow Shock Protocol. Goal is to maintain a mean arterial pressure (MAP) ≥ 65 mmHg.
C. If unknown poison or overdose and the patient has a decreased level of consciousness, treat per Altered Mental Status protocol.
D. Manage airway per the Airway Management protocol.
E. Contact OLMC and/or Oregon Poison Center (1-800-222-1222) for advice.
F. Treat specific **symptomatic** poisoning/overdose patients as outlined below:

- **Aspirin or acetaminophen:**
  1. If it is less than two hours since ingestion, administer 1 g/kg of activated charcoal PO/NG to a max of 50 g.
  2. If ingestion involves more than just aspirin and/or acetaminophen contact OLMC for use of activated charcoal.
  3. Avoid intubating aspirin overdoses unless absolutely necessary. If intubation becomes necessary, the ventilation goal should be 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:**
  1. Place all suspected CO poisoning patients on CPAP/BiPAP with high flow O_2.
  2. Recommend NRB with nasal cannula if contraindications to or if patient does not tolerate CPAP/BiPAP.
  3. Measure CO level with SpCO monitor when possible.
  4. All symptomatic patients (e.g., headache, dizziness, nausea) or patients with an SpCO monitor reading ≥ 15 should be transported.
  5. Transport to the nearest facility, or designated hyperbaric chamber if available, for patients with severe symptoms (e.g., cardiac ischemia, coma, syncope, seizures, loss of consciousness) for stabilization.
  6. Treat symptoms per appropriate protocol (e.g., 12-lead ECG for suspected cardiac ischemia.)
  7. If cyanide poisoning is also suspected, consider obtaining SpCO, if possible, before administration of CYANOKIT® since the latter will interfere with the carboxyhemoglobin monitor.

- **Chlorine inhalation:**
  Treat symptomatic patients with:
  1. Albuterol- 2.5 mg nebulized.
  2. Dexamethasone- 10 mg IV/IO/IM/PO.
  3. 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 fluid bolus.

- **Hydrofluoric Acid:**
  Dermal: Calcium gluconate 3 g mixed with 5 oz water soluble lubricant and applied to burn.

- **Sodium Channel Blockade (e.g., Tricyclic Antidepressants, Diphenhydramine, Type 1a or 1c anti-arrhythmics):**
  1. If patient exhibits arrhythmias or a widening QRS complex, administer sodium bicarbonate 1 mEq/kg IV/IO.
  2. Treat hypotension per Shock protocol.

- **Organophosphates:**
  1. Prepare to handle copious secretions.
  2. 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.
  3. 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.
  4. Treat seizures per seizure protocol.
  5. See Haz-Mat Protocol for more specifics of treatment.

G. Contact OLMC for advice on activated charcoal for other ingested poisons.

PEDIATRIC PATIENTS:

A. Consider possibility of neglect or abuse.
B. For organophosphate poisoning, atropine dose is 0.05 mg/kg IV/IO. Contact OLMC for frequency of dosing.
C. Activated charcoal dose is 1 g/kg, max of 50 g.
D. For children < 1-year, dilute sodium bicarbonate by one-half with normal saline prior to administration.
E. 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 fluid bolus. Contact OLMC for advice regarding second dose.

NOTES & PRECAUTIONS:

A. SpCO levels may be elevated in smokers. Levels can range from 3 - 20% depending on the number of packs smoked.
B. Pulse oximeter may provide a false reading in patients with elevated SpCO levels.
C. If the patient exhibits extrapyramidal symptoms/dystonia with a history of phenothiazine use, consider diphenhydramine.
D. For large organophosphate poisonings, refer to Haz-Mat protocol.
E. Do not neutralize acids or alkalis.
F. Strongly consider Haz-Mat Team activation when appropriate.

KEY CONSIDERATIONS:

Route of poisoning, amount of ingestion, antidote given, suicidal intent, multiple patients, psychiatric history

CO Clinical Presentation Transport Matrix				
Carbon Monoxide	Yes	Yes	Yes	Yes
Burns	No	Yes	No	Yes
Trauma	No	No	Yes	Yes
Destination	Hyperbaric Center	Burn Center	Trauma Center	Trauma Center

Carbon Monoxide = $\geq$ 15, Burns = Burn Center Criteria, Trauma = Trauma Center Criteria

TOXIDROME TABLE

Toxidrome	Examples	Clinical Features	Antidotes
Sympathomimetic	Cocaine Methamphetamine	Agitation Diaphoresis Hypertension Hyperthermia Dilated pupils 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) (Hazmat, OLMC)
Sedative-Hypnotic	Barbiturates Benzodiazepines GHB	Depressed mental status Hypotension Hypothermia	Supportive treatment
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)	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	**Nicotinic	***Central
Diarrhea, Urination, Miosis, Bradycardia, Bronchospasm, Bronchorrhea, Emesis, Lacrimation, Salivation, Sweating	Mydriasis, Tachycardia, Weakness, Hypertension, Hyperglycemia, Fasciculations	Confusion, Convulsions, Coma

TREATMENT:

A. Treat per Universal Patient Care.
B. Follow appropriate Airway Management or Cardiac Dysrhythmia protocol if indicated.
C. Treat patient's clinical impression as follows:

- **Upper Airway**
  1. Croup & Epiglottitis – Transport in position of comfort, monitor airway.
  2. Anaphylaxis – Treat per Anaphylaxis and Allergic Reaction protocol.
  3. Foreign Body – Begin obstructed airway procedures. Remove object using direct laryngoscopy if complete obstruction exists.
  4. Complete Obstruction – If you cannot effectively ventilate/oxygenate the patient and the patient is deteriorating, consider cricothyrotomy.

- **Decompensated Heart Failure**
  1. Sit patient upright.
  2. If BP < 100 mmHg systolic, treat for possible cardiogenic shock per Shock protocol.
  3. If BP > 100 mmHg systolic:
     a. Nitroglycerine 0.4 mg SL; repeat every 3 - 5 minutes. *(Do not administer nitroglycerine 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).*
     b. Consider albuterol 2.5 mg by nebulizer. May repeat as needed.
     c. If the patient remains in respiratory distress, consider CPAP/BiPAP if available.
     d. Furosemide (If systolic BP > 100 and fluid overload state with JVD, edema (peripheral, sacral, abdominal), recent weight gain):
        1. If patient is not currently taking furosemide, give 20 mg IV.
        2. If the patient is taking furosemide, give 40 mg IV.

- **"SCAPE" - Sympathetic Crashing Acute Pulmonary Edema** (Presentation consistent with rapid onset, extreme respiratory distress, diaphoresis markedly elevated systolic blood pressure > 160, tachycardia, decreased oxygen saturation)
  1. Nitroglycerine 0.4 mg SL; repeat every 3 - 5 minutes. (*Do not administer nitroglycerine 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).*
  2. 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. If CPAP/BiPAP is in place prior to SL nitroglycerine, you can proceed to push dose nitroglycerine directly.)**
  3. Push dose nitroglycerine 1 mg IV, if respiratory distress persists and SBP remains > 160 mmHg systolic. May repeat once in 5 minutes. *(Refer to page 2 of NTG medication page for mixing instructions)*.

- **COPD**
  1. DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat DuoNeb as needed X 2. Do not administer more than three total treatments.
  2. If additional bronchodilator needed after DuoNeb, repeat albuterol only 2.5 mg by nebulizer as needed.
  3. If patient has moderate to severe respiratory distress based on Severity Assessment Guide, give dexamethasone 10mg IV/IO or IM. May also be given orally.
  4. Consider CPAP**/**BiPAP if available.

- **Asthma**
  1. DuoNeb (albuterol 3 mg / ipratropium 0.5 mg) by nebulizer. Repeat DuoNeb as needed X 2. Do not administer more than three total treatments.
  2. If additional bronchodilator needed after DuoNeb, repeat albuterol only 2.5 mg by nebulizer as needed.
  3. If patient has moderate to severe asthma based on Asthma Severity Assessment Guide, give dexamethasone 10mg IV/IO/IM/PO.
  4. 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.
  5. If transport time is long and asthma is severe, consider magnesium sulfate 2 grams over 15 - 20 minutes.
  6. Consider CPAP/BiPAP if non-responsive to interventions or impending respiratory failure.

PEDIATRIC PATIENTS:

A. Upper Airway

1. 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 mins. if necessary. Contact OLMC for additional dosing.
2. Treat anaphylaxis and foreign body obstruction per adult guidelines.
3. The usual cause of respiratory arrest in children with croup, epiglottitis, or laryngeal edema is exhaustion, not complete obstruction.
   a. If suspected croup, administer dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.
   b. If the child deteriorates, ventilate with a BVM.
   c. If you cannot effectively ventilate with BVM perform intubation.
4. If complete obstruction is present and you cannot effectively BVM ventilate the patient and the patient is deteriorating, consider needle cricothyrotomy.

B. Asthma

1. Consider asthma in the following setting:
   a. Prior history of wheezing.
   b. History of eczema and allergies.
   c. Family history of asthma.
   d. Home use of bronchodilator.
2. Give DuoNeb and albuterol per adult guidelines.
3. If patient is deteriorating give 1:1000 epinephrine 0.01 mg/kg IM (max dose 0.5 mg). Contact OLMC for additional doses.
4. If patient has moderate to severe asthma based on Severity Assessment Guide and is not improving with treatment, consider dexamethasone 0.6 mg/kg IV/IO/IM/PO up to 10 mg.
5. If transport time is long and asthma is severe, contact OLMC for consideration of magnesium sulfate.

C. Acute Bronchiolitis (< 2 years old)

Mild-moderate respiratory distress (see Infant Respiratory Distress table below and Undifferentiated Respiratory Distress in < 2 y.o. flow chart)

1. Give oxygen via blow-by, nasal cannula or mask to keep SpO_2 > 92%. Monitor $EtCO_2$ if available.
2. If nasal secretions and/or congestion, use nasal suction with adapter if available. If secretions are thick, may use normal saline to loosen.
3. If still wheezing, give albuterol 2.5 mg via nebulizer. If improvement may use every 10 minutes. Discontinue if patient's heart rate is > 200.
4. If patient worsens and is still wheezing, consider alternative diagnosis such as asthma (croup if stridor). If suspected croup, administer epinephrine 5 ml (5 mg) of 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 mins. if necessary. Discontinue if patient's heart rate is > 200.
5. 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)

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

NOTES & PRECAUTIONS:

A. Aggressive airway management, including early intubation, is appropriate for the patient who does not respond to treatment or is rapidly deteriorating.
B. 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 the same condition again.
C. 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.
D. COPD and asthma patients receiving CPAP/BiPAP need to be monitored closely due to the higher risk of pneumothorax.

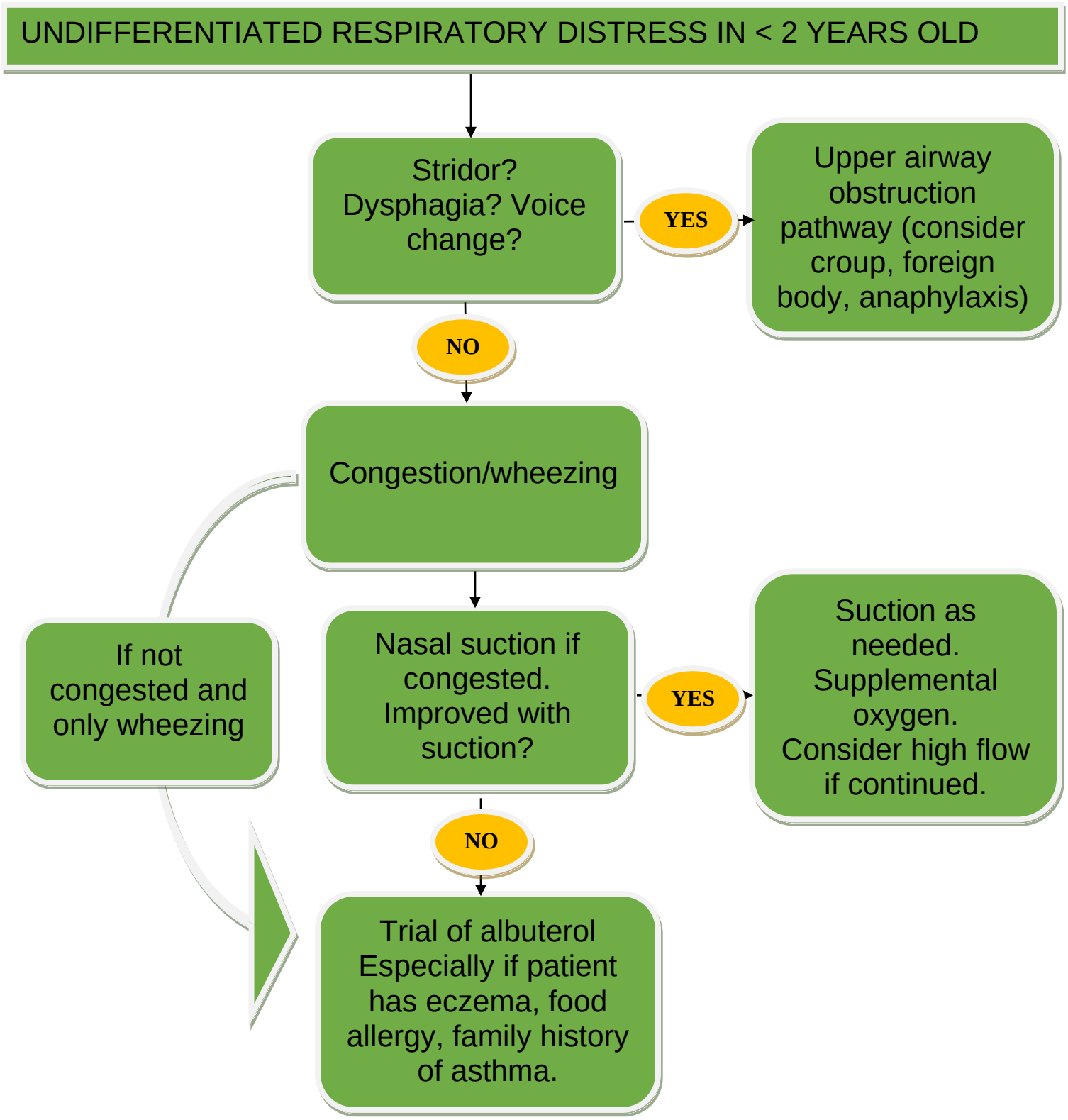
KEY CONSIDERATIONS:

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

Respiratory Distress – 10.160

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

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


UNDIFFERENTIATED RESPIRATORY DISTRESS IN < 2 YEARS OLD
Stridor? Dysphagia? Voice change?
YES
Upper airway obstruction pathway (consider croup, foreign body, anaphylaxis)
NO
Congestion/wheezing
If not congested and only wheezing
Nasal suction if congested. Improved with suction?
YES
Suction as needed. Supplemental oxygen. Consider high flow if continued.
NO
Trial of albuterol Especially if patient has eczema, food allergy, family history of asthma.

TREATMENT:

A. Treat per Universal Patient Care.
B. If patient is actively seizing upon EMS arrival or having repetitive seizures without regaining consciousness:
    1. Administer midazolam 10 mg IM/IN. Repeat every 5 minutes until seizure stops,
    OR
    Administer lorazepam 4 mg IM. May repeat once in 10 minutes if seizure continues to a max of 8 mg.
    2. If the patient already has an IV/IO, administer midazolam 2.5 - 5 mg IV/IO. Repeat every 5 minutes until seizure stops,
    OR
    Administer lorazepam 2 mg IV/IO. Repeat every 5 minutes until seizure stops to a max of 8 mg.
C. Monitor patient's respiratory status closely after midazolam or lorazepam administration.
D. Check blood glucose after first dose of midazolam or lorazepam and treat per Altered Mental Status protocol.
E. Place patient on left side for transport.
F. If the seizure activity does not stop after two doses of midazolam or lorazepam, transport to the closest hospital.
G. 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. If patient is not transported have the patient (or guardian) sign a Patient Information Form and document the patient's mental status.
H. All first-time seizure patients require medical evaluation and should be transported. Contact OLMC if patient refuses.

PEDIATRIC PATIENTS:

A. If patient is actively seizing upon EMS arrival or having repetitive seizures without regaining consciousness:
    1. Administer midazolam 0.3 mg/kg IM/IN to a max of 10 mg. Repeat every 5 minutes until seizure stops,
    OR
    Administer lorazepam 0.2 mg/kg IM to a max single dose of 4 mg. Repeat every 10 minutes until seizure stops to a max total dose of 8 mg.
    2. If an IV/IO is available, may administer midazolam 0.1 mg/kg IV/IO to a max of 5 mg. Repeat every 5 minutes until seizure stops,
    OR
    Administer lorazepam 0.1 mg/kg IV/IO to a max single dose of 2 mg. Repeat every 5 minutes until seizure stops to a max total dose of 8 mg.
B. Monitor patient's respiratory status closely after midazolam or lorazepam administration.
C. Check blood glucose after first dose of midazolam or lorazepam and treat per Altered Mental Status protocol.
D. Febrile seizures are generally found between the ages of 6 months - 6 years and are usually short in duration.
E. If seizure does not stop after two doses of midazolam or lorazepam, transport to the closet hospital. Transport to a non-pediatric hospital may be necessary to get alternative antiepileptics.
F. If, on arrival, the patient is not actively seizing (post-ictal) an IV is not required.
G. All hypoglycemic or first-time pediatric seizure patients should be transported.

NOTES & PRECAUTIONS:

A. 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.
B. 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.
C. New onset of seizures in a pregnant patient, especially in the third trimester, may indicate toxemia of pregnancy. Contact OLMC for consideration of magnesium sulfate. Normal dose is 4 grams IV over 15 - 20 minutes.

TREATMENT:

A. Treat per Universal Patient Care.
B. Monitor $EtCO_2$ and maintain $SpO_2 \geq 94\%$.
C. Evaluate for sepsis alert criteria:

1. Suspected or confirmed source of infection; **and**

2. **At least two** of the following SIRS* criteria:
   a. Temperature greater than 38°C (100.4°F) or lower than 36°C (96.8°F)
   b. Pulse > 90 bpm
   c. Respiratory rate > 20; **and**

3. Hypoperfusion as manifested by **at least one** of the following:
   a. MAP < 65 mmHg (systolic BP < 90)
   b. $EtCO_2 \leq 25$ mmHg

D. If **above 3 criteria** are met:
   1. Notify the receiving hospital with a "Sepsis Alert".
   2. If MAP < 65 mmHg (systolic BP < 90 mmHg), start IV and treat per shock protocol. Target mean arterial pressure (MAP) ≥ 65 mmHg.
   3. If available, check point of care lactate and notify receiving hospital if > 4 mMol.

NOTES & PRECAUTIONS:

A. Sepsis is a rapidly progressing, life threatening condition due to systemic infection. Sepsis must be recognized early and treated aggressively to prevent progression to shock and death.
B. The purpose of a "Sepsis Alert" is to provide pre-arrival emergency department notification to facilitate rapid assessment and treatment of a suspected severe sepsis patient.
C. *SIRS – Systemic Inflammatory Response Syndrome.

Shock – 10.180

Treat per Universal Patient Care and prepare for rapid transport

↓

Determine type of shock and treat as follows:

↓

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

A. Control external bleeding with direct pressure, elevation, tourniquet, and/or hemostatic dressing.
B. 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)
C. 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)

A. If tension pneumothorax is suspected, decompress per the Needle Decompression procedure protocol.
B. 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)
C. 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.
D. While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
E. Contact OLMC for advice.

Cardiogenic Shock (STEMI, cardiomyopathy)

A. If suspected cardiac event, follow Chest Pain protocol.
B. Monitor cardiac rhythm and follow Cardiac Dysrhythmia protocol.
C. Administer 20 ml/kg fluid challenge (10 ml/kg in neonates) to maintain age appropriate SBP. Repeat twice if continued signs of shock and no pulmonary edema to a max of 60 ml/kg (30 ml/kg in neonates).
D. If blood pressure remains low, 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.
E. While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
F. Contact OLMC for advice.

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

A. **If anaphylaxis is suspected**, follow Anaphylaxis and Allergic Reaction protocol.
B. 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.
C. 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.
D. While drip is being set up, consider push dose epinephrine, per epinephrine protocol, for temporary hemodynamic support.
E. Contact OLMC for advice.

NOTES & PRECAUTIONS:

A. Closely monitor patient's respiratory status and vital signs. Avoid fluid overload.
B. Mean Arterial Pressure targets:
    1. Uncontrolled traumatic hemorrhagic shock without TBI or suspected AAA, target MAP is 55 - 65 mmHg (SBP 70 - 90).
    2. Uncontrolled traumatic hemorrhagic shock with TBI or shock from all other causes, target MAP is ≥ 65 mmHg (SBP ≥ 90).
C. 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.
D. If an improvised tourniquet is present before medical provider arrival, place a commercial tourniquet per protocol and remove the improvised tourniquet if operationally feasible.

KEY CONSIDERATIONS:

Mechanism of injury, medications, recent illness, medical history

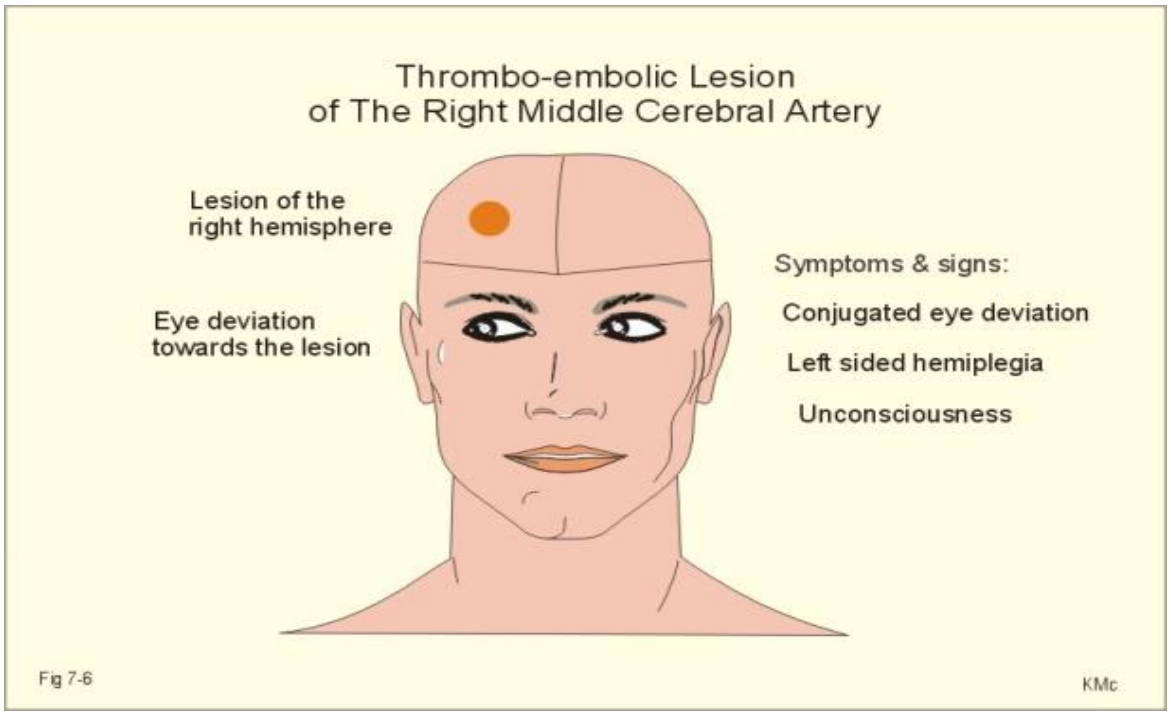
Stroke / CVA – 10.190

TREATMENT:

A. Treat per Universal Patient Care (No oxygen if SpO2 ≥ 94% with good waveform).
B. Apply cardiac monitor as soon as possible and continuously assess rhythm.
C. Place I8g IV or larger, in the AC when possible.
D. If CBG is low, treat per Altered Mental Status guidelines.
E. Complete **Portland Prehospital Stroke Screen (PPSS)**.
F. If PPSS is positive, perform **Cincinnati – Stroke Triage Assessment Tool (C-STAT)**
   1. If PPSS and C-STAT positive **(≥ 2**), transport to nearest interventional stroke center and activate a stroke alert.
   2. If PPSS positive and C-STAT negative, notify receiving facility of acute stroke alert as soon as feasible.
   3. When contacting receiving hospital notify them that patient is either C-STAT positive or negative.
G. Transport patient with head elevated at least 30 degrees.
H. Document serial neurologic examinations.

1 **PORTLAND PREHOSPITAL STROKE SCREEN**			
1. Age over 45	Yes	No	Unknown
2. No prior history of seizure disorder	Yes	No	Unknown
3. New onset of neurologic symptoms in last 24 hours	Yes	No	Unknown
4. Patient was ambulatory at baseline (prior to event)	Yes	No	Unknown
5. CBG between 60 & 400	Yes	No	
Neurological examination	**Normal**	**Abnormal**	
Facial smile/grimace (ask patient to smile/show teeth) Normal: Both sides of face move equally well Abnormal: One side of face does not move as well as the other	Yes	Right	Left
Arm drift (patient closes eyes and hold both arms out, palms up) Normal: Both arms move the same or do not move at all Abnormal: One arm does not move or drifts down compared to the other	Yes	Right	Left
Hand grip (have patient squeeze both hands simultaneously) Normal: Equal grip strength Abnormal: Unequal grip strength	Yes	Right	Left
Speech (have patient repeat a simple phrase such as "You can't teach an old dog new tricks") Normal: No difficulty repeating Abnormal: Patient has difficulty finding words, may speak in long meaningless sentences and/or cannot understand or follow simple verbal instructions	Normal/Abnormal		
If questions 1 – 5 are all answered "Yes" or "Unknown" and at least 1 of the 4 neurological examination findings are abnormal, the patient is considered to have a POSITIVE screen. Continue to C-STAT evaluation.			

2	C-STAT – CINCINNATI STROKE TRIAGE ASSESSMENT TOOL		
		Points	
Gaze Preference – Deviation of eyes **away** from side of weakness, toward side of stroke.			
Absent		0	
Present		2	
Arm Weakness - Cannot hold up arm(s) for 10 seconds			
Absent		0	
Present		1	
Level of Consciousness - Incorrectly answers at least one of two LOC questions **AND** does not follow at least one of two commands.			
Absent		0	
Present		1	
******* POSITIVE C-STAT SCORE IS ≥ 2 *******			



NOTES & PRECAUTIONS:

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

Submerged Patient – 10.200

TREATMENT:

A. Treat per Universal Patient Care.
B. If there is any doubt as to mechanism of injury or any possibility of cervical injury, immobilize patient and consider Trauma System entry.
C. If indicated, treat per Hypothermia protocol.
D. If patient is in cardiac arrest, 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:
   1. Children < 6 years of age and water temperature at recovery depth of < 40° F.
   2. Patients who may have been trapped in an underwater air pocket.
   3. 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.
   4. Paramedic discretion (contact OLMC).

NOTES & PRECAUTIONS:

A. If patient is still in the water, rescue should be performed by properly trained and equipped personnel only.
B. Be prepared to manage vomiting.
C. Even if patient initially appears fine, delayed pulmonary edema is likely to occur.

KEY CONSIDERATIONS:

Medical history, length of submersion, water temperature at recovery depth, medications and allergies, events prior to submersion

TREATMENT:

A. Treat per Universal Patient Care.
B. Patient evaluation should include best GCS to help categorize injury severity.
    1. Mild injury GCS of 13 - 15
    2. Moderate GCS 9 - 12
    3. Severe GCS ≤ 8
C. Avoid hypoxia at all times. Place a non-rebreather facemask on **ALL** patients with potential TBI.
D. Prevent hypotension: Goal MAP ≥ 80 mmHg (SBP ≥ 110) **for isolated traumatic brain injuries only**.
    1. Initiate a bolus of normal saline or lactated ringers.
    2. Continue fluid boluses to maintain the MAP ≥ 80 mmHg (SBP ≥ 110 mmHg).
E. 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).
F. 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.
G. If the patient has an airway placed (oral or advanced), carefully manage ventilations in order to minimize hyperventilation.
    1. Monitor $EtCO_2$ with goal of $EtCO_2$ of 40 mmHg.
    2. If available, use a pressure-controlled bag (PCB) and ventilation rate timer (VRT).
    3. If a transport ventilator is available, begin with the following settings:
        a. Tidal volume of 7ml/kg,
        b. Rate of 10 BPM. Adjust rate to keep $EtCO_2$ within target range
H. If there are signs of herniation, then MILD hyperventilation to an $EtCO_2$ of 35 mmHg may be performed. Signs of herniation include:
    1. Blown pupil
    2. Posturing
I. For moderate to severe blunt or penetrating head trauma: **If available**, administer 2 grams Tranexamic acid (TXA) slow IV/IO push if **both** the following indications are met:
    1. Age ≥ 15 (or ≥ 50 kg if age unknown)
    2. 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 (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
J. Consider and treat reversible causes of altered mental status including hypoxia, hypoglycemia, and overdose.

PEDIATRIC PATIENTS:

A. Manage hypoxia. Place a non-rebreather facemask in **ALL** patients with potential TBI.
B. Manage blood pressure. Avoid hypotension.
    1. Initiate a 20 ml/kg bolus of normal saline or lactated ringers.
    2. Continue fluid boluses to maintain SBP goals:
        a. Infants/children age < 10: 70 mmHg + (age X 2).
        b. Children age ≥ 10: 100 mmHg (same as adults).
C. If patient 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).
D. 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.
K. If an airway is placed (oral or advanced), then carefully manage ventilations in order to minimize hyperventilation.
    1. Monitor $EtCO_2$ on all patients with goal of $EtCO_2$ of 40 mmHg.
    2. If available, use a pressure-controlled bag (PCB) and ventilation rate timer (VRT).
    3. If a transport ventilator is available, set a tidal volume of 7 ml/kg. Adjust rate to keep $EtCO_2$ within target range.
    4. Pediatric ventilatory rates:
        a. Infants: (age 0 - 24 months): 25 breaths per minute (bpm);
        b. Children: (age 2 - 14): 20 BPM;
        c. > 15 years: 10 bpm (same as adults).
E. If there are signs of herniation, then MILD hyperventilation to an $EtCO_2$ of 35 mmHg may be performed. Signs of herniation include:
    1. Blown pupil
    2. Posturing

NOTES & PRECAUTIONS:

A. The main goal is to avoid the three H's that increase mortality:
    1. Avoid **h**ypoxia
    2. Avoid **h**yperventilation
    3. Avoid **h**ypotension
B. A single episode of hypoxia is independently associated with DOUBLING of the mortality rate.
C. Hyperventilation is independently associated with a mortality rate that is between TWO and SIX times higher.
D. Inadvertent hyperventilation happens reliably if not meticulously prevented by proper external means.
E. 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.