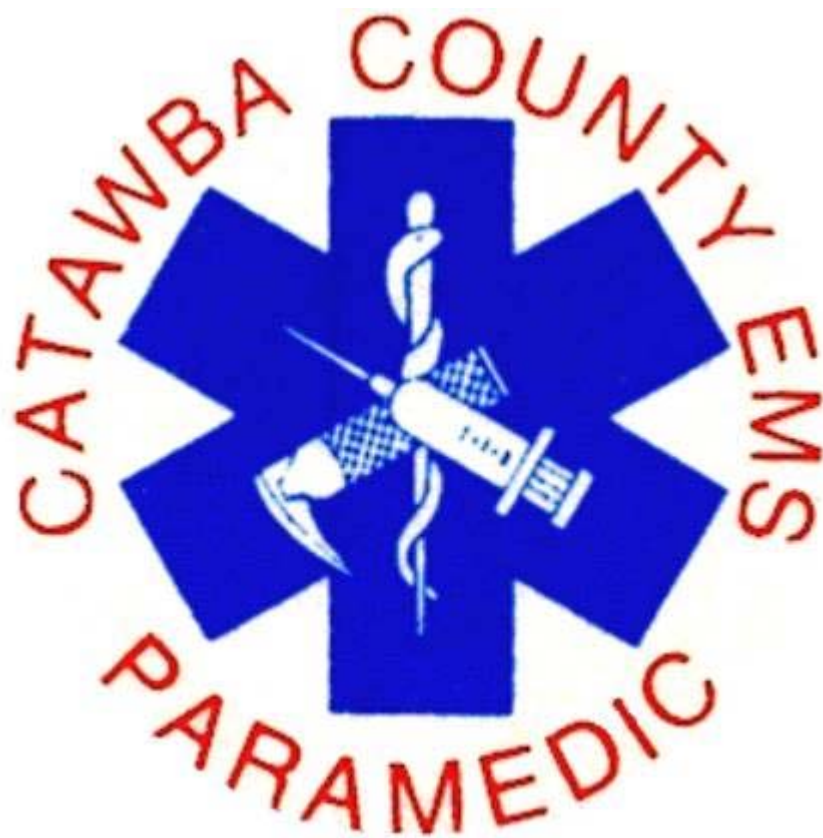


Catawba County Emergency Medical Services System



2018 Protocol Field Manual

Protocols - 2017 NCCEP

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Introduction

The following medical treatment protocols are developed for North Carolina EMS agencies. The process has evolved since 2007 and continues with input from Medical Directors, EMS Administration, North Carolina Chapter of Emergency Physicians Protocol Committee, North Carolina Office of EMS, EMS field personnel and the public at large through on-line surveys, public meetings across North Carolina and direct communication with stakeholders. The 2017 update expands on the 2012 and 2009 version and continues to incorporate evidence-based guidelines, expert opinion and historically proven practices meant to ensure that citizens and visitors of North Carolina will continue to be provided the highest quality pre-hospital patient care available. The North Carolina Chapter of Emergency Physicians develops and provides final approval.

The purpose of the protocol section is to provide treatment protocols outlining permissible and appropriate assessment, delivery of care, reassessment and procedures which may be rendered by pre-hospital providers. The protocols also outline which medical situations require direct voice communication with medical control. In general treatment protocols are specific orders which may and should be initiated prior to contact with Medical Control.

Please note the medical protocols are divided into three (3) to four (4) sections. The upper section includes three (3) boxes (History, Signs and Symptoms and Differential) which serves as a guide to assist in obtaining pertinent patient information and exam findings as well as considering multiple potential causes of the patients complaint. It is not expected that every historical element or sign / symptom be recorded for every patient. It is expected that those elements pertinent to your patient encounter will be included in the patient evaluation.

The algorithm section describes the essentials of patient care. Virtually every patient should receive the care outlined in this section, usually in the order described. However each medical emergency must be dealt with individually and appropriate care determined accordingly. Professional judgment is mandatory in determining treatment modalities within the parameters of these protocols. Circumstances will arise where treatment may move ahead in the algorithm, move outside to another protocol and then re-enter later. While protocols are written based on body systems and primary complaints the patient should be treated as a whole and therefore the protocols should be considered as a whole in providing care.

Professional judgment hierarchy:

The pre-hospital provider may determine that no specific treatment is needed;

Or

The pre-hospital provider may follow the appropriate treatment protocols and then consult Medical Control;

Or

The pre-hospital provider may consult Medical Control before initiating any specific treatment.

Some protocols will encompass two (2) pages. Protocols which exist in a single page format may have page 2 added by the local medical director. The PEARLS section will either be located at the bottom of page 1 (single page protocol) or page 2 (double page protocol). The PEARLS section provides points regarding the main protocol based on evidence to date, common medical knowledge and expert medical opinion.

Information boxes highlighted in purple. These areas are editable at the local level. They will mainly involve specific medications and dosages utilized by the local EMS agency. Page 2 will have a large section highlighted in purple where the local Medical Director may edit as they see fit to provide expanded points and treatment not otherwise specified in the algorithm. If the box is not to be utilized – add ***“This Space Left Blank Intentionally.”***

Finally these medical treatment protocols are established to ensure safe, efficient and effective interventions to relieve pain and suffering and improve patient outcomes without inflicting harm. They also serve to ensure a structure of accountability for Medical Directors, EMS agencies, pre-hospital providers and facilities to provide continual performance improvement. A recent report of the Institute of Medicine calls for the development of standardized, evidence-based pre-hospital care protocols for the triage, treatment and transport of patients. These protocols establish expectations of pre-hospital care in North Carolina.

Introduction

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Key to Protocol Utilization

History

- Important history items
- Circumstances of event
- SAMPLE
- Time of onset
- Duration

Signs and Symptoms

- Important Signs and Symptoms specific to each protocol

Differential

- A list of other disease or injury which should be considered

Black Box

Highlights
Important
Information



Universal Patient Care Protocol
Assumed all protocols utilize and will not appear on individual protocols

Red Box

Highlights
Critical
Information

May direct to
another
protocol



Signals protocol within a protocol

Information box

Indicates
Entry / Exit
from / to
to another protocol(s)



Decision Point
Darker outline to highlight



Highlights medication after
Contact Medical Control
May be added by Local Medical Director

Purple Shading of Information Box

Indicates items changeable at local agency level, including medications / dosages on NCMB formulary
Local Medical Director may add / change at his / her discretion
Local medical director may add page 2 to any protocol where none exists for additional comments

Algorithm Legend

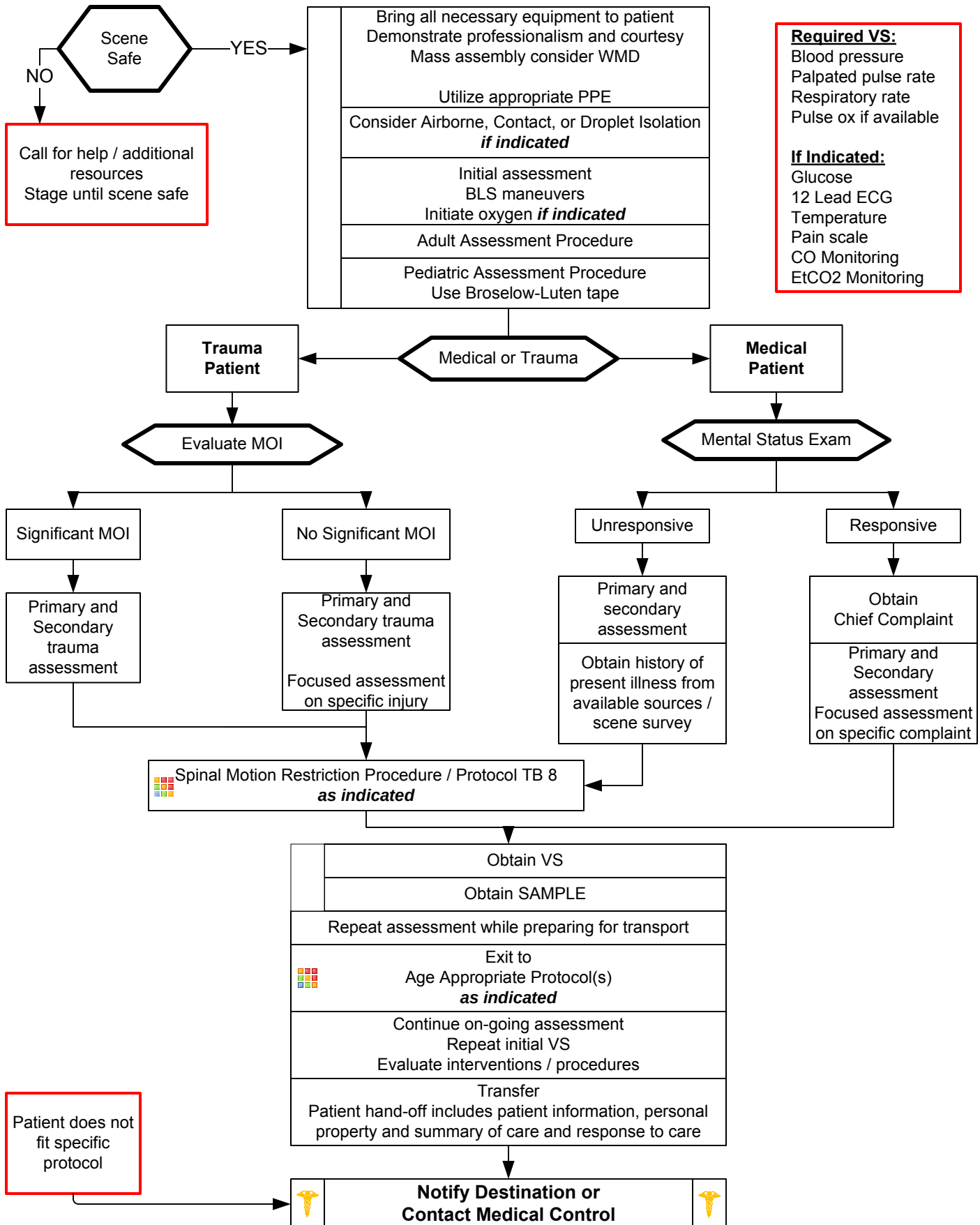
	Emergency Medical Responder
B	Emergency Medical Technician
A	Advanced Emergency Medical Technician
P	Paramedic
	Notify Destination or Contact Medical Control
	

Pearls

- Important information specific to each protocol will appear here.
- Will usually appear on page.
- Important exam items listed here specific to protocol.



Universal Patient Care





Universal Patient Care

Scene Safety Evaluation:

Identify potential hazards to rescuers, patient and public.
Identify number of patients and utilize START protocol if indicated.
Observe patient position and surroundings.

General:

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 the circumstances, events and care of the patient and should allow a reader to understand the complaint, the assessment, the treatment, why procedures were performed and why indicated procedures were not performed as well as ongoing assessments and response to treatment and interventions.

Adult Patient:

An adult is considered hypotensive when Systolic Blood Pressure is less than 90 mmHg.
Diabetic patients and women may have atypical presentations of cardiac related problems such as MI.
General weakness can be the symptom of a very serious underlying process.
Beta blockers and other cardiac drugs may prevent a reflexive tachycardia in shock with low to normal pulse rates.

Geriatric Patient:

Hip fractures and dislocations have high mortality.
Altered mental status is not always dementia. Always check Blood Sugar and assess signs of stroke, trauma, etc. with any alteration in a patient's baseline mental status.
Minor or moderate injury in the typical adult may be very serious in the elderly.

Special note on oxygen administration and utilization:

Oxygen is a pharmaceutical with indications, contraindications as well as untoward side effects.

Utilize oxygen when indicated and not because it is available. A reasonable target oxygen saturation in all treatment protocols is 94 % regardless of delivery device.

• **Pearls**

- **Recommended Exam: Minimal exam if not noted on the specific protocol is vital signs, mental status with GCS, and location of injury or complaint.**

- **Any patient contact which does not result in an EMS transport must have a completed disposition form.**
- **Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.**
- **2 complete vital sign acquisitions should occur at a minimum with a patient encounter.**

• **Patient Refusal**

Patient refusal is a high risk situation. Encourage patient to accept transport to medical facility.
Encourage patient to allow an assessment, including vital signs. Documentation of the event is very important including a mental status assessment describing the patient's capacity to refuse care.
Guide to Assessing capacity:

C: Patient should be able to communicate a clear choice: This should remain stable over time. Inability to communicate a choice or an inability to express the choice consistently demonstrates incapacity.

R: Relevant information is understood: Patient should be able to display a factual understanding of the illness, the options and risks and benefits.

A: Appreciation of the situation: Ability to communicate an understanding of the facts of the situation. They should be able to recognize the significance of the outcome potentially from their decision.

M: Manipulation of information in a rational manner: Demonstrate a rational process to come to a decision. Should be able to describe the logic they are using to come to the decision, though you may not agree with decision.

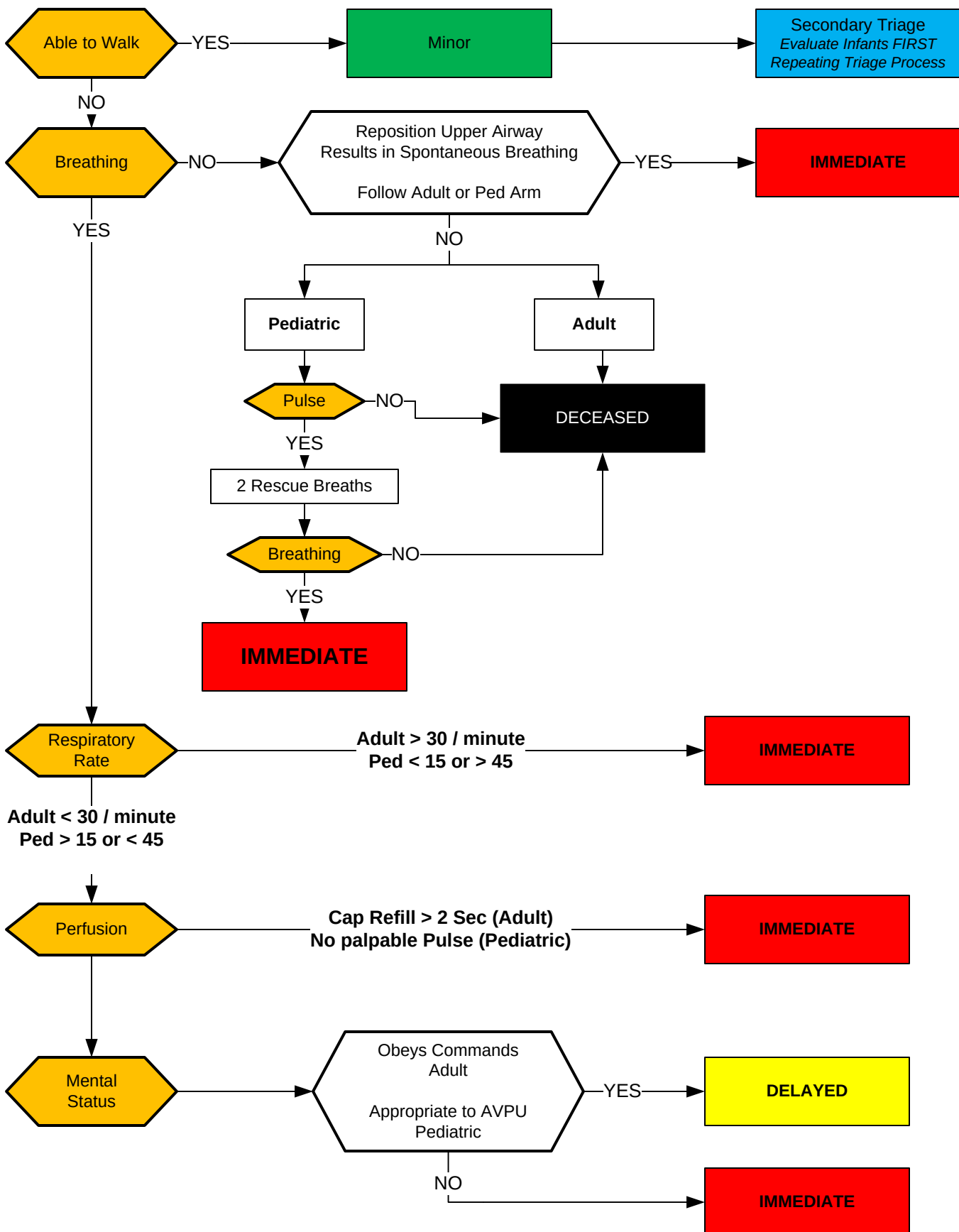
• **Pediatric Patient General Considerations:**

A pediatric patient is defined by fitting a Length-based Resuscitation Tape, Age ≤ 15, weight ≤ 49 kg.
Patients off the Broselow-Luten tape should have weight based medications until age ≥ 16 or weight ≥ 50 kg.
Special needs children may require continued use of Pediatric based protocols 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.

- Timing of transport should be based on patient's clinical condition and the transport policy.
- Never hesitate to contact medical control for patient who refuses transport.
- Blood Pressure is defined as a Systolic / Diastolic reading. A palpated Systolic reading may be necessary at times.
- SAMPLE: Signs / Symptoms; Allergies; Medications; PMH; Last oral intake; Events leading to illness / injury



Triage





Triage

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Pearls

- **When approaching a multiple casualty incident where resources are limited:**
Triage decisions must be made rapidly with less time to gather information
Emphasis shifts from ensuring the best possible outcome for an individual patient to ensuring the best possible outcome for the greatest number of patients.
- **Scene Size Up:**
 1. **Conduct a scene size up. Assure well being of responders. Determine or ensure scene safety before entering. If there are several patients with the same complaints consider HazMat, WMC or CO poisoning.**
 2. **Take Triage system kit.**
 3. **Determine number of patients. Communicate the number of patients and nature of the incident, establish command and establish a medical officer and triage officer if personnel available**
- **Triage is a continual process and should recur in each section as resources allow.**
- **Step 1: Global sorting:**
Call out to those involved in the incident to walk to a designated area and assess third.
For those who cannot walk, have them wave / indicate a purposeful movement and assess them second.
Those involved who are not moving or have an obvious life threat, assess first.
- **Step 2: Individual assessments:**
Control major hemorrhage
Open airway and if child, give 2 rescue breaths
Perform Needle Chest Decompression Procedure if indicated.
Administer injector antidotes if indicated
- **Assess the first patient you encounter using the three objective criteria which can be remembered by RPM.**
R: Respiratory
P: Perfusion
M: Mental Status
- If your patient falls into the RED TAG category, stop, place RED TAG and move on to next patient. Attempt only to correct airway problems, treat uncontrolled bleeding, or administer an antidote before moving to next patient.
- **Treatment:**
Once casualties are triaged focus on treatment can begin. You may need to move patients to treatment areas.
RED TAGs are moved / treated first followed by YELLOW TAGs. BLACK TAGs should remain in place.
You may also indicate deceased patients by pulling their shirt / clothing over their head.
As more help arrives then the triage / treatment process may proceed simultaneously.
- Capillary refill can be altered by many factors including skin temperature. Age-appropriate heart rate may also be used in triage decisions.
- SMART triage tag system is utilized in NC.



Abdominal Pain Vomiting and Diarrhea

History

- 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

Signs and Symptoms

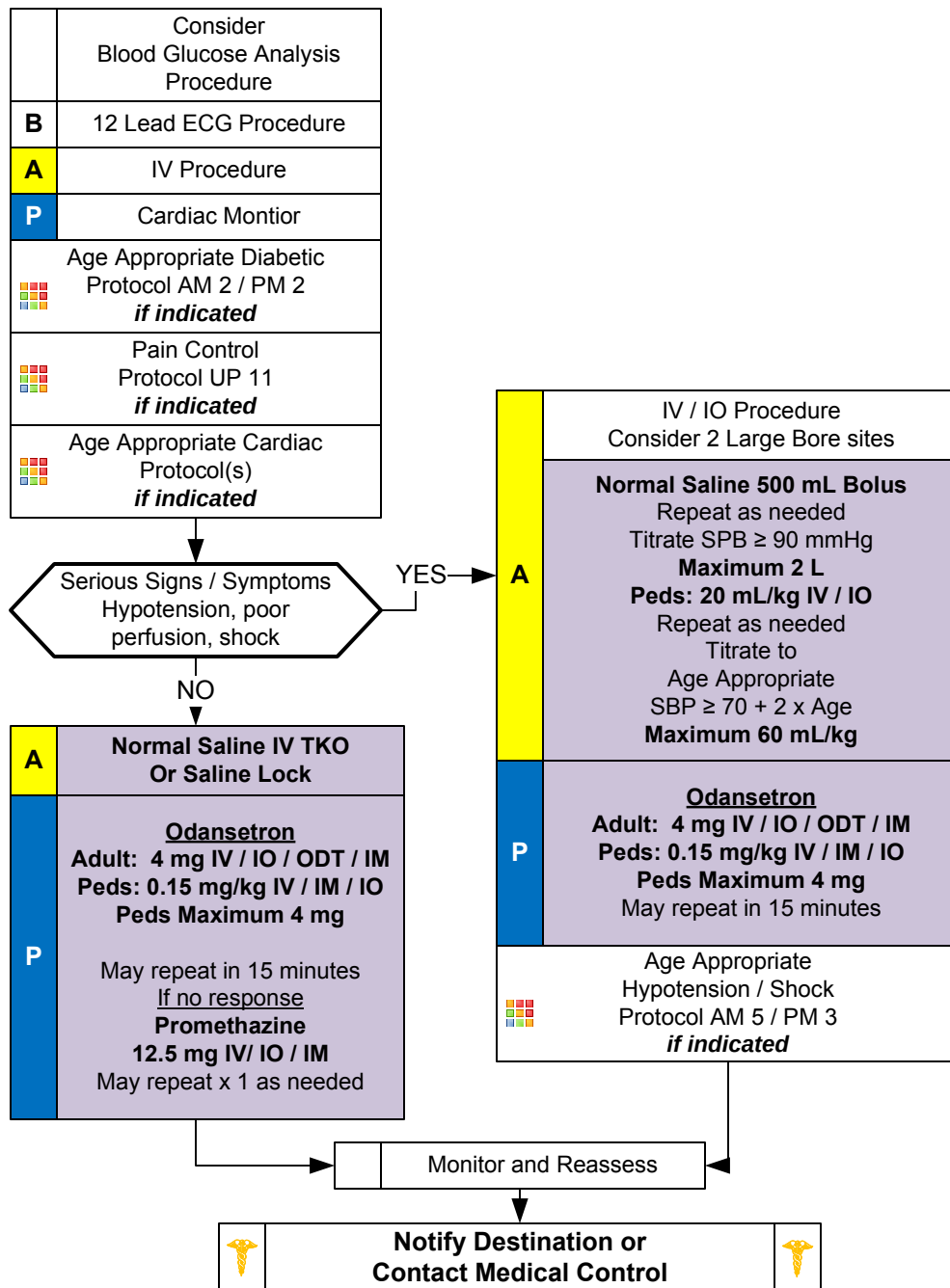
- Pain
- Character of pain (constant, intermittent, sharp, dull, etc.)
- Distention
- Constipation
- Diarrhea
- Anorexia
- Radiation

Associated symptoms:

Fever, headache, blurred vision, weakness, malaise, myalgias, cough, headache, dysuria, mental status changes, rash

Differential

- CNS (increased pressure, headache, stroke, CNS lesions, trauma or hemorrhage, vestibular)
- Myocardial infarction
- Drugs (NSAID's, antibiotics, narcotics, chemotherapy)
- GI or Renal disorders
- Diabetic ketoacidosis
- OB-Gyn disease (ovarian cyst, PID, Pregnancy)
- Infections (pneumonia, influenza)
- Electrolyte abnormalities
- Food or toxin induced
- Medication or Substance abuse
- Psychological





Abdominal Pain Vomiting and Diarrhea

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Pearls

- **Recommended Exam:** Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- **Age specific blood pressure** 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years > 70 + (2 x age) mmHg and 11 years and older > 90 mmHg.
- **Abdominal / back pain** in women of childbearing age should be treated as pregnancy related until proven otherwise.
- **The diagnosis of abdominal aneurysm** should be considered with abdominal pain, with or without back and / or lower extremity pain or diminished pulses, especially in patients over 50 and / or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.
- **Consider cardiac etiology** in patients > 50, diabetics and / or women especially with upper abdominal complaints.
- **Repeat vital signs** after each fluid bolus.
- **Heart Rate:** One of the first clinical signs of dehydration, almost always increased heart rate, tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.
- **Promethazine (Phenergan)** may cause sedative effects in pediatric patients and ages ≥ 60 and the debilitated, etc.) When giving promethazine IV dilute with 10 mL of normal saline and administer slowly as it can also harm the veins.
- Beware of vomiting only in children. Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.
- Document the mental status and vital signs prior to administration of Promethazine (Phenergan).
- Isolated vomiting may be caused by pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures).
- 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), and organophosphate poisoning. Maintain a high index of suspicion.



Altered Mental Status

History

- Known diabetic, medic alert tag
- Drugs, drug paraphernalia
- Report of illicit drug use or toxic ingestion
- Past medical history
- Medications
- History of trauma
- Change in condition
- Changes in feeding or sleep habits

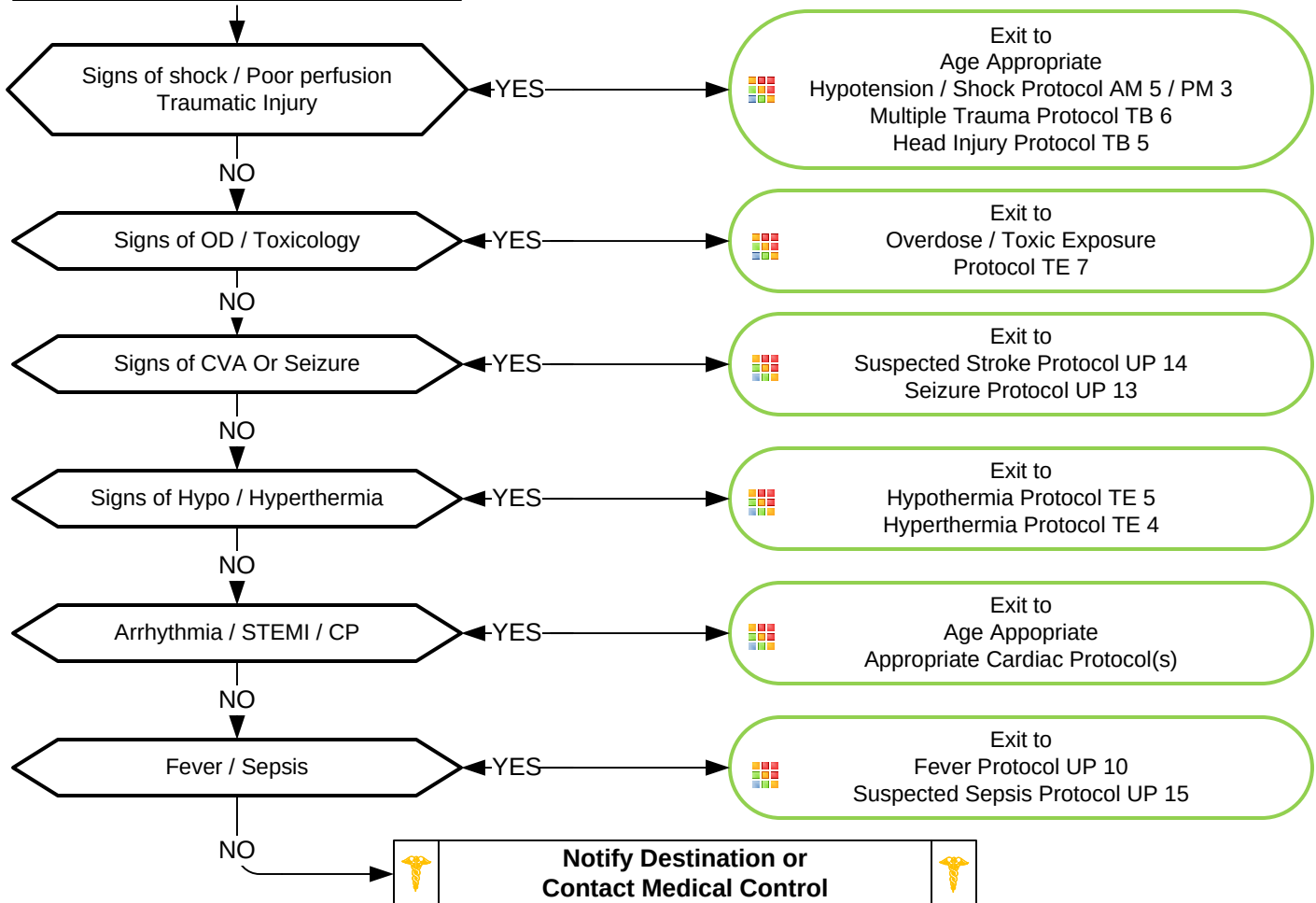
Signs and Symptoms

- Decreased mental status or lethargy
- Change in baseline mental status
- Bizarre behavior
- Hypoglycemia (cool, diaphoretic skin)
- Hyperglycemia (warm, dry skin; fruity breath; Kussmaul respirations; signs of dehydration)
- Irritability

Differential

- Head trauma
- CNS (stroke, tumor, seizure, infection)
- Cardiac (MI, CHF)
- Hypothermia
- Infection (CNS and other)
- Thyroid (hyper / hypo)
- Shock (septic, metabolic, traumatic)
- Diabetes (hyper / hypoglycemia)
- Toxicological or Ingestion
- Acidosis / Alkalosis
- Environmental exposure
- Pulmonary (Hypoxia)
- Electrolyte abnormality
- Psychiatric disorder

Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 <i>if indicated</i>	
	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
A	IV / IO Procedure
Age Appropriate Diabetic Protocol(s) AM 2 / PM 2 <i>if indicated</i>	





Altered Mental Status

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Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **AMS may present as a sign of an environmental toxin or Haz-Mat exposure - protect personal safety.**
- **General:**
 - The patient with AMS poses one of the most significant challenges.**
 - A careful assessment of the patient, the scene and the circumstances should be undertaken.**
 - Assume the patient has a life threatening cause of their AMS until proven otherwise.**
 - Pay careful attention to the head exam for signs of bruising or other injury.**
 - Information found at the scene must be communicated to the receiving facility.**
- **Substance misuse:**
 - Patients ingesting substances can pose a great challenge.
 - DO NOT assume recreational drug use and / or alcohol are the sole reasons for AMS.
 - Misuse of alcohol may lead to hypoglycemia.
 - More serious underlying medical and trauma conditions may be the cause.
- **Behavioral health:**
 - The behavioral health patient may present a great challenge in forming a differential.
 - DO NOT assume AMS is the result solely of an underlying psychiatric etiology.
 - Often an underlying medical or trauma condition precipitates a deterioration of a patient's underlying disease.
- **Spinal Motion Restriction / Trauma:**
 - Only utilize spinal immobilization if the situation warrants.
 - The patient with AMS may worsen with increased agitation when immobilized.
- **It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon**
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.



Back Pain

History

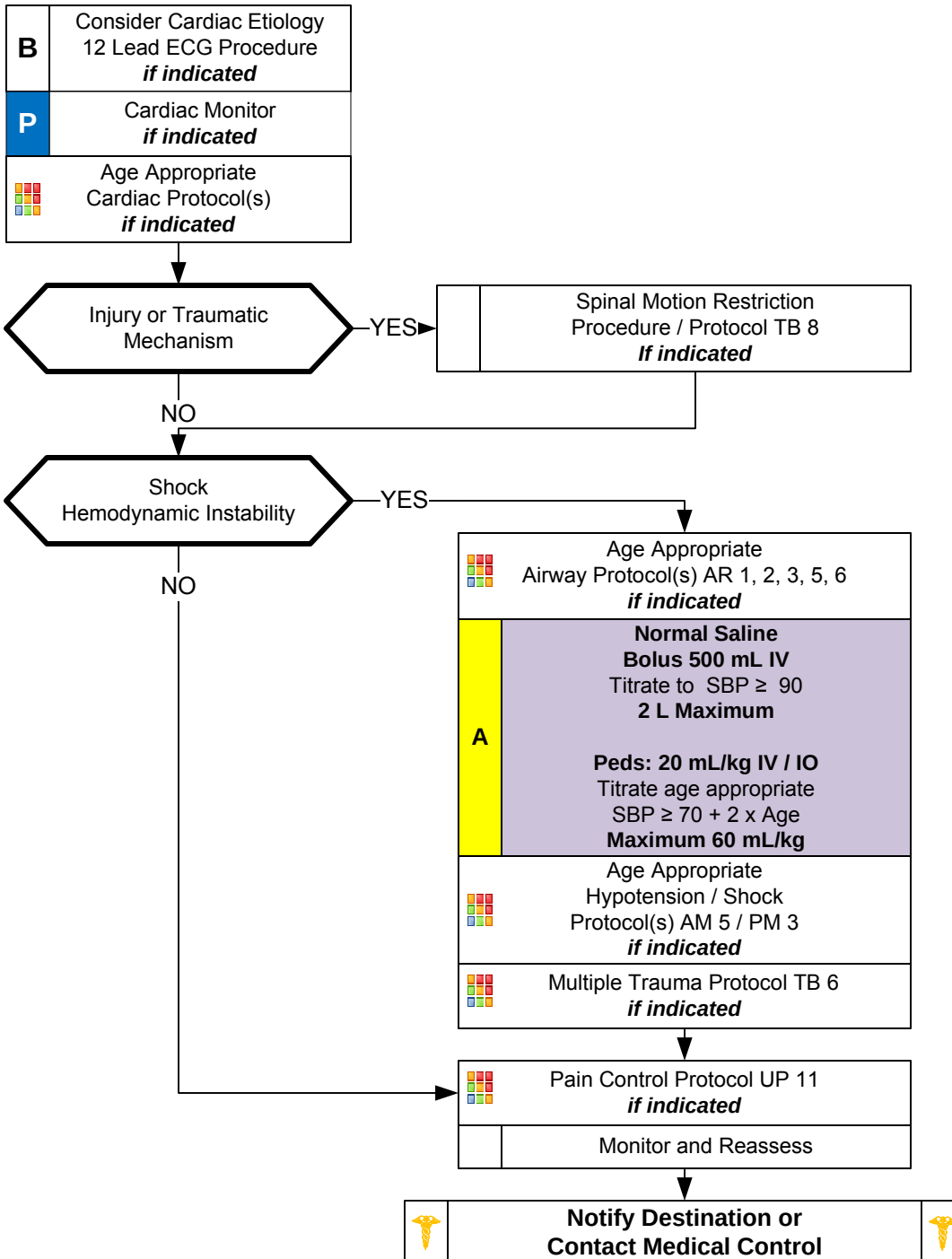
- Age
- Past medical history
- Past surgical history
- Medications
- Onset of pain / injury
- Previous back injury
- Traumatic mechanism
- Location of pain
- Fever
- Improvement or worsening with activity

Signs and Symptoms

- Pain (paraspinous, spinous process)
- Swelling
- Pain with range of motion
- Extremity weakness
- Extremity numbness
- Shooting pain into an extremity
- Bowel / bladder dysfunction

Differential

- Muscle spasm / strain
- Herniated disc with nerve compression
- Sciatica
- Spine fracture
- Kidney stone
- Pyelonephritis
- Aneurysm
- Pneumonia
- Spinal Epidural Abscess
- Metastatic Cancer
- AAA





Back Pain

Have a high suspicion of Abdominal Aortic Aneurysm (AAA) if the patient is > 50 years of age and presents with flank pain if no history of Kidney stones. First presentation of kidney stones in patient greater than 50 y/o is rare.

Ketorolac is drug of choice when treating kidney stones. Narcotic analgesia should only be given secondary to Ketorolac.

Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Neuro, Lower extremity perfusion**
- Back pain is one of the most common complaints in medicine and affects more than 90 % of adults at some point in their life. Back pain is also common in the pediatric population. Most often it is a benign process but in some circumstances can be life or limb threatening.
- **Consider pregnancy or ectopic pregnancy with abdominal or back pain in women of childbearing age.**
- **Consider abdominal aortic aneurysm with abdominal pain especially in patients over 50 and/or patients with shock/ poor perfusion. Patients may have abdominal pain and / or lower extremity pain with diminished pulses, . Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 50, diabetics and / or women especially with upper abdominal complaints.**
- **Red Flags which may signal more serious process associated with back pain:**
 - Age > 50 or < 18
 - Neurological deficit (leg weakness, urinary retention, or bowel incontinence)
 - IV Drug use
 - Fever
 - History of cancer, either current or remote
 - Night time pain in pediatric patients
- **Cauda equina syndrome is where the terminal nerves of spinal cord are being compressed (Symptoms include):**
 - Saddle anesthesia
 - Recent onset of bladder and bowel dysfunction. (Urine retention and bowel incontinence)
 - Severe or progressive neurological deficit in the lower extremity.
 - Motor weakness of thigh muscles or foot drop
- **Back pain associated with infection:**
 - Fever / chills.
 - IV Drug user (consider spinal epidural abscess)
 - Recent bacterial infection like pneumonia.
 - Immune suppression such as HIV or patients on chronic steroids like prednisone.
 - Meningitis.
- **Spinal motion restriction in patients with underlying spinal deformity should be maintained in their functional position.**
- Kidney stones typically present with an acute onset of flank pain which radiates around to the groin area.



Behavioral

History

- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic alert tag
- Substance abuse / overdose
- Diabetes

Signs and Symptoms

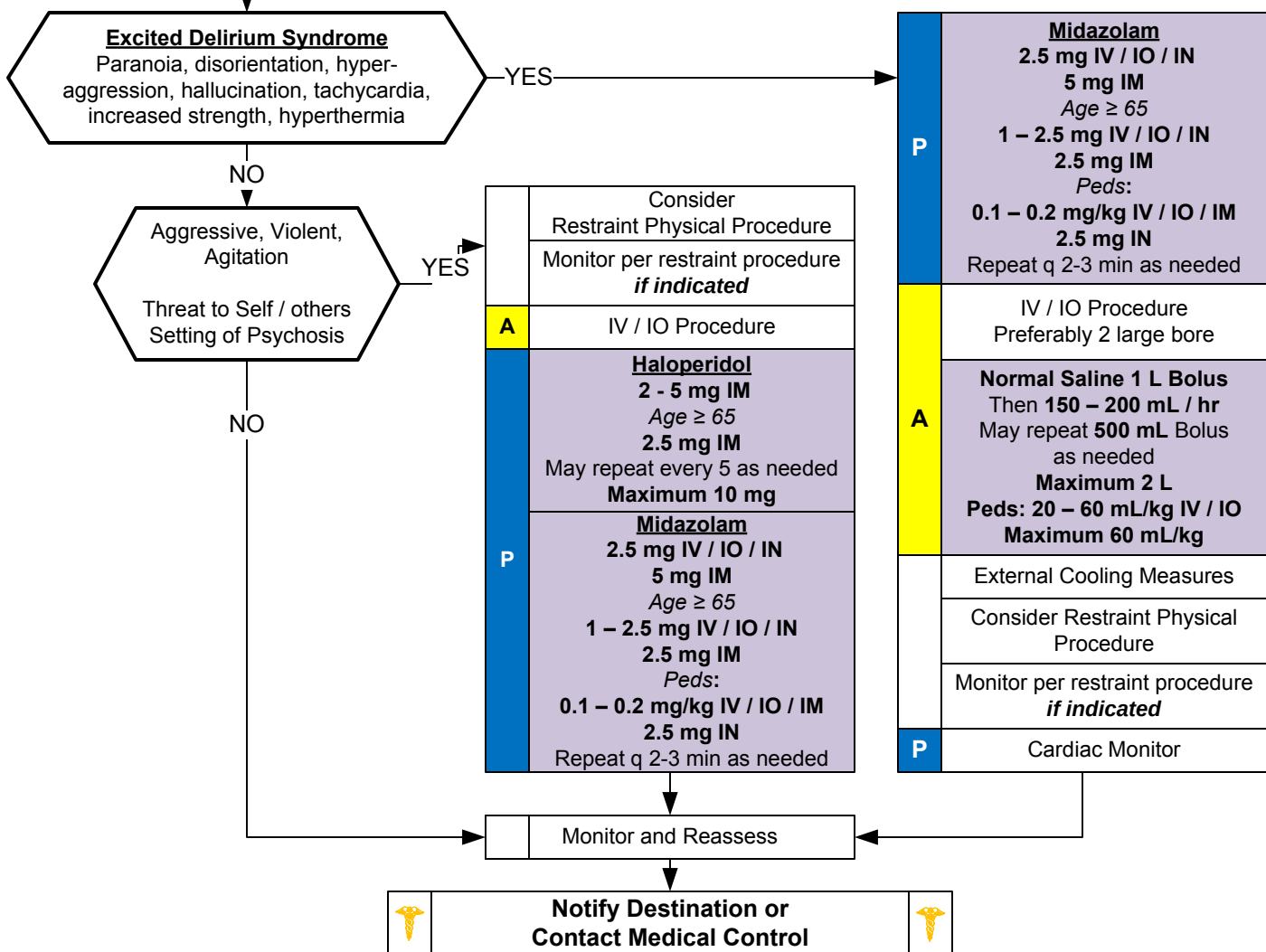
- Anxiety, agitation, confusion
- Affect change, hallucinations
- Delusional thoughts, bizarre behavior
- Combative violent
- Expression of suicidal / homicidal thoughts

Differential

- Altered Mental Status differential
- Alcohol Intoxication
- Toxin / Substance abuse
- Medication effect / overdose
- Withdrawal syndromes
- Depression
- Bipolar (manic-depressive)
- Schizophrenia
- Anxiety disorders

	Blood Glucose Analysis Procedure <i>if indicated</i>
	Age Appropriate Diabetic Protocol AM 2 / PM 2 <i>if indicated</i>
	Altered Mental Status Protocol UP 4 Overdose / Toxic Ingestion Protocol TE 7 <i>if indicated</i>
	Head Trauma Protocol TB 5 Multiple Trauma Protocol TB 6 <i>if indicated</i>

Call for help / additional resources
Stage until scene safe



Universal Protocol Section



Behavioral

Scene safety:

First priority is safety of on scene personnel. Protect yourself and others by requesting law enforcement. Do not approach patient if armed with any type weapon or reasonable suspicion of weapon. Retreat from scene to safe staging area if scene is or becomes unsafe at any point.

General:

Behavioral emergencies may be precipitated by an underlying medical condition even with known psychiatric disease.

Be vigilant in your assessment to make sure an underlying medical condition is not the cause, but assume medical condition is precipitating cause.

Psychosis may include head trauma, hypoglycemia, acute intoxication, sepsis, CNS insult, hypoxia and ingestions. Psychosis and delirium may be very difficult to distinguish. Search patient to ensure no weapons even if law enforcement has done so.

Use SAFER model:

Stabilize the situation by containing and lowering the stimuli (remove unnecessary personnel, remove patient from stress, reassure, calm and establish rapport.) Position yourself between patient and an exit. Keep hands in front of your body (non-threatening posture.) Only one provider should communicate with patient. Outline the patient's choices and calmly set some boundaries of acceptable behavior.

Assess and acknowledge crisis

Facilitate resources (Friends, family, police, chaplain)

Encourage patient to use resources available and take actions in their best interest

Recovery or referral: Patient in care of responsible person, professional or transport to medical facility.

Restraints:

Patient must be out of control and posing a threat to themselves or others.

Use minimum necessary force required for patient control must be done in a way not to inflict harm upon the patient.

Position of patient must not impede airway or breathing. This should be done supine or lateral with one arm raised above the head.

Restraints must not impede circulation. Do not restrain patient in prone position. Do not allow patient to continue to struggle against restraint: This can cause life threatening condition. Contact Medical Control if necessary for chemical restraint advice.

Chemical Restraint:

Patient must be out of control and posing a threat to themselves others.

Necessary force required for patient control must be done in a way not to inflict harm upon the patient.

Position of patient must not impede airway or breathing. This should be done supine or lateral with one arm raised above the head.

Drug must be able to be given without imparting harm to rescuers or patient.

Intranasal Midazolam Dose:

Mix 5 mg of Midazolam in 1 mL of NS

0.2 mg/kg IN (If ≥ 26 kg give 5 mg)

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neuro**
- **Crew / responders safety is the main priority.**
- **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS must be accompanied by law enforcement in the ambulance.**
- **Consider Haldol or Ziprasidone for patients with history of psychosis or a benzodiazepine for patients with presumed substance abuse.**
- **Haldol is acceptable treatment in pediatric patients ≥ 12 years old. Safety and efficacy is not established in younger ages.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- Be sure to consider all possible medical/trauma causes for behavior (hypoglycemia, overdose, substance abuse, hypoxia, head injury, etc.)
- Do not irritate the patient with a prolonged exam.
- Do not overlook the possibility of associated domestic violence, child, or geriatric abuse.
- Do not position or transport any restrained patient in such a way that could impact the patients respiratory or circulatory status.
- **Excited Delirium Syndrome:**
Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent / bizarre behavior, insensitivity to pain, hyperthermia and increased strength. Potentially life-threatening and associated with use of physical control measures, including physical restraints and Tasers. Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents. Alcohol withdrawal or head trauma may also contribute to the condition.
- **If patient is suspected of EDS suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early**
- **Extrapyramidal reactions:**
Condition causing involuntary muscle movements or spasms typically of the face, neck and upper extremities. May present with contorted neck and trunk with difficult motor movements. Typically an adverse reaction to antipsychotic drugs like Haloperidol and may occur with your administration. When recognized give **Diphenhydramine 50 mg IV / IO / IM / PO** in adults or **1 mg/kg IV / IO / IM / PO** in pediatrics.
- **May add page 3 to protocol for specific for local mental health and / or substance misuse resources or destinations.**



Dental Problems

History

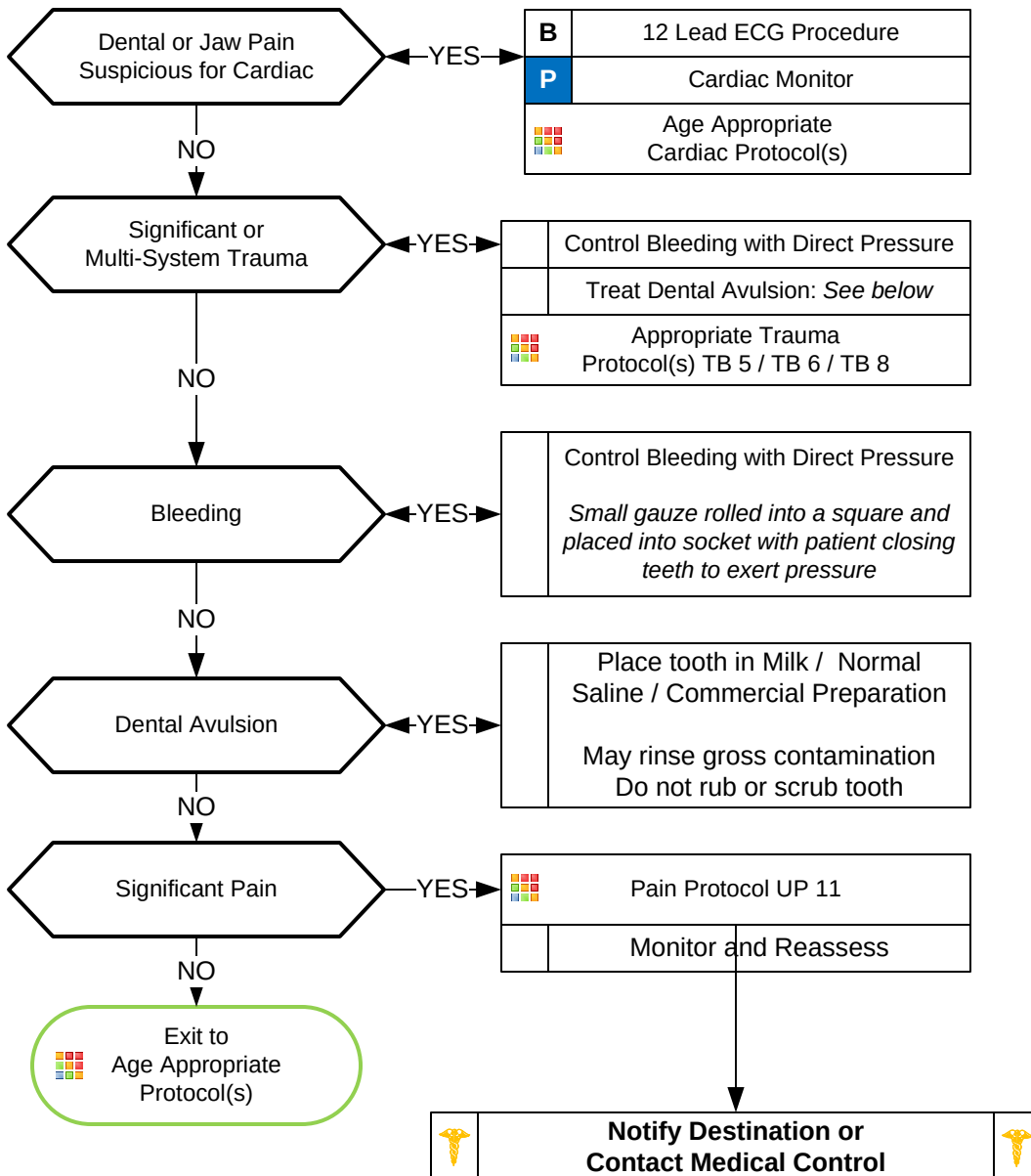
- Age
- Past medical history
- Medications
- Onset of pain / injury
- Trauma with "knocked out" tooth
- Location of tooth
- Whole vs. partial tooth injury

Signs and Symptoms

- Bleeding
- Pain
- Fever
- Swelling
- Tooth missing or fractured

Differential

- Decay
- Infection
- Fracture
- Avulsion
- Abscess
- Facial cellulitis
- Impacted tooth (wisdom)
- TMJ syndrome
- Myocardial infarction



Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Chest, Lungs, Neuro**
- Significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess.
- Scene and transport times should be minimized in complete tooth avulsions. Reimplantation is possible within 4 hours if the tooth is properly cared for.
- Occasionally cardiac chest pain can radiate to the jaw.
- All pain associated with teeth should be associated with a tooth which is tender to tapping or touch (or sensitivity to cold or hot).



Emergencies Involving Indwelling Central Lines

History

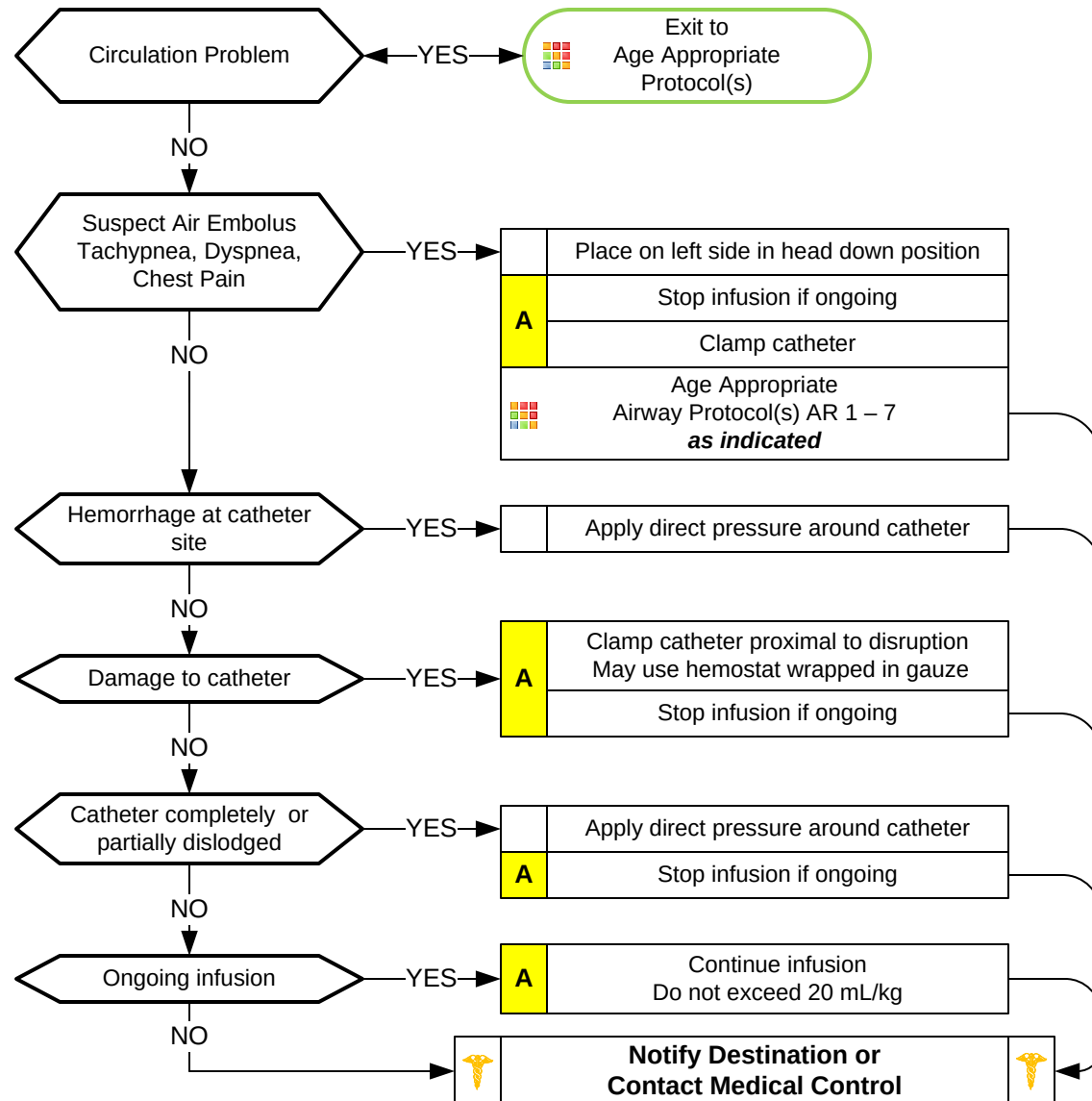
- Central Venous Catheter Type
Tunneled Catheter
(Broviac / Hickman)
- PICC (peripherally inserted
central catheter)
- Implanted catheter
(Mediport / Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

Signs and Symptoms

- External catheter dislodgement
- Complete catheter dislodgement
- Damaged catheter
- Bleeding at catheter site
- Internal bleeding
- Blood clot
- Air embolus
- Erythema, warmth or drainage
about catheter site indicating
infection

Differential

- Fever
- Hemorrhage
- Reactions from home nutrient or medication
- Respiratory distress
- Shock



Universal Protocol Section

Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **Use strict sterile technique when accessing / manipulating an indwelling catheter.**
- **Cardiac arrest: May access central catheter and utilize if functioning properly.**
- Do not place a tourniquet or BP cuff on the same side where a PICC line is located.
- Do not attempt to force catheter open if occlusion evident.
- Some infusions may be detrimental to stop. Ask family or caregiver if it is appropriate to stop or change infusion.
- Hyperalimentation infusions (IV nutrition): If stopped for any reason monitor for hypoglycemia.



Epistaxis

History

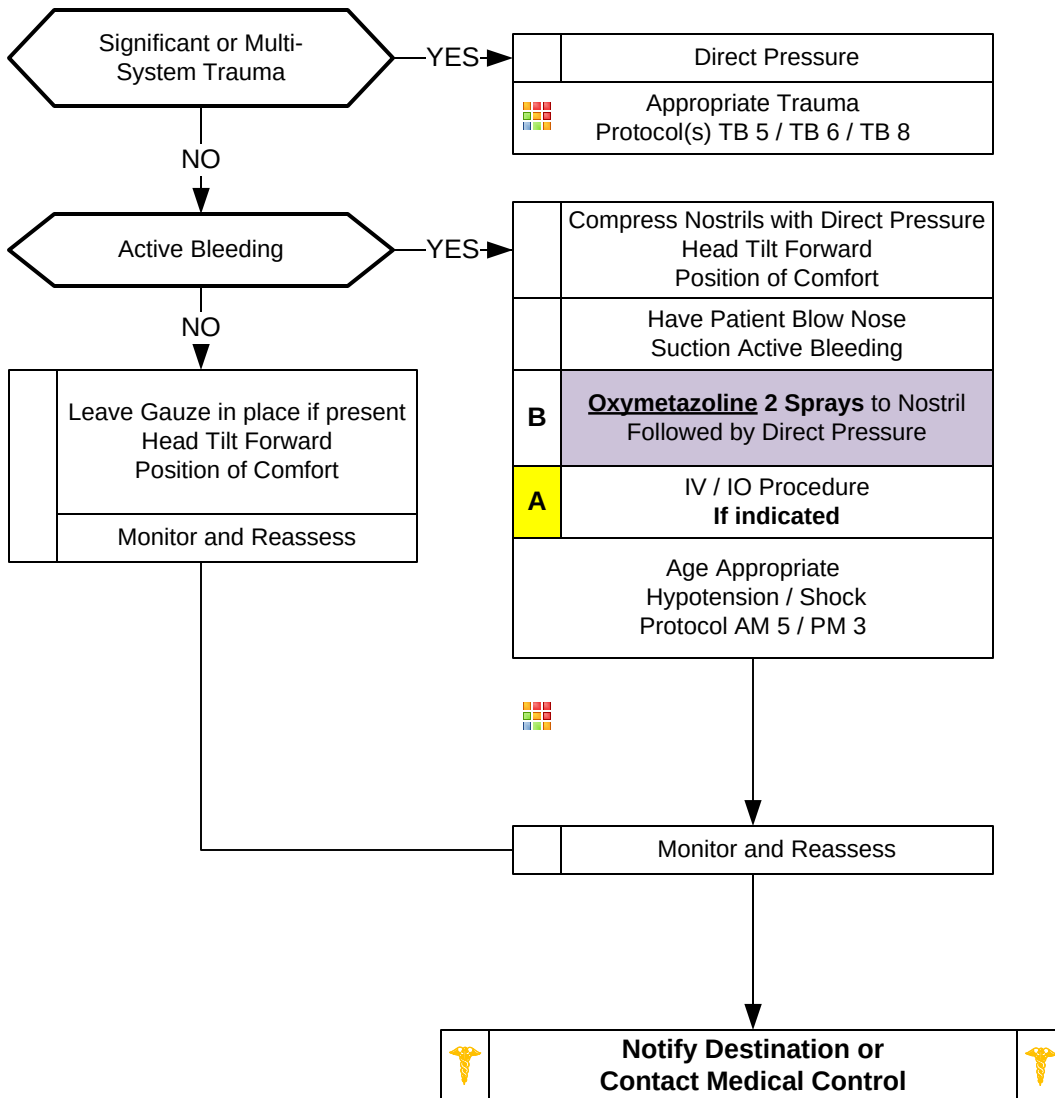
- Age
- Past medical history
- Medications (HTN, anticoagulants, aspirin, NSAIDs)
- Previous episodes of epistaxis
- Trauma
- Duration of bleeding
- Quantity of bleeding

Signs and Symptoms

- Bleeding from nasal passage
- Pain
- Nausea
- Vomiting

Differential

- Trauma
- Infection (viral URI or Sinusitis)
- Allergic rhinitis
- Lesions (polyps, ulcers)
- Hypertension



Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Age specific hypotension: 0 – 28 days < 60 mmHg, 1 month – 1 year < 70 mmHg, 1 year – 10 years < 70 + (2 x age)mmHg, 11 years and greater < 90 mmHg.**
- It is very difficult to quantify the amount of blood loss with epistaxis.
- Bleeding may also be occurring posteriorly. Evaluate for posterior blood loss by examining the posterior pharynx.
- Anticoagulants include warfarin (Coumadin), Apixaban (Eliquis), heparin, enoxaparin (Lovenox), dabigatran (Pradaxa), rivaroxaban (Xarelto), and many over the counter headache relief powders.
- Anti-platelet agents like aspirin, clopidogrel (Plavix), aspirin/dipyridamole (Aggrenox), and ticlopidine (Ticlid) can contribute to bleeding.



Fever / Infection Control

History

- Age
- Duration of fever
- Severity of fever
- Past medical history
- Medications
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Environmental exposure
- Last acetaminophen or ibuprofen

Signs and Symptoms

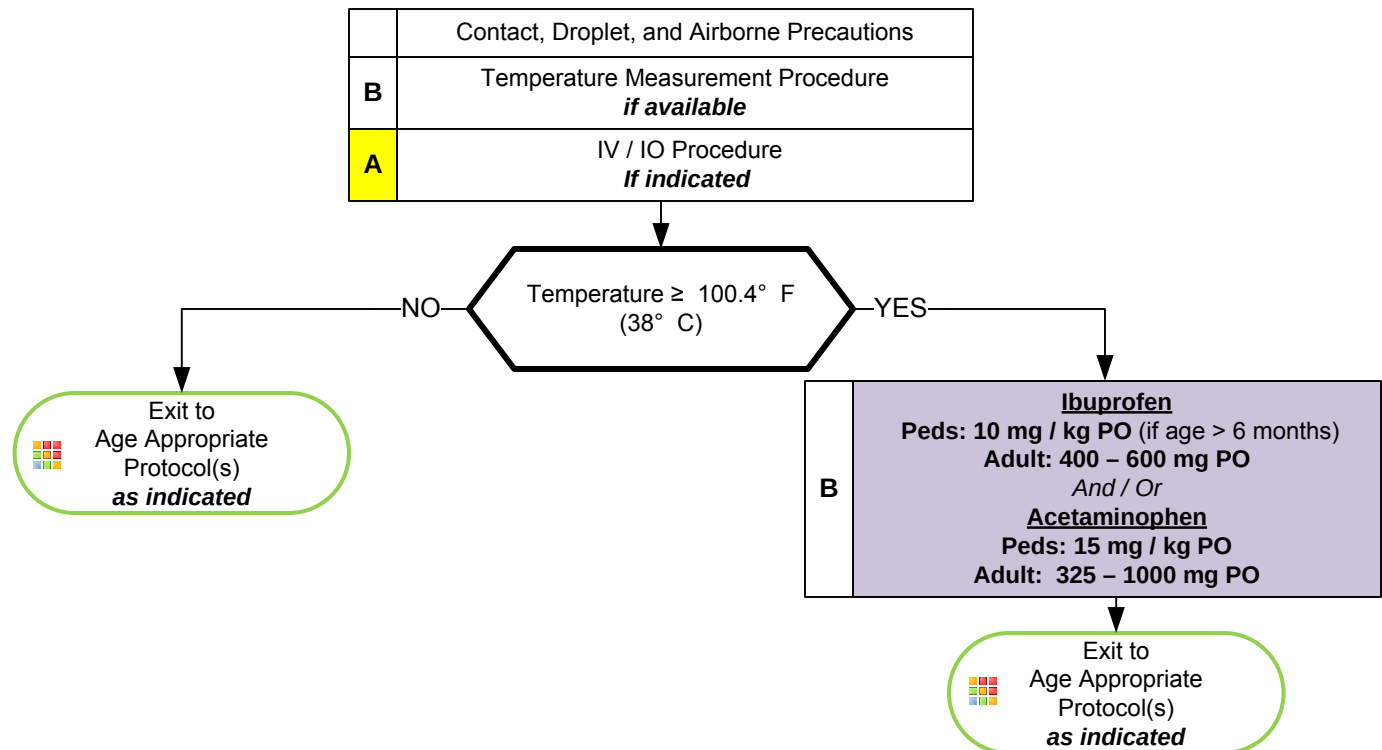
- Warm
- Flushed
- Sweaty
- Chills/Rigors

Associated Symptoms (Helpful to localize source)

- myalgias, cough, chest pain, headache, dysuria, abdominal pain, mental status changes, rash

Differential

- Infections / Sepsis
- Cancer / Tumors / Lymphomas
- Medication or drug reaction
- Connective tissue disease
 - Arthritis
 - Vasculitis
- Hyperthyroidism
- Heat Stroke
- Meningitis



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- Patients with a history of liver failure should not receive acetaminophen.
- **Droplet precautions** include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient. This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected. A patient with a potentially infectious rash should be treated with droplet precautions.
- **Airborne precautions** include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions. This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions** include standard PPE plus airborne precautions plus contact precautions. This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- Rehydration with fluids increases the patient's ability to sweat and improves heat loss.
- All patients should have drug allergies documented prior to administering pain medications.
- Allergies to NSAIDs (non-steroidal anti-inflammatory medications) are a contraindication to Ibuprofen. Do not give to patients who have renal disease or renal transplant.
- NSAIDs should not be used in the setting of environmental heat emergencies.
- **Do not** give aspirin to a child, age ≤ 15 years.
- Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.



Pain Control

History

- Age
- Location
- Duration
- Severity (1 - 10)
- If child use Wong-Baker faces scale
- Past medical history
- Medications
- Drug allergies

Signs and Symptoms

- Severity (pain scale)
- Quality (sharp, dull, etc.)
- Radiation
- Relation to movement, respiration
- Increased with palpation of area

Differential

- Per the specific protocol
- Musculoskeletal
- Visceral (abdominal)
- Cardiac
- Pleural / Respiratory
- Neurogenic
- Renal (colic)

Enter from
Protocol based on Specific Complaint

Assess Pain Severity

Use combination of Pain Scale,
Circumstances, MOI, Injury or
Illness severity

Mild

Moderate to Severe

B	Ibuprofen 10 mg/kg PO (400 – 600 mg typical adult) Maximum 800 mg Or Acetaminophen 15 mg/kg (325 – 1000 mg typical adult) Maximum 1000 mg Or Aspirin 324 to 650 mg PO (≥ 16 only)
A	Consider IV Procedure <i>if indicated</i>

A	IV / IO Procedure
	Ketorolac 30 mg IV / IO 60 mg IM Maximum 60 mg Peds: 0.5 mg/kg IV / IO / IM Maximum 30 mg
P	Cardiac Monitor
	Continuous Waveform Capnography
	Hydromorphone 1-2 mg IV / IO / IM Repeat 1 mg every 20-30 minutes Maximum 5 mg Or Fentanyl 50 – 75 mcg IV / IO / IN Repeat 25 mcg every 20 minutes Maximum 200 mcg Peds: 1 mcg/kg IV / IO / IM / IN May repeat 0.5 mg/kg every 5 minutes Maximum 2 mcg/kg Or Morphine 4 mg IV / IO / IM Repeat 2 mg every 5 minutes as needed Peds: 0.1 mg/kg IV / IO / IM May repeat every 5 minutes Maximum 10 mg
	Monitor and Reassess Every 10 minutes following sedative

Monitor and Reassess

Notify Destination or
Contact Medical Control

Universal Protocol Section



Pain Control

Additional Information:

Ketorolac - Do not use in pregnant women or in women who are breast feeding.
Do not use in patients who have recently taken NSAIDS orally

Patients should not be given narcotics without being transported. Confirm patients will be transported prior to administering narcotic pain medication. If the patient does not wish to be transported, Medical Control **must** be contacted for orders to administer narcotic analgesia.

Pearls

- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded before and after PO, IV, IO or IM medication delivery and at patient hand off. Monitor BP closely as sedative and pain control agents may cause hypotension.**
- **Both arms of the treatment may be used in concert. For patients in Moderate pain for instance, you may use the combination of an oral medication and parenteral if no contraindications are present.**
- **Pediatrics:**
 - For children use Wong-Baker faces scale or the FLACC score (see Assessment Pain Procedure)
 - Use Numeric (> 9 yrs), Wong-Baker faces (4-16yrs) or FLACC scale (0-7 yrs) as needed to assess pain
- **Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction in the event no transport occurs.
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities, headaches, or abdominal pain.
- **Ketorolac (Toradol) and Ibuprofen should not be used in patients with known renal disease or renal transplant, in patients who have known drug allergies to NSAID's (non-steroidal anti-inflammatory medications), with active bleeding, headaches, abdominal pain, stomach ulcers or in patients who may need surgical intervention such as open fractures or fracture deformities.**
- Do not administer **Acetaminophen** to patients with a history of liver disease.
- Burn patients may required higher than usual opioid doses to titrate adequate pain control.
- Consider agency-specific anti-emetic(s) for nausea and/or vomiting.



Police Custody

History

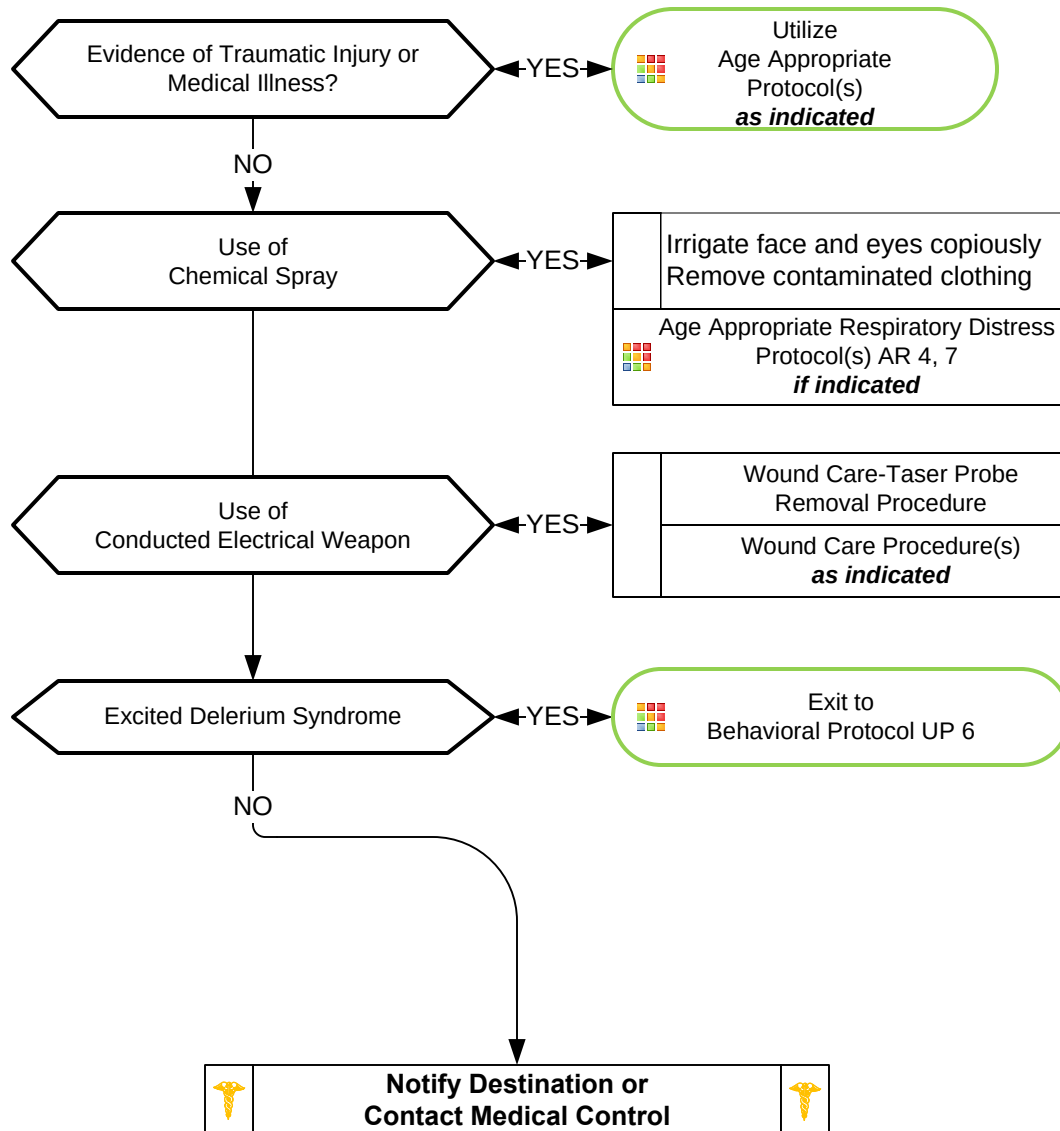
- Traumatic Injury
- Drug Abuse
- Cardiac History
- History of Asthma
- Psychiatric History

Signs and Symptoms

- External signs of trauma
- Palpitations
- Shortness of breath
- Wheezing
- Altered Mental Status
- Intoxication/Substance Abuse

Differential

- Agitated Delirium Secondary to Psychiatric Illness
- Agitated Delirium Secondary to Substance Abuse
- Traumatic Injury
- Closed Head Injury
- Asthma Exacerbation
- Cardiac Dysrhythmia





Police Custody

Blood Draws

- Patient consent or a search warrant must be obtained prior to the specimen being obtained
- Safety of the provider is of utmost importance. Law Enforcement must ensure the patient is secure and it is safe for the provider to obtain the specimen.

Pearls

- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **Local EMS agencies should formulate a policy with local law enforcement agencies concerning patients requiring EMS and Law Enforcement simultaneously. Agencies should work together to formulate a disposition in the best interest of the patient.**
- **Patients restrained by law enforcement devices must be transported accompanied by a law enforcement officer in the patient compartment who is capable of removing the devices. However when rescuers have utilized restraints in accordance with Restraint Procedure, the law enforcement agent may follow behind the ambulance during transport.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- The responsibility for patient care rests with the highest authorized medical provider on scene per North Carolina law.
- If an asthmatic patient is exposed to pepper spray and released to law enforcement, all parties should be advised to immediately contact EMS if wheezing/difficulty breathing occurs.
- All patients with decision-making capacity in police custody retain the right to participate in decision making regarding their care and may request care or refuse care of EMS.
- If extremity / chemical / law enforcement restraints are applied, follow Restraint Procedure.
- **Consider Haldol or Ziprasidone for patients with history of psychosis or a benzodiazepine for patients with presumed substance abuse.**
- **Haldol is acceptable treatment in pediatric patients ≥ 12 years old. Safety and efficacy is not established in younger ages.**
- **Excited Delirium Syndrome:**
 - Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent / bizarre behavior, insensitivity to pain, hyperthermia and increased strength. Potentially life-threatening and associated with use of physical control measures, including physical restraints and Tasers.
 - Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents. Alcohol withdrawal or head trauma may also contribute to the condition.
 - If patient suspected of EDS suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early.**
- Do not position or transport any restrained patient in such a way that could impact the patient's respiratory or circulatory status.
- Patients exposed to chemical spray, with or without history of respiratory disease, may develop respiratory complaints up to 20 minutes post exposure.



Seizure

History

- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Document number of seizures
- Alcohol use, abuse or abrupt cessation
- Fever

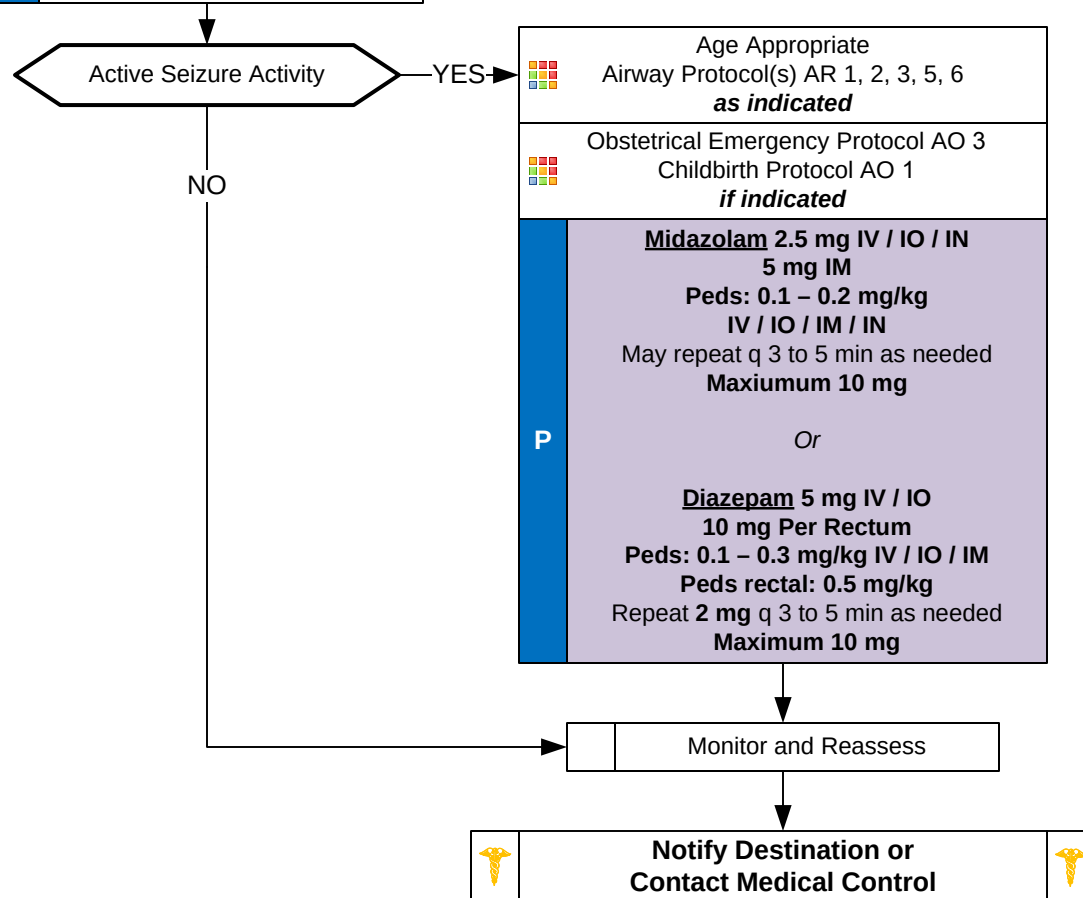
Signs and Symptoms

- Decreased mental status
- Sleepiness
- Incontinence
- Observed seizure activity
- Evidence of trauma
- Unconscious

Differential

- CNS (Head) trauma
- Tumor
- Metabolic, Hepatic, or Renal failure
- Hypoxia
- Electrolyte abnormality (Na, Ca, Mg)
- Drugs, Medications, Non-compliance
- Infection / Fever
- Alcohol withdrawal
- Eclampsia
- Stroke
- Hyperthermia
- Hypoglycemia

	Loosen any constrictive clothing Protect patient
	Blood Glucose Analysis Procedure
	Altered Mental Status Protocol UP 4 if indicated
	Behavioral Protocol UP 6 if indicated
A	IV / IO Procedure if indicated
P	Cardiac Monitor if indicated





Seizure

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Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Adult:**
 - Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.
- **Pediatrics:**
 - Midazolam 0.2 mg/kg (Maximum 10 mg) IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.
- **Status epilepticus** is defined as two or more successive seizures without a period of consciousness or recovery. This is a true emergency requiring rapid airway control, treatment, and transport.
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures** affect only a part of the body and are not usually associated with a loss of consciousness, but can propagate to generalized seizures with loss of consciousness.
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- In an infant, a seizure may be the only evidence of a closed head injury.
- Be prepared to assist ventilations especially if diazepam or midazolam is used.
- For any seizure in a pregnant patient, follow the OB Emergencies Protocol.
- Diazepam (Valium) is not effective when administered IM. Give IV or Rectally.
- Midazolam is well absorbed when administered IM.



Suspected Stroke

History

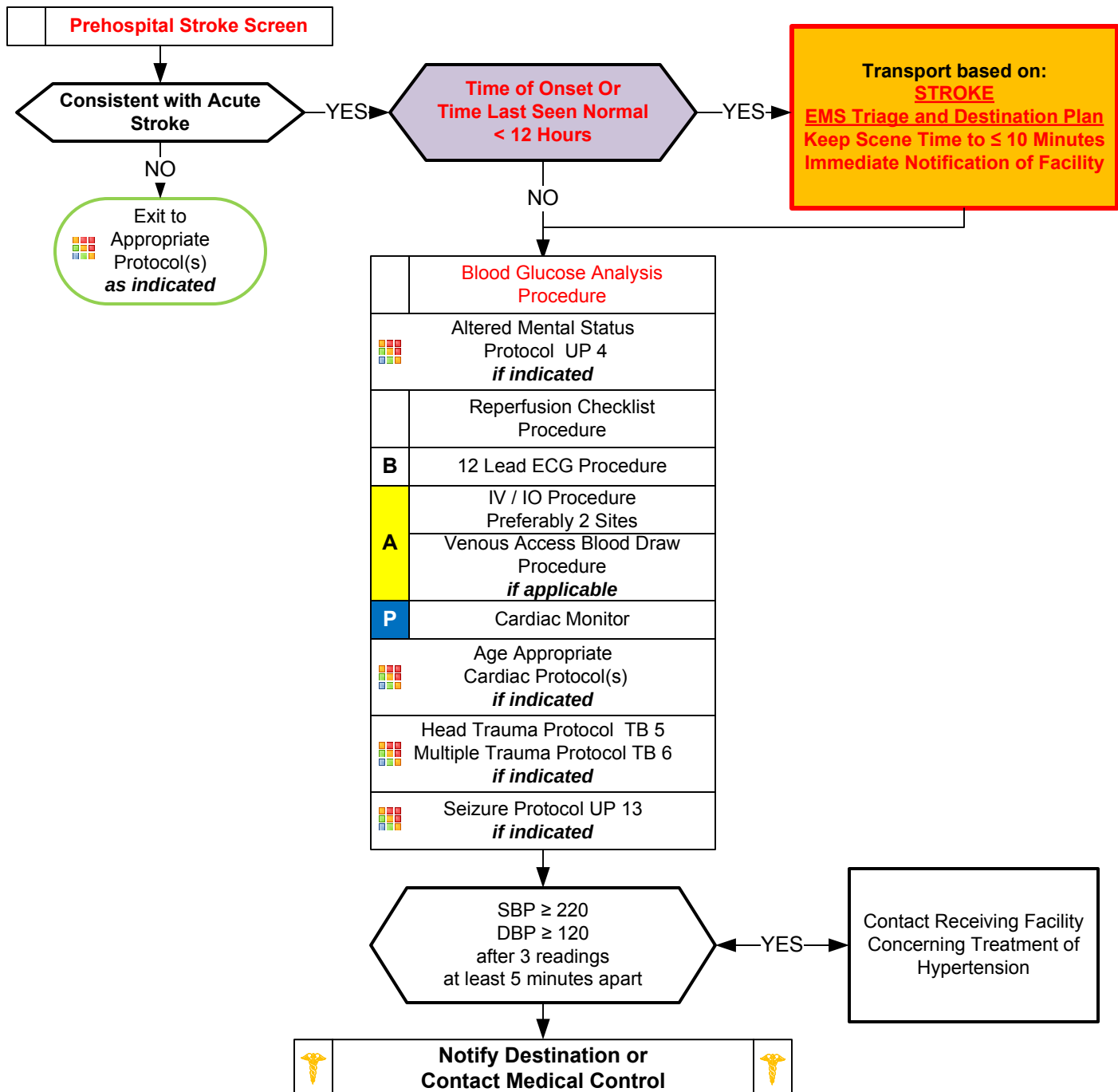
- Previous CVA, TIA's
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hypertension, CAD
- Atrial fibrillation
- Medications (blood thinners)
- History of trauma
- Sickle Cell Disease
- Immune disorders
- Congenital heart defects
- Maternal infection / hypertension

Signs and Symptoms

- Altered mental status
- Weakness / Paralysis
- Blindness or other sensory loss
- Aphasia / Dysarthria
- Syncope
- Vertigo / Dizziness
- Vomiting
- Headache
- Seizures
- Respiratory pattern change
- Hypertension / hypotension

Differential

- See Altered Mental Status
- TIA (Transient ischemic attack)
- Seizure
- Todd's Paralysis
- Hypoglycemia
- Stroke
 - Thrombotic or Embolic (~85%)
 - Hemorrhagic (~15%)
- Tumor
- Trauma
- Dialysis / Renal Failure





Suspected Stroke

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Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used in the EMS Acute Stroke Care Toolkit.**
- **Acute Stroke care is evolving rapidly. Time of onset / last seen normal may be changed at any time depending on the capabilities and resources of your hospital based on Stroke: EMS Triage and Destination Plan.**
- **Time of Onset or Last Seen Normal:**
 - **One of the most important items the pre-hospital provider can obtain, of which all treatment decisions are based.**
 - **Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT “about 45 minutes ago.”)**
 - **Without this information patient may not be able to receive thrombolytics at facility.**
 - **Wake up stroke: Time starts when patient last awake or symptom free.**
- **You are often in the best position to determine the actual Time of Onset while you have family, friends or caretakers available. Often these sources of information may arrive well after you have delivered the patient to the hospital. Delays in decisions due to lack of information may prevent an eligible patient from receiving thrombolytics.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient. With a duration of symptoms of less than 12 , scene times should be limited to ≤ 10 minutes, early notification / activation of receiving facility should be performed and transport times should be minimized.**
- **If possible place 2 IV sites.**
- **Blood Draw:**
 - **Many systems utilize EMS venous blood samples. Follow your local policy and procedures.**
- **The differential listed on the Altered Mental Status Protocol should also be considered.**
- **Be alert for airway problems (swallowing difficulty, vomiting/aspiration).**
- **Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.**
- **Document the Stroke Screen results in the PCR.**
- **Agencies may use validated pre-hospital stroke screen of choice.**
- **Pediatrics:**
 - **Strokes do occur in children, they are slightly more common in ages < 2, in boys, and in African-Americans.**
 - **Newborn and infant symptoms consist of seizures, extreme sleepiness, and using only one side of the body.**
 - **Children and teenagers symptoms may consist of severe headaches, vomiting, sleepiness, dizziness, and/or loss of balance or coordination.**



Suspected Sepsis

History

- Duration and severity of fever
- Past medical history
- Medications / Recent antibiotics
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Indwelling medical device
- Last acetaminophen or ibuprofen
- Recent Hospital / healthcare facility
- Bedridden or immobile
- Elderly and very young – at risk
- Prosthetic device / indwelling device

Signs and Symptoms

- Warm
- Flushed
- Sweaty
- Chills / Rigors
- Delayed cap refill
- Mental status changes

Associated Symptoms (Helpful to localize source)

- myalgias, cough, chest pain, headache, dysuria, abdominal pain, rash

Differential

- Infections: UTI, Pneumonia, skin/ wound
- Cancer / Tumors / Lymphomas
- Medication or drug reaction
- Connective tissue disease: Arthritis, Vasculitis
- Hyperthyroidism
- Heat Stroke
- Meningitis
- Hypoglycemia/hypothermia
- MI / CVA

Consider: Contact, Droplet, and Airborne Precautions	
Temperature Measurement Procedure <i>if available</i>	
	Fever / Infection Control Protocol UP 10 <i>if needed</i>
	Altered Mental Status Protocol UP 4 <i>if needed</i>
B	12 Lead ECG Procedure
A	IV / IO Procedure <i>if indicated</i>
P	Cardiac Monitor
	Waveform Capnography

 Exit to
Age Appropriate
Condition Appropriate
Protocol(s)

**Sepsis Screen
Positive**

MAP
(Mean Arterial Pressure)

$$\frac{SBP + 2(DBP)}{3}$$

Monitor usually calculates this
value on screen

Adult SIRS Criteria

Temperature
 $\geq 100.4^{\circ} \text{F}$ (38°C)
Or
 $\leq 96.8^{\circ} \text{F}$ (36°C)

AND

Any 1 of the following:
HR > 90
RR > 20
EtCO $< 25 \text{ mmHg}$

Pediatrics SIRS Criteria

Temperature
Same as adult

AND

Heart Rate
1 month – 1 year > 180
2 – 5 years > 140
6 – 12 years > 130
13 – 18 years > 120

SEPSIS ALERT
Notify Receiving Facility
Immediately

A Venous Access Blood Draw
if applicable

Normal Saline 500 mL Bolus
Repeat as needed
Titrate SPB $\geq 90 \text{ mmHg}$
MAP $> 65 \text{ mmHg}$
Maximum 2 L

Peds: 20 mL/kg IV / IO
Repeat to titrate
Age Appropriate
SBP $\geq 70 + 2 \times \text{Age}$
Maximum 60 mL/kg

P **Dopamine**
5 – 20 mcg/kg/min IV / IO
Or
Norepinephrine
1 mcg/kg/min IV / IO
Maximum 3 mcg/kg/min
To effect SBP ≥ 90

 Age Appropriate
Hypotension / Shock
Protocol AM 5 / PM 3

 **Notify Destination or
Contact Medical Control** 

Universal Protocol Section



Suspected Sepsis

Alternate Sepsis Criteria Tool -

Adult qSOFA Criteria

SBP $\leq$ 100 mmHG

RR $\geq$ 22

AMS or new mental status change

Dopamine Infusion: Dose 2-20 mcg / kg/ min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

50 kg and greater

Pt weight (Kg) x Dose x 0.25 = ____ gtts / min (using **10 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 0.25 = **20 gtts / min** or **1 gtt / 3 sec**

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using **60 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

• Pearls

- Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro
- Recommended Exam Pediatrics: In childhood, physical assessment reveals important clues for sepsis. Look for mental status abnormalities such as anxiety, restlessness, agitation, irritability, confusion, or lethargy. Cardiovascular findings to look for include cool extremities, capillary refill >3 seconds, or mottled skin.
- Sepsis is a life threatening condition where the body's immune response to infection injures its own tissues and organs.
- Severe sepsis is a suspected infection and 2 or more SIRS criteria (or qSOFA) with organ dysfunction such as AMS or hypotension.
- Septic shock is severe sepsis and poor perfusion unimproved after fluid bolus.
- Agencies administering antibiotics should inquire about drug allergies specific to antibiotics or family of antibiotics.
- Following each fluid bolus, assess for pulmonary edema. Consider administration of agency specific vasopressor.
- Supplemental oxygen should be given and titrated to oxygenation saturation $\geq$ 94%.
- EKG should be obtained with suspected sepsis, but should not delay care in order to obtain.
- Abnormally low temperatures increase mortality and found often in geriatric patients.
- Quantitative waveform capnography can be a reliable surrogate for lactate monitoring in detecting metabolic distress in sepsis patients. EtCO₂ < 25 mm Hg are associated with serum lactate levels > 4 mmol/L.
- Patients with a history of liver failure should not receive acetaminophen.
- Droplet precautions:
 - Include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient.
 - This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected.
 - A patient with a potentially infectious rash should be treated with droplet precautions.
- Airborne precautions:
 - Include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions.
 - This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- All-hazards precautions:
 - Include standard PPE plus airborne precautions plus contact precautions.
 - This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- All patients should have drug allergies documented prior to administering pain medications.
- Allergies to NSAIDs (non-steroidal anti-inflammatory medications) are a contraindication to Ibuprofen.
- Agency Medical Director may require contact of medical control prior to EMT / MR administering any medication.
- Sepsis Screen:
 - Agencies may use Adult / Pediatric Systemic Inflammatory Response Syndrome (SIRS) criteria or quickSOFA (qSOFA) criteria.
 - Receiving facility should be involved in determining Sepsis Screen utilized by EMS.



Syncope

History

- Cardiac history, stroke, seizure
- Occult blood loss (GI, ectopic)
- Females: LMP, vaginal bleeding
- Fluid loss: nausea, vomiting, diarrhea
- Past medical history
- Medications

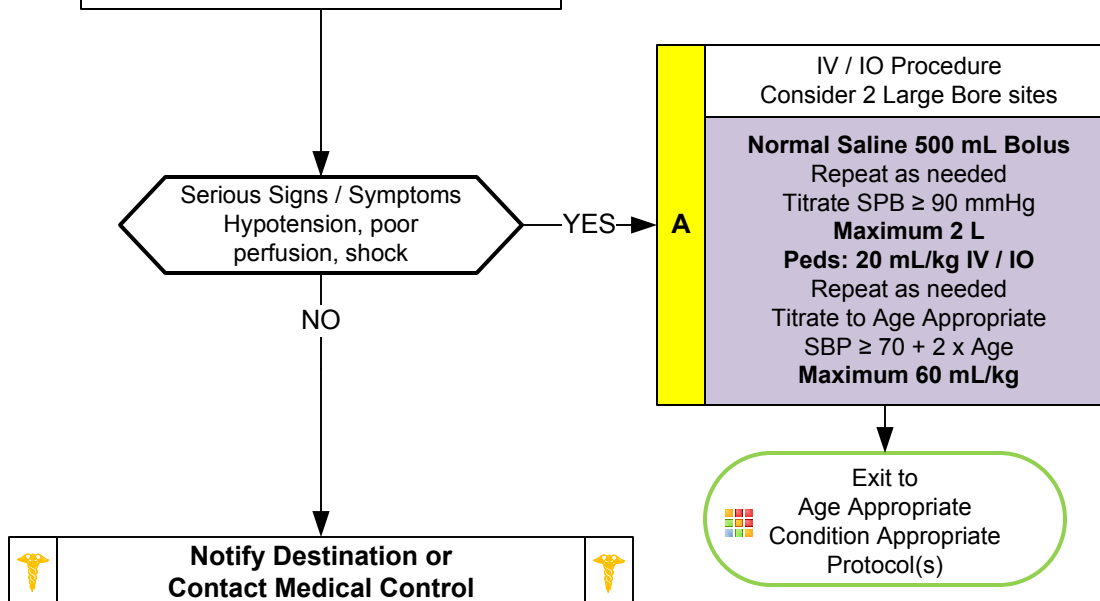
Signs and Symptoms

- Loss of consciousness with recovery
- Lightheadedness, dizziness
- Palpitations, slow or rapid pulse
- Pulse irregularity
- Decreased blood pressure

Differential

- Vasovagal
- Orthostatic hypotension
- Cardiac syncope
- Micturition / Defecation syncope
- Psychiatric
- Stroke
- Hypoglycemia
- Seizure
- Shock (see Shock Protocol)
- Toxicological (Alcohol)
- Medication effect (hypertension)
- PE
- AAA

Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 <i>if indicated</i>	
	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
I	IV / IO Procedure
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Age Appropriate Cardiac Protocol(s) <i>if indicated</i>
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 <i>if indicated</i>
	Multiple Trauma Protocol TB 6 Spinal Motion Restriction Procedure / Protocol TB 8 <i>if indicated</i>





Syncope

Additional History Questions:

- 1) Type of episode?
- 2) Was there a complete loss of consciousness?
- 3) Was there spontaneous recovery?
- 4) Are there other associated symptoms?
- 5) Was there a sudden onset? (Cardiac causes are usually rapid onset)
- 6) Position? (Orthostatic Hypotension)
- 7) Are there any provocative factors?
- 8) Gestational Syncope?
- 9) What was the duration of the syncope?
- 10) Were there any signs witnessed?
- 11) Is the age of the patient a factor?
- 12) Are there any pre-existing medical conditions?
- 13) Any significant family history?
- 14) Is there recent injury?
- 15) Medication or recreational drugs use?
- 16) Try to discern from seizure. Seizure can mimic up to 15% of syncopal episodes.

Pearls

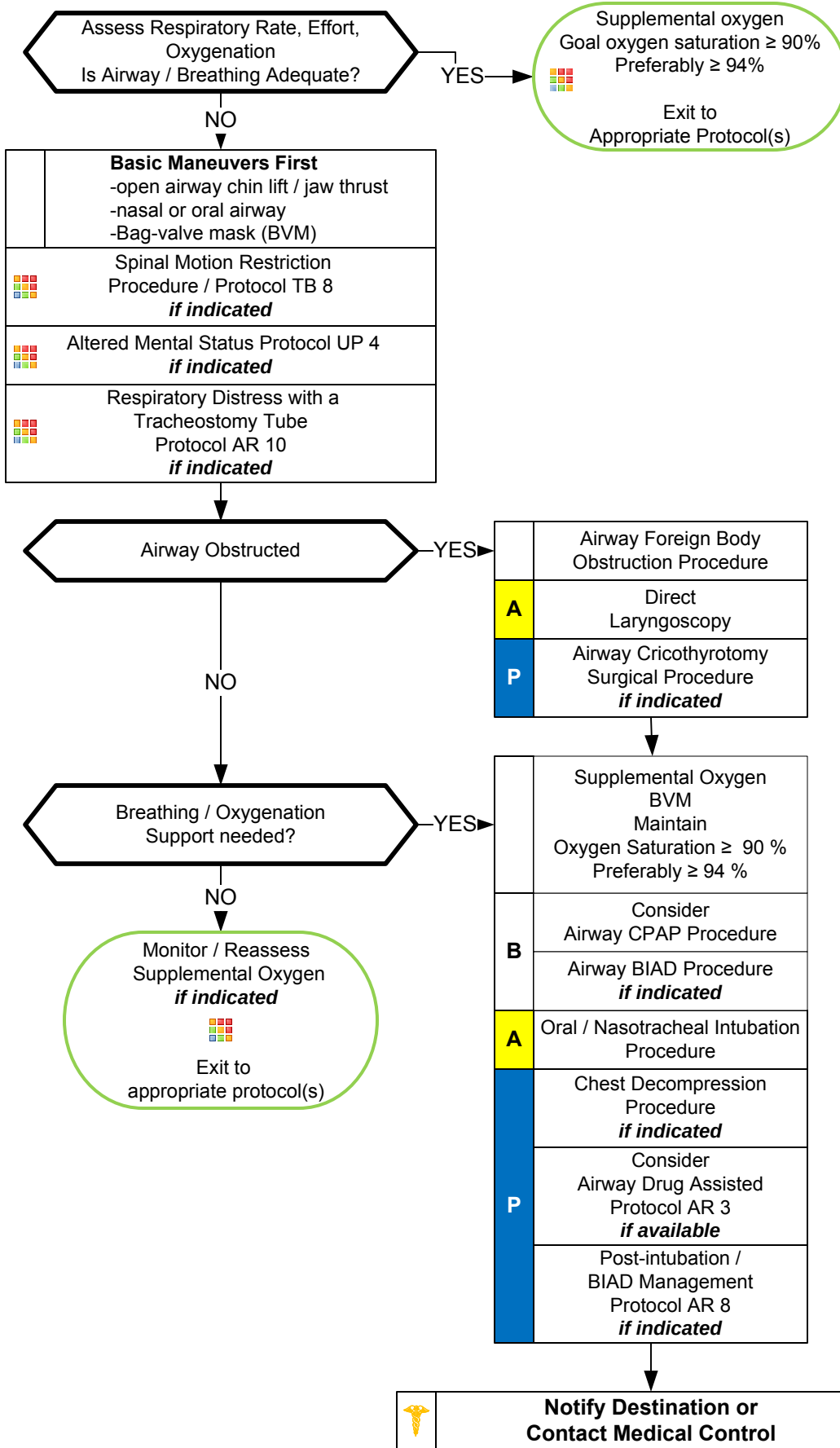
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Syncope is both loss of consciousness and loss of postural tone. Symptoms preceding the event are important in determining etiology.**
- **Syncope often is due to a benign process but can be an indication of serious underlying disease in both the adult and pediatric patient.**
- **Often patients with syncope are found normal on EMS evaluation. In general patients experiencing syncope require cardiac monitoring and emergency department evaluation.**
- **Differential should remain wide and include:**

Cardiac arrhythmia	Neurological problem	Choking	Pulmonary embolism
Hemorrhage	Stroke	Respiratory	Hypo or Hyperglycemia
GI Hemorrhage	Seizure	Sepsis	
- **High-risk patients:**

Age ≥ 60	Syncope with exertion
History of CHF	Syncope with chest pain
Abnormal ECG	Syncope with dyspnea
- **Age specific blood pressure 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years $> 70 + (2 \times \text{age})$ mmHg and 11 years and older > 90 mmHg.**
- **Abdominal / back pain in women of childbearing age should be treated as pregnancy related until proven otherwise.**
- **The diagnosis of abdominal aneurysm should be considered with abdominal pain, with or without back and / or lower extremity pain or diminished pulses, especially in patients over 50 and / or patients with shock/ poor perfusion. Notify receiving facility early with suspected abdominal aneurysm.**
- **Consider cardiac etiology in patients > 50 , diabetics and / or women especially with upper abdominal complaints.**
- **Heart Rate: One of the first clinical signs of dehydration, almost always increased heart rate, tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.**
- **Syncope with no preceding symptoms or event may be associated with arrhythmia.**
- **Assess for signs and symptoms of trauma if associated or questionable fall with syncope.**
- **Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.**
- **These patients should be transported. Patients who experience syncope associated with headache, neck pain, chest pain, abdominal pain, back pain, dyspnea, or dyspnea on exertion need prompt medical evaluation.**
- **More than 25% of geriatric syncope is cardiac dysrhythmia based.**



Adult Airway



Protocols AR 1, 2, and 3 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.

Unable to Ventilate and Oxygenate ≥ 90% during or after one (1) or more unsuccessful intubation attempts . and/or
Anatomy inconsistent with continued attempts. and/or
Three (3) unsuccessful attempts by most experienced Paramedic/ AEMT.
Exit to **Adult Failed Airway Protocol AR 2**



Adult Airway

Always weigh the risks and benefits of endotracheal intubation in the field against transport. All prehospital endotracheal intubations are be considered high risk. If ventilation / oxygenation is adequate rapid transport may be the best option. The most important airway device and the most difficult to use correctly and effectively is the Bag Valve Mask (not the laryngoscope).

Few prehospital airway emergencies cannot be temporized or managed with proper BVM techniques.

Trauma: Utilize in-line cervical stabilization during intubation, BIAD or BVM use. During intubation or BIAD the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

Pearls

- See Pearls section of protocols AR 2 and 3.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- Intubation Attempt is passing the laryngoscope blade past the teeth or ETT inserted into the nasal passage.
- Continuous Waveform Capnography and Pulse Oximetry is required for the verification and ongoing monitoring of all patients with a BIAD or an endotracheal tube. This is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)
- Ventilatory rate should be 8-10 per minute to maintain a EtCO₂ of 35-45. Avoid hyperventilation.
- An Airway Evaluation Form is required with any intubation or surgical airway procedure.
- Anticipating the Difficult Airway and Airway Assessment
 - Difficult BVM Ventilation (MOANS): Mask seal difficulty (hair, secretions, trauma); Obese, obstruction, OB – 2nd & 3rd trimesters; Age ≥ 55 ; No teeth; Stiff lungs or neck
 - Difficult Laryngoscopy (LEON): Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patients finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patients finger's width); Obese, obstruction, OB – 2nd & 3rd trimesters; Neck mobility limited.
 - Difficulty BIAD (RODS): Restricted mouth opening; Obese, obstruction, OB – 2nd & 3rd trimesters; Distorted or disrupted airway; Stiff lungs or neck
 - Difficulty Cricothyrotomy / Surgical Airway (SMART): Surgery scars; Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor.
- Nasotracheal intubation: Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation. Contraindicated in combative, anatomical disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.
- Maintain spinal motion restriction for patients with suspected spinal injury.
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.

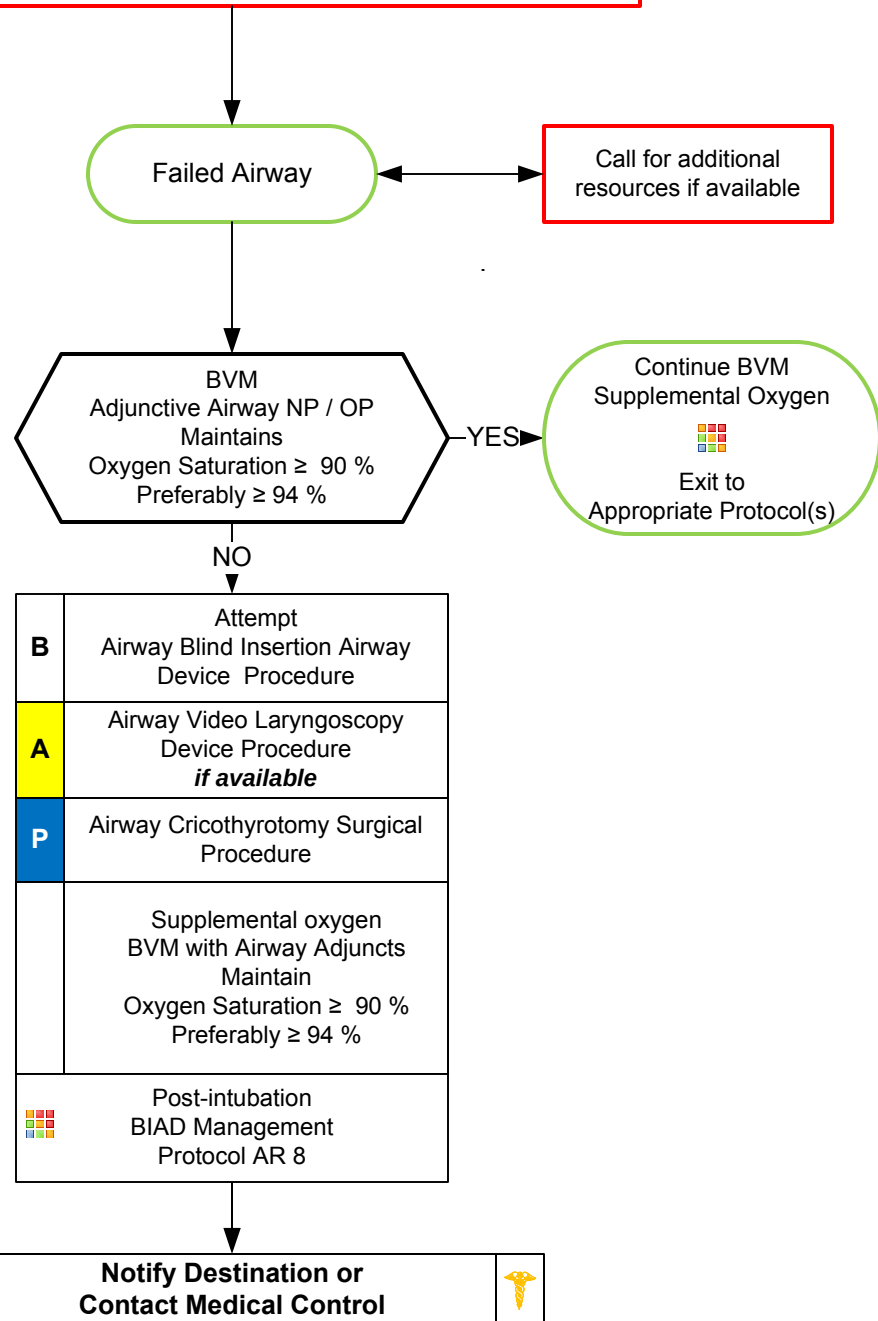


Adult, Failed Airway

Protocols AR 1, 2, and 3 should be utilized together (even if agency is not using Drug Assisted Airway as they contain useful information for airway management.

Unable to Ventilate and Oxygenate $\geq 90\%$ during or after one (1) or more unsuccessful intubation attempts.
and/or
Anatomy inconsistent with continued attempts.
and/or
Three (3) unsuccessful attempts by most experienced Paramedic/AEMT.
Each attempt should include change in approach or equipment

NO MORE THAN THREE (3) ATTEMPTS TOTAL





Adult, Failed Airway

The most important way to avoid a failed airway is to identify potential patients with expected difficult airway, difficult BVM ventilation, difficult BIAD, difficult laryngoscopy, and / or difficult cricothyrotomy

Position of patient:

In the field setting improper position of the patient and rescuer are responsible for many failed and difficult intubations. Often this is dictated by uncontrolled conditions present at the scene and we must adapt. However, many times the rescuer does not optimize patient and rescuer position. The sniffing position or the head simply extended upon the neck are probably the best positions. The goal is to align the ear canal with the suprasternal notch in a straight line.

In the obese or late pregnant patient elevating the torso by placing blankets, pillows or towels will optimize the position. This can be facilitated by raising the head of the cot.

Use of cot in optimal patient / rescuer position:

The cot can be elevated and lowered to facilitate intubation. With the patient on the cot raise until the patients nose is at the level of your umbilicus which will place you at the optimal position.

Trauma: Utilize in-line cervical stabilization during intubation, BIAD or BVM use. During intubation or BIAD the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening.

Cricothyrotomy / Surgical Airway Procedure:

Use in patients 12 years of age and greater only. Needle Cricothyrotomy is used in younger patients.

Relative contraindications include for Cricothyrotomy:

Pre-existing laryngeal or tracheal tumors, infections or abscess overlying the cricoid area.
Hematoma or anatomical landmark destruction / injury.

Pearls

- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.**
- **Continuous Waveform Capnography and Pulse Oximetry is required for the verification and ongoing monitoring of all patients with a BIAD or an endotracheal tube. This is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)**
- **An Airway Evaluation Form is required with any intubation or surgical airway procedure.**
- **Anticipating the Difficult Airway and Airway Assessment**
 - Difficult BVM Ventilation (MOANS):** Mask seal difficulty (hair, secretions, trauma); Obese, obstruction, OB – 2nd and 3rd trimesters; Age ≥ 55 ; No teeth; Stiff lungs or neck
 - Difficult Laryngoscopy (LEON):** Look externally for anatomical problems; Evaluate 3-3-2 (Mouth opening should equal 3 of patients finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patients finger's width); Obese, obstruction, OB – 2nd and 3rd trimesters; Neck mobility limited.
 - Difficulty BIAD (RODS):** Restricted mouth opening; Obese, obstruction, OB – 2nd and 3rd trimesters; Distorted or disrupted airway; Stiff lungs or neck
 - Difficulty Cricothyrotomy / Surgical Airway (SMART):** Surgery scars; Mass or hematoma, Access or anatomical problems; Radiation treatment to face, neck, or chest; Tumor.
- **If first intubation attempt fails, make an adjustment and then consider:**
 - Different laryngoscope blade / Video or other optical laryngoscopy devices
 - Gum Elastic Bougie
 - Different ETT size
 - Change head positioning
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Continuous pulse oximetry should be utilized in all patients with inadequate respiratory function.
- Continuous EtCO₂ should be applied to all patients with respiratory failure or to all patients with advanced airways.
- **Notify Medical Control AS EARLY AS POSSIBLE concerning the patient's difficult / failed airway.**
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Airway, Drug Assisted (OPTIONAL)

Indications for Drug Assisted Airway

Failure to protect the airway
and/or
Unable to oxygenate
and/or
Unable to ventilate
and/or
Impending airway compromise

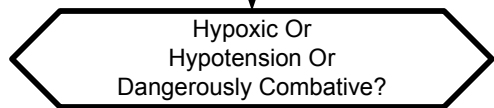
Procedure will remove
patient's protective
airway reflexes and
ability to ventilate.

You must be sure of
your ability to intubate
before beginning this
procedure.

Must have two (2)
Paramedics on scene

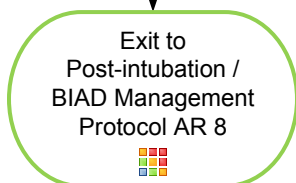
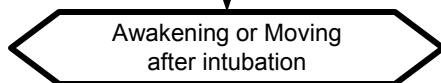
Protocols AR 1, 2, and 3
should be utilized together
(even if agency is not using
Drug Assisted Airway
Protocol) as they contain
useful information for airway
management.

	Preoxygenate 100% O2
A	IV / IO Procedure (preferably 2 sites)
P	Assemble Airway Equipment Suction equipment Alternative Airway Device



P	Etomidate 0.3 mg/kg IV / IO Or Ketamine 2 mg/kg IV / IO May repeat x 1
	Succinylcholine 1.5 mg / kg IV / IO Or Rocuronium 1 mg kg IV / IO May repeat x 1
	Intubate trachea
	Placement Verified Continuous Capnography

	Consider Restraints Physical Procedure
P	Consider Gastric Tube Insertion Procedure



	Notify Destination or Contact Medical Control	
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P	Airway Management Ketamine 2 mg/kg IV / IO
	Airway Management + Dangerously Combative Ketamine 300 – 400 mg IM Ketamine 2 mg/kg IV / IO
	Correct Hypoxia and / or Hypotension
	Adult Airway Adult Failed Airway Protocol(s) AR 1, 2 as indicated
	Hypotension / Shock Protocol AM 5 as indicated

Red Text
are the key
performance indicators
used to evaluate
protocol compliance.

An Airway Evaluation
Form must be
completed on every
patient who receives
Rapid Sequence
Intubation.



Airway, Drug Assisted (OPTIONAL)

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Pearls

- Agencies must maintain a separate Performance Improvement Program specific to Drug Assisted Airway.
- See Pearls section of protocols AR 1 and 2.
- This procedure requires at least 2 Paramedics. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.
- Patients with hypoxia and/or hypotension are at risk of cardiac arrest when a sedative and paralytic medication are administered. Hypoxia and hypotension require resuscitation and correction prior to use of these combined agents. Ketamine allows time for appropriate resuscitation to occur during airway management.
- **KETAMINE:**
 - Ketamine may be used with and without a paralytic agent in conjunction with either a OP, NP, BIAD or endotracheal tube.
 - Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated.
 - Ketamine may be used in the dangerously combative patient requiring airway management IM. IV / IO should be established as soon as possible.
 - Ketamine may NOT be used for purposes of sedation only – it must be used only during airway management procedures.
- Continuous Waveform Capnography and Pulse Oximetry is required for the verification and ongoing monitoring of all patients with a BIAD or an endotracheal tube. This is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)
- Before administering any paralytic drug, screen for contraindications with a thorough neurologic exam.
- An Airway Evaluation Form is required with any intubation or surgical airway procedure.
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
 - Different laryngoscope blade
 - Change cricoid pressure; No longer routinely recommended and may worsen your view.
 - Different ETT size
 - Align external auditory canal with sternal notch / proper positioning.
 - Change head positioning
 - Consider applying BURP maneuver (Back [posterior], Up, and to patient's Right)
- Paramedics / AEMT should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Protect the patient from self-extubation when the drugs wear off. Longer acting paralytics may be needed post-intubation.
- Drug Assisted Airway is not recommended in an urban setting (short transport) when able to maintain oxygen saturation $\geq 90\%$.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Adult COPD / Asthma Respiratory Distress

History

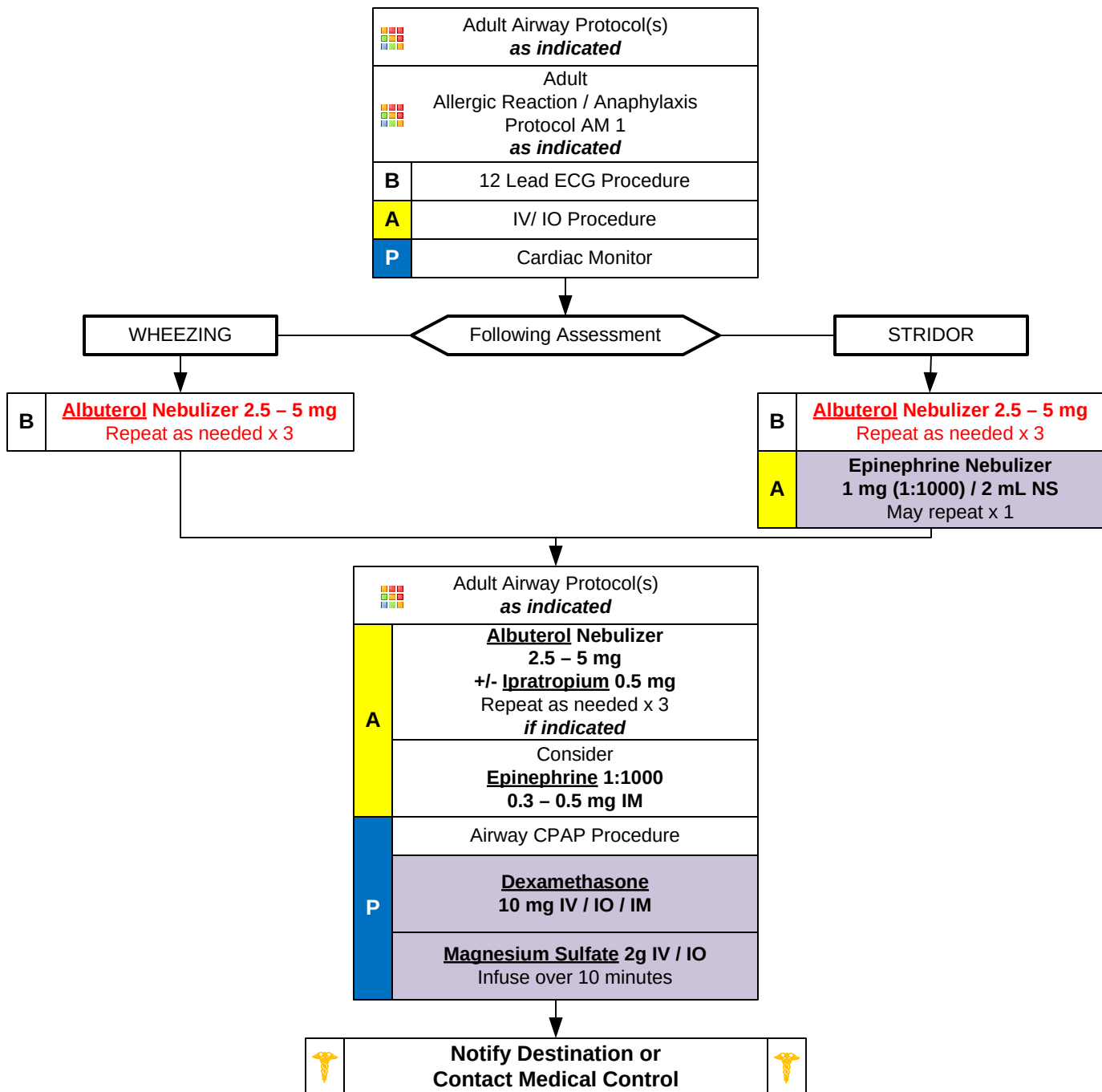
- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

Signs and Symptoms

- Shortness of breath
- Pursed lip breathing
- Decreased ability to speak
- Increased respiratory rate and effort
- Wheezing, rhonchi
- Use of accessory muscles
- Fever, cough
- Tachycardia

Differential

- Asthma
- Anaphylaxis
- Aspiration
- COPD (Emphysema, Bronchitis)
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pneumothorax
- Cardiac (MI or CHF)
- Pericardial tamponade
- Hyperventilation
- Inhaled toxin (Carbon monoxide, etc.)





Adult COPD / Asthma Respiratory Distress

**CPAP settings for COPD & Asthma should be 5 or 7.5 cmH₂O. Higher settings require an order from Medical Control

Magnesium Sulfate Infusion:

- Add 2g of Mag to 100 mL D5W or NaCl & infuse using 10 gtts set

$$\frac{100 \text{ ml} \times 10 \text{ gtts}}{10 \text{ min}} = 50 \text{ gtts / min} \quad \text{or} \quad 5 \text{ gtts / 3 sec}$$

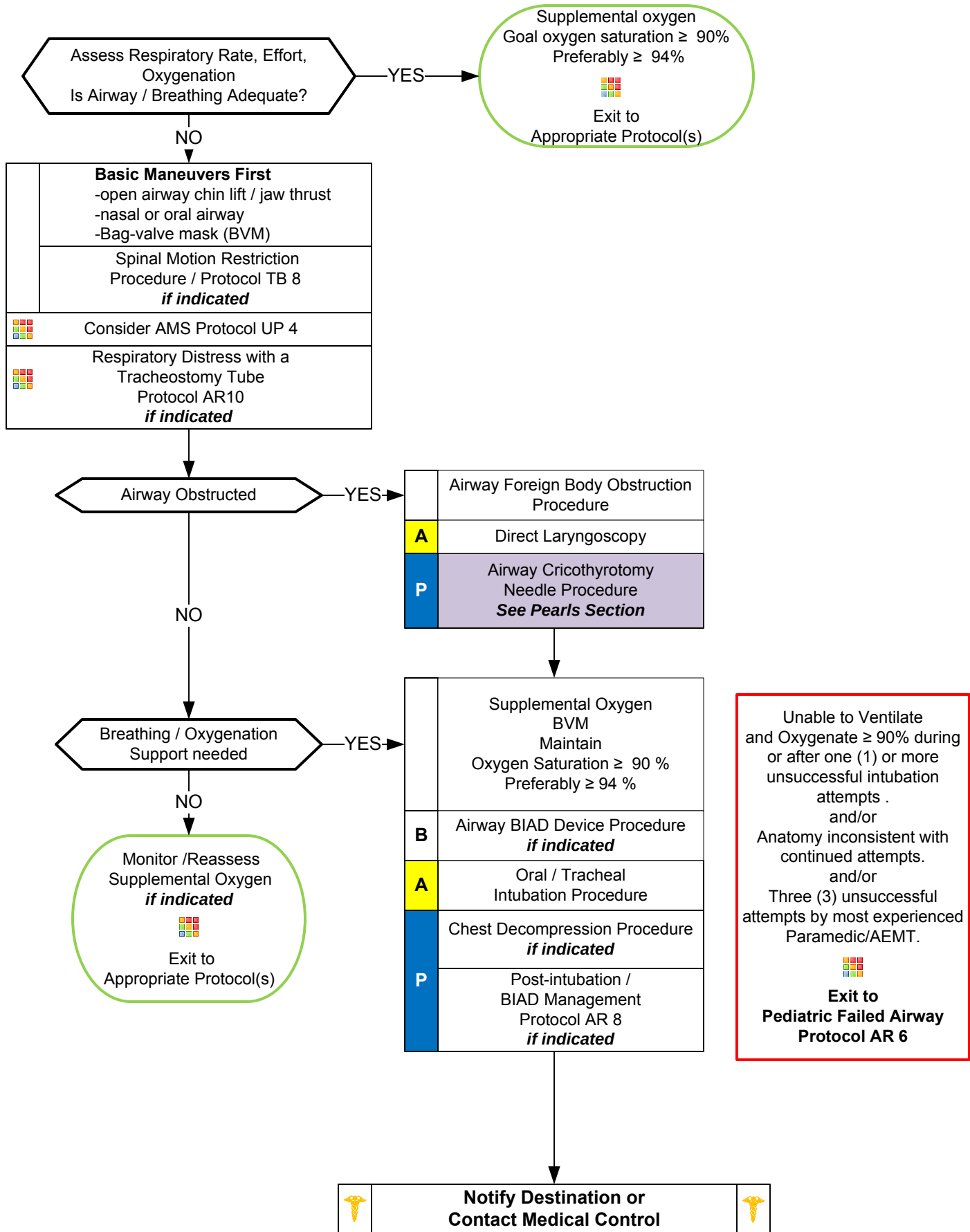
Mag is supplied: 1gm / 2 ml or 50mg / 0.1 ml

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **This protocol includes all patients with respiratory distress, COPD, Asthma, Reactive Airway Disease, or Bronchospasm. Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- **Combination nebulizers containing albuterol and ipratropium:**
 - Patients may receive more than 3 nebulizer treatments, treatments should continue until improvement.
 - Following 3 combination nebulizers, it is acceptable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
 - If allergic reaction or anaphylaxis is suspected, go to "AM 1" – Allergic Reaction / Anaphylaxis Protocol
 - If allergic reaction is not suspected, administer with impending respiratory failure and no improvement.
- **Consider Magnesium Sulfate with impending respiratory failure and no improvement.**
- **Pulse oximetry should be monitored continuously and consider End-tidal CO₂ monitoring if available.**
- **CPAP or Non-Invasive Positive Pressure Ventilation:**
 - May be used with COPD, Asthma, Allergic reactions, and CHF.
 - Consider early in treatment course.
 - Consider removal if SBP remains < 100 mmHg and not responding to other treatments.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.



Pediatric Airway





Pediatric Airway

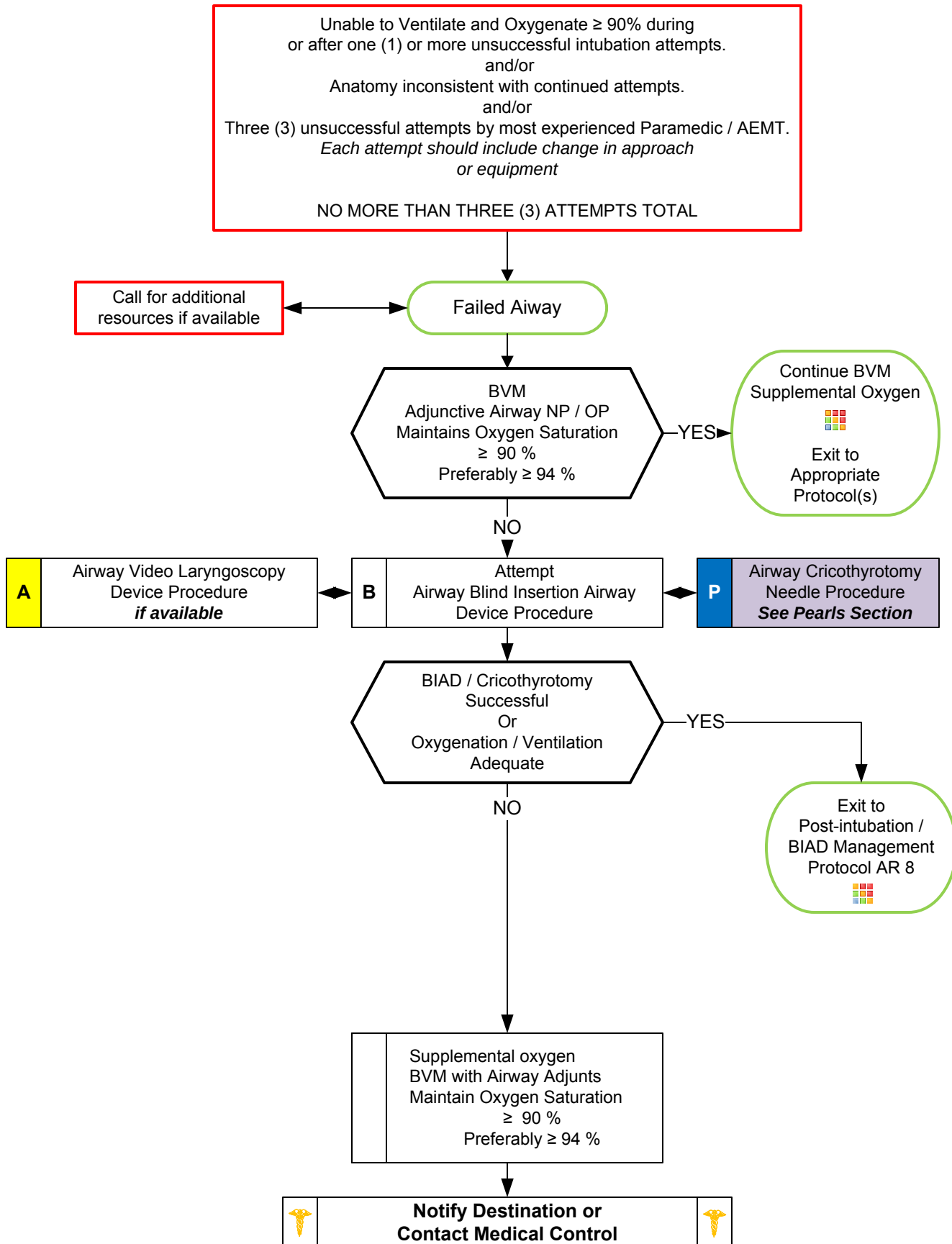
Needle Cricothyrotomy is only indicated in a *"can't intubate, can't ventilate"* setting in the pediatric patient

Pearls

- For this protocol, pediatric is defined as any patient which can be measured within the Broselow-Luten tape.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- An intubation attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.
- Continuous Waveform Capnography and Pulse Oximetry is required for the verification and ongoing monitoring of all patients with a BIAD or an endotracheal tube. This is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)
- Ventilatory rate: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 - 10 per minute. Maintain a EtCO₂ between 35 and 45 and avoid hyperventilation.
- An Airway Evaluation Form is required with any intubation or surgical airway procedure.
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Needle Procedure:**
 - Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.
 - Very little evidence to support its use and safety.
 - A variety of alternative pediatric airway devices now available make the use of this procedure rare.
 - Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director / Regional EMS Office.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Pediatric Failed Airway





Pediatric Failed Airway

Needle Cricothyrotomy is only indicated in a "can't intubate, can't ventilate" setting in the pediatric patient

Pearls

- For this protocol, pediatric is defined as any patient which can be measured within a Length-based Resuscitation Tape.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of $\geq 90\%$, it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- An intubation attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.
- Continuous Waveform Capnography and Pulse Oximetry is required for the verification and ongoing monitoring of all patients with a BIAD or an endotracheal tube. This is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)
- Ventilatory rate: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 – 10 per minute. Maintain a EtCO₂ between 35 and 45 and avoid hyperventilation.
- An Airway Evaluation Form is required with any intubation or surgical airway procedure.
- If first intubation attempt fails, make an adjustment and then try again: Different laryngoscope blade; Gum Elastic Bougie; Different ETT size; Change cricoid pressure; Apply BURP; Change head positioning
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Needle Procedure:**
 - Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.
 - Very little evidence to support it's use and safety.
 - A variety of alternative pediatric airway devices now available make the use of this procedure rare.
 - Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director / Regional EMS Office.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.



Pediatric Asthma Respiratory Distress

History

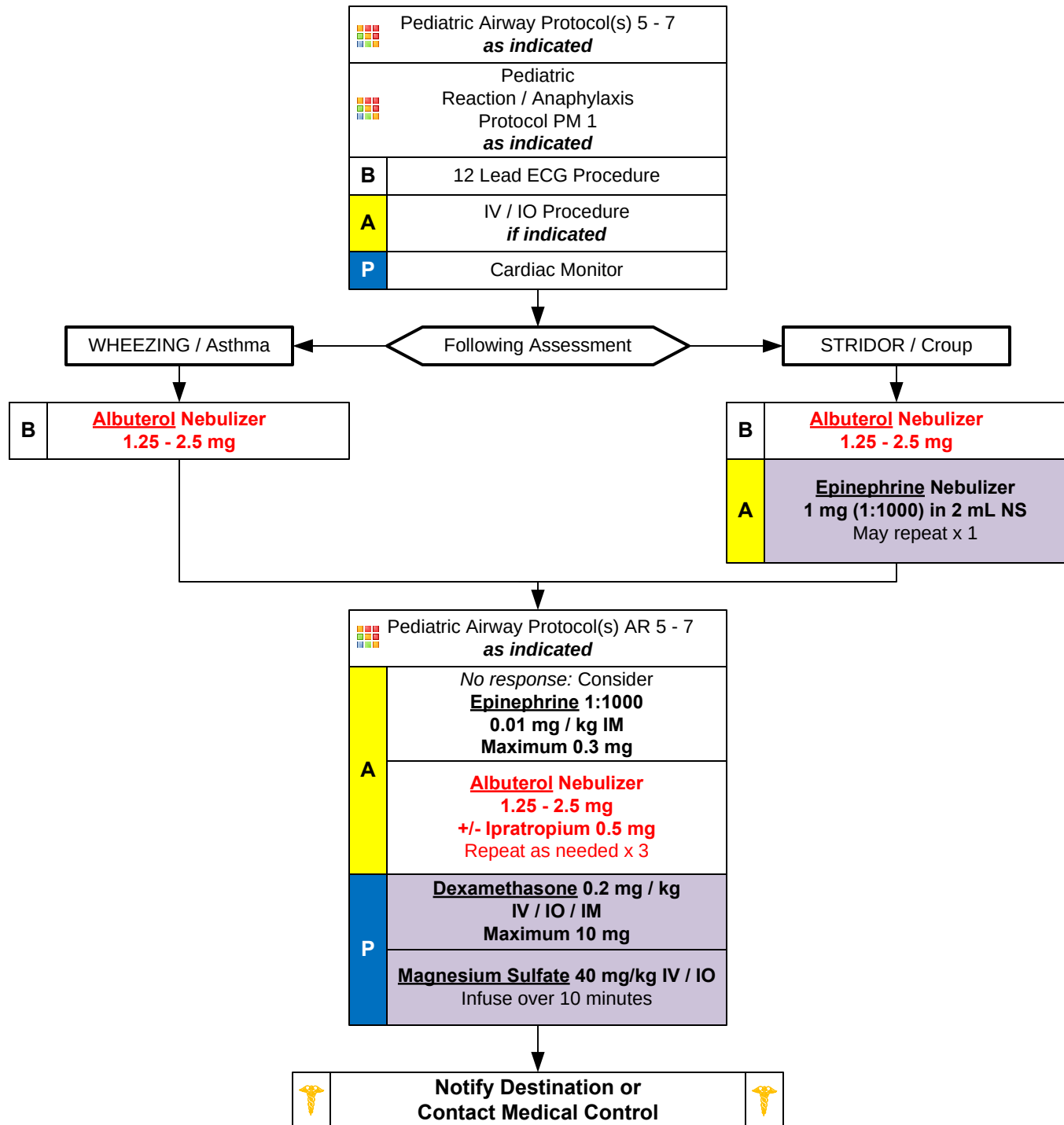
- Time of onset
- Possibility of foreign body
- Past Medical History
- Medications
- Fever / Illness
- Sick Contacts
- History of trauma
- History / possibility of choking
- Ingestion / OD
- Congenital heart disease

Signs and Symptoms

- Wheezing / Stridor / Crackles / Rales
- Nasal Flaring / Retractions / Grunting
- Increased Heart Rate
- AMS
- Anxiety
- Attentiveness / Distractability
- Cyanosis
- Poor feeding
- JVD / Frothy Sputum
- Hypotension

Differential

- Asthma / Reactive Airway Disease
- Aspiration
- Foreign body
- Upper or lower airway infection
- Congenital heart disease
- OD / Toxic ingestion / CHF
- Anaphylaxis
- Trauma





Pediatric Asthma Respiratory Distress

Magnesium Sulfate Infusion:

- Add 40 mg/kg of Mag to 100 mL D5W or NaCl & infuse using 10 gtts set

$$\frac{100 \text{ ml} \times 10 \text{ gtts}}{10 \text{ min}} = 50 \text{ gtts / min} \quad \text{or} \quad 5 \text{ gtts / 3 sec}$$

Mag is supplied: 1gm / 2 ml or 50mg / 0.1 ml

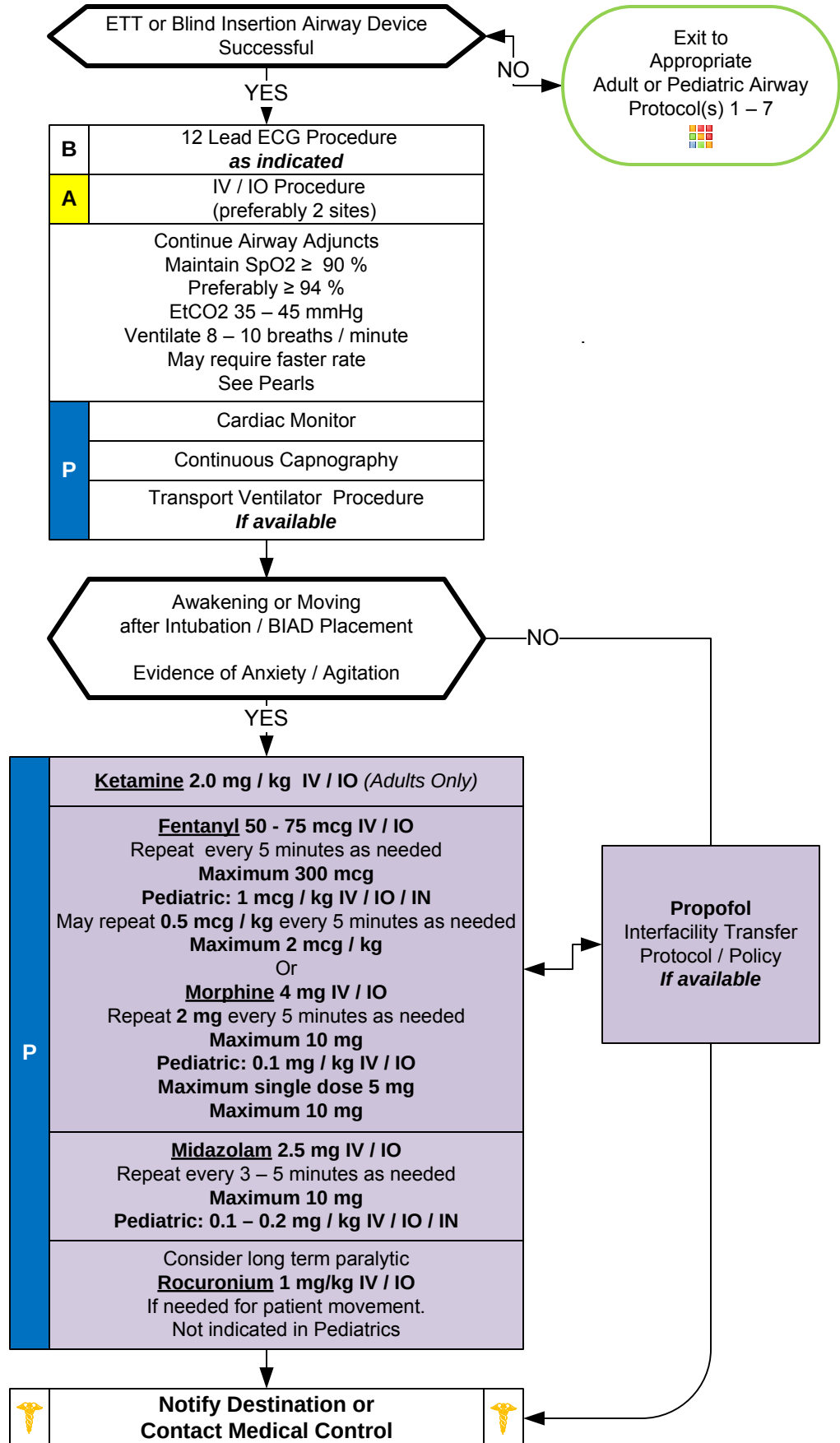
Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **Pulse oximetry should be monitored continuously in the patient with respiratory distress.**
- **This protocol includes all patients with respiratory distress, Asthma, Reactive Airway Disease, croup, or Bronchospasm. Patients may also have wheezing and respiratory distress with viral upper respiratory tract infections and pneumonia.**
- **Combination nebulizers containing albuterol and ipratropium:**
Patients may receive more than 3 nebulizer treatments, treatments should continue until improvement. Following 3 combination nebulizers, it is acceptable to continue albuterol solely with subsequent treatments as there is no proven benefit to continual use of ipratropium.
- **Epinephrine:**
- If allergic reaction or anaphylaxis is suspected, go to “PM 1” – Pediatric Allergic Reaction
- If allergic reaction is not suspected, administer with impending respiratory failure and no improvement.
- Consider Magnesium Sulfate with impending respiratory failure and no improvement.
- Albuterol dosing: ≤ 1 year of age 1.25 mg; 1 – 6 years 1.25 – 2.5 mg; 6 – 14 years 2.5 mg; ≥ 15 years 2.5 – 5 mg.
- Consider IV access when Pulse oximetry remains ≤ 92 % after first beta agonist treatment.
- Do not force a child into a position, allow them to assume position of comfort. They will protect their airway by their body position.
- Bronchiolitis is a viral infection typically affecting infants which results in wheezing which may not respond to beta-agonists. Consider Epinephrine nebulizer if patient < 18 months and not responding to initial beta-agonist treatment.
- Croup typically affects children < 2 years of age. It is viral, possible fever, gradual onset, no drooling is noted.
- Epiglottitis typically affects children > 2 years of age. It is bacterial, with fever, rapid onset, possible stridor, patient wants to sit up to keep airway open, drooling is common. Airway manipulation may worsen the condition.
- In patients using levalbuterol (Xopenex) you may use Albuterol for the first treatment then use the patient's supply for repeat nebulizers or agency's supply.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency medical director may require Contact of Medical Control prior to administration.



Post-intubation / BIAD Management

Protocols AR 1, 2, 3, 5, and 6 should be utilized together (even if agency is not using Drug Assisted Airway Protocol) as they contain useful information for airway management.





Post-intubation / BIAD Management

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Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
- **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
- **Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.**
- **Vital signs such as tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.**
- **Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.**
- **Ventilator / Ventilation strategies will need to be tailored to individual patient presentations. Medical director can indicate different strategies above.**
- In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH2O.
- Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
- Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- With abrupt clinical deterioration, if mechanically ventilated, disconnect from ventilator to assess lung compliance. Search for dislodged ETT or BIAD, obstruction in tubing or airway, pneumothorax, or ETT balloon leak.
- **DOPE: Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.**



Ventilator Emergencies

History

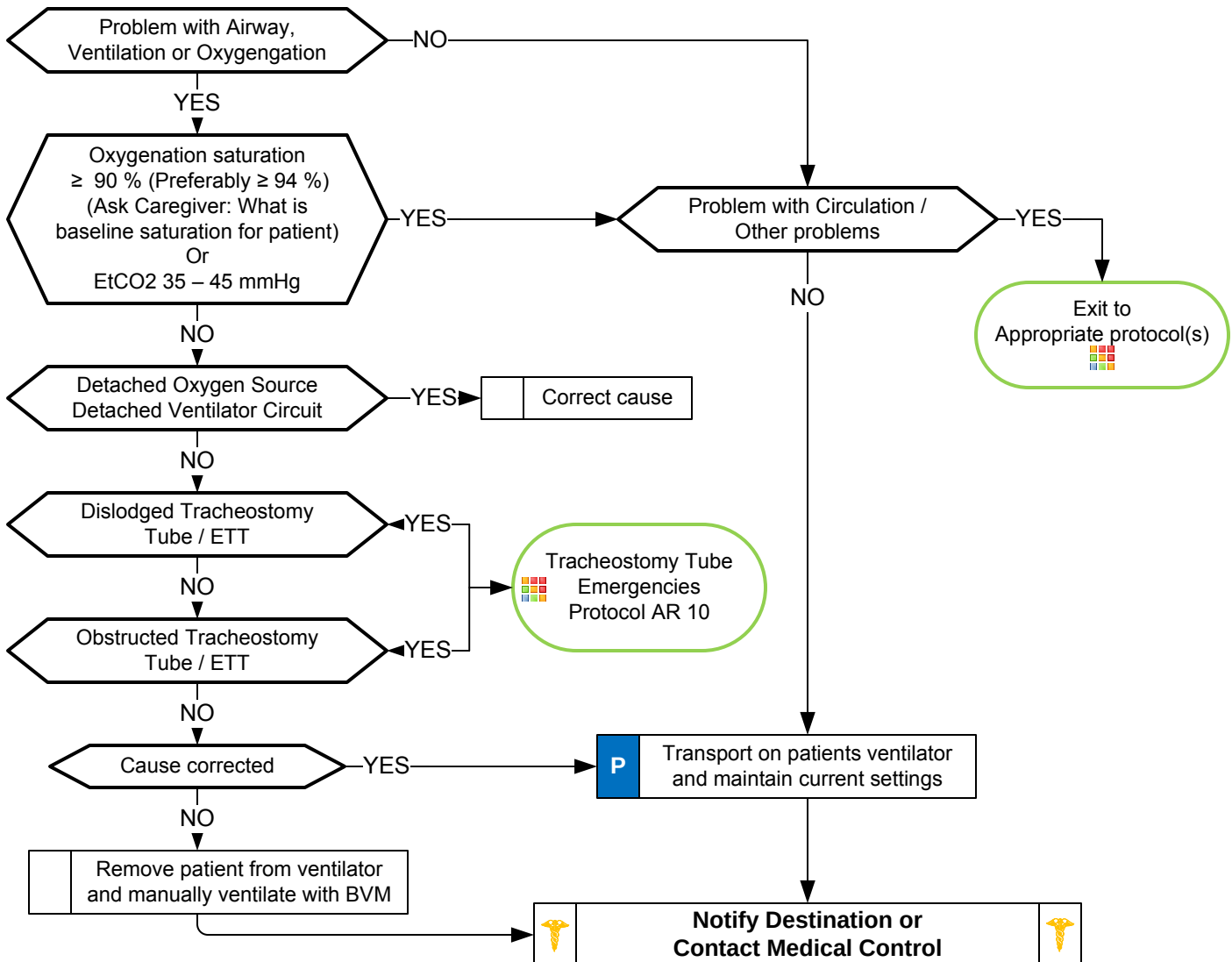
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchopulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Transport requiring maintenance of a mechanical ventilator
- Power or equipment failure at residence

Differential

- Disruption of oxygen source
- Dislodged or obstructed tracheostomy tube
- Detached or disrupted ventilator circuit
- Cardiac arrest
- Increased oxygen requirement / demand
- Ventilator failure



Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **If using the patient's ventilator bring caregiver knowledgeable in ventilator operation during transport.**
- Always use patient's equipment if available and functioning properly.
- Continuous pulse oximetry and end tidal CO2 monitoring must be utilized during assessment and transport.
- Unable to correct ventilator problem: Remove patient from ventilator and manually ventilate using BVM. Take patient's ventilator to hospital even if not functioning properly.
- Typical alarms:
 - Low Pressure / Apnea: Loose or disconnected circuit, leak in circuit or around tracheostomy site.
 - Low Power: Internal battery depleted.
 - High Pressure: Plugged / obstructed airway or circuit.
- **DOPE: Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.**



Tracheostomy Tube Emergencies

History

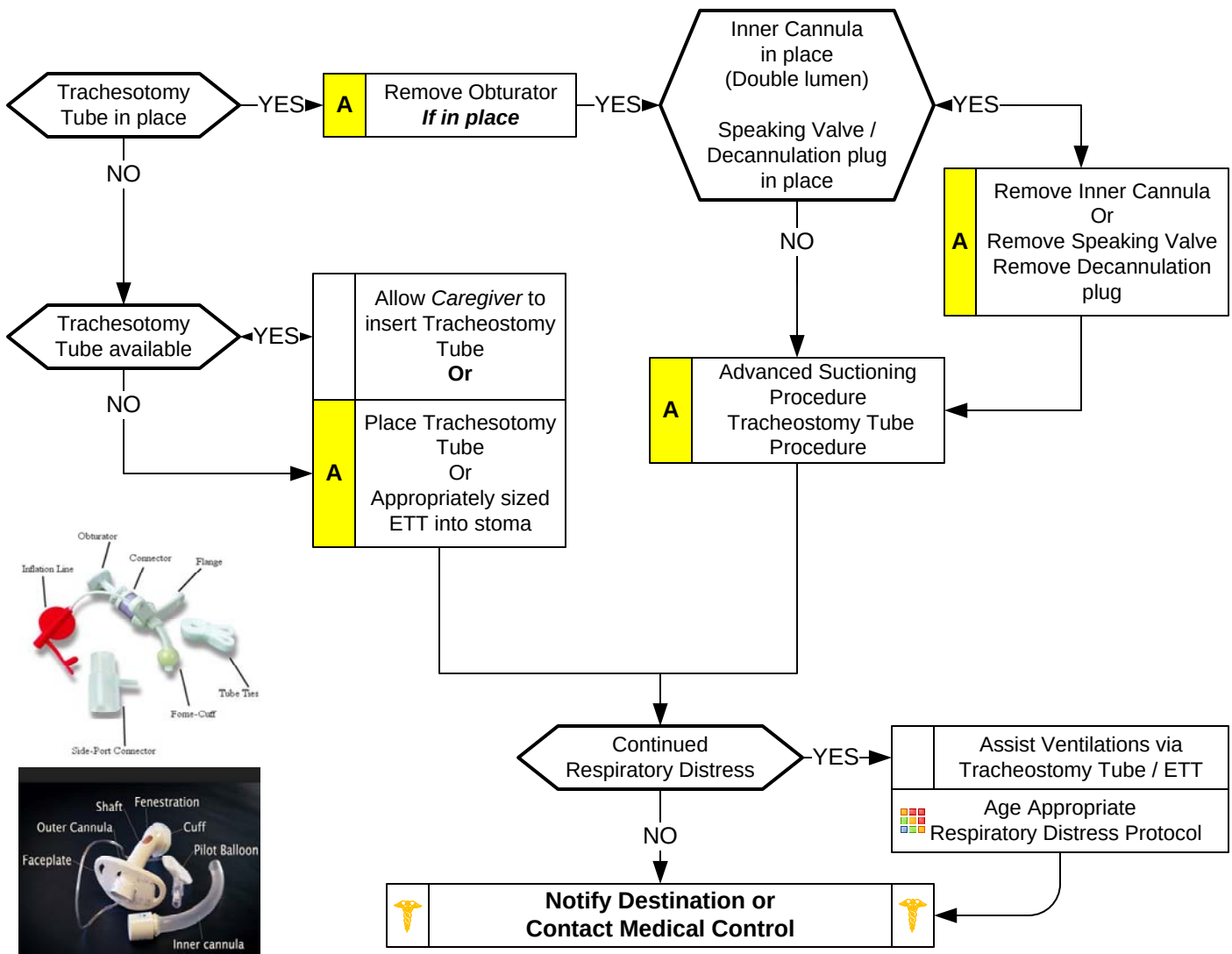
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (accidental damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

- Nasal flaring
- Chest wall retractions (with or without abnormal breath sounds)
- Attempts to cough
- Copious secretions noted coming out of the tube
- Faint breath sounds on both sides of chest despite significant respiratory effort
- AMS
- Cyanosis

Differential

- Allergic reaction
- Asthma
- Aspiration
- Septicemia
- Foreign body
- Infection
- Congenital heart disease
- Medication or toxin
- Trauma



Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **Important to ask if patient has undergone laryngectomy. This does not allow mouth/nasal ventilation by covering stoma.**
- Use patients equipment if available and functioning properly.
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down.
- Suction depth: Ask family / caregiver. No more than 3 to 6 cm typically. Instill 2 – 3 mL of NS before suctioning.
- Do not suction more than 10 seconds each attempt and pre-oxygenate before and between attempts.
- **DO NOT** force suction catheter. If unable to pass, then tracheostomy tube should be changed.
- Always deflate tracheal tube cuff before removal. Continual pulse oximetry and EtCO2 monitoring if available.
- **DOPE:** Displaced tracheostomy tube / ETT, **O**bststructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.



Adult Asystole / Pulseless Electrical Activity

History

- SAMPLE
- Estimated downtime
- See Reversible Causes below
- DNR, MOST, or Living Will

Signs and Symptoms

- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- See Reversible Causes below



Cardiac Arrest Protocol AC 3

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES

Decomposition
Rigor mortis
Dependent lividity
Blunt force trauma
Injury incompatible with life
Extended downtime with asystole

Do not begin resuscitation

Follow
Deceased Subjects
Policy

NO

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol AC 9

Begin Continuous CPR Compressions
Push Hard (≥ 2 inches)
Push Fast (100 - 120 / min)
Change Compressors every 2 minutes
(sooner if fatigued)
(Limit changes / pulse checks ≤ 10 seconds)

Ventilate 1 breath every 6 seconds
30:2 Compression:Ventilation if no Advanced Airway
Monitor EtCO₂
if available

AED Procedure
if available

Search for Reversible Causes

P

Consider Chest Decompression Procedure

Cardiac Monitor

IV / IO Procedure

A

Epinephrine (1:10,000) 1 mg IV / IO
Repeat every 3 to 5 minutes

Normal Saline Bolus 500 mL IV / IO
May repeat as needed
Maximum 2 L



Adult Rhythm Appropriate Protocol(s)
as indicated



On Scene Resuscitation / Termination of Resuscitation
Protocol(s) AC 12
as indicated

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Dialysis / Renal Patient

P

Calcium Gluconate
2 gm IV / IO
(Or **Calcium Chloride**
1 gm IV / IO)

Sodium Bicarbonate
50 mEq IV / IO

Adult Cardiac Protocol Section



Notify Destination or
Contact Medical Control





Adult Asystole / Pulseless Electrical Activity

The use of sodium bicarbonate is an adjunct therapy for hyperkalemia. It is not to be used first and/or as the only treatment for hyperkalemia. Calcium Gluconate or Calcium Chloride should be used primarily.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT), compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- **IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.**
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 - Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - Opioid Overdose** - Naloxone 2 mg IM / IV / IO / IN. EMT may administer Naloxone via IN route only. May give from EMS supply.
 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.



Bradycardia; Pulse Present

History

- Past medical history
- Medications
 - Beta-Blockers
 - Calcium channel blockers
 - Clonidine
 - Digoxin
- Pacemaker

Signs and Symptoms

- HR < 60/min with hypotension, acute altered mental status, chest pain, acute CHF, seizures, syncope, or shock secondary to bradycardia
- Chest pain
- Respiratory distress
- Hypotension or Shock
- Altered mental status
- Syncope

Differential

- 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

Exit to
Appropriate
Protocol(s)



NO

Heart Rate < 60 / min and Symptomatic:
Hypotension, Acute AMS, Ischemic Chest Pain,
Acute CHF, Seizures, Syncope, or Shock
secondary to bradycardia
Typically HR < 50 / min

YES

Airway Protocol(s) AR 1, 2, 3 <i>if indicated</i>	
Respiratory Distress Protocol AR 4 <i>if indicated</i>	
Chest Pain: Cardiac and STEMI Protocol AC 4 <i>if indicated</i>	
B	Search for Reversible Causes
	12 Lead ECG Procedure
A	IV / IO Procedure
P	Cardiac Monitor
A	Normal Saline Fluid Bolus 500 mL – 2 L NS IV / IO (Unless Acute CHF) Maximum 2 L
	Atropine 0.5 mg IV / IO May repeat every 3 – 5 minutes Maximum 3 mg
	Epinephrine Push Dose – 5 – 20 mcg q 5 min Or Infusion 1 - 10 mcg/min IV / IO Or Dopamine 2 – 20 mcg/kg/min IV / IO Or Norepinephrine 1mcg/kg/min Maximum 3 mcg/kg/min Titrate to SBP ≥ 90 mmHg with all meds
	If No Improvement Transcutaneous Pacing Procedure (<i>Consider earlier in 2nd or 3rd AVB</i>)
Notify Destination or Contact Medical Control	

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary
(PE)
Thrombosis; coronary (MI)

Consider Sedation

Midazolam 2.5 mg
IV / IO / IM / IN
Maximum 10 mg

Adult Cardiac Protocol Section



Bradycardia; Pulse Present

Dopamine Infusion: Dose 2-20 mcg / kg/ min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

50 kg and greater

Pt weight (Kg) x Dose x 0.25 = ____ gtts / min (using **10 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 0.25 = **20 gtts / min** or **1 gtt / 3 sec**

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using **60 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

Epinephrine – Push Dose

Mix 9 ml of normal saline with 1 ml of 1:10,000 of Epinephrine

This gives you 100mcg/ 10 ml or 10 mcg/ml

Administer 5-20mcg (0.5-2ml) q 5 min

Epinephrine Infusion: Dose 1-10 mcg / min

Add 1mg epinephrine 1:1,000 to 100 ml D5W or NS = 1000 mcg in 100 mL or 10 mcg/ml

1 mcg/min = 6 gtts/min

2 mcg/min = 12 gtts/min

3 mcg/min = 18 gtts/min

4 mcg/min = 24 gtts/min

5 mcg/min = 30 gtts/min

6 mcg/min = 36 gtts/min

7 mcg/min = 42 gtts/min

8 mcg/min = 48 gtts/min

9 mcg/min = 54 gtts/min

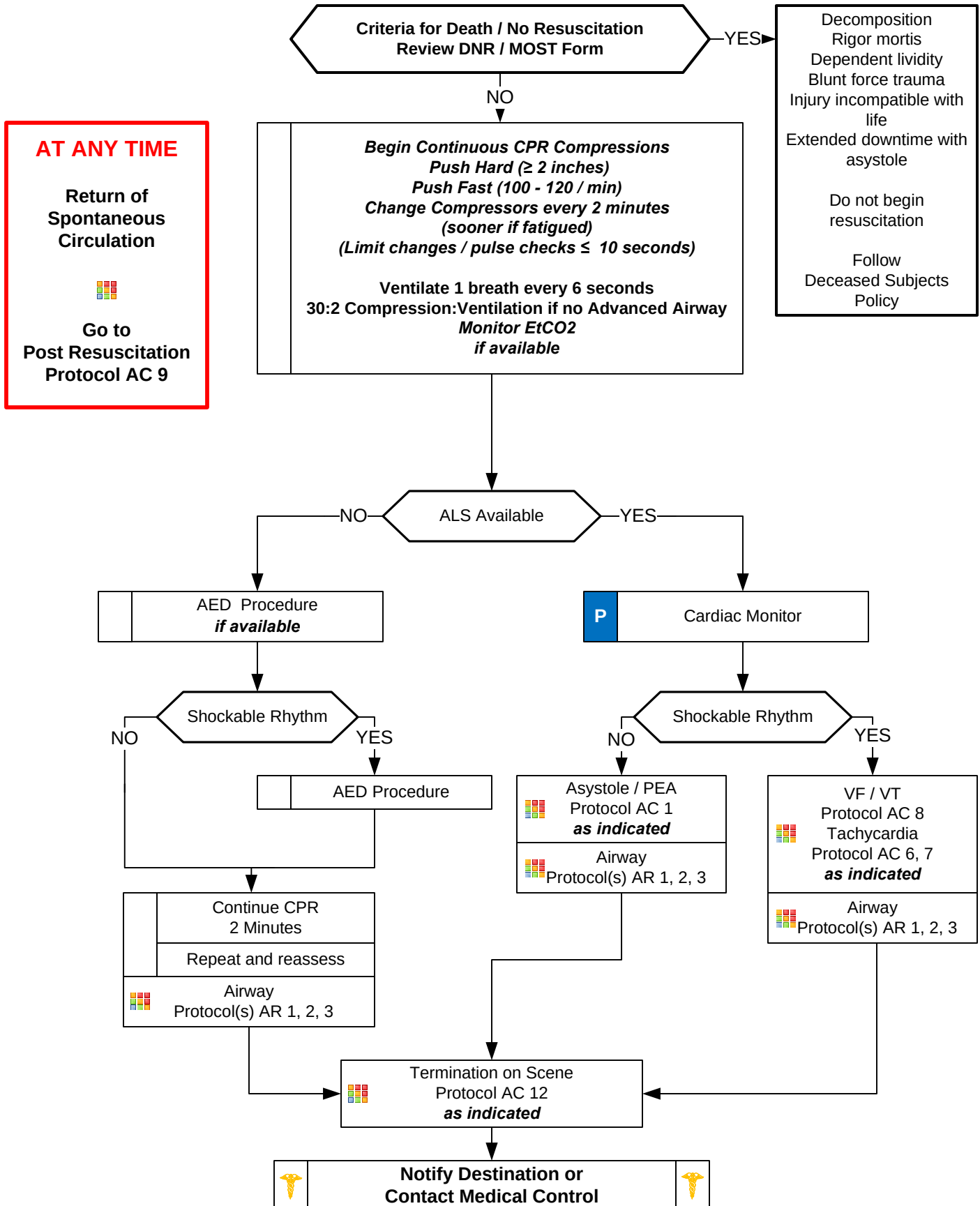
10 mcg/min = 60 gtts/min

Pearls

- **Recommended Exam: Mental Status, Neck, Heart, Lungs, Neuro**
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia.**
- Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.
- **Atropine**
 - Do NOT delay Transcutaneous Pacing to administer Atropine in bradycardia with poor perfusion. Caution in setting of acute MI. Elevated heart rate can worsen ischemia.
 - Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.
- **Transcutaneous Pacing Procedure (TCP)**
 - Utilize TCP early if no response to atropine. If time allows transport to specialty center because transcutaneous pacing is a temporizing measure. Transvenous / permanent pacemaker will probably be needed.
 - Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)



Cardiac Arrest; Adult





Cardiac Arrest; Adult

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Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- **IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.**
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 - Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - Opioid Overdose** - Naloxone cannot be recommended in opioid-associated cardiac arrest. If suspected, attention to airway, oxygenation, and ventilation increase in importance. Naloxone is not associated with improved outcomes in cardiac arrest.
 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.



Chest Pain: Cardiac and STEMI

History

- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies
- Recent physical exertion
- Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (onset / duration / repetition)

Signs and Symptoms

- 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**
- Women:
 - More likely to have dyspnea, N/V, weakness, back or jaw pain

Differential

- Trauma vs. Medical
- Angina vs. Myocardial infarction
- Pericarditis
- Pulmonary embolism
- Asthma / COPD
- Pneumothorax
- Aortic dissection or aneurysm
- GE reflux or Hiatal hernia
- Esophageal spasm
- Chest wall injury or pain
- Pleural pain
- Overdose: Cocaine or Methamphetamine

	12 Lead ECG Procedure
B	Aspirin 81 mg x 4 PO (chewed) Or 325 mg PO
	Nitroglycerin 0.3 / 0.4 mg Sublingual Repeat every 5 minutes x 3 <i>if prescribed to patient and (BP ≥ 100)</i>
P	Cardiac Monitor

Acute MI / STEMI
(STEMI = 1 mm ST Segment
Elevation ≥ 2 Contiguous Leads)

NO

A	IV / IO Procedure
A	Nitroglycerin 0.3 / 0.4 mg SL Repeat every 5 minutes as needed
P	Morphine 2 – 4 mg IV / IO Repeat every 5 minutes as needed Maximum 10 mg Or Fentanyl 50 – 75 mcg IV / IO Repeat 25 mcg every 20 minutes as needed Maximum 200 mcg
	Hypotension / Shock Protocol AM 5 <i>if indicated</i>
	CHF / Pulmonary Edema Protocol AC 5 <i>if indicated</i>

Transport based on:

STEMI

EMS Triage and Destination Plan
Immediate Notification of Facility
Immediate Transmission of ECG
if capable
Keep Scene Time to ≤ 10 Minutes

B

If transporting to Non PCI Center
Reperfusion Checklist



**Notify Destination or
Contact Medical Control**





Chest Pain: Cardiac and STEMI

A new onset of RBBB may be more specific for an MI and place more myocardial tissue at risk than in a new onset LBBB

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are the key performance indicators for the EMS Acute Cardiac (STEMI) Care Toolkit**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
- **STEMI (ST-Elevation Myocardial Infarction)**
 - **Positive Reperfusion Checklist should be transported to the appropriate facility based on STEMI EMS Triage and Destination Plan.**
 - **Consider placing 2 IV sites in the left arm: Many PTCI centers use the right radial vein for intervention.**
 - **Consider placing defibrillator pads on patient as a precaution.**
 - **Consider Normal Saline or Lactated Ringers bolus of 250 – 500 mL as pre-cath hydration.**
- **If CHF / Cardiogenic shock resulting from inferior MI (II, III, aVF), consider Right Sided ECG (V3 or V4). If ST elevation noted Nitroglycerin and / or opioids may cause hypotension requiring normal saline boluses.**
- **If patient has taken nitroglycerin without relief, consider potency of the medication.**
- **Monitor for hypotension after administration of nitroglycerin and narcotics (Morphine, Fentanyl, or Dilaudid).**
- **Diabetic, geriatric and female patients often have atypical pain, or only generalized complaints.**
- **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **EMT may administer Nitroglycerin to patients already prescribed medication. May give from EMS supply.**
- **Agency medical director may require Contact of Medical Control prior to administration.**



CHF / Pulmonary Edema

History

- Congestive heart failure
- Past medical history
- Medications (digoxin, Lasix, Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Cardiac history --past myocardial infarction

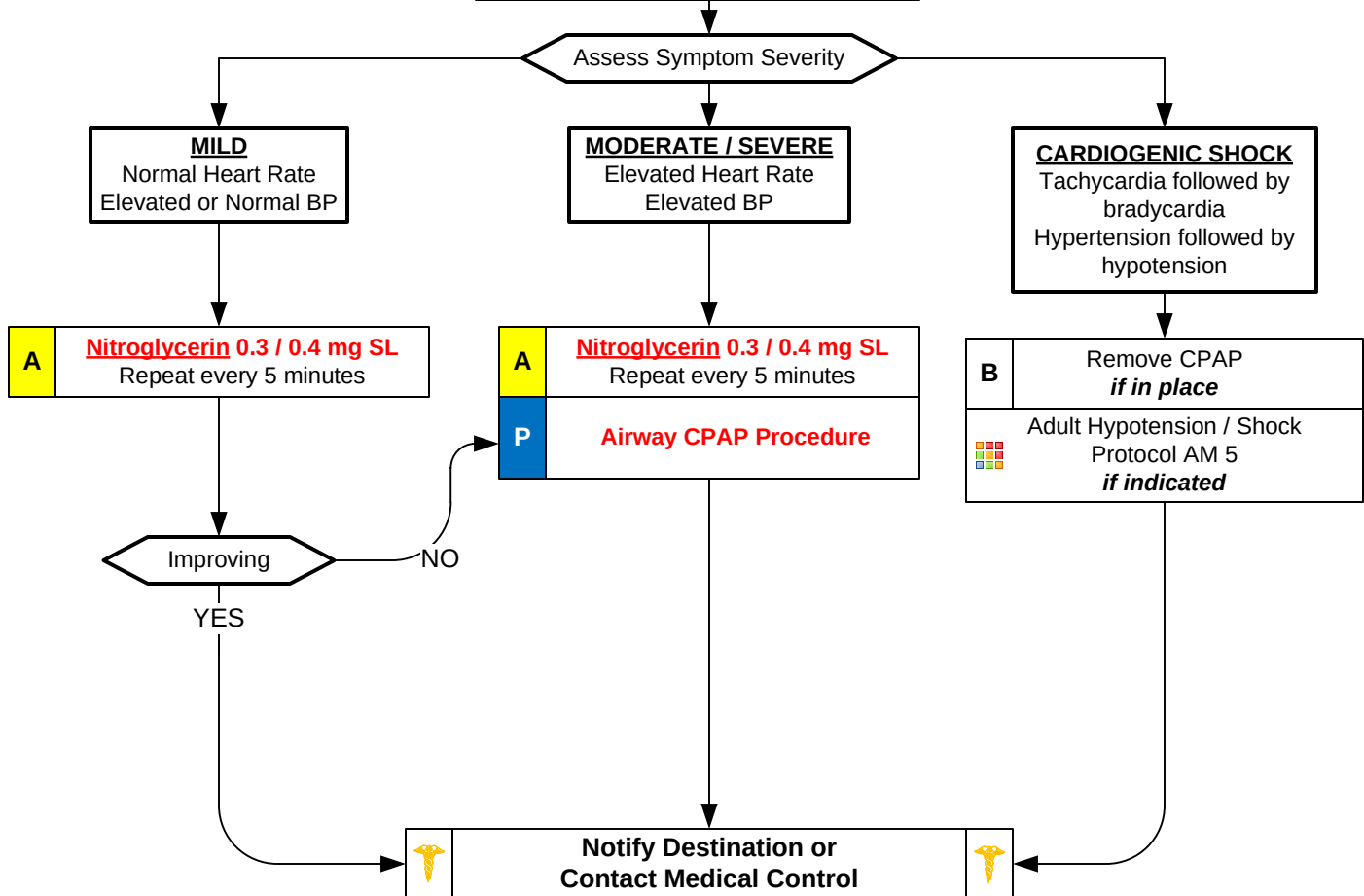
Signs and Symptoms

- Respiratory distress, bilateral rales
- Apprehension, orthopnea
- Jugular vein distention
- Pink, frothy sputum
- Peripheral edema, diaphoresis
- Hypotension, shock
- Chest pain

Differential

- Myocardial infarction
- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- COPD
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure

Airway Protocol(s) AR 1, 2, 3 <i>as indicated</i>	
Chest Pain and STEMI Protocol AC 4 <i>if indicated</i>	
B	12 Lead ECG Procedure
	Nitroglycerin 0.3 / 0.4 mg Sublingual Repeat every 5 minutes x 3 <i>if prescribed to patient and (BP >100)</i>
P	Cardiac Monitor
A	IV / IO Procedure





CHF / Pulmonary Edema

A cardiac exams includes not only the lungs and heart, but the neck (inspect for JVD) and the lower legs as well.

Distended neck veins and pitting edema in the legs add to the suspicion of pulmonary edema. Also, if one calf is larger than the other and is tender to palpation, it could indicate a deep vein thrombosis (DVT) and a possible pulmonary embolus (PE).

In an Inferior MI, the right ventricle may be flaccid and not pump well. Think of it as a water hose that is not filled. You may need to give a fluid bolus to fill the right ventricle or push fluid so it gets to the left ventricle.

CPAP Setting in CHF / Pulmonary Edema is 7.5 cmH₂O. Higher settings require an order from Medical Control

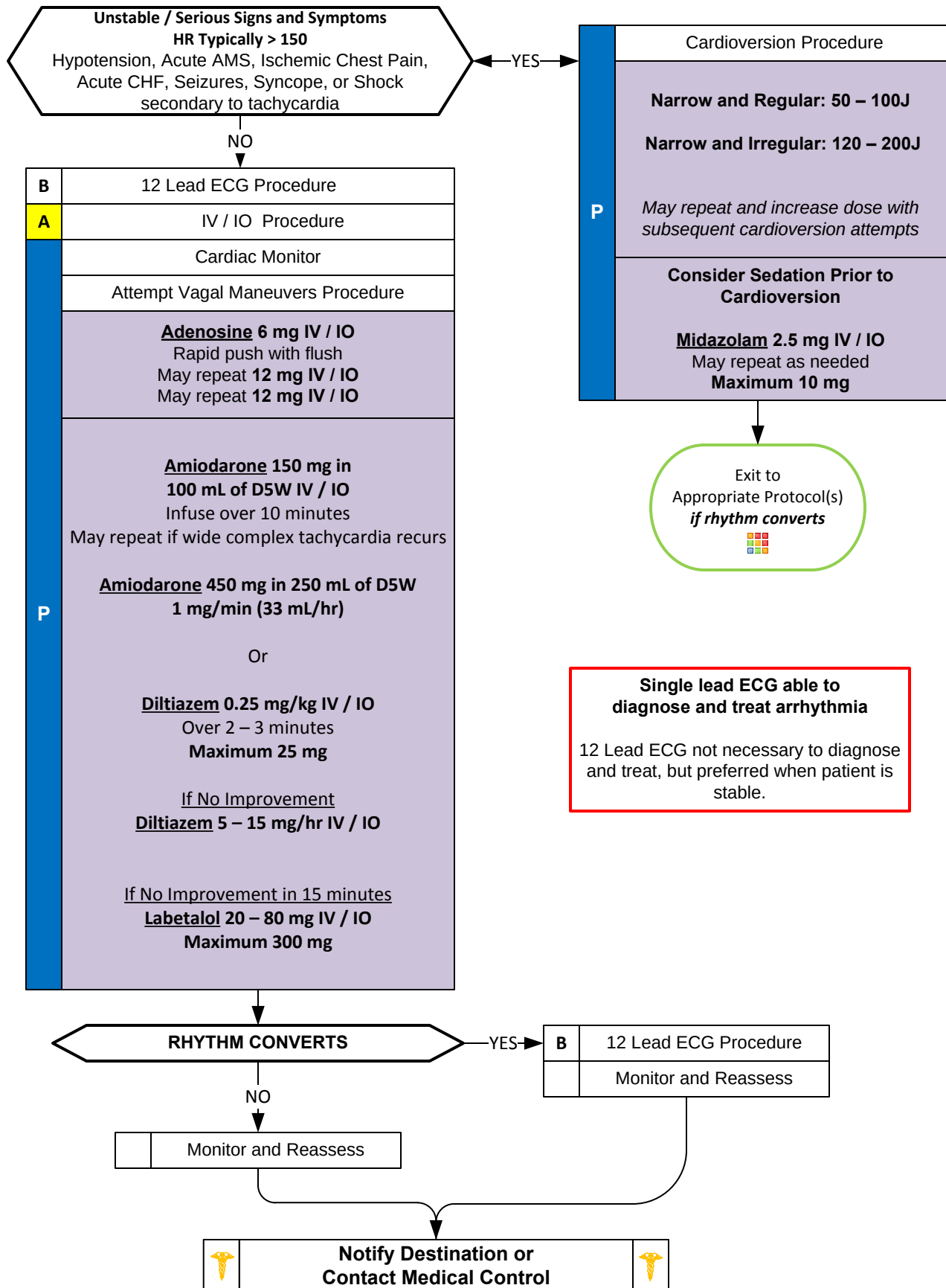
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Furosemide and Opioids have NOT been shown to improve the outcomes of EMS patients with pulmonary edema. Even though this historically has been a mainstay of EMS treatment, it is no longer routinely recommended.**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
- **Carefully monitor the level of consciousness, BP, and respiratory status with the above interventions.**
- **If CHF / Cardiogenic shock resulting from inferior MI (II, III, aVF), consider Right Sided ECG (V3 or V4). If ST elevation noted Nitroglycerin and / or opioids may cause hypotension requiring normal saline boluses.**
- If patient has taken nitroglycerin without relief, consider potency of the medication.
- Contraindications to opioids include severe COPD and respiratory distress. Monitor the patient closely.
- Consider myocardial infarction in all these patients. Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints.
- Allow the patient to be in their position of comfort to maximize their breathing effort.
- Document CPAP application using the CPAP procedure in the PCR. Document 12 Lead ECG using the 12 Lead ECG procedure.
- **EMT may administer Nitroglycerin to patients already prescribed medication. May give from EMS supply.**
- Agency medical director may require Contact of Medical Control.



Adult Tachycardia

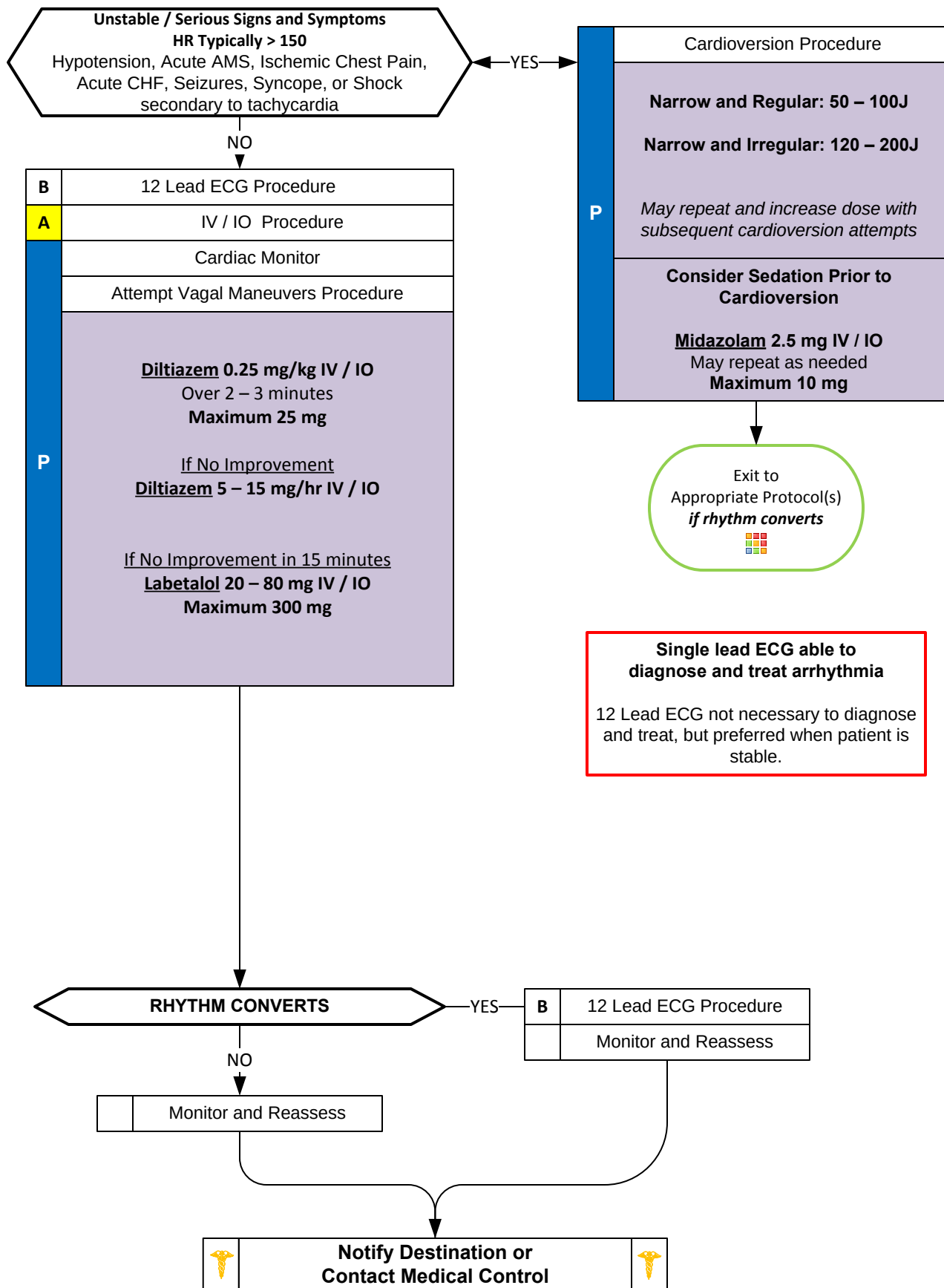
Narrow Complex (≤ 0.11 sec) REGULAR RHYTHM





Adult Tachycardia

Narrow Complex (≤ 0.11 sec) IRREGULAR RHYTHM





Adult Tachycardia Narrow Complex (≤ 0.11 sec)

Consider Atrial Flutter if ventricular rate is around 150 bpm. Atrial Flutter waves are usually around 300 bpm (range is 240-340 bpm) with the ventricular rate at about 1/2 the atrial rate (150 bpm)

Amiodarone Infusion

1st Dose: 150 mg in 100 mL D5W

$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{10 \text{ min}} = 100 \text{ mL} / \text{min}$ or 5 gtts / 3 sec

2nd Dose: 450 mg / 250 mL D5W

$\frac{250 \text{ mL} \times 60 \text{ gtts set}}{7.5 \text{ hr (450 min)}} = 33 \text{ mL} / \text{min}$ or 1 gtt / 2 sec

Diltiazem Infusion

Add 25 mg to 250 mL NaCl = 5 mg / 50 mL

5mg / hr

$\frac{50 \text{ mL} \times 60 \text{ gtts set}}{60 \text{ min}} = 50 \text{ gtts} / \text{min}$ or 5 gtts / 6 sec

10 mg / hr Increase infusion to 100 gtts / min or 5 gtts / 3 sec

$\frac{100 \text{ mL} \times 60 \text{ gtts set}}{60 \text{ min}} = 100 \text{ gtts} / \text{min}$

15 mg / hr Increase infusion to 150 gtts / min or 5 gtts / 2 sec

$\frac{150 \text{ mL} \times 60 \text{ gtts set}}{60 \text{ min}} = 150 \text{ gtts} / \text{min}$

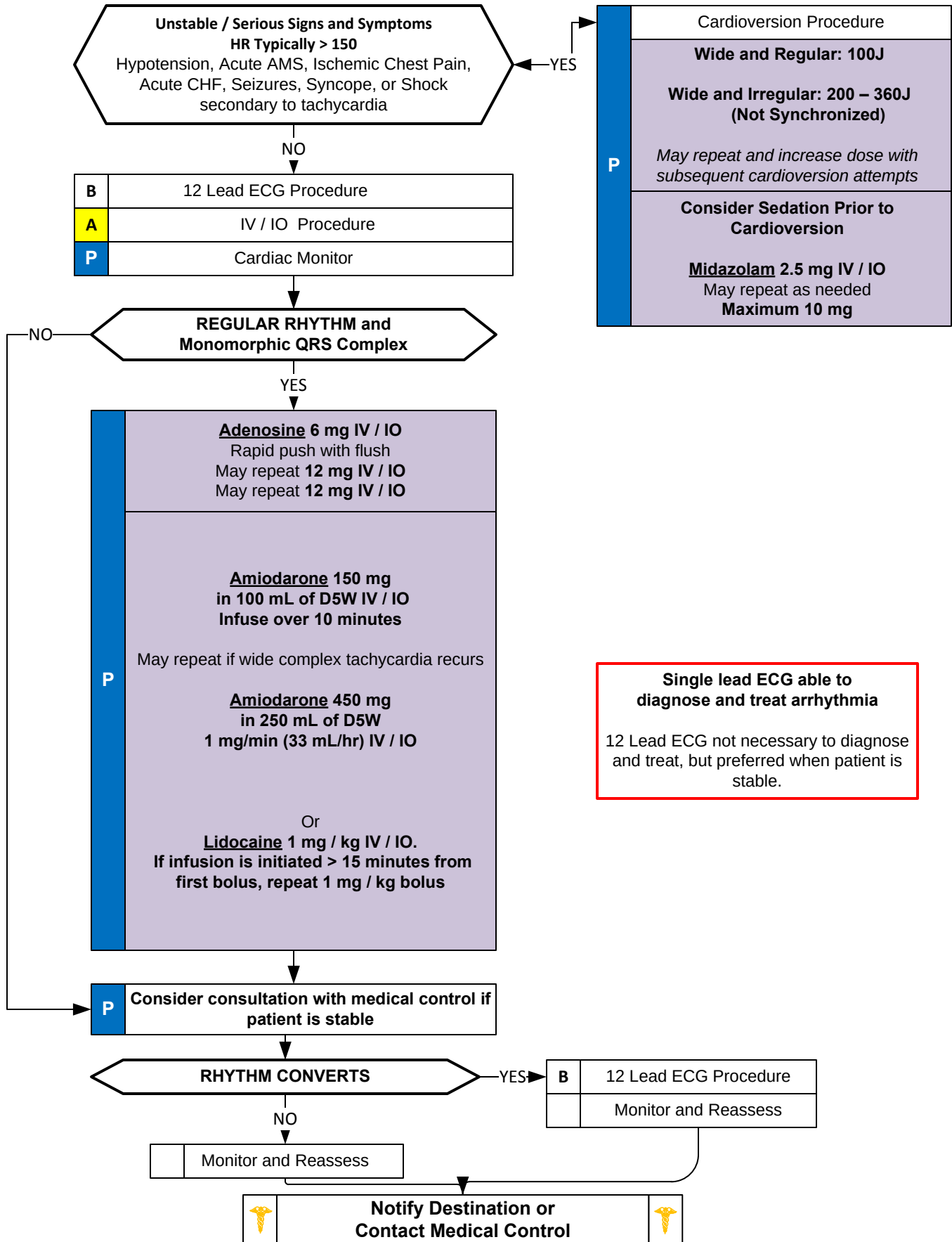
Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **Rhythm should be interpreted in the context of symptoms.**
- **Unstable condition**
Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
If at any point patient becomes unstable move to unstable arm in algorithm.
- **Symptomatic condition**
Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs / Symptoms:**
Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g. Diltiazem) or Beta Blockers. Use caution with Adenosine and give only with defibrillator available.**
- **Typical sinus tachycardia is in the range of 100 to (200 - patient's age) beats per minute.**
- **Regular Narrow-Complex Tachycardias:**
Vagal maneuvers and adenosine are preferred. 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.
Agencies using both calcium channel blockers and beta blockers should choose one primarily. Giving the agents sequentially requires **Contact of Medical Control**. This may lead to profound bradycardia / hypotension.
- **Irregular Tachycardias:**
First line agents for rate control are calcium channel blockers or beta blockers.
Agencies using both calcium channel blockers and beta blockers should choose one primarily. Giving the agents sequentially requires **Contact of Medical Control**. This may lead to profound bradycardia / hypotension.
Adenosine may not be effective in identifiable atrial fibrillation / flutter, yet is not harmful and may help identify rhythm.
Amiodarone may be given in CHF, risk of rhythm conversion in patients with arrhythmia > 48 hours.
- **Synchronized Cardioversion:**
Recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and Monomorphic-Regular Tachycardia (VT.)
- **Monitor for hypotension after administration of Calcium Channel Blockers or Beta Blockers.**
- **Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.**



Adult Tachycardia

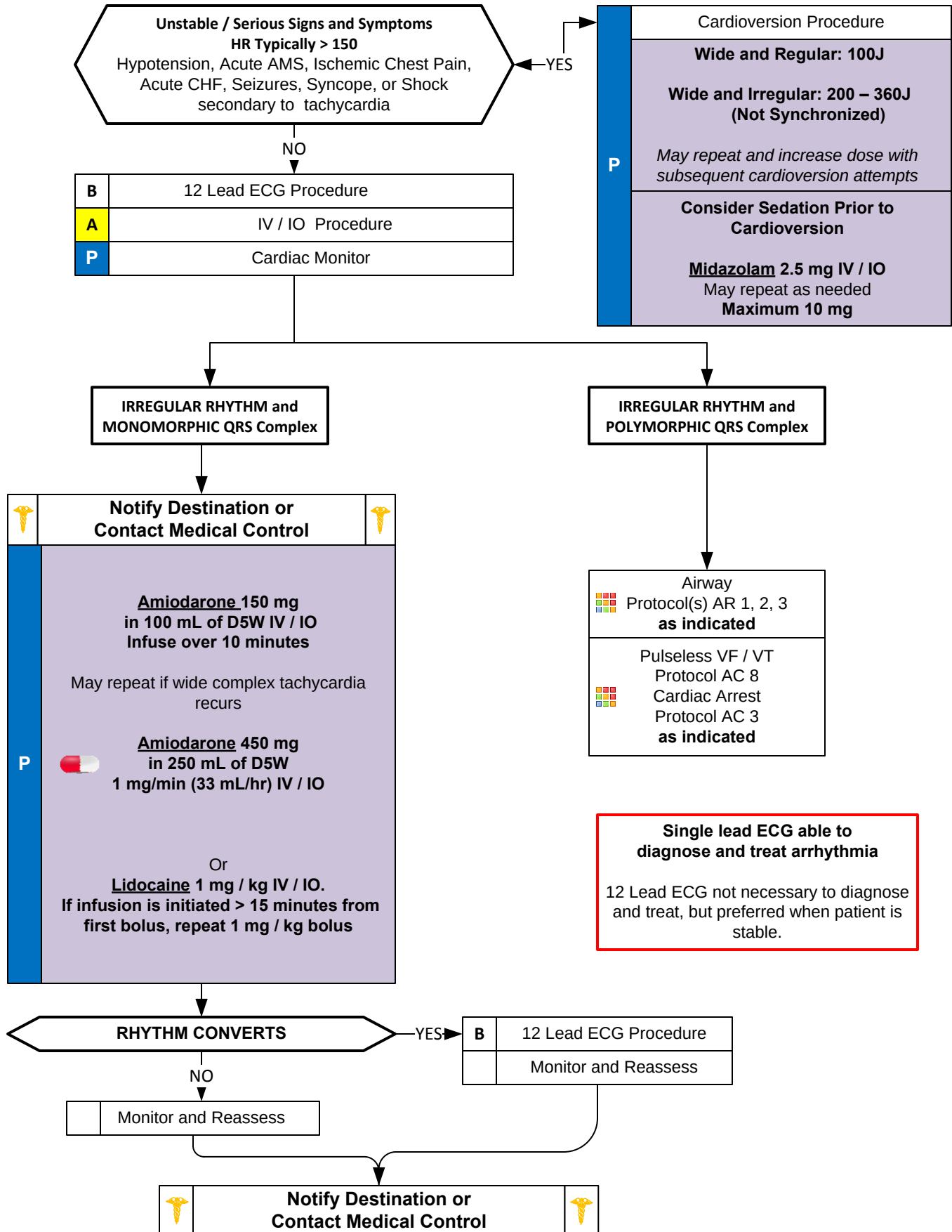
Wide Complex (≥ 0.12 sec) REGULAR RHYTHM





Adult Tachycardia

Wide Complex (≥ 0.12 sec) IRREGULAR RHYTHM





Adult Tachycardia

Wide Complex (≥ 0.12 sec)

Amiodarone Infusion:

1st Dose: 150 mg in 100 mL D5W

$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{10 \text{ min}} = 100 \text{ mL / min}$ or 5 gtts / 3 sec

2nd Dose: 450 mg / 250 mL D5W

$\frac{250 \text{ mL} \times 60 \text{ gtts set}}{7.5 \text{ hr (450 min)}} = 33 \text{ mL / min}$ or 1 gtt / 2 sec

Lidocaine Infusion:

ROSC Dose: 1-4 mg / min

1 gm in 250 mL = 4 mg / mL

Select the dose that is 1 mg higher than the dose given to convert the rhythm.

(i.e. 2 mg of Lidocaine converted rhythm, infusion dose is 3 mg / min)

Using a 60 gtt set:

60 gtts / min = 4 mg

45 gtts / min = 3 mg

30 gtts / min = 2 mg

15 gtts / min = 1 mg

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **Rhythm should be interpreted in the context of symptoms**
- **Unstable condition**
 - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
 - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Symptomatic condition**

Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.

Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs / Symptoms:**

Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.
- Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem) or Beta Blockers. Use caution with Adenosine and give only with defibrillator available.
- Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.
- Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.
- **Regular Wide-Complex Tachycardias:**
 - **Unstable condition:**

Immediate defibrillation if pulseless and begin CPR.
 - **Stable condition:**

Typically VT or SVT with aberrancy. Adenosine may be given if regular and monomorphic and if defibrillator available.

Verapamil contraindicated in wide-complex tachycardias.

Agencies using Amiodarone, Procainamide and Lidocaine need choose one agent primarily. Giving multiple anti-arrhythmics requires contact of medical control.

Atrial arrhythmias with WPW should be treated with Amiodarone or Procainamide
- **Irregular Tachycardias:**

Wide-complex, irregular tachycardia: Do not administer calcium channel, beta blockers, or adenosine as this may cause paradoxical increase in ventricular rate. This will usually require cardioversion. Contact medical control.
- **Polymorphic / Irregular Tachycardia:**

This situation is usually unstable and immediate defibrillation is warranted.

When associated with prolonged QT this is likely Torsades de pointes: Give 2 gm of Magnesium Sulfate slow IV / IO.

Without prolonged QT likely related to ischemia and Magnesium may not be helpful.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.



Ventricular Fibrillation Pulseless Ventricular Tachycardia

Cardiac Arrest Protocol AC 3

	Begin Continuous CPR Compressions Push Hard (≥ 2 inches) Push Fast (100 - 120 / min) Change Compressors every 2 minutes (sooner if fatigued) (Limit changes / pulse checks ≤ 10 seconds) At the end of each 2 minute cycle Check AED / ECG Monitor If shockable rhythm, deliver shock and immediately continue chest compressions
	Search for Reversible Causes
A	IV / IO Procedure Epinephrine (1:10,000) 1 mg IV / IO Repeat every 3 to 5 minutes

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary
(PE)
Thrombosis; coronary
(MI)

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol AC 9

	Continue CPR Compressions Push Hard (≥ 2 inches) Push Fast (100 - 120 / min) Change Compressors every 2 minutes (sooner if fatigued) (Limit changes / pulse checks ≤ 10 seconds) If Rhythm Refractory Continue CPR and give Agency specific Anti- arrhythmics and Epinephrine Continue CPR up to point where you are ready to defibrillate with device charged. Repeat pattern during resuscitation.
P	Amiodarone 300 mg IV / IO May repeat if refractory Amiodarone 150 mg IV / IO Refractory Consider Lidocaine 1.0 – 1.5 mg/kg IV / IO May repeat if refractory Lidocaine 0.75 mg/kg IV / IO Maximum 3 mg/kg Refractory Magnesium 2 gm IV / IO



Notify Destination or
Contact Medical Control





Ventricular Fibrillation Pulseless Ventricular Tachycardia

Cycle of treatment in refractory VF and P VTach:

Drug → Circulate → Shock → Drug → Circulate → Shock → Drug → Circulate → Shock →

Amiodarone Infusion:

ROSC Dose: 450 mg / 250 mL D5W

$\frac{250 \text{ mL} \times 60 \text{ gtts set}}{7.5 \text{ hr (450 min)}} = 33 \text{ mL / min}$ or 1 gtt / 2 sec

Lidocaine Infusion:

ROSC Dose: 1-4 mg / min

1 gm in 250 mL = 4 mg / mL

Using a 60 gtt set:

60 gtts / min = 4 mg

45 gtts / min = 3 mg

30 gtts / min = 2 mg

15 gtts / min = 1 mg

Select the dose that is 1 mg higher than the dose given to convert the rhythm.

(i.e. 2 mg of Lidocaine converted rhythm, infusion dose is 3 mg / min)

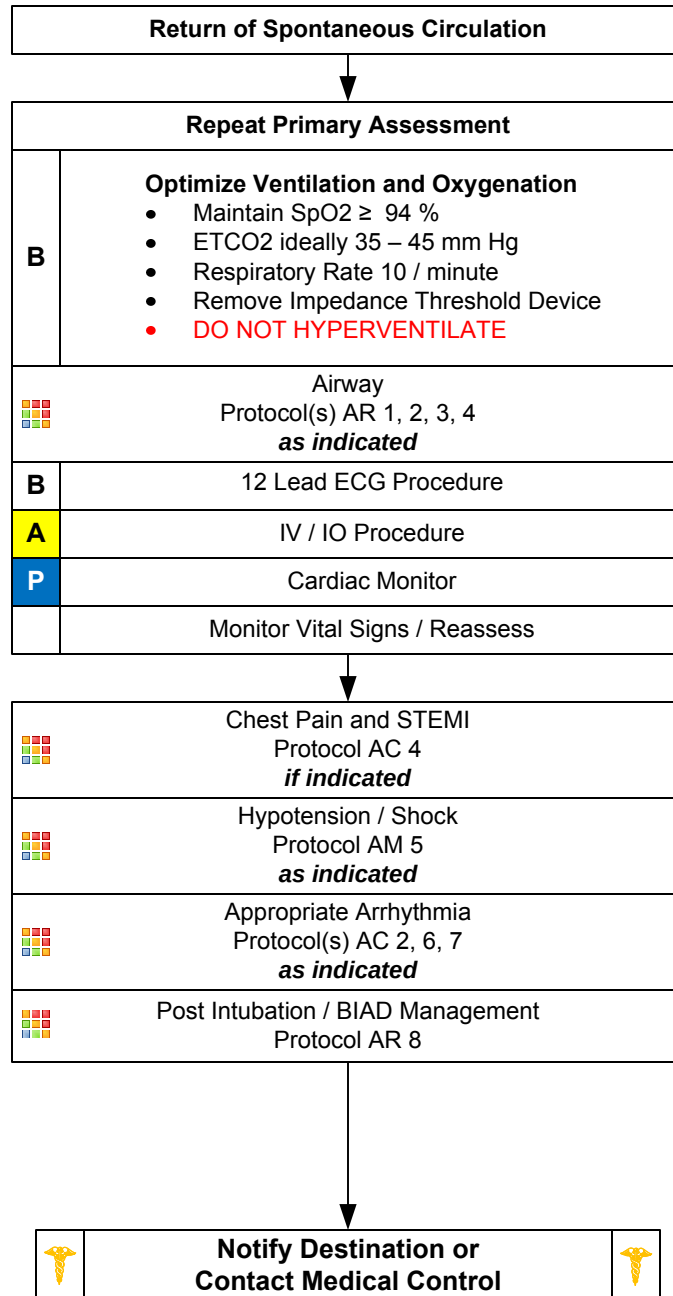
Magnesium Sulfate must be given in 20% or less concentrations intravenously.

Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

- **Pearls**
- **Recommended Exam: Mental Status, neuro, heart, and lung**
- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks.**
- **Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE:** If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- Reassess and document BIAD and / or endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- **IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.**
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO₂ (EtCO₂)**
- If EtCO₂ is < 10 mmHg, improve chest compressions.
- If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Avoid Procainamide in CHF or prolonged QT.**
- **Magnesium Sulfate is not routinely recommended during cardiac arrest, but may help with Torsades de points, Low Magnesium States (Malnourished / alcoholic), and Suspected Digitalis Toxicity**
- If no IV / IO, with drugs that can be given down ET tube, double dose and then flushed with 5 mL of Normal Saline followed by 5 quick ventilations. IV / IO is the preferred route when available.
- Return of spontaneous circulation: Heart rate should be > 60 when initiating anti-arrhythmic infusions.



Post Resuscitation



Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Arrhythmias are common and usually self limiting after ROSC



If Arrhythmia Persists follow Rhythm Appropriate Protocol



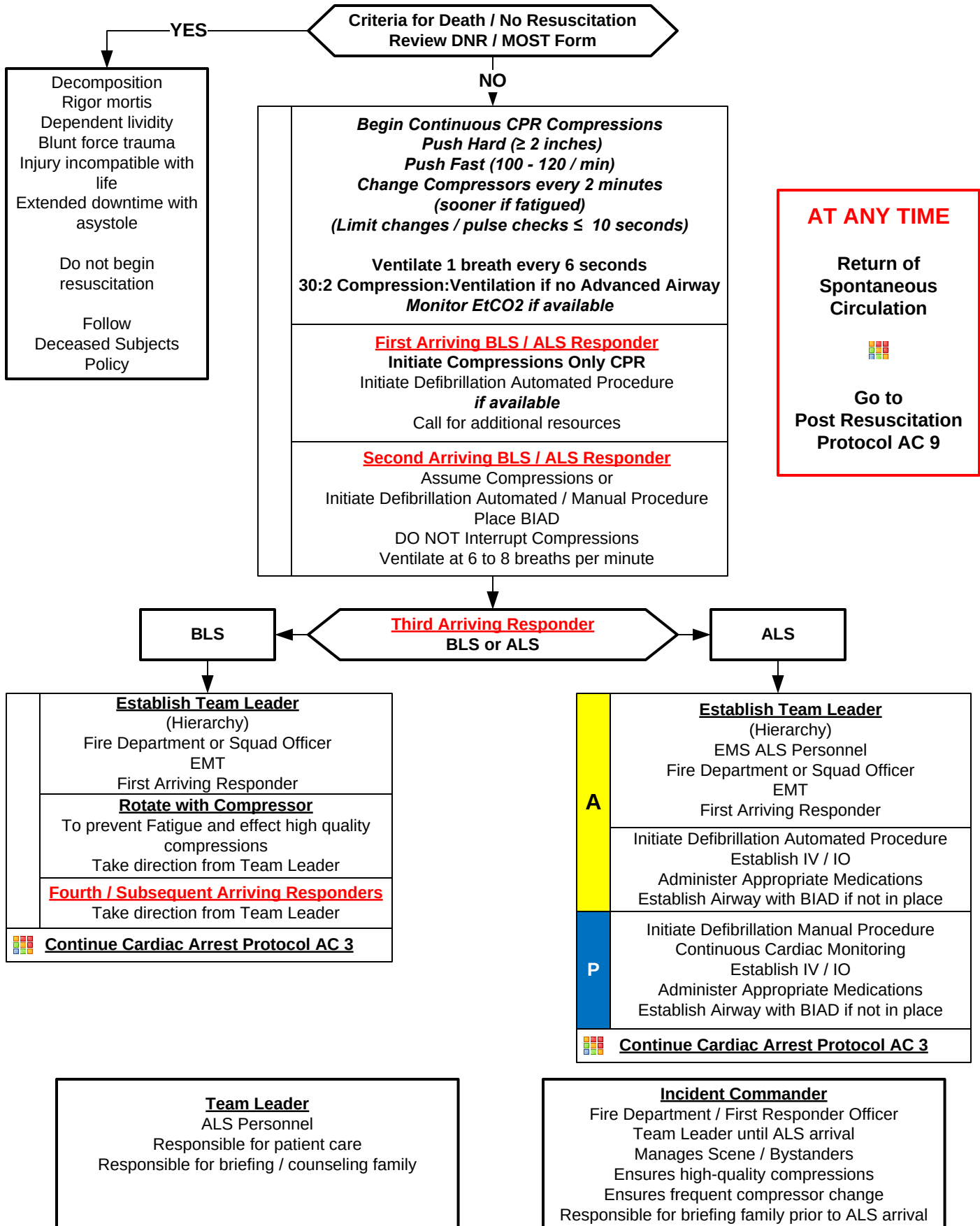
Post Resuscitation

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- **Pearls**
- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Continue to search for potential cause of cardiac arrest during post-resuscitation care.**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs. Titrate FiO2 to maintain SpO2 of $\geq 94\%$.**
- **Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize. While goal is 35 – 45 mmHg avoid hyperventilation to achieve.**
- **Most patients immediately post resuscitation will require ventilatory assistance.**
- **Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90 – 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.**
- **STEMI:**
- **Transport to a primary cardiac catheter facility with evidence of STEMI on 12 Lead ECG.**
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.**
- **The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with medical control.**



Team Focused CPR (Optional)





Team Focused CPR (Optional)

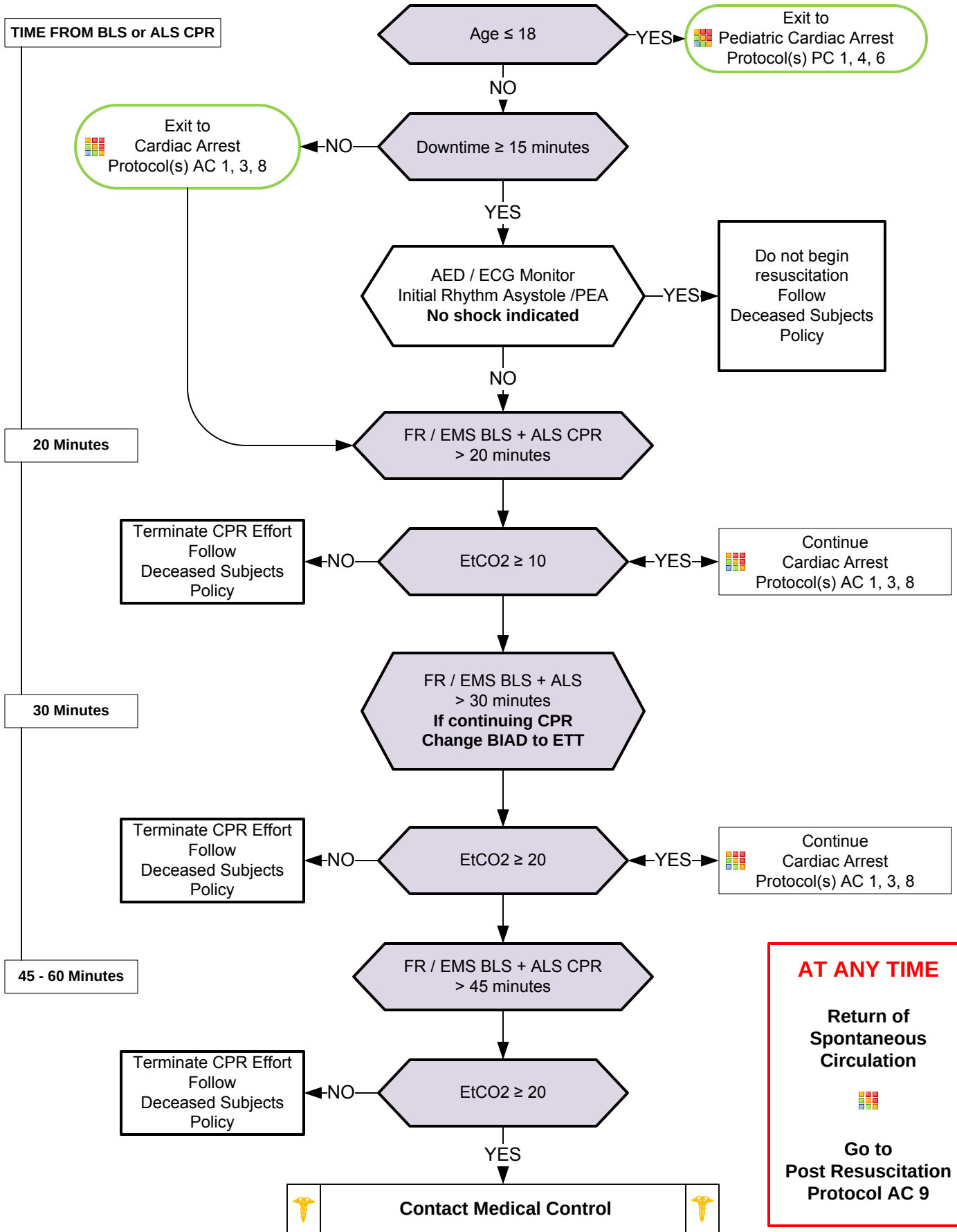
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Pearls

- This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.
- Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.
- Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.
- DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.
- Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.
- Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach. Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.



On Scene Resuscitation Termination of CPR (Optional)





On Scene Resuscitation / Termination of CPR

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Pearls.

- **General approach:**
 1. Determine if a terminal disease is involved?
 2. Is there an advanced directive such as a DNR / MOST form?
 3. Did the patient express to your historian any desires regarding resuscitation and if so what measures?
 4. Remember a living will is not a DNR.

Obtain a history while resuscitation efforts are ongoing. Determine the most legitimate person on scene as your information source such as a spouse, child, or sibling or Durable Health Care Power of Attorney.



Allergic Reaction / Anaphylaxis

History

- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms

- Itching or hives
- Coughing / wheezing or respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema
- N/V

Differential

- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration / Airway obstruction
- Vasovagal event
- Asthma or COPD
- CHF

Assess Symptom Severity / Suspected Exposure to Allergen

MILD
Skin Only

IV Procedure
if indicated

A

Diphenhydramine
25 - 50 mg
PO / IV / IM / IO

B Monitor and Reassess
Monitor for Worsening
Signs and Symptoms

MODERATE
2 + Body Systems

Epinephrine 1:1000 IM
0.3 – 0.5 mg
if available

B

Albuterol Nebulizer
2.5 – 5 mg
Repeat as needed x 3
if indicated

A

Diphenhydramine
25 - 50 mg IV / IM / IO
if not already given PO

Epinephrine 1:1000
0.3 – 0.5 mg IM
Repeat in 5 minutes if no
improvement

IV / IO Procedure

A

Albuterol Nebulizer
2.5 – 5 mg
+/- Ipratropium 0.5 mg
Repeat as needed x 3
if indicated

Normal Saline Bolus
500 mL IV / IO
Repeat as needed
Maximum 2 Liters

P

Dexamethasone
10 mg IV / IO / IM

No improvement with IM Epinephrine
Push Dose Epinephrine IV / IO
See Pearls for dosing regimen

Notify Destination or
Contact Medical Control

SEVERE
2 + Body Systems + hypotension
Or Isolated Hypotension

Epinephrine 1:1000 IM
0.3 – 0.5 mg
if available

B

Albuterol 2.5 – 5 mg
Nebulizer
Repeat as needed x 3
if indicated

Airway Protocol(s) AR 1 - 4
if indicated

Hypotension / Shock
Protocol AM 5
if indicated

Adult Medical Protocol Section



Allergic Reaction / Anaphylaxis

Epinephrine – Push Dose

Mix 9 ml of normal saline with 1 ml of 1:10,000 of Epinephrine

This gives you 100mcg/ 10 ml or 10 mcg/ml

Administer 5-20mcg (0.5-2ml) q 5 min

Pitfalls in Diagnosis of Anaphylaxis:

- 1) Anaphylaxis can occur in the absence of hypotension or shock
- 2) Hypotension may go undetected if the initial BP measurement is after the administration of Epinephrine
- 3) Skin symptoms may be unrecognized in 20% of patients
- 4) It may be difficult to recognize anaphylaxis in a patient with neurologic or psychiatric problems or patients who take anti-histamines

- Dexamethasone should be given as soon as possible when administering Epi in moderate and severe allergic reactions.

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdominal**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine administration:**
 - Drug of choice and the FIRST drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms.)**
 - IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
 - Diphenhydramine and steroids have no proven utility in Moderate / Severe anaphylaxis and may be given only After Epinephrine. Diphenhydramine and steroids should NOT delay repeated Epinephrine administration.**
 - In Moderate and Severe anaphylaxis Diphenhydramine may decrease mental status. Oral Diphenhydramine should NOT be given to a patient with decreased mental status and / or a hypotensive patient as this may cause nausea and / or vomiting.**
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion. Contact Medical Control for appropriate dosing.**
- **Symptom Severity Classification:**
 - Mild symptoms:**
 - Flushing, hives, itching, erythema with normal blood pressure and perfusion.
 - Moderate symptoms:**
 - Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
 - Severe symptoms:**
 - Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension/poor perfusion or isolated hypotension.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Angioedema** is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.
- **Hereditary Angioedema** involves swelling of the face, lips, airway structures, extremities, and may cause moderate to severe abdominal pain. Some patients are prescribed specific medications to aid in reversal of swelling. **Paramedic may assist or administer this medication per patient / package instructions.**
- **12 lead ECG and cardiac monitoring should NOT delay administration of epinephrine.**
- **EMR / EMT may administer Epinephrine IM and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMR / EMT administering any medication.
- **EMR / EMT may administer Epinephrine IM via AutoInjector or manual draw-up** per Agency Medical Director.
- **EMT may administer diphenhydramine by oral route only and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- **The shorter the onset from exposure to symptoms the more severe the reaction.**



Diabetic; Adult

History

- Past medical history
- Medications
- Recent blood glucose check
- Last meal

Signs and Symptoms

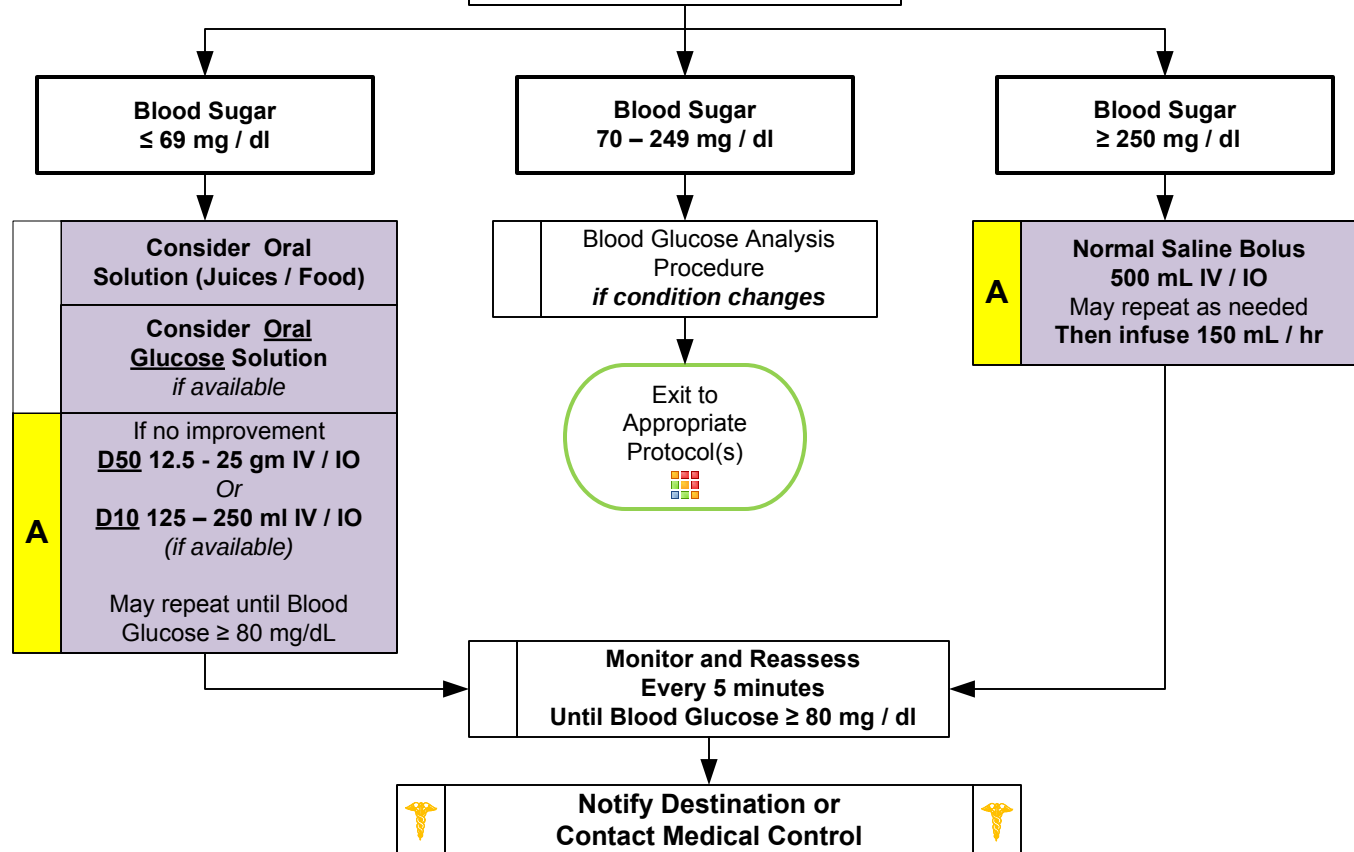
- Altered mental status
- Combative / irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea / vomiting
- Weakness
- Dehydration
- Deep / rapid breathing

Differential

- Alcohol / drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure <i>if indicated</i>
A	IV / IO Procedure
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Hypotension / Shock Protocol AM 5 <i>if indicated</i>
	Suspected Stroke Protocol UP14 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>

A	Blood Glucose ≤ 69 mg / dl and symptomatic No venous access Glucagon 1 – 2 mg IM / IN Repeat in 15 minutes if needed
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Diabetic; Adult

Both D10 and D50 are hypertonic solutions. These can cause venous thrombosis and phlebitis when administered rapidly. With this in mind it is recommended that a slow IV administration. This should not be given through a saline lock only. A solution of normal saline should be administered to coincide with this medication administration.

Chronic alcoholics may not respond to Glucagon secondary to low glycogen stores

Pearls

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- **Patients with prolonged hypoglycemia may not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per manufacturers recommendation for all glucometers.**
- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**
 - Blood sugar must be ≥ 80 , patient has ability to eat and availability of food with responders on scene.
 - Patient must have known history of diabetes and not taking any oral diabetic agents.
 - Patient returns to normal mental status and has a normal neurological exam with no new neurological deficits.
 - Must demonstrate capacity to make informed health care decisions. See Universal Patient Care Protocol UP-1.
 - Otherwise contact medical control.
- **Hypoglycemia with Oral Agents:**
 - Patient's taking oral diabetic medications should be encouraged to allow transportation to a medical facility.
 - They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established.
 - Not all oral agents have prolonged action so Contact Medical Control for advice.
 - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **Hypoglycemia with Insulin Agents:**
 - Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established.
 - Not all insulin have prolonged action so Contact Medical Control for advice.
 - Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **Congestive Heart Failure patients who have Blood Glucose > 250:**
 - Limit fluid boluses unless they have signs of volume depletion, dehydration, poor perfusion, hypotension, and / or shock.
- In extreme circumstances with no IV / IO access & no response to glucagon, D50 can be administered rectally only with an order from Medical Control.



Dialysis / Renal Failure

History

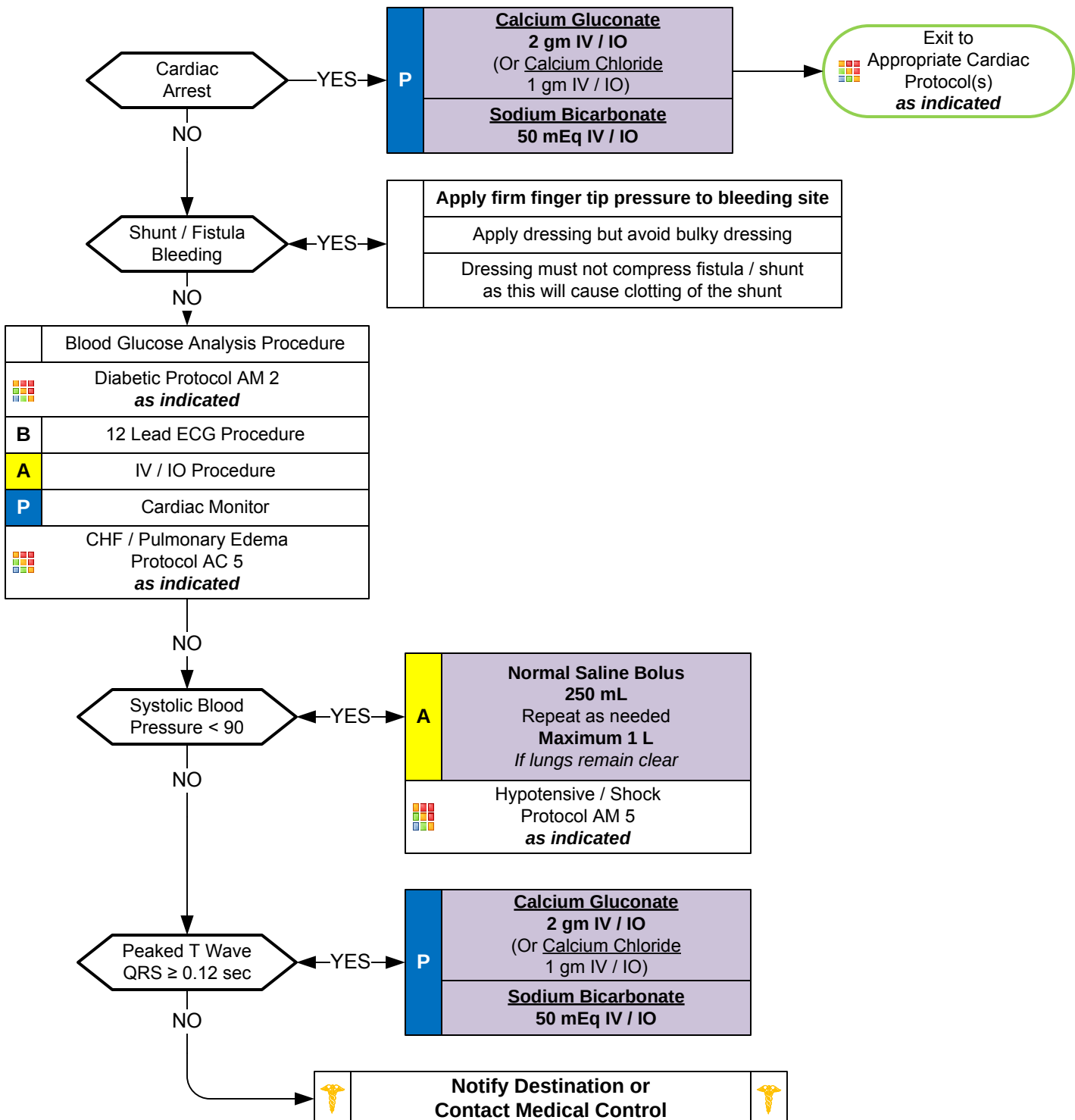
- Peritoneal or Hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

Signs and Symptoms

- Hypotension
- Bleeding
- Fever
- Electrolyte imbalance
- Nausea and / or vomiting
- Altered Mental Status
- Seizure
- Arrhythmia

Differential

- Congestive heart failure
- Pericarditis
- Diabetic emergency
- Sepsis
- Cardiac tamponade





Dialysis / Renal Failure

The use of sodium bicarbonate is an adjunct therapy for hyperkalemia. It is not to be used first and/or as the only treatment for hyperkalemia. Calcium Gluconate or Calcium Chloride should be used primarily.

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
 - **Consider transport to medical facility capable of providing Dialysis treatment.**
 - **Do not take Blood Pressure or start IV in extremity which has a shunt / fistula in place.**
 - **Access of shunt indicated in the dead or near-dead patient only with no IV or IO access.**
 - **If hemorrhage cannot be controlled with firm, uninterrupted direct pressure, application of tourniquet with uncontrolled dialysis fistula bleeding is indicated.**
 - **Hemodialysis:**
 - Process which removes waste from the blood stream and occurs about three times each week.
 - Some patients do perform hemodialysis at home.
 - **Peritoneal dialysis:**
 - If patient complains of fever, abdominal pain, and / or back pain, bring the PD fluid bag, which has drained from the abdomen, to the hospital.
- Complications of Dialysis Treatment:**
- Hypotension:**
Typically responds to small fluid bolus of 250 mL Normal Saline. May result in angina, AMS, seizure or arrhythmia.
- Filtration and decreased blood levels of some medications like some seizure medications:**
- Disequilibrium syndrome:**
Shift of metabolic waste and electrolytes causing weakness, dizziness, nausea and / or vomiting and seizures.
- Equipment malfunction:**
Air embolism.
Bleeding.
Electrolyte imbalance.
Fever.
- **Fever:**
 - Consider sepsis in a dialysis patient with any catheter extending outside the body.
 - Always consider Hyperkalemia in all dialysis or renal failure patients.
 - Sodium Bicarbonate and Calcium Chloride / Gluconate should not be mixed. Ideally give in separate lines.
 - Renal dialysis patients have numerous medical problems typically. Hypertension and cardiac disease are prevalent.



Hypertension

History

- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

Signs and Symptoms

One of these

- Systolic BP 220 or greater
- Diastolic BP 120 or greater

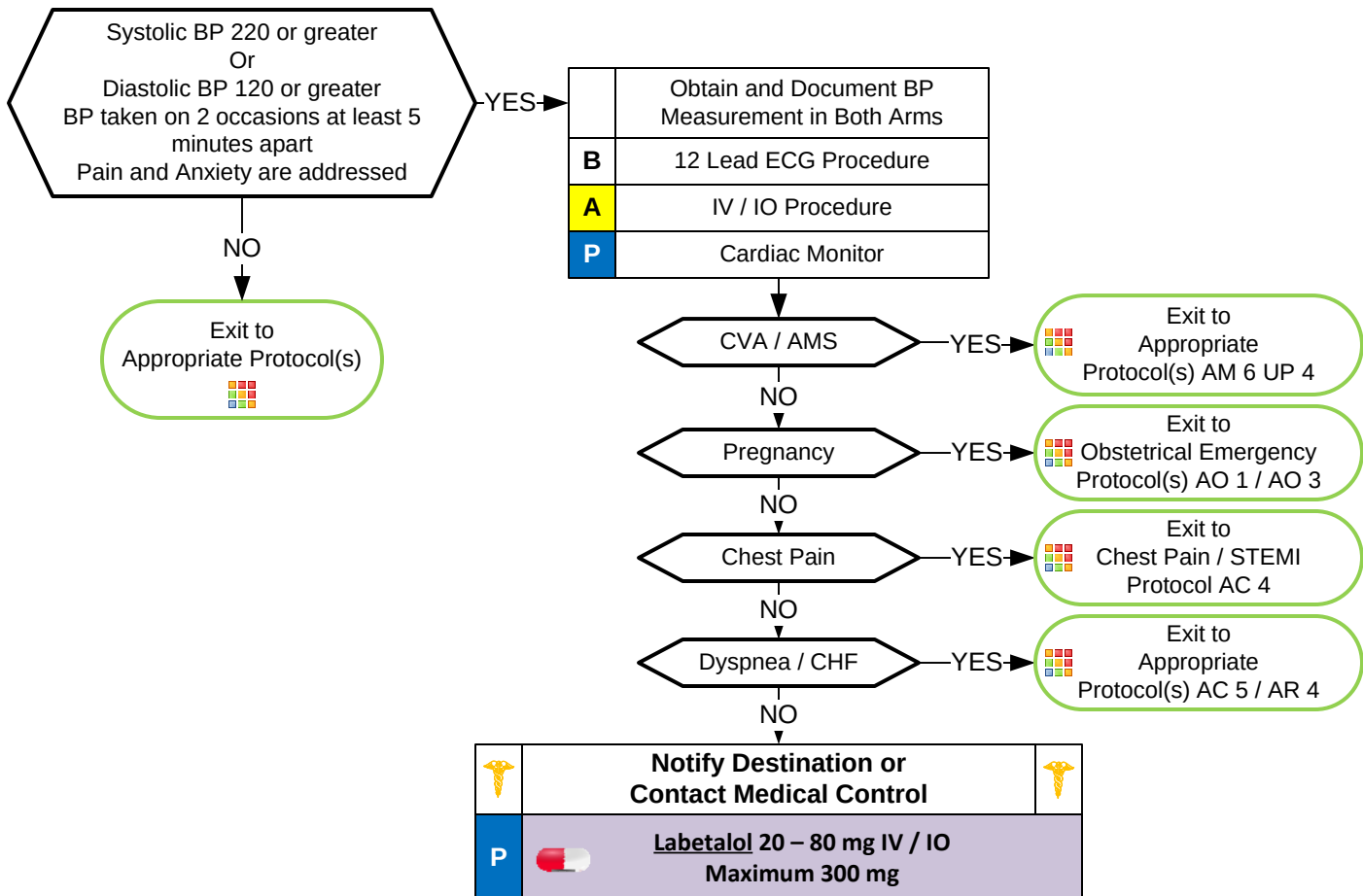
AND at least one of these

- Headache
- Chest Pain
- Dyspnea
- Altered Mental Status
- Seizure

Differential

- Hypertensive encephalopathy
- Primary CNS Injury
Cushing's Response with Bradycardia and Hypertension
- Myocardial Infarction
- Aortic Dissection / Aneurysm
- Pre-eclampsia / Eclampsia

Hypertension is not uncommon especially in an emergency setting. Hypertension is usually transient and in response to stress and / or pain. A hypertensive emergency is based on blood pressure along with symptoms which suggest an organ is suffering damage such as MI, CVA or renal failure. This is very difficult to determine in the pre-hospital setting in most cases. Aggressive treatment of hypertension can result in harm. Most patients, even with significant elevation in blood pressure, need only supportive care. Specific complaints such as chest pain, dyspnea, pulmonary edema or altered mental status should be treated based on specific protocols and consultation with Medical Control.



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- Elevated blood pressure is based on two to three sets of vital signs.
- Symptomatic hypertension is typically revealed through end organ dysfunction to the cardiac, CNS or renal systems.
- All symptomatic patients with hypertension should be transported with their head elevated at 30 degrees.
- Ensure appropriate size blood pressure cuff utilized for body habitus.



Hypotension / Shock

History

- 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

Signs and Symptoms

- Restlessness, confusion
- Weakness, dizziness
- Weak, rapid pulse
- Pale, cool, clammy skin
- Delayed capillary refill
- Hypotension
- Coffee-ground emesis
- Tarry stools

Differential

- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)
- Sepsis

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
A	IV / IO Procedure
P	Cardiac Monitor
	Airway Protocol(s) <i>if indicated</i>
	Diabetic Protocol AM 2 <i>if indicated</i>

History and Exam Suggest Type of Shock

Cardiogenic

Chest Pain: Cardiac and STEMI
 Protocol AC 4
 Appropriate Cardiac Protocol(s)
if indicated

Hypovolemic

Allergy Protocol AM 1
if indicated
 Suspected Sepsis Protocol UP 15
if indicated
 Multiple Trauma Protocol TB 6
if indicated

Distributive

Obstructive

P Chest Decompression-Needle Procedure
if indicated

A	Normal Saline Bolus 500 mL IV Repeat to effect SBP > 90 2 L Maximum
P	<u>Dopamine</u> 5 – 20 mcg/kg/min IV / IO Or <u>Norepinephrine</u> 1 mcg/kg/min IV / IO Maximum 3 mcg/kg/min Titrate to effect SBP ≥ 90

Notify Destination or Contact Medical Control



Hypotension / Shock

Risk Factors for Pulmonary Embolus (Obstructive) include:

- Immobilization
- Major surgery in the past (3) months
- CVA
- Malignancy
- Chronic heart disease
- History of DVT
- Confinement in vehicle or aircraft for a long time period in the past 1-2 weeks

*The most common **symptoms** of PE are acute dyspnea, pleuritic pain, and cough. Onset of dyspnea occurs within seconds to minutes

The most common **signs are tachypnea, tachycardia, and rales.

- If suspected Acute Adrenal Insufficiency, contact Medical Control for orders as listed below
- If you suspect a **ruptured AAA**, consider TXA. Contact Medical Control for orders

Dopamine Infusion: Dose 2-20 mcg / kg/ min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

50 kg and greater

Pt weight (Kg) x Dose x 0.25 = ____ gtts / min (using 10 gtts drip set)

example: 80 kg pt x 1 mcg/min x 0.25 = **20 gtts / min** or **1 gtt / 3 sec**

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using 60 gtts drip set)

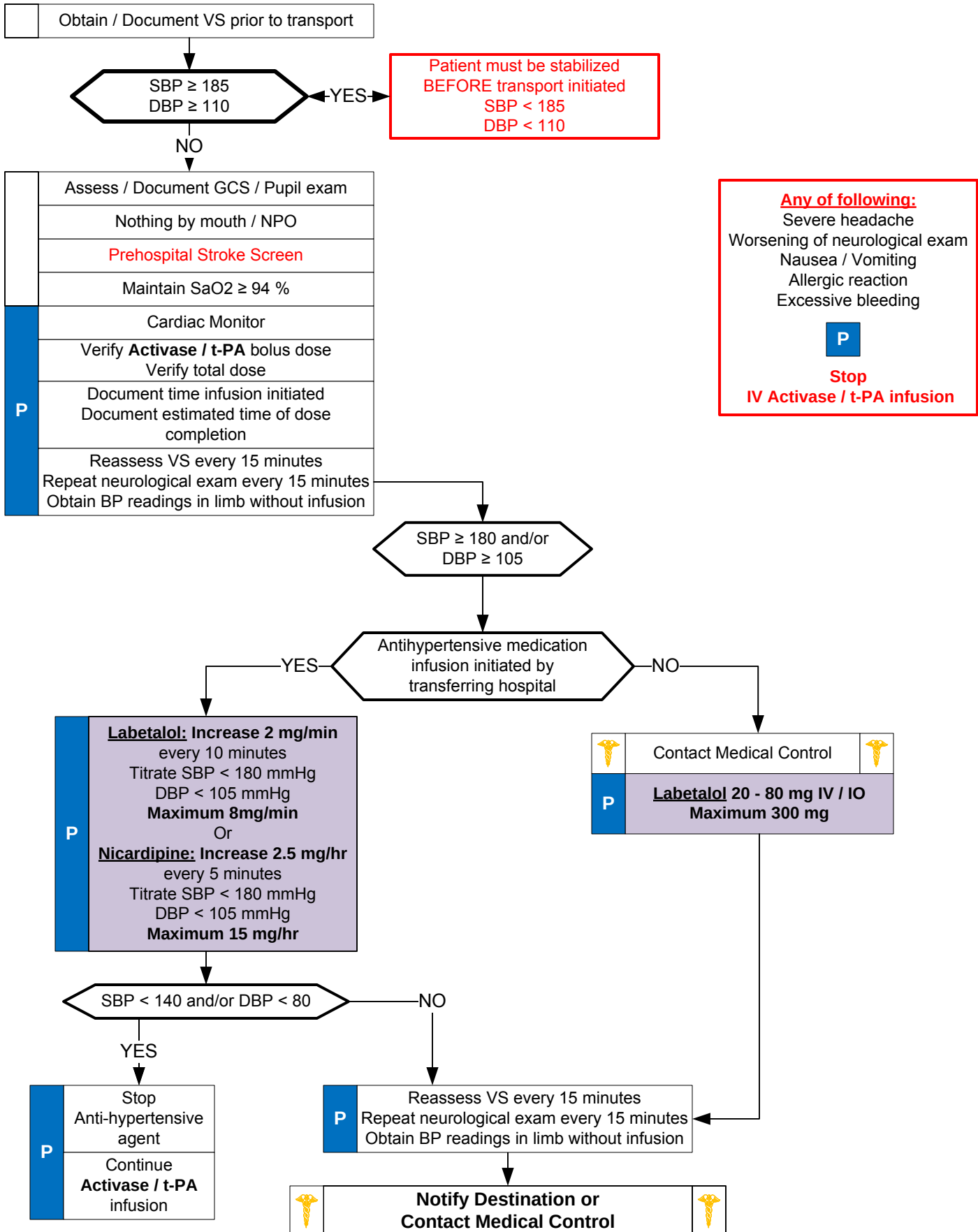
example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Hypotension can be defined as a systolic blood pressure of less than 90. This is not always reliable and should be interpreted in context and patients typical BP if known. Shock may be present with a normal blood pressure initially.
- Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Consider all possible causes of shock and treat per appropriate protocol.
- For non-cardiac, non-trauma hypotension, consider Dopamine when hypotension unresponsive to fluid resuscitation.
- **Hypovolemic Shock:**
Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding.
- **Tranexamic Acid (TXA):**
Agencies utilizing TXA must have approval from your T-RAC.
- **Cardiogenic Shock:**
Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricular / septum / valve / toxins.
- **Distributive Shock:**
Sepsis
Anaphylactic
Neurogenic: Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
Toxins
- **Obstructive Shock:**
Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
Body cannot produce enough steroids (glucocorticoids / mineralocorticoids.) May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate. Usually hypotensive with nausea, vomiting, dehydration and / or abdominal pain. **If suspected Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list. May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.**



Suspected Stroke: Interfacility Transfer Activase / t-PA (Optional)





Suspected Stroke: Activase / t-PA (Optional)

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Pearls

- **This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.**
- **This protocol is intended for interfacility transfer patients only. Medication must be started at initial treating hospital.**
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used in protocol compliance.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient.**
- **Onset of symptoms** is defined as the last witnessed time the patient was symptom free (i.e. awakening with stroke symptoms would be defined as an onset time when the patient went to sleep or last time known to be symptom free.)
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- **Infusion Pump Alarm / No Flow:**
 - Remove drip chamber from Activase / t-PA bag.
 - Spike Activase / t-PA drip chamber to NS bag.
 - Restart infusion to complete medication remaining in IV tubing.
- **Medication dosing safety:**
 - When IV **Activase / t-PA** dose administration will continue en route, verify estimated time of completion.
 - Verify with sending hospital that excess **Activase / t-PA** has been withdrawn from the bottle and wasted.
 - This ensures the bottle will be empty when the full dose is finished. *For example, if the total dose is 70 mg, then 30 cc should be withdrawn and wasted since a 100 mg bottle of **Activase / t-PA** contains 100 mL of fluid when reconstituted.*
 - Sending hospital should apply a label to **Activase / t-PA** bottle with the number of mL of fluid that should be in the bottle in case of pump failure during transit.
- **Allergy / Anaphylaxis:**
 - Activase / t-PA**, is structurally identical to endogenous t-PA and therefore should not induce allergy, single cases of acute hypersensitivity reactions have been reported.
- **Angioedema:**
 - Rapid swelling (edema) of the dermis, subcutaneous tissue, mucosa and submucosal tissues. Typically involves the face, lips, tongue and neck.
 - Almost always self limiting but may progress to interfere with airway / breathing so close monitoring is warranted.
 - Utilize the Allergy / Anaphylaxis Protocol as indicated and also for angioedema. Infusion should be stopped.
 - Give all medications related to the Allergy / Anaphylaxis Protocol by IV route only as patient should remain NPO.



Childbirth / Labor

History

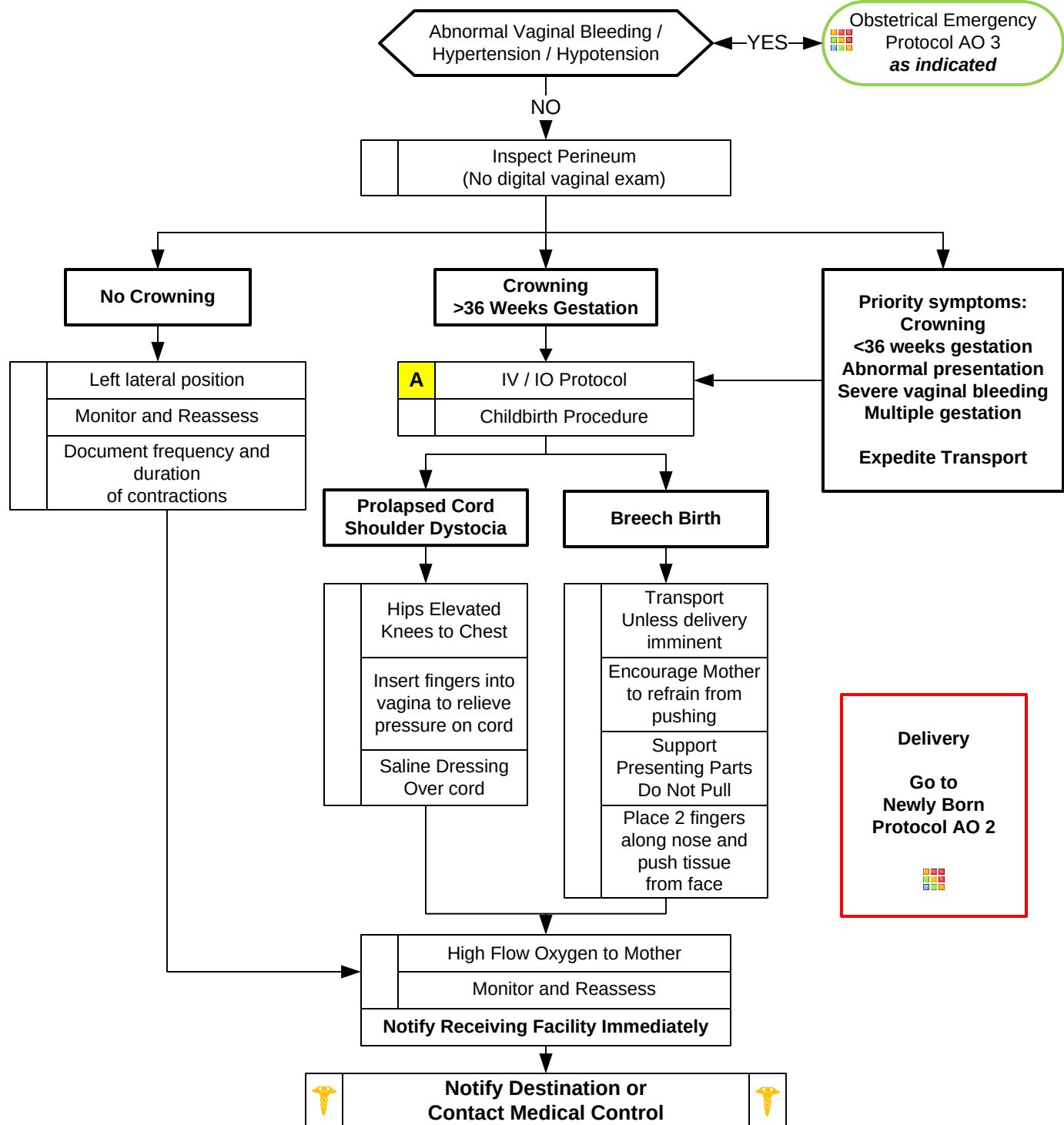
- Due date
- Time contractions started / how often
- Rupture of membranes
- Time / amount of any vaginal bleeding
- Sensation of fetal activity
- Past medical and delivery history
- Medications
- Gravida / Para Status
- High Risk pregnancy

Signs and Symptoms

- Spasmodic pain
- Vaginal discharge or bleeding
- Crowning or urge to push
- Meconium

Differential

- Abnormal presentation
 - Buttock
 - Foot
 - Hand
- Prolapsed cord
- Placenta previa
- Abruptio placenta





Childbirth / Labor

APGAR Completed at 1 and 5 minutes post delivery

Figure 1: APGAR Scoring

SIGN/SCORE	0	1	2
Appearance	Blue/pale	Body pink, extremities blue	Pink
Pulse Rate	None	< 100	> 100
Grimace	None	Grimace	Cries
Activity	Limp	Some	Active
Respiration	Absent	Slow/irregular	Strong cry

Pearls

- **Recommended Exam (of Mother): Mental Status, Heart, Lungs, Abdomen, Neuro**
- **Record APGAR at 1 minute and 5 minutes after birth.**
- **After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding.**
- Document all times (delivery, contraction frequency, and length).
- **Transport or Delivery?**
Decision to transport versus remain and deliver is multifactorial and difficult. Generally it is preferable to transport. Factors that will impact decision include: number of previous deliveries; length of previous labors; frequency of contractions; urge to push; and presence of crowning.
- **Maternal positioning for labor:**
Supine with head flat or elevated per mother's choice. Maintain flexion of both knees and hips. Elevated buttocks slightly with towel. If delivery not imminent, place mother in the left, lateral recumbent position with right side up about 10 – 20°.
- **Umbilical cord clamping and cutting:**
Place first clamp about 10 cm from infant's abdomen and second clamp about 5 cm away from first clamp.
- **Multiple Births:**
Twins occur about 1/90 births. Typically manage the same as single gestation. If imminent delivery call for additional resources, if needed. Most twins deliver at about 34 weeks so lower birth weight and hypothermia are common. Twins may share a placenta so clamp and cut umbilical cord after first delivery. Notify receiving facility immediately.
- If maternal seizures occur, refer to the Obstetrical Emergencies Protocol.
- Some perineal bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal.



Newly Born

History

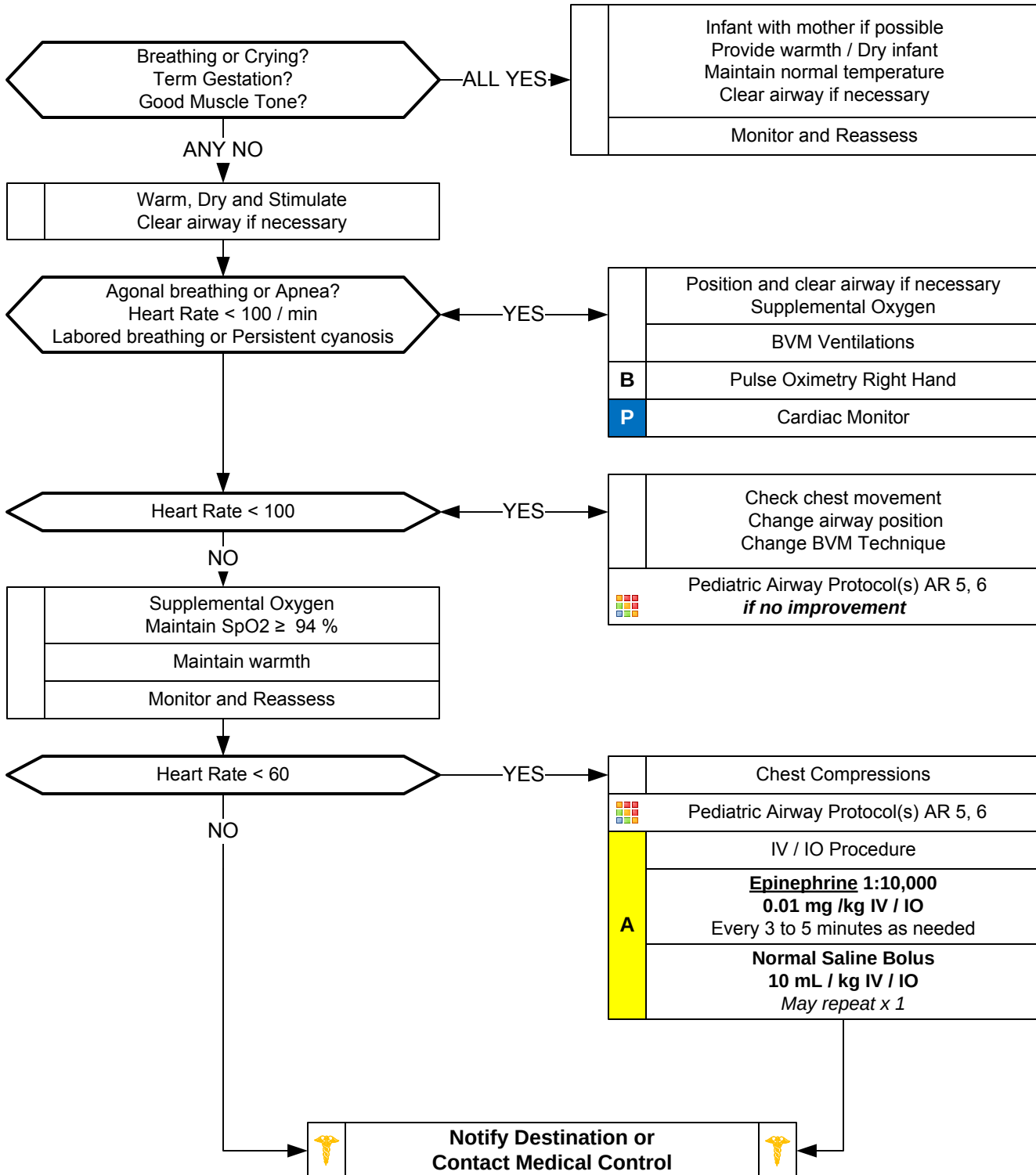
- Due date and gestational age
- Multiple gestation (twins etc.)
- Meconium / Delivery difficulties
- Congenital disease
- Medications (maternal)
- Maternal risk factors such as substance abuse or smoking

Signs and Symptoms

- Respiratory distress
- Peripheral cyanosis or mottling (normal)
- Central cyanosis (abnormal)
- Altered level of responsiveness
- Bradycardia

Differential

- Airway failure
 - Secretions
 - Respiratory drive
- Infection
- Maternal medication effect
- Hypovolemia, Hypoglycemia, Hypothermia
- Congenital heart disease





Newly Born

APGAR Completed at 1 and 5 minutes post delivery

Figure 1: APGAR Scoring

SIGN/SCORE	0	1	2
Appearance	Blue/pale	Body pink, extremities blue	Pink
Pulse Rate	None	< 100	> 100
Grimace	None	Grimace	Cries
Activity	Limp	Some	Active
Respiration	Absent	Slow/irregular	Strong cry

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Chest, Heart, Abdomen, Extremities, Neuro**
- **Document 1 and 5 minute Apgars in PCR**
- **Most newborns requiring resuscitation respond to ventilations / BVM, compressions, and/or epinephrine. If infant not responding consider hypovolemia, pneumothorax, and/or hypoglycemia (< 40 mg/dL).**
- Term gestation, strong cry / breathing and with good muscle tone generally will need no resuscitation. Routine suctioning is no longer recommended.
- Most important vital signs in the newly born are respirations / respiratory effort and heart rate.
- Maintain warmth of infant following delivery; cover head, wrap with blanket, thermal mattress, radiant heat
- **Meconium staining:**
Infant born through meconium staining who is not vigorous: Positive pressure ventilation is recommended, direct endotracheal suctioning is no longer recommended.
- **Expected Pulse Oximetry readings immediately following birth:**
 - 1 minute 60 – 65%
 - 2 minutes 65 – 70%
 - 3 minutes 70 – 75%
 - 4 minutes 75 – 80%
 - 5 minutes 80 – 85%
 - 10 minutes 85 – 95%
- Heart rate is critical during the first few moments of life and is best assessed by 3-lead ECG.
- Pulse oximetry should be applied to the right upper arm, wrist, or palm.
- CPR in infants is 120 compressions/minute with a 3:1 compression to ventilation ratio. 2-thumbs encircling chest and supporting the back is recommended. Limit interruptions of chest compressions.
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended-supportive care only).
- D10 = D50 diluted (1 ml of D50 with 4 ml of Normal Saline)



Obstetrical Emergency

History

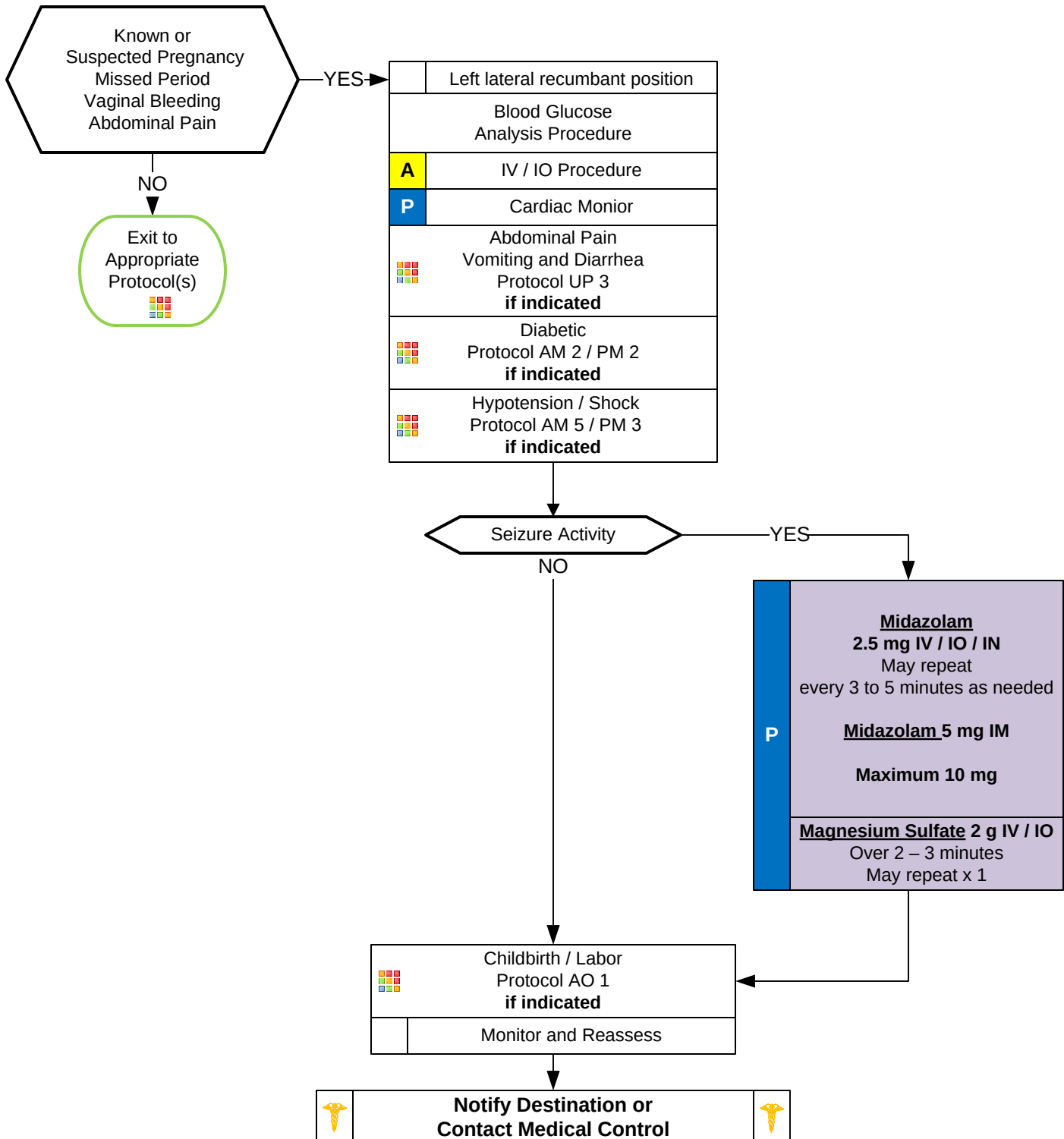
- Past medical history
- Hypertension meds
- Prenatal care
- Prior pregnancies / births
- Gravida / Para

Signs and Symptoms

- Vaginal bleeding
- Abdominal pain
- Seizures
- Hypertension
- Severe headache
- Visual changes
- Edema of hands and face

Differential

- Pre-eclampsia / Eclampsia
- Placenta previa
- Placenta abruptio
- Spontaneous abortion





Obstetrical Emergency

Magnesium Sulfate must be given in 20% or less concentrations intravenously.

Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

Pearls

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO access.**
- **Magnesium Sulfate should be administered as quickly as possible. May cause hypotension and decreased respiratory drive, but typically in doses higher than 6 g.**
- **Any pregnant patient involved in a MVC should be seen immediately by a physician for evaluation. Greater than 20 weeks generally require 4 to 6 hours of fetal monitoring. DO NOT suggest the patient needs an ultrasound.**
- **Ectopic pregnancy:**
Implantation of fertilized egg outside the uterus, commonly in or on the fallopian tube. As fetus grows, rupture may occur. Vaginal bleeding may or may not be present. Many women with ectopic pregnancy do not know they are pregnant. Usually occurs within 5 to 10 weeks of implantation. Maintain high index of suspicion with women of childbearing age experiencing abdominal pain.
- **Preeclampsia:**
Occurs in about 6% of pregnancies. Defined by hypertension and protein in the urine. RUQ pain, epigastric pain, N/V, visual disturbances, headache, and hyperreflexia are common symptoms.
In the setting of pregnancy, hypertension is defined as a BP greater than 140 systolic or greater than 90 diastolic, or a relative increase of 30 systolic and 20 diastolic from the patient's normal (pre-pregnancy) blood pressure.
Risk factors: < 20 years of age, first pregnancy, multigestational pregnancy, gestational diabetes, obesity, personal or family history of gestational hypertension.
- **Eclampsia:**
Seizures occurring in the context of preeclampsia. Remember, women may not have been diagnosed with preeclampsia.
- **Maintain patient in a left lateral position, right side up 10 - 20° to minimize risk of supine hypotensive syndrome.**
- **Ask patient to quantify bleeding - number of pads used per hour.**



Blast Injury / Incident

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history / Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension

Differential

- Superficial (1st Degree) red - painful (Don't include in TBSA)
- Partial Thickness (2nd Degree) blistering
- Full Thickness (3rd Degree) painless/charred or leathery skin
- Thermal injury
- Chemical – Electrical injury
- Radiation injury
- Blast injury

Nature of Device: Agent / Amount. Industrial Explosion. Terrorist Incident. Improvised Explosive Device.

Method of Delivery: Incendiary / Explosive

Nature of Environment: Open / Closed.

Distance from Device: Intervening protective barrier. Other environmental hazards,

Evaluate for: Blunt Trauma / Crush Injury / Compartment Syndrome / Traumatic Brain Injury / Concussion / Tympanic Membrane Rupture / Abdominal hemorrhage or Evisceration, Blast Lung Injury and Penetrating Trauma.

Scene Safety / Quantify and Triage Patients / Load and Go with Assessment / Treatment Enroute

Accidental / Intentional
Explosions
(See Pearls)

	Triage Protocol UP 2 as indicated
	Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 as indicated
	Multiple Trauma Protocol TB 6 if indicated
A	IV / IO Procedure if indicated
P	Cardiac Monitor if indicated
	Thermal Burn Protocol TB 9 Chemical and Electrical Burn Protocol TB 2 if indicated
	Crush Injury Protocol TB 3 if indicated
	Radiation Incident Protocol TB 7 if indicated

Blast Lung Injury

YES

Age Appropriate
Airway Protocol(s) AR 4, 7
as indicated

NO

	Decontamination Procedure if indicated
	Pain Control Protocol UP 11 if indicated
Rapid Transport to appropriate destination using Trauma and Burn: EMS Triage and Destination Plan	

**Notify Destination or
Contact Medical Control**

Trauma and Burn Protocol Section



Blast Injury / Incident

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Pearls

- **Types of Blast Injury:**

- Primary Blast Injury: From pressure wave.
 - Secondary Blast Injury: Impaled objects. Debris which becomes missiles / shrapnel.
 - Tertiary Blast Injury: Patient falling or being thrown / pinned by debris.
 - Most Common Cause of Death: Secondary Blast Injuries.

- **Triage of Blast Injury patients:**

- Blast Injury Patients with Burn Injuries Must be Triageed using the Thermal / Chemical / Electrical Burn Destination Guidelines for Critical / Serious / Minor Trauma and Burns
 - Patients may be hard of hearing due to tympanic membrane rupture.

- **Care of Blast Injury Patients:**

- Patients may suffer multi-system injuries including blunt and penetrating trauma, shrapnel, barotrauma, burns, and toxic chemical exposure.
 - Consider airway burns which should prompt early and aggressive airway management.
 - Cover open chest wounds with semi-occlusive dressing.
 - Use Lactated Ringers (if available) for all Critical or Serious Burns.
 - Minimize IV fluids resuscitation in patients with no sign of shock or poor perfusion.

- **Blast Lung Injury:**

- Blast Lung Injury is characterized by respiratory difficulty and hypoxia. Can occur (rarely) in patients without external thoracic trauma. More likely in enclosed space or in close proximity to explosion.
 - Symptoms: Dyspnea, hemoptysis, cough, chest pain, wheezing and hemodynamic instability.
 - Signs: Apnea, tachypnea, hypopnea, hypoxia, cyanosis and diminished breath sounds.
 - Air embolism should be considered and patient transported prone and in slight left-lateral decubitus position.
 - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyperventilation.
 - Air transport may worsen lung injury as well and close observation is mandated. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.

- **Accidental Explosions or Intentional Explosions:**

- All explosions or blasts should be considered intentional until determined otherwise.**
 - Attempt to determine source of the blast to include any potential threat for aerosolization of hazardous materials.
 - Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases.
 - Consider structural collapse / Environmental hazards / Fire.
 - Conditions that led to the initial explosion may be returning and lead to a second explosion.
 - Greatest concern is potential threat for a secondary device.
 - Patients who can, typically will attempt to move as far away from the explosive source as they safely can.
 - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.

- If patient is unconscious or there is(are) fatality(fatalities) and you are evaluating patient(s) for signs of life:**

- Before moving note if there are wires coming from the patient(s), or it appears the patient(s) is(are) lying on a package/package, or bulky item, do not move the patient(s), quickly back away and immediately notify a law enforcement officer.**

- If there are no indications the patient is connected to a triggering mechanism for a secondary device, expeditiously remove the patient(s) from the scene and begin transport to the hospital.

- Protect the airway and cervical spine, however, beyond the primary survey, care and a more detailed assessment should be deferred until the patient is in the ambulance.

- If there are signs the patient was carrying the source of the blast, notify law enforcement immediately and most likely, a law enforcement officer will accompany your patient to the hospital.



Chemical and Electrical Burn

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history / Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

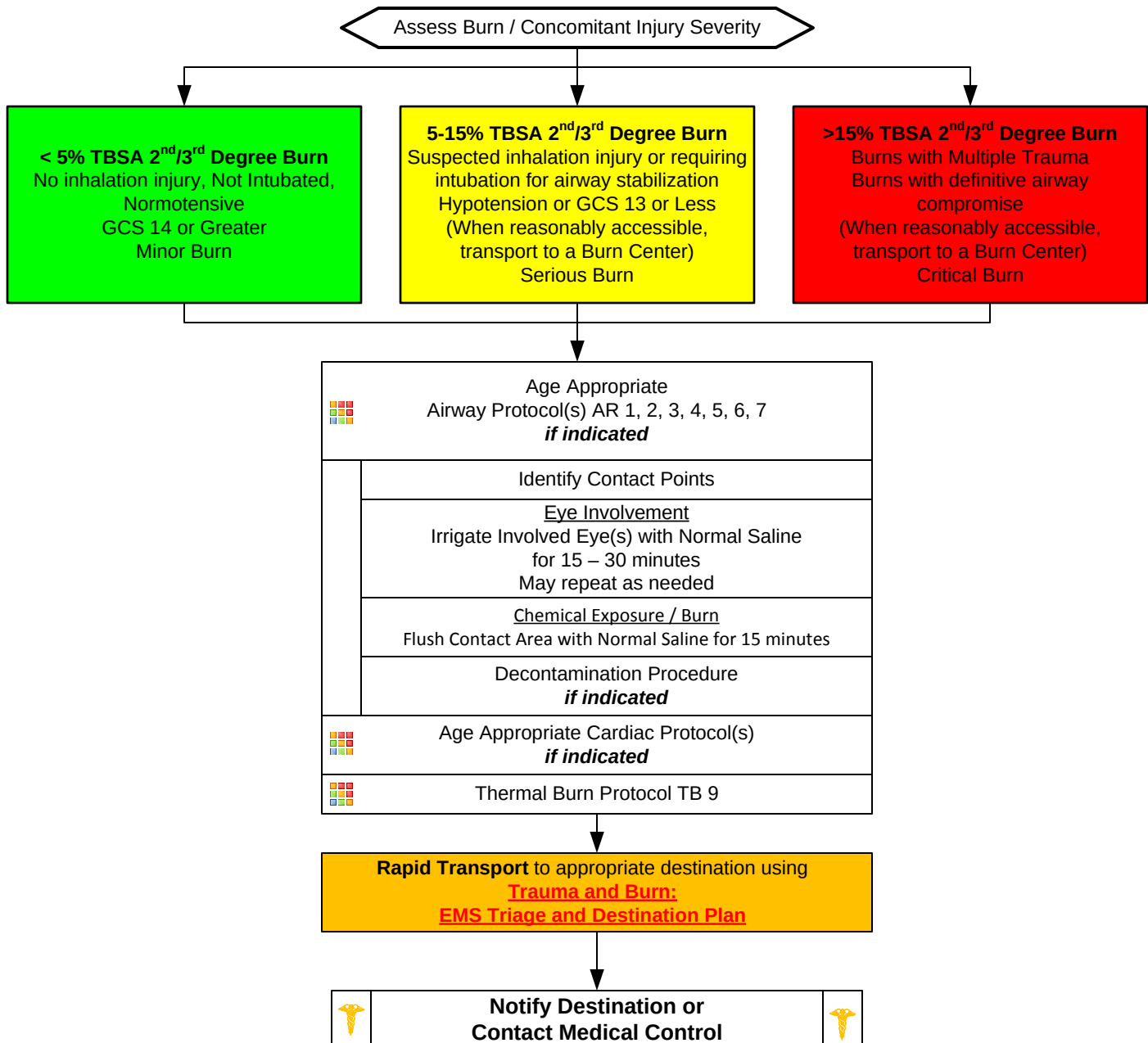
Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension

Differential

- Superficial (1st Degree) red - painful (Don't include in TBSA)
- Partial Thickness (2nd Degree) blistering
- Full Thickness (3rd Degree) painless/charred or leathery skin
- Thermal injury
- Chemical – Electrical injury
- Radiation injury
- Blast injury

Assure Chemical Source is NOT Hazardous to Responders.
Assure Electrical Source is NO longer in contact with patient before touching patient.



Chemical and Electrical Burn

Removal of clothing will eliminate 80% - 90% of contaminants. Do so only if you are protected with proper PPE

Attempt to determine chemical name if time and patient condition allows.

Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Green, Yellow and Red In burn severity do not apply to Triage systems.**
- **Refer to Rule of Nines: Remember the extent of the obvious external burn from an electrical source does not always reflect more extensive internal damage not seen.**
- **Chemical Burns:**
 - Refer to Decontamination Procedure.
 - Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation and use tap water.
 - Other water sources may be used based on availability.
 - Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
- **Electrical Burns:**
 - DO NOT contact patient until you are certain the source of the electrical shock is disconnected.
 - Attempt to locate contact points (generally there will be two or more.) A point where the patient contacted the source and a point(s) where the patient is grounded.
 - Sites will generally be full thickness.
 - Do not refer to as entry and exit sites or wounds.**
 - Cardiac Monitor: Anticipate ventricular or atrial irregularity including VT, VF, atrial fibrillation and / or heart blocks.
 - Attempt to identify the nature of the electrical source (AC / DC), the amount of voltage and the amperage the patient may have been exposed to during the electrical shock.



Crush Syndrome Trauma

History

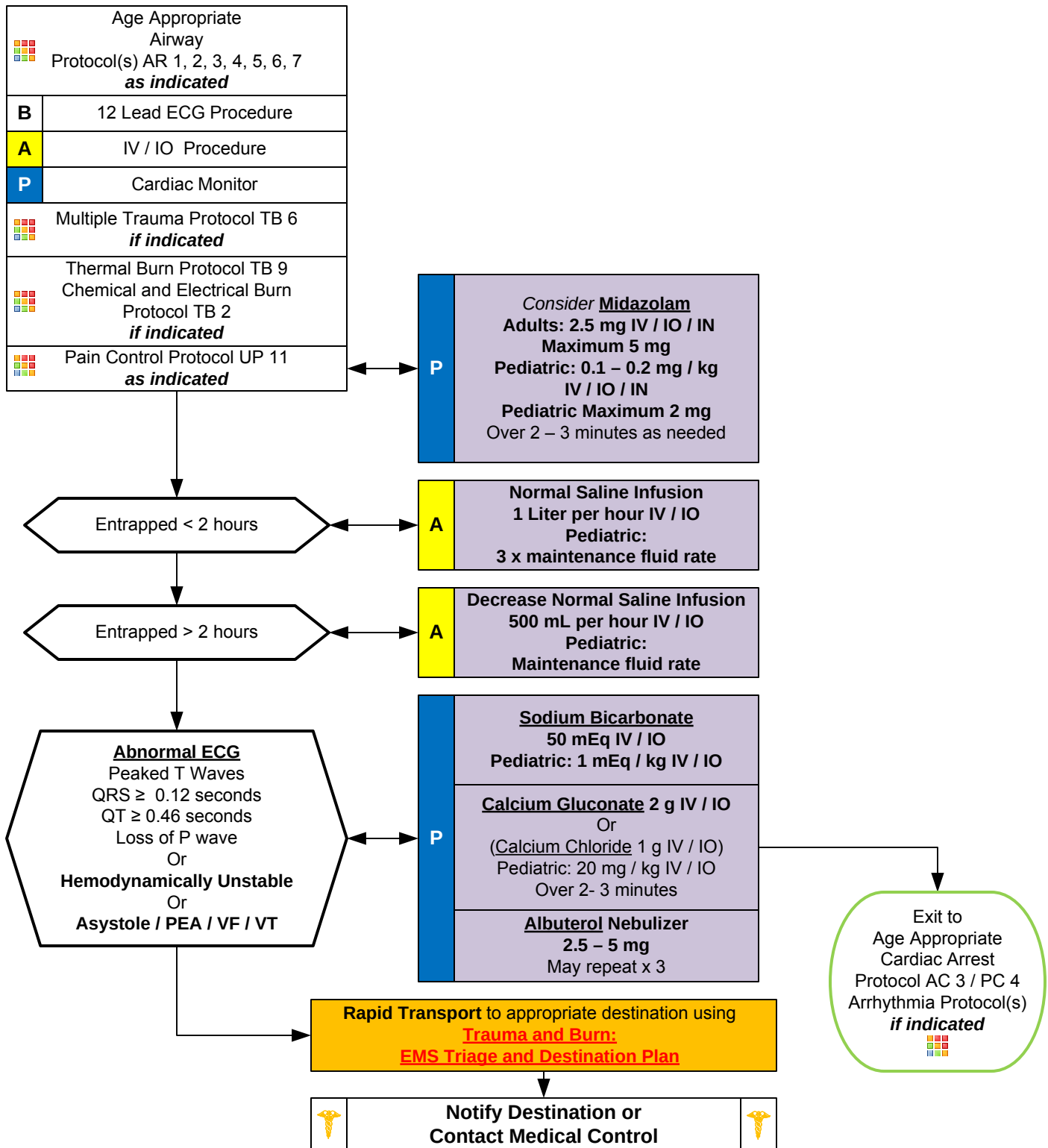
- Entrapped and crushed under heavy load > 30 minutes
- Extremity / body crushed
- Building collapse, trench collapse, industrial accident, pinned under heavy equipment

Signs and Symptoms

- Hypotension
- Hypothermia
- Abnormal ECG findings
- Pain
- Anxiety

Differential

- Entrapment without crush syndrome
- Vascular injury with perfusion deficit
- Compartment syndrome
- Altered mental status





Crush Syndrome Trauma

Pediatric Maintenance Fluid Calculation: 4/2/1 Method

$(4\text{ml/kg for the first } 10\text{kg}) + (2\text{ml/kg for kg } 11\text{-}20) + (1\text{ml/kg for every kg above } 20) = \text{hourly rate}$

Example hourly maintenance fluid rate for a child who weighs 25kg

$(4\text{ml} \times 10\text{kg}) + (2\text{ml} \times 10\text{kg}) + (1\text{ml} \times 5\text{kg}) = \text{hourly rate}$

$40\text{ml} + 20\text{ml} + 5\text{ml} = 65\text{ml/hr}$

Using the 4/2/1 method, this child's hourly maintenance fluid rate is 65mL/hr

Pearls

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- **Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- **Pediatric IV Fluid maintenance rate: 4 mL per first 10 kg of weight + 2 mL per second 10 kg of weight + 1 mL for every additional kg in weight.**
- **Crush syndrome typically manifests after 2 – 4 hours of crush injury, but may present in < 1 hour.**
- **Fluid resuscitation:**
 - **If access to patient and initiation of IV fluids occurs after 2 hours, give 2 liters of IV fluids in adults and 20 mL/kg of IV fluids in pediatrics and then begin > 2 hour dosing regimen.**
- **Consider all possible causes of shock and treat per appropriate protocol. Majority of decompensation in pediatrics is airway related.**
- **Decreasing heart rate and hypotension occur late in children and are signs of imminent cardiac arrest.**
- **Shock may be present with a normal blood pressure initially.**
- **Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.**
- **Consider all possible causes of shock and treat per appropriate protocol.**
- **Patients may become hypothermic even in warm environments.**
- **Hyperkalemia from crush syndrome can produce ECG changes described in protocol, but may also be a bizarre, wide complex rhythm. Wide complex rhythms should also be treated using the VF/Pulseless VT Protocol.**



Extremity Trauma

History

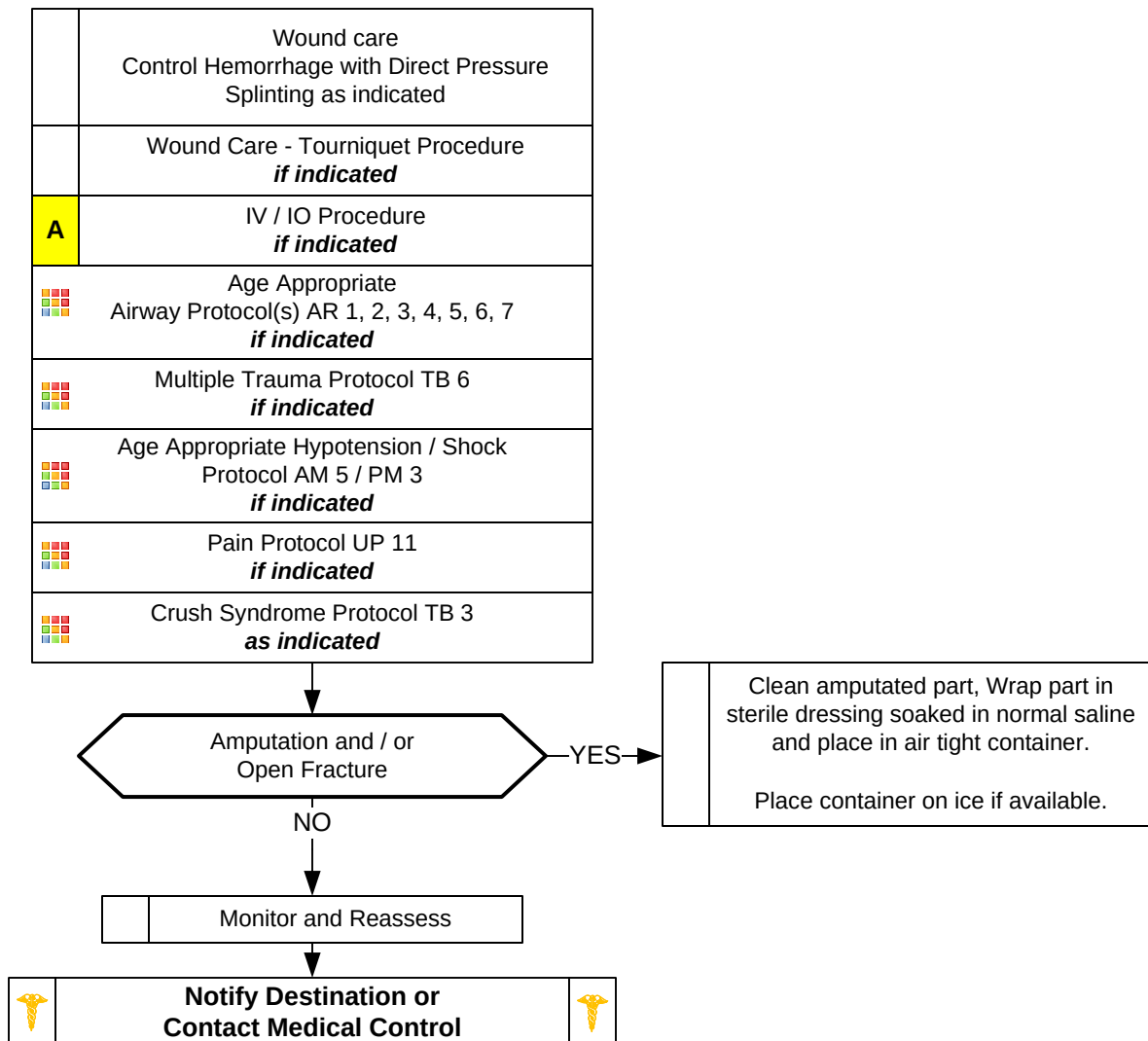
- Type of injury
- Mechanism: crush / penetrating / amputation
- Time of injury
- Open vs. closed wound / fracture
- Wound contamination
- Medical history
- Medications

Signs and Symptoms

- Pain, swelling
- Deformity
- Altered sensation / motor function
- Diminished pulse / capillary refill
- Decreased extremity temperature

Differential

- Abrasion
- Contusion
- Laceration
- Sprain
- Dislocation
- Fracture
- Amputation



Pearls

- **Recommended Exam: Mental Status, Extremity, Neuro**
- Peripheral neurovascular status is important
- In amputations, time is critical. Transport and notify medical control immediately, so that the appropriate destination can be determined.
- Hip dislocations and knee and elbow fracture / dislocations have a high incidence of vascular compromise.
- Urgently transport any injury with vascular compromise.
- Blood loss may be concealed or not apparent with extremity injuries.
- Lacerations must be evaluated for repair within 6 hours from the time of injury.
- Multiple casualty incident: Tourniquet Procedure may be considered first instead of direct pressure.



Head Trauma

History

- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma

Signs and Symptoms

- Pain, swelling, bleeding
- Altered mental status
- Unconscious
- Respiratory distress / failure
- Vomiting
- Major traumatic mechanism of injury
- Seizure

Differential

- Skull fracture
- Brain injury (Concussion, Contusion, Hemorrhage or Laceration)
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Spinal injury
- Abuse

Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 <i>if indicated</i>	
	Obtain and Record GCS
	Supplemental oxygen Maintain SpO ₂ ≥ 90% Preferably ≥ 94%
	Prevent Oxygen desaturation events < 90%
	Maintain EtCO ₂ 35 – 45 mmHg
	Blood Glucose Analysis Procedure
A	IV / IO Procedure <i>if indicated</i>
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 <i>if indicated</i>
	Multiple Trauma Protocol TB 6 <i>if indicated</i>
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 <i>if indicated</i>
	Seizure Protocol UP 13 <i>if indicated</i>
	Spinal Motion Restriction Procedure / Protocol TB 8 <i>if indicated</i>
	Pain Control Protocol UP 11 <i>if indicated</i>
	Monitor and Reassess

Rapid Transport to appropriate destination
using
**Trauma and Burn:
EMS Triage and Destination Plan**



**Notify Destination or
Contact Medical Control**



DO NOT ROUTINELY HYPERVENTILATE

Evidence of Brain Herniation:

Unilateral or Bilateral Dilation of
Pupils / Posturing

Hyperventilate to maintain
EtCO₂ 30 – 35 mmHg
See Pearls



Head Trauma

Eye Opening Response	Verbal Response	Motor Response
4 = Spontaneous	5 = Oriented	6 = Obeys commands
3 = To verbal stimuli	4 = Confused	5 = Localizes pain
2 = To pain	3 = Inappropriate words	4 = Withdraws from pain
1 = None	2 = Incoherent	3 = Flexion to pain or decorticate
	1 = None	2 = Extension to pain or decerebrate
		1 = None

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- **GCS is a key performance measure used in the EMS Acute Trauma Care Toolkit.**
- **A single episode of hypoxia and / or hypotension can significantly increase morbidity and mortality with head injury.**
- **Hyperventilation in head injury:**
 - Hyperventilation lowers CO₂ and causes vasoconstriction leading to increased intracranial pressure (ICP) and should not be done routinely.**
 - Use in patient with evidence of herniation (blown pupil, decorticate / decerebrate posturing, bradycardia, decreasing GCS).**
 - If hyperventilation is needed, ventilate at 14 – 18 / minute to maintain EtCO₂ between 30 - 35 mmHg.**
 - Short term option only used for severe head injury typically GCS ≤ 8 or unresponsive.**
- **Do not place in Trendelenburg position as this may increase ICP and worsen blood pressure.**
- **Poorly fitted cervical collars may also increase ICP when applied too tightly.**
- **In areas with short transport times, Drug Assisted Airway protocol is not recommended for patients who are spontaneously breathing and who have oxygen saturations of ≥ 90% with supplemental oxygen including BIAD / BVM.**
- **Hypotension:**
 - Limit IV fluids unless patient is hypotensive.**
 - Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).**
 - Usually indicates injury or shock unrelated to the head injury and should be aggressively treated.**
 - Fluid resuscitation should be titrated to maintain at least a systolic BP of > 70 + 2 x the age in years.**
 - Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- **An important item to monitor and document is a change in the level of consciousness by serial examination.**
- **Consider Restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.**
- **Concussions:**
 - Traumatic brain injuries involving any of a number of symptoms including confusion, LOC, vomiting, or headache.**
 - Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.**
 - EMS Providers cannot make return-to-play decisions when evaluating an athlete with suspected concussion. This is outside the scope of practice.**



Multiple Trauma

History

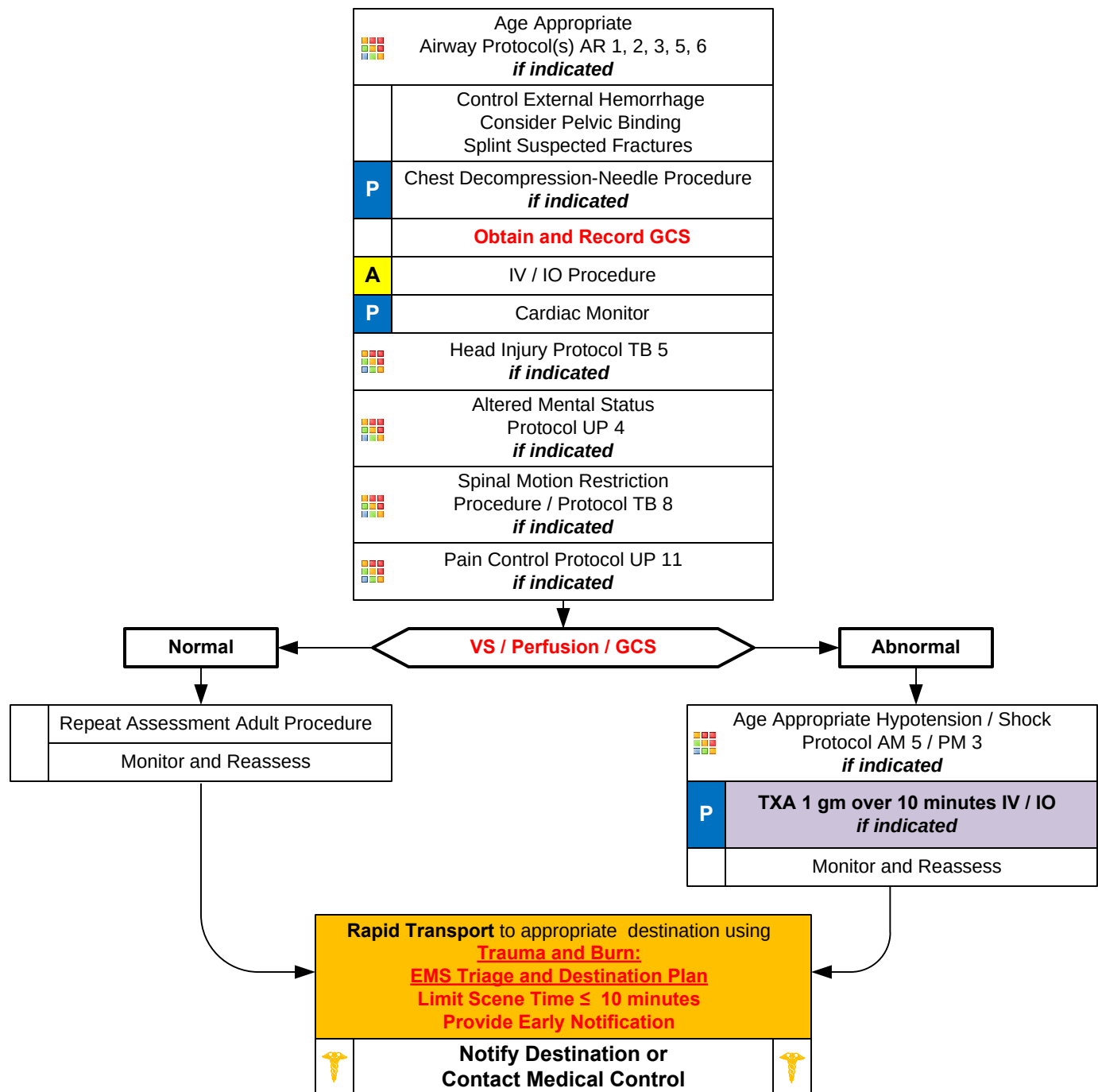
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints / protective equipment
- Past medical history
- Medications

Signs and Symptoms

- Pain, swelling
- Deformity, lesions, bleeding
- Altered mental status or unconscious
- Hypotension or shock
- Arrest

Differential (Life threatening)

- Chest: Tension pneumothorax
Flail chest
Pericardial tamponade
Open chest wound
Hemothorax
- Intra-abdominal bleeding
- Pelvis / Femur fracture
- Spine fracture / Cord injury
- Head injury (see Head Trauma)
- Extremity fracture / Dislocation
- HEENT (Airway obstruction)
- Hypothermia





Multiple Trauma

TXA Criteria

- 18 y/o or greater
- Trauma within 3 hrs
- S/S of Hypovolemic Shock with suspected internal hemorrhage or external hemorrhage uncontrolled by other means (Tourniquet or direct pressure)
- Sustained Tachycardia w/ HR > 110 bpm
- Sustained hypotension w/ BP < 90
- No evidence of patient taking anti-coagulants, thrombin inhibitors, or anti-hemophilic agents
- No evidence or history of intravascular clotting (DVT, PE, CVA)

TXA Loading Dose

1 gm / 100 ml of NaCl or D5W over 10 min

100 mL x 10 gtts set = 100 mL / min or 5 gtts / 3 sec
10 min

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- **Items in Red Text are key performance measures used in the EMS Acute Trauma Care Toolkit**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- **Scene times should not be delayed for procedures. These should be performed en route when possible.**
Rapid transport of the unstable trauma patient to the appropriate facility is the goal.
- **Control external hemorrhage and prevent hypothermia by keeping patient warm.**
- **Consider Chest Decompression with signs of shock and injury to torso and evidence of tension pneumothorax.**
- **Trauma Triad of Death:**
Metabolic acidosis / Coagulopathy / Hypothermia
Appropriate resuscitation measures and keeping patient warm regardless of ambient temperature helps to mitigate metabolic acidosis, coagulopathy, and hypothermia.
- **Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained $\geq 90\%$**
- **Tranexamic Acid (TXA):**
Agencies utilizing TXA must have approval from your T-RAC.
- **Trauma in Pregnancy:**
Providing optimal care for the mother = optimal care for the fetus. After 20 weeks gestation (fundus at or above umbilicus) transport patient on left side with 10 – 20° of elevation.
- **Pediatric Trauma:**
Age specific blood pressure 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years > 70 + (2 x age)mmHg and 11 years and older > 90 mmHg.
- **Geriatric Trauma:**
Evaluate with a high index of suspicion.
Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning.
Risk of death with trauma increases after age 55.
SBP < 110 may represent shock / poor perfusion in patients over age 65.
Low impact mechanisms, such as ground level falls might result in severe injury especially in age over 65.
- See Regional Trauma Guidelines when declaring Trauma Activation.
- Severe bleeding from an extremity not rapidly controlled with direct pressure may necessitate the application of a tourniquet.
- Maintain high-index of suspicion for domestic violence or abuse, pediatric non-accidental trauma, or geriatric abuse.



Radiation Incident

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history / Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

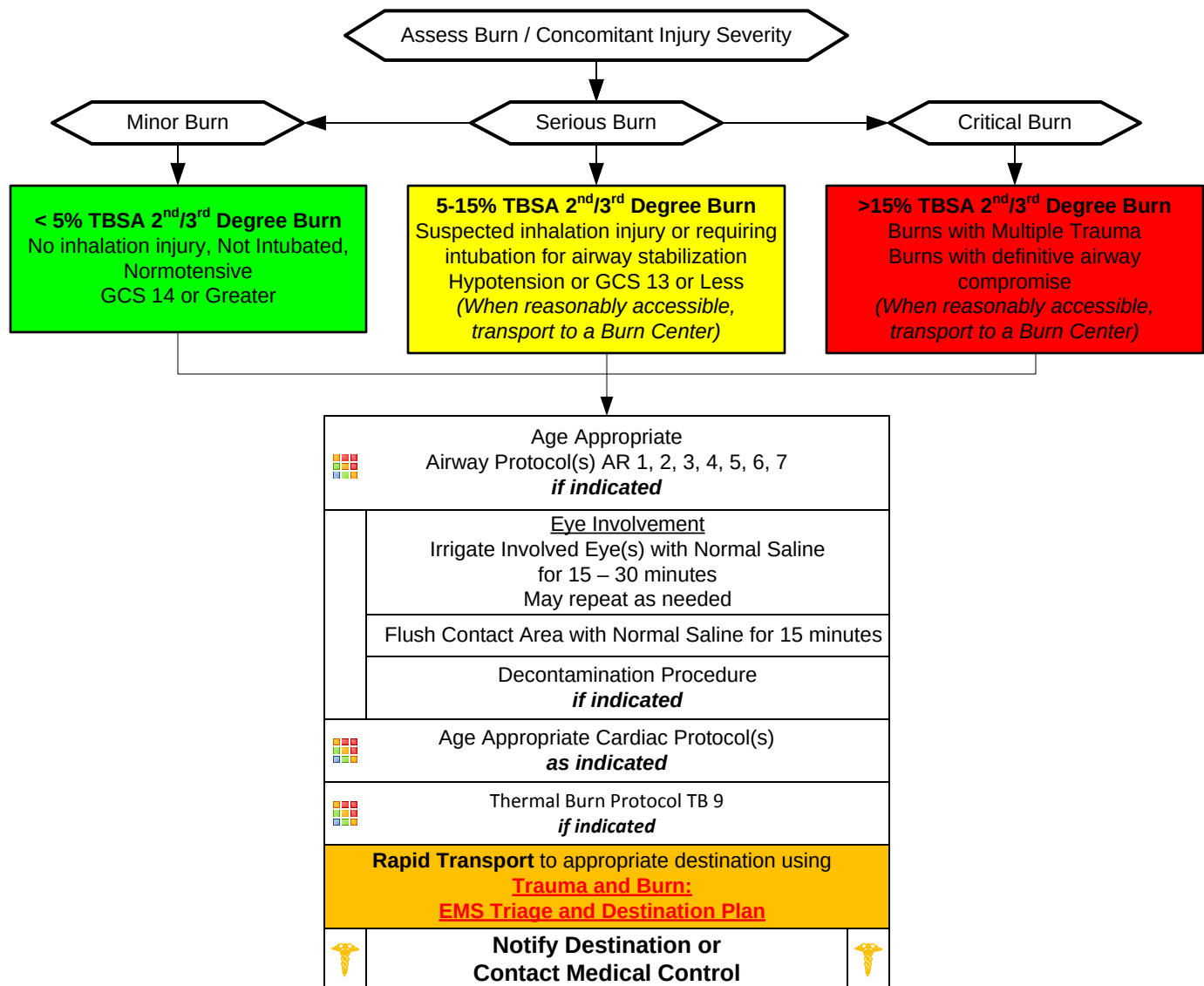
Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension

Differential

- Superficial (1st Degree) red - painful (Don't include in TBSA)
- Partial Thickness (2nd Degree) blistering
- Full Thickness (3rd Degree) painless/charred or leathery skin
- Thermal injury
- Chemical – Electrical injury
- Radiation injury
- Blast injury

Scene Safety / Quantify and Triage Patients / Load and Go with Assessment / Treatment Enroute



Trauma and Burn Protocol Section

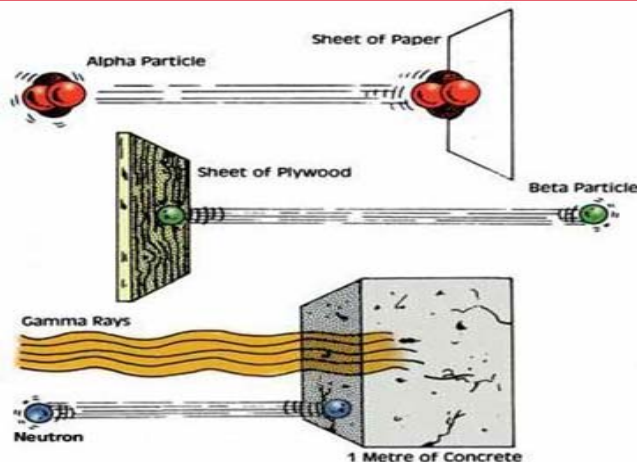
Collateral Injury: Most all injuries immediately seen will be a result of collateral injury, such as heat from the blast, trauma from concussion, treat collateral injury based on typical care for the type of injury displayed.

Qualify: Determine exposure type; external irradiation, external contamination with radioactive material, internal contamination with radioactive material.

Quantify: Determine exposure (generally measured in Grays/Gy). Information may be available from those on site who have monitoring equipment, do not delay transport to acquire this information

Radiation Incident

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Time Phases of Radiation Injury
(Exposure Dose vs Clinical Outcome)

Exposure Dose (Gy)	Prodrome Severity	Manifest Illness - Symptom Severity			Prognosis
		Hematologic	Gastrointestinal	Neurologic	
0.5 to 1.0	+	+	0	0	Survival almost certain
1.0 to 2.0	+/++	+	0	0	Survival >90 percent
2.0 to 3.5	++	++	0	0	Probable survival
3.5 to 5.5	+++	+++	+	0	Death in 50% at 3.5 to 6 wks
5.5 to 7.5	+++	+++	++	0	Death probable in 2-3 wks
7.5 to 10	+++	+++	+++	0*	Death probable in 1-2.5 wks
10 to 20	+++	+++	+++	+++	Death certain in 5-12 days
> 20	+++	+++	+++	+++**	Death certain in 2-5 days

Abbreviations: Gy: dose in Grey;

0: no effects; +: mild; ++: moderate; +++: severe or marked

* Hypotension

** Also cardiovascular collapse, fever, shock

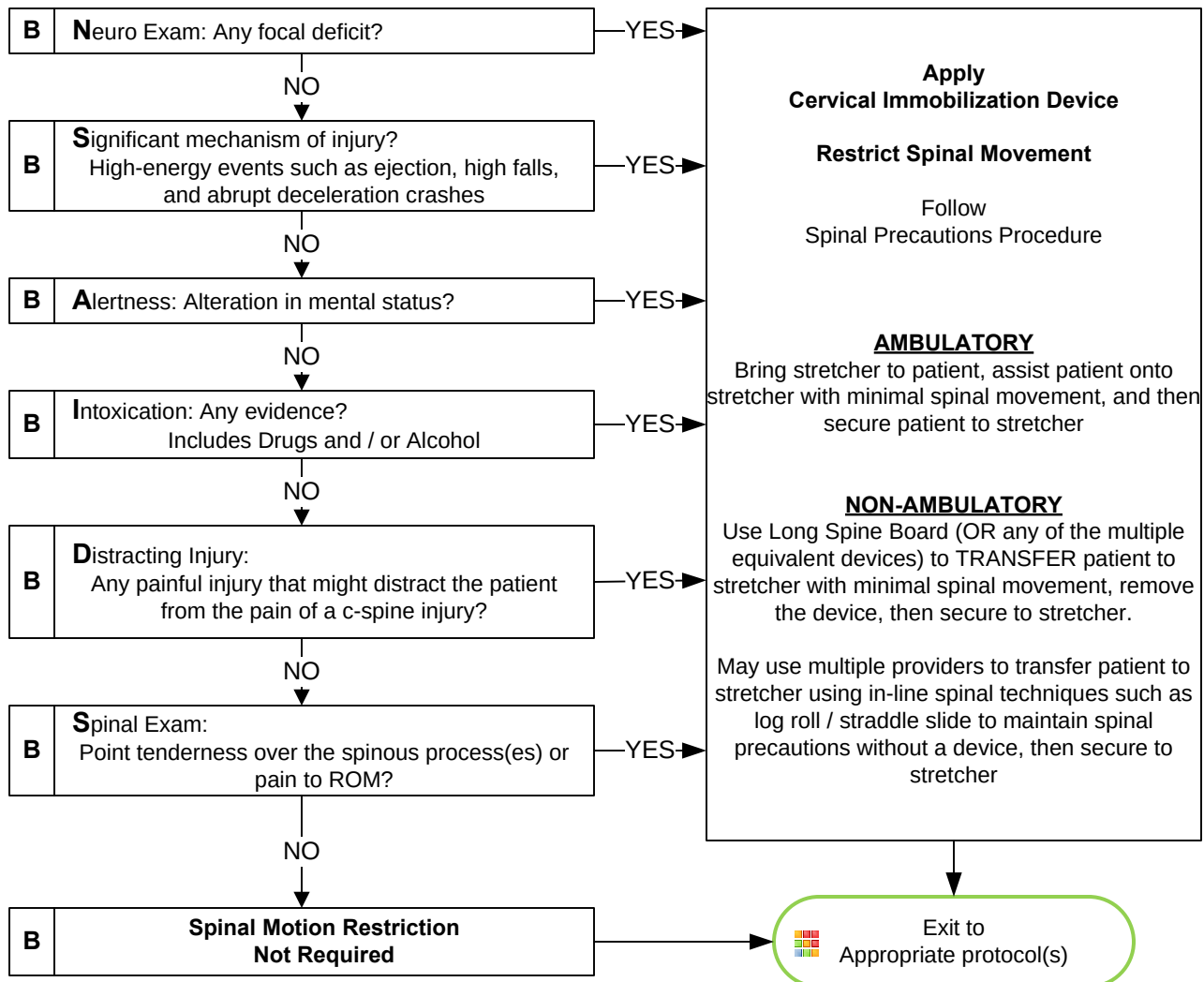
Modified from: Waselenko, JK, MacVittie, TJ, Blakely, WF, et al. Medical management of the acute radiation syndrome: Recommendations of the strategic national stockpile radiation working group. Ann Int Med 2004; 140:1039.

Pearls

- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC's, a dead but decontaminated patient is not a good outcome. Refer to the Decontamination Procedure for more information.
- Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation using tap water. Other water sources may be used based on availability. Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
- Three methods of exposure:**
 - External irradiation
 - External contamination
 - Internal contamination
- Two classes of radiation:**
 - Ionizing radiation (greater energy) is the most dangerous and is generally in one of three states: Alpha Particles, Beta Particles and Gamma Rays.
 - Non-ionizing (lower energy) examples include microwaves, radios, lasers and visible light.
- Radiation burns with early presentation are unlikely, it is more likely this is a combination event with either thermal or chemical burn being presented as well as a radiation exposure. Where the burn is from a radiation source, it indicates the patient has been exposed to a significant source, (> 250 rem).
- Patients experiencing radiation poisoning are not contagious. Cross contamination is only a threat with external and internal contamination.
- Typical ionizing radiation sources in the civilian setting include soil density probes used with roadway builders and medical uses such as x-ray sources as well as radiation therapy. Sources used in the production of nuclear energy and spent fuel are rarely exposure threats as is military sources used in weaponry. Nevertheless, these sources are generally highly radioactive and in the unlikely event they are the source, consequences could be significant and the patient's outcome could be grave.
- The three primary methods of protection from radiation sources:**
 - Limiting time of exposure
 - Distance from
 - Shielding from the source
- Dirty bombs ingredients generally include previously used radioactive material and combined with a conventional explosive device to spread and distribute the contaminated material.
- Refer to Decontamination Procedure / WMD / Nerve Agent Protocol for dirty contamination events.
- If there is a time lag between the time of exposure and the encounter with EMS, key clinical symptom evaluation includes: Nausea/ Vomiting, hypothermia/hyperthermia, diarrhea, neurological/cognitive deficits, headache and hypotension.
- This event may require an activation of the National Radiation Injury Treatment Network, RITN. UNC Hospitals, Wake Forest-Baptist and Duke are the NC hospitals, with burns managed at UNC and Wake Forest.



Selective Spinal Motion Restriction



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients meeting all the above criteria do not require spinal motion restriction. However, patients who fail one or more criteria above require spinal motion restriction, but does NOT require use of the long spine board for immobilization.**
- **Long spine boards are NOT considered standard of care in most cases of potential spinal injury. Spinal motion restriction with cervical collar and securing patient to cot, while padding all void areas is appropriate.**
- **True spinal immobilization is not possible. Spine protection and spinal motion restriction do not equal long spine board.**
- **Spinal motion restriction is always utilized in at-risk patients. These include cervical collar, securing to stretcher, minimizing movement / transfers and maintenance of in-line spine stabilization during any necessary movement / transfers. This includes the elderly or others with body or spine habitus preventing them from lying flat.**
- **Consider spinal motion restriction in patients with arthritis, cancer, dialysis, underlying spine or bone disease.**
- Range of motion (ROM) is tested by touching chin to chest (look down), extending neck (look up), and turning head from side to side (shoulder to shoulder) without posterior cervical mid-line pain. ROM should NOT be assessed if patient has midline spinal tenderness. Patient's range of motion should not be assisted.
- **Immobilization on a long spine board is not necessary where:**
 - Penetrating trauma to the head, neck or torso with no signs / symptoms of spinal injury.
- **Concerning mechanisms that may result in spinal column injury:**
 - Fall from ≥ 3 feet and/or ≥ 5 stairs or steps
 - MVC ≥ 30 mph, rollover, and/or ejection
 - Motorcycle, bicycle, other mobile device, or pedestrian-vehicle crash
 - Diving or axial load to spine
 - Electric shock



Thermal Burn

History

- Type of exposure (heat, gas, chemical)
- Inhalation injury
- Time of Injury
- Past medical history and Medications
- Other trauma
- Loss of Consciousness
- Tetanus/Immunization status

Signs and Symptoms

- Burns, pain, swelling
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/wheezing

Differential

- Superficial (1st Degree) red - painful (Don't include in TBSA)
- Partial Thickness (2nd Degree) blistering
- Full Thickness (3rd Degree) painless/charred or leathery skin
- Thermal injury
- Chemical – Electrical injury
- Radiation injury
- Blast injury

Assess Burn / Concomitant Injury Severity

< 5% TBSA 2nd/3rd Degree Burn
No inhalation injury, Not Intubated,
Normotensive
GCS 14 or Greater
Minor Burn

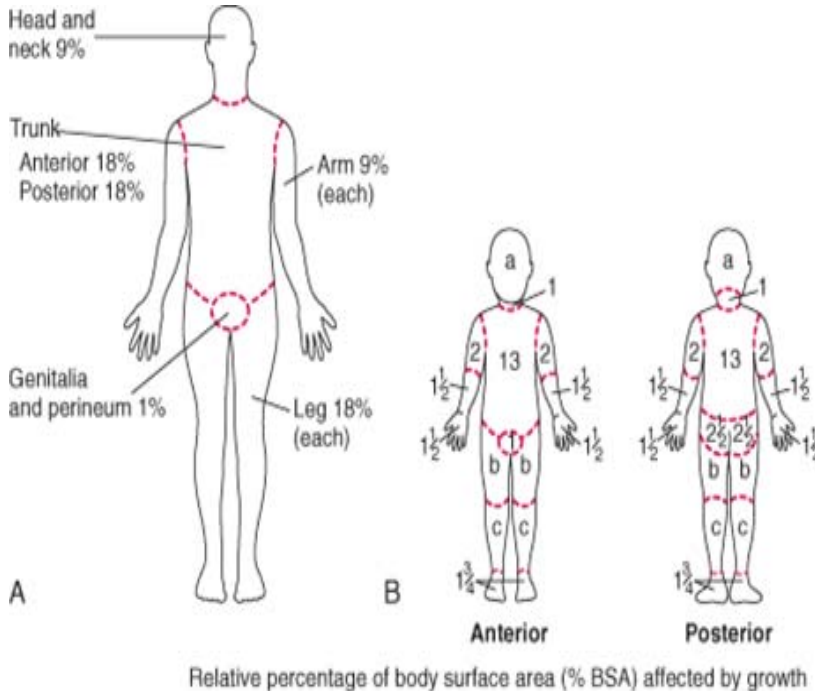
5-15% TBSA 2nd/3rd Degree Burn
Suspected inhalation injury or requiring
intubation for airway stabilization
Hypotension or GCS 13 or Less
(When reasonably accessible,
transport to a Burn Center)
Serious Burn

>15% TBSA 2nd/3rd Degree Burn
Burns with Multiple Trauma
Burns with definitive airway
compromise
(When reasonably accessible,
transport to a Burn Center)
Critical Burn

	Airway Protocol(s) AR 1, 2, 3, 5, 6 <i>as indicated</i>	
	Multiple Trauma Protocol TB 6 <i>if indicated</i>	
	Remove Rings, Bracelets / Constricting Items	
	Dry Clean Sheet or Dressings	
A	IV / IO Procedure Consider 2 IV sites if greater than 15 % TBSA	
	Normal Saline 0.25 mL / kg (x % TBSA) / hr for up to the first 8 hours. <i>(More info below)</i> <i>Lactated Ringers if available</i>	
	Pain Control Protocol UP 11 <i>if indicated</i>	
	Carbon Monoxide / Cyanide Protocol TE 2 <i>if indicated</i>	
	Monitor and Reassess	
Rapid Transport to appropriate destination using <u>Trauma and Burn:</u> <u>EMS Triage and Destination Plan</u>		
		
	Notify Destination or Contact Medical Control	

1. Lactated Ringers preferred over Normal Saline. Use if available, if not change over once available.
2. Formula example; an 80 kg (176 lbs.) patient with 50% TBSA will need 1000 cc of fluid per hour.

Thermal Burn



Body Part	Age				
	0 yr	1 yr	5 yr	10 yr	15 yr
a = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2
b = 1/2 of 1 thigh	2 3/4	3 1/4	4	4 1/4	4 1/2
c = 1/2 of 1 lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4

Rule of Nines

- Seldom do you find a complete isolated body part that is injured as described in the Rule of Nines.
- More likely, it will be portions of one area, portions of another, and an approximation will be needed.
- For the purpose of determining the extent of serious injury, differentiate the area with minimal or 1st degree burn from those of partial (2nd) or full (3rd) thickness burns.
- For the purpose of determining Total Body Surface Area (TBSA) of burn, include only Partial and Full Thickness burns. Report the observation of other superficial (1st degree) burns but do not include those burns in your TBSA estimate.
- Some texts will refer to 4th 5th and 6th degree burns. There is significant debate regarding the actual value of identifying a burn injury beyond that of the superficial, partial and full thickness burn at least at the level of emergent and primary care. For our work, all are included in Full Thickness burns.
- Other burn classifications in general include:
 - 4th referring to a burn that destroys the dermis and involves muscle tissue.
 - 5th referring to a burn that destroys dermis, penetrates muscle tissue, and involves tissue around the bone.
 - 6th referring to a burn that destroys dermis, destroys muscle tissue, and penetrates or destroys bone tissue.

Estimate spotty areas of burn by using the size of the patient's palm as 1 %

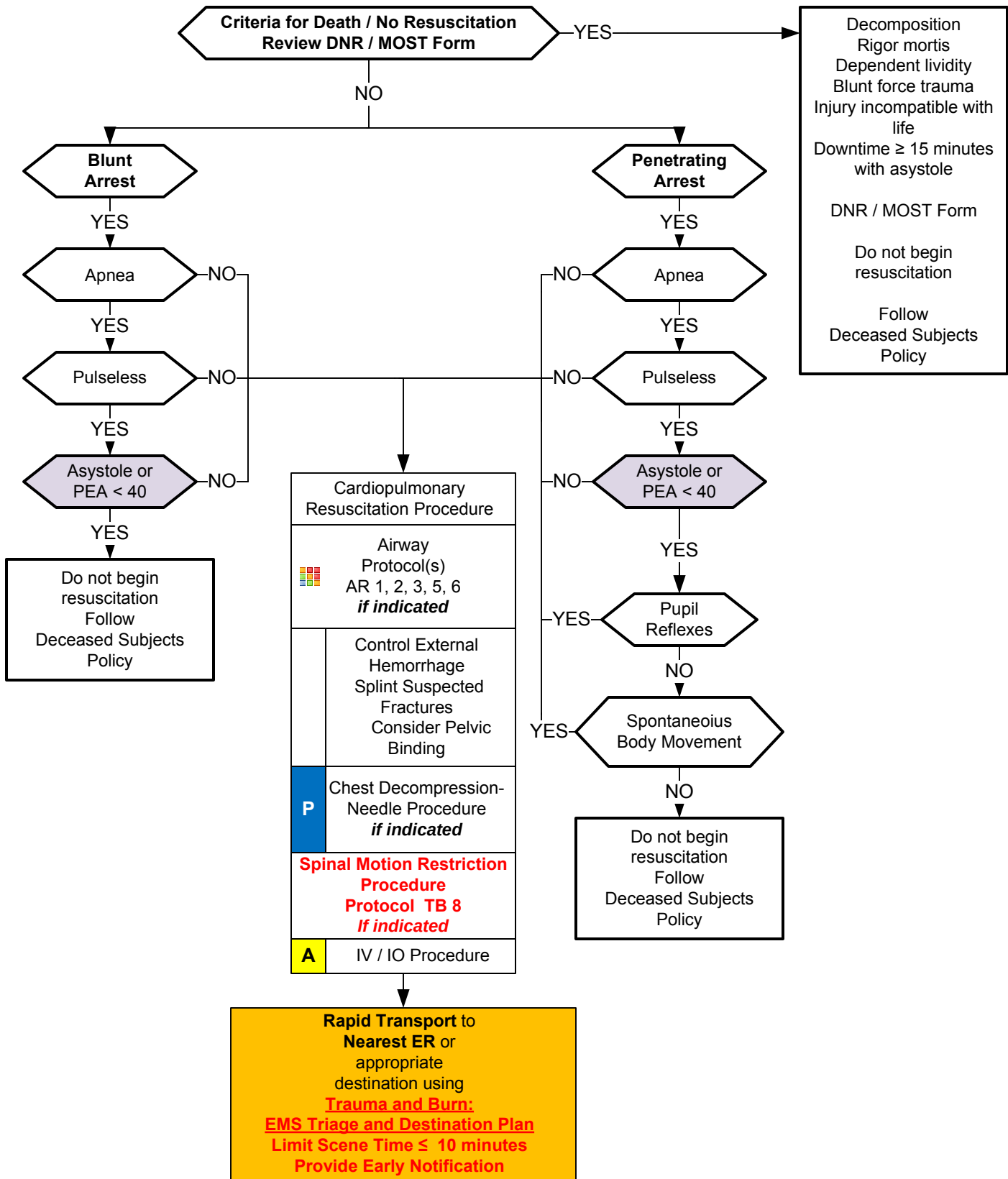
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Pearls

- Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- Green, Yellow and Red in burn severity do not apply to the Start / JumpStart Triage System.**
- Critical or Serious Burns:**
 - > 5-15% total body surface area (TBSA) 2nd or 3rd degree burns, or
 - 3rd degree burns > 5% TBSA for any age group, or
 - circumferential burns of extremities, or
 - electrical or lightning injuries, or
 - suspicion of abuse or neglect, or
 - inhalation injury, or
 - chemical burns, or
 - burns of face, hands, perineum, or feet
- Require direct transport to a Burn Center. Local facility should be utilized only if distance to Burn Center is excessive or critical interventions such as airway management are not available in the field.
- Burn patients are trauma patients, evaluate for multisystem trauma.
- Assure whatever has caused the burn is no longer contacting the injury. (Stop the burning process!)
- Early intubation is required when the patient experiences significant inhalation injuries.
- 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, must maintain normal body temperature.
- Evaluate the possibility of geriatric abuse with burn injuries in the elderly.
- Never administer IM pain injections to a burn patient.



Traumatic Arrest (Optional)





Traumatic Arrest (Optional)

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Pearls.

- **Recommended Exam:** Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro
- **Withholding resuscitative efforts with blunt and penetrating trauma victims who meet criteria is appropriate.**
- **If transport time to Trauma Center is < 15 minutes use of ECG monitor may delay resuscitation.**
- **Rhythm determination is more helpful in rural settings or where transport to nearest facility is > 15 minutes. Omit from algorithm where appropriate.**
- **Organized rhythms for the purposes of this protocol include Ventricular Tachycardia, Ventricular Fibrillation and PEA.**
- **Wide, bizarre rhythms such as Idioventricular and severely bradycardic rhythms < 40 BPM are not organized rhythms.**
- **First arriving EMS personnel should make the assessment concerning agonal respirations, pulselessness, asystole or PEA < 40, pupillary reflexes and spontaneous body movements.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Consider early IO placement if available and difficult IV anticipated.**
- **DO NOT HYPERVENTILATE:** If no advanced airway (BIAD, ETT) compressions to ventilations are 30:2. If advanced airway in place ventilate 8 – 10 breaths per minute.
- **ALS procedures should optimally be performed during rapid transport.**
- **Time considerations:**
 - **From the time cardiac arrest is identified, if CPR is performed $\geq$ 15 minutes with no ROSC consider termination of resuscitation.**
 - **From the time cardiac arrest is identified, if transport time to closest Trauma Center is > 15 minutes consider termination of resuscitation.**
- **Lightning strike, drowning or in situations causing hypothermia resuscitation should be initiated.**
- **Where multiple lightning strike victims are found used Reverse Triage: Begin CPR where apneic / pulseless**
- **Agencies utilizing Targeted Temperature Management Protocol should not cool the trauma patient, but rather make every effort to maintain warmth.**



Pediatric Asystole / PEA

History

- Events leading to arrest
- Estimated downtime
- SAMPLE
- Existence of terminal illness
- Airway obstruction
- Hypothermia
- Suspected abuse

Signs and Symptoms

- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential

- Respiratory failure
- Foreign body
- Infection (croup, epiglottitis)
- Congenital heart disease
- See Reversible Causes below



Pediatric Pulseless Arrest Protocol

Criteria for Death / No Resuscitation Review DNR / MOST Form

YES

Decomposition
Rigor mortis
Dependent lividity
Blunt force trauma
Injury incompatible with life
Extended downtime with asystole

Do not begin resuscitation

Follow
Deceased Subjects
Policy

NO

Begin Continuous CPR Compressions
Push Hard (1.5 inches Infant / 2 inches in Children)
($\geq 1/3$ AP Diameter of Chest)
Push Fast (100 - 120 / min)
Change Compressors every 2 minutes
(Limit changes / pulse checks ≤ 10 seconds)

Ventilate 1 breath every 6 seconds
15:2 Compression:Ventilation if no Advanced Airway

AED Procedure
if available

Search for Reversible Causes

Blood Glucose Analysis Procedure

Cardiac Monitor

Consider Chest Decompression-Needle Procedure

IV / IO Procedure

Epinephrine 1:10,000
0.01 mg/kg IV / IO Maximum Single Dose 1mg
Or
Epinephrine 1:1,000 0.1 mg / kg ETT Maximum 2.5 mg
Repeat every 3 - 5 minutes

Normal Saline Bolus 20 mL/kg IV / IO
May repeat as needed
Maximum 60 mL/kg

Consider
Epinephrine: 0.1 - 1 mcg / kg / min IV / IO
Or
Dopamine: 2 - 20 mcg/kg/min IV / IO
Or
Norepinephrine: 1 - 3 mcg/kg/min IV / IO

See Pearls

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol



Notify Destination or
Contact Medical Control



Pediatric Asystole / PEA

Epinephrine Infusion: 0.1 - 1 mcg/kg/min

Add 1mg epinephrine 1:1,000 to 100 ml D5W or NS = 1,000 mcg in 100 mL or 10 mcg/ml

Pt weight (Kg) x Dose x 6 = ____ gtts / min (using **60 gtts** drop set)

example: 20 kg pt x 0.1 mcg/min x 6 = **12 gtts / min** or **1 gtt / 5 sec**

Dopamine Infusion: Dose 2-20 mcg / kg / min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using **60 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

Pearls

- **Recommended Exam: Mental Status**
- **Beginning compressions first is recommended in pediatric patients during CPR. However, the majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When 1 provider is present, perform 30 compressions with 2 ventilations.**
- **When 2 providers are present, perform 15 compressions with 2 ventilations.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: If advanced airway in place ventilate 8 – 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **High-Quality CPR:**
 - Make sure chest compressions are being delivered at 100 – 120 / min.
 - Make sure chest compressions are adequate depth for age and body habitus.
 - Make sure you allow full chest recoil with each compression to provide maximum perfusion.
 - Minimize all interruptions in chest compressions to < 10 seconds.
 - Do not hyperventilate, ventilate every 6 seconds only.
- **Use AED or apply ECG monitor / defibrillator as soon as available.**
- Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or BIAD. Patient survival is often dependent on proper ventilation and oxygenation / Airway Interventions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach / Pit-Crew Approach assigning responders to predetermined tasks. Refer to optional protocol.
- **Vasopressor agents:**
 - Dopamine 2 – 20 mcg / kg / min IV / IO**
 - Epinephrine 0.1 – 1 mcg / kg / min IV / IO**
 - Norepinephrine 1 – 3 mcg / kg / min IV / IO**
 - Dose Calculation: mL / hour = kg x dose(mcg / kg / min) x 60 (min / hr) / concentration (mcg / mL)**
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg)** via ETT (**Maximum 2.5 mg**)



Pediatric Bradycardia With Poor Perfusion

History

- Past medical history
- Foreign body exposure
- Respiratory distress or arrest
- Apnea
- Possible toxic or poison exposure
- Congenital disease
- Medication (maternal or infant)

Signs and Symptoms

- Decreased heart rate
- Delayed capillary refill or cyanosis
- Mottled, cool skin
- Hypotension or arrest
- Altered level of consciousness

Differential

- Respiratory failure, Foreign body, Secretions, Infection (croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax
- Hypothermia
- Toxin or medication
- Hypoglycemia
- Acidosis

Bradycardia
Causing Hypotension / AMS
Poor Perfusion / Shock
Typically HR < 50/min

Suspected Beta-Blocker or Calcium Channel Blocker



Follow Pediatric Toxicology Protocol

 Pediatric Airway Protocol(s) AR 5, 6 as indicated	
	Identify underlying cause
	Blood Glucose Analysis Procedure
P	Cardiac Monitor
A	Search for reversible causes
	IV / IO Procedure
P	Normal Saline Bolus 20 ml / kg IV / IO Repeat as needed x 3 Maximum 60 mL / kg
	Epinephrine: 0.1 – 1 mcg / kg / min IV / IO Or Dopamine: 2 – 20 mcg/kg/min IV / IO Or Norepinephrine: 1 – 2 mcg/kg/min IV / IO Maximum 3 mcg/kg/min Titrate to age appropriate SBP $\geq 70 + 2 \times \text{Age}$
	Atropine 0.02 mg / kg IV / IO May repeat x 1 Minimum single dose 0.1 mg Maximum single dose 0.5 mg
	Consider Cardiac Pacing Procedure

Exit to
 Appropriate Pediatric Protocol(s)

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

Tension pneumothorax
Tamponade; cardiac
Toxins
Thrombosis; pulmonary (PE)
Thrombosis; coronary (MI)

Bradycardia / Heart Rate < 60 Persists
AND
Poor Perfusion / Shock
Cardiac arrest?

Exit to
 Pediatric Cardiac Arrest Protocol PC 1, 4, 6

 **Notify Destination or Contact Medical Control** 

Pediatric Bradycardia With Poor Perfusion

Epinephrine Infusion: 0.1 - 1 mcg/kg/min

Add 1mg epinephrine 1:1,000 to 100 ml D5W or NS = 1,000 mcg in 100 mL or 10 mcg/ml

Pt weight (Kg) x Dose x 6 = ____ gtts / min (using **60 gtts** drop set)

example: 20 kg pt x 0.1 mcg/min x 6 = **12 gtts / min** or **1 gtt / 5 sec**

Dopamine Infusion: Dose 2-20 mcg / kg / min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

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Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using **60 gtts** drip set)

example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Use Length-based Resuscitation Tape for drug dosages if applicable.**
- **Ensure patent airway, breathing, and circulation as needed. Administer oxygen. Reassess if bradycardia persists after adequate oxygenation and ventilation.**
- **Bradycardia with adequate pulses, perfusion, and respirations requires no emergency intervention. Monitor and continue evaluation with reassessments.**
- **With HR < 60 / min and poor perfusion despite adequate ventilation and oxygenation, begin CPR immediately.**
- **Epinephrine is first drug choice for persistent, symptomatic bradycardia.**
- **Atropine is second choice, unless there is evidence of increased vagal tone or a primary AV conduction block, then given Atropine first.**
- **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.
 - Pediatric patients requiring external transcutaneous pacing require the use of pads appropriate for pediatric patients per the manufacturers guidelines.
- **Do not delay therapy when bradycardia is evident and no ECG monitor is available.**
- **Vasopressor agents:**
 - Dopamine 2 – 20 mcg / kg / min IV / IO
 - Epinephrine 0.1 – 1 mcg / kg / min IV / IO
 - Norepinephrine 1 – 3 mcg / kg / min IV / IO
 - Dose Calculation: mL / hour = kg x dose(mcg / kg / min) x 60 (min / hr) / concentration (mcg / mL)
- The majority of pediatric arrests are due to airway problems.
- Most maternal medications pass through breast milk to the infant so maintain high-index of suspicion for OD-toxins.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia. Many other agents a child ingests can cause bradycardia, often is a single dose.



Pediatric Pulmonary Edema / CHF

History

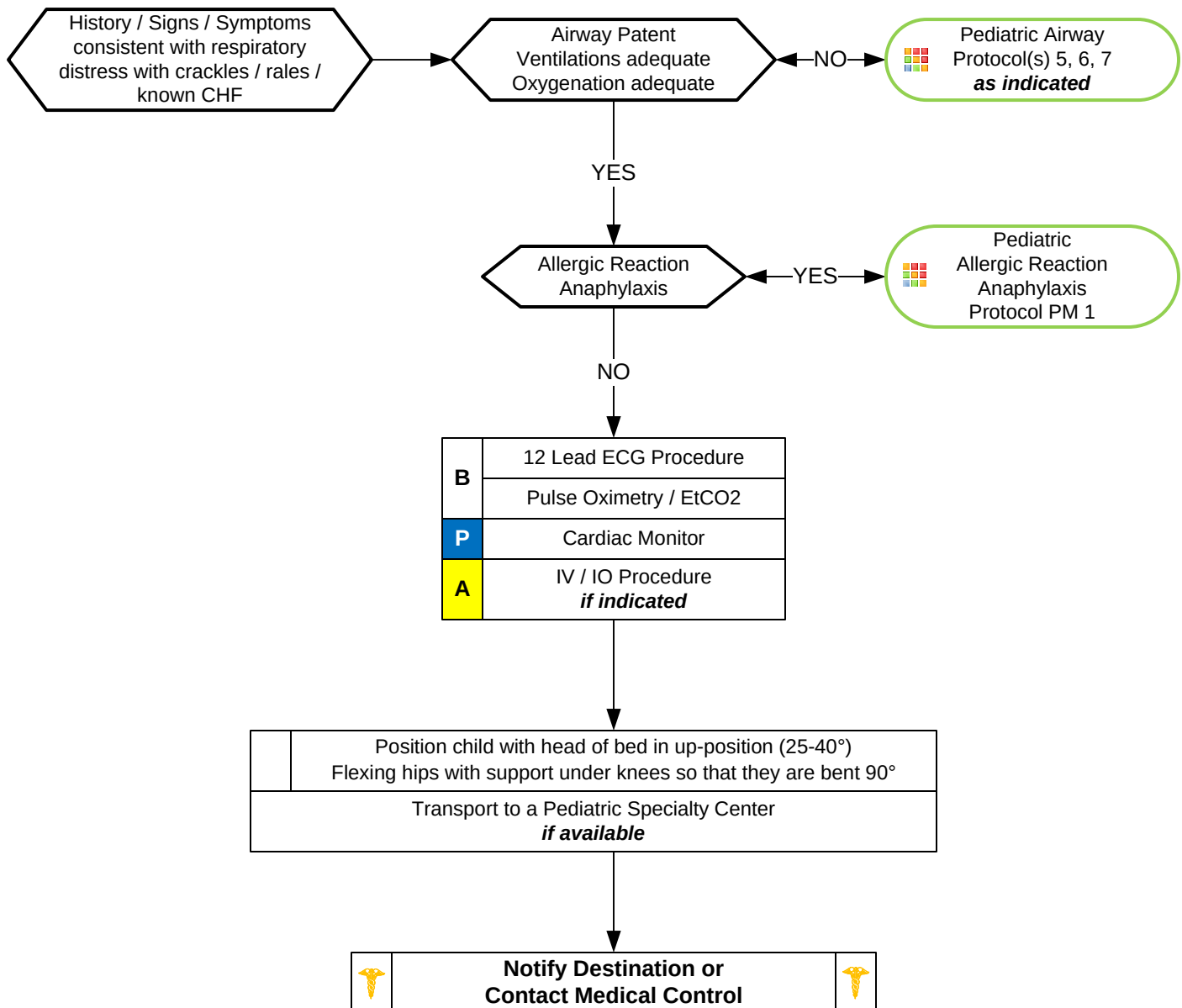
- Congenital Heart Disease
- Chronic Lung Disease
- Congestive heart failure
- Past medical history

Signs/Symptoms

- Infant: Respiratory distress, poor feeding, lethargy, weight gain, +/- cyanosis
- Child/Adolescent: Respiratory distress, bilateral rales, apprehension, orthopnea, jugular vein distention (rare), pink, frothy sputum, peripheral edema, diaphoresis, chest pain
- Hypotension, shock

Differential

- Congestive heart failure
- Asthma
- Anaphylaxis
- Aspiration
- Pleural effusion
- Pneumonia
- Pulmonary embolus
- Pericardial tamponade
- Toxic Exposure





Pediatric Pulmonary Edema / CHF

Congenital Heart Defects: 4-12 out of 1000 live births. 25% can be discharged before diagnosis.

1. Congenital cyanotic heart disease can show up in neonates that are in the first few days to weeks. They have a lesion that gets much worse when the patent ductus arteriosus closes! It allows deoxygenated blood to get to the lungs. The patient has a right to left shunt (allows desaturated blood to bypass the lungs and get into the systemic circulation).
2. Hypoplastic left heart syndrome and aortic coarctation can present in profound shock when the ductus closes.
3. Neonates can not increase stroke volume and must rely on tachycardia to increase cardiac output. Dehydration or a relative bradycardia can decrease cardiac output.
4. Differential diagnosis: right to left shunt: Tetralogy of fallot, Transposition of the great artery, tricuspid atresia, total anomalous pulmonary venous return, truncus arteriosus, pulmonary atresia, Epstein abnormality, hypoplastic left heart syndrome.

"Tet Spell" = acute increase in right to left shunt

Hypercyanotic Spell

1. Pulmonary valve stenosis
2. VSD (Ventricular Septal Defect)
3. Overriding Aorta
4. Right ventricular hypertrophy

Knee to chest- This maneuver increases systemic vascular resistance by kinking the femoral arteries this increases systemic vascular resistance by decreasing the right to left shunting through the VSD

Morphine – Mechanism of action is unknown but it is supposed to break the cycle of agitation and hyperapnea and may have direct effects on the infundibulum

Pulmonary valve stenosis:

Some believe that the infundibulum is the primary event

Pearls

- **Recommended exam: Mental status, Respiratory, Cardiac, Skin, Neuro**
- **Contact Medical Control early in the care of the pediatric cardiac patient.**
- **Most children with CHF have a congenital heart defect, obtain a precise past medical history.**
- **Congenital heart disease varies by age:**
 - < 1 month: Tetralogy of Fallot, Transposition of the great arteries, Coarctation of the aorta.
 - 2 – 6 months: Ventricular septal defects (VSD), Atrioseptal defects (ASD).
 - Any age: Myocarditis, Pericarditis, SVT, heart blocks.
- **Treatment of Congestive Heart Failure / Pulmonary edema may vary depending on the underlying cause and may include the following with consultation by Medical Control:**
 - Morphine Sulfate: 0.1 mg/kg IV / IO. Max single dose 5mg/dose
 - Fentanyl: 1 mcg/kg IV / IO. Max single dose 50 mcg.
 - Nitroglycerin: Dose determined after consultation of Medical Control.
 - Lasix 1 mg/kg IV / IO.
 - Agency specific vasopressor.
- Do not assume all wheezing is pulmonary, especially in a cardiac child: avoid albuterol unless strong history of recurrent wheezing secondary to pulmonary etiology (discuss with Medical Control)



Pediatric Cardiac Arrest

History

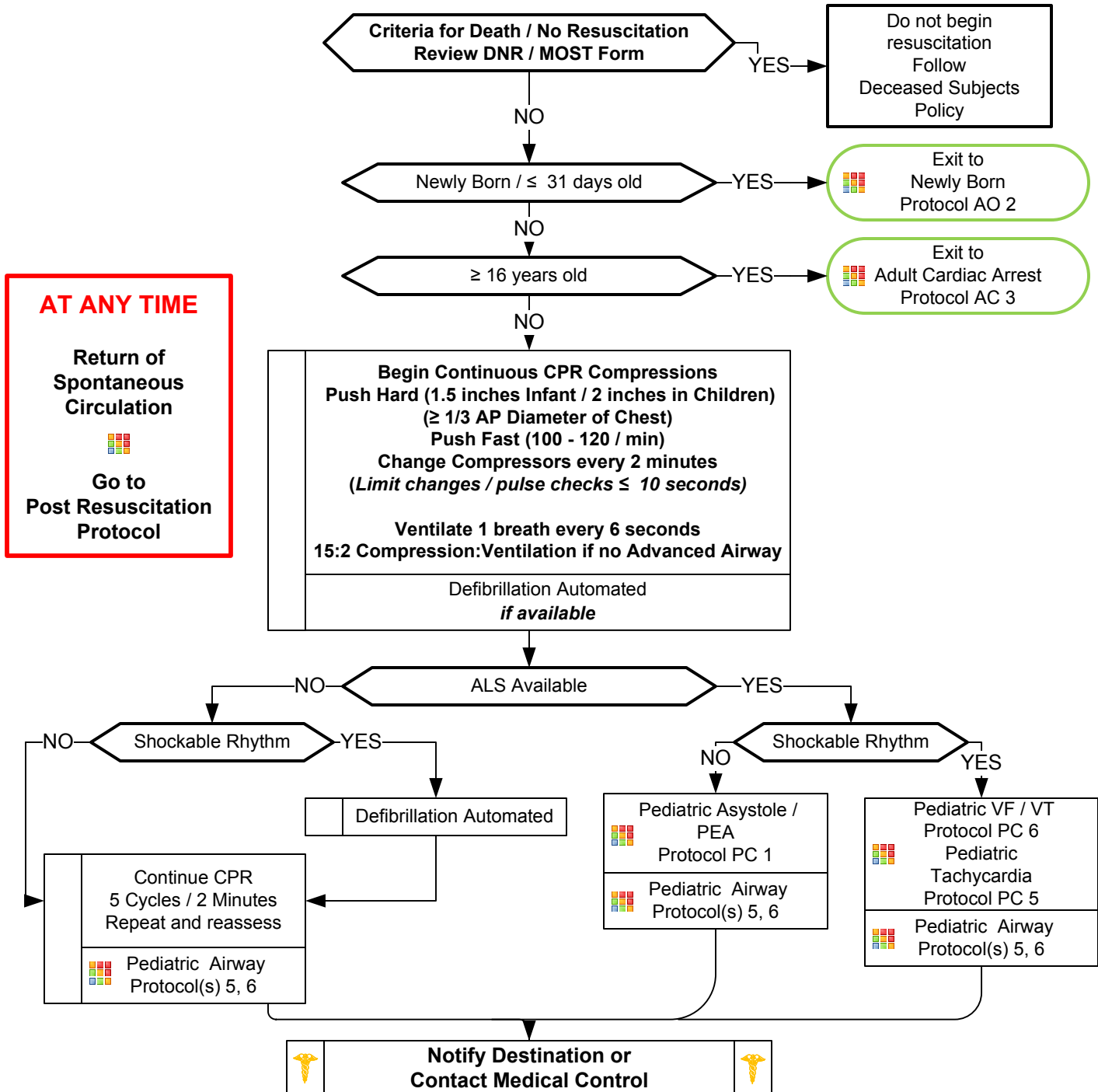
- Time of arrest
- Medical history
- Medications
- Possibility of foreign body
- Hypothermia

Signs and Symptoms

- Unresponsive
- Cardiac arrest

Differential

- Respiratory failure: Foreign body, Secretions, Infection (croup, epiglottitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax, cardiac tamponade, pulmonary embolism
- Hypothermia
- Toxin or medication
- Electrolyte abnormalities (Glucose, K)
- Acidosis





Pediatric Cardiac Arrest

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Pearls

- **Recommended Exam: Mental Status**
- **Beginning compressions first is recommended in pediatric patients during CPR. However, the majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When 1 provider is present, perform 30 compressions with 2 ventilations.**
- **When 2 providers are present, perform 15 compressions with 2 ventilations.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: If advanced airway in place ventilate 8 – 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Defibrillation: First defibrillation is 2 J/kg, second defibrillation is 4 J/kg, subsequent shocks ≥ 4 J/kg (Maximum 10 J/kg or adult dose)**
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
 - Maternal Arrest** - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
 - Renal Dialysis / Renal Failure** - Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
 - Opioid Overdose** - Naloxone cannot be recommended in opioid-associated cardiac arrest. If suspected, attention to airway, oxygenation, and ventilation increase in importance. Naloxone is not associated with improved outcomes in cardiac arrest.
 - Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike** – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
 - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach / Pit-Crew Approach assigning responders to predetermined tasks. Refer to optional protocol.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg) via ETT (Maximum 2.5 mg)**



Pediatric Tachycardia

History

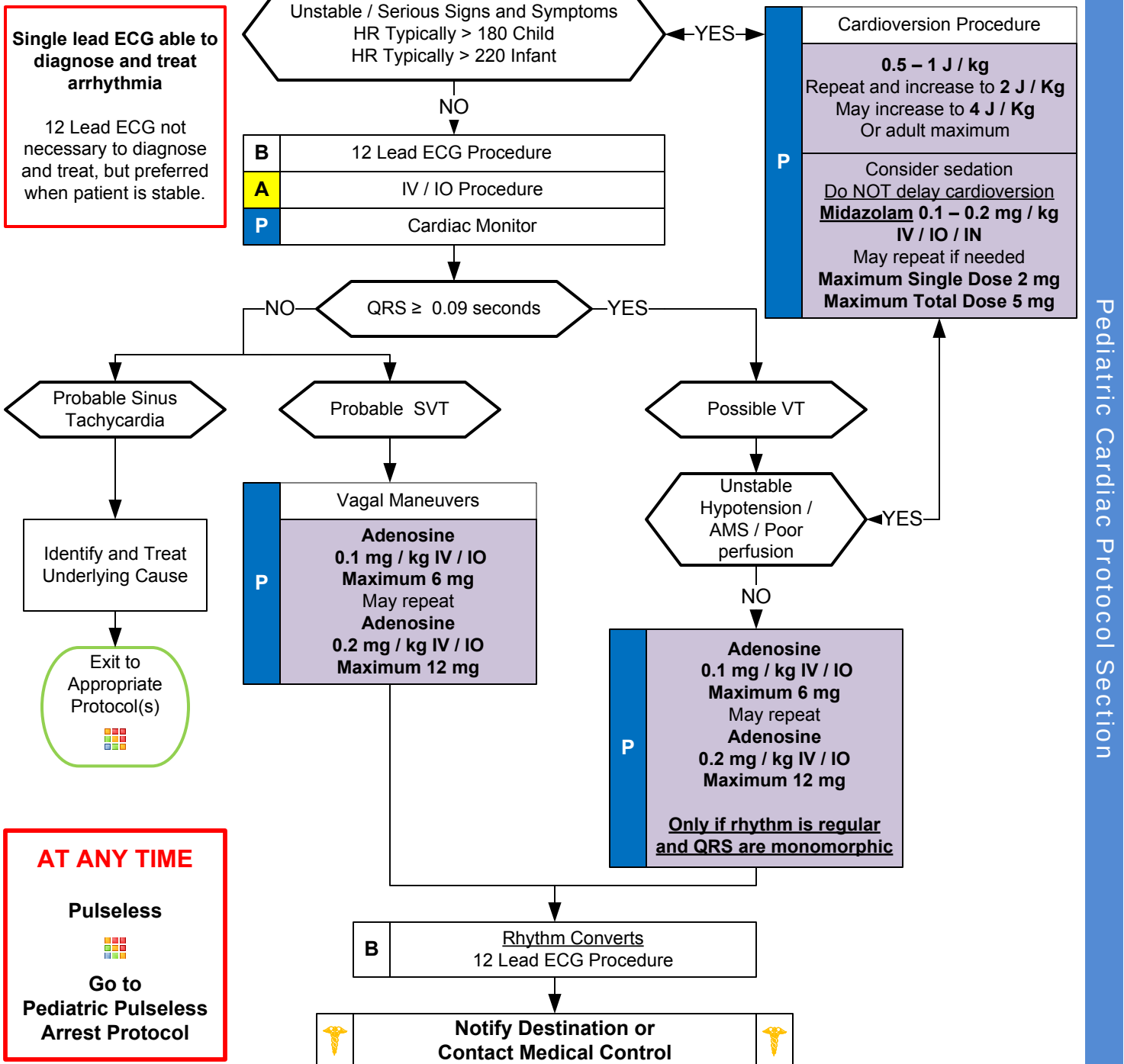
- Past medical history
- Medications or Toxic Ingestion (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

Signs and Symptoms

- Heart Rate: Child > 180/bpm
Infant > 220/bpm
- Pale or Cyanosis
- Diaphoresis
- Tachypnea
- Vomiting
- Hypotension
- Altered Level of Consciousness
- Pulmonary Congestion
- Syncope

Differential

- Heart disease (Congenital)
- Hypo / Hyperthermia
- Hypovolemia or Anemia
- Electrolyte imbalance
- Anxiety / Pain / Emotional stress
- Fever / Infection / Sepsis
- Hypoxia, Hypoglycemia
- Medication / Toxin / Drugs (see HX)
- Pulmonary embolus
- Trauma, Tension Pneumothorax





Pediatric Tachycardia

Magnesium Sulfate Infusion:

- Torsades de Pointes non-arrest **Dose over 10 min**

Add 40 mg/kg of Mag to 100 mL D5W or NaCl & infuse using 10 gtts set

$$\frac{100 \text{ mL} \times 10 \text{ gtts}}{10 \text{ min}} = 100 \text{ gtts / min} \quad \text{or} \quad 5 \text{ gtts / 3 sec}$$

- Torsades w/ arrest **Dose over 2 min**

Dilute 40 mg/kg of Mag Sulfate with 10 mL of NS and slow IVP

Mag is supplied: 1gm / 2 ml or 50mg / 0.1 ml

Amiodarone Infusion: 5mg/kg over 10 min

- Add 5 mg/kg of Amiodarone to 100 mL D5W & infuse using 10 gtts set

$$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{20 \text{ min}} = 100 \text{ mL / min} \quad \text{or} \quad 5 \text{ gtts / 6 sec.}$$

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Serious Signs and Symptoms:**
 - Respiratory distress / failure.
 - Signs of shock / poor perfusion with or without hypotension.
 - AMS
 - Sudden collapse with rapid, weak pulse
- **Narrow Complex Tachycardia (≤ 0.09 seconds):**
 - Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 beats / minute. Children usually < 180 beats / minute.
 - SVT: > 90 % of children with SVT will have a narrow QRS (≤ 0.09 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / minute.
 - Atrial Flutter / Fibrillation
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
 - SVT with aberrancy.
 - VT: Uncommon in children. Rates may vary from near normal to > 200 / minute. Most children with VT have underlying heart disease / cardiac surgery / long QT syndrome / cardiomyopathy.
 - Amiodarone 5 mg / kg over 20 – 60 minutes** are recommended agents. They should not be administered together. Consultation with Medical Control is advised when these agents are considered.
- **Torsades de Pointes / Polymorphic (multiple shaped) Tachycardia:**
 - Rate is typically 150 to 250 beats / minute.
 - Associated with long QT syndrome, hypomagnesaemia, hypokalemia, many cardiac drugs.
 - May quickly deteriorate to VT.
 - Administer **Magnesium Sulfate 40 mg / kg IV / IO over 10 minutes**. Cardiac arrest given 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 careful not to occlude the airway.
- 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 Diazepam, Lorazepam, or Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Generally, the maximum sinus tachycardia rate is 220 – the patient's age in years.



Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia

History

- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Airway obstruction
- Hypothermia

Signs and Symptoms

- Unresponsive
- Cardiac Arrest

Differential

- Respiratory failure / Airway obstruction
- Hyper / hypokalemia, Hypovolemia
- Hypothermia, Hypoglycemia, Acidosis
- Tension pneumothorax, Tamponade
- Toxin or medication
- Thrombosis: Coronary / Pulmonary Embolism
- Congenital heart disease

Pediatric Pulseless Arrest Protocol

	Begin Continuous CPR Compressions Push Hard (1.5 inches Infant / 2 inches in Children) (≥ 1/3 AP Diameter of Chest) (Push Fast (100 - 120 / min) Change Compressors every 2 minutes (Limit changes / pulse checks ≤ 10 seconds) Ventilate 1 breath every 6 seconds 15:2 Compression:Ventilation if no Advanced Airway
A	Defibrillation Automated <i>if available</i>
	IV / IO Procedure
	<u>Epinephrine</u> 1:10,000 0.01 mg/kg IV / IO Maximum 1mg Or <u>Epinephrine</u> 1:1000 0.1 mg / kg ETT Maximum 2.5 mg Repeat every 3 – 5 minutes
P	Defibrillation Manual Procedure 2 J / Kg
	<u>If Rhythm Refractory</u> Continue CPR and give Agency specific Anti-arrhythmic(s). Continue epinephrine during compressions. Continue CPR up to point where you are ready to defibrillate with device charged. Repeat pattern during resuscitation.
P	<u>Amiodarone</u> 5 mg/kg IV / IO Repeat every 5 minutes Maximum Repeat Dose 150 mg Max dose 300 mg Max <u>total</u> dose 15 mg/kg Or <u>Lidocaine</u> 1 mg/kg IV / IO Repeat 0.5 mg/kg Max single dose 100 mg Max <u>total</u> dose 3 mg/kg
	Defibrillation Manual Procedure 4 J / Kg Subsequent shocks ≥ 4 J / kg Maximum 10 J / kg or adult dose

AT ANY TIME

Return of
Spontaneous
Circulation



Go to
Post Resuscitation
Protocol

Persistent VF / VT
Or
Torsades de Points

Magnesium Sulfate
40 mg/kg IV / IO over
1 – 2 minutes
May repeat
every 5 minutes
Maximum 2 g



**Notify Destination or
Contact Medical Control**





Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia

Cycle of treatment in refractory VF and P VTach:

Drug → Circulate → Shock → Drug → Circulate → Shock → Drug → Circulate → Shock →

- Torsades w/ arrest **Dose over 2 min**

Dilute 40 mg/kg of Mag Sulfate with 10 mL of NS and slow IVP

Pearls

- **Recommended Exam: Mental Status**
- **Beginning compressions first is recommended in pediatric patients during CPR. However, the majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When 1 provider is present, perform 30 compressions with 2 ventilations.**
- **When 2 providers are present, perform 15 compressions with 2 ventilations.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress $\geq 1/3$ anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: If advanced airway in place ventilate 8 – 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Defibrillation:** First defibrillation is 2 J/kg, second defibrillation is 4 J/kg, subsequent shocks ≥ 4 J/kg (Maximum 10 J/kg or adult dose)
- **End Tidal CO₂ (EtCO₂)**
 - If EtCO₂ is < 10 mmHg, improve chest compressions.
 - If EtCO₂ spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Antiarrhythmic agents:**
 - Adenosine:** First dose: 0.1 mg / kg (Maximum 6 mg) Second dose: 0.2 mg / kg (Maximum 12 mg)
 - Amiodarone:** 5 mg / kg IV / IO (single dose Maximum 300 mg). May repeat x 2 to a Maximum of 15 mg / kg.
 - Lidocaine:** 1 mg / kg IV / IO. Infusion 20 – 50 mcg / kg / min. If infusion is initiated > 15 minutes from first bolus, repeat 1 mg / kg bolus.
 - Magnesium Sulfate:** 40 mg / kg IV / IO over 10 – 20 minutes. In Torsades de pointes give over 1 – 2 minutes. Maximum 2 g.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach / Pit-Crew Approach assigning responders to predetermined tasks. Refer to optional protocol.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg) via ETT (Maximum 2.5 mg)**



Pediatric Post Resuscitation

History

- Respiratory arrest
- Cardiac arrest

Signs/Symptoms

- Return of pulse

Differential

- Continue to address specific differentials associated with the original dysrhythmia

	 Pediatric Airway Protocol(s) AR 5 - 7 as needed
	Monitor Vital Signs / Reassess
	Blood Glucose Analysis Procedure
B	Optimize Ventilation and Oxygenation • Maintain SpO2 ≥ 90% • Preferably SpO2 ≥ 94% • Advanced airway if indicated • ETCO2 ideally 35 – 45 mm Hg • Respiratory Rate 8 – 10 • Remove Impedance Threshold Device DO NOT HYPERVENTILATE
B	12 Lead ECG Procedure
A	IV / IO Procedure
P	Cardiac Monitor
	Pediatric Diabetic Protocol PM 2 if indicated
	Pediatric Hypotension / Shock Protocol PM 3 if indicated
	Pediatric Bradycardia Protocol PC 2 if indicated
	Pediatric Tachycardia Protocol PC 5 if indicated

Hypotension Age Based

0 – 31 Days
< 60 mmHg

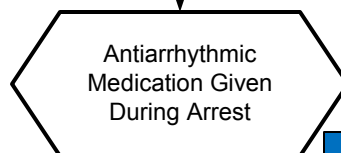
1 Month to 1 Year
< 70 mmHg

> than 1 Year
< 70 + (2 x age) mmHg

Arrhythmias are common and usually self limiting after ROSC



If Arrhythmia Persists follow Rhythm Appropriate Protocol



NO

YES

Continue Antiarrhythmic Utilized
Refer to Appropriate Pediatric Arrhythmia Protocol

P

Amiodarone 5 mg/kg IV / IO

Repeat every 5 minutes

Maximum Repeat Dose 150 mg

Max dose 300 mg Max total dose 15 mg/kg

Or

Lidocaine 1 mg/kg IV / IO

Repeat 0.5 mg/kg

Max single dose 100 mg Max total dose 3 mg/kg

Post-intubation /
BIAD Management
Protocol AR 8

 **Notify Destination or
Contact Medical Control** 



Pediatric Post Resuscitation

Amiodarone Infusion: 5mg/kg over 10 min

- Add 5 mg/kg of Amiodarone to 100 mL D5W & infuse using 10 gtts set

$$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{20 \text{ min}} = 100 \text{ mL / min} \quad \text{or} \quad 5 \text{ gtts / 6 sec.}$$

Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Goals of care are to preserve neurologic function, prevent secondary organ damage, treat the underlying cause of illness, and optimize prehospital care. Frequent reassessment is necessary.**
- **Hyperventilation is a significant cause of hypotension / recurrence of cardiac arrest in post resuscitation phase and must be avoided.**
- **Target oxygenation to $\geq 94\%$. 100 % FiO2 is not necessary, titrate oxygen accordingly.**
- **EtCO2 should be continually monitored with advanced airway in place.**
- **Administer resuscitation fluids and vasopressor agents to maintain SBP at targets listed on page 1. This table represents minimal SBP targets.**
- **Antiarrhythmic agents:**
 - Adenosine: First dose: 0.1 mg / kg (Maximum 6 mg) Second dose: 0.2 mg / kg (Maximum 12 mg)
 - Amiodarone: 5 mg / kg IV / IO (single dose Maximum 300 mg). May repeat x 2 to a Maximum of 15 mg / kg.
 - Lidocaine: 1 mg / kg IV / IO. Infusion 20 – 50 mcg / kg / min. If infusion is initiated > 15 minutes from first bolus, repeat 0.5 mg / kg bolus.
 - Magnesium Sulfate: 40 mg / kg IV / IO over 10 – 20 minutes. In Torsades de pointes give over 1 – 2 minutes. Maximum 2 g.
- **Vasopressor agents:**
 - Dopamine: 2 – 20 mcg / kg / min IV / IO
 - Epinephrine: 0.1 – 1 mcg / kg / min IV / IO
 - Norepinephrine: 0.1 – 2 mcg / kg / min IV / IO
 - Dose Calculation: $\text{mL / hour} = \text{kg} \times \text{dose}(\text{mcg / kg / min}) \times 60 (\text{min / hr}) / \text{concentration} (\text{mcg / mL})$
- If pediatric weight is known, use in drug and fluid calculations. Use actual body weight for calculating initial medication dosages. If unknown then use a body length tape system.
- Appropriate post-resuscitation management may best be planned in consultation with medical control.



Pediatric Allergic Reaction

History

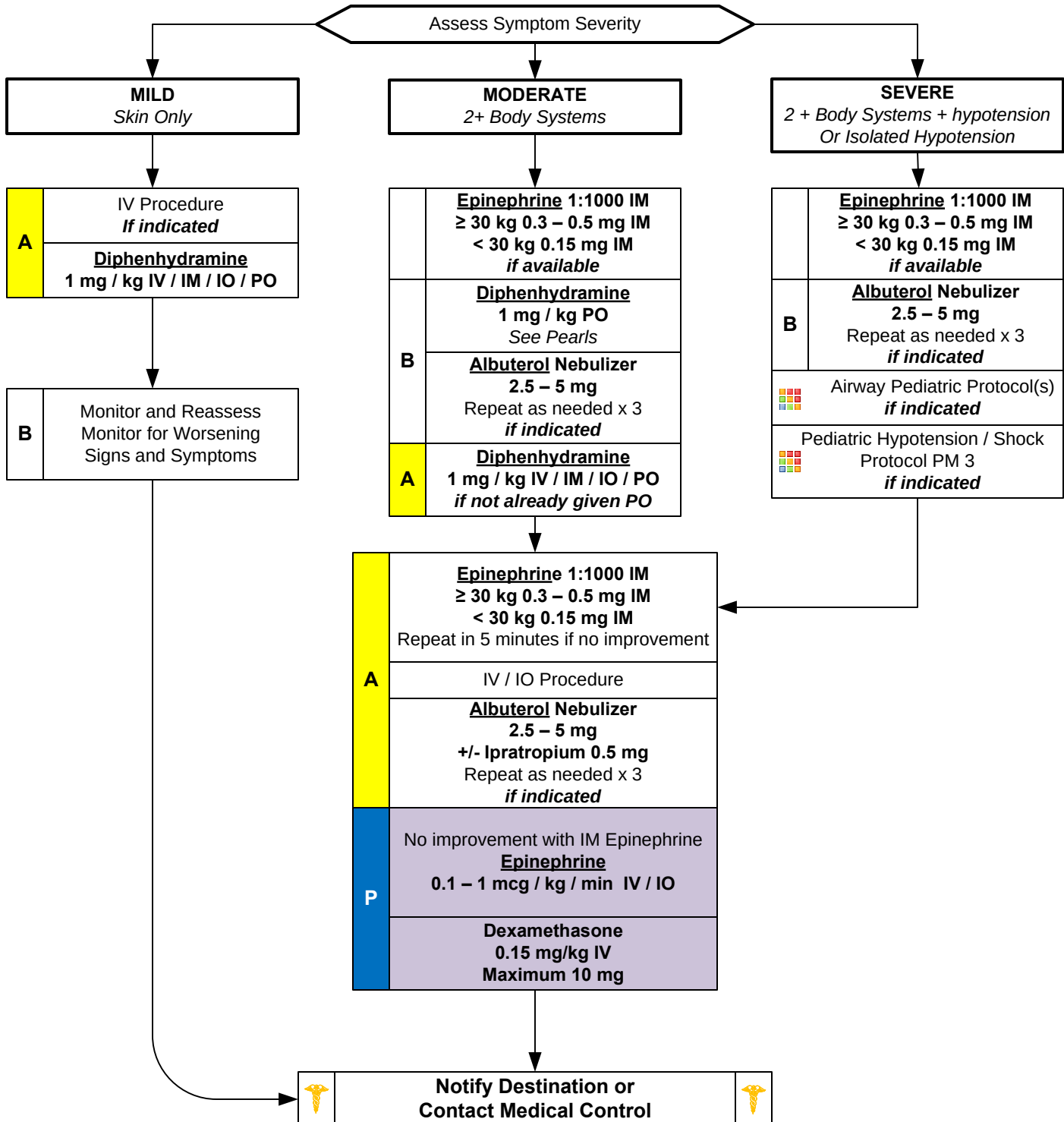
- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past medical history / reactions
- Medication history

Signs and Symptoms

- Itching or hives
- Coughing / wheezing or respiratory distress
- Chest or throat constriction
- Difficulty swallowing
- Hypotension or shock
- Edema

Differential

- Urticaria (rash only)
- Anaphylaxis (systemic effect)
- Shock (vascular effect)
- Angioedema (drug induced)
- Aspiration / Airway obstruction
- Vasovagal event
- Asthma / COPD / CHF





Pediatric Allergic Reaction

Epinephrine Infusion: 0.1 - 1 mcg/kg/min

Add 1mg epinephrine 1:1,000 to 100 ml D5W or NS = 1,000 mcg in 100 mL or 10 mcg/ml

Pt weight (Kg) x Dose x 6 = ____ gtts / min (using **60 gtts** drop set)

example: 20 kg pt x 0.1 mcg/min x 6 = **12 gtts / min** or **1 gtt / 5 sec**

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine administration:**
 - Drug of choice and the FIRST drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms.)**
 - IM Epinephrine should be administered in priority before or during attempts at IV or IO access.**
 - Diphenhydramine and steroids have no proven utility in Moderate / Severe anaphylaxis and may be given only After Epinephrine. Diphenhydramine and steroids should NOT delay repeated Epinephrine administration.**
 - In Moderate and Severe anaphylaxis Diphenhydramine may decrease mental status. Oral Diphenhydramine should NOT be given to a patient with decreased mental status and / or a hypotensive patient as this may cause nausea and / or vomiting.**
- **Anaphylaxis unresponsive to repeat doses of IM epinephrine may require IV epinephrine administration by IV push or epinephrine infusion. Contact Medical Control for appropriate dosing.**
- **Symptom Severity Classification:**
 - Mild symptoms:**
 - Flushing, hives, itching, erythema with normal blood pressure and perfusion.
 - Moderate symptoms:**
 - Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.
 - Severe symptoms:**
 - Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Angioedema is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.**
- **Fluids and Medication titrated to maintain a SBP >70 + (age in years x 2) mmHg.**
- **EMR / EMT may administer Epinephrine IM and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMR / EMT administering any medication.
- **EMT may administer diphenhydramine by oral route only and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- **Patients with moderate and severe reactions should receive a 12 lead ECG and should be continually monitored, but this should NOT delay administration of epinephrine.**
- **The shorter the onset from exposure to symptoms the more severe the reaction.**



Pediatric Diabetic

History

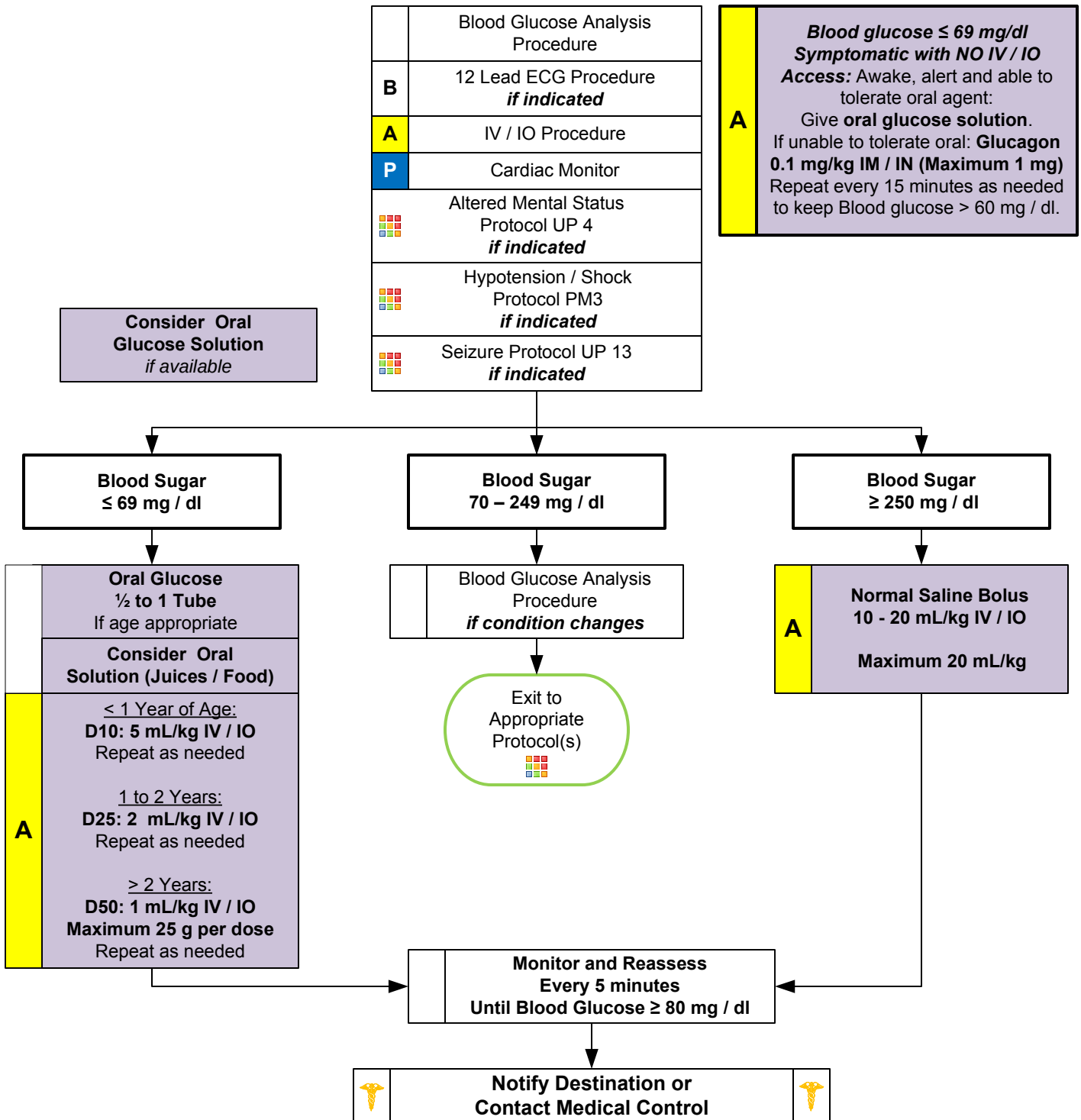
- Past medical history
- Medications
- Recent blood glucose check
- Last meal

Signs and Symptoms

- Altered mental status
- Combative / irritable
- Diaphoresis
- Seizures
- Abdominal pain
- Nausea / vomiting
- Weakness
- Dehydration
- Deep / rapid breathing

Differential

- Alcohol / drug use
- Toxic ingestion
- Trauma; head injury
- Seizure
- CVA
- Altered baseline mental status.





Pediatric Diabetic

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Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients with prolonged hypoglycemia may not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per manufacturers recommendation for all glucometers.**
- **D10 / D25 Preparation:**
 - D10: Remove 10 mL of D50 from a D50 vial. Add 40 mL of NS with the 10 mL of D50 – total volume 50 mL.**
 - D10: Alternative, Discard 40 mL from the D50 vial and draw up 40 mL of NS – total volume 50 mL.**
 - D25: Remove 25 mL of D50 and draw up 25 mL of NS – total volume 50 mL.**
- In extreme circumstances with no IV and no response to glucagon Dextrose 50 % can be administered rectally. Contact medical control for advice.
- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**
 - Adult caregiver must be present with pediatric patient.
 - Blood sugar must be ≥ 80 , patient has ability to eat and availability of food with responders on scene.
 - Patient must have known history of diabetes and not taking any oral diabetic agents.
 - Patient returns to normal mental status and has a normal neurological exam with no new neurological deficits.
 - Must demonstrate capacity to make informed health care decisions. See Universal Patient Care Protocol UP-1.
 - Otherwise contact medical control.
- **Hypoglycemia with Oral Agents:**
 - Patients taking oral diabetic medications should be strongly encouraged to allow transportation to a medical facility. They are at risk of recurrent hypoglycemia that can be delayed for hours and require close monitoring even after normal blood glucose is established. Not all oral agents have prolonged action so Contact Medical Control for advice. Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **Hypoglycemia with Insulin Agents:**
 - Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established. Not all insulins have prolonged action so Contact Medical Control for advice. Patients who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.



Pediatric Hypotension / Shock

History

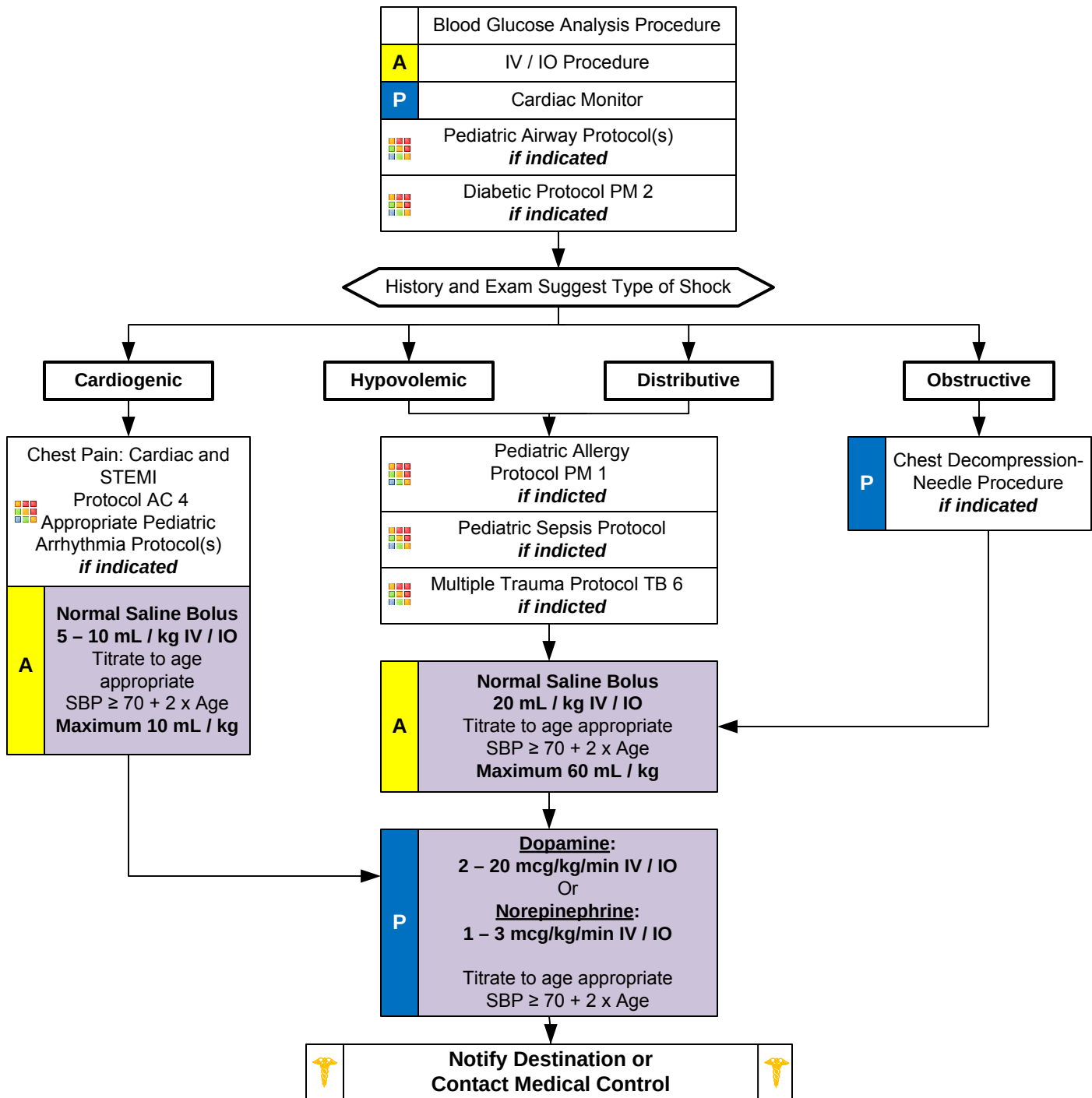
- Blood loss
- Fluid loss
- Vomiting
- Diarrhea
- Fever
- Infection

Signs and Symptoms

- Restlessness, confusion, weakness
- Dizziness
- Tachycardia
- Hypotension (Late sign)
- Pale, cool, clammy skin
- Delayed capillary refill
- Dark-tarry stools

Differential

- Shock
 - Hypovolemic
 - Cardiogenic
 - Septic
 - Neurogenic
 - Anaphylactic
- Trauma
- Infection
- Dehydration
- Congenital heart disease
- Medication or Toxin





Hypotension / Shock

Dopamine Infusion: Dose 2-20 mcg / kg / min

Pt weight (Kg) x Dose x .0375 = ____ gtts / min (using 60 gtts drip set)

example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Norepinephrine Infusion: 1 mcg/kg/min

Add 4mg norepinephrine to 100 ml D5W or NS = 4000 mcg in 100 mL or 40 mcg/ml

Under 50 kg

Pt weight (Kg) x Dose x 1.5 = ____ gtts / min (using 60 gtts drip set)

example: 80 kg pt x 1 mcg/min x 1.5 = **120 gtts / min** or **2 gtts / sec**

- If suspected Acute Adrenal Insufficiency, contact Medical Control for orders as listed below

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- Consider all possible causes of shock and treat per appropriate protocol. Majority of decompensation in pediatrics is airway related.
- Decreasing heart rate and hypotension occur late in children and are signs of imminent cardiac arrest.
- Shock may be present with a normal blood pressure initially.
- Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.
- Consider all possible causes of shock and treat per appropriate protocol.
- **Hypovolemic Shock:**
Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding.
- **Cardiogenic Shock:**
Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventricular / septum / valve / toxins.
- **Distributive Shock:**
Septic
Anaphylactic
Neurogenic: Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
Toxic
- **Obstructive Shock:**
Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
Body cannot produce enough steroids (glucocorticoids / mineralocorticoids.) May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate. Usually hypotensive with nausea, vomiting, dehydration and / or abdominal pain. **If suspected Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list. May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.**



Bites and Envenomations

History

- Type of bite / sting
- Description / photo for identification
- Time, location, size of bite / sting
- Previous reaction to bite / sting
- Domestic vs. Wild
- Tetanus and Rabies risk
- Immunocompromised patient

Signs and Symptoms

- Rash, skin break, wound
- Pain, soft tissue swelling, redness
- Blood oozing from the bite wound
- Evidence of infection
- Shortness of breath, wheezing
- Allergic reaction, hives, itching
- Hypotension or shock

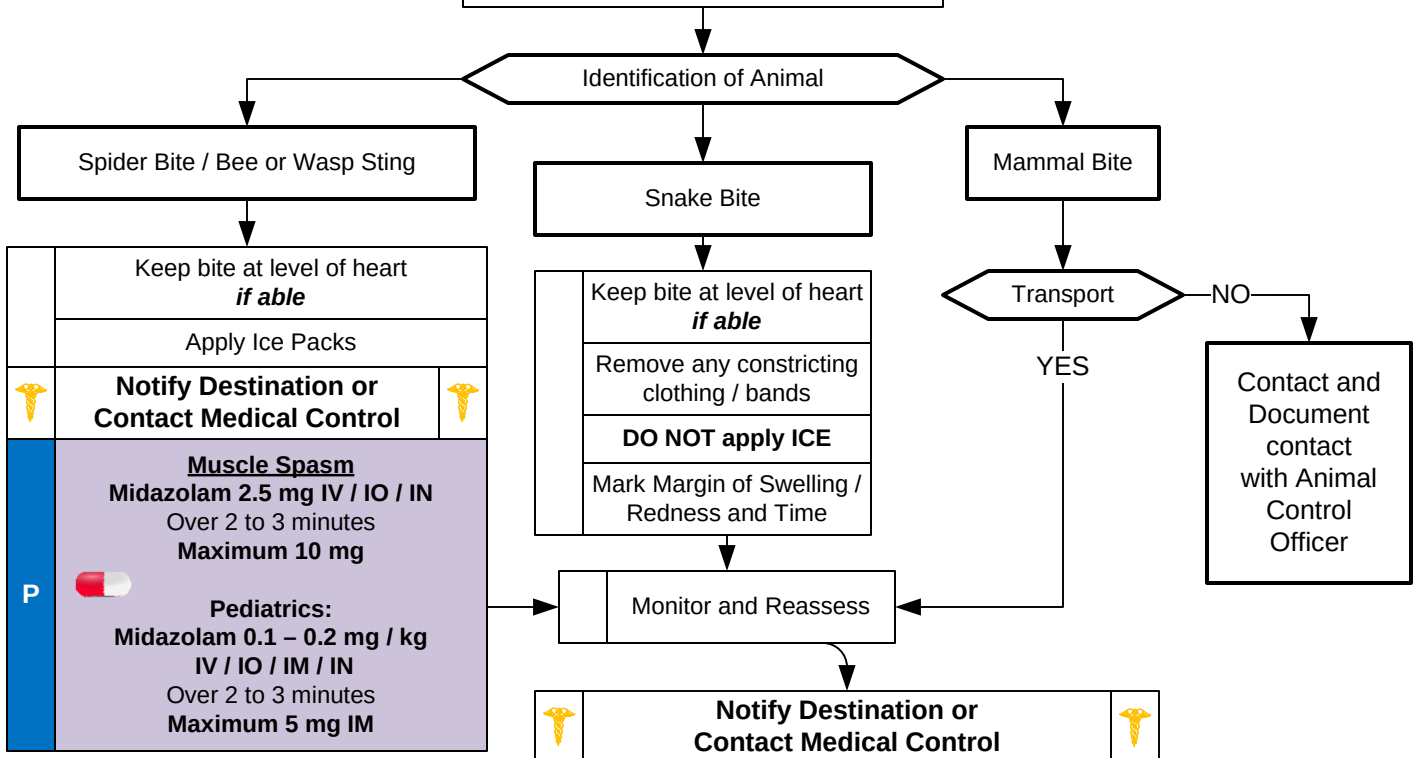
Differential

- Animal bite
- Human bite
- Snake bite (poisonous)
- Spider bite (poisonous)
- Insect sting / bite (bee, wasp, ant, tick)
- Infection risk
- Rabies risk
- Tetanus risk

Call for help / additional resources
Stage until scene safe

If Needed
Carolinas Poison Control
1-800-222-1222

	General Wound Care Procedure
	Immobilize Injury
	Remove any constricting clothing / bands / jewelry
A	IV / IO Procedure <i>if indicated</i>
	Age Appropriate Trauma Protocol(s) TB 4, 5, 6 <i>if indicated</i>
	Age Appropriate Allergic Reaction/ Anaphylaxis Protocol AM 1 / PM 1 <i>if indicated</i>
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 <i>if indicated</i>
	Pain Control Protocol UP 11 <i>if indicated</i>
	Extremity Trauma Protocol TB 4 <i>if indicated</i>





Bites and Envenomations

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Pearls

- **Recommended Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neuro exam if systemic effects are noted**
- **Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patients.**
- **Consider contacting the North Carolina Poison Control Center for guidance (1-800-222-1222).**
- **Do not put responders in danger attempting to capture and animal or insect for identification purposes.**
- **Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound.**
- **Human bites:**
Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- **Dog / Cat / Carnivore bites:**
Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
Cat bites may progress to infection rapidly due to a specific bacteria (*Pasteurella multocida*).
- **Snake bites:**
Poisonous snakes in this area are generally of the pit viper family: rattlesnake and copperhead.
Coral snake bites are rare: Very little pain but very toxic. "Red on yellow - kill a fellow, red on black - venom lack."
Amount of envenomation is variable, generally worse with larger snakes and early in spring.
If no pain or swelling, envenomation is unlikely. About 25 % of snake bites are "dry" bites.
- **Spider bites:**
Black Widow spider bites tend to be minimally painful, but over a few hours, muscular pain and severe abdominal pain may develop (spider is black with red hourglass on belly).
Brown Recluse spider bites are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite develops over the next few days (brown spider with fiddle shape on back).



Carbon Monoxide / Cyanide

History

- Smoke inhalation
- Ingestion of cyanide
- Eating large quantity of fruit pits
- Industrial exposure
- Trauma
- Reason: Suicide, criminal, accidental
- Past Medical History
- Time / Duration of exposure

Signs and Symptoms

- AMS
- Malaise, weakness, flu like illness
- Dyspnea
- GI Symptoms; N/V; cramping
- Dizziness
- Seizures
- Syncope
- Reddened skin
- Chest pain

Differential

- Diabetic related
- Infection
- MI
- Anaphylaxis
- Renal failure / dialysis problem
- Head injury / trauma
- Co-ingestant or exposures

	Immediately Remove from Exposure
	Appropriate Airway Protocol(s) 1 - 7 as indicated
	High Flow Oxygen
	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
A	IV/ IO Procedure
P	Cardiac Monitor / CO Monitor
	Altered Mental Status Protocol UP 4 if indicated
	Age Appropriate Diabetic Protocol AM 2 / PM 2 if indicated
	Age Appropriate Multiple Trauma Protocol TB 6 Head Injury TB 5 if indicated
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 if indicated

High Suspicion
of Cyanide

YES

P

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NO

Continue Care
Continue High Flow Oxygen

Monitor and Reasses



Notify Destination or
Contact Medical Control



Pearls

- **Recommended exam: Neuro, Skin, Heart, Lungs, Abdomen, Extremities**
- **Scene safety is priority.**
- Consider CO and Cyanide with any product of combustion
- Normal environmental CO level does not exclude CO poisoning.
- Symptoms present with lower CO levels in pregnancy, children and the elderly.
- Continue high flow oxygen regardless of pulse ox readings.



Drowning

History

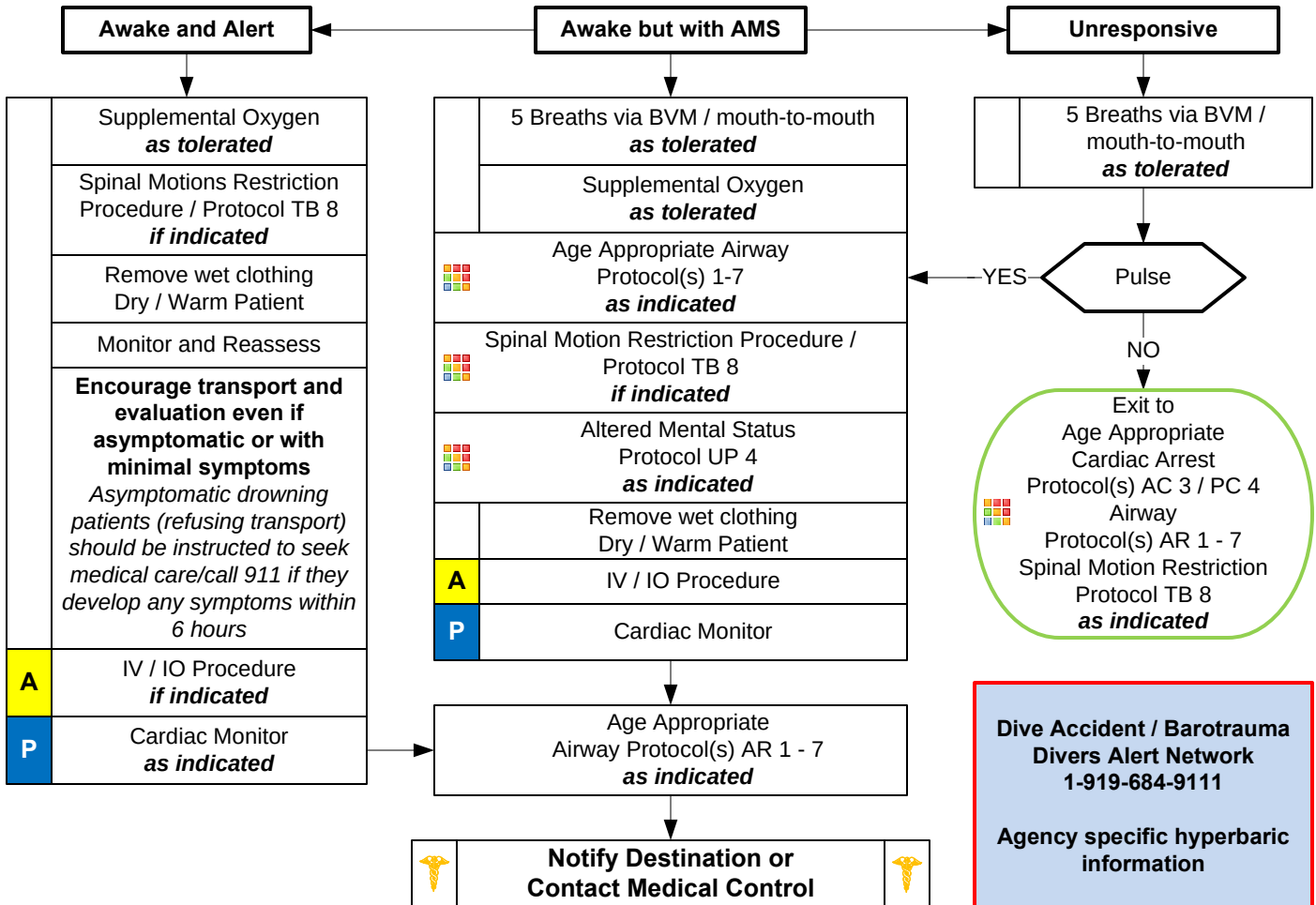
- Submersion in water regardless of depth
- Possible history of trauma
Slammed into shore wave break
- Duration of submersion / immersion
- Temperature of water or possibility of hypothermia

Signs and Symptoms

- Unresponsive
- Mental status changes
- Decreased or absent vital signs
- Foaming / Vomiting
- Coughing, Wheezing, Rales, Rhonchi, Stridor
- Apnea

Differential

- Trauma
- Pre-existing medical problem
Hypoglycemia
Cardiac Dysrhythmia
- Pressure injury (SCUBA diving)
Barotrauma
Decompression sickness
- Post-immersion syndrome



Pearls

- **Recommended Exam: Respiratory, Mental status, Trauma Survey, Skin, Neuro**
- **Drowning is the process of experiencing respiratory impairment (any respiratory symptom) from submersion / immersion in a liquid.**
- **Begin with BVM ventilations, if patient does not tolerate then apply appropriate mode of supplemental oxygen.**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **When feasible, only appropriately trained and certified rescuers should remove patients from areas of danger.**
- **Regardless of water temperature – resuscitate all patients with known submersion time of ≤ 25 minutes.**
- **Regardless of water temperature – If submersion time ≥ 1 hour consider moving to recovery phase instead of rescue.**
- **Foam is usually present in airway and may be copious, DO NOT waste time attempting to suction. Ventilate with BVM through foam (suction water and vomit only when present.)**
- **Cardiac arrest in drowning is caused by hypoxia, airway and ventilation are equally important to high-quality CPR.**
- **Encourage transport of all symptomatic patients (cough, foam, dyspnea, abnormal lung sounds, hypoxia) due to potential worsening over the next 6 hours.**
- **Predicting prognosis in prehospital setting is difficult and does not correlate with mental status. Unless obvious death, transport.**
- **Hypothermia is often associated with drowning and submersion injuries even with warm ambient conditions.**
- **Drowning patient typically has <1 – 3 mL/kg of water in lungs (does not require suction) Primary treatment is reversal of hypoxia.**
- **Spinal motion restriction is usually unnecessary. When indicated it should not interrupt ventilation, oxygenation and / or CPR.**



Hyperthermia

History

- Age, very young and old
- Exposure to increased temperatures and / or humidity
- Past medical history / Medications
- Time and duration of exposure
- Poor PO intake, extreme exertion
- Fatigue and / or muscle cramping

Signs and Symptoms

- Altered mental status / coma
- Hot, dry or sweaty skin
- Hypotension or shock
- Seizures
- Nausea

Differential

- Fever (Infection)
- Dehydration
- Medications
- Hyperthyroidism (Thyroid Storm)
- Delirium tremens (DT's)
- Heat cramps, exhaustion, stroke
- CNS lesions or tumors

B

Temperature Measurement Procedure
if available

Temperature Measurement should NOT delay treatment of hyperthermia

Remove from heat source to cool environment
Cooling measures
Remove tight clothing
Blood Glucose Analysis Procedure
Age Appropriate Diabetic Protocol AM 2 / PM 2 <i>as indicated</i>

Assess Symptom Severity

HEAT CRAMPS

Normal to elevated body temperature
Warm, moist skin
Weakness, Muscle cramping

PO Fluids as tolerated
Monitor and Reassess

HEAT EXHAUSTION

Elevated body temperature
Cool, moist skin
Weakness, Anxious, Tachypnea

HEAT STROKE

Fever, usually > 104°F (40°C)
Hot, dry skin
Hypotension, AMS / Coma

Age Appropriate
Airway Protocol(s) AR 1 - 7
as indicated

Altered Mental Status
Protocol UP 4
as indicated

Active cooling measures
Target Temp < 102.5° F (39°C)

B 12 Lead ECG Procedure

A IV / IO Procedure

P Cardiac Monitor

A Normal Saline Bolus
500 mL IV / IO
Repeat to effect SBP > 90
Maximum 2 L
PED: Bolus 20 mL/kg IV / IO
Repeat to effect Age appropriate
SBP ≥ 70 + 2 x Age
Maximum 60 mL/kg

Age Appropriate
Hypotension / Shock
Protocol AM 5 / PM 3
as indicated

Monitor and Reassess

Notify Destination or
Contact Medical Control

Toxic-Environmental Protocol Section



Hyperthermia

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Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Neuro**
- **Extremes of age are more prone to heat emergencies (i.e. young and old). Obtain and document patient temperature if able.**
- Predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- Intense shivering may occur as patient is cooled.
- **Heat Cramps:**
Consists of benign muscle cramping secondary to dehydration and is not associated with an elevated temperature.
- **Heat Exhaustion:**
Consists of dehydration, salt depletion, dizziness, fever, mental status changes, headache, cramping, nausea and vomiting. Vital signs usually consist of tachycardia, hypotension, and an elevated temperature.
- **Heat Stroke:**
Consists of dehydration, tachycardia, hypotension, temperature $\geq 104^{\circ}\text{F}$ (40°C), and an altered mental status. Sweating generally disappears as body temperature rises above 104°F (40°C). The young and elderly are more prone to be dry with no sweating.
Exertional Heat Stroke:
In exertional heat stroke (athletes, hard labor), the patient may have sweated profusely and be wet on exam. **Rapid cooling takes precedence over transport as early cooling decreases morbidity and mortality.**
If available, immerse in an ice water bath for 5 – 10 minutes. Monitor rectal temperature and remove patient when temperature reaches 102.5°F (39°C). Your goal is to decrease rectal temperature below 104°F (40°C) with target of 102.5°F (39°C) within 30 minutes. Stirring the water aids in cooling.
Other methods include cold wet towels below and above the body or spraying cold water over body continuously.
- **Neuroleptic Malignant Syndrome (NMS):**
Neuroleptic Malignant Syndrome is a hyperthermic emergency which is not related to heat exposure. It occurs after taking neuroleptic antipsychotic medications. This is a rare but often lethal syndrome characterized by muscular rigidity, AMS, tachycardia and hyperthermia.
Drugs Associated with Neuroleptic Malignant Syndrome:
Prochlorperazine (Compazine), promethazine (Phenergan), clozapine (Clozaril), and risperidone (Risperdal) metoclopramide (Reglan), amoxapine (Ascendin), and lithium.
Management of NMS:
Supportive care with attention to hypotension and volume depletion.
Use benzodiazepines such as diazepam or midazolam for seizures and / or muscular rigidity.



Hypothermia / Frostbite

History

- Age, very young and old
- Exposure to decreased temperatures but may occur in normal temperatures
- Past medical history / Medications
- Drug use: Alcohol, barbituates
- Infections / Sepsis
- Length of exposure / Wetness / Wind chill

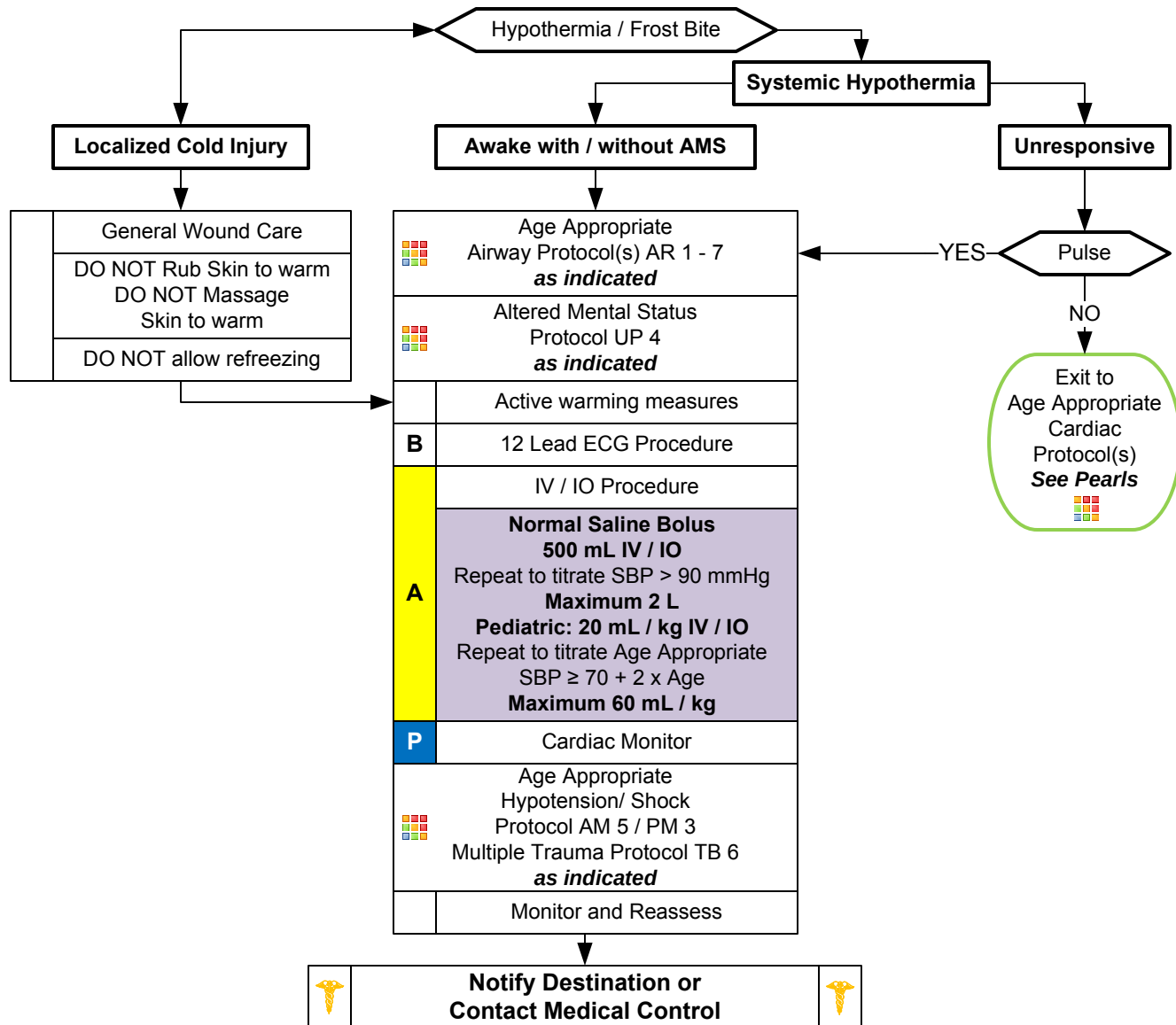
Signs and Symptoms

- Altered mental status / coma
- Cold, clammy
- Shivering
- Extremity pain or sensory abnormality
- Bradycardia
- Hypotension or shock

Differential

- Sepsis
- Environmental exposure
- Hypothyroidism
- Hypoglycemia
- CNS dysfunction
 - Stroke
 - Head injury
 - Spinal cord injury

B	Temperature Measurement Procedure <i>if available</i>
	Temperature Measurement should NOT delay treatment of hypothermia
	Remove wet clothing Dry / Warm Patient
	Passive warming measures
	Blood Glucose Analysis Procedure
	Age Appropriate Diabetic Protocol AM 2 / PM 2 <i>as indicated</i>





Hypothermia / Frostbite

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Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature $\geq 93.2^{\circ}\text{F}$, 32°C .)**
- **Many thermometers do not register temperature below 93.2°F .**
- **Hypothermia categories:**
 - Mild $90 - 95^{\circ}\text{F}$ ($32 - 35^{\circ}\text{C}$)
 - Moderate $82 - 90^{\circ}\text{F}$ ($28 - 32^{\circ}\text{C}$)
 - Severe $< 82^{\circ}\text{F}$ ($< 28^{\circ}\text{C}$)
- **Mechanisms of hypothermia:**
 - Radiation: Heat loss to surrounding objects via infrared energy (60% of most heat loss.)
 - Convection: Direct transfer of heat to the surrounding air.
 - Conduction: Direct transfer of heat to direct contact with cooler objects (important in submersion.)
 - Evaporation: Vaporization of water from sweat or other body water losses.
- Contributing factors of hypothermia: Extremes of age, malnutrition, alcohol or other drug use.
- If the temperature is unable to be measured, treat the patient based on the suspected temperature.
- **CPR:**
 - Severe hypothermia may cause cardiac instability and rough handling of the patient theoretically can cause ventricular fibrillation. This has not been demonstrated or confirmed by current evidence. Intubation and CPR techniques should not be withheld due to this concern.**
 - Intubation can cause ventricular fibrillation so it should be done gently by most experienced person.**
 - Below 86°F (30°C) antiarrhythmics may not work and if given should be given at increased intervals. Contact medical control for direction. Epinephrine / Vasopressin can be administered. Below 86°F (30°C) pacing should not be utilized.**
 - Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.**
 - If the patient is below 86°F (30°C) then defibrillate 1 time if defibrillation is required. Deferring further attempts until more warming occurs is controversial. Contact medical control for direction.**
 - Hypothermia may produce severe bradycardia so take at least 60 seconds to palpate a pulse.**
- **Active Warming:**
 - Remove from cold environment and to warm environment protected from wind and wet conditions.
 - Remove wet clothing and provide warm blankets / warming blankets.
 - Hot packs can be activated and placed in the armpit and groin area if available. Care should be taken not to place the packs directly against the patient's skin.



Marine Envenomations / Injury

History

- Type of bite / sting
- Identification of organism
- Previous reaction to marine organism
- Immunocompromised
- Household pet

Signs and Symptoms

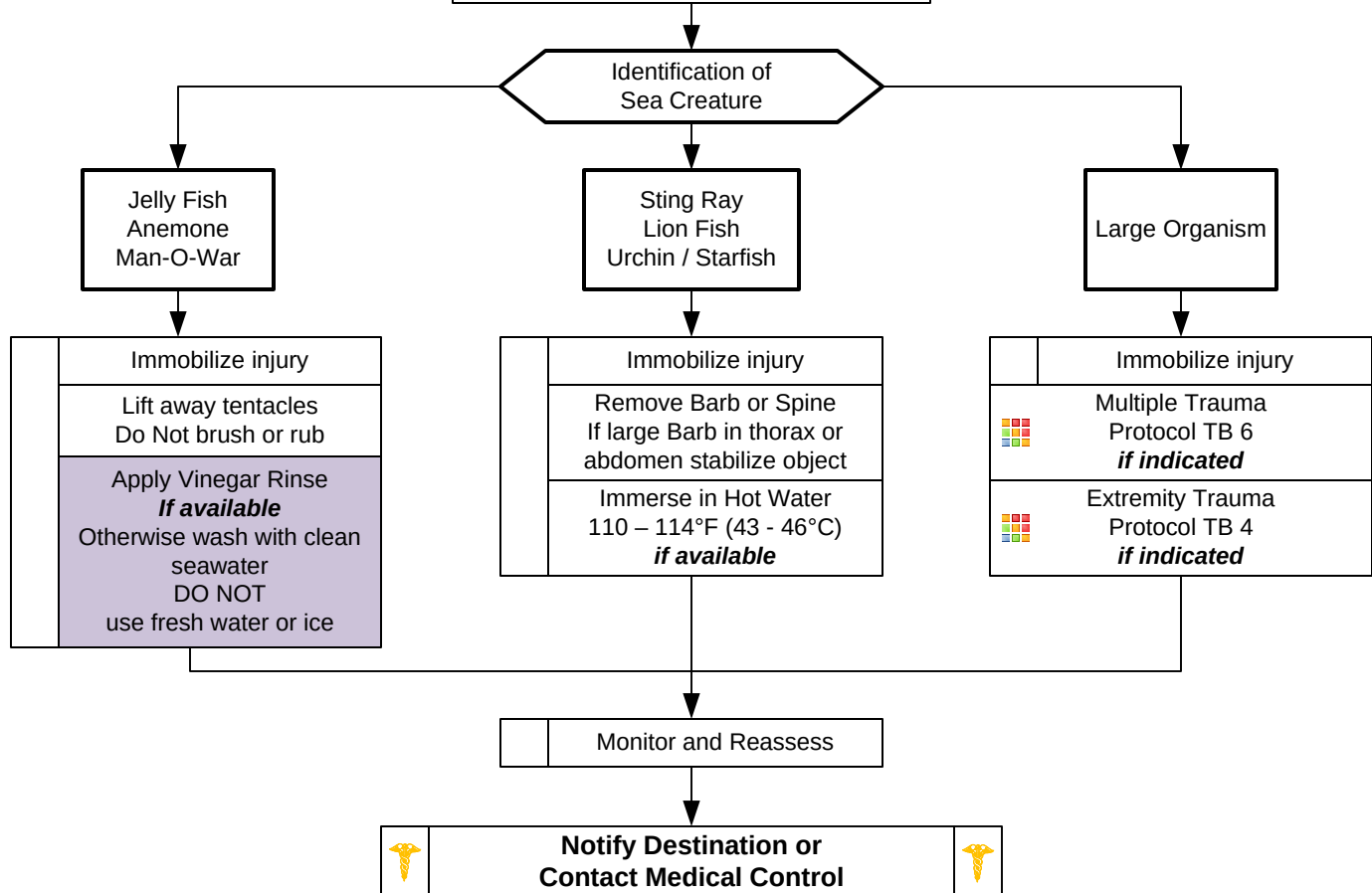
- Intense localized pain
- Increased oral secretions
- Nausea / vomiting
- Abdominal cramping
- Allergic reaction / anaphylaxis

Differential

- Jellyfish sting
- Sea Urchin sting
- Sting ray barb
- Coral sting
- Swimmers itch
- Cone Shell sting
- Fish bite
- Lion Fish sting

If Needed
Carolinas Poison Control
1-800-222-1222

	General Wound Care Procedure
A	IV / IO Procedure <i>if indicated</i>
P	Cardiac Monitor <i>if indicated</i>
	Drowning Protocol TE 3 <i>if indicated</i>
	Age Appropriate Allergy / Anaphylaxis Protocol AM 1 / PM 1 <i>if indicated</i>
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 <i>if indicated</i>
	Pain Control Protocol UP 11 <i>if indicated</i>





Marine Envenomations / Injury

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Pearls

- **Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.**
- **Priority is removal of the patient from the water to prevent drowning.**
- **Coral:**
Coral is covered by various living organisms which are easily dislodged from the structure.
Victim may swim into coral causing small cuts and abrasions and the coral may enter to cuts causing little if any symptoms initially.
The next 24 – 48 hours may reveal an inflammatory reaction with swelling, redness, itching, tenderness and ulceration.
Treatment is flushing with large amounts of fresh water or soapy water then repeating
- **Jelly Fish / Anemone / Man-O-War:**
Wash the area with fresh seawater to remove tentacles and nematocysts.
Do not apply fresh water or ice as this will cause nematocysts firing as well.
Recent evidence does not demonstrate a clear choice of any solution that neutralizes nematocysts.
Vinegar (immersion for 30 seconds), 50:50 mixture of Baking Soda and Seawater, and even meat tenderizer may have similar effects.
Immersion in warm water for 20 minutes, 110 – 114°F (43 - 46°C), has recently been shown to be effective in pain control.
Shaving cream may be useful in removing the tentacles and nematocysts with a sharp edge (card).
Stimulation of the nematocysts by pressure or rubbing cause the nematocyst to fire even if detached from the jellyfish.
Lift away tentacles as scrapping or rubbing will cause nematocysts firing.
Typically symptoms are immediate stinging sensation on contact, intensity increases over 10 minutes.
Redness and itching usually occur.
Papules, vesicles and pustules may be noted and ulcers may form on the skin.
Increased oral secretions and gastrointestinal cramping, nausea, pain or vomiting may occur.
Muscle spasm, respiratory and cardiovascular collapse may follow.
- **Lionfish:**
In North Carolina this would typically occur in the home as they are often kept as pets in saltwater aquariums.
Remove any obvious protruding spines and irrigate area with copious amounts of saline.
The venom is heat labile so immersion in hot water, 110 – 114 degrees for 30 to 90 minutes is the treatment of choice but do not delay transport if indicated.
- **Stingrays:**
Typical injury is swimmer stepping on ray and muscular tail drives 1 – 4 barbs into victim.
Venom released when barb is broken.
Typical symptoms are immediate pain which increases over 1 – 2 hours. Bleeding may be profuse due to deep puncture wound.
Nausea, vomiting, diarrhea, muscle cramping and increased urination and salivation may occur.
Seizures, hypotension and respiratory or cardiovascular collapse may occur.
Irrigate wound with saline. Extract the spine or barb unless in the abdomen or thorax, contact medical control for advise.
Immersion in hot water if available for 30 to 90 minutes but do not delay transport.
- Patients can suffer cardiovascular collapse from both the venom and / or anaphylaxis even in seemingly minor envenomations.
- Sea creature stings and bites impart moderate to severe pain.
- Arrest the envenomation by inactivation of the venom as appropriate.
- Ensure good wound care, immobilization and pain control.



Overdose / Toxic Ingestion

History

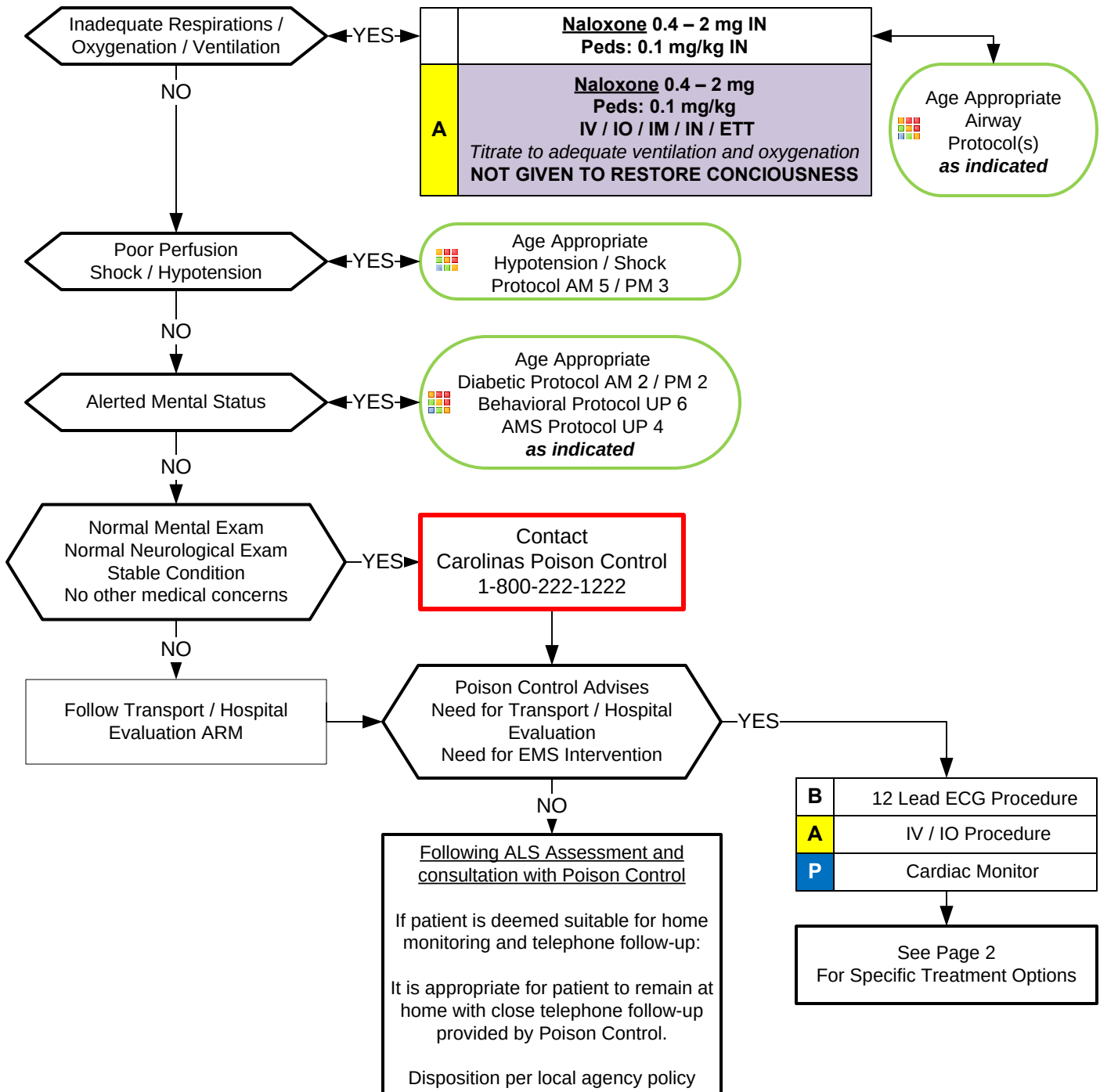
- Ingestion or suspected ingestion of a potentially toxic substance
- Substance ingested, route, quantity
- Time of ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

Signs and Symptoms

- Mental status changes
- Hypotension / hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- S.L.U.D.G.E.
- D.U.M.B.B.E.L.S

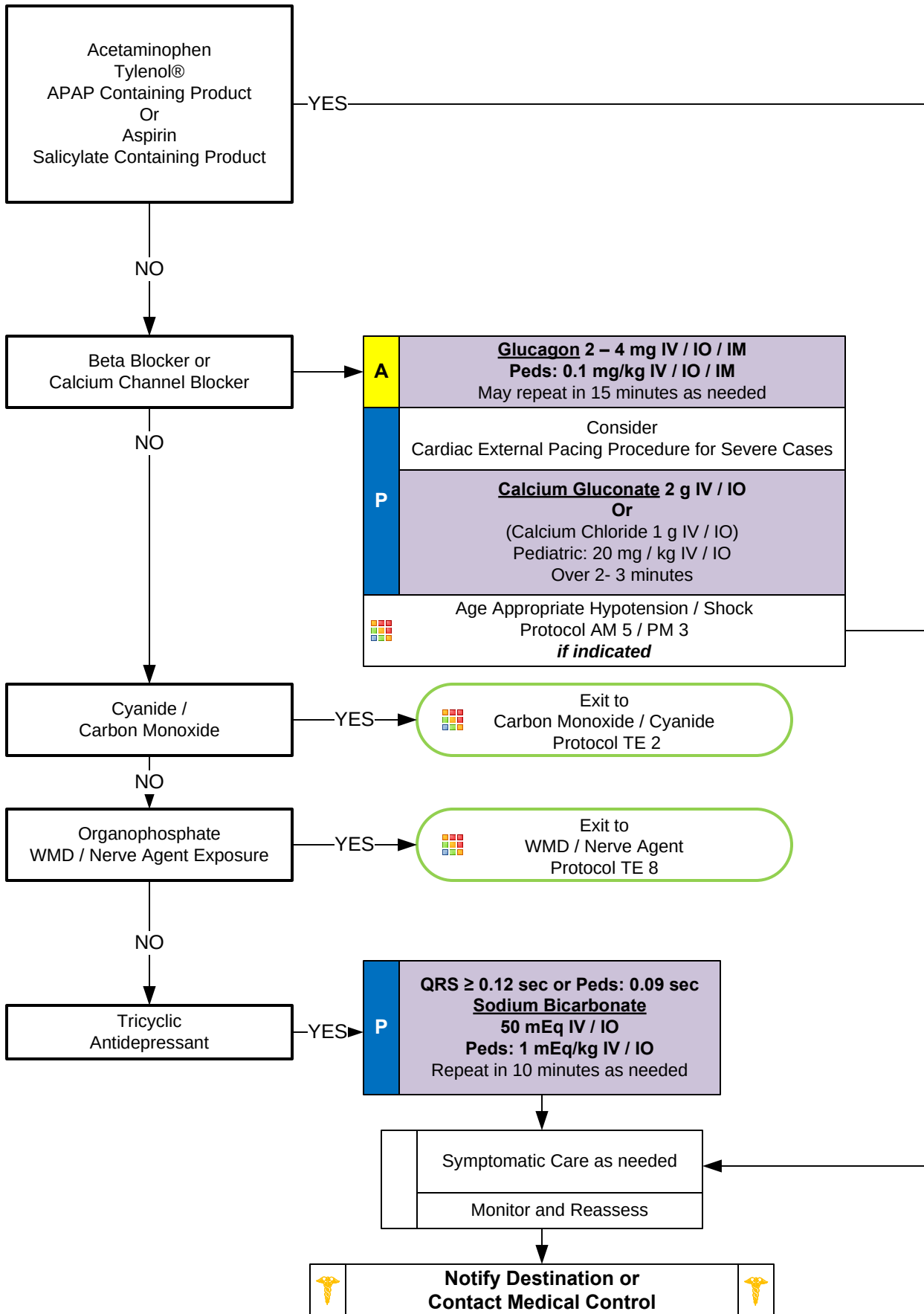
Differential

- Tricyclic antidepressants (TCAs)
- Acetaminophen (Tylenol)
- Aspirin
- Depressants
- Stimulants
- Anticholinergic
- Cardiac medications
- Solvents, Alcohols, Cleaning agents
- Insecticides (organophosphates)





Overdose / Toxic Ingestion





Overdose / Toxic Ingestion

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Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Opioids and opiates may require higher doses of Naloxone to improve respiration, in certain circumstances up to 10 mg.**
- **Time of Ingestion:**
 1. Most important aspect is the **TIME OF INGESTION** and the substance and amount ingested and any co-ingestants.
 2. Every effort should be made to elicit this information before leaving the scene.
- **Charcoal Administration:**

The American Academy of Clinical Toxicology DOES NOT recommend the routine use of charcoal in poisonings.

 1. Consider Charcoal within the **FIRST HOUR** after ingestion. If a potentially life threatening substance is ingested or extended release agent(s) are involved and $\geq$ one hour from ingestion contact medical control or Poison Center for direction.
 2. If NG is necessary to administer Charcoal then DO NOT administer unless known to be adsorbed, and airway secured by intubation and ingestion is less than **ONE HOUR** confirmed and potentially lethal.
 3. Charcoal in general should only be given to a patient who is alert and awake such that they can self-administer the medication.
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is still not carrying other medications or has any weapons.**
- **Pediatric:**
- **Age specific blood pressure** 0 – 28 days > 60 mmHg, 1 month - 1 year > 70 mmHg, 1 - 10 years > 70 + (2 x age)mmHg and 11 years and older > 90 mmHg.
- **Maintenance IV Rate: By weight of child:** First 10 kg = 4 mL, Second 10 kg = 2 mL, Additional kg = 1 mL. (Example: 36 kg child: First 10 kg = 40 mL, Second 10 kg = 20 mL, 16 kg remaining at 1 mL each. Total is 76 mL / hour)
- **Bring bottles, contents, emesis to ED.**
- **S.L.U.D.G.E:** Salivation, Lacrimation, Urination, Defecation, GI distress, Emesis
- **D.U.M.B.B.E.L.S:** Diarrhea, Urination, Miosis, Bradycardia, Bronchorrhea, Emesis, Lacrimation, Salivation.
- **Tricyclic:** 4 major areas of toxicity: seizures, dysrhythmias, hypotension, decreased mental status or coma; rapid progression from alert mental status to death.
- **Acetaminophen:** initially normal or nausea/vomiting. If not detected and treated, causes irreversible liver failure
- **Aspirin:** Early signs consist of abdominal pain and vomiting. Tachypnea and altered mental status may occur later. Renal dysfunction, liver failure, and or cerebral edema among other things can take place later.
- **Depressants:** decreased HR, decreased BP, decreased temperature, decreased respirations, non-specific pupils
- **Stimulants:** increased HR, increased BP, increased temperature, dilated pupils, seizures
- **Anticholinergic:** increased HR, increased temperature, dilated pupils, mental status changes
- **Cardiac Medications:** dysrhythmias and mental status changes
- **Solvents:** nausea, coughing, vomiting, and mental status changes
- **Insecticides:** increased or decreased HR, increased secretions, nausea, vomiting, diarrhea, pinpoint pupils
- **Nerve Agent Antidote kits** contain 2 mg of Atropine and 600 mg of pralidoxime in an autoinjector for self administration or patient care. These kits may be available as part of the domestic preparedness for Weapons of Mass Destruction.
- **EMR and EMT may administer naloxone by IN route only and may administer from EMS supply. Agency medical director may require Contact of Medical Control prior to administration and may restrict locally.**
- **When appropriate contact the North Carolina Poison Control Center for guidance, reference Policy 18.**
- Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.



WMD-Nerve Agent Protocol

History

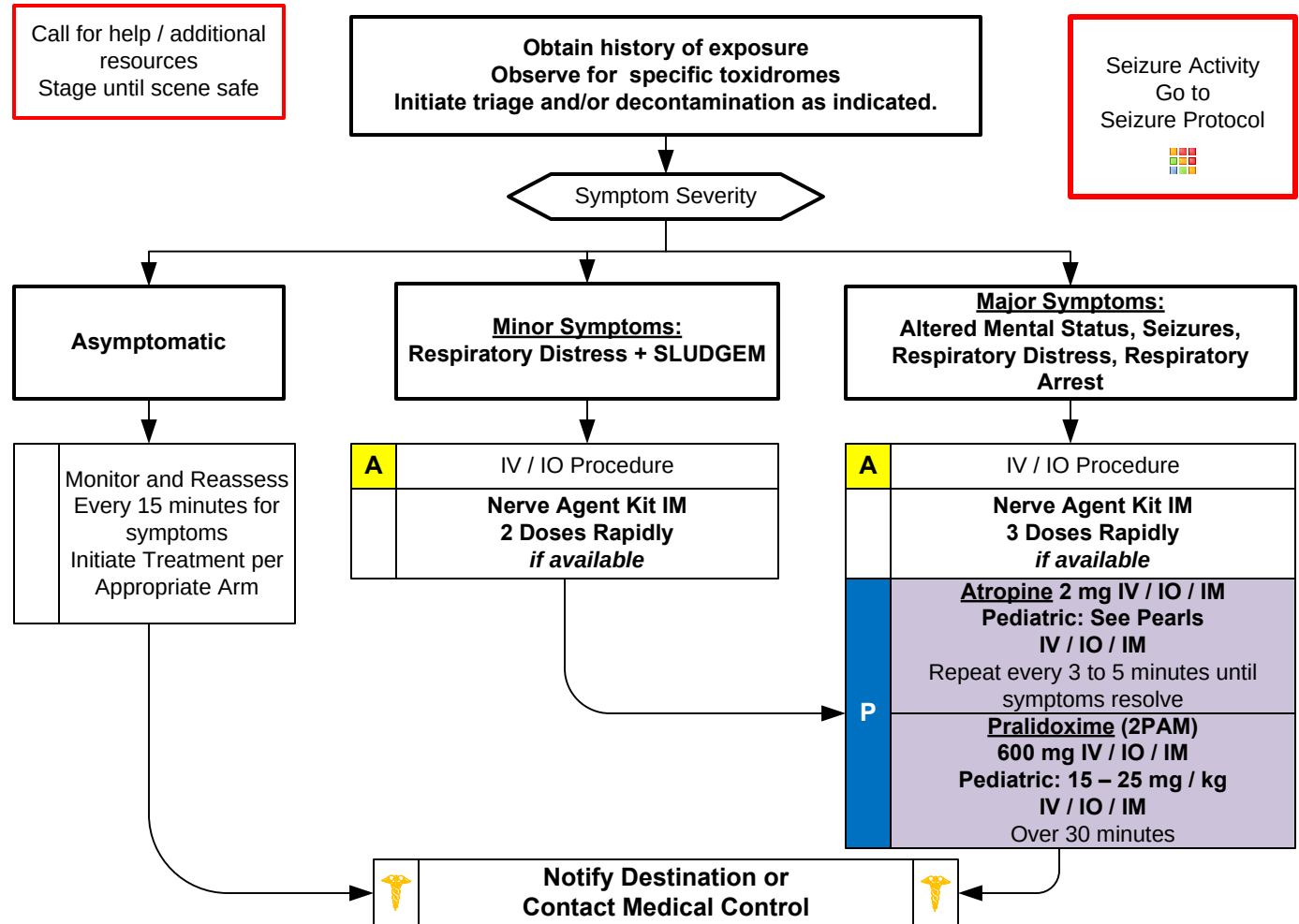
- Exposure to chemical, biologic, radiologic, or nuclear hazard
- Potential exposure to unknown substance/hazard

Signs and Symptoms

- **S**alivation
- **L**acrimation
- **U**rination; increased, loss of control
- **D**efecation / Diarrhea
- **G**I Upset; Abdominal pain / cramping
- **E**mesis
- **M**uscle Twitching
- Seizure Activity
- Respiratory Arrest

Differential

- Nerve agent exposure (e.g., VX, Sarin, Soman, etc.)
- Organophosphate exposure (pesticide)
- Vesicant exposure (e.g., Mustard Gas, etc.)
- Respiratory Irritant Exposure (e.g., Hydrogen Sulfide, Ammonia, Chlorine, etc.)



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Gastrointestinal, Neuro**
- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **Adult / Pediatric Atropine Dosing Guides:**
 - Confirmed attack: Begin with 1 Nerve Agent Kit for patients less than 7 years of age, 2 Nerve Agent Kits from 8 to 14 years of age, and 3 Nerve Agent Kits for patients 15 years of age and over.
 - If Triage / MCI issues exhaust supply of Nerve Agent Kits, use pediatric atropines (if available).
 - Usual pediatric doses: 0.5 mg ≤ 40 pounds (18 kg), 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg), and 2 mg dose ≥ 90 pounds (≥ 40 kg).
- Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine. Give if available.
- **Activity: Any benzodiazepine by any route is acceptable.**
- For patients with major symptoms, there is no limit for atropine dosing.
- Carefully evaluate patients to ensure they not from exposure to another agent (e.g., narcotics, vesicants, etc.)
- The main symptom that the atropine addresses is excessive secretions so atropine should be given until salivation improves.
- EMS personnel, public safety officers and EMR / EMT may carry, self-administer or administer to a patient atropine / pralidoxime by protocol. Agency medical director may require Contact of Medical Control prior to administration.



Suspected Viral Hemorrhagic Fever Ebola

EMS Dispatch Center

1. Use Emerging Infectious Disease (EID) Surveillance Tool with the following chief complaints:
Typical Flu-Like Symptoms
and/or
Unexpected Bleeding
(not trauma or isolated nose bleed related)
2. Use EID Card (or equivalent) with the following protocols (or equivalent)
EMD 6 Breathing Problem
EMD 10 Chest Pain
EMD 18 Headache
EMD 21 Hemorrhage (medical)
EMD 26 Sick Person
3. Ask the following:
In the past 21 days have you been to Africa or been exposed to someone who has?
If YES:
Do you have a fever?

Evolving Protocol:

Protocol subject to change at any time dependent on changing outbreak locations.

Monitor for protocol updates.

Viral Hemorrhagic Fevers:

Ebola is one of many.

DO NOT DISPATCH FIRST RESPONDERS

YES → Dispatch EMS Unit only
Discretely notify EMS Supervisor or command staff

NO

EMS

Do not rely solely on EMD personnel to identify a potential viral hemorrhagic fever patient – constrained by time and caller information

Obtain a travel history / exposure history and assess for clinical signs and symptoms

EMS Immediate Concern

1. Traveler from area with known VHR (Ebola) with or without symptoms
2. Traveler from Sierra Leone, Guinea, or Liberia within past 21 days

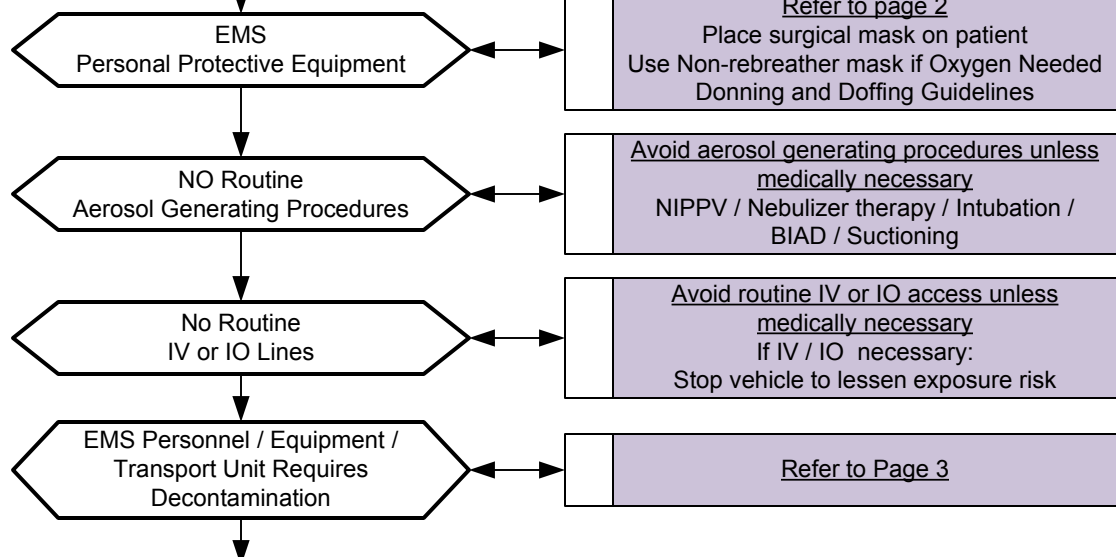
AND

Fever, Headache	Joint and Muscle aches	Weakness, Fatigue
Vomiting and/or Diarrhea	Abdominal Pain	Anorexia
Bleeding		

NO →

Exit to
Appropriate
Protocol(s)

YES



Notify Destination as soon and as discretely as possible
DO NOT ENTER facility with patient until instructed
Follow entry directions from hospital staff



Special Circumstances Section



Suspected Viral Hemorrhagic Fever Ebola

PARTICULAR ATTENTION MUST BE PAID TO PROTECTING MUCOUS MEMBRANES OF THE EYES, NOSE, and MOUTH FROM SPLASHES OF INFECTIOUS MATERIAL OR SELF INOCULATION FROM SOILED PPE / GLOVES.
THERE SHOULD BE NO EXPOSED SKIN

DONNING PPE: **BEFORE** you enter the patient area.

Recommended PPE

PAPR: A PAPR with a full face shield, helmet, or headpiece. Any reusable helmet or headpiece must be covered with a single-use (disposable) hood that extends to the shoulders and fully covers the neck and is compatible with the selected PAPR.

N95 Respirator: Single-use (disposable) N95 respirator in combination with single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield. If N95 respirators are used instead of PAPRs, careful observation is required to ensure healthcare workers are not inadvertently touching their faces under the face shield during patient care.

Single-use (disposable) fluid-resistant or impermeable gown that extends to at least mid-calf or coverall without integrated hood. Coveralls with or without integrated socks are acceptable.

Single-use (disposable) nitrile examination gloves with extended cuffs. Two pairs of gloves should be worn. At a minimum, outer gloves should have extended cuffs.

Single-use (disposable), fluid-resistant or impermeable boot covers that extend to at least mid-calf or single-use (disposable) shoe covers. Boot and shoe covers should allow for ease of movement and not present a slip hazard to the worker.

Single-use (disposable) fluid-resistant or impermeable shoe covers are acceptable only if they will be used in combination with a coverall with integrated socks.

Single-use (disposable), fluid-resistant or impermeable apron that covers the torso to the level of the mid-calf should be used if Ebola patients have vomiting or diarrhea. An apron provides additional protection against exposure of the front of the body to body fluids or excrement. If a PAPR will be worn, consider selecting an apron that ties behind the neck to facilitate easier removal during the doffing procedure

DOFFING PPE: OUTSIDE OF PPE IS CONTAMINATED! DO NOT TOUCH

1) PPE must be carefully removed without contaminating one's eyes, mucous membranes, or clothing with potentially infectious materials.

Use great care while doffing your PPE so as not to contaminate yourself (e.g. Do not remove your N-95 facemask or eye protection BEFORE you remove your gown). There should be a dedicated monitor to observe donning and doffing of PPE. It is very easy for personnel to contaminate themselves when doffing. A dedicated monitor should observe doffing to insure it is done correctly. Follow CDC guidance on doffing.

2) PPE must be double bagged and placed into a regulated medical waste container and disposed of in an appropriate location.

3) Appropriate PPE must be worn while decontaminating / disinfecting EMS equipment or unit.

3) Re-useable PPE should be cleaned and disinfected according to the manufacturer's reprocessing instructions.

Hand Hygiene should be performed by washing with soap and water with hand friction for a minimum of 20 seconds.

Alcohol-based hand rubs may be used if soap and water are not available.

EVEN IF AN ALCOHOL-BASED HAND RUB IS USED, WASH HANDS WITH SOAP AND WATER AS SOON AS FEASIBLE.

THE USE OF GLOVES IS NOT A SUBSTITUTE FOR HAND WASHING WITH SOAP & WATER

For any provider exposure or contamination contact occupational health.

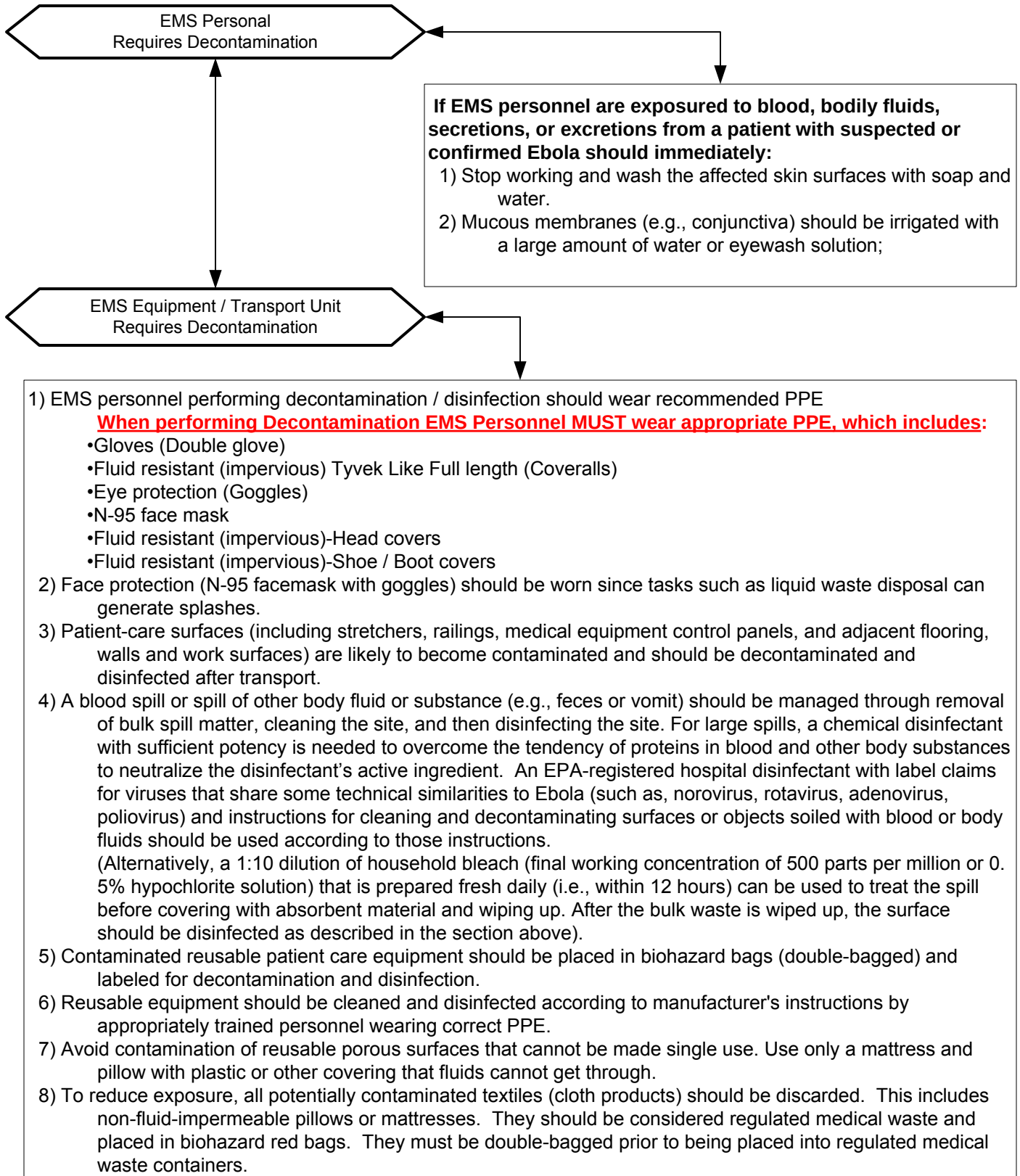
If the patient is being transported via stretcher then a disposable sheet can be placed over them.

Pearls

- **Transmission to another individual is the greatest after a patient develops fever. Once there is fever, the viral load in the bodily fluids appears to be very high and thus a heightened level of PPE is required.**
- **Patient contact precautions are the most important consideration.**
- **Incubation period 2-21 days**
- **Ebola must be taken seriously; however using your training, protocols, procedures and proper Personal Protective Equipment (PPE), patients can be cared for safely.**
- When an infection does occur in humans, the virus can be spread in several ways to others. The virus is spread through direct contact (through broken skin or mucous membranes) with a sick person's blood or body fluids (urine, saliva, feces, vomit, and semen) objects (such as needles) that have been contaminated with infected body fluids.
- Limit the use of needles and other sharps as much as possible. All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers. Safety devices must be employed immediately after use.
- Ebola Information: **For a complete review of Ebola go to:**
<http://www.cdc.gov/vhf/ebola/index.html>
<http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-emergency-medical-services-systems-911-public-safety-answering-points-management-patients-known-suspected-united-states.html>



Suspected Viral Hemorrhagic Fever Ebola



Pearls

- Ebola Information: **For a complete review of Ebola EMS Vehicle Disinfection go to:**
<http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-emergency-medical-services-systems-911-public-safety-answering-points-management-patients-known-suspected-united-states.html>

Suspected Viral Hemorrhagic Fever Ebola

Decedent Known or suspected carrier of HVF / Ebola Requires Transportation

Only personnel trained in handling infected human remains, and wearing full PPE, should touch, or move any Ebola-infected remains.
Handling human remains should be kept to a minimum.

Donning / Doffing PPE

PPE should be in place BEFORE contact with the body

- 1) Prior to contact with body, postmortem care personnel must wear PPE consisting of: surgical scrub suit, surgical cap, impervious Tyvex-Coveralls, eye protection (e.g., face shield, goggles), facemask, shoe covers, and double surgical gloves.
- 2) Additional PPE (leg coverings,) might be required in certain situations (e.g., copious amounts of blood, vomit, feces, or other body fluids that can contaminate the environment).

PPE should be removed immediately after and discarded as regulated medical waste.

- 1) Use caution when removing PPE as to avoid contaminating the wearer.
- 2) Hand hygiene (washing your hands thoroughly with soap and water or an alcohol based hand rub) should be performed immediately following the removal of PPE. If hands are visibly soiled, use soap and water.

Preparation of Body Prior to Transport

- 1) At the site of death, the body should be wrapped in a plastic shroud. Wrapping of the body should be done in a way that prevents contamination of the outside of the shroud.
- 2) Change your gown or gloves if they become heavily contaminated with blood or body fluids.
- 3) Leave any intravenous lines or endotracheal tubes that may be present in place.
- 4) Avoid washing or cleaning the body.
- 5) After wrapping, the body should be immediately placed in a leak-proof plastic bag not less than 150 µm thick and zippered closed. The bagged body should then be placed in another leak-proof plastic bag not less than 150 µm thick and zippered closed before being transported to the morgue.

Surface Decontamination

- 1) Prior to transport to the morgue, perform surface decontamination of the corpse-containing body bags by removing visible soil on outer bag surfaces with EPA-registered disinfectants which can kill a wide range of viruses.
- 2) Follow the product's label instructions. Once the visible soil has been removed, reapply the disinfectant to the entire bag surface and allow to air dry.
- 3) Following the removal of the body, the patient room should be cleaned and disinfected.
- 4) Reusable equipment should be cleaned and disinfected according to standard procedures.

Transportation of VHVF / Ebola Remains

PPE is required for individuals driving or riding in a vehicle carrying human remains. DO NOT handle the remains of a suspected / confirmed case of Ebola. The remains must be safely contained in a body bag where the outer surface of the body bag has been disinfected prior to the transport.

Special Circumstances Section

Pearls

- Ebola Information: **For a complete review of Handling Remains of Ebola Infected Patients go to:**
<http://www.cdc.gov/vhf/ebola/hcp/guidance-safe-handling-human-remains-ebola-patients-us-hospitals-mortuaries.html>



Scene Rehabilitation: General (Optional)

Injury / Illness / Complaint should be treated using appropriate treatment protocol beyond need for oral or IV hydration.



Initial Process

1. Personnel logged into General Rehabilitation Section
2. VS Assessed / Recorded (If HR > 110 then obtain Temp)
Carbon Monoxide monitoring if indicated
3. Personnel assessed for signs / symptoms
4. Remove PPE, Body Armor, Haz-Mat Suits, Turnout Gear, Other equipment as indicated

Significant Injury
Cardiac Complaint: Signs / Symptoms
Respiratory Complaint: Serious Signs / Symptoms
Respiratory Rate < 8 or > 40
Systolic Blood Pressure ≤ 80

Exit to
Scene Rehabilitation
Responder
Protocol



NO

Heat
or
Cold stress

HEAT STRESS

Active Cooling Measures

Forearm immersion, cool shirts,
cool mist fans etc.
Rest 10 – 20 Minutes

Rehydration Techniques

12 – 32 oz Oral Fluid over 20 minutes
*Oral Rehydration may occur along with
Active Cooling Measures*
*Firefighters should consume 8 ounces
of fluid between SCBA change-out*

COLD STRESS

Active Warming Measures

Dry responder, place in warm area
Hot packs to axilla and / or groin
Rest 10 – 20 minutes

Rehydration Techniques

12 – 32 oz Oral Fluid over 20 minutes
*Oral Rehydration may occur along with
Active Warming Measures*
*Firefighters should consume 8 ounces
of fluid between SCBA change-out*

Reassess responder after 20 Minutes in
General Rehabilitation Section
Reassess VS

HR
≥ 110

NO

Temp
≥ 100.6

NO

Temp
≥ 100.6

NO

HR
≥ 110

NO

Discharge Responder from
General Rehabilitation Section

Reports for Reassignment

Responder
Cannot Wear
Protective Gear

Extend
Rehabilitation
Time Until VS
Improve

Extend
Rehabilitation
Time Until VS
Improve

VITAL SIGN CAVEATS

Blood Pressure:

Prone to inaccuracy on scenes. Must
be interpreted in context.

Firefighters have elevated blood
pressure due to physical exertion
and is not typically pathologic.

Firefighters with Systolic BP ≥ 160 or
Diastolic BP ≥ 100 may need
extended rehabilitation. However this
does not necessarily prevent them
from returning to duty.

Temperature:

Firefighters may have increased
temperature during rehabilitation.

Special Operations Section



Scene Rehabilitation: General (Optional)

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Pearls

- **This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.**
- **Rehabilitation officer has full authority in deciding when responders may return to duty and may adjust rest / rehabilitation time frames depending on existing conditions.**
- **Rehabilitation goals:**
 - Relief from climatic conditions.**
 - Rest, recovery, and hydration prior to incident, during, and following incident.**
 - Active and / or passive cooling or warming as needed for incident type and climate conditions.**
- **May be utilized with adult responders on fire, law enforcement, rescue, EMS and training scenes.**
- **Responders taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.**
- **General indications for rehabilitation:**
 - 20-minute rehabilitation following use of a second 30-minute SCBA, 45-minute SCBA or single 60-minute SCBA cylinder.
 - 20-minute rehabilitation following 40 minutes of intense work without SCBA.
- **General work-rest cycles:**
 - 10-minute self-rehabilitation following use of one 30-minute SCBA cylinder or performing 20 minutes of intense work without SCBA.
- **Serious signs / symptoms:**
 - Chest pain, dizziness, dyspnea, weakness, nausea, or headache.
 - Symptoms of heat stress (cramps) or cold stress.
 - Changes in gait, speech, or behavior.
 - Altered Mental Status.
 - Abnormal Vital Signs per agency SOP or Policy / Procedure.
- **Rehabilitation Section:**
 - Integral function within the Incident Management System.
 - Establish section such that it provides shelter / shade, privacy and freedom from smoke or other hazards
 - Large enough to accommodate expected number of personnel.
 - Separate area to remove PPE.
 - Accessible to EMS transport units and water supply.
 - Away from media agencies and spectators / bystanders.



Scene Rehabilitation: Responder (Optional)

Remove:

PPE
Body Armor
Chemical Suits
SCBA
Turnout Gear
Other equipment as indicated

Continue:

Heat and Cold Stress treatment techniques from General Rehab Section

Injury / Illness / Complaint should be treated using appropriate treatment protocol beyond need for oral or IV hydration.



NFPA Age Predicted 85 % Maximum Heart Rate

20 - 25	170
26 - 30	165
31 - 35	160
36 - 40	155
41 - 45	152
46 - 50	148
51 - 55	140
55 - 60	136
61 - 65	132

Initial Process

1. Personnel logged into Responder Rehabilitation Section
2. VS Assessed and Recorded / Orthostatic Vital Signs
3. Pulse oximetry and SPCO (if available)
4. Personnel assessed for signs / symptoms

Use in conjunction with General Rehabilitation Protocol

20 Minute Rest Period

Pulse Rate > 85 % NFPA Age Predicted Maximum

YES

A

Normal Saline Bolus
500 mL IV / IO
Maximum 2 L
Titrate to HR ≤ 100
An
SBP ≥ 100 mmHg

NO

Systolic BP ≥ 160
Or
Diastolic BP ≥ 100

YES

NO

Respirations < 8 or > 40

YES

NO

Pulse oximetry < 90 %
SPCO > 10 %

YES

NO

Temperature ≥ 100.6

YES

NO

Discharge Responder from General Rehabilitation Section

Reports for Reassignment

No improvement after 30 minutes of additional rehabilitation

Mandatory Rest Period
Rehydration is Most Important
Re-evaluate in 10 minutes

Notify Destination or Contact Medical Control

Special Operations Section

Pearls

- This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.
- Rehabilitation officer has full authority in deciding when responders may return to duty.
- Utilized when responder is not appropriate for General Rehabilitation Protocol.
- May be utilized with adult responders on fire, law enforcement, rescue, EMS and training scenes.
- Responders taking anti-histamines, blood pressure medication, diuretics or stimulants are at increased risk for cold and heat stress.
- Rehabilitation Section is an integral function within the Incident Management System.
- Establish section such that it provides shelter, privacy and freedom from smoke or other hazards.

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Patient Care Policies



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Policies



Standards Policy: Disposition Policy Section

Criteria for Death / Withholding Resuscitation

Policy:

CPR and ALS treatment are to be withheld only if the patient is obviously dead or a valid North Carolina ***MOST and/or Do Not Resuscitate*** form (see separate policy) is present.

Purpose:

The purpose of this policy is to:

- Honor those who have obviously expired prior to EMS arrival.

Procedure:

1. If a patient is in complete cardiopulmonary arrest (clinically dead) and meets one or more of the criteria below, CPR and ALS therapy need not be initiated:
 - Body decomposition
 - Rigor mortis
 - Dependent lividity
 - Blunt force trauma
 - Injury not compatible with life (i.e., decapitation, burned beyond recognition, massive open or penetrating trauma to the head or chest with obvious organ destruction)
 - Extended downtime with Asystole on the ECG
2. If a bystander or first responder has initiated CPR or automated defibrillation prior to an EMS paramedic's arrival and any of the above criteria (signs of obvious death) are present, the paramedic may discontinue CPR and ALS therapy. All other EMS personnel levels must communicate with medical control prior to discontinuation of the resuscitative efforts.
3. If doubt exists, start resuscitation immediately. Once resuscitation is initiated, continue resuscitation efforts until either:
 - a) Resuscitation efforts meet the criteria for implementing the **Discontinuation of Prehospital Resuscitation Policy** (see separate policy)
 - b) Patient care responsibilities are transferred to the destination hospital staff.

Disposition Policy 1

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



Deceased Subjects

Policy:

EMS will handle the disposition of deceased subjects in a uniform, professional, and timely manner.

Purpose:

The purpose of this policy is to:

- Organize and provide for a timely disposition of any deceased subject
- Maintain respect for the deceased and family
- Allow EMS to return to service in a timely manner.

Procedure:

1. Do not remove lines or tubes from unsuccessful cardiac arrests/codes unless directed below.
2. Notify the law enforcement agency with jurisdiction if applicable.
3. If subject was found deceased by EMS, the scene is turned over to law enforcement.
4. If EMS has attempted to resuscitate the patient and then terminated the resuscitative efforts, the EMS personnel should contact the family physician (medical cases) or medical examiner (traumatic cases or family physician unavailable) to provide information about the resuscitative efforts.
5. Transport arrangements should be made in concert with law enforcement and the family's wishes.
6. If the deceased subject's destination is other than the county morgue, any line(s) or tube(s) placed by EMS should be removed prior to transport.
7. Document the situation, name of Physician or Medical Examiner contacted, the agency providing transport of the deceased subject, and the destination on the patient care report form (PCR).



Standards Policy: Disposition Policy Section

Discontinuation of Prehospital Resuscitation

Policy:

Unsuccessful cardiopulmonary resuscitation (CPR) and other advanced life support (ALS) interventions may be discontinued prior to transport or arrival at the hospital when this procedure is followed.

Purpose:

The purpose of this policy is to:

- Allow for discontinuation of prehospital resuscitation after the delivery of adequate and appropriate ALS therapy.

Procedure:

1. Discontinuation of CPR and ALS intervention may be implemented **prior to contact with Medical Control** if **ALL** of the following criteria have been met:
 - Patient must be 18 years of age or older
 - Adequate CPR has been administered
 - Airway has been successfully managed with verification of device placement. Acceptable management techniques include orotracheal intubation, nasotracheal intubation, Blind Insertion Airway Device (BIAD) placement, or cricothyrotomy
 - IV or IO access has been achieved
 - No evidence or suspicion of any of the following:
 - Drug/toxin overdose
 - Active internal bleeding
 - Hypothermia
 - Preceding trauma
 - Rhythm appropriate medications and defibrillation have been administered according to local EMS Protocols for a total of 3 cycles of drug therapy without return of spontaneous circulation (palpable pulse)
 - All EMS paramedic personnel involved in the patient's care agree that discontinuation of the resuscitation is appropriate
2. If all of the above criteria are not met and discontinuation of prehospital resuscitation is desired, **contact Medical Control**.
3. The **Deceased Subjects Policy** should be followed.

Document all patient care and interactions with the patient's family, personal physician, medical examiner, law enforcement, and medical control in the EMS patient care report (PCR).

Policy 3

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



Standards Policy: Disposition Policy Section

Disposition (Patient Instructions)

Policy:

All patient encounters responded to by EMS will result in the accurate and timely completion of:

- The Patient Care Report (PCR) for all patients transported by EMS
- The Patient Disposition Form for all patients not transported by EMS

Purpose:

To provide for the documentation of:

- The evaluation and care of the patient
- The patient's refusal of the evaluation, treatment, and/or transportation
- The patient's disposition instructions
- The patient's EMS encounter to protect the local EMS system and its personnel from undue risk and liability.

Procedure:

1. All patient encounters, which result in some component of an evaluation, must have a Patient Care Report completed.
2. All patients who refuse any component of the evaluation or treatment, based on the complaint, must have a Disposition Form completed.
3. All patients who are NOT transported by EMS must have a Disposition (patient instruction) Form completed including the Patient Instruction Section.
4. A copy of the Patient Disposition Form should be maintained with the official Patient Care Report (PCR)

Disposition Policy 4

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



Standards Policy: Disposition Policy Section

North Carolina Do Not Resuscitate and MOST Form

Policy:

Any patient presenting to any component of the EMS system with a completed **North Carolina Do Not Resuscitate (DNR)** form (yellow form) and/or **MOST (Medical Orders for Scope of Treatment)** form (bright pink form) shall have the form honored. Treatment will be limited as documented on the DNR or MOST form.

Purpose:

- To honor the terminal wishes of the patient
- To prevent the initiation of unwanted resuscitation

Procedure:

1. When confronted with a patient or situation involving the NC DNR and/or MOST form(s), the following form content must be verified before honoring the form(s) request.
 - The form(s) must be an original North Carolina DNR form (yellow form - not a copy) and/or North Carolina MOST form (bright pink – not a copy)
 - The effective date and expiration date must be completed and current
 - The DNR and/or MOST Form must be signed by a physician, physician's assistant, or nurse practitioner.
2. A valid DNR or MOST form may be overridden by the request of:
 - The patient
 - The guardian of the patient
 - An on-scene physician

A valid MOST form may also be overridden by the request of:

- A representative of the patient, as defined by G.S. 90-322

EMS personnel should contact **Medical Control** to obtain assistance and direction if clarification is necessary.

3. A living will or other legal document that identifies the patient's desire to withhold CPR or other medical care may be honored with the approval of **Medical Control**. This should be done when possible in consultation with the patient's family and personal physician.

Disposition Policy 5

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



Standards Policy: Disposition Policy Section

Patient Without a Protocol

Policy:

Anyone requesting EMS services will receive a professional evaluation, treatment, and transportation (if needed) in a systematic, orderly fashion regardless of the patient's problem or condition.

Purpose:

- To ensure the provision of appropriate medical care for every patient regardless of the patient's problem or condition.

Procedure:

1. Treatment and medical direction for all patient encounters, which can be triaged into an EMS patient care protocol, is to be initiated by protocol.
2. When confronted with an emergency or situation that does not fit into an existing EMS patient care protocol, the patient should be treated by the **Universal Patient Care Protocol** and a **Medical Control Physician** should be contacted for further instructions.

Disposition Policy 6

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



Physician on Scene

Policy:

The medical direction of prehospital care at the scene of an emergency is the responsibility of those most appropriately trained in providing such care. All care should be provided within the rules and regulations of the state of North Carolina.

Purpose:

- To identify a chain of command to allow field personnel to adequately care for the patient
- To assure the patient receives the maximum benefit from prehospital care
- To minimize the liability of the EMS system as well as the on-scene physician

Procedure:

1. When a non medical-control physician offers assistance to EMS or the patient is being attended by a physician with whom they do not have an ongoing patient relationship, EMS personnel must review the On-Scene Physician Form with the physician. All requisite documentation must be verified and the physician must be approved by on-line medical control.
2. When the patient is being attended by a physician with whom they have an ongoing patient relationship, EMS personnel may follow orders given by the physician if the orders conform to current EMS guidelines, and if the physician signs the PCR. Notify medical control at the earliest opportunity. Any deviation from local EMS protocols requires the physician to accompany the patient to the hospital.
3. EMS personnel may accept orders from the patient's physician over the phone with the approval of medical control. The paramedic should obtain the specific order and the physician's phone number for relay to medical control so that medical control can discuss any concerns with the physician directly.



Opioid Overdose/Misuse (Optional)

Policy:

Patients who have experienced an opioid overdose/misuse should be offered a variety of options to more appropriately manage their care where available in the community. All care should be provided within the rules and regulations of the state of North Carolina.

Purpose:

- To ensure patients are offered options for treatment of opioid misuse where available.
- Provide harm reduction measures related to opioid misuse.

Procedure:

1. Patients must be over 18 years of age and experienced unintentional overdose or misuse of an opioid medication(s) only. Patients must NOT have experienced cardiac arrest defined as administration of chest compressions by first responders or EMS during the incident.
2. The patient must regain a normal mental status and respiratory effort after the administration of naloxone, NOT have suicidal or homicidal ideations/intentions, and NOT ingested substance(s) for intentional self-harm.
3. Patients who have co-ingested other substances should be treated based on appropriate protocol. Consult Carolina Poison Center at 1-800-222-1222 for advice if needed.
4. Transport to an Emergency Department should be offered to all patients. For patients who decline transport to an Emergency Department, alternative destinations should be offered if available in the community. Options may include assistance with accessing inpatient treatment centers, outpatient facilities, mobile crisis solutions, addiction specialists, and/or other local treatment options.
5. In order to decline transport, the patient must meet the following criteria:
 - a) Be 18 years or older
 - b) Maintain a GCS of 15 (alert, and oriented to time, place, person, and situation)
 - c) Demonstrate decision-making capacity as outlined in Universal Protocol (UP 1) Pearls.
6. If patient declines transport to an Emergency Department, an additional dose of naloxone should be offered by EMS if patient consents to additional treatment. IN administration is preferable to limit the possibility of provider needle stick injury. If patient has no sober and responsible party to monitor them, EMS should offer IM administration of naloxone if patient consents to treatment. If available, a naloxone kit should be left with the patient, family, and/or friends on scene. EMS should provide brief education on how to properly use these kits and refer them to read all package related material and instructions provided by the manufacturer.
7. In addition to naloxone kits, the following items should be offered where possible/available:
 - a) Offer to properly dispose of any dirty needles following your agency policy
 - b) Provide clean needles/syringes where possible following your agency policy
 - c) Refer to a community peer support team if available
 - d) Provide literature outlining resources for substance misuse treatment programs in the community



Standards Policy: Documentation Policy Section

EMS Documentation and Data Quality

Policy:

The complete EMS documentation associated with service delivery and patient care shall be electronically recorded into a Patient Care Report (PCR) within 24 hours of the completion of the EMS event, with an EMS Data Score at/or below the state average.

Definition:

EMS documentation of a Patient Care Report (PCR) is based on the appropriate and complete documentation of the EMS data elements as required and defined within the North Carolina College of Emergency Physician's EMS Standards (www.NCCEP.org). Since each EMS event and/or patient scenario is unique, only the data elements relevant to that EMS event and/or patient scenario should be completed.

The EMS Data Score is calculated on each EMS PCR as it is electronically processed into the North Carolina PreHospital Medical Information System (PreMIS). Data Quality Scores are provided within PreMIS. The best possible score is a 0 (zero) and with each data quality error a point is added to the data quality score.

A complete Patient Care Report (PCR) must contain the following information (as it relates to each EMS event and/or patient):

- Service delivery and crew information regarding the EMS Agency's response
- Dispatch information regarding the dispatch complaint, and EMD card number
- Patient care provided prior to EMS arrival
- Patient assessment as required by each specific complaint based protocol
- Past medical history, medications, allergies, and DNR/MOST status
- Trauma and cardiac arrest information if relevant to the EMS event or patient
- All times related to the event
- All procedures and their associated time
- All medications administered with their associated time
- Disposition and/or transport information
- Communication with medical control
- Appropriate signatures (written and/or electronic)

Purpose:

The purpose of this policy is to:

- Promote timely and complete EMS documentation.
- Promote quality documentation that can be used to evaluate and improve EMS service delivery, personnel performance, and patient care to the county's citizens.
- Promote quality documentation that will decrease EMS legal and risk management liability.
- Provide a means for continuous evaluation to assure policy compliance.



Standards Policy: Documentation Policy Section

EMS Documentation and Data Quality

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. The EMS Patient Care Report (PCR) shall be completed as soon as possible after the time of the patient encounter. **Documentation should be completed prior to leaving the destination facility unless call demand dictates otherwise, in which case documentation must be completed prior to the end of the personnel's shift.**
2. **A copy of the patient care report form SHOULD be provided to the receiving medical facility. If the final PCR is not available at the time the patient is left with the emergency department or other healthcare facility, an interim report such as the PreMIS Preliminary Report Form MUST be provided.**
3. The PCR must be completed in the PreMIS System or electronically submitted to the PreMIS System within 24 hours of the EMS event or patient encounter's completion. The EMS data quality feedback provided at the time of the electronic submission into PreMIS should be reviewed and when possible any identified errors will be corrected within each PCR. Each PCR may be electronically resubmitted to PreMIS as many times as needed.
4. The EMS Data Quality Scores for the EMS System, EMS Agency, and individual EMS personnel will be reviewed regularly within the EMS System Peer Review Committee.



Standards Policy: Documentation Policy Section

Documentation of Vital Signs

Policy:

Every patient encounter by EMS will be documented. Vital signs are a key component in the evaluation of any patient and a complete set of vital signs is to be documented for any patient who receives some assessment component.

Purpose:

To insure:

- Evaluation of every patient's volume and cardiovascular status
- Documentation of a complete set of vital signs

Procedure:

1. An **initial** complete set of vital signs includes:
 - Pulse rate
 - Systolic **AND** diastolic blood pressure
 - Respiratory rate
 - Pain / severity (when appropriate to patient complaint)
 - GCS for Injured Patients
2. When no ALS treatment is provided, palpated blood pressures are acceptable for **REPEAT** vital signs.
3. Based on patient condition and complaint, vital signs may also include:
 - Pulse Oximetry
 - Temperature
 - End Tidal CO2
 - Breath Sounds
 - Level of Response
4. If the patient refuses this evaluation, the patient's mental status and the reason for refusal of evaluation must be documented. A patient disposition form must also be completed.
5. Document situations that preclude the evaluation of a complete set of vital signs.
6. Record the time vital signs were obtained.
7. Any abnormal vital sign should be repeated and monitored closely.



EMS Dispatch Center Time

Policy:

The EMS Dispatch Center Time will be less than 90 seconds, 90% of the time, for all events identified and classified as an emergent or hot (with lights and siren) response.

Definition:

The EMS Dispatch Center Time is defined as the time interval beginning with the time the initial 911 phone call rings at the 911 Communications Center requesting emergency medical services and ending with the dispatch time of the EMS Unit responding to the event.

Purpose:

The purpose of this policy is to:

- Provide the safest and most appropriate level of response to all EMS events within the EMS System.
- Provide a timely and reliable response for all EMS events within the EMS System.
- Provide quality EMS service and patient care to the county's citizens.
- Provide a means for continuous evaluation to assure policy compliance.

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. A public calls into the 911 Communications Center requesting emergency medical assistance will never be required to speak with more than two persons before a formal EMS Unit is dispatched.
2. In EMS Dispatch Centers where Emergency Medical Dispatch (EMD) has been implemented, EMS Units will be dispatched by EMD certified personnel in accordance with the standards developed by the Medical Director and the Emergency Medical Dispatch Protocols.
3. EMS Units will be dispatched hot (with lights and sirens) or cold (no lights and sirens) by the 911 Call Center based on predetermined criteria. If First Responders are dispatched as a component of the EMS response, they should typically be dispatched hot (with lights and sirens).
4. Without question, exception, or hesitation, EMS Units will respond as dispatched (hot or cold). This includes both requests to respond on active calls and requests to "move-up" to cover areas of the System that have limited EMS resources available.
5. EMS Units may, at their discretion, request for a First Responder on Non-First Responder calls in situations where additional resources are required such as manpower, extreme response time of the EMS Unit, need for forcible entry, etc.



EMS Dispatch Center Time

6. EMS Units dispatched with a cold (no lights and sirens) response, will not upgrade to a hot (with lights and sirens) response **UNLESS**:
 - Public Safety personnel on-scene requests a hot (with lights and sirens) response.
 - Communications Center determines that the patient's condition has changed, and requests you to upgrade to a hot (with lights and sirens) response.
7. An EMS Unit may divert from a current cold (no lights and sirens) call to a higher priority hot (with lights and sirens) call **ONLY IF**:
 - The EMS Unit can get to the higher priority call before it can reach the lower priority call. Examples of High Priority Calls: Chest Pain, Respiratory Distress, CVA, etc.
 - The diverting EMS Unit must notify the EMS Dispatch Center that they are diverting to the higher priority call.
 - The diverting EMS Unit ensures that the EMS Dispatch Center dispatches an EMS Unit to their original call.
 - Once a call has been diverted, the next EMS Unit dispatched must respond to the original call. A call cannot be diverted more than one (1) time.
8. Any EMS Dispatch Center Time delays resulting in a prolonged EMS Dispatch Center Time for emergent hot (with lights and sirens) events will be documented in Patient Care Report (PCR) as an "EMS Dispatch Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.
9. All EMS Dispatch Delays will be reviewed regularly within the EMS System Peer Review Committee.



Drug Assisted Airway

Policy:

Drug Assisted Intubation (DAI) requires an EMS System or Agency to follow these guidelines to ensure that this invasive procedure is performed in a safe and effective manner to benefit the citizens and guest of North Carolina.

Purpose:

The purpose of this policy is to:

- Ensure that the procedure is performed in a safe and effective manner
- Facilitate airway management in appropriate patients

Procedure:

1. In addition to other monitoring devices, Waveform Capnography and Pulse Oximetry are required to perform Drug Assisted Airways and must be monitored throughout the procedure.
2. Two Paramedics or higher-level providers must be present and participate in the airway management of the patient during the procedure.
3. All staff must be trained and signed off by the EMS Medical Director prior to performing Drug Assisted Airways.
4. A printed copy or electronic download from the monitor defibrillator including the pulse oximetry, heart rate, heart rhythm, waveform capnography, and blood pressure must be stored with the patient care report.
5. An EMS Airway Evaluation Form must be completed on all Drug Assisted Airway Attempts.
6. The EMS Airway Evaluation Form must be reviewed and signed by the EMS Medical Director within 14 days of the Drug Assisted Airway attempts.
7. All Drug Assisted Airways must be reviewed by the EMS System or Agency and issues identified addressed through the System Peer Review Committee.
8. A copy of the EMS Airway Evaluation form for each Drug Assisted Airways must be forwarded to the appropriate OEMS Regional Office listed below at the end of each month for state review.

Western Regional Office
3305-4 16th Avenue SE
Conover, NC 28613
Telephone: 828-466-5548
Fax: 828-466-5651

Central Regional Office
2707 Mail Service Center
Raleigh, NC 27699-2707
Telephone: 919-855-4678
Fax: 919-715-0498

Eastern Regional Office
404 Saint Andrews Dr
Greenville, NC 27834
Telephone: 252-355-9026
Fax: 252-355-9063

In addition, the NC EMS Airway Evaluation Form has been revised to a one page document to improve provider compliance and promote receiving/confirming physician acceptance.



Child with Special Health Care Needs (NC Kidbase)

Policy:

Medical technology, changes in the healthcare industry, and increased home health capabilities have created a special population of patients that interface with the EMS system. It is important for EMS to understand and provide quality care to children with special health care needs.

Purpose:

The purpose of this policy is to:

- Provide quality patient care and EMS services to children with special health care needs.
- Understand the need to communicate with the parents and caregivers regarding healthcare needs and devices that EMS may not have experience with.
- Promote, request, and use the “Kidbase” form, which catalogs the health care problems, needs, and issues of each child with a special healthcare need.

Procedure:

1. Caregivers who call 911 to report an emergency involving a child with special health care needs may report that the emergency involves a “Kidbase child” (if they are familiar with the NC Kidbase program) or may state that the situation involves a special needs child.
2. Responding EMS personnel should ask the caregiver of a special needs child for a copy of the “Kidbase Form”, which is the North Carolina terminology for the Emergency Information Form (EIF).
3. EMS personnel may choose to contact the child’s primary care physician for assistance with specific conditions or devices or for advice regarding appropriate treatment and/or transport of the child in the specific situation.
4. Transportation of the child, if necessary, will be made to the hospital appropriate for the specific condition of the child. In some cases this may involve bypassing the closest facility for a more distant yet more medically appropriate destination.



Infant Abandonment

Policy:

The North Carolina Infant Homicide Prevention Act provides a mechanism for unwanted infants to be taken under temporary custody by a law enforcement officer, social services worker, healthcare provider, or EMS personnel if an infant is presented by the parent within 7 days of birth. Emergency Medical Services will accept and protect infants who are presented to EMS in this manner, until custody of the child can be released to the Department of Social Services.

*“A law enforcement officer, a department of social services worker, a health care provider as defined in G.S. 90-21.11 at a hospital or local or district health department, or an **emergency medical technician** at a fire station shall, without a court order, take into temporary custody an infant under 7 days of age that is voluntarily delivered to the individual by the infant's parent who does not express an intent to return for the infant. An individual who takes an infant into temporary custody under this subsection shall perform any act necessary to protect the physical health and well-being of the infant and shall immediately notify the department of social services. Any individual who takes an infant into temporary custody under this subsection may inquire as to the parents' identities and as to any relevant medical history, but the parent is not required to provide this information.”*

Purpose:

To provide:

- Protection to infants that are placed into the custody of EMS under this law
- Protection to EMS systems and personnel when confronted with this issue

Procedure:

1. Initiate the Pediatric Assessment Procedure.
2. Initiate Newly Born Protocol as appropriate.
3. Initiate other treatment protocols as appropriate.
4. Keep infant warm.
5. Call local Department of Social Services or the county equivalent as soon as infant is stabilized.
6. Transport infant to medical facility as per local protocol.
7. Assure infant is secured in appropriate child restraint device for transport.
8. Document protocols, procedures, and agency notifications in the PCR.



EMS Back in Service Time

Policy:

All EMS Units transporting a patient to a medical facility shall transfer the care of the patient and complete all required operational tasks to be back in service for the next potential EMS event within 30 minutes of arrival to the medical facility, 90% of the time.

Definition:

The EMS Back in Service Time is defined as the time interval beginning with the time the transporting EMS Unit arrives at the medical facility destination and ending with the time the EMS Unit checks back in service and available for the next EMS event.

Purpose:

The purpose of this policy is to:

- Assure that the care of each EMS patient transported to a medical facility is transferred to the medical facility staff in a timely manner.
- Assure that the EMS unit is cleaned, disinfected, restocked, and available for the next EMS event in a timely manner.
- Assure that an interim or complete EMS patient care report (PCR) is completed and left with the receiving medical facility documenting, at a minimum, the evaluation and care provided by EMS for that patient (It is acceptable to leave the PreMIS Preliminary Report or equivalent if the final PCR cannot be completed before leaving the facility).
- Provide quality EMS service and patient care to the county's citizens.
- Provide a means for continuous evaluation to assure policy compliance.

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. The EMS Unit's priority upon arrival at the medical facility will be to transfer the care of the patient to medical facility staff as soon as possible.
2. EMS personnel will provide a verbal patient report on to the receiving medical facility staff.
3. EMS personnel will provide an interim (PreMIS Preliminary Report or equivalent) or final Patient Care Report (PCR) to the receiving medical facility staff, prior to leaving the facility, that documents at a minimum the patient's evaluation and care provided by EMS prior to arrival at the medical facility. A complete PCR should be completed as soon as possible but should not cause a delay in the EMS Back in Service Time.
4. The EMS Unit will be cleaned, disinfected, and restocked (if necessary) during the EMS Back in Service Time interval.
5. Any EMS Back in Service Time delay resulting in a prolonged EMS Back in Service Time will be documented in Patient Care Report (PCR) as an "EMS Turn-Around Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.
6. All EMS Turn-Around Delays will be reviewed regularly within the EMS System Peer Review Committee.



Standards Policy: Service Metric Policy Section

EMS Wheels Rolling (Turn-Out) Time

Policy:

The EMS Wheels Rolling (Turn-out) Time will be less than 90 seconds, 90% of the time, for all events identified and classified as an emergent or hot (with lights and siren) response.

Definition:

The EMS Wheels Rolling (Turn-out) Time is defined as the time interval beginning with the time the EMS Dispatch Center notifies an EMS Unit to respond to a specific EMS event and ending with the time the EMS Unit is moving en route to the scene of the event.

Purpose:

The purpose of this policy is to:

- Provide a timely and reliable response for all EMS events within the EMS System.
- Provide quality EMS service and patient care to the county's citizens.
- Provide a means for continuous evaluation to assure policy compliance.

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. In EMS Dispatch Centers where Emergency Medical Dispatch (EMD) has been implemented, EMS Units will be dispatched by EMD certified personnel in accordance with the standards developed by the Medical Director and the Emergency Medical Dispatch Protocols.
2. The EMS Unit Wheels Rolling (Turn-out) time will be less than 90 seconds from time of dispatch, 90% of the time. If a unit fails to check en route within 2:59 (mm:ss), the next available EMS unit will be dispatched.
3. Without question, exception, or hesitation, EMS Units will respond as dispatched (hot or cold). This includes both requests to respond on active calls and requests to "move-up" to cover areas of the System that have limited EMS resources available.
4. An EMS Unit may divert from a current cold (no lights and sirens) call to a higher priority hot (with lights and sirens) call **ONLY IF**:
 - The EMS Unit can get to the higher priority call before it can reach the lower priority call. Examples of High Priority Calls: Chest Pain, Respiratory Distress, CVA, etc.
 - The diverting EMS Unit must notify the EMS Dispatch Center that they are diverting to the higher priority call.
 - The diverting EMS Unit ensures that the EMS Dispatch Center dispatches an EMS Unit to their original call.
 - Once a call has been diverted, the next EMS Unit dispatched must respond to the original call. A call cannot be diverted more than one (1) time.
5. Any EMS Wheels Rolling (Turn-out) Time delay resulting in a prolonged EMS Response Time for emergent hot (with lights and sirens) events will be documented in Patient Care Report (PCR) as an "EMS Response Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.
6. All EMS Response Delays will be reviewed regularly within the EMS System Peer Review Committee.

Service Metric Policy 2

Any local EMS System changes to this document must follow the NC OEMS Protocol Change Policy and be approved by OEMS



State Poison Center

Policy:

The state poison center should be utilized by the 911 centers and the responding EMS services to obtain assistance with the prehospital triage and treatment of patients who have a potential or actual poisoning.

Purpose:

The purpose of this policy is to:

- Improve the care of patients with poisonings, envenomations, and environmental/biochemical terrorism exposures in the prehospital setting.
- Provide for the most timely and appropriate level of care to the patient, including the decision to transport or treat on the scene.
- Integrate the State Poison Center into the prehospital response for hazardous materials and biochemical terrorism responses

Procedure:

1. The 911 call center will identify and if EMD capable, complete key questions for the Overdose/Poisoning, Animal Bites/Attacks, or Carbon Monoxide/Inhalation/HazMat emergency medical dispatch complaints and dispatch the appropriate EMS services and/or directly contact the State Poison Center for consultation.
2. If no immediate life threat or need for transport is identified, EMS personnel may conference the patient/caller with the Poison Center Specialist at the **State Poison Center at 800-222-1222**. If possible, dispatch personnel should remain on the line during conference evaluation.
3. The Poison Center Specialist at the State Poison Center will evaluate the exposure and make recommendations regarding the need for on-site treatment and/or hospital transport in a timely manner. If dispatch personnel are not on-line, the Specialist will recontact the 911 center and communicate these recommendations.
4. If the patient is determined to need EMS transport, the poison center Specialist will contact the receiving hospital and provide information regarding the poisoning, including treatment recommendations. EMS may contact medical control for further instructions or to discuss transport options.
5. If the patient is determined not to require EMS transport, personnel will give the phone number of the patient/caller to the Poison Center Specialist. The Specialist will initiate a minimum of one follow-up call to the patient/caller to determine the status of patient.
6. Minimal information that should be obtained from the patient for the state poison center includes:
 - Name and age of patient
 - Time of exposure
 - Signs and symptoms
 - Substance(s) involved
 - Any treatment given
7. Minimal information which should be provided to the state poison center for mass poisonings, including biochemical terrorism and HazMat, includes:
 - Substance(s) involved
 - Signs and symptoms
 - Time of exposure
 - Any treatment given



Air Transport

Policy:

Air transport should be utilized whenever patient care can be improved by decreasing transport time or by giving advanced care not available from ground EMS services, but available from air medical transport services (i.e. blood).

Purpose:

The purpose of this policy is to:

- Improve patient care in the prehospital setting.
- Allow for expedient transport in serious, mass casualty settings.
- Provide life-saving treatment such as blood transfusion.
- Provide more timely access to interventional care in acute Stroke and ST-elevation myocardial infarction (STEMI) patients

Procedure:

Patient transportation via ground ambulance will not be delayed to wait for helicopter transportation.

If the patient is packaged and ready for transport and the helicopter is not on the ground, or within a reasonable distance, the transportation will be initiated by ground ambulance.

Air transport should be considered if any of the following criteria apply:

- High priority patient with > 20 minute transport time
- Entrapped patients with > 10 minute estimated extrication time
- Multiple casualty incident with red/yellow tag patients
- Multi-trauma or medical patient requiring life-saving treatment not available in prehospital environment (i.e., blood transfusion, invasive procedure, operative intervention)
- Time dependent medical conditions such as acute ST-elevation myocardial infarctions (STEMI) or acute Stroke that could benefit from the resources at a specialty center as per the EMS System's Stroke and STEMI Plans.

If a potential need for air transport is anticipated, but not yet confirmed, an air medical transport service can be placed on standby.

If the scene conditions or patient situation improves after activation of the air medical transport service and air transport is determined not to be necessary, paramedic or administrative personnel may cancel the request for air transport.

Minimal Information which should be provided to the air medical transport service include:

- Number of patients
- Age of patients
- Sex of patients
- Mechanism of injury or complaint (MVC, fall, etc)



Standards Policy: Transport Policy Section

Safe Transport of Pediatric Patients

Policy:

Without special considerations children are at risk of injury when transported by EMS. EMS must provide appropriate stabilization and protection to pediatric patients during EMS transport.

Purpose:

To provide:

- Provide a safe method of transporting pediatric patients within an ambulance.
- Protect the EMS system and personnel from potential harm and liability associated with the transportation of pediatric patients.

Procedure:

1. Drive cautiously at safe speeds observing traffic laws.
2. Tightly secure all monitoring devices and other equipment.
3. Insure that all pediatric patient less than 40 lbs are restrained with an approved child restraint device secured appropriately to the stretcher or captains chair.
3. Insure that all EMS personnel use the available restraint systems during the transport.
4. Transport adults and children who are not patients, properly restrained, in an alternate passenger vehicle, whenever possible.
5. Do not allow parents, caregivers, or other passengers to be unrestrained during transport.
6. NEVER attempt to hold or allow the parents or caregivers to hold the patient during transport.



Transport

Policy:

All individuals served by the EMS system will be evaluated, treated, and furnished transportation (if indicated) in the most timely and appropriate manner for each individual situation.

Purpose:

To provide:

- Rapid emergency EMS transport when needed.
- Appropriate medical stabilization and treatment at the scene when necessary
- Protection of patients, EMS personnel, and citizens from undue risk when possible.

Procedure:

1. All trauma patients with significant mechanism or history for multiple system trauma will be transported as soon as possible. The scene time should be 10 minutes or less.
2. All acute Stroke and acute ST-Elevation Myocardial Infarction patients will be transported as soon as possible. The scene time should be 10 minutes or less for acute Stroke patients and 15 minutes or less (with 12 Lead ECG) for STEMI patients
2. Other Medical patients will be transported in the most efficient manner possible considering the medical condition. Advanced life support therapy should be provided at the scene if it would positively impact patient care. Justification for scene times greater than 20 minutes should be documented.
3. No patients will be transported in initial response non-transport vehicles.
4. In unusual circumstances, transport in other vehicles may be appropriate when directed by EMS administration.

Propofol (Diprivan)

Class

- General Anesthetic

Pharmacology

- Produces hypnosis or sedation usually within 40 seconds
- Duration 5-7 minutes after infusion discontinued

Indications

- Sedation of intubated patients

Contraindications

- Known hypersensitivity reaction
- Allergy to egg or egg products & soybeans or soy products
- Hypotension
- Age < 3 years

Dose Adult & Pediatric

- 5 mcg/kg/min – 50 mcg/kg/min



Guidelines for the Utilization of Propofol

The following are guidelines specific to the interfacility transportation of a patient with a Propofol drip and all must be followed:

1. Propofol will only be used on patients with a secured, definitive airway
2. Propofol will be used only during interfacility transfers and will not be supplied on any Catawba County EMS Unit.
3. Propofol must be infused via an IV pump supplied by the transferring facility.
4. Medication boluses of Propofol are strictly prohibited, under any circumstance.
5. The minimum medication information obtained from the transferring facility includes:
 - a. Current drip rate/dosage
 - b. Concentration of the medication
 - c. Any adverse reactions the patient experienced during administration
6. Continuous waveform capnography must be utilized as well as serial vital signs every 10 minutes. Initial vital signs include: heart rate, manual blood pressure, pulse oximetry, EtCO₂, respiratory rate, and breath sounds. Repeat blood pressures may be obtained via an automated device; however, it is recommended that manual blood pressures be obtained whenever possible.
7. The patient must have at least one (1) additional vascular access site prior to transporting. This site should be used to administer any other medications as needed.
8. If the patient is not achieving adequate sedation with Propofol, you may administer Etomidate 0.3 mg/kg IV and consult medical control for further instruction.
9. If the patient experiences hypotension during transport, administer one (1) fluid bolus, decrease dosage by 5 mcg/kg/min, and consult medical control for further instructions.
10. Any titration of the medication must be in consult with medical control. Duration between dosage changes must be at least 5 minutes and in increments no greater than 5 mcg/kg/min.
11. When transferring care, you must relay the following information to the receiving facility:
 - a. Current drip rate/dosage
 - b. Initial drip rate/dosage if changed
 - c. Additional sedative given (if applicable)
 - d. Concentration of the medication
 - e. Any adverse reactions the patient experienced during administration

Education Requirements

Each EMT-Paramedic must show proficiency in the care of sedated patients. All EMT-Paramedics are required to complete annual training on Propofol to include indications, contraindications, dosage ranges, common side effects, and a review of drug calculation for weight based medications. A skill evaluation will be performed annually on the use of IV pumps utilized by transferring facilities to include how to troubleshoot problems encountered.

Quality Management Requirements

Every patient care report which Propofol is utilized will be reviewed by the EMS Training Officer or designee and presented to the System Medical Director. Any documentation associated with the quality management of Propofol will be available for inspection at any time, upon request, by the North Carolina Office of EMS.

Skills / Procedures

North Carolina Medical Board

Approved Skills for Credentialed EMS Personnel

EMS personnel performing these skills must do so within an EMS system. Personnel must follow written treatment protocols and must complete appropriate medical education. All EMS System protocols and policies must be reviewed and approved by the Medical Director of the Office of EMS.

All items highlighted in “red” are required in all systems with EMS personnel credentialed at the specified level. Specialty Care (SCTP) required items are not listed here, as they can be found on the Specialized Ambulance Protocol Summary (SAPS) form.

Skills	FR/LEO	EMR	EMT	AEMT	PARAMEDIC
12-Lead ECG Acquisition & Transmission			X	X	X
12-Lead ECG Interpretation					X
15-Lead ECG Acquisition					X
Arterial Access - Blood Draw					X
Arterial Line maintenance					X
Blind Insertion Airway Device (BIAD)			X ¹	X	X
Capnography (Waveform)			X	X	X
Carbon Monoxide Measurement (non-invasive)		X	X	X	X
Cardiac Monitoring			X ⁴	X ⁴	X
Cardiac Pacing					X
Cardiopulmonary Resuscitation	X	X	X	X	X
Cardioversion					X
Carotid Massage					X
Central Venous Pressure Line Maintenance					X
Chest Compression-External Device			X	X	X
Chest Decompression-Needle					X
Chest Tube Maintenance					X
Childbirth			X	X	X
CPAP			X	X	X
Cricothyrotomy-Needle					X
Cricothyrotomy-Surgical					X ⁵
Decontamination		X	X	X	X
Defibrillation-Automated	X	X	X	X	X
Defibrillation-Manual					X
Endotracheal Tube Introducer				X	X
Epidural Catheter Maintenance					X
Foreign Body Airway Obstruction		X	X	X	X
Gastric Intubation			X ³	X ³	X
Glucose Measurement		X	X	X	X
Hemostatic Agent		X	X	X	X
Injections – Subcutaneous and Intramuscular			X ²	X	X
Intra-Ventricular Catheter Maintenance					X
Intubation - Nasotracheal					X
Intubation - Orotracheal				X ⁶	X ⁶

Skills	FR/LEO	EMR	EMT	AEMT	PARAMEDIC
Intubation Confirmation - Capnometry (color)				X	X
Intubation Confirmation - Esophageal Bulb				X	X
Medication Administration	X ²	X ²	X ²	X ²	X ²
Nebulizer Inhalation Therapy			X	X	X
Orthostatic Blood Pressure		X	X	X	X
Oxygen Administration	X	X	X	X	X
Patient Assessment		X	X	X	X
Pulse Oximetry		X	X	X	X
Rapid Sequence Induction (RSI)					X ^{5,6}
Reperfusion Checklist		X	X	X	X
Respirator Operation			X	X	X
Restraints			X	X	X
Spinal Motion Restriction			X	X	X
Splinting		X	X	X	X
Stroke Screen		X	X	X	X
Suction		X	X	X	X
Swan-Ganz Catheter maintenance					X
Taser Probe Removal	X	X	X	X	X
Temperature Measurement		X	X	X	X
Tourniquet Application	X	X	X	X	X
Tracheostomy Tube Change				X	X
Urinary Catheterization					X
Venous Access-Blood Draw				X	X
Venous Access-Existing catheters					X
Venous Access-Femoral Line					X
Venous Access-Intraosseous				X	X
Venous Access-Peripheral				X	X
Ventilator Operation					X
Wound Care	X	X	X	X	X

¹ EMTs using blind insertion airway devices must be functioning in EMS systems with medical direction and written treatment protocols.

² EMS personnel at any level who administer medications must do so within an EMS system that provides medical oversight. Personnel must follow written treatment protocols and must complete appropriate medical education. All EMS System protocols and policies must be reviewed and approved by the Medical Director of the Office of EMS. The approved medication list is found at the beginning of this document. The administration of oxygen does not require medical direction.

³ Gastric tube insertion may be performed only when utilized in conjunction with a blind insertion airway device.

⁴ Cardiac monitoring is permitted for non-diagnostic use only.

⁵ Systems performing rapid sequence induction must have the ability to perform surgical cricothyrotomy. Commercial cricothyrotomy or tracheostomy kits that create an airway comparable to a surgical cricothyrotomy are acceptable.

⁶ All EMT-Intermediate/AEMT and Paramedic systems must use either capnometry (color) or waveform capnography to confirm every intubation and invasive airway. Paramedic systems performing rapid sequence induction (RSI) must use waveform capnography to confirm tube placement.

-EMD personnel are responsible for:

- 1) Pre-arrival instructions to callers
- 2) Determining and dispatching appropriate EMS resources
- 3) All EMD skills must be performed in EMS systems with medical oversight and written EMS protocols



Assessment: Adult

Clinical Indications:

- Any patient requesting a medical evaluation that is too large to be measured with a 2017 Length-based Resuscitation Tape.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Scene size-up, including universal precautions, scene safety, environmental hazards assessment, need for additional resources, by-stander safety, and patient/caregiver interaction
- Assess need for additional resources.
- Initial assessment includes a general impression as well as the status of a patient's airway, breathing, and circulation.
- Assess mental status (e.g., AVPU) and disability (e.g., GCS).
- Control major hemorrhage and assess overall priority of patient.
- Perform a focused history and physical based on patient's chief complaint.
- Assess need for critical interventions.
- Complete critical interventions and perform a complete secondary exam to include a baseline set of vital signs as directed by protocol.
- Maintain an on-going assessment throughout transport; to include patient response/possible complications of interventions, need for additional interventions, and assessment of evolving patient complaints/conditions.
- Document all findings and information associated with the assessment, performed procedures, and any administration of medications on the PCR.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Assessment / Screening Section

Pain Assessment and Documentation

Clinical Indications:

- Any patient with pain.

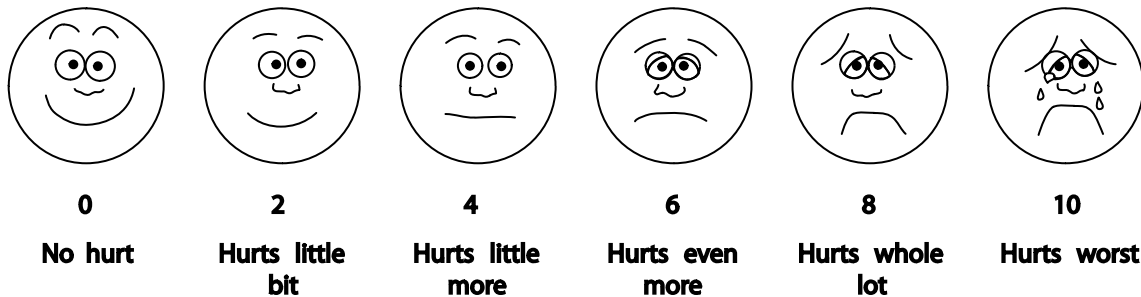
Definitions:

- Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.
- Pain is subjective (whatever the patient says it is).

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Initial and ongoing assessment of pain intensity and character is accomplished through the patient's self report.
- Pain should be assessed and documented in the PCR during initial assessment, before starting pain control treatment, and with each set of vitals.
- Pain should be assessed using the appropriate approved scale.
- Three pain scales are available: the 0 – 10, the Wong - Baker "faces", and the FLACC.
 - 0 – 10 Scale: the most familiar scale used by EMS for rating pain with patients. It is primarily for adults and is based on the patient being able to express their perception of the pain as related to numbers. Avoid coaching the patient; simply ask them to rate their pain on a scale from 0 to 10, where 0 is no pain at all and 10 is the worst pain ever.
 - Wong – Baker "FACES" scale: this scale is primarily for use with pediatrics but may also be used with geriatrics or any patient with a language barrier. The faces correspond to numeric values from 0-10. This scale can be documented with the numeric value.



- FLACC scale: this scale has been validated for measuring pain in children with mild to severe cognitive impairment and in pre-verbal children (including infants).

CATEGORIES	SCORING		
	0	1	2
FACE	No particular expression or smile	Occasional grimace or frown, withdrawn, disinterested.	Frequent to constant 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.	Difficulty to console or comfort

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Assessment: Pediatric

Clinical Indications:

- Any child that can be measured with a Length-based Resuscitation Tape.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Scene size-up, including universal precautions, scene safety, environmental hazards assessment, need for additional resources, by-stander safety, and patient/caregiver interaction
- Assess patient using the pediatric triangle of ABCs:
 - Airway and appearance: speech/cry, muscle tone, inter-activeness, look/gaze, movement of extremities
 - Work of breathing: absent or abnormal airway sounds, use of accessory muscles, nasal flaring, body positioning
 - Circulation to skin: pallor, mottling, cyanosis
- Establish spinal immobilization if suspicion of spinal injury
- Establish responsiveness appropriate for age (AVPU, GCS, etc.)
- Color code using Broselow-Luten tape
- Assess disability (pulse, motor function, sensory function, papillary reaction)
- Perform a focused history and physical exam. Recall that pediatric patients easily experience hypothermia and thus should not be left uncovered any longer than necessary to perform an exam.
- Record vital signs (BP > 3 years of age, cap refill < 3 years of age)
- Include Immunizations, Allergies, Medications, Past Medical History, last meal, and events leading up to injury or illness where appropriate.
- Treat chief complaint as per protocol

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Blood Glucose Analysis

Clinical Indications:

- Patients with suspected hypoglycemia (diabetic emergencies, change in mental status, bizarre behavior, etc.)

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Gather and prepare equipment.
2. Blood samples for performing glucose analysis can be obtained through a finger-stick or when possible simultaneously with intravenous access.
3. Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions.
4. Time the analysis as instructed by the manufacturer.
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.
6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol.
7. Perform Quality Assurance on glucometers at least once every 7 days, if any clinically suspicious readings are noted, and/or as recommended by the manufacturer and document in the log.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Capnography

Clinical Indications:

- Capnography shall be used when available with the use of all invasive airway procedures including endotracheal, nasotracheal, cricothyrotomy, or Blind Insertion Airway Devices (BIAD).
- Capnography should also be used when possible with CPAP.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Attach capnography sensor to the BIAD, endotracheal tube, or oxygen delivery device.
2. Note CO₂ level and waveform changes. These will be documented on each respiratory failure, cardiac arrest, or respiratory distress patient.
3. The capnometer shall remain in place with the airway and be monitored throughout the prehospital care and transport.
4. Any loss of CO₂ detection or waveform indicates an airway problem and should be documented.
5. The capnogram should be monitored as procedures are performed to verify or correct the airway problem.
6. Document the procedure and results on/with the Patient Care Report (PCR) and the Airway Evaluation Form.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Pulse Oximetry

Clinical Indications:

- Patients with suspected hypoxemia.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Apply probe to patient's finger or any other digit as recommended by the device manufacturer.
2. Allow machine to register saturation level.
3. Record time and initial saturation percent on room air if possible on/with the patient care report (PCR).
4. Verify pulse rate on machine with actual pulse of the patient.
5. Monitor critical patients continuously until arrival at the hospital. If recording a one-time reading, monitor patients for a few minutes as oxygen saturation can vary.
6. Document percent of oxygen saturation every time vital signs are recorded and in response to therapy to correct hypoxemia.
7. In general, normal saturation is 97-99%. Below 94%, suspect a respiratory compromise.
8. Use the pulse oximetry as an added tool for patient evaluation. Treat the patient, not the data provided by the device.
9. The pulse oximeter reading should never be used to withhold oxygen from a patient in respiratory distress or when it is the standard of care to apply oxygen despite good pulse oximetry readings, such as chest pain. Supplemental oxygen is not required if the oxyhemoglobin saturation is $\geq 94\%$, unless there are obvious signs of heart failure, dyspneic, or hypoxic to maintain to 94%.
10. Factors which may reduce the reliability of the pulse oximetry reading include but are not limited to:
 - Poor peripheral circulation (blood volume, hypotension, hypothermia)
 - Excessive pulse oximeter sensor motion
 - Fingernail polish (may be removed with acetone pad)
 - Carbon monoxide bound to hemoglobin
 - Irregular heart rhythms (atrial fibrillation, SVT, etc.)
 - Jaundice
 - Placement of BP cuff on same extremity as pulse ox probe.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Reperfusion Checklist

Clinical Indications:

Rapid evaluation of a patient with suspected acute stroke and/or acute myocardial infarction (STEMI) to:

- Determine eligibility and potential benefit from fibrinolysis..
- Rapid identification of patients who are not eligible for fibrinolysis and will require interventional therapy.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Follow the appropriate protocol for the patient's complaint to assess and identify an acute condition which could potentially benefit from fibrinolysis. If a positive finding is noted on one of the following assessments, proceed to step 2.
 - Perform a 12-lead ECG to identify an acute ST elevation myocardial infarction (STEMI).
 - Perform the Los Angeles Pre-hospital Stroke Screen to identify an acute stroke
2. Complete the Reperfusion Check Sheet to identify any potential contraindications to fibrinolysis. (See Appendix)
 - Systolic Blood Pressure greater than 180 mm Hg
 - Diastolic Blood Pressure greater than 110 mm Hg
 - Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm Hg
 - History of structural Central Nervous System disease (age ≥ 18 , history of aneurysm or AV-malformation, tumors, masses, hemorrhage, etc.)
 - Significant closed head or facial trauma within the previous 3 months
 - Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding
 - Bleeding or clotting problem or on blood thinners
 - CPR performed greater than 10 minutes
 - Currently Pregnant
 - Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure.
3. Identify if the patient is currently in heart failure or cardiogenic shock. For these patients, a percutaneous coronary intervention is more effective.
 - Presence of pulmonary edema (rales greater than halfway up lung fields)
 - Systemic hypoperfusion (cool and clammy)
4. If any contraindication is noted using the check list and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients. This may require the EMS Agency, an Air Medical Service, or a Specialty Care Transport Service to transport directly to a specialty center capable of interventional care within the therapeutic window of time.
5. Record all findings in the Patient Care Report (PCR).

Certification Requirements:

Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Stroke Screen: LA Prehospital

Clinical Indications:

- Suspected Stroke Patient

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Assess and treat suspected stroke patients as per protocol.
2. The Los Angeles Prehospital Stroke Screen (LAPSS) form should be completed for all suspected stroke patients (see appendix). There are six screening criteria items on the LAPSS form.
3. Screen the patient for the following criteria:
 - Age over 45 years
 - No history of a seizure disorder
 - New onset of symptoms in last 24 hours
 - Patient ambulatory prior to event
 - Blood glucose between 60-400
4. The final criterion consists of performing a patient exam looking for facial droop, unilateral grip weakness/absence, or unilateral arm weakness. One of these exam components must be positive to answer “yes” on the screening form.
5. **If all of the LAPSS screening criteria are met (“yes” to all criteria OR if unknown), follow the EMS System Stroke Plan and alert the receiving hospital of a possible stroke patient as early as possible.**
6. All sections of the LAPSS form must be completed.
7. The completed LAPSS form should be attached or documented in the PCR.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Temperature Measurement

Clinical Indications:

- Monitoring body temperature in a patient with suspected infection, hypothermia, hyperthermia, or to assist in evaluating resuscitation efforts.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- For adult patients that are conscious, cooperative, and in no respiratory distress, an oral temperature is preferred (steps 2 to 4 below). For infants or adults that do not meet the criteria above, a rectal temperature is preferred (steps 6 to 8 below).
- To obtain an oral temperature, ensure the patient has no significant oral trauma and place the thermometer under the patient's tongue with appropriate sterile covering.
- Have the patient seal their mouth closed around thermometer.
- If using an electric thermometer, leave the device in place until there is indication an accurate temperature has been recorded (per the "beep" or other indicator specific to the device). If using a traditional thermometer, leave it in place until there is no change in the reading for at least 30 seconds (usually 2 to 3 minutes). Proceed to step 8.
- Prior to obtaining a rectal temperature, assess whether the patient has suffered any rectal trauma by history and/or brief examination as appropriate for patient's complaint.
- To obtain a rectal temperature, cover the thermometer with an appropriate sterile cover, apply lubricant, and insert into rectum no more than 1 to 2 cm beyond the external anal sphincter.
- Follow guidelines in step 5 above to obtain temperature.
- Record time, temperature, method (oral, rectal), and scale (C° or F°) in Patient Care Report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Assessment / Screening Section

Orthostatic Blood Pressure Measurement

Clinical Indications:

- Patient situations with suspected blood, fluid loss, or dehydration with no indication for spinal immobilization.
- Orthostatic vital signs are not routinely recommended.
- Patients ≥ 8 years of age, or patients larger than the Broselow-Luten tape
- Orthostatic Vital Signs are not sensitive nor specific for volume loss / dehydration and may induce syncope in some cases. Assessment of orthostatic vital signs are not routinely recommended. Local Medical Director should indicate and educate on situations where they may be helpful.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Gather and prepare standard sphygmomanometer and stethoscope.
2. With the patient supine, obtain pulse and blood pressure.
3. Have the patient sit upright.
4. After 30 seconds, obtain blood pressure and pulse.
5. If the systolic blood pressure falls more than 30 mmHg or the pulse rises more than 20 bpm, the patient is considered to be orthostatic.
6. If a patient experiences dizziness upon sitting or is obviously dehydrated based on history or physical exam, formal orthostatic examination should be omitted and fluid resuscitation initiated.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Airway Section

Airway: BIAD-Combitube

Clinical Indications for Blind Insertion Airway Device (BIAD) Use:

- Inability to adequately ventilate a patient with a Bag Valve Mask (BVM) or longer EMS transport distances require a more advanced airway.
- Appropriate intubation is impossible due to patient access or difficult airway anatomy.
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex where at least one failed intubation attempt has occurred.
- Patient must be ≥ 5 feet and ≥ 16 years of age and must be unconscious.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Preoxygenate the patient.
 2. Lubricate the tube.
 3. Grasp the patient's tongue and jaw with your gloved hand and pull forward.
 4. Gently insert the tube until the teeth are between the printed rings.
 5. Inflate line 1 (blue pilot balloon) leading to the pharyngeal cuff with 100 cc of air.
 6. Inflate line 2 (white pilot balloon) leading to the distal cuff with 15 cc of air.
 7. **Ventilate the patient through the longer blue tube.**
 - Auscultate for breath sounds and sounds over the epigastrium.
 - Look for the chest to rise and fall.
 8. **If breath sounds are positive and epigastric sounds are negative, continue ventilation through the blue tube. The tube is in the esophagus.**
 - In the esophageal mode, stomach contents can be aspirated through the #2, white tube relieving gastric distention.
 9. If breath sounds are negative and epigastric sounds are positive, attempt ventilation through the shorter, #2 white tube and reassess for lung and epigastric sounds. If breath sounds are present and the chest rises, you have intubated the trachea and continue ventilation through the shorter tube.
 10. The device is secured by the large pharyngeal balloon.
 11. **Confirm tube placement using end-tidal CO₂ detector or esophageal bulb device.**
 12. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
 13. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**
- **Endotracheal intubation with a Combitube in Place (Only if ventilation unsuccessful):**
 - If you cannot ventilate with the Combitube in place, you should remove the tube, open and suction the airway, and ventilate with a BVM prior to intubation or re-establishment of another BIAD.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Airway: BIAD King

Clinical Indications for Blind Insertion Airway Device (BIAD) Use:

- Inability to adequately ventilate a patient with a Bag Valve Mask or longer EMS transport distances require a more advanced airway.
- Appropriate intubation is impossible due to patient access or difficult airway anatomy.
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex where at least one failed intubation attempt has occurred.
- Patient must be unconscious.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Preoxygenate the patient.
2. Select the appropriate tube size for the patient.
3. Lubricate the tube.
4. Grasp the patient's tongue and jaw with your gloved hand and pull forward.
5. Gently insert the tube rotated laterally 45-90 degrees so that the blue orientation line is touching the corner of the mouth. Once the tip is at the base of the tongue, rotate the tube back to midline. Insert the airway until the base of the connector is in line with the teeth and gums.
6. Inflate the pilot balloon with 45-90 ml of air depending on the size of the device used.
7. **Ventilate the patient while gently withdrawing the airway until the patient is easily ventilated.**
8. Auscultate for breath sounds and sounds over the epigastrium and look for the chest to rise and fall.
9. The large pharyngeal balloon secures the device.
10. **Confirm tube placement using end-tidal CO₂ detector.**
11. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
12. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Airway Section

Airway: BIAD-Laryngeal Mask Airway (LMA)

Clinical Indications for Blind Insertion Airway Device (BIAD) Use:

- Inability to adequately ventilate a patient with a Bag Valve Mask or longer EMS transport distances require a more advanced airway.
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex where at least one failed intubation attempt has occurred.
- Appropriate intubation is impossible due to patient access or difficult airway anatomy.
- **This airway does not prevent aspiration of stomach contents.**

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Contraindications:

- Deforming Facial Trauma
- Pulmonary Fibrosis
- Morbid Obesity

Procedure:

1. Select the appropriate tube size for the patient.
2. Check the tube for proper inflation and deflation.
3. Completely deflate the tube prior to insertion.
4. Lubricate with a water-soluble jelly.
5. Pre-Oxygenate the patient with 100% Oxygen
6. Insert the LMA into the hypopharynx until resistance is met.
7. Inflate the cuff until a seal is obtained.
8. Connect the LMA to an ambu bag and assess for breath sounds and air entry.
9. **Confirm tube placement using end-tidal CO₂ detector or esophageal bulb device.**
10. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
11. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
12. Re-verify LMA placement after every move and upon arrival in the ED
13. Document the procedure, time, and result (success) on/with the patient care report (PCR)
14. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation once per certification cycle.



Standards Procedure (Skill) Airway Section

Airway: BIAD-i-Gel

Clinical Indications for Blind Insertion Airway Device (BIAD) Use:

- Inability to adequately ventilate a patient with a Bag Valve Mask or longer EMS transport distances require a more advanced airway.
- Inability to secure an endotracheal tube in a patient who does not have a gag reflex.
- Appropriate intubation is impossible due to patient access or difficult airway anatomy.
- Do not leave in place for ≥ 4 hours.
- **This airway does not prevent aspiration of stomach contents.**

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Contraindications:

- Deforming Facial Trauma
- Pulmonary Fibrosis
- Morbid Obesity

Procedure:

1. Pre-Oxygenate the patient with 100% Oxygen
2. Select the appropriate tube size for the patient.
3. Remove the device from the protective cradle and carefully for any signs of damage.
4. Place water-soluble jelly in the middle of the protective cradle.
5. Lubricate the back of the i-Gel on the non-inflatable cuff and ensure no lubricant is in the cuff.
5. Lubricate each side and the tip of the non-inflatable cuff.
6. Grasp along the integral bite block and face the cuff outlet toward the patient's chin.
7. Insert the i-Gel into the mouth in the direction of the hard palate.
8. Glide the device down and back along the hard palate with continuous, gentle pressure, until resistance is met. Tape to secure or use a commercial tube holder.
9. Connect the i-Gel to an BVM and assess for breath sounds and air entry.
10. **Confirm tube placement using end-tidal CO₂ detector or esophageal bulb device.**
11. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
12. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
13. Re-verify i-Gel placement after every move and upon arrival in the ED
43. Document the procedure, time, and result (success) on/with the patient care report (PCR)
15. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation once per certification cycle.



Airway: Cricothyrotomy-Surgical

Clinical Indications:**P PARAMEDIC P**

- Failed Airway Protocol
- Management of an airway when standard airway procedures cannot be performed or have failed in a patient ≥ 12 years old.

Procedure:

1. Have suction and supplies available and ready.
2. Locate the cricothyroid membrane utilizing anatomical landmarks.
3. Prep the area with an antiseptic swab (Betadine).
4. Attach a 5-cc syringe to an 18G - 1 & 1/2-inch needle.
5. Insert the needle (with syringe attached) perpendicularly through the cricothyroid membrane with the needle directed posteriorly.
6. During needle insertion, gentle aspiration should be applied to the syringe. Rapid aspiration of air into the syringe indicates successful entry into the trachea. Do not advance the needle any further. Attach forceps and remove syringe.
7. With the needle remaining in place, make a 1-inch vertical incision through the skin and subcutaneous tissue above and below the needle using a scalpel. Using blunt dissection technique, expose the cricothyroid membrane. This is a bloody procedure. The needle should act as a guide to the cricothyroid membrane.
8. With the needle still in place, make a horizontal stabbing incision approx. 1/2 inch through the membrane on each side of the needle. Remove the needle.
9. Using (skin hook, tracheal hook, or gloved finger) to maintain surgical opening, insert the cuffed tube into the trachea. (Cric tube from the kit or a #6 endotracheal tube is usually sufficient).
10. Inflate the cuff with 5-10cc of air and ventilate the patient while manually stabilizing the tube.
11. All of the standard assessment techniques for insuring tube placement should be performed (auscultation, chest rise & fall, end-tidal CO₂ detector, etc.) Esophageal bulb devices are not accurate with this procedure.
12. Secure the tube.
13. If Available apply end tidal carbon dioxide monitor (Capnography) and record readings on scene, en route to the hospital, and at the hospital.
14. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices used to confirm initial tube placement and after each movement of the patient.
15. Consider placing an NG or OG tube to clear stomach contents after the airway is secured.
- 16. It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
- 17. It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Airway: Intubation Oral Tracheal

Clinical Indications:

A	AEMT	A
P	PARAMEDIC	P

- Inability to adequately ventilate a patient with a Bag Valve Mask or longer EMS transport distances require a more advanced airway.
- An unconscious patient without a gag reflex who is apneic or is demonstrating inadequate respiratory effort.
- A component of Drug Assisted Intubation

Procedure:

1. Prepare, position and oxygenate the patient with 100% Oxygen.
2. Select proper ET tube (and stylette, if used), have suction ready.
3. Using laryngoscope, visualize vocal cords. (Use Sellick maneuver/BURP to assist you).
4. Limit each intubation attempt to 30 seconds with BVM between attempts.
5. Visualize tube passing through vocal cords.
- 6. Confirm and document tube placement using an end-tidal CO₂ monitoring or esophageal bulb device.**
7. Inflate the cuff with 3-to10 cc of air; secure the tube to the patient's face.
8. Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If you are unsure of placement, remove tube and ventilate patient with bag-valve mask.
9. Consider using a Blind Insertion Airway Device if intubation efforts are unsuccessful.
10. If Available apply end tidal carbon dioxide monitor (Capnography) and record readings on scene, en route to the hospital, and at the hospital.
11. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices used to confirm initial tube placement. Also document positive or negative breath sounds before and after each movement of the patient.
12. Consider placing an NG or OG tube to clear stomach contents after the airway is secured with an ET tube.
- 13. It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
- 14. It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Airway Section

Airway: Intubation Nasotracheal

Clinical Indications:

A	AEMT	A
P	PARAMEDIC	P

- A spontaneously breathing patient in need of intubation (inadequate respiratory effort, evidence of hypoxia or carbon dioxide retention, or need for airway protection).
- Rigidity or clenched teeth prohibiting other airway procedures.
- Patient must be 12 years of age or older.

Procedure:

1. Premedicate the patient with nasal spray.
2. Select the largest and least obstructed nostril and insert a lubricated nasal airway to help dilate the nasal passage.
3. Preoxygenate the patient. Lubricate the tube. The use of a BAAM device is recommended.
4. Remove the nasal airway and gently insert the tube keeping the bevel of the tube toward the septum.
5. Continue to pass the tube listening for air movement and looking for to and fro vapor condensation in the tube. As the tube approaches the larynx, the air movement gets louder.
6. Gently and evenly advance the tube through the glottic opening on the inspiration. This facilitates passage of the tube and reduces the incidence of trauma to the vocal cords.
7. Upon entering the trachea, the tube may cause the patient to cough, buck, strain, or gag. Do not remove the tube! This is normal, but be prepared to control the cervical spine and the patient, and be alert for vomiting.
8. Auscultate for bilaterally equal breath sounds and absence of sounds of the epigastrium. Observe for symmetrical chest expansion. The 15mm adapter usually rests close to the nostril with proper positioning.
9. Inflate the cuff with 5-10 cc of air.
10. **Confirm tube placement using an end-tidal CO₂ monitoring or esophageal bulb device.**
11. Secure the tube.
12. Reassess airway and breath sounds after transfer to the stretcher and during transport. These tubes are easily dislodged and require close monitoring and frequent reassessment.
13. Document the procedure, time, and result (success) on/with the patient care report (PCR).
14. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
15. **It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Airway Section

Airway: Drug Assisted Airway

Clinical Indications:

P PARAMEDIC P

- Need for advanced airway control in a patient who has a gag reflex or trismus (jaw clenching)
- Failure to protect the airway. Unable to ventilate and / or oxygenate. Impending airway compromise
- A minimum of 2 EMT-Paramedics on scene able to participate in patient care
- This protocol is only for use in patients with patients longer than a Length-based Resuscitation Tape except in agencies utilizing Ketamine for pediatric airway management with direct online medical control via system medical director or assistant medical director.

Clinical Contraindications:

- Refer to drug list for contraindications regarding use of Succinylcholine and Rocuronium.

Procedure:

1. Perform focused neurological exam
2. Evaluate for difficult airway (LEMON)-see appendix
3. Prepare equipment (intubation kit, BVM, suction, DAI medications, BIAD, Cricothyrotomy kit, waveform capnography, other airway adjuncts as available)
4. Pre-oxygenate patient with 100% oxygen via NRB mask or BVM. Apneic oxygenation: May continue high-flow oxygen via NC during entire procedure
5. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
6. Ensure functioning IV / IO access. Two (2) IV sites are preferable
8. In-line c-spine stabilization by second caregiver (in setting of trauma)
9. Administer Etomidate or Ketamine by rapid IV push
10. Administer Succinylcholine or Rocuronium, await fasciculation and jaw relaxation
11. Perform external laryngeal manipulation to improve view during laryngoscopy with the right hand.
12. Intubate trachea or place BIAD if intubation unsuccessful or felt to be unsuccessful during procedure.
13. Verify ET placement through auscultation, Capnography, and Pulse Oximetry
14. May repeat Succinylcholine or Rocuronium if inadequate relaxation
15. Release cricoid pressure (if utilized) and secure tube
- 16. Continuous Capnography and Pulse Oximetry is required for DAI. Pre-intubation, minimal during intubation, and post-intubation readings must be recorded in the PCR.**
17. Re-verify tube placement after every move and upon arrival in the ED
18. Document ETT or BIAD size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices/methods used to confirm initial tube placement initially and with patient movement.
19. Consider placing a gastric tube to clear stomach contents after the airway is secured.
- 20. Completion of the Airway Evaluation Form is required including a signature from the receiving physician at the Emergency Department confirming proper tube placement.**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Airway: Tracheostomy Tube Change

Clinical Indications:

A	AEMT	A
P	PARAMEDIC	P

- Presence of Tracheostomy site.
- Urgent or emergent indication to change the tube, such as obstruction that will not clear with suction, dislodgement, or inability to oxygenate/ventilate the patient without other obvious explanation.

Procedure:

1. Have all airway equipment prepared for standard airway management, including equipment of orotracheal intubation and failed airway.
2. Have airway device (endotracheal tube or tracheostomy tube) of the same size as the tracheostomy tube currently in place as well as 0.5 size smaller available (e.g., if the patient has a #6.0 Shilley, then have a 6.0 and a 5.5 tube).
3. Lubricate the replacement tube(s) and check the cuff.
4. Remove the tracheostomy tube from mechanical ventilation devices and use a bag-valve apparatus to pre-oxygenate the patient as much as possible.
5. Once all equipment is in place, remove devices securing the tracheostomy tube, including sutures and/or supporting bandages.
6. If applicable, deflate the cuff on the tube. If unable to aspirate air with a syringe, cut the balloon off to allow the cuff to lose pressure.
7. Remove the tracheostomy tube.
8. Insert the replacement tube. Confirm placement via standard measures except for esophageal detection (which is ineffective for surgical airways).
9. If there is any difficulty placing the tube, re-attempt procedure with the smaller tube.
10. If difficulty is still encountered, use standard airway procedures such as oral bag-valve mask or endotracheal intubation (as per protocol). **More difficulty with tube changing can be anticipated for tracheostomy sites that are immature – i.e., less than two weeks old. Great caution should be exercised in attempts to change immature tracheostomy sites.**
11. Document procedure, confirmation, patient response, and any complications in the PCR

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment for this skill should include direct observation at least once per certification cycle.



Airway: Endotracheal Tube Introducer (Bougie)

Clinical Indications:

- Patients meet clinical indications for oral intubation
- Initial intubation attempt(s) unsuccessful
- Predicted difficult intubation

A	AEMT	A
P	PARAMEDIC	P

Contraindications:

- Three attempts at orotracheal intubation (utilize failed airway protocol)
- Age less than eight (8) or ETT size less than 6.5 mm

Procedure:

1. Prepare, position and oxygenate the patient with 100% oxygen;
2. Select proper ET tube without stylet, test cuff and prepare suction;
3. Lubricate the distal end and cuff of the endotracheal tube (ETT) and the distal 1/2 of the Endotracheal Tube Introducer (Bougie) (note: Failure to lubricate the Bougie and the ETT may result in being unable to pass the ETT);
4. Using laryngoscopic techniques, visualize the vocal cords if possible using Sellick's/BURP as needed;
5. Introduce the Bougie with curved tip anteriorly and visualize the tip passing the vocal cords or above the arytenoids if the cords cannot be visualized;
6. Once inserted, gently advance the Bougie until you meet resistance or "hold-up" (if you do not meet resistance you have a probable esophageal intubation and insertion should be re-attempted or the failed airway protocol implemented as indicated);
7. Withdraw the Bougie ONLY to a depth sufficient to allow loading of the ETT while maintaining proximal control of the Bougie;
8. Gently advance the Bougie and loaded ET tube until you have hold-up again, thereby assuring tracheal placement and minimizing the risk of accidental displacement of the Bougie;
9. While maintaining a firm grasp on the proximal Bougie, introduce the ET tube over the Bougie passing the tube to its appropriate depth;
10. If you are unable to advance the ETT into the trachea and the Bougie and ETT are adequately lubricated, withdraw the ETT slightly and rotate the ETT 90 degrees COUNTER clockwise to turn the bevel of the ETT posteriorly. If this technique fails to facilitate passing of the ETT you may attempt direct laryngoscopy while advancing the ETT (this will require an assistant to maintain the position of the Bougie and, if so desired, advance the ETT);
11. Once the ETT is correctly placed, hold the ET tube securely and remove the Bougie;
12. Confirm tracheal placement according to the intubation protocol, inflate the cuff with 3 to 10 cc of air, auscultate for equal breath sounds and reposition accordingly;
13. When final position is determined secure the ET tube, reassess breath sounds, apply end tidal CO₂ monitor, and record and monitor readings to assure continued tracheal intubation.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Airway Section

Airway Intubation Confirmation – End-Tidal CO₂ Detector

Clinical Indications:

- The End-Tidal CO₂ detector shall be used with any Endotracheal Tube or Blind Insertion Airway Device use.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

It is strongly recommended that continuous Capnography be used in place of or in addition to the use of an End-Tidal CO₂ detector.

Procedure:

1. Attach End-Tidal CO₂ detector to the Blind Insertion Airway Device or the Endotracheal Tube.
2. Note color change. A color change or CO₂ detection will be documented on each respiratory failure or cardiac arrest patient.
3. The CO₂ detector shall remain in place with the airway and monitored throughout the prehospital care and transport unless continuous Capnography is used. Any loss of CO₂ detection or color change is to be documented and monitored as procedures are done to verify or correct the airway problem.
4. Tube placement should be verified frequently and always with each patient move or loss of color change in the End-Tidal CO₂ detector.
5. Document the procedure and the results on/with the Patient Care Report (PCR) as well as on the Airway Evaluation Form.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Airway: Foreign Body Obstruction

Clinical Indications:

- Sudden onset of respiratory distress often with coughing, wheezing, gagging, or stridor due to a foreign-body obstruction of the upper airway.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Assess the degree of foreign body obstruction
 - Do not interfere with a mild obstruction allowing the patient to clear their airway by coughing.
 - In severe foreign-body obstructions, the patient may not be able to make a sound. The victim may clutch his/her neck in the universal choking sign.
- For an infant**, deliver 5 back blows (slaps) followed by 5 chest thrusts repeatedly until the object is expelled or the victim becomes unresponsive.
- For a child**, perform a subdiaphragmatic abdominal thrust (Heimlich Maneuver) until the object is expelled or the victim becomes unresponsive.
- For adults**, a combination of maneuvers may be required.
 - First, subdiaphragmatic abdominal thrusts (Heimlich Maneuver) should be used in rapid sequence until the obstruction is relieved.
 - If abdominal thrusts are ineffective, chest thrusts should be used. Chest thrusts should be used primarily in morbidly obese patients and in the patients who are in the late stages of pregnancy.
- If the victim becomes unresponsive, begin CPR immediately but look in the mouth before administering any ventilations. If a foreign-body is visible, remove it.
- Do not perform blind finger sweeps in the mouth and posterior pharynx. This may push the object farther into the airway.**
- In unresponsive patients, AEMT and Paramedic level professionals should visualize the posterior pharynx with a laryngoscope to potentially identify and remove the foreign-body using Magill forceps.
- Document the methods used and result of these procedures in the patient care report (PCR).

Certification Requirements:

Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.

Standards Procedure (Skill) Airway Section

Airway: Cricothyrotomy – Needle

Clinical Indications:

P PARAMEDIC P

- Failed Airway Protocol
- Management of an airway when standard airway procedures cannot be performed or have failed in a patient < 11 years old.

Procedure:

1. Have suction and supplies available and ready.
2. Locate the cricothyroid membrane utilizing anatomical landmarks.
3. Prep the area with an antiseptic swab (Betadine).
4. Use a 5cc or 10cc syringe and a 14G - 1 & 1/2-inch needle
5. Attach the needle to the syringe and insert the needle perpendicularly through the cricothyroid membrane with the needle directed posteriorly then adjusting the angle toward the feet at a 45° - 60° angle.
6. Aspirate for air while advancing the needle. Once air returns easily, stop advancing the catheter
7. Be careful during insertion as to not progress posteriorly but in a caudal (toward feet) direction.
8. Remove needle leaving the catheter in place.
9. Attach the BVM adapter from a 3.0 ET Tube to the catheter and provide oxygenation with oxygen attached to the BVM.
10. Assess breath sounds while ventilating patient. Make certain that ample time is used not only for inspiration but expiration as well. Remember that a 1:4 inspiration/expiration ratio is normal.
11. Monitor pulse oximetry – SpO₂ should improve if circulation is adequate. EtCO₂ will be of limited benefit since elimination of CO₂ through a needle is difficult.
12. Secure the catheter in place using the best method, recognizing this may be direct hands-on control of the device throughout the transport.
13. If unable to obtain an adequate airway, resume basic airway management and transport the patient as soon as possible.
14. Document needle/catheter size, time, result (success).
15. Document all devices used to confirm oxygenation and after each movement of the patient.
- 16. It is strongly recommended that the airway (if equipment is available) be monitored continuously through Pulse Oximetry.**
17. It is strongly recommended that an Airway Evaluation Form be completed with all intubations

Certification Requirements:

Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Cardiac: 12 Lead ECG

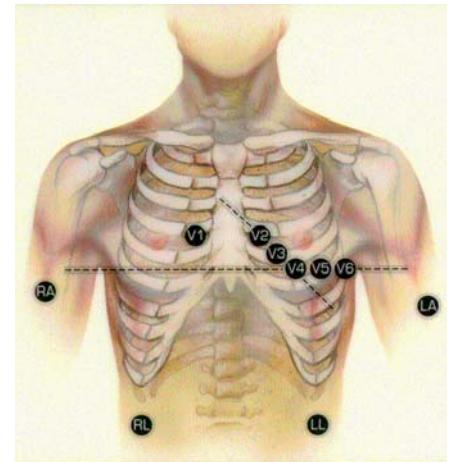
Clinical Indications:

- Suspected cardiac patient
- Suspected tricyclic overdose
- Electrical injuries
- Syncope

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Assess patient and monitor cardiac status.
2. Administer oxygen as patient condition warrants.
3. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform a 12 Lead ECG.
4. Prepare ECG monitor and connect patient cable with electrodes.
5. Enter the required patient information (patient name, etc.) into the 12 lead ECG device.
6. Expose chest and prep as necessary. Modesty of the patient should be respected.
7. Apply chest leads and extremity leads using the following landmarks:
 - RA -Right arm
 - LA -Left arm
 - RL -Right leg
 - LL -Left leg
 - V1 -4th intercostal space at right sternal border
 - V2 -4th intercostal space at left sternal border
 - V3 -Directly between V2 and V4
 - V4 -5th intercostal space at midclavicular line
 - V5 -Level with V4 at left anterior axillary line
 - V6 -Level with V5 at left midaxillary line
8. Instruct patient to remain still.
9. Press the appropriate button to acquire the 12 Lead ECG.
10. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12 Lead acquisition will be interrupted until the noise is removed.
11. Once acquired, transmit the ECG data by fax to the appropriate hospital.
12. Contact the receiving hospital to notify them that a 12 Lead ECG has been sent.
13. Monitor the patient while continuing with the treatment protocol.
14. Download data as per guidelines and attach a copy of the 12 lead to the PCR.
15. Document the procedure, time, and results on/with the patient care report (PCR)

**Certification Requirements:**

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Cardiac: Cardioversion

Clinical Indications:

P **PARAMEDIC** **P**

- Unstable patient with a tachydysrhythmia (rapid atrial fibrillation, supraventricular tachycardia, ventricular tachycardia)
- Patient is not pulseless (the pulseless patient requires unsynchronized cardioversion, i.e., defibrillation)

Procedure:

1. Ensure the patient is attached properly to a monitor/defibrillator capable of synchronized cardioversion.
2. Have all equipment prepared for unsynchronized cardioversion/defibrillation if the patient fails synchronized cardioversion and the condition worsens.
3. Consider the use of pain or sedating medications.
4. Set energy selection to the appropriate setting.
5. Set monitor/defibrillator to synchronized cardioversion mode.
6. Make certain all personnel are clear of patient.
7. Press and hold the shock button to cardiovert. Stay clear of the patient until you are certain the energy has been delivered. NOTE: It may take the monitor/defibrillator several cardiac cycles to “synchronize”, so there may a delay between activating the cardioversion and the actual delivery of energy.
8. Note patient response and perform immediate unsynchronized cardioversion/defibrillation if the patient’s rhythm has deteriorated into pulseless ventricular tachycardia/ventricular fibrillation, following the procedure for Defibrillation-Manual.
9. If the patient’s condition is unchanged, repeat steps 2 to 8 above, using escalating energy settings.
10. Repeat until maximum setting or until efforts succeed. Consider discussion with medical control if cardioversion is unsuccessful after 2 attempts.
11. Note procedure, response, and time in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle., or other mechanisms as deemed appropriate by the local EMS System.



Cardiac: External Pacing

Clinical Indications:

P PARAMEDIC P

- Patients with symptomatic bradycardia (less than 60 per minute) with signs and symptoms of inadequate cerebral or cardiac perfusion such as:
 - Chest Pain
 - Hypotension
 - Pulmonary Edema
 - Altered Mental Status, Confusion, etc.
 - Ventricular Ectopy
- Asystole, pacing must be done early to be effective.
- PEA, where the underlying rhythm is bradycardic and reversible causes have been treated.

Procedure:

1. Attach standard four-lead monitor.
2. Apply defibrillation/pacing pads to chest and back:
 - One pad to left mid chest next to sternum
 - One pad to mid left posterior chest next to spine.
3. Rotate selector switch to pacing option.
4. Adjust heart rate to 70 BPM for an adult and 100 BPM for a child.
5. Note pacer spikes on EKG screen.
6. Slowly increase output until capture of electrical rhythm on the monitor.
7. If unable to capture while at maximum current output, stop pacing immediately.
8. If capture observed on monitor, check for corresponding pulse and assess vital signs.
9. Consider the use of sedation or analgesia if patient is uncomfortable.
10. Document the dysrhythmia and the response to external pacing with ECG strips in the PCR.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Cardiac Section

Cardiac: Cardiopulmonary Resuscitation (CPR)

Clinical Indications:

- Basic life support for the patient in cardiac arrest

Procedure:

- Assess the patient's level of responsiveness.
- If no response, open the patient's airway with the head-tilt, chin-lift and look, listen, and feel for respiratory effort. If the patient may have sustained C-spine trauma, use the modified jaw thrust while maintaining immobilization of the C-spine. For infants, positioning the head in the sniffing position is the most effective method for opening the airway.
- Check for pulse (carotid for adults and older children, brachial for infants) for at least 10 seconds. If no pulse, begin chest compressions based on chart below:

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Age	Location	Depth	Rate
Infant	Over sternum, between nipples (inter-mammary line), 2-3 fingers	At least 1/3 AP diameter of chest About 1.5 inches 4 cm	Continuous compressions at least 100 – 120/minute
Child	Over sternum, just cephalad from xyphoid process, heel of one hand	At least 1/3 AP diameter of chest About 2 inches 5 cm	Continuous compressions at least 100 – 120/minute
Adult	Over sternum, just cephalad from xyphoid process, hands with interlocked fingers	At least 2 inches 5 cm	Continuous compressions at least 100 – 120/minute

- If patient is an adult, go to step 5. If no respiratory effort in a pediatric patient, give two ventilations. If air moves successfully, go to step 5. If air movement fails, proceed to the Airway Obstruction Procedure.
- Go to Cardiac Arrest Procedure. Begin ventilations in the adult as directed in the Cardiac Arrest Procedure
- Provide 1 breath every 6 seconds with the BVM or BIAD. Use EtCO₂ to guide your ventilations as directed in the Cardiac Arrest Protocol.
- Chest compressions should be provided in an uninterrupted manner. Only brief interruptions (< 5 seconds with a maximum of 10 seconds) are allowed for rhythm analysis, defibrillation, and performance of procedures
- Document the time and procedure in the Patient Care Report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Cardiac: Defibrillation-Automated

Clinical Indications:

- Patients in cardiac arrest (pulseless, non-breathing).
- Age < 8 years, use Pediatric Pads if available.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Contraindication:

- Pediatric patients who are so small that the pads cannot be placed without touching one another.

Procedure:

1. If multiple rescuers available, one rescuer should provide uninterrupted chest compressions while the AED is being prepared for use.
2. Apply defibrillator pads per manufacturer recommendations. Based on 2010 guidelines, place pads preferably in AP or AL position when implanted devices (pacemakers, AICDs) occupy preferred pad positions and attempt to avoid placing directly over device.
3. Remove any medication patches on the chest and wipe off any residue.
4. If necessary, connect defibrillator leads: white to the anterior chest pad and the red to the posterior pad.
5. Activate AED for analysis of rhythm.
6. **Stop CPR and clear the patient** for rhythm analysis. Keep interruption in CPR as brief as possible.
7. Defibrillate if appropriate by depressing the “shock” button. **Assertively state “CLEAR” and visualize that no one, including yourself, is in contact with the patient prior to defibrillation.** The sequence of defibrillation charges is preprogrammed for monophasic defibrillators. Biphasic defibrillators will determine the correct joules accordingly.
8. Begin CPR (chest compressions and ventilations) immediately after the delivery of the defibrillation.
9. After 2 minutes of CPR, analyze rhythm and defibrillate if indicated. Repeat this step every 2 minutes.
10. If “no shock advised” appears, perform CPR for two minutes and then reanalyze.
11. Transport and continue treatment as indicated.
12. **Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.**
13. **If pulse returns please use the Post Resuscitation Protocol**

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Cardiac Section

Cardiac: Defibrillation-Manual

Clinical Indications:

P **PARAMEDIC** **P**

- Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia

Procedure:

1. **Ensure that Chest Compressions are adequate and interrupted only when absolutely necessary.**
2. Clinically confirm the diagnosis of cardiac arrest and identify the need for defibrillation.
3. After application of an appropriate conductive agent if needed, apply defibrillation hands free pads (recommended to allow more continuous CPR) or paddles to the patient's chest in the proper position
 - Paddles: right of sternum at 2nd ICS and anterior axillary line at 5th ICS
 - Pads: anterior-posterior position

For patients with implanted pacers/defibrillators, paddles or pads can be in AP or AL positions. The presence of implanted pacers/defibrillators should not delay defibrillation. Attempt to avoid placing paddles or pads directly above device.
4. Set the appropriate energy level
5. Charge the defibrillator to the selected energy level. **Continue chest compressions while the defibrillator is charging.**
6. If using paddles, assure proper contact by applying 25 pounds of pressure on each paddle.
7. **Hold Compressions, assertively state, "CLEAR" and visualize that no one, including yourself, is in contact with the patient.**
8. Deliver the countershock by depressing the discharge button(s) when using paddles, or depress the **shock button** for hands free operation.
9. Immediately resume chest compressions and ventilations for 2 minutes. After 2 minutes of CPR, analyze rhythm and check for pulse only if appropriate for rhythm.
10. Repeat the procedure every two minutes as indicated by patient response and ECG rhythm.
11. Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Parenteral Access: Arterial Blood Draw

Clinical Indications:

P PARAMEDIC P

- Arterial blood gas (ABG) analysis
- Other needs for arterial blood as indicated by medical control

Procedure:

1. Assemble ABG kit, ice, alcohol wipes, and gloves.
2. Determine if there is any history of trauma or any other difficulties with circulation to either hand. If a problem does exist, do not use that extremity for the blood draw.
3. Palpate the radial pulse just proximal to the wrist.
4. Clean the skin with an alcohol wipe.
5. Insert the ABG syringe at a 45 to 60 degree angle over the area of the pulse.
6. Slowly advance the syringe, watching for return of arterial blood. You do not need to aspirate but rather allow the syringe to fill from the arterial pressure.
7. Once the sample has been acquired, remove and discard the needle in an approved fashion.
8. Place the small airtight cap over the needle port on the syringe. Remove air from the sample by inverting the syringe and pressing the plunger on the syringe until a small amount of the sample enters the airtight cap.
9. Place the sample on ice as soon as possible
10. Hold pressure over the blood draw sight for at least 5 minutes before checking to ensure hemostasis.
11. Record procedure, time, and any complications in patient care report (PCR)

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Arterial Line Maintenance

Clinical Indications:

P **PARAMEDIC** **P**

- Transport of a patient with an existing arterial line.

Procedure:

1. Make certain arterial line is secured prior to transport, including intersection of arterial catheter and IV/Monitoring lines.
2. Use available equipment for monitoring of arterial pressures via arterial line.
3. Do not use the arterial line for administration of any fluids or medications.
4. If there is any question regarding dislodgement of the arterial line and bleeding results, remove the line and apply direct pressure over the site for at least five minutes before checking to ensure hemostasis.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Parenteral Access: Venous Blood Draw

Clinical Indications:

- Collection of a patient's blood for laboratory analysis

A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Utilize universal precautions as per OSHA.
- Select vein and prep as usual.
- Select appropriate blood-drawing devices.
- Draw appropriate tubes of blood for lab testing.
- Assure that the blood samples are labeled with the correct information (a minimum of the patients name, along with the date and time the sample was collected).
- Deliver the blood tubes to the appropriate individual at the hospital.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Central Line Maintenance

Clinical Indications:

P PARAMEDIC P

- Transport of a patient with a central venous pressure line already in place

Procedure:

1. Prior to transportation, ensure the line is secure.
2. Medications and IV fluids may be administered through a central venous pressure line. Such infusions must be held while the central venous pressure is transduced to obtain a central venous pressure, but may be restarted afterwards.
3. Do not manipulate the central venous catheter.
4. If the central venous catheter becomes dysfunctional, does not allow drug administration, or becomes dislodged, contact medical control.
5. Document the time of any pressure measurements, the pressure obtained, and any medication administration in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Epidural Catheter Maintenance

Clinical Indications:

P **PARAMEDIC** **P**

- Presence of an epidural catheter in a patient requiring transport

Procedure:

1. Prior to transport, ensure catheter is secure and that transport personnel are familiar with medication(s) being delivered and devices used to control medication administration.
2. No adjustments in catheter position are to be attempted.
3. No adjustments in medication dosage or administration are to be attempted without direct approval from on-line medical control.
4. Report any complications immediately to on-line medical control.
5. Document the time and dose of any medication administration or rate adjustment in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Ventricular Catheter Maintenance

Clinical Indications:

P PARAMEDIC P

- Transport of a patient with an intra-ventricular catheter in place

Procedure:

1. Prior to transport, ensure the catheter is secure.
2. Prior to transport, determine from the referring hospital/physician the desired patient position (e.g., supine, head of bed elevated 30 degrees, etc.).
3. Prior to transport, determine the height at which the drain is to be maintained, given the patient position desired from #2 above (if applicable).
4. Do not manipulate or move the drain.
5. If the patient or height of the drain is altered, immediately correct based on the pre-determined configuration in step 2 and 3 above.
6. Report any problems immediately to on-line medical control.
7. Document the time and any adjustments or problems in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Existing Catheters

Clinical Indications:

P PARAMEDIC **P**

- Inability to obtain adequate peripheral access.
- Access of an existing venous catheter for medication or fluid administration.
- Central venous access in a patient in cardiac arrest.

Procedure:

1. Clean the port of the catheter with alcohol wipe.
2. Using sterile technique, withdraw 5-10 ml of blood and discard syringe in sharps container.
3. Using 5cc of normal saline, access the port with sterile technique and gently attempt to flush the saline.
4. If there is no resistance, no evidence of infiltration (e.g., no subcutaneous collection of fluid), and no pain experienced by the patient, then proceed to step 5. If there is resistance, evidence of infiltration, pain experienced by the patient, or any concern that the catheter may be clotted or dislodged, do not use the catheter.
5. Begin administration of medications or IV fluids slowly and observe for any signs of infiltration. If difficulties are encountered, stop the infusion and reassess.
6. Record procedure, any complications, and fluids/medications administered in the Patient Care Report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: External Jugular Access

Clinical Indications:

A	AEMT	A
P	PARAMEDIC	P

- External jugular vein cannulation is indicated in a critically ill patient ≥ 8 years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein is not obtainable.
- External jugular cannulation can be attempted initially in life threatening events where no obvious peripheral site is noted.

Procedure:

1. Place the patient in a supine head down position. This helps distend the vein and prevents air embolism.
2. Turn the patient's head toward the opposite side if no risk of cervical injury exists.
3. Prep the site as per peripheral IV site.
4. Align the catheter with the vein and aim toward the same side shoulder.
5. "Tourniqueting" the vein lightly with one finger above the clavicle, puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual method.
6. Attach the IV and secure the catheter avoiding circumferential dressing or taping.
7. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Parenteral Access: Venous-Extremity

Clinical Indications:

- Any patient where intravenous access is indicated (significant trauma, emergent or potentially emergent medical condition).

A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Saline locks may be used as an alternative to an IV tubing and IV fluid in every protocol at the discretion of the ALS professional.
- Paramedic/AEMT can use intraosseous access where threat to life exists as provided for in the Venous Access-Intraosseous procedure.
- Use the largest catheter bore necessary based upon the patient's condition and size of veins.
- Fluid and setup choice is preferably:
 - Lactated Ringers with a macro drip (10 gtt/cc) for burns
 - Normal Saline with a macro drip (10 gtt/cc) for medical conditions, trauma or hypotension
 - Normal Saline with a micro drip (60 gtt/cc) for medication infusions
- Inspect the IV solution for expiration date, cloudiness, discoloration, leaks, or the presence of particles.
- Connect IV tubing to the solution in a sterile manner. Fill the drip chamber half full and then flush the tubing bleeding all air bubbles from the line.
- Place a tourniquet around the patient's extremity to restrict venous flow only.
- Select a vein and an appropriate gauge catheter for the vein and the patient's condition.
- Prep the skin with an antiseptic solution.
- Insert the needle with the bevel up into the skin in a steady, deliberate motion until the bloody flashback is visualized in the catheter.
- Advance the catheter into the vein. **Never** reinsert the needle through the catheter. Dispose of the needle into the proper container without recapping.
- Draw blood samples when appropriate.
- Remove the tourniquet and connect the IV tubing or saline lock.
- Open the IV to assure free flow of the fluid and then adjust the flow rate as per protocol or as clinically indicated.

Rates are preferably:

- Adult: KVO: 60 cc/hr (1 gtt/ 6 sec for a macro drip set)
- Pediatric: KVO: 30 cc/hr (1 gtt/ 12 sec for a macro drip set)

If shock is present:

- Adult: 500 cc fluid boluses repeated as long as lungs are dry and BP < 90. Consider a second IV line.
- Pediatric: 20 cc/kg boluses repeated PRN for poor perfusion.

- Cover the site with a sterile dressing and secure the IV and tubing.
- Label the IV with date and time, catheter gauge, and name/ID of the person starting the IV.
- Document the procedure, time and result (success) on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Femoral Line – Page 1 of 2

Clinical Indications:

P **PARAMEDIC** **P**

- Central venous access in a patient with an urgent need for fluid or medication administration.
- Inability to obtain adequate peripheral access.
- Patient aged greater than 16 years.
- No evidence of pelvic trauma.
- No evidence of trauma in the extremity in which the catheter is to be placed.

Procedure:

1. Obtain central access kit with 6.0 to 8.0 French cordis and equipment to place catheter by Selinger technique.
2. Completely expose the groin area on the side where the catheter is to be placed.
3. Palpate the femoral pulse in the inguinal crease. Recall that the inguinal ligament connects the pubic symphysis with the anterior, superior iliac spine and that all attempts at access should be made inferior to this ligament to avoid inadvertent entry into the abdominal cavity.
4. Once the femoral pulse has been palpated distal to the ilio-inguinal ligament, prep a large area of the skin with Betadine.
5. Use sterile gloves and place sterile drapes around the Betadine-prepped field.
6. With one hand, palpate the femoral pulse. The femoral vein will be located medially when compared with the femoral artery.
7. With the introducing needle from the kit, enter the skin over the anticipated position of the femoral vein. Gently aspirate as the needle is advanced. Angle the needle approximately 45 to 60 degrees in reference to the skin on the thigh.
8. Once non-pulsatile, venous blood is obtained, stop advancing the needle and hold the needle in position. Remove the syringe and observe the hub for pulsatile flow. If the blood appears arterial and/or is pulsatile, immediately remove the needle and apply direct pressure over the site. Once bleeding is controlled, return to step 7 above or consider the other extremity, if there are no contraindications.
9. If the needle appears to be in the femoral vein, insert the guide wire with sterile technique. Stop advancing the wire if there is any resistance; you may gently withdraw the wire and attempt re-insertion so long as sterility is maintained.
10. Stop advancing the wire in order to leave approximately 10 cm of the wire external to the hub of the needle.
- 11. DO NOT LET GO OF THE WIRE.**
12. Holding the wire in the distal hand, remove the needle over the wire. Once the needle reaches the end of the wire, use the proximal hand to control the wire and the distal hand to remove the needle from the wire.
13. Use the scalpel to create a small incision in the skin at the base of the wire. Make certain the incision extends completely to the wire so there is no skin tag.

CONTINUED VENOUS ACCESS: FEMORAL LINE - PAGE 2



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Femoral Line – Page 1 of 2

14. Place the catheter over the wire; use the wire a guide to place the catheter. Some
15. Gentle force may be required as the catheter enters the skin; this should not, however, require excessive force. Again, one hand should always maintain control of the wire.
16. Once the catheter is completely inserted, remove the wire.
17. Attach a syringe to the port of the catheter, release the clamp, and aspirate for blood. There should be an easy flow of venous blood.
18. Once all of the air has been removed from the catheter by aspirating blood, re-clamp the line.
19. Attach the desired IV fluid/blood/etc and begin infusion. **Note that “wide-open” lines will deliver large amounts of fluid quickly – monitor the patient’s fluid status closely.**
20. Secure the catheter with sterile dressing or sutures.
21. Document procedure, complications, and clinical results in the patient care report (PCR)

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Intraosseous

Clinical Indications:

- Rapid, regular IV access is unavailable with any of the following:
- Cardiac arrest.
- Multisystem trauma with severe hypovolemia.
- Severe dehydration with vascular collapse and/or loss of consciousness.
- Respiratory failure / Respiratory arrest.
- Burns.

A	AEMT	A
P	PARAMEDIC	P

Contraindications:

- Fracture proximal to proposed intraosseous site.
- History of Osteogenesis Imperfecta
- Current or prior infection at proposed intraosseous site.
- Previous intraosseous insertion or joint replacement at the selected site.

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.).
2. **Proximal tibia:** Identify anterior-medial aspect of the proximal tibia (bony prominence below the knee cap). The insertion location will be 1-2 cm (2 finger widths) below this.
Distal tibia: If this site is not suitable, and patient is an adult, identify the anterior-medial aspect of the distal tibia (2 cm proximal to the medial malleolus).
Distal femur: If this site is not suitable, and patient is a pediatric, identify the patella with the leg outstretched to prevent bending of the knee. The insertion site is approximately 1 cm above the patella and approximately 1 – 2 cm medially.
Proximal humerus: Acceptable insertion site for adult patients. Locate the insertion site 1 – 2 cm above the surgical neck on the most prominent aspect of the greater tubercle. This is located on the lateral aspect of the ball of the humerus. Direct the needle at a 45 degree angle or toward the opposite hip.
3. Prep the site recommended by the device manufacturer with providone-iodine ointment or solution.
4. For manual pediatric devices, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, twist the needle handle with a rotating grinding motion applying controlled downward force until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further.
5. For the EZ-IO intraosseous device, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, power the driver until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further. Utilize the yellow needle for the proximal humerus. The pink needle is only intended for use in neonatal patients.
6. Remove the stylette and place in an approved sharps container.
7. Attach a syringe filled with at least 5 cc NS; aspirate bone marrow for manual devices only, to verify placement; then inject at least 5 cc of NS to clear the lumen of the needle.
8. Attach the IV line and adjust flow rate. A pressure bag may assist with achieving desired flows.
9. Stabilize and secure the needle with dressings and tape.
10. Paramedic may administer 10 to 20 mg (1 to 2 cc) of 2% Lidocaine in adult patients who experience infusion-related pain. This may be repeated PRN to a maximum of 60 mg (6 cc).
11. Following the administration of any IO medications, flush the IO line with 10 cc of IV fluid.
12. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation at least once per certification cycle.



Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Swan-Ganz Catheter Maintenance

Clinical Indications:

P **PARAMEDIC** **P**

- Transport of a patient with a Swan-Ganz catheter that is in place prior to transport.

Procedure:

1. Make certain catheter is secure prior to transport.
2. Under the supervision of the nurse or physician caring for the patient, make certain the transport personnel are aware of the depth at which the catheter is secured.
3. **UNDER NO CIRCUMSTANCES SHOULD TRANSPORT PERSONNEL ADVANCE THE SWAN-GANZ CATHETER.**
4. The sterile plastic sheath that surrounds the catheter should not be manipulated.
5. The ports of the catheter may be used to continue administration of medications or IV fluids that were initiated prior to transport. These should be used as any other IV port with attention to sterile technique.
6. If applicable, measurements from the catheter may be obtained during transport and used to guide care as per local protocols and medical control orders.
7. If at anytime during the transport difficulties with the function of the Swan-Ganz catheter is noted, contact medical control.
8. Document the time and any adjustments or problems associated with the catheter in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Respiratory Section

Airway: Suctioning-Advanced

Clinical Indications:

- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient currently being assisted by an airway adjunct such as a naso-tracheal tube, endotracheal tube, Combitube, tracheostomy tube, or a cricothyrotomy tube.

A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Ensure suction device is in proper working order.
2. Preoxygenate the patient as is possible.
3. Attach suction catheter to suction device, keeping sterile plastic covering over catheter.
4. Using the suprasternal notch and the end of the airway into the catheter will be placed as guides, measure the depth desired for the catheter (judgment must be used regarding the depth of suctioning with cricothyrotomy and tracheostomy tubes).
5. If applicable, remove ventilation devices from the airway.
6. With the thumb port of the catheter uncovered, insert the catheter through the airway device.
7. Once the desired depth (measured in #4 above) has been reached, occlude the thumb port and remove the suction catheter slowly.
8. A small amount of Normal Saline (10 ml) may be used if needed to loosen secretions for suctioning.
9. Reattach ventilation device (e.g., bag-valve mask) and ventilate the patient
10. Document time and result in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Respiratory Section

Respiratory: Suctioning-Basic

Clinical Indications:

- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient who cannot maintain or keep the airway clear.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Ensure suction device is in proper working order with suction tip in place.
2. Preoxygenate the patient as is possible.
3. Explain the procedure to the patient if they are coherent.
4. Examine the oropharynx and remove any potential foreign bodies or material which may occlude the airway if dislodged by the suction device.
5. If applicable, remove ventilation devices from the airway.
6. Use the suction device to remove any secretions, blood, or other substance.
7. The alert patient may assist with this procedure.
8. Reattach ventilation device (e.g., bag-valve mask) and ventilate or assist the patient
9. Record the time and result of the suctioning in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Respiratory Section

Respiratory: Nebulizer Inhalation Therapy

Clinical Indications:

- Patients experiencing bronchospasm.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Gather the necessary equipment.
2. Assemble the nebulizer kit.
3. Instill the premixed drug (such as Albuterol or other approved drug) into the reservoir well of the nebulizer.
4. Connect the nebulizer device to oxygen at 4 - 6 liters per minute or adequate flow to produce a steady, visible mist.
5. Instruct the patient to inhale normally through the mouthpiece of the nebulizer. The patient needs to have a good lip seal around the mouthpiece.
6. The treatment should last until the solution is depleted. Tapping the reservoir well near the end of the treatment will assist in utilizing all of the solution.
7. Monitor the patient for medication effects. This should include the patient's assessment of his/her response to the treatment and reassessment of vital signs, ECG, and breath sounds.
8. Assess and document peak flows before and after nebulizer treatments.
9. Document the treatment, dose, and route on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Respiratory Section

Respiratory: NIPPV

(Non-Invasive Positive Pressure)

Clinical Indications:

P PARAMEDIC P

- Non-Invasive Positive Airway Pressure (NIPPV) is indicated in all patients whom inadequate ventilation is suspected. This could be as a result of Pulmonary Edema, CHF, COPD, Pneumonia, or Asthma.
- Agencies may utilize Continuous and/or Bi-Level Positive Airway Pressure Devices

Clinical Contraindications:

- Decreased Mental Status.
- Facial features or deformities that prevent an adequate mask seal.
- Excessive respiratory secretions.

Procedure:

1. Ensure adequate oxygen supply to ventilation device.
2. Explain the procedure to the patient.
3. Consider placement of a nasopharyngeal airway.
4. Place the delivery mask over the mouth and nose. Oxygen should be flowing through the device at this point.
5. Secure the mask with provided straps starting with the lower straps until minimal air leak occurs.
6. If the Positive Pressure is adjustable on the NIPPV device adjust and slowly titrate to achieve a positive pressure as follows:

Continuous pressure device:

5 – 25 cmH₂O for Pulmonary Edema, CHF, COPD, Asthma, Drowning, possible aspiration, or pneumonia.

Bi-Level pressure device:

IPAP 10 – 15 over EPAP 5 – 7 cmH₂O for Pulmonary Edema, CHF, COPD, Asthma, Drowning, possible aspiration, or pneumonia.

During titration keep IPAP – EPAP at least a difference of 5 cmH₂O

25 cmH₂O is maximum pressure that should be utilized with NIPPV.

Increasing positive pressure can cause hypotension.

Use caution or remove and re-evaluate with Systolic Blood Pressures consistently < 100 mmHg.

7. Evaluate the response of the patient assessing breath sounds, oxygen saturation, and general appearance.
8. Titrate oxygen levels to the patient's response. Many patients respond to low FIO₂ (30-50%).
9. Encourage the patient to allow forced ventilation to occur. Observe closely for signs of complications. The patient must be breathing for use of the NIPPV device.
10. Document time and response on patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Respiratory Section

Respiratory: Respirator Operation

Clinical Indications:

- Transport of an intubated patient

A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Confirm the placement of tube as per airway protocol.
2. Ensure adequate oxygen delivery to the respirator device.
3. Preoxygenate the patient as much as possible with bag-valve mask.
4. Remove BVM and attach tube to respiration device.
5. Per instructions of device, set initial respiration values. For example, set an inspiratory:expiratory ratio of 1:4 (for every 1 second of inspiration, allow 4 seconds and expiration) with a rate of 12 to 20.
6. Assess breath sounds. Allow for adequate expiratory time. Adjust respirator setting as clinically indicated.
7. **It is required that patients on a transport ventilator should be monitored continuously through Capnography and Pulse Oximetry. The ventilatory rate should adjusted to maintain a pulse oximetry of >90 (preferably $\geq 94\%$) while maintaining a pCO₂ of 30-35.**
8. If any worsening of patient condition, decrease in oxygen saturation, or any question regarding the function of the respirator, remove the respirator and resume bag-valve mask ventilations.
9. Document time, complications, and patient response on the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Respiratory: Ventilator Operation

Clinical Indications:

P PARAMEDIC P

- Management of the ventilation of a patient during a prolonged or interfacility transport of an intubated patient.

Procedure:

1. Transporting personnel should review the operation of the ventilator with the treating personnel (physician, nurse, or respiratory therapy) in the referring facility prior to transport if possible.
2. All ventilator settings, including respiratory rate, FiO₂, mode of ventilation, and tidal volumes should be recorded prior to initiating transport. Additionally, the recent trends in oxygen saturation experienced by the patient should be noted.
3. Prior to transport, specific orders regarding any anticipated changes to ventilator settings as well as causes for significant alarm should be reviewed with the referring medical personnel as well as medical control.
4. Once in the transporting unit, confirm adequate oxygen delivery to the ventilator.
5. Frequently assess breath sounds to assess for possible tube dislodgment during transfer.
6. Frequently assess the patient's respiratory status, noting any decreases in oxygen saturation or changes in tidal volumes, peak pressures, etc.
7. Note any changes in ventilator settings or patient condition in the PCR.
8. Consider placing an NG or OG tube to clear stomach contents.
- 9. It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
10. If any significant change in patient condition, including vital signs or oxygen saturation or there is a concern regarding ventilator performance/alarms, remove the ventilator from the endotracheal tube and use a bag-valve mask with 100% O₂. Contact medical control immediately.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Childbirth

Clinical Indications:

- Imminent delivery with crowning

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Delivery should be controlled so as to allow a slow controlled delivery of the infant. This will prevent injury to the mother and infant.
2. Support the infant's head as needed.
3. Check the umbilical cord surrounding the neck. If it is present, slip it over the head. If unable to free the cord from the neck, double clamp the cord and cut between the clamps.
4. Suction the airway with a bulb syringe.
5. Grasping the head with hands over the ears, gently pull down to allow delivery of the anterior shoulder.
6. Gently pull up on the head to allow delivery of the posterior shoulder.
7. Slowly deliver the remainder of the infant.
8. Clamp the cord 2 inches from the abdomen with 2 clamps and cut the cord between the clamps.
9. Record APGAR scores at 1 and 5 minutes.
10. Follow the **Newly Born Protocol** for further treatment.
11. The placenta will deliver spontaneously, usually within 5 minutes of the infant. Do not force the placenta to deliver.
12. Massaging the uterus may facilitate delivery of the placenta and decrease bleeding by facilitating uterine contractions.
13. Continue transport to the hospital.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Universal Section

Decontamination

Clinical Indications:

- Any patient who may have been exposed to significant hazardous materials, including chemical, biological, or radiological weapons.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- In coordination with HazMAT and other Emergency Management personnel, establish hot, warm and cold zones of operation.
- Ensure that personnel assigned to operate within each zone have proper personal protective equipment.
- In coordination with other public safety personnel, assure each patient from the hot zone undergoes appropriate initial decontamination. This is specific to each incident; such decontamination may include:
 - Removal of patients from Hot Zone
 - Simple removal of clothing
 - Irrigation of eyes
 - Passage through high-volume water bath (e.g., between two fire apparatus) for patients contaminated with liquids or certain solids. Patients exposed to gases, vapors, and powders often will not require this step as it may unnecessarily delay treatment and/or increase dermal absorption of the agent(s).
- Initial triage of patients should occur after step #3. Immediate life threats should be addressed prior to technical decontamination.
- Assist patients with technical decontamination (unless contraindicated based on #3 above). This may include removal of all clothing and gentle cleansing with soap and water. All body areas should be thoroughly cleansed, although overly harsh scrubbing which could break the skin should be avoided.
- Place triage identification on each patient. Match triage information with each patient's personal belongings which were removed during technical decontamination. Preserve these personnel affects for law enforcement.
- Monitor all patients for environmental illness.
- Transport patients per local protocol.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Gastric Tube Insertion

Clinical Indications:

P PARAMEDIC P

- Gastric decompression in intubated patients or for administration of activated charcoal in patients with altered mental status.

Procedure:

1. Estimate insertion length by superimposing the tube over the body from the nose to the stomach.
2. Flex the neck **if not contraindicated** to facilitate esophageal passage.
3. Liberally lubricate the distal end of the tube and pass through the patient's nostril along the floor of the nasal passage. Do not orient the tip upward into the turbinates. This increases the difficulty of the insertion and may cause bleeding.
4. In the setting of an intubated patient or a patient with facial trauma, oral insertion of the tube may be considered or preferred after securing airway.
5. Continue to advance the tube gently until the appropriate distance is reached.
6. Confirm placement by injecting 20cc of air and auscultate for the swish or bubbling of the air over the stomach. Additionally, aspirate gastric contents to confirm proper placement.
7. Secure the tube.
8. Decompress the stomach of air and food either by connecting the tube to suction or manually aspirating with the large catheter tip syringe.
9. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Standards Procedure (Skill) Universal Section

Injections: Subcutaneous and Intramuscular

Clinical Indications:

- When medication administration is necessary and the medication must be given via the SQ or IM route (not auto-injector), or as an alternative route in selected medications.

B	EMT*	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Receive and confirm medication order or perform according to standing orders.
- Prepare equipment and medication expelling air from the syringe.
- Explain the procedure to the patient and reconfirm patient allergies.
- The most common site for subcutaneous injection is the arm.
 - Injection volume should not exceed 1 cc.
- The possible injection sites for intramuscular injections include the arm, buttock and thigh.
 - Injection volume should not exceed 1 cc for the arm
 - Injection volume should not exceed 2 cc in the thigh or buttock.
- The thigh should be used for injections in pediatric patients and injection volume should not exceed 1 cc.
- Expose the selected area and cleanse the injection site with alcohol.
- Insert the needle into the skin with a smooth, steady motion

SQ: 45-degree angle
skin pinched

IM: 90-degree angle
skin flattened

- Aspirate for blood
- Inject the medication.
- Withdraw the needle quickly and dispose of properly without recapping.
- Apply pressure to the site.
- Monitor the patient for the desired therapeutic effects as well as any possible side effects.
- Document the medication, dose, route, and time on/with the patient care report (PCR).

** EMT may administer Epinephrine for anaphylaxis, by IM route, if approved by the system medical director.*

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Restraints: Physical

Clinical Indications:

- Any patient who may harm himself, herself, or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Attempt less restrictive means of managing the patient.
- Request law enforcement assistance and **Contact Medical Control**.
- Ensure that there are sufficient personnel available to physically restrain the patient safely.
- Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient. The patient will never be restrained in the prone position.
- The patient must be under constant observation by the EMS crew at all times. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring.
- The extremities that are restrained will have a circulation check at least every 15 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This **MUST** be documented on the PCR.
- Documentation on/with the patient care report (PCR) should include the reason for the use of restraints, the type of restraints used, and the time restraints were placed. Use of the Restraint Checklist is highly recommended.
- If the above actions are unsuccessful, or if the patient is resisting the restraints, consider administering medications per protocol. (Chemical restraint may be considered earlier.)
- If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel can not remove, a law enforcement officer must accompany the patient to the hospital in the transporting EMS vehicle.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Urinary Catheterization

Clinical Indications:

P **PARAMEDIC** **P**

- Monitoring a patient's fluid status and/or response to therapy during transport.
- Collection of urine for laboratory analysis.
- Patients with medical (but NOT TRAUMA) complaints over the age of 16.

Procedure:

1. Explain the procedure to the patient. Maximize patient privacy. Have a second crewmember or other chaperone if performing the procedure on a member of the opposite sex.
2. If there is any question of traumatic injury in the Genitourinary (GU) region, do not perform this procedure.
3. Open the catheter kit. Test the balloon at the catheter tip. Connect the catheter to the urine collection system. Maintain the sterility of contents.
4. Use sterile gloves from the kit. Use one hand to come in contact with the patient and the other to use items from the kit. Recall that once your hand touches the patient, it is no longer sterile and cannot be used to obtain items from the kit.
5. Using the Betadine swabs from the kit, thoroughly cleanse the area surrounding the urethra. For males, this will require retracting the foreskin for uncircumcised males and cleansing of the glans for all males. For females, this will require retraction of the labia majora and cleansing of the area around the urethra.
6. Once the patient has been prepped with Betadine, place sterile sheet(s).
7. Lubricate the tip of the catheter.
8. Gently guide the catheter through the external opening of the urethra. Advance the catheter slowly until there is return of urine. Do not force the catheter through resistance. If resistance is encountered, withdraw the catheter slightly and gently re-direct the catheter.
9. Once urine is returned, gently inflate the balloon and secure the urine collection device.
10. Record procedure and amount of urine returned in the Patient Care Report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.

Standards Procedure (Skill) Universal Section

Medication Administration: Intranasal

Clinical Indications:

- Patient needing medication administration when the specific medication must be given via the intranasal route or as an alternative route in selected medications.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Contraindication:

- Lack of a nose
- Destruction of nasal mucosa from surgery or drug abuse

Procedure:

1. Receive and confirm medication order or perform according to standing orders.
2. Explain the procedure to the patient if applicable and reconfirm patient allergies.
3. Prepare equipment and medication expelling air from the syringe.
4. Withdraw the appropriate volume dosage of medication into the syringe
5. Attach the MAD (Mucosal Atomizer Device) nasal atomizer.
6. Ensure the nostrils are clear of blood, mucous, or debris. If not, suction to clear if possible.
7. Using the free hand, stabilize the head by holding the occiput
8. Place the atomizer approx. 1.5 cm into the patient's nostril and aim slightly up and outward to cover turbinates and olfactory mucosa (toward the top of the ear).
9. Briskly compress the syringe to administer $\frac{1}{2}$ of the medication.
 - **Do not exceed 1ml per nostril**
10. Remove and repeat into the other nostril until all of the medication has been administered.
11. Volumes greater than 1ml are too large and will lead to failure because the drug cannot be absorbed by the nasal mucosa quickly enough.
12. Factors that negatively affect mucosal absorption of medication may include recent use of vasoconstrictors, i.e. cocaine or Afrin, epistaxis, nasal congestion and/or discharge.
13. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
14. Document the medication, dose, route, and time on/with the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Chest Decompression

Clinical Indications:

P PARAMEDIC P

- Patients with hypotension (SBP <90), clinical signs of shock, and at least one of the following signs:
 - Jugular vein distention.
 - Tracheal deviation away from the side of the injury (often a late sign).
 - Absent or decreased breath sounds on the affected side.
 - Hyper-resonance to percussion on the affected side.
 - Increased resistance when ventilating a patient.
- Patients in traumatic arrest with chest or abdominal trauma for whom resuscitation is indicated. These patients may require bilateral chest decompression even in the absence of the signs above.

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.).
2. Administer high flow oxygen.
3. Identify and prep the site:
 - Locate the second intercostals space in the mid-clavicular line on the same side as the pneumothorax.
 - If unable to place anteriorly, lateral placement may be used at the fourth ICS mid-axillary line.
 - Prepare the site with providone-iodine ointment or solution.
4. Insert the catheter (14 gauge for adults) into the skin over the third rib and direct it just over the top of the rib (superior border) into the interspace.
5. Advance the catheter through the parietal pleura until a “pop” is felt and air or blood exits under pressure through the catheter, then advance catheter only to chest wall.
6. Remove the needle, leaving the plastic catheter in place.
7. Secure the catheter hub to the chest wall with dressings and tape.
8. Consider placing a finger cut from an exam glove over the catheter hub. Cut a small hole in the end of the finger to make a flutter valve. Secure the glove finger with tape or a rubber band. (Note – don’t waste much time preparing the flutter valve; if necessary control the air flow through the catheter hub with your gloved thumb.)

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System. Assessment should include direct observation once per certification cycle.



Spinal Motion Restriction

Clinical Indications:

- Need for Spinal Motion Restriction as determined by protocol.
 - Guidelines for appropriate use of long spine board (LSB) OR any equivalent device below:**
- Spine boards or similar rigid devices, should NOT be used during transport or during inter-facility transfers.** They should be utilized for extrication and / or patient transfers, as well as support for chest compressions. They DO NOT improve outcomes and can induce pain, agitation / anxiety, respiratory compromise, and decreased tissue perfusion at pressure points.
 - Devices such as the long or short spine board, scoop stretcher, soft-body splints, etc., should be considered extrication devices rather than transport-devices. Instead, use of Spinal Motion Restriction which includes a rigid cervical collar, manual in-line spine stabilization, maintaining spinal alignment with movement and transfers, and securing to the ambulance stretcher.
 - Penetrating trauma to head, torso, or back with no evidence of spinal injury does not require Spinal Motion Restriction.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

- Gather LSB, scoop, ambulance cot, or other Spinal Motion Restriction device, securing devices, and appropriate C-collar.
- Explain the procedure to the patient and assess / record neurological exam and pulse status.
- Place the patient in an appropriately sized C-collar while maintaining in-line stabilization of the C-spine by second provider. In-line stabilization should not involve traction / tension, but rather maintain the head in a neutral, midline position while the first rescuer applies the collar.
- Once the collar is secure, the second rescuer should still maintain their position to ensure stabilization (the collar is helpful but will not do the job by itself.)
- If indicated, place patient on a Spinal Motion Restriction device with log-roll or similar technique dependent on circumstances, if patient is supine or prone. During extrication or where otherwise unable to be placed prone or supine, place on Spinal Motion Restriction device by the safest method available that allows maintenance of in-line spinal stability.
- Stabilize the patient with straps / head rolls / tape / other devices as needed. Once the head is secured to the Spinal Motion Restriction device / stretcher, the second rescuer may release manual in-line stabilization. **Once the patient arrives at the stretcher, REMOVE the rigid Spinal Motion Restriction device while maintaining spinal alignment using log-roll or multi-rescuer lift techniques and transfer and secure to the stretcher for transport.**
- NOTE: Spinal precautions may be achieved by many methods. Never force a patient into a certain position to immobilize them. Such situations may require a second rescuer to maintain manual stabilization throughout the transport to the hospital. Special equipment such as football players in full pads and helmet may remain immobilized with helmet and pads in place.
- Document the time of the procedure in the patient care report (PCR).

Certification Requirements:

Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Splinting

Clinical Indications:

- Immobilization of an extremity for transport, either due to suspected fracture, sprain, or injury.
- Immobilization of an extremity for transport to secure medically necessary devices such as intravenous catheters

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Assess and document pulses, sensation, and motor function prior to placement of the splint. If no pulses are present and a fracture is suspected, consider reduction of the fracture prior to placement of the splint.
2. Remove all clothing from the extremity.
3. Select a site to secure the splint both proximal and distal to the area of suspected injury, or the area where the medical device will be placed.
4. Do not secure the splint directly over the injury or device.
5. Place the splint and secure with Velcro, straps, or bandage material (e.g., kling, kerlex, cloth bandage, etc.) depending on the splint manufacturer and design.
6. Document pulses, sensation, and motor function after placement of the splint. If there has been a deterioration in any of these 3 parameters, remove the splint and reassess
7. If a femur fracture is suspected and there is no evidence of pelvic fracture or instability, the following procedure may be followed for placement of a femoral traction splint:
 - Assess neurovascular function as in #1 above.
 - Place the ankle device over the ankle.
 - Place the proximal end of the traction splint on the posterior side of the affected extremity, being careful to avoid placing too much pressure on genitalia or open wounds. Make certain the splint extends proximal to the suspected fracture. If the splint will not extend in such a manner, reassess possible involvement of the pelvis
 - Extend the distal end of the splint at least 6 inches beyond the foot.
 - Attach the ankle device to the traction crank.
 - Twist until moderate resistance is met.
 - Reassess alignment, pulses, sensation, and motor function. If there has been deterioration in any of these 3 parameters, release traction and reassess.
8. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Wound Care-General

Clinical Indications:

- Protection and care for open wounds prior to and during transport.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

1. Use personal protective equipment, including gloves, gown, and mask as indicated.
2. If active bleeding, elevate the affected area if possible and hold direct pressure. Do not rely on “compression” bandage to control bleeding. Direct pressure is much more effective.
3. Once bleeding is controlled, irrigate contaminated wounds with saline as appropriate (this may have to be avoided if bleeding was difficult to control). Consider analgesia per protocol prior to irrigation.
4. Cover wounds with sterile gauze/dressings. Check distal pulses, sensation, and motor function to ensure the bandage is not too tight.
5. Monitor wounds and/or dressings throughout transport for bleeding.
6. Document the wound and assessment and care in the patient care report (PCR).

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Wound Care-Hemostatic Agent

Clinical Indications:

- Serious hemorrhage that can not be controlled by other means.

Contraindications:

- Wounds involving open thoracic or abdominal cavities.

Procedure:

1. Apply approved non-heat-generating hemostatic agent per manufacturer's instructions.
2. Supplement with direct pressure and standard hemorrhage control techniques.
3. Apply dressing.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P



Standards Procedure (Skill) Wound Care / Trauma Care

Wound Care-Conducted Electrical Weapon Removal

Clinical Indications:

- Patient with uncomplicated conducted electrical weapon probes embedded subcutaneously in non-sensitive areas of skin.
- Conducted electrical weapon probes are barbed metal projectiles that may embed themselves up to 13 mm into the skin.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Contraindications:

- Patients with conducted electrical weapon probe penetration in vulnerable areas of body as mentioned below should be transported for further evaluation and probe removal
- Probes embedded in skin above level of clavicles, female breasts, or genitalia
- Suspicion that probe might be embedded in bone, blood vessel, or other sensitive structure.

Procedure:

- Ensure wires are disconnected from weapon.
- Stabilize skin around probe using non-dominant hand.
- Grasp probe by metal body with pliers or hemostats to prevent puncture wounds to EMS personnel.
- Remove probe in single quick motion.
- Wipe wound with antiseptic wipe and apply dressing.

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.



Wound Care-Tourniquet

Clinical Indications:

- Life threatening extremity hemorrhage that can not be controlled by other means.
- Serious or life threatening extremity hemorrhage and tactical considerations prevent the use of standard hemorrhage control techniques.

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Contraindications:

- Non-extremity hemorrhage
- Proximal extremity location where tourniquet application is not practical

Procedure:

1. Place tourniquet proximal to wound
2. Tighten per manufacturer instructions until hemorrhage stops and/or distal pulses in affected extremity disappear.
3. Secure tourniquet per manufacturer instructions
4. Note time of tourniquet application and communicate this to receiving care providers
5. Dress wounds per standard wound care protocol
6. If delayed or prolonged transport and tourniquet application time > 45 minutes: consider reattempting standard hemorrhage control techniques and removing tourniquet

Certification Requirements:

- Maintain knowledge of the indications, contraindications, technique, and possible complications of the procedure. Assessment of this knowledge may be accomplished via quality assurance mechanisms, classroom demonstrations, skills stations, or other mechanisms as deemed appropriate by the local EMS System.

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Medications / Drug Lists

North Carolina Medical Board

Approved Medications for Credentialed EMS Personnel

EMS personnel at any level who administer medications must do so within an EMS system that provides medical oversight. Personnel must follow written treatment protocols and must complete appropriate medical education. All EMS System protocols and policies must be reviewed and approved by the Medical Director of the Office of EMS.

All items highlighted in “red” are required in all systems with EMS personnel credentialed at the specified level. Specialty Care (SCTP) required items are not listed here, as they can be found on the Specialized Ambulance Protocol Summary (SAPS) form.

Medications	FR/LEO	EMR	EMT	AEMT	PARAMEDIC
Acetaminophen		X	X	X ¹⁵	X
Adenosine					X
Amiodarone					X
Anti-arrhythmic					X ¹²
Anti-emetic preparations					X
Aspirin			X	X	X
Atropine		X ⁴	X ⁴	X ⁴	X
Benzodiazepine preparations					X ¹⁴
Beta agonist preparations			X ²	X	X
Beta blockers					X ¹³
Calcium channel blockers					X ¹³
Calcium chloride/gluconate					X
Crystalloid solutions				X	X
Diphenhydramine			X ³	X	X
Dopamine					X
Epinephrine		X ¹	X ¹	X	X
Etomidate					X
Furosemide					X
Glucagon				X	X
Glucose, oral		X	X	X	X
Glucose solutions				X	X
Haloperidol					X
Histamine 2 blockers				X	X
Ketamine					X ⁷
Lidocaine					X
Magnesium sulfate					X
Narcotic analgesics					X
Narcotic antagonists	X ^{9,10}	X ⁹	X ⁹	X	X
Nasal spray decongestant			X	X	X
Nitroglycerin			X ²	X	X
Non-prescription medications			X	X	X
Non-steroidal anti-inflammatory			X	X ¹⁵	X
Norepinephrine					X
Oxygen	X ⁵	X ⁵	X ⁵	X ⁵	X ⁵
Paralytic agents					X ⁷

Medications	FR/LEO	EMR	EMT	AEMT	PARAMEDIC
Pralidoxime		X ⁴	X ⁴	X ⁴	X
Procainamide					X
Propofol					X ⁸
Sodium bicarbonate					X
Steroid preparations					X
Thiamine				X	X
Topical hemostatic agents	X	X	X	X	X
Tranexamic Acid (TXA)					X ¹¹

¹ EMR and EMT use of epinephrine is limited to the treatment anaphylaxis and may be administered only by auto injector, unless approved by EMS System Medical Director and OEMS.

² EMT use of beta-agonists and nitroglycerine is limited to patients who currently are prescribed the medication. EMTs may administer these medications from EMS supplies. EMT use of beta-agonists may be through any inhaled method of medication administration.

³ EMT administration of diphenhydramine is limited to the oral route.

⁴ As a component of preparedness for domestic terrorism, EMS personnel, public safety officers, and other first responders recognized by the EMS system, may carry, self-administer, or administer to a patient atropine and/or pralidoxime, based on written protocols and medical direction. All personnel except for Paramedics must administer these medications by an auto injector.

⁵ Administration of oxygen does not require medical direction.

⁶ Administration of immunizations and TB skin tests are not limited to public health initiatives.

⁷ Can only be used as induction agent for RSI or for post intubation sedation.

⁸ Can only be used for interfacility transport where infusion has already been started at transferring facility. **EMS units cannot carry Propofol or CroFab. This medication must be provided by the transferring hospital.**

⁹ FR, LEO, EMR, and EMT administration of Naloxone is limited to the intra-nasal (IN) and auto-injector routes.

¹⁰ First Responder agencies, to include law enforcement are allowed to administer Naloxone with the following requirements:

- They must administer the Naloxone under the medical oversight of the County EMS Medical Director, and be incorporated into the respective EMS System in which they are administering the Naloxone.
- They must receive appropriate training and continuing education as approved by the County EMS Medical Director.
- The Naloxone must be administered as part of a protocol and procedure approved by the County EMS Medical Director, and the NC Office of EMS.
- All administration of Naloxone must be reviewed by the EMS Peer Review/Quality Management Committee of the EMS System, which functions under the supervision of the local County EMS Medical Director.

¹¹ For an EMS System to use Tranexamic Acid (TXA), they must submit for approval by the OEMS State Medical Director a signed letter from any Trauma Centers that would be the recipient of the patient that the destination Trauma Center agrees with its use and will give the 2nd required dose of Tranexamic Acid (TXA).

¹² All Paramedic systems must carry some form of anti-arrhythmic agent. This must either be amiodarone, lidocaine, **or** procainamide.

¹³ Paramedic systems must carry either a calcium channel blocker **or** beta-blocker.

¹⁴ All Paramedic systems must carry some form of injectable benzodiazepine.

¹⁵ EMT-Intermediate/AEMT systems must carry either acetaminophen **or** a non-steroidal anti-inflammatory.

Acetaminophen (*Tylenol*)



Class –

- Analgesic
- Antipyretic

Mechanism of Action –

- The primary mechanism of action is believed to be inhibition of cyclooxygenase (COX), with a predominant effect on COX-2. Inhibition of COX enzymes prevents the metabolism of arachidonic acid to prostaglandin H₂, an unstable intermediate byproduct which is converted to pro-inflammatory compounds. In the central nervous system, inhibition of COX enzymes reduces concentrations of prostaglandin E₂, which lowers the hypothalamic set-point to reduce fever, and activation of descending inhibitory serotonergic pathways to produce analgesia.

Indications –

- Mild to moderate pain
- Fever reduction

Dosing –

- Adult: 325-1000 mg PO
- Pediatric: 15 mg/kg

Onset –

- 5-15 min

Contraindications –

- Hypersensitivity
- Severe hepatic impairment
- Severe active liver disease

Adverse Reactions –

- Hepatic Injury
- Skin Reaction (Stevens-Johnson Syndrome, Toxic epidermal necrolysis)

Pregnancy –

- **Class C** – Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 500 mg PO tablets
- 160mg/5ml liquid

Applicable Protocols –

- UP-10, UP-11,

Adenosine (*Adenocard*)



Class –

- Antiarrhythmic (Endogenous nucleoside)

Mechanism of Action –

- Adenosine slows supraventricular tachycardia (SVT) by slowing conduction thru the AV node

Indications –

- 1st drug of choice for narrow complex tachycardia's and dysrhythmias associated with bypass tracts such as WPW.

Dosing –

- **Adult:** 6mg, 12 mg, 12 mg
- **Pediatric:** 0.1 mg/kg max dose 6mg, 0.2 mg/kg max dose of 12 mg

Onset –

- Immediate

Duration –

- 10 sec.

Contraindications –

- Drug induced tachycardias

Adverse Reactions –

- | | |
|--------------------|-----------------------|
| - Facial Flushing | - Chest pain |
| - Light headedness | - Hypotension |
| - Headache | - Shortness of breath |
| - Palpitations | - Ventricular ectopy |

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 6mg/2ml

Applicable Protocols –

- AC-6, AC-7, PC-5

Albuterol



Class –

- Sympathomimetic, Bronchodilator, Beta2 agonist

Mechanism of Action –

- Albuterol is a sympathomimetic that is selective for beta2- adrenergic receptors. It relaxes smooth muscle of the bronchial tree and peripheral vasculature by stimulating adrenergic receptors of the sympathetic nervous system.

Indications –

- Relief of bronchospasm in patients with reversible obstructive airway disease

Dosing –

- **Adult:** 2.5-5mg May repeat protocol specific
- **Pediatric:** 1.25-5mg May repeat per protocol (age/protocol specific)

Onset –

- 5-8 minutes

Contraindications –

- Hypersensitivity to Albuterol or Levalbuterol (Xopenex)
- Use precaution in tachycardia associated with cardiac dysrhythmias.

Adverse Reactions –

- Restlessness
- Dizziness
- Palpitations
- Dysrhythmias
- Tremors

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 2.5mg/3ml

Applicable Protocols –

- AM-1, TB-3, PM-1, AR-4, AR-7,

Amiodarone (*Cordarone*)



Class –

- Class III Antiarrhythmic

Mechanism of Action –

- Amiodarone is unique antiarrhythmic it has multiple mechanisms of action. It prolongs the duration of the action potential and the effective refractory period, and when given short-term IV, probably includes noncompetitive beta-adrenergic receptor and calcium channel blocker activity.

Indications –

- Treatment of recurring V-Fib/ V-Tach
- V-Tach with a pulse when the patient is hemodynamically stable
- Treatment of Narrow Complex Tachycardia

Dosing –

Adult:

V-fib / pulseless V-Tach

- 300 mg IV push
- Repeat dose of 150 mg IV push

V-Tach with a pulse/ NCT

150 mg in 100cc D5W over 10 min

Pediatric:

V-fib / pulseless V-Tach

- 5 mg/kg IV push over 5 min (Max 300mg)
- Repeat up to 15mg/kg IV
(Max repeat dose 150mg for recurrent episodes)

V-Tach with a pulse

5 mg/kg IV Drip over 20 minutes

Onset –

- Within minutes

Contraindications –

- Cardiogenic Shock
- 2nd and 3rd degree heart blocks
- Sensitive to Amiodarone or iodine

Adverse Reactions –

- Hypotension
- Bradycardia
- CHF
- Atrioventricular conduction abnormalities

Pregnancy –

- **Class D** - There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 150mg/3ml

Applicable Protocols –

- AC-6, AC-7, AC-8, PC-5, PC-6, PC-7,

Aspirin (ASA)



Class –

- Analgesic
- Anti-inflammatory
- Antiplatelet

Mechanism of Action –

- Aspirin decreases inflammation (analgesic effect not limited to effects in CNS), dilates peripheral vessels, and decreases platelet aggregation.

Indications –

- Prevention of platelet aggregation in ischemia and thromboembolism
- All patient with ACS or symptoms of ischemic chest pain
- Unstable angina, prevention of myocardial infarction or reinfarction

Dosing –

- **Adult:** 324-650mg PO

Onset –

- 15-30 minutes

Duration –

- 15-30 hours due to saturation of liver metabolism

Contraindications –

- Hypersensitivity to Salicylates
- GI Bleeding
- Bleeding disorders

Adverse Reactions –

- Stomach irritation
- Heartburn/indigestion
- Nausea/Vomiting

Pregnancy –

- **Category D** - There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 81 mg chewable tablets

Applicable Protocols –

- UP-11, AC-4

Atropine Sulfate



Class –

- Anticholinergic agent

Mechanism of Action –

- Atropine (a potent parasympatholytic) Inhibits actions of the acetylcholine at the postganglionic parasympathetic (primarily muscarinic) receptor sites. Small doses inhibit salivary and bronchial secretions; Moderate doses dilate pupils and increase heart rate. Large doses decrease intestinal motility, inhibits gastric acid secretions, and may block nicotinic receptors sites at the autonomic ganglia and at the neuromuscular junction. Blocked vagal effects result in increased heart rate and enhanced atrioventricular conduction with limited to no inotropic (force of contraction) effect.

Indications –

- Bradycardia that is hemodynamically unstable

Dosing –

- **Adult:** Bradycardia: 0.5 mg q 3-5 min max dose 3 mg
 - o Organophosphate: 1-2 mg IM or IV
- **Pediatric:** Bradycardia: 0.02 mg/kg IV/IO (0.5 mg max per dose) (1mg max total)
 - o Organophosphate: 0.05 mg/kg IV/IO

Onset –

- Rapid

Contraindications –

- Tachycardia -MI -Narrow Angle Glaucoma
- Avoid in hypothermic bradycardia

Adverse Reactions –

- Tachycardia -Dysrhythmias
- Paradoxical tachycardia when pushed too slow or doses less than 0.5 mg
- Anticholinergic effects i.e. (dry mouth/nose/skin, photophobia)

Pregnancy –

- **Category B-** Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Supplied –

- 1mg/1ml

Applicable Protocols –

- PC-2, TE-8, AC-2

Calcium Gluconate



Class –

- Electrolyte

Mechanism of Action –

- Calcium is an essential component for the functional integrity of the nervous and muscular systems, for normal cardiac contractility, and the coagulation of blood.

Indications –

- Hyperkalemia except when associated with digitalis toxicity
- Hypocalcemia
- Calcium channel blocker toxicity

Dosing –

- Adult: 2 gm IV/IO

Onset –

- 5-15 minutes

Contraindications –

- Patients with digitalis toxicity
- Hypercalcemia
- V-Fib during cardiac arrest

Adverse Reactions –

- Bradycardia
- Hypotension
- Very necrotic Sloughing occurs if IV infiltrates

Pregnancy –

- Category N- Not Classified

Supplied –

- 1 gm in 10ml

Applicable Protocols –

- TE-7, AC-1, AM-3, TB-3

Diltiazem (*Cardizem*)



Class –

- Calcium Channel Blocker

Mechanism of Action –

- Cardizem is a calcium channel blocking agent that slows conduction, increases refractoriness in the AV node, and causes coronary and peripheral vasodilation.

Indications –

- Atrial Fib
- Atrial Flutter
- Multifocal Atrial Tachycardia
- PSVT

Dosing –

- **Adult:** Weight based dose is 0.25 mg/kg 2nd dose is 0.35mg/kg

Onset –

- 2-5 min

Contraindications –

- Wide QRS tachycardias
- Rapid A-fib/Flutter associated with WPW
- Ventricular tachycardias
- Acute MI

Adverse Reactions –

- Atrial Flutter
- 1st & 2nd degree AV Blocks
- Bradycardia
- Chest pain
- Dyspnea
- CHF / Peripheral edema

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 25mg/5ml

Applicable Protocols –

- AC-6

Dexamethasone (*Decadron*)



Class –

- Glucocorticoid

Mechanism of Action –

- Dexamethasone is a synthetic steroid that is related chemically to the natural hormones secreted by the adrenal cortex. The drug suppresses acute and chronic inflammation, potentiates the relaxation of vascular and bronchial smooth muscle by beta-adrenergic agonists, and possibly alters airway hyperactivity. In emergency care, dexamethasone generally, is used in the treatment of allergic reactions and asthma and to reduce swelling in the central nervous system.

Indications –

- Allergic reactions
- Asthma

Dosing –

- **Adult:** 10mg Slow IV/IO/IM
- **Pediatric:** 0.15-0.2 mg/kg IV/IO/IM Max 10mg (protocol dependent)

Onset –

- rapid onset

Contraindications –

- Hypersensitivity to the product
- Active untreated infections (relative)
- Systemic Fungal infection

Adverse Reactions –

- Hyperglycemia
- Decreased wound healing
- Hypertension
- Gastrointestinal bleeding

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 10mg/1ml

Applicable Protocols –

- PM-1, PM-3, AR-4, AR-7, AM-1, AM-5

Dextrose 5%, 10%, 25%, & 50%



Class –

- Carbohydrate, hypertonic solution

Mechanism of Action –

- Dextrose is the principle form of carbohydrate used by the body

Indications –

- Hypoglycemia - Coma of unknown origin
- Altered LOC - Seizure of unknown origin

Dosing –

- **Adult:**
 - o D-50 12.5-25g IV/IO
 - o D-10 125-250 ml IV/IO
- **Pediatric:** age dependent
 - o < 1 years of age: D10 5 ml/kg IV / IO
 - o 1 year to 2 Years: D25 2 ml/kg IV / IO
 - o > 2 Years: D50 1 ml/kg IV / IO (Maximum 25 g per dose)

Onset –

- 1 minute

Contraindications –

- Intracranial hemorrhage - Increased ICP
- Known or suspected stroke in the absence of hypoglycemia

Adverse Reactions –

- Hyperglycemia - Thrombophlebitis

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 25g/50ml (D-50) - 250ml bags of D-10

Applicable Protocols –

- PM-2, AM-2

Diazepam (*Valium*)



Class –

- Benzodiazepine

Mechanism of Action –

- Diazepam acts on the limbic, thalamic, and hypothalamic regions of the central nervous system to potentiate the effects of inhibitory neurotransmitters, raising the seizure threshold in the motor cortex.

Indications –

- Anxiety
- Seizure

Dosing –

- **Adults:**
 - 5mg IV/IO initially
Repeat 2mg q 3-5 minutes up to 10 mg max, unless medical control dictates.
 - 10 mg rectally if unable to obtain IV
- **Pediatric:** 0.1-0.3 mg/kg IV/IO
 - 0.5 mg/kg rectally
 - Repeat 2 mg q3-5 min as needed
 - Max Total Dose 10 mg

Onset –

- 1-5 min

Contraindications –

- Shock
- Respiratory depression

Adverse Reactions –

- Hypotension
- Respiratory distress
- Ataxia
- Confusion

Pregnancy –

- **Class D** - There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 10mg in 1ml

Applicable Protocols –

- UP-13

Diphenhydramine (*Benadryl*)



Class –

- Antihistamine

Mechanism of Action –

- Antihistamines prevent the physiological actions of histamine by blocking H1 (Benadryl and Cimetidine) and H2 (Cimetidine, Ranitidine, and Famotidine) receptors site. Antihistamines are also affective in the treatment of certain extrapyramidal (dystonic) reactions.

Indications –

- Mild, Moderate, and Severe allergic reactions
- Anaphylaxis
- Acute extrapyramidal (dystonic) reactions

Dosing –

- **Adult:** 25-50 mg IV/IO/IM
- **Pediatric:** 1mg/kg IV/IO/IM (do not give in infants <3 months old)

Onset –

- Max effect 1-3 hrs.

Contraindications –

- Patients taking non-selective MAO inhibitors
- Narrow Angle glaucoma
- New born infants

Adverse Reactions –

- Drowsiness
- Paradoxical excitement in children
- Palpitations
- Thickening of bronchial secretions
- Hypotension

Pregnancy –

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Supplied –

- 50mg/1ml

Applicable Protocols –

- AM-1, PM-1,

Dopamine



Class –

- Sympathomimetic

Mechanism of Action –

- Dopamine is related chemically to Epinephrine and Norepinephrine. It acts primarily on Alpha1 and Beta 1 adrenergic receptors in a dose dependent fashion. Moderate dose (cardiac dose), Dopamine stimulates the beta adrenergic receptors, causing enhanced myocardial contractility, increased cardiac output, and a rise in the blood pressure. High Doses (vasopressor dose), dopamine has an alpha-adrenergic effect, producing peripheral arterial and venous restriction.

Indications –

- Hemodynamically significant hypotension (in the absence of hypovolemia)

Dosing –

- **Adult:** 2-20 micrograms/kg/min IV/IO titrate to BP of 90mmhg
- **Pediatric:** 2-20 micrograms/kg/min IV/IO titrate to age appropriate systolic BP

Onset –

- 2-4 min

Contraindications –

- Tachydysrhythmias - V-Fib

Adverse Reactions –

- Tachydysrhythmias
- Hypertension
- Increased myocardial oxygen demand

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans.

Supplied –

- 400mg/250ml (1600mcg/ml)

Applicable Protocols –

- UP-15, AC-2, AM-5, PC-1, PC-2, PC-7, PM-3

Epinephrine 1:1,000 (*Adrenalin*)



Class –

- Sympathomimetic

Mechanism of Action –

- Epinephrine is an endogenous catecholamine that directly stimulates Alpha, Beta, and Beta 2 adrenergic receptors in dose-related fashion.

Indications –

- Allergic Reaction
- Bronchial Asthma

Dosing –

- **Adult:** 0.3-0.5 mg IM
- **Pediatric:** 0.01 mg/kg IM

Nebulized Epinephrine –

- 1mg mixed with 2 ml of Normal Saline

Onset –

- Rapid

Contraindications –

- Hypovolemic Shock

Adverse Reactions –

- Headache
- Dysrhythmias
- Hypertension

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans

Supplied –

- 1mg/1ml

Applicable Protocols –

- AM-1, AR-4, AR-7

Epinephrine 1:10,000



Class –

- Sympathomimetic

Mechanism of Action –

- Epinephrine is an endogenous catecholamine that directly stimulates Alpha, Beta, and Beta 2 adrenergic receptors in dose-related fashion.

Indications –

- Cardiac arrest
- Ventricular fibrillation
- Ventricular tachycardia-pulseless
- PEA
- Asystole

Dosing –

- **Adult:** 1.0 mg IV/IO q 3-5 minutes (May be given ET double the dose)
- **Pediatric:** 0.01 mg/kg IV/IO (Max dose 1mg) q 3-5 minutes (May be given ET double the dose)

Onset –

- Rapid

Contraindications –

- None in the emergency setting

Adverse Reactions –

- N/A

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans

Supplied –

- 1mg/10 ml

Applicable Protocols –

- AO-2, PC-1, PC-6, AC-1, AC-8,

Etomidate (*Amidate*)



Class –

- Non-barbiturate hypnotic, Anesthetic

Mechanism of Action –

- Etomidate is a short acting drug that acts at the level of the reticular activating system to produce anesthesia.

Indications –

- Premedication during RSI
- Also used in the Propofol policy

Dosing –

- Adult: 0.3mg/kg IV/IO

Onset –

- Less than 1 min

Contraindications –

- Hypersensitivity
- Labor/delivery

Adverse Reactions –

- Nausea/Vomiting
- Hypotension/ Hypertension
- Cortisol suppression
- Involuntary muscle movement
- Dysrhythmias

Pregnancy –

- Class C - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans.

Supplied –

- 2mg/1ml

Applicable Protocols –

- AR-3

Fentanyl Citrate



Class –

- Synthetic opioid analgesic (schedule II narcotic)

Mechanism of Action –

- Binds with opioid receptors in the brain, altering pain perception causing analgesia and euphoria

Indications –

- Pain management
- Sedation for invasive airway procedures including RSI

Dosing –

- **Adult:** 50-75 mcg IV, IO, IN Max Dose 200-300mcg (protocol dependent)
- **Pediatric:** 1 mcg/kg IV, IO, IN Max Dose 2 mcg/kg
- IV dose should be diluted and given over 1-2 minutes

Onset –

- Immediate - 2 min

Duration –

- 30-60 min

Contraindications –

- Respiratory Depression
- Hypotension
- Head Injury
- Altered LOC
- Cardiac dysrhythmia
- Myasthenia Gravis
- Children under age 1
- Hypersensitivity

Warnings / Precautions –

- Use with caution in elderly and in with patients severe respiratory, seizure, or cardiac disorders

Adverse Reactions –

- Resp. Depression
- Dizziness
- Drowsiness
- Bradycardia
- Hypo or Hypertension
- Nausea / Vomiting
- Chest wall muscle rigidity

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 50 mcg / ml SDV

Applicable Protocols –

- AR-8, AC-4, UP-11

Furosemide (*Lasix*)



Class –

- Loop Diuretic

Mechanism of Action –

- Lasix is a potent diuretic that inhibits the reabsorption of sodium and chloride in the proximal tubule and the loop of Henle. IV doses can reduce cardiac preload by increasing venous capacitance.

Indications –

- Acute Pulmonary Edema

Dosing –

- **Adult:** 40mg IV ONLY IF
Transport time >30 minutes
Known CHF/ Daily Lasix
Afebrile

Onset –

- Diuretic effects within 15-20 minutes; vascular effects within 5 min.

Contraindications –

- Hypovolemia/dehydration
- Known hypersensitivity to sulfonamides,
- Severe electrolyte depletion (Hypokalemia)

Adverse Reactions –

- | | | |
|-----------------|----------------|-----------------|
| - Hypotension | - Hypokalemia | - Hyponatremia |
| - Hypochloremia | - Hypocalcemia | - Hyperglycemia |

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks

Supplied –

- 40mg/4ml

Applicable Protocols –

- N/A

Glucagon (*Glucagen*)



Class –

- Pancreatic hormone, antihypoglycemic agent

Mechanism of Action –

- Glucagon is a protein secreted by the alpha cells of the Pancreas. When released, glucagon results in blood glucose elevation by increasing the breakdown of glycogen to glucose (Glycogenolysis) and stimulating glucose synthesis (Gluconeogenesis). Glucagon is only effective in treating hypoglycemia if liver glycogen is available and therefore, may be ineffective in chronic states of hypoglycemia, starvation, and adrenal insufficiency. Glucagon also exerts positive inotropic action on the heart and decreases renal vascular resistance (by stimulating Cyclic AMP synthesis independent of the beta-adrenergic receptor). Due to this Glucagon is also used in the managing patients with Beta-Blocker and Calcium Channel Blocker cardiotoxicity.

Indications –

- Hypoglycemia
- Calcium channeled blocker and Beta-Blocker Toxicity (overdose)

Dosing–

- **Adult:** 1-2mg IM/IN
 - o Repeat BGL in 15 min, if 69mg/dl or less repeat dose.
- **Pediatric:** 0.1 mg/kg IM/IN, Max dose 1mg
 - o Repeat BGL in 15 min, if 69mg/dl or less repeat dose.

Onset –

- Within 1 minute

Contraindications –

Hypersensitivity (allergy to proteins)

Adverse Reactions –

- Tachycardia
- Hypotension
- Nausea/Vomiting
- Urticaria

Pregnancy–

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Supplied –

- 1mg / 2 ml **must be reconstituted

Applicable Protocols–

- AM-2, PM-2, TE-7

Oral Glucose



Class –

- Carbohydrate

Mechanism of Action –

- Provides glucose for cell use once absorbed

Indications –

- Patient who are in a conscious hypoglycemic state

Dosing –

- Adult/Pediatric: 1 tube or packet, typically 15 grams

Onset –

- 1 minute

Contraindications –

- Patient unable to control their own airway
- Patient who are not able to swallow

Adverse Reactions –

- N/A

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

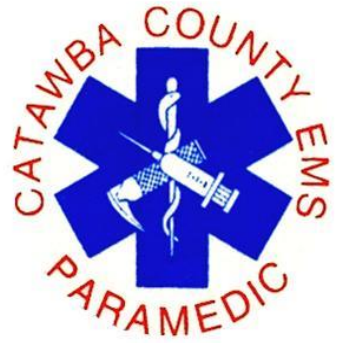
Supplied –

- 1 tube (typically 15 grams)

Applicable Protocols –

- AM-2, PM-2

Haloperidol (*Haldol*)



Class –

- Antipsychotic/ neuroleptic

Mechanism of Action –

- Haldol has pharmacological properties similar to Phenothiazines. Haldol is thought to block dopamine (type 2) receptors in the brain, altering mood and behavior.

Indications –

- Acute psychotic episode
- Psychosis with associated aggressiveness
- Violence
- Agitation who may be a harm to self or others

Dosing –

- **Adult Only:** 2-5mg (may repeat max dose 10mg)

Onset –

- 30-60 minutes (IM)

Contraindications –

- CNS depression
- Pregnancy
- Severe liver or Cardiac disease

Adverse Reactions –

- Extrapyramidal reaction
- Pseudoparkinsonism
- Akathisia (state of agitation)
- Dystonias
- Allergic reaction

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 5mg/1ml

Applicable Protocols –

- UP-6

Hydromorphone (*Dilaudid*)



Class –

- Analgesic, opiate agonist (Schedule II)

Mechanism of Action –

- Hydromorphone is a semi-synthetic analog of morphine. In the CNS it binds with the mu-and delta- Opioid receptors.

Indications –

- Moderate to severe pain

Dosing–

- **Adults only:** 1-2 mg IV/IO/IM
 - o Repeat 1mg as necessary 20-30min until clinical improvement.
 - o Max Dose - 5mg

Onset –

- (IV/IM) Within 15 min

Contraindications –

- Asthma
- GI obstruction
- Status asthmaticus

Adverse Reactions –

- Respiratory depression
- Euphoria
- Delirium/Agitation
- Hallucination
- Dysrhythmias

Pregnancy–

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied–

- 1mg/1ml

Applicable Protocols–

- UP-11

Ketamine HCl (*Ketalar*)



Class –

- dissociative anesthetic

Mechanism of Action –

- Acts limbic system and cerebral cortex to block transmission of impulses associated with pain perception as well as memory
- Related to phencyclidine (PCP)

Indications –

- Induction agent used in invasive airway procedures

Dosing –

- 2 mg/kg

Onset / Duration –

- Within 30 sec
- 10 - 15 min

Contraindications –

- Stroke
- Increased ICP
- Severe Hypertension
- Hypersensitivity

Warnings / Precautions –

- Ketamine also results in bronchodilation, increased cerebral blood flow and metabolism, lowering of the seizure threshold and increased salivary secretions.

Adverse Reactions –

- Hypertension
- Increased Heart Rate
- Hallucinations, delusions, explicit dreams
- Less common includes hypotension, Bradycardia, respiratory depression

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

Applicable Protocols –

- AR-8, AR-3

Ketorolac (*Toradol*)



Class –

- Nonsteroidal anti-inflammatory

Mechanism of Action –

- Toradol is an anti-inflammatory that also exhibits peripherally acting non-narcotic analgesic activity by inhibiting prostaglandin synthesis.

Indications –

- Short term management of moderate to severe pain

Dosing –

- **Adult:** 30 mg IV/IO or 60 mg IM
- **Pediatric:** 0.5 mg/kg IV/IO/IM (max 30mg)

Onset –

- Within 10 min

Contraindications –

- Patient allergic to ASA or NSAIDS
- Bleeding disorders
- Active peptic ulcer disease
- **Patients who will require surgery**

Adverse Reactions –

- Anaphylaxis from hypersensitivity
- Edema
- Bleeding disorders
- Nausea

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 60mg/2ml

Applicable Protocols –

- UP-5 (Pearls), UP-11

Labetalol HCl



Class –

- Alpha- and beta-adrenergic blocker

Mechanism of Action –

- Labetalol is a competitive alpha 1 -receptor blocker and a nonselective beta-receptor blocker that is used for lowering blood pressure in hypertensive crisis. Labetalol is a more potent beta blocker than alpha blocker. Blood pressure is reduced without reflex tachycardia, and total peripheral resistance is decreased, helping maintain cardiac output.

Indications –

- Hypertensive emergencies

Dosing –

- **Adult:** 20-80 mg IV/IO Max dose 300 mg

Onset –

- Within 5 minutes

Contraindications –

- Hemodynamically unstable patients
- STEMI if signs of heart failure, low cardiac output, or increased risk for cardiogenic shock are present
- **Relative contraindications include**
 - o P-R interval > 0.24 sec,
 - o Second- or third-degree heart block
 - o Active asthma
 - o Reactive airway disease
 - o Severe bradycardia
 - o SBP < 100 mm Hg

Adverse Reactions –

- | | | |
|----------------------------|-----------------------|---|
| - Headache | - Facial flushing | - Orthostatic hypotension (most common) |
| - Dizziness | - Allergic reaction | - Fatigue |
| - Diaphoresis | - Dizziness | - Allergic Reaction |
| - Ventricular dysrhythmias | - Tinnitus | - Vertigo |
| - Dyspnea | - Bradycardia | |
| - Edema | - Nausea and vomiting | |

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

Applicable Protocols –

- AC-6, AM-4, AM-6

Norepinephrine (*Levophed*)



Class –

- Sympathomimetic

Mechanism of Action –

- Norepinephrine functions as a peripheral vasoconstrictor (alpha-adrenergic action) and as an inotropic stimulator of the heart and dilator of coronary arteries (beta-adrenergic action)

Indications –

- Hypotension not related to hypovolemia
- Adjunct treatment in cardiac arrest with profound hypotension
- Septicemia
- Cardiogenic Shock

Dosing –

- **Adult:** 1-3 mcg/kg/min
- **Pediatric:** 1-3 mcg/kg/min

Onset –

- 1-3 minutes

Contraindications –

- Hypotensive patients with hypovolemia (**relative contraindication**)

Adverse Reactions –

- Headache
- Hypertension
- Dysrhythmias
- Tachycardia
- Reflex bradycardia
- Angina pectoris

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

Applicable Protocols –

- AM-5, PC-1, PC-2, PM-3, UP-15, AC-2

Lidocaine HCl



Class –

- Antiarrhythmic (class IB, Local anesthetic)

Mechanism of Action –

- Lidocaine decreases phase 4 diastolic depolarization (which decreases automaticity) and has been shown to be effective in the suppression of premature ventricular complexes. Lidocaine also raises the ventricular fibrillation threshold.

Indications –

- Ventricular fibrillation
- Ventricular tachycardia-pulseless
- Wide complex tachycardia

Dosing –

- **Adult:** 1-1.5 mg/kg IV/IO bolus
May repeat ½ initial dose if no response (ETT dose 2 times IV dose)
- **Pediatric:** 1mg/kg IV/IO (max 100 mg)
May repeat at 0.5 mg/kg

Maximum dose 3mg/kg

Onset –

- 30-90 sec

Contraindications –

- 2nd or 3rd degree heart blocks

Adverse Reactions –

- Confusion - Hypotension
- Bradycardia
- Headache
- Seizure

Pregnancy –

- **Class B- No risk in other studies:** Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women OR Animal studies have shown an adverse effect, but adequate and well-controlled studies in pregnant women have failed to demonstrate a risk to the fetus in any trimester.

Supplied –

- 100mg/5ml

Applicable Protocols –

- PC-6, PC-7, AC-7, AC-8

Magnesium Sulfate



Class –

- Electrolyte, anticonvulsant

Mechanism of Action –

- Magnesium sulfate reduces striated muscle contraction and blocks peripheral neuromuscular transmission by reducing acetylcholine release at the myoneural junction. It has uses in seizures related to eclampsia and as a bronchodilator after beta-agonist and anticholinergic agents have been used.

Indications –

- Seizure of Eclampsia
- Torsades de pointes
- Asthma

Dosing –

- **Adult:** Respiratory Distress: 2 g IV/IO over 10 minutes
Obstetrical Seizures: 2 g IV/IO over 2-3 minutes
Torsades: 2 g IV/IO over 2 minutes
- **Pediatric:** Respiratory Distress: 40 mg/kg IV/IO over 10 minutes

Onset –

- Immediate

Contraindications –

- Heart block or myocardial damage

Adverse Reactions –

- Diaphoresis - Hypotension - Depressed reflexes
- Circulatory Collapse - Diarrhea/Nausea/Vomiting

Pregnancy –

- **Class A** - Adequate and well-controlled human studies have failed to demonstrate a risk to the fetus in the first trimester of pregnancy (and there is no evidence of risk in later trimesters).

Supplied –

- 5 grams/10ml

Applicable Protocols –

- AR-4, AR-7, AC-7 (Pearls), AC-8, AO-3, PC-5 (Pearls), PC-6, PC-7 (Pearls)

Methylprednisolone (*Solu-Medrol*)



Class –

- Glucocorticoid

Mechanism of Action –

- Methylprednisolone is a synthetic steroid that suppresses acute and chronic inflammation. In addition, it potentiates vascular smooth muscle relaxation by beta-adrenergic agonist and may alter airway hyper-activity.

Indications –

- Anaphylaxis
- Asthma unresponsive to Bronchodilators

Dosing –

- **Adult:** 125 mg IV/IO
- **Pediatric:** 2mg/kg IV/IO (Max 125 mg)

Onset –

- 1-2 hrs

Contraindications –

- Use with caution in patients with GI bleeds
- Diabetes mellitus
- Severe infection

Adverse Reactions –

- Hypertension
- Sodium and water retention
- Hypokalemia
- Alkalosis

Pregnancy –

- **Class C** - There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 125mg/2ml

Applicable Protocols –

- N/A

Midazolam (*Versed*)



Class –

- Short-acting benzodiazepine

Mechanism of Action –

- Midazolam is a short-acting benzodiazepine central nervous system (CNS) depressant. Pharmacodynamic properties of Midazolam and its metabolites, which are similar to those of other benzodiazepines, include sedative, anxiolytic, amnesic and hypnotic activities. Benzodiazepine pharmacologic effects appear to result from reversible interactions with the (gamma)-amino butyric acid (GABA) benzodiazepine receptor in the CNS, the major inhibitory neurotransmitter in the central nervous system.

Indications –

- Seizures - Combative Patients - Premedication for certain procedures

Dosing –

- **Adult:** 1-5MG IV/IO/IM/IN
(These doses are Protocol/Age/Route dependent. Please look at each protocol for Dose/Max Dose)
- **Pediatric:** 0.1-0.2mg/kg IV/IO/IM/IN
(These doses are Protocol/Age/Route dependent. Please look at each protocol for Dose/Max Dose)

Onset –

- 1-3 min (IV)

Contraindications –

- Hypotension - Shock -Glaucoma (relative)

Adverse Reactions –

- Respiratory depression - Hypotension - Respiratory arrest

Pregnancy –

- **Class D** - There is positive evidence of human fetal risk based on adverse reaction data from investigational or marketing experience or studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 5mg/1ml

Applicable Protocols –

- UP-6, UP-13, AR-7, AC-2, AC-6, AC-7, AO-3, TB-3, PC-5, TE-1

Morphine Sulfate



Class –

- Opioid analgesic (Schedule II)

Mechanism of Action –

- Morphine is a natural opium alkaloid that has a primary effect of analgesia. It also increased peripheral venous capacitance and decreases venous return. Morphine caused euphoria, respiratory and central nervous system depression. Secondary pharmacological effects of morphine include depressed responsiveness of alpha adrenergic receptors (producing peripheral vasodilatation) and baroreceptors inhibition. Since morphine decreases preload and afterload, it may decrease myocardial oxygen demand.

Indications –

- Moderate to severe pain control -Chest pain associated with ACS unresponsive to nitro

Dosing –

- **Adult:** 2-4mg IM/IV/IO Bolus then 2mg q 5 minutes until a max of 10mg or clinical improvement.
- **Pediatric:** 0.1 mg/kg IV/IO/IM May repeat q 5 minutes. Max single dose 5mg Max overall dose 10.

Onset –

- 1-2 min

Contraindications –

- Hypovolemia - Hypotension - Respiratory depression
- Head injury - Increased ICP

Adverse Reactions –

- Hypotension - Bronchospasm
- Tachycardia/Bradycardia - Respiratory Depression

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 10mg/1ml

Applicable Protocols –

- UP-11, AR-8, AC-4

Naloxone (*Narcan*)



Class –

- Opioid antagonist

Mechanism of Action –

- Narcan is a competitive antagonist used in the management of known or suspected overdose caused by narcotics. Narcan is not fully understood, evidence suggests that Narcan antagonizes opioid effects by competing for the Mu, Kappa, Delta opiate receptors site, with the greatest affinity for the Mu receptor sites.

Indications –

- For the complete or partial reversal of CNS and Respiratory depression induced by Opioids.
(Used to increase respiratory rate not to restore consciousness).

Dosing –

- **Adult:** 0.4-2mg IV/IO/IM/IN/ETT Titrated to patient's respiratory response.
- **Pediatric:** 0.1 mg/kg IV/IO/IN/IM/ETT (max 2mg)

Onset –

- Within 2 minutes

Contraindications –

- Hypersensitivity

Adverse Reactions –

- Tachycardia - Hypertension - Dysrhythmias
- Nausea/Vomiting - Diaphoresis - Withdrawal

Pregnancy –

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women

Supplied –

- 2mg/2ml

Applicable Protocols –

- TE-7

Nitroglycerin



Class –

- Vasodilator

Mechanism of Action –

- Nitrates dilate arterioles and veins in the periphery (and Coronary arteries). The resultant reduction in preload, and to a lesser extent in afterload, decreased the workload of the heart and lowers myocardial oxygen demand.

Indications –

- Ischemic Chest pain
- Congestive heart failure

Dosing –

- **Adult:** 0.3/0.4 mg SL q 5 min until pain free

Onset –

- 1-3 minutes

Contraindications –

- Volume depletion
- Hypersensitivity
- Hypotension
- Extreme Bradycardia/ tachycardia
- Right Ventricular infarct
- Recent use of Tadalafil (Cialis), Vardenafil (Levitra), or Sildenafil (Viagra)

Adverse Reactions –

- Transient headache -Reflex tachycardia
- Hypotension
- Nausea/Vomiting
- Diaphoresis
- Flushing

Pregnancy –

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women

Supplied –

- Metered dose SL 400mcg

Applicable Protocols –

- AC-4, AC-5

Ondansetron (*Zofran*)



Class –

- Antiemetic

Mechanism of Action –

- Ondansetron is the first selective serotonin blocking agent to be marketed. Ondansetron preferentially blocks the serotonin 5-HT₃ receptors. These receptors are found centrally in the chemoreceptor trigger zone and peripherally at vagal nerve terminals in the intestines.

Indications –

- Nausea
- Vomiting

Dosing –

- **Adult:** 4 mg IV/IO/IM
- **Pediatric:** 0.15 mg/kg IV/IOIM (Max 4 mg)

Onset –

- Within 30 minutes

Contraindications –

- Hypersensitivity
- Liver Disease
- GI obstruction
- Use caution with drugs that prolong the QT interval which could lead to Dysrhythmias (Torsades de Pointes) (Prolonged QTc > 440ms in men or > 460ms in women.)

Adverse Reactions –

- EKG irregularities - Hiccups - Pruritus - Dizziness
- Drowsiness - Hypoxia - Extrapyrimal symptoms

Pregnancy –

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Supplied –

- 4mg/2ml

Applicable Protocols –

- UP-3

Oxymetazolin (*Afrin*)



Class –

- Nasal decongestant

Mechanism of Action –

- Afrin is a sympathomimetic agent which exerts a local vasoconstriction action in the nasal mucosa, reducing nasal congestion.

Indications –

- Epistaxis

Dosing –

- **Adult:** 2 Sprays in the affected nostril

Onset –

- Within a few minutes

Contraindications –

- Patients taking MAOI's currently or in the past two weeks
- Narrow-angle glaucoma
- Use with caution in patients with CAD
- Hypertension
- Hyperthyroidism
- Diabetes Mellitus

Adverse Reactions –

- Blurred vision - Tachycardia - Palpitations - Headache
- Dizziness - Drowsiness - Hypertension

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 15 ml single patient bottle with 0.05 % of Oxymetazolin hydrochloride

Applicable Protocols –

- UP-9

Pralidoxime (*2-PAM*)



Class –

- Cholinesterase reactivator and antidote

Mechanism of Action –

- Pralidoxime reactivates the enzyme acetylcholinesterase, which allows acetylcholine to be degraded, thus relieving the parasympathetic overstimulation caused by excess acetylcholine.

This drug is sometimes combined with atropine in an auto injector (DuoDote)

Indications –

- Organophosphate poisoning (after/with Atropine)

Dosing –

- **Adult:** Symptom related 2-3 doses (auto-injector) Please see protocol

Onset –

- Within minutes

Contraindications –

- Hypersensitivity to Pralidoxime

Adverse Reactions –

- Tachycardia
- Hypertension
- Laryngospasm
- Hyperventilation
- Muscle weakness
- Nausea

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- Auto-injector (600mg of 2-PAM and 2.1mg of Atropine)

Applicable Protocols –

- TE-8

Promethazine (*Phenergan*)



Class –

- Phenothiazine, Antihistamine

Mechanism of Action –

- Promethazine is an H1-receptor antagonist that blocks the action of histamine by competitive antagonism at the H1 receptor. Promethazine also possess sedative, anti-motion, antiemetic, and anticholinergic activity.
- Promethazine also potentiates the effects of narcotics.

Indications –

- Nausea
- Vomiting

Dosing –

- **Adult:** 12.5 mg IV/IO/IM (may repeat 1 x as needed)

Onset –

- Rapid (IV)

Contraindications –

- Hypersensitivity
- Use in children may cause hallucinations, convulsions, and **sudden death**.

Adverse Reactions –

- Dizziness
- Allergic reaction
- Dysrhythmias
- Hyperexcitability
- Dystonias

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 25mg/1ml

Applicable Protocols –

- UP-3

Rocuronium (*Zemuron*)



Class –

- Non-depolarizing neuromuscular blocker

Mechanism of Action –

- Blocks acetylcholine at the neuromuscular junction causing paralysis

Indications –

- Emergent airway procedures

Dosing –

- 1 mg/kg IV / IO (Adults only)

Onset / Duration –

- Onset 60 sec
- Duration 30-40 minutes

Contraindications –

- Hypersensitivity

Warnings / Precautions –

- **Paralyzing Agent – you are responsible for the patient's airway!

Adverse Reactions –

- Bradycardia
- Tachycardia
- Hypo / Hypertension

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 10mg /ml vial - Must be refrigerated

Applicable Protocols –

- AR-3, AR-8

Sodium Bicarbonate



Class –

- Buffer, alkalinizing agent, electrolyte supplement

Mechanism of Action –

- Sodium Bicarbonate reacts with hydrogen ions to form water and carbon dioxide and thereby it can act to buffer metabolic acidosis.

Indications –

- Tricyclic antidepressant overdose
- Known preexisting hyperkalemia
- Known pre-existing bicarbonate responsive acidosis
- Management of metabolic acidosis.

Dosing –

- **Adult:** Initial Bolus 50 mEq IV/IO (see individual protocol for further specifics)
- **Pediatric:** Initial Bolus 1 mEq/kg IV/IO (max 50 mEq) see individual protocol for further specifics.

Onset –

- 2-10 minutes

Contraindications –

- Metabolic/Respiratory alkalosis
- Hypocalcemia
- Hypocalcemia
- Hypernatremia

Adverse Reactions –

- Metabolic alkalosis - Hypoxia -Seizures
- Tissue sloughing at injection site

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- 50mEq/50ml

Applicable Protocols –

- AC-1, AM-3, TB-3, TE-7

Tranexamic Acid (TXA)



Class –

- Anti-fibrinolytic

Mechanism of Action –

- Synthetic derivative of lysine, that inhibits fibrinolysis by blocking the lysine binding sites on plasminogen, thus preventing clot breakdown rather than promoting new clot formation

Indications –

- 18 y/o or greater, with signs/symptoms of internal or external hemorrhage and anticipation of blood transfusion
- Suspected Hemorrhagic shock includes SBP < 90 and HR > 110, AMS, pale & diaphoretic skin

Dosing –

- Loading Dose - 1 gm / 100 ml NaCl or D5W over 10 min (infusion)
 - o Most effective if given within 1 hr of injury
- Maintenance Infusion – 1gm over 8 hrs in NaCl or D5W

Onset –

- 5-15 min

Contraindications –

- Greater than 3 hrs post-injury
- Hemorrhage controlled by other means (tourniquet, direct pressure, minimal blood loss)
- Non-traumatic, non-hemorrhagic shock
- Patients taking anti-coagulants, thrombin inhibitors, factor Xa inhibitors, anti-hemophilic agents or evidence or history of intravascular clotting (DVT, PE, CVA)

Adverse Reactions –

- | | |
|-------------|-------------------------|
| - Headache | - Rhinitis / Rhinorrhea |
| - Back ache | - Abdominal pain |

Pregnancy –

- **Class B** - Animal reproduction studies have failed to demonstrate a risk to the fetus and there are no adequate and well-controlled studies in pregnant women.

Supplied –

- 100 mg/ml

Applicable Protocols –

- TB-6, AM-5 (Pearls with Medical Control Order)

****Pts given TXA must be transported to a Trauma Receiving Center,
either by air or ground****

Vecuronium (*Norcuron*)



Class –

- Non-depolarizing neuromuscular blocker

Mechanism of Action –

- Vecuronium bromide is an intermediate-acting, non-depolarizing, Neuromuscular blocking agent. Non-depolarizing agents produce skeletal muscle paralysis by blockade at the myoneural junction. Unlike depolarizing agents, Vecuronium has little agonist activity, with no depolarizing effect at the motor endplate. Neuromuscular blockade progresses in a predictable order, beginning with muscles associated with fine movements (e.g., eyes, face, and neck); followed by muscles of the limbs, chest, and abdomen; and finally, the diaphragm.

Indications –

- To facilitate intubation during RSI

Dosing –

- **Adult:** 0.1 mg/kg

Onset –

- Within 1 minute

Contraindications –

- Bromide hypersensitivity
- Inability to control airway and/or support ventilations with oxygen and positive pressure
- Bradycardias - Dysrhythmias - Respiratory depression
- Hypotension

Adverse Reactions –

- Excessive doses of vecuronium can cause prolonged apnea, dyspnea, respiratory depression, and/or profound muscular weakness.
- Rare hypersensitivity reactions (e.g., bronchospasm, flushing, erythema, urticaria, hypotension, sinus - tachycardia)

Pregnancy –

- **Class C** - Animal reproduction studies have shown an adverse effect on the fetus and there are no adequate and well-controlled studies in humans, but potential benefits may warrant use of the drug in pregnant women despite potential risks.

Supplied –

- Powder form that must be reconstituted.

Applicable Protocols –

- N/A



Pediatric Color Coded Drug List



Weight 3-5 Kg (Avg 4.0 Kg)			
Length < 59.5 cm	Vital Signs		Acetaminophen 64 mg
	Heart Rate	120-150	Adenosine 1 st Dose- 0.3 mg
	Respirations	24-48	Repeat Dose- 0.6 mg
	BP Systolic	70 (+/-25)	Afrin Nasal Spray HOLD
	Equipment		Albuterol 2.5mg
	ET Tube	2.5 - 3.5	Amiodarone 20 mg
	Blade Size	0 - 1	Atropine 0.10 mg
			Calcium Chloride 80 mg
	Defibrillation		Charcoal N/A
	Defibrillation	8 J, 15 J	Dextrose 10% 20 ml
	Cardioversion	2 J, 4 J	Diazepam (IV) 0.8 mg
			(Rectal) 2.0 mg
	Normal Saline 80 ml		Dilaudid HOLD
			Diphenhydramine 6.5 mg
			Dopamine (800 mg in 500 cc)
			2 mcg/kg/min 0.3 ml/hr
			5 mcg/kg/min 0.9 ml/hr
			10 mcg/kg/min 1.7 ml/hr
			20 mcg/kg/min 3.3 ml/hr
			Epinephrine 1:10,000 0.04 mg
			Epinephrine 1:1000 Nebulized 2.0 mg
			Epinephrine 1:1000 IM 0.05 mg
			Fentanyl 8.0 mcg
			Glucagon 0.5 mg
			Ibuprofen N/A
			Ipratropium 500 mcg
			Levalbuterol 0.31 mg
			Lidocaine 4 mg
			Lorazepam 0.2 mg
			Magnesium Sulfate 200 mg
			Methylprednisolone 6.25 mg
			Midazolam 0.5 mg
			Morphine Sulfate 0.4 mg
			Naloxone 0.4 mg
			Ondansetron 0.6 mg
			Prednisone 4.0 mg
			Sodium Bicarbonate 4 mEq

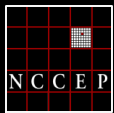
Gray (0-3 months)

Weight 6-7 Kg (Avg 6.5 Kg)			
Length 59.5-66.5 cm	Vital Signs		Acetaminophen 96 mg
	Heart Rate	120-125	Adenosine 1 st Dose- 0.6 mg
	Respirations	24-48	Repeat Dose- 1.2 mg
	BP Systolic	85 (+/-25)	Afrin Nasal Spray HOLD
	Equipment		Albuterol 2.5 mg
	ET Tube	3.5	Atropine 0.13 mg
	Blade Size	1	Amiodarone 30 mg
			Calcium Chloride 130 mg
	Defibrillation		Charcoal HOLD
	Defibrillation	10 J, 20 J	Dextrose 10% 35 ml
	Cardioversion	2 J, 5 J	Diazepam (IV) 1.3 mg
			(Rectal) 3.2 mg
	Normal Saline 130 ml		Dilaudid HOLD
			Diphenhydramine 5 mg
			Dopamine (800 mg in 500 cc)
			2 mcg/kg/min 0.5 ml/hr
			5 mcg/kg/min 1.3 ml/hr
			10 mcg/kg/min 2.5 ml/hr
			20 mcg/kg/min 5.0 ml/hr
			Epinephrine 1:10,000 0.06 mg
			Epinephrine 1:1000 Nebulized 2.0 mg
			Epinephrine 1:1000 IM 0.06 mg
			Fentanyl 13.0 mcg
			Glucagon 0.5 mg
			Ibuprofen N/A
			Ipratropium 500 mcg
			Levalbuterol 0.31 mg
			Lidocaine 6 mg
			Lorazepam 0.33 mg
			Magnesium Sulfate 300 mg
			Methylprednisolone 12.5 mg
			Midazolam 0.5 mg
			Morphine Sulfate 0.6 mg
			Naloxone 0.6 mg
			Ondansetron 1.0 mg
			Prednisone 6.5 mg
			Sodium Bicarbonate 6 mEq

Pink (3-6 Months)

Weight 8-9 Kg (Avg 8.5 Kg)			
Length 66.5-74 cm	Vital Signs		Acetaminophen 128 mg
	Heart Rate	120	Adenosine 1 st Dose- 0.9 mg
	Respirations	24-32	Repeat Dose- 1.8 mg
	BP Systolic	92 (+/-30)	Afrin Nasal Spray HOLD
	Equipment		Albuterol 2.5 mg
	ET Tube	3.5-4.0	Atropine 0.17 mg
	Blade Size	1	Amiodarone 40 mg
			Calcium Chloride 170 mg
	Defibrillation		Charcoal HOLD
	Defibrillation	20 J, 40 J	Dextrose 10% 43 ml
	Cardioversion	5 J, 9 J	Diazepam (IV) 1.7 mg
			(Rectal) 4.25 mg
	Normal Saline 170 ml		Dilaudid HOLD
			Diphenhydramine 10 mg
			Dopamine (800 mg in 500 cc)
			2 mcg/kg/min 0.7 ml/hr
			5 mcg/kg/min 1.6 ml/hr
			10 mcg/kg/min 3.2 ml/hr
			20 mcg/kg/min 6.5 ml/hr
			Epinephrine 1:10,000 0.08 mg
			Epinephrine 1:1000 Nebulized 2.0 mg
			Epinephrine 1:1000 IM 0.08 mg
			Fentanyl 17.0 mcg
			Glucagon 0.5 mg
			Ibuprofen 4.0 ml
			Ipratropium 500 mcg
			Levalbuterol 0.31 mg
			Lidocaine 8 mg
			Lorazepam 0.43 mg
			Magnesium Sulfate 400 mg
			Methylprednisolone 12.5 mg
			Midazolam 0.85 mg
			Morphine Sulfate 0.8 mg
			Naloxone 0.8 mg
			Ondansetron 1.2 mg
			Prednisone 8.5 mg
			Sodium Bicarbonate 8 mEq

Red (7-10 Months)



Pediatric Color Coded Drug List



Weight 10-11 Kg (Avg 10.5 Kg)

Length 74-84.5 cm

Vital Signs

Heart Rate 115-120
Respirations 22-30
BP Systolic 96 (+/-30)

Equipment

ET Tube 4.0
Blade Size 1

Defibrillation

Defibrillation 20 J, 40 J
Cardioversion 5 J, 10 J

Normal Saline 210 ml

Acetaminophen 160 mg
Adenosine 1st Dose- 0.9 mg
Repeat Dose- 1.8 mg
Afrin Nasal Spray HOLD
Albuterol 2.5 mg
Atropine 0.2 mg
Amiodarone 50 mg
Calcium Chloride 210 mg
Charcoal HOLD
Dextrose 10% 50 ml
Diazepam (IV) 1.0 mg
(Rectal) 5.0 mg
Dilaudid HOLD
Diphenhydramine 10 mg
Dopamine (800 mg in 500 ml Normal Saline)
2 mcg/kg/min 0.8 ml/hr
5 mcg/kg/min 2.0 ml/hr
10 mcg/kg/min 4.0 ml/hr
20 mcg/kg/min 8.0 ml/hr

Epinephrine 1:10,000 0.1 mg
Epinephrine 1:1000 IM 0.1 mg
Epinephrine 1:1000 Nebulized 2.0 mg
Fentanyl 21.0 mcg
Glucagon 1.0 mg
Ibuprofen 5.0 ml
Ipratropium 500 mcg
Levalbuterol 0.63 mg
Lidocaine 10 mg
Lorazepam 0.53 mg
Magnesium Sulfate 500 mg
Methylprednisolone 18.75 mg
Midazolam 1.0 mg
Morphine Sulfate 1.0 mg
Naloxone 1.0 mg
Ondansetron 1.6 mg
Prednisone 10.5 mg
Sodium Bicarbonate 10 mEq

Purple (11-18 Months)

Weight 12-14 Kg (Avg 13 Kg)

Length 84.5-97.5 cm

Vital Signs

Heart Rate 110-115
Respirations 20-28
BP Systolic 100(+/-30)

Equipment

ET Tube 4.5
Blade Size 2

Defibrillation

Defibrillation 30 J, 50 J
Cardioversion 6 J, 15 J

Normal Saline 260 ml

Acetaminophen 192 mg
Adenosine 1st Dose- 1.2 mg
Repeat Dose- 2.4 mg
Afrin Nasal Spray 1 spray
Albuterol 2.5 mg
Atropine 0.26 mg
Amiodarone 65 mg
Calcium Chloride 260 mg
Charcoal 15 gms
Dextrose 10% 60-80 ml
Diazepam (IV) 2.6 mg
(Rectal) 6.5 mg
Dilaudid HOLD
Diphenhydramine 10 mg
Dopamine (800 mg in 500 ml Normal Saline)
2 mcg/kg/min 0.8 ml/hr
5 mcg/kg/min 2.5 ml/hr
10 mcg/kg/min 5.0 ml/hr
20 mcg/kg/min 10 ml/hr

Epinephrine 1:10,000 0.10 mg
Epinephrine 1:1000 IM 0.10 mg
Epinephrine 1:1000 Nebulized 2.0 mg
Fentanyl 26.0 mcg
Glucagon 0.5 mg
Ibuprofen 6.5 ml
Ipratropium 500 mcg
Levalbuterol 0.63 mg
Lidocaine 14 mg
Lorazepam 0.65 mg
Magnesium Sulfate 650 mg
Methylprednisolone 25.0 mg
Midazolam 1 mg
Morphine Sulfate 1.0 mg
Naloxone 1.3 mg
Ondansetron 2.0 mg
Prednisone 13.0 mg
Sodium Bicarbonate 13 mEq

Yellow (19-35 Months)

Weight 15-18 Kg (Avg 16.5 Kg)

Length 97.5-110 cm

Vital Signs

Heart Rate 100-115
Respirations 20-26
BP Systolic 100(+/-20)

Equipment

ET Tube 5.0
Blade Size 2

Defibrillation

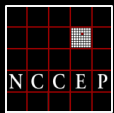
Defibrillation 30 J, 70 J
Cardioversion 8 J, 15 J

Normal Saline 330 ml

Acetaminophen 240 mg
Adenosine 1st Dose- 1.8 mg
Repeat Dose- 3.6 mg
Afrin Nasal Spray 1 spray
Albuterol 2.5 mg
Atropine 0.32 mg
Amiodarone 80 mg
Calcium Chloride 330 mg
Charcoal 15-30 gms
Dextrose 10% 80 ml
Diazepam (IV) 3.3 mg
(Rectal) 8.25 mg
Dilaudid HOLD
Diphenhydramine 15 mg
Dopamine (800 mg in 500 ml Normal Saline)
2 mcg/kg/min 1.2 ml/hr
5 mcg/kg/min 3.0 ml/hr
10 mcg/kg/min 6.0 ml/hr
20 mcg/kg/min 12 ml/hr

Epinephrine 1:10,000 0.16 mg
Epinephrine 1:1000 IM 0.20 mg
Epinephrine 1:1000 Nebulized 2.0 mg
Fentanyl 33.0 mcg
Glucagon 0.5 mg
Ibuprofen 8.0 ml
Ipratropium 500 mcg
Levalbuterol 0.63 mg
Lidocaine 15 mg
Lorazepam 0.83 mg
Magnesium Sulfate 800 mg
Methylprednisolone 31.25 mg
Midazolam 1.5 mg
Morphine Sulfate 1.0 mg
Naloxone 1.6 mg
Ondansetron 2.4 mg
Prednisone 16.5 mg
Sodium Bicarbonate 16 mEq

White (3-4 yrs)



Pediatric Color Coded Drug List



Weight 19-22 Kg (Avg 20.75 Kg)

Length 110-122 cm

Vital Signs

Heart Rate 100
Respirations 20-24
BP Systolic 100(+/-15)

Equipment

ET Tube 5.5
Blade Size 2

Defibrillation

Defibrillation 40 J, 85 J
Cardioversion 10 J, 20 J

Normal Saline 410 ml

Acetaminophen	288 mg
Adenosine 1 st Dose-	2.1 mg
Repeat Dose-	4.1 mg
Afrin Nasal Spray	1 spray
Albuterol	2.5 mg
Atropine	0.4 mg
Amiodarone	100 mg
Calcium Chloride	420 mg
Charcoal	20-40 gms
Dextrose 10%	100 ml
Diazepam (IV)	4.0 mg
(Rectal)	10.0 mg
Dilaudid	0.31 mg
Diphenhydramine	25.0 mg
Dopamine	(800 mg in 500 ml Normal Saline)
2 mcg/kg/min	1.6 ml/hr
5 mcg/kg/min	3.9 ml/hr
10 mcg/kg/min	7.8 ml/hr
20 mcg/kg/min	16 ml/hr

Epinephrine 1:10,000	0.2 mg
Epinephrine 1:1000 IM	0.2 mg
Epinephrine 1:1000 Nebulized	2.0 mg
Fentanyl	40.0 mcg
Glucagon	1.0 mg
Ibuprofen	10.0 ml
Ipratropium	500 mcg
Levalbuterol	0.63 mg
Lidocaine	20 mg
Lorazepam	1.0 mg
Magnesium Sulfate	1000 mg
Methylprednisolone	37.5 mg
Midazolam	2.0 mg
Morphine Sulfate	2.0 mg
Naloxone	2.0 mg
Ondansetron	3.0 mg
Prednisone	20.0 mg
Sodium Bicarbonate	20 mEq

Blue (5-6 yrs)

Weight 24-30 Kg (Avg 27 Kg)

Length 122-137 cm

Vital Signs

Heart Rate 90
Respirations 18-22
BP Systolic 105(+/-15)

Equipment

ET Tube 6.0
Blade Size 2-3

Defibrillation

Defibrillation 50 J, 100 J
Cardioversion 15 J, 30 J

Normal Saline 540 ml

Acetaminophen	384 mg
Adenosine 1 st Dose-	2.7 mg
Repeat Dose-	5.4 mg
Afrin Nasal Spray	1 spray
Albuterol	2.5 mg
Atropine	0.5 mg
Amiodarone	135 mg
Calcium Chloride	540 mg
Charcoal	25-50 gms
Dextrose 10%	135 ml
Diazepam (IV)	4.0 mg
(Rectal)	10.0 mg
Dilaudid	0.4 mg
Diphenhydramine	25 mg
Dopamine	(800 mg in 500 ml Normal Saline)
2 mcg/kg/min	2 ml/hr
5 mcg/kg/min	5 ml/hr
10 mcg/kg/min	10 ml/hr
20 mcg/kg/min	20 ml/hr

Epinephrine 1:10,000	0.27 mg
Epinephrine 1:1000 IM	0.3 mg
Epinephrine 1:1000 Nebulized	2.0 mg
Fentanyl	54.0 mcg
Glucagon	1.0 mg
Ibuprofen	13 ml
Ipratropium	500 mcg
Levalbuterol	0.63 mg
Lidocaine	20 mg
Lorazepam	1.35 mg
Magnesium Sulfate	1350 mg
Methylprednisolone	54.0 mg
Midazolam	2.0 mg
Morphine Sulfate	2.0 mg
Naloxone	2.0 mg
Ondansetron	4.0 mg
Prednisone	27.0 mg
Sodium Bicarbonate	27 mEq

Orange (7-9 yrs)

Weight 32-40 Kg (Avg 36 Kg)

Length 137-150 cm

Vital Signs

Heart Rate 85-90
Respirations 16-22
BP Systolic 115(+/-20)

Equipment

ET Tube 6.5
Blade Size 3

Defibrillation

Defibrillation 60 J, 150 J
Cardioversion 15 J, 30 J

Normal Saline 720 ml

Acetaminophen	544 mg
Adenosine 1 st Dose-	3.6 mg
Repeat Dose-	7.2 mg
Afrin Nasal Spray	2 spray
Albuterol	2.5 mg
Atropine	0.5 mg
Amiodarone	180 mg
Calcium Chloride	700 mg
Charcoal	25-50 gms
Dextrose 10%	180 ml
Diazepam (IV)	4.0 mg
(Rectal)	10.0 mg
Dilaudid	0.54 mg
Diphenhydramine	35 mg
Dopamine	(800 mg in 500 ml Normal Saline)
2 mcg/kg/min	2.7 ml/hr
5 mcg/kg/min	7.0 ml/hr
10 mcg/kg/min	14.0 ml/hr
20 mcg/kg/min	28.0 ml/hr

Epinephrine 1:10,000	0.3 mg
Epinephrine 1:1000 IM	0.3 mg
Epinephrine 1:1000 Nebulized	2.0 mg
Fentanyl	62.0 mcg
Glucagon	1.0 mg
Ibuprofen	18 ml
Ipratropium	500 mcg
Levalbuterol	0.63 mg
Lidocaine	36 mg
Lorazepam	1.8 mg
Magnesium Sulfate	1800 mg
Methylprednisolone	62.5 mg
Midazolam	2.0 mg
Morphine Sulfate	3.0 mg
Naloxone	2.0 mg
Ondansetron	4.0 mg
Prednisone	36.0 mg
Sodium Bicarbonate	36 mEq

Green (10-12 yrs)

Dopamine Infusion:

Supplied: 450 mg in 250mL D5W

Dose 2-20 mcg / kg/ min

Pt weight (Kg) x Dose x .0375 = __ gtts / min

Ex: 100 kg pt x 7 mcg/min x 0.0375 = 26.25 gtts / min

Tranexamic Acid (TXA) Infusion:

Loading Dose: Add 1 gm to 100 mL D5W

$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{10 \text{ min}} = 100 \text{ gtts / min}$ or **5 gtts / 3 sec**

Diltiazem Infusion:

1st Infusion Dose: 5mg / hr

Add 25 mg to 250 ml of D5W or NaCl = 5 mg / 50 ml

$\frac{50 \text{ mL} \times 60 \text{ gtts set}}{60 \text{ min}} = 50 \text{ gtts / min}$ or **5 gtts / 6 sec**

2nd Infusion Dose: 10 mg / hr

Increase infusion to 100 gtts / min

$\frac{100 \text{ mL} \times 60 \text{ gtts set}}{60 \text{ min}} = 100 \text{ gtts / min}$ or **5 gtts / 3 sec**

Amiodarone Infusion:

1st Infusion Dose: Add 150 mg in 100 mL D5W

$\frac{100 \text{ mL} \times 10 \text{ gtts set}}{10 \text{ min}} = 100 \text{ gtts / min}$ or **5 gtts / 3 sec**

2nd Infusion Dose: Add 450 mg / 250 mL D5W

$\frac{250 \text{ mL} \times 60 \text{ gtts set}}{7.5 \text{ hr (450 min)}} = 33 \text{ gtts / min}$ or **1 gtt / 2 sec**

Lidocaine Infusion:

Supplied: Pre-mixed 1 gm in 250 mL = 4 mg / mL

ROSC Dose: 1-4 mg / min

Using a 60 gtt set:

60 gtts / min = 4 mg

45 gtts / min = 3 mg

30 gtts / min = 2 mg

15 gtts / min = 1 mg

Select the dose that is 1 mg higher than the dose given to convert the rhythm. (i.e. 2 mg of Lidocaine converted rhythm, infusion dose is 3 mg / min)

Norepinephrine:

Dose 1 mcg/kg/min

Add 4 mg to 100 mL D5W or NS = 4000 mcg / 100 mL or 40 mcg/mL

50 kg and greater (using 10 gtts drip set)

$\frac{80 \text{ kg} \times 1 \text{ mcg} \times 10 \text{ gtts set}}{40 \text{ mcg / 1 mL}} = 20 \text{ gtts / min}$ or **1 gtt / 3 sec**

Ex: 80 kg pt x 1 mcg/min x 0.25 = 20 gtts / min

Under 50 kg (using 60 gtts drip set)

$\frac{40 \text{ kg} \times 1 \text{ mcg} \times 60 \text{ gtts set}}{40 \text{ mcg / 1 mL}} = 10 \text{ gtts / min}$ or **2 gtts / sec**

Ex: 40 kg pt x 1 mcg/min x 1.5 = 120 gtts / min or 2 gtts / sec

Magnesium Sulfate Infusion:

Adult

2 gms Mag Sulfate in 100 mL D5W or NS using 10 gtts set

$\frac{100 \text{ mL} \times 10 \text{ gtts}}{10 \text{ min}} = 100 \text{ gtts / min}$ or **5 gtts / 3 sec**

****Magnesium Sulfate must be 20% or less concentration****

Pediatric

Add 40 mg/kg of Mag Sulfate in 100 mL of D5W or NS using 10 gtt set

$\frac{100 \text{ mL} \times 10 \text{ gtts}}{20 \text{ min}} = 50 \text{ gtts / min}$ or **5 gtts / 6 sec**

Epinephrine Infusion:

Using a 60 gtt drop set:

1 mg in 250 mL NS = **4 mcg / mL** or **4 mcg / 60 gtts**

1 mcg/min =	15 gtts/min
2 mcg/min =	30 gtts/min
3 mcg/min =	45 gtts/min
4 mcg/min =	60 gtts/min
5 mcg/min =	75 gtts/min
6 mcg/min =	90 gtts/min
7 mcg/min =	105 gtts/min
8 mcg/min =	120 gtts/min
9 mcg/min =	135 gtts/min
10 mcg/min =	150 gtts/min

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2018 Protocol Field Guide

Protocols - 2017 NCCEP

Protocols Effective July 1, 2018