Universal Patient Care

Scene Safe

NO → Call for help / additional resources
Stage until scene safe

YES →
- Bring all necessary equipment to patient
  Demonstrate professionalism and courtesy
  Mass assembly consider WMD
  Utilize appropriate PPE
- Consider Airborne or Droplet Isolation ***if indicated***
- Initial assessment
  BLS maneuvers
  Initiate oxygen ***if indicated***
- Adult Assessment Procedure
- Pediatric Assessment Procedure
  Use Broselow-Luten tape

Required VS:
Blood pressure
Palpated pulse rate
Respiratory rate
Pulse ox if available

If Indicated:
Glucose
12 Lead ECG
Temperature
Pain scale
CO Monitoring

Trauma Patient

Evaluate Mechanism of Injury (MOI)
Consider Spinal Immobilization
If indicated

- Significant MOI → Primary and Secondary trauma assessment → Obtain VS → Obtain SAMPLE
- No Significant MOI → Primary and Secondary trauma assessment
  Focused assessment on specific injury → Obtain VS

Medical Patient

Mental Status Exam

- Unresponsive → Primary and secondary assessment → Obtain history of present illness from available sources / scene survey
  Obtain SAMPLE → Obtain VS
- Responsive → Chief Complaint
  Obtain SAMPLE → Primary and Secondary assessment
  Focused assessment on specific complaint → Obtain VS

Exit to Appropriate Protocol

Repeat assessment while preparing for transport

Continue on-going assessment
Repeat initial VS
Evaluate interventions / procedures

Transfer
Patient hand-off includes patient information, personal property and summary of care and response to care

Exit to Appropriate Protocol

Patient does not fit specific protocol

Notify Destination or Contact Medical Control

Patient does not fit specific protocol

General Section Protocols

Universal Patient Care

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

General:
All patient care must be appropriate to your level of training and documented in the PCR.

The PCR / EMR narrative should be considered a story of the circumstances, events and care of the patient and should allow a reader to understand the complaint, the assessment, the treatment, why procedures were performed and why indicated procedures were not performed as well as ongoing assessments and response to treatment and interventions.

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

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

Pediatric Patient:
Pediatric patient is defined by those which fit on the Broselow-Luten Resuscitation Tape, Age 15 years or less and / or weight 49 kg or less. Patients off the Broselow-Luten tape should have weight based medications until age 16 or greater or weight greater than or equal to 50 kg. Special needs children may require continued use of Pediatric based protocols regardless of age and weight.

Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation to skin.

The order of assessment may require alteration dependent on the developmental state of the pediatric patient.

Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.

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

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

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

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

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

Special note on oxygen administration and utilization:
Oxygen is a pharmaceutical with indications, contraindications as well as untoward side effects.
Utilize oxygen when indicated and not because it is available. A reasonable target oxygen saturation in all treatment protocols is 94 % regardless of delivery device.

Pearls

- **Recommended Exam: Minimal exam if not noted on the specific protocol is vital signs, mental status with GCS, and location of injury or complaint.**
- **Any patient contact which does not result in an EMS transport must have a completed disposition form.**
- **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.

Assess Respiratory Rate, Effort, Oxygenation
Is Airway / Breathing Adequate?

YES → Supplemental oxygen
Goal oxygen saturation ≥ 90%

Exit to Appropriate Protocol

NO

Basic Maneuvers First
-open airway chin lift / jaw thrust
-nasal or oral airway
-Bag-valve mask (BVM)

Spinal Immobilization Procedure ***if indicated***

Consider AMS Protocol

Adult / Pediatric Respiratory Distress With a Tracheostomy Tube Protocol ***if indicated***

Airway Patent?

NO → Airway Foreign Body Obstruction Procedure

I — Direct Laryngoscopy

YES

Breathing / Oxygenation Support needed?

YES → Supplemental oxygen BVM

I — Consider Airway CPAP Procedure

NO

Monitor / Reassess Supplemental Oxygen ***if indicated***

Exit to appropriate protocol

BVM / CPAP Effective?

NO → B — Airway BIAD Procedure

I — Oral / Nasotracheal Intubation Procedure

P — Consider RSI Protocol ***if available***

YES

Complete Obstruction?

NO

YES

P — Airway Cricothyrotomy Surgical Procedure

Unable to Ventilate and Oxygenate ≥ 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.

Exit to Adult Failed Airway Protocol

P — Consider Sedation
If BIAD or ETT in place

Midazolam 2.5 mg IV / IO
Repeat q 5 min up to 10 mg OR
Diazepam 4mg IV / IO
Repeat 2 mg q 3-5 min up to 10mg

Notify Destination or Contact Medical Control

Adult General Section Protocols

Adult Airway

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

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

Please refer to Protocols 2 and 3 for additional information.

Difficult Airway Assessment

Difficult BVM Ventilation:
MOANS: Difficult **M**ask seal due to facial hair, anatomy, blood or secretions / trauma; **O**bese or late pregnancy; **A**ge > 55; **N**o teeth (roll gauze and place between gums and cheeks to improve seal); **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant).

Difficult Laryngoscopy:
LEMON: Look externally for anatomical distortions (small mandible, short neck, large tongue); **E**valuate 3-3-2 Rule (Mouth open should accommodate 3 patient fingers, mandible to neck junction should accommodate 3 patient fingers, chin-neck junction to thyroid prominence should accommodate 2 patient fingers); **M**allampati (difficult to assess in the field); **O**bstruction / Obese or late pregnancy; **N**eck mobility.

Difficult BIAD:
RODS: Restricted mouth opening; **O**bstruction / Obese or late pregnancy; **D**istorted or disrupted airway; **S**tiff or increased airway pressures (Asthma, COPD, Obese, Pregnant);

Difficult Cricothyrotomy / Surgical Airway:
SHORT: Surgery or distortion of airway; **H**ematoma over lying neck; **O**bese or late pregnant; **R**adiation treatment skin changes; **T**umor overlying neck.

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

Nasotracheal intubation: *Orotracheal intubation is the preferred choice.* Procedure requires patient have spontaneous breathing. Contraindicated in combative patients, anatomically disrupted or distorted airways, increased intracranial pressure, severe facial trauma, basal skull fracture, head injury. Not a rapid procedure and exposes patient to risk of desaturation.

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 ≥ 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 $EtCO_2$ 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 ≥ 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.

Failed Airway

Call for additional resources if available

BVM
Adjunctive Airway
Maintains SpO2 ≥ 90 %

YES

Continue BVM
Supplemental Oxygen

Exit to
Appropriate Protocol

NO

Significant Facial Trauma / Swelling / Distortion

YES

P Airway Cricothyrotomy Surgical Procedure

P Continue Ventilation / Oxygenation
Maintain SpO2 ≥ 90 %

NO

B Airway BIAD Procedure

BIAD Successful

NO

YES

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

Notify Destination or Contact Medical Control

Adult General Section Protocols

Adult, Failed Airway

A failed airway occurs when a provider begins a course of airway management by endotracheal intubation and identifies that intubation by that means will not succeed.

Conditions which define a Failed Airway:

1. Failure to maintain adequate oxygen saturation 90 % or greater after 2 or more failed intubation attempts.

2. Three (3) failed at intubation by the most experienced prehospital provider on scene even when adequate oxygen saturation 90 % or greater can be maintained.

3. Unable to maintain adequate oxygen saturation 90 % or greater with BVM techniques and insufficient time to attempt alternative maneuvers. A patient near death or dying.

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

Please refer to Protocol 1, Adult Airway page 2 for information in how to identify the patient with potential difficult airway.

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

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

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

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

Cricothyrotomy / Surgical Airway Procedure:
Use in patients 12 years of age and greater only. Percutaneous transtracheal jet ventilation is used in younger patients.

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

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, Drug Assisted
(*OPTIONAL*)

Indications for RSI
Failure to protect the airway
Unable to oxygenate
Unable to ventilate
Impending airway compromise

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

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.

Hypoxic Or
Hypotension Or
Dangerously Combative?

NO

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

	Consider Restraints Physical Procedure
P	Consider Gastric Tube Insertion Procedure

Awakening or Moving after intubation

NO

YES

P	**Ketamine 1.5 – 2 mg/kg IV / IO**
P	**Fentanyl 50 - 75 mcg IV / IO** Repeat 25 – 50 mcg q 5 min as needed **Maximum 500 mcg** ***Or*** **Morphine 4 mg IV / IO** Repeat 2 mg every 5 minutes as needed **Maximum 10 mg**
P	**Midazolam 2.5 mg IV / IO** Repeat every 3 – 5 minutes as needed **Maximum 10 mg**
P	Consider long term paralytic if not used on induction **Rocuronium 1mg/kg IV / IO** ***OR*** **Vecuronium 0.1 mg/kg IV/ IO**

YES

	Ketamine 1.5 – 2 mg/kg IV / IO	
P	**Dangerously Combative** **Ketamine 300 – 400 mg IM / IV / IO**	P

Exit to
Adult Airway
Adult Failed Airway

Hypotension / Shock Protocol(s)
as indicated

Notify Destination or Contact Medical Control

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.

Adult General Section Protocols

Airway, Drug Assisted
(*OPTIONAL*)

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Pearls

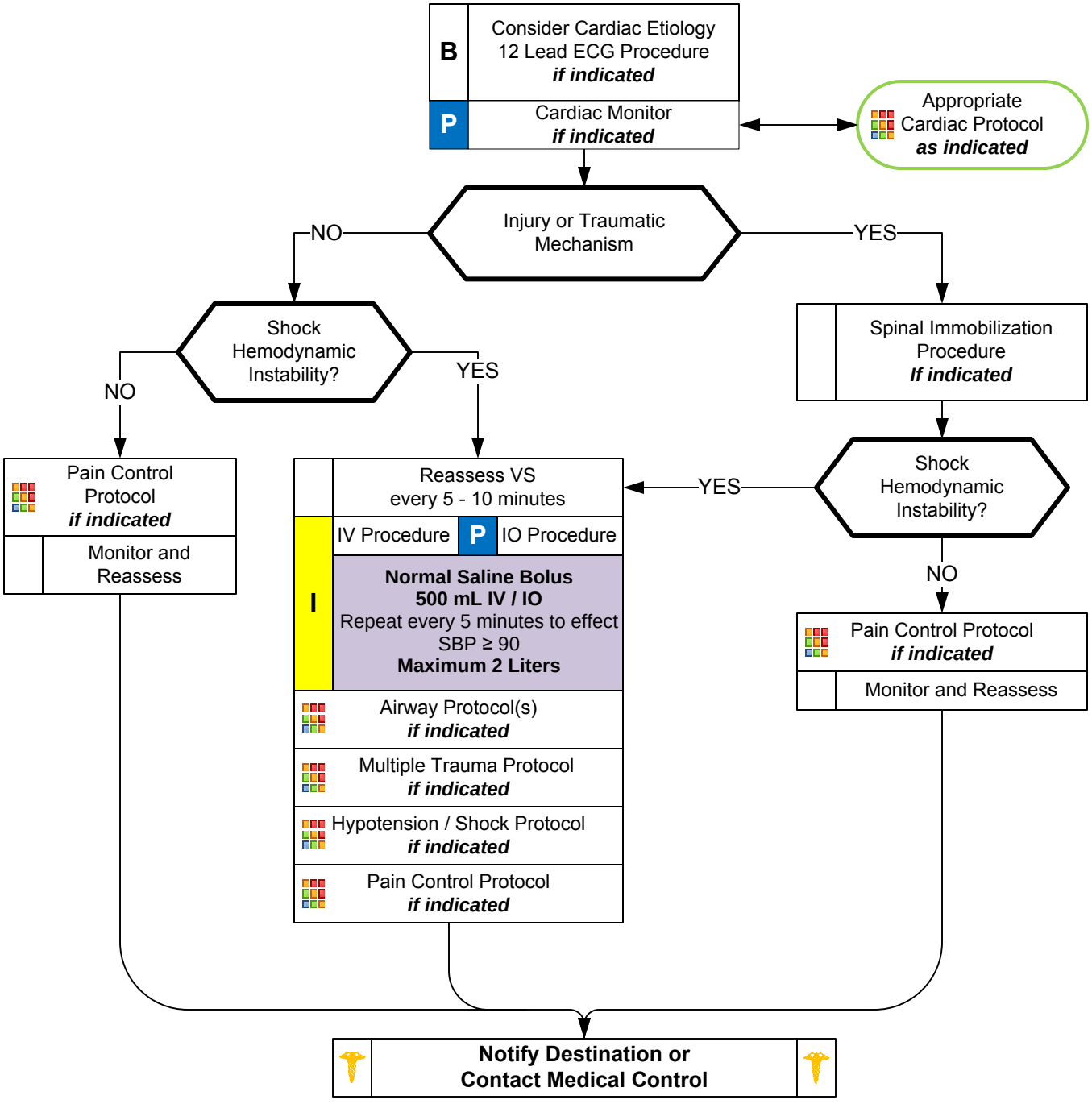
- **Agencies must maintain a separate Performance Improvement Program specific to Rapid Sequence Intubation.**
- **This procedure requires at least 2 EMT-Paramedics. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.**
- **Patients with hypoxia and/or hypotension are at risk of cardiac arrest when a sedative and paralytic medication are administered. Hypoxia and hypotension require resuscitation and correction prior to use of these combined agents. Ketamine is preferred agent to allow time for resuscitation to occur.**
- **<u>This protocol is only for use in patients who are longer than the Broselow-Luten Tape.</u>**
  Ketamine may be used during airway management of patients who FIT on the Broselow-Luten Tape with a DIRECT, ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR OR ASSISTANT MEDICAL DIRECTOR ONLY. Specific use in this population of patients must also be for use in individual agencies by the NC OEMS State Medical Director prior to use.
- **Continuous Waveform Capnography and Pulse Oximetry and are required for intubation verification and ongoing patient monitoring though this is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended.**
- **Before administering any paralytic drug, screen for contraindications with a thorough neurologic exam.**
- **<u>Agencies utilizing Ketamine must submit a local systems plan to State Medical Director detailing how the drug is used in your program.</u>**
  Ketamine may be used with and without a paralytic agent in conjunction with either a OP, NP, BIAD or endotracheal tube.
  Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management.
  Ketamine may be used in the dangerously combative patient requiring airway management IM. IV / IO should be established as soon as possible.
  Ketamine may NOT be used for purposes of sedation only – it must be used only during airway management procedures.
- **If First intubation attempt fails, make an adjustment and try again:**
- **Different laryngoscope blade**
- **Different ETT size**
- **Change head positioning**
- **Change cricoid pressure; No longer routinely recommended and may worsen your view.**
- **Align external auditory canal with sternal notch / proper 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.
- RSI not recommended in urban setting (short transport) when able to maintain oxygen saturation ≥ 90 %.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.

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



Adult General Section Protocols

Back Pain

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

Pearls

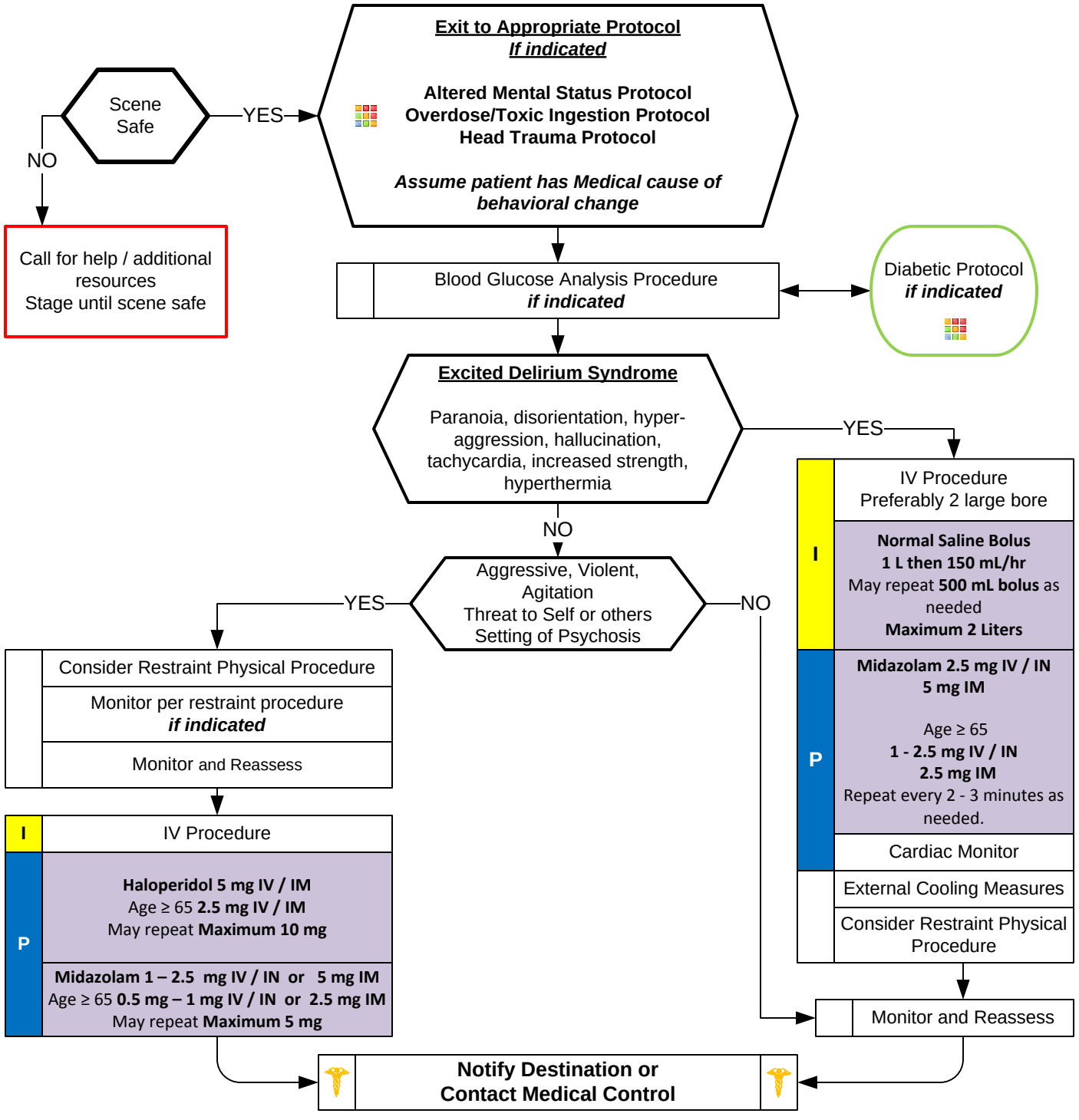
- Patients with underlying spinal deformity should be immobilized in their functional position.
- Abdominal aneurysms are a concern especially in patients over the age of 50 and / or with vascular or hypertensive disease.
- Kidney stones typically present with an acute onset of flank pain which radiates 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.

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



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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 is such a way that could impact the patients respiratory or circulatory status.
- **Excited Delirium Syndrome:**
  Medical emergency: Combination of delirium, psychomotor agitation, anxiety, hallucinations, speech disturbances, disorientation, violent / bizarre behavior, insensitivity to pain, hyperthermia and increased strength. Potentially life-threatening and associated with use of physical control measures, including physical restraints and Tasers. Most commonly seen in male subjects with a history of serious mental illness and/or acute or chronic drug abuse, particularly stimulant drugs such as cocaine, crack cocaine, methamphetamine, amphetamines or similar agents. Alcohol withdrawal or head trauma may also contribute to the condition.
- **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

B

Acetaminophen 15 mg/kg PO
(500 to 1000 mg typical adult)
Or
Aspirin 324 to 650 mg PO
(Adult Only)
Or
Ibuprofen 10 mg/kg PO
(400 - 800 mg typical adult)

I

Consider IV Procedure

Monitor and Reassess

Moderate to Severe

I

IV Procedure | **P** | IO Procedure

Ketorolac 30 mg IV / IO
60 mg IM

P

Cardiac Monitor

Morphine 4 mg (0.1 mg/kg) IV / IO
Repeat 2 mg every 5 minutes as needed
Maximum 10 mg
Or
Hydromorphone 1-2 mg IM / IV / IO
Repeat 1 mg every 20-30 minutes
Maximum 5 mg
Or
Fentanyl 50-75 mcg IV / IO / IN
Repeat 25 mcg q 20 min as needed
Maximum 200 mcg

Monitor and Reassess
Every 10 minutes following sedative

Monitor and Reassess

Notify Destination or
Contact Medical Control

Pain Control: Adult

Additional Information:

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

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 required higher than usual opioid doses to effect adequate pain control

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

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

YES → Exit to Scene Rehabilitation Responder Protocol

NO

Heat or Cold stress

YES → **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

YES → **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

NO

Reassess responder after 20 Minutes in General Rehabilitation Section
Reassess VS

HR ≥ 110 → YES → Temp ≥ 100.6 → YES → Responder Cannot Wear Protective Gear
Extend Rehabilitation Time Until VS Improve

NO

Temp ≥ 100.6 → YES → HR ≥ 110 → YES → Extend Rehabilitation Time Until VS Improve

NO

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)

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Pearls

- **This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.**
- **Rehabilitation officer has full authority in deciding when responders may return to duty.**
- **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.

Scene Rehabilitation: Responder (Optional)

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

Continue:
Heat and Cold Stress treatment techniques from General Rehab Section

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

NFPA Age Predicted 85 % Maximum Heart Rate	
20 - 25	170
26 - 30	165
31 - 35	160
36 - 40	155
41 - 45	152
46 - 50	148
51 -55	140
55 - 60	136
61 - 65	132

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

Use in conjunction with General Rehabilitation Protocol

20 Minute Rest Period

Pulse Rate > 85 % NFPA Age Predicted Maximum — YES → **I** **Normal Saline IV Bolus Up to 2 L** *Until Pulse Rate is 110 or less And Systolic BP is 100 or greater*

NO

Systolic BP ≥ 160 Or Diastolic BP ≥ 100 — YES

NO

Respirations < 8 or > 40 — YES

NO

Pulse oximetry < 90 % SPCO > 10 % — YES

NO

Temperature ≥ 100.6 — YES

NO

Discharge Responder from General Rehabilitation Section

Reports for Reassignment

No improvement after 30 minutes of additional rehabilitation

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

Notify Destination or Contact Medical Control

Adult General Section Protocols

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.

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

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

Do not begin resuscitation

Follow Deceased Subjects Policy

Cardiac Arrest Protocol

Criteria for Death / No Resuscitation Review DNR / MOST Form

YES

NO

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

P Cardiac Monitor

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Follow Rhythm Appropriate Protocol

YES

Shockable Rhythm

NO

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia
Hypoglycemia

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

Dialysis / Renal Failure Protocol ***if indicated***

Search for Reversible Causes →

IV Procedure | P | IO Procedure

Cold Normal Saline Bolus 500 mL IV / IO

I

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 Consider Chest Decompression Procedure

Criteria for Discontinuation

YES

Discontinue Resuscitation

Follow Deceased Subjects Policy

NO

Notify Destination or Contact Medical Control

Adult Cardiac Section Protocols

Adult Asystole / Pulseless Electrical Activity

Utilize cold fluids for all non-traumatic cardiac arrests greater than 18 y/o. For the purpose of induced hypothermia, drownings and asphyxiation arrests (i.e. hangings) are considered non-traumatic

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

Heart Rate < 60 / minute and Symptomatic
Hypotension, Acute AMS, Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to bradycardia

NO → Exit to Appropriate Protocol

YES

Dyspnea / Increased Work of Breathing especially with hypoxia

YES → Appropriate Airway and / or Respiratory Distress Protocol

NO

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Overdose / Toxic Ingestion Protocol

B	12 Lead ECG Procedure
P	Cardiac Monitor
I	IV Procedure / P IO Procedure

P — **Atropine 0.5 mg IV / IO**
Repeat every 3 – 5 minutes
Maximum 3 mg

I — **Normal Saline Bolus 500 mL IV / IO**
May repeat as needed
Maximum 2 Liters

P — *Consider Sedation*
Midazolam 0.5 mg to 2.5 mg IV / IO
May repeat as needed
Maximum dose 5 mg

P — Transcutaneous Pacing
If not responsive to Atropine
Consider earlier in 2nd or 3rd AVB)

Consider
Dopamine 2 – 20 mcg/kg/min IV / IO
If no clinical response

Notify Destination or Contact Medical Control

P — **Epinephrine Infusion**
1 – 10 mcg / min IV / IO

Adult Cardiac Section Protocols

Bradycardia; Pulse Present

For Dopamine to have a heart rate affect, higher doses may need to be applied. Doses of 2 mcg/kg/min - 5mcg/kg/min are considered to be "renal" doses however doses of 5mcg/kg/min - 10 mcg/kg/min are "cardiac" doses

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

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

Epinephrine Infusion: Dose 1-10 mcg / min *(must have medical control order)*

***Mcg/min 4 mcg/ml concentration* (60 gtt set)**

1 . . . . . 15 gtt/min
2 . . . . . 30 gtt/min
3 . . . . . 45 gtt/min
4 . . . . . 60 gtt/min
5 . . . . . 75 gtt/min
6 . . . . . 90 gtt/min
7 . . . . . 105 gtt/min
8 . . . . . 120 gtt/min
9 . . . . . 135 gtt/min
10 . . . . . .150 gtt/min

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.

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

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

Do not begin resuscitation

Follow Deceased Subjects Policy

YES ◀ **Criteria for Death / No Resuscitation Review DNR / MOST Form**

NO ▼

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

AED Procedure if available

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

ALS Available

NO ▼

Shockable Rhythm

NO ▼

Continue CPR
2 Minutes
Repeat and reassess

Airway Protocol(s)

YES ▼

Shock Delivery

Continue CPR
2 Minutes
Repeat and reassess

Airway Protocol(s)

YES ▼

P Cardiac Monitor

Shockable Rhythm

NO ▼

Follow Asystole / PEA Airway Protocol(s) ***as indicated***

YES ▼

Follow VF / VT Tachycardia Airway Protocol(s) ***as indicated***

Notify Destination or Contact Medical Control

Adult Cardiac Section Protocols

Cardiac Arrest; Adult

Utilize cold fluids for all non-traumatic cardiac arrests greater than 18 y/o. For the purpose of induced hypothermia, drownings and asphyxiation arrests (i.e. hangings) are considered non-traumatic

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
- **P**alliation / **P**rovocation
- **Q**uality (crampy, constant, sharp, dull, etc.)
- **R**egion / **R**adiation / **R**eferred
- **S**everity (1-10)
- **T**ime (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 Signs / Symptoms consistent with cardiac etiology

NO → Dyspnea / Atypical symptoms Suspect cardiac etiology

NO → Exit to Appropriate Protocol

YES

YES

B — **12 Lead ECG Procedure**

B — **Aspirin 81 mg x 4 PO (chewed)** Or **325 mg PO**

B — **Nitroglycerin 0.3 / 0.4 mg Sublingual** Repeat every 5 minutes x 3 ***if prescribed to patient and (BP ≥ 100)***

P — Cardiac Monitor

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

YES → **Transport based on:** **STEMI** **EMS Triage and Destination Plan** **Immediate Notification of Facility** **Immediate Transmission of ECG** *if capable* **Keep Scene Time to ≤ 10 Minutes**

B — *If transporting to Non PCI Center* **Reperfusion Checklist**

NO

I — IV Procedure | **P** — IO Procedure

Systolic BP ≥ 100

NO → Lung Exam: CHF / Pulmonary Edema

NO → **I** — **Normal Saline Bolus 500 mL IV / IO** *Repeat as needed* **Maximum 2 L**

YES

YES → Exit to Adult CHF / Pulmonary Edema Protocol

I — **Nitroglycerin 0.4 mg SL** Repeat every 5 minutes as needed

P — **Morphine 2 - 4 mg (0.1 mg/kg) IV / IO** Repeat 2 mg every 5 minutes as needed **Maximum 10 mg** ***Or*** **Fentanyl 50 - 75 mcg IV / IO / IN** Repeat 25 mcg q 20 min as needed **Maximum 200 mcg**

Notify Destination or Contact Medical Control

Adult Cardiac Section Protocols

Chest Pain: Cardiac and STEMI

A new onset of RBBB maybe more specific for an MI place more myocardial tissue at risk than a new onset LBBB

Pearls

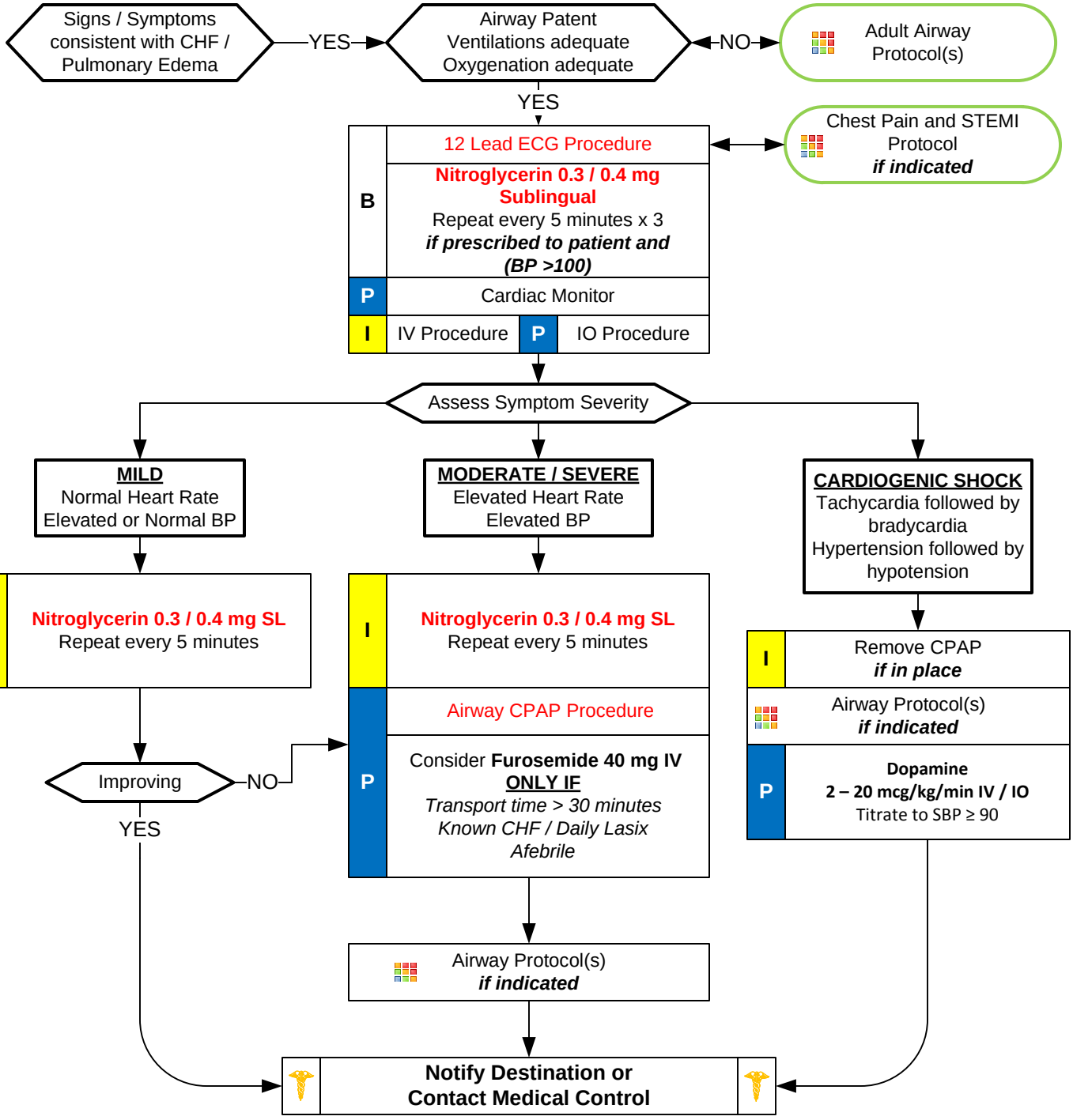
- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are the key performance indicators for the EMS Acute Cardiac (STEMI) Care Toolkit**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in the past 24 hours or Cialis (tadalafil) in the past 36 hours due to potential severe hypotension.**
- **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



Adult Cardiac Section Protocols

This protocol has been altered from the original 2012 NCCEP Protocol by the local EMS Medical Director

CHF / Pulmonary Edema

A cardiac exams includes not only the lungs and heart, but the neck (inspect for JVD) and the lower legs as well. Distended neck veins and pitting edema in the legs add to the suspicion of pulmonary edema. Also, if one calf is larger than the other and is tender to palpation, it could indicate a deep vein thrombosis (DVT) and a possible pulmonary embolus (PE).

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

Lasix is to be used only in people with fluid overload. Make sure the patient has fluid overload and not pneumonia with hypovolemia.

CPAP Setting in CHF / Pulmonary Edema is 7.5 cmH_20. Higher settings require an order from Medical Control

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

example: 100 kg pt x 7 mcg/min x 0.0375 = 26.25 gtts / min

Pearls

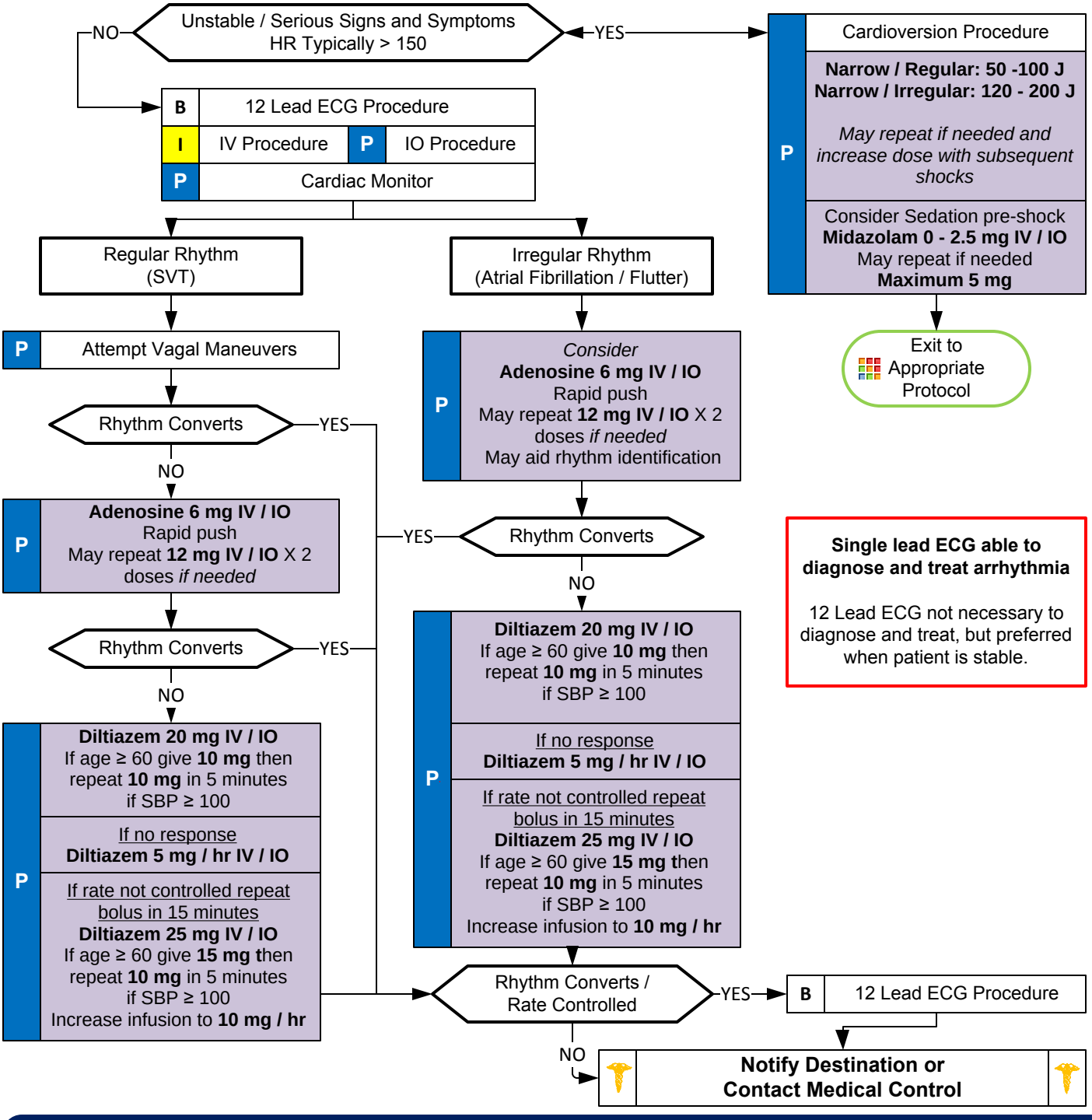
- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Furosemide and Opioids have NOT been shown to improve the outcomes of EMS patients with pulmonary edema. 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 Cardiac Section Protocols

Adult Tachycardia
Narrow Complex (≤ 0.11 sec)

Dilitiazem - 20 mg is average adult dose. Actual dose is 0.25 mg/kg of actual body weight. Repeat dose is 0.35 mg/kg

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

Dilitiazem Infusion

1st Infusion Dose: 5mg / hr
Add 25 mg to 250 ml NaCl = 5 mg / 50 ml
50 mL x 60 gtts set / 60 min = **50 gtts / min or *5 gtts / 6 sec***

2nd Infusion Dose: 10 mg / hr
*Increase infusion to 100 gtts / min or **5 gtts / 3 sec***
100 mL x 60 gtts set / 60 min = 100 gtts / min

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE.**
- **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

Unstable / Serious Signs and Symptoms
HR Typically > 150

NO → B: 12 Lead ECG Procedure; I: IV Procedure; P: IO Procedure; P: Cardiac Monitor

YES → P: Cardioversion Procedure
Wide / Regular: 100 J
Wide / Irregular: 200 J
May repeat if needed and increase dose with subsequent shocks
Consider Sedation pre-shock
Midazolam 0 - 2.5 mg IV / IO
May repeat if needed
Maximum 5 mg
→ Exit to Appropriate Protocol

Regular Rhythm Monomophic Complex (VT or SVT with aberrancy)
P: ***Consider*** **Adenosine 6 mg IV / IO** Rapid push
May repeat **12 mg IV / IO** X 2 doses *if needed*
→ Rhythm Converts?
YES → B: 12 Lead ECG Procedure after rhythm conversion
NO → P: **Amiodarone 150 mg in 100 mL of D5W IV / IO** Over 10 minutes
If no response **Amiodarone 450 mg / 250 mL of D5W 1 mg/min (33mL / hr)**
→ Rhythm Converts?
YES → B: 12 Lead ECG Procedure after rhythm conversion
NO → **Notify Destination or Contact Medical Control**

Irregular Rhythm Monomorphic Complex (Pre-excitation Atrial Fibrillation)
→ Contact Medical Control

Irregular Rhythm Polymorphic Complex (Torsade de pointes)
P: Cardioversion Procedure Follow Unstable Arm
→ Rhythm Converts?
NO → Exit to Adult VF / Pulseless VT Protocol
YES → P: **Magnesium Sulfate 2 gm IV / IO** Over 2 minutes
→ B: 12 Lead ECG Procedure after rhythm conversion

Single lead ECG able to diagnose and treat arrhythmia

12 Lead ECG not necessary to diagnose and treat, but preferred when patient is stable.

Adult Cardiac Section Protocols

Adult Tachycardia
Wide Complex (≥0.12 sec)

The use of Adenosine is contraindicated in Atrial Fibrillation with wide complex. It is unlikely to convert the A-fib and may cause ventricular fibrillation.

Aberrant conduction is the most common reason for a widened QRS duration in SVT, but it is still much less common that in V-Tach

Amiodarone Infusion:

1st Dose: 150 mg in 100 mL D5W

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

2nd Dose: 450 mg / 250 mL D5W

250 mL x 60 gtts set = 33 mL / min or 1 gtt / 2 sec
7.5 hr (450 min)

Magnesium Sulfate must be given in 20% or less concentrations intravenously.
Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

Pearls

- **Recommended Exam: Mental Status, 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

P **Defibrillate 200 J**

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***

Airway Protocol(s)

IV Procedure | P IO Procedure

I **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 **Defibrillate 300 J**

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 **Defibrillate 200 J**

Consider
Magnesium Sulfate 2g IV / IO
over 2 minutes

P **Amiodarone Infusion 1 mg/min IV / IO**
if rhythm converts

P **Amiodarone 300 mg IV / IO**
May repeat at **150 mg IV / IO**
if no response

Defibrillate 360 J

P **Lidocaine Infusion 1 – 4 mg/min IV / IO**
if rhythm converts

High Quality, Continuous Compressions

P **Lidocaine 1.5 mg/kg IV / IO**
May repeat ½ initial dose in no response

Defibrillate 360 J

Consider Discontinuation of Resuscitation Policy

NO ← Return of Spontaneous Circulation → YES

Exit to Post Resuscitation Protocol

AND / OR

Notify Destination or Contact Medical Control

Adult Cardiac Section Protocols

Ventricular Fibrillation
Pulseless Ventricular Tachycardia

Utilize cold fluids for all non-traumatic cardiac arrests greater than 18 y/o. For the purpose of induced hypothermia, drownings and asphyxiation arrests (i.e. hangings) are considered non-traumatic

Amiodarone Infusion:
ROSC Dose: 450 mg / 250 mL D5W
250 mL x 60 gtts set = 33 mL / min or 1 gtt / 2 sec
7.5 hr (450 min)

Lidocaine Infusion:
ROSC Dose: 1-4 mg / min
1 gm in 250 mL = 4 mg / mL

Using a 60 gtt set:
60 gtts / min = 4 mg
45 gtts / min = 3 mg
30 gtts / min = 2 mg
15 gtts / min = 1 mg

Select the dose that is 1 mg higher that the dose given to convert the rhythm.
(i.e 2 mg of Lidocaine converted rhythm, infusion dose is 3 mg / min)

Magnesium Sulfate must be given in 20% or less concentrations intravenously.
Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

Pearls

- **Recommended Exam: Mental Status**
- **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**
- Maintain SpO2 ≥ 94 %
- Advanced airway ***if indicated***
- ETCO2 ideally 35 – 45 mm Hg
- Respiratory Rate 8 – 12 / minute
- Remove Impedance Threshold Device
- DO NOT HYPERVENTILATE

I IV Procedure | **P** IO Procedure

B 12 Lead ECG Procedure

P Cardiac Monitor

Monitor Vital Signs / Reassess

Hypotension Systolic BP < 90

YES →

I **Normal Saline Bolus 500 mL IV / IO**
May repeat as needed if lungs remain clear
Maximum 2 L

P **Dopamine**
2 – 20 mcg/kg/min IV / IO
Titrate to SBP ≥ 90

NO ↓

Follows Commands

NO → Induced Hypothermia Protocol ***if available***

YES ↓

STEMI / Suspicion of MI

YES → Chest Pain and STEMI Protocol
STEMI EMS Triage and Destination Plan

NO ↓

Symptomatic Bradycardia

YES → Bradycardia; Pulse Present Protocol

NO ↓

ROSC with Antiarrhythmic given

YES → **P** Continue Antiarrhythmic Utilized
Refer to Appropriate Arrhythmia Protocol(s)

NO → Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate Protocol

NO ↓

P Consider Sedation / Paralysis
Use only with definitive airway in place

Midazolam 2.5 mg IV / IO
May repeat in 5 minutes if needed
And / Or
Fentanyl 50 - 75 mcg IV / IO
Repeat 25 mcg q 20 min as needed
Maximum 200 mcg

↔ **P** **Vecuronium 10 mg IV / IO**
OR
Rocuronium 1 mg/kg IV/VO
If needed

↓

Notify Destination or Contact Medical Control

Adult Cardiac Section Protocols

Post Resuscitation

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

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

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 catherterization 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 ≥ 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

Return of Spontaneous Circulation ROSC

Criteria for Induced Hypothermia
Initial rectal temperature
≥ 93.2 F (34C)

NO → Exit to Post Resuscitation Protocol

YES

Intra-arrest cooling should be initiated on all cardiac arrests when the criteria above is met

Airway Protocol(s) ***as indicated***

NO ↔

B	**Advanced Airway (includes BIAD) in place** with EtCO2 > 20 mmHg
	Perform Neurological Assessment
	Expose and apply ice packs to axilla and groin areas
I	**Cold Normal Saline Bolus 30 mL/kg IV / IO Maximum 2 L**
P	**Dopamine 2 – 20 mcg/kg/min IV / IO** Titrate to SBP ≥ 90

Reassess Rectal Temperature
Target: 91.4 F (33C)
(Range 89.6 F to 93.3 F)
(Range 32 – 34C)

≤ 91.4 F (33 C) → Stop cooling measures Until temperature increases

Reassess temperature every 10 minutes

Continue Post Resuscitation Care

≥ 92 F (33.3 C) → Continue Cooling

Exit to Post Resuscitation Protocol

Shivering noted

NO → Exit to Post Resuscitation Protocol

YES

P **Etomidate 10 – 20 mg IV / IO**

Continued Shivering

YES → P **Midazolam 2.5 mg IV / IO**
May repeat in 5 minutes if needed
And / Or
Fentanyl 50 - 75 mcg IV / IO
Repeat 25 mcg q 20 min as needed
Maximum 200 mcg

NO → P **Vecuronium 10 mg IV / IO**
OR
Rocuronium 1 mg/kg IV/VO
If needed

Notify Destination or Contact Medical Control

Agencies utilizing cerebral cooling devices are unlikely to see a change in rectal temperature during transport.

Continued temperature assessment not warranted with these devices. Document initial temperature

Adult Cardiac Section Protocols

Induced Hypothermia (Optional)

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

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

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)

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES

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

Do not begin resuscitation

Follow Deceased Subjects Policy

NO

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

First Arriving BLS / ALS Responder
Initiate Compressions Only CPR
Initiate Defibrillation Automated Procedure
if available
Call for additional resources

Second Arriving BLS / ALS Responder
Assume Compressions or
Initiate Defibrillation Automated / Manual Procedure
Place BIAD
DO NOT Interrupt Compressions
Ventilate at 6 to 8 breaths per minute

Third Arriving Responder
BLS or ALS

BLS

Establish Team Leader
(Hierarchy)
Fire Department or Squad Officer
EMT-B
First Arriving Responder

Rotate with Compressor
To prevent Fatigue and effect high quality compressions
Take direction from Team Leader

Fourth / Subsequent Arriving Responders
Take direction from Team Leader

Continue Cardiac Arrest Protocol

ALS

Establish Team Leader
(Hierarchy)
EMS ALS Personnel
Fire Department or Squad Officer
EMT-B
First Arriving Responder

I

Initiate Defibrillation Automated Procedure
Establish IV / IO
Administer Appropriate Medications
Establish Airway with BIAD if not in place

P

Initiate Defibrillation Manual Procedure
Continuous Cardiac Monitoring
Establish IV / IO
Administer Appropriate Medications
Establish Airway with BIAD if not in place

Continue Cardiac Arrest Protocol

Utilize this Protocol with

Cardiac Arrest Protocol

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Team Leader
ALS Personnel
Responsible for patient care
Responsible for briefing / counseling family

Incident Commander
Fire Department / First Responder Officer
Team Leader until ALS arrival
Manages Scene / Bystanders
Ensures high-quality compressions
Ensures frequent compressor change
Responsible for briefing family prior to ALS arrival

Team Focused CPR (Optional)

EMS Personnel Roles:

Primary Caregiver (EMT-P)
- Team Leader
- Oversees *ALL* patient care
- Continuous Cardiac Monitoring
- Establishes Vascular Access
- Briefing / Counseling Family
- Performs other procedures that Secondary caregiver cannot due to credential level

Secondary Caregiver
- Establishes Airway (if not in place) May make (1) attempt at Endotracheal Intubation time then ***MUST*** use King LTD
- Provide Ventilations
- Administer Medications (permitted by level of credential)

Additional Caregiver(s):
- Performs tasks as assigned by Primary Caregiver (Team Leader) and within Scope of Practice of credential

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.

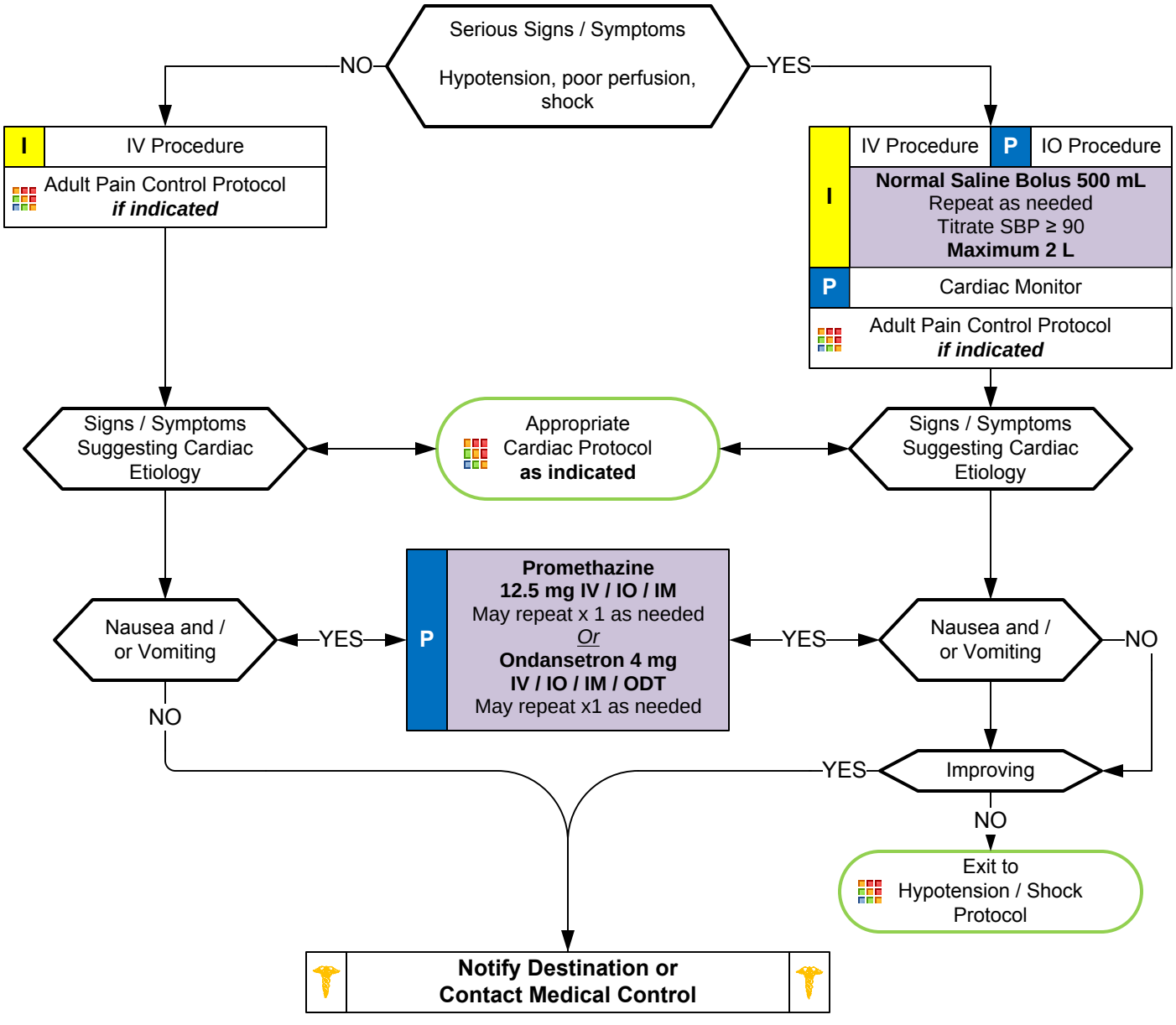
Abdominal Pain

History
- Age
- Past medical / surgical history
- Medications
- Onset
- Palliation / Provocation
- Quality (crampy, constant, sharp, dull, etc.)
- Region / Radiation / Referred
- Severity (1-10)
- Time (duration / repetition)
- Fever
- Last meal eaten
- Last bowel movement / emesis
- Menstrual history (pregnancy)

Signs and Symptoms
- Pain (location / migration)
- Tenderness
- Nausea
- Vomiting
- Diarrhea
- Dysuria
- Constipation
- Vaginal bleeding / discharge
- Pregnancy

Associated symptoms:
(Helpful to localize source)
Fever, headache, weakness, malaise, myalgias, cough, headache, mental status changes, rash

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



Adult Medical Section Protocols

Abdominal Pain

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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 ≥ 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.

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

Assess Symptom Severity

MILD
Skin Only

I
- IV Procedure ***if indicated***
- **Diphenhydramine 25 - 50 mg PO / IV / IM / IO**

B
- Monitor and Reassess
- Monitor for Worsening Signs and Symptoms

MODERATE
2+ Body Systems

B
- **Epinephrine 1:1000 0.3 mg IM**
- **Albuterol Nebulizer 2.5 – 5 mg** Repeat as needed x 3 ***if indicated***

I
- **Epinephrine 1:1000 0.3 – 0.5 mg IM** Repeat in 5 minutes if no improvement
- IV Procedure
- **Diphenhydramine 25 - 50 mg IV / IM / IO *if not already given PO***
- **Albuterol Nebulizer 2.5 – 5 mg +/- Ipratropium 0.5 mg** Repeat as needed x 3 ***if indicated***

P
- **Methylprednisolone 125 mg IV / IO**

SEVERE
2+ Body Systems + hypotension or isolated hypotension

B
- **Epinephrine 1:1000 0.3 mg IM**
- **Albuterol Nebulizer 2.5 – 5 mg** Repeat as needed x 3 ***if indicated***
- Airway Protocol(s) ***if indicated***

I
- **Epinephrine 1:1000 0.3 – 0.5 mg IM** Repeat in 5 minutes if no improvement
- IV Procedure / P / IO Procedure
- **Diphenhydramine 25 - 50 mg IV / IM / IO** if not already given
- **Albuterol Nebulizer 2.5 – 5 mg +/- Ipratropium 0.5 mg** Repeat as needed x 3 ***if indicated***
- **Normal Saline Bolus 500 mL IV / IO** Repeat as needed **Maximum 2 Liters**

P
- **Methylprednisolone 125 mg IV / IO**

Cardiac Monitoring Indicated for Moderate and Severe Reactions

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Allergic Reaction / Anaphylaxis

Pitfalls in Diagnosis of Anaphylaxis:

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

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.**
- **Hereditary Angioedema** involves swelling of the face, lips, airway structures, extremities, and may cause moderate to severe abdominal pain. Some patients are prescribed specific medications to aid in reversal of swelling. **EMT-P may assist or administer this medication per patient / package instructions.**
- **12 lead ECG and cardiac monitoring 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.

Blood Glucose ≤ 69 or ≥ 250 — YES → Exit to Diabetic Protocol

NO

Signs of shock / Poor perfusion — YES → Exit to Hypotension / Shock Protocol

NO

Signs of OD / Toxicology — YES → Exit to Overdose / Toxic Exposure Protocol

NO

Signs of CVA Or Seizure — YES → Exit to CVA / Seizure Protocol ***as indicated***

NO

Signs of Hypo / Hyperthermia — YES → Exit to Hypo / Hyperthermia Protocol ***as indicated***

NO

Arrhythmia / STEMI — YES → Exit to Appropriate Cardiac Protocol ***as indicated***

NO

Notify Destination or Contact Medical Control

Adult Medical Section Protocols

Altered Mental Status

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Pearls

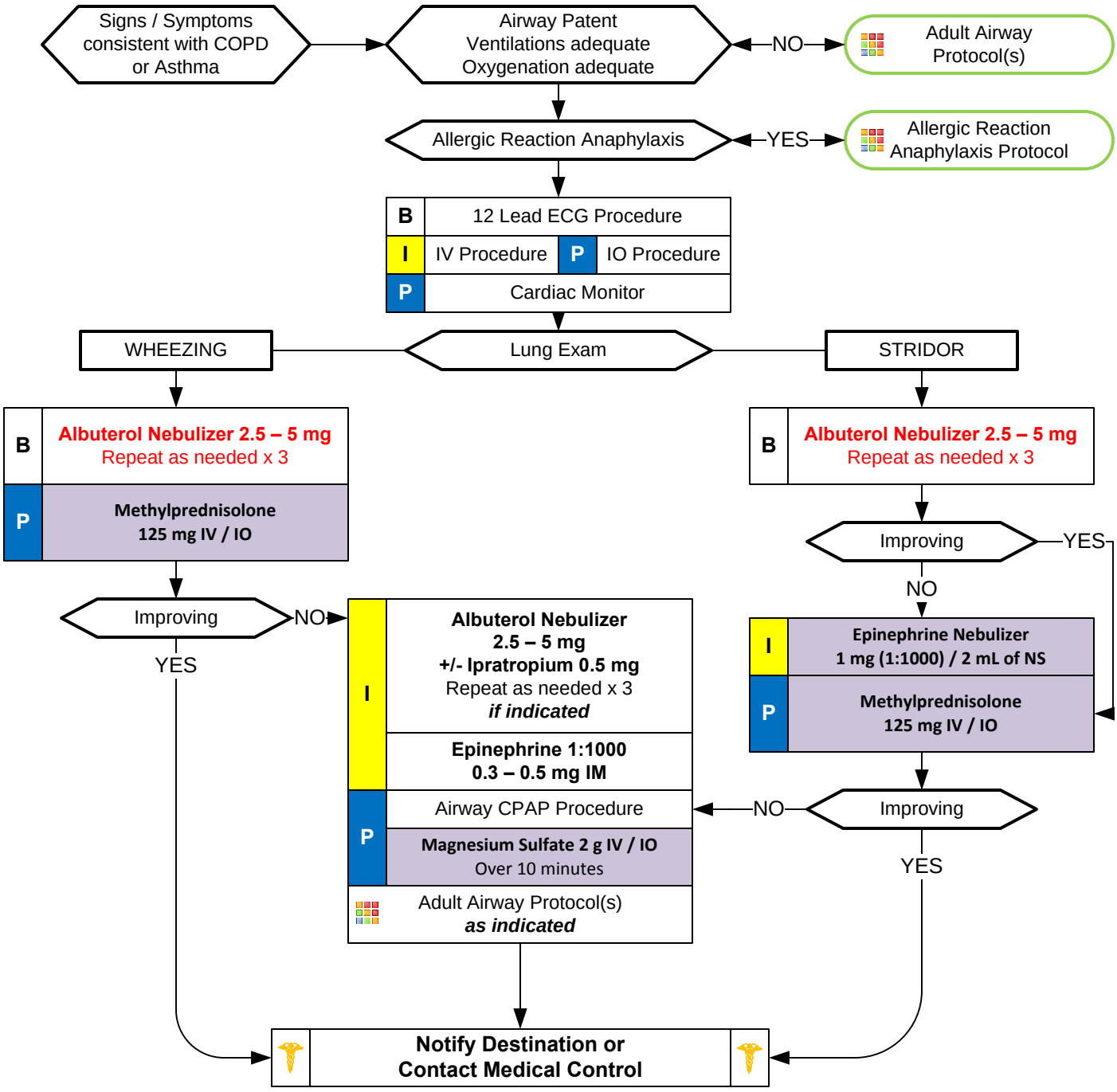
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **Pay careful attention to the head exam for signs of bruising or other injury.**
- Be aware of AMS as presenting sign of an environmental toxin or Haz-Mat exposure and protect personal safety.
- It 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

**CPAP settings for COPD & Asthma should be 5 or 7.5 cmH_20. Higher settings require an order from Medical Control

Magnesium Sulfate Infusion: Dose 2 g over 10 min
2 gms Mag Sulfate in 50 ml NS using 10 gtts set

$$\frac{50 \text{ ml} \times 10 \text{ gtts}}{10 \text{ min}} = 50 \text{ gtts / min}$$

Pearls

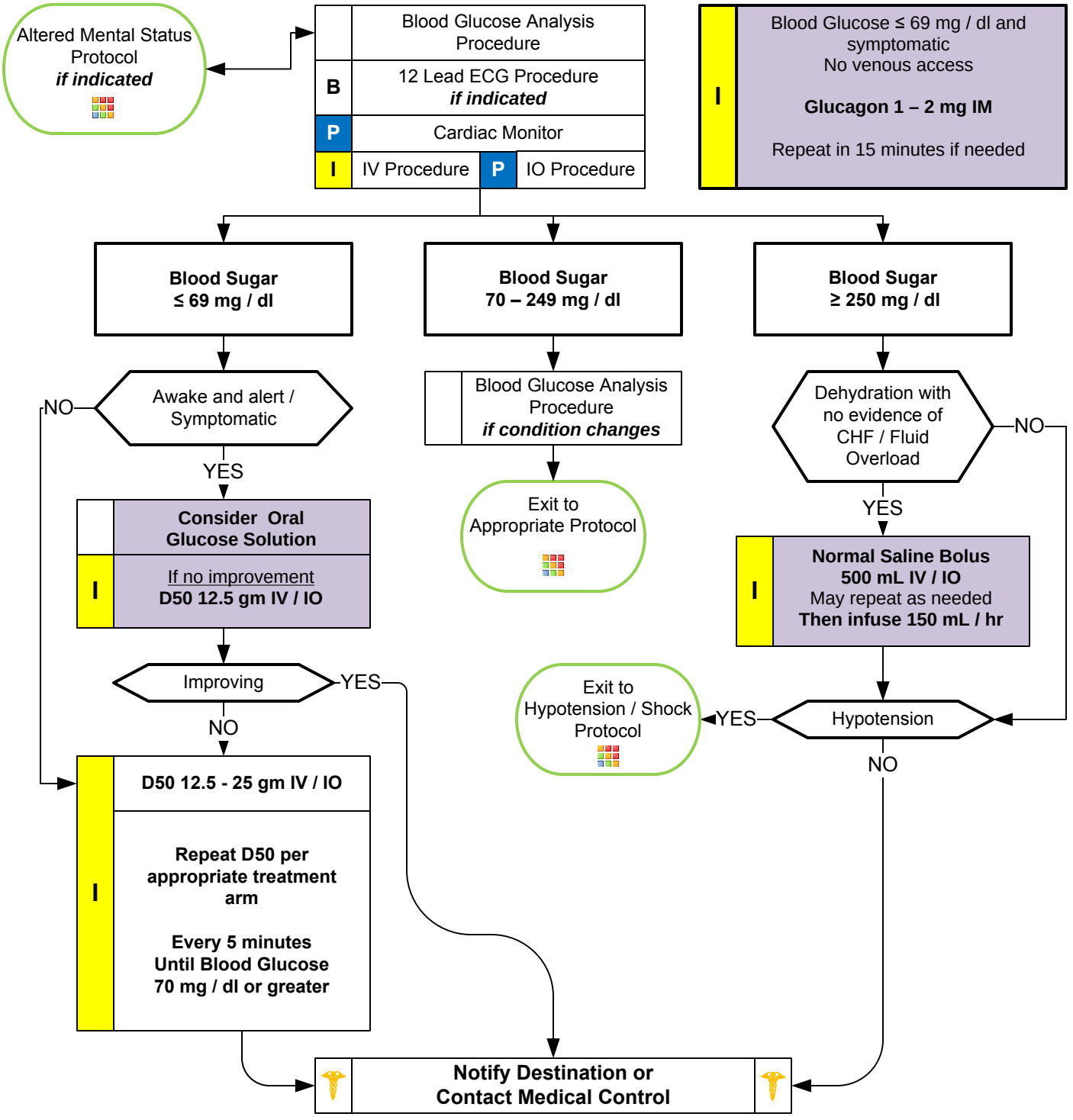
- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Contact Medical Control prior to administering epinephrine in patients who are >50 years of age, have a history of cardiac disease, or if the patient's heart rate is >150. Epinephrine may precipitate cardiac ischemia. A 12-lead ECG should be performed on these patients.**
- **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.**
- **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.



Adult Medical Section Protocols

Diabetic; Adult

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

Pearls

- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- Patients with prolonged hypoglycemia my 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:**

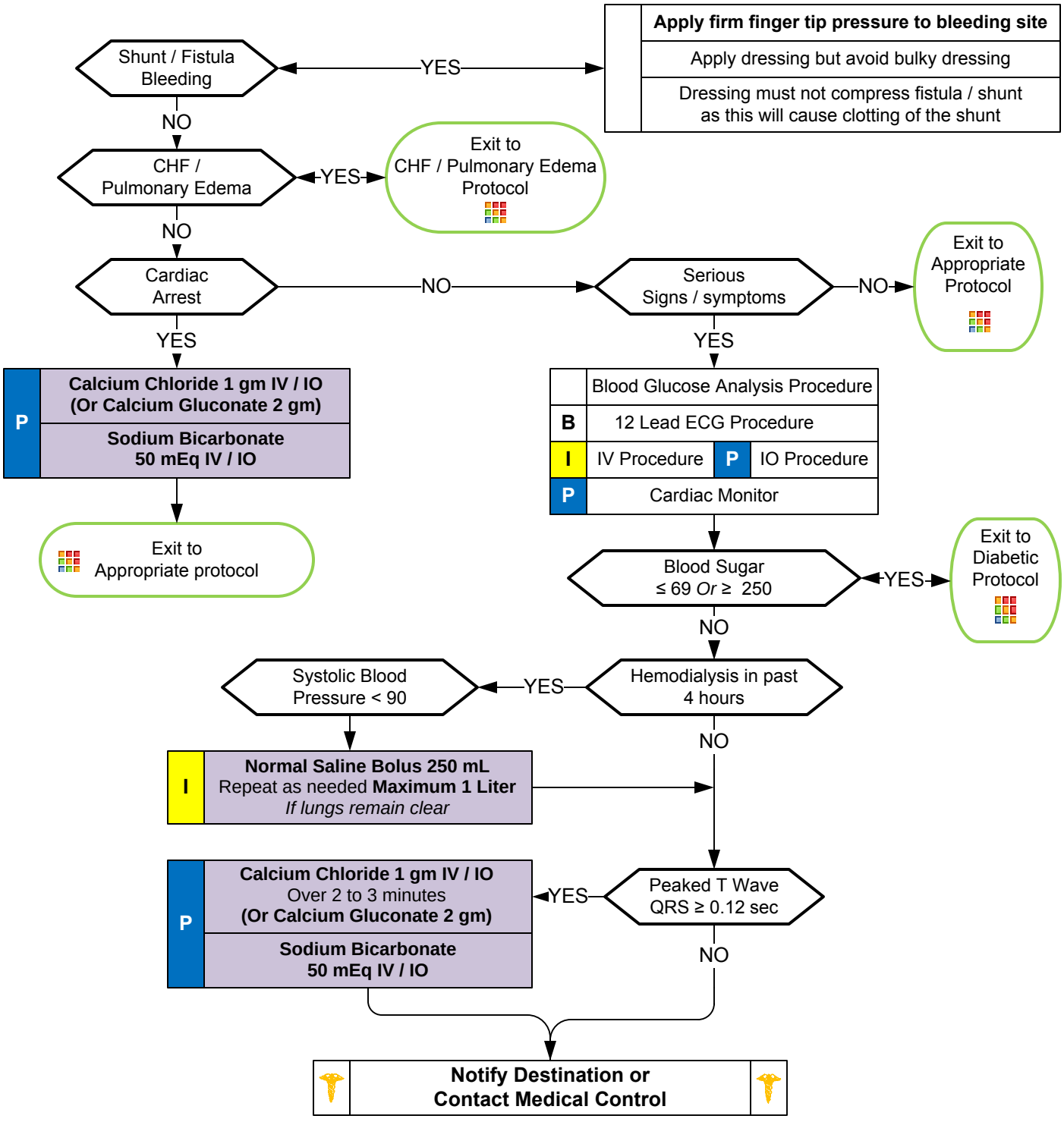
  Many forms of insulin now exist. Longer acting insulin places the patient at risk of recurrent hypoglycemia even after a normal blood glucose is established. Not all insulins have prolonged action so Contact Medical Control for advice. Patient's who meet criteria to refuse care should be instructed to 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



Adult Medical Section Protocols

Dialysis / Renal Failure

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

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
- **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

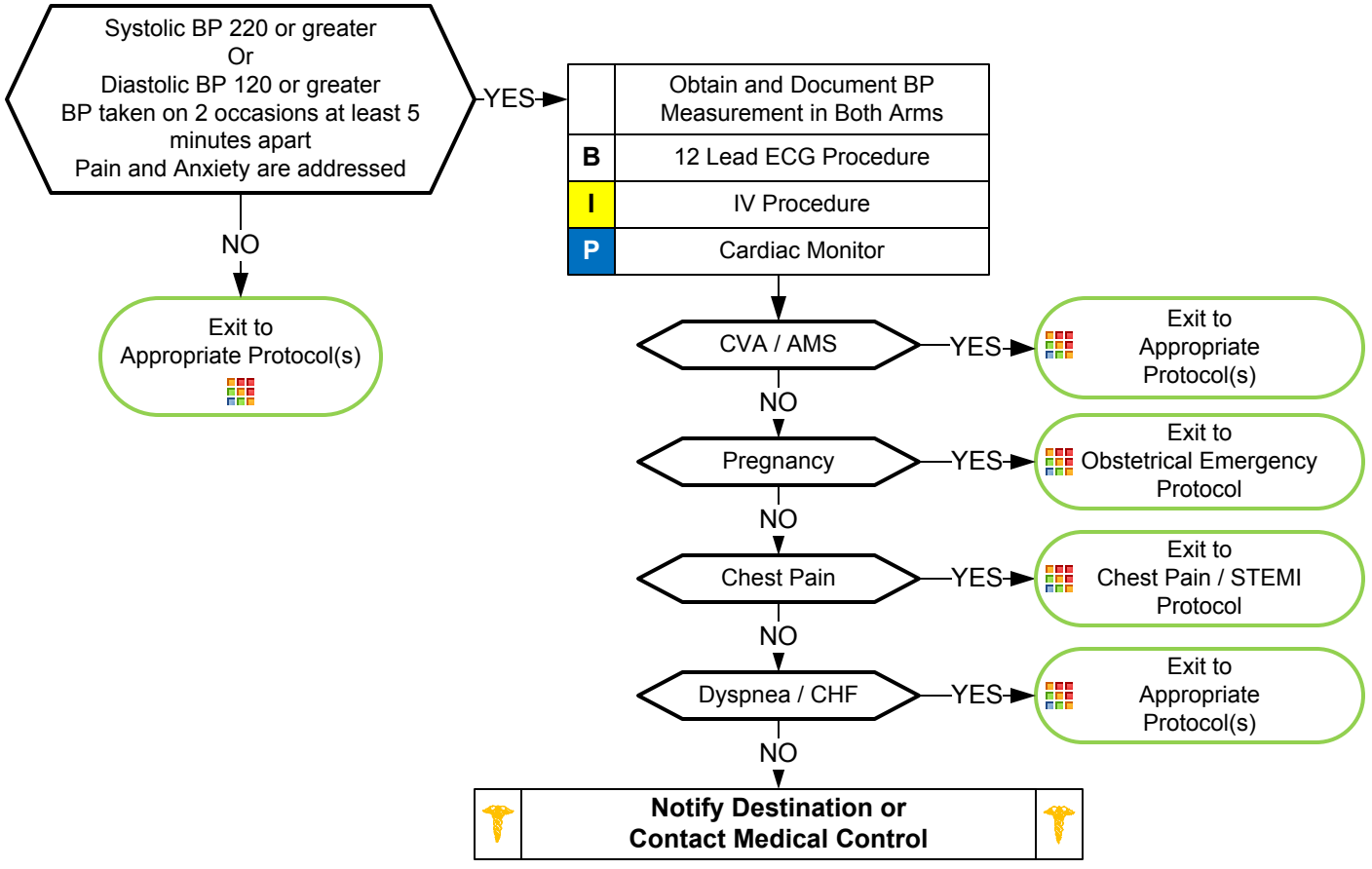
History
- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

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.



Adult Medical Section Protocols

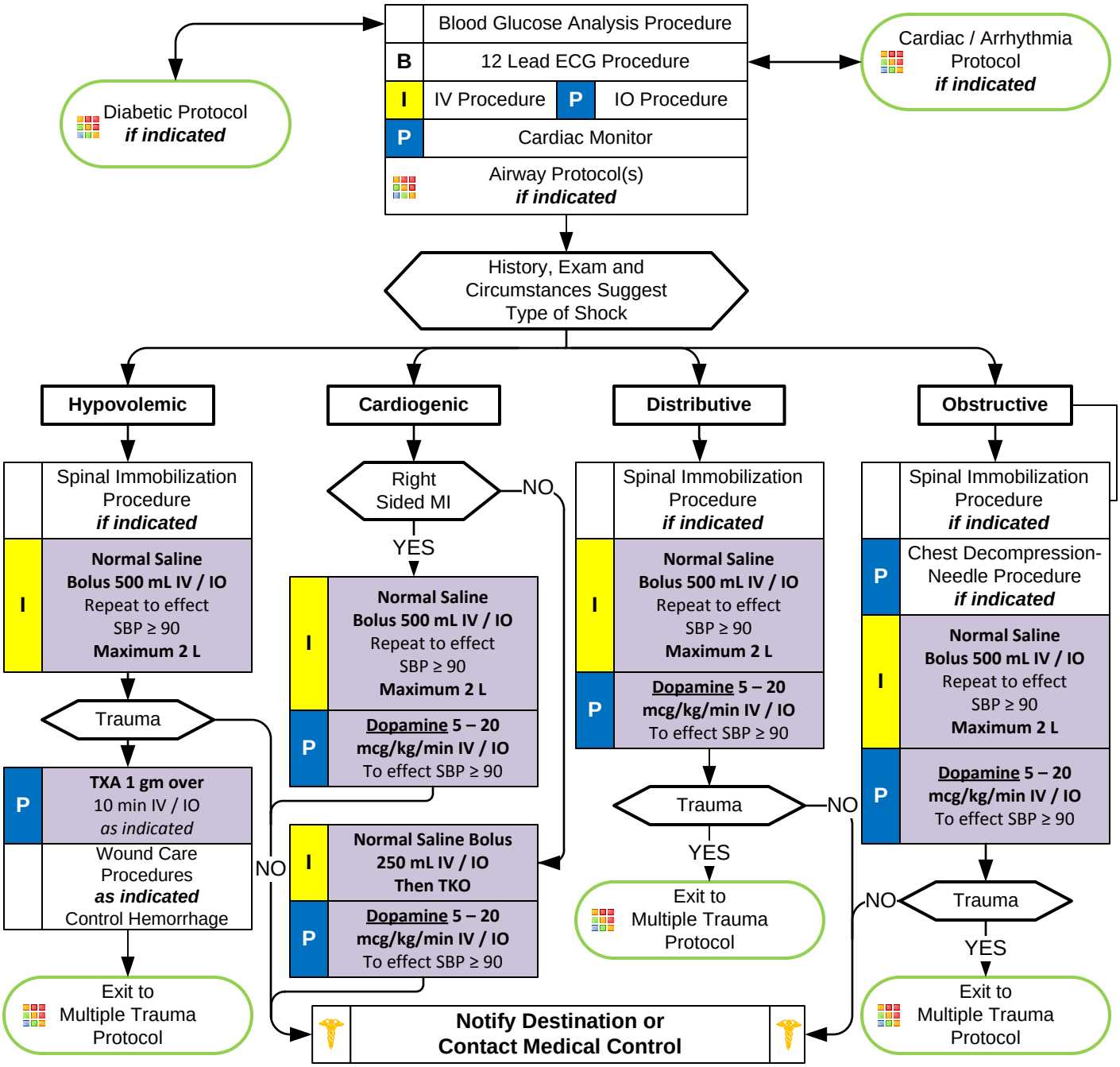
Pearls
- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- Elevated blood pressure is based on two to three sets of vital signs.
- Symptomatic hypertension is typically revealed through end organ dysfunction to the cardiac, CNS or renal systems.
- All symptomatic 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)



Adult Medical Section Protocols

Hypotension / Shock

Risk Factors for Pulmonary Embolus (Obstructive) include:

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

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

Dopamine Infusion: **Dose 2-20 mcg / kg/ min**
Pt weight (Kg) x Dose x .0375 = ___ gtts / min
example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

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

TXA Criteria

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

TXA *Loading Dose*

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

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

Pearls

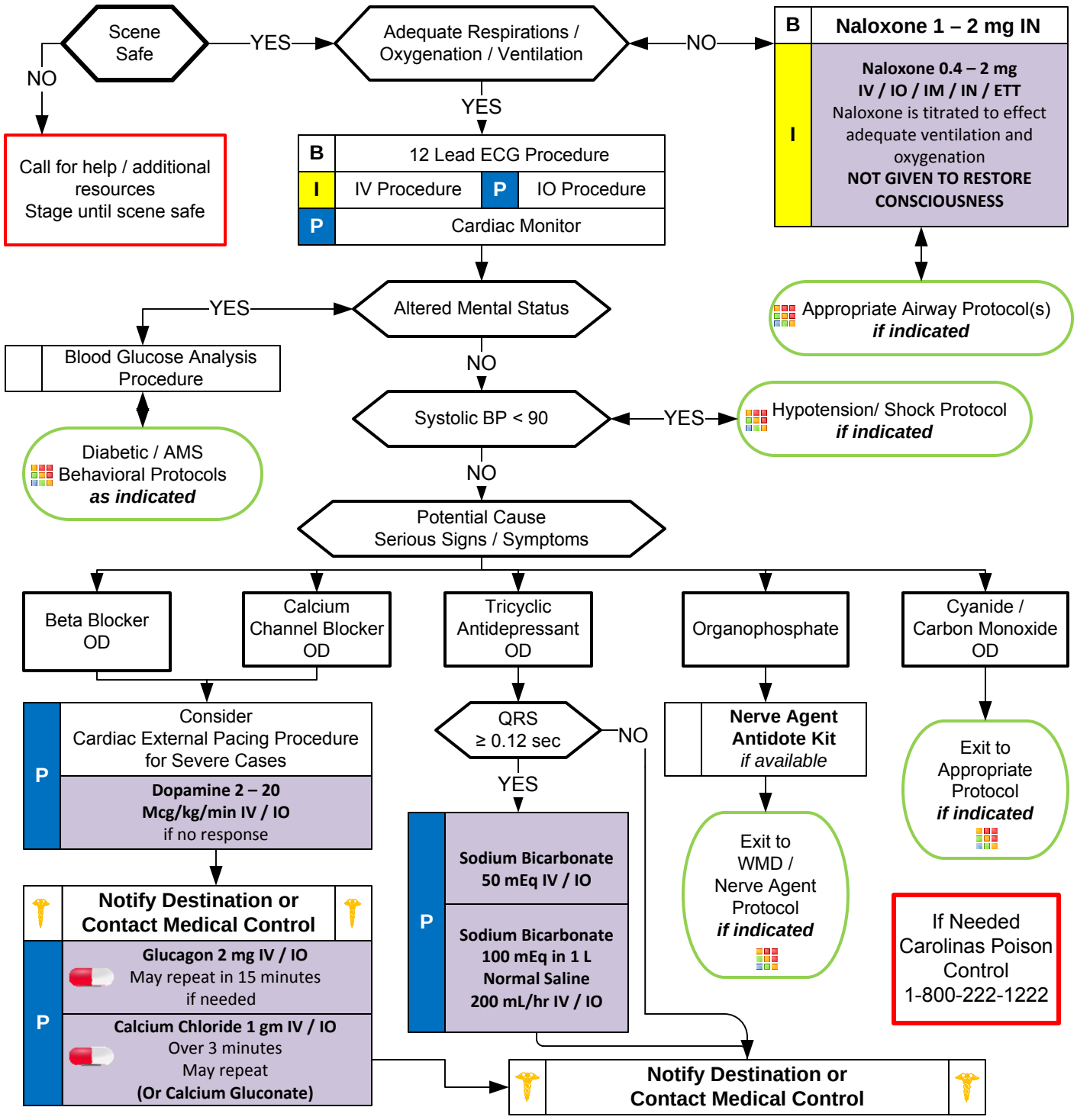
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Hypotension can be defined as a systolic blood pressure of less than 90. This is not always reliable and should be interpreted in context and patients typical BP if known. Shock may be present with a normal blood pressure initially.**
- **Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.**
- **Consider all possible causes of shock and treat per appropriate protocol.**
- **Hypovolemic Shock:**
  Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding.
  Condsider Tranexamic Acid (TXA) if indicated
- **Cardiogenic Shock:**
  Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventrical / 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, with and order.** May use steroid agent specific to your drug list.
- For non-cardiac, non-trauma hypotension, Dopamine should only be started after 1 - 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)



Adult Medical Section Protocols

Overdose / Toxic Ingestion

QRS Duration in Tricyclic Ant0depressant overdose - No patient with a QRS duration of 100 milliseconds or less suffering a seizure or ventricular arrhythmia. Patients with a QRS greater than 160 milliseconds has a 50% chance of ventricular arrythmia

EKG signs that suggest cardiotoxicity in TCA overdose
- QRS greater than 100 ms
- Deep slurred S wave in Lead I and aVL
- R wave in aVR greater than 3 mm
- R to S ratio in aVR greater than 0.7 ms

Glucagon in Beat-Blocker Overdose
An effect should be observed in 1-3 minutes and the peak effect should be at 5-7 minutes.
If no effect seen, call medical control for further instruction.
Vomiting is a well known side effect of Glucagon

Calcium Chloride and Calcium Gluconate can be used for beta-blocker overdoses. ***Contact Medical Control for orders***

Glucagon can be used for calcium channel blocker overdoses. ***Call Medical Control for orders***

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

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

Pearls

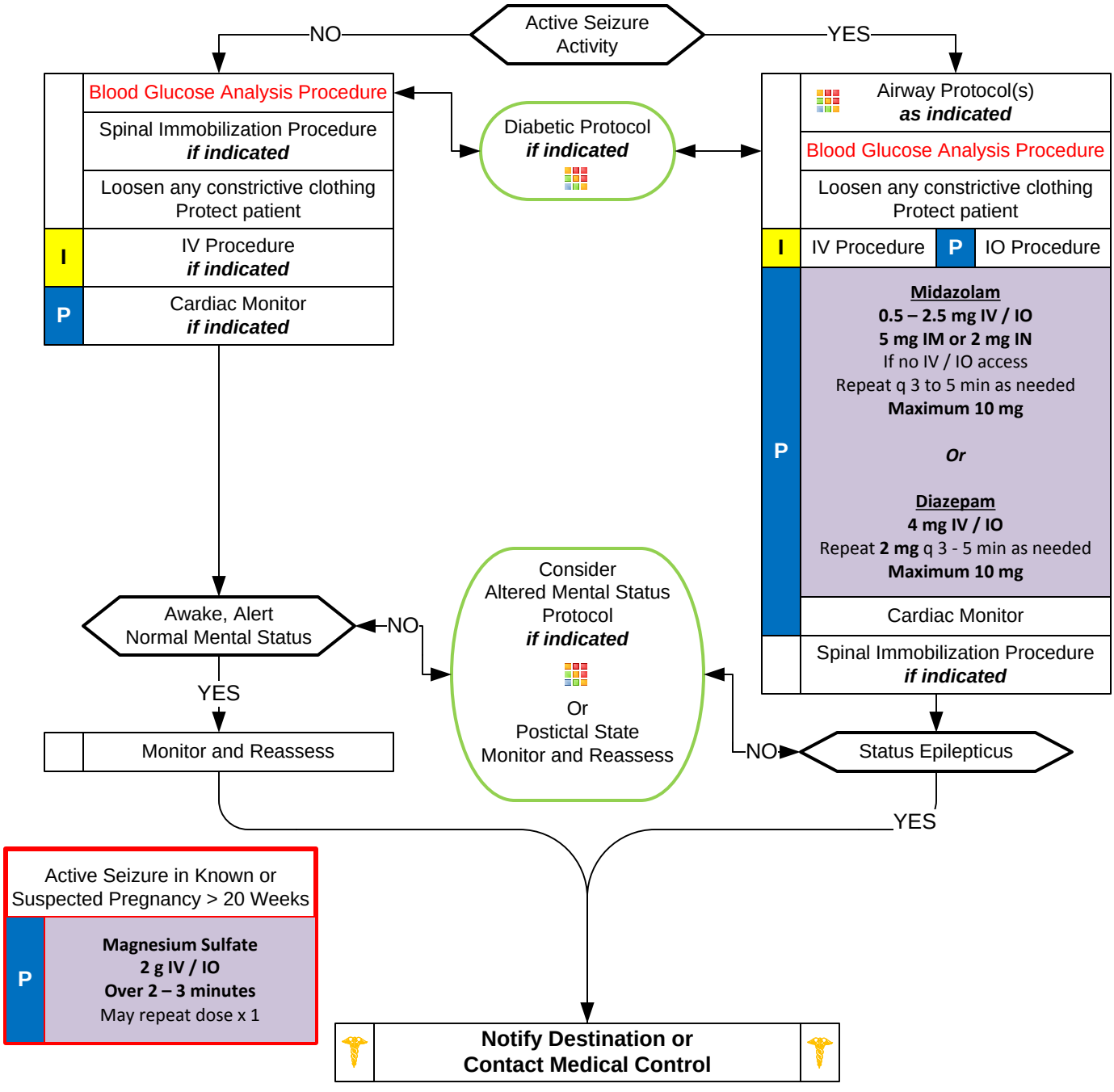
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is still not carrying other medications or has any weapons.**
- **Bring bottles, contents, emesis to ED.**
- **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

Magnesium Sulfate must be given in 20% or less concentrations intravenously.
Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

Pearls

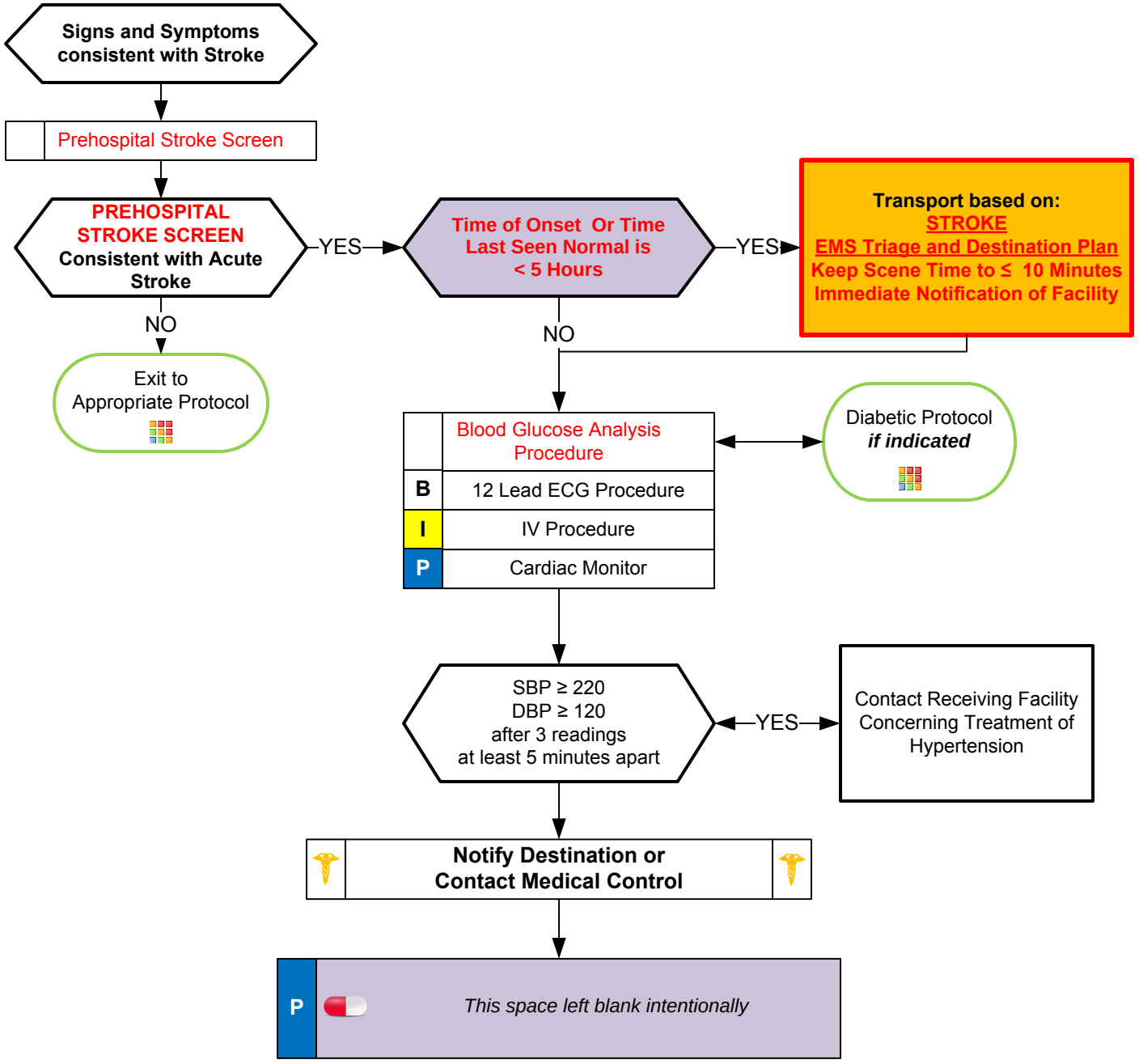
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult IV or IO 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.

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

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Pearls

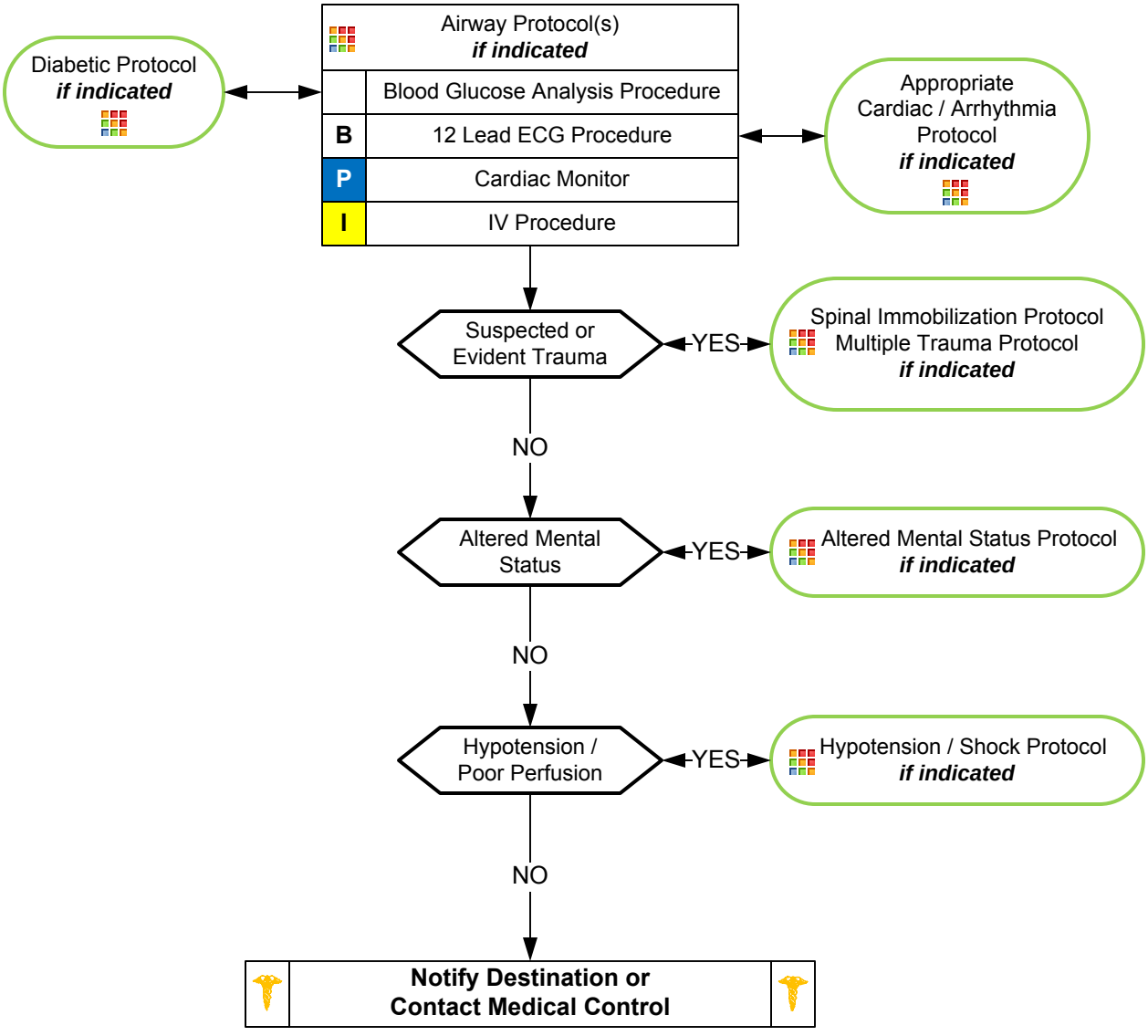
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used in the EMS Acute Stroke Care Toolkit.**
- **Acute Stroke care is evolving rapidly. Time of onset / last seen normal may be changed at any time depending on the capabilities and resources of your hospital based on Stroke: EMS Triage and Destination Plan.**
- **Time of Onset or Last Seen Normal: One of the most important items the pre-hospital provider can obtain, of which all treatment decisions are based. Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT "about 45 minutes ago.") Without this information patient may not be able to receive thrombolytics at facility. Wake up stroke: Time starts when patient last awake.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient. With a duration of symptoms of less than** 5 HOURS **, 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

Additional History Questions:

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

Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- 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.

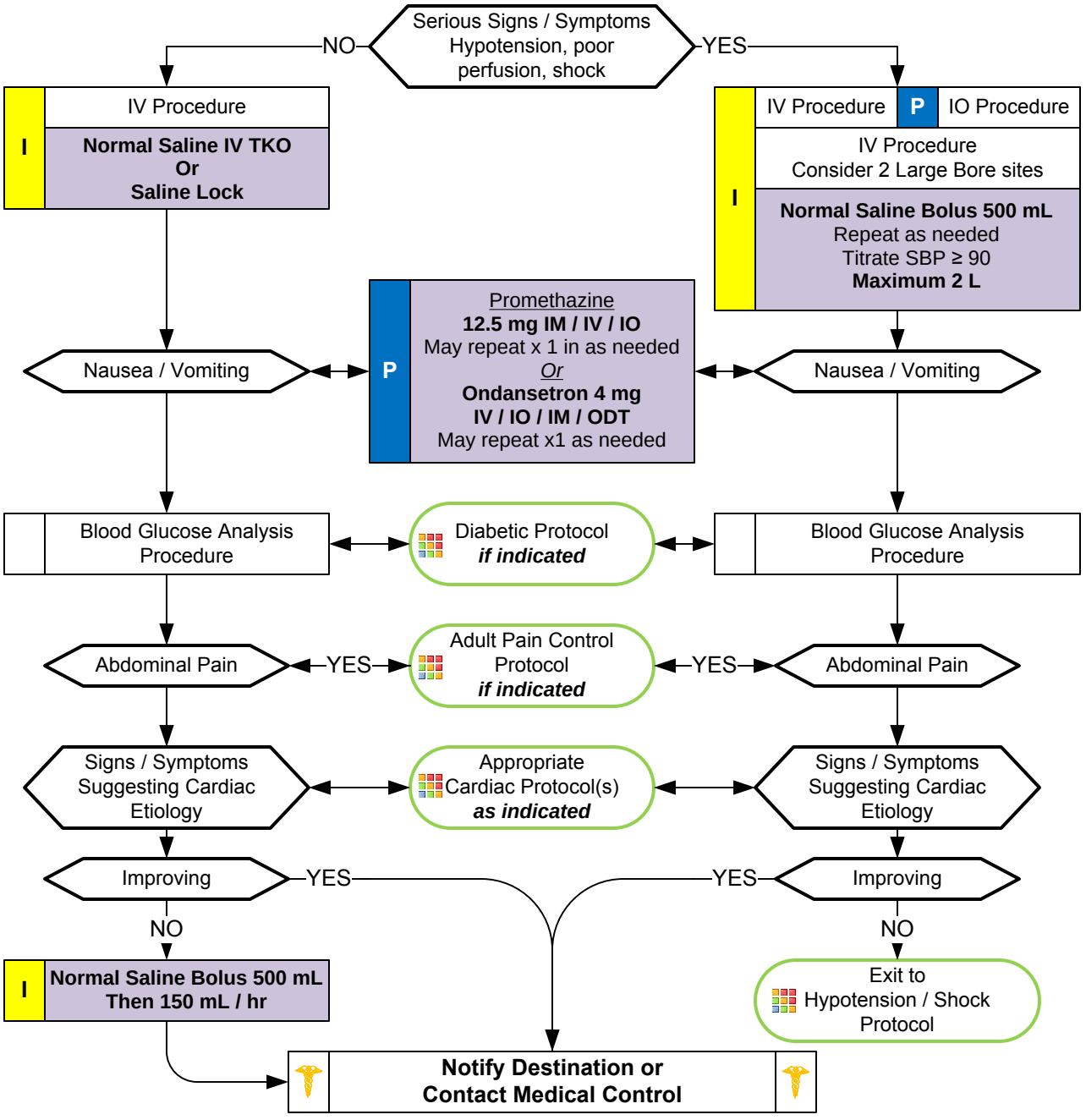
Vomiting and Diarrhea

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



Adult Medical Section Protocols

Vomiting and Diarrhea

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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 ≥ 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).

Activase / t-PA IV Transfer (Optional)

Signs / Symptoms consistent with CVA
Transfer of patient
Patient receiving t-PA (Alteplace)

- Obtain / Document VS prior to transport

SBP ≥ 185
DBP ≥ 110

YES → Patient must be stabilized BEFORE transport initiated
SBP < 185
DBP < 110

NO

- Assess / Document GCS / Pupil exam
- Nothing by mouth / NPO
- Prehospital Stroke Screen
- Maintain SaO2 ≥ 94 %

P
- Cardiac Monitor
- Verify **Activase / t-PA** bolus dose
  Verify total dose
- Document time infusion initiated
  Document estimated time of dose completion
- Reassess VS every 15 minutes
  Repeat neurological exam every 15 minutes
  Obtain BP readings in limb without infusion

SBP ≥ 180
DBP ≥ 105
And
Antihypertensive medication infusion initiated by transfering hospital

YES → P
Labetalol: Increase 2mg/min q 10 min
Maximum 8 mg/min
Titrate to Systolic BP <180
Diastolic BP <105

OR IF

Nicardipine: Increase 2.5 mg/hr q 5 min
Maximum 15 mg/hr
Titrate to Systolic BP <180
Diastolic BP <105

NO

Activase / t-PA Infusion Pump Alarm: No Flow

YES → P
- Remove drip chamber from **Activase / t-PA bag**
- Spike **Activase / t-PA** drip chamber to NS bag
- Restart infusion to complete medication remaining in IV tubing

NO ← SBP < 140
DBP < 80

YES

P
- Stop Anti-hypertensive agent
- Continue **Activase / t-PA** infusion
- Reassess V/S q 15 minutes
  Repeat neuro exam q 15 minutes
  Obtain BP readings in limb without infusion

NO

Any of following:
Severe headache
Worsening of neurological exam
Nausea / Vomiting
Allergic reaction
Excessive bleeding

YES → P
- Stop IV **Activase / t-PA** infusion
- Reassess V/S q 15 min
  Repeat neuro q 15 min
  Obtain BP readings in limb without infusion

NO

Notify Destination or Contact Medical Control

Adult Medical Section Protocols

Activase / t-PA IV Transfer (Optional)

Pearls

- **This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.**
- **This protocol is intended for interfacility transfer patients only. Medication must be started at initial treating hospital.**
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used in protocol compliance.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient.**
- **Onset of symptoms** is defined as the last witnessed time the patient was symptom free (i.e. awakening with stroke symptoms would be defined as an onset time when the patient went to sleep or last time known to be symptom free.)
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- **Medication dosing safety:**

  When IV **Activase / t-PA** dose administration will continue en route, verify estimated time of completion. Verify with sending hospital that excess **Activase / t-PA** has been withdrawn from the bottle and wasted. This ensures the bottle will be empty when the full dose is finished. *For example, if the total dose is 70 mg, then 30 cc should be withdrawn and wasted since a 100 mg bottle of **Activase / t-PA** contains 100 mL of fluid when reconstituted.* Sending hospital should apply a label to **Activase / t-PA** bottle with the number of mL of fluid that should be in the bottle in case of pump failure during transit.
- **Allergy / Anaphylaxis:**

  Activase / t-PA, is structurally identical to endogenous t-PA and therefore should not induce allergy, single cases of acute hypersensitivity reactions have been reported.

  Angioedema:

  Rapid swelling (edema) of the dermis, subcutaneous tissue, mucosa and submucosal tissues. Typically involves the face, lips, tongue and neck.

  Almost always self limiting but may progress to interfere with airway / breathing so close monitoring is warranted.

  Utilize the Allergy / Anaphylaxis Protocol as indicated and also for angioedema. Infusion should be stopped. Give all medications related to the Allergy / Anaphylaxis Protocol by IV route only as the stroke / CVA patient should remain NPO.

Childbirth / Labor

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

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

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

Left lateral position

Abnormal Vaginal Bleeding / Hypertension / Hypotension

YES → Obstetrical Emergency Protocol *as indicated*

NO

Inspect Perineum (No digital vaginal exam)

No Crowning

Monitor and Reassess

Document frequency and duration of contractions

Crowning >36 Weeks Gestation

I — IV Protocol

Childbirth Procedure

Priority symptoms:
Crowning
<36 weeks gestation
Abnormal presentation
Severe vaginal bleeding
Multiple gestation

Expedite transport

Prolapsed Cord Shoulder Dystocia

Hips Elevated Knees to Chest

Insert fingers into vagina to relieve pressure on cord

Saline Dressing Over cord

Breech Birth

Transport Unless delivery imminent

Encourage Mother to refrain from pushing

Support Presenting Parts Do Not Pull

Unable to Deliver

Create air passage by supporting presenting part of infant.

Place 2 fingers along side nose and push away from face
Transport in Knee to Chest Position or Left Lateral Position

Delivery

Go to Newly Born Protocol

Notify Destination or Contact Medical Control

Adult Obstetrical Section Protocols

Childbirth / Labor

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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.

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

Care of mother
Appropriate Protocol

Term Gestation
Breathing or Crying
Good Muscle Tone

YES
- Provide warmth / Dry infant
  Clear airway if necessary
- Monitor and Reassess

NO
- Warm, Dry and Stimulate
  Clear airway if necessary

Heart Rate < 100
Agonal breathing or Apnea

NO

Labored breathing /
Persistent Cyanosis

NO

YES

YES
- BVM Ventilations
- B: Pulse Oximetry
- P: Cardiac Monitor

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

Heart Rate < 100

NO

YES
- **BVM Ventilations**
  If repeating cycle take corrective action: Change in position or BVM Technique. If no improvement move down algorithm to intubation

Heart Rate < 60

NO

YES
- Pediatric Airway Protocol(s)
- Chest Compressions
- I: IV Procedure
- P: IO Procedure

Heart Rate < 60

NO

YES
- I:
  - **Epinephrine 1:10,000**
    0.01 mg /kg IV / IO
    Every 3 to 5 minutes as needed
  - **Normal Saline Bolus**
    10 mL / kg IV / IO
    May repeat x 1

NO
- Supplemental Oxygen
  Maintain SpO2 ≥ 94 %
- Maintain warmth
- Monitor and Reassess

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

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

Notify Destination or Contact Medical Control

Adult Obstetrical Section Protocols

Newly Born

This space left blank intentionally

Pearls

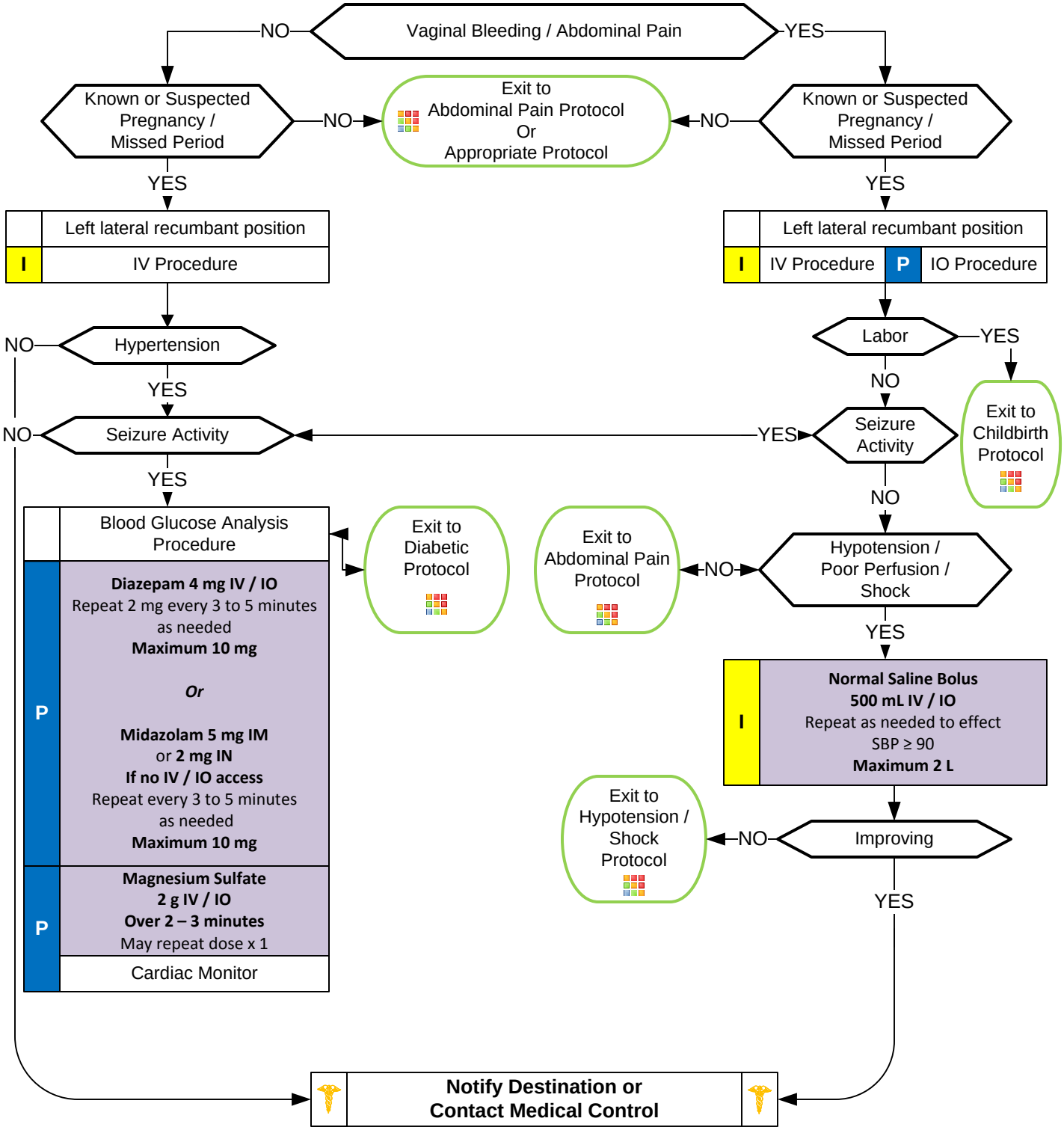
- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Chest, Heart, Abdomen, Extremities, Neuro**
- **Term gestation, strong cry / breathing and with good muscle tone generally will need no resuscitation.**
- **Most important vital signs in the newly born are respirations / respiratory effort and heart 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



Adult Obstetric Section Protocols

Obstetrical Emergency

Magnesium Sulfate must be given in 20% or less concentrations intravenously.
Dilute 2 gms (4 mL) of Magnesium Sulfate with 6 mL of NS = 2 gms Magnesium Sulfate in 10 mL Normal Saline

Pearls

- **Recommended Exam: Mental Status, Abdomen, Heart, Lungs, Neuro**
- 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

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

- Remove Rings, Bracelets / Constricting Items
- Dry Clean Sheet or Dressings
- Adult Multiple Trauma Protocol ***if indicated***
- Adult Airway Protocol(s) ***as indicated***
- I: IV Procedure ***if indicated***
- I: **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

Serious Burn

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

Criticial Burn

>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***
- I: IV Procedure Consider 2 IV sites if greater than 15 % TBSA
- P: IO Procedure ***if indicated***
- I: **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

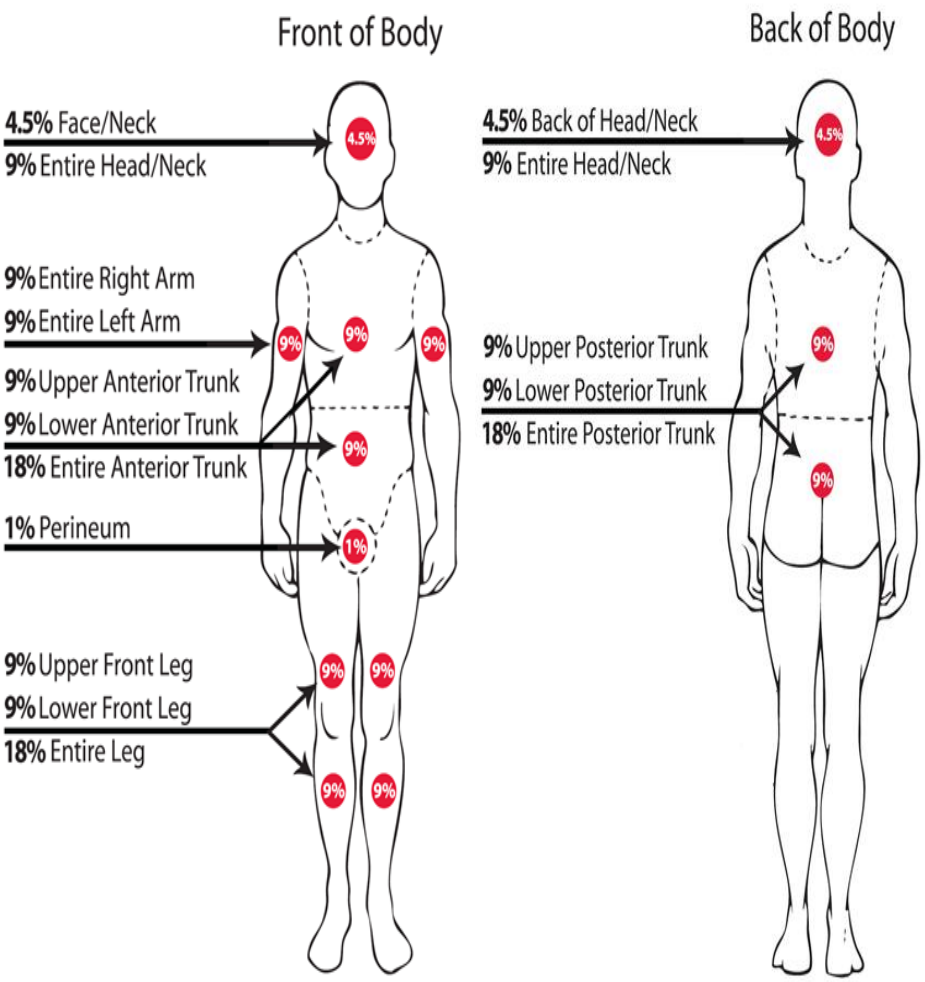
Carbon Monoxide / Cyanide Protocol

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.

Adult Trauma and Burn Section Protocols

Adult Thermal Burn



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 ***if indicated***

Adult Multiple Trauma Protocol ***if indicated***

I: IV Procedure | P: IO Procedure

Altered Mental Status Protocol ***if indicated***

Seizure Protocol ***if indicated***

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

Assess Mental Status
Record GCS

GCS ≤ 8?

NO → Monitor and Reassess

YES → Able to Cough?

NO → Airway Protocol(s)
RSI Protocol ***if available***
B: Maintain EtCO2 35 – 45 mmHg

YES → Supplemental oxygen Maintain SpO2 ≥ 94 %
B: Maintain EtCO2 35 – 45 mmHg
Monitor and Reassess
Airway Protocol(s) ***if indicated***

Notify Destination or Contact Medical Control

Adult Trauma and Burn Section Protocols

Head Trauma

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Pearls

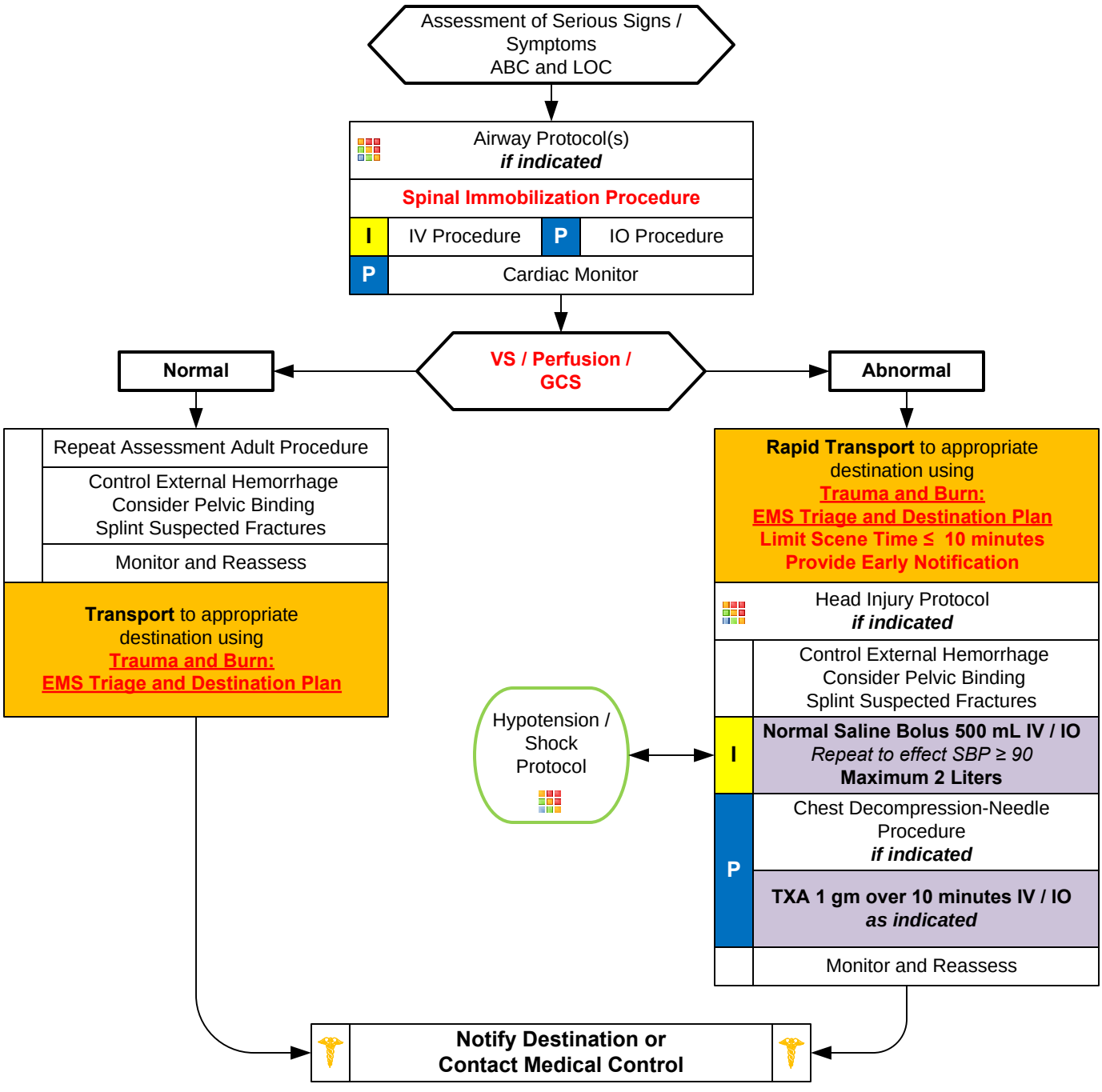
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- **GCS is a key performance measure used in the EMS Acute Trauma Care Toolkit.**
- **If GCS < 12 consider air / rapid transport**
- **In areas with short transport times, RSI/Drug-Assisted Intubation is not recommended for patients who are spontaneously breathing and who have oxygen saturations of ≥ 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.

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



Adult Trauma and Burn Section Protocols

Multiple Trauma

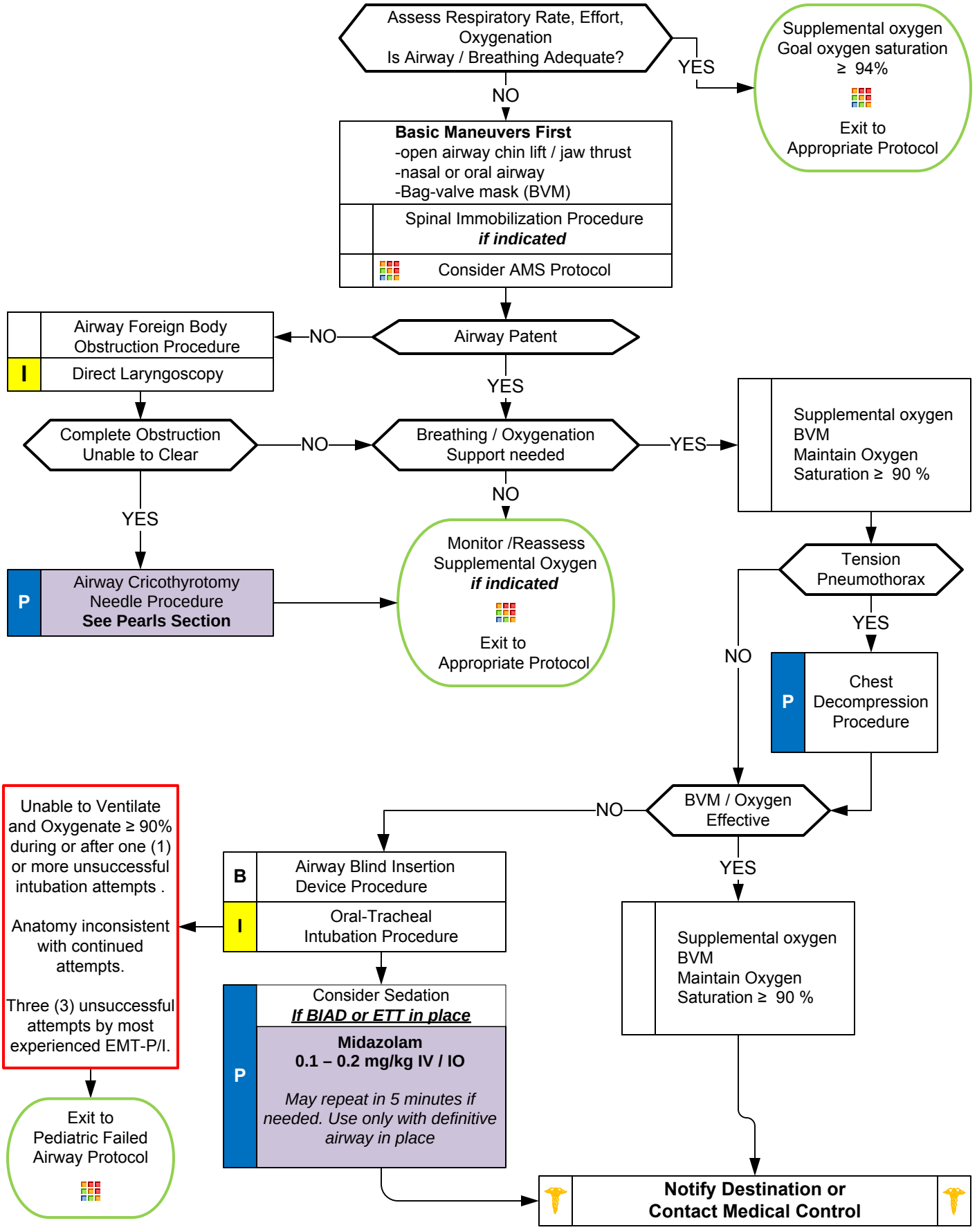
TXA Criteria
- 18 y/o or greater
- Trauma within 3 hrs
- S/S of Hypovolemic Shock with suspected internal hemorrhage or external hemorrhage uncontrolled by other means (Tourniquet or direct pressure)
- Sustained Tachycardia w/ HR > 110 bpm
- Sustained hypotension w/ BP < 90
- No evidence of patient taking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

TXA *Loading Dose*
1 gm / 100 ml of NaCl or D5W over 10 min

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

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 ≥ 90%**
- **Tranexamic Acid (TXA):**
  Agencies utilizing TXA must have approval from your T-RAC.
- 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.

Pediatric Airway



Pediatric General Section Protocols

Pediatric Airway

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

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 ≥ 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 pCO_2 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.
- **<u>Airway Cricothyrotomy Needle Procedure:</u>**
  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 ≥ 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

YES → Failed Aiway ↔ Call for additional resources if available

BVM
Adjunctive Airway
Maintains Oxygen
Saturation ≥ 90 %

YES → Supplemental oxygen
BVM
Maintain Oxygen
Saturation ≥ 90 %

NO

Significant Facial
Trauma / Swelling / Distortion

Place Oral and / or Nasal Airway

Oxygenation / Ventilation
Adequate

YES → Supplemental oxygen
BVM
Maintain Oxygen
Saturation ≥ 90 %

NO

B Airway BIAD Procedure

Continue BVM
Supplemental Oxygen

Exit to
Appropriate Protocol

Airway BIAD Procedure
Successful

NO → **P** Airway Cricothyrotomy Needle Procedure
See Pearls Section

Supplemental oxygen
BVM
Maintain Oxygen
Saturation ≥ 90 %

YES → Supplemental oxygen
BVM
Maintain Oxygen
Saturation ≥ 90 %

Notify Destination or Contact Medical Control

Pediatric General Section Protocols

Pediatric Failed Airway

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

Pearls

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- **Hyperventilation in deteriorating head trauma should only be done to maintain a pCO_2 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.
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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

B	**Acetaminophen 15 mg/kg PO** Maximum 1000 mg ***Or*** **Ibuprofen 10 mg/kg PO** Maximum 800 mg
I	Consider IV Procedure ***if indicated***
	Monitor and Reassess every 5 minutes

Moderate to Severe

I	IV Procedure	P	IO Procedure
	***Ketorolac* 0.5 mg/kg IV / IO / IM** Maximum 30 mg		
P	Cardiac Monitor		
	Morphine 0.1 mg/kg IV / IO / IM May repeat every 5 minutes **Maximum single dose 2 mg** **Maximum dose 10 mg** **OR** **Fentanyl 1 mcg/kg IV / IO / IN** Repeat 0.5 mcg q 5 min as needed **Maximum 200 mcg**		
	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.**

Pediatric Asystole / PEA

History
- Events leading to arrest
- Estimated downtime
- Past medical history
- Medications
- Existence of terminal illness
- Airway obstruction
- Hypothermia
- Suspected abuse; shaken baby syndrome, pattern of injuries
- SIDS

Signs and Symptoms
- Unresponsive
- Cardiac Arrest
- Signs of lividity or rigor

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

Pediatric Pulseless Arrest Protocol

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES → Do not begin Resuscitation

Follow Deceased Subjects Policy

NO →

Begin Continuous CPR Compressions
Push Hard (1.5 inches Infant / 2 inches in Children) Push Fast (≥ 100 / min)
Change Compressors every 2 minutes
(Limit changes / pulses checks ≤ 10 seconds)

P Cardiac Monitor

Shockable Rhythm

YES → Follow Rhythm Appropriate Protocol

NO ↓

Search for Reversible Causes →

I
- IV Procedure | P | IO Procedure
- **Epinephrine1:10,000**
  0.01 mg/kg IV/IO (max 1mg)
  (0.1 mL / kg of 1:10,000)
  Repeat every 3 – 5 minutes
- **Normal Saline Bolus 10 mL/kg IV / IO**
  May repeat as needed **Maximum 60 mL/kg**

Blood Glucose Analysis Procedure

Pediatric Diabetic Protocol
as indicated

P
- Consider
  Dopamine 2 – 20 mcg/kg/min IV / IO
- Consider Chest Decompression-Needle Procedure

Notify Destination or Contact Medical Control

Consider
Beta Blocker OD
Calcium Channel Blocker OD

Pediatric Toxicology Protocol

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia
Hypoglycemia

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

Pediatric Cardiac Section Protocols

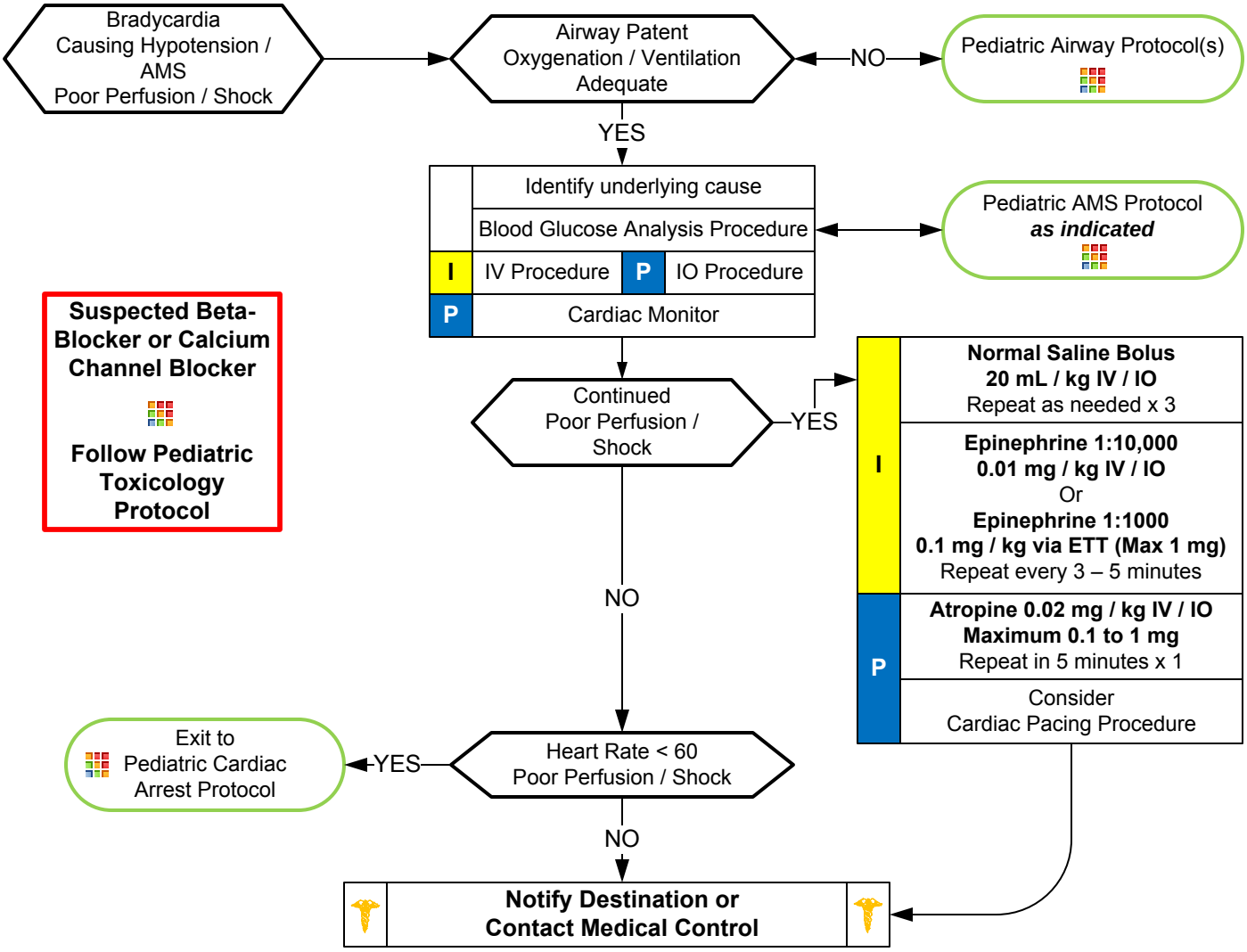
Pearls
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- Respiratory arrest is a common cause of cardiac arrest. Unlike adults early airway intervention is critical.
- In most cases pediatric airways can be managed by basic interventions.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg)** via ETT (**Maximum 10 mg**)

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, epiglotitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax
- Hypothermia
- Toxin or medication
- Hypoglycemia
- Acidosis



Pediatric Cardiac Section Protocols

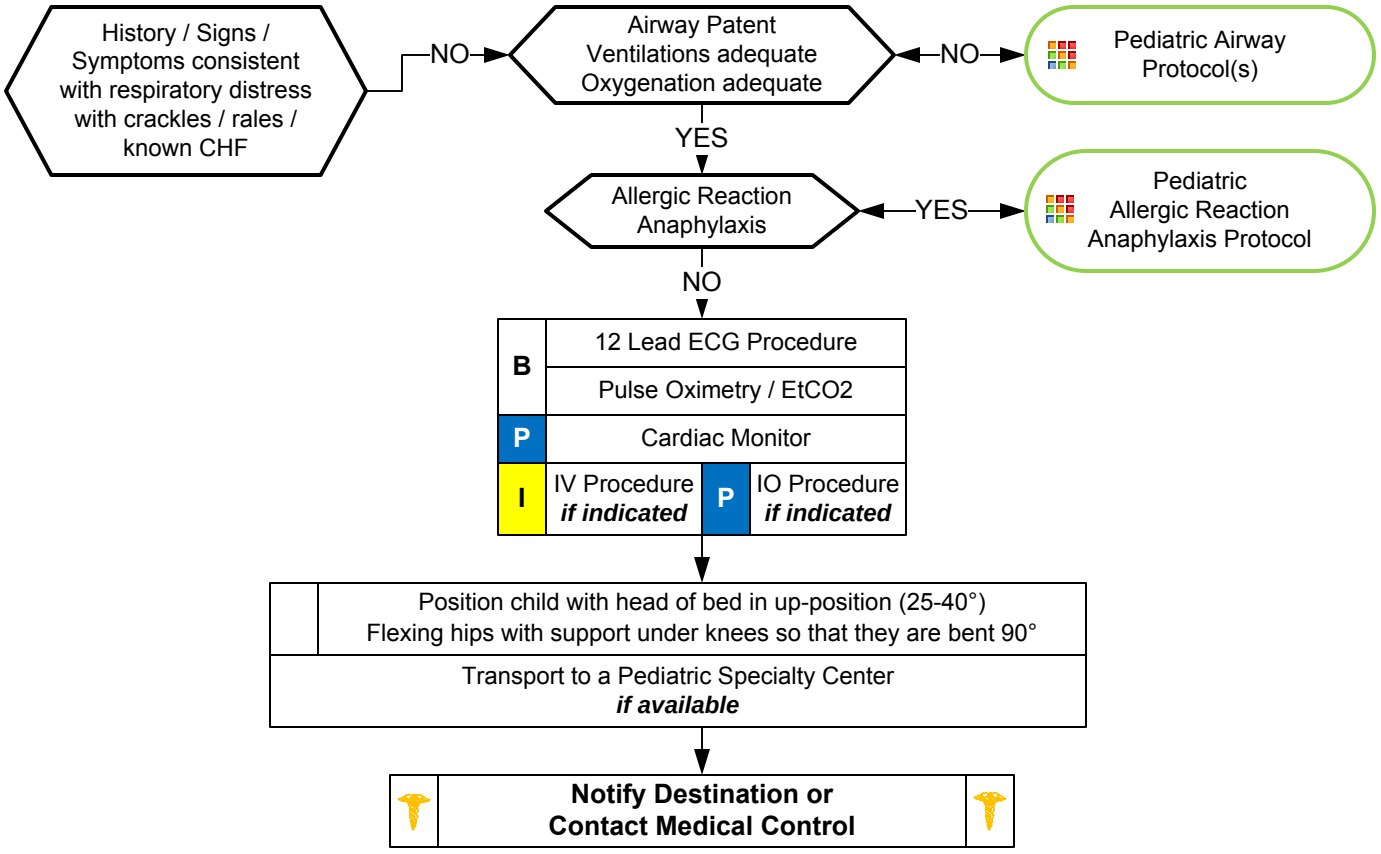
Pearls
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Use Broselow-Luten Tape for drug dosages if applicable.**
- Infant ≤ 1 year of age
- The majority of pediatric arrests are due to airway problems.
- Most maternal medications pass through breast 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



Pediatric Cardiac Section Protocols

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:**
  - **MorphineSulfate: 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, epiglotitis)
- Hypovolemia (dehydration)
- Congenital heart disease
- Trauma
- Tension pneumothorax, cardiac tamponade, pulmonary embolism
- Hypothermia
- Toxin or medication
- Electrolyte abnormalities (Glucose, K)
- Acidosis

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES → Do not begin resuscitation
Follow Deceased Subjects Policy

NO

Newly Born / ≤ 31 days old → YES → Exit to Newly Born Protocol

NO

≥ 15 years old → YES → Exit to Adult Cardiac Arrest Protocol

NO

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Begin Continuous CPR Compressions
Push Hard (1.5 inches Infant / 2 inches in Children) Push Fast (≥ 100 / min)
Change Compressors every 2 minutes
(Limit changes / pulses checks ≤ 10 seconds)

Defibrillation Automated
if available

ALS Available

NO → Shockable Rhythm → YES

NO:
Continue CPR
5 Cycles / 2 Minutes
Repeat and reassess
Pediatric Airway Protocol(s)

YES:
Defibrillation Automated
Continue CPR
5 Cycles / 2 Minutes
Repeat and reassess
Pediatric Airway Protocol(s)

YES → Shockable Rhythm

NO:
Follow Pediatric Asystole / PEA Pediatric Airway Protocols

YES:
Follow Pediatric VF / VT Pediatric Tachycardia Pediatric Airway Protocols

Notify Destination or Contact Medical Control

Pediatric Cardiac Section Protocols

Pediatric Pulseless Arrest

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Pearls

- **Recommended Exam: Mental Status**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 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

Unstable / Serious Signs and Symptoms
HR Typically > 180 Child
HR Typically > 220 Infant

NO

YES

Probable Sinus Tachycardia

YES

NO

B 12 Lead ECG Procedure

I IV Procedure **P** IO Procedure

P Cardiac Monitor

P Cardioversion Procedure

SVT / VT: 0.5 - 1 J/kg
May repeat if needed and increase dose with subsequent shocks **2 J/kg.**

Consider Sedation pre-shock
Midazolam 0.1 – 0.2 mg/kg IV / IO
May repeat if needed
Maximum 5 mg
0.2 mg/kg IN Maximum 2 mg

QRS ≥ 0.09 seconds

YES

NO

Probable Sinus Tachycardia

Identify and Treat Underlying Cause

Exit to Appropriate Protocol

Probable SVT

P Vagal Maneuvers

Adenosine
0.1 mg / kg IV / IO
Maximum 6 mg
May repeat
Adenosine
0.2 mg / kg IV / IO
Maximum 12 mg

P <u>If no response</u>
Amiodarone
5 mg/kg IV / IO
Over 20 Minutes
Maximum 150 mg

Exit to Appropriate Protocol

P Consider
Adenosine
0.1 mg / kg IV / IO
Maximum 6 mg

P <u>If no response</u>
Amiodarone
5 mg/kg IV / IO
Over 20 Minutes
Maximum 150 mg

Single lead ECG able to diagnose and treat arrhythmia

12 Lead ECG not necessary to diagnose and treat, but preferred when patient is stable.

AT ANY TIME

Pulseless

Go to Pediatric Pulseless Arrest Protocol

B <u>Rhythm Converts</u>
12 Lead ECG Procedure

P <u>Torsades de pointes</u>
Magnesium Sulfate
40 mg/kg IV / IO
Over **10** minutes
Cardiac arrest
40 mg/kg IV / IO
Over **2** minutes

Notify Destination or Contact Medical Control

Pediatric Cardiac Section Protocols

Pediatric Tachycardia

Magnesium Sulfate Infusion:
- Torsades de Pointes non-arrest **Dose over 10 min**

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

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

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

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

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

Amiodarone Infusion: 5mg/kg over 10 min

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

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

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Serious Signs and Symptoms:**
  - **Respiratory distress / failure.**
  - **Signs of shock / poor perfusion with or without hypotension.**
  - **AMS**
  - **Sudden collapse with rapid, weak pulse**
- **Narrow Complex Tachycardia (≤ 0.09 seconds):**
  - Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 beats / minute. Children usually < 180 beats / minute.
  - SVT: > 90 % of children with SVT will have a narrow QRS (≤0.09 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / minute.
  - Atrial Flutter / Fibrillation
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
  - SVT with aberrancy.
  - VT: Uncommon in children. Rates may vary from near normal to > 200 / minute. Most children with VT have underlying heart disease / cardiac surgery / long QT syndrome / cardiomyopathy.
- **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

P **Defibrillation 2 Joules/kg**

Begin Continuous CPR Compressions
Push Hard (1.5 inches Infant / 2 inches in Children) Push Fast (≥ 100 / min)
Change Compressors every 2 minutes
(*Limit changes / pulses checks ≤ 10 seconds*)

Pediatric Airway Protocol(s)

I IV Procedure **P** IO Procedure

Epinephrine (1:10,000) 0.01 1 mg IV / IO
Maximum 1 mg each dose
Repeat every 3 to 5 minutes

P **Defibrillate 4 Joules/kg**

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

<u>If Rhythm Refractory</u>
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 **Amiodarone 5 mg/kg IV / IO**
Maximum dose 300 mg
Repeat every 5 minutes
Maximum Repeat Dose 150 mg
Maximum *<u>total</u>* dose 15 mg/kg

Defibrillate 4 Joules/kg

High Quality, Continuous Compressions

P **Lidocaine 1 mg/kg IV / IO**
Maximum 100 mg
Repeat 0.5 mg/kg
Maximum 3 mg/kg total

Notify Destination or Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

<u>Persistent VF / VT</u>

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

<u>Tosades de points</u>

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

Pediatric Cardiac Section Protocols

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

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

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

Pearls

- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 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** • Maintain SpO2 ≥ 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

Hypotension Age based — YES →

I: **Normal Saline Bolus**
10 mL/kg IV / IO
May repeat to **60 mL/kg** if lungs remain clear

P: **Dopamine**
2 – 20 mcg/kg/min IV / IO
Titrate to SBP age appropriate

NO ↓

Blood Glucose ≤ 69 or ≥ 250 — YES → Pediatric Diabetic Protocol

NO ↓

Symptomatic Bradycardia — YES → Pediatric Bradycardia Protocol

NO ↓

Symptomatic Tachycardia — YES → Pediatric Tachycardia Protocol

NO ↓

ROSC After Defibrillation and **NO** Antiarrhythmic

YES → P: **Amiodarone 5 mg/kg IV / IO**
Infuse over 10 minutes

NO → P: Continue Antiarrhythmic Utilized
Refer to Appropriate Pediatric Arrhythmia Protocol

P:
Consider Sedation / Paralysis
Use only with definitive airway in place

Midazolam 0.1 – 0.2 mg/kg IV / IO
May repeat in 3 -5 minutes as needed
And / Or
Fentanyl 1 mcg/kg IV / IO / IN
Repeat 1 mcg/kg q 20 min as needed
Maximum 200 mcg

Notify Destination or Contact Medical Control

Pediatric Cardiac Section

Pediatric Post Resuscitation

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min
example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Amiodarone Infusion: 5mg/kg over 10 min

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

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

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.

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

Assess Symptom Severity

MILD

I
- IV Procedure *If indicated*
- **Diphenhydramine 1 mg / kg IV / IM / IO**

B
- Monitor and Reassess
- Monitor for Worsening Signs and Symptoms

MODERATE

- **Epinephrine 1:1000**
  ≥ 30 kg 0.3 – 0.5 mg IM
  < 30 kg – 0.15 mg IM

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

I
- **Epinephrine 1:1000**
  0.01 mg / kg IM
  Maximum 0.5 mg
  Repeat in 5 minutes if no improvement
- IV Procedure
- **Diphenhydramine**
  1 mg / kg IV / IM / IO
  if not already given PO
- **Albuterol Nebulizer**
  2.5 – 5 mg
  +/- Ipratropium 0.5 mg
  Repeat as needed x 3
  if indicated

P
- **Methylprednisolone**
  2 mg/kg IV
  Maximum dose 125 mg

SEVERE

- **Epinephrine 1:1000**
  ≥ 30 kg 0.3 – 0.5 mg IM
  < 30 kg – 0.15 mg IM

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

- Airway Pediatric Protocol(s) ***if indicated***

I
- **Epinephrine 1:1000**
  0.01 mg / kg IM
  Maximum 0.5 mg
  Repeat in 5 minutes if no improvement
- IV Procedure | P | IO Procedure
- **Diphenhydramine**
  1 mg / kg IV / IM / IO
  if not already given PO
- **Albuterol Nebulizer**
  2.5 – 5 mg
  +/- Ipratropium 0.5 mg
  Repeat as needed x 3
  if indicated
- **Normal Saline Bolus**
  20 mL/kg IV / IO
  Repeat as needed to effect age appropriate SBP
  Maximum 60 mL/kg

P
- **Methylprednisolone**
  2 mg/kg IV
  Maximum dose 125 mg

Cardiac Monitoring Indicated for Moderate and Severe Reactions

Notify Destination or Contact Medical Control

Pediatric Medical Section Protocols

Pediatric Allergic Reaction

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Pearls

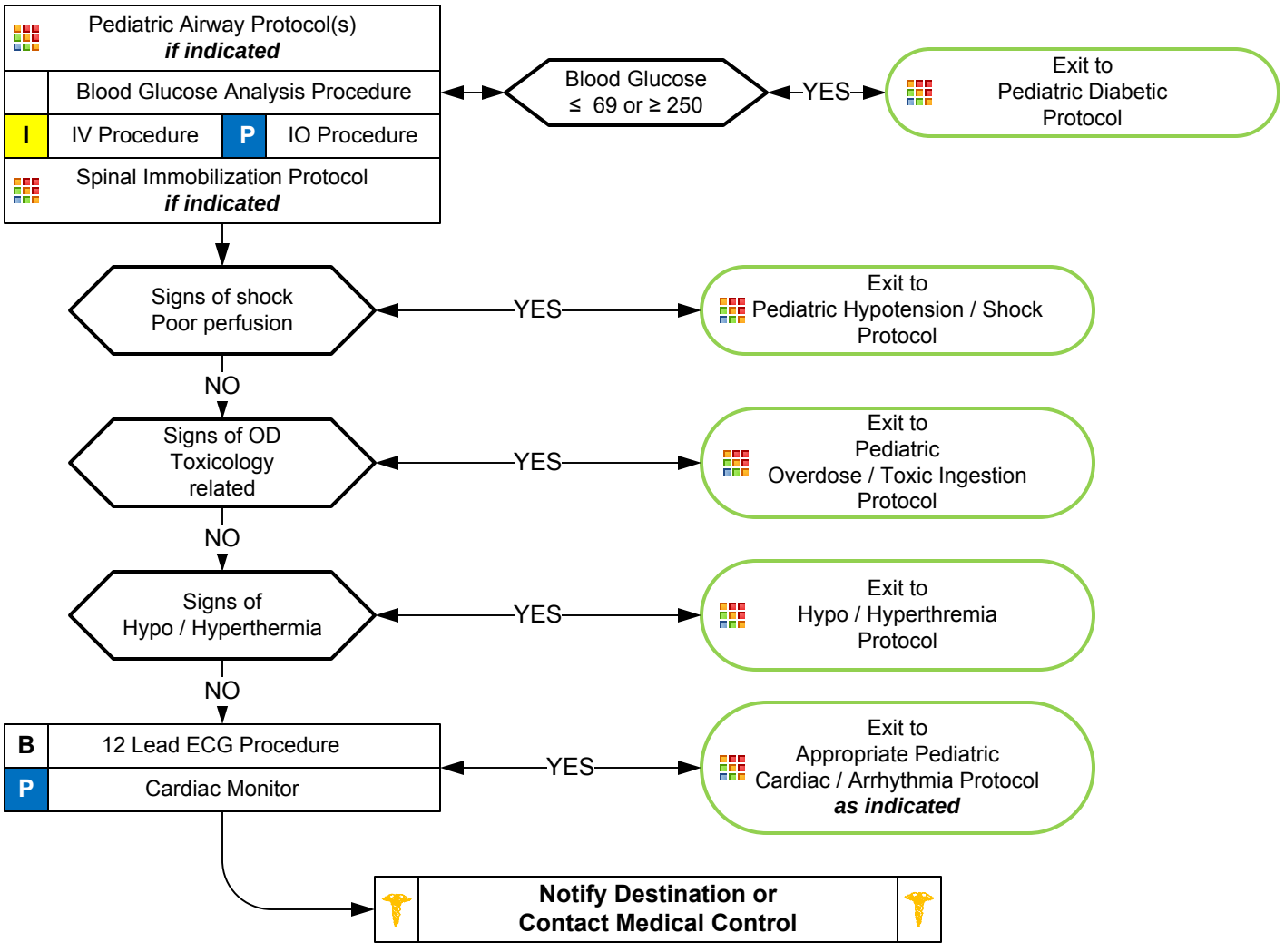
- **Recommended Exam: Mental Status, Skin, Heart, Lungs**
- **Anaphylaxis is an acute and potentially lethal multisystem allergic reaction.**
- **Epinephrine is the drug of choice and the first drug that should be administered in acute anaphylaxis (Moderate / Severe Symptoms.) IM Epinephrine should be 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.**
- **<u>Symptom Severity Classification:</u>**
  - **Mild symptoms:**
    - **Flushing, hives, itching, erythema with normal blood pressure and perfusion.**
  - **Moderate symptoms:**
    - **Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with normal blood pressure and perfusion.**
  - **Severe symptoms:**
    - **Flushing, hives, itching, erythema plus respiratory (wheezing, dyspnea, hypoxia) or gastrointestinal symptoms (nausea, vomiting, abdominal pain) with hypotension and poor perfusion.**
- **Allergic reactions may occur with only respiratory and gastrointestinal symptoms and have no rash / skin involvement.**
- **Angioedema is seen in moderate to severe reactions and is swelling involving the face, lips or airway structures. This can also be seen in patients taking blood pressure medications like Prinivil / Zestril (lisinopril)-typically end in -il.**
- **Fluids and Medication titrated to maintain a SBP >70 + (age in years x 2) mmHg.**
- **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 abnormatilities
- Psychiatric disorder



Pediatric Medical Section Protocols

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 ***if indicated***

I

Blood glucose ≤ 69 mg / dl Symptomatic with NO IV / IO Access:
Awake, alert and able to tolerate oral agent: Give **oral glucose solution**
If unable to tolerate oral:
Glucagon 0.1 mg/kg IM (Maximum 1 mg)
Repeat every 15 minutes as needed to keep Blood glucose > 60 mg / dl.

Blood Sugar ≤ 69 mg / dl

Awake and alert but symptomatic

NO

YES

Consider **Oral Glucose Solution** *If age appropriate*

I

< 31 Days:
D10 6 mL/kg IV / IO
Repeat as needed

31 Days to 2 Years:
D25 4 mL/kg IV / IO
Repeat as needed

> 2 Years:
D50 2 mL/kg IV / IO
Maximum 25 g per dose
Repeat as needed

Repeat Dextrose per appropriate treatment arm

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

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

I

Normal Saline Bolus
10 mL/kg IV / IO
Repeat as needed to effect age appropriate SBP
Maximum 60 mL/kg

Notify Destination or Contact Medical Control

Pediatric Medical Section Protocols

Pediatric Diabetic

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Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Patients with prolonged hypoglycemia my 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:**

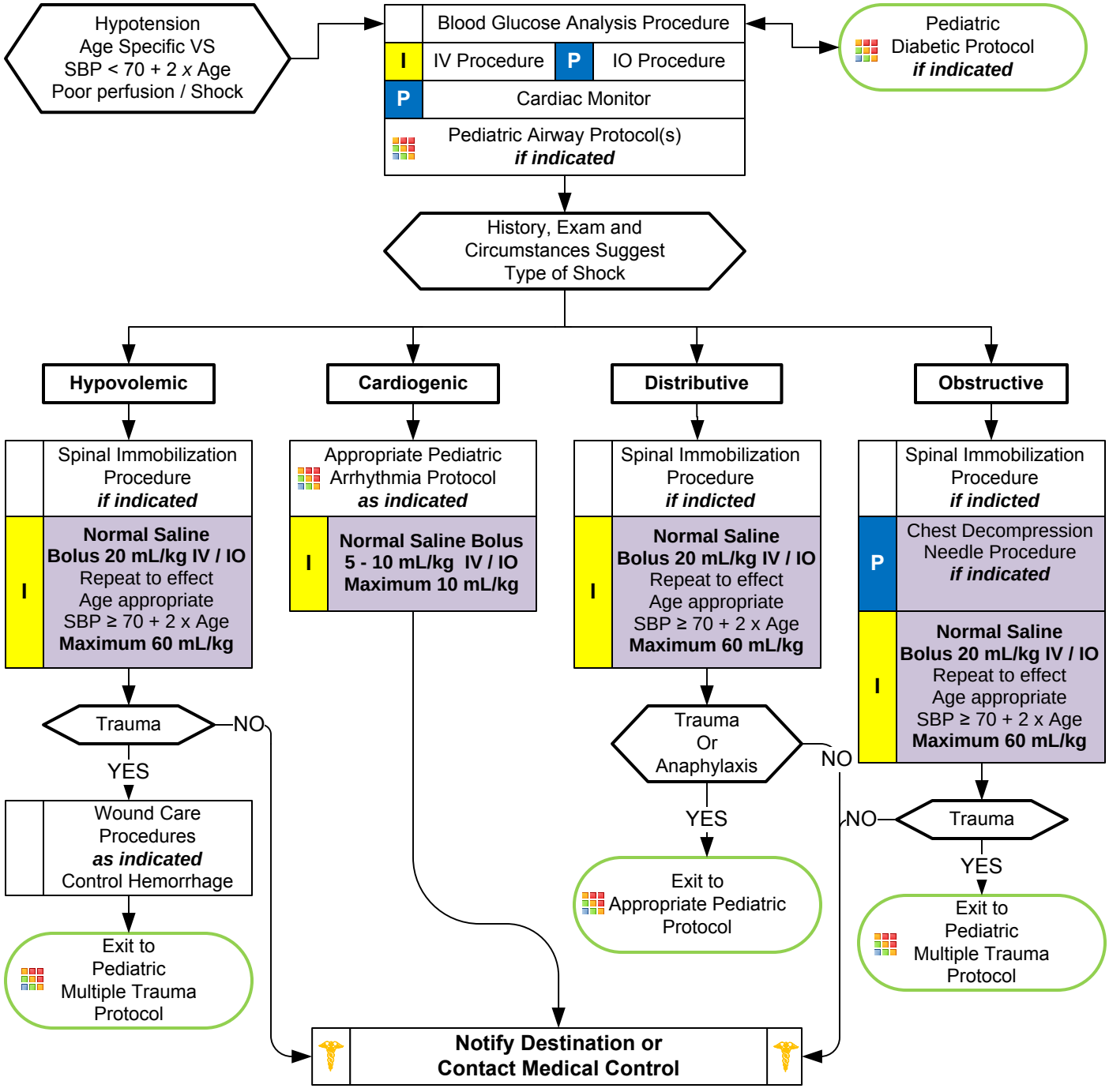
  Adult caregiver must be present with pediatric patient. Blood sugar must be 100 or greater and patient has ability to eat and availability of food with responders on scene. Patient must have known history of diabetes and not be taking any oral diabetic agents. Otherwise contact medical control.

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



Pediatric Medical Section Protocols

Hypotension / Shock

Pediatric Medical Section Protocol

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

Pearls

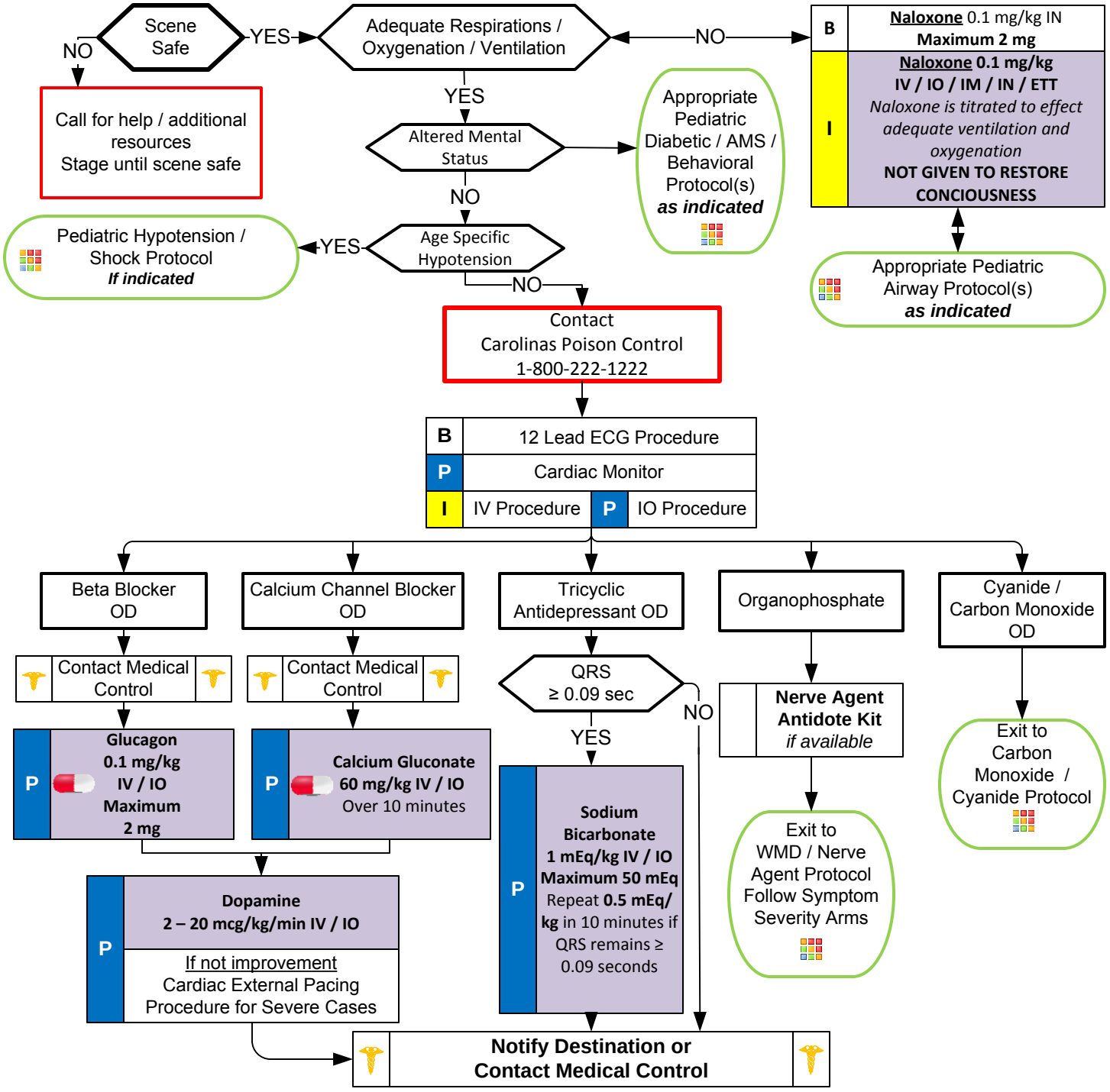
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- **Consider all possible causes of shock and treat per appropriate protocol. Majority of decompensation in pediatrics is airway related.**
- **Decreasing heart rate and hypotension occur late in children and are signs of imminent cardiac arrest.**
- **Shock may be present with a normal blood pressure initially.**
- **Shock often is present with normal vital signs and may develop insidiously. Tachycardia may be the only manifestation.**
- **Consider all possible causes of shock and treat per appropriate protocol.**
- **Hypovolemic Shock:**
  Hemorrhage, trauma, GI bleeding, ruptured aortic aneurysm or pregnancy-related bleeding.
- **Cardiogenic Shock:**
  Heart failure: MI, Cardiomyopathy, Myocardial contusion, Ruptured ventrical / 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
- **S**alivation, **L**acrimation, **U**rination; increased, loss of control, **D**efecation / Diarrhea, **G**I Upset; Abdominal pain / cramping, **E**mesis, **M**uscle Twitching

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



Pediatric Overdose / Toxic Ingestion

QRS Duration in Tricyclic Antidepressant overdose - No patient with a QRS duration of 100 milliseconds or less suffering a seizure or ventricular arrhythmia. Patients with a QRS greater than 160 milliseconds has a 50% chance of ventricular arrhythmia

EKG signs that suggest cardiotoxicity in TCA overdose
- QRS greater than 100 ms
- Deep slurred S wave in Lead I and aVL
- R wave in aVR greater than 3 mm
- R to S ratio in aVR greater than 0.7 ms

Glucagon in Beat-Blocker Overdose
An effect should be observed in 1-3 minutes and the peak effect should be at 5-7 minutes.
If no effect seen, call medical control for further instruction.
Vomiting is a well known side effect of Glucagon

Calcium Chloride and Calcium Gluconate can be used for beta-blocker overdoses. ***Contact Medical Control for orders***

Glucagon can be used for calcium channel blocker overdoses. ***Call Medical Control for orders***

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

Pt weight (Kg) x Dose x .0375 = ___ gtts / min

example: 100 kg pt x 7 mcg/min x 0.0375 = 26.25 gtts / min

Pearls

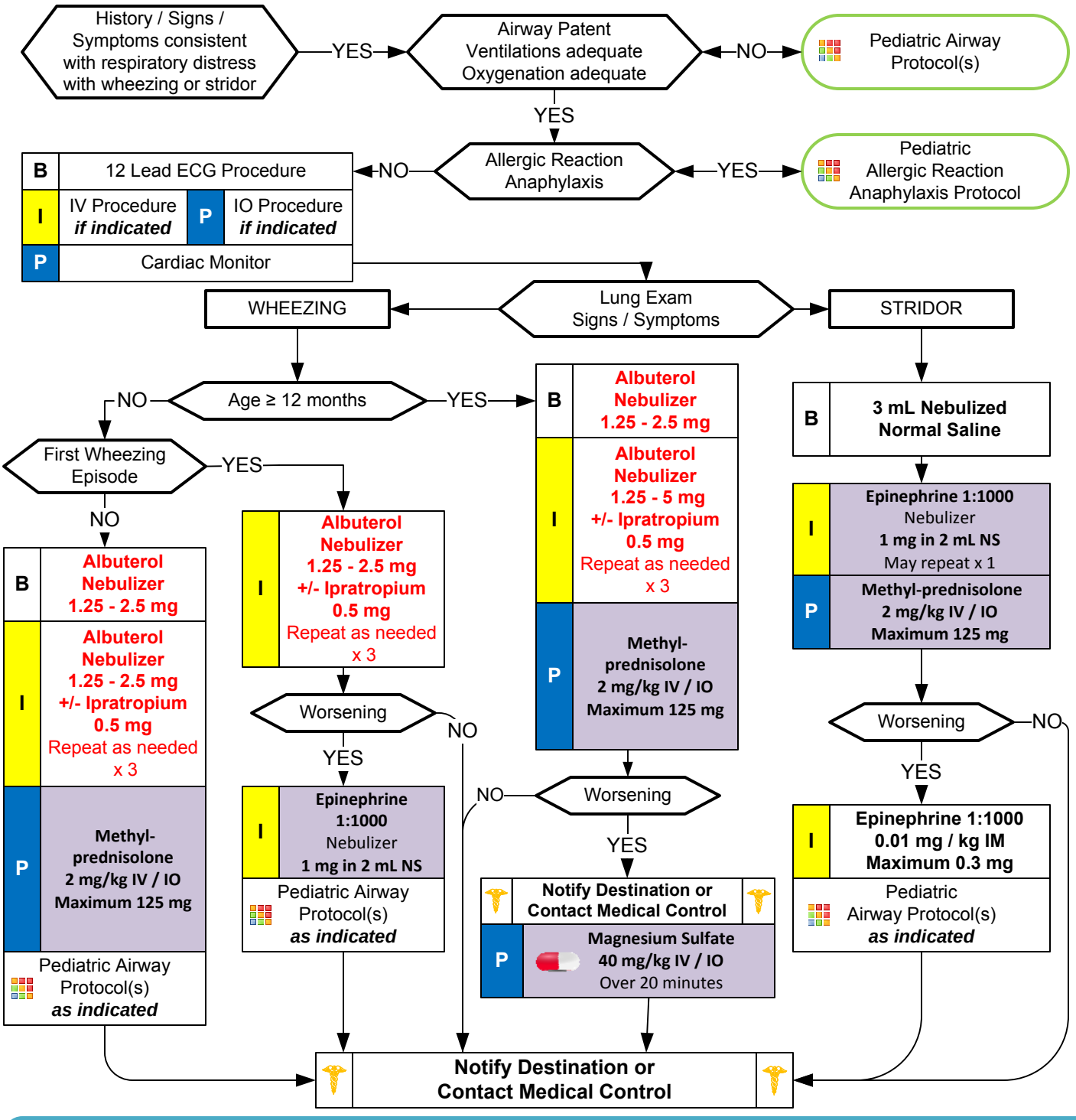
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Do not rely on patient history of ingestion, especially in suicide attempts. Make sure patient is still not carrying other medications or has any weapons. Bring bottles, contents, emesis to ED.**
- **Age 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 Medical Section Protocols

Magnesium Sulfate Infusion:

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

$$\frac{100 \text{ ml} \times 10 \text{ gtts}}{20 \text{ min}} = 50 \text{ gtts / min} \quad \text{or} \quad 5 \text{ gtts / 6 sec}$$

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

Pearls

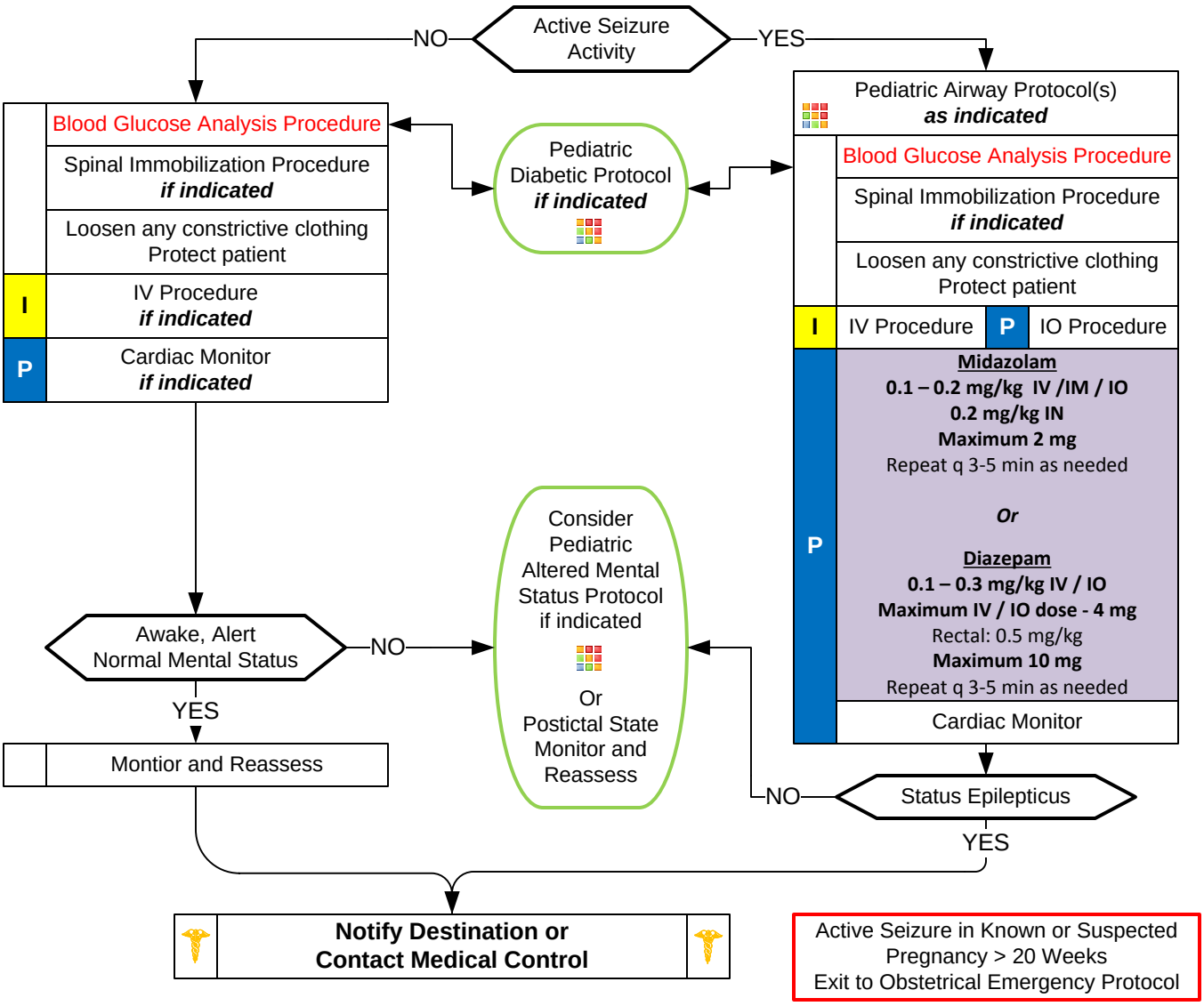
- **Recommended Exam: Mental Status, HEENT, Skin, Neck, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care.**
- **Pulse oximetry should be monitored continuously in the patient with respiratory distress.**
- **EMT-B 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 ≤ 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



Pediatric Medical Section Protocols

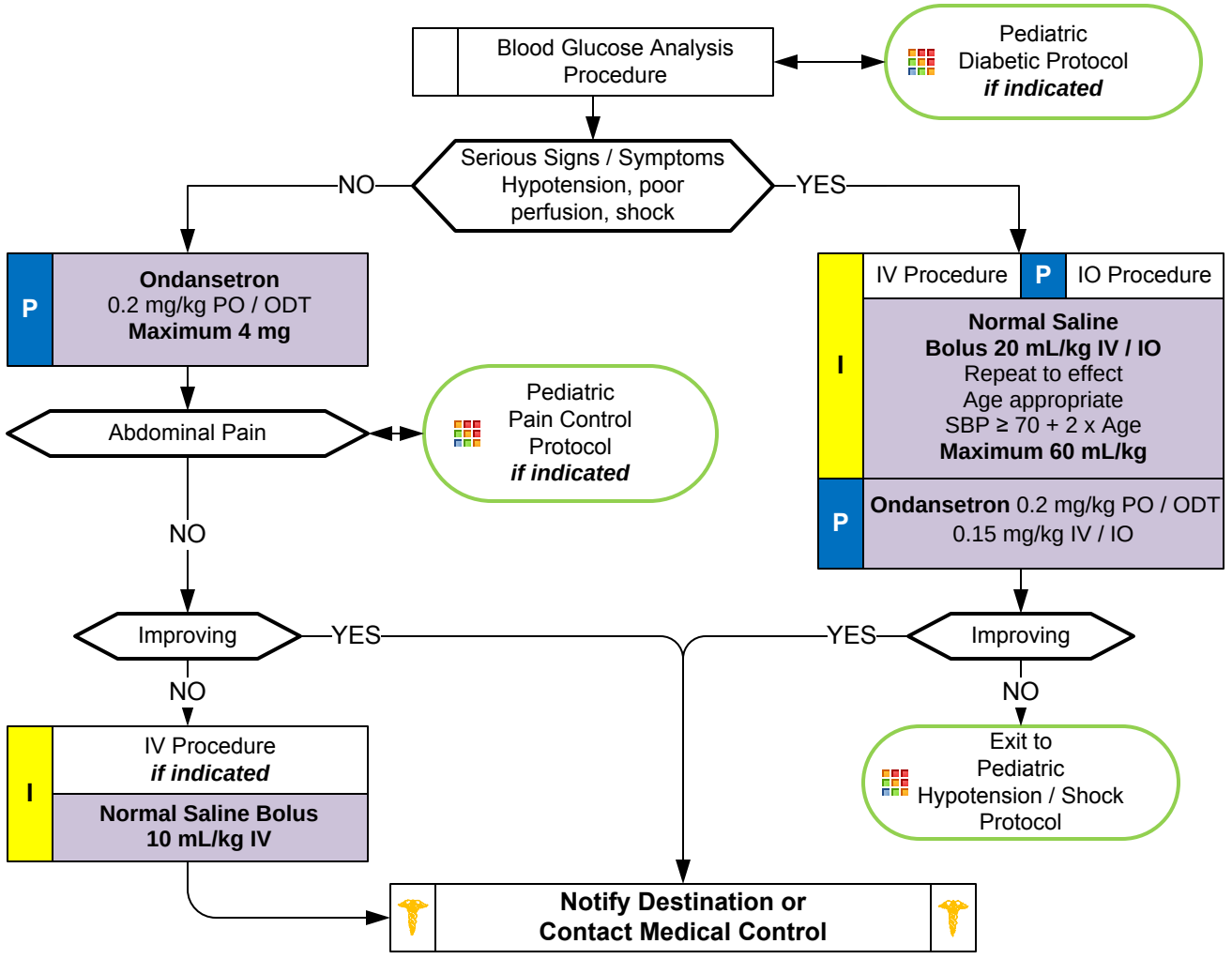
Pearls
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Midazolam 0.2 mg/kg (Maximum 10 mg) IM is effective in termination of seizures. Do not delay IM administration with 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 Vomiting / Diarrhea

History
- Age
- Time of last meal
- Last bowel movement / emesis
- Improvement or worsening with food or activity
- Other sick contacts
- Past Medical History
- Past Surgical History
- Medications
- Travel history
- Bloody Emesis or diarrhea

Signs and Symptoms
- Pain
- Distension
- Constipation
- Diarrhea
- Anorexia
- Fever
- Cough,
- Dysuria

Differential
- CNS (Increased pressure, headache, tumor, trauma or hemorrhage)
- Drugs
- Appendicitis
- Gastroenteritis
- GI or Renal disorders
- Diabetic Ketoacidosis
- Infections (pneumonia, influenza)
- Electrolyte abnormalities



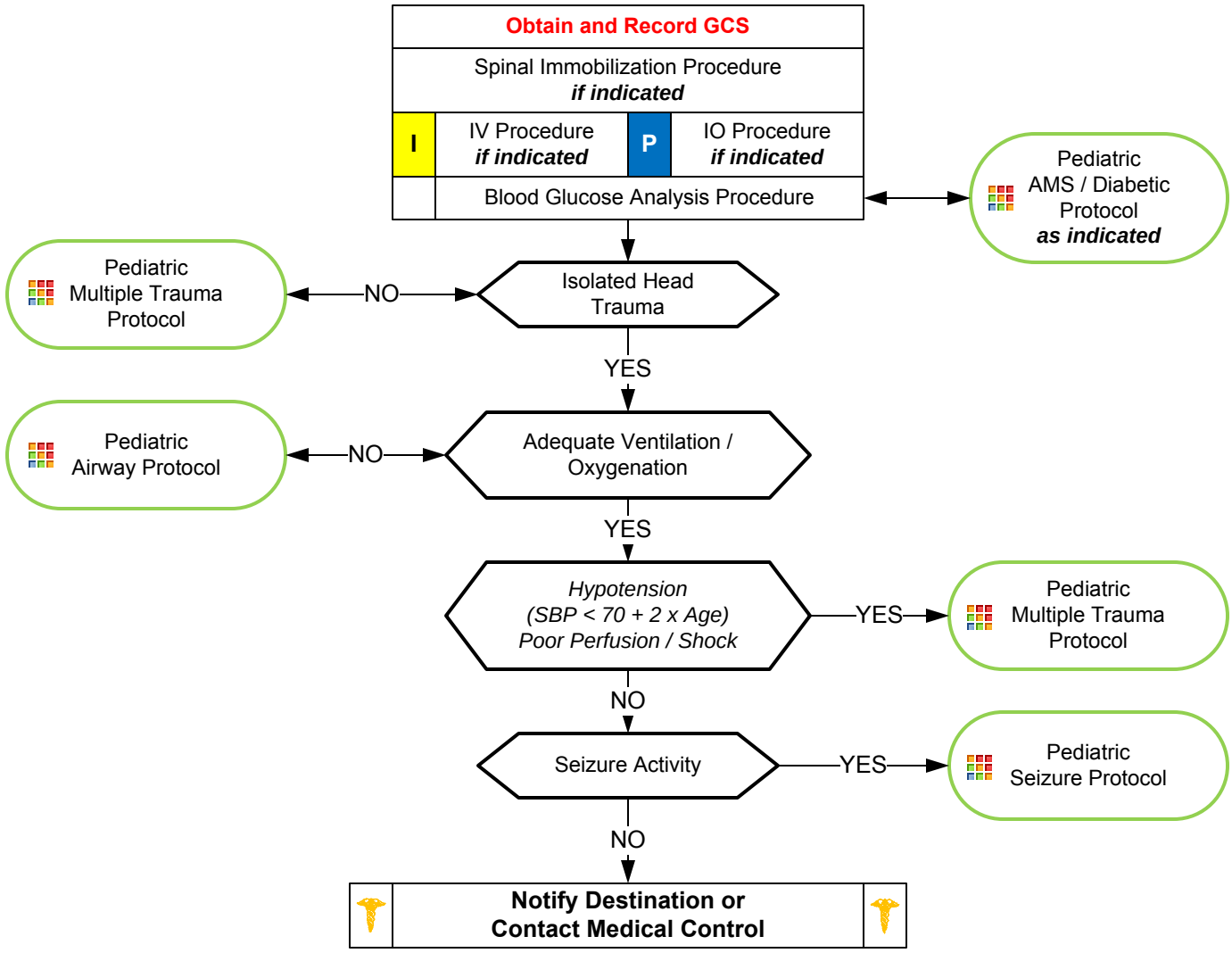
Pearls
- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Heart Rate: One of the first clinical signs of dehydration, almost always increased heart rate, tachycardia increases as dehydration becomes more severe, very unlikely to be significantly dehydrated if heart rate is close to normal.**
- **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.**
- Beware of vomiting only in children. Pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures) all often present with vomiting.

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



Pediatric Trauma and Burn Section Protocols

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

Pediatric Airway Protocol(s) ***if indicated***

Spinal Immobilization Procedure

I: IV Procedure | P: IO Procedure

P: Cardiac Monitor

Assess VS / Perfusion / GCS

Normal

- Repeat Assessment Pediatric Procedure
- Splint Suspected Fractures
  Consider Pelvic Binding
  Control External Hemorrhage
- Monitor and Reassess

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

Abnormal

Rapid Transport to appropriate destination using
Trauma and Burn:
EMS Triage and Destination Plan
Limit Scene Time ≤ 10 minutes
Provide Early Notification

- Pediatric Head Injury Protocol ***if indicated***
- Splint Suspected Fractures
  Consider Pelvic Binding
  Control External Hemorrhage
- I: **Normal Saline**
  Bolus 20 mL/kg IV / IO
  Repeat to effect Age appropriate
  SBP ≥ 70 + 2 x Age
  Maximum 60 mL/kg
- P: Chest Decompression-Needle Procedure ***if indicated***
- Monitor and Reassess

Pediatric Hypotension / Shock Protocol ***as indicated***

Notify Destination or Contact Medical Control

Pediatric Trauma and Burn Section Protocols

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

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

- Remove Rings, Bracelets / Constricting Items
- Dry Clean Sheet or Dressings
- Pediatric Multiple Trauma Protocol ***if indicated***
- Pediatric Airway Protocol(s) ***as indicated***
- I: IV Procedure ***if indicated***
- I: **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 — YES → Carbon Monoxide / Cyanide Protocol

NO → Transport Facility of Choice

Serious Burn

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

Criticial Burn

>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***
- I: IV Procedure Consider 2 IV sites if greater than 15 % TBSA
- I: **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 — YES → Carbon Monoxide / Cyanide Protocol

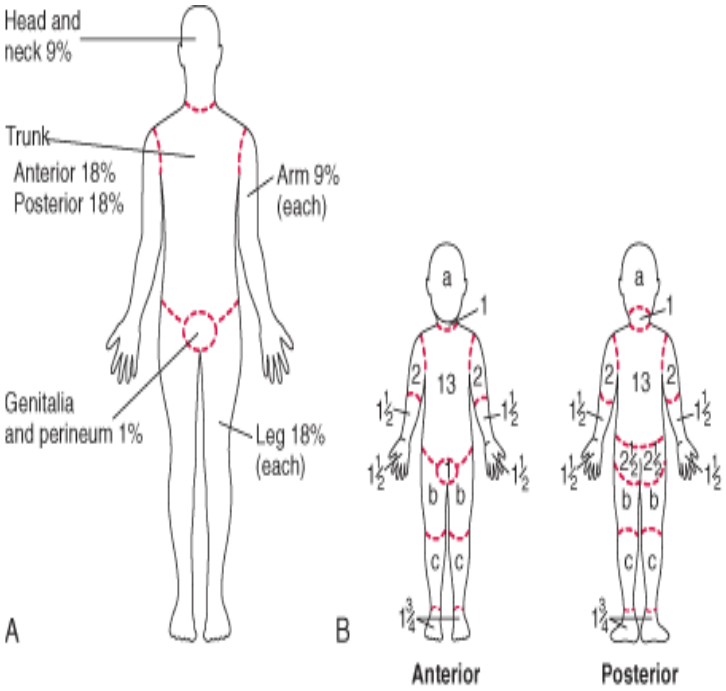
NO → **Rapid Transport** to appropriate destination using Trauma and Burn: EMS Triage and Destination Plan

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.

Pediatric Trauma and Burn Protocols

Pediatric Thermal Burn



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

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

Rule of Nines

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

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

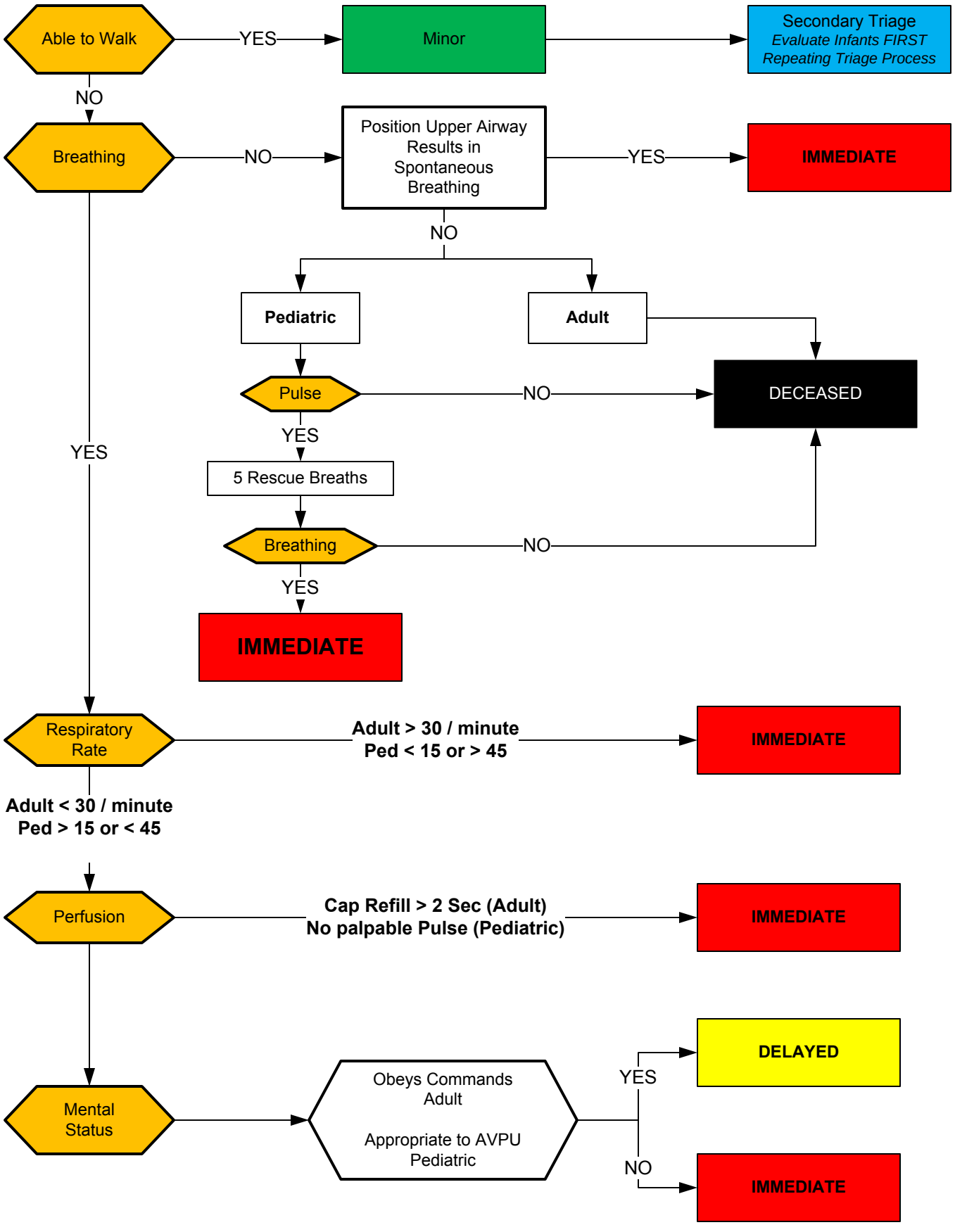
Pearls

- **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


Able to Walk
YES
Minor
Secondary Triage
Evaluate Infants FIRST
Repeating Triage Process
NO
Breathing
NO
Position Upper Airway
Results in
Spontaneous
Breathing
YES
IMMEDIATE
NO
Pediatric
Adult
Pulse
NO
DECEASED
YES
5 Rescue Breaths
Breathing
NO
YES
IMMEDIATE
YES
Respiratory
Rate
Adult > 30 / minute
Ped < 15 or > 45
IMMEDIATE
Adult < 30 / minute
Ped > 15 or < 45
Perfusion
Cap Refill > 2 Sec (Adult)
No palpable Pulse (Pediatric)
IMMEDIATE
Mental
Status
Obeys Commands
Adult
Appropriate to AVPU
Pediatric
YES
DELAYED
NO
IMMEDIATE

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Pearls

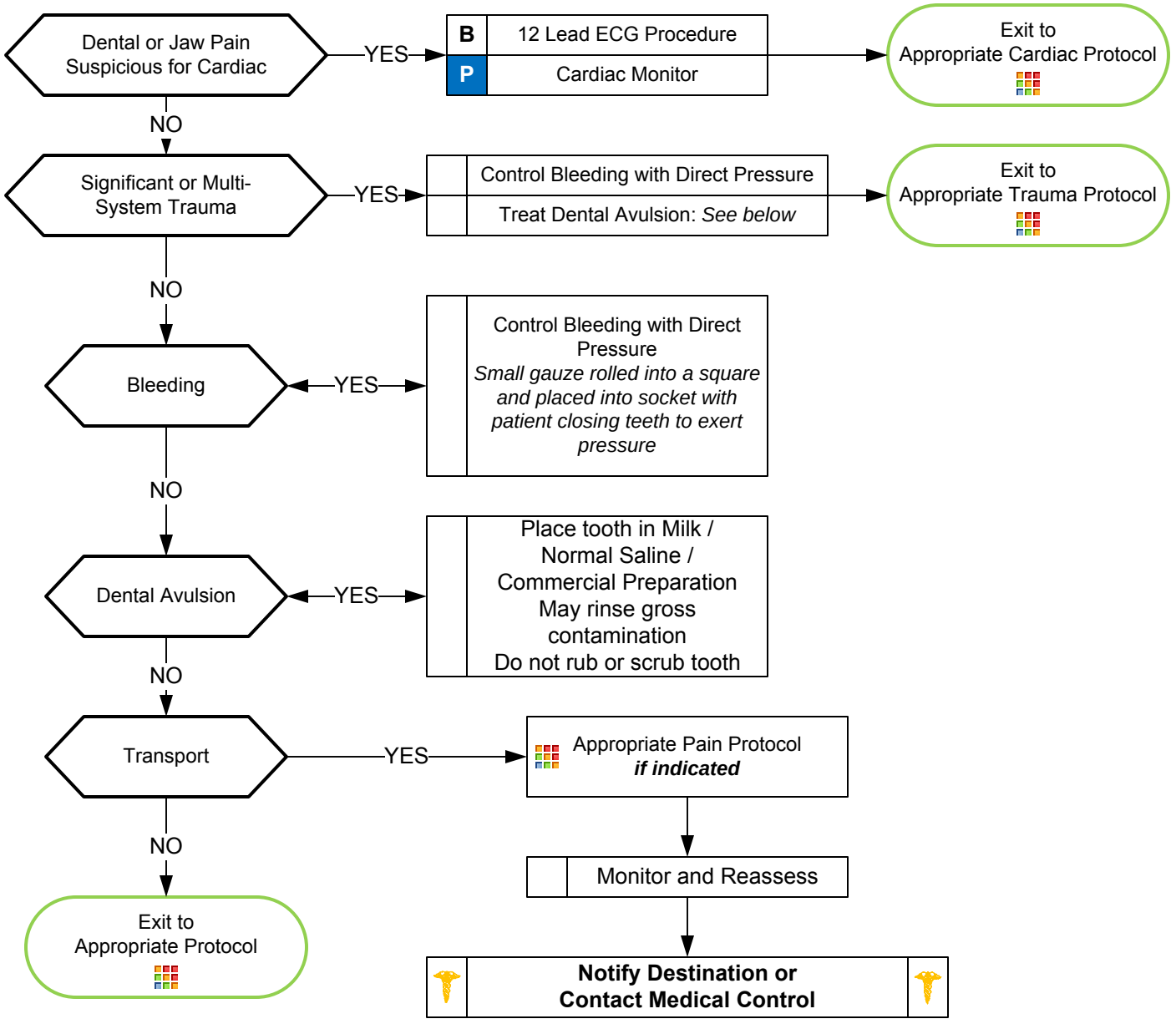
- First evaluate all children who did not walk under their on power where possible and safety allows.
- Capillary refill can be altered by many factors including skin temperature. Age-appropriate heart rate may also be used in triage decisions.

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

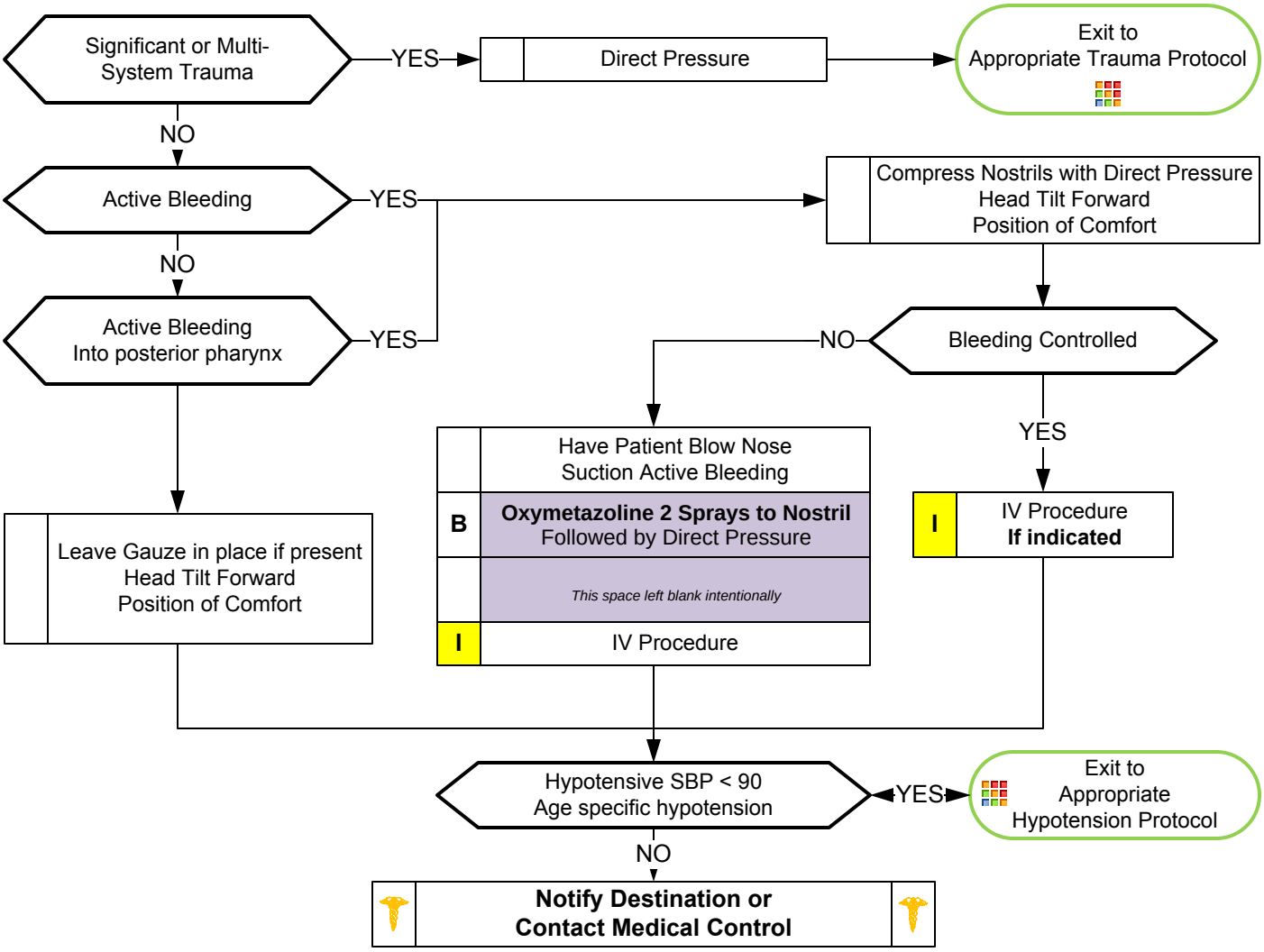
Pearls
- **Recommended Exam: Mental Status, HEENT, Neck, Chest, Lungs, Neuro**
- Significant soft tissue swelling to the face or oral cavity can represent a cellulitis or abscess.
- Scene and transport times should be minimized in complete tooth avulsions. Reimplantation is possible within 4 hours if 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).

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



Adult / Pediatric General Section Protocols

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 pharnyx.
- 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.

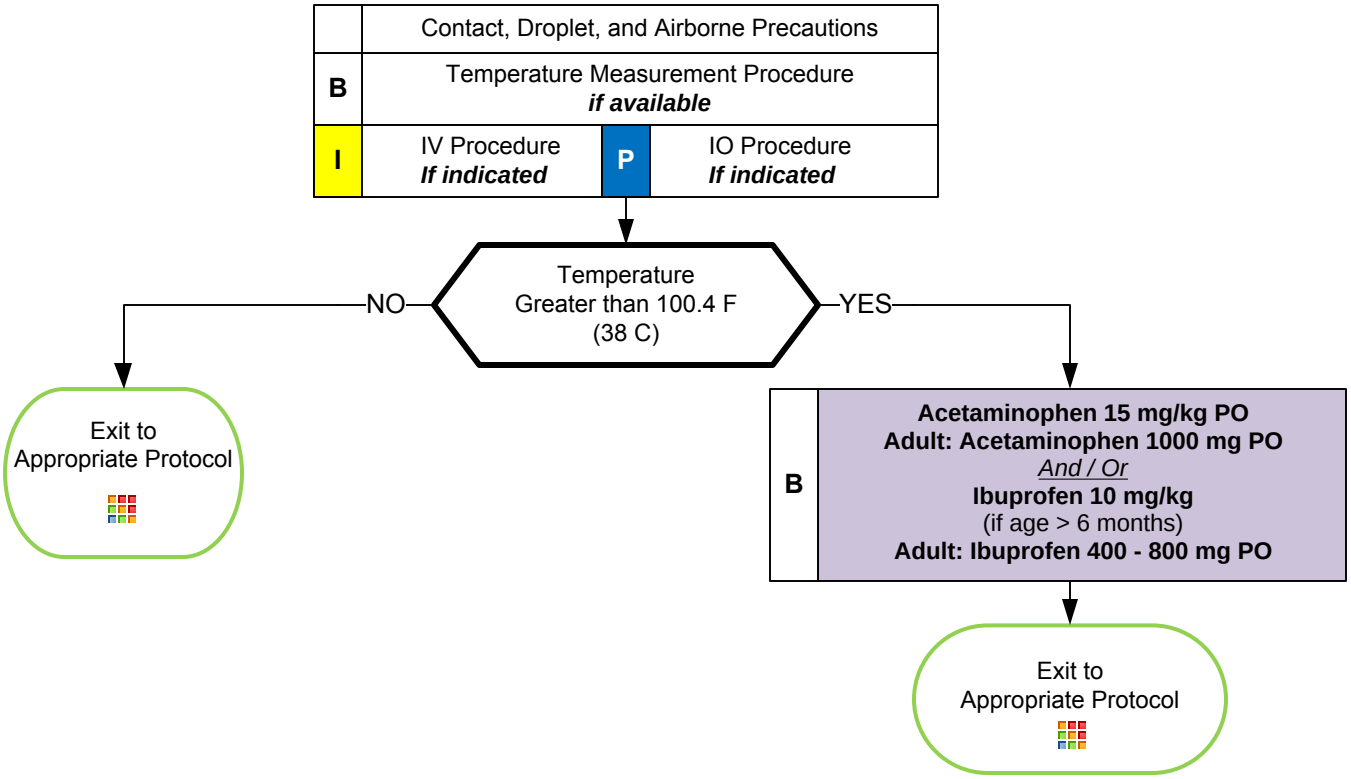
Fever / Infection Control

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



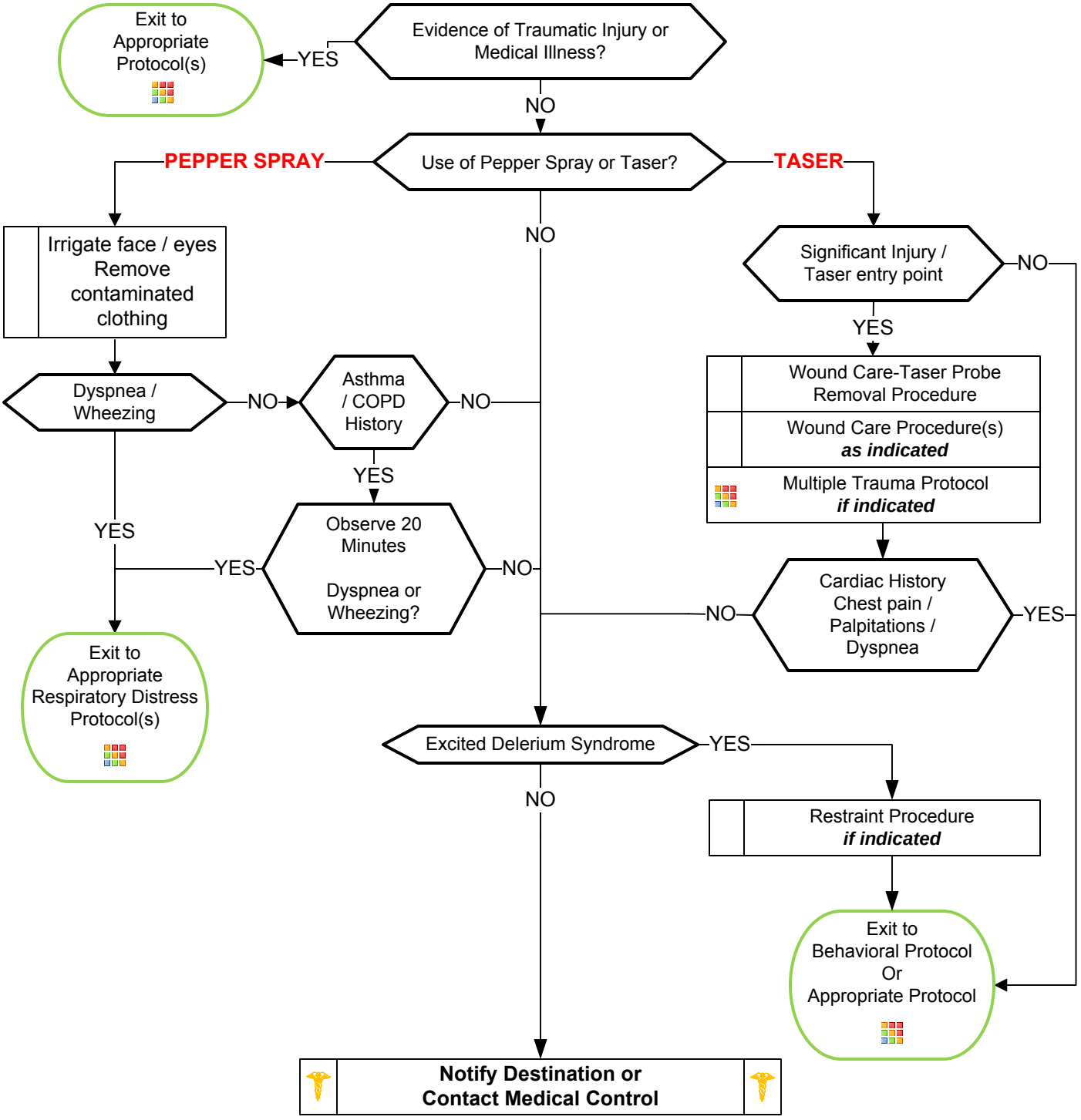
Pearls
- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- Febrile seizures are more likely in children with a history of febrile seizures and with a rapid elevation in temperature.
- Patients with a history of liver failure should not receive acetaminophen.
- **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



Adult / Pediatric General Section Protocols

Police Custody

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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 is such a way that could impact the patients respiratory or circulatory status.

Emergencies Involving Indwelling Central Lines

History

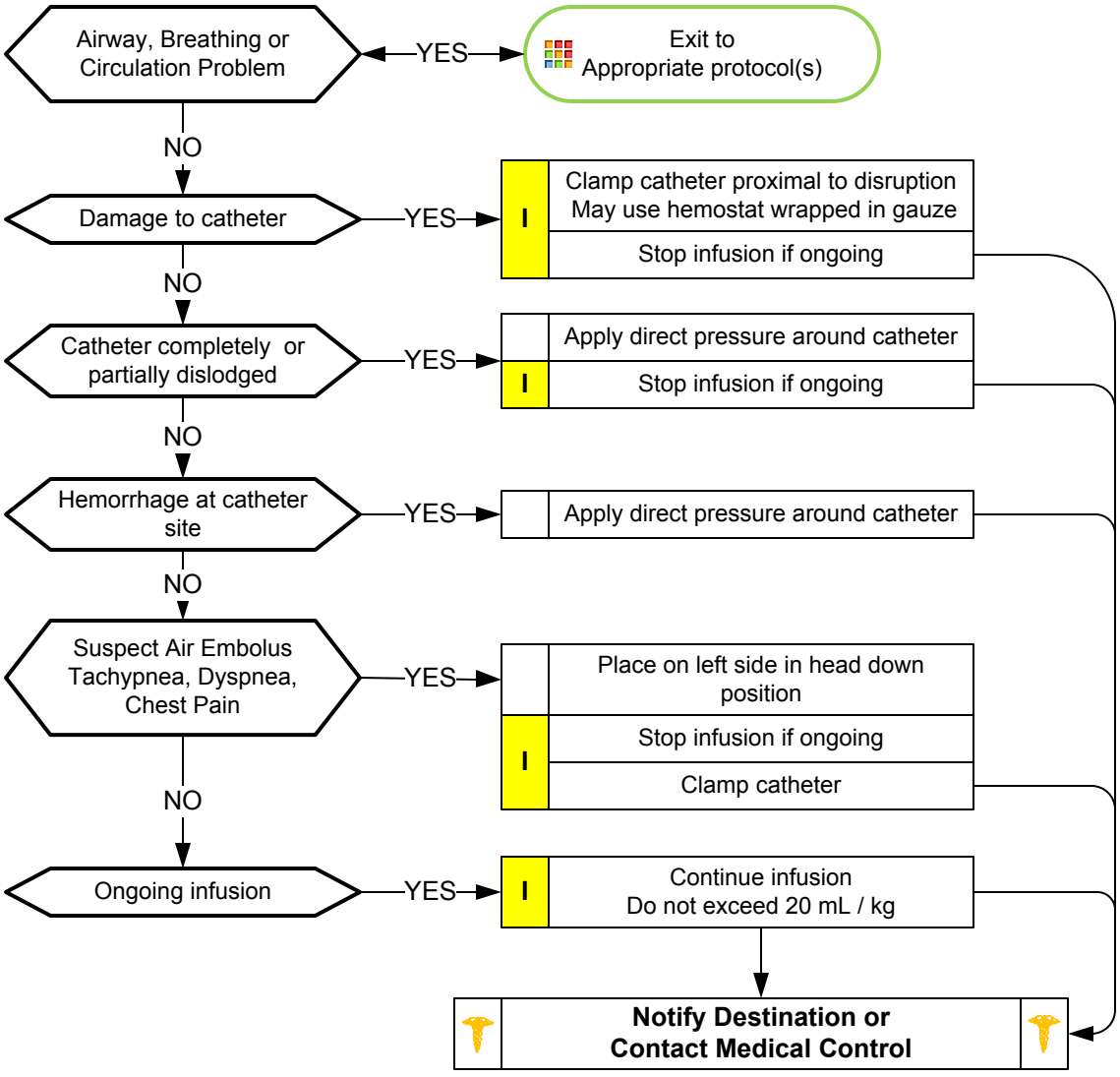
- Central Venous Catheter Type
  - Tunneled Catheter (Broviac / Hickman)
  - PICC (peripherally inserted central catheter
  - Implanted catheter (Mediport / Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

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

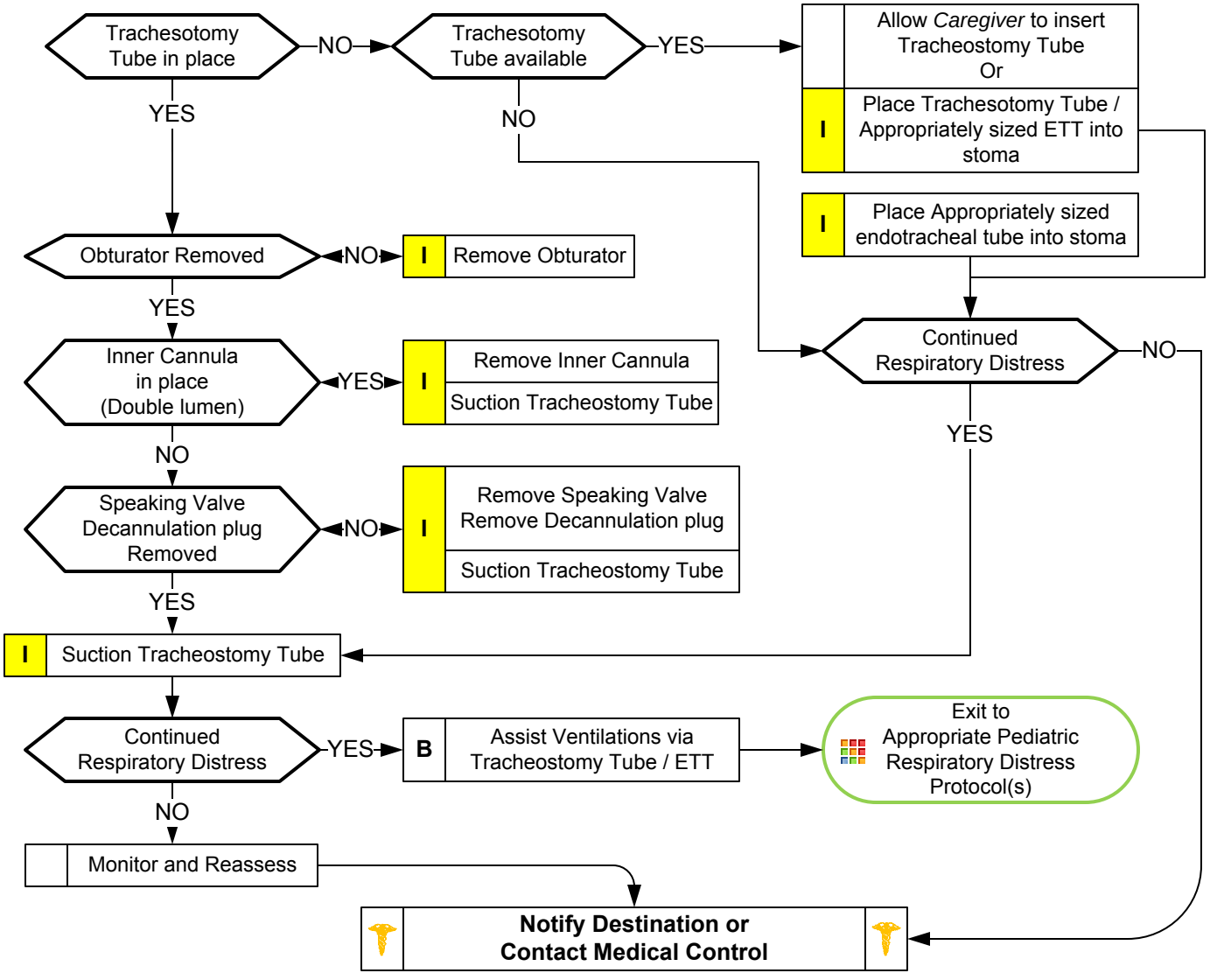
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Use strict sterile technique when accessing / manipulating an indwelling catheter.
- Do not place a tourniquet or BP cuff on the same side where a PICC line is located.
- Do not attempt to force catheter open if occlusion 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

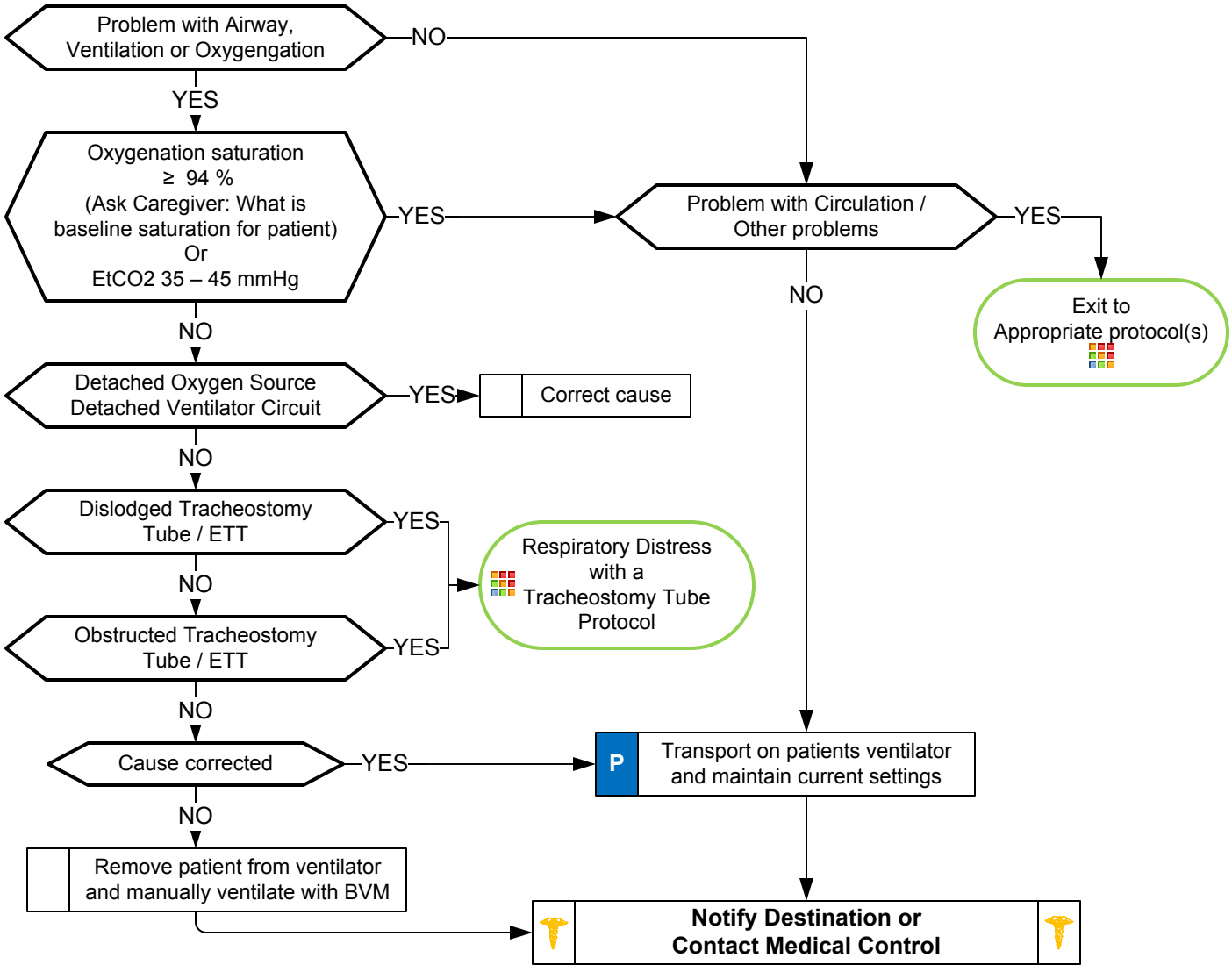
Pearls
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Use patients equipment if available and functioning properly.
- Estimate suction catheter size by doubling the inner tracheostomy tube diameter and rounding down.
- Suction depth: Ask family / caregiver. No 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: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

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



Adult / Pediatric General Section Protocols

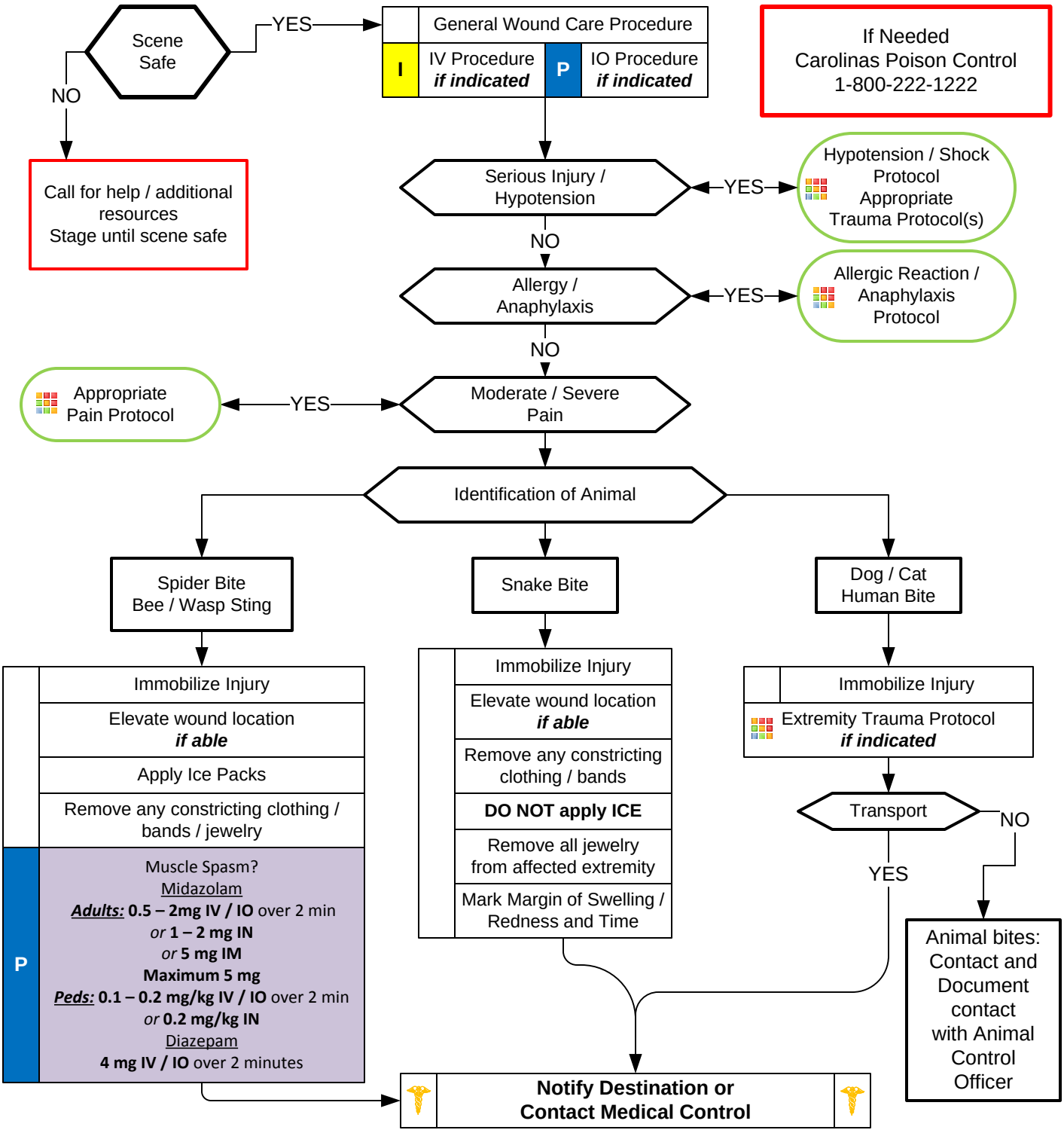
Pearls
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- Always use patient's equipment if available and functioning properly.
- Continuous pulse oximetry and end tidal CO2 monitoring must be utilized during assessment and transport.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment 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



Adult / Pediatric Environmental Section Protocols

Bites and Envenomations

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Pearls

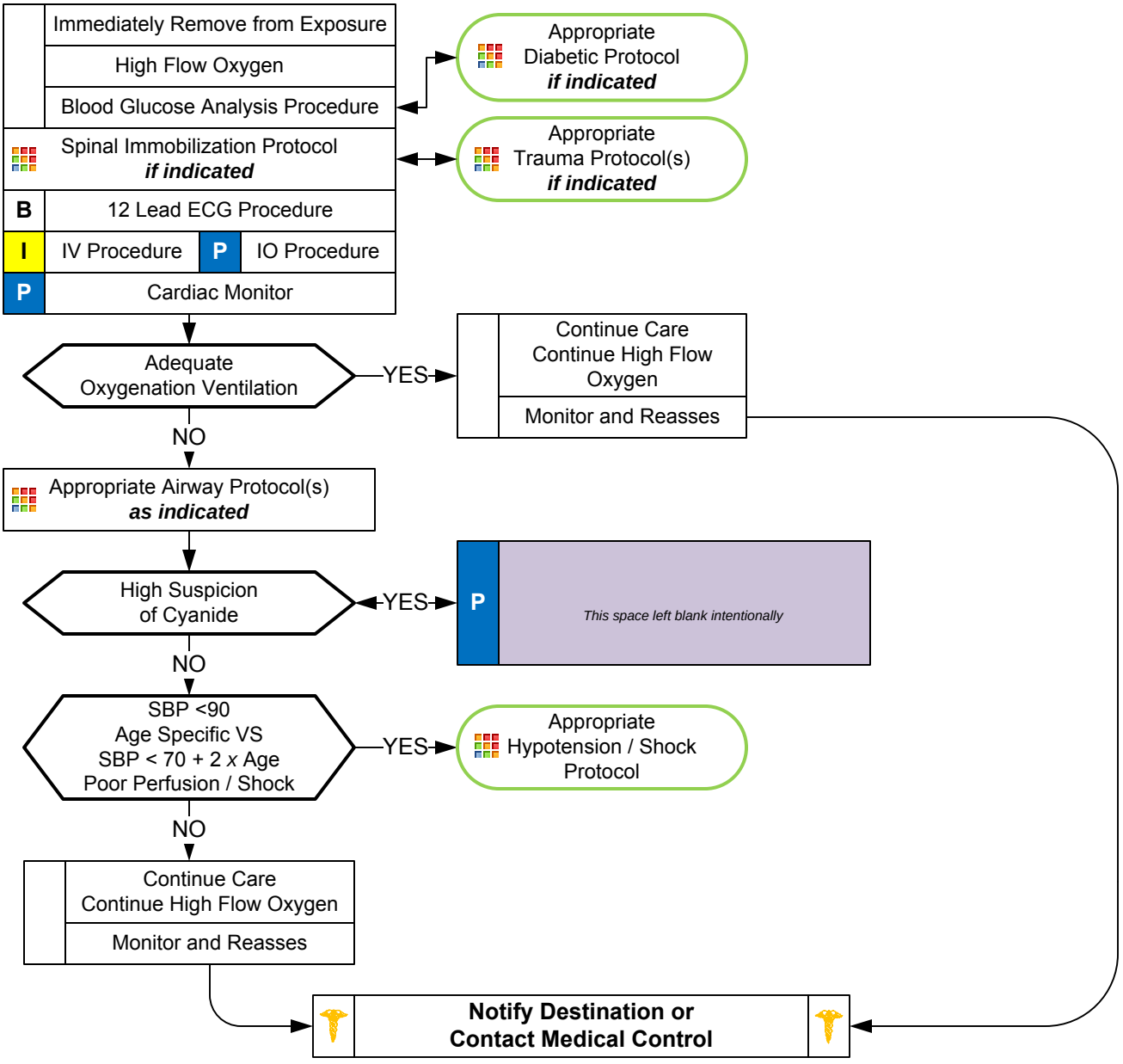
- **Recommended Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neuro exam if systemic effects are noted**
- Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
- Cat bites may progress to infection rapidly due to a specific bacteria (Pasteurella multicoda).
- 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.

Drowning

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

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

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

Awake and Alert

- Supplemental Oxygen ***as tolerated***
- Spinal Immobilization Procedure ***if indicated***
- Remove wet clothing
  Dry / Warm Patient
- Monitor and Reassess
- **Encourage transport and evaluation even if asymptomatic or with minimal symptoms**
  Asymptomatic drowning patients (refusing transport) should be instructed to seek medical care/call 911 if they develop any symptoms within 6 hours
- I: IV Procedure ***if indicated***
- P: Cardiac Monitor ***as indicated***

Awake but with AMS

- 5 Breaths via BVM / mouth-to-mouth ***as tolerated***
- Supplemental Oxygen ***as tolerated***
- Age Appropriate Airway Protocol(s) ***as indicated***
- Spinal Immobilization Procedure ***if indicated***
- Age Appropriate Altered Mental Status Protocol ***as indicated***
- Remove wet clothing
  Dry / Warm Patient
- I: IV Procedure — P: IO Procedure
- P: Cardiac Monitor

Unresponsive

- 5 Breaths via BVM / mouth-to-mouth ***as tolerated***

Pulse
- YES → Age Appropriate Airway Protocol(s) ***as indicated***
- NO → Exit to Age Appropriate Cardiac / Pulseless Arrest Arrhythmia Protocol(s) Respiratory Distress Protocol and / or Selective Spinal Immobilization Protocol ***as indicated***

Exit to Age Appropriate Respiratory Distress Protocol(s) ***as indicated***

Notify Destination or Contact Medical Control

Dive Accident / Barotrauma
Divers Alert Network
1-919-684-9111

Agency specific hyperbaric information

Adult / Pediatric Environmental Section Protocols

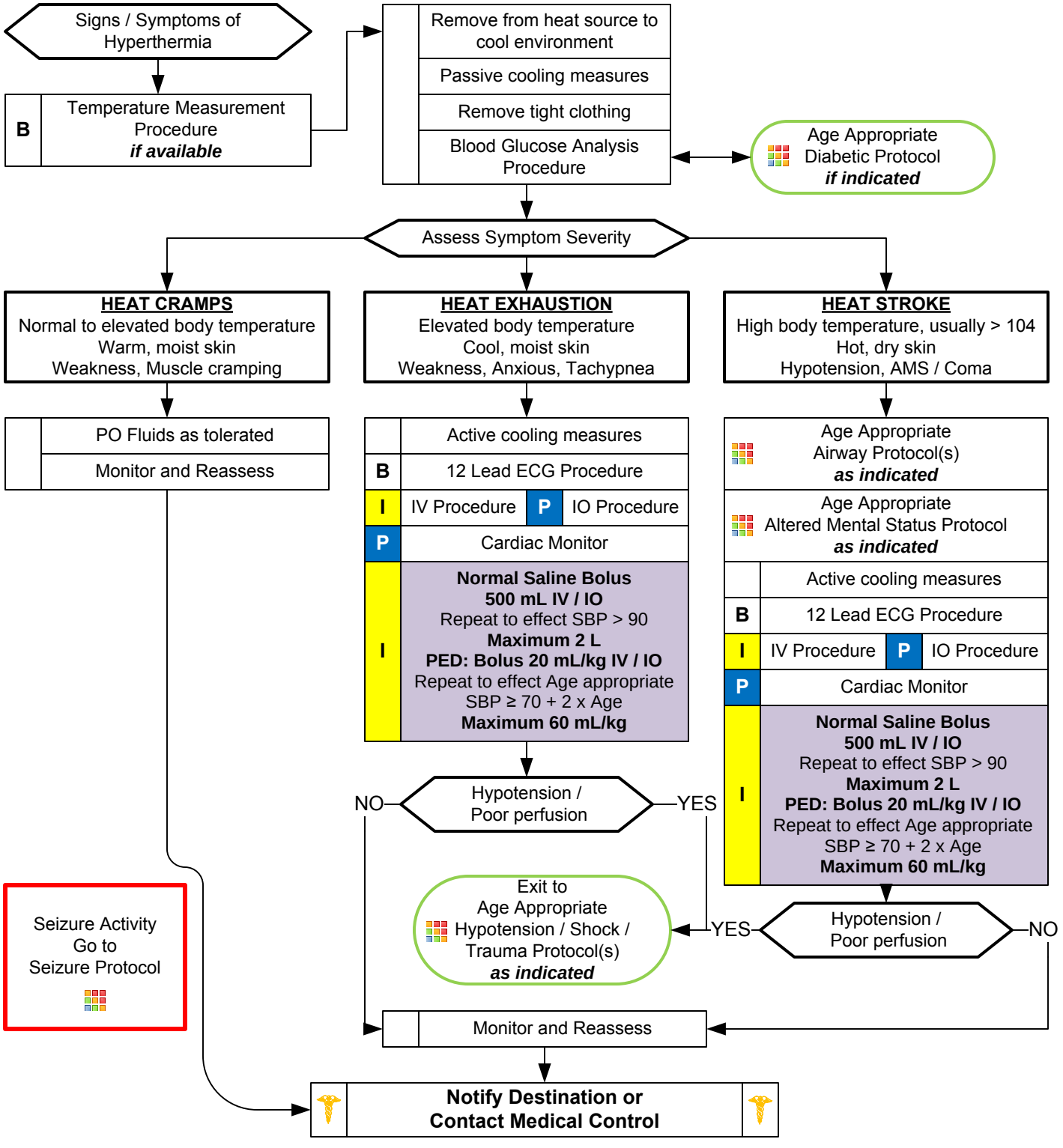
Pearls
- **Recommended Exam: Respiratory, Mental status, Trauma Survey, Skin, Neuro**
- **Drowning is the process of experiencing respiratory impairment (any respiratory symptom) from submersion / immersion in a liquid.**
- **Begin with BVM ventilations, if patient does not tolerate then apply appropriate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

Hyperthermia

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

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

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



Adult / Pediatric Environmental Section Protocols

Hyperthermia

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Pearls

- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Neuro**
- Extremes of age are more prone to heat emergencies (i.e. young and old). Obtain and document patient temperature if able.
- Predisposed by use of: tricyclic antidepressants, phenothiazines, anticholinergic medications, and alcohol.
- Cocaine, Amphetamines, and Salicylates may elevate body temperatures.
- 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, dizzyness, 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

Signs / Symptoms of Hypothermia and / or Frostbite

B Temperature Measurement Procedure ***if available***

Remove wet clothing
Dry / Warm Patient

Passive warming measures

Blood Glucose Analysis Procedure

Age Appropriate Diabetic Protocol ***if indicated***

Hypothermia / Frost Bite

Localized Cold Injury

- Monitor and Reassess
- General Wound Care
- DO NOT Rub Skin to warm
- DO NOT allow refreezing

Systemic Hypothermia

Awake with / without AMS

Respiratory Distress — YES → Age Appropriate Respiratory Distress Protocol(s)

- Age Appropriate Airway Protocol(s) ***as indicated***
- Age Appropriate Altered Mental Status Protocol ***as indicated***
- Active warming measures
- B 12 Lead ECG Procedure
- I IV Procedure / P IO Procedure
- P Cardiac Monitor
- I **Normal Saline Bolus**
  500 mL IV / IO
  Repeat to effect SBP > 90
  Maximum 2 L
  PED: Bolus 20 mL/kg IV / IO
  Repeat to effect Age appropriate SBP ≥ 70 + 2 x Age
  Maximum 60 mL/kg
- Age Appropriate Hypotension/ Shock or Multiple Trauma Protocol ***as indicated***
- Monitor and Reassess

Unresponsive

Pulse — YES → Age Appropriate Airway Protocol(s) ***as indicated***

Pulse — NO → Exit to Age Appropriate Cardiac / Pulseless Arrest and Arrhythmia Protocols ***See Pearls***

Notify Destination or Contact Medical Control

Adult / Pediatric Environmental Section Protocols

Hypothermia / Frostbite

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Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature ≥ 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) antiarrythmics may not work and if given should be given at reduced intervals. Contact medical control for direction. Epinephrine / Vasopressin can be administered. Below 86 degress 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

General Wound Care Procedure

I: IV Procedure *if indicated*

P: IO Procedure *if indicated*

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

Serious Injury / Hypotension — YES → Age Appropriate Hypotension / Shock Protocol, Trauma Protocol(s)

NO

Allergy / Anaphylaxis — YES → Age Appropriate Allergy Protocol

NO

Moderate / Severe Pain — YES → Age Appropriate Pain Protocol

Identification of Sea Creature

Jelly Fish, Anemone, Man-O-War
- Immobilize injury
- Lift away tentacles. Do Not brush or rub
- Apply Vinegar Rinse ***If available*** Otherwise wash with clean seawater. DO NOT use fresh water or ice
- Age Appropriate Pain Control Protocol ***if indicated***
- P: **Calcium Chloride (or Gluconate) 1 gm IV / IO. Peds: 20 mg/kg IV / IO** Over 3 minutes for severe muscle spasms

Sting Ray, Lion Fish, Urchin / Starfish
- Immobilize injury
- Remove Barb or Spine. If large Barb in thorax or abdomen stabilize object
- Immerse in Hot Water 110 – 114 Degrees ***if available***
- Age Appropriate Pain Control Protocol ***if indicated***
- P: **Calcium Chloride (or Gluconate) 1 gm IV / IO. Peds: 20 mg/kg IV / IO** Over 3 minutes for severe muscle spasms

Large Organism
- Immobilize injury
- Age Appropriate Multiple Trauma Protocol ***if indicated***
- Extremity Trauma Protocol ***if indicated***
- Age Appropriate Pain Control Protocol ***if indicated***

Notify Destination or Contact Medical Control

Adult / Pediatric Environmental Section Protocols

Marine Envenomations / Injury

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Pearls

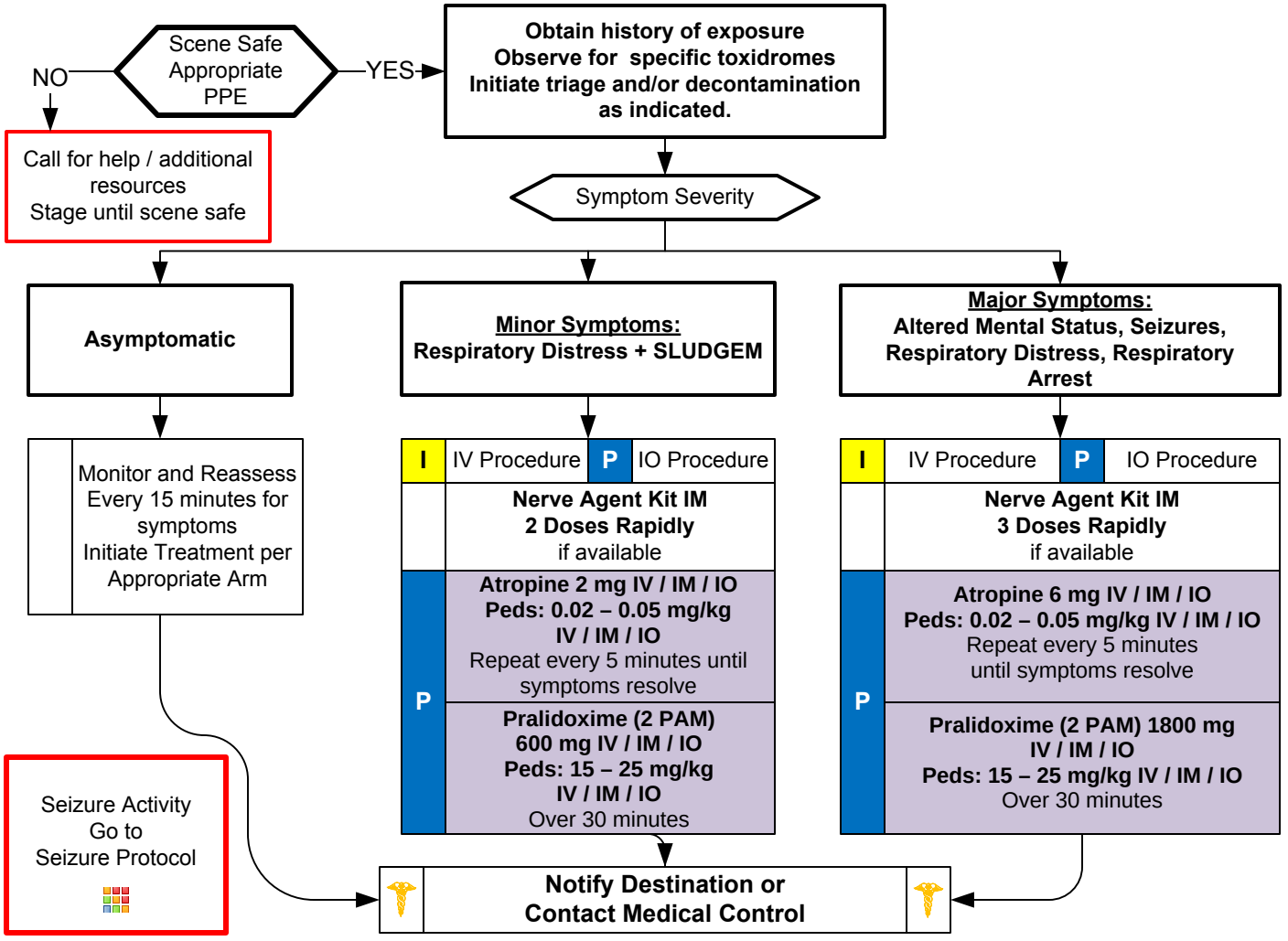
- Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.
- Patients can suffer cardiovascular collapse from both the venom and / or anaphylaxis even in seemingly minor envenomations.
- Sea creature stings and bites impart moderate to severe pain.
- Arrest the envenomation by inactivation of the venom as appropriate.
- Ensure good wound care, immobilization and pain control.

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.)



Adult / Pediatric Environmental Section Protocols

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

Accidental / Intentional Explosions (See Pearls)

Triage Protocol

Thermal / Chemical / Electrical Burn or Exposure — YES → Age Appropriate Thermal Burn / Chemical and Electrical Burn Protocol

Radiation Burn or Exposure — YES → Radiation Incident Protocol

Crush Injury — YES → Crush Syndrome Trauma Protocol

Adult / Pediatric Multiple Trauma Protocol ***if indicated***

Adult / Pediatric Airway Protocol(s) ***as indicated***

I: IV Procedure ***if indicated*** | P: IO Procedure ***if indicated***

P: Cardiac Monitor ***if indicated***

Blast Lung Injury — YES → Maintain Oxygen Saturation ≥ 94 %; Adult / Pediatric Airway Protocol(s) ***as indicated***

Adult / Pediatric Pain Control Protocol ***if indicated***

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

Notify Destination or Contact Medical Control

Adult / Pediatric Trauma and Burn Section Protocols

Blast Injury / Incident

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Pearls

- **Types of Blast Injury:**
  - Primary Blast Injury: From pressure wave.
  - Secondary Blast Injury: Impaled objects. Debris which becomes missiles / shrapnel.
  - Tertiary Blast Injury: Patient falling or being thrown / pinned by debris.
  - Most Common Cause of Death: Secondary Blast Injuries.
- **Triage of Blast Injury patients:**
  - Blast Injury Patients with Burn Injuries Must be Triaged 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 particalization 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 particalization 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/pack, 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.

Assess Burn / Concomitant Injury Severity

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

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

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

P — Cardiac Monitor ***if indicated***

Age Appropriate Cardiac Arrest / Pulseless Arrest / Age Appropriate Arrhythmia Protocol(s) ***as indicated***

Irrigate Involved Eye(s) with Normal Saline for 15 minutes
May repeat as needed

Eye Involvement

Flush Contact Area with Normal Saline for 15 minutes

Identify Contact Points

Exit to Age Appropriate Thermal Burn Protocol

Adult / Pediatric Trauma and Burn Section Protocols

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

Scene Safe

NO

Call for help / additional resources
Stage until scene safe

YES

Age Appropriate Airway Protocol(s) ***as indicated***

I — IV Procedure | P — IO Procedure

I — **Normal Saline Bolus**
1 L then 500 mL/hr IV / IO
Peds: 20 mL/kg IV / IO then 3 x maintenance fluid rate

B — 12 Lead ECG Procedure

P — Cardiac Monitor

Hypotension / Entrapped > 1 hour

I — **Normal Saline Bolus**
1 L IV / IO
Peds: 20 mL/kg IV / IO

Abnormal ECG / Hemodynamically unstable

YES — Peaked T Waves
QRS ≥ 0.12 seconds
QT ≥ 0.46 seconds
Loss of P wave

YES

P — **Sodium Bicarbonate**
50 mEq IV / IO
Peds: 1 mEq/kg IV / IO

P — **Calcium Chloride (or Gluconate)**
1 gm IV / IO
Peds: 20 mg/kg IV / IO
Over 3 minutes

NO

P — **Immediately Prior to Extrication**
Sodium Bicarbonate
50 mEq IV / IO
Peds: 1 mEq/kg IV / IO

YES — Asystole / PEA
VF / VT

YES

P — **Sodium Bicarbonate**
50 mEq IV / IO
Peds: 1 mEq/kg IV / IO

P — **Calcium Chloride (or Gluconate) 1 gm IV / IO**
Peds: 20 mg/kg IV / IO
Over 3 minutes

Exit to
Age Appropriate Cardiac Arrest / Pulseless Arrest / Arrhythmia Protocol(s) ***as indicated***

P — **Morphine 4 mg IV /IO Maximum 10 mg**
Peds: 0.1 mg/kg IV / IO Maximum 5 mg
Repeat **2 mg** q **5** minutes as needed
Or
Hydromorphone 1-2 mg IM / IV / IO
Repeat 1 mg every 20-30 minutes
Maximum 5 mg
Or
Fentanyl 50 - 75 mcg IV / IO / IN
Peds: 1 mcg/kg IV / IO / IN
Repeat 25 mcg (1 mcg/kg)
q 20 min as needed
Maximum 200 mcg

Midazolam
Adults: **- 0.5 – 2 mg IV / IO**
1 – 2 mg IN
Maximum 5 mg
Peds: **- 0.1 – 0.2 mg/kg IV / IO**
0.2 mg/kg IN
Maximum 2 mg
Slowly over 2 – 3 minutes
as needed

I — Monitor and Reassess
Monitor for fluid overload

Consider
Age Appropriate Multiple Trauma Protocol
Hypothermia / Hyperthermia Protocol(s)
as indicated

Notify Destination or Contact Medical Control

Adult / Pediatric Trauma and Burn Section Protocols

Crush Syndrome Trauma

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Pearls

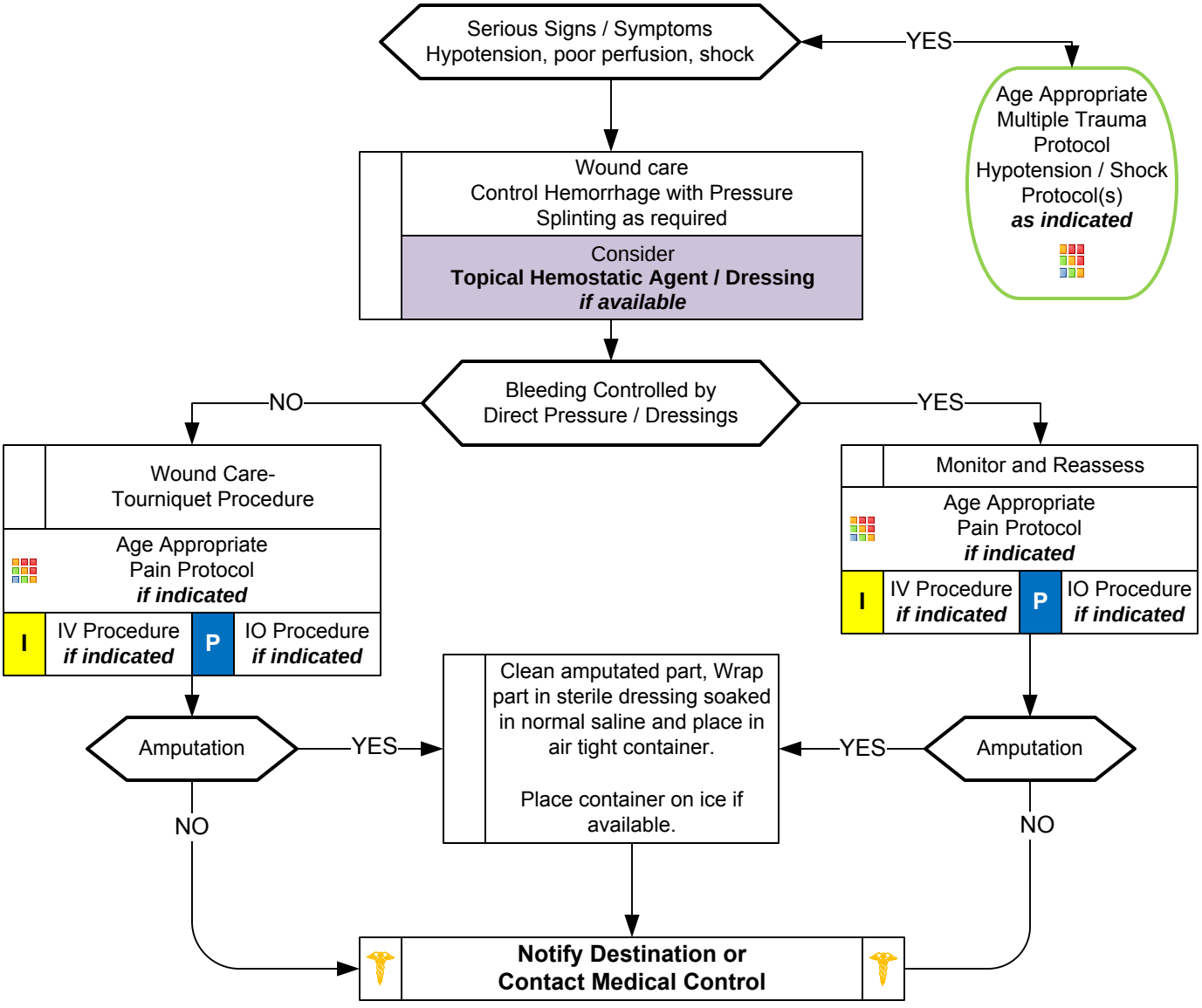
- **Recommended exam: Mental Status, Musculoskeletal, Neuro**
- **Scene safety is of paramount importance as typical scenes pose hazards to rescuers. Call for appropriate resources.**
- Avoid Ringers Lactate IV Solution due to potassium and potential worsening hyperkalemia
- Hyperkalemia from crush syndrome 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

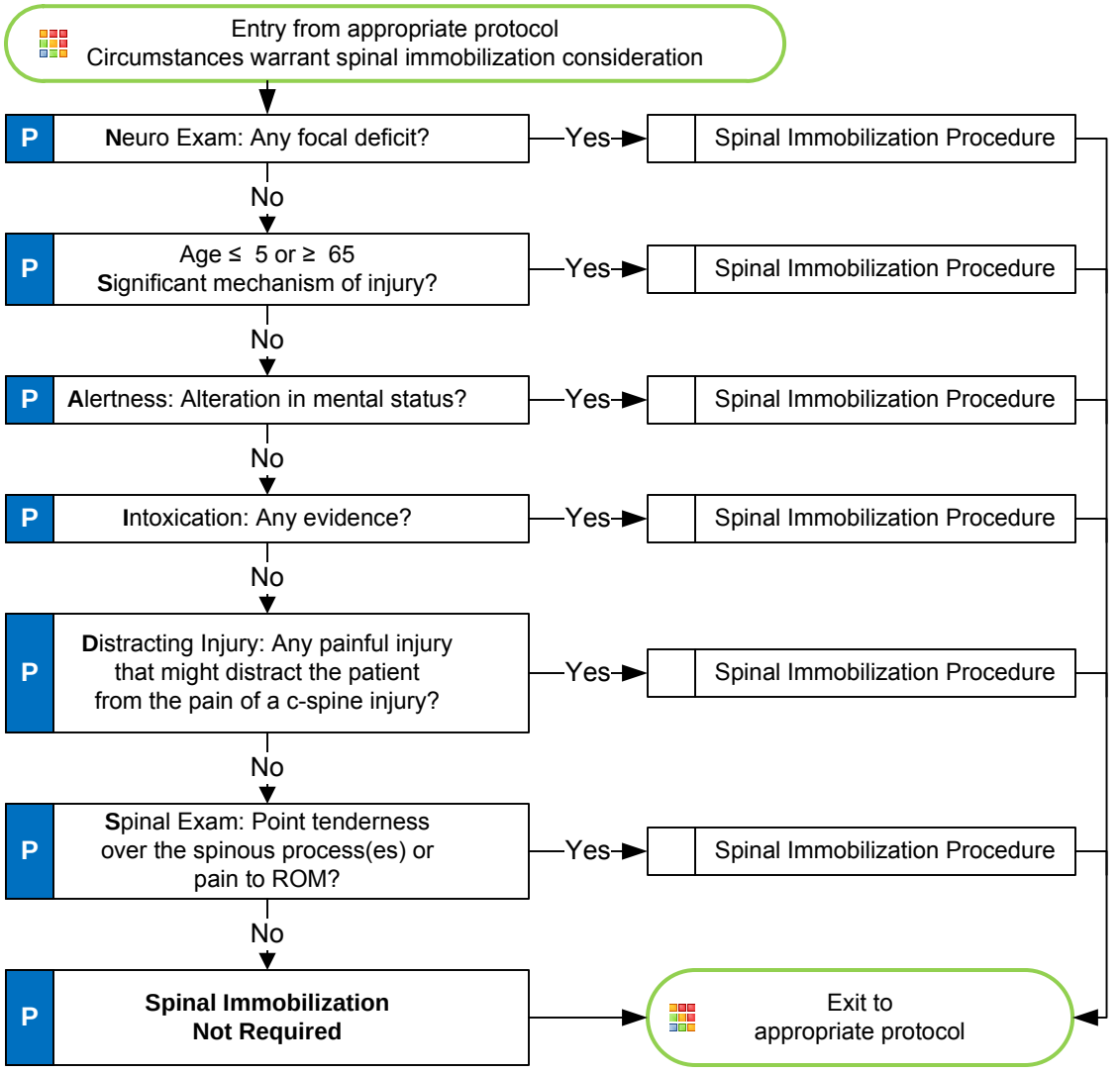
Differential
- Abrasion
- Contusion
- Laceration
- Sprain
- Dislocation
- Fracture
- Amputation



Adult / Pediatric Trauma and Burn Section Protocols

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)



Adult / Pediatric Trauma and Burn Section Protocols

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients meeting all the above criteria may be "cleared" from spinal immobilization. However, patients who fail one or more criteria above require spinal stabilization but do NOT always require use of the long spine board (see below.)**
- **Appropriate use of cervical collar and long spine board includes blunt trauma and AMS, spinal pain or tenderness, neurological signs / symptoms, spine deformity, high-energy mechanism of injury, drug / alcohol use, inability to communicate and / or distracting injury. Use mnemonic "NSAIDS." Fill all voids with padding during immobilization.**
- **Consider immobilization in patients with arthritis, cancer, dialysis, underlying spine (spinal surgery) or bone disease.**
- 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 (ROM) is tested by touching chin to chest (look down), extending neck (look up), and turning head from side to side (shoulder to shoulder) without spinal process pain. ROM should NOT be assessed if patient has midline spinal tenderness. Patient's range of motion should not be assisted. This is the responsibility of the EMT-Paramedic.
- **<u>Immobilization on a long spine board is not necessary where</u>:**
  - **Patient has normal LOC with no spine tenderness / deformity, no neurological signs / symptoms, no distracting injury and no intoxication with drugs and / or alcohol.**
  - **Penetrating trauma to the head, neck or torso with no signs / symptoms of spinal injury.**
- **<u>Immobilization May be maintained by cervical collar and securing to EMS stretcher ONLY where</u>:**
  - **Patients are found to be ambulatory at the scene.**
  - **Transport for a protracted time (> 45 minutes) or during an inter-facility transfer.**
  - **Patients where a long spine board is not otherwise indicated.**
- **When long spine board not utilized spinal precautions in at-risk patients is paramount. These include cervical collar, securing to stretcher, minimal movement / transfers and maintenance of in-line spine stabilization during any necessary movement / transfers. This includes the elderly or others with body or spine habitus preventing them from lying flat.**

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

Radiation Burn / Exposure

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)*

P Cardiac Monitor ***if indicated***

Age Appropriate Cardiac Arrest / Pulseless Arrest / Age Appropriate Arrhythmia Protocol(s) ***as indicated***

Eye Involvement

Irrigate Involved Eye(s) with Normal Saline for 15 minutes
May repeat as needed

Flush Contact Area with Normal Saline for 15 minutes

Exit to Age Appropriate Thermal Burn Protocol

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

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

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

Radiation Incident

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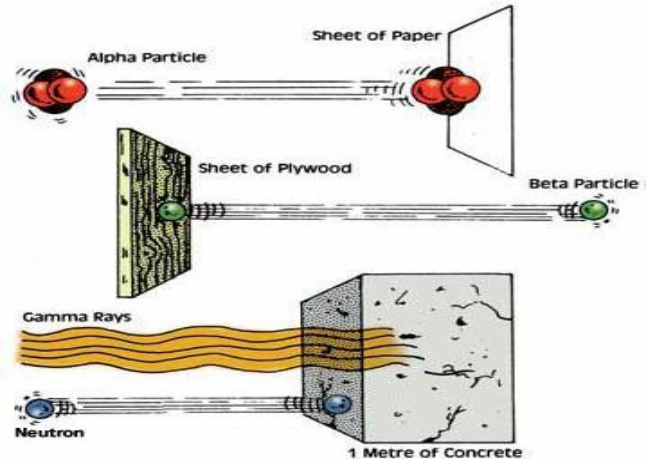


Time Phases of Radiation Injury
(Exposure Dose vs Clinical Outcome)

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

Abbreviations: Gy: dose in Grey;
0: no effects; +: mild; ++: moderate; +++: severe or marked

* Hypotension
** Also cardiovascular collapse, fever, shock

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

Pearls

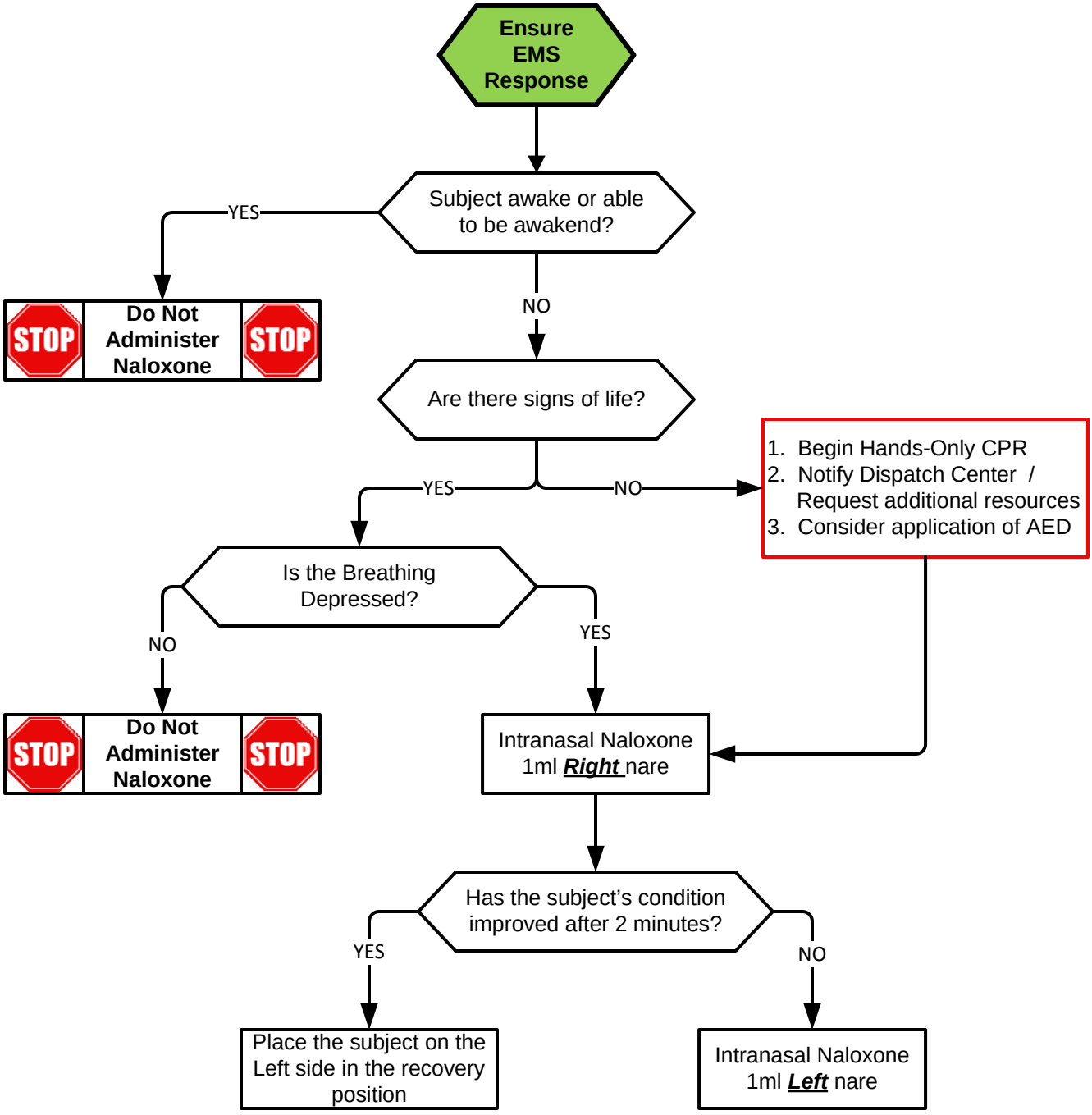
- Dealing with a patient with a radiation exposure can be a frightening experience. Do not ignore the ABC's, a dead but decontaminated patient is not a good outcome. Refer to the Decontamination Procedure for more information.
- Normal Saline or Sterile Water is preferred, however if not available, do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

Naloxone for Law Enforcement

History
- Ingestion or suspected ingestion of a narcotic
- Paraphernalia
- Known history of narcotic drug use or access to narcotics

Signs and Symptoms
- Mental status changes
- Unconsciousness
- Depressed breathing
- Pin Point Pupils
- Blue (Cyanosis) at the lips / fingers
- Pale Skin
- Track Marks

Differential
- Narcotic Overdose
- Mixed Overdose
- Alcohol Intoxication
- Trauma / Assault
- Obvious Death



Naloxone for Law Enforcement

Procedure for Intranasal Naloxone Administration:

1. Confirm the correct medication, expiration date, and dosage.
2. Naloxone is typically packaged in 2mg in 2ml volume.
3. Attach the MAD (Mucosal Atomizer Device) nasal atomizer.
4. Place the atomizer 1.5 cm into the patient's nostril.
5. Briskly compress the syringe to administer 1ml of the medication.
6. Remove and repeat into the other nostril, *if indicated*, until all of the medication has been administered.
7. Volumes greater than 1ml are too large and will lead to failure because the drug cannot be absorbed by the nasal mucosa quickly enough.
8. Monitor the subject for signs of improvement, such as increased respiratory effort improving level of consciousness, and purposeful movements.

Pearls

- Subjects may become combative after naloxone administration.
- Subjects may vomit after naloxone administration, be quick to move subject to left side if signs of improvement or vomiting
- Make sure patient is still not carrying other medications
- The nare can only absorb 1 ml of fluid.
- Factors that negatively affect mucosal absorption of medication may include recent use of vasoconstrictors, i.e. cocaine or afrin, nosebleeds, nasal congestion and/or discharge.

Suspected Sepsis

History
- Age ≥ 18
- Fever Duration & Severity
- Altered Mental Status
- Past Medical History
- Medications
- Immunocomprimised
  - Recent Surgery
  - HIV
  - Chronic Steriods
  - Cancer / Chemotherapy
- Environmental Exposure

Signs and Symptoms
- Hypo / Hyperthermia
- Weakness, dizziness
- Weak, rapid pulse
- Tachypnea
- Hypotension or Delayed cap refill
- Recent infection history:
  - Pneumonia
  - Urinary Tract Infection
  - Soft-Tissue Infection
  - Catheter / Implanted Device related infection
  - Endocarditis, Meningitis, Osetomyelitis

Differential
- Shock
  - Hypovolemic
  - Cardiogenic
  - Neurogenic
- Pulmonary Embolism
- Diabetic Ketoacidosis
- Myocardial Infarction
- Disseminated Intravascular Coagulation (DIC)
- Pregnancy
- Heat Emergency

Sepsis Alert Criteria

1. Infection either known or suspected

AND

2. Any two (2) of the following SIRS markers:
   - Temp. > 100.4° F (38° C) *or* < 96.8° F (36° C)
   - Heart Rate ≥ 90 beats / min
   - Resp. Rate ≥ 20 breaths / min

AND

3. Any one (1) sign of hypoperfusion:
   - Systolic BP < 90
   - MAP < 65
   - EtCO2 ≤ 25 mmHg
   - Serum Lactate > 4 mMol (*if available)*

Diabetic Protocol ***if indicated***

Cardiac / Arrhythmia Protocol ***if indicated***

	Airway Protocol(s) ***if indicated***		
	Blood Glucose Analysis Procedure		
B	12 Lead ECG Procedure		
B	Continuous Waveform Capnography		
I	IV Procedure	P	IO Procedure
P	Cardiac Monitor		

Sepsis Alert Criteria Met

Yes

	Early notification to receiving facility
I	*Consider* 2nd IV site
I	**NaCl Bolus 500 mL IV / IO** *Repeat x 1* *titrate to SBP ≥ 90mmHg*

SBP Improvement after 2nd NaCl bolus

No

P	**Dopamine 5 – 20 mcg/kg/min IV / IO** To effect SBP ≥ 90

Yes

No

I	**NaCl Bolus 250 mL IV / IO** *titrate to effect* *SBP ≥ 90mmHg* **Max 2 L**

Notify Destination or Contact Medical Control

Adult Medical Section Protocols

Suspected Sepsis

Dopamine Infusion: Dose 2-20 mcg / kg/ min
Pt weight (Kg) x Dose x .0375 = ___ gtts / min
example: 100 kg pt x 7 mcg/min x .0375 = 26.25 gtts / min

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Sepsis is a rapidly progressing, life threatening condition due to systemic infection. Sepsis must be recognized early and treated aggressively to prevent progression to shock and death.**
- **Have a higher index of suspicion in the elderly and the very young or with bed-confined or immobile patients**
- **Look for source of infection if unknown. Inquire about recent surgeries, gastrointestinal or bladder infections, abdominal discomfort, unusual body or joint pain**
- **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 normal vital signs initially and may develop insidiously. Tachycardia may be the only manifestation.**
- **As with any shock, ensure adequate oxygenation is provided. Advanced airway procedures may be needed to treat for hypoxia**
- Septic patients are profoundly dehydrated. Aggressive fluid resuscitation and early antibiotics are essential following early recognition. Monitor breath sounds.
- Prevent hypothermia, abnormally low body temperatures increase mortality in septic patients
- Vasopressors (Dopamine) should be considered after 1 liter of fluid with no improvement.