University Emergency Medical Services Administrative Guidelines

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Administrative Guidelines and Associated References

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University EMS Administrative Guidelines Contents

Introduction and Foundations of Practice

This document provides evidence-based guidelines and historically proven practices for common pre-hospital scenarios. They require that individual EMS providers use their education, experience & clinical judgement to perform an independent evaluation of every patient and apply each component of the guideline as needed to optimized patient care. While it is impossible to address every possible variation of disease or traumatic injury, these off-line policies, procedures, and protocols offer a foundation for treating most patients we encounter. Certainly, our education, experience, and clinical judgment will assist us as we strive to provide the highest quality pre-hospital patient care

These Administrative Guidelines have been developed and approved by the University Emergency Medical Services physicians and approved by the Office of the Medical Director for TFD, NWFD and GRFD. They are based on the National Association of State EMS Officials Model EMS Clinical Guidelines and modified to include other EMS best practices and statutory requirements specific to the state of Arizona

Guidelines for the Use of Administrative Guidelines

Individual protocols are organized into three sections, each describing an important element of patient care. The top section includes 'History,' 'Signs and Symptoms,' and 'Differential,' and guides us to obtain patient information and consider potential causes for each clinical scenario.

The middle section describes the essentials of patient care, presented in flow chart style. These guidelines represent proven practices that provide the foundation of our pre-hospital care. Nearly every patient should receive the care suggested in this section, usually in the order described. Certainly, exceptions will exist, but the rationale for any deviation from the recommended course should be clearly explained in the narrative of the patient care report. Such exceptions should be rare.

The last section is titled 'Education and Pearls' and is found on the second page or bottom of each guideline. This section provides further guidance and adjuncts for patient care based on experience and common medical knowledge. While it is impossible to condense emergency medicine to a single-page flow chart, these pearls allow for expanded medication advice, dosages, and description of special situations. The section should be studied along with the rest of the guidelines and followed if applicable.

Lastly, pediatric patients often require age-tailored care. The pediatric-specific protocol should be utilized (Age < 14) if one exists for the patient's complaint. If a pediatric-specific protocol is unavailable, utilize the adult protocol for care guidance, but always use pediatric weight-based dosing for medications. Never exceed adult doses of medication for a pediatric patient.

Definition of a Patient

A patient is any individual(s) who is sick, injured or wounded, and who is deemed by the officer or senior medic on scene to require medical evaluation, medical monitoring, medical treatment, or transport. (R9-25-101-33 as authorized by A.R.S 36-2201, 36-2202, 36-2204, 36-2205). A patient should meet one or more of the following criteria:

- Has an acute medical complaint or the potential for acute illness or injury (including lift assist, found down, MVA with injury, or otherwise involved in an event with a mechanism of injury that a similarly trained EMS professional would believe to have caused injury).
- Appears disoriented or to have impaired decisional capacity.
- Exhibits psychiatric illness with likely danger to self or others, including psychosis, suicidal ideation or homicidal intent.
- A witness or person with personal knowledge of the individual requesting assessment or treatment on their behalf.

B	O_2 to maintain $SpO_2 \geq 94\%$ if indicated Obtain VS (FSBG and temperature as indicated/available) Obtain SAMPLE history
	Required VS: Blood pressure Pulse rate Respiratory rate Pulse ox if available

↓

B	**Perform if Indicated:** Glucose 12 Lead ECG (EMTs may obtain for paramedic interpretation) Temperature Pain scale CO Monitoring $EtCO_2$ Monitoring (if ahthorized by medical director IV placement (If authorized by medical director) Mental status examination

↓

B	Ongoing reassessment Repeat required VS Exit to more appropriate **Treatment AG** if indicated

↓

B	Transport to appropriate receiving facility after notification including provider primary impression and BLS or ALS Refer to **BLS Transport Threshold AG** as indicated

Education/Pearls

All patient care must be appropriate to your level of training and documented in the PCR. The PCR / EMR narrative should be considered a story of circumstances and include events and care of the patient. A comprehensive narrative should allow a reader to understand the complaint, the assessment, the treatment, why procedures were performed, why indicated procedures were not performed, as well as ongoing assessments and response to treatment and interventions.

For minor patients, it is preferable to have a parent or legal guardian provide consent for treatment; however EMS may provide emergency treatment when parent or guradian is not available.

- **Adult Patient:** Vital signs are a good indicator of underlying illness. An adult with new hypotension (a Systolic Blood Pressure less than 90 mmHg) may have a critical problem with the heart, blood volume, infection, or other problem. Vital signs may be masked by medications; beta blockers and other cardiac drugs may prevent a reflex tachycardia in shock so patients may have low to normal pulse rates. General weakness can be a symptom of an underlying process. Diabetic patients and women may have atypical presentations of cardiac-related problems, such as MI.

- **Geriatric Patient:** Minor or moderate injury in the typical adult may be very serious in the elderly; hip fractures and dislocations carry a high mortality. Altered mental status is not always dementia, and may represent a stroke, metabolic problem, or infection. Always check Blood Sugar and assess for signs of a stroke, trauma, etc. with any change in a patient's baseline mental status.

- **Pediatric Patient:** Special needs children may require continued use of pediatric-based guidelines regardless of age and weight. Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation to skin. The order of assessment may require alteration dependent on the developmental state of the pediatric patient. Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.

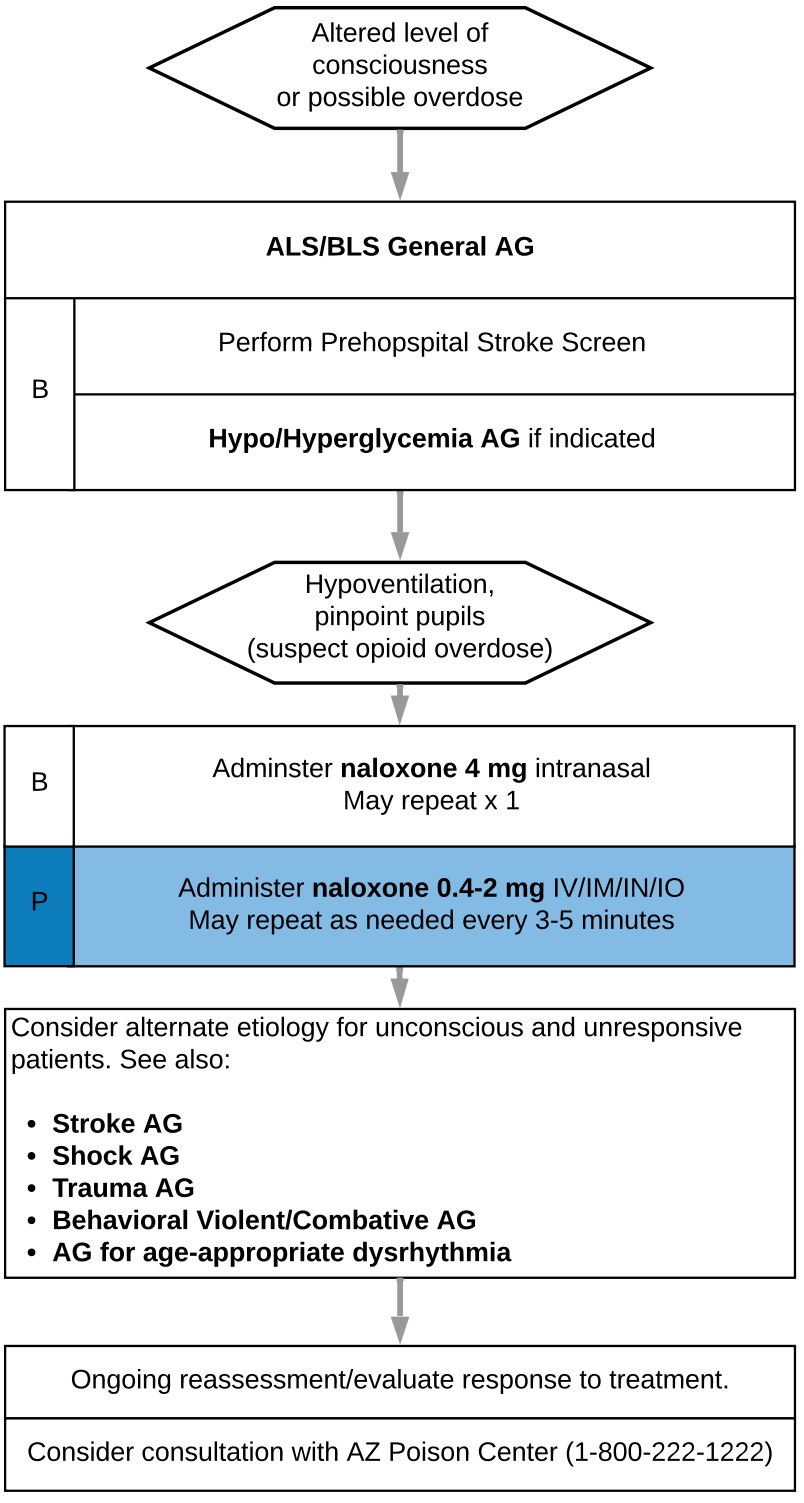
- Refer to **BLS Thresholds AG** for criteria to transport via BLS.
- All medications should be pushed slowly (unless otherwise indicated) and followed with a **20 mL NS flush.**
- When administering a fluid bolus to a patient, reassess VS and lung sounds after every 500 mL infused.
- If patient has status changes or changes in complaint where another AG would be best to treat patient, transition to that AG or contact medical direction.

<table>
<tr>
<td rowspan="2">Primary Survey (Airway, Breathing, Circulation, Disability, Exposure)
Open airway as indicated
Position
Suction
Consider use of airway adjuncts as indicated
Administer oxygen as appropriate
Assess circulatory status
Control any major external bleeding
Initiate chest compressions as indicated
Evaluate patient responsiveness: AVPU/GCS
Evaluate gross motor and sensory function in all extremities
Expose patient as appropriate to the chief complaint</td>
<td>Secondary Survey
Obtain baseline vital signs
Assess blood glucose as indicated
OPQRST history
SAMPLE history
Check temperature as indicated, treat environmental hyperthermia/hypothermia</td>
</tr>
<tr>
<td>Ongoing Reassessment
Proceed to the appropriate guideline as indicated
Determine need for transport, resources available, and location of most appropriate destination
Reassess chief complaint, assessment findings, and response to treatment
Assess vital signs at least every 5 minutes for unstable patients; every 15 minutes for stable patients</td>
</tr>
</table>

Altered/Neuro/Overdose Administrative Guideline

History	Signs and Symptoms	Differential

• Diabetes
• Medical Alert Tag/Bracelet
• Report of toxic ingestion or overdose
• History of trauma
• Past medical history
  ◦ ETOH/Drug usage
  ◦ Seizure
	• Decreased level of consciousness
	• Change in behavior reported
	• Signs of hypoglycemia (cool/clammy)
	• Hyperglycemia/DKA (dehydration, Kussmal respirations)
	• Irritability
		• Shock or sepsis
		• Cardiac arrhythmia
		• Hyperglycemia/hypoglycemia/other metabolic abnormality
		• Ingestion/intoxication
		• Seizures or postictal state



Education/Pearls

Altered mental status can arise from a variety of diseases and traumatic injuries. A careful history is an important adjunct to a physical exam in determining the cause of altered mental status; these patients require a careful assessment of the patient, scene, and circumstances.

- Pay careful attention not to miss subtle signs of trauma, especially head injury. Signs of head trauma in patients with altered mental status or altered level of consciousness warrant consideration of cervical spine immobilization and/or other methods of spinal motion restriction.
  - Consider **Trauma AG** if indicated
- Patients with a history of substance abuse and/or mental health issues quite often have co-morbid medical conditions that may lead to alterations in mental status. They may also be the victims of violence.
  - Do not assume that substance use or underlying mental health conditions are the only reason for the patient's altered mental status or change in behavior (e.g. patients with a history of alcohol abuse are at risk for hypoglycemia).
- Patients with severe or dangerous behavioral presentations may need sedation or restraint per **Behavioral Violent/Combative AG**.
- Patients who receive naloxone should be evaluated and observed in the emergency department. Encourage transport and treatment.
  - Max 1 mL per nostril for MAD administration of naloxone
- Contact Poison Control for suspected overdose or toxic ingestion 1-800-222-1222. Poison Control may be able to provide additional treatment and transport recommendations.

Anaphylaxis/Allergic Reaction Administrative Guideline

History	Signs and Symptoms	Differential
• Onset and location • Insect sting or bite • Food or med allergy/exposure • Past history of reactions	• Dyspnea/hypoxia • Wheezing • Stridor • Difficulty swallowing • Oropharyngeal/tongue swelling • Shock/decreased perfusion • Urticaria • Abdominal pain/vomiting	• Urticaria (rash only) • Anaphylaxis (systemic) • Infection/sepsis • Angioedema • Airway obstruction • Asthma/COPD • CHF

Suspected allergic reaction or anaphylaxis

Anaphylaxis, multisystem reaction, or shock

B	Administer **epinephrine by autoinjector** or **by prepared kit** (if available). For children (<30kg) **administer 0.15 mL (1 mg/mL concentration)**IM For adults (>30kg; 9 years or older by Handtevy) **administer 0.3 mL (1 mg/mL concentration)** IM Adminstration should be upper lateral thigh
P	Administer **epinephrine (1 mg/mL concentration) 0.01 mg/kg** IM **(max dose 0.5 mg)** in upper lateral thigh May **repeat epinephrine** dose every 5-15 minutes

B	Administer **albuterol 2.5 mg** SVN for wheezing May repeat **albuterol** to max of 3 doses Consider administration of **ipratropium (Atrovent) 0.5 mg** nebulized with **albuterol** x 1 Administer **20 mL/kg NS/LR bolus** for hypotension
P	IV/IO access Cardiac Monitor, $EtCO_2$ if available Consider appropriate airway management adjuncts Assess for signs of shock (poor perfusion, decreased mental status)
	Administer **20 mL/kg NS/LR bolus** for hypotension Administer **diphenhydramine 1 mg/kg** IV/IM **(max dose 50 mg)** Administer **methylprednisolone 2 mg/kg** IV/IM (**max dose 125 mg)**

Localized allergic reaction

P	Administer **diphenhydramine 1 mg/kg** IV/IM/PO **(max dose 50 mg)**

Education/Pearls

An allergic reaction is a systemic response to an allergen, which may be food, drugs, or other substance. The response varies from mild (one organ system, such as skin) to severe, when the condition may become life-threatening. The presence of shock or airway compromise always indicates a severe response and can lead to cardiac arrest and airway compromise.

Anaphylaxis is defined as:

- Severe, acute onset AND one of the following:
  - Respiratory compromise (dyspnea, wheeze, stridor, hypoxemia)
  - Decreased BP (SBP<90)

OR

- A combination of 2 of the following:
  - Urticaria
  - Swollen tongue or lips
  - Nausea/Vomiting
  - Abdominal pain
  - Syncope
  - Incontinence

A non-anaphylactic allergic reaction is defined as ONE of the following:

- Localized symptoms
- Localized angioedema without airway or GI symptoms
- Urticaria alone

Medication Administration:

- Epinephrine is the drug of choice and the FIRST drug that should be administered in acute anaphylaxis (in moderate and severe symptoms).
- Intramuscular injection in the thigh (but not the upper arm) results in the fastest rise of blood levels of epinephrine. Intramuscular injection in the upper arm (deltoid) and subcutaneously in the upper arm result in a much slower absorption and should not be used as a first choice.
- IM epinephrine should be administered as a priority, before or during attempts at IV or IO access.
- If signs of anaphylaxis persist, additional doses of IM epinephrine can be repeated every 5-15 minutes
- Diphenhydramine and steroids have no proven utility in moderate or severe anaphylaxis and may be given only after epinephrine. Diphenhydramine and steroids should NOT delay repeated epinephrine administration if needed.
- In moderate and severe anaphylaxis, diphenhydramine may decrease mental status. Caution with rate of administration.
- If a patient exhibits respiratory distress with wheezing, administer nebulized albuterol and consider administratino of ipratroprium (Atrovent)

Any patient with concern for anaphylaxis or who has received epinephrine IM should be transported to the ED, even if symptoms have resolved.

Behavioral Violent/Combative Administrative Guideline

History	Signs and Symptoms	Differential
• Past medical history • Pertinent medication history • Compliance with medications • Recent exacerbating factor(s) • Petitioned or court ordered • Collateral information • Substance abuse history	• Statements of suicidal/homicidal thoughts/ actions • Agitated/violent behavior • Exhibiting behaviors that can be deemed dangerous to self or others • Acute psychological complaint	• Altered mental status related to drug usage • Trauma • Hypoglycemia/Hyperglycemia • Infection/Fever

Patient violent or exhibiting behavior that is dangerous to self or others during transport or agitation that interferes with ability to provide necessary patient care

B	Attempt verbal reassurance and calm patient Engage friends or family if they are able to help calm patient
	Follow agency SOP for physical restraint

P	Administer **midazolam 0.1 mg/kg** IM/IN Max initial dose 10 mg IM/IN **May repeat x1 after 10 minutes to a max total dose of 15 mg IM/IN** **or** Administer **midazolam 0.05 mg/kg IV/IO** **max initial dose 5 mg IV/IO)** **May repeat x1 after 10 minutes to a max total dose of 10 mg IV//IO** *For patients with agitation that interferes with necessary patient care* Administer **midazolam 0.05 mg/kg IM/IV/IO (max dose 2.5 mg)** **≤14 or > 65 years max initial and total doses are half** ***≤ 8 yrs: Contact Medical Direction for orders*** ***Use caution when patient at risk for hypotension, as midazolam administration will lower blood pressure.***

B	Obtain full set of vital signs once able (including initial temperature when available) O_2 to maintain sat ≥ 94%
P	IV/IO access once able to safely obtain Apply cardiac monitor and $EtCO_2$ as soon as possible if sedation is administered. Consider 12-lead ECG

B	Reassess and document mental status and vital signs every 5 minutes and neurovascular status of all extremities every 15 minutes.

Education/Pearls

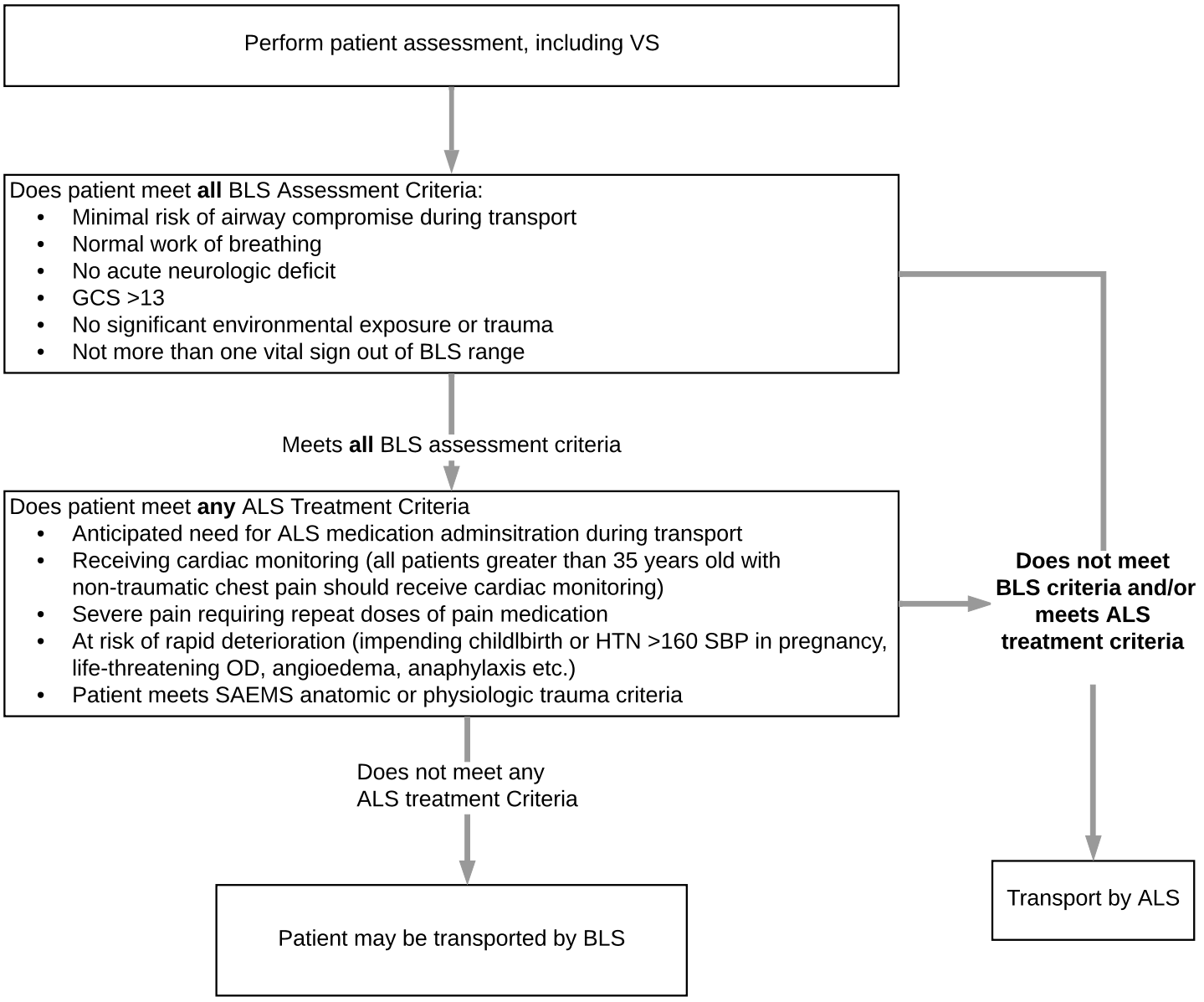
Behavioral patients provide a unique challenge in danger to the healthcare provider, as well as often losing their decision-making capacity. Patients with mental health disorders often have co-existing medical conditions.

Combative patients with traumatic injury/TBI present a uniquely challenging scenario. The provider must consider the risks of causing hypotension by providing chemical sedation only when absolutely necessary.

- Security is essential:
  - Always be sure to protect yourself and others.
  - Patients who verbalize a danger to self or others may NOT refuse care.
  - Attempt to protect patient from injury, but do not place yourself in danger to do so.
  - Summon law enforcement as necessary.

- Restraints should only be used if necessary:
  - Physical Restraint:
    - Handcuffs are to be placed by law enforcement only. If in law enforcement handcuffs, key must be within proximity of patient care at all times (but not within patient's reach).
    - Place stretcher in sitting position.
    - Do not apply restraints that restrict the patient's chest wall movement.
    - Pearls for extremity restraint:
      - Soft or leather restraints should not require a key
      - Restrain all four extremities to stationary frame of stretcher
      - All restraints must allow quick release
      - Reassess and document neurovascular status of all extremities every 15 minutes
  - Chemical Restraint:
    - Utilize with caution, as all restraint medications can cause respiratory compromise
    - Should be a later consideration for pediatric patients
    - $EtCO_2$ should be utilized for all patients who receive restraints.
- Excited Delerium Syndrome (ExDS) - common but poorly characterized presentation with a wide differential diagnosis. it is hypothesized to be due to catecholamine excess.
  - Likely to be identified by law enforcement, attempts to control individuals experiencing ExDS, via physical, chemical or electrical restraint are associated with an exceedingly high rate of morbidity and mortality.
  - Mortality is most strongly associated with respiratory depression, severe hyperthermia, and/or acidemia. Of these, profound hyperthermia has the strongest association with mortality. But normal temperature does not rule out ExDS.
  - Typically ExDS patients present with ANY combination of:
    - agitation
    - heightened pain tolerance
    - tachypnea
    - diaphoresis
  - They have a propensity to develop severe acidemia with progression to sudden cardiac arrest, which is why safe positioning, prompt sedation and thorough medical evaluation are necessary for prehospital treatment.
- Apply cardiac monitor and obtain vital signs as soon as possible, particularly when chemical restraints have been administered. Reassess VS every 5 minutes and document patient status, response, and monitor airway.

BLS Transport Thresholds Administrative Guideline



	Age > 14 yr	Age 6-13 yr	Age 1 w-5 yr	Age < 1 w
Respiratory Rate	**12-20**	**20-25**	**25-30**	**30-50**
Heart Rate	**60-130**	**60-150**	**60-160**	**100-180**
SBP	**> 90**	**> 80**	**> 70 + (Age x2)**	**> 70**
Glucose	**> 70**			**> 40**
Oxygen Saturation	**>92% with maximum of 6L supplemental O_2 by nasal cannula**			**>92%**

In practice for intoxicated individuals:

- Person is "talking but not walking" would indicate mild intoxication and BLS transport could be appropriate.
- Person is "not talking and not walking" would indicate moderate to severe intoxication and should be transported by ALS.

Adult Bradycardia Administrative Guideline (Age ≥ 14)

History	Signs and Symptoms	Differential

• Past medical history
• Medications
  ◦ Beta-Blockers
  ◦ Calcium channel blockers
  ◦ Clonidine
  ◦ Digoxin
• Pacemaker
	• Chest pain
	• Respiratory distress
	• Hypotension or Shock
	• Altered mental status
	• Syncope
	• Lightheadedness/Dizziness
		• Acute myocardial infarction
		• Hypoxia / Hypothermia
		• Pacemaker failure
		• Sinus bradycardia
		• Head injury (elevated ICP) or Stroke
		• Spinal cord lesion
		• Sick sinus syndrome
		• AV blocks (1°, 2°, or 3°)
		• Overdose

Bradycardia (HR<60)
with either symptoms or evidence of hemodynamic instability.

Symptomatic Bradycardia
chest pain, shortness of breath, lightheadedness

ALS/BLS General

P — Administer **20 mL/kg NS/LR** fluid bolus (unless signs of fluid overload).
May repeat x 1

Continued bradycardia

P — Administer **atropine sulfate 1 mg** rapid push IV/IO
May repeat every 3-5 minutes to a **max total dose of 3 mg**

P — For wide complex bradycardia and history of renal failure, consider hyperkalemia and administer **calcium chloride 1g** IVP

Continued bradycardia

P — **Dopamine 5-20 mcg/kg/min** IV/IO.
For adults may start with 1 drop every 2 seconds (30 drops per minute) using a 60 drop set
Titrate to effect, goal SBP 90

Hemodynamic instability:
Hypotension with evidence of poor perfusion and end organ compromise (chest pain, shortness of breath, altered mental status, etc.)

Do not delay transcutanous pacing in patients with severe instability (poor perfusion and altered LOC)

P — Consider transcutaneous pacing if refractory to medical management or in patients with poor perfusion and altered LOC

P — Consider sedation if needed for pacing:
- **Midazolam 2.5 mg** IV/IO or **5 mg** IM
- May repeat as needed; **Max 10 mg**

Education/Pearls

Bradycardia

- Identifying signs and symptoms of poor perfusion caused by bradycardia is paramount.
- Rhythm should be interpreted in the context of symptoms and pharmacological treatment given ONLY when symptomatic; otherwise, closely monitor the patient and reassess.
- **Do not delay transcutaneous pacing for patients with evidence of severe hemodynamically instability, with poor perfusion, or altered mental status**.

- Bradycardia typically causes symptoms at a rate of <50 beats/minute.
  - Bradycardia may present with altered mental status, chest pain, congestive heart failure, seizure, syncope, shock, pallor, diaphoresis, or evidence of hemodynamic instability.

- Consider treatable causes for bradycardia
  - Common causes: electrolyte abnormalities (e.g. hyperkalemia), myocardial ischemia, medication overdose (see below for more details), infections, hypoxemia, and hypothyroidism
  - Consider hyperkalemia in patients with ECG evidence of wide complex bradycardic rhythms. Administer calcium chloride 1 g IV/IO for suspicion of hyperkalemia.
  - Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory efforts.

- Atropine
  - **Do NOT delay Transcutaneous Pacing to administer Atropine in bradycardia with poor perfusion.**
  - Caution in setting of:
    - Acute MI, as elevated heart rate can worsen ischemia.
    - Overdoses, as administration may cause worsening bradycardia in certain scenarios (such as alpha agonist overdose, like Clonidine.)
    - Cardiac transplant, as it may cause paradoxical bradycardia.

- Transcutaneous Pacing Procedure (TCP)
  - Immediately utilize TCP in patients with evidence of poor perfusion or with high-degree AV block (2nd or 3rd degree) without IV/IO access.
  - If time allows, transport to a cardiac receiving center because transcutaneous pacing is a temporizing measure.
  - Consider sedation or pain control for TCP
    - Use $EtCO_2$ for all patients receiving sedation

- Overdose
  - Bradycardia is a consequence of medication overdoses, including beta blockers, calcium channels, and alpha-2 agonists (Clonidine)
  - In Clonidine overdoses, avoid use of atropine in the setting of normotension, as atropine may cause reflex hypertension in this unique setting

Burn Administrative Guideline

History	Signs and Symptoms	Differential
• Type of exposure • Time of injury • Other trauma • Airway/inhalation injury	• Burns • Pain and swelling • Hypotension/shock • Airway compromise/distress could be indicated by hoarseness/wheezing	• Superficial (1stDegree) red, painful (Don't include in TBSA) • Partial Thickness (2nd Degree) blistering • Full Thickness (3rd Degree) painless/charred or leathery skin • Thermal injury, including chemical or electrical • Radiation injury • Blast injury

Thermal burn
Includes electrical and lightning burns

B	Remove clothing if not stuck to patient. Remove jewelry and other constrictive items from all extremities. Leave blisters intact and cover burns with dry dressing or clean sheet. Keep patient warm.
	Initiate fluid resuscitation for large surface area burns (>10%) Administer **20 mL/kg NS/LR fluid bolus** May repeat as needed
P	IV/IO placement (avoid placement through burned skin) Consider 2 IV sites for burns larger than 10% Cardiac monitor and $EtCO_2$ Evaluate for thermal burn to airway **Airway management ONLY if unable to ventilate or oxygenate.**

Consider the following as needed:
Pain Management AG
Smoke Inhalation AG

Transport to appropriate destination per **SAEMS Regional Trauma Triage**

Education/Pearls:

- Critical or Serious Burns should be transported directly to a burn center:
  - Partial thickness burns >10% TBSA
  - Moderate to severe burns that involve the face, hands, feet, genitalia, perineum, or major joints.
  - Full thickness burns in any age group.
  - Electrical burns, including lightning injury.
  - Chemical burns.
  - Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality.

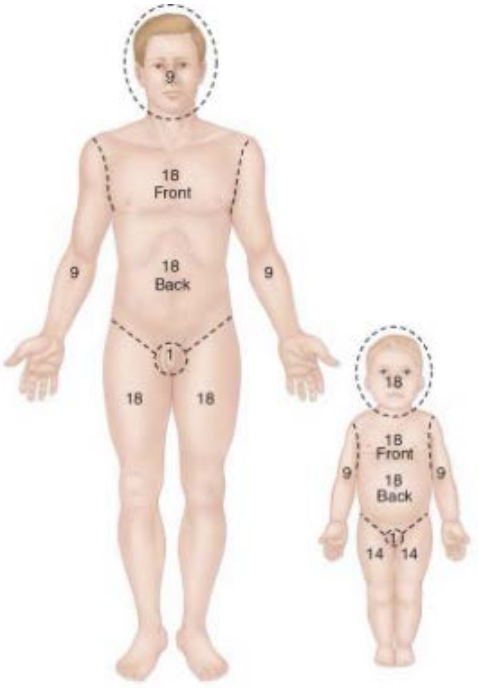
- Burn patients are often trauma patients; evaluate for multisystem trauma and consider whether a patient meets trauma criteria.
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Burn patients are prone to hypothermia - never apply ice or cool the burn. Instead, maintain normal body temperature.
- Evaluate the possibility of abuse with burn injuries in the elderly or pediatric patients.
- Do not administer IM pain injections to a burn patient.

- Electrical Burns:
  - DO NOT contact patient until the source of the electrical shock is disconnected..
  - Cardiac Monitor: Anticipate cardiac arrhythmias including VT, VF, atrial fibrillation and/or heart blocks.

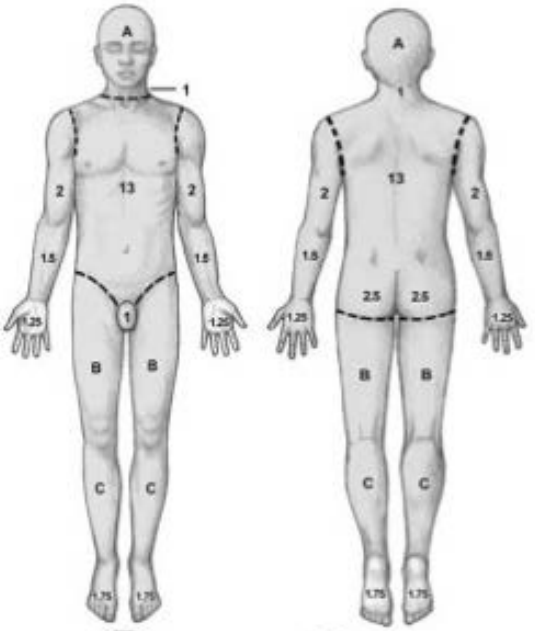
- Lightning strikes generate unique injuries that require appropriate interventions
  - Lightning can cause hearing difficulty, cardiac arrhythmias, and deep burns that may not be visible externally. They may coincide with additional physical trauma (e.g. falls or being thrown by event).
  - Utilize REVERSE TRIAGE for multiple victims:
    - Initiate treatment on apneic or pulseless patients first, then proceed to address the less-injured.
    - Patients may experience cardiac arrest and/or be in extremis from both a medical (dysrhythmia) and traumatic cause. Prioritize correction of any life-threatening dysrhythmia (e.g. defibrillate VF and initiate CPR) and also initiate transport to a trauma center with ongoing high-quality resuscitation.

Burn Surface Area Reference Guide

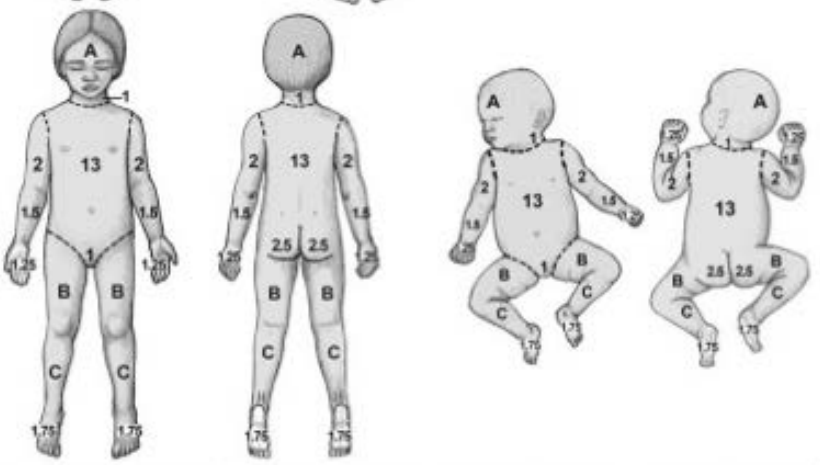
Rule of Nines



Lund and Browder Charts for area of body burnt



Burnt area	%
Head	
Neck	
Trunk (front)	
Trunk (back	
Arm (right)	
Arm (left)	
Hand (right)	
Hand (left)	
Buttock (right)	
Buttock (left)	
Genitals	
Leg (right)	
Leg (left)	
Feet (right)	
Feet (left)	
Total burn area	



Age (years)	Under 1	2–4	5–9	10–14	15	Adult
A — ½ of head	9½	8½	6½	5½	4½	3½
B — ½ of one thigh	2¼	3¼	4	4½	4½	4¾
C — ½ of one leg	2½	2½	2¾	3	3¾	3

Burn AG

Remote Primary Health Clinic Manuals. Burns. 2014. Available from: https://rphcm.allette.com.au/publication/cpm/Burns.htm

Adult and Pediatric Cardiac Arrest Administrative Guideline

Minutes 1-8

B	Initiate chest compressions at rate of 100-120 bpm 15 LPM NRB mask & NPA/OPA
B	If unwitnessed arrest or respiratory/hypoxia/pediatric/trauma IMMEDIATELY begin airway management and positive pressure ventilation at a rate of 10 breaths per minute.
B	Ventilate all children < 8yo using OPA/BVM only
P	Place pads and perform immediate rhythm check/**defibrillation 2 J/kg (200 J adult dose)**

B	• Perform 4 rounds of 200 compressions • Check rhythm and pulse every 2 minutes • Defibrillate if indicated • Minimize interruptions
P	IV/IO access Administer **epinephrine** as early as possible
P	If pVT/VF after third shock, administer **amiodarone.** For polymorphic VT (torsades) administer **magnesium.**

Minutes 8-20

Consider alternative etiologies and administer medications below if strong evidence of reversible cause of cardiac arrest

P	Place advanced airway (supraglottic airway or ETI) after 4 rounds/8 minutes Administer 2nd dose of **epinephrine (max 2 mg)**
	Dead on Scene AG if indicated

POST ROSC CARE	
B	<u>Support Airway/Oxygenation/Ventilation</u> Leave I-gel in place Continue maximal O2 therapy BVM ventilation rate of 8-10 bpm **<u>Do not overventilate/hyperventilate</u>** Prevent hyperthermia only, do not perform therapeutic hypothermia
P	Obtain 12 lead ECG Attempt peripheral IV access Hang dopamine and monitor for shock
P	Begin **dopamine** if HR and BP downtrending significantly or patient in shock**.**

For rearrest
Resume chest compressions
Do not give 3rd dose of epinphrine
May leave pressor running if started

DRUG DOSAGES:

Defibrillation: **2 J/kg --> 4 J/kg --> 6 J/kg --> 10 J/kg** (Max 200J)

Epinephrine (1 mg/10mL) 0.01 mg/kg IV/IO (max dose 1 mg)
<u>Max total dose of 2mg with 2nd dose at 8 minutes</u>

Amiodarone 5 mg/kg IV/IO**. Max dose 300 mg**
May repeat x 1 **at 2.5 mg/kg** I/IO. **Max dose for repeat is 150 mg**
Follow amiodarone doses with 20 mL NS flush
Do not administer in torsades

Dopamine 5-20 mcg/kg/min IV/IO (adults and children)
Titrate to effect, goal SBP 90

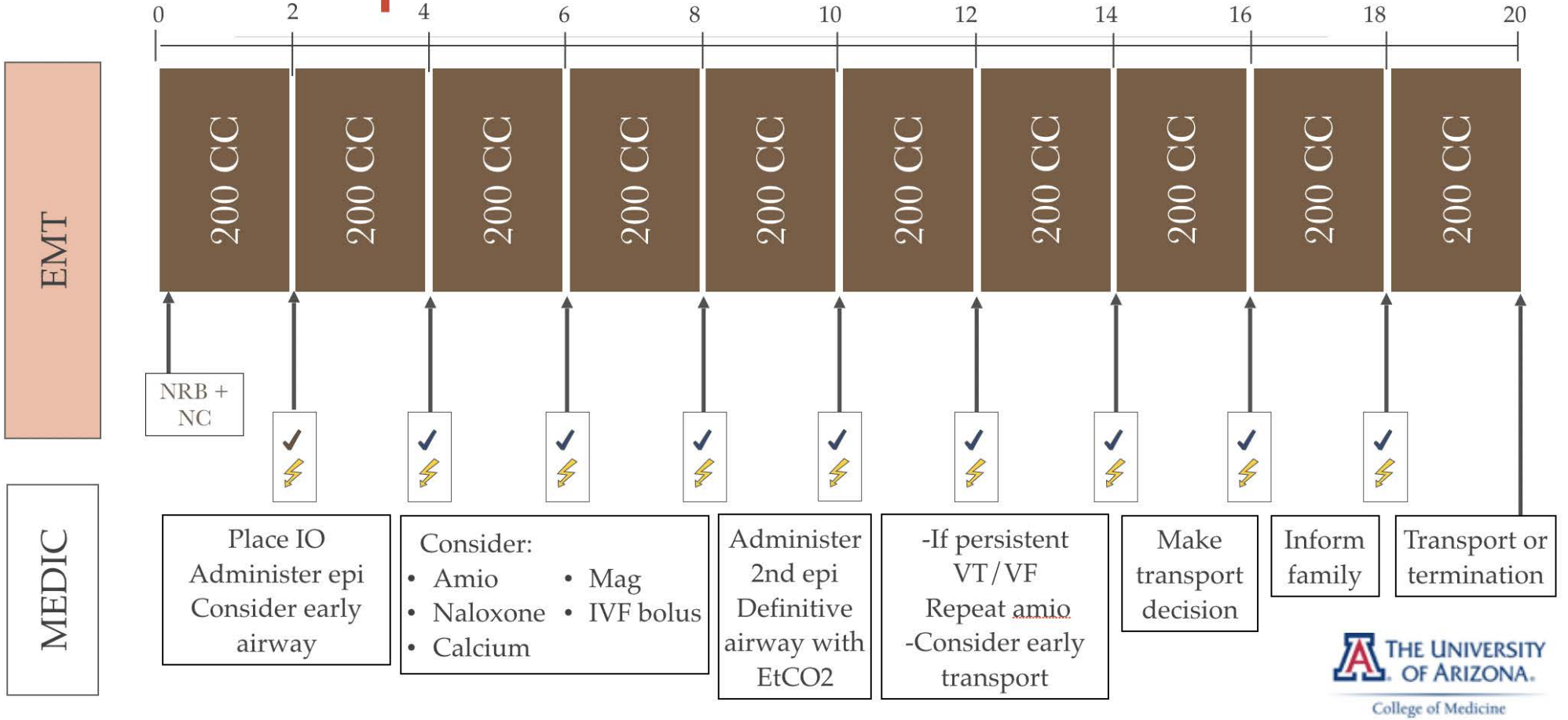
Simplified dosing for adults may start with 1 drop every 2 seconds (30 drops per minute) using a 60 drop set

Only if concern for opioid overdose;
Administer **naloxone 2 mg IN/IV/IO**
May repeat **naloxone 2 mg IV/IO**

Only if concern for hyperkalemia:
Administer **calcium chloride 20 mg/kg IV/IO**
Max dose 1 g

For polymorphic ventricular tachycardia (torsades). Administer **magnesium 25 mg/kg (max 2g)** IV/IO over 2-5 minutes.

pCPR Protocol Overview

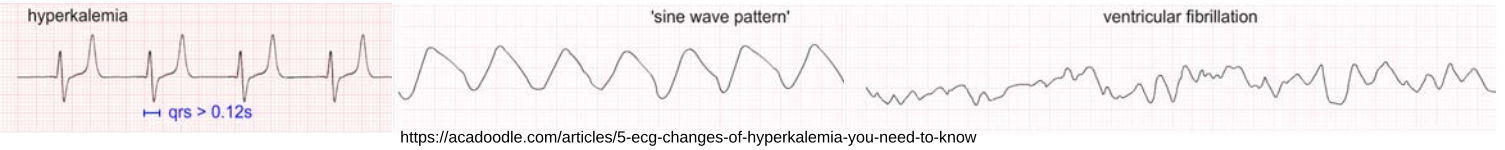


THE UNIVERSITY OF ARIZONA.
College of Medicine

Education/Pearls

Treatment of cardiac arrest provides a unique challenge due to the intensive therapies and critical windows for intervention. Prioritize effective CPR in the first 8 minutes, addressing any cardiac arrhythmias and optimizing airway opening with an OPA or NPA. Consider the possibility of transport early in resuscitation in cases of dynamic arrhythmias or persistent VF.

- Hyperkalemia:
  - A common cause of arrests, hyperkalemia is often seen in the setting of renal failure, tissue destruction (such as prolonged downtime from rhabdomyolysis or large burns), certain medications, or prior episodes of hyperkalemia, and should be suspected in wide complex rhythms or VF.
  - The pacing threshold for bradycardia is elevated in hyperkalemia, leading to increased latency, intermittent or loss of capture, and loss of sensing.
  - When suspected, give: Calcium Chloride 1 g IV/IO
  - The following ECG changes may be present in hyperkalemia:



https://acadoodle.com/articles/5-ecg-changes-of-hyperkalemia-you-need-to-know

In patients under the age of 14, strongly consider respiratory illness as the cause of cardiac arrest.
  - Early ventilation is indicated in these patients
  - **Do not intubate patients <8 years**

- For persistent shock resistent VF after 3+ defibrillation attempts, consider electrical storm and place patient on mechanical CPR device (if available) and prepare for transport.
- For torsades, administer magnesium (max 2 g). Amiodarone prolonges the QT interval and should not be given to patients with torsades (polymorphic VT due to prolonged QT).

The post-arrest period is dangerous for the patient, as re-arrest and dysrhythmias frequently occur. Titrate fluid resuscitation, vasopressor administration, and oxyen to optimize vital sign parameters. Dysrhythmias are common and usually self-limiting after ROSC and may not need further treatment, especially atrial dysrhythmias. However, providers should treat worsening bradycardia, as it may precede re-arrest.

- Continuously monitor cardiac rhythm and $EtCO_2$
  - $EtCO_2$ should remain above 20 - lower readings may indicate re-arrest
- Titrate O_2 to maintain saturation between 94-99%
- Obtain a 12 lead; if STEMI, transmit ECG and expedite preparation for transport
- Treat bradycardia per **Bradycardia AG**
- Once loaded for transport, reassess airway and pulse
- Assure there are appropriate personnel for transport, particularly in the event of rearrest
- Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90 – 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.

Pacing:
- **While transcutaneous pacing may otherwise be indicated in the ischemic heart, consider the danger of missed re-arrest while pacing.**
- In general titrate pressors as needed, and only attempt pacing if indicated in the post ROSC patient if mechanical capture can absolutely be verified (i.e. finger on the pulse with good blood pressure) and the patient is under constant monitoring.

Chest Pain/STEMI Administrative Guideline

History	Signs and Symptoms	Differential
• Age • Medications (Viagra / sildenafil, • Levitra / vardenafil, Cialis / tadalafil) • Past medical history (MI, Angina, • Diabetes, post menopausal) • Recent physical exertion	• CP (pain, pressure, aching, vice-like • tightness) • Location (substernal, epigastric, arm, • jaw, neck, shoulder) • Radiation of pain • Pale, diaphoresis • Shortness of breath • Nausea, vomiting, dizziness • Time of onset	• Angina vs. Myocardial infarction • Pericarditis • Pulmonary embolism • Asthma / COPD • Pneumothorax • Aortic dissection or aneurysm • GE reflux • Chest wall injury or pain • Pleural pain

Nontraumatic chest pain or anginal equivalent in patient 35 years or older (or medic discretion)

Age <35

Obtain 12 Lead ECG

For pediatric patients consider transport per **SAEMS Critical Pediatric Triage Protocol**

B

If dyspneic or hypoxemic administer oxygen and titrate to maintain SpO_2 of 94%
May obtain 12 lead ECG for paramedic interpretation
IV access (if authorized)

Administer **aspirin 324 mg** PO (chewed)

Consider administration of **nitroglycerin 0.4 mg** SL tablets or one full spray if SBP > 110 mm Hg in patients who are prescribed this medication.
Repeat every 5 minutes until pain relieved or to a max of 3 doses

Administer **250 mL NS/LR fluid bolus** for SBP < 110
May repeat as needed

P

IV access
Obtain 12 lead ECG and transmit, when available

Consider administration of **nitroglycerin 0.4 mg** SL tablets if SBP > 110 mm Hg
Repeat nitroglycerine every 5 minutes until pain relieved or to a max of 3 doses

Consider **morphine 0.1 mg/kg** IV/IO
2-5 mg increments every 5 minutes, to a max total dose 20 mg.
Hold for hypotension

Administer **250 mL NS/LR fluid bolus** for SBP < 110
May repeat as needed

If nauseated administer **ondansetron 4 mg** IV

STEMI ALERT
(STEMI = 1 mm ST segment elevation in ≥ 2 contiguous limb leads or 2 mm elevation in precordial leads (v leads)

CHF exacerbation/ pulmonary edema on exam

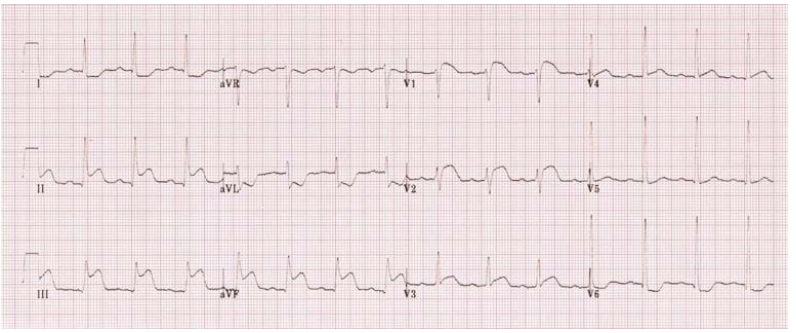
Consider **CHF/Fluid Overload AG** if indicated

Obtain second IV
Transport patient to **Cardiac Receiving Center or Certified Chest Pain Center with 24/7 cath lab capabilities**

Education /Pearls

Acute Coronary Syndrome (ACS) is a common cause of chest pain. ACS occurs when the blood supply of the heart cannot meet the demand of the heart, leading to cardiac ischemia. Coronary artery blockages may cause ischemia and infarction of territories of the heart, which presents as angina. Angina is typically described as chest pain radiating to the jaw or arm(s), diaphoresis, nausea/vomiting, and shortness of breath. Additional atypical symptoms may include epigastric/retrosternal pain or dizziness, and are commonly seen in the elderly, diabetics, and women; have a low threshold to perform a 12 lead EKG in these patients.

- Risk factors for ACS include diabetes, smoking, hypertension, hyperlipidemia, family history of cardiac disease, and atherosclerotic disease (prior stroke, heart attack, or peripheral vascular disease).
- Consider ACS as the cause of chest pain in patients >35 y with risk factors or in younger patients with recent cocaine/methamphetamine use.
- If presentation is severe or delayed, patients may present with acute heart failure, syncope and/or shock.
- Performance of serial ECGs is recommended if not diagnostic or change in patient condition



Nitroglycerin: Nitroglycerin dilates vasculature and may ease pain caused by myocardial ischemia.

- Do not withhold nitroglycerine while obtaining IV access.
- The use of **nitroglycerine is contraindicated** within 24-48 hours of the use of erectile dysfunction medication (sildenafil, tadalafil).
- Use caution when providing nitroglycerin to patients that demonstrate inferior STEMI patterns (II, III, aVF), as this may represent a right-sided MI that is preload dependent (see EKG).
- Nitroglycerin may be repeated per dosing guidelines.
- Monitor for hypotension after administration.

Morphine: Morphine provides analgesia but offers no survival benefit. Morphine should be used with caution in unstable angina/non-STEMI due to an association with increased mortality.

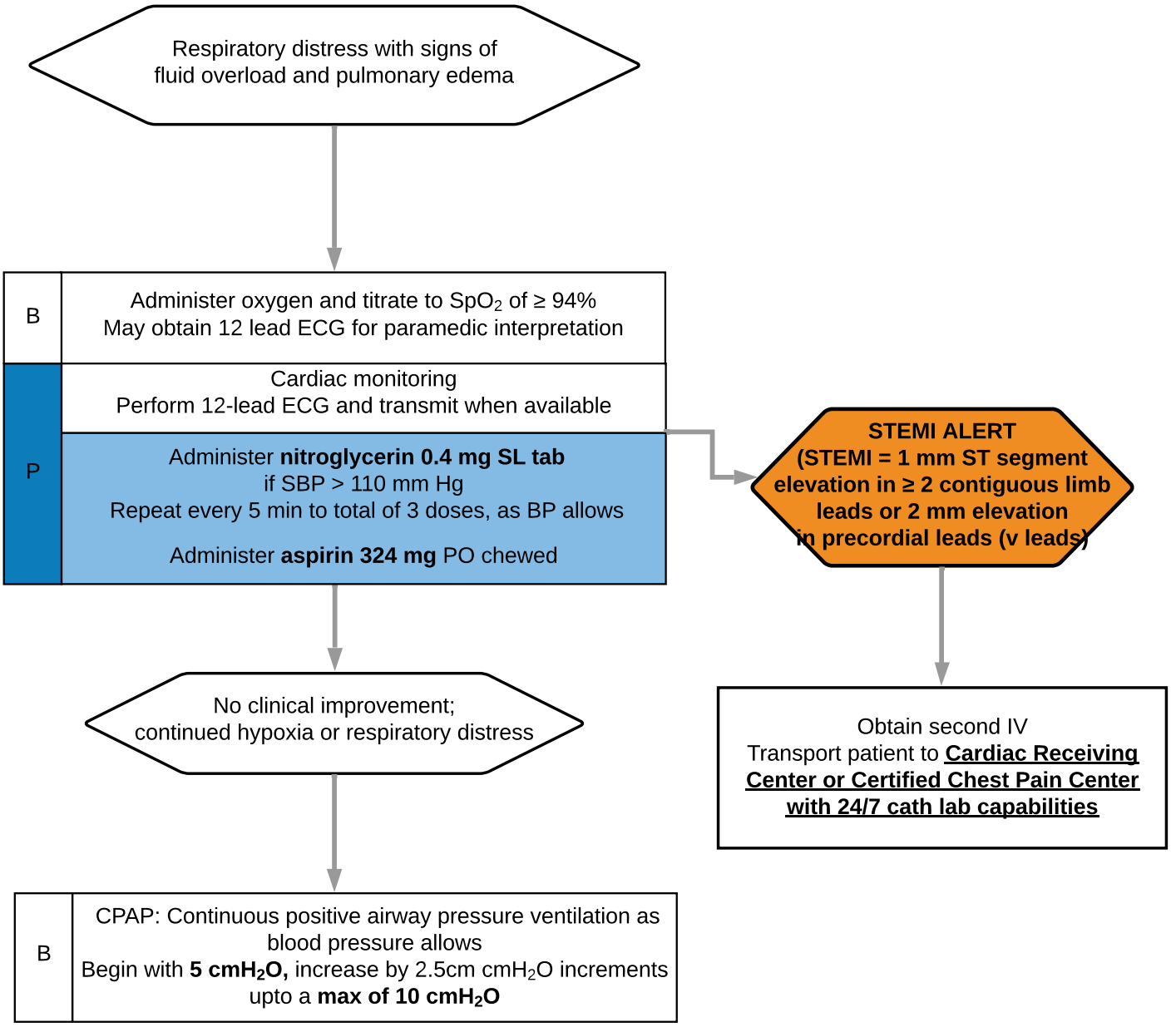
- Monitor for hypotension after administration.
- Opioids may be repeated per dosing guidelines.

ST Elevation Myocardial Infarction (STEMI):

- Diagnostic criteria: Anginal symptoms plus one of the following:
  - 1 mm ST elevation in 2 or more contiguous limb leads (I, II, III, avF, aVR, aVL) and reciprocal ST depressions.
  - 2 mm ST elevation in 2 or more precordial leads (V1-V6) and reciprocal ST depressions.
- Treatment timing goals:
  - Obtain and transmit ECG within 5 minutes
  - Provide STEMI alert within 10 minutes
  - Time at scene less than 15 minutes

CHF/Pulmonary Edema Administrative Guideline

History	Signs and Symptom	Differential
• Congestive heart failure • Medications (digoxin, Lasix, Viagra/sildenafil, Levitra/vardenafil, Cialis/tadalafil) • Cardiac history/past myocardial infarction	• Respiratory distress • Crackles on lung exam • Jugular vein distention • Frothy/pink sputum • Peripheral edema, diaphoresis • Hypotension, shock • Chest pain	• CHF exacerbation • MI • Asthma/COPD/Pneumonia/PE • Pericardial effusion/tamponade • Aspiration • Noncardiogenic pulmonary edema



Education/Pearls

Heart failure describes a clinical syndrome in which the heart's ability to pump is impaired. When a patient experiences an increase in their fluid status (ingestion of fluid or salt) or a decrease in their heart's ability to pump (such as a myocardial infarction or valve failure), a heart failure exacerbation may occur and fluid may build up in the body. Pulmonary edema is a dangerous consequence and can impair breathing and gas exchange. Commonly, patients with heart failure may not tolerate lying supine and may complain of chest pain, shortness of breath, or sudden night-time awakening. Treatment goals include nitroglycerin, providing ventilatory support with CPAP, and determining the underlying cause (such as a myocardial infarction).

- Patients with heart failure should receive an ECG.
- Use care in administration of fluid in hypotension, as this may worsen respiratory status.

Nitroglycerin: By dilating vasculature, nitroglycerin may improve the left ventricle's ability to function.

- The use of **nitroglycerine is contraindicated** within 24-48 hours of the use of erectile dysfunction medication (sildenafil, tadalafil).
- Use caution when providing nitroglycerin to patients that demonstrate inferior STEMI patterns (II, III, aVF), as this may represent a right-sided MI that is preload dependent, leading to sudden and severe hypotension when given nitroglycerine.
- Nitroglycerin may be repeated per dosing guidelines.
- Monitor for hypotension after administration.

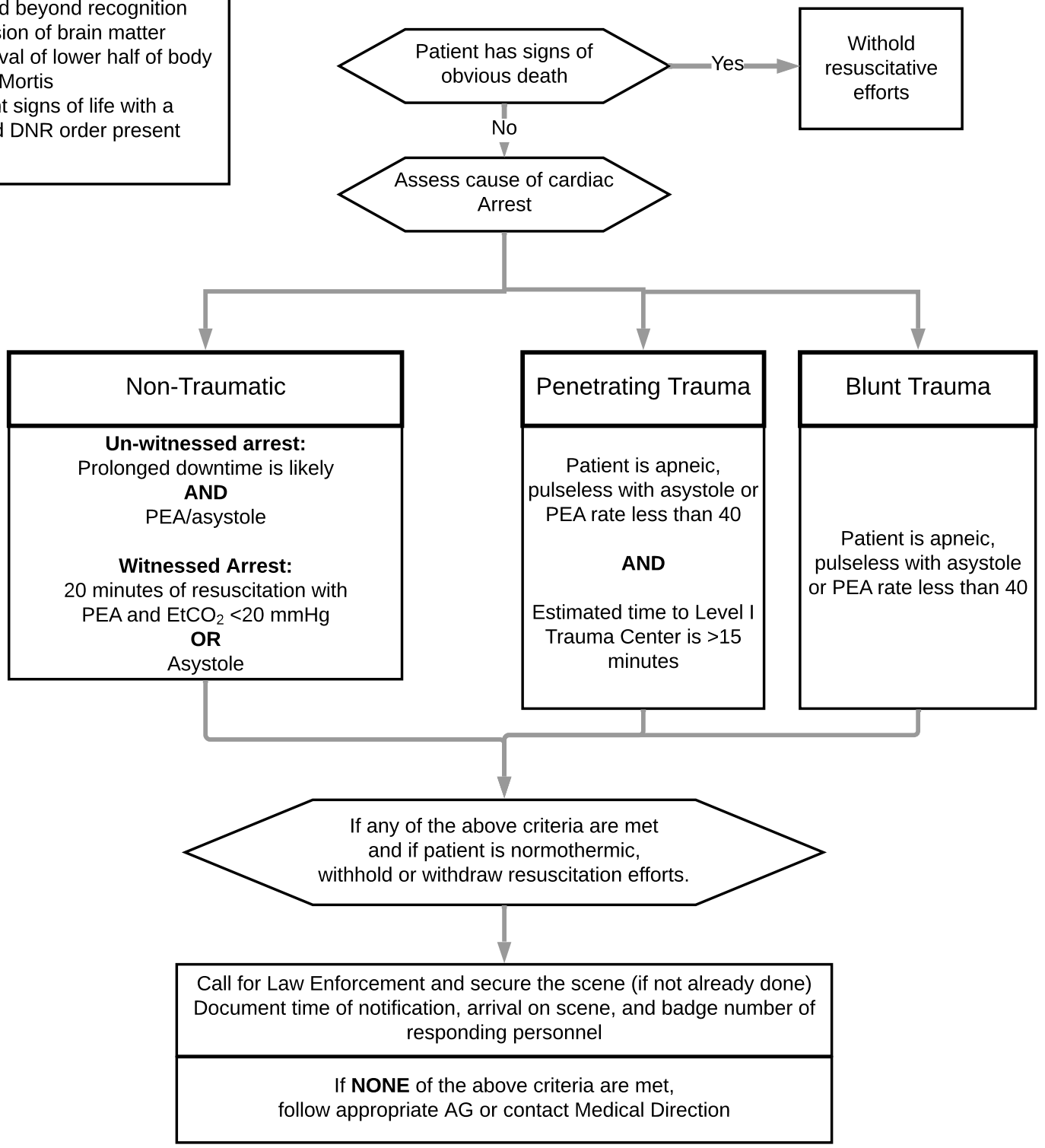
Continuous Positive Airway Pressure (CPAP): Noninvasive Positive Pressure Ventilation (NIPPV), such as CPAP, supports respiratory status in patients with evidence of pulmonary edema.

- Patients who receive CPAP may experience a decrease in mental status and blood pressure. Closely monitor vitals and mental status, and discontinue CPAP for shock, vomiting, or altered LOC.
- Patients with a decreased GCS or inability to protect their airway are at risk for aspiration and should not receive NIPPV.
- Consider Midazolam to assist with CPAP compliance. Benzodiazepines may precipitate respiratory depression or may worsen compliance with CPAP in patients who are already tired, already have altered LOC, or who have recent history of alcohol or drug ingestion. All efforts at verbal coaching should be utilized prior to giving benzodiazepines for patients in respiratory distress.

Dead On Scene Administrative Guideline

Obvious Death Criteria:

- Decapitation
- Decomposed
- Burned beyond recognition
- Extrusion of brain matter
- Removal of lower half of body
- Rigor Mortis
- Absent signs of life with a signed DNR order present



Education/Pearls

- Patients must be pulseless and apneic to apply this AG. PEA/Asystole should be confirmed in two leads for at least ten seconds.
- If the patient is hypothermic due to submersion or environmental exposure, follow **OHCA AG** and transport per guideline.
- Online medical direction is not necessary if the patient meets this AG criteria.
- An EMS provider must remain with the patient until released to the Law Enforcement Officer.
- For patients <18 years of age, consultation with online medical direction is recommended.
- After termination, do not alter body condition in any way or remove equipment (lines, tubes, etc.). Doing so may compromise potential Medical Examiner investigation

Advanced Directives (ADs): ADs describe the patient's wishes for treatment in life-threatening situations, and may include limitations of compressions, airway management, feeding, fluids, and preference for organ donation or dialysis. In the absence of formal written directions (MOLST, POLST, DNR, generic advanced directives), a person with power of attorney for healthcare or healthcare proxy may prescribe limits of treatment.

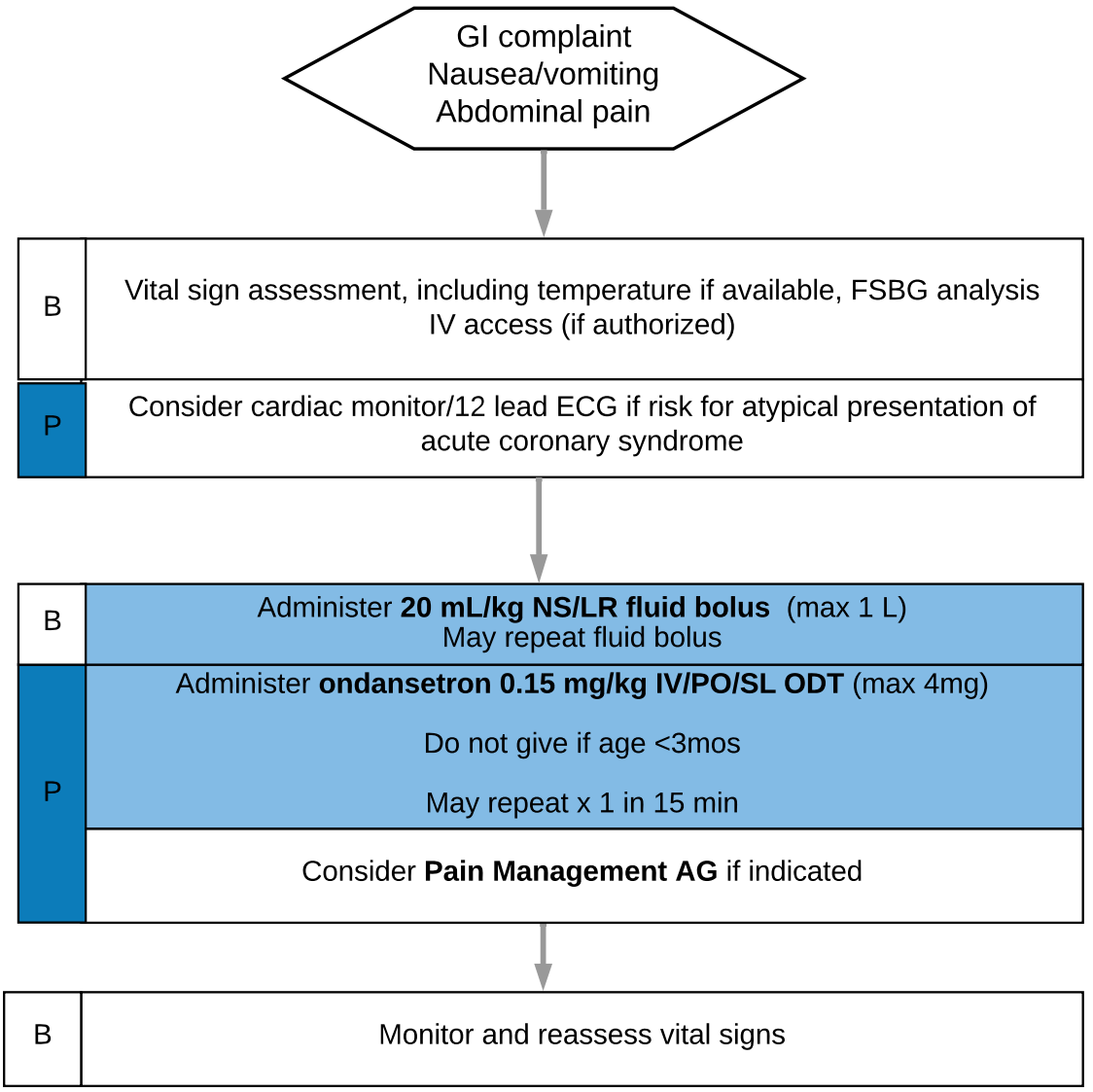
- Patients must have one of the following documents or a valid alternative (such as identification bracelet indicating wishes) immediately available:
  - Physician Orders for Life Sustaining Treatment (POLST) or Medical Orders for Life Sustaining Treatment (MOLST): explicitly describes acceptable interventions for the patient in the form of medical orders, and must be signed by a physician or other empowered medical provider to be valid.
  - Do Not Resuscitate (DNR) order: identifies that CPR and intubation are not to be initiated if the patient is in arrest or peri-arrest. The extent of interventions covered by this order can vary widely.
  - One of the documents above is valid when it meets all of the following criteria:
    - Be intact: it has not been cut, broken or shows signs of being repaired
    - Display the patient's name and the physician's name
- If there is documentation of Advanced Directives (POLST, MOLST, DNR), the patient should receive full treatment per protocols with the exception of any intervention specifically prohibited in the patient's advanced directive; for example, a patient with a DNI (Do Not Intubate) should receive all interventions except intubation.
  - If for any reason an intervention that is prohibited by an advanced directive is being considered, online medical direction should be obtained.
- In cases where the patient's status is unclear, appropriateness of withholding resuscitation efforts is questioned, or if there is question on the validity of the provided forms, EMS personnel should initiate CPR immediately and then contact online medical direction. Proceed with resuscitation until additional information can be obtained to clarify the best course of action.
- Special Consideration: For scene safety and/or family wishes, the provider may decide to implement CPR even if all the criteria for death are met.

Traumatic Arrest:

- Resuscitation efforts may be terminated in any blunt trauma patient who is apneic, and pulseless.
- Victims of penetrating trauma found apneic and pulseless should be rapidly assessed for the presence of other signs of life, such as pupillary reflexes, spontaneous movement, response to pain, and electrical activity on EKG.
- If resuscitation is not terminated, transport is indicated. Cardiopulmonary arrest patients in whom mechanism of injury does not correlate with clinical condition, suggesting a non-traumatic cause of arrest, should have standard ALS resuscitation initiated.

GI/Nausea Administrative Guideline

History	Signs and symptoms	Differential
• Age • Time of last meal • Last bowel movement/emesis • Improvement or worsening with food or activity • Duration of problem • Other sick contacts • Past medical history • Past surgical history/medications • Menstrual history (pregnancy) • Travel history • Bloody emesis / diarrhea	• Pain • Character of pain (constant, intermittent, sharp, dull, etc.) • Distention, constipation • Diarrhea • Anorexia • Radiation • Associated symptoms:Fever, headache, blurred vision, weakness, malaise, myalgias, cough, headache, dysuria, mental status changes, rash	• CNS (stroke, CNS lesions, trauma or hemorrhage, vertigo, migraine) • Myocardial Infarction • Drugs (NSAID's, chemo, antibiotics) • Chronic GI or renal disorders • Diabetic ketoacidosis • OB-Gyn disease (ovarian cyst, PID, Pregnancy) • Infections (pneumonia, influenza) • Food or toxin induced



Education/Pearls:

PO ondansetron can be given as ODT preparation or IV preparation can be given by mouth. It tastes bad, so easier to give in small amount of flavored drink.

Vomiting and diarrhea are common symptoms, but can be the symptoms of uncommon and serious pathology such as stroke, carbon monoxide poisoning, acute MI, new onset diabetes, diabetic ketoacidosis (DKA), or organophosphate poisoning. Maintain a high index of suspicion and utilize other protocols as indicated. Epigastric discomfort can be a mimic of cardiac disease, especially in elderly women and diabetic patients, and warrants an EKG in those populations. Analgesia may be administered via the **Pain Management AG**.

Vital signs are an important guideline in gastrointestinal illness:

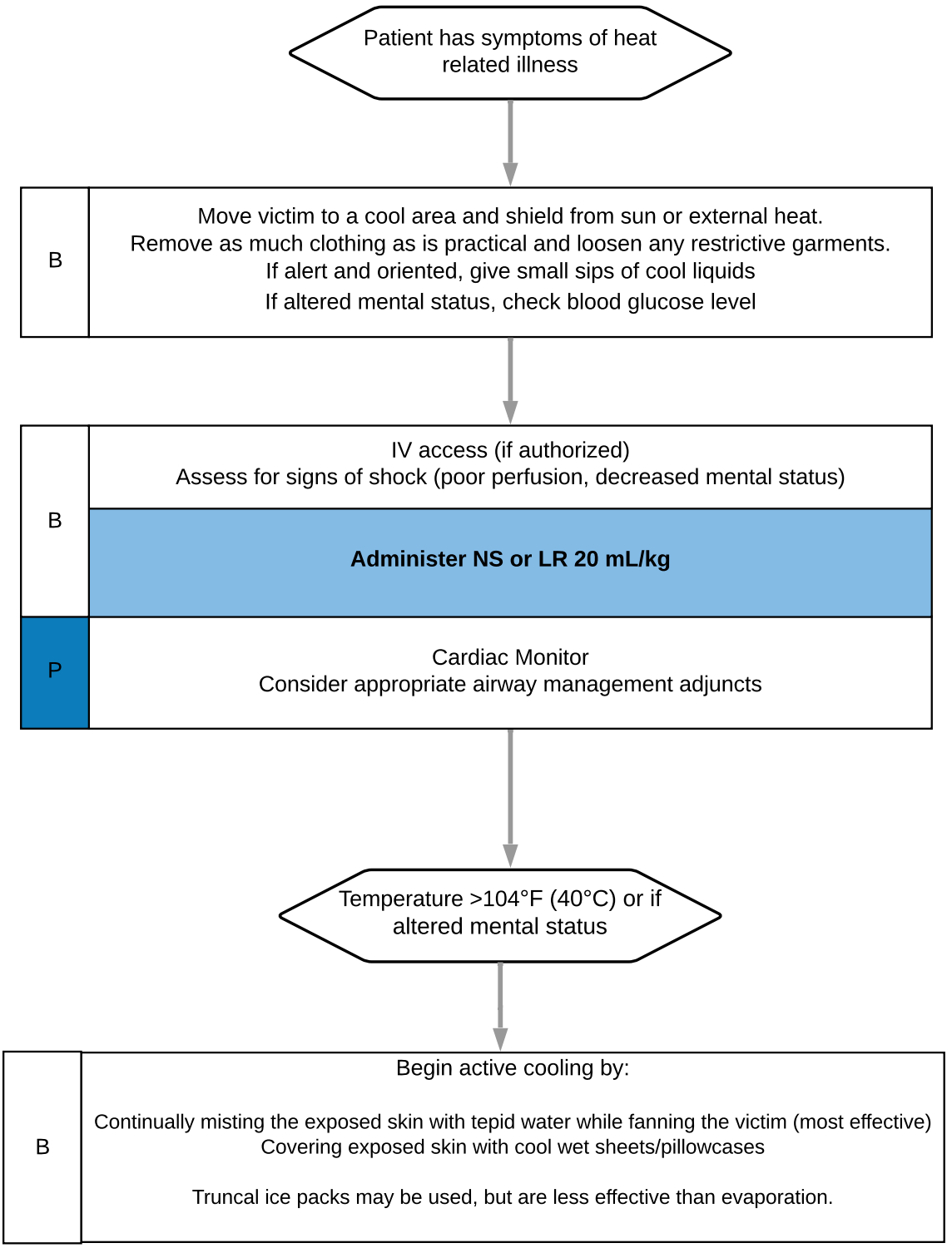
- Repeat vital signs after each fluid bolus.
- Heart Rate: Increased heart rate is one of the first clinical signs of dehydration or infection, and may represent a reduction in volume satatus. Tachycardia usually increases as dehydration becomes more severe. Patients with normal heart rate are very unlikely to be significantly dehydrated.

Pediatrics:

- Beware of isolated vomiting in children. Isolated vomiting may represent pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures), as well as a response to fever or infection.

Hyperthermia Administrative Guideline

History	Signs and Symptoms	Differential
• Ambient temperature • Medications/drugs • Exertion level • Time of exposure to heat • Attire • Fluid intake	• Flushed • Dry or sweaty • Muscle cramps • Nausea/vomiting • Tachycardia/hypotension/poor perfusion • Elevated temperature • Altered mental status	• Heat cramps • Heat edema • Heat exhaustion • Heat Syntope • Heat stroke • Stimulant drug use • Fever/sepsis • Dehydration • Medication adverse reaction



Education/Pearls

Heat-related illness is a spectrum of disease that occurs when the body's thermoregulatory system does not work properly. Heat-related illness most often affects athletes (exertional hyperthermia), but can also occur during the warm weather months or in locations with extreme temperatures. Patients with impaired thermoregulation (those at extremes of age, the obese or mentally ill) are at higher risk. The definitive treatment for heat-related illness is total body cooling.

Heat (Muscle) Cramps

- Heat cramps are minor muscle cramps usually in the legs and abdominal wall.
- Temperature is normal.

Heat Exhaustion

- Heat exhaustion has both salt and water depletion usually of a gradual onset.
- As it progresses tachycardia, hypotension, elevated temperature, and very painful cramps occur.
- Symptoms of headache, nausea and vomiting occur.
- Heat exhaustion can progress to heat stroke.

Heat Stroke

- Heat stroke occurs when the cooling mechanism of the body (sweating) ceases due to temperature overload and/or electrolyte imbalances.
- Temperature is usually > 104 F.
- When no thermometer is available, it is distinguished from heat exhaustion by altered level of consciousness.

Treatment for heat related illness

- In mild cases of hyperthermia, treatment is supportive. Removing the patient from a heated environment is the first intervention, followed by passive cooling measures such as removing clothing and fanning air across the skin.
- Besides ice water immersion, evaporation (mist and fan) is the most rapid way to cool a patient.
- Ice packs to the groin, axilla, neck, and areas near other great vessels have been shown to be less effective.
- Monitor the skin if applying ice packs for prolonged periods. The skin is susceptible to damage with prolonged exposure to ice. Coverine ice packs with a sheet ad adjusting the site can miditigate this.
- Hydration orally or intravenously can help restore water balance quickly
- For patients who have signs and symptoms of hypovolemic shock, volume replacement is indicated

Hypo/Hyperglycemia Administrative Guideline

History	Signs and Symptoms	Differential

• Recent illness or infection
• Past medical history
  ◦ Insulin pump?
• Pertinent medication history
  ◦ PO or Sub Q interventions
  ◦ Recent treatments
  ◦ Treatment compliance
	• Altered mental status
	• Kussmaul breathing
	• Polyuria
	• Tachycardia
	• Weakness
		• Stroke
		• Head injury/Trauma
		• Drug usage
		• ETOH usage

Abnormal FSBG
with symptoms or abnormal VS

B	Assess mental status/GCS Assess prehopstial stroke screen as indicated O_2 to maintain $SpO_2 \geq 94\%$ Vital Signs

Hypoglycemia (FSBG<60)

B	Administer **oral glucose 1 tube (25g)** ONLY IF ALERT AND ABLE TO SWALLOW May repeat x 1
P	IV/IO access Cardiac monitor
	Administer **Dextrose 10% (D10) 1 mL/kg** (max dose 250 mL) IV/IO May repeat x 1 for continued symptomatic hypoglycemia If unable to establish IV access, administer **glucagon 0.1 mg/kg** (max 1 mg) IM/IN. May repeat x 1 after 10 min

B	Reassess VS, mental status, FSBG

Consider **Treat and Release AG**
Consider **BLS Transport Thresholds**

Hyperglycemia (FSBG >250)

B	IV access (if authorized) Consider EtCO2 to monitor for hyperventilation (especially when FSBS 'HI' or >600 this is concerning for DKA)
	Consider **NS/LR fluid bolus 10 mL/kg over one hour**
P	IV/IO access Cardiac monitor

Pediatric patients:
New onset hyperglycemia in pediatric patients requires ED evaluation

Education/Pearls

Symptoms vary broadly in patients with hypoglycemia and hyperglycemia. Hypoglycemia may cause patients to feel anxious or exhibit diaphoresis, tachycardia, or hypotension; others are asymptomatic. Many patients with hyperglycemia are also asymptomatic and do not need prehospital treatment of their hyperglycemia, especially if chronic. Other patients may feel thirst, urinate frequently, or experience malaise; even others progress to developing acidosis or altered mental status from complications of hyperglycemia in such diseases as diabetic ketoacidosis and hyperosmolar hyperglycemic state.

Evaluate patients for causes of their glucose level abnormalities, as it may represent an underlying process, like infection, trauma, or other illness. Patients who have developed diabetic ketoacidosis (DKA) related to elevated blood sugar may benifit from fluid administration; these patients often appear ill, and exhibit a constillation of symptoms (e.g. polyuria, polydipsia, weakness, dizziness, abdominal pain, tachypnea).

Hypoglycemia: Patients may be considered for release without transport or further EMS treatment per the **Treat and Release AG**. If patients do not meet the following criteria, they are at increased risk of decompensation. Consider consultation with medical direction for patients that do not meet all of the followng criteria:

- Not actively vomiting/is tolerating oral intake
- Patient had adequate response to single dose of dextrose - with VS in BLS range, normal mentation, and FSBG within normal limits.
- Patient has no acute conditions other than hypoglycemia (chest pain, shortness of breath, intoxication, liver disease, kidney disease, or febrile illness).
- Patient only on short acting insulin or premixed analog (e.g. NovoLog® 70/30 or Humalog® 70/30)
- Patient is not taking oral agents (other than metformin) for blood glucose control.
- Patient released to competent adult
- Patient or legal guardian refuses transport or patient and providers agree transport is not indicated

Hypoglycemia in patients with insulin pump:

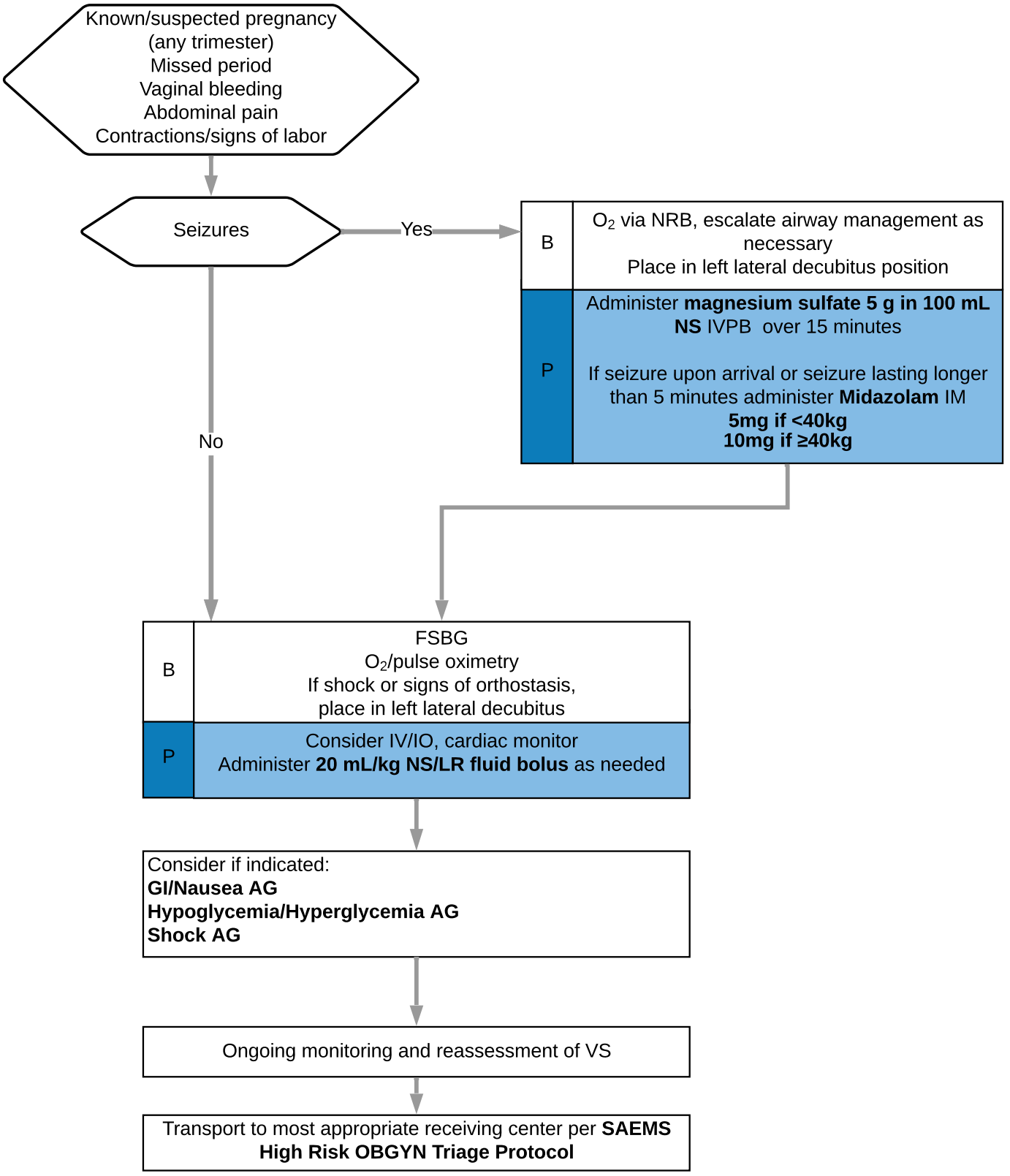
- ALOC/AMS – stop insulin pump or disconnect at insertion site.
- GCS 15 & able to take oral glucose – leave connected with pump running.

Hyperglycemia: Patients may benefit from fluid administration; a 10 mL/kg bolus is indicated, especially in the setting of dehydration.

- Multiple boluses of fluid may be harmful to patients in DKA; however, if the patient is exhibiting signs of shock or decreased perfusion, treat per **Shock AG.**
- Avoid administration of narcotics or anxiolytics in the setting of DKA, as tachypnea is important to maintaining the patient's precarious acid-base status.
- In young patients with diabetes or suspected new-onset diabetes, **administer fluid slowly** to minimize the chance of developing cerebral edema.

Obstetric Emergencies Administrative Guideline

History	Signs and symptoms	Differential
• Past medical history • History of hypertension • Prenatal care • Prior pregnancies/complications	• Vaginal bleeding • Abdominal pain • Seizures • Hypertension • Severe headache • Visual changes • Edema of hands and face	• Preeclampsia/eclampsia • Placenta previa • Placental abruption • Spontaneous abortion • Ectopic pregnancy



Education/Pearls

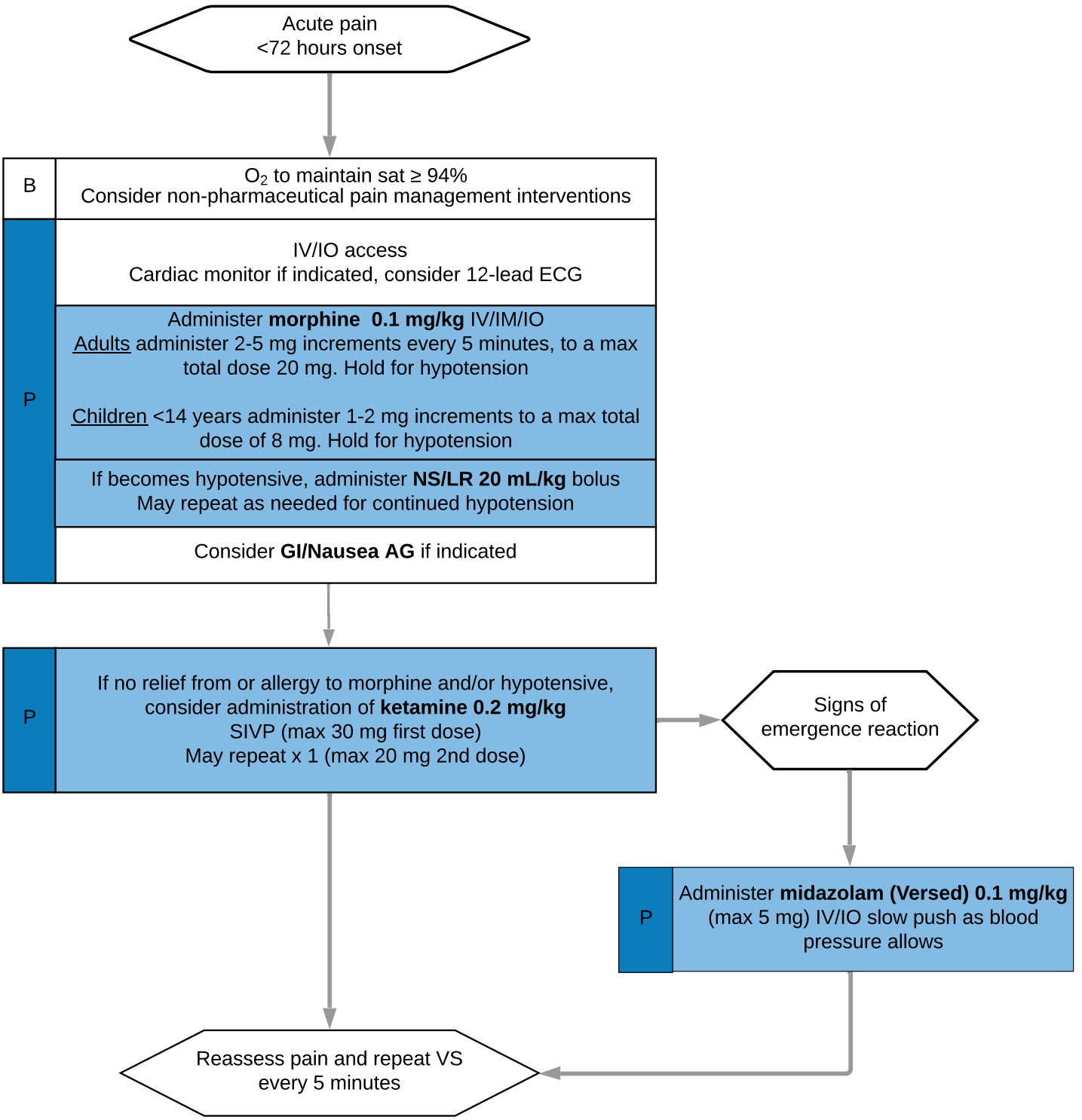
- Ectopic Pregnancy: the implantation of the fertilized egg outside of the uterus, which may cause rupture of organs, bleeding, and death. It may mimic other abdominal pathology, like appendicitis.
  - Patients may or may not be aware they are pregnant (usually occurs within 5-10 weeks of implantation).
  - Maintain a high suspicion in women of childbearing age with severe abdominal pain, syncope, or shock.
  - May or may not present with vaginal bleeding.
- Pre-eclampsia: a disorder thought to be related to the placenta, pre-eclampsia may cause hypertension, swelling of hands and legs, abdominal pain, and in severe cases cerebral edema with vision changes.
  - Occurs in approximately 6% of pregnancies, up to 6 weeks postpartum
  - Some symptoms include: headache, RUQ pain, visual disturbances, leg/arm swelling, frothy urine
  - Management of hypertension associated with preeclampsia is typically not performed in the prehospital environment.
- Eclampsia: seizures or altered LOC in the context of pre-eclampsia.
  - Can occur up to 6 weeks post-partum
  - Treatment consists of magnesium sulfate administration and delivery of the fetus.
  - Priority is administration of magnesium IV. Due to the serious consequences of seizures in the eclamptic patient, if magnesium sulfate is not effective in stopping seizure activity, administer your traditional benzodiazepine for seizure control.
- Placental Abruption: a pathological detachment of the placenta, abruption presents as vaginal bleeding with or without abdominal pain.
  - Can occur after abdominal trauma
  - Treatment consists of delivery of the fetus.
  - May present with shock due to rapid internal blood loss.

Destination: Transport to facility based on gestational age - Per **SAEMS High Risk OB Triage**

- ≥20 weeks and <28 weeks - BUMC-T or TMC (NICU capable)
- ≥28 weeks - BUMC-T, TMC, SJH or NMC

Pain Management Administrative Guideline

History	Signs and Symptoms	Differential
• Past medical history • Pertinent medication history ◦ Home pain medications • Pain source • Mechanism of injury (if known)	• Pain level - utilize the age appropriate pain scale • Pain exacerbation factors (e.g. movement, palpation, position, etc.)	• Chronic pain • Trauma



Education/Pearls

Pain is a consequence of a multitude of medical conditions from trauma to infections to neurological syndromes, and should be assessed as part of general patient care in all ages. Consider all patients as candidates for management of acute pain regardless of transport times. Pain should be assessed prior to and after all pain-relieving interventions. In the setting of analgesic administration, patients require monitoring of continuous pulse oximetry and vital signs, and may require supplemental oxygen to maintain O_2 sats >94%.

- Use an age appropriate pain scale to assess pain
  - Numerical scale: 0 to 10, zero as no pain and 10 as the worst pain possible
  - Age <4 years: consider using an observational scale (i.e. FLACC - face, legs, activity, cry consolability)
  - Age 4-12 years: Consider using a self-report scale (i.e. Faces Pain Scale or Wong-Baker Faces)
  - Age > 12 years: Consider using a self-report numerical scale
- Non-pharmaceutical pain management techniques:
  - Place patient in position of comfort for patient while still adhering to safe transport recommendations
  - Supporting affected extremity as indicated
  - Applying ice packs and/or splints
  - Verbal reassurance/distraction
- Zofran should not be utilized unless patient verbalizes complaints of nausea.
  - If patient is noted to have prolonged QT interval, contact medical direction.
- Ketamine: A dissociative medication, this agent relieves pain by changing the patient's mental state and inducing delirium with possible hallucinations. It may cause vasoconstriction, hypertension, and an emergence reaction, which occurs when a patient's dissociation becomes agitating or unpleasant for the patient.
  - Ketamine should not be used as treatment for chest pain, as vasoconstriction may be harmful.
  - Push this medication via slow IV push - rapid administration can cause apneic episodes
  - If the patient becomes excessively agitated and impedes safe transport, consider administration of midazolam and/or contact medical direction for further orders.

Caution with administration of morphine and/or midazolam in trauma patients who have concern for TBI, due to risk of hypotension.

	Scoring		
Categories	0	1	2
Face	No particular expression or smile.	Occasional grimace or frown, withdrawn, disinterested	Frequent to constant frown, quivering chin, clenched jaw
Legs	Normal position or relaxed	Uneasy, restless, tense	Kicking or legs drawn up
Activity	Lying quietly, normal position, moves easily	Squirming, shifting back and forth, tense	Arched, rigid, or jerking
Cry	No cry (awake or asleep)	Moans or whimpers; occasional complaint	Crying steadily, screams or sobs, frequent complaints
Consolability	Content, relaxed	Reassured by occasional touching, hugging, or being talked to; distractable	Difficult to console or comfort

Note: Each of the five categories Face (F), Legs (L), Activity (A), Cry (C), and Consolability (C) is scored from 0-2, which results in a total score between 0 and 10.
From Merkel, Voepel-Lewis, Shayevitz, & Malviya (1997). The FLACC: A behavioral scale for scoring postoperative pain in young children. *Pediatric Nursing, 23* (3) 293-297.

Patient Refusal of Transport Administrative Guideline

Individual meets the definition of a patient and patient or parent/legal guardian wishes to refuse EMS treatment or transport

B	**Complete an initial assessment with particular attention to neurologic and mental status**
	• Obtain a complete set of vital signs

B	**Determine patients ability to make informed medical decision concerning the extent of his/her illness or injury**
	• Alert and oriented **• Has the ability to understand the circumstances surrounding his/her illness or impairment** **• Understands possible risks associated with refusing treatment and/or transport.** **• Judgment must not be significantly impaired by illness, injury, or drug/alcohol intoxication.** **• No attempted suicide or verbalized intent of harm to self or others.**

B	**Perform appropriate medical care with the consent of the individual**
	Complete the patient care report clearly documenting the initial assessment findings and the discussions with all involved individuals regarding the possible consequences of refusing additional prehospital care and/or transportation.

- Consider contacting medical direction for assistance when provider is concerned for:
  - Potentially life-threatening condition
  - Possible physical/psychological abuse
  - Doubts about whether the individual has capacity to refuse or other concerns related to risk of refusal

If verbalized intent or attempted self harm patient must be evaluated by qualified mental health professional or transported to an appropriate facility to receive evaluation

Education/Pearls

Decision-Making Capacity: An individual who is alert, oriented, and has the ability to understand the circumstances surrounding his/her illness or impairment, as well as the possible risks associated with refusing treatment and/or transport, typically is considered to have decision-making capacity. Decision-making capacity should be demonstrated and documented as defined by the presence of the following criteria. The patient must be able to:

- Receive and comprehend information needed to make a decision,
- Process and deliberate a decision and its potential consequences,
- Make and articulate a decision that is consistent over time,
- Justify that decision with logic that fits the individual's own value system.
- The individual's judgment must not be impaired by illness, injury, or clinically apparent drug/alcohol intoxication.

EMS providers should make all reasonable efforts to avoid danger to themselves.

Individuals must be advised of the risks and consequences resulting from refusal of medical care.

- Assess the patient's understanding of the medical emergency: the possible medical problems, the proposed medical care, the benefits of medical care and risks of refusal.
- Contact online medical direction based on local protocol.
- Document the patient encounter.

Pediatrics:

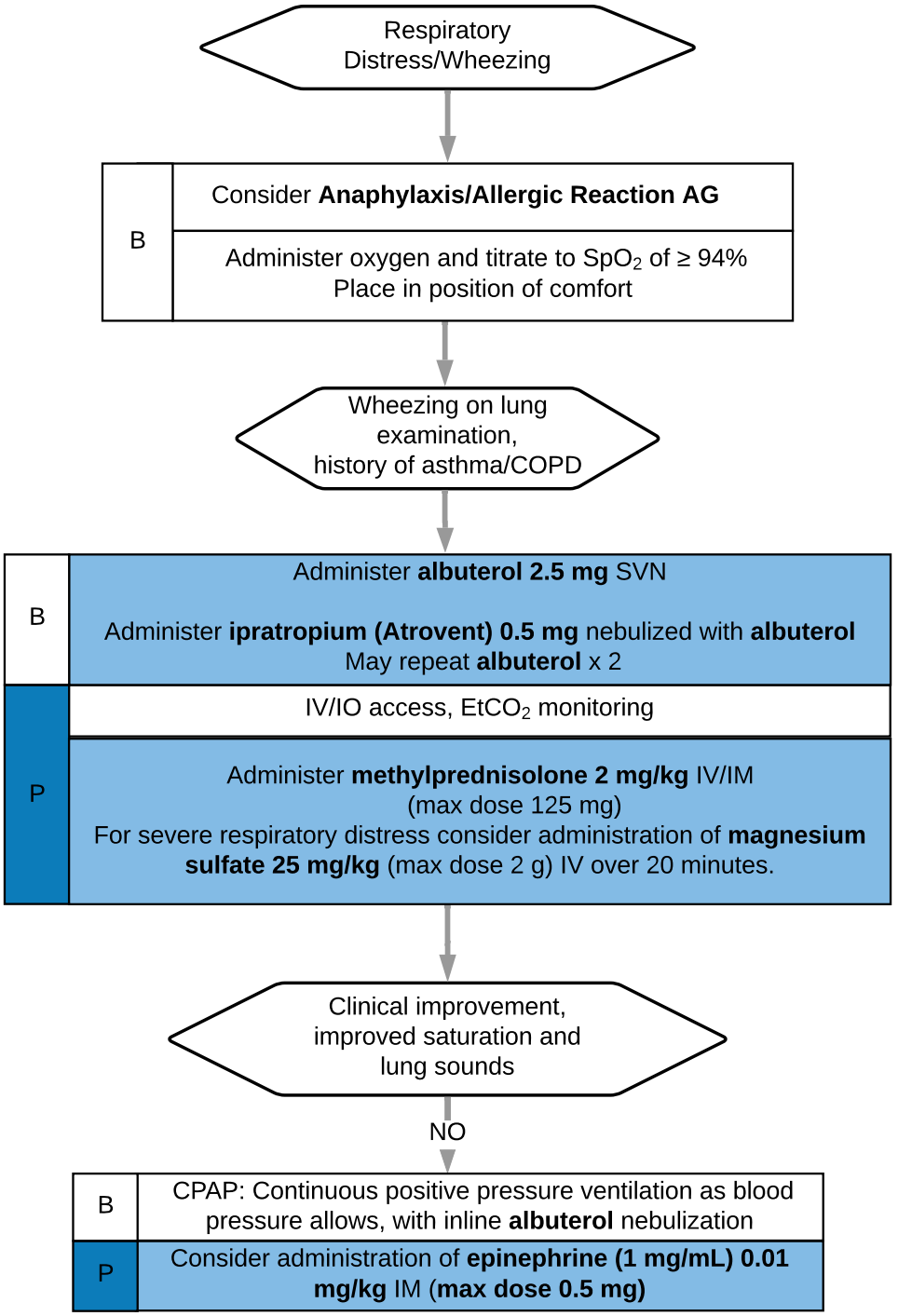
- It is preferable for a minor to have a parent or legal guardian who can provide consent for treatment on behalf of the minor. However, EMS providers may provide emergency treatment when a parent is not available to provide consent.
- **Minors cannot refuse care on their own behalf unless they have documentation of emancipation.**
  - **A parent or legal guardian must be contacted to refuse care for minor patients.**
- The provider should take additional means necessary to facilitate transport if abuse or neglect is suspected. Notify law enforcement as necessary to facilitate transport to the hospital.
- A DCS report should be made as required for suspected abuse or neglect.

Psychiatric illness:

- Patients may generally refuse EMS **medical** care even with petition for mandatory psychiatric evaluation.
- The only excception to this is patients with a revoked court order.

Respiratory-Asthma/COPD Administrative Guideline

History	Signs and Symptom	Differential
• Asthma/COPD/chronic bronchitis/emphysema • Congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Decreased ability to speak • Increased work of breathing/accessory muscle use • Wheezing, rhonchi • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration • COPD (Emphysema, Bronchitis) • Pneumonia • Pulmonary embolus • Pneumothorax • Cardiac (MI or CHF) • Pericardial tamponade • Hyperventilation • Inhaled toxin (Carbon monoxide, etc.)



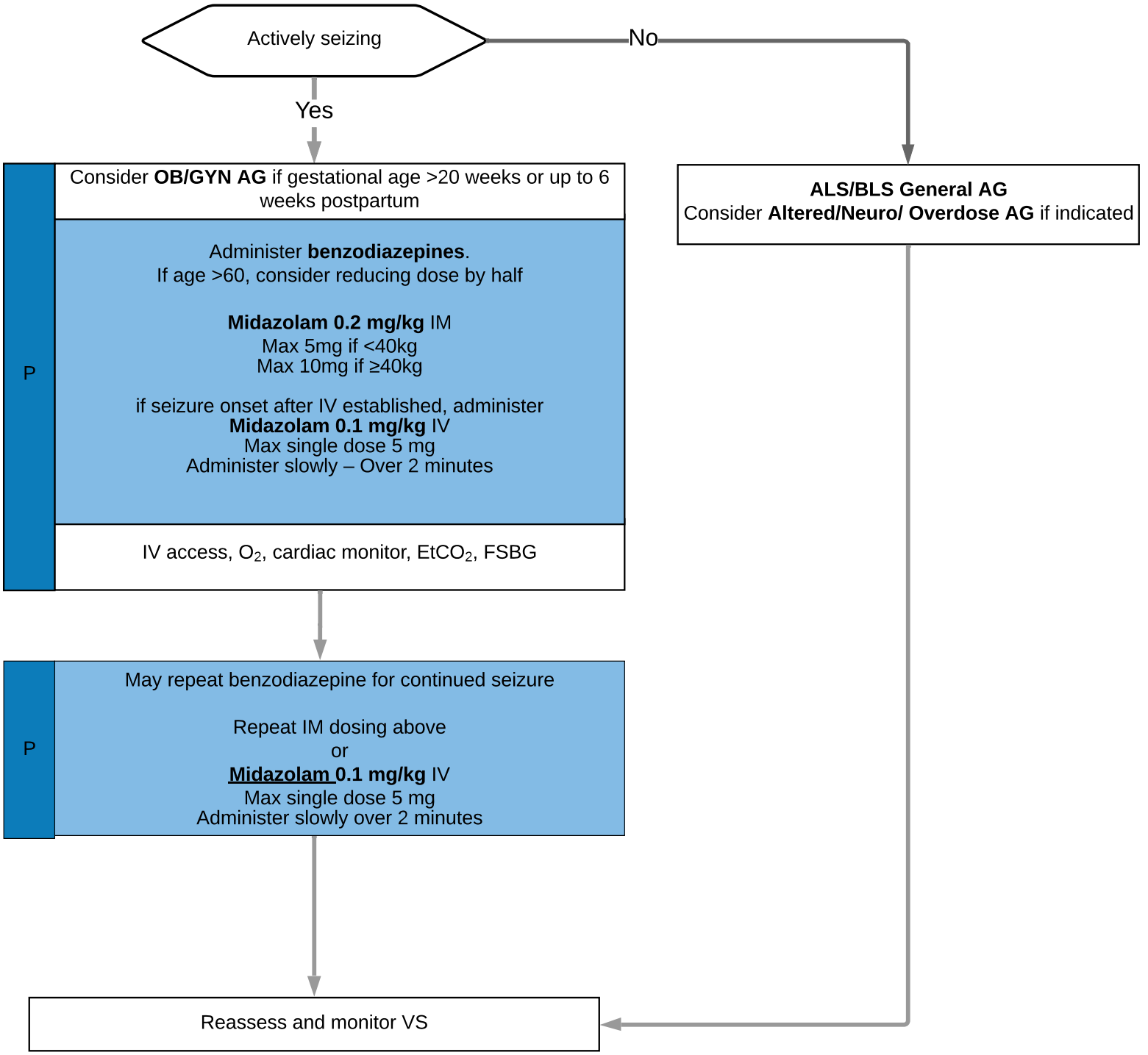
Education/Pearls

Asthma, COPD, and anaphylaxis are common reactive airway diseases in which inflammation of the airways impedes airflow. The mainstay of treatment includes reducing inflammation, providing oxygenation, and assisting in ventilation. Aerosols, steroids, and magnesium improve air movement by reducing inflammation and relaxing airway musculature. Asthma and COPD may benefit from positive end-expiratory pressure (PEEP), for which non-invasive positive-pressure ventilation (NIPPV) is utilized.

- Pulse oximetry and waveform capnography should be monitored continuously for any patient with respiratory distress.
- NIPPV includes CPAP and BIPAP
  - Should be administered for severe respiratory distress or if not improving with less invasive support
  - Discontinue NIPPV for shock, altered LOC, or vomiting.
  - Supraglottic devices and intubation should be utilized only if bag valve mask ventilation fails.
- Administer epinephrine for suspected allergic reaction/anaphylaxis or impending respiratory failure related to asthma
  - Administer with caution in patients with history of CAD/MI/stents, as epinephrine may precipitate myocardial ischemia in these patients

Seizure Administrative Guideline

History	Signs and Symptoms	Differential
• Hx of seizure disorder • Seizure medications • Alcohol withdrawal • Hx Trauma • Hx Diabetes • Hx Pregnancy • Overdose • History of Isoniazid use	• Decreased mental status compared to baseline • Signs of trauma • Witnessed seizure activity • Urinary incontinence	• Trauma • Alcohol withdrawal • Metabolic/electrolyte abnormality (i.e. renal failure) • Stroke • Hypoglycemia • Infection/Fever



Education/Pearls

Seizures occur due to abnormal electrical activity in the brain. Standard of treatment consists of prevention of seizures with anti-epileptics, stabilizing patients when seizures do occur, and treatment of the consequences of seizures. Glucose should be rapidly checked, as hypoglycemia may cause seizures and is treated with glucose administration.

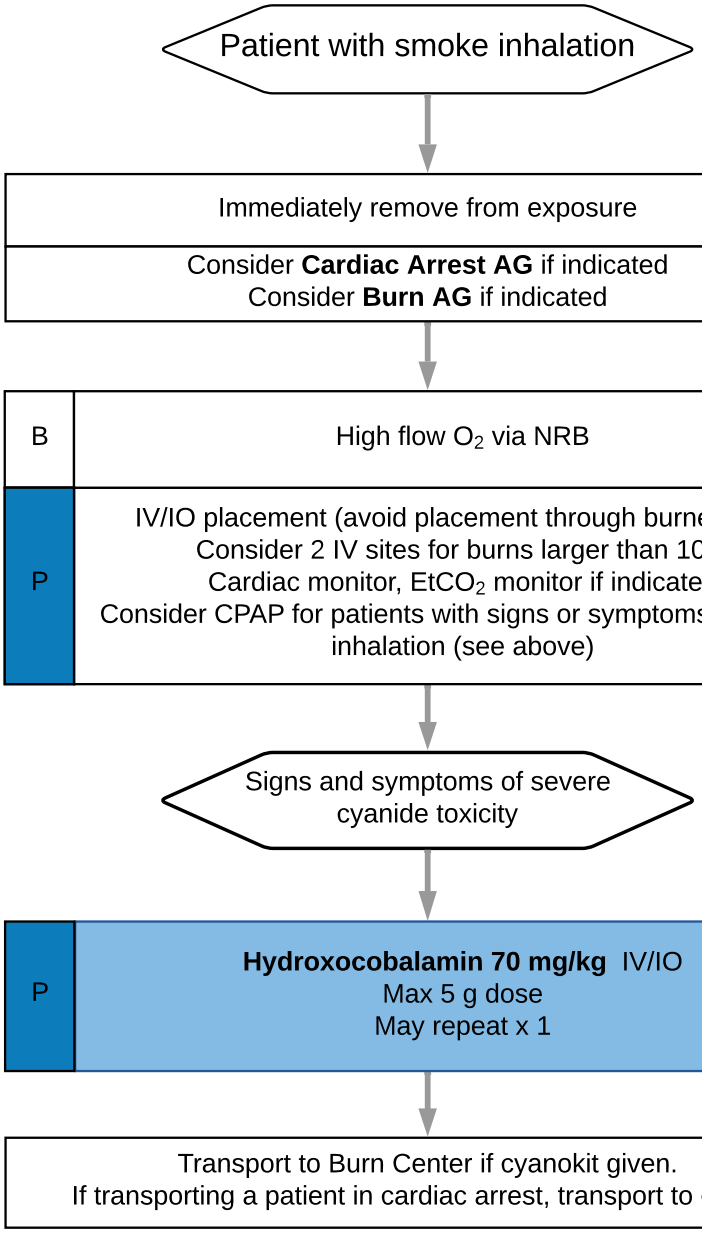
- Types of seizures:
  - **Status epilepticus:** Status epilepticus occurs when a seizure lasts longer than 5 minutes or when seizures occur close together without a patient regaining normal mental status between seizures.
  - **Generalized:** This seizure affects the whole brain at once. They begin with stiffening of the limbs (the tonic phase), followed by rhythmic jerking of the limbs and face (the clonic phase). A generalized seizure is the type most likely to be encountered by EMS responders. A generalized tonic-clonic seizure can also be caused by head trauma, poisoning, brain tumors, metabolic disorders or other acute conditions affecting the brain.
  - **Focal:** Seizure activity is limited to a part of one brain hemisphere. There is a site, or a focus, in the brain where the seizure begins. Patients may or may not be aware of their surroundings depending on the type of focal seizure. Symptoms may be confined to one extremity or portion of a patient's body.
  - **Febrile:** Febrile seizures occur in children from 6 months to 5 years of age. A febrile seizure must be a generalized seizure in the setting of fever, lasting less than 5 minutes, and with return to normal neurologic baseline. Treat the seizure if lasting > 5 minutes.
  - **Eclamptic:** Eclampsia is an obstetric emergency. It is considered a complication of severe preeclampsia, and is commonly defined as new onset of grand mal seizure activity and/or unexplained coma during pregnancy or the postpartum period in a woman with signs or symptoms of preeclampsia. Eclampsia typically occurs during or after the 20th week of gestation or in the postpartum period.

- Treatment of seizures:
  - IM midazolam is the preferred treatment in patients without IV access. Do not delay administration of Midazolam for placement of IV/IO.
  - Hypoglycemia is a common cause of seizures. Obtain fingerstick glucose rapidly, and treat any hypoglycemia encountered.
  - Midazolam and Lorazepam are well absorbed when administered IM.

- Many overdoses may cause seizures and warrant hospital evaluation; medications that cause seizures include anti-depressants (e.g. escitalopram, citalopram, bupropion), anti-cholinergics (e.g. diphenhydramine), illicit drugs (e.g. cocaine), and antibiotics (e.g. Isoniazid).
- Prolonged postictal periods - Within 20 minutes, most patients have regained full alertness and orientation. If after 20 minutes the person remains confused, the person should be transported to an appropriate medical facility for evaluation.
- Be prepared for airway problems and continued seizures. Be prepared to assist ventilations, especially if midazolam is used.
- Assess the possibility of occult trauma and substance abuse.
- In an infant, a seizure may be the only evidence of a closed head injury or hypoglycemia.
- For any seizure in a pregnant patient, follow the OB Emergencies Protocol.
- Refusals: Patients with first time or new-onset seizures should be strongly encouraged to accept transport to the ED since there are multiple life-threatening conditions that may be present. If refusing transport, these patients should be made aware of the potential for underlying medical conditions.
  - Refer to **Refusal AG**.

Smoke Inhalation Administrative Guideline

History	Signs and Symptoms	Differential
• Smoke inhalation • Time of injury • Other trauma • Airway/inhalation	• Altered mental status • Dyspnea • Syncope • Chest Pain • Cardiac Arrest	• MI • Trauma/head injury • Other chemical exposure



Severe Cyanide Toxicity:
Dyspnea, respiratory failure, hypotension, dysrhythmias, chest pain, altered mental status

Education/Pearls:

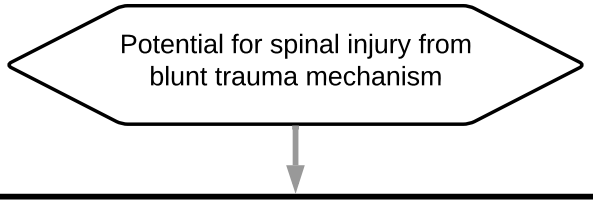
Smoke inhalation can cause exposure to a variety of dangerous substances, including cyanide (CN), carbon monoxide (CO), and other chemicals. CN poisoning is difficult to detect, and may cause a syndrome including confusion, dyspnea, and headache; it may disable the body's ability to use oxygen, so it can be fatal despite administration of oxygen. CO poisoning also causes vague symptoms, but are generally milder with minimal exposure, and include headache, fatigue, and irritability. The most common source of CN poisoning in humans arises from exposure to fire. Persons admitted to the hospital due to fire accidents may have been exposed to CO as well as CN.

- HCN is developed from an incomplete combustion of any material containing nitrogen such as plastic, vinyl, wool, or silk.
- HCN can be produced when there are only burning embers
- CN is a small lipid soluble molecule and penetration into cells is rapid.

- **Hydroxocobalamin** treatment is indicated for patients with evidence of CN exposure. This medication allows for harmless excretion of CN.
  - Symptoms of CN toxicity include:
    - Altered LOC, unconsciousnes, or seizures
    - Soot in the mouth or expectoration
    - Cardiac arrest
  - Side effects are red colouring of skin and urine, urticaria, rarely anaphylaxis. It may also cause tachycardia and hypertension.
  - <u>Administration of hydroxocobalamin must not delay any other basic life support such as securing of the airways, cardiovascular support or oxygen administration.</u>
  - Administration instructions:
    - Reconstitute: Place the vial in an upright position. Add **200 mL** of 0.9% Sodium Chloride injection to the vial using the transfer spike. **Fill to the line.** (LR and dextrose are also compatible)
    - Mix: The vial should be repeatedly inverted or rocked, not shaken, for at least **60 seconds** prior to infusion.
    - Infuse Vial: Use vented intravenous tubing, hang and infuse over **15 minutes**. Will need to use push pull method if administering through an IO.
  - Pediatrics (70 mg/kg) is the starting dose. May round up to the nearest 1/4 of a bottle.

CPAP can be utilized in patients with evidence of inhalational injury to enhance oxygen delivery; however, the patient must be breathing spontaneously to tolerate CPAP.

Spinal Motion Restriction Procedure



High risk patients - must perform spinal motion restriction

- Any altered mental status (GCS <15) including possible intoxication from alcohol or drugs, agitation.
  - Pediatric patients may demonstrate altered mental status with agitation, apnea, hypopnea, or somnolence.
- Midline neck or back pain and/or tenderness.
- Focal neurologic signs and/or symptoms (e.g. weakness, tingling, or numbness).
- Anatomic deformity of the spine.
- Torticollis (self-splinting or painful rotation/tilt of the neck).
- Unreliable patient interaction including distraction from painful injury or distressing circumstances.
- Communication/language barrier that prevents accurate assessment.
- Lack of cooperation or contribution during exam.

High Risk Patient Characteristics

- Meets Field Trauma Triage mechanism criteria
- Age >65
- Axial load injuries (diving injuries, spearing tackle), sudden acceleration/deceleration, lateral bending forces to neck/torso.

Apply spinal motion restriction for high risk patient

Meets none of above

Low risk if patient meets all of the following:

- Minor mechanism - equavalent to simple rear end collision
- No neck pain on scene
- No midline cervical tenderness
- Ambulatory on scene at any time

May be transported without the use of a cervical collar or any other means to restrict spinal motion.

Low risk characteristics have not been studied in pediatric patients are should not be used alone to determine need for SMR.

Education/Pearls

Spinal Motion Restriction (SMR) aims to reduce movement in a patient's spine, thereby preventing injury to a potentially unstable spine or injury to the spinal cord. SMR is defined as placement of a cervical collar and its accompanying stabilizing maneuvers. These include securing the patient FLAT to stretcher unless anatomy prevents, minimizing movement and transfers, and maintainin in-line spine stabilization during any necessary movement and transfers.

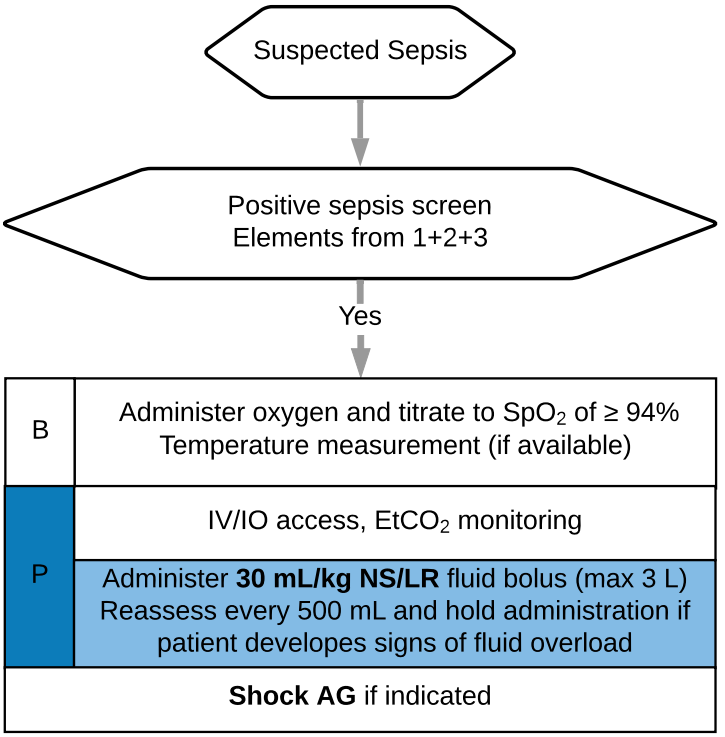
- SMR cannot be safely performed with a patient in a sitting position.
- Patients who meet any high-risk criteria require SMR but do NOT require the use of a long spine board.
  - SMR may be achieved by use of a scoop stretcher, vacuum splint, or ambulance stretcher with the patient safely secured.
  - LSB should be reserved for extrication. Effort should be mae to remove the patient form this form of rigid device as soon as possible.
  - These patients should not be transported in the sitting position.
- If elevation of the head is required, maintain alignment of the neck and torso while elevating the head. Consider Reverse Trendelenburg, if stretcher allows.

Pediatrics:

- Low risk characteristics have not been studied in pediatric patients and should not be used alone to determine need for SMR.
- Children may require additional padding under the shoulders to avoid excessive cervical spine flexion with SMR.

Sepsis Administrative Guideline

History	Signs and symptoms	Differential
• Duration and severity of fever • Past medical history • Medications/recent antibiotics • Immunocompromised (transplant, HIV, diabetes, cancer) • Last acetaminophen or ibuprofen	• Fever/chills • Altered mental status • Delayed capillary refill • Chest pain, cough, headache, abdominal pain, dysuria • Nausea, vomiting, diarrhea	• Infection - pneumonia, UTI, cellulitis, abscess, gastrointestinal • Malignancy • Heat related illness • Hyperthyroid • Meningitis • Hyperglycemia/hypoglycemia • Overdose (sympathomimetic, anticholinergic)



Sepsis Screen	
1	**Suspected Infection or immunosuppression** **High Risk Pediatric Patients**
2	Two or more markers of Systemic Inflammatory Response Syndrome (SIRS): Temp ≥ 100 or ≤ 97 HR ≥ 90 RR ≥ 20 Glucose > 140 in non-diabetic Altered mental status Pediatric 0-2 yr / 2-10 y r / 10-14 yr HR >190 / >140 / >100 RR >50 / >34 / >30 Capillary refill delayed > 2 sec Mental status: decreased arousability, irritable,
3	Findings of Shock: SBP <90 or MAP < 65 or SBP drop of 40 mmHg from prior baseline $EtCO_2$ ≤25 O_2 sat ≤ 92% on RA Mottled or cold extremities Central cap refill ≥3 seconds Purpuric rash No radial pulse Pediatric SBP <70 + (age in yr x 2) 3 or more exam criteria 2 or more exam criteria in high risk patient

Education/Pearls

Sepsis is a life-threatening condition in which the body's immune response to infection injures its own tissues and organs. When this occurs, the body generates an inflammatory reaction, which is called Systemic Inflammatory Response Syndrome (SIRS), defined by vital sign abnormalities. Tachypnea or tachycardia may precede shock and AMS. Suspect sepsis in the elderly with AMS or hypothermia, post-operative patients, or unwell-appearing patients with fever. Fever may be absent in immunocompromised patients. See the table below for other high-risk scenarios that should increase your suspicion for sepsis.

- Sepsis is categorized the following ways:
  - Sepsis - a suspected infection with 2 or more SIRS criteria (tachypnea, tachycardia, abnormal temperature, and a white blood cell abnormality on lab draw)
  - Severe sepsis - sepsis with the presence of organ dysfunction, such as AMS or hypotension. Lactate, a consequence of tissue metabolism, rises when organ dysfunction is present. Severe sepsis is responsive to fluid resuscitation.
  - Septic shock - severe sepsis and poor perfusion, unimproved after fluid bolus.

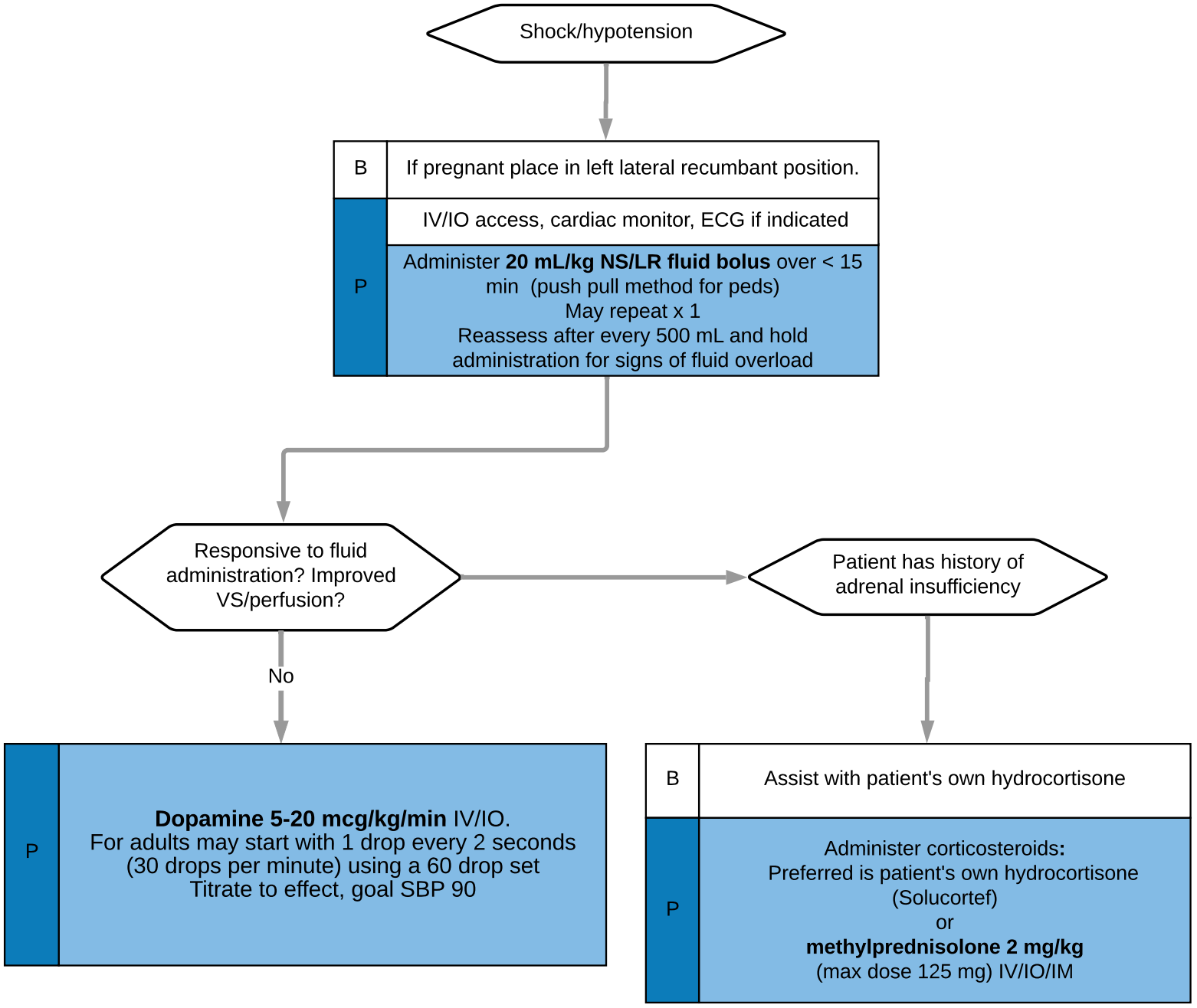
- Sepsis can be monitored and treated:
  - Quantitative waveform capnography - can be used as a surrogate for lactate monitoring in detecting metabolic acidosis. $EtCO_2$< 25 mm Hg are associated with serum lactate levels > 4 mmol/L, indicating severe sepsis/septic shock.
  - IV access - 2 large bore (18 gauge) IVs are preferred for patients with shock. Do not delay transport if unsuccessful in obtaining IV access.
  - IV fluid - suspected septic patients should receive repeated fluid boluses while being checked frequently for signs of pulmonary edema (particularly in dialysis and CHF patients). Stop fluid infusion in the setting of pulmonary edema; re-evaluate lung exams every 500 mL of fluid.
  - Supplemental oxygen - titrate to oxygenation saturation ≥94%. Septic patients are especially susceptible to traumatic lung injury and ARDS.
  - Airway - If artificial ventilation is necessary, avoid ventilating with excessive tidal volumes. If CPAP is utilized, airway pressure (PEEP) should be limited to 5 cmH2O

Suspected Infection or immunosuppression
Open wounds, sores, cellulitis
UTI
Pneumonia
Meningitis
Indwelling medical device
Vomiting, diarrhea
Recent surgery/procedure
Chemotherapy in the past 6 weeks
Chronic steroid use

Pediatric high risk:
Malignancy
Asplenia/sickle cell disease
Bone marrow transplant
Indwelling medical device
Solid organ transplant
Severe intellectual disability
Immunocompromise

Shock/Hypotension Administrative Guideline

History	Signs and Symptoms	Differential
• Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic • Fluid loss - vomiting, diarrhea, fever • Infection • Cardiac ischemia (MI, CHF) • Medications • Allergic reaction • Pregnancy • History of poor oral intake	• Tachycardia out of proportion to temp • AMS • Delayed capilary refill >2 sec • Tachypnea • Hypotension for age • Cool/mottled or flushed/ruddy skin. • Tarry stool/GI bleed	• Ectopic pregnancy • Dysrhythmias • Pulmonary embolus • Tension pneumothorax • Medication effect / overdose • Vasovagal • Physiologic (pregnancy) • Sepsis



Shock/Hypotension Administrative Guideline

Education/Pearls

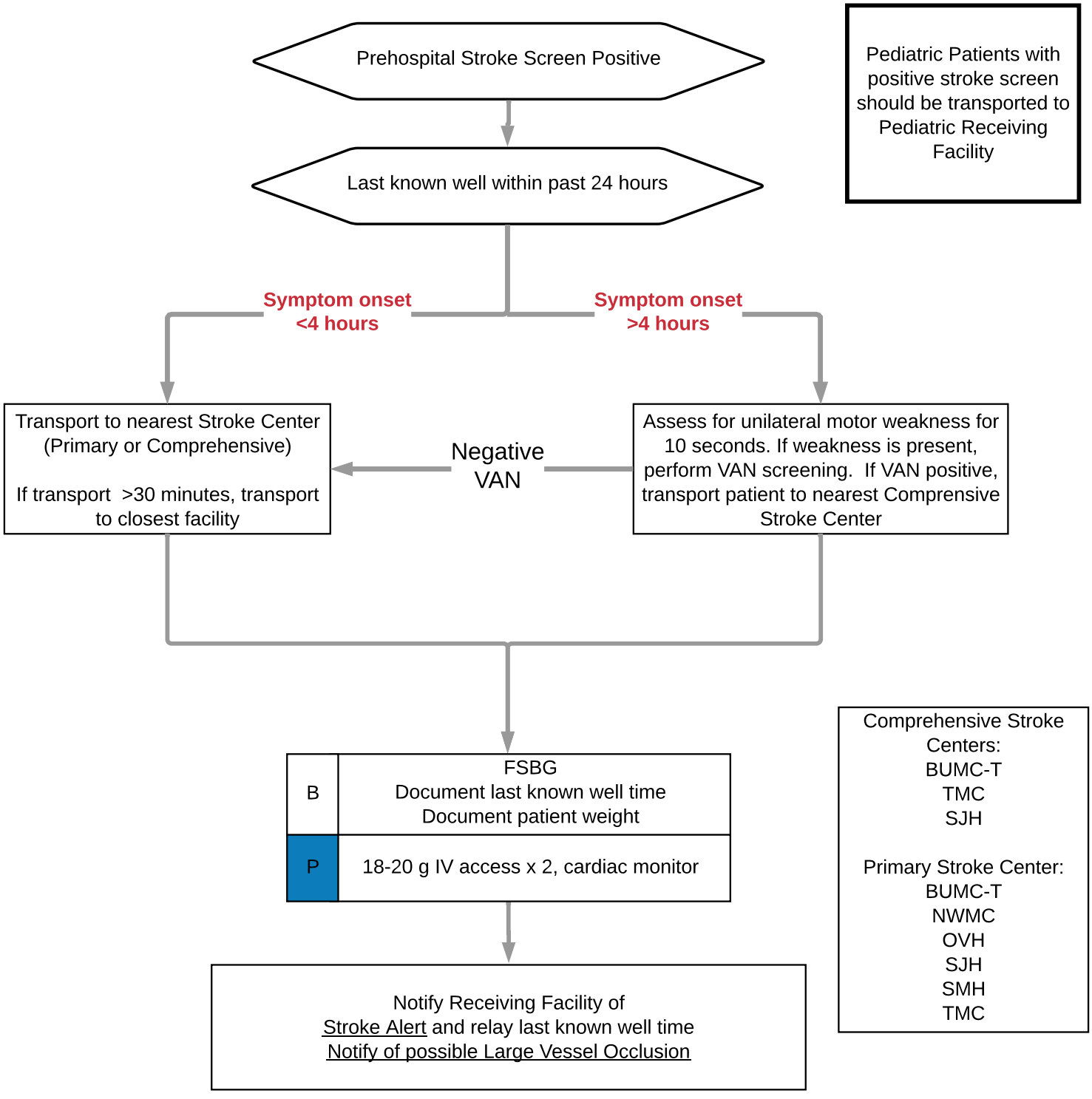
Shock describes a state of tissue underperfusion. There are multiple etiologies of shock, including hypovolemic (e. g. dehydration, blood loss), obstructive (e.g. tension pneumothorax, cardiac tamponade), distributive (e.g. sepsis, severe burns), and cardiogenic (e.g. heart failure, acute papillary muscle rupture). Rapid fluid resuscitation is the mainstay of treatment, as the duration of shock coincides with the extent of tissue damage.

- 2 large bore (18 gauge) IVs are preferred for patients with shock.
- Consider IO placement early.
- Do not delay transport if unsuccessful in obtaining IV access.
- Fluid resuscitation: Although often essential in shock, fluid may worsen the clinical picture in certain conditions, including cardiogenic shock. Monitor patients for signs of fluid overload when adminstering rapid fluid boluses.
  - Discontinue fluids of patient is developing signs of pulmonary edema or respiratory insufficiency/failure.
  - Utilize pressors early in suspected cardiogenic shock and signs of pulmonary edema.

- Patients may have a history of adrenal insuffiency related to congenital adrenal hyperplasia or from long-term daily steroid use. These patients may require stress dose steroids to maintain blood pressure in the face of shock.
  - For adults the typical dose of hydrocortisone is 100 mg IM
  - For children:
    - 0-3 years 25 mg IM
    - 3-12 years: 50 mg IM
    - 12+ years: 100 mg IM
  - Methylprednisolone is the alternative treatment.

Stroke Administrative Guideline

History	Signs and Symptoms	Differential
• Pertinent Medical history ◦ Hypertension ◦ Stroke ◦ Diabetes • Medication history ◦ Blood thinners (and time last taken) ◦ Blood pressure meds • Last known well time	• Weakness ◦ Facial ◦ extremity • Difficulty with speech ◦ Slurred ◦ Inappropriate verbiage • Altered mental status	• ETOH/Drug usage • Hypoglycemia • Head injury



Education/Pearls

Strokes cause a variety of clinical findings, from hemiparesis to obtundation. The severity of symptoms often relates to the size of infarction of brain tissue. Consider other causes of altered mental status in patients with vague symptoms or globally decreased mental status. Treatment is time-sensitive and includes thrombolytics or supportive care.

- Obtaining the last-known well time is extremely important and helps hospital providers administer time-sensitive thrombolytics. EMS often has the advantage of direct communication with family or other witnesses. Please attempt to obtain last-known well time and a list of important medications without causing significantly delays in transport.
- Patients with acute stroke or altered mental status are at risk or aspiration due to their neurologic deficit. Avoid administering oral medications or other food/liquid by mouth in acute stroke patients.
- Pediatric patients with concern for stroke should be taken to the nearest pediatric capable center. While strokes in children are extremely rare, they do occur and require prompt intervention.

Interpretation: if any of these 3 signs is abnormal, the probability of a stroke is 72%

Arm Drift

The patient closes eyes and extends both arms straight out, with palms up for 10 seconds

- Normal – both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful)
- **Abnormal – one arm does not move or one arm drifts downward**

Facial Droop

The patient shows teeth or smile

- Normal – both sides of the face move equally
- **Abnormal – one side of the face does not move as well as the other side**

Abnormal Speech

The patient repeats "you can't teach an old dog new tricks"

- Normal – patient uses correct words with no slurring
- **Abnormal – patient slurs words, uses the wrong words, or is unable to speak**

Vision Provider holds 2 fingers to the right and one to the left while the patnet stares at the providers nose/mouth (left and right visual fields) Can patient correctly identify the number of fingers on both sides? ☐ Yes ☐ No
Ask the patient to look left and right one or more times. (Double vision, equal eye movements) Do both eyes move at the same speed and direction ? ☐ Yes ☐ No
Aphasia Show the patient 2 common objects (pen, shirt) and ask patient to verbally identify. Can patient verbally correctly identify both objects? ☐ Yes ☐ No
Neglect Ask the patient to follow your finger with only their eyes form left to right. (forced gaze, inability to track) Can patient track your finger? ☐ Yes ☐ No
Ask the patient to close their eyes with arms by their side. Begin brushing patient's forearms simultaneously and ask "which arm am I touching?" (equal arm sensation) Can patient feel both arms at the same time? ☐ Yes ☐ No
Observe if the gaze turns to one side or does not react to stimuli on one side. (does not seem to fase someone, or does not seem to hear from one side) Can patient look, move, and react to stimuli on both sides? ☐ Yes ☐ No
If No to any of the above: Notify receiving facility of "stroke alert" with positive VAN

Treat and Release Hypoglycemia - Guideline

Patient/legal guardian wishes to refuse treatment after dextrose administration for hypoglycemia

Refusal is required when the patient is not a diabetic, the patient is on oral hypoglycemic medications, or takes intermediate and/or long acting insulin.

If the patient's symptoms have resolved, may consider release without transport. All of the following conditions must be met:

- Not actively vomiting/is tolerating oral intake
- Patient had adequate response to single dose of dextrose - with VS in BLS range, normal mentation, and FSBG within normal limits.
- Patient has no acute conditions other than hypoglycemia (chest pain, shortness of breath, intoxication, liver disease, kidney disease, or febrile illness).
- Patient only on short acting insulin or premixed analog (e.g. NovoLog® 70/30 or Humalog® 70/30)
- **Patients on a single oral agent EXCLUDING sulfonylureas and meglitinides (see chart below)**
- Patient released to competent adult
- Patient or legal guardian refuses transport or patient and providers agree transport is not indicated

New onset hyperglycemia in pediatric patients requires ED evaluation

Drug Name	Drug Class	Route	Risk of Hypoglycemia
Metformin	Biguanide	PO	Very low
Glyburide Glipizide Glimepiride	Sulfonylureas	PO	High
Repaglinide Nateglinide	Meglitinides (same MOA as sulfonylureas)	PO	High
Rosiglitazone Pioglitazone	Thiazolidinediones	PO	Low
Acarbose Miglitol	Alpha-glucosidase inhibitors	PO	Low
Bromocriptine	Dopamine-2 agonist	PO	Low
Sitagliptin Saxagliptin Linagliptin Vildagliptin	DPP-IV inhibitors	PO	Low
Canagliflozin Dapagliflozin Empagliflozin Ertugliflozin	SGLT-2 inhibitors	PO	Very Low
Exenatide Liraglutide Dulaglutide Semaglutide	GLP-1 agonists	SubQ	Low

Adult Tachycardia - Narrow Complex Admin Guideline (Age ≥ 14)

Narrow tachycardia with serious signs or symptoms (generally HR >150): dyspnea, chest pain, syncope/near-syncope, hemodynamic compromise, altered mental status or other signs of end organ hypoperfusion

Asymptomatic patients

For ASYMPTOMATIC PATIENTS (or those with only minimal symptoms, such as palpitations) and a normal blood pressure, manage with CLOSE OBSERVATION and/or fluid bolus rather than immediate treatment with an anti-arrythmic medication.

Shock, poor perfusion, altered mentation

P	Cardioversion: 120J (Attempt to synchronize, if no sync and unstable - defibrillate) May repeat if needed at 200J. Check pulse and evaluate for cardiac arrest if no conversion
P	Administer **500mL NS/LR fluid bolus**
P	Consider sedation prior to cardioversion: **Midazolam 2.5 mg** IV/IO **or 5mg** IM May repeat as needed max total dose 10 mg

Normal perfusion, normal mentation

Severe tachycardia can present as regular tachycardia with hidden p waves.

Do not give AV nodal blockers to sinus tachycardia and give fluids.

B	Administer O_2, VS assessment (inc. temp when available)
P	IV/IO access, O_2, Cardiac monitor Administer **500 mL NS/LR fluid bolus**. May repeat as needed.

Regular Rhythm (SVT)

B	Vagal maneuvers
P	Administer **adenosine 6 mg** IV (proximal), followed by **20 mL saline flush** May repeat x 1 at **12 mg** IV if no conversion, consider administration of **diltiazem 20 mg** IV/IO. Give initial 10 mg dose slowly over 2 minutes. Administer remainder of dose slowly as blood pressure allows. Patients over 65: Administer **diltiazem 10 mg** IV/IO Give initial 5mg slowly over 2 minutes. Administer remainder of dose slowly as blood pressure allows May repeat diltizem dose for any age x 1 if needed.
P	Repeat 12 lead EKG, repeat vital signs, monitor

Irregular Rhythm (A-fib/A-flutter)

B	Vagal maneuvers
P	Administer **diltiazem 20 mg** IV/IO. Give initial 10 mg slowly over 2 minutes. Administer remainder of dose slowly as blood pressure allows. Patients over 65: Administer **diltiazem 10 mg** IV/IO Give initial 5mg slowly over 2 minutes. Administer remainder of dose slowly as blood pressure allows May repeat diltizem dose x 1 if needed.
P	Repeat 12 lead ECG, repeat vital signs, monitor

Education/Pearls:

Tachycardia is common, and may reflect an underlying process (such as a reaction to infection, pain, or injury) or represent a primary cardiac disease, such as an accessory electric cardiac pathway or cardiac ischemia. Treatment of tachycardia depends on symptoms of the patient and vital sign stability. In the stable patient with minimal symptoms, non-electric interventions may be attempted first. Evidence of shock (altered mental status, hypotension, mottled extremities, cyanosis), chest pain with evidence of ischemia (STEMI, ST changes, T-wave inversions or depressions) or acute heart failure should prompt rapid intervention. Continuous pulse oximetry is required for all narrow complex patients.

For ASYMPTOMATIC PATIENTS (or those with only minimal symptoms, such as palpitations) and any tachycardia with rate approximately 100-120 and a normal blood pressure, consider CLOSE OBSERVATION and/or fluid bolus rather than immediate treatment with an anti-arrythmic medication. A patient's "usual" atrial fibrillation, for example, may not require emergent treatment.

- **Sinus tachycardia:** Typically ranges from 100 to (220 - patient's age) beats per minute. It may be caused by dehydration, fever, substance use, etc.
  - Symptomatic tachycardia usually occurs at rates of 120 -150 and typically ≥ 150 beats per minute.
  - Patients symptomatic with heart rates < 150 often have impaired cardiac function, such as CHF
  - Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.

- **Wolff-Parkinson-White (WPW):**
  - A rare syndrome, WPW is diagnosed by a short PR interval and upsloping QRS complex (delta wave). The rhythm can degenerate to appear similar to atrial fibrillation with rapid ventricular response. A 12-lead ECG or the patient's history may reveal WPW
  - DO NOT administer any Ca Channel Blocker (e.g. Diltiazem), Beta Blockers, or Adenosine
  - Unstable patients with WPW require electrical cardioversion.

- **Regular Narrow-Complex Tachycardia (SVT):**
  - Vagal maneuvers and adenosine may be administered. Vagal maneuvers may convert up to 25 % of SVT.
  - Adenosine should be pushed rapidly via proximal IV site followed by 20 mL Normal Saline rapid flush.
  - Diltiazem may be considered alternatively or if rhythm does not convert with adenosine.

- **Irregular Tachycardia:** Includes atrial fibrillation and atrial flutter.
  - First line agents for rate control are calcium channel blockers.
  - Adenosine may be considered to assist with diagnosis or if patient has history of Adenosine conversion, but Adenosine is NOT mandated.
  - Adenosine may not be effective in atrial fibrillation / flutter, yet is not harmful and may help identify rhythm.

- Synchronized cardioversion is recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and Regular Narrow-Complex Tachycardia (SVT.)
- Amiodarone may also be used to treat narrow complex tachycardia, either regular or irregular, as a second line agent if there is an allergy or contraindication to adenosine or diltiazem or other primary agent.
  - Refer to dosing in the **Tachycardia - Wide Complex AG**.
- Monitor for hypotension after administration of Calcium Channel Blockers.
- Monitor for respiratory depression and hypotension associated with Midazolam if utilized to faciliate cardioversion.
- Document all rhythm changes with monitor strips and obtain monitor strips with therapeutic interventions.

Adult Tachycardia - Wide Complex Administrative Guideline (Age ≥ 14)

WCT with serious signs or symptoms:
dyspnea, chest pain, syncope/near-syncope, hemodynamic compromise, altered mental status or other signs of end organ hypoperfusion

Normal perfusion, normal mentation

Shock, poor perfusion, altered mentation

B	Administer O_2, vital sign assessment (including temperature if available)
P	IV/IO access, O_2, Cardiac monitor

P	**Synchronized cardioversion: 120 Joules** (Attempt to synchronize. If no sync and unstable - defibrillate) May repeat synchronized **cardioversion at 200J,** check pulse and evaluate for cardiac arrest if no conversion
	Consider Sedation Prior to Cardioversion: - **Midazolam 2.5 mg** IV/IO or **5 mg** IM **-** May repeat as needed; **Max 10 mg**
	Administer **500 mL NS/LR fluid bolus**
	For torsades, administer **Magnesium 2 g** IV/IO over 1-2 minutes.
	Cardiac Arrest AG if indicated

Regular Rhythm

P	Administer **amiodarone (first line) 150 mg IV/IO** in D5W/NS, infuse over 10 minutes May repeat x 1 if no response Consider adenosine in patients with history of SVT with abberancy and/or prior conversion with adenosine. Administer **adenosine 6 mg** IV (proximal), followed by **20 mL saline flush** May repeat x 1 at **12 mg** IV

Irregular Rhythm

P	Administer **amiodarone 150 mg** IV/IO in D5W/NS, infuse over 10 minutes May repeat x 1 if no response

P	12 lead ECG, repeat vital signs, cardiac monitor

Education/Pearls

The evaluation of wide complex tachycardia is based principally on the stability of the patient and evidence of altered mental status or shock. If the patient is unstable, utilize electricity if able; otherwise, medications or vagal maneuvers may be employed.

- Do not administer calcium channel blockers (diltiazem) in wide-complex tachycardias.
- Symptomatic tachycardia usually occurs at heart rates >150 BPM. If symptomatic at lower rates (100-120), consider underlying heart disease, like congestive heart failure.
- Obtaining rhythm strips can be helpful in further diagnosis of the patient's arrhythmia at the Emergency Department. Obtain rhythm strips and/or EKG after therapeutic intervention.

- Monomorphic (Regular) Wide-Complex Tachycardia:
  - Unstable - sync cardiovert if possible, otherwise defibrillate.
  - Stable - consider VT or SVT with aberrancy (presence of a bundle branch block). Amiodarone is the first line treatment. Adenosine can be considered if you suspect SVT with aberrancy; the strip must be regular and momomorphic.
    - Defibrillator should in place on the patient when administering adenosine.
  - If there is suspicition of WPW, do not administer adenosine or other nodal blockers (e.g. CCB)
    - Administering nodal blocking agents in WPW can cause a paradoxical increase in the ventricular rate.

- Polymorphic Wide-Complex Tachycardia:
  - May be Torsades de Pointes, especially in patients with history of prolonged QTc.
  - Adminster magnesium in addition to above treatments and defibrillation.

Local Cardiac Receiving Centers:

- BUMC-T
- BUMC-SC
- NWMC
- TMC
- SJMC

Trauma Administrative Guideline

History	Signs and Symptoms	Differential
• Time/mechanism/speed • Damage/intrusion • Restraints or protective equipment	• Pain • Deformity • Bleeding • ALOC • Shock	• Chest injuries • Intraabdominal injuries • Pelvic fractures/bleeding • Head injury • Extremity trauma

Traumatic injury

Dead on Scene AG if indicated	
B	Hemorrhage control Airway maintenence Breathing and ventilation Circulation Time critical procedures as part of primary survey *****Minimize scene times*****
P	18 g IV/IO placement Cardiac monitor

Shock Index
=
HR/SBP

For peds - use age appropriate BP goals

Blunt trauma at risk for hemorrhage	
B	Apply SMR
P	Adults≥14 years: Administer **TXA 1 gram** IV/IO in 50-100ml NS IVPB over 10 minutes if shock index >1 Peds <14 years: Administer **TXA 15 mg/kg** in 50-100ml NS IVPB over 10 minutes for patients with shock Administer **NS/LR fluid bolus** to keep SBP >110 mmHg

Penetrating or isolated extremity trauma at risk of hemorrhage	
B	**<u>If isolated penetrating trauma to head, follow EPIC TBI for fluid resuscitation BP goals</u>**
P	Adults≥14 years: Administer **TXA 1 gram** IV/IO in 50-100ml NS IVPB over 10 minutes if shock index >1 Peds <14 years: Administer **TXA 15 mg/kg** in 50-100ml NS IVPB over 10 minutes for patients with shock Administer **NS/LR fluid bolus** to keep SBP >70 mmHg

EPIC TBI GCS <15 or loss of consciousness	
B	O_2 to target saturation of 100% **20 mL/kg NS/LR fluid bolus** to keep SBP >110 mmHg [70+(agex2) for peds] $EtCO_2$ target for all mechanically or manually ventilated patients 40 (range 35-45)
P	Advanced airway management <u>only</u> if unable to oxygenate/ventilate wtih BLS airway interventions

Trauma Procedures
Needle decompression for tension pneumothorax
Pelvic binder
Splint obvious fractures

Education/Pearls

The treatment of traumatic injury focuses on ABCs and prevention of further or secondary injury. Interventions are aimed at preventing overt hypoxemia, hypotension, and hyperventilation.

- Transport patients based on **SAEMS Regional Trauma Triage Guidelines.**
- Airway/Breathing: Prepare for a difficult airway, as traumatic airways are made difficult by trauma conditions, including spinal motion restriction, patient mentation, and bloodied airways.
  - For advanced airway, anticipate the need for suction and video laryngoscopy, if available.
  - Use care during intubation to maintain in-line stabilization, as cervical spine fractures may be present.
- Circulation: The most common cause of shock following trauma is hemorrhage. Scalp wounds, abdominal organ injury, and long-bone fractures can cause rapid blood loss.
  - Bleeding - apply anticoagulant gauze wound packing until resistance is met and/or apply tourniquet until bleeding is stopped.
  - Pulseless - may consider bilateral needle thoracostomy; may terminate as per **Dead on Scene AG** if penetrating trauma, and blunt trauma if transport will take > 15 min to Level 1 Trauma Center.
- Immobilization:
  - Long spine board use in trauma patients should be restricted to extrication procedures only and should be avoided in patients with penetrating trauma.
  - Spinal motion restriction procedure should be followed for all trauma patients with neck or back pain, neurologic deficit, or other risk factor for spine trauma. The elderly are at high risk for spinal injury with lower mechanism injury.
  - Patients with isolated blunt injuries may not warrant SMR or pelvic binder placement.
- Temperature: Prevent hypothermia, as this contributes to a harmful acid/base status and bleeding abnormalities.
  - Expose the patient for rapid trauma assessment/treatment only.
  - Cover patient and rewarm as soon as possible.

Moderate or severe TBI: defined as anyone with physical trauma and a mechanism consistent with the potential to have induced a brain injury, and:

i. Any injured patient with loss of consciousness, especially those with GCS <15 or confusion OR
ii. Multisystem trauma requiring intubation whether the primary need for intubation was from TBI or from other potential injuries OR
iii. Post-traumatic seizures, whether ongoing or not
iv. *(Pediatric)* Infants (where GCS may be difficult to obtain or interpret): any evidence of decreased level of consciousness, decreased responsiveness, or deterioration of mental status

See next page (**EPIC TBI**) for TBI management guidelines.

- Emergency Surgical Airway
  - In the event oxygenation and ventilation of the patient cannot be achieved either by BLS maneuvers, placement of a SGA or Endotracheal Intubation, perform surgical cricothyrotomy.
    - *Surgical Cricothyrotomy*: 12 years of age and above
    - *Needle Cricothyrotomy*: Under 12 years of age

Prevent hypoxia, hypotension and hyperventilation

B	All patients - Supplemental oxygen therapy to maintain O2 saturation 100% - Monitor HR, BP and O2 every 3-5 minutes
P	- IV access with 18g IV (document exceptions)

B	Monitor vital signs closely and escalate therapy before the patient becomes hypoxic or hypotensive.
	Administer **NS fluid bolus 20 ml/kg** Repeat until hypotension resolves

B	Provide positive pressure ventilation with BVM with 100% O2 at age approprite respiratory rate AVIOD HYPERVENTILATION
P	If patient is failing BVM and remains hypoxic, consider endotracheal intubation or supraglottic airway placement (if age >8 years old) If O2 saturation <90 despite intubation, or other advanced airway management, consider tension pneumothorax. AVIOD HYPERVENTILATION CAREFULLY MAINTAIN AGE APPROPRIATE RR TARGET EtCO2 40 mmHg (range 35-45)

Ventilation Rates:
- Infants (0-24 mos) **25 bpm**
- Children (2-14 yrs) **20 bpm**

>14 yrs **10 bpm (same as adults)**

	Age > 14 yr	Age 6-13 yr	Age 1 w-5 yr	Age < 1 w
Heart Rate	**60-130**	**60-150**	**60-160**	**100-180**
SBP	**> 90**	**> 80**	**> 70 + (Age x2)**	**> 70**

University Emergency Medical Services Pediatric Administrative Guidelines

Pediatric Respiratory/Asthma/Croup Administrative Guideline (Age < 14)

History	Signs and Symptom	Differential
• Asthma; COPD -- chronic bronchitis, emphysema, • Congestive heart failure • Home treatment (oxygen, nebulizer) • Medications (theophylline, steroids, inhalers) • Toxic exposure, smoke inhalation	• Shortness of breath • Decreased ability to speak • Increased work of breathing/accessory muscle use • Wheezing, rhonchi • Fever, cough • Tachycardia	• Asthma • Anaphylaxis • Aspiration/inhaled foriegn body • Croup • Pneumonia • Pulmonary embolus • Hyperventilation • Inhaled toxin (i.e. carbon monoxide)

Respiratory distress/wheezing/stridor

B	Consider **Anaphylaxis/Allergic Reaction AG**
	Administer oxygen and titrate to SaO_2 of ≥ 94% Place in position of comfort

Wheezing on lung examination, history of asthma/COPD

B	Administer **albuterol** SVN if available
	IV access if indicated, $EtCO_2$ if indicated
P	Administer **albuterol 2.5 mg** SVN; May repeat as needed. Administer **ipratropium (Atrovent)** nebulized with **albuterol**; May repeat **albuterol** x 2 For severe respiratory distress consider administration of **magnesium sulfate 25 mg/kg** (max dose 2 g) IV over 20 minutes.

Stridor with croup suggested

P	Avoid IV placement Consider **nebulized epinephrine (1mg/mL) 3 mL** by SVN May repeat x 1 in 20 minutes

Administer **methylprednisolone 2 mg/kg** IV/IM (max dose 125 mg)

No clinical improvement/ continued respiratory distress

P	Consider administration of **epinephrine (1 mg/mL) 0.01 mg/kg** IM max dose 0.3 mg

Education/Pearls

Reactive airway disease is a common cause of respiratory distress in pediatric patients. Pediatric airways are smaller, and partial obstruction - depending on the location of it - causes wheezing and stridor. **Wheezing** is a whistling sound that results from air flowing through the lower airways, and can be caused by asthma, allergies, or other lung diseases. **Stridor** is a harsh, crowing, or vibratory sound of variable pitch that results from turbulent air flow caused by partial obstruction of the upper respiratory passages. Croup is the most common cause of inspiratory stridor in children.

- Pulse oximetry and waveform capnography should be monitored continuously for any patient with respiratory distress.
- Epinephrine may be administered for suspected allergic reaction/anaphylaxis or impending respiratory failure related to asthma.
- Croup is most common in children ages 6 and younger. It affects about 60 of every 1,000 children between ages 1 and 2; occurrence drops significantly after age 6.
    - When assessing a patient with croup, you may note hoarseness, coryza (acute rhinitis), pharyngeal erythema, and a slightly increased respiratory rate. When croup progresses to upper airway obstruction, the patient may have an increased respiratory rate, nasal flaring, and suprasternal, infrasternal, and intercostal retractions along with continuous stridor.

To aid assessment and diagnosis of croup, clinicians use the number grades below:

- *Grade 1*: exertion causes dyspnea or stridor.
- Grade 2: stridor is present at rest, and worsens with exertion.
- *Grade 3*: stridor and retractions of the sternal chest wall are present at rest.
- *Grade 4*: respiratory distress, irritability, pallor or cyanosis, tachycardia, and exhaustion are present at rest.

Audible without a stethoscope, stridor always warrants immediate attention because it may be the first sign of a serious or life-threatening process. Grade 3 and 4 croup is an emergency that necessitates immediate treatment. Your ability to promptly recognize croup and stridor can save a child's life.

In pediatric patients with sudden symptoms of wheezing or stridor, consider foreign body aspiration as a cause. Obtain history to clarify history of recent illness vs sudden onset of symptoms.

Epinephrine (using parenteral 1 mg/mL solution): Nebulization: 3 mL of **1 mg/mL** solution. May repeat x 1 in 20 minutes.

Pediatric Bradycardia (age <14) Administrative Guideline

History	Signs and Symptoms	Differential
• Past medical history • Foriegn body aspiration • Respiratory distress • Apnea • Possible toxic exposure or ingestion • Congenital diseases • Medication (maternal or infant)	• Decreased heart rate • Delayed capillary refill or cyanosis • Mottled, cool skin • Hypotension or arrest • Altered level of consciousness	• Respiratory failure • Foreign body/secretions • Infection (croup, epiglottitis) • Hypovolemia (dehydration) • Congenital heart disease • Trauma • Hypothermia • Toxin, medication • Hypoglycemia

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

Apneic or pulseless at any time, follow **Cardiac Arrest AG**

B — Open airway
Provide supplemental oxygenation and ventilation as indicated
FSBG analysis
Search for reversible causes (see differential above)

P — IV/IO access, pulse ox, cardiac monitor
12 lead ECG (do not delay initiating treatment)

Bradycardia (HR<60)
causing ALOC, hypotension,
poor perfusion, or shock despite adequate oxygenation and ventilation

Age <28 days begin chest compressions and refer to **Neonatal Resuscitation AG**

<1 yr begin chest compressions and refer to **Cardiac Arrest AG**

Age > 1 yr

P

First line: administer **epinephrine (1mg/10 mL) 0.01 mg/kg** IV/IO
Max single dose 1 mg
May repeat every 3-5 minutes
Or
If vagally mediated: administer **atropine sulfate: 0.02 mg/kg** IV/IO rapid push
(min dose 0.1 mg) max initial dose 0.5 mg
May repeat every 3-5 minutes
Max total dose 3 mg

Administer **NS/LR 20 mL/kg** IV/IO fluid bolus, assess for signs of fluid overload

Continued bradycardia
causing ALOC, hypotension,
poor perfusion, or shock (usually <50 BPM)

B — Begin chest compressions

Transport according to **SAEMS Critical Pediatric Triage Protocol**
Notify Receiving Facility or Contact Medical Direction

Education/Pearls

The majority of pediatric bradycardia is caused by respiratory failure and hypoxia. Evaluate for signs of respiratory distress in all pediatric patients. Medication overdose is also a common cause of pediatric bradycardia, often due to unintentional ingestion of parental medications; in the setting of a breastfeeding child, consider overdose or intoxication via maternal breast milk.

- Hypoglycemia, severe dehydration, and opioids may produce bradycardia. Many other agents a child ingests can cause bradycardia, often in a single dose.
- Age appropriate minimal SBP = 70 + (2 x Age in Years)

Epinephrine is the drug choice for persistent, symptomatic bradycardia in pediatric patients.

- Atropine:
  - Although atropine is effective in a broader range of patients and provides a greater amount of hemodynamic support, it can cause or worsen bradycardia.
  - It is **second choice** unless there is evidence of increased vagal tone or a primary AV conduction block.
  - The paradoxical effects are the reason for the minimum dose and recommendation for rapid administration.

- Transcutaneous pacing:
  - **Indicated if bradycardia is due to complete heart block or other AV blocks which are not responsive to oxygenation, ventilation, chest compressions, or medications. Indicated with known congenital or acquired heart disease.**
  - Transcutaneous pacing is not indicated for asystole or bradycardia due to postarrest hypoxic / ischemic myocardial insult or respiratory failure. Do not delay therapy when bradycardia is evident and no ECG monitor is available.

Pediatric Tachycardia Administrative Guideline (Age < 14)

History
- Past medical history
- Medications or Toxic Ingestion
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

Signs and symptoms
- Heart rate: (child >180/bpm, Infant > 220/bpm)
- Pale/cyanotic/diaphoretic
- Hypotension/ALOC
- Pulmonary congestion/tachypnea
- Syncope

Differential
- Heart disease (Congenital)
- Hypo/hyperthermia
- Hypovolemia or anemia
- Anxiety/pain/emotional stress
- Fever/infection/sepsis
- Hypoxia, hypoglycemia
- Medication / Toxin / Drugs (see HX)
- Trauma

Tachycardia with serious signs or symptoms

Hypotension, poor perfusion, or ALOC

P: Cardioversion for shockable rhythm:
0.5 J / kg for shock #1,
- Increase to 1 J/kg for #2
- Increase to 2 J/kg (max 360 J)

Consider Sedation:
- **Midazolam 0.1 mg/kg** IV/IO/IM/IN **(max 2.5 mg initial dose)**
- May repeat if needed to maximum dose of **midazolam 5 mg** IV/IO/IM/IN

B: Administer O_2 to maintain SPO_2 >94%
Vital sign assessment, including temperature if available

P: IV/IO access, O_2, cardiac monitor, 12 lead ECG

Narrow Complex ≤ 0.08s

Wide complex >0.08 s

Sinus Tachycardia

B: Identify and treat underlying cause

P: Consider **20 mL/kg fluid bolus** with reassessment every 100 mL for signs of fluid overload.

SVT
Infants usually >220 bpm
Children usually >180 bpm

B: Age specific vagal maneuvers

P: Consider **20 mL/kg NS/LR bolus** with reassessment every 100 mL

Administer **adenosine 0.1 mg/kg** in proximal IV **(max 6 mg)**
May repeat **adenosine at 0.2 mg/kg** IV **(max 12 mg)**
follow by 10 mL saline flush

If no response or history or WPW administer **amiodarone 5 mg/kg** IV/IO **(max 150 mg)** over 20 minutes

B: Age specific vagal maneuvers

P: Consider SVT with aberrancy:
Administer **adenosine 0.1 mg/kg** in proximal IV (max 6 mg)
May repeat **adenosine at 0.2 mg/kg** IV (max 12 mg)
follow by 10 mL saline flush

Always follow with 10 mL flush

If no response or VT or WPW is considered:
Administer **amiodarone 5 mg/kg** IV/IO **(max 150 mg)** over 20 minutes

P: Torsades de pointes:
Administer **magnesium sulfate 25 mg/kg** IV/IO over 10 minutes **(max dose 2 g)**

Cardiac arrest:
slow IVP over 2-3min

Conversion of rhythm

P: 12-lead ECG, repeat vital signs, monitor

Notify receiving facility or contact Medical Direction

Pulseless at any time refer to **Cardiac Arrest AG**

Pediatric Tachycardia Administrative (Age < 14)

Education/Pearls

Children may present atypically when exhibiting elevated heart rates. Serious signs and symptoms include respiratory distress or failure, signs of shock or poor perfusion (mottled skin, perioral cyanosis), AMS, or sudden collapse with rapid, weak pulse. Generally, the maximum sinus tachycardia rate is (220 - the patient's age in years) beats/minute (bpm). If available, continuous pulse oximetry is indicated for all unstable tachycardias.

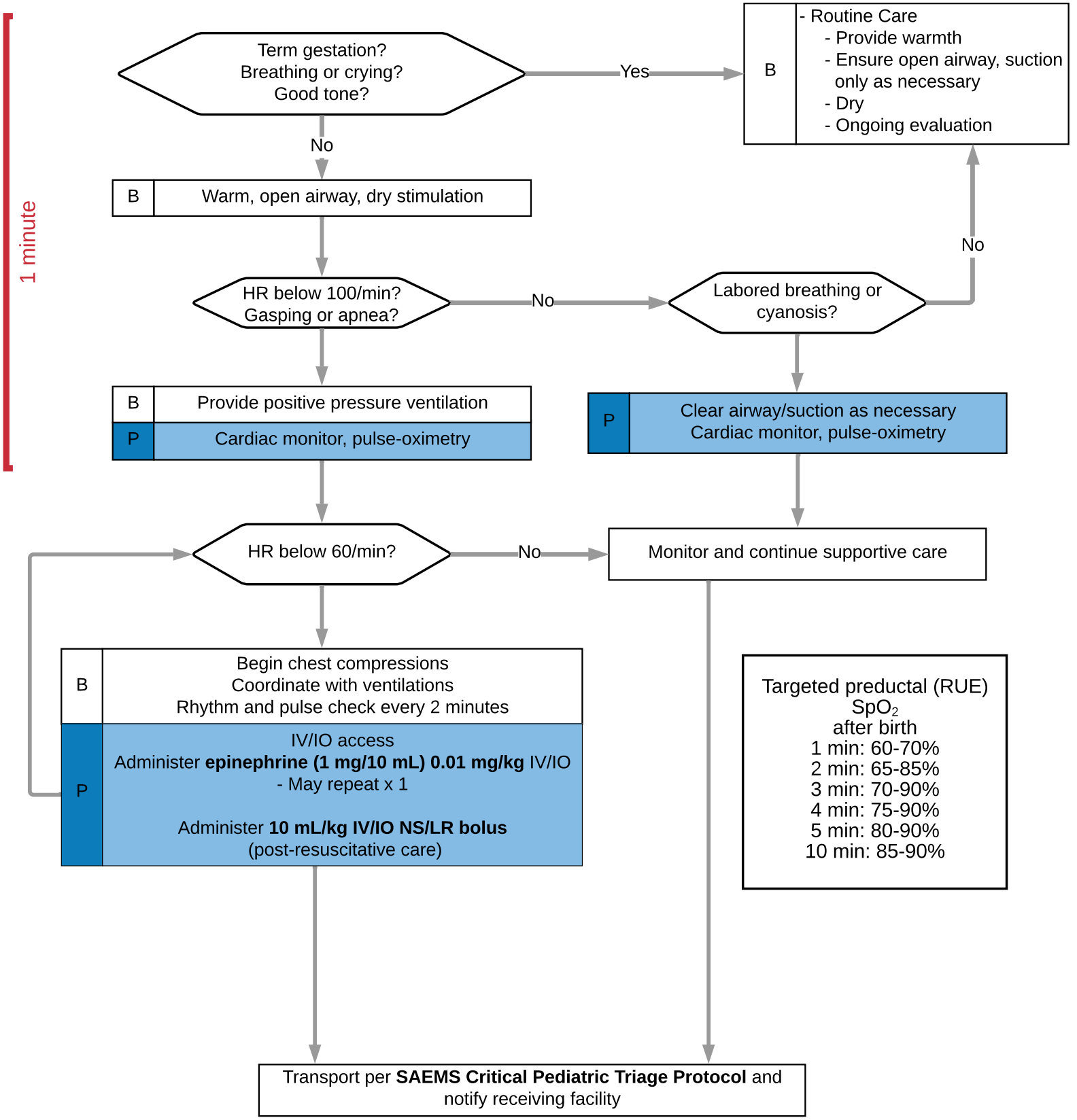
- Narrow Complex Tachycardia (≤ 0.08 seconds)
  - Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 bpm. Children usually <180 bpm.
  - SVT: > 90 % of children with SVT will have a narrow QRS (≤0.08 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 bpm. Children usually >180 bpm.
  - Atrial Flutter: Will have saw-tooth atrial waves. Rate can vary depending on conduction. May be irregular if variable block/conduction is present.
  - Atrial Fibrillation: In children, may represent Wolff-Parkinson-White. Adenosine is **contraindicated.**
- Wide Complex Tachycardia (≥ 0.08 seconds):
  - SVT with aberrancy - Monomophic and regular wide complex tachycardia
  - VT: Uncommon in children. Rates may vary from near normal to > 200 bpm. Most children with VT have underlying heart disease, cardiac surgery, long QT syndrome, or cardiomyopathy.
    - **Amiodarone 5 mg/kg over 20-60 minutes** is the recommended agent.
    - The presence of caption or fusion beats is diagnostic.
- Torsades de Pointes (Polymorphic Ventricular Tachycardia):
  - Rate is typically 150 to 250 bpm.
  - Associated with long QT syndrome, hypomagnesaemia, hypokalemia, and many cardiac drugs. May quickly deteriorate to VT.
    - Administer Magnesium Sulfate 25 mg/kg IV or IO over 10 minutes. In cardiac arrest give over 2 minutes.

- Vagal Maneuvers:
  - Breath holding.
  - Blowing a glove into a balloon.
  - Have child blow out "birthday candles" or through an obstructed straw.
  - Infants: May put a bag of ice water over the upper half of the face, using care not to occlude the airway.

<u>Pediatric Notes</u>:

- Separating the child from the caregiver may worsen the child's clinical condition.
- Pediatric paddles should be used in children < 10 kg or Broselow-Luten color Purple if available.
- Monitor for respiratory depression and hypotension associated if Midazolam is used to facilitate cardioversion.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Neonatal Resuscitation (age <28 days) Administrative Guideline



Education/Pearls

- Wait at least 30-60 seconds post delivery before clamping and cutting the umbilical cord.
- Warm, dry, and stimulate baby for 30 seconds.
- Wrap infant in a dry towel and keep as warm as possible during the resuscitation. Keep the head covered if possible. If gestational age < 32 weeks, additional warming measures are recommended (plastic wrap or bag).
- If strong cry, regular respiratory effort and good tone are present and the infant is term gestation, place infant skin to skin with mother.
- If weak cry, signs of respiratory distress, or poor tone are present, or the infant is preterm gestation, then position airway (sniffing position) and clear airway as needed. If thick meconium, signs of respiratory distress, or secretions are present then suction mouth and nose.
- Consider checking blood glucose for ongoing resuscitation, maternal history of diabetes, if the infant is ill-appearing, or if the infant is unable to feed. Refer to **Hypoglycemia/Hyperglycemia AG** as needed.

First 30-60 seconds:

If heart rate > 100 beats per minute:

- Monitor for central cyanosis and provide blow-by oxygen as needed.
- Monitor for signs of respiratory distress. If apneic or in significant respiratory distress, initiate BVM with room air at 40-60 breaths per minute.

If heart rate < 100 beats per minute:

- Initiate BVM ventilations with room air at 40-60 breaths per minute while monitoring heart rate closely.
- If no improvement after 90 seconds, change O_2 delivery to 100% FiO_2 until HR normalizes

If heart rate < 60 beats per minute:

- Ensure effective ventilations with supplementary oxygenation and adequate chest rise.
- If no improvement after 30 seconds, initiate chest compressions.
- Coordinate chest compressions with BVM ventilations.

Epinephrine is indicated if the newborn's heart rate remains less than 60 beats per minute after at least 30 seconds of positive pressure ventilation, and another 60 seconds of chest compressions coordinated with positive pressure ventilation administered with 100% FiO_2.

Neonatal transportation destinations:

- BUMC-T
- TMC