



Universal Patient Care



Pearls

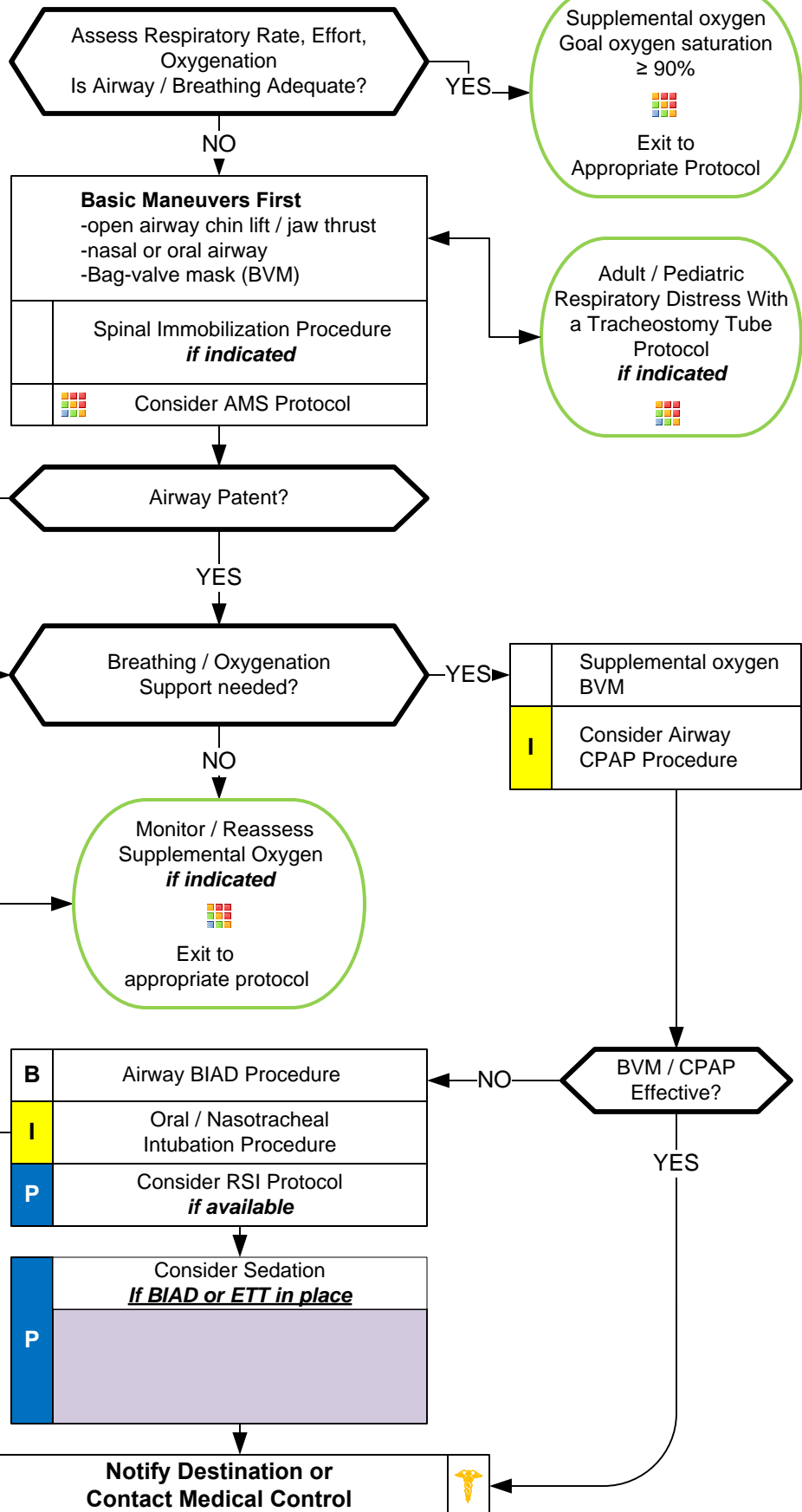
- **Recommended Exam:** Minimal exam if not noted on the specific protocol is vital signs, mental status with GCS, and location of injury or complaint.
- Any patient contact which does not result in an EMS transport must have a completed disposition form.
- A pediatric patient is defined by fitting on the Broselow-Luten tape, Age ≤ 15 , weight ≤ 49 kg.
- Pediatric Airway Protocols are defined by patients ≤ 11 years of age.
- 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



Adult Airway



Protocols 1, 2 and 3 should be utilized together (even if agency is not using RSI) as they contain very useful information for airway management.





Adult Airway



Pearls

- This protocol is only for use in patients with an Age ≥ 12 or patients longer than the Broselow-Luten Tape.
- Capnometry (Color) or capnography is mandatory with all methods of intubation. Document results.
- Continuous capnography (EtCO₂) is strongly recommended for the monitoring of all patients with a BIAD or endotracheal tube.
- 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.
- Ventilatory rate should be 8-10 per minute to maintain a EtCO₂ of 35-45. Avoid hyperventilation.
- It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.
- Intermediates and Paramedics should use a BIAD if oral-tracheal intubation is unsuccessful.
- Maintain C-spine immobilization for patients with suspected spinal injury.
- Do not assume hyperventilation is psychogenic – use oxygen, not a paper bag.
- Cricoid pressure and BURP maneuver may be used to assist with difficult intubations. They may worsen view in some cases.
- Hyperventilation in deteriorating head trauma should only be done to maintain a EtCO₂ of 30-35.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well and consider c-collar (in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.



Adult, Failed Airway



Unable to Ventilate and Oxygenate $\geq 90\%$ during or after one (1) or more unsuccessful intubation attempts.

Anatomy inconsistent with continued attempts.

Three (3) unsuccessful attempts by most experienced EMT-P/I.

Each attempt should include change in approach or equipment

NO MORE THAN THREE (3) ATTEMPTS TOTAL

Protocols 1, 2 and 3 should be utilized together (even if agency is not using RSI) as they contain very useful information for airway management.

Call for additional resources if available

Failed Airway

BVM
Adjunctive Airway
Maintains SpO₂ $\geq 90\%$

YES

Continue BVM
Supplemental Oxygen

Exit to
Appropriate Protocol

NO

Significant Facial
Trauma / Swelling /
Distortion

YES

Airway Cricothyrotomy
Surgical Procedure

P

Continue Ventilation /
Oxygenation
Maintain SpO₂ $\geq 90\%$

P

NO

Airway BIAD Procedure

B

BIAD Successful

NO

YES

Continue Ventilation / Oxygenation
Maintain SpO₂ $\geq 90\%$
EtCO₂ 35 – 45
Ventilate 8 – 10 breaths / minute

Notify Destination or
Contact Medical Control



Adult General Section Protocols

Protocol 3

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

2012



Adult, Failed Airway



Pearls

- **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 cricoid pressure. Cricoid pressure no longer routinely recommended and may worsen view.
 - Apply BURP maneuver (Push trachea Back [posterior], Up, and to patient's Right)
 - Change head positioning
- Continuous pulse oximetry should be utilized in all patients with an 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 about the patient's difficult / failed airway.**



Airway, Rapid Sequence Intubation (OPTIONAL)

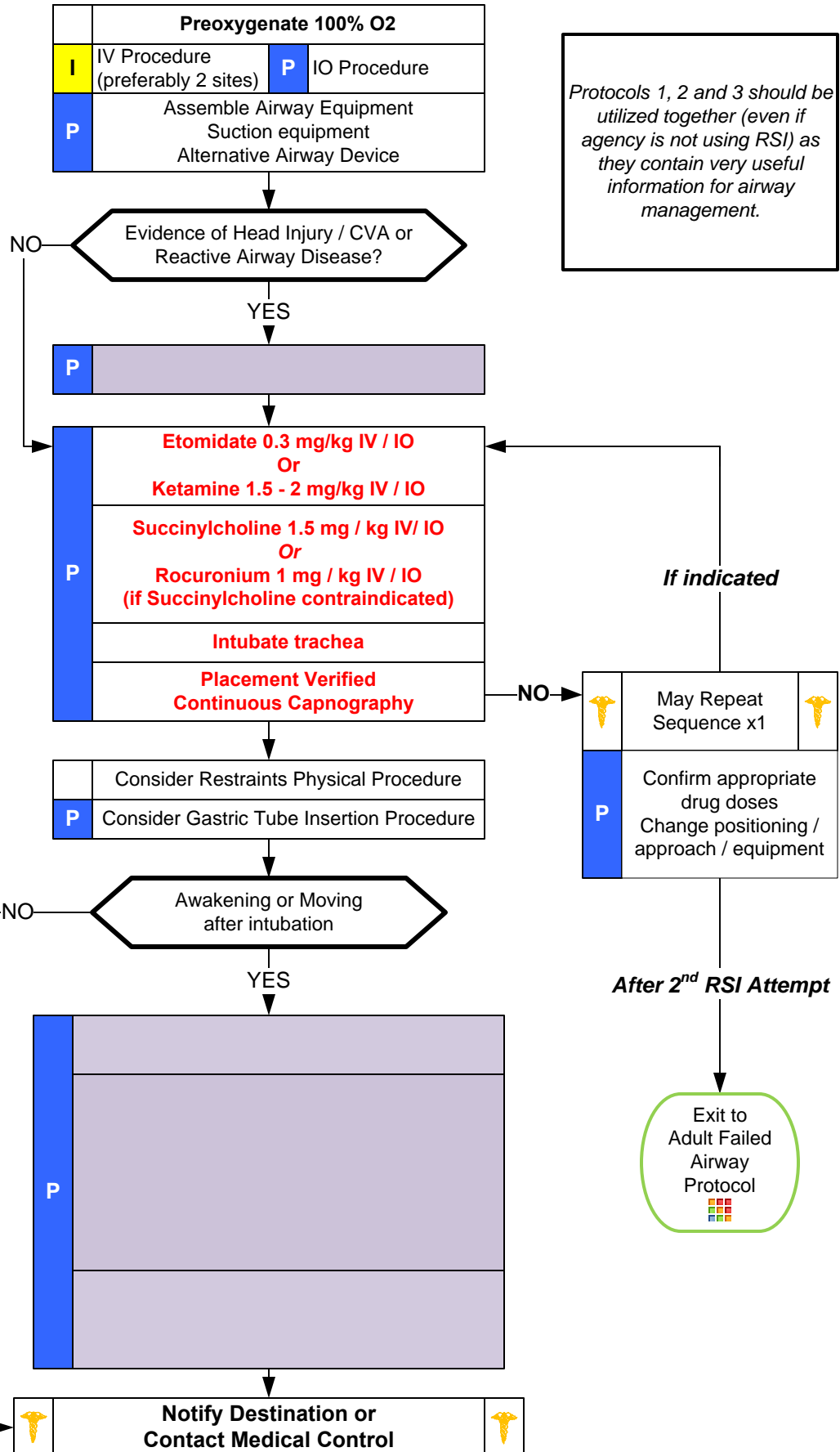


Indications for RSI
Failure to protect the airway
Unable to oxygenate
Unable to ventilate
Impending airway compromise
Age ≥ 12 / Length > Broselow-Luten Tape

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) EMT-P on scene

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.

Protocols 1, 2 and 3 should be utilized together (even if agency is not using RSI) as they contain very useful information for airway management.





Airway, Rapid Sequence Intubation (OPTIONAL)



Pearls

- Agencies must maintain a separate Performance Improvement Program specific to Rapid Sequence Intubation.
- This procedure requires at least 2 EMT-Paramedics. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.
- This protocol is only for use in patients with an Age ≥ 12 or patients longer than the Broselow-Luten Tape.
- Once a patient has been given a paralytic drug, YOU ARE RESPONSIBLE FOR VENTILATIONS if desaturation occurs.
- Continuous Waveform Capnography and Pulse Oximetry and are required for intubation verification and ongoing patient monitoring
- Before administering any paralytic drug, screen for contraindications with a thorough neurologic exam.
- Agencies utilizing Ketamine must submit a local systems plan to State Medical Director detailing how the drug is used in your program.
- If First intubation attempt fails, make an adjustment and try again:
 - Different laryngoscope blade
 - Change cricoid pressure; No longer routinely recommended and may worsen your view.
 - Different ETT size
 - Continuous pulse oximetry should be utilized in all patients.
 - Change head positioning
 - Consider applying BURP maneuver (Back [posterior], Up, and to patient's Right)
- Protect the patient from self-extubation when the drugs wear off. Longer acting paralytics may be needed post-intubation.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.
- RSI not recommended in urban setting (short transport) when able to maintain oxygen saturation $\geq 90\%$.



Back Pain



History

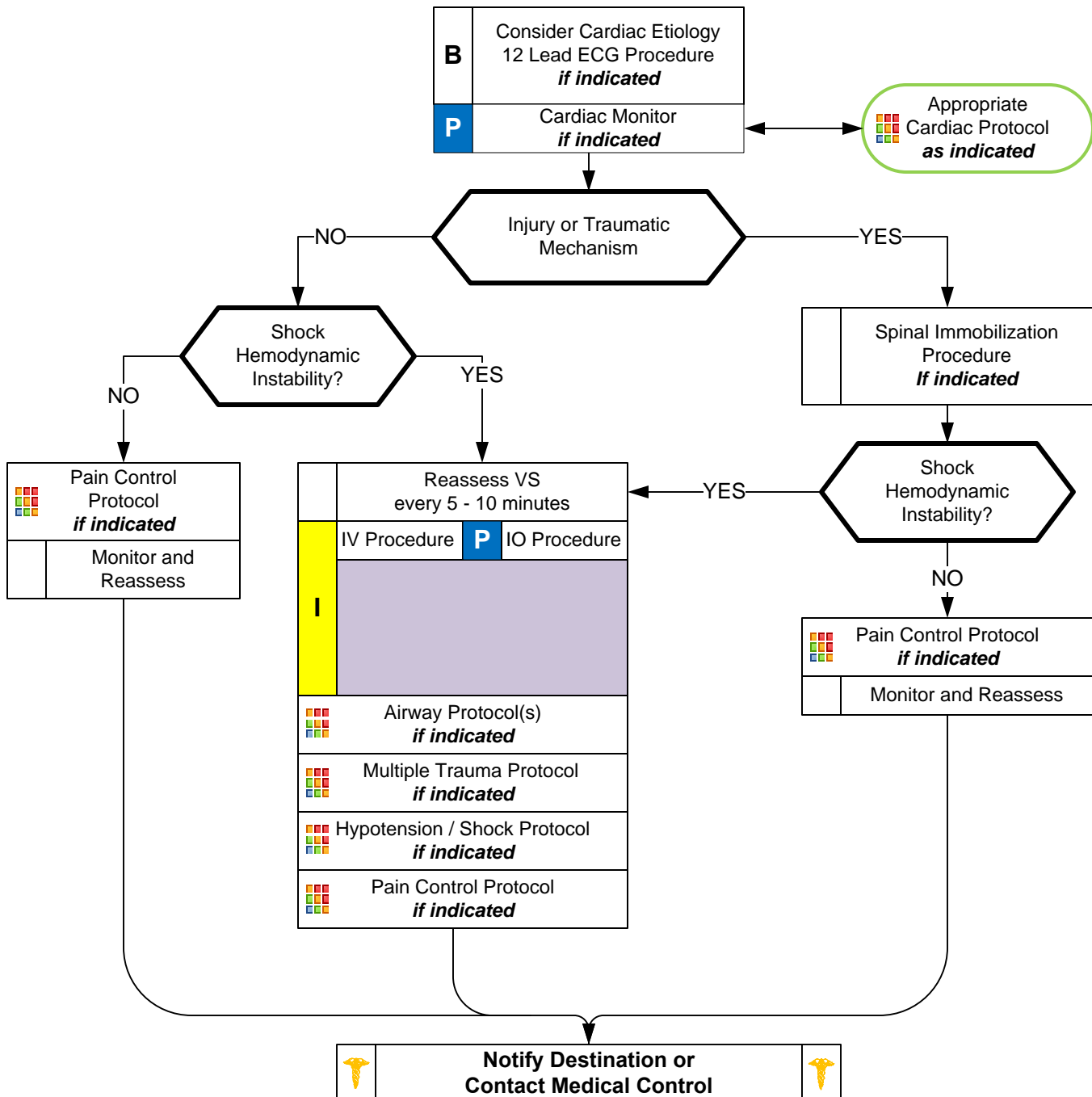
- Age
- Past medical history
- Past surgical history
- Medications
- Onset of pain / injury
- Previous back injury
- Traumatic mechanism
- Location of pain
- Fever
- Improvement or worsening with activity

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



Pearls

- Patients with underlying spinal deformity should be immobilized in their functional position.
- Abdominal aneurysms are a concern especially in patients over the age of 50 and / or with vascular or hypertensive disease.
- Kidney stones typically present with an acute onset of flank pain which radiates around to the groin area.
- Patients with midline pain over the spinous processes should be spinally immobilized.
- Any bowel or bladder incontinence is a significant finding which requires immediate medical evaluation
- In patient with history of IV drug abuse a spinal epidural abscess should be considered.

Protocol 5

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Behavioral



History

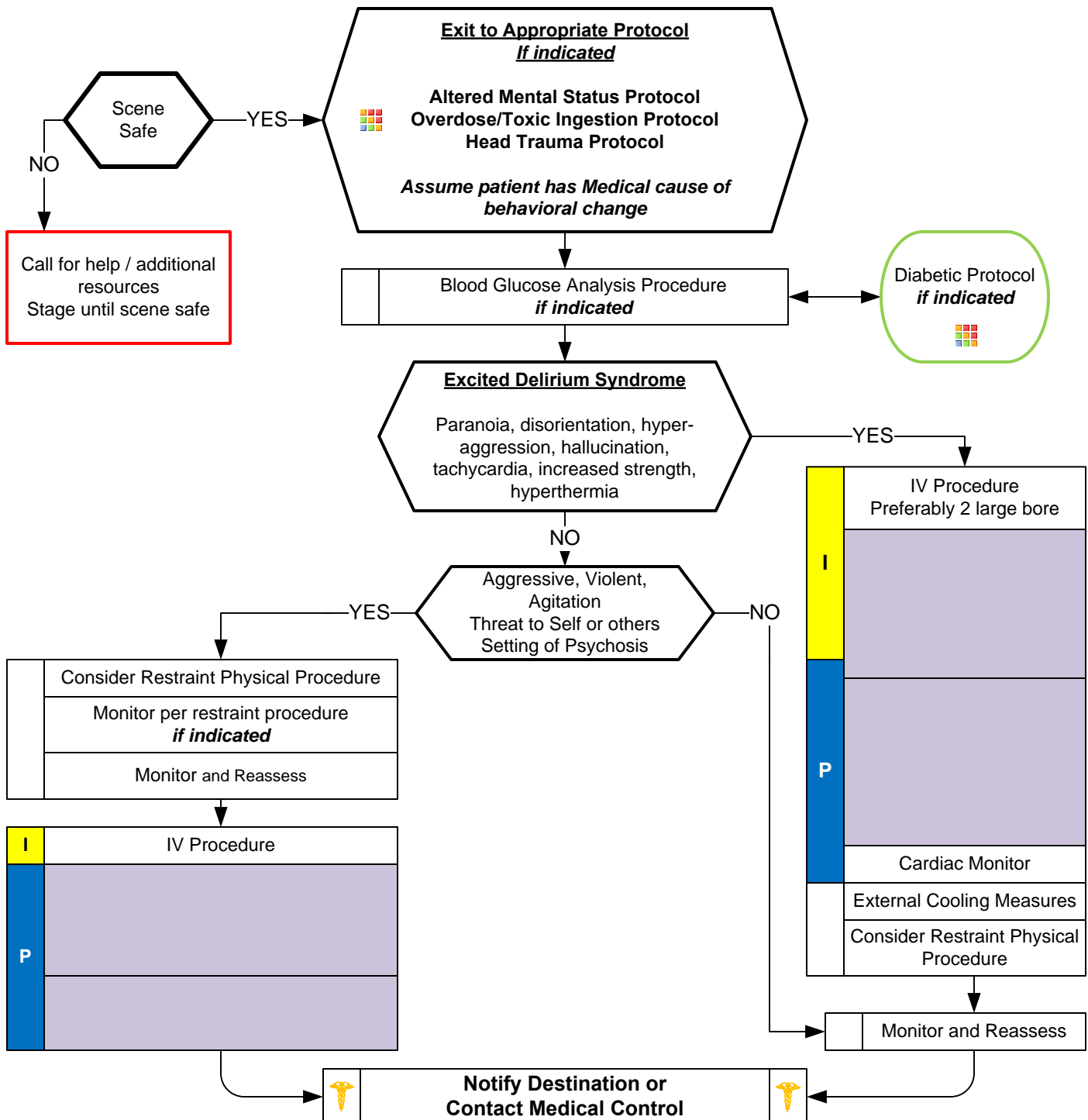
- Situational crisis
- Psychiatric illness/medications
- Injury to self or threats to others
- Medic alert tag
- Substance abuse / overdose
- Diabetes

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





Behavioral



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.**
- **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 or child abuse.
- If patient is suspected of agitated delirium 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.
- **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.
- **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.



Pain Control: Adult



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		
I	Consider IV Procedure	
	Monitor and Reassess	

	IV Procedure	P	IO Procedure
I			
P			

	Cardiac Monitor
P	
	Monitor and Reassess Every 10 minutes following sedative
	Monitor and Reassess



**Notify Destination or
Contact Medical Control**



Adult General Section Protocols

Protocol 7

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

2012



Pain Control: Adult



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.**
- **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 require higher than usual opioid doses to effect adequate pain control

Protocol 7

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Scene Rehabilitation: General (Optional)

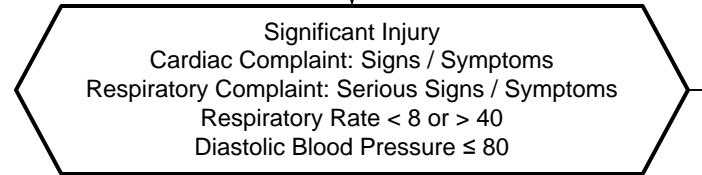


Injury / Illness / Complaint should be treated using appropriate treatment protocol beyond need for oral or IV hydration.



Initial Process

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



Exit to
Scene Rehabilitation
Responder
Protocol

NO

Heat
or
Cold stress

HEAT STRESS

Active Cooling Measures

Forearm immersion, cool shirts, cool mist fans etc.
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

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

Responder
Cannot Wear
Protective Gear

Extend
Rehabilitation
Time Until VS
Improve

Extend
Rehabilitation
Time Until VS
Improve

Discharge Responder from
General Rehabilitation Section

Reports for Reassignment

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.

Adult General Section Protocols



Scene Rehabilitation: General (Optional)



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.**
- 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.

Protocol 8

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Scene Rehabilitation: Responder (Optional)



Remove:

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

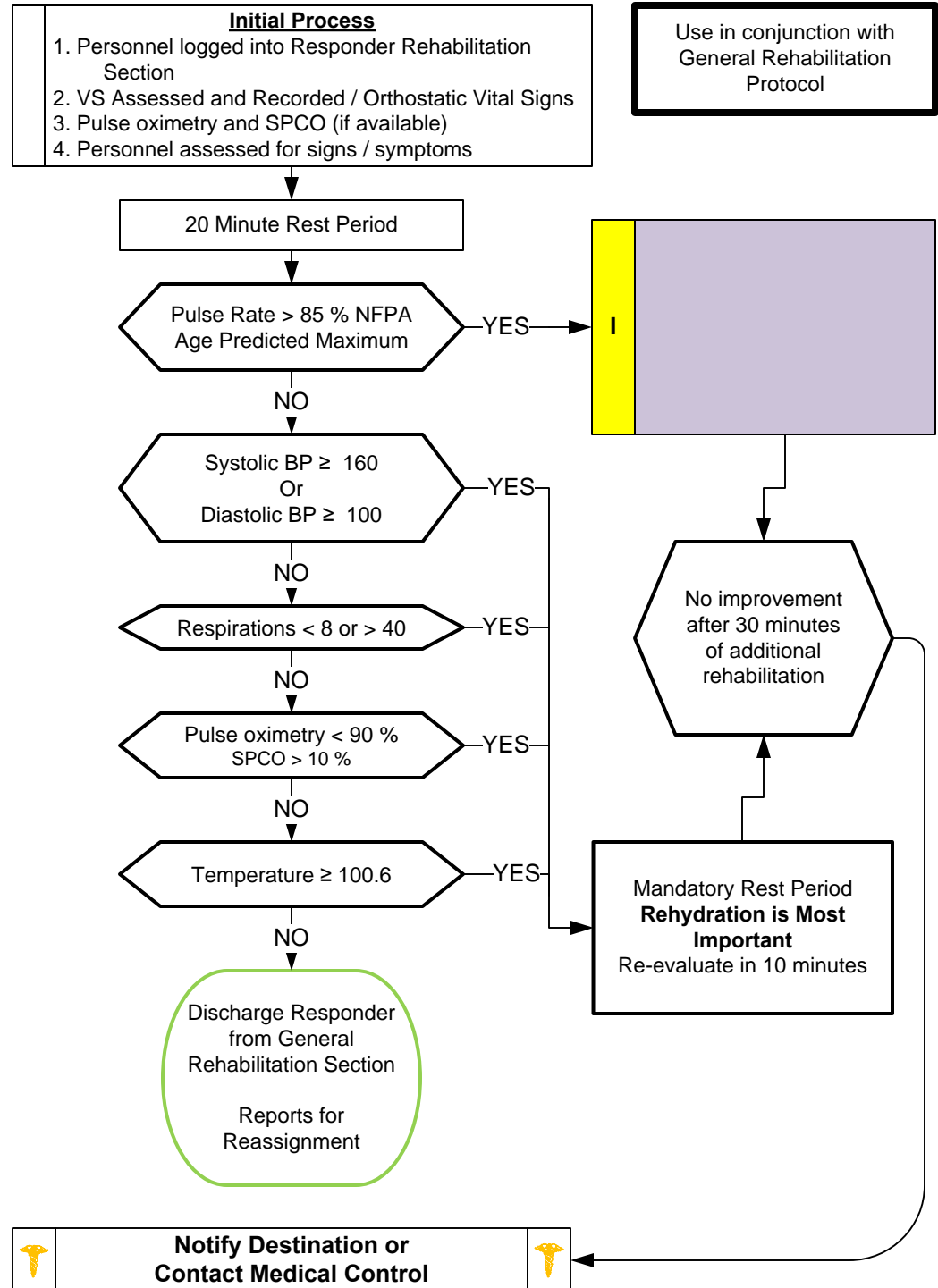
Continue:

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



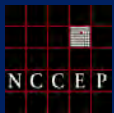
Pearls

- 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.

Protocol 9

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2012



Adult Asystole / Pulseless Electrical Activity



History

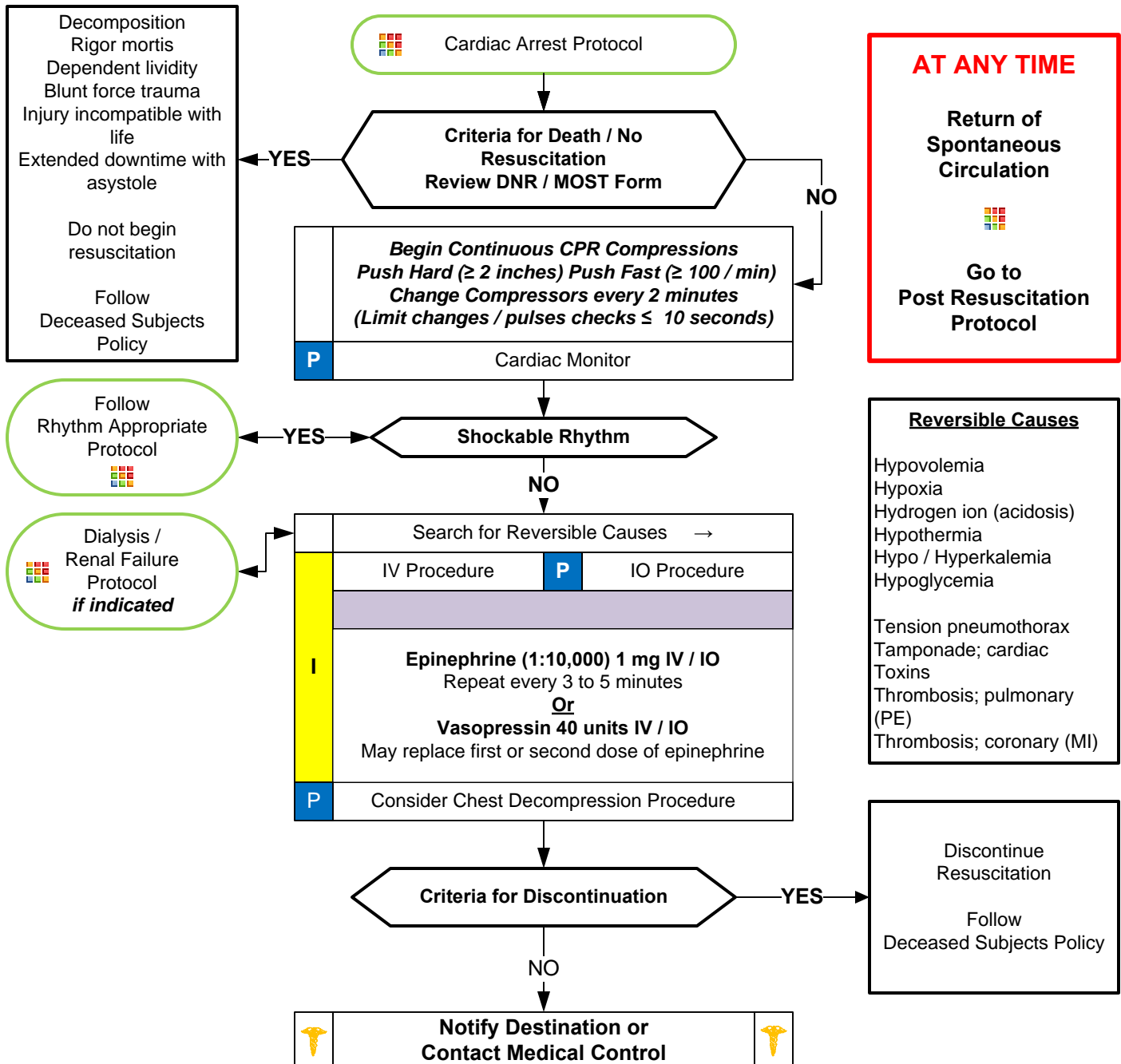
- Past medical history
- Medications
- Events leading to arrest
- End stage renal disease
- Estimated downtime
- Suspected hypothermia
- Suspected overdose
 - Tricyclic
 - Digitalis
 - Beta blockers
 - Calcium channel blockers
- DNR, MOST, or Living Will

Signs and Symptoms

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

Differential

- Hypovolemia (Trauma, AAA, other)
- Cardiac tamponade
- Hypothermia
- Drug overdose (Tricyclic, Digitalis, Beta blockers, Calcium channel blockers)
- Massive myocardial infarction
- Hypoxia
- Tension pneumothorax
- Pulmonary embolus
- Acidosis
- Hyperkalemia





Pearls

- **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) compressions to ventilations are 30:2. 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.**
- **Breathing / Airway management after 2 rounds of compressions (2 minutes each round.)**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- If no IV / IO, drugs that can be given down ET tube should have dose doubled and then flushed with 5 ml of Normal Saline followed by 5 quick ventilations. IV/IO is the preferred route when available.
- Consider each possible cause listed in the differential: Survival is based on identifying and correcting the cause.
- Potential association of PEA with hypoxia so placing definitive airway with oxygenation early may provide benefit.
- PEA caused by sepsis or severe volume loss may benefit from higher volume of normal saline administration.
- Return of spontaneous circulation after Asystole / PEA requires continued search for underlying cause of cardiac arrest.
- Treatment of hypoxia and hypotension are important after resuscitation from Asystole / PEA.
- Asystole is commonly an end-stage rhythm following prolonged VF or PEA with a poor prognosis.
- Sodium bicarbonate no longer recommended. Consider in the dialysis / renal patient, known hyperkalemia or tricyclic overdose at 50 mEq total IV / IO.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.
- Potential protocols used during resuscitation include Overdose / Toxic Ingestion, Diabetic and Dialysis / Renal Failure.



Bradycardia; Pulse Present



History

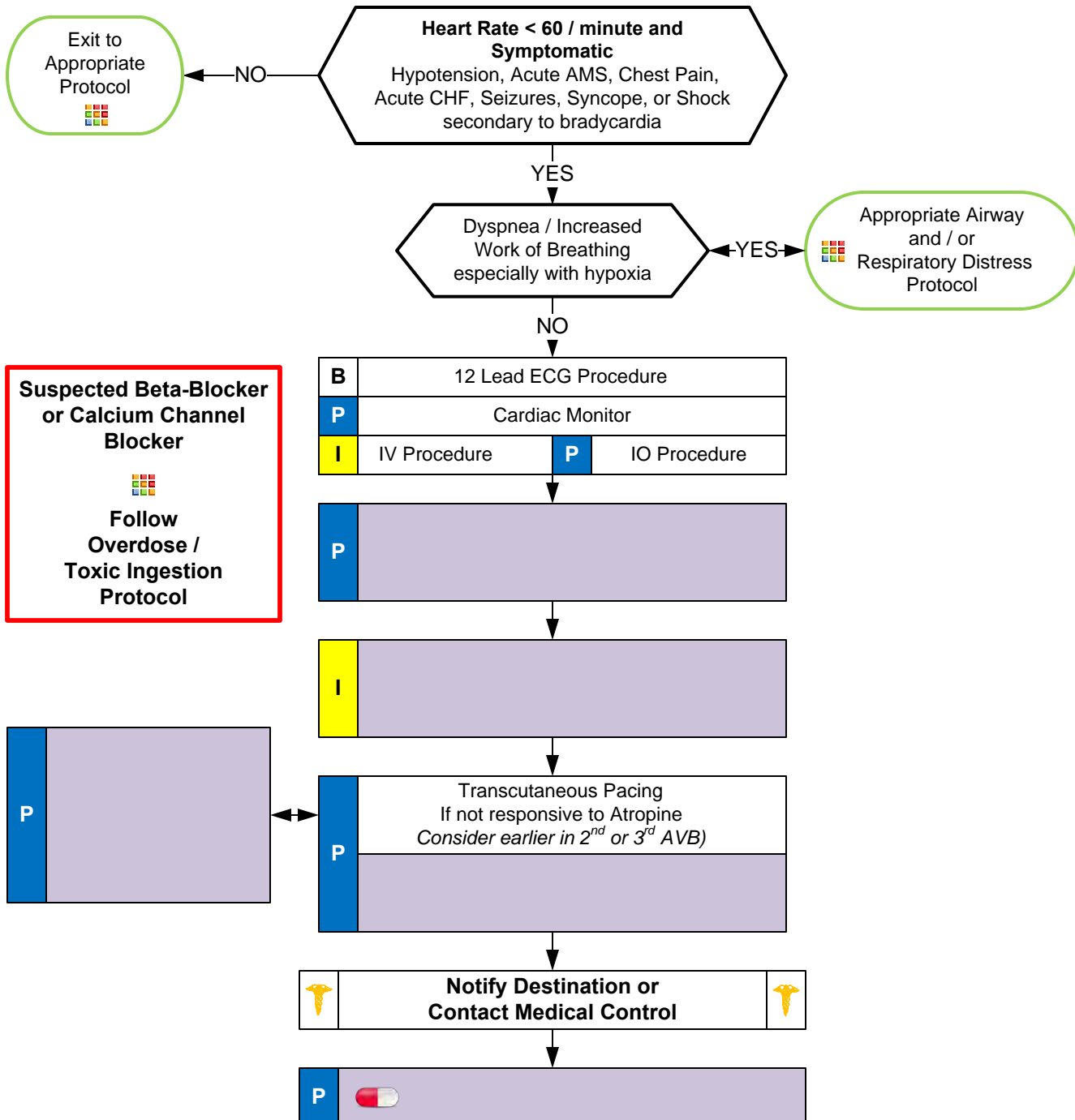
- Past medical history
- Medications
 - Beta-Blockers
 - Calcium channel blockers
 - Clonidine
 - Digoxin
- Pacemaker

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
- Pacemaker failure
- Hypothermia
- Sinus bradycardia
- Athletes
- Head injury (elevated ICP) or Stroke
- Spinal cord lesion
- Sick sinus syndrome
- AV blocks (1°, 2°, or 3°)
- Overdose



Suspected Beta-Blocker or Calcium Channel Blocker



Follow Overdose / Toxic Ingestion Protocol



Bradycardia; Pulse Present

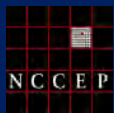


Pearls

- **Recommended Exam: Mental Status, Neck, Heart, Lungs, Neuro**
- **Bradycardia causing symptoms is typically < 50/minute. Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Atropine: Caution in setting of acute MI. The use of Atropine for PVCs in the presence of a MI may worsen heart damage. Should not delay Transcutaneous Pacing with poor perfusion. Ineffective in cardiac transplantation.**
- Utilize transcutaneous pacing early if no response to atropine. If time allows transport to specialty center as transcutaneous pacing is a temporizing measure and patient will likely require transvenous pacemaker.
- Wide complex, bizarre appearance of complex with slow rhythm consider hyperkalemia.
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)
- Hypoxemia is a common cause of bradycardia be sure to oxygenate the patient and support respiratory effort.

Protocol 12

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Cardiac Arrest; Adult



History

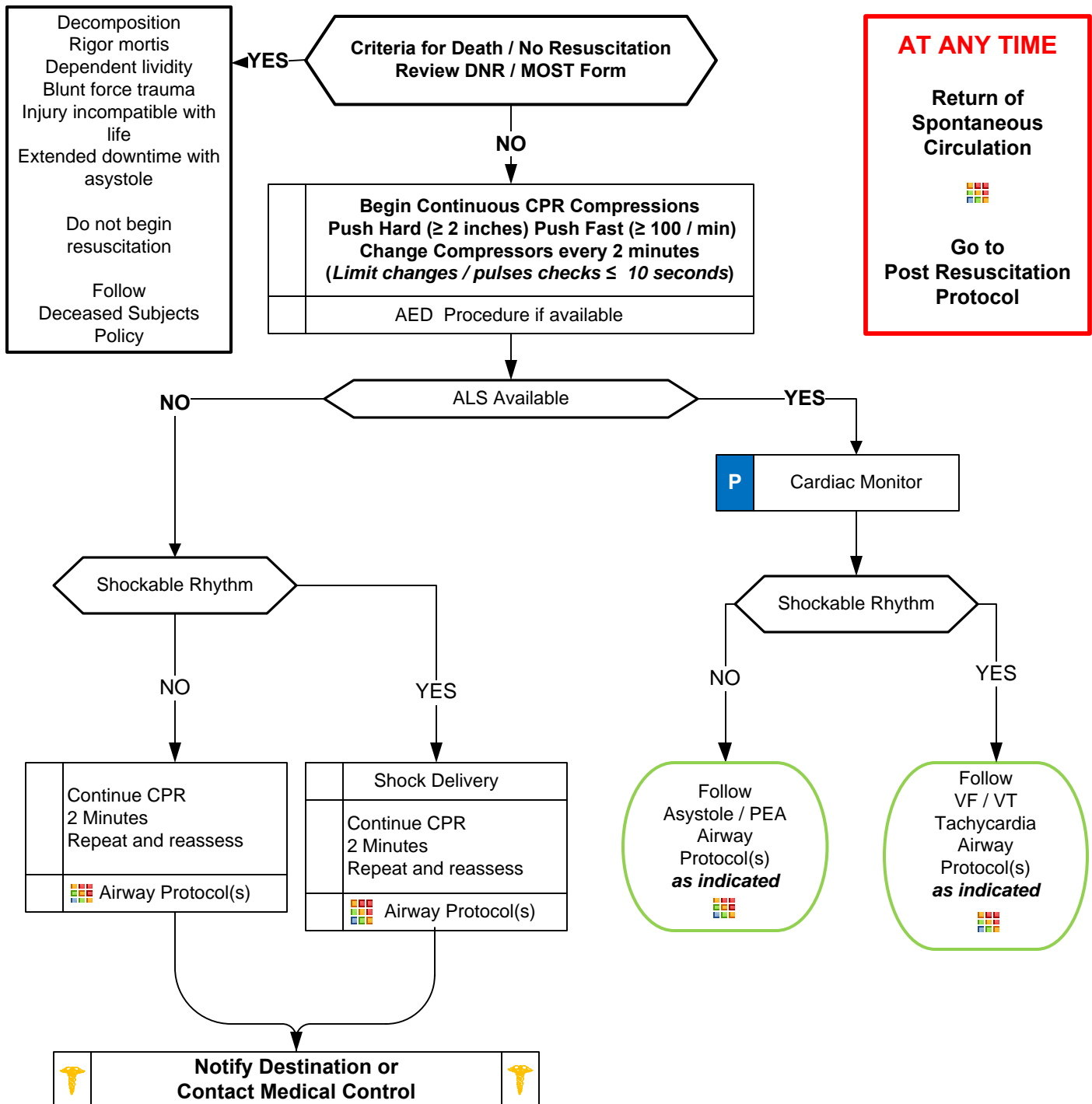
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness

Signs and Symptoms

- Unresponsive
- Apneic
- Pulseless

Differential

- Medical vs. Trauma
- VF vs. Pulseless VT
- Asystole
- PEA
- Primary Cardiac event vs. Respiratory arrest or Drug Overdose





Cardiac Arrest; Adult



Pearls

- **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) compressions to ventilations are 30:2. 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.**
- **Breathing / Airway management after second shock and / or 2 rounds of compressions (2 minutes each round.)**
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach assigning responders to predetermined tasks.
- Team Focused Approach / Pit-Crew Approach. Refer to optional protocol or development of local agency protocol.
- Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- **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.
- Consider mechanical CPR (compression) device if available.
- Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
- Consider Opioid Overdose: Naloxone 2 mg IM / IV / IO / IN. EMT-B may administer Naloxone via IN route only. May give from EMS supply.
- Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.



Chest Pain: Cardiac and STEMI



History

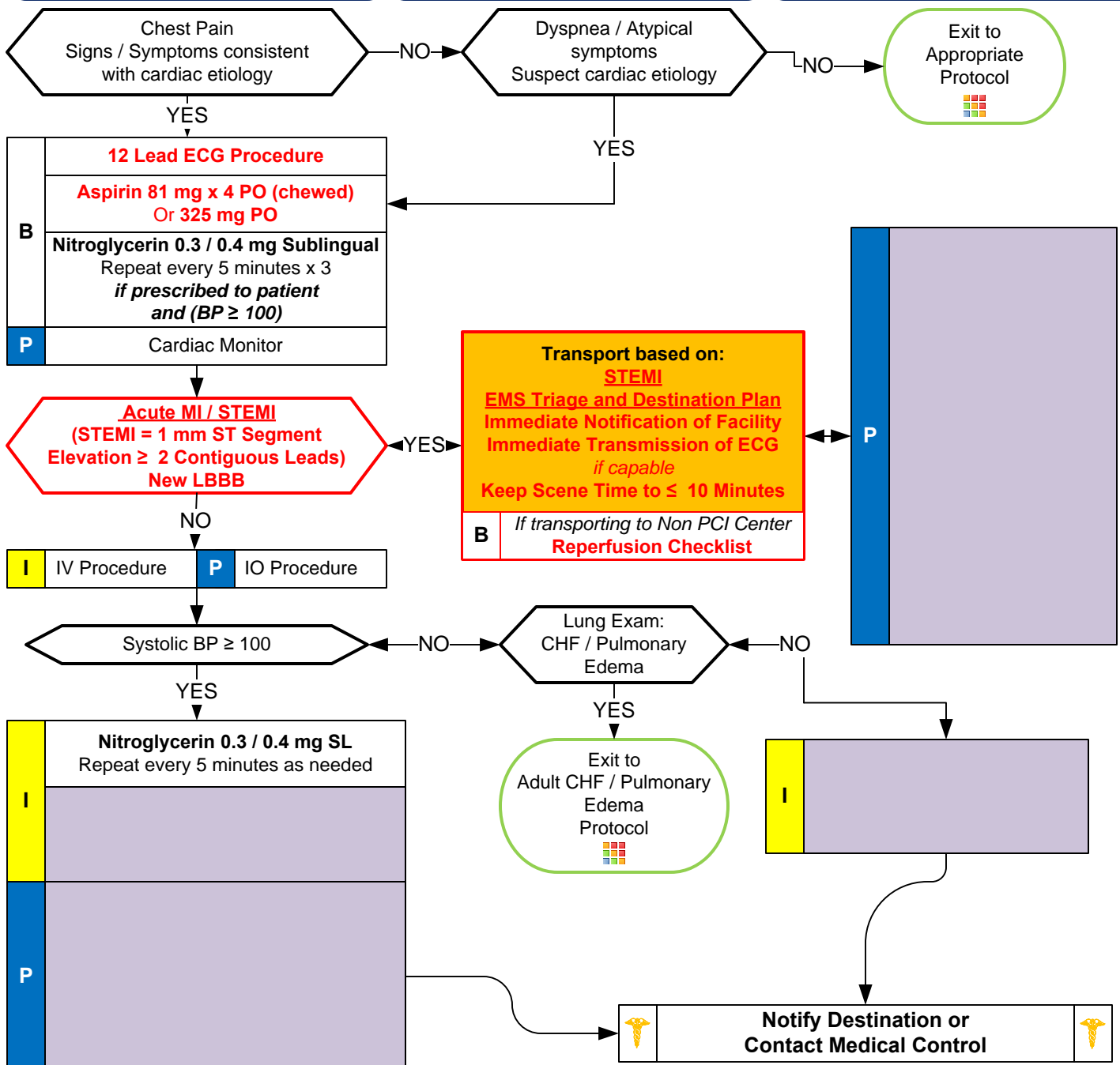
- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies
- Recent physical exertion
- **Palliation / Provocation**
- **Quality** (crampy, constant, sharp, dull, etc.)
- **Region / Radiation / Referred**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

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





Chest Pain: Cardiac and STEMI



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.**
- **Patients with STEMI (ST-Elevation Myocardial Infarction) or positive Reperfusion Checklist should be transported to the appropriate facility based on STEMI EMS Triage and Destination Plan.**
- **If CHF / Cardiogenic shock resulting from inferior (II, III, aVF) MI. 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).
- Nitroglycerin and opioids may be repeated per dosing guidelines.
- Diabetics, 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 (EMT-P.)
- **EMT-B 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

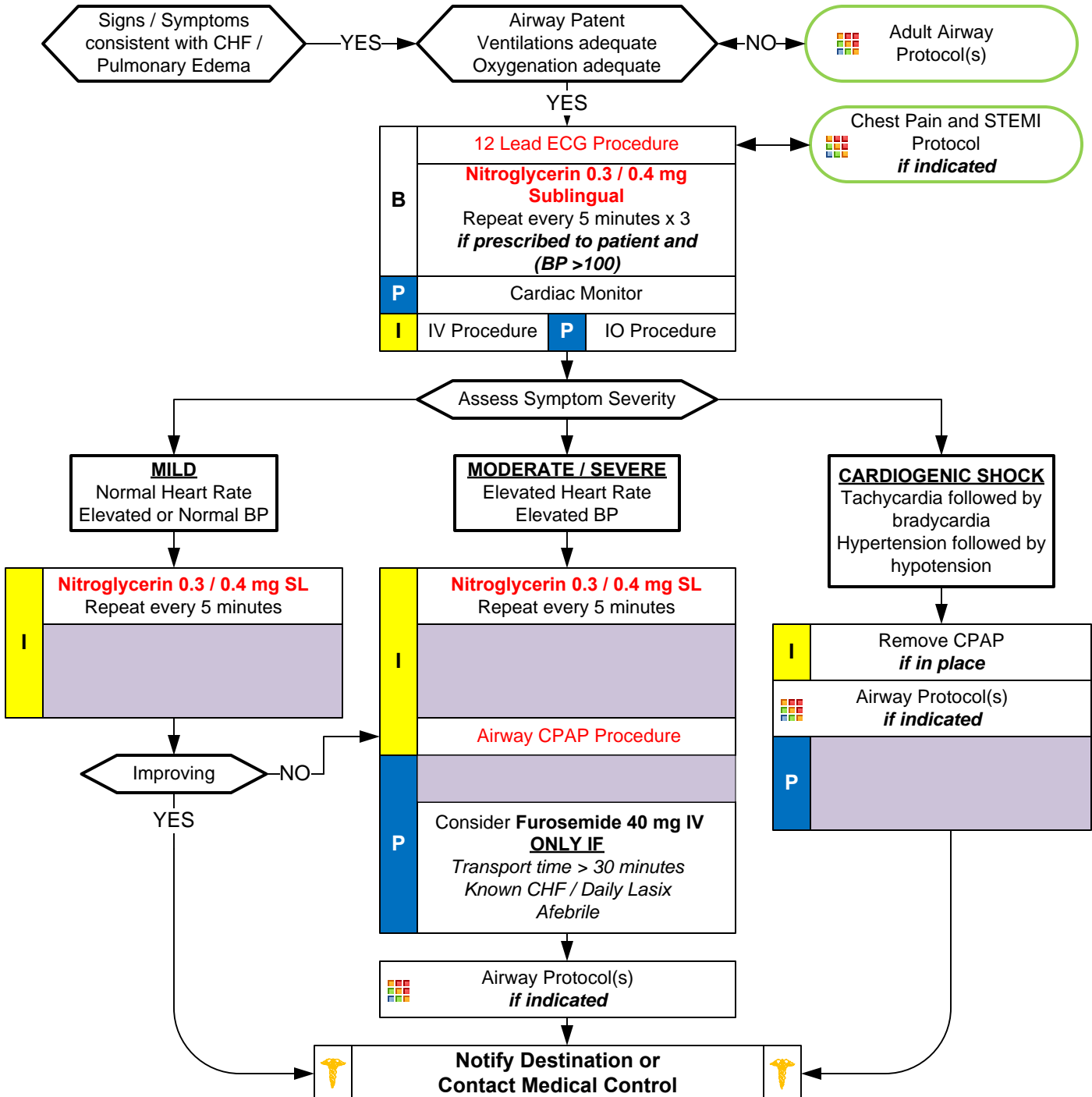
- Congestive heart failure
- Past medical history
- Medications (digoxin, Lasix, Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Cardiac history --past myocardial infarction

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





CHF / Pulmonary Edema



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 (II, III, aVF) MI. Consider Right Sided ECG (V3 or V4). If ST elevation noted Nitroglycerin and / or opioids may cause hypotension requiring normal saline boluses.**
- If Nitro-paste is used, do not continue to use Nitroglycerin SL.
- 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-B 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)



History

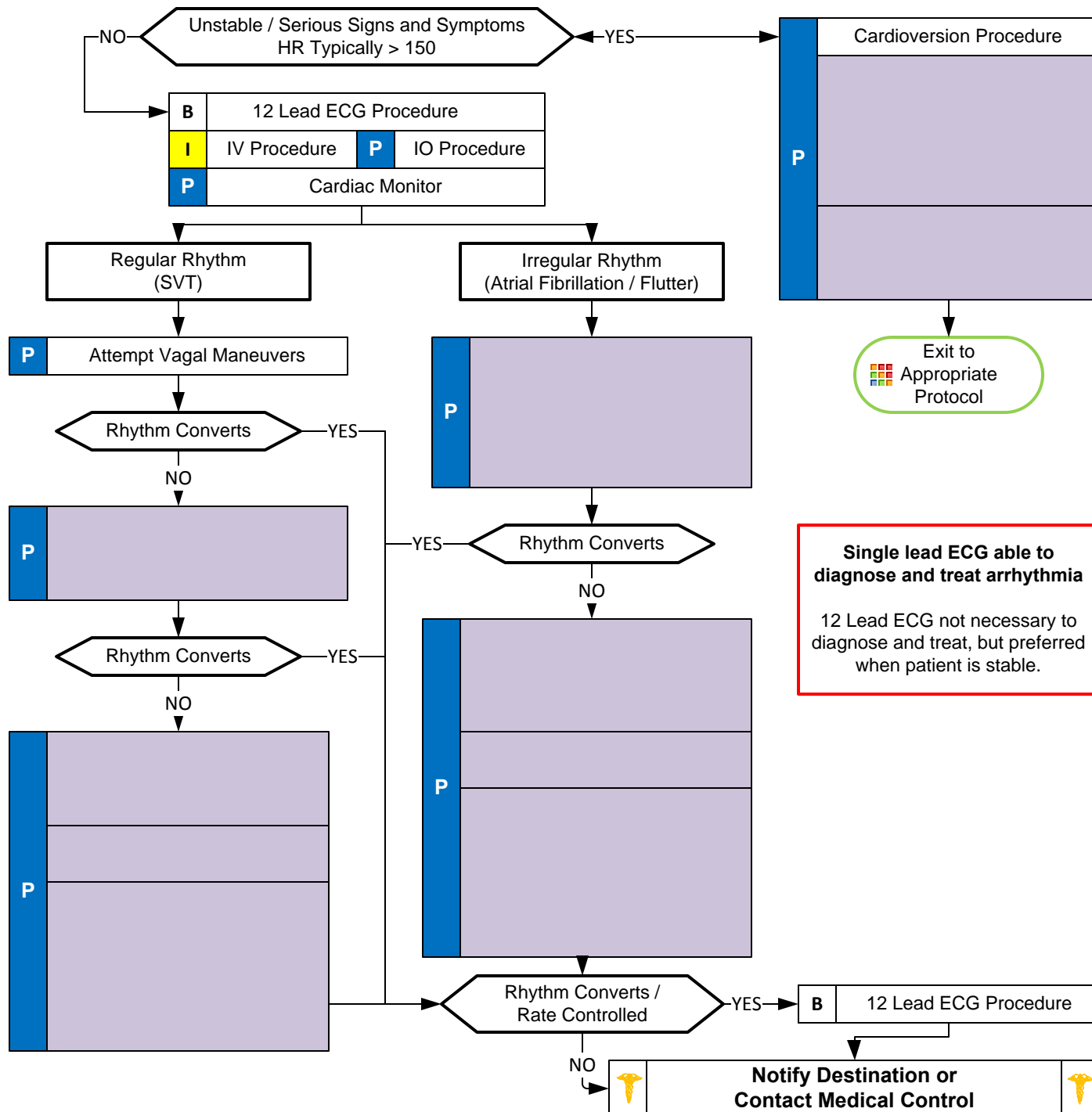
- Medications
(Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical history
- History of palpitations / heart racing
- Syncope / near syncope

Signs and Symptoms

- Heart Rate > 150
- Systolic BP < 90
- Dizziness, CP, SOB, AMS, Diaphoresis
- CHF
- Potential presenting rhythm
Atrial/Sinus tachycardia
Atrial fibrillation / flutter
Multifocal atrial tachycardia
Ventricular Tachycardia

Differential

- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia
- Hypovolemia or Anemia
- Drug effect / Overdose (see HX)
- Hyperthyroidism
- Pulmonary embolus



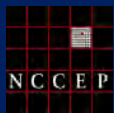


Adult Tachycardia Narrow Complex (≤ 0.11 sec)



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.**
- **If at any point patient becomes unstable move to unstable arm in algorithm.**
- Symptomatic tachycardia usually occurs at rates of 120 -150 and typically ≥ 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 need 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 need 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.
- **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.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Continuous pulse oximetry is required for all SVT patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.



Adult Tachycardia

Wide Complex (≥ 0.12 sec)



History

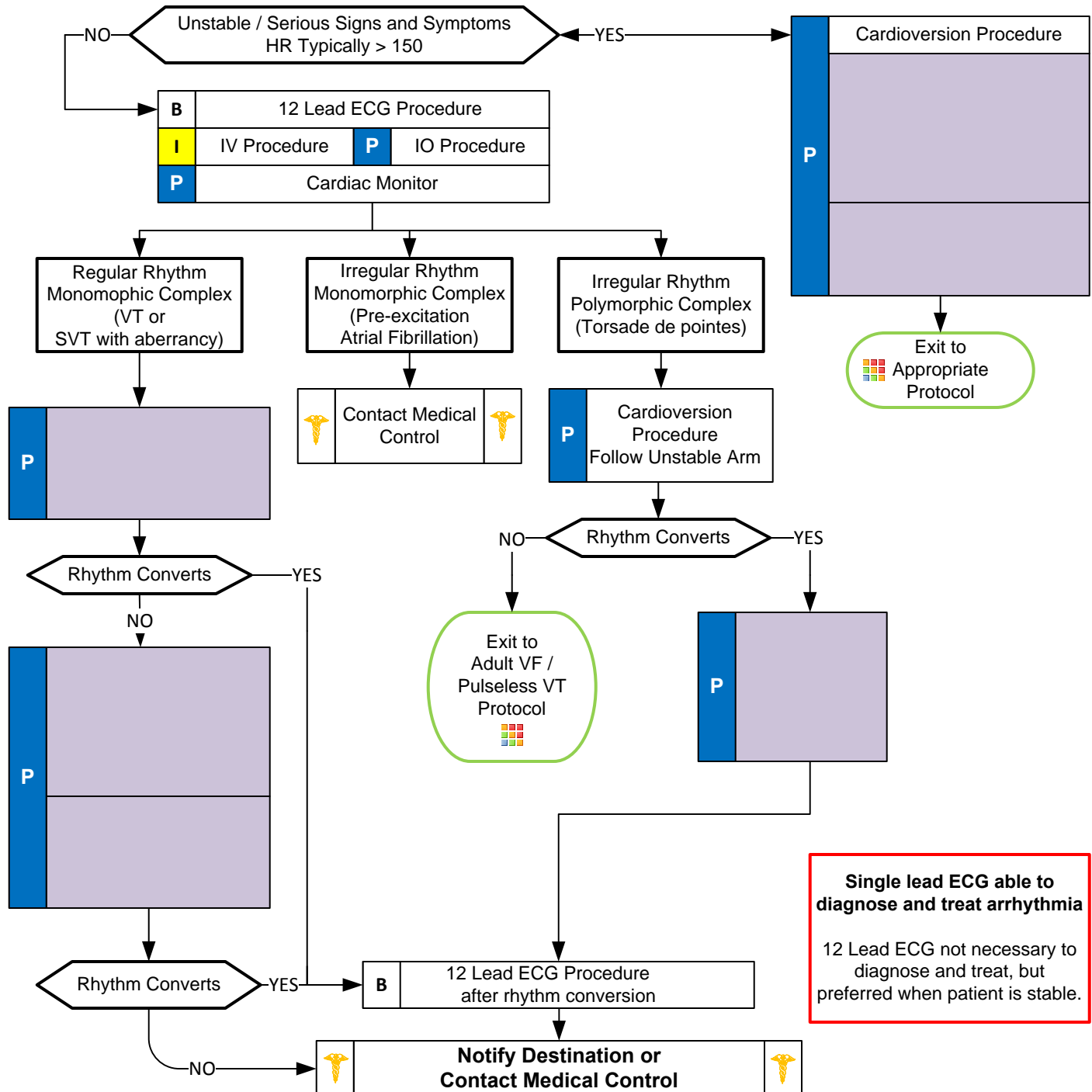
- Medications (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Diet (caffeine, chocolate)
- Drugs (nicotine, cocaine)
- Past medical history
- History of palpitations / heart racing
- Syncope / near syncope

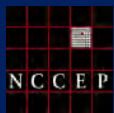
Signs and Symptoms

- Heart Rate > 150
- Systolic BP < 90
- Dizziness, CP, SOB, AMS, Diaphoresis
- CHF
- Potential presenting rhythm
 - Atrial/Sinus tachycardia
 - Atrial fibrillation / flutter
 - Multifocal atrial tachycardia
 - Ventricular Tachycardia

Differential

- Heart disease (WPW, Valvular)
- Sick sinus syndrome
- Myocardial infarction
- Electrolyte imbalance
- Exertion, Pain, Emotional stress
- Fever
- Hypoxia
- Hypovolemia or Anemia
- Drug effect / Overdose (see HX)
- Hyperthyroidism
- Pulmonary embolus





Adult Tachycardia

Wide Complex (≥ 0.12 sec)



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.**
- **If at any point patient becomes unstable move to unstable arm in algorithm.**
- Symptomatic tachycardia usually occurs at rates of 120 – 150 and typically ≥ 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 cardioversion or pre-cordial thump if defibrillator not available.
 - **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 or beta blockers, 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.
- Monitor for respiratory depression and hypotension associated with Midazolam.
- Continuous pulse oximetry is required for all SVT Patients.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.



Ventricular Fibrillation Pulseless Ventricular Tachycardia



History

- Estimated down time
- Past Medical History
- Medications
- Events leading to arrest
- Renal failure / Dialysis
- DNR or MOST form

Signs and Symptoms

- Unresponsive, apneic, pulseless
- Ventricular fibrillation or ventricular tachycardia on EKG

Differential

- Asystole
- Artifact / Device Failure
- Cardiac
- Endocrine / Medicine
- Drugs
- Pulmonary

Cardiac Arrest Protocol

Begin Continuous CPR Compressions
Push Hard (≥ 2 inches) Push Fast (≥ 100 / min)
Change Compressors every 2 minutes
(Limit changes / pulses checks ≤ 10 seconds)

Dialysis / Renal
Failure Protocol
if indicated

P

Airway Protocol(s)

IV Procedure

P IO Procedure

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

Or

Vasopressin 40 units IV / IO
May replace first or second dose of epinephrine

P

AT ANY TIME

**Return of
Spontaneous
Circulation**



**Go to
Post Resuscitation
Protocol**

Begin Continuous CPR Compressions
Push Hard (≥ 2 inches) Push Fast (≥ 100 / min)
Change Compressors every 2 minutes
(Limit changes / pulses checks ≤ 10 seconds)

If Rhythm Refractory

Continue CPR and give Agency specific Anti-arrhythmics / Epinephrine / Vasopressin during compressions.
Continue CPR up to point where you are ready to defibrillate with device charged.
Repeat pattern during resuscitation.

Tosades de points
Low Magnesium States
(Malnourished / alcoholic)
Suspected Digitalis Toxicity

P

P

P

P

P

High Quality, Continuous Compressions

NO **Return of Spontaneous Circulation** YES

Exit to
 Post Resuscitation
Protocol

Consider
Discontinuation
of Resuscitation Policy

AND / OR

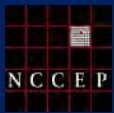
**Notify Destination or
Contact Medical Control**

Adult Cardiac Section Protocols

Protocol 18

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

2012



Ventricular Fibrillation Pulseless Ventricular Tachycardia



Pearls

- **Recommended Exam: Mental Status**
- **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 with continuous, uninterrupted compressions.
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Breathing / Airway management after second shock and / or 2 rounds of compressions (2 minutes each round.)**
- **Avoid Procainamide in CHF or prolonged QT.**
- Effective CPR and prompt defibrillation are the keys to successful resuscitation.
- If no IV / IO, drugs that can be given down ET tube should have dose doubled and then flushed with 5 ml of Normal Saline followed by 5 quick ventilations. IV / IO is the preferred route when available.
- Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- Do not stop CPR to check for placement of ET tube or to give medications.
- If BVM is ventilating the patient successfully, intubation should be deferred until rhythm has changed or 4 or 5 defibrillation sequences have been completed.
- Return of spontaneous circulation: Heart rate should be > 60 when initiating anti-arrhythmic infusions.
- Sodium bicarbonate no longer recommended. Consider in the dialysis / renal patient, known hyperkalemia or tricyclic overdose at 50 mEq total IV / IO.
- Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.



Post Resuscitation



History

- Respiratory arrest
- Cardiac arrest

Signs/Symptoms

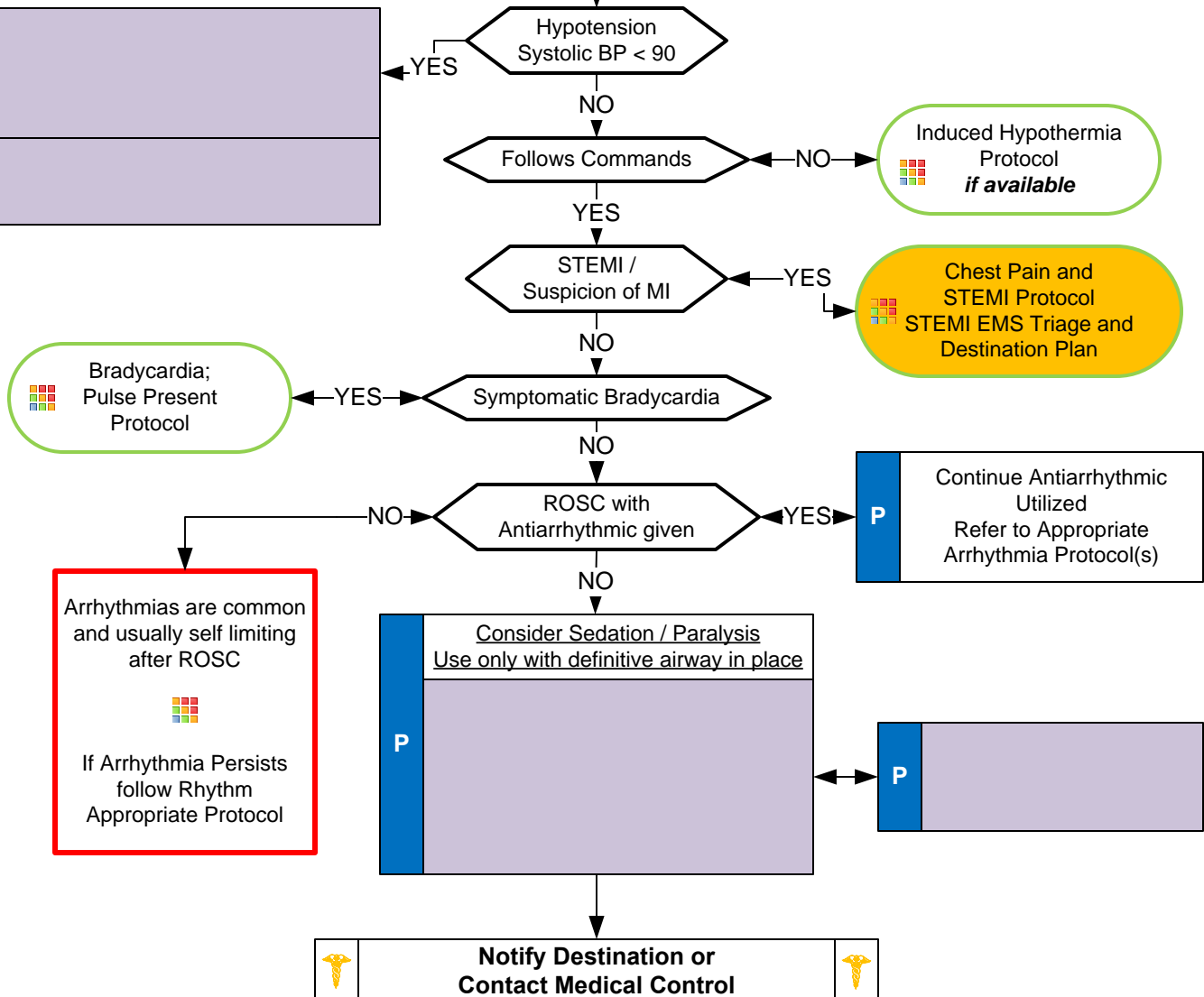
- Return of pulse

Differential

- Continue to address specific differentials associated with the original dysrhythmia

Repeat Primary Assessment			
B	Optimize Ventilation and Oxygenation <ul style="list-style-type: none"> • Maintain SpO2 \geq 94 % • Advanced airway <i>if indicated</i> • ETCO2 ideally 35 – 45 mm Hg • Respiratory Rate 8 – 12 / minute • Remove Impedance Threshold Device • DO NOT HYPERVENTILATE 		
	I	IV Procedure	P IO Procedure
	12 Lead ECG Procedure		
	Cardiac Monitor		
	Monitor Vital Signs / Reassess		

I	
P	





Post Resuscitation



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.
- Initial End tidal CO₂ may be elevated immediately post-resuscitation but will usually normalize. While goal is 35 – 45 mm Hg avoid hyperventilation.
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiac catheterization and intensive care service.**
- Most patients immediately post resuscitation will require ventilatory assistance.
- 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.
- Common causes of post-resuscitation hypotension include hyperventilation, hypovolemia, pneumothorax, and medication reaction to ALS drugs.
- Titrate Dopamine or other vasopressors to maintain SAP \geq 90. Ensure adequate fluid resuscitation is ongoing.



Induced Hypothermia (Optional)



History

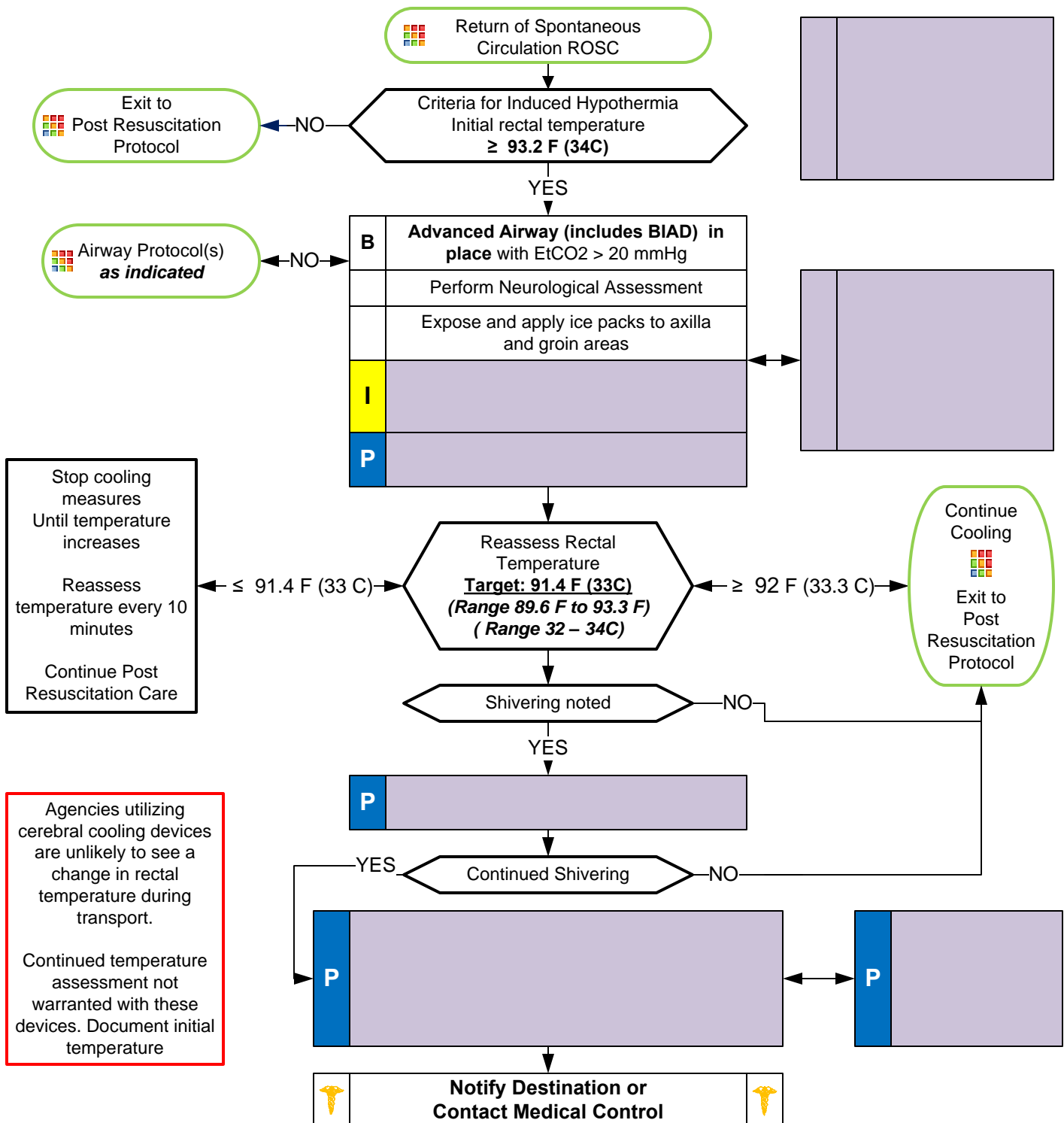
- Non-traumatic cardiac arrests (drownings and hanging / asphyxiation are permissible in this protocol.)
- All presenting rhythms are permissible in this protocol
- Age 18 or greater

Signs and Symptoms

- Cardiac arrest
- Return of Spontaneous Circulation post-cardiac arrest

Differential

- Continue to address specific differentials associated with the arrhythmia





Induced Hypothermia (Optional)

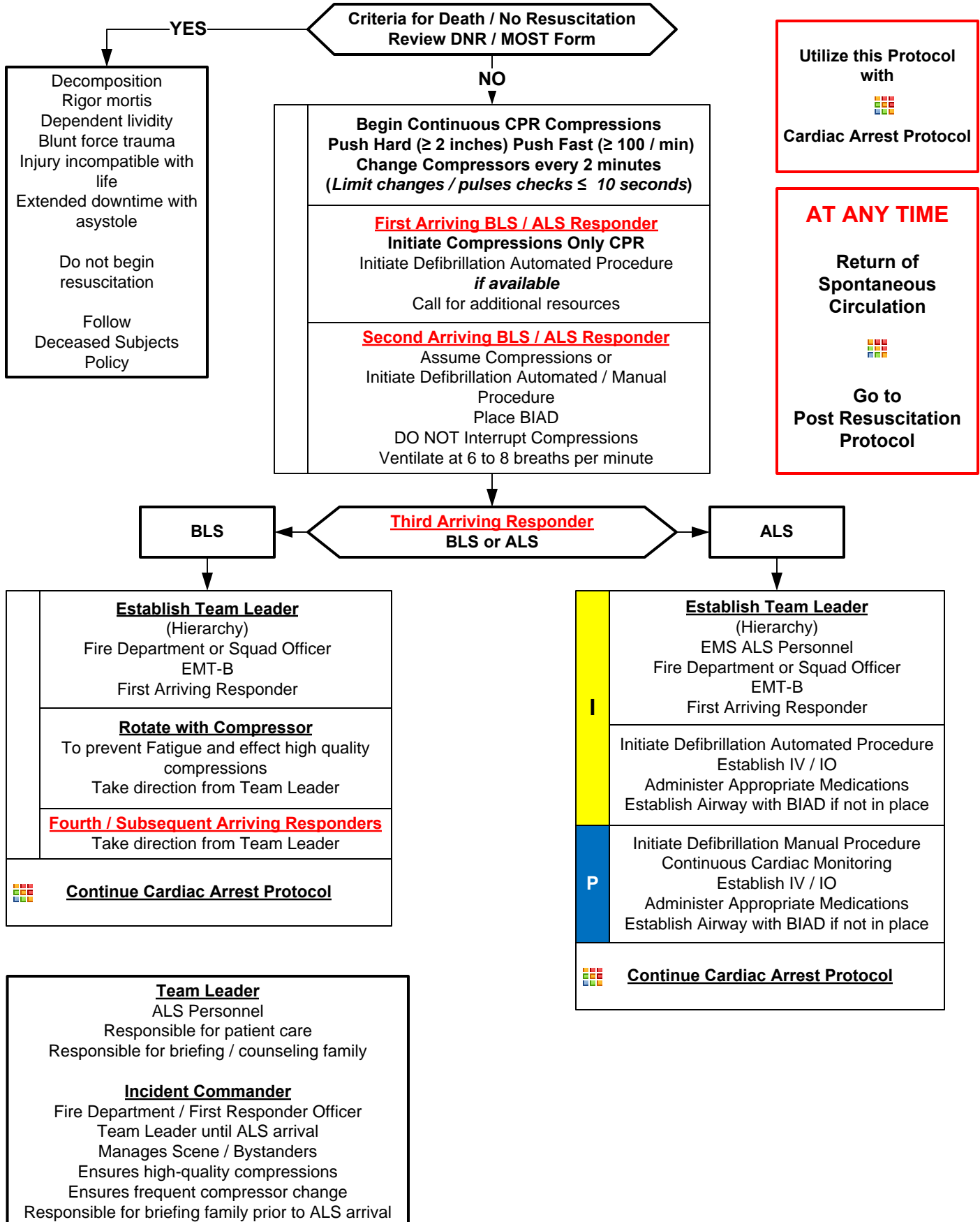


Pearls

- **Criteria for Induced Hypothermia:**
 - Return of spontaneous circulation not related to blunt / penetrating trauma or hemorrhage.
 - Temperature greater than 93 degrees (34 C).
 - Advanced airway (including BIAD) in place with no purposeful response to verbal commands.
- Do not delay transport to initiate induced hypothermia.
- Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs.
- Initial End tidal CO₂ may be elevated immediately post-resuscitation but will usually normalize. While goal is 35 – 45 mm Hg avoid hyperventilation.
- Utilization of this protocol mandates transport to facility capable of managing the post-arrest patient and continuation of induced hypothermia therapy.
- If no advanced airway in place obtained, cooling may only be initiated on order from medical control.
- Maintain patient modesty. Undergarments may remain in place during cooling.
- Monitor advance airway frequently, especially after any movement of patient.



Team Focused CPR (Optional)





Team Focused CPR (Optional)



Pearls

- This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.
- 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.
- 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.

Protocol 21

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



Differential

- Pneumonia or Pulmonary embolus
- Liver (hepatitis, CHF)
- Peptic ulcer disease / Gastritis
- Gallbladder
- Myocardial infarction
- Pancreatitis
- Kidney stone
- Abdominal aneurysm
- Appendicitis
- Bladder / Prostate disorder
- Pelvic (PID, Ectopic pregnancy, Ovarian cyst)
- Spleen enlargement
- Diverticulitis
- Bowel obstruction
- Gastroenteritis (infectious)
- Ovarian and Testicular Torsion

Fever, headache, weakness, malaise, myalgias, cough, headache, mental status changes, rash



2012



Abdominal Pain



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lung, Abdomen, Back, Extremities, Neuro**
- Document the mental status and vital signs prior to administration of anti-emetics
- Abdominal pain in women of childbearing age should be treated as pregnancy related until proven otherwise.
- Antacids should be avoided in patients with renal disease.
- The diagnosis of abdominal aneurysm should be considered with abdominal pain especially in patients over 50 and / or patients with shock/ poor perfusion.
- Repeat vital signs after each fluid bolus.
- The use of metoclopramide (Reglan) may worsen diarrhea and should be avoided in patients with this symptom.
- Choose the lower dose of promethazine (Phenergan) for patients likely to experience sedative effects (e.g., Age \geq 60, debilitated, etc.) When giving promethazine IV dilute with 10 mL of normal saline and administer slowly.
- Consider cardiac etiology in patients > 50 , diabetics and / or women especially with upper abdominal complaints.

Protocol 23

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



Allergic Reaction / Anaphylaxis



History

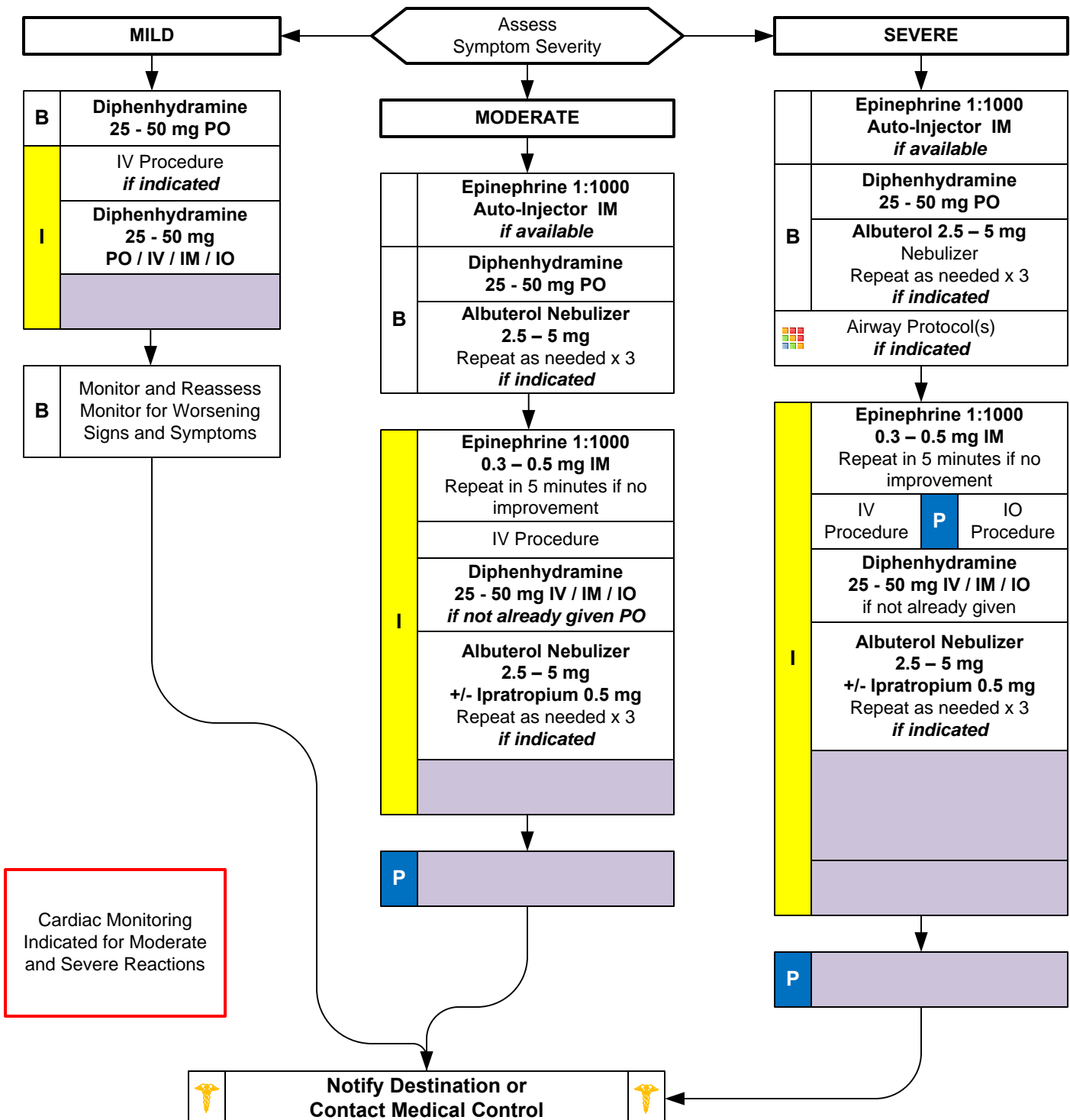
- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past history of reactions
- Past medical history
- Medication history

Signs and Symptoms

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

Differential

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





Allergic Reaction / Anaphylaxis



Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the 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.**
- **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.
- Patients who are ≥ 50 years of age, have a history of cardiac disease, take Beta-Blockers / Digoxin or patient's who have heart rates ≥ 150 give one-half the dose of epinephrine (0.15 – 0.25 mg of 1:1000.) Epinephrine may precipitate cardiac ischemia. These patients should receive a 12 lead ECG at some point in their care, but this should NOT delay administration of epinephrine.
- **MR / EMT-B may administer Epinephrine IM as Auto-injector only and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to MR / EMT-B administering any medication.
- **EMT-B 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-B / MR administering any medication.
- **EMT-B 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-B / MR administering any medication.
- Any patient with respiratory symptoms or extensive reaction should receive IV or IM diphenhydramine.
- The shorter the onset from symptoms to contact, the more severe the reaction.



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

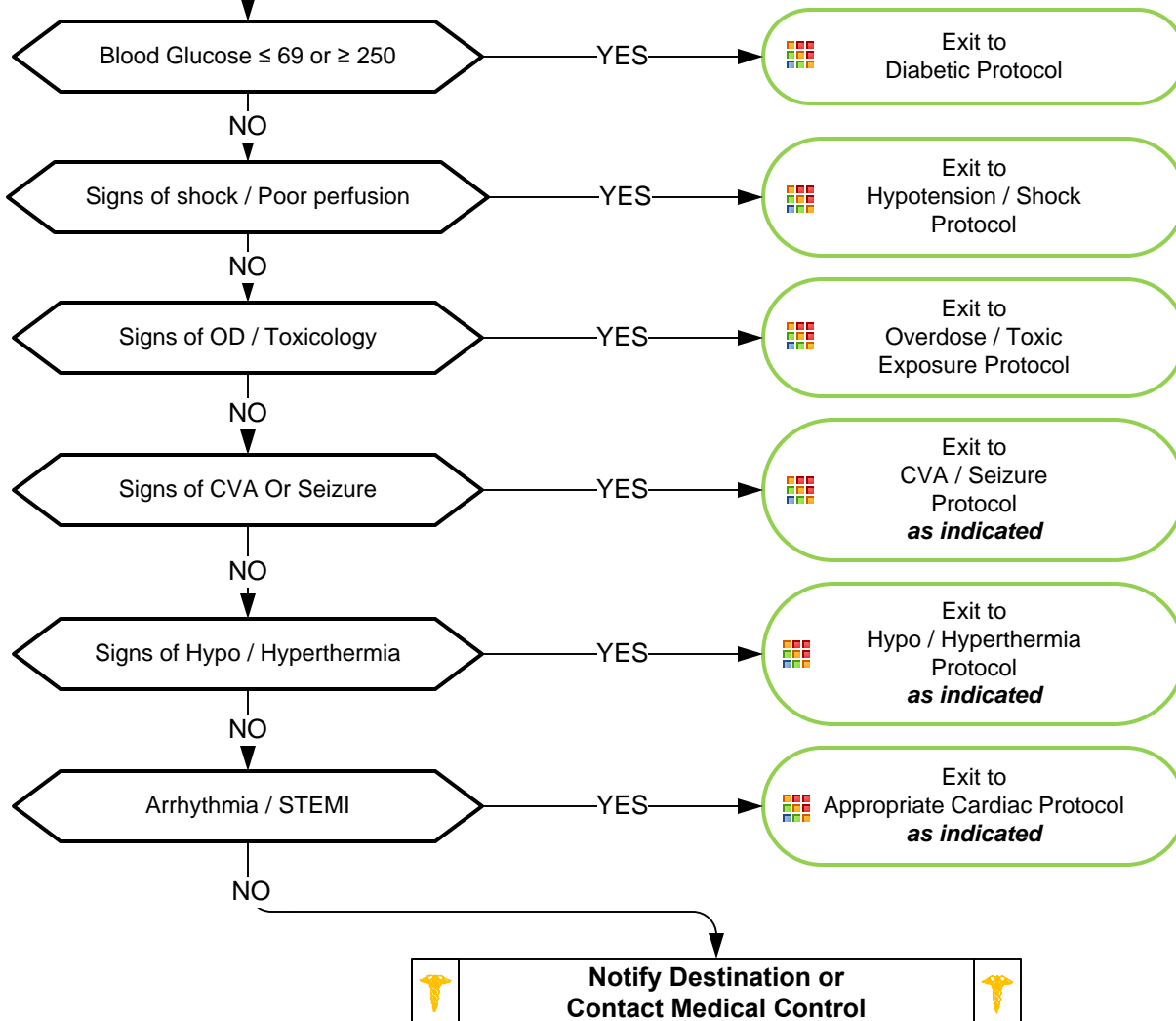
- Decreased mental status or lethargy
- Change in baseline mental status
- Bizarre behavior
- Hypoglycemia (cool, diaphoretic skin)
- Hyperglycemia (warm, dry skin; fruity breath; Kussmaul respirations; signs of dehydration)
- Irritability

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

 Airway Protocol(s) if indicated			
	Blood Glucose Analysis Procedure		
B	12 Lead ECG Procedure		
I	IV Procedure	P	IO Procedure

Utilize Spinal Immobilization Protocol where circumstances suggest a mechanism of injury.





Altered Mental Status



Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **Pay careful attention to the head exam for signs of bruising or other injury.**
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon
- Do not let alcohol confuse the clinical picture. Alcoholics frequently develop hypoglycemia and may have unrecognized injuries.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.



Adult COPD / Asthma



History

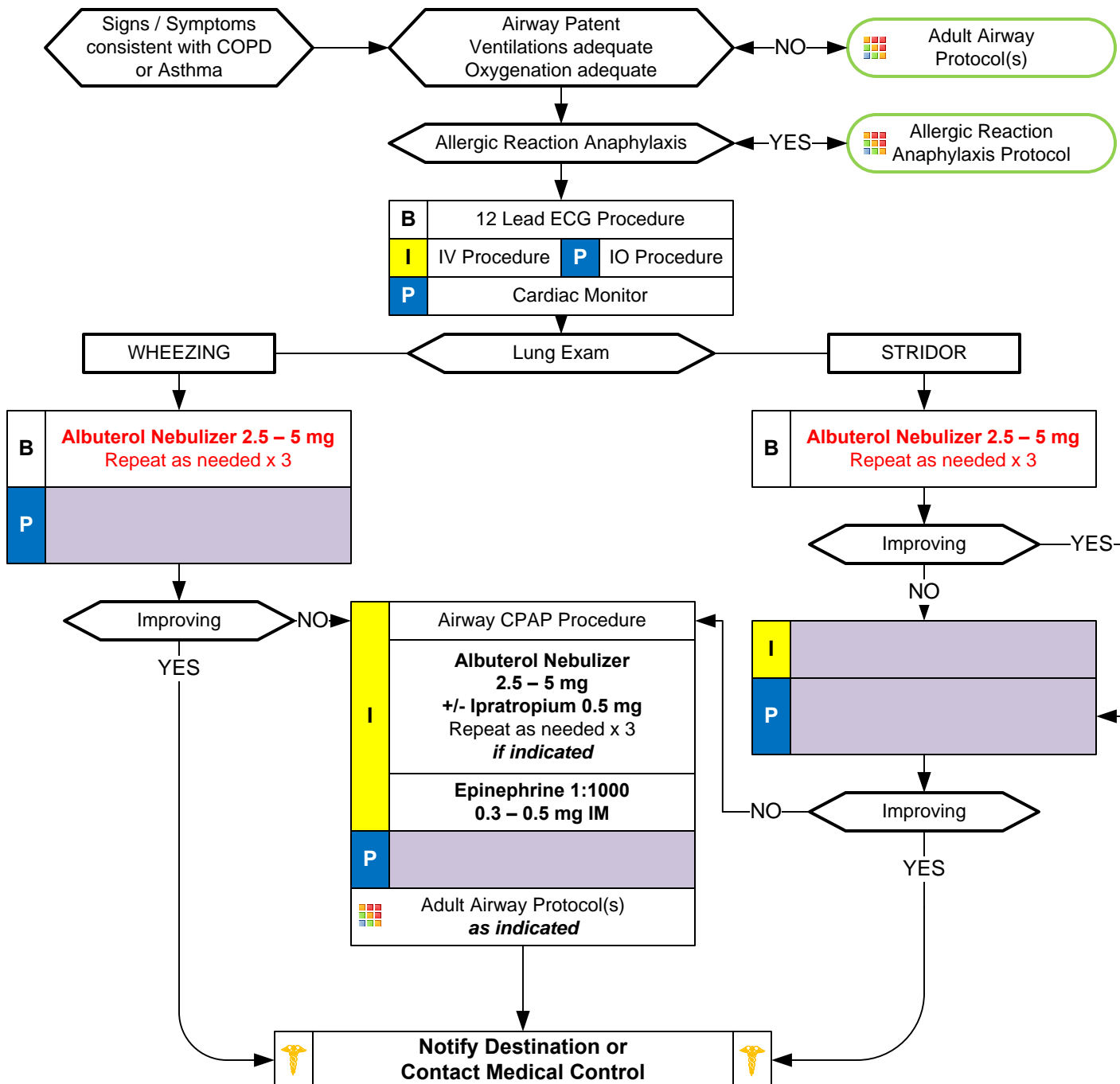
- Asthma; COPD -- chronic bronchitis, emphysema, congestive heart failure
- Home treatment (oxygen, nebulizer)
- Medications (theophylline, steroids, inhalers)
- Toxic exposure, smoke inhalation

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.)



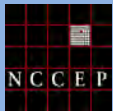


Adult COPD / Asthma



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**
- Patients who are ≥ 50 years of age, have a history of cardiac disease, take Beta-Blockers / Digoxin or patient's who have heart rates ≥ 150 give one-half the dose of epinephrine (0.15 – 0.25 mg of 1:1000.) Epinephrine may precipitate cardiac ischemia. These patients should receive a 12 lead ECG at some point in their care, but this should NOT delay administration of epinephrine.
- **Pulse oximetry should be monitored continuously.**
- ETCO₂ should be used when Respiratory Distress is significant and does not respond to initial Beta-Agonist dose.
- A silent chest in respiratory distress is a pre-respiratory arrest sign.
- **EMT-B 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.



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

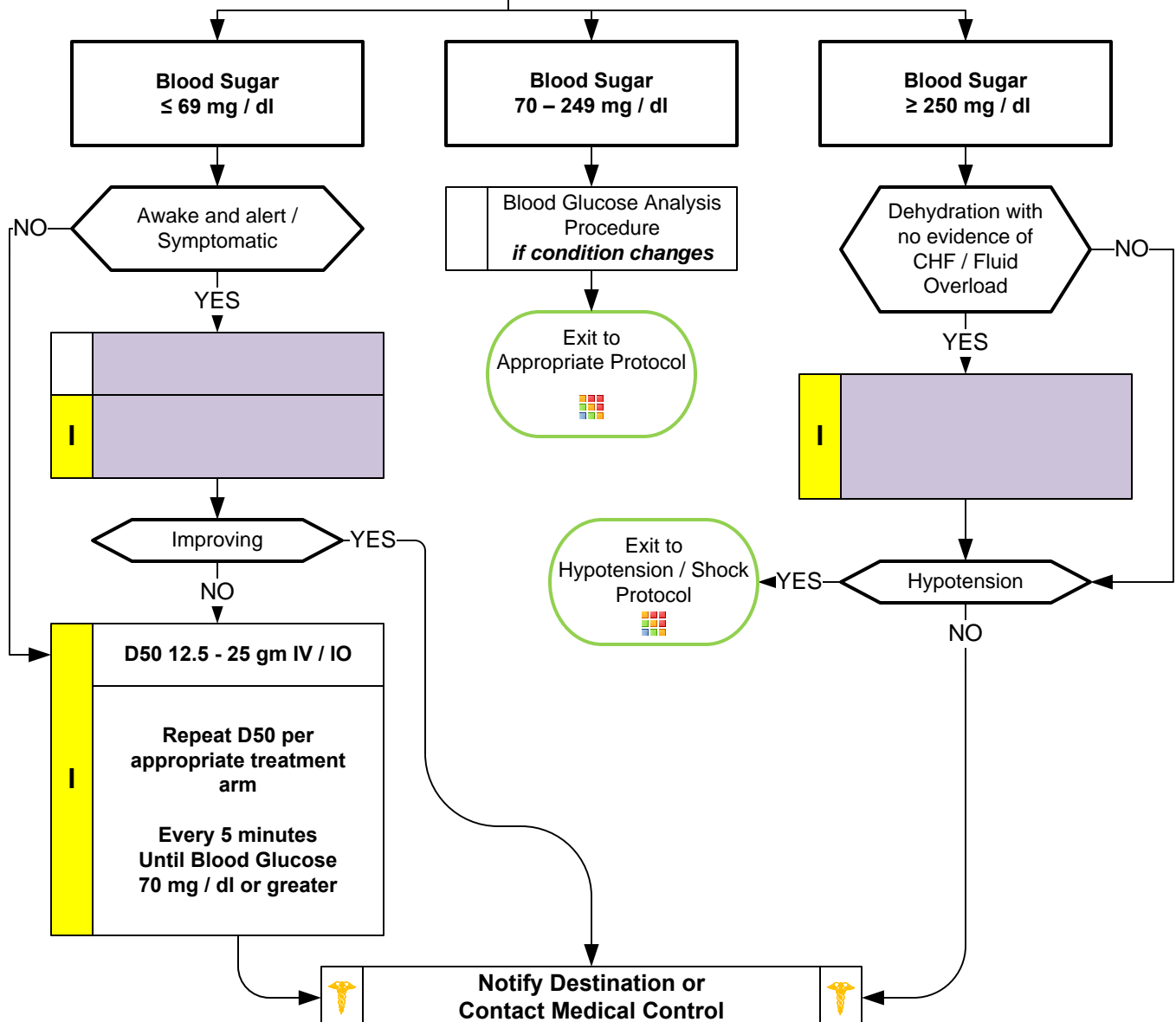
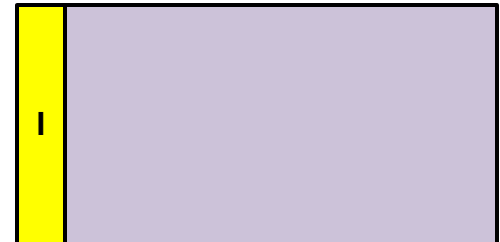
Differential

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

Altered Mental Status
Protocol
if indicated



	Blood Glucose Analysis Procedure	
B	12 Lead ECG Procedure <i>if indicated</i>	
P	Cardiac Monitor	
I	IV Procedure	P IO Procedure





Diabetic; Adult



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.
- In extreme circumstances with no IV and no response to glucagon, Dextrose 50 % can be administered rectally. Contact medical control for advice.
- Quality control checks should be maintained per manufacturers recommendation for all glucometers.
- **Patient's refusing transport to medical facility after treatment of hypoglycemia:**
- **Oral Agents:**
Patient's 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. Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.
- **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. Patient's who meet criteria to refuse care should be instructed to contact their physician immediately and consume a meal.



Dialysis / Renal Failure



History

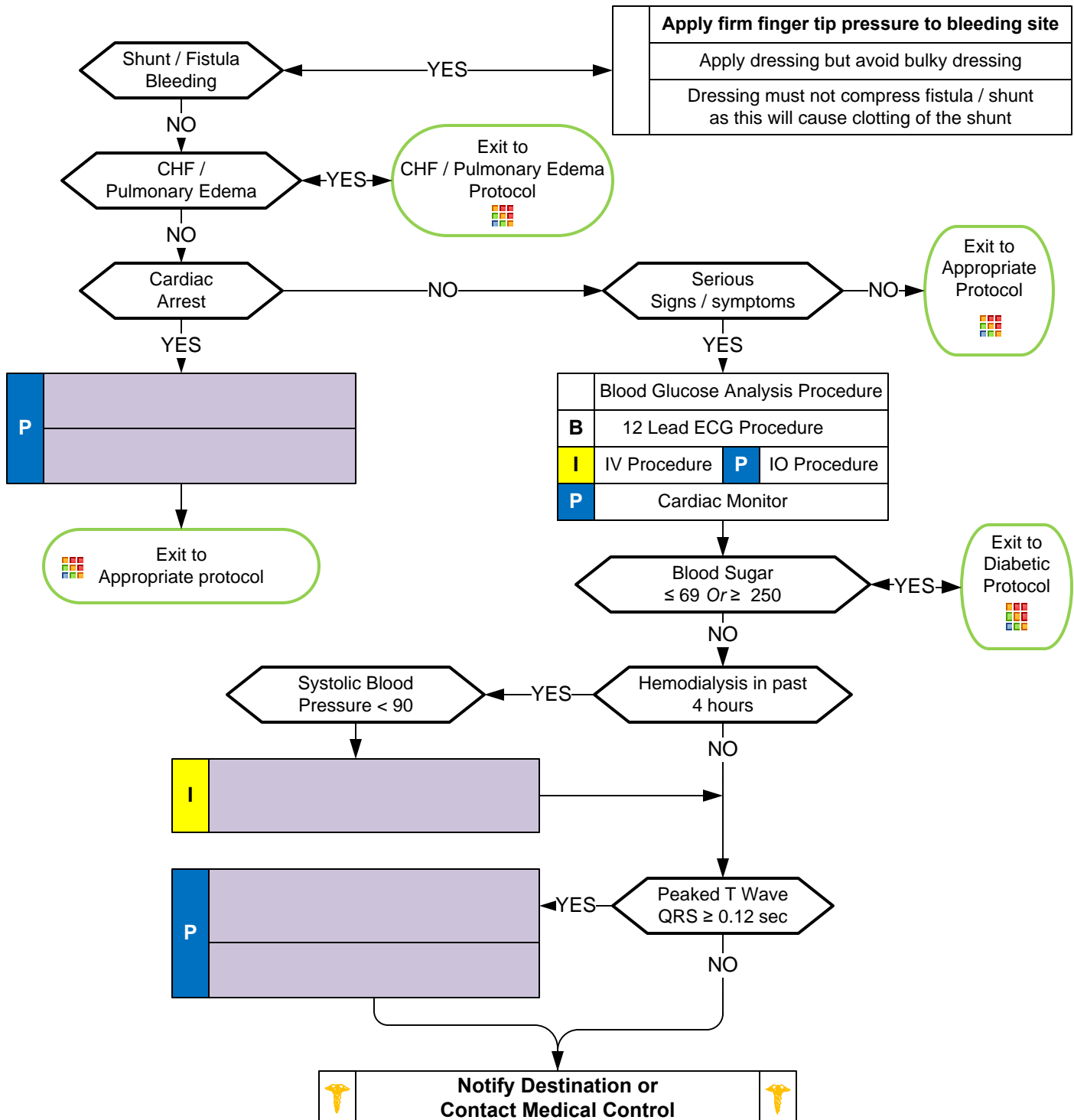
- Peritoneal or Hemodialysis
- Anemia
- Catheter access noted
- Shunt access noted
- Hyperkalemia

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



Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
- **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 other available access. IO if available.**
- **Use of tourniquet with uncontrolled dialysis fistula bleeding requires Contact of Medical Control.**
- 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

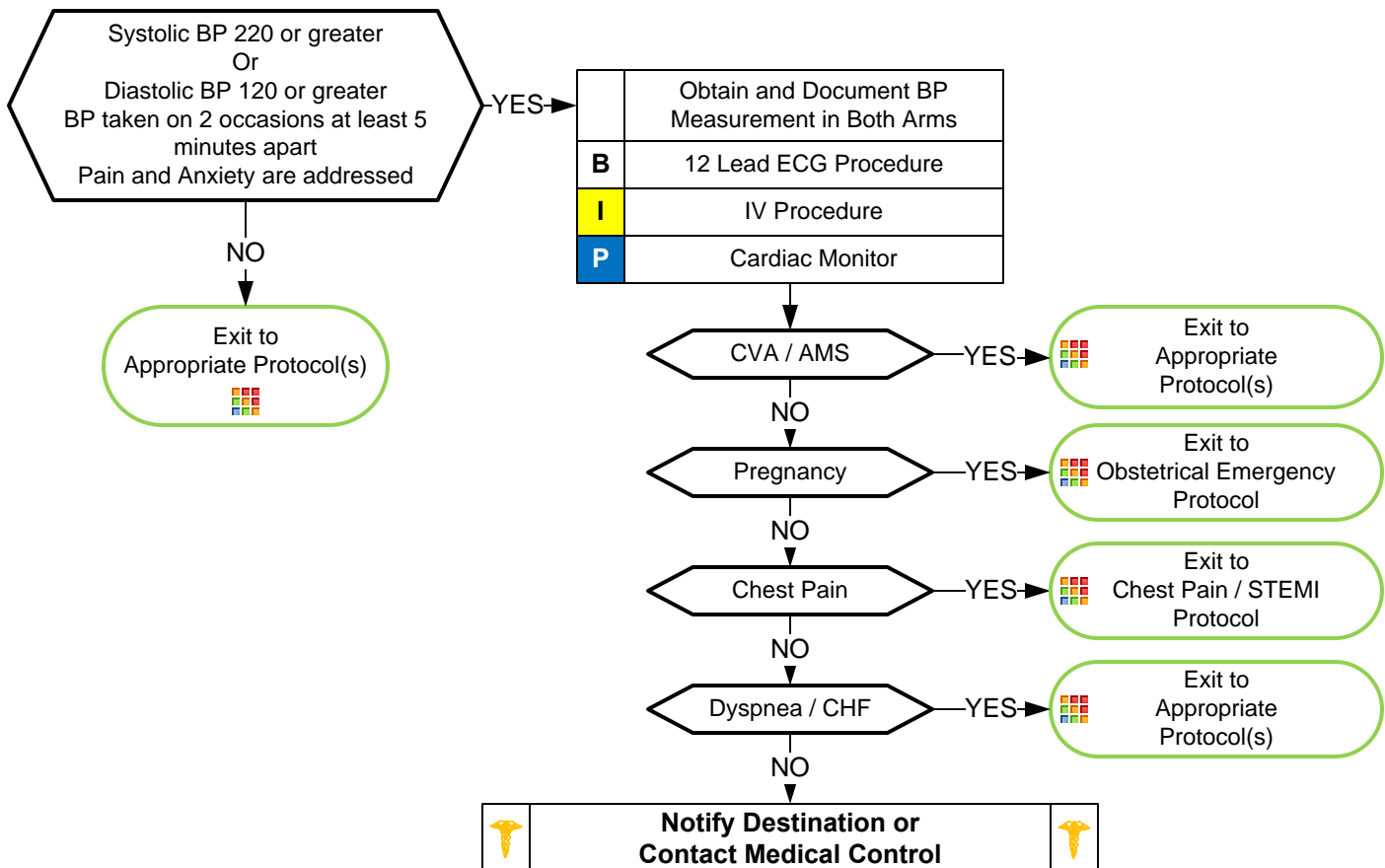
AND at least one of these

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

Differential

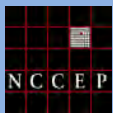
- Hypertensive encephalopathy
- Primary CNS Injury
Cushing's Response with
Bradycardia and
Hypertension
- Myocardial Infarction
- Aortic Dissection / Aneurysm
- Pre-eclampsia / Eclampsia

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

- Shock
 - Hypovolemic
 - Cardiogenic
 - Septic
 - Neurogenic
 - Anaphylactic
- Ectopic pregnancy
- Dysrhythmias
- Pulmonary embolus
- Tension pneumothorax
- Medication effect / overdose
- Vasovagal
- Physiologic (pregnancy)



Diabetic Protocol
if indicated

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

Cardiac / Arrhythmia
Protocol(s)
as indicated

History, Exam and
Circumstances Suggest
Type of Shock

Hypovolemic

	Spinal Immobilization Procedure <i>if indicated</i>
I	

Trauma

NO

YES

	Wound Care Procedures <i>as indicated</i> Control Hemorrhage
--	---

Exit to
Multiple Trauma
Protocol

Cardiogenic

	Right Sided MI
	NO
	YES
I	
P	

I	
P	

Notify Destination or
Contact Medical Control

Distributive

	Spinal Immobilization Procedure <i>if indicated</i>
I	
P	

Trauma

NO

YES

Exit to
Multiple Trauma
Protocol

Obstructive

	Spinal Immobilization Procedure <i>if indicated</i>
P	Chest Decompression- Needle Procedure <i>if indicated</i>
I	
P	

Trauma

NO

YES

Exit to
Multiple Trauma
Protocol



Hypotension / Shock



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.
- **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:**
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:** State where body cannot produce enough steroids (glucocorticoids / mineralocorticoids.) May have primary adrenal disease or more commonly have stopped a steroid like prednisone. Usually hypotensive with nausea, vomiting, dehydration and / or abdominal pain. If suspected EMT-P should give Methylprednisolone 125 mg IV / IO or Dexamethasone 10 mg IV / IO. May use steroid agent specific to your drug list.
- For non-cardiac, non-trauma hypotension, Dopamine should only be started after 2 liters of NS have been given.



Overdose / Toxic Ingestion



History

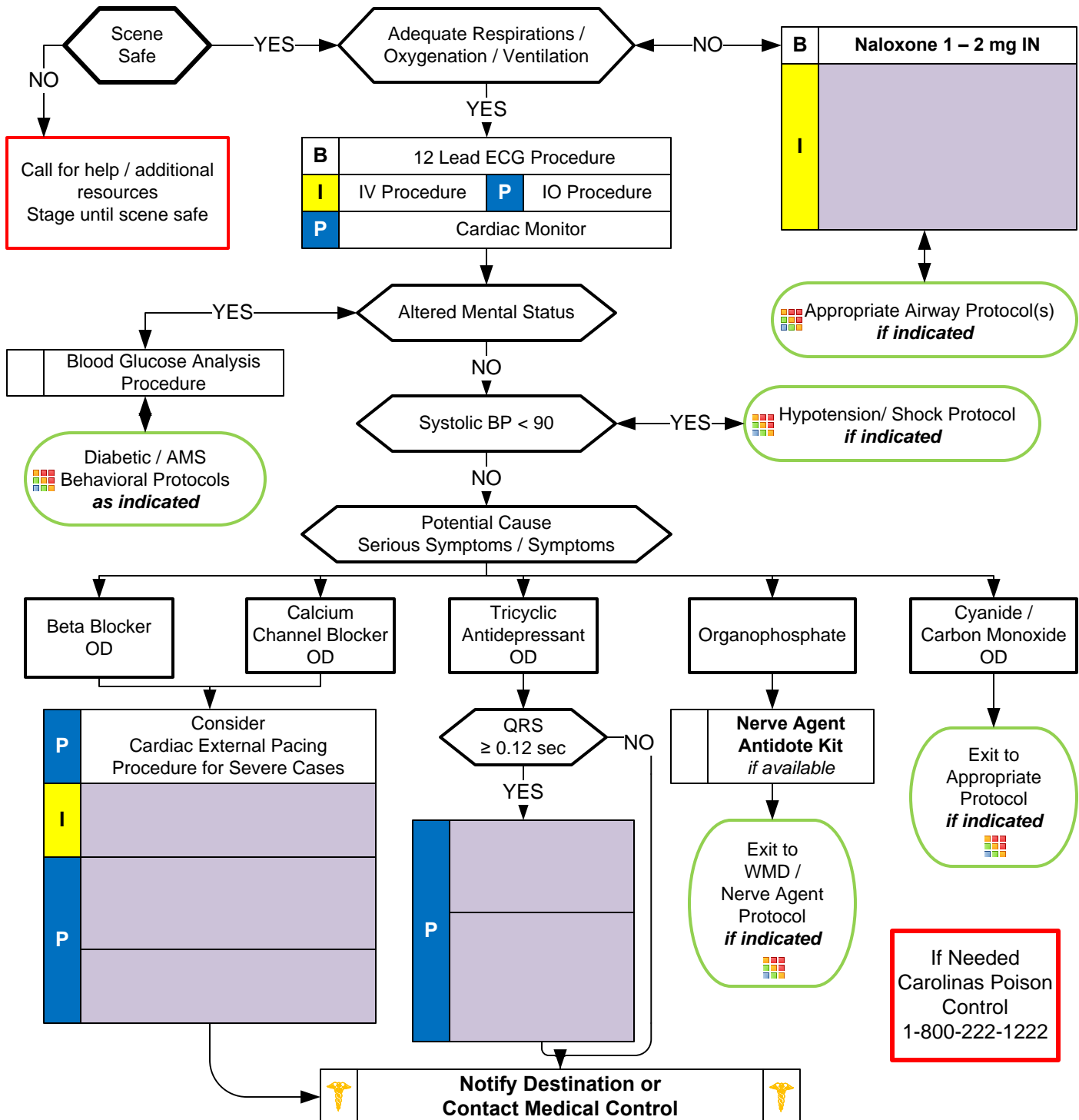
- Ingestion or suspected ingestion of a potentially toxic substance
- Substance ingested, route, quantity
- Time of ingestion
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications

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)



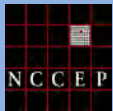


Overdose / Toxic Ingestion



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **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.**
- **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
- Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- **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.
- **EMT-B may administer naloxone by IN route only. May administer from EMS supply.** Agency medical director may require Contact of Medical Control prior to administration.
- **Consider contacting the North Carolina Poison Control Center for guidance.**



Seizure



History

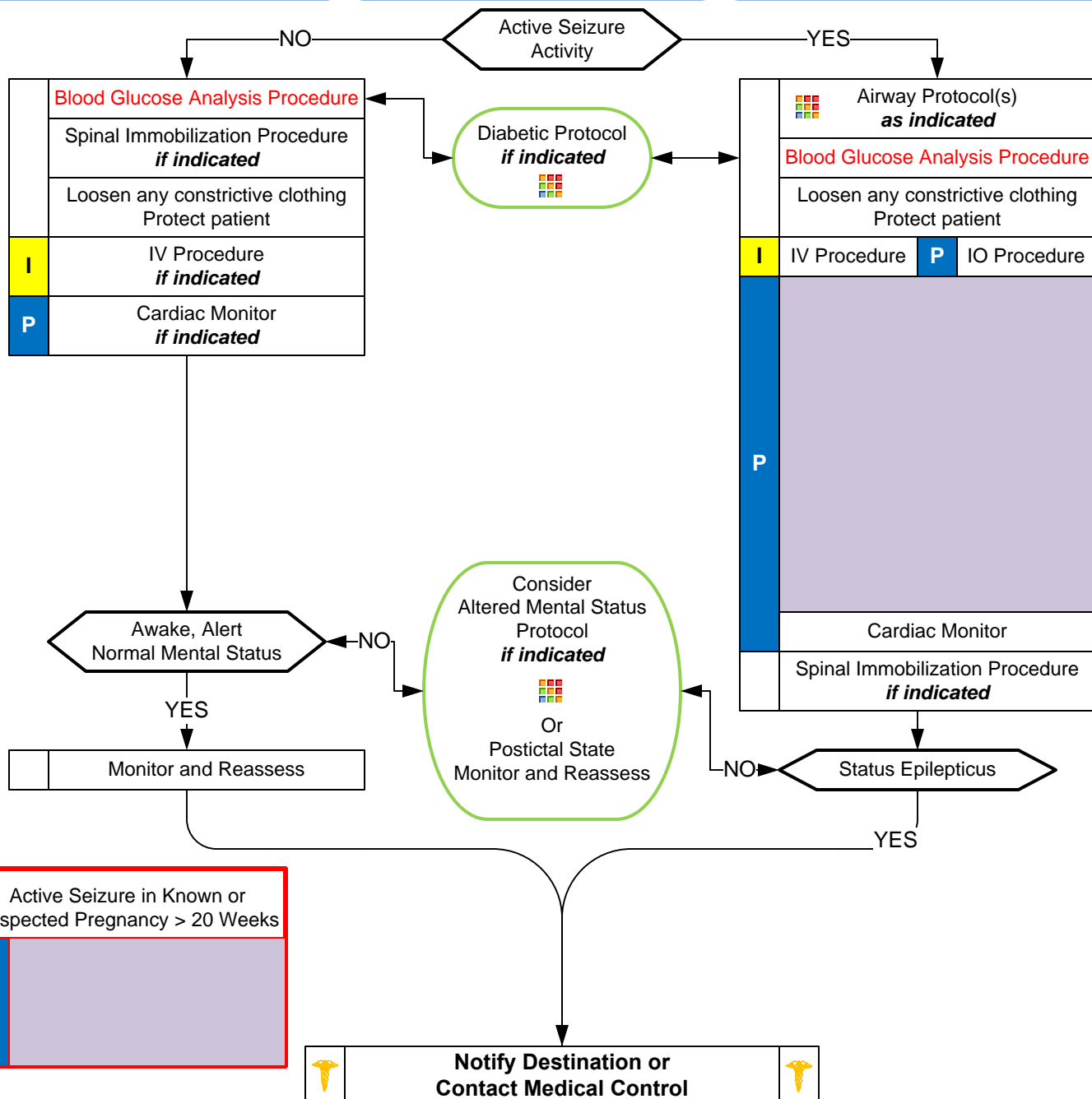
- Reported / witnessed seizure activity
- Previous seizure history
- Medical alert tag information
- Seizure medications
- History of trauma
- History of diabetes
- History of pregnancy
- Time of seizure onset
- Document number of seizures
- Alcohol use, abuse or abrupt cessation
- Fever

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





Seizure



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**
- **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.**
- **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 (petit mal)** effect only a part of the body and are not usually associated with a loss of consciousness
- Be prepared for airway problems and continued seizures.
- Assess possibility of occult trauma and substance abuse.
- 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.

Protocol 32

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



Suspected Stroke



History

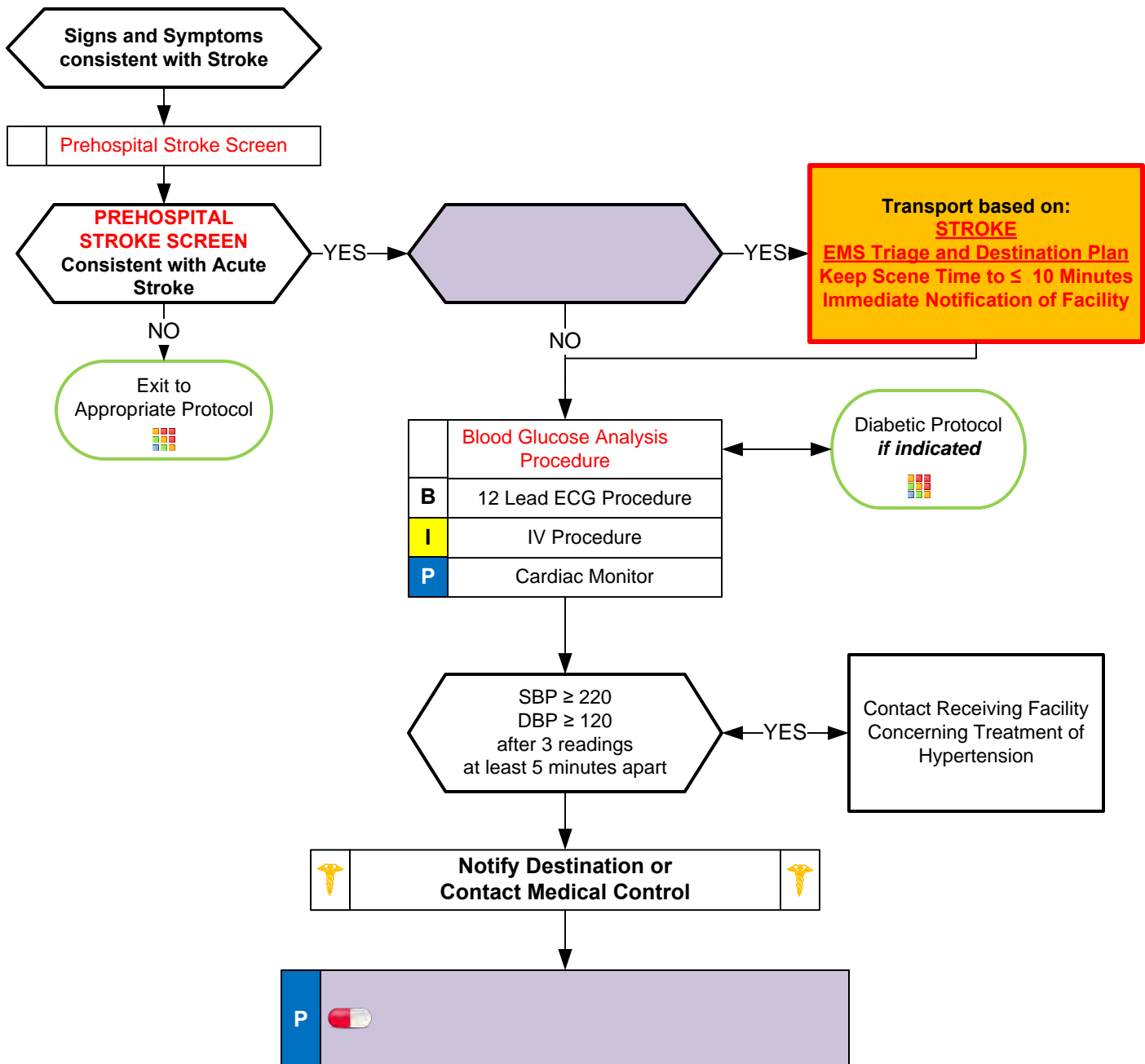
- Previous CVA, TIA's
- Previous cardiac / vascular surgery
- Associated diseases: diabetes, hypertension, CAD
- Atrial fibrillation
- Medications (blood thinners)
- History of trauma

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



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.
- The **Reperfusion Checklist** should be completed for any suspected stroke patient. With a duration of symptoms of less than , scene times should be limited to ≤ 10 minutes, early notification / activation of receiving facility should be performed and transport times should be minimized.
- **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.
- Document the Stroke Screen results in the PCR.
- Agencies may use validated pre-hospital stroke screen of choice.



Syncope



History

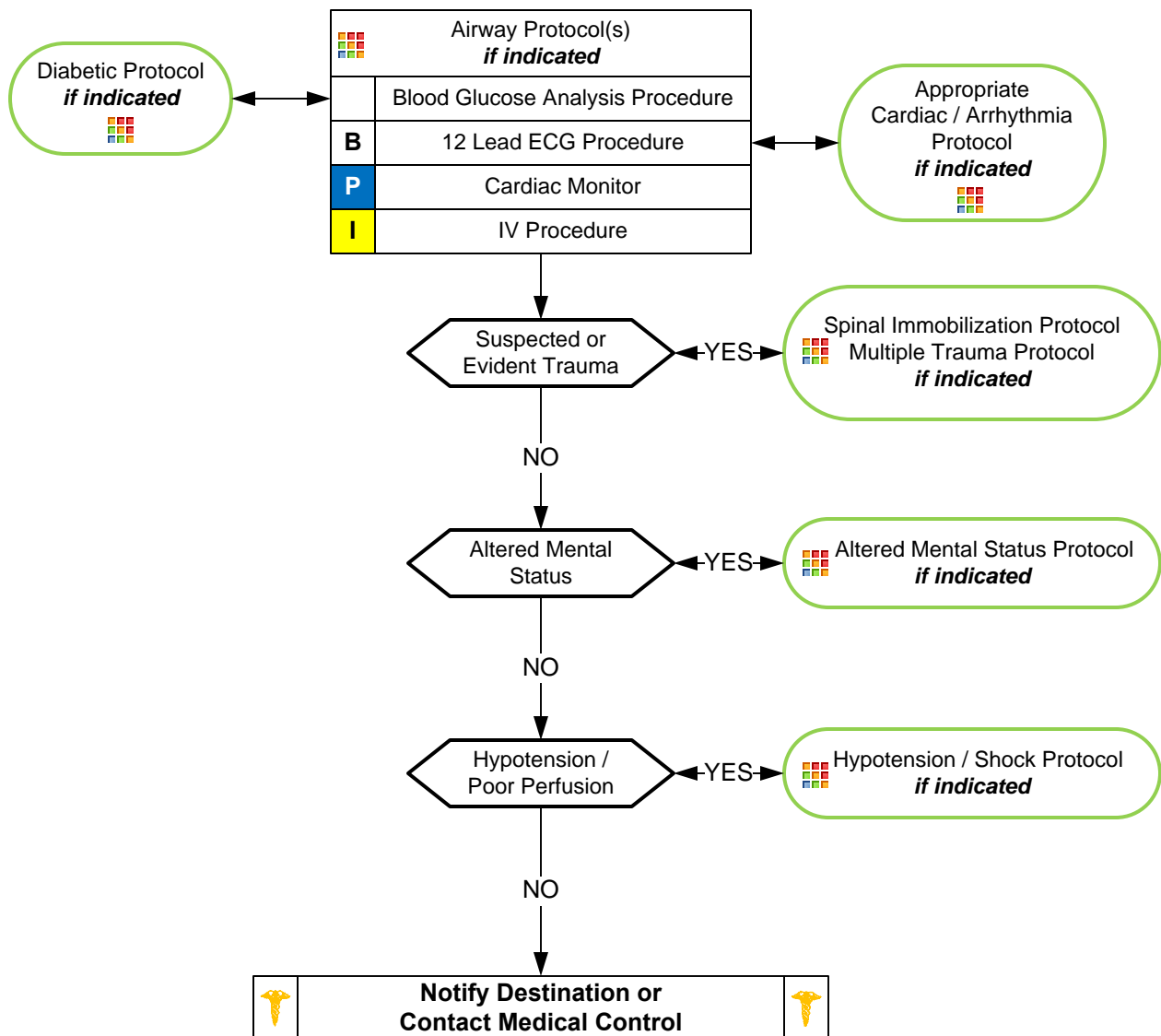
- Cardiac history, stroke, seizure
- Occult blood loss (GI, ectopic)
- Females: LMP, vaginal bleeding
- Fluid loss: nausea, vomiting, diarrhea
- Past medical history
- Medications

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





Syncope



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- 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.
- More than 25% of geriatric syncope is cardiac dysrhythmia based.

Protocol 34

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



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

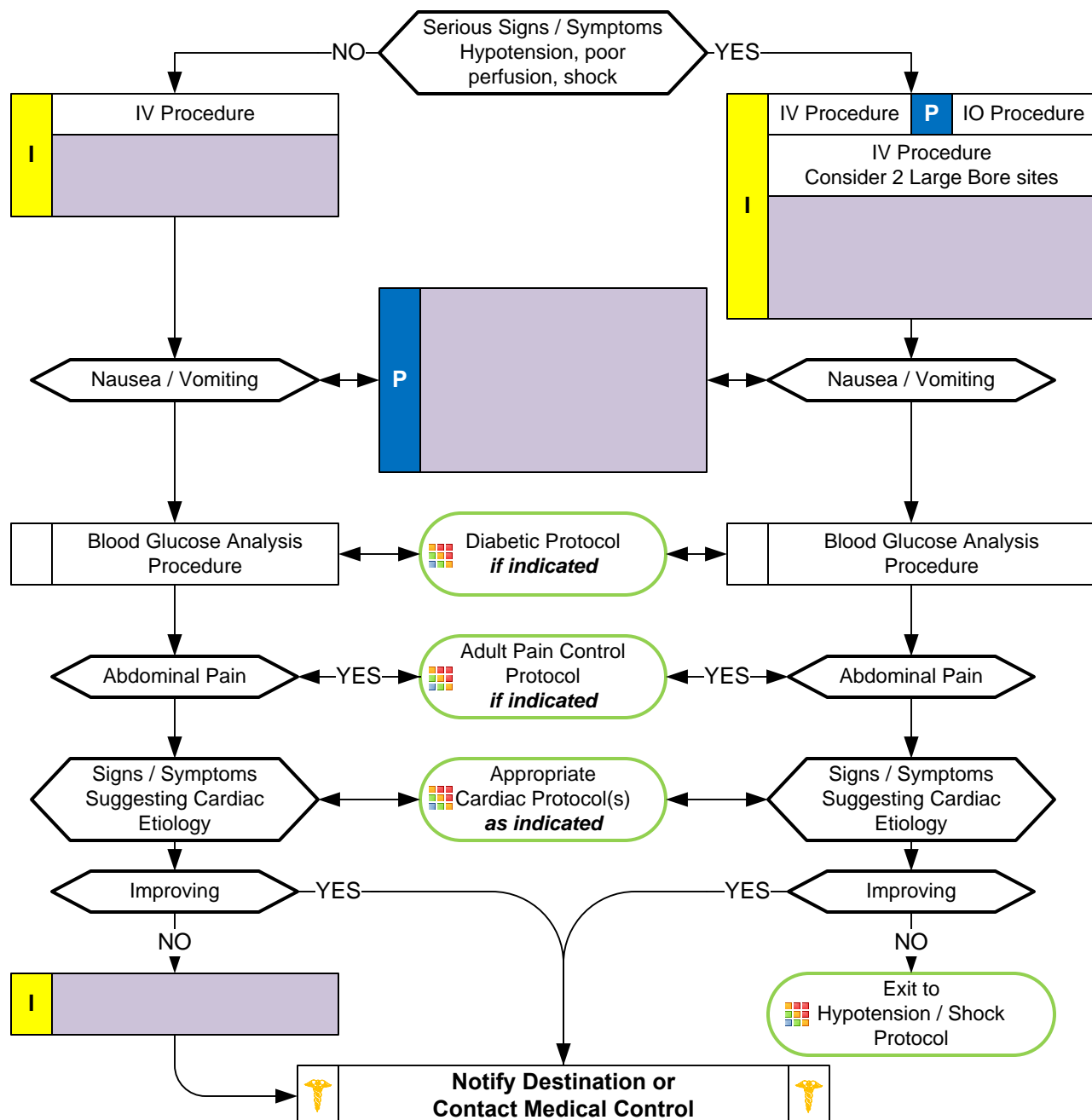
- Pain
- Character of pain (constant, intermittent, sharp, dull, etc.)
- Distention
- Constipation
- Diarrhea
- Anorexia
- Radiation

Associated symptoms: (Helpful to localize source)

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
- Gynecologic disease (ovarian cyst, PID)
- Infections (pneumonia, influenza)
- Electrolyte abnormalities
- Food or toxin induced
- Medication or Substance abuse
- Pregnancy
- Psychological





Vomiting and Diarrhea



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- The use of metoclopramide (Reglan) may worsen diarrhea and should be avoided in patients with this symptom.
- Choose the lower dose of promethazine (Phenergan) for patients likely to experience sedative effects (e.g., Age \geq 60, debilitated, etc.) When giving promethazine IV dilute with 10 mL of normal saline and administer slowly.
- Document the mental status and vital signs prior to administration of Promethazine (Phenergan).
- Isolated vomiting in pediatrics may be caused by pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures).



Childbirth / Labor



History

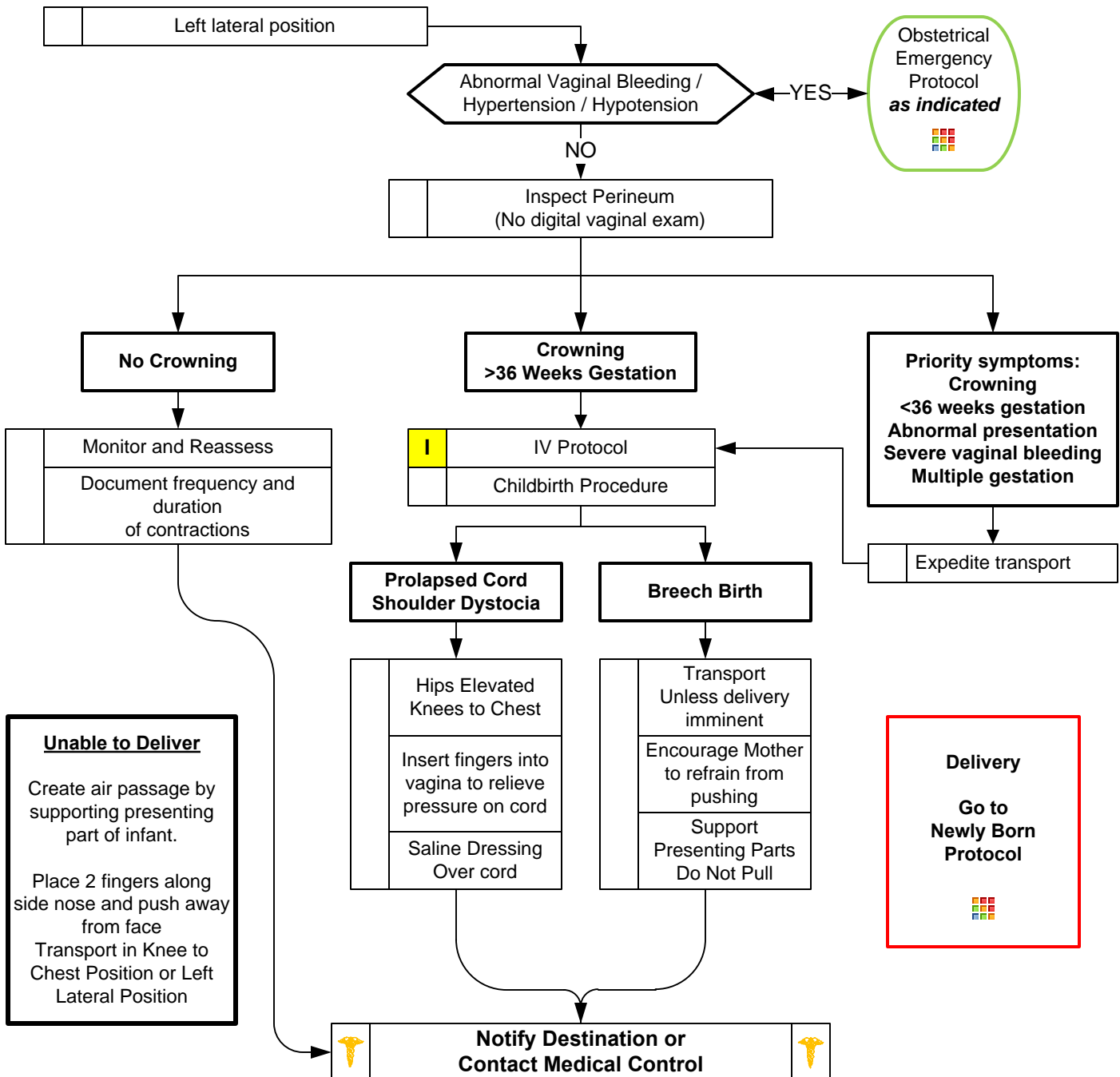
- Due date
- Time contractions started / how often
- Rupture of membranes
- Time / amount of any vaginal bleeding
- Sensation of fetal activity
- Past medical and delivery history
- Medications
- Gravida / Para Status
- High Risk pregnancy

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

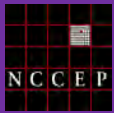


Pearls

- **Recommended Exam (of Mother): Mental Status, Heart, Lungs, Abdomen, Neuro**
- Document all times (delivery, contraction frequency, and length).
- If maternal seizures occur, refer to the Obstetrical Emergencies Protocol.
- After delivery, massaging the uterus (lower abdomen) will promote uterine contraction and help to control post-partum bleeding.
- Some perineal bleeding is normal with any childbirth. Large quantities of blood or free bleeding are abnormal.
- Record APGAR at 1 minute and 5 minutes after birth.

Protocol 37

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



Newly Born



History

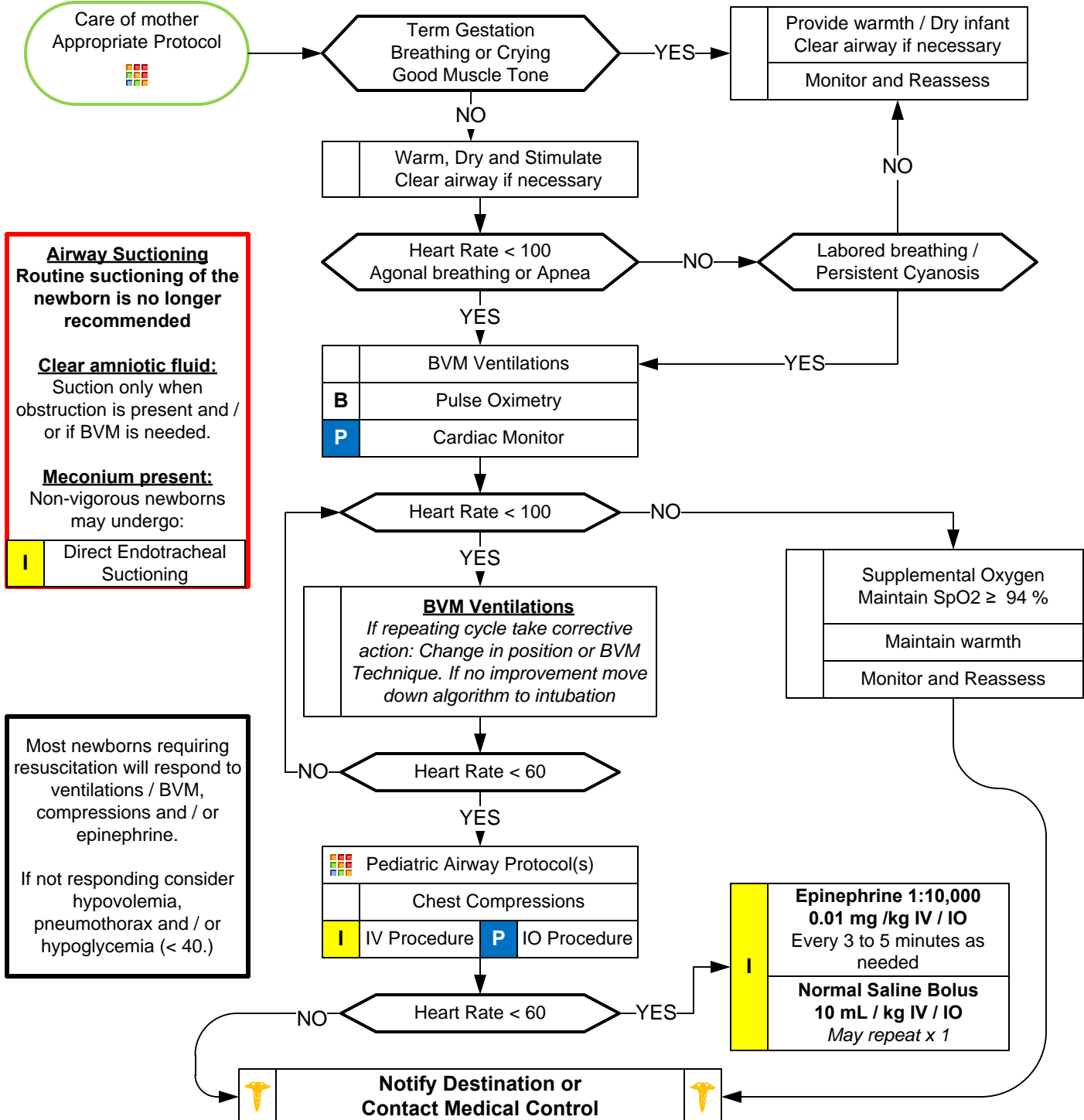
- Due date and gestational age
- Multiple gestation (twins etc.)
- Meconium
- Delivery difficulties
- Congenital disease
- Medications (maternal)
- Maternal risk factors
 - substance abuse
 - smoking

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
- Congenital heart disease
- Hypothermia



Airway Suctioning
Routine suctioning of the newborn is no longer recommended

Clear amniotic fluid:
Suction only when obstruction is present and / or if BVM is needed.

Meconium present:
Non-vigorous newborns may undergo:

I Direct Endotracheal Suctioning

Most newborns requiring resuscitation will respond to ventilations / BVM, compressions and / or epinephrine.

If not responding consider hypovolemia, pneumothorax and / or hypoglycemia (< 40.)

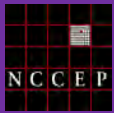


Newly Born



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Chest, Heart, Abdomen, Extremities, Neuro**
- **Term gestation, strong cry / breathing and with good muscle tone generally will need no resuscitation.**
- **Most important vital signs in the newly born are respirations / respiratory effort and heart rate.**
- Heart rate best assessed by auscultation of the precordial pulse followed palpation of the umbilical pulse.
- Pulse oximetry should be applied to the right side of the body.
- **Expected pulse oximetry readings:** Following birth at 1 minute = 60 - 65 %, 2 minutes = 65 – 70%, 3 minutes = 70 – 75 %, 4 minutes = 75 – 80 %, 5 minutes = 80 – 85 % and 10 minutes = 85 – 95%.
- CPR in infants is 120 compressions/minute with a 3:1 compression to ventilation ratio.
- It is extremely important to keep infant warm
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended-supportive care only).
- Consider hypoglycemia in infant.
- D10 = D50 diluted (1 ml of D50 with 4 ml of Normal Saline)
- Document 1 and 5 minute Apgars in PCR



Obstetrical Emergency



History

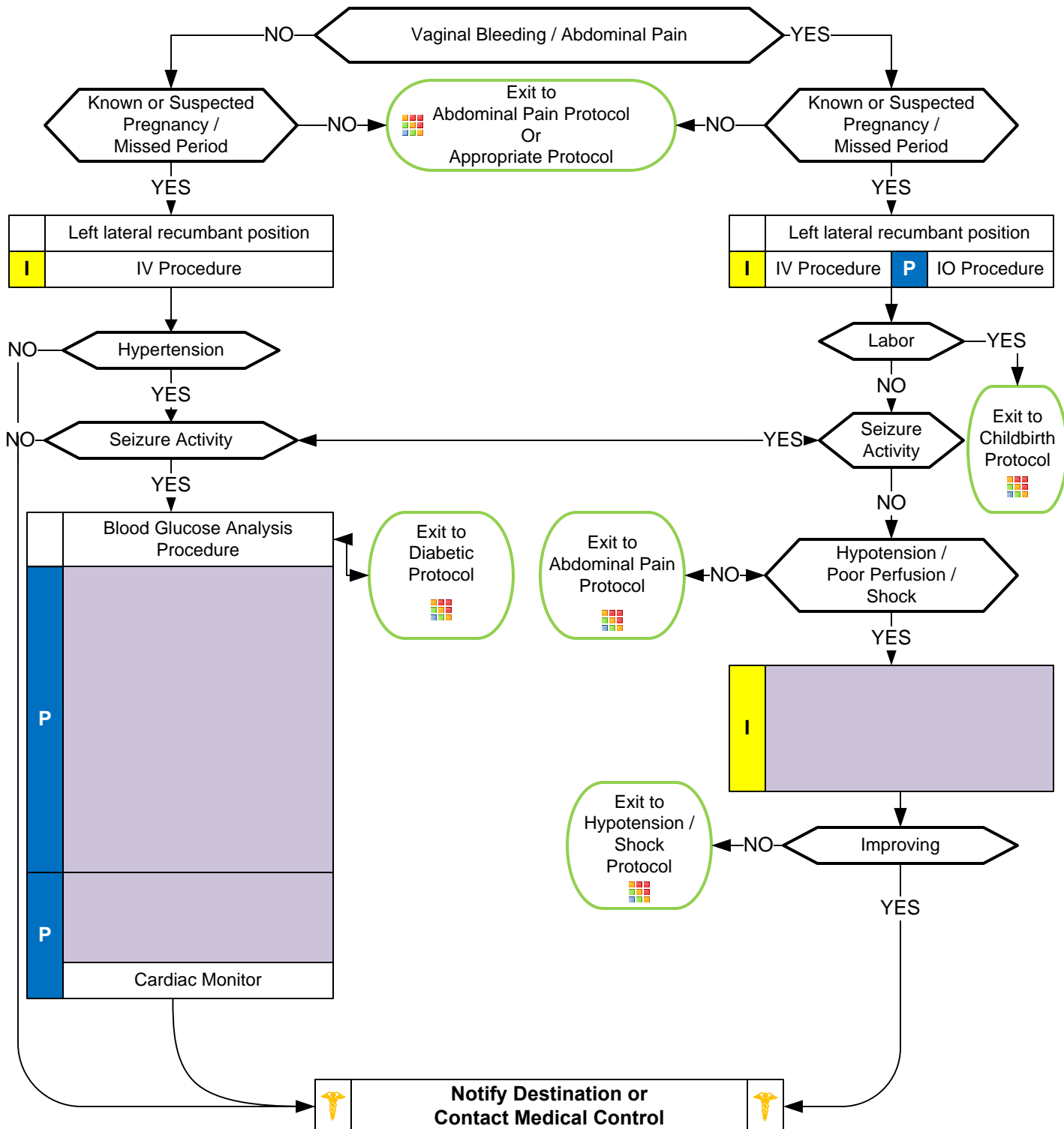
- Past medical history
- Hypertension meds
- Prenatal care
- Prior pregnancies / births
- Gravida / Para

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



Pearls

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- Severe headache, vision changes, or RUQ pain may indicate preeclampsia.
- 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.
- Maintain patient in a left lateral position to minimize risk of supine hypotensive syndrome.
- Ask patient to quantify bleeding - number of pads used per hour.
- 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.
- Magnesium may cause hypotension and decreased respiratory drive. Use with caution.
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO access.**



Adult 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

Minor Burn

Serious Burn

Critical Burn

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

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)

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

Remove Rings, Bracelets /
Constricting Items

Dry Clean Sheet or Dressings

Adult Multiple Trauma Protocol
if indicated

Adult Airway Protocol(s)
as indicated

IV Procedure
if indicated

Normal Saline
0.25 mL / kg (x % TBSA) / hr
for up to the first 8 hours.
(More info below)
Lactated Ringers
if available

Adult Pain Control Protocol
if indicated

Carbon Monoxide /
Cyanide Exposure

Transport Facility of Choice

Remove Rings, Bracelets / Constricting Items

Dry Clean Sheet or Dressings

Adult Multiple Trauma Protocol
if indicated

Adult Airway Protocol(s)
as indicated

IV Procedure
Consider 2 IV sites if greater than 15 % TBSA

IO Procedure *if indicated*

Normal Saline
0.25 mL / kg (x % TBSA) / hr
for up to the first 8 hours.
(More info below)
Lactated Ringers
if available

Adult Pain Control Protocol
if indicated

Carbon Monoxide /
Cyanide Exposure

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

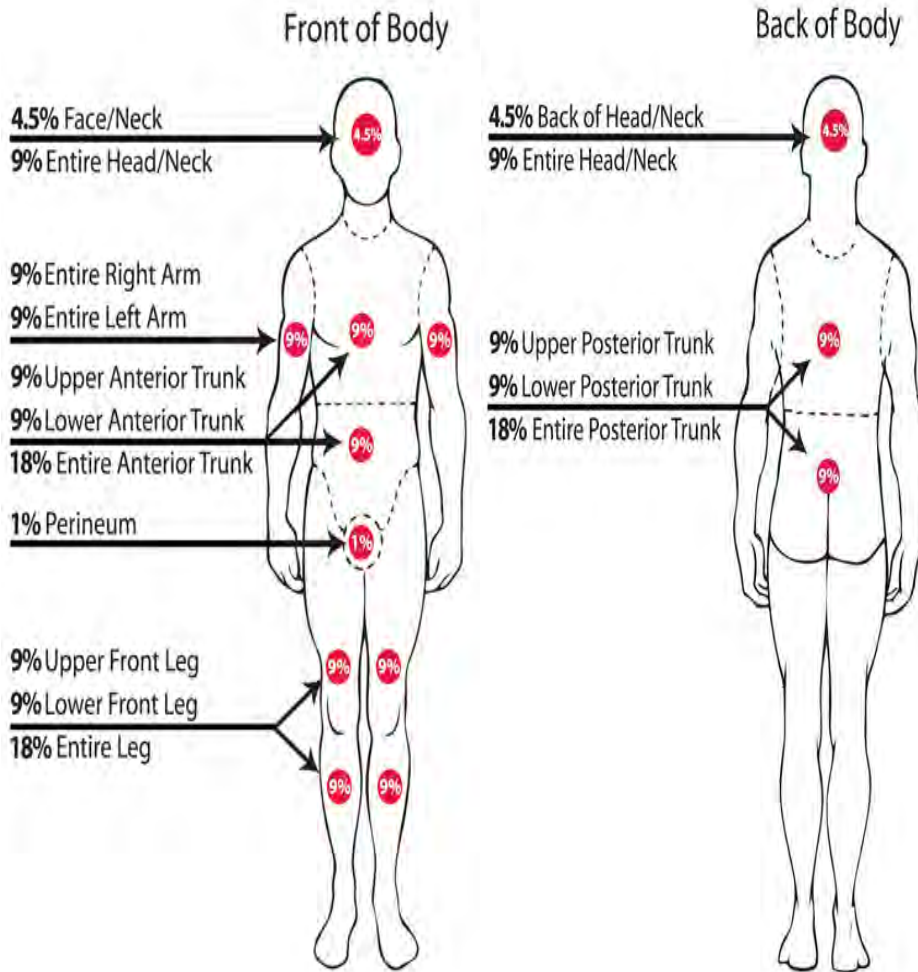
Notify Destination or
Contact Medical Control

1. Lactated Ringers preferred over Normal Saline. Use if available, if not change over once available.
2. Formula example; an 80 kg (196 lbs.) patient with 50% TBSA will need 1000 cc of fluid per hour.

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

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.

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 child abuse with children and burn injuries.
- Never administer IM pain injections to a burn patient.



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

DO NOT HYPERVENTILATE

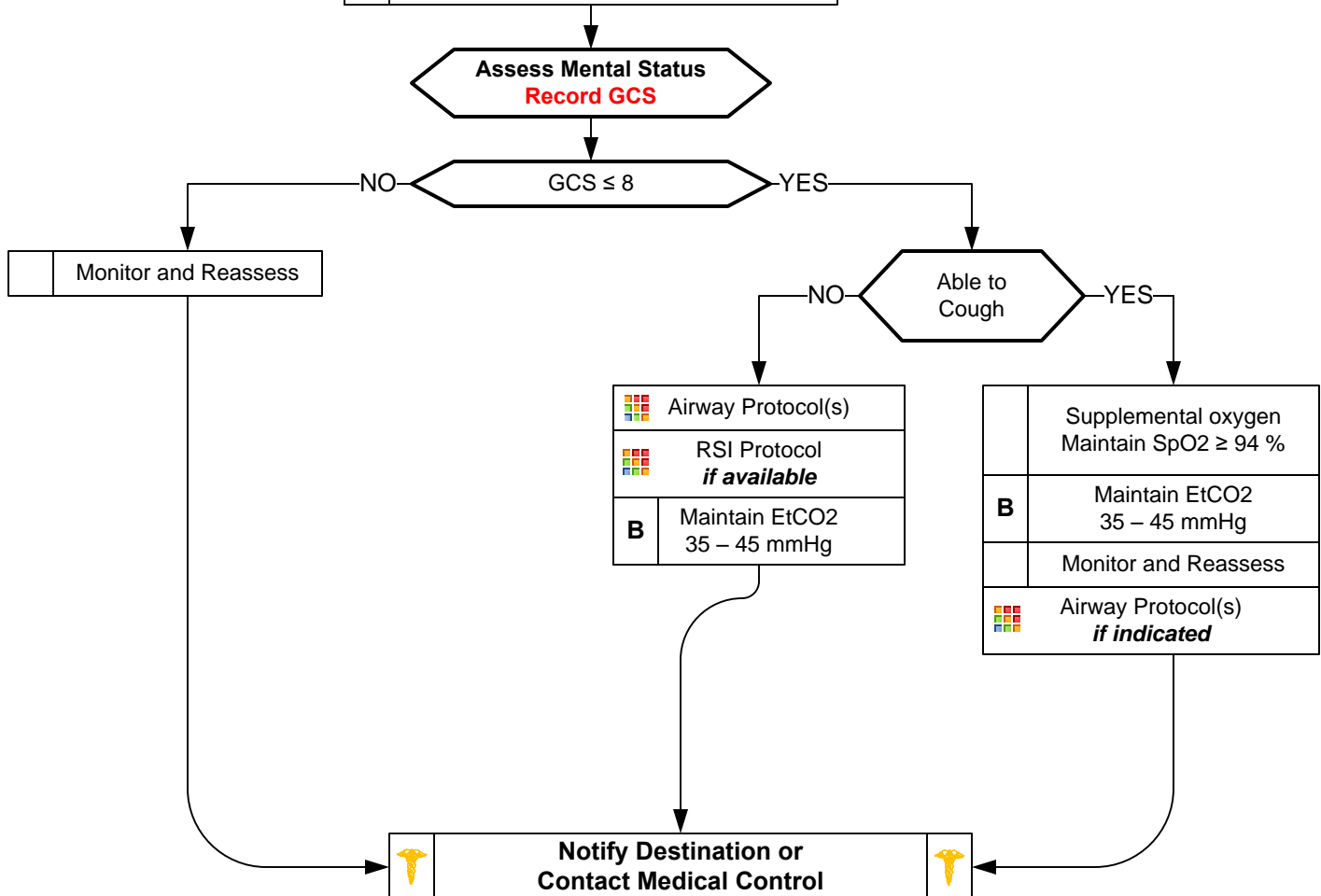
Ventilate 8 – 10 Breaths
per minute to maintain
EtCO₂ 35 – 45 mmHg

Spinal Immobilization Protocol <i>if indicated</i>	
Adult Multiple Trauma Protocol <i>if indicated</i>	
I IV Procedure	P IO Procedure
Altered Mental Status Protocol <i>if indicated</i>	
Seizure Protocol <i>if indicated</i>	
Blood Glucose Analysis Procedure	

Brain Herniation

Unilateral or Bilateral Dilation of
Pupils / Posturing

Hyperventilate 14 – 16 Breaths
per minutes to maintain
EtCO₂ 30 – 35 mmHg





Head Trauma



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.**
- **If GCS < 12 consider air / rapid transport**
- **In areas with short transport times, RSI/Drug-Assisted Intubation is not recommended for patients who are spontaneously breathing and who have oxygen saturations of $\geq 90\%$ with supplemental oxygen including BIAD / BVM.**
- Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
- Hypotension usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
- 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.
- Limit IV fluids unless patient is hypotensive.
- Concussions are 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.

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Multiple Trauma



History

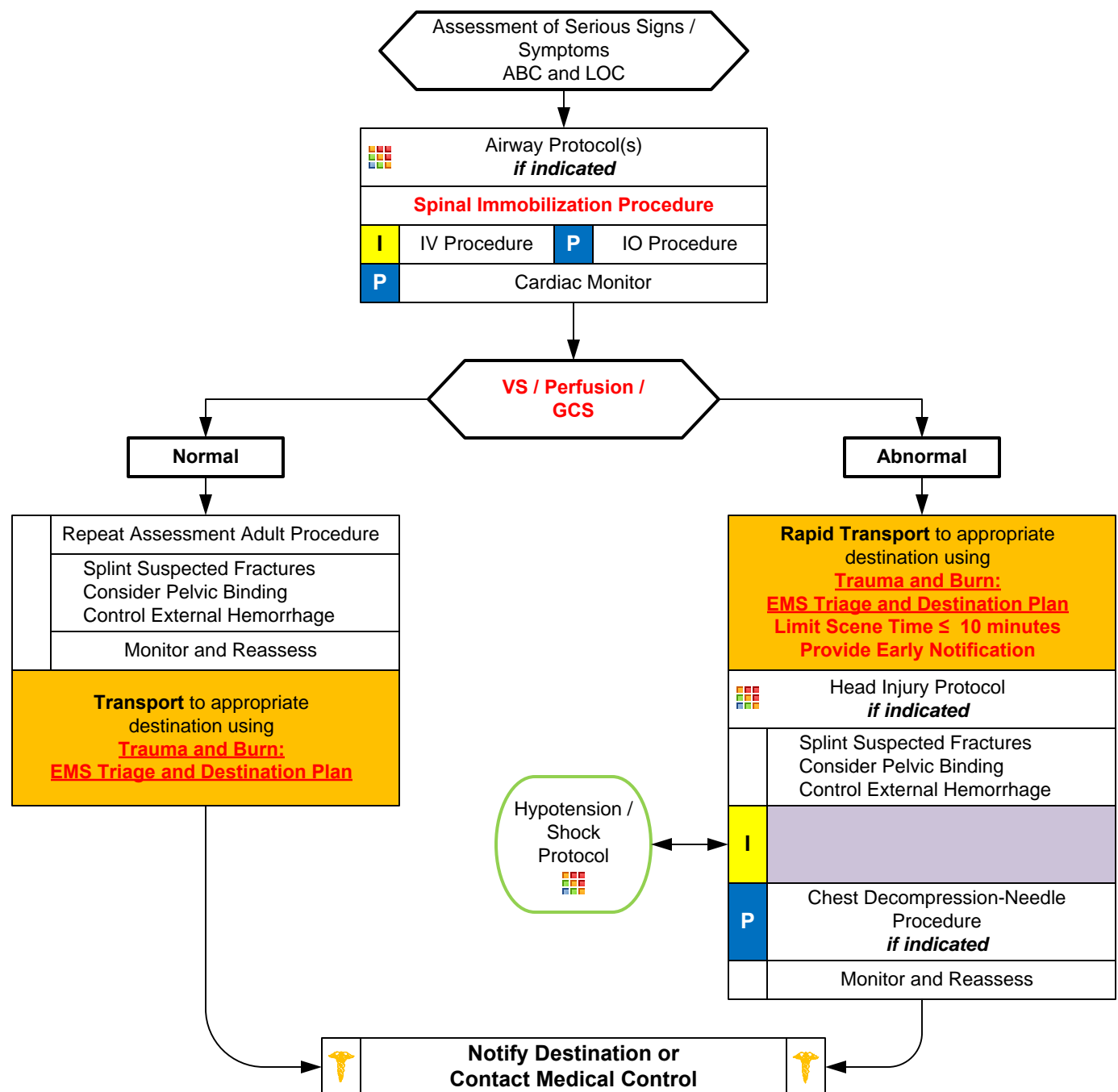
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints / protective equipment
- Past medical history
- Medications

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



Pearls

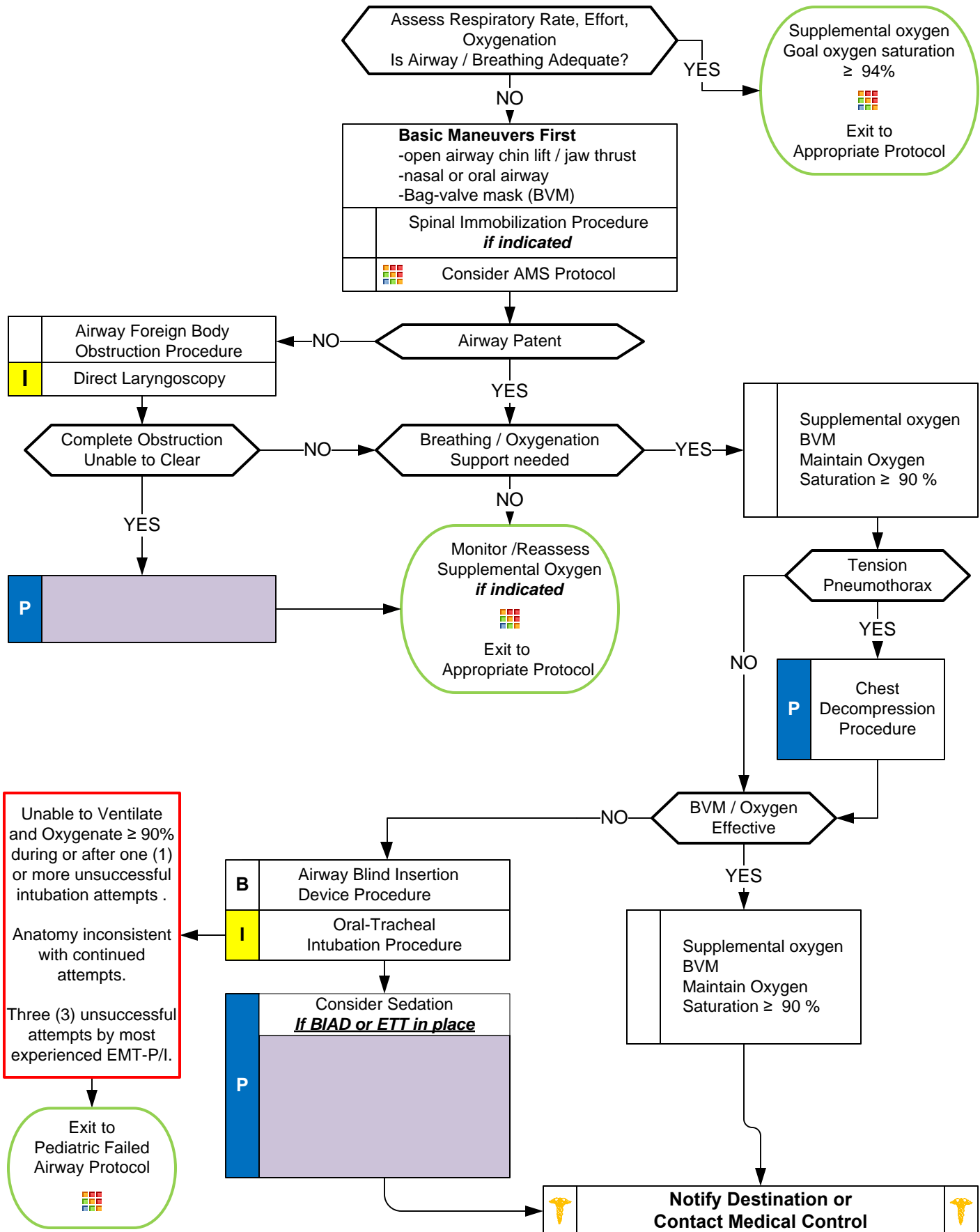
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lung, Abdomen, Extremities, Back, Neuro**
- **Items in Red Text are key performance measures used in the EMS Acute Trauma Care Toolkit**
- **Transport Destination is chosen based on the EMS System Trauma Plan with EMS pre-arrival notification.**
- **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.**
- **Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained $\geq 90\%$**
- Geriatric patients should be evaluated with a high index of suspicion. Often occult injuries are more difficult to recognize and patients can decompensate unexpectedly with little warning.
- Mechanism is the most reliable indicator of serious injury.
- In prolonged extrications or serious trauma, consider air transportation for transport times and the ability to give blood.
- Do not overlook the possibility of associated domestic violence or abuse.

Protocol 42

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



Pediatric Airway





Pediatric Airway



Pearls

- For this protocol, pediatric is defined as less than ≤ 11 years of age or any patient which can be measured within the Broselow-Luten tape.
- Capnometry (color) or capnography is mandatory with all methods of intubation. Document results.
- Continuous capnography (EtCO₂) is strongly recommended with BIAD or endotracheal tube use.
- 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.
- Ventilatory rate should be 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 12 per minute. Maintain a EtCO₂ between 35 and 45 and avoid hyperventilation.
- Hyperventilation in deteriorating head trauma should only be done to maintain a pCO₂ of 30-35.
- It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.
- Do not attempt intubation in patients who maintain a gag reflex.
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- Cricoid pressure and BURP maneuver may be used to assist with difficult intubations. They may worsen view in some cases.
- 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.



Pediatric Failed Airway

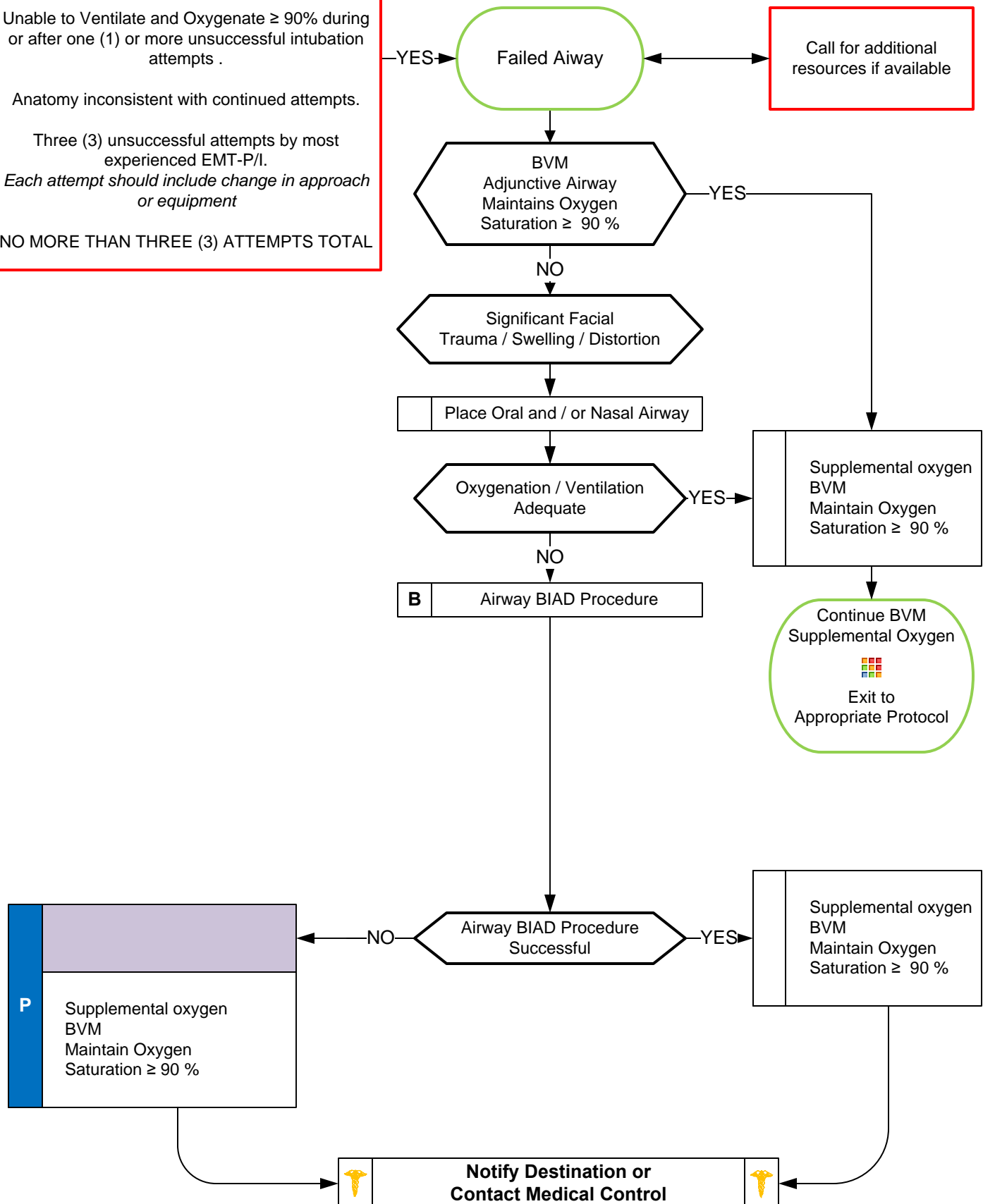


Unable to Ventilate and Oxygenate $\geq 90\%$ during or after one (1) or more unsuccessful intubation attempts .

Anatomy inconsistent with continued attempts.

Three (3) unsuccessful attempts by most experienced EMT-P/I.
Each attempt should include change in approach or equipment

NO MORE THAN THREE (3) ATTEMPTS TOTAL





Pediatric Failed Airway



Pearls

- For this protocol, pediatric is defined as less than ≤ 11 years of age or any patient which can be measured within the Broselow-Luten tape.
- Capnometry (color) or capnography is mandatory with all methods of intubation. Document results.
- Continuous capnography (EtCO₂) is strongly recommended with BIAD or endotracheal tube use.
- 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.
- Ventilatory rate should be 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 12 per minute. Maintain a EtCO₂ between 35 and 45 and avoid hyperventilation.
- Hyperventilation in deteriorating head trauma should only be done to maintain a pCO₂ of 30-35.
- It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation 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
- Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- Cricoid pressure and BURP maneuver may be used to assist with difficult intubations. They may worsen view in some cases.
- 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.

Protocol 45



Pediatric 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)

Allow for position of maximum comfort unless contraindicated

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	
I	Consider IV Procedure <i>if indicated</i>
	Monitor and Reassess every 5 minutes

	IV Procedure	P	IO Procedure
I			
	Cardiac Monitor		
P			
	Monitor and Reassess Every 5 minutes following sedative		
	Monitor and Reassess every 5 minutes		

**Notify Destination or
Contact Medical Control**

Pediatric General Section Protocols

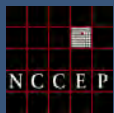
Pearls

- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- Pain severity (0-10) is a vital sign to be recorded pre and post IV or IM medication delivery and at disposition.
- For children use Wong-Baker faces scale or the FLACC score (see Assessment Pain Procedure)
- Vital signs should be obtained pre, 5 minutes post, and at disposition with all pain medications.
- Contraindications to Narcotic use include hypotension, head injury, or respiratory distress.
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction.
- **Ibuprofen / Ketorolac** should not be given if there is abdominal pain, history of gastritis, stomach ulcers, fracture, or if patient will require sedation.
- Do not administer any PO medications for patients who may need surgical intervention such as open fractures or fracture deformities.
- Use Numeric (> 9 yrs), Wong-Baker faces (4-16yrs) or FLACC scale (0-7 yrs) as needed to assess pain
- Consider agency-specific anti-emetic(s) for nausea and/or vomiting.

Protocol 46

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Pediatric Bradycardia



History

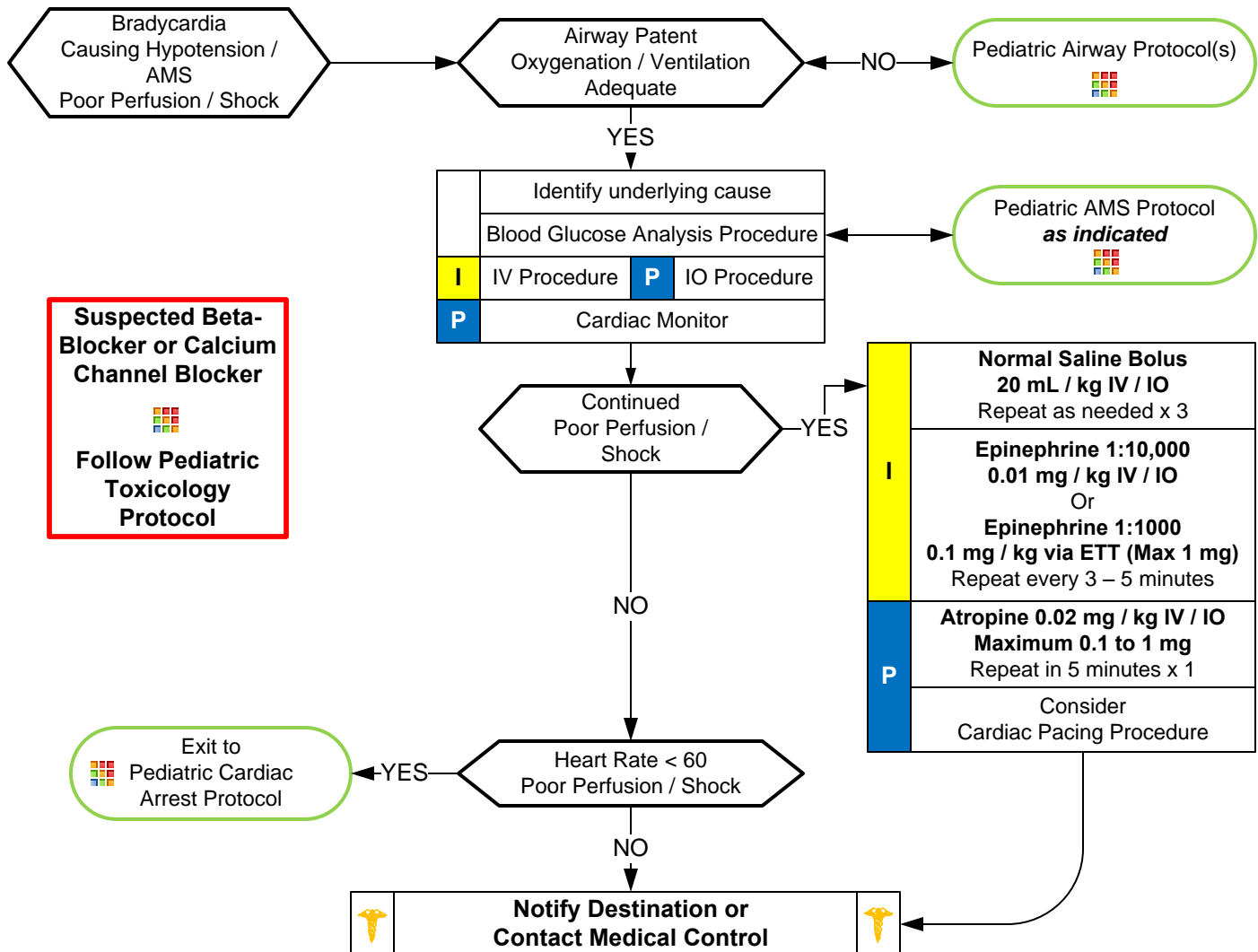
- Past medical history
- Foreign body exposure
- Respiratory distress or arrest
- Apnea
- Possible toxic or poison exposure
- Congenital disease
- Medication (maternal or infant)

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



Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Use Broselow-Luten Tape for drug dosages if applicable.**
- Infant ≤ 1 year of age
- The majority of pediatric arrests are due to airway problems.
- Most maternal medications pass through breast milk to the infant.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia.
- Pediatric patients requiring external transcutaneous pacing require the use of pads appropriate for pediatric patients per the manufacturers guidelines.
- Minimum Atropine dose is 0.1 mg IV.



Pediatric Pulmonary Edema / CHF



History

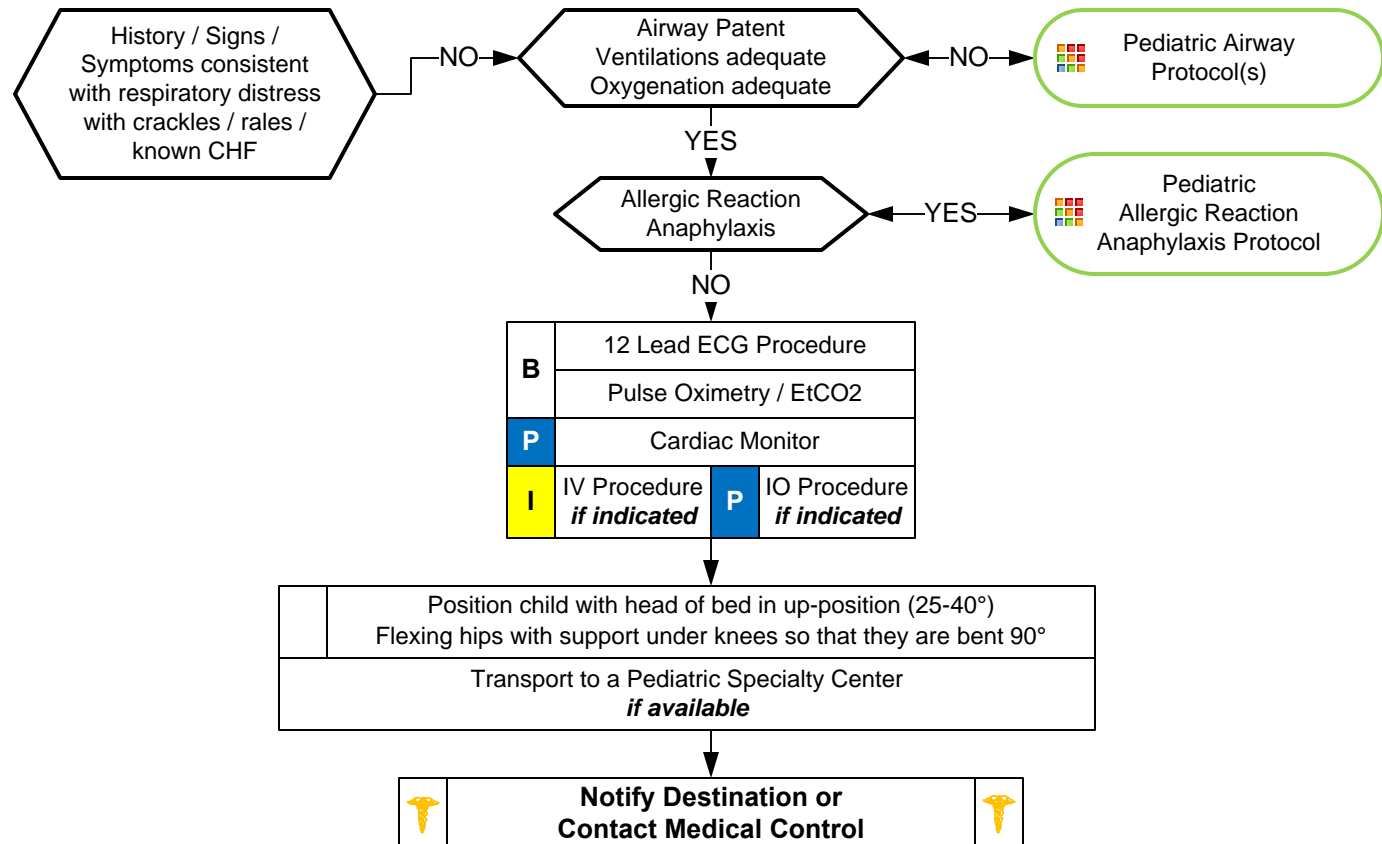
- Congenital Heart Disease
- Chronic Lung Disease
- Congestive heart failure
- Past medical history

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



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.
 - Dopamine 2 – 20 mcg/kg IV / IO. Titrate to age specific systolic blood pressure.
- 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 Pulseless Arrest



History

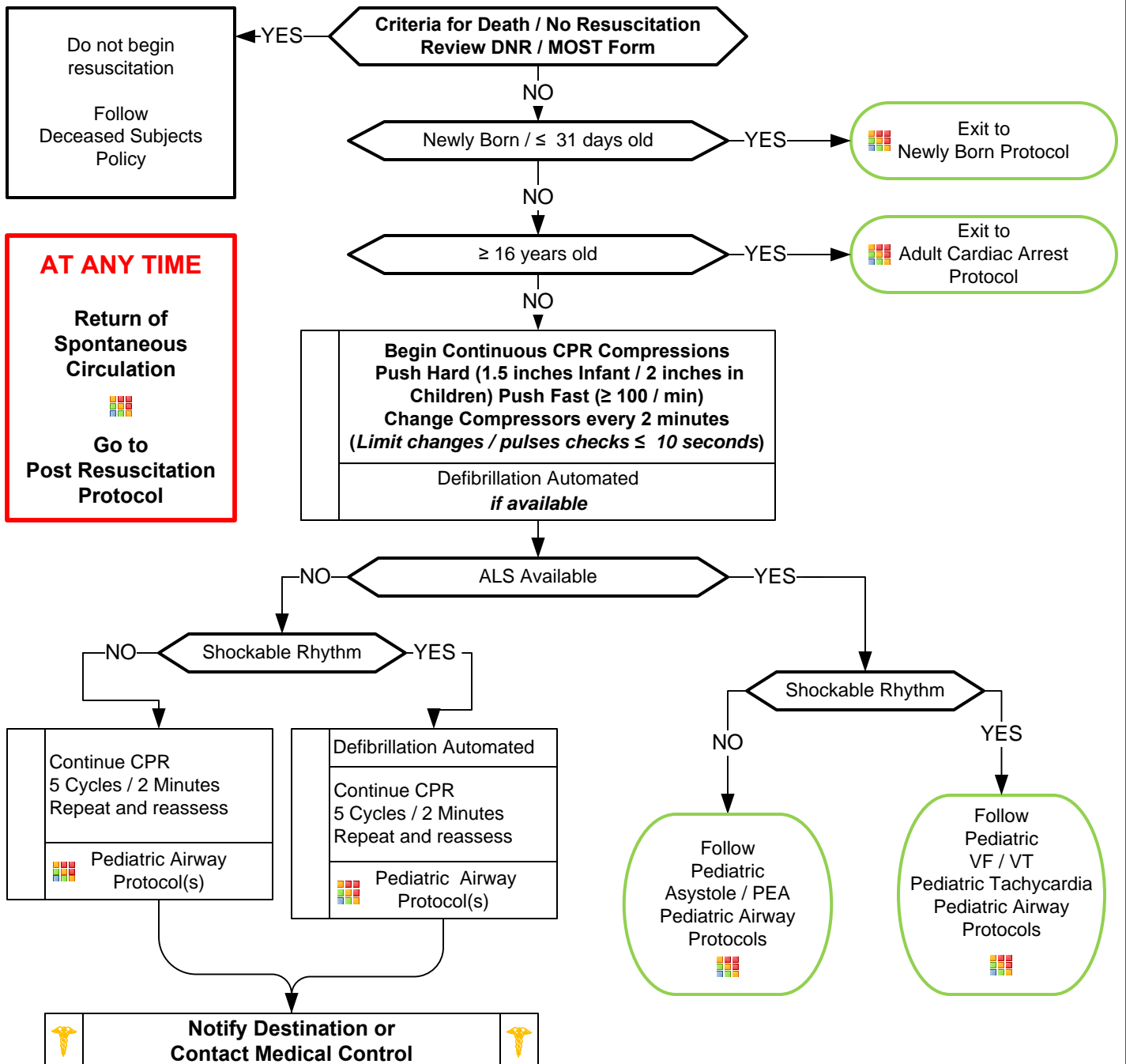
- Time of arrest
- Medical history
- Medications
- Possibility of foreign body
- Hypothermia

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



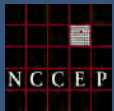


Pediatric Pulseless Arrest



Pearls

- **Recommended Exam: Mental Status**
- **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 no advanced airway (BIAD, ETT) compressions to ventilations are 30:2. 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.**
- Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or supraglottic device. 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 assigning responders to predetermined tasks.
- Team Focused Approach / Pit-Crew Approach. Refer to optional protocol or development of local agency protocol.
- Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- Monophasic and Biphasic waveform defibrillators should use the same energy levels 2 joules / kg and increase to 4 joules / kg on subsequent shocks.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.



Pediatric Tachycardia



History

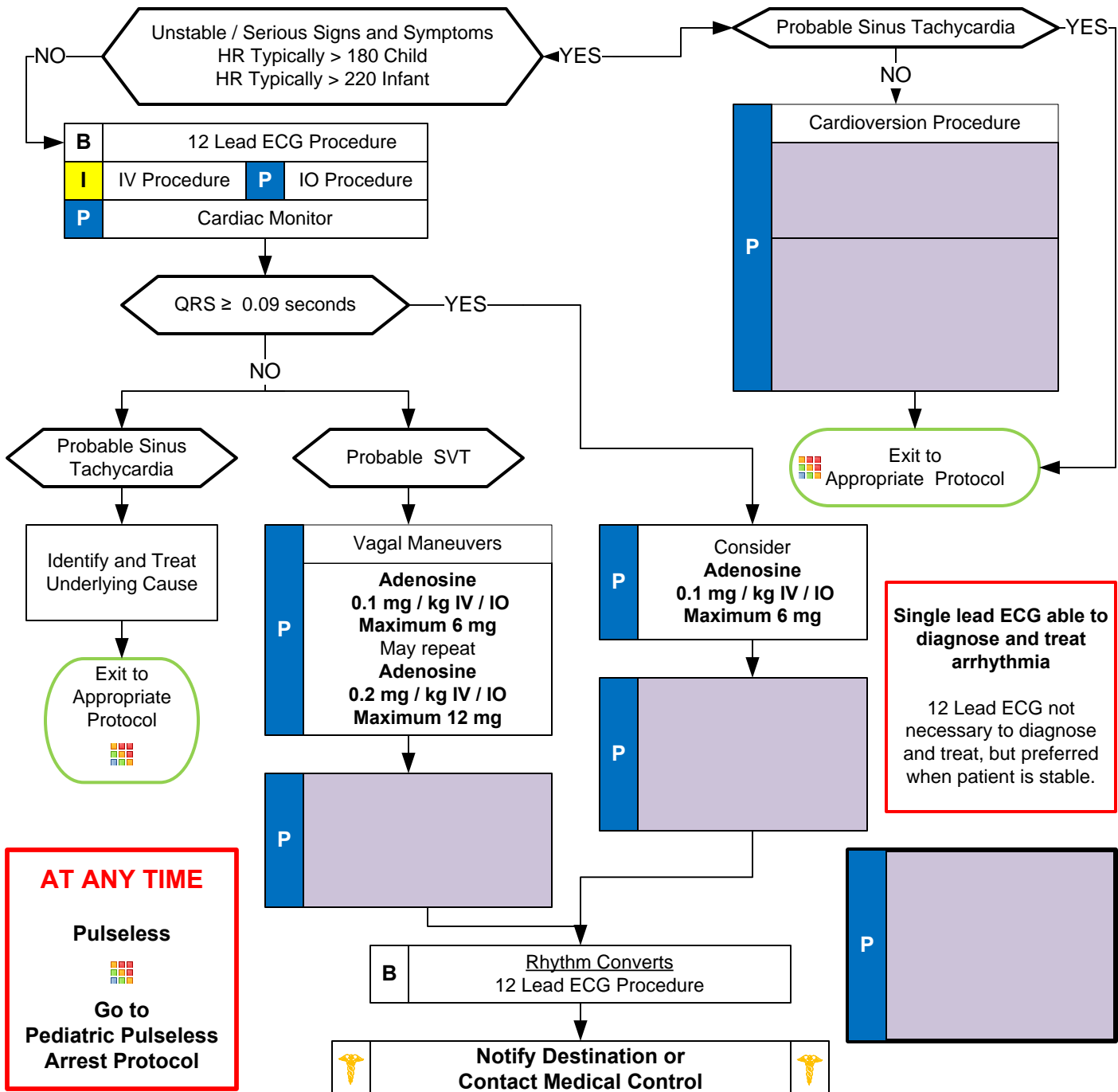
- Past medical history
- Medications or Toxic Ingestion (Aminophylline, Diet pills, Thyroid supplements, Decongestants, Digoxin)
- Drugs (nicotine, cocaine)
- Congenital Heart Disease
- Respiratory Distress
- Syncope or Near Syncope

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



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.
- **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.
- **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 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) Push Fast (≥ 100 / min) Change Compressors every 2 minutes <i>(Limit changes / pulses checks ≤ 10 seconds)</i>	
	 Pediatric Airway Protocol(s)	
	IV Procedure	P IO Procedure
I	Epinephrine (1:10,000) 0.01 mg/kg IV / IO Maximum 1 mg each dose Repeat every 3 to 5 minutes	
P		

AT ANY TIME

**Return of
Spontaneous
Circulation**



**Go to
Post Resuscitation
Protocol**

Persistent VF / VT

After second defibrillation
may increase energy in
increments of 2 Joules/kg
not to exceed **10 Joules/kg**
Maximum

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

	Begin Continuous CPR Compressions Push Hard. Push Fast (≥ 100 / min) Change Compressors every 2 minutes <i>(Limit changes / pulses checks ≤ 10 seconds)</i>	
	If Rhythm Refractory Continue CPR and give Agency specific Anti-arrhythmics / Epinephrine during compressions. Continue CPR up to point where you are ready to defibrillate with device charged. Repeat pattern during resuscitation.	
P		

	High Quality, Continuous Compressions
P	

	Notify Destination or Contact Medical Control	
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Tosades de points	
P	



Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia



Pearls

- **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 no advanced airway (BIAD, ETT) compressions to ventilations are 30:2. 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.**
- Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or supraglottic device. Patient survival is often dependent on proper ventilation and oxygenation / Airway Interventions
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- Respiratory arrest is a common cause of cardiac arrest. Unlike adults early ventilation intervention is critical.
- In most cases pediatric airways can be managed by basic interventions.
- Reassess and document endotracheal tube placement and EtCO₂ frequently, after every move, and at transfer of care.
- Monophasic and Biphasic waveform defibrillators should use the same energy levels 2 joules / kg and increase to 4 joules / kg on subsequent shocks.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.



Pediatric Post Resuscitation



History

- Respiratory arrest
- Cardiac arrest

Signs/Symptoms

- Return of pulse

Differential

- Continue to address specific differentials associated with the original dysrhythmia

Arrhythmias are common and usually self limiting after ROSC



If Arrhythmia Persists follow Rhythm Appropriate Protocol

Repeat Primary Assessment

B	Optimize Ventilation and Oxygenation	
	<ul style="list-style-type: none"> Maintain SpO2 \geq 94 % Advanced airway if indicated ETCO2 ideally 35 – 45 mm Hg Respiratory Rate 8 – 10 Remove Impedence Threshold Device 	
	DO NOT HYPERVENTILATE	
	Monitor Vital Signs / Reassess	
B	12 Lead ECG Procedure	
I	IV Procedure	P IO Procedure
P	Cardiac Monitor	

Hypotension Age Based

0 – 28 Days
< 60 mmHg

1 Month to 1 Year
< 70 mmHg

1 to 10 Years
< 70 + (2 x age) mmHg

11 Years and older
< 90 + (2 x age) mmHg

I	
P	

Pediatric Bradycardia Protocol

Pediatric Diabetic Protocol

Pediatric Tachycardia Protocol

P	
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P	Continue Antiarrhythmic Utilized Refer to Appropriate Pediatric Arrhythmia Protocol
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P	Consider Sedation / Paralysis Use only with definitive airway in place
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	Notify Destination or Contact Medical Control	
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Pediatric Post Resuscitation



Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- Hyperventilation is a significant cause of hypotension / recurrence of cardiac arrest in post resuscitation phase and must be avoided.
- Appropriate post-resuscitation management may best be planned in consultation with medical control.

Protocol 54

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



Pediatric Allergic Reaction



History

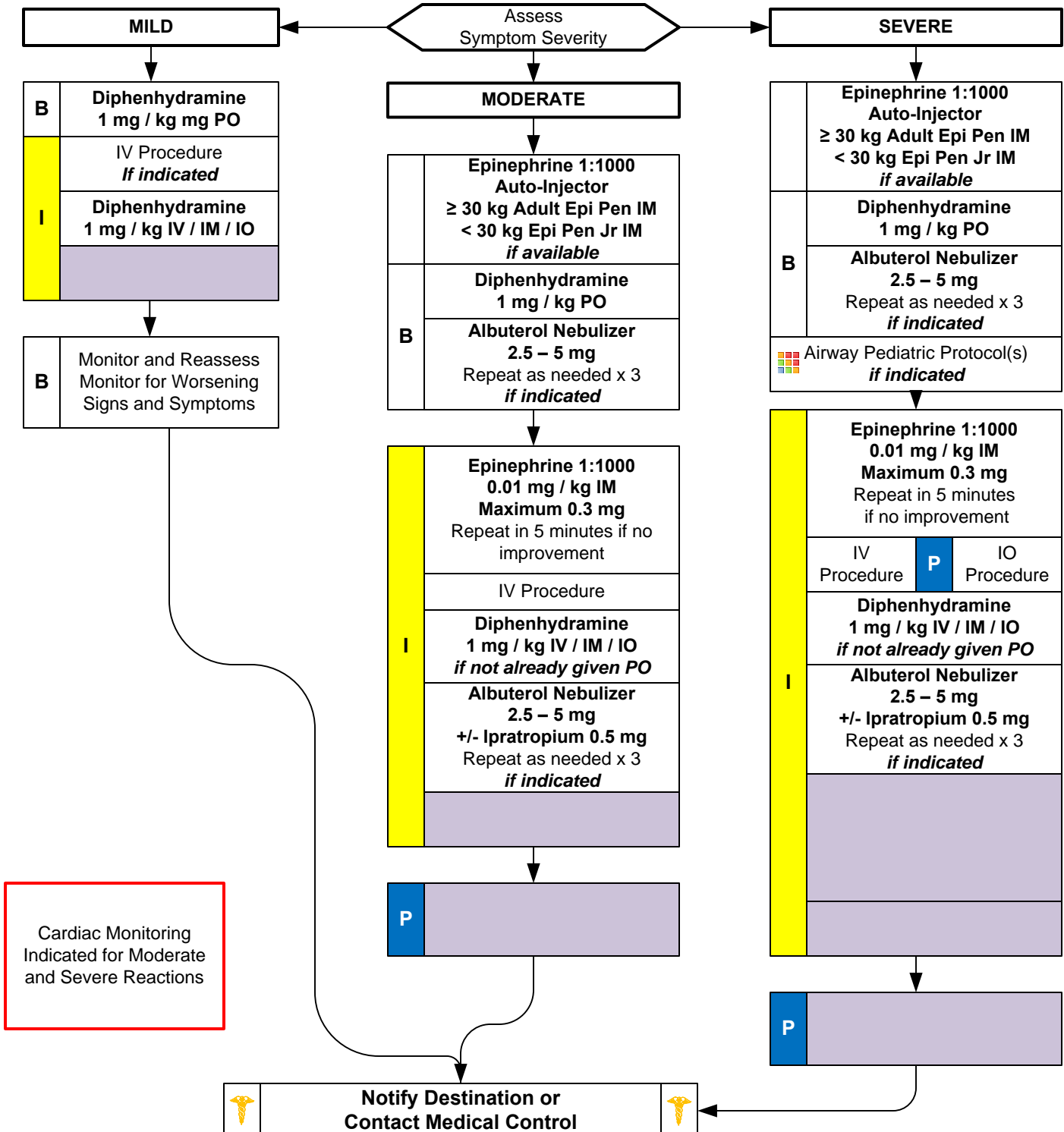
- Onset and location
- Insect sting or bite
- Food allergy / exposure
- Medication allergy / exposure
- New clothing, soap, detergent
- Past medical history / reactions
- Medication history

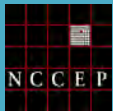
Signs and Symptoms

- 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



Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the 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.**
- **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 $>70 + (\text{age in years} \times 2)$ mmHg.**
- **MR / EMT-B may administer Epinephrine IM as Auto-injector only and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to MR / EMT-B administering any medication.
- **EMT-B 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-B / MR administering any medication.
- **EMT-B 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-B / MR 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 symptoms to contact, the more severe the reaction.**
- **The shorter the onset from exposure to symptoms the more severe the reaction.**



Pediatric Altered Mental Status



History

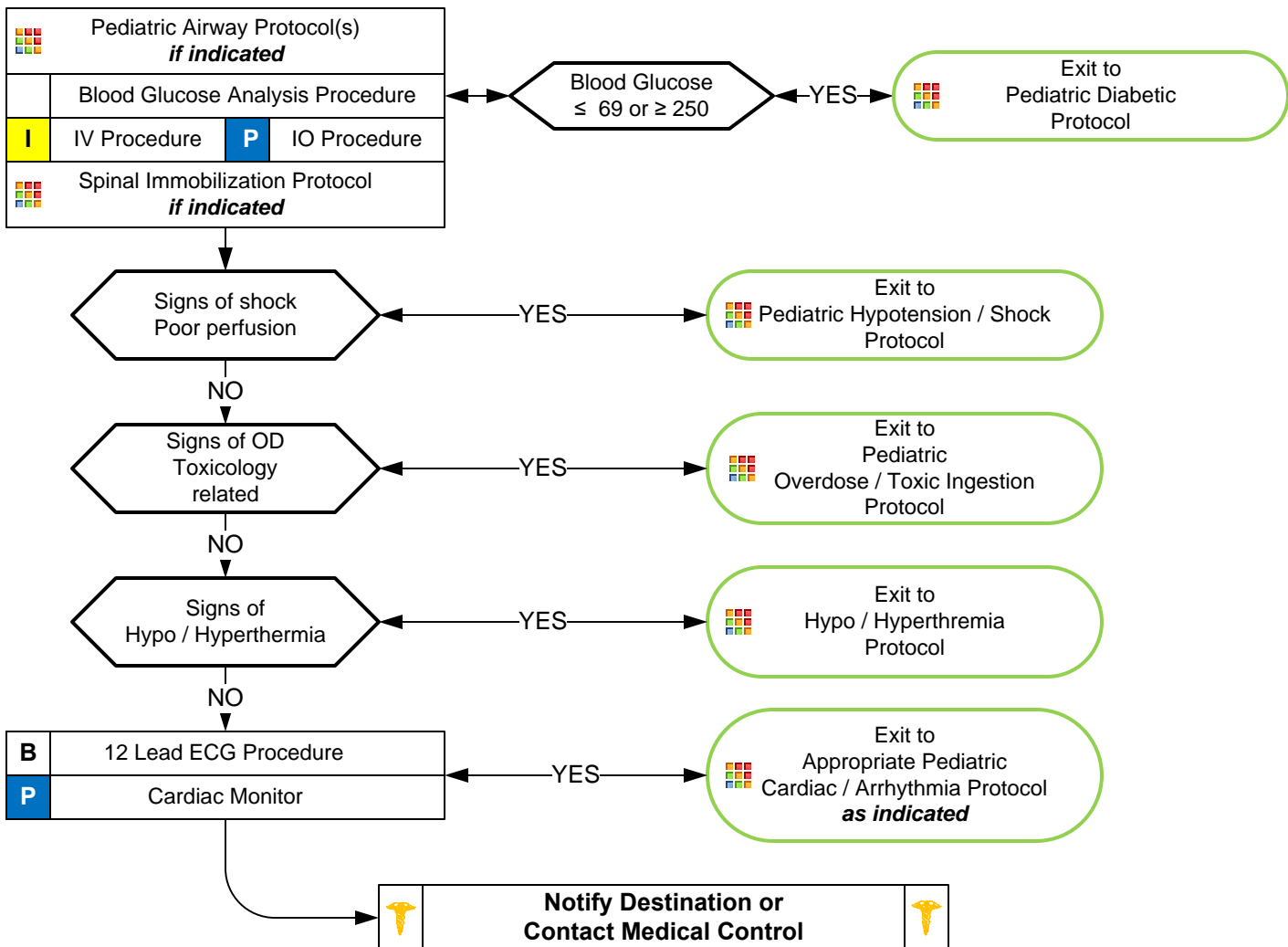
- Past medical history
- Medications
- Recent illness
- Irritability
- Lethargy
- Changes in feeding / sleeping
- Diabetes
- Potential ingestion
- Trauma

Signs and Symptoms

- Decrease in mentation
- Change in baseline mentation
- Decrease in Blood sugar
- Cool, diaphoretic skin
- Increase in Blood sugar
- Warm, dry, skin, fruity breath, kussmaul respirations, signs of dehydration

Differential

- Hypoxia
- CNS (trauma, stroke, seizure, infection)
- Thyroid (hyper / hypo)
- Shock (septic-infection, metabolic, traumatic)
- Diabetes (hyper / hypoglycemia)
- Toxicological
- Acidosis / Alkalosis
- Environmental exposure
- Electrolyte abnormalities
- Psychiatric disorder



Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Pay careful attention to the head exam for signs of bruising or other injury.**
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It is safer to assume hypoglycemia than hyperglycemia if doubt exists. Recheck blood glucose after Dextrose or Glucagon
- Consider alcohol, prescription drugs, illicit drugs and Over the Counter preparations as a potential etiology.
- Consider Restraints if necessary for patient's and/or personnel's protection per the restraint procedure.



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

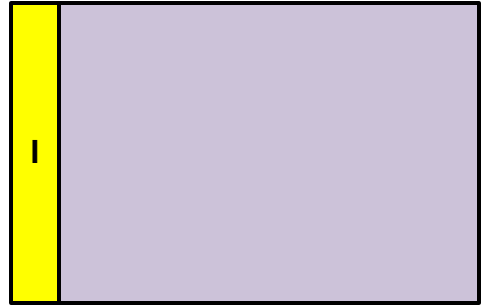
Differential

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

Pediatric
Altered Mental Status
Protocol
if indicated



Blood Glucose Analysis Procedure			
I	IV Procedure	P	IO Procedure
P	Cardiac Monitor <i>if indicated</i>		



Blood Sugar
 ≤ 69 mg / dl

Awake and alert
but symptomatic

YES

NO



Blood Sugar
70 – 249 mg / dl

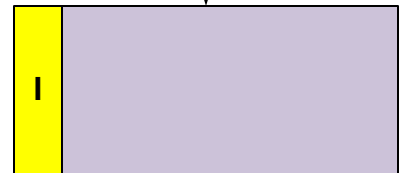
Monitor Blood
Glucose
Q 15 minutes

Exit to Appropriate
Protocol



Blood Sugar
 ≥ 250 mg / dl

Dehydration with
no evidence of
CHF/ Fluid
Overload



Repeat Dextrose per
appropriate treatment arm

Every 5 minutes
Until Blood Glucose
70 mg / dl or greater



Notify Destination or
Contact Medical Control





Pediatric Diabetic



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.
- **Make D10 by removing 10 mL of D50 and dilute with 40 mL of NS. Make D25 by removing 25 mL of D50 and dilute with 25 mL of NS.**
- In extreme circumstances with no IV and no response to glucagon Dextrose 50 % can be administered rectally. Contact medical control for advice.
- Quality control checks should be maintained per manufacturers recommendation for all glucometers.
- **Patient Refusal:**
Adult caregiver must be present with pediatric patient. Blood sugar must be 100 or greater and patient has ability to eat and availability of food with responders on scene. Patient must have known history of diabetes and not be taking any oral diabetic agents. Otherwise contact medical control.



Pediatric Hypotension / Shock



History

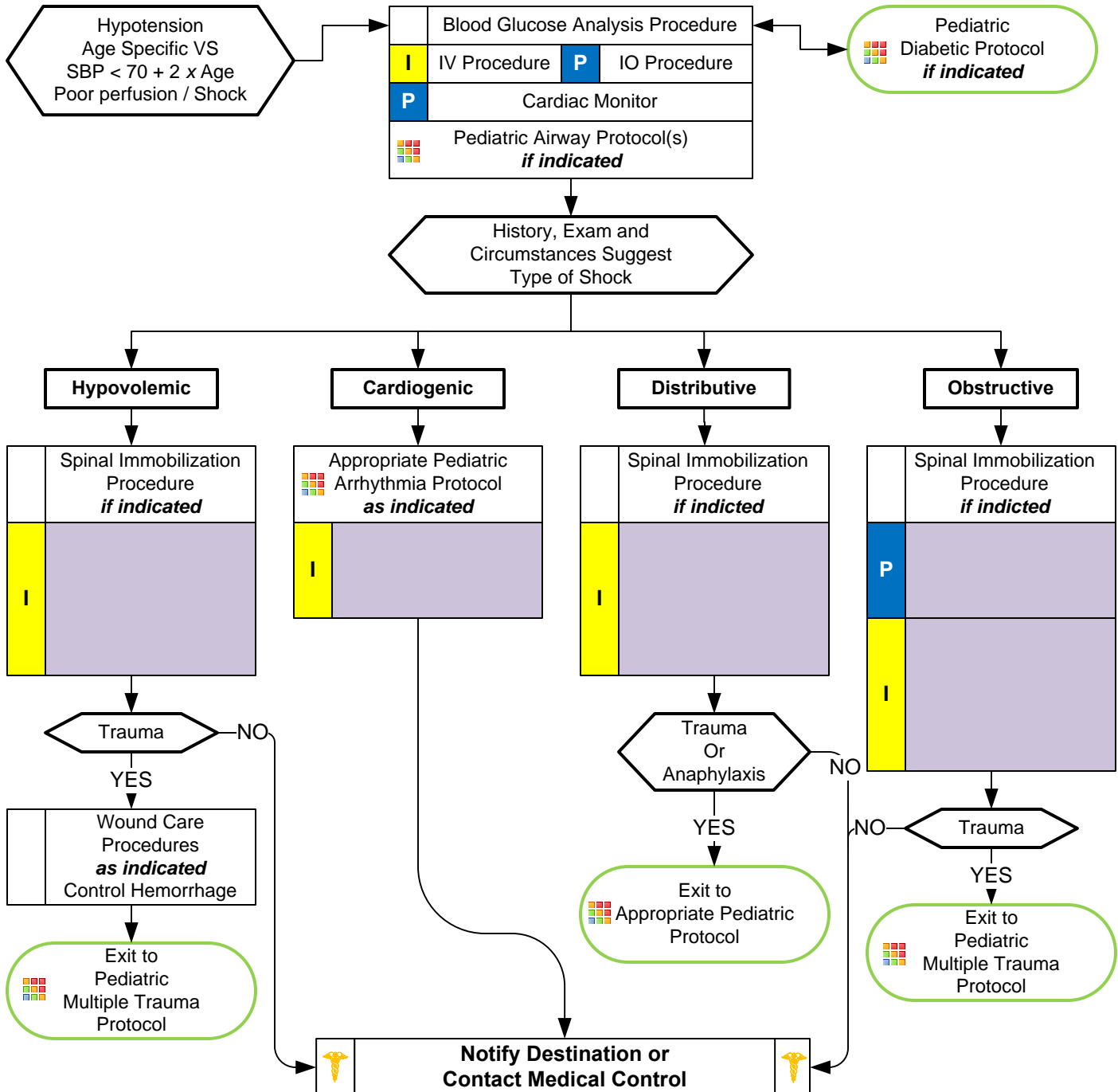
- Blood loss
- Fluid loss
- Vomiting
- Diarrhea
- Fever
- Infection

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



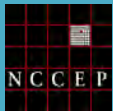


Hypotension / Shock



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: $70 + 2 \times \text{age in years}$.**
- 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:**
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:** State where body cannot produce enough steroids (glucocorticoids / mineralocorticoids.) May have primary adrenal disease or more commonly have stopped a steroid like prednisone. Usually hypotensive with nausea, vomiting, dehydration and / or abdominal pain. If suspected EMT-P should give **Methylprednisolone 2 mg/kg IV / IO** or **Dexamethasone 0.3 mg/kg (Maximum 10 mg) IV / IO**. Use agency-specific steroid.



Pediatric Overdose / Toxic Ingestion



History

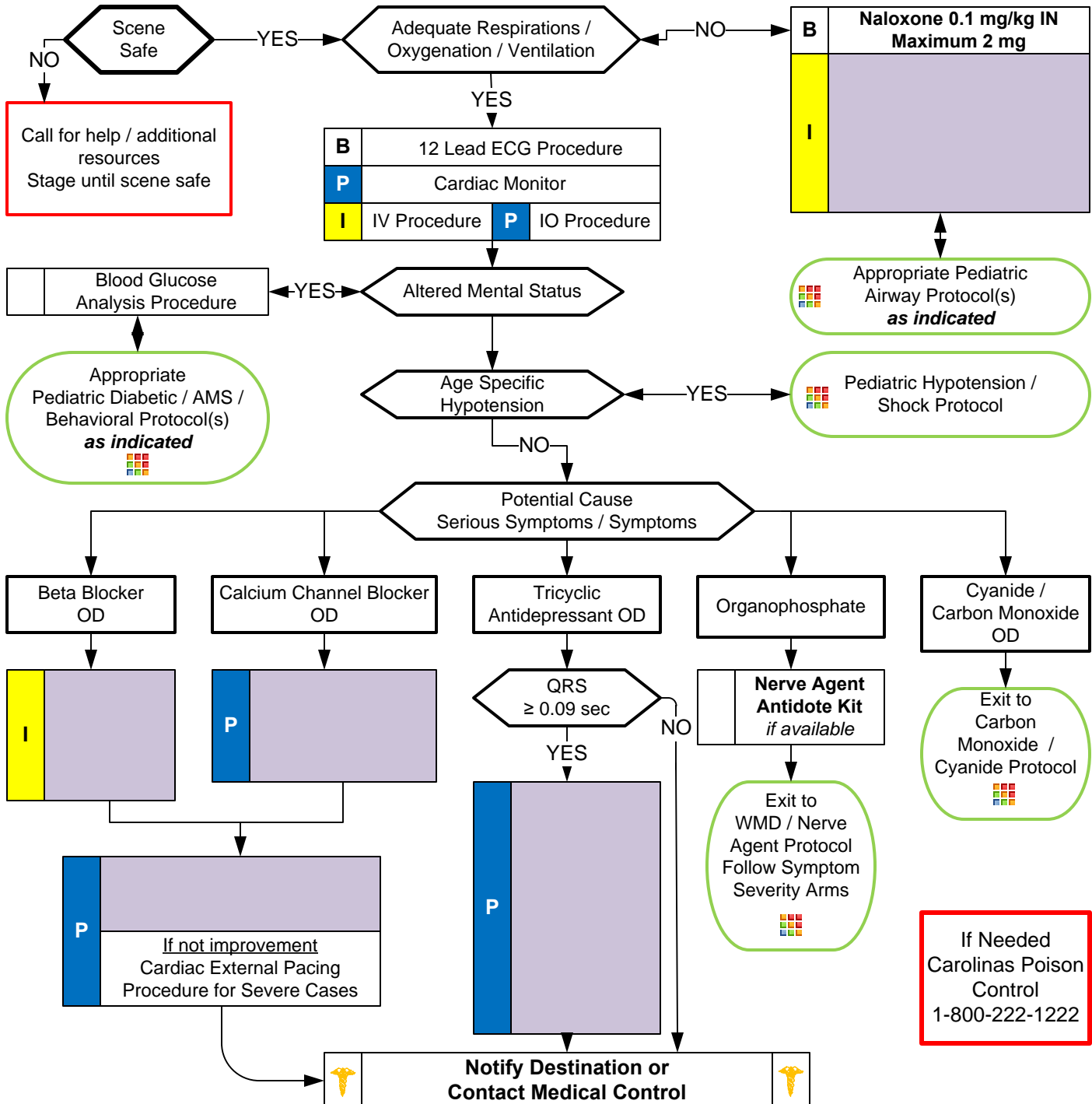
- Ingestion or suspected ingestion of potentially toxic substance
- Substance ingested, route, quantity
- Time of Ingestion is important
- Reason (suicidal, accidental, criminal)
- Available medications in home
- Past medical history, medications, past psychiatric history

Signs and Symptoms

- Mental status changes
- Hypotension / hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- Salivation, Lacrimation, Urination; increased, loss of control, Defecation / Diarrhea, GI Upset; Abdominal pain / cramping, Emesis, Muscle Twitching

Differential

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



Protocol 60



Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **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. Bring bottles, contents, emesis to ED.**
- **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.
- **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
- Consider restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- **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.
- Consider contacting the North Carolina Poison Control Center for guidance.



Pediatric Respiratory Distress



History

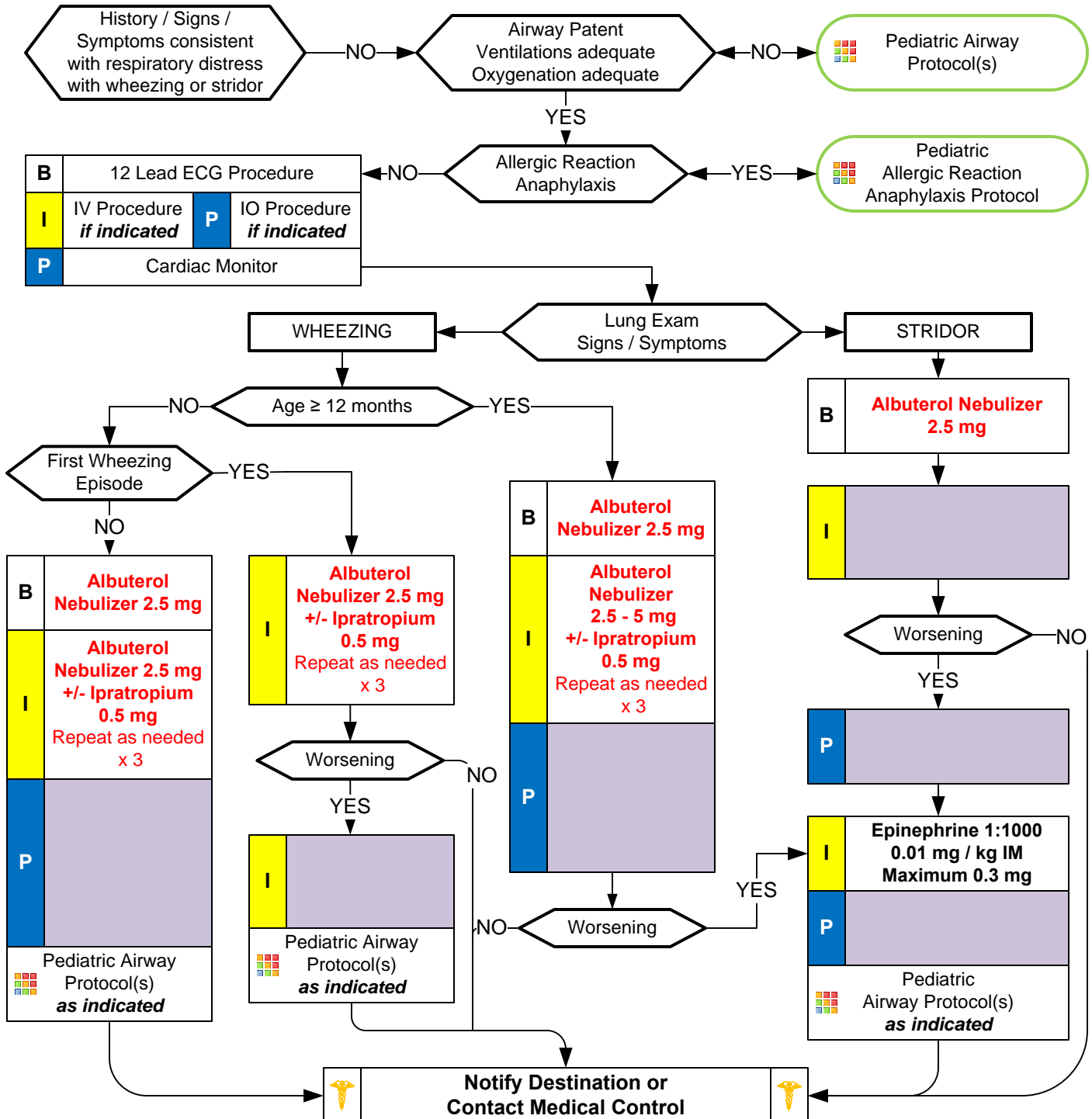
- Time of onset
- Possibility of foreign body
- Past Medical History
- Medications
- Fever / Illness
- Sick Contacts
- History of trauma
- History / possibility of choking
- Ingestion / OD
- Congenital heart disease

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 Respiratory Distress



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.**
- **EMT-B 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.
- **Consider IV access when Pulse oximetry remains $\leq 92\%$ 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.
- The most important component of respiratory distress is airway control.
- 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.



Pediatric Seizure



History

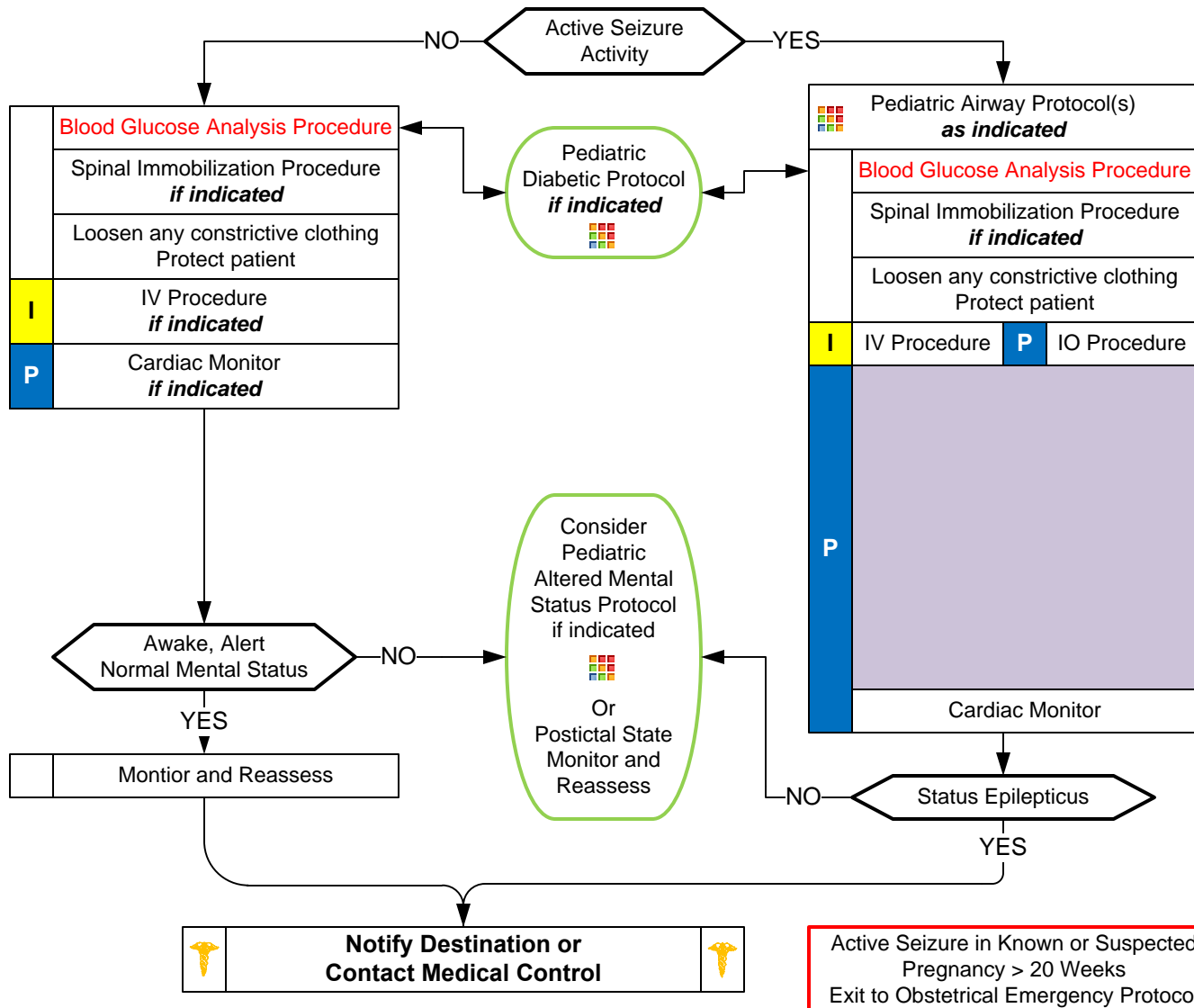
- Fever
- Sick contacts
- Prior history of seizures
- Medication compliance
- Recent head trauma
- Whole body vs unilateral seizure activity
- Duration, Single/multiple
- Congenital Abnormality

Signs and Symptoms

- Fever; hot, dry skin
- Seizure activity
- Incontinence
- Tongue trauma
- Rash
- Nuchal rigidity
- Altered mental status

Differential

- Febrile seizure
- Infection
- Head trauma
- Medication or Toxin
- Hypoxia or Respiratory failure
- Hypoglycemia
- Metabolic abnormality / acidosis
- Tumor



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**
- **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.**
- Addressing the ABCs and verifying blood glucose is as important than stopping the seizure.
- Be prepared to assist ventilations especially if a benzodiazepine is used. Avoiding hypoxemia is extremely important.
- In an infant, a seizure may be the only evidence of a closed head injury.
- 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.
- Assess possibility of occult trauma and substance abuse, overdose or ingestion / toxins and fever.



Pediatric Head Trauma



History

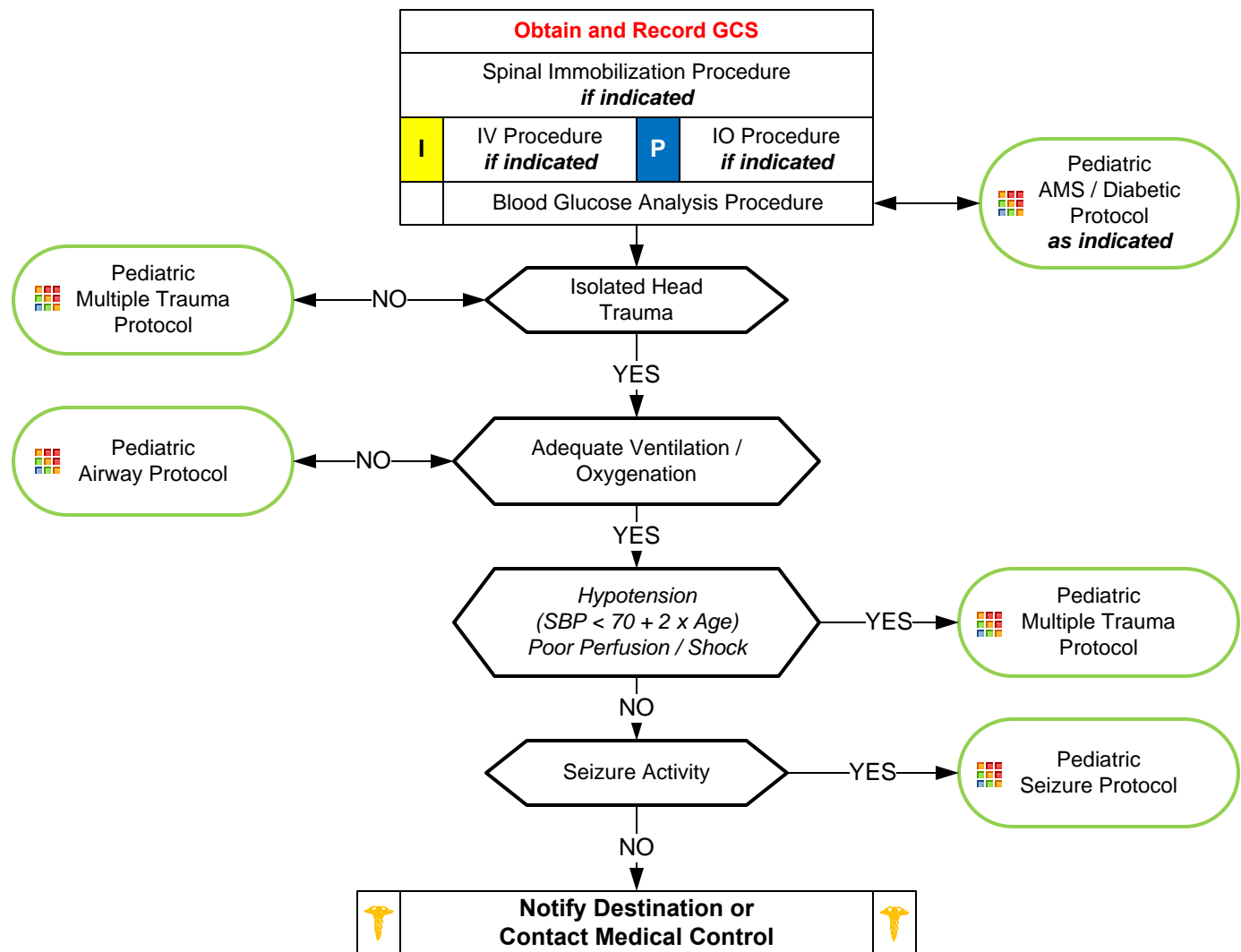
- Time of injury
- Mechanism (blunt vs. penetrating)
- Loss of consciousness
- Bleeding
- Past medical history
- Medications
- Evidence for multi-trauma

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)
- Epidural hematoma
- Subdural hematoma
- Subarachnoid hemorrhage
- Spinal injury
- Abuse



Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- **GCS is a key performance measure used to evaluate protocol compliance and care**
- If GCS < 12 consider air / rapid transport and if GCS < 9 intubation should be anticipated.
- Hyperventilate the patient only if evidence of herniation (blown pupil, decorticate / decerebrate posturing, bradycardia, decreasing GCS). If hyperventilation is needed (35 / minute for infants <1 year and 25 / minute for children >1 year) EtCO₂ should be maintained between 30 - 35 mmHg.
- Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
- Hypotension usually indicates injury or shock unrelated to the head injury and should be treated aggressively.
- An important item to monitor and document is a change in the level of consciousness by serial examination.
- Concussions are 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.
- Fluid resuscitation should be titrated to maintain at least a systolic BP of > 70 + 2 x the age in years.



Pediatric Multiple Trauma



History

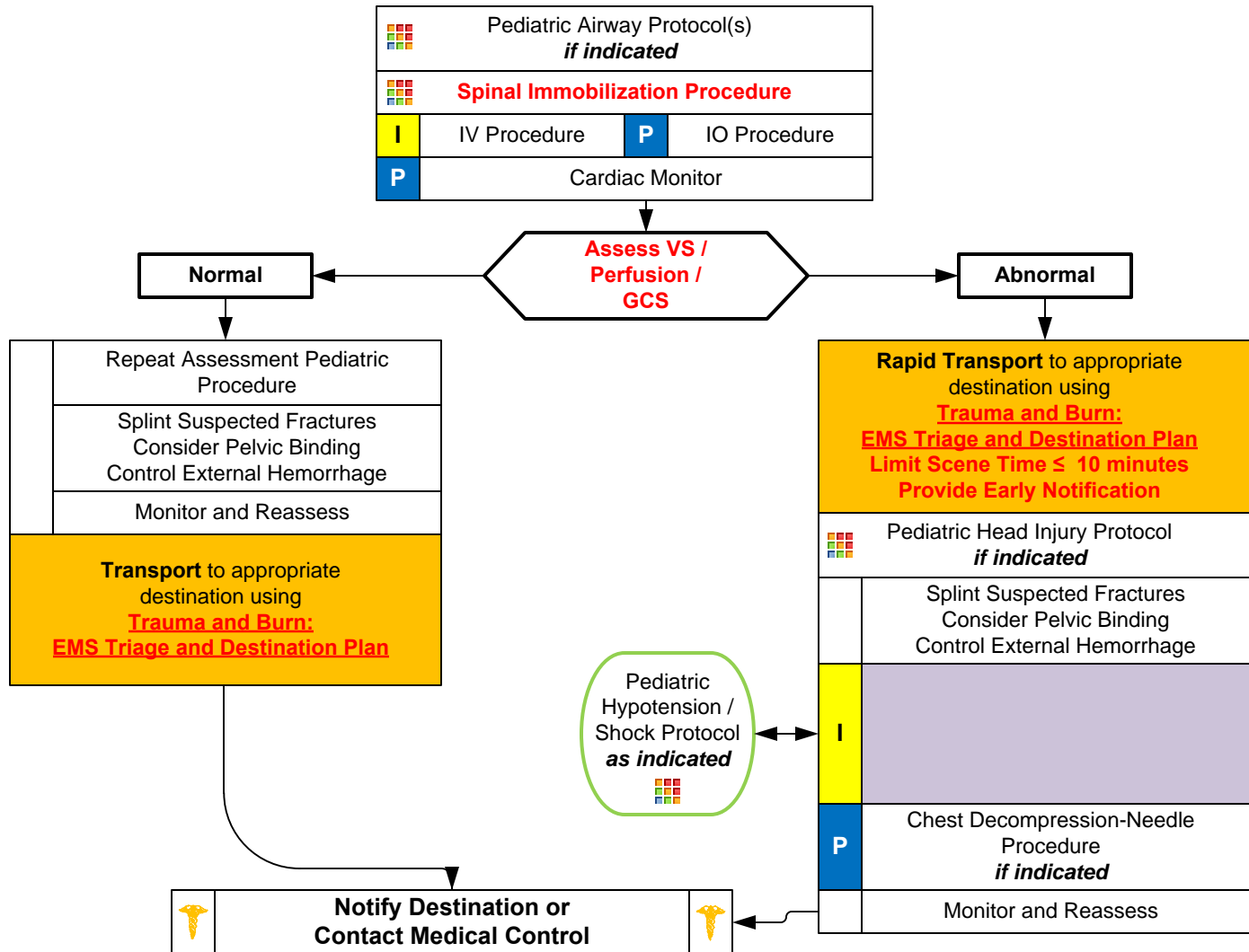
- Time and mechanism of injury
- Damage to structure or vehicle
- Location in structure or vehicle
- Others injured or dead
- Speed and details of MVC
- Restraints / protective equipment
- Past medical history
- Medications

Signs and Symptoms

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

Differential

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



Pearls

- **Items in Red Text are key performance measures used in the EMS Acute Trauma Care Toolkit**
- **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.**
- **Bag valve mask is an acceptable method of managing the airway if pulse oximetry can be maintained ≥ 90%**
- 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.
- Consider Chest Decompression with signs of shock and injury to torso and evidence of tension pneumothorax.
- 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.
- Do not overlook the possibility of child abuse.



Pediatric 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
- Chemical – Electrical

Assess Burn / Concomitant Injury Severity

Minor Burn

Serious Burn

Critical Burn

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

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)

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

Remove Rings, Bracelets /
Constricting Items

Dry Clean Sheet or Dressings

Pediatric Multiple Trauma Protocol
if indicated

Pediatric Airway Protocol(s)
as indicated

IV Procedure
if indicated

Normal Saline
0.25 mL / kg (x % TBSA) / hr
for up to the first 8 hours.
(More info below)
Lactated Ringers
if available

Pediatric Pain Control Protocol
if indicated

Carbon Monoxide /
Cyanide Exposure

NO

Transport Facility of Choice

Remove Rings, Bracelets / Constricting Items

Dry Clean Sheet or Dressings

Pediatric Multiple Trauma Protocol
if indicated

Pediatric Airway Protocol(s)
as indicated

IV 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.
(More info below)
Lactated Ringers if available

P IO Procedure **if indicated**

Pediatric Pain Control Protocol
if indicated

Carbon Monoxide /
Cyanide Exposure

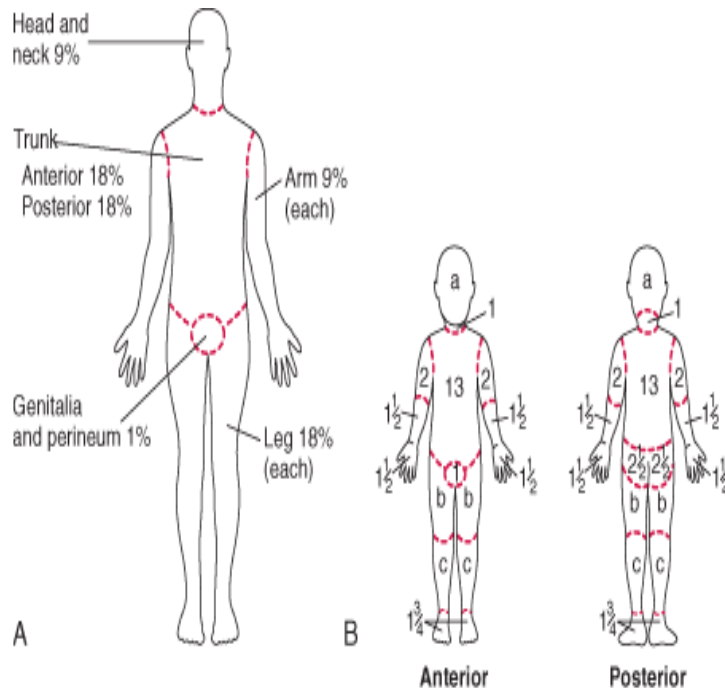
NO

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

Carbon
Monoxide /
Cyanide
Protocol

**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 (196 lbs.) patient with 50% TBSA will need 1000 cc of fluid per hour.



Relative percentage of body surface area (% BSA) affected by growth

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

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

Rule of Nines

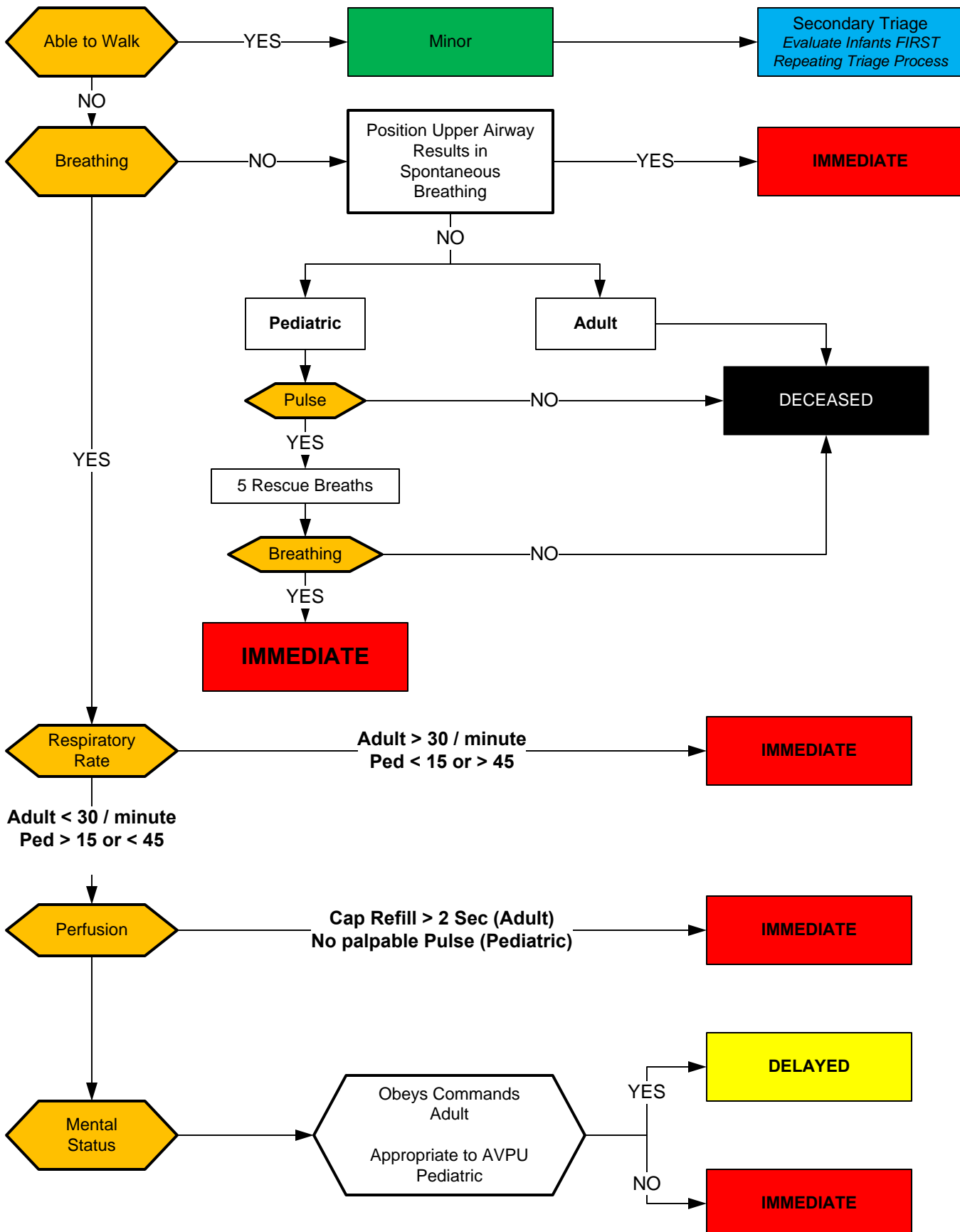
- Seldom do you find a complete isolated body part that is injured as described in the Rule of Nines.
- More likely, it will be portions of one area, portions of another, and an approximation will be needed.
- For the purpose of determining the extent of serious injury, differentiate the area with minimal 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.

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, or
 - any burn requiring hospitalization.
- 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 child abuse with children and burn injuries.
- Never administer IM pain injections to a burn patient.



Triage





Triage



Pearls

- First evaluate all children who did not walk under their on power where possible and safety allows.
- Capillary refill can be altered by many factors including skin temperature. Age-appropriate heart rate may also be used in triage decisions.



Dental Problems



History

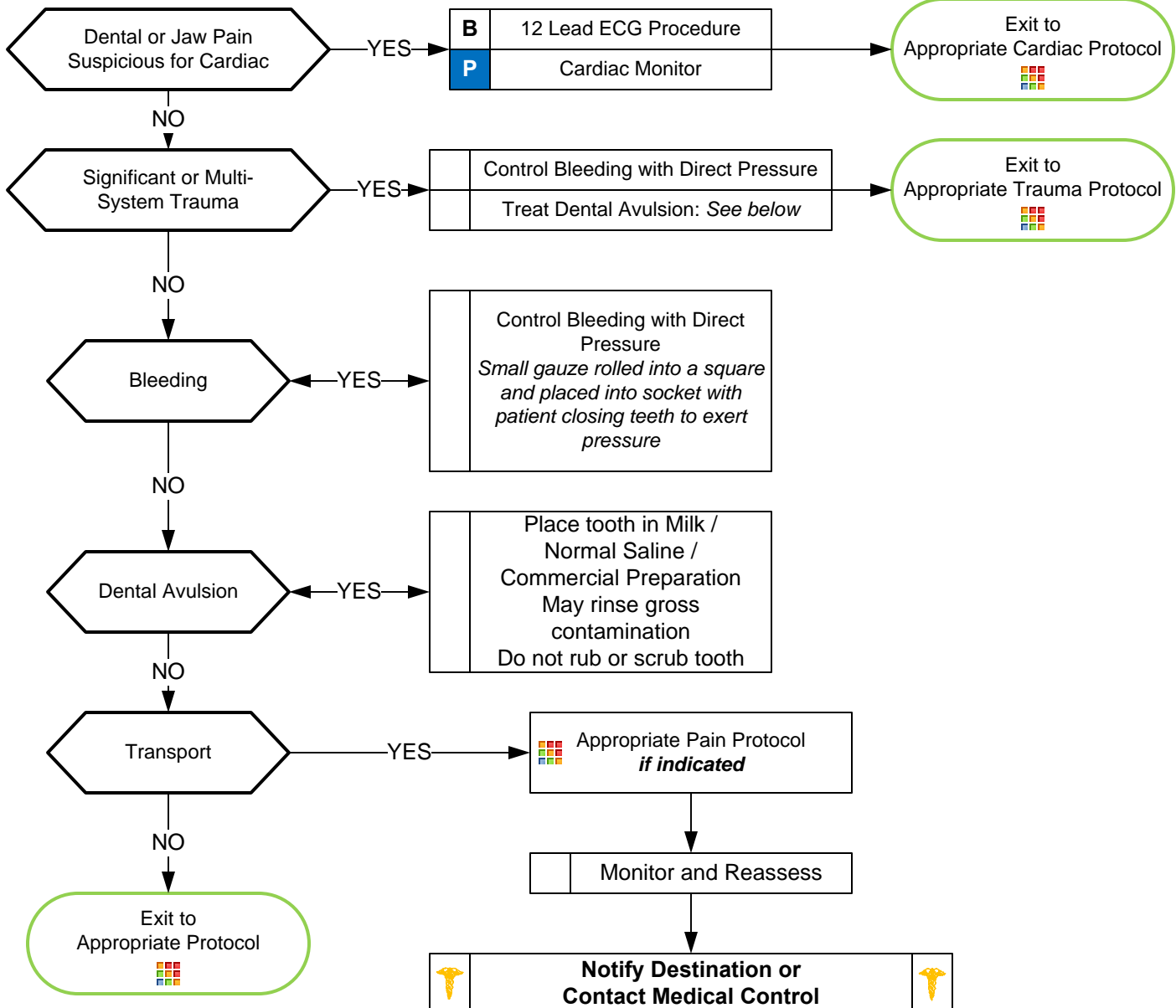
- Age
- Past medical history
- Medications
- Onset of pain / injury
- Trauma with "knocked out" tooth
- Location of tooth
- Whole vs. partial tooth injury

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



Adult / Pediatric General Section Protocols

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).

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Epistaxis



History

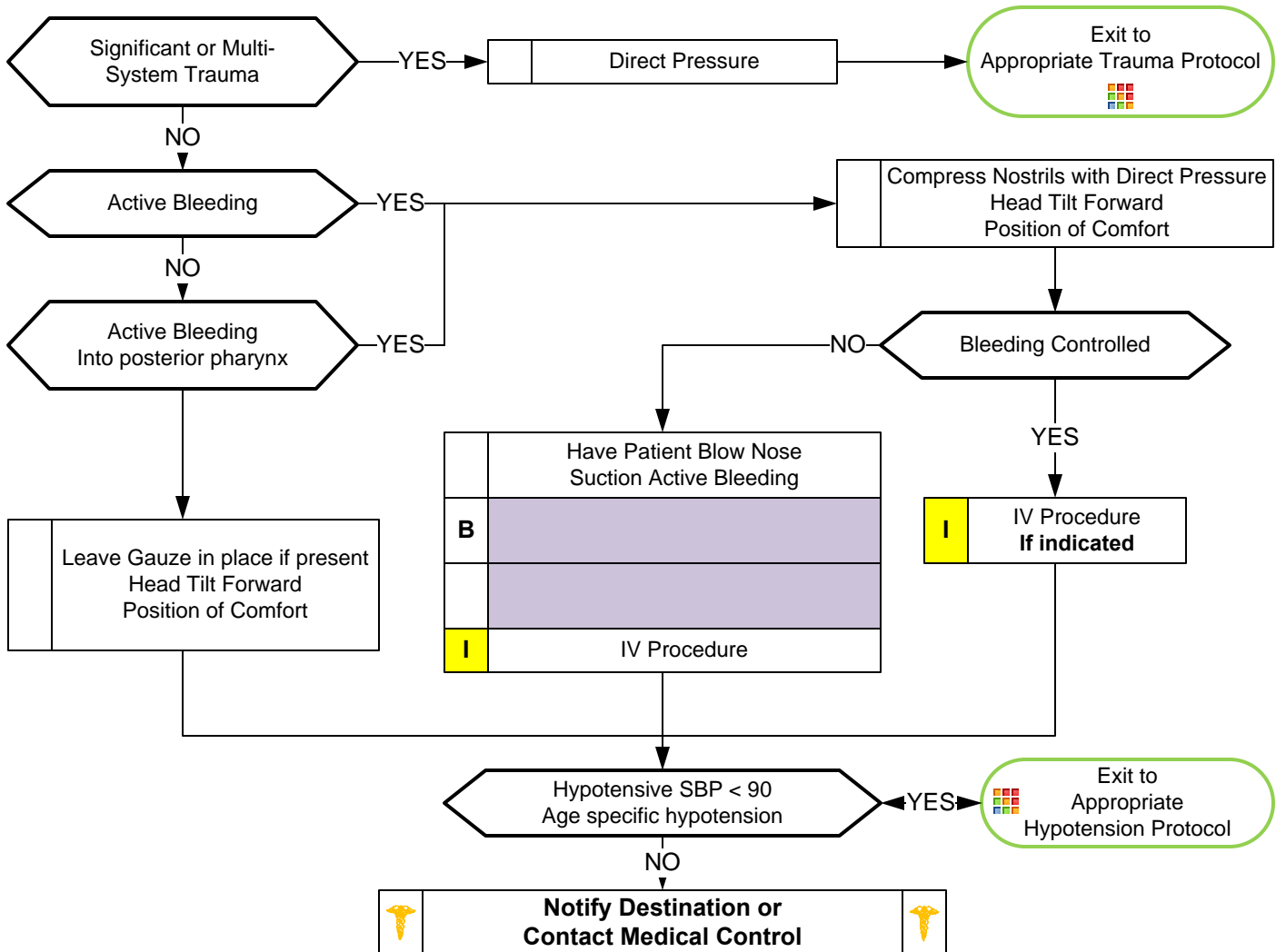
- Age
- Past medical history
- Medications (HTN, anticoagulants, aspirin, NSAIDs)
- Previous episodes of epistaxis
- Trauma
- Duration of bleeding
- Quantity of bleeding

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**
- **Avoid Afrin in patients who have a blood pressure of greater than 110 diastolic or known coronary artery disease.**
- 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), 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

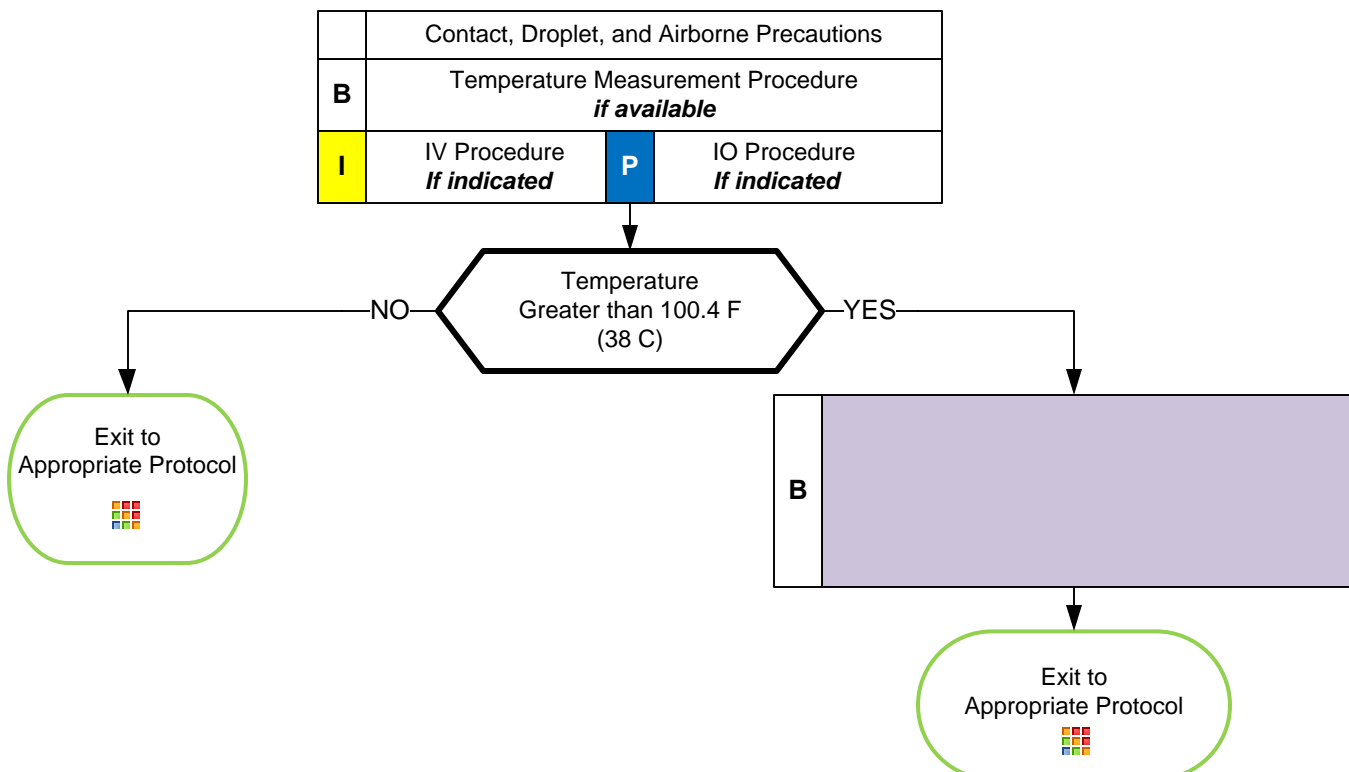
- Warm
- Flushed
- Sweaty
- Chills/Rigors

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 increased the patients 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.
- NSAIDs should not be used in the setting of environmental heat emergencies.
- **Do not** give aspirin to a child.
- Agency Medical Director may require contact of medical control prior to EMT-B / MR administering any medication.



Police Custody



History

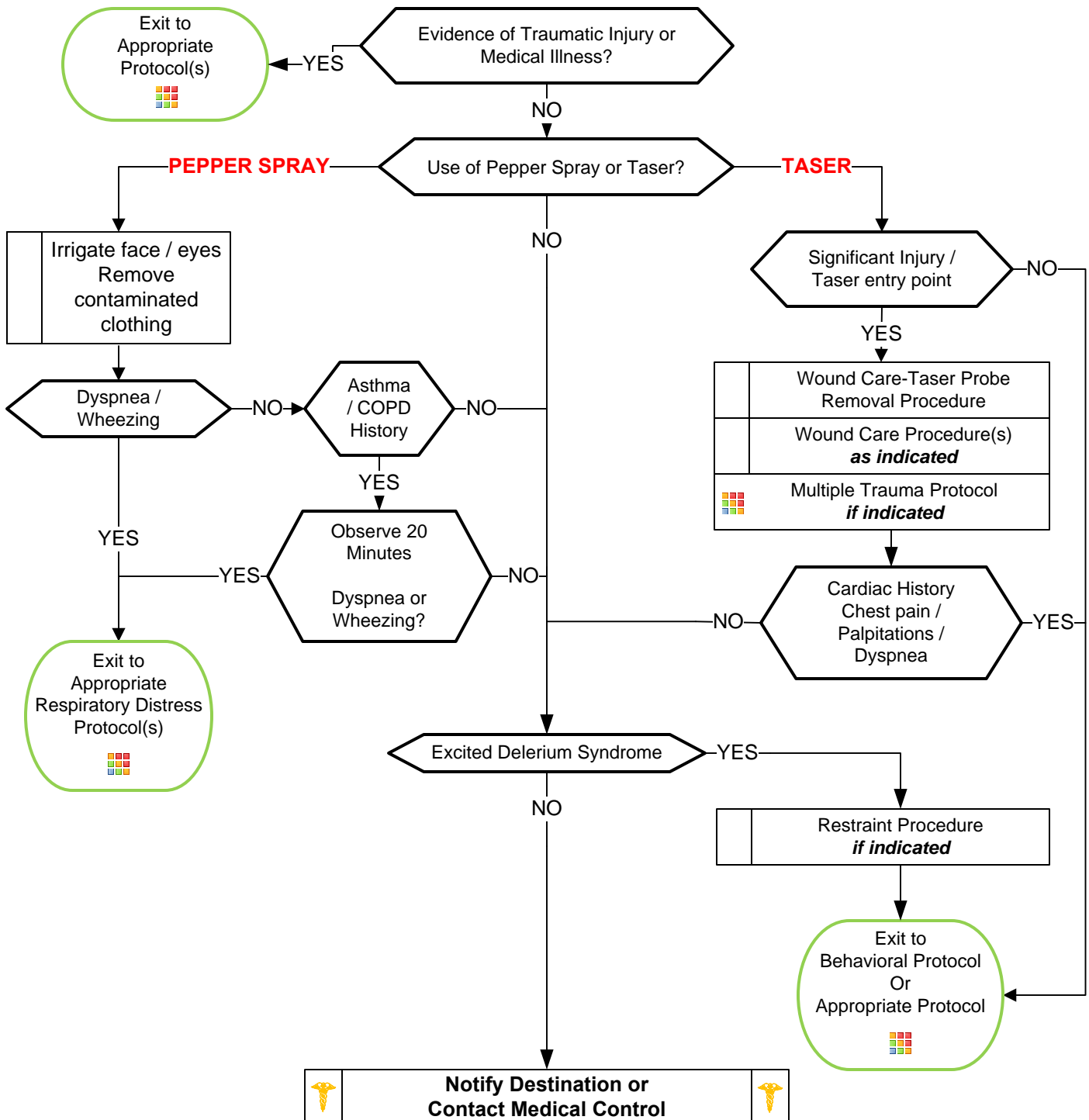
- Traumatic Injury
- Drug Abuse
- Cardiac History
- History of Asthma
- Psychiatric History

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



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.**
- 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 in police custody retain the right to participate in decision making regarding their care and may request 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.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- **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 excited delirium 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.



Emergencies Involving Indwelling Central Lines



History

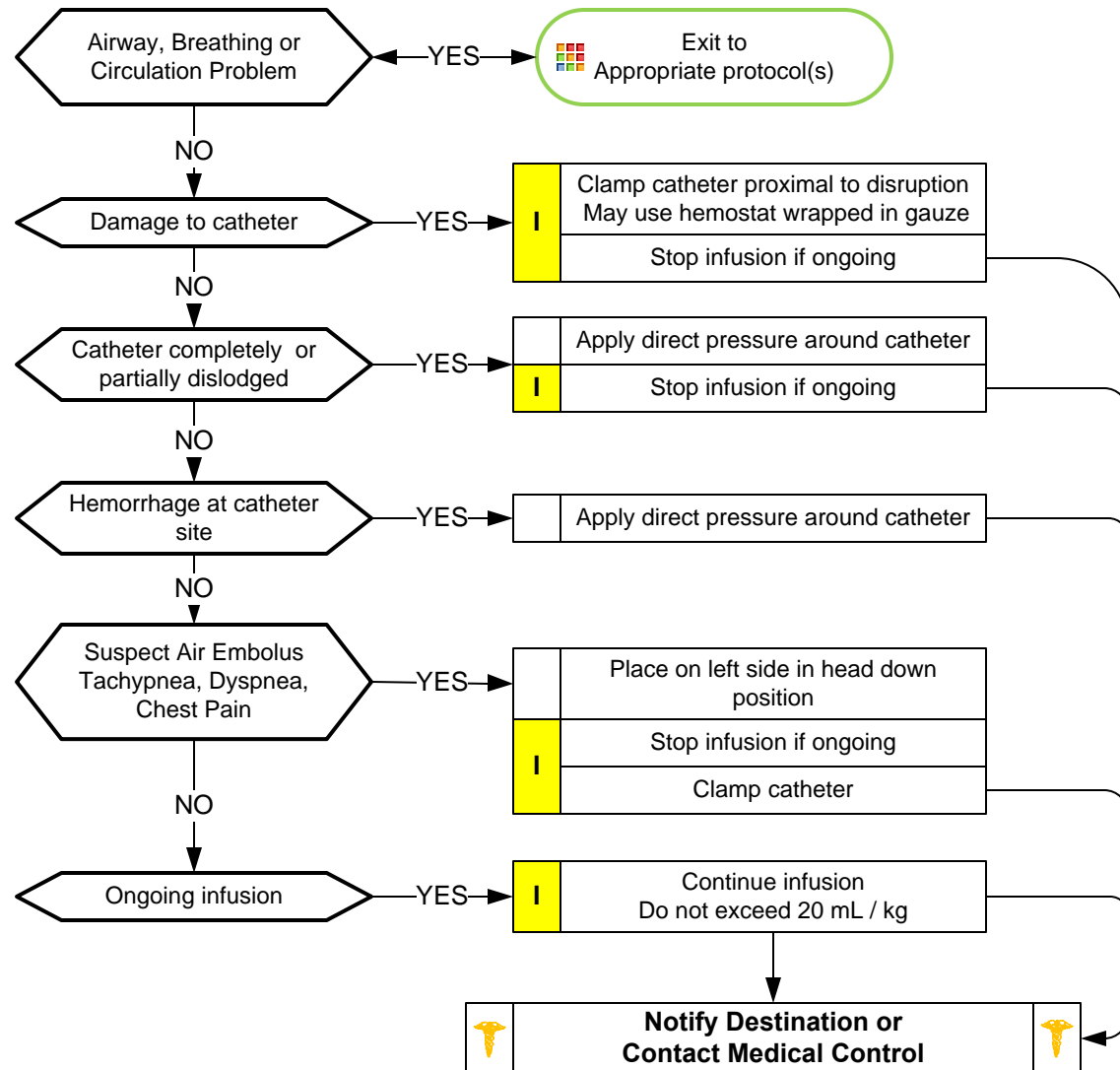
- Central Venous Catheter Type
Tunneled Catheter (Broviac / Hickman)
- PICC (peripherally inserted central catheter)
- Implanted catheter (Mediport / Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

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



Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Use strict sterile technique when accessing / manipulating an indwelling catheter.
- 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.
- Cardiac arrest: Access central catheter and utilize if functioning properly.
- Hyperalimentation infusions (IV nutrition): If stopped for any reason monitor for hypoglycemia.



Respiratory Distress With a Tracheostomy Tube



History

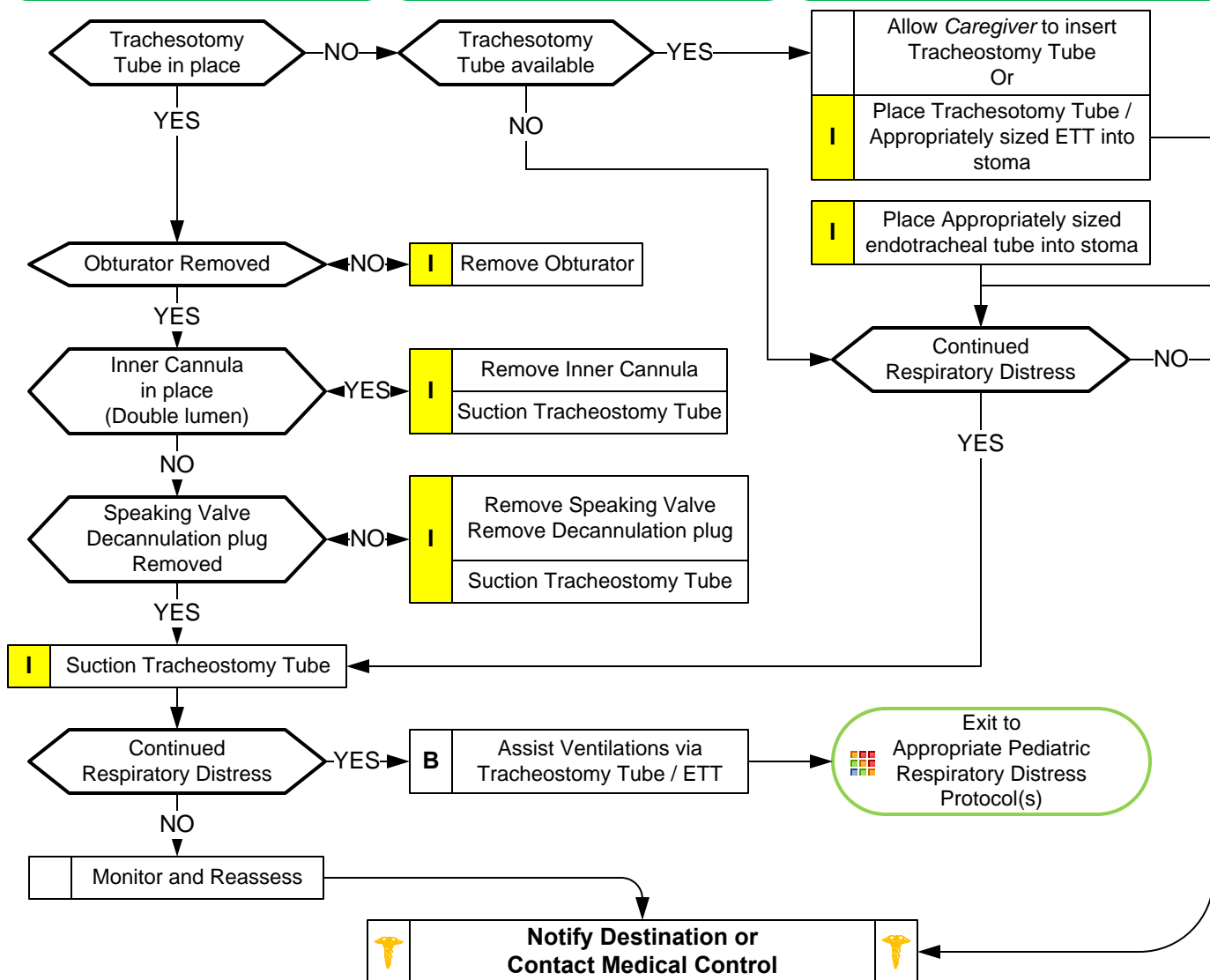
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (accidental damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)

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



Adult / Pediatric General Section Protocols

Pearls

- **Always talk to family / caregivers as they have specific knowledge and skills.**
- 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, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.

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Emergencies Involving Ventilators



History

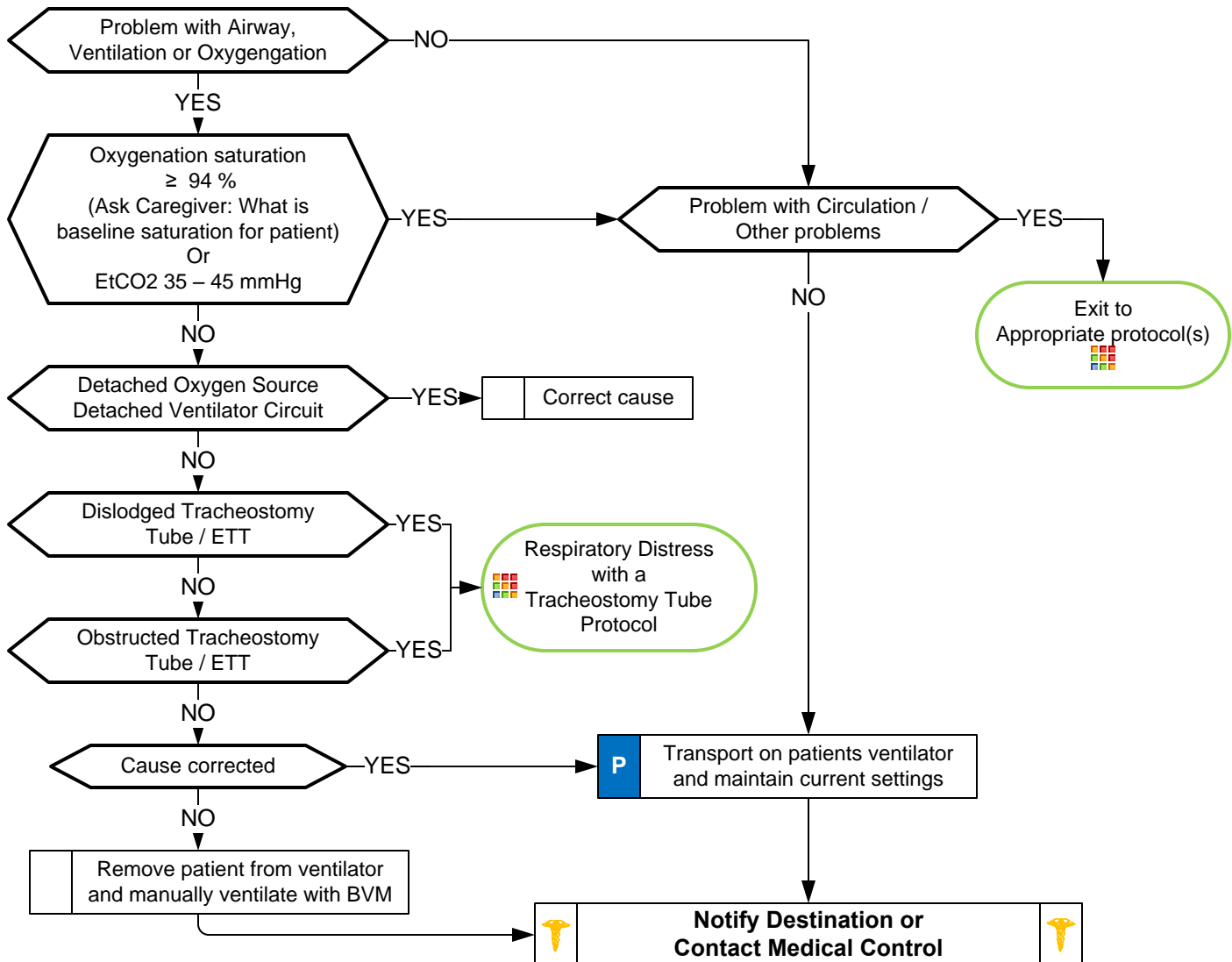
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchopulmonary dysplasia, muscular dystrophy)

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.**
- 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.
- **DOPE:** Displaced tracheostomy tube / ETT, Obstructed tracheostomy tube / ETT, Pneumothorax and Equipment failure.
- 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.



Bites and Envenomations



History

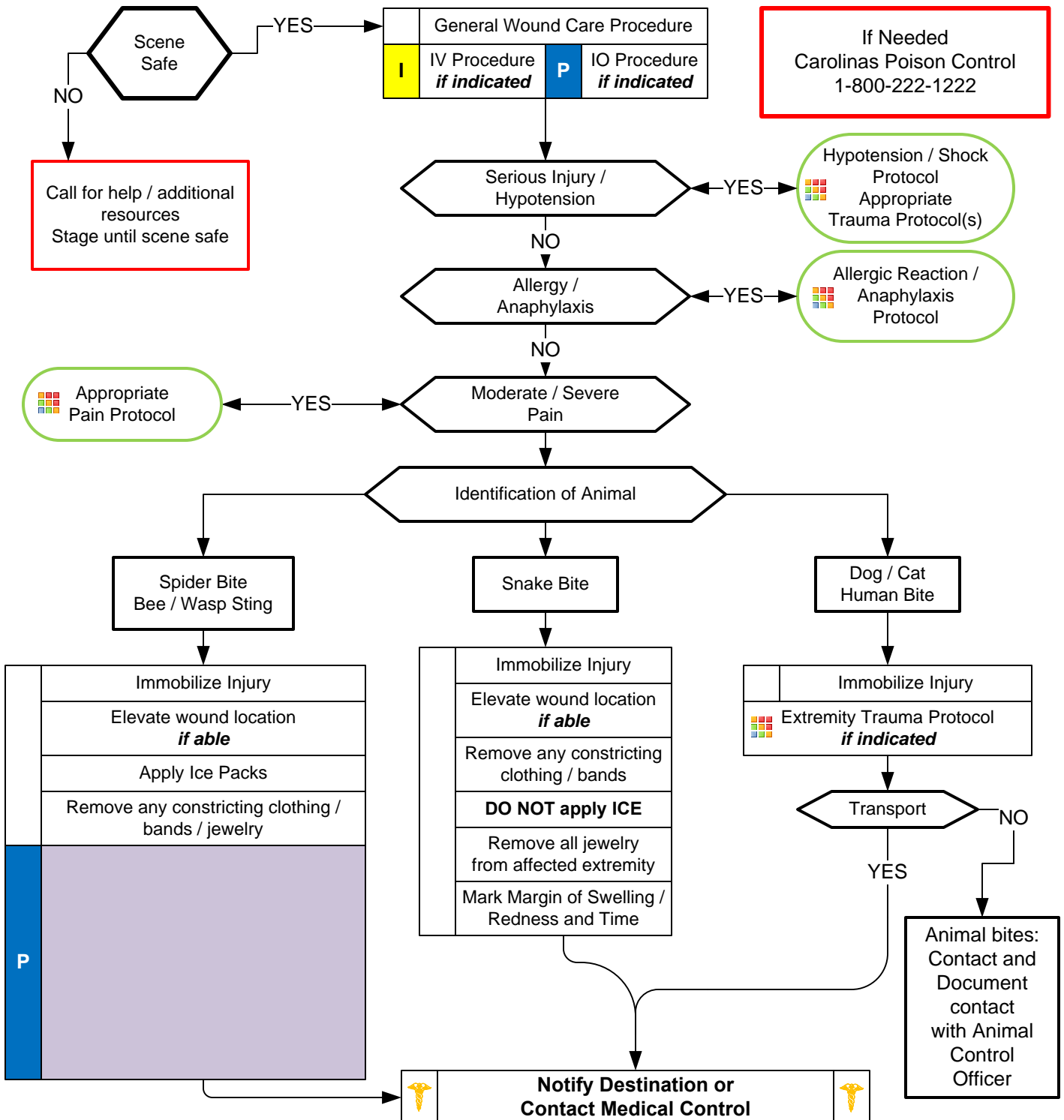
- Type of bite / sting
- Description or bring creature / photo with patient for identification
- Time, location, size of bite / sting
- Previous reaction to bite / sting
- Domestic vs. Wild
- Tetanus and Rabies risk
- Immunocompromised patient

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





Bites and Envenomations



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**
- Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- 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*).
- 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.
- 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).
- Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound.
- Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patients.
- Consider contacting the North Carolina Poison Control Center for guidance (1-800-84-TOXIN).



Carbon Monoxide / Cyanide



History

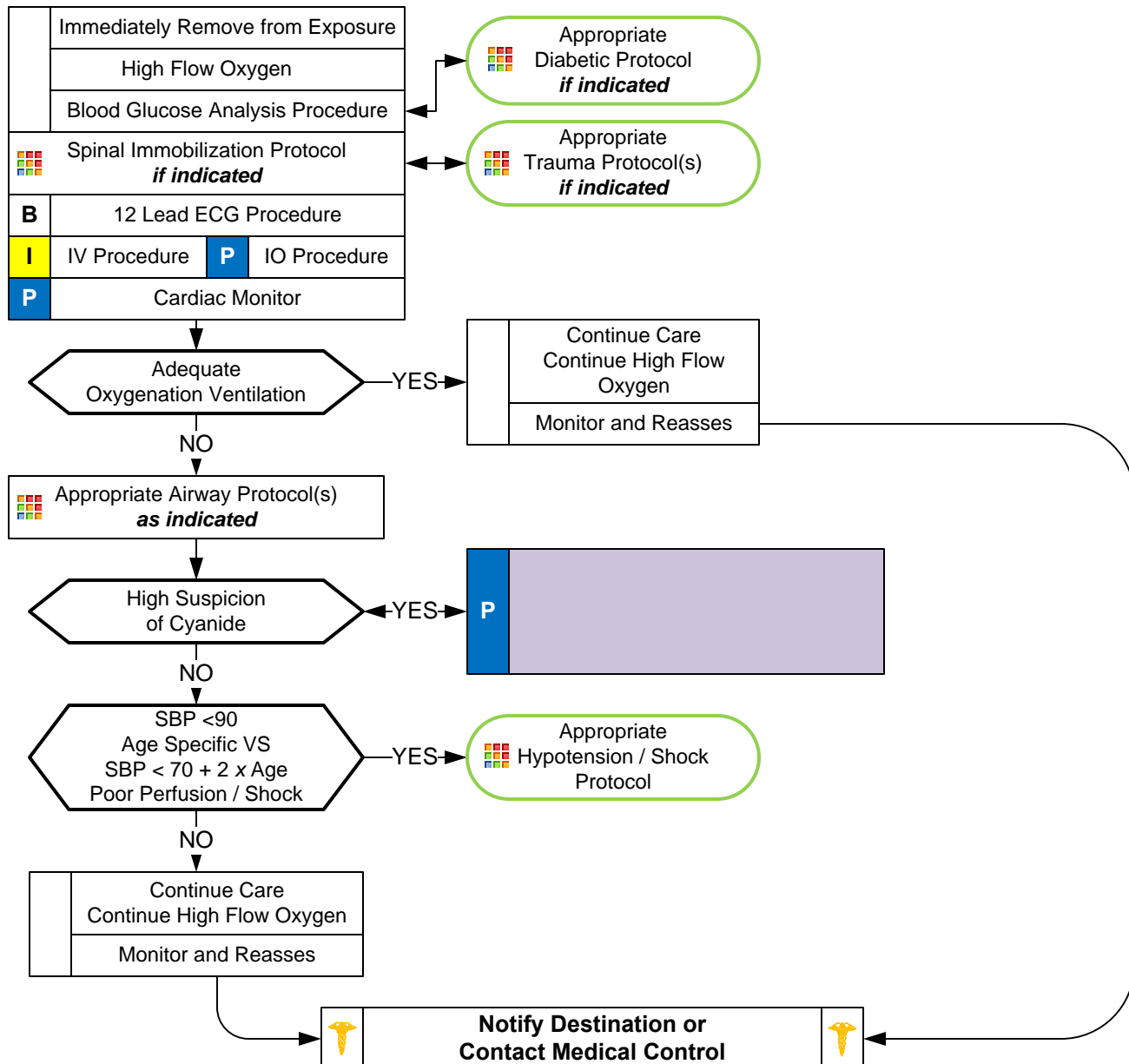
- Smoke inhalation
- Ingestion of cyanide
- Eating large quantity of fruit pits
- Industrial exposure
- Trauma
- Reason: Suicide, criminal, accidental
- Past Medical History
- Time / Duration of exposure

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



Adult / Pediatric Environmental Section Protocols

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.

Protocol 79

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Drowning / Submersion Injury



History

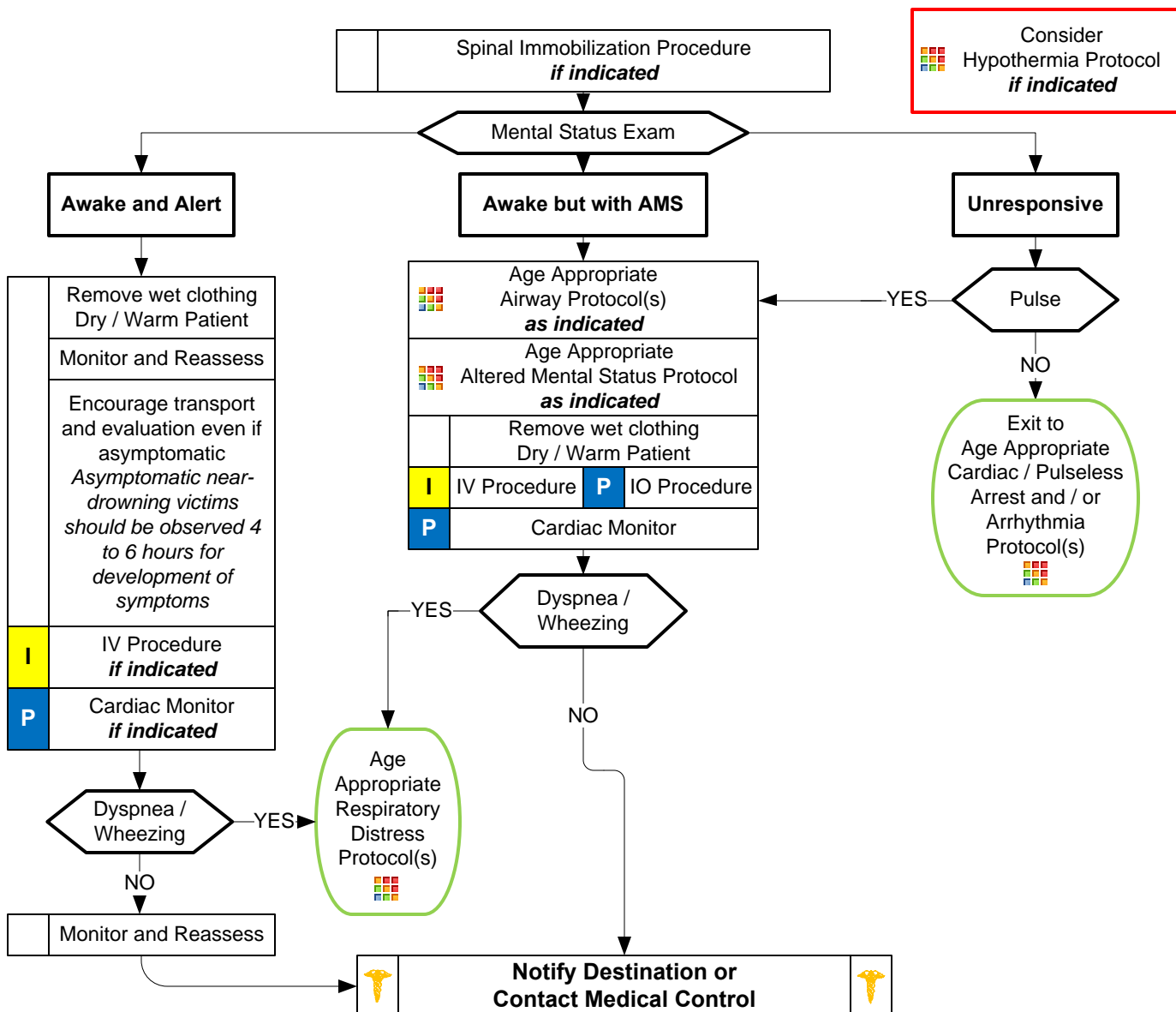
- Submersion in water regardless of depth
- Possible history of trauma ie: diving board
- Duration of immersion
- Temperature of water or possibility of hypothermia
- Degree of water contamination

Signs and Symptoms

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

Differential

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



Pearls

- **Recommended Exam: Trauma Survey, Head, Neck, Chest, Abdomen, Pelvis, Back, Extremities, Skin, Neuro**
- **Ensure scene safety. Drowning is a leading cause of death among would-be rescuers.**
- **Allow appropriately trained and certified rescuers to remove victims from areas of danger.**
- **With cold water no time limit -- resuscitate all. These patients have an increased chance of survival.**
- Have a high index of suspicion for possible spinal injuries
- Hypothermia is often associated with drowning and submersion injuries.
- All victims should be transported for evaluation due to potential for worsening over the next several hours.
- With pressure injuries (decompression / barotrauma), consider transport to or availability of a hyperbaric chamber.



Hyperthermia



History

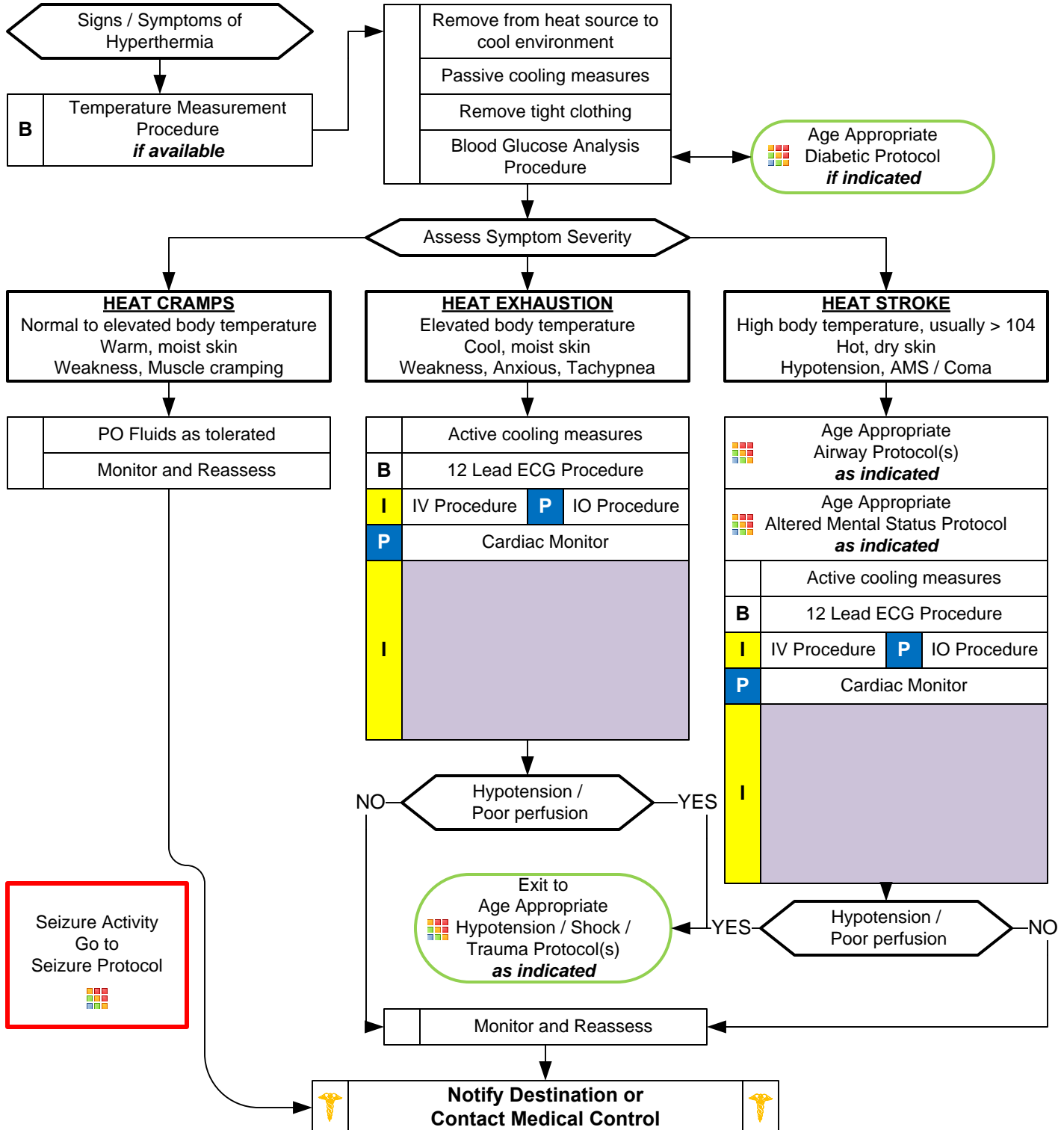
- Age, very young and old
- Exposure to increased temperatures and / or humidity
- Past medical history / Medications
- Time and duration of exposure
- Poor PO intake, extreme exertion
- Fatigue and / or muscle cramping

Signs and Symptoms

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

Differential

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



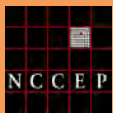


Hyperthermia



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.
- Sweating generally disappears as body temperature rises above 104° F (40° C).
- Intense shivering may occur as patient is cooled.
- **Heat Cramps** consists of benign muscle cramping 2° 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 >104° F (40° C), and an altered mental status.



Hypothermia / Frostbite



History

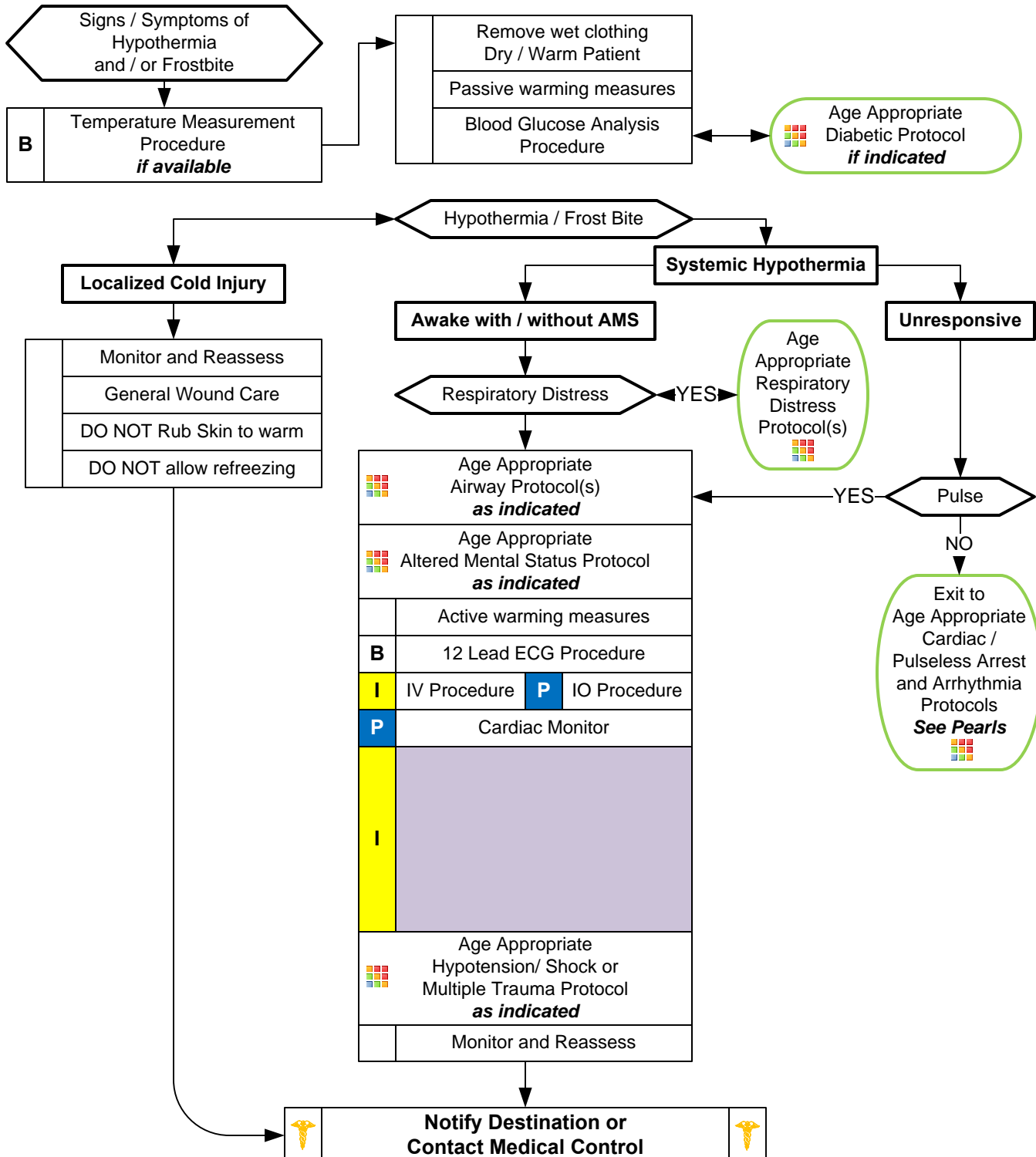
- Age, very young and old
- Exposure to decreased temperatures but may occur in normal temperatures
- Past medical history / Medications
- Drug use: Alcohol, barbituates
- Infections / Sepsis
- Length of exposure / Wetness / Wind chill

Signs and Symptoms

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

Differential

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





Hypothermia / Frostbite



Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature ≥ 93.2 degrees F, 32 degrees C.)**
- **Hypothermia categories:**
 - Mild 90 – 95 degrees F (32 – 35 degrees C)
 - Moderate 82 – 90 degrees F (28 – 32 degrees C)
 - Severe < 82 degrees F (< 28 degrees 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 with-held due to this concern.**
 - Intubation can cause ventricular fibrillation so it should be done gently by most experienced person.**
 - Below 86 degrees F (30 degrees C) antiarrhythmics may not work and if given should be given at reduced intervals. Contact medical control for direction. Epinephrine / Vasopressin can be administered. Below 86 degrees F (30 degrees) pacing should not be done**
 - Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.**
 - If the patient is below 86 degrees F (30 degree 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 45 second to palpate a pulse.**
- 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

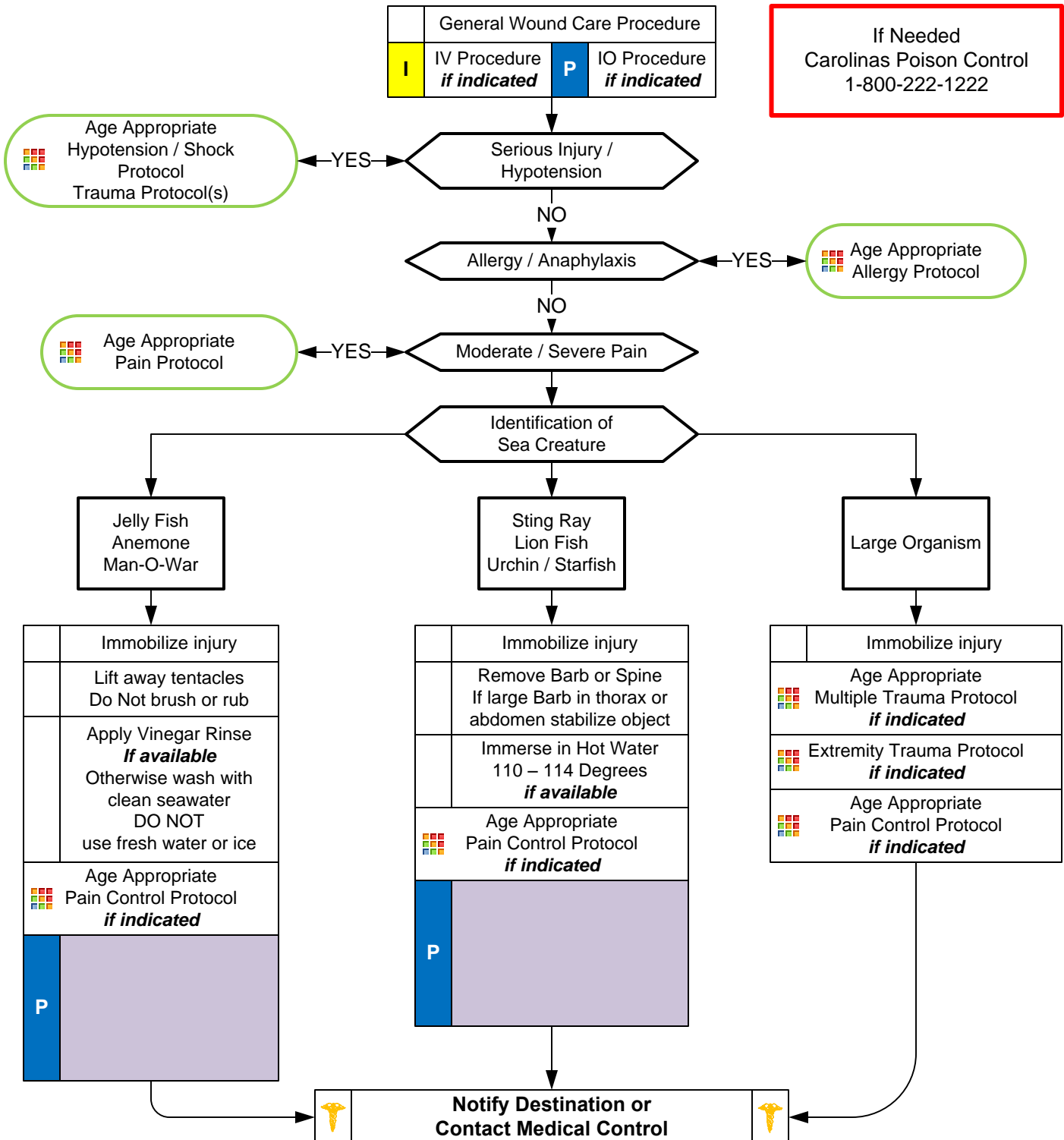
- Type of bite / sting
- Identification of organism
- Previous reaction to marine organism
- Immunocompromised
- Household pet

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





Marine Envenomations / Injury



Adult / Pediatric Environmental Section Protocols

Pearls

- Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.
- 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.

Protocol 83

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WMD-Nerve Agent Protocol



History

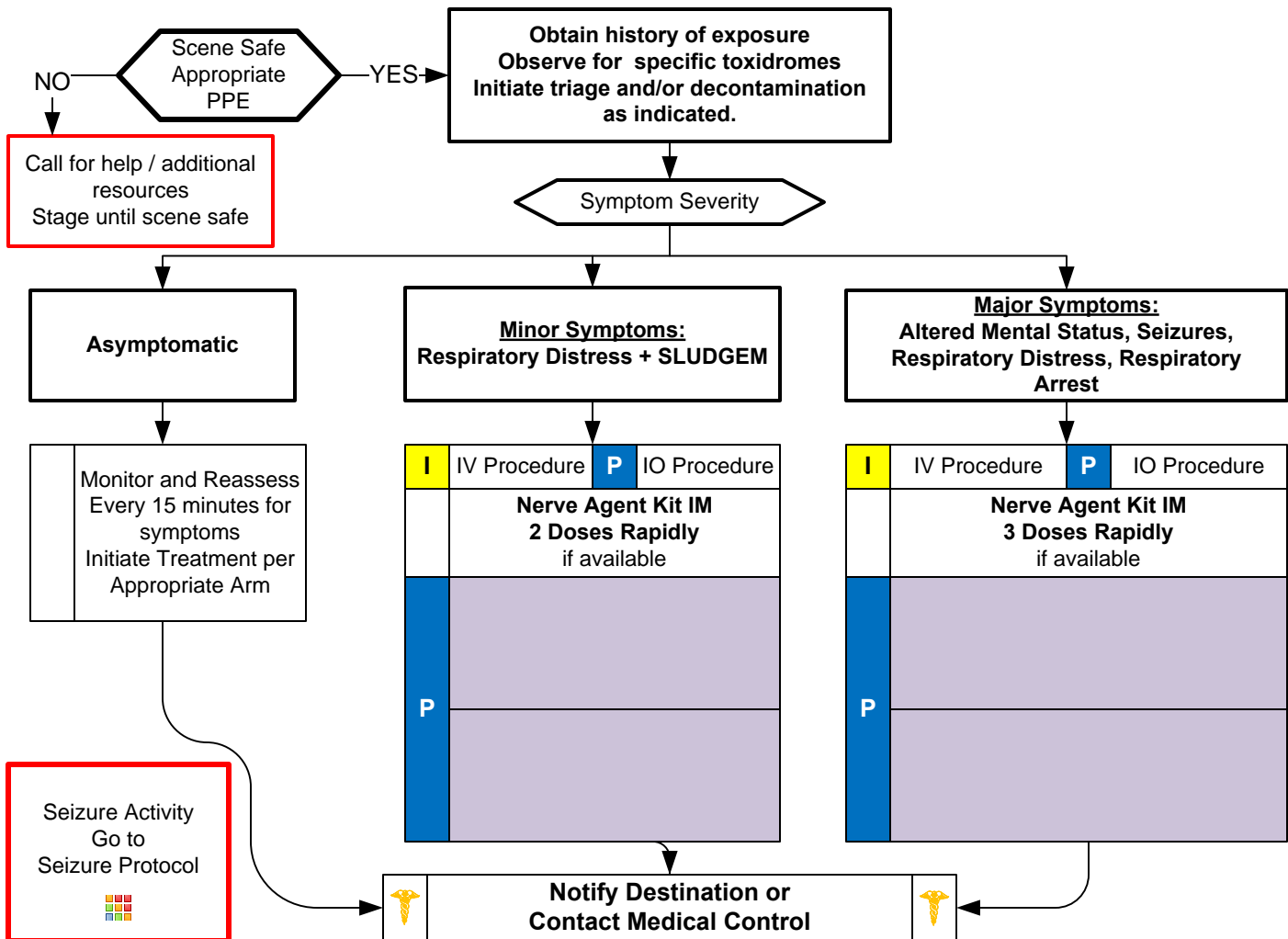
- Exposure to chemical, biologic, radiologic, or nuclear hazard
- Potential exposure to unknown substance/hazard

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.**
- In the face of a bona fide 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). Use the 0.5 mg dose if patient is less than 40 pounds (18 kg), 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg), and 2 mg dose for patients greater than 90 pounds (>40 kg).
- Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine.
- **Seizure 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 Medical Responders / EMT-B 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.



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.

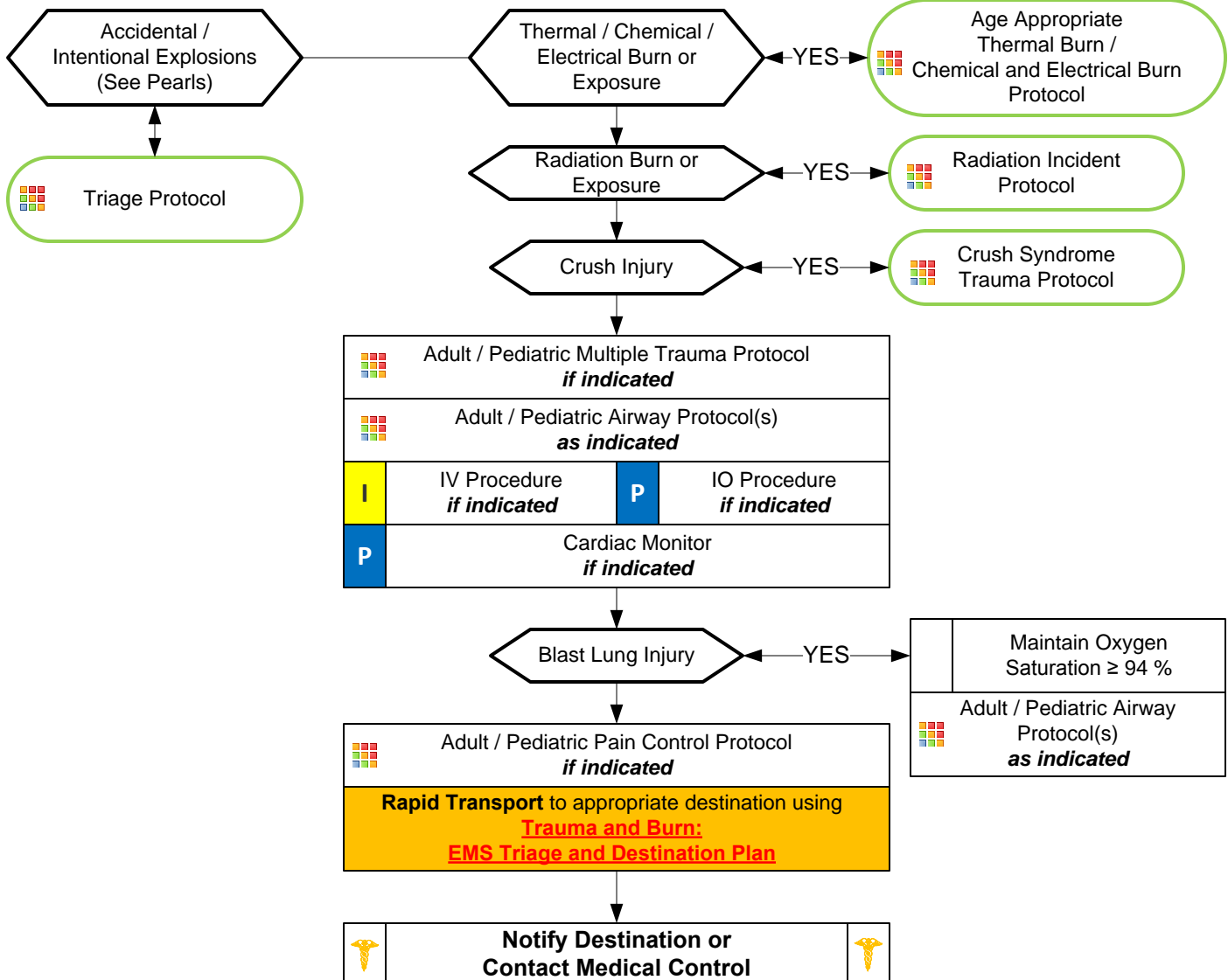
Method of Delivery: Incendiary / Explosive

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





Blast Injury / Incident



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

- **Care of Blast Injury Patients:**

Blast Injury Patients with Burn Injuries Must be cared for using the Thermal / Chemical / Electrical Burn Protocols.
Use Lactated Ringers (if available) for all Critical or Serious Burns.

- **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.

- **Accident Explosions:**

Attempt to determine source of the blast to include any potential threat for partialization 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.
Patients who can, typically will attempt to move as far away from the explosive source as they safely can.

- **Intentional Explosions:**

Attempt to determine source of the blast to include any potential threat for partialization of hazardous materials.
Greatest concern is potential threat for a secondary device.
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 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.
Consider the threat of structural collapse, contaminated particles and / or fire hazards.



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

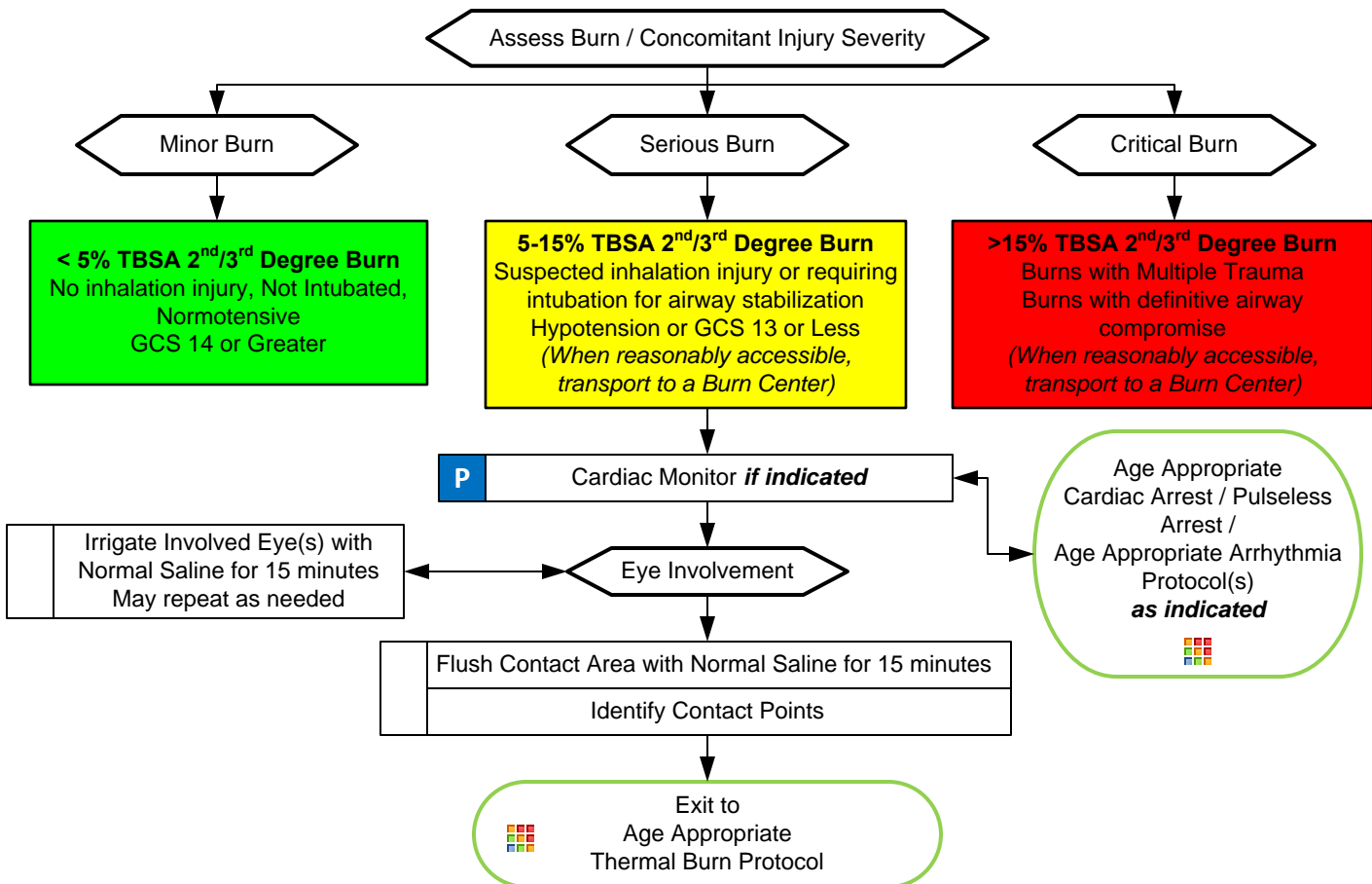
Signs and Symptoms

- 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.



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.**
- **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 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.
- **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 then 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

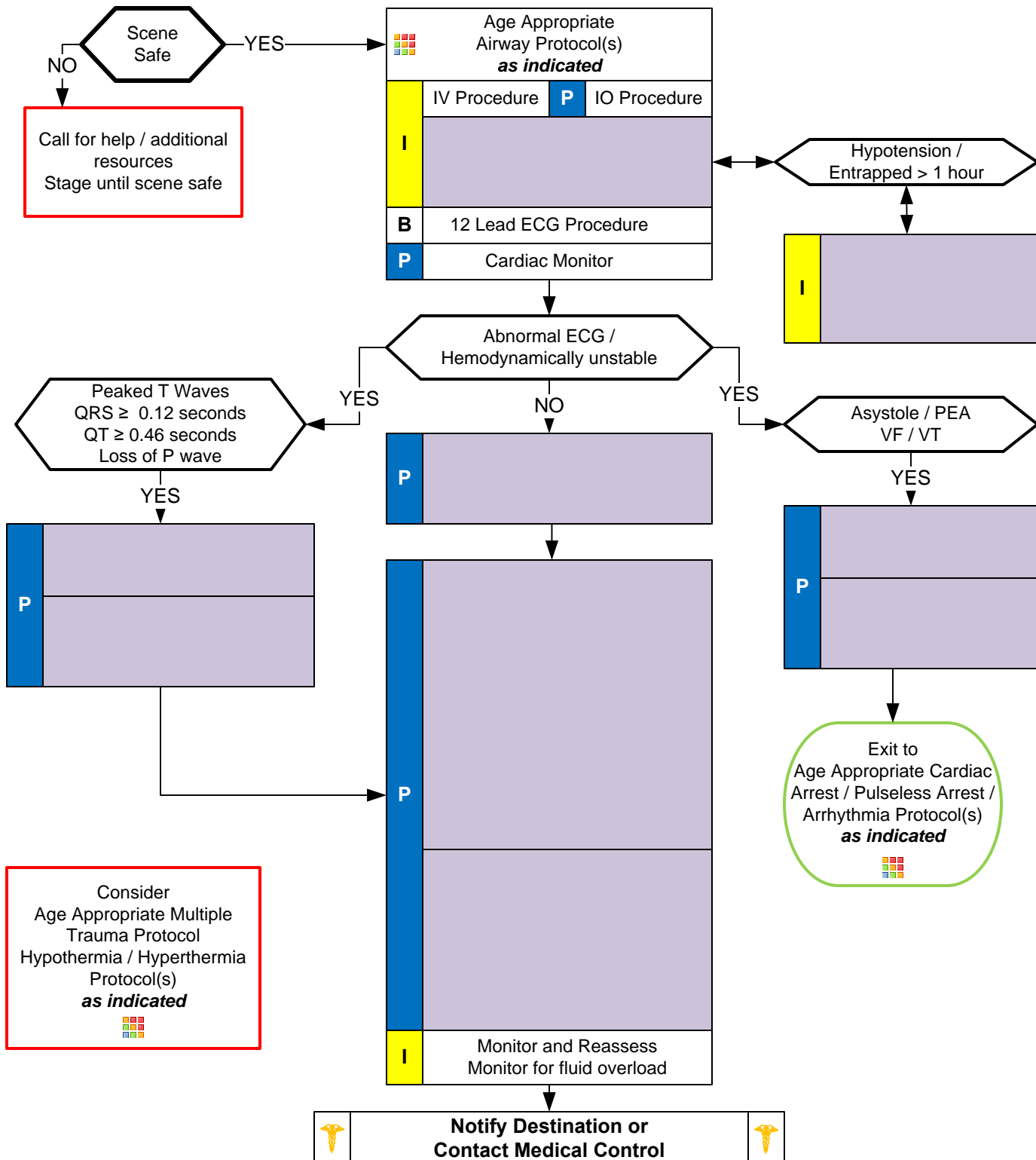
- Entrapped and crushed under heavy load > 30 minutes
- Extremity / body crushed
- Building collapse, trench collapse, industrial accident, pinned under heavy equipment

Signs and Symptoms

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

Differential

- Entrapment without crush syndrome
- Entrapment without significant crush
- Altered mental status





Crush Syndrome Trauma



Pearls

- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- Avoid Ringers Lactate IV Solution due to potassium and potential worsening hyperkalemia
- 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.
- Patients may become hypothermic even in warm environments.
- 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.



Extremity Trauma



History

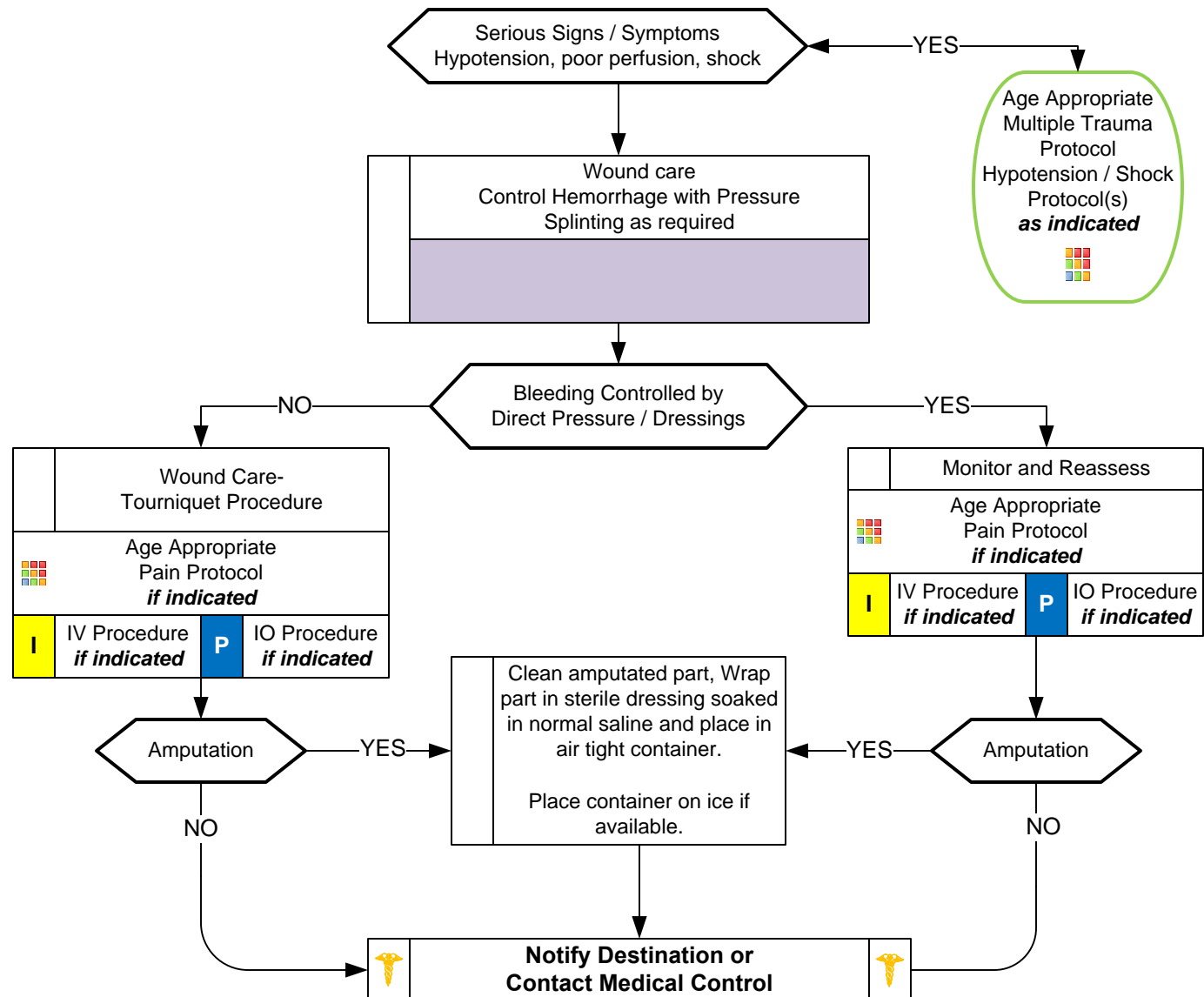
- Type of injury
- Mechanism: crush / penetrating / amputation
- Time of injury
- Open vs. closed wound / fracture
- Wound contamination
- Medical history
- Medications

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

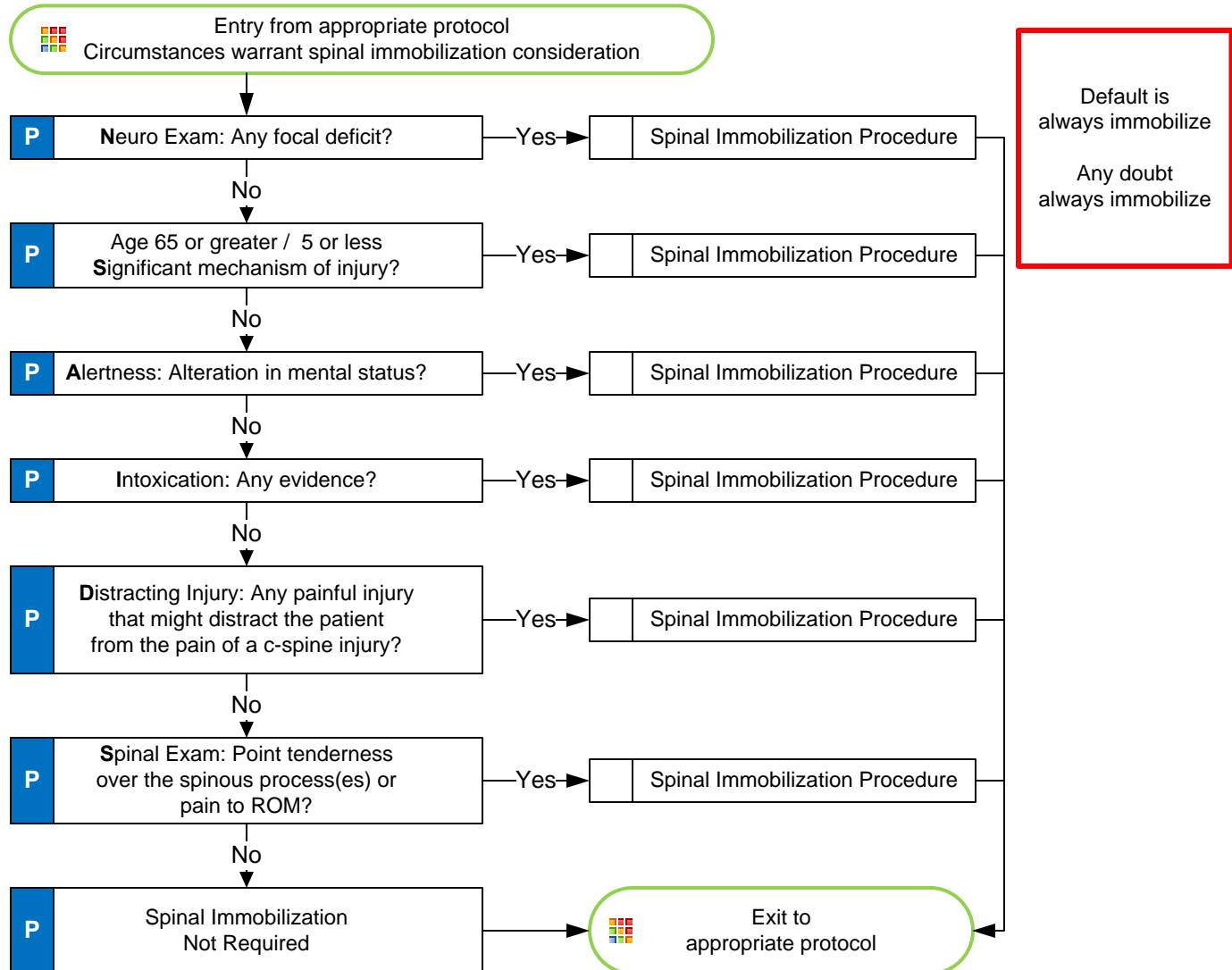


Pearls

- **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.



Selective Spinal Immobilization (Optional)



Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Consider immobilization in any patient with arthritis, cancer, dialysis or other underlying spinal or bone disease.
- The decision to NOT implement spinal immobilization in a patient is the responsibility of the paramedic solely.
- In very old and very young, a normal exam may not be sufficient to rule out spinal injury.
- Significant mechanism includes high-energy events such as ejection, high falls, and abrupt deceleration crashes and may indicate the need for spinal immobilization in the absence of symptoms.
- Range of motion should NOT be assessed if patient has midline spinal tenderness. Patient's range of motion should not be assisted. The patient should touch their chin to their chest, extend their neck (look up), and turn their head from side to side (shoulder to shoulder) without spinal process pain.
- **The acronym "NSAIDS" should be used to remember the steps in this protocol.**
 - "N" = Neurologic exam. Look for focal deficits such as tingling, reduced strength, or numbness in an extremity.
 - "S" = Significant mechanism or extremes of age.
 - "A" = Alertness. Is patient oriented to person, place, time, and situation? Any change to alertness with this incident?
 - "I" = Intoxication. Is there any indication that the person is intoxicated, impaired decision-making ability (alcohol, drugs)?
 - "D" = Distracting injury. Is there any other injury producing significant pain in this patient? Any injury which the patient seems to focus on and rate 6 or greater on the pain scale is likely distracting.
 - "S" = Spinal exam. Look for point tenderness in any spinal process or spinal process tenderness with range of motion. Each of 7 cervical spinal processes must be palpated during the exam.
- Apply appropriate padding to fill voids especially in the elderly, very young and / or obese patients.



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

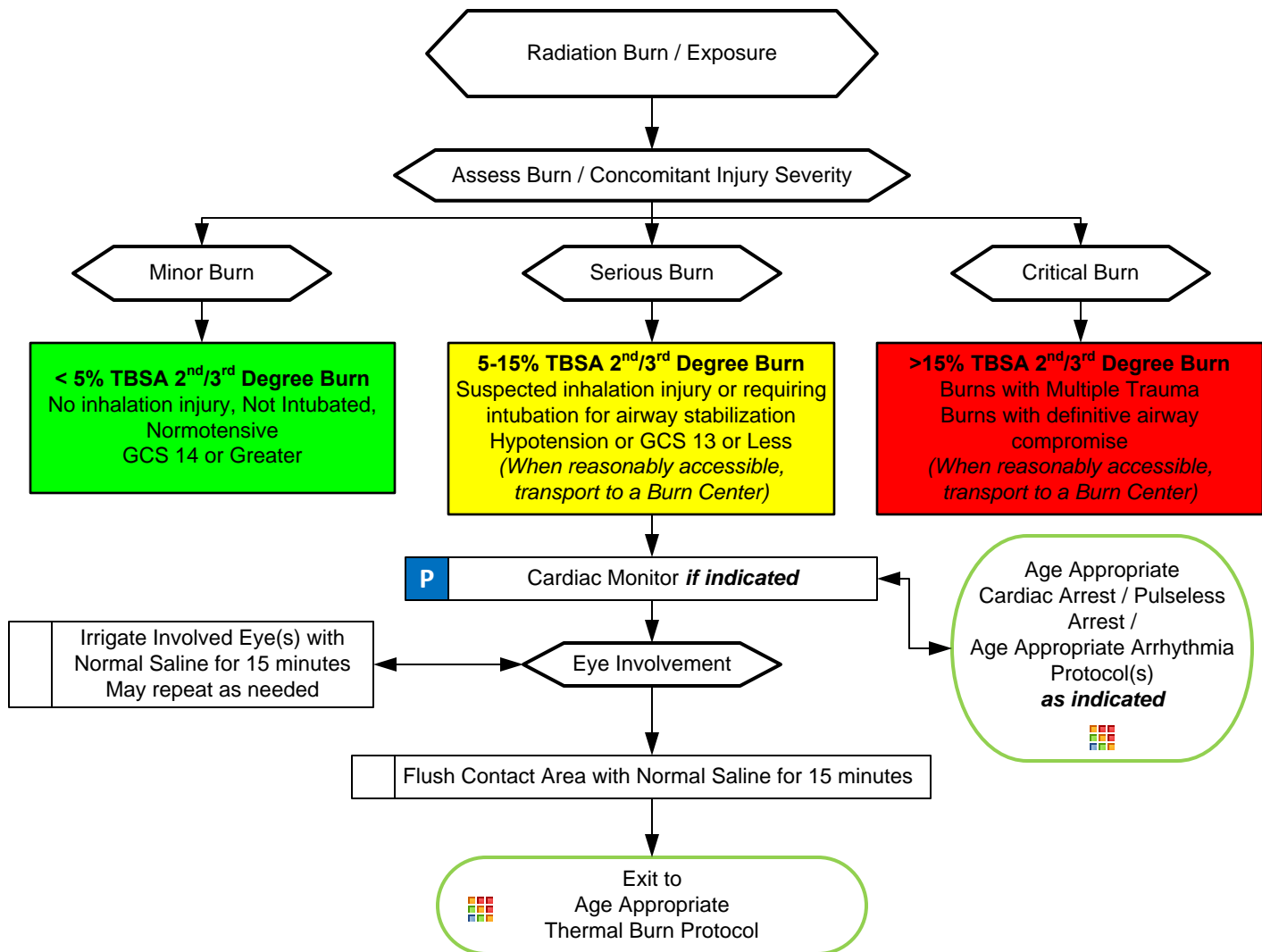
Signs and Symptoms

- 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



Adult / Pediatric Trauma and Burn Section Protocols

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.

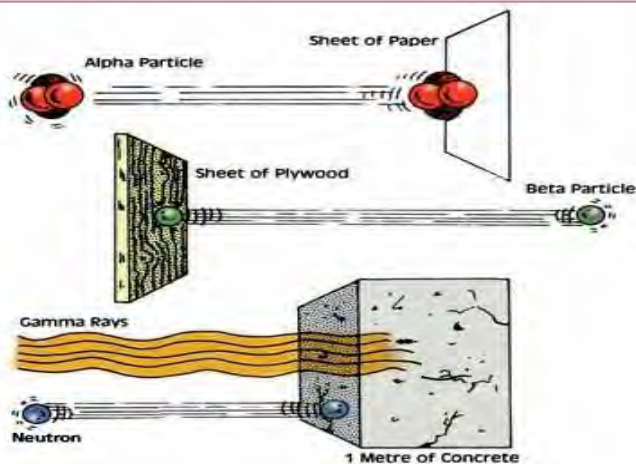
Qualify: Determine exposure type; external irradiation, external contamination with radioactive material, internal contamination with radioactive material.

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.

Protocol 91

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

2012



5.5 to 7.5	+++
7.5 to 10	+++
10 to 20	+++
> 20	+++

Abbreviations: Gy: dose
0: no effects; +: mild; ++
* Hypotension
** Also cardiovascular
Modified from: Waserer
radiation syndrome: Rev
Ann Int Med 2004; 140:

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.