Davidson County Emergency Services

Patient Treatment

Protocols – Procedures – Policies

Effective Date 08/01/2025

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Special Circumstances Section SC (Black)

Introduction

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

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

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

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

Professional judgment hierarchy:

The pre-hospital provider may determine that no specific treatment is needed;
Or
The pre-hospital provider may follow the appropriate treatment protocols and then consult Medical Control;
Or
The pre-hospital provider may consult Medical Control before initiating any specific treatment.

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

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

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

Introduction

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Key to Protocol Utilization

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

Signs and Symptoms
- Important Signs and Symptoms specific to each protocol

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

Black Box

Hightlights Important Information

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

Red Box

Highlights Critical Information

May direct to another protocol

Signals protocol within a protocol

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

Information box

Decision Point
Darker outline to highlight

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

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

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

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

Universal Patient Care

Scene Safe

YES

NO

Call for help / additional resources
Stage until scene safe

Bring all necessary equipment to patient
Demonstrate professionalism and courtesy
Mass assembly consider WMD

Utilize appropriate PPE

Consider Airborne, Contact, 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
EtCO2 Monitoring

Medical or Trauma

Trauma Patient

Medical Patient

Evaluate MOI

Mental Status Exam

Significant MOI

No Significant MOI

Unresponsive

Responsive

Primary and Secondary trauma assessment

Primary and Secondary trauma assessment

Focused assessment on specific injury

Primary and secondary assessment

Obtain history of present illness from available sources / scene survey

Obtain Chief Complaint

Primary and Secondary assessment
Focused assessment on specific complaint

Spinal Motion Restriction Procedure / Protocol TB 8 ***as indicated***

Obtain VS

Obtain SAMPLE

Repeat assessment while preparing for transport

Exit to
Age Appropriate Protocol(s)
as indicated

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

Patient does not fit specific protocol

Notify Destination or Contact Medical Control

Universal Protocol Section

Universal Patient Care

Scene Safety Evaluation

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

General

All patient care must be appropriate to your level of training / certification and documented in the PCR.
After arriving on scene and upon making contact with the patient(s) 911 communications will be notified of patient contact to document time.

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

Adult Patient:

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

Geriatric Patient:

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

Special note on oxygen administration and utilization

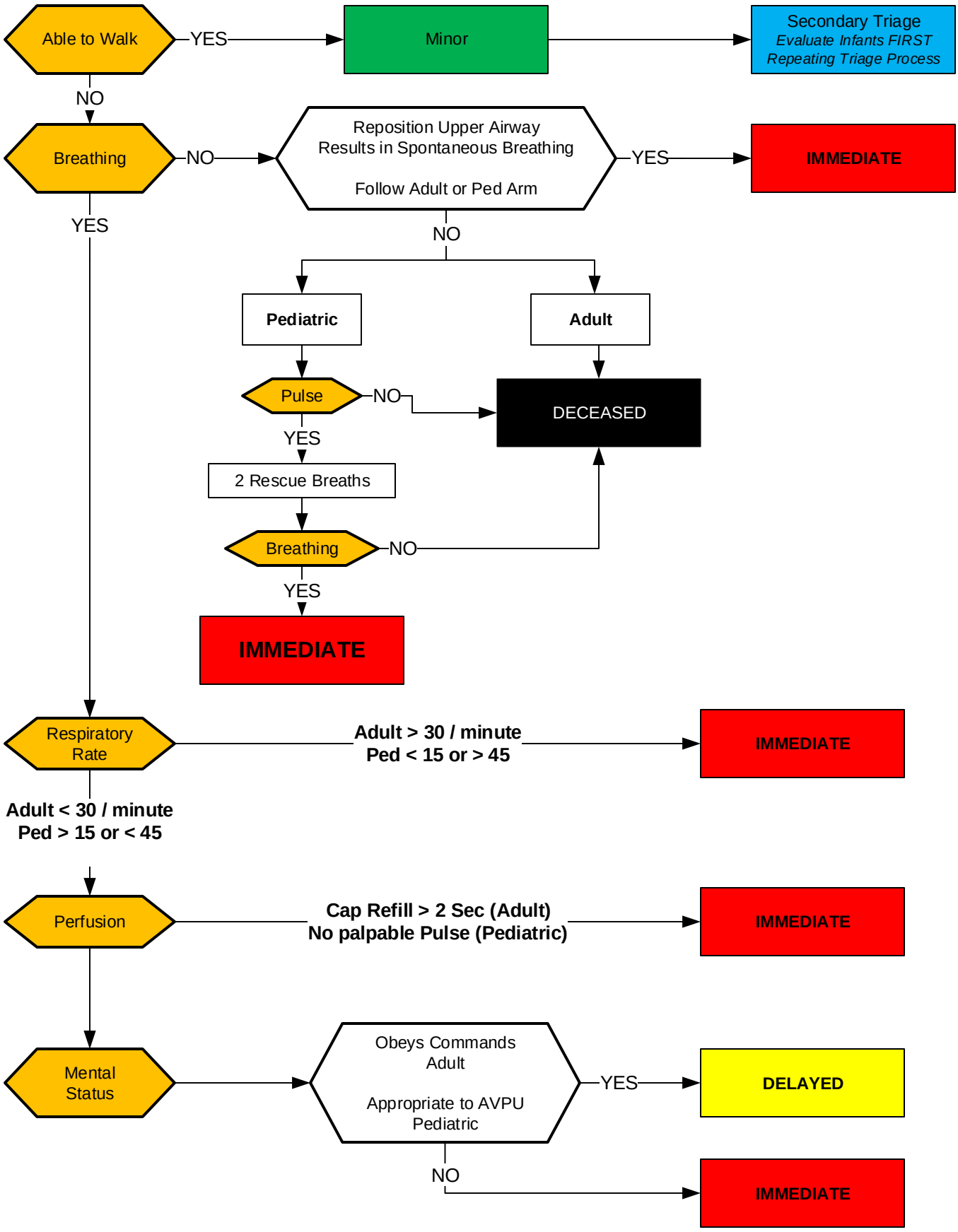
Oxygen is ubiquitous in pre-hospital patient care and probably over utilized. Oxygen is a drug with indications, contraindications as well as untoward side effects. Recent research demonstrates a link with increased mortality when oxygen is over-utilized (hyperoxia / hyperventilation) in cardiac arrest. Utilize oxygen when indicated and not because it is available. A reasonable target oxygen saturation in all treatment protocols is ≥ 94 % regardless of delivery device.

- **Pearls**
- **Recommended Exam: Minimal exam if not noted on the specific protocol is vital signs, mental status with GCS, and location of injury or complaint.**
- **Any patient contact which does not result in an EMS transport must have a completed disposition form.**
- **Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.**
- **2 complete vital sign acquisitions should occur at a minimum with a patient encounter.**
- **Patient Refusal**

  Patient refusal is a high risk situation. Encourage patient to accept transport to medical facility.
  Encourage patient to allow an assessment, including vital signs. Documentation of the event is very important including a mental status assessment describing the patient's capacity to refuse care.
  Guide to Assessing capacity:
  C:***Patient should be able to communicate a clear choice:*** This should remain stable over time. Inability to communicate a choice or an inability to express the choice consistently demonstrates incapacity.
  R: ***Relevant information is understood:*** Patient should be able to display a factual understanding of the illness, the options and risks and benefits.
  A: ***Appreciation of the situation:*** Ability to communicate an understanding of the facts of the situation. They should be able to recognize the significance of the outcome potentially from their decision.
  M: ***Manipulation of information in a rational manner:*** Demonstrate a rational process to come to a decision. Should be able to describe the logic they are using to come to the decision, though you may not agree with decision.
- **Pediatric Patient General Considerations:**

  A pediatric patient is defined by fitting a Length-based Resuscitation Tape, Age ≤ 15, weight ≤ 49 kg.
  Patients off the Broselow-Luten tape should have weight based medications until age ≥ 16 or weight ≥ 50 kg.
  Special needs children may require continued use of Pediatric based protocols regardless of age and weight.
  Initial assessment should utilize the Pediatric Assessment Triangle which encompasses Appearance, Work of Breathing and Circulation to skin.
  The order of assessment may require alteration dependent on the developmental state of the pediatric patient.
  Generally the child or infant should not be separated from the caregiver unless absolutely necessary during assessment and treatment.
- Timing of transport should be based on patient's clinical condition and the transport policy.
- Never hesitate to contact medical control for patient who refuses transport.
- Blood Pressure is defined as a Systolic / Diastolic reading. A palpated Systolic reading may be necessary at times.
- SAMPLE: Signs / Symptoms; Allergies; Medications; PMH; Last oral intake; Events leading to illness / injury

Triage



Universal Protocol Section

Triage

Triage is used to bring control to a seemingly overwhelmeing situation. Incidents which produce multiple casualties are rare but do occur and planning is paramount. A multiple casualty incident is defined as any incident where more casualties are present than initial response can reasonably handle. More response is needed for triage, treatment and transport than can arrive in a timely fashion.

Responders are also tasked with assuring / maintaining the scene safety as well as dealing with injury and illness. First arriving responders can become overwhelmed with patients presenting with a wide variety of injury and illness as well an those with no injury or illness.

This protocol incorporates pediatric patient multiple casualty triage tool. It provides an objective structure to help assure responders triage children with their heads and not their hearts which can lead to over triage and diversion of precious resources from other patients who may need them more. Under triage is addressed as well by recognizing key differences between adult and pediatric physiology. ***This should only be used with true multiple casualty incidents and disasters where resources for care are limited and should not be used for routine pre-hospital triage***.

Sorting / Triage:
Sort patients based on objective criteria in how they present. The severity of injury and therefore treatment / transport priority is color coded. Triage tags contain these colors so treatment and transport crews easily can see which patients have been triaged and to which level.
If your patient falls into the RED TAG category, stop, place RED TAG and move on to next patient. Attempt only to correct airway problems or treat uncontrolled bleeding before moving to next patient.

Pearls

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

Abdominal Pain
Vomiting and Diarrhea

History
- Age
- Time of last meal
- Last bowel movement/emesis
- Improvement or worsening with food or activity
- Duration of problem
- Other sick contacts
- Past medical history
- Past surgical history
- Medications
- Menstrual history (pregnancy)
- Travel history
- Bloody emesis / diarrhea

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

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

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

	Consider Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
A	IV Procedure
P	Cardiac Montior
	Age Appropriate Diabetic Protocol AM 2 / PM 2 ***if indicated***
	Pain Control Protocol UP 11 ***if indicated***
	Age Appropriate Cardiac Protocol(s) ***if indicated***

Serious Signs / Symptoms
Hypotension, poor perfusion, shock

YES

A	IV / IO Procedure Consider 2 Large Bore sites
	NS or LR 500 mL Bolus Repeat as needed Titrate SPB ≥ 90 mmHg **Maximum 2 L** **Peds: 20 mL/kg IV / IO** Repeat as needed Titrate to Age Appropriate SBP ≥ 70 + 2 x Age **Maximum 60 mL/kg**
P	**Ondansetron 4 mg** **IV / IO / ODT / IM** **Peds: 0.2 mg/kg PO / ODT** **Peds Maximum 4 mg** May repeat x 1 as needed Or **Droperidol 2.5mg IV** Do not repeat dose
	Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 ***if indicated***

NO

P	**Ondansetron 4 mg ODT / IM** **Peds: 0.2 mg/kg ODT** **Maximum 4 mg** May repeat x 1 as needed or **Promethazine** **12.5 mg IM** May repeat x 1 as needed

Monitor and Reassess

Notify Destination or Contact Medical Control

Universal Protocol Section

Abdominal Pain
Vomiting and Diarrhea

Universal Protocol Section

Abdominal pain is a common complaint encountered by EMS. Abdominal pain may arise from many organ systems including cardiac, pulmonary, endocrine, genitourinary and renal systems. Often 40 – 60 % of abdominal complaints have no diagnosis after extensive testing once in the emergency department so a diagnosis is very difficult in the pre-hospital setting.

Four patient populations which deserve special focus:

1. Elderly
   - May signal significant morbidity and mortality in patients > 50 years of age.
   - Disease significance may be out of proportion to exam findings and presentation.
   - Vascular problems are seen more often.
   - Consider cardiac etiology and obtain ECG if warranted.

2. Immunocompromised
   - HIV, Diabetes, Renal Failure, Transplant patients, Patients taking chronic steroids.

3. Women of childbearing age
   - Consider ectopic pregnancy until proven otherwise.

4. Pediatric
   - Blood Glucose Analysis as abdominal pain and N/V can be an initial sign of diabetes or DKA

Stable versus unstable patient:

Very important as the stable patient with undifferentiated abdominal pain may require only supportive care, anti-emetics and possibly pain medications. The unstable patient needs more directed therapy which is typically driven by presentation and vital signs.

Ondansetron and Droperidol can cause QT prolongation. Consider EKG in patients requiring multiple doses.

Pearls

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

Altered Mental Status

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

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

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

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

Signs of shock / Poor perfusion Traumatic Injury — YES → Exit to Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3, Multiple Trauma Protocol TB 6, Head Injury Protocol TB 5

NO

Signs of OD / Toxicology — YES → Exit to Overdose / Toxic Exposure Protocol TE 7

NO

Signs of CVA Or Seizure — YES → Exit to Suspected Stroke Protocol UP 14, Seizure Protocol UP 13

NO

Signs of Hypo / Hyperthermia — YES → Exit to Hypothermia Protocol TE 5, Hyperthermia Protocol TE 4

NO

Arrhythmia / STEMI / CP — YES → Exit to Age Appopriate Appropriate Cardiac Protocol(s)

NO

Fever / Sepsis — YES → Exit to Fever Protocol UP 10, Suspected Sepsis Protocol UP 15

NO → **Notify Destination or Contact Medical Control**

Universal Protocol Section

Altered Mental Status

Universal Protocol Section

General:
The patient with AMS poses one of the most significant challenges to you as a provider. A careful assessment of the patient, the scene and the circumstances should be undertaken. Assume the patient has a life threatening cause of their AMS until proven otherwise.

The algorithm is written in a step wise fashion but circumstances may dictate moving within the protocol. The stepwise fashion should serve as a reminder of the importance of a methodical approach to the patient with AMS. An example is the 12 lead ECG procedure and interpretation of the rhythm. As you work as a team one provider may be assessing the finger stick glucose while another provider interprets the ECG rhythm.

Spinal Motion Restriction / Trauma:
As noted only utilize spinal immobilization if the situation warrants. The patient with AMS may worsen in some instances when immobilized so only use when necessary.

In AMS with trauma evident you should move immediately to the Adult Head Trauma Protocol in conjunction with the Altered Mental Status Protocol.

Excited Delirium Syndrome:
Excited Delirium is a hyper-stimulated state usually induced by either a psychiatric condition or drug use (usually stimulants such as cocaine or meth). The surge of catecholamine (the body's natural equivalent of epinephrine and norepinephrine) can induce cardiac arrest and death. The treatment is Midazolam. Consider this diagnoses in a patient that is severely agitated. The longer the patient is restrained, the higher the risk of cardiac arrest. This is especially true if the patient has been restrained by police prior to your arrival on scene. The longer they fight, the higher the risk. Consider chemical restraint early.

Pearls

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

Back Pain

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

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

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

B Consider Cardiac Etiology 12 Lead ECG Procedure ***if indicated***

P Cardiac Monitor ***if indicated***

Age Appropriate Cardiac Protocol(s) ***if indicated***

Injury or Traumatic Mechanism — YES → Spinal Motion Restriction Procedure / Protocol TB 8 ***If indicated***

NO

Shock Hemodynamic Instability — YES →

Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 ***if indicated***

A **Normal Saline or Lactated Ringers**
Bolus 500 mL IV
Titrate to SBP ≥ 90
2 L Maximum
Peds: 20 mL/kg IV / IO
Titrate age appropriate
SBP ≥ 70 + 2 x Age
Maximum 60 mL/kg

Age Appropriate Hypotension / Shock Protocol(s) AM 5 / PM 3 ***if indicated***

Multiple Trauma Protocol TB 6 ***if indicated***

NO

Pain Control Protocol UP 11 ***if indicated***

Monitor and Reassess

Notify Destination or Contact Medical Control

Universal Protocol Section

Back Pain

Back pain is one of the most common complaints in medicine and effects more than 90 % of adults at some point in their life. Most often it is a benign process but in some circumstances can be life or limb threatening.

Associated symptoms:
Fever, chills and night sweats.
Symptoms outside the musculoskeletal system like urinary, gastrointestinal or pulmonary.
Progressive neurological symptoms described below.
Past medical history described below.
Abnormal vital signs.

Non-traumatic back pain:
Most important signs / symptoms or bowel and bladder function, sexual function, weakness, numbness especially saddle anesthesia (numbness in the inner thighs, buttocks and perineum – what would sit in a horse saddle) as this increases suspicion of cauda equina syndrome.

Traumatic back pain:
Red flags for spinal fracture:
Major trauma
Minor trauma / strenuous lifting in older adults (> 50) or those with known osteoporosis or other bone diseases or diseases like renal failure which affects bone metabolism.

Back pain in patients with known malignancy:
Should always be evaluated by physician.

Universal Protocol Section

Pearls

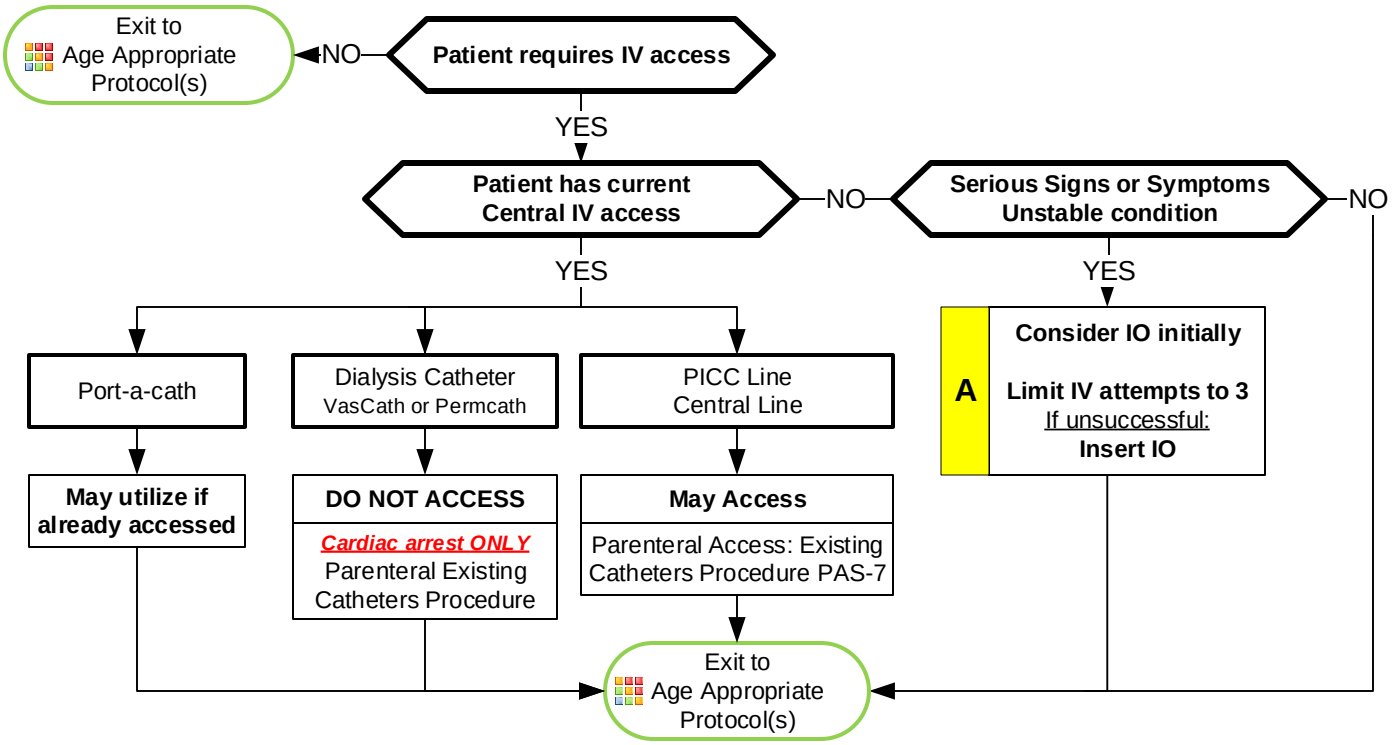
- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Neuro, Lower extremity perfusion**
- **Back pain is one of the most common complaints in medicine and effects more than 90 % of adults at some point in their life. Back pain is also common in the pediatric population. Most often it is a benign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

IV or IO Access

History
- Chronic medical conditions requiring recurrent need for IV access for medication, hydration, or blood sampling.
- Medical condition requiring administration of IV medications at home.
- End-stage renal disease requiring hemodialysis.
- Chronic medical condition requiring IV nutrition.

Signs and Symptoms
- Fever
- Bleeding
- Hypotension
- Redness, swelling, and/or pain at IV catheter site
- Shortness of breath
- Chest pain
- IV catheter patency

Differential
- Infection or sepsis
- Infection of catheter
- Clotted IV catheter
- Air embolism
- Pneumothorax
- Overdose of home medication
- Shock



Universal Protocol Section

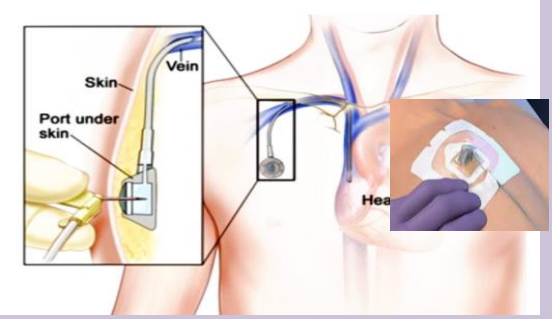
Pearls
- **Frequent encounter of patients with IV access devices and confusion as to which device can be accessed and used by EMS providers.**
- **If unclear about device use, always ask "Is this device used for dialysis?"**
- **When accessing central catheter, always ensure sterility of catheter connection point by cleaning port with alcohol, or similar disinfectant, 2 – 3 times prior to access.**
- **Central line catheters placed for administration of chemotherapy, medications, electrolytes, antibiotics, and blood are available to EMS providers for access and administration of fluids, medications, antibiotics, and blood products.**
- **Central line catheters placed for hemodialysis are NOT available for access by EMS providers unless the patient is in cardiac arrest.**
- Long term IV access is frequently needed for a variety of indications:
  - Medication administration such as antibiotics, pain relief, or chemotherapy
  - Administration of IV nutrition or feeding
  - Need for multiple IV line access or recurrent blood sampling
  - Poor vasculature requiring repeated attempts at IV access
  - End-stage renal disease requiring hemodialysis
- Common complications of central access devices:
  - Infection
  - Damage to vasculature
  - Air embolism
  - Loss of patency due to clogging or clotting
  - Pneumothorax

IV or IO Access

Types of IV catheters:

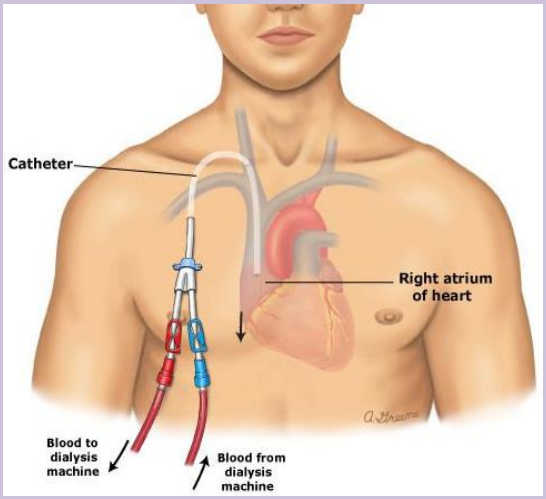
Port-a-Cath® :

Surgically implanted device allowing easy access to venous system.
The port and the catheter are all placed beneath the skin.
Requires a special kit and a specific needle to access.
Paramedic does NOT routinely access this device.
Paramedic may utilize if already accessed with needle/extension.
Paramedic may access if trained on procedure with access to proper equipment.



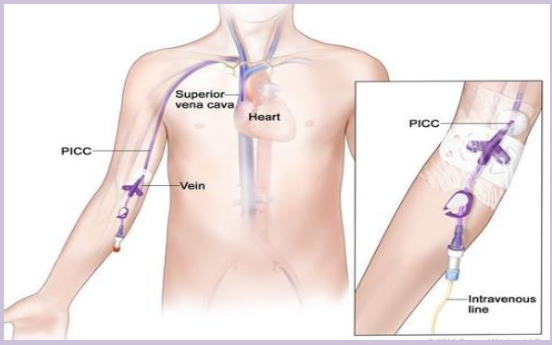
Dialysis Catheter:

Surgically implanted device used to access the vasculature for hemodialysis.
May be tunneled under the skin with access on outside of skin surface or may be non-tunneled with greater portion of catheter on outside of skin surface.
Catheter has a RED port indicating use for dialysis:
Most catheters have a RED port and a BLUE port.
Some catheters have a RED port and a WHITE port.
Dialysis catheters may be used for both short and long-term dialysis and should not accessed or used for delivery of fluids, medications, antibiotics, or blood products as it increases risk of infection, which then requires removal and subsequent loss of dialysis access.
Paramedic and AEMT do NOT routinely access this device.
Paramedic and AEMT MAY access during cardiac arrest only (Only if IV or IO access cannot be established.)



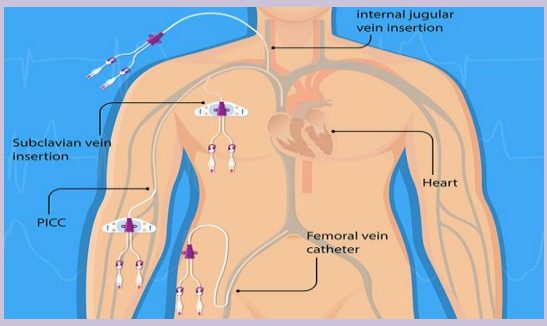
PICC (Peripherally Inserted Central Catheters):

Long catheter inserted into a vein in arm or leg (less common) with the tip of the catheter positioned into the central circulation.
Used for long-term IV fluids, medication administration, blood administration or blood draws.
May have 1 or 2 ports (possibly more, but less common.)
Port ends usually white, blue, or purple. (May be red, less common and is not used for dialysis.)
Paramedic and AEMT may access and utilize following clean technique.



Central Lines:

Catheter placed in large vein in the neck, under the clavicle, or in the groin.
Used for long-term IV fluids, medication administration, blood administration or blood draws.
May have 1 - 4 ports (possibly more, but less common.)
Port ends usually white, blue, or purple. (May be red, less common and is not used for dialysis.)
Paramedic and AEMT may access and utilize following clean technique.



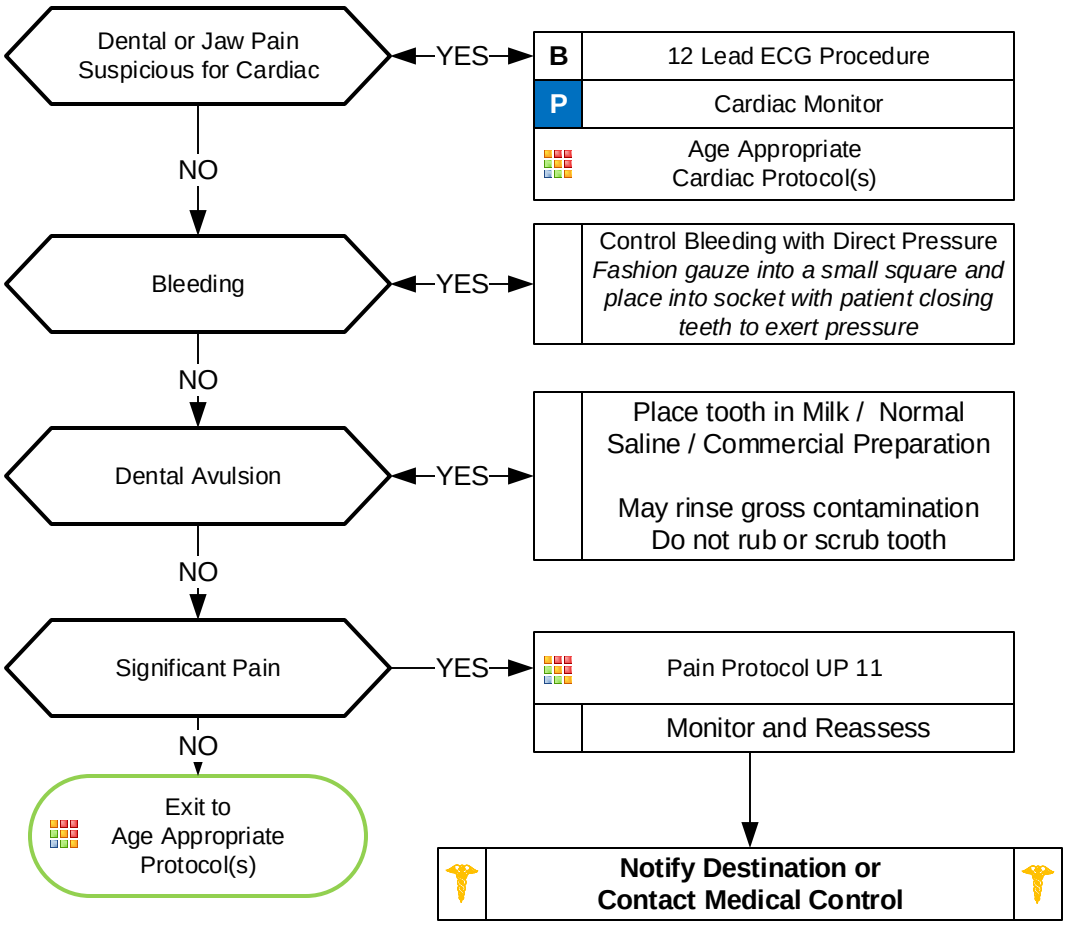
Universal Protocol Section

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



Universal Protocol Section

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

Emergencies Involving Indwelling Central Lines

History

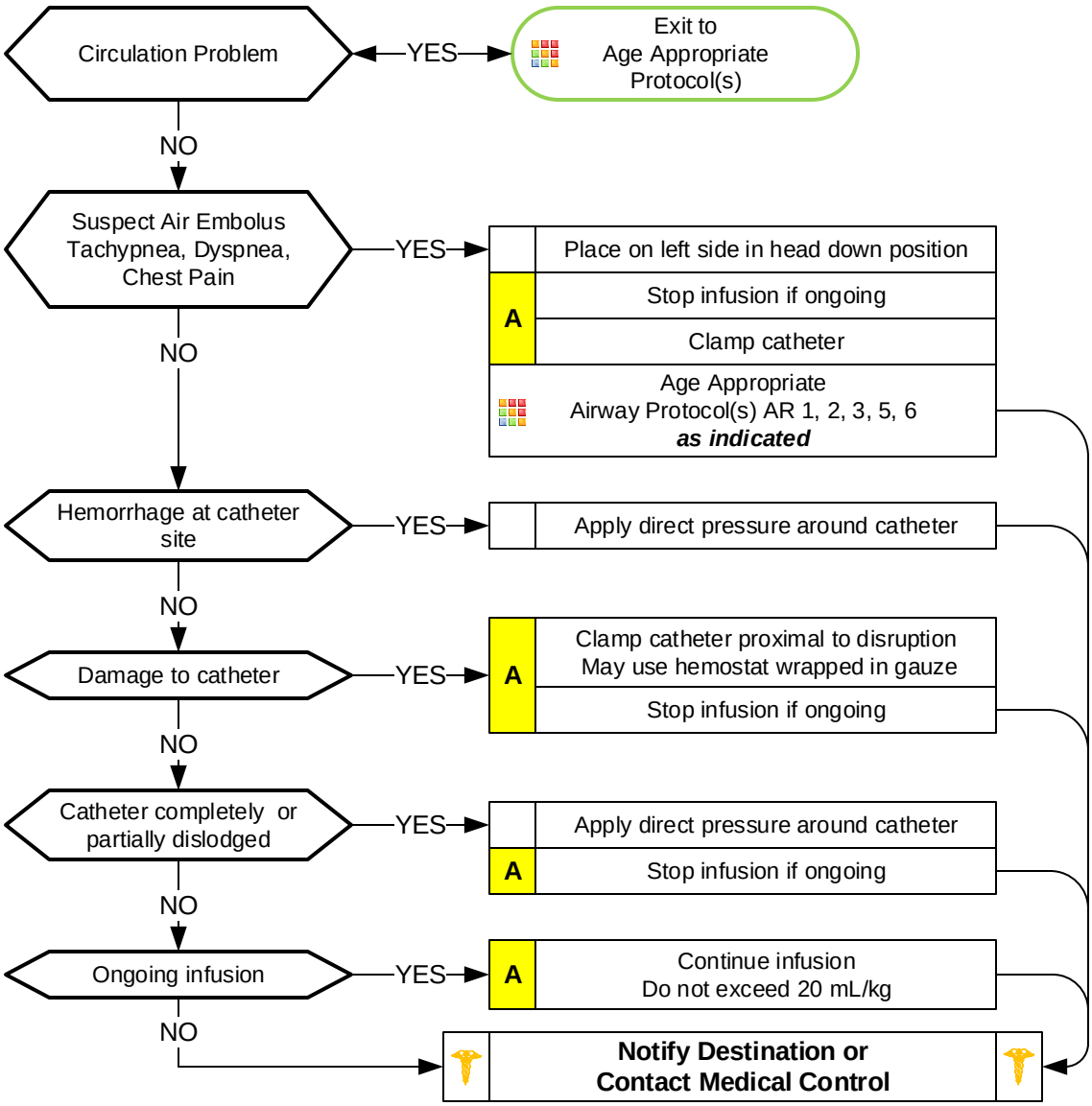
- Central Venous Catheter Type
  - Tunneled Catheter (Broviac / Hickman)
  - PICC (peripherally inserted central catheter
  - Implanted catheter (Mediport / Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

Signs and Symptoms

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

Differential

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



Universal Protocol Section

Pearls

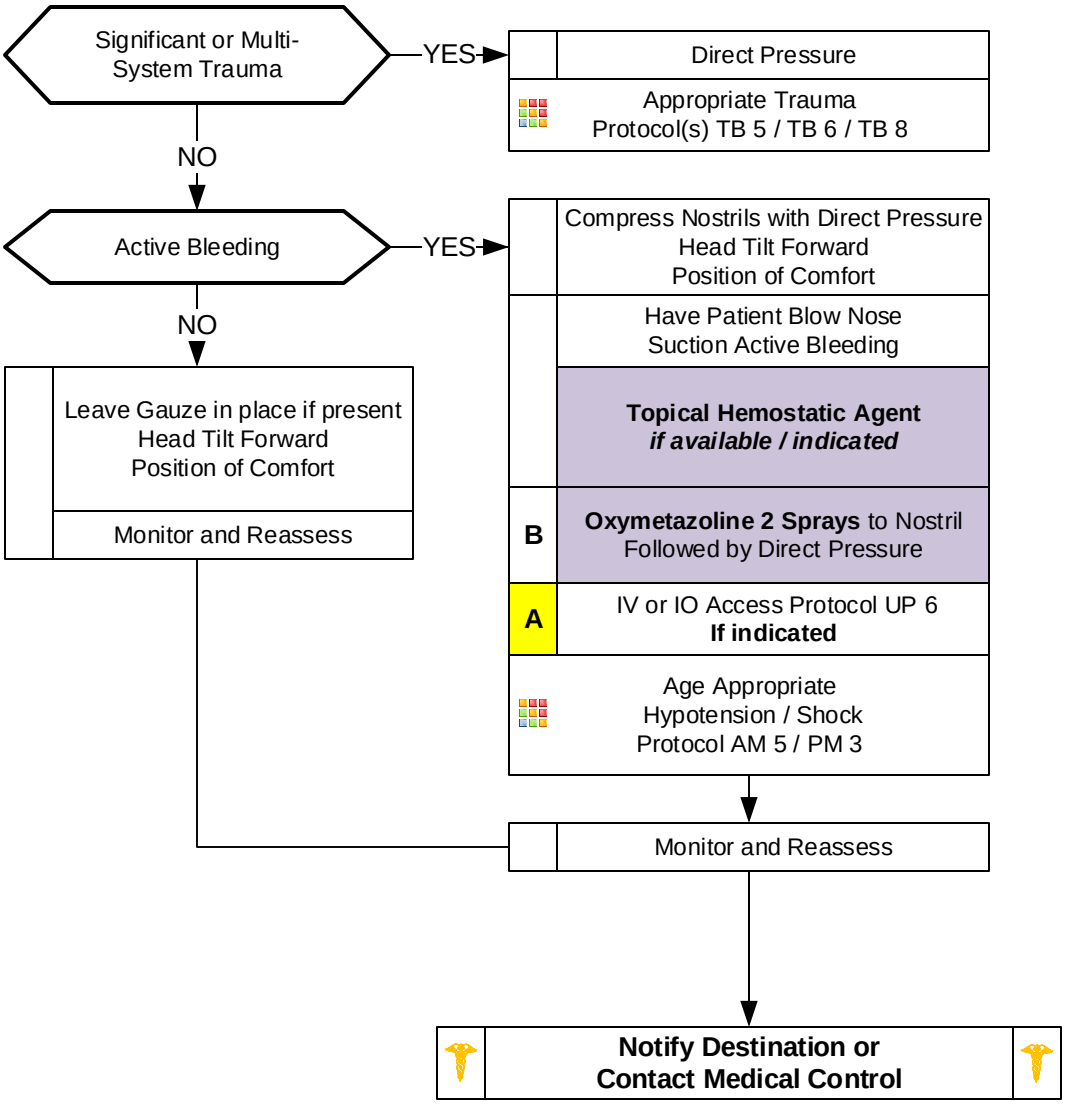
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **Use strict sterile technique when accessing / manipulating an indwelling catheter.**
- **Cardiac arrest: May access central catheter and utilize if functioning properly.**
- Do not attempt to force catheter open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

Epistaxis

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

Signs and Symptoms
- Bleeding from nasal passage
- Pain
- Nausea
- Vomiting

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



Universal Protocol Section

Pearls
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Age specific hypotension: 0 – 28 days < 60 mmHg, 1 month – 1 year < 70 mmHg, 1 year – 10 years < 70 + (2 x age)mmHg, 11 years and greater < 90 mmHg.**
- It is very difficult to quantify the amount of blood loss with epistaxis.
- Bleeding may also be occurring posteriorly. Evaluate for posterior blood loss by examining the posterior pharnyx.
- Anticoagulants include warfarin (Coumadin), Apixaban (Elequis), 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

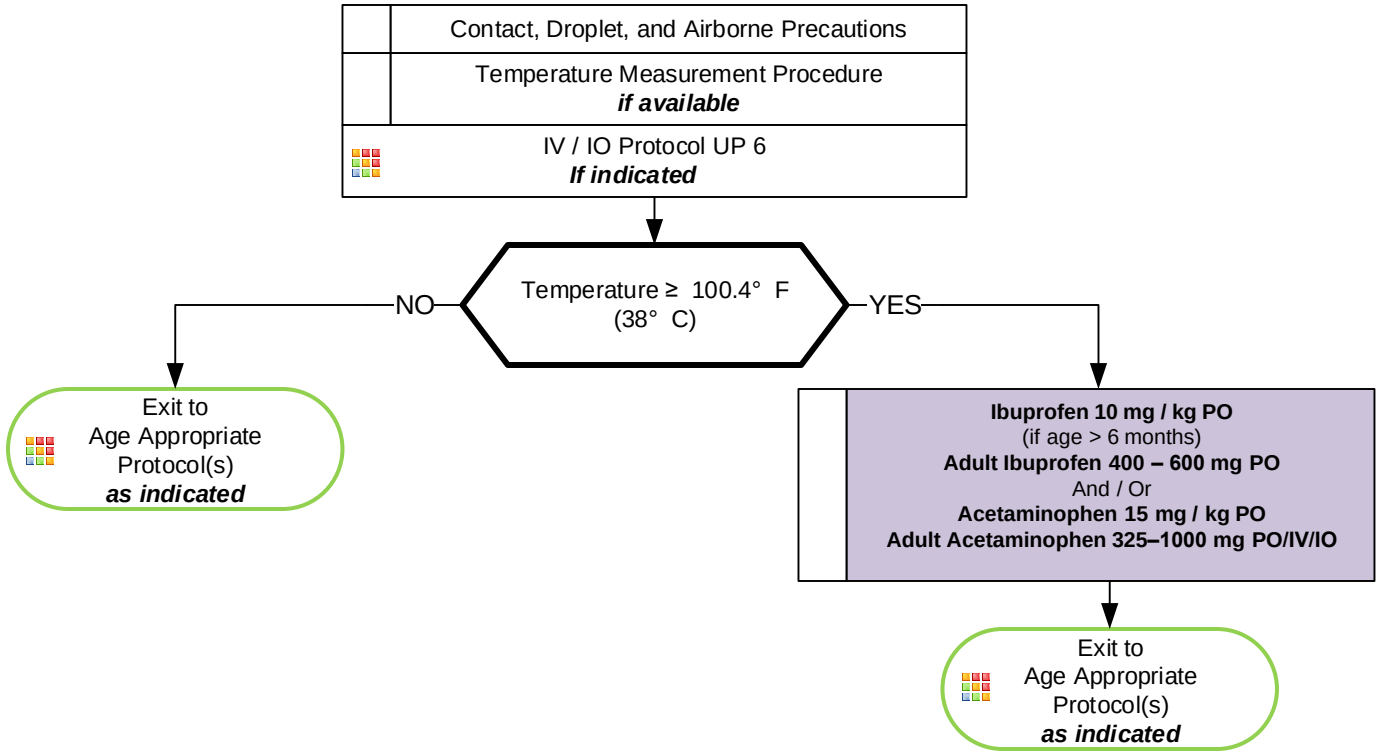
History
- Age
- Duration of fever
- Severity of fever
- Past medical history
- Medications
- Immunocompromised (transplant, HIV, diabetes, cancer)
- Environmental exposure
- Last acetaminophen or ibuprofen

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

Universal Protocol Section



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.
- **Droplet precautions:**
  - Include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient.
  - This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected.
  - A patient with a potentially infectious rash should be treated with droplet precautions.
- **Airborne precautions:**
  - Include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions.
  - This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions:**
  - Include standard PPE plus airborne precautions plus contact precautions.
  - This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- All patients should have drug allergies documented prior to administering pain medications.
- Allergies to NSAIDs (non-steroidal anti-inflammatory medications) are a contraindication to Ibuprofen. Do not give to patients who have renal disease or renal transplant.
- NSAIDs should not be used in the setting of environmental heat emergencies.
- **Do not** give aspirin to a child, age ≤ 15 years.

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)

Specific Complaint Protocol

Assess Pain Severity

Combination of Pain Scale, MOI, circumstances, Injury or Illness severity

Mild

B

Ibuprofen 400 mg PO
Peds: 10 mg/kg PO

Or

Acetaminophen: 650 mg PO
Peds: 15 mg/kg

Or

Aspirin 324 mg PO
(≥ 16 only)

If no improvement
Consider IV or IO Access Protocol UP 6
if indicated

Moderate to Severe

IV or IO Access Protocol UP 6

A

Ketorolac 15 mg IV / IO/ IM
Peds: 0.5 mg/kg IV / IO / IM
Maximum 30 mg

Acetaminophen: 1000 mg IV Adult

Cardiac Monitor

P

Fentanyl 50 IV / IO / IM / IN
Repeat every 5 minutes
Maximum 300 mcg
Peds: 1 mcg/kg IV / IO / IM / IN
May repeat 0.5 mcg/kg every 5 minutes
Maximum 2 mcg/kg
Or
Morphine 4 mg IV / IO / IM
Repeat **2 mg** every 5 minutes as needed
Maximum 10 mg
Peds: 0.1 mg/kg IV / IO / IM
May repeat every 5 minutes
Maximum 0.3 mg/kg

Monitor and Reassess
Every 10 minutes following sedative

Notify Destination or Contact Medical Control

Universal Protocol Section

Pain Control

The treatment of pain is a key aspect in emergency medical care:

1. Pain is the most common complaint EMS encounters. 50 – 75 % of all patients are experiencing pain.
2. An essential mission of EMS providers is the relief of pain.
3. We are often judged in how effective we are in relieving pain.
4. Often procedures we perform cause pain.
5. Unrelieved pain is associated with many untoward effects.
    a. Increased sympathetic response.
    b. Increase in peripheral vascular resistance.
    c. Increase in myocardial oxygen consumption.
    d. Increase in carbon dioxide production.
    e. Increase in clotting potentials.
    f. Decrease in gastric motility.
    g. Decrease in immune function.
6. It is important to measure, document and treat pain.
7. Poorly treated acute pain can lead to a patient experiencing chronic pain as a response.

Measurement of pain:

Use the verbal pain scale of 0 – 10. Explain to the patient how the system works, zero is no pain and 10 is the worst pain you can imagine. An example may be hitting your hand with a sledgehammer. If the patient uses a number like 11 or 20 then the patient does not understand the scale and / or you have not explained the score clearly. The worst pain you can imagine is 10, 20 does not exist.

If a person cannot speak, but hears and understands or reads lips then you can draw the pain scale on paper from 0 – 10 and ask the patient to point to their pain number. Unfortunately, the only device we have to truly measure pain is the patient and this totally relies on their perception. While you can use demeanor, facial expression and other body language to help assess the degree of pain they are not reliable alone.

Approach to pain management:

1. We have several classes of pain relievers. Initial attempts at pain relief can begin with ibuprofen or acetaminophen as long as the patient may take liquids / medications by mouth. Patients where surgery is anticipated should remain NPO.
2. Opioids: Morphine is well known and commonly used. It is well known to cause histamine release which can cause itching but more importantly hypotension. In patients where hypotension is a concern Fentanyl is a better choice.
3. Use caution when giving pain medication IM or IN as the onset of action is longer and dose stacking is a concern.
4. Dosing of fentanyl and morphine can always be lower than the protocol dose. Age, weight, blood pressure, respiratory status, etc., may factor into giving a lower dose.
5. Vital signs and pain scale will be documented before and after each dose administered.

Pearls

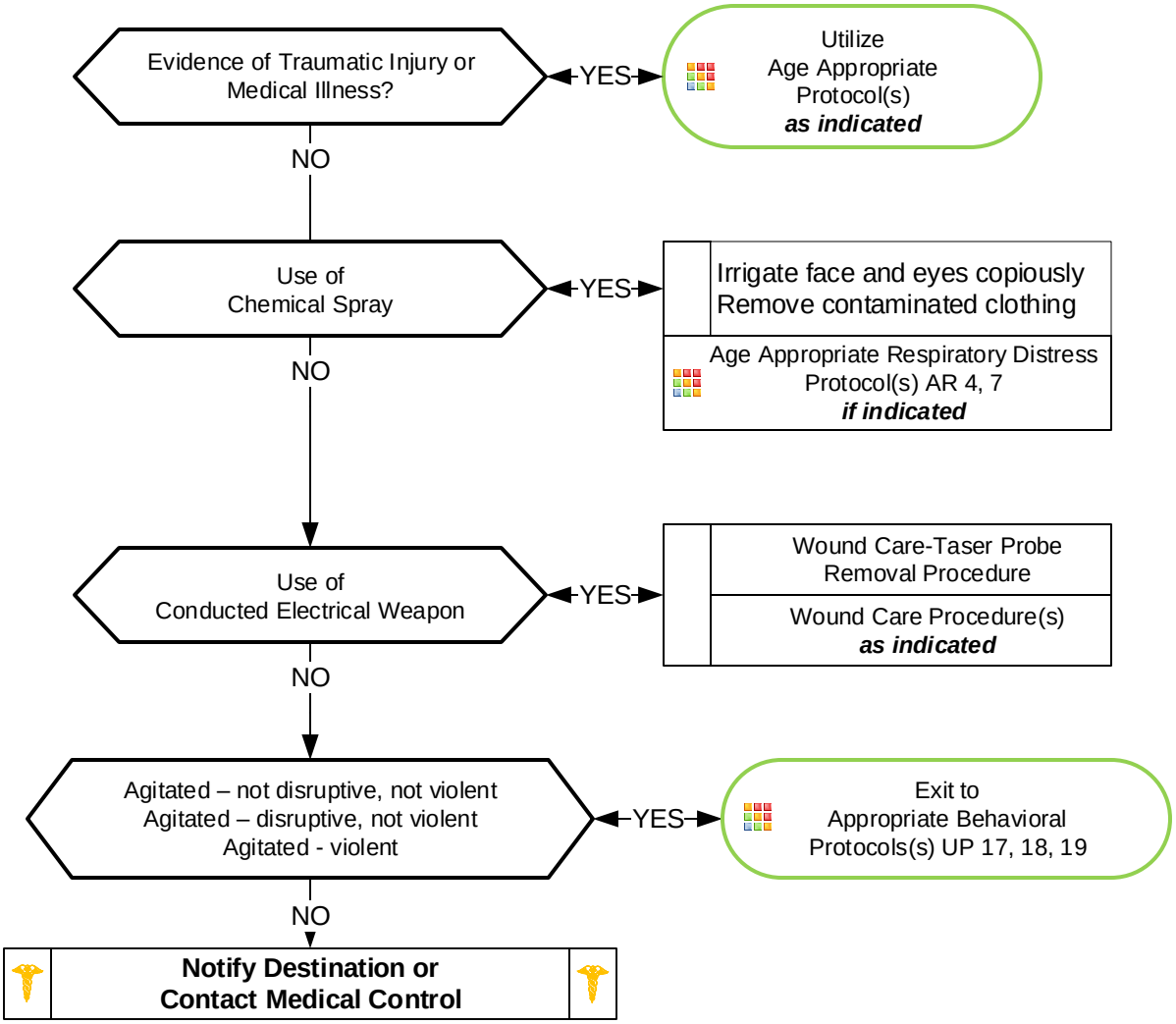
- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded before and after PO, IV, IO or IM medication delivery and at patient hand off. Monitor BP closely as sedative and pain control agents may cause hypotension.**
- **Ketamine:**
  Ketamine may be used in patients who are outside a Pediatric Medication/Skill Resuscitation System product.
  Ketamine may be used in patients who fit within a Pediatric Medication/Skill Resuscitation System product only with DIRECT ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR or ASSISTANT MEDICAL DIRECTOR.
- **Ketamine: appropriate indications for pain control:**
  Patients who have developed opioid-tolerance. Sickle cell crisis patients with opioid-tolerance.
  Patients who have obstructive sleep apnea.
  May use in combination with opioids to limit total amount of opioid administration.
- **Ketamine: caution when using for pain control:**
  Slow infusion or IV push over 10 minutes is associated with less side effects. Do not administer by rapid IV push.
  Avoid in patients who have cardiac disease or uncontrolled hypertension.
  Avoid in patients with increased intraocular pressure such as glaucoma.
  Avoid use in combination with benzodiazepines due to decreased respiratory effort.
- **Both arms of the treatment may be used in concert. For patients in Moderate pain for instance, you may use the combination of an oral medication and parenteral if no contraindications are present.**
- **Pediatrics:**
  For children use Wong-Baker faces scale or the FLACC score (see Assessment Pain Procedure)
  Use Numeric (> 9 yrs), Wong-Baker faces (4-16yrs) or FLACC scale (0-7 yrs) as needed to assess pain
- **Vital signs should be obtained before, 10 minutes after, and at patient hand off with all pain medications.**
- All patients who receive IM or IV medications must be observed 15 minutes for drug reaction in the event no transport occurs.
- Do not administer **Acetaminophen** to patients with a history of liver disease.
- Burn patients may required higher than usual opioid doses to titrate adequate pain control.
- Consider agency-specific anti-emetic(s) for nausea and/or vomiting.

Police Custody

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

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

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



Universal Protocol Section

Police Custody

Transport Decisions

Any patient in custody is under the authority of a law enforcement agency. A law enforcement agent or duly sworn representative must accompany the patient at all times. Following in another vehicle is not sufficient.

If a patient's condition warrants medial care, the attending paramedic shall inform the proper law enforcement officer of the appropriate treatment and transportation.

If medical care or transport by EMS for the patient in custody or prison confinement is denied by authorized personnel, EMS personnel will advise the staff that they will assume full responsibility for the patient. EMS personnel are required to document the full event in the PCR including the names of the law enforcement officers, agency he/she represents and obtain their signature on the appropriate forms.

(Per Davidson County Emergency Services GOG, Section 13. Patients in Custody or in Prison Confinement)

Patients transported with restraint devices placed by law enforcement (i.e. cuffs) should be restrained in such a way as to allow access for medical care at all times. Wrist restraints should not be placed with the patient's arms behind their back.

Pearls

- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neurologic status**
- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **EMS agency should formulate a policy with local law enforcement agencies concerning patients requiring EMS and Law Enforcement involvement simultaneously.**
- **Agencies should work together to formulate a disposition in the best interest of the patient.**
- **Law Enforcement:**
  - **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS, must be accompanied by law enforcement during transport capable of removing the devices.**
  - **Patient should not be transported with upper extremities hand-cuffed behind back as this prevents proper assessment and could lead to injury.**
  - **Consider multidisciplinary coordination with law enforcement to approach verbal de-escalation, restraint, and/or take-down restraint procedure.**
- **Maintain high-index of suspicion for underlying medical or traumatic disorder causing or contributing to behavioral disturbance. Medical causes more likely in ages < 12 or > 40.**
- **Medications are not to be used solely to aid in placing an individual into police custody. Physical and/or chemical restraints are reserved for a medical emergency in order to prevent imminent injury to a patient and/or providers.**
- **Restraints:**
  - **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
  - **Do not position or transport any restrained patient is such a way that could impact the patients respiratory or circulatory status.**
  - **However, when EMS providers have utilized physical restraints in accordance with Restraint Procedure USP 5, 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.
- Patients exposed to chemical spray, with or without history of respiratory disease, may develop respiratory complaints up to 20 minutes post exposure.
- All patients with decision-making capacity in police custody retain the right to participate in decision making regarding their care and may request care or refuse care of EMS.
- If extremity / chemical / law enforcement restraints are applied, follow Restraint Procedure.
- **Excited Delirium Syndrome and Violent:**
  - 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.
  - 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 or substance withdrawal as well as head trauma may also contribute to the condition.
  - **If patient suspected of EDS suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early.**

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

Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 ***as indicated***

Altered Mental Status Protocol UP 4 ***if indicated***

Childbirth/ Labor Protocol AO 1
Obstetrical Emergency Protocol AO 3 ***if indicated***

Behavioral Protocol UP 17, 18, 19 ***if indicated***

Loosen any constrictive clothing
Protect patient

Active Seizure Activity — YES → IV / IO Access — YES → P

P: **Midazolam 2.5 mg IV / IO / IN**
May repeat every 3 - 5 min as needed
Maximum 10 mg
Peds: 0.1 mg/kg IV / IO / IN
Maximum single dose 2.5 mg
May repeat every 3 - 5 min as needed
Maximum 0.4 mg/kg

Ativan 2 mg IV / IO / IM
May repeat every 5 min
Maximum 6 mg
Peds: 0.1 mg/kg IV / IO / IM
Maximum single dose 2 mg
Maximum 0.3 mg/kg

Active Seizure Activity — NO → Blood Glucose Analysis Procedure

IV / IO Access — NO

P: **≥ 25 kg**
Midazolam 5 mg IM
May repeat in 5 minutes if needed
Maximum 10 mg

< 25 kg
Midazolam 0.2 mg/kg IM
Maximum single dose 5 mg
May repeat in 5 minutes if needed
Maximum 10 mg

Blood Glucose Analysis Procedure

A: IV or IO Access Protocol UP 6 ***if indicated***

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

Monitor and Reassess

Notify Destination or Contact Medical Control

Universal Protocol Section

Seizure

Signs and Symptoms:
LOC or AMS / behavioral changes such as bizarre behavior that often times has a repetitive or robotic-type movements.
Head deviation or fixed eye gazes with AMS.
Convulsions or tremors.
Incontinence.
Subjective changes in perception such as taste, smell or fear.

Classification:

Generalized:
1. Tonic-Clonic
2. Absence
3. Myoclonic
   Neuronal discharges occur bilaterally in the brain with LOC noted.
   Tonic movements: Flexion / extension of head / trunk / extremities.
   Clonic movements: Rhythmic motor jerking of extremities or neck.

Partial:
1. Simple partial
   Begin in focal area of brain. Patient may remain conscious.
   May have aura which is a perception of flashing lights, noises or visual disturbances.

2. Complex partial
   Remain awake but has an alteration in consciousness. May not recall the event.
   Lip smacking, mumbling or continued rhythmic movements of hands are noted.
   Typically are post-ictal.
3. Secondarily generalized
   Loss of consciousness with generalized tonic-clonic movements

Partial-complex:
Begin in focal area of brain. Patient may remain conscious.
May have aura which is a perception of flashing lights, noises or visual disturbances.

Active Seizure with no IV / IO access:
Midazolam is preferred agent, give IM (may give IN)

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

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.**
- **Brief seizure-like activity can be seen following ventricular fibrillation or ventricular tachycardia associated cardiac arrest.**
- **Status epilepticus is defined by seizure activity lasting > 5 minutes or multiple seizures without return to baseline.**
- **Most seizure activity is brief, lasting only 1 – 2 minutes, and is associated with transient hypoventilation.**
- **Be prepared for airway problems and continued seizures.**
- **Seizure activity may be a marker of closed head injury, especially in the very young, examine for trauma.**
- **Adult:**
  Midazolam 10 mg IM is effective in termination of seizures.
  Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.
- **Pediatrics:**
  Midazolam 0.2 mg/kg (Maximum 5 mg) IM is effective in termination of seizures.
  Do not delay IM administration with difficult IV or IO access. IM Preferred over IO.
- **Do not delay administration of anti-epileptic drugs to check for blood glucose.**
- **Grand mal seizures (generalized)** are associated with loss of consciousness, incontinence, and tongue trauma.
- **Focal seizures** affect only a part of the body and are not usually associated with a loss of consciousness, but can propagate to generalized seizures with loss of consciousness.
- Be prepared 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.
- **Optimal conditions for patients refusing transport following a seizure:**
  Known history of seizures/epilepsy
  Full recovery to baseline mental status
  No injuries requiring treatment or evaluation
  Adequate supervision
  Seizure not associated with drugs or alcohol
  Only 1 seizure episode in the past hour
  Seizure not associated with pregnancy

Suspected Stroke

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

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

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

EMS Stroke Screen Assessment

Blood Glucose Analysis Procedure

Consistent with Acute Stroke

NO → Exit to Appropriate Protocol(s) ***as indicated***

YES

Determine
1. **Last Known Well Time**
2. **Time of Symptom Discovery**

Time of Onset Or Time Last Seen Normal < 24 Hours

YES → **Stroke Severity Screen Procedure**

NO

- Altered Mental Status Protocol UP 4 ***if indicated***
- **B** 12 Lead ECG Procedure
- IV / IO Protocol UP 6
- Age Appropriate Cardiac Protocol(s) ***if indicated***
- Head Trauma Protocol TB 5 / Multiple Trauma Protocol TB 6 ***if indicated***
- Seizure Protocol UP 13 ***if indicated***

Transport Destination Facility based on:
STROKE
EMS Triage and Destination Plan

- **Refer to plan for Last Known Well Time and Stroke Severity Assessment values**
- **Combination of factors will drive transport destination decision-making based on your region**

Transport based on:
STROKE
EMS Triage and Destination Plan

Goal Scene Time ≤ 15 Minutes
Provide Early Notification of Destination Facility
Suspected Stroke Alert

- Reperfusion Checklist Procedure ***if time allows***
- **B** 12 Lead ECG Procedure
- IV / IO Protocol UP 6 Preferably 2 Sites
- **A** Venous Access Blood Draw Procedure ***if applicable***
- **P** Cardiac Monitor
- **P** **Persistent Hypertension**
  If SBP ≥ 185 or DBP ≥ 110
  After 3 readings all 5 minutes apart
  Contact Receiving Facility Concerning Treatment of Hypertension

Notify Destination or Contact Medical Control

Universal Protocol Section

Suspected Stroke

Universal Protocol Section

TIME OF ONSET:

All treatment for stroke hinges on the Time of Onset. This is important because it helps direct the physician to determine eligibility for systemic thrombolytics. When systemic thrombolytics are given beyond 4.5 hours of symptom onset, the risk of significant bleeding increases. The Time of Onset should be communicated to the receiving hospital and receiving providers as an actual time. Reporting the symptoms began "about 45 minutes ago" is unacceptable. Often stroke victims are discovered by someone (family, friends or caregivers) which begins the time of onset when they discovered the patient – inquire about the Time Last Seen Normal. You must ask directed questions to determine the last time the patient is known to be normal or at their baseline. Wake-up Stroke: People often awaken with stroke symptoms – the time they were last seen normal and awake would be used in this case. You are often in the best position to determine the actual Time of Onset while you have family, friends or caretakers available. Often these sources of information may arrive well after you have delivered the patient to the hospital. Delays in decisions due to lack of information may prevent an eligible patient from receiving thrombolytics. If the witness or family member cannot come with you then obtain their name and a contact number so hospital providers can contact them for more information. If possible, take a family member to the hospital with the patient.

Blood Draw Kits:

Forsyth Medical Center and Wake Forest University Baptist Medical Center furnish blood draw kits. The lab specimens should be obtained if at all possible as this will speed the assessment process upon arrival at the receiving facility.

Hospital notification:

Receiving hospital should be given notification of suspected stroke patient at least 10 minutes prior to arrival.

Pearls

- **Recommended Exam: EMS Stroke Screen and Severity Assessment, Mental Status, 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 or well may be changed at any time depending on the capabilities and resources of your regional hospitals based on Stroke: EMS Triage and Destination Plan.**
- **Time of Onset or Last Seen Normal or Well:**
  - **One of the most important items the pre-hospital provider can obtain, of which all treatment decisions are based.**
  - **Be 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 care may be delayed at facility.**
  - **Wake up stroke: Time starts when patient last awake or symptom free.**
- **Time of Symptom Discovery:**
  - **Time when symptoms of stroke are first noticed by patient or witness.**
- **Sources of information pertaining to Last Known Well time:**
  - **You are often in the best position to determine the actual Time of Onset while you have family, friends or caretakers available.**
  - **Often these sources of information may arrive well after you have delivered the patient to the hospital.**
  - **Delays in decisions due to lack of information may negatively impact care.**
  - **Obtain contact information (phone number and name) of witnesses and give to facility providers.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient as time allows.**
- **If possible place 2 IV sites.**
- **Blood Draw:**
  - **Many systems utilize EMS venous blood samples. Follow your local policy and procedures.**
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- Document the Stroke Screen, Stroke Severity Score, and facility notifcation time in the PCR.
- Agencies may use validated pre-hospital stroke screen of choice.
- **Pediatrics:**
  - Strokes do occur in children, they are slightly more common in ages < 2, in boys, and in African-Americans.
  - Newborn and infant symptoms consist of seizures, extreme sleepiness, and using only one side of the body.
  - Children and teenagers symptoms may consist of severe headaches, vomiting, sleepiness, dizziness, and/or loss of balance or coordination.

Suspected Sepsis

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

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

Associated Symptoms (Helpful to localize source)
- myalgias, cough, chest pain, headache, dysuria, abdominal pain, rash

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

Consider: Contact, Droplet, and Airborne Precautions

Temperature Measurement Procedure ***if available***

Fever/ Infection Control Protocol UP 10 ***if needed***

Altered Mental Status Protocol UP 4 ***if needed***

B 12 Lead ECG Procedure

A IV or IO Access Protocol UP 6 ***If indicated***

P Cardiac Monitor

Sepsis Screen Positive

NO → Exit to Age Appropriate Condition Appropriate Protocol(s)

YES → **SEPSIS ALERT**
Notify Receiving Facility Immediately

Adult SIRS Criteria
Temperature
≥ 100.4° F (38° C)
Or
≤ 96.8° F (36° C)
AND
Any 1 of the following:
HR > 90
RR > 20
EtCO < 25 mmHg

Adult qSOFA Criteria
SBP ≤ 100 mmHG
RR ≥ 22
AMS or new mental status change

Pediatrics SIRS Criteria
Temperature
Same as adult

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

MAP
(Mean Arterial Pressure)

SBP + 2(DBP)
3
Monitor usually calculates this value on screen

A
- Venous Access Blood Draw ***if applicable***
- **NS or LR**
  500 mL Bolus
  Repeat as needed
  Titrate SPB ≥ 90 mmHg
  Maximum 2 L

  Peds: 20 mL/kg IV / IO
  Repeat to titrate
  Age Appropriate
  SBP ≥ 70 + 2 x Age
  Maximum 60 mL/kg

P
- **If SBP < 90**
  consider drip or push dose pressors
  (see Page 2 for mixing instructions)
  HR<120
  Epinephrine:
  5 mcg every 5 min
  HR≥120
  Phenylephrine:
  50 mcg every 5 min

Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3

Notify Destination or Contact Medical Control

Universal Protocol Section

Suspected Sepsis

Universal Protocol Section

General approach:
Sepsis occurs when the body is fighting an infection. The response becomes overwhelming and can affect multiple organ systems and may cause organ damage. Early fluid resuscitation to maintain a SBP ≥ 90 mmHg or a MAP ≥ 65 mmHg can decrease morbidity and mortality. When you recognize that a patient is potentially septic, notify the receiving facility as quickly as possible. Early notification allows the facility to set-up to receive the patient and ready antibiotics. Early antibiotic administration also decreases morbidity and mortality.

Fluid resuscitation goals:
Administer 1L of Normal Saline bolus to patients suspected of sepsis. Repeat 1L of Normal Saline if transport time allows.
Maximum fluid volume should be 30 mL/kg. If BP remains ≤ 90 mmHg or MAP ≤ 65 mmHg give push-dose pressor.
If patient develops dyspnea with pulmonary edema then decrease fluid infusion.
Use caution in patients with renal disease or congestive heart failure.

Push-Dose Vasopressors:
Epinephrine
Mix 1:1000 (1mg in 1mL) into 250 mL of NS or D5.
Yields a concentration of 4 mcg/mL of Epinephrine which is the same concentration as epi drip.
Push dose is 4 – 8 mcg (1 – 2 mL) every 5 min.
Phenylephrine (adult only)
Mix 1mL (10mg/mL concentration) in 1L of normal saline and draw up from the diluted solution.
Dosing is 5 – 10 mL (50 – 100 mcg) every 5 min.

- **Pearls**
- **Recommended Exam: Mental Status, Skin, HEENT, Neck, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Recommended Exam Pediatrics: In childhood, physical assessment reveals important clues for sepsis. Look for mental status abnormalities such as anxiety, restlessness, agitation, irritability, confusion, or lethargy. Cardiovascular findings to look for include cool extremities, capillary refill >3 seconds, or mottled skin.**
- **Sepsis is a life threatening condition where the body's immune response to infection injures its own tissues and organs.**
- **Severe sepsis is a suspected infection and 2 or more SIRS criteria (or qSOFA) with organ dysfunction such as AMS or hypotension.**
- **Septic shock is severe sepsis and poor perfusion unimproved after fluid bolus.**
- **Agencies administering antibiotics should inquire about drug allergies specific to antibiotics or family of antibiotics.**
- **Following each fluid bolus, assess for pulmonary edema. Consider administration of agency specific vasopressor.**
- **Supplemental oxygen should be given and titrated to oxygenation saturation ≥ 94%.**
- **EKG should be obtained with suspected sepsis, but should not delay care in order to obtain.**
- **Abnormally low temperatures increase mortality and found often in geriatric patients.**
- Quantitative waveform capnography can be a reliable surrogate for lactate monitoring in detecting metabolic distress in sepsis patients. $EtCO_2$ < 25 mm Hg are associated with serum lactate levels > 4 mmol/L.
- Patients with a history of liver failure should not receive acetaminophen.
- **Droplet precautions:**
  - Include standard PPE plus a standard surgical mask for providers who accompany patients in the back of the ambulance and a surgical mask or NRB O2 mask for the patient.
  - This level of precaution should be utilized when influenza, meningitis, mumps, streptococcal pharyngitis, and other illnesses spread via large particle droplets are suspected.
  - A patient with a potentially infectious rash should be treated with droplet precautions.
- **Airborne precautions:**
  - Include standard PPE plus utilization of a gown, change of gloves after every patient contact, and strict hand washing precautions.
  - This level of precaution is utilized when multi-drug resistant organisms (e.g. MRSA), scabies, or zoster (shingles), or other illnesses spread by contact are suspected.
- **All-hazards precautions:**
  - Include standard PPE plus airborne precautions plus contact precautions.
  - This level of precaution is utilized during the initial phases of an outbreak when the etiology of the infection is unknown or when the causative agent is found to be highly contagious (e.g. SARS).
- All patients should have drug allergies documented prior to administering pain medications.
- Allergies to NSAIDs (non-steroidal anti-inflammatory medications) are a contraindication to Ibuprofen.
- Agency Medical Director may require contact of medical control prior to EMT / MR administering any medication.
- **Sepsis Screen:**
  - Agencies may use Adult / Pediatric Systemic Inflammatory Response Syndrome (SIRS) criteria or quickSOFA (qSOFA) criteria.
  - Receiving facility should be involved in determining Sepsis Screen utilized by EMS.

Syncope

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

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

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

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

Serious Signs / Symptoms Hypotension, poor perfusion, shock

YES → **A**

IV / IO Procedure
Consider 2 Large Bore sites

NS or LR 500 mL Bolus
Repeat as needed
Titrate SPB ≥ 90 mmHg
Maximum 2 L
Peds: 20 mL/kg IV / IO
Repeat as needed
Titrate to Age Appropriate SBP ≥ 70 + 2 x Age
Maximum 60 mL/kg

Exit to Age Appropriate Condition Appropriate Protocol(s)

NO

Notify Destination or Contact Medical Control

Universal Protocol Section

Syncope

Syncope is a transient loss of consciousness which has a multitude of causes. Syncope can be caused by an increase in vagal tone (vasovagal syncope), low blood sugar, low blood pressure. It can also be caused by more life threatening events such as cardiac arrhythmia, stroke (usually hemorrhagic), or pulmonary embolism.

Two important tests with patients who experience syncope are an **ECG** and **Blood Glucose Analysis**.

High risk patients who experience syncope:
Age ≥ 60
Patients with abnormal ECG
Patients with history of CHF
Patient who experience exertional syncope (syncope during physical activity) at any age

Universal Protocol Section

Pearls

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

Cardiac arrhythmia	Neurological problem	Choking	Pulmonary embolism
Hemorrhage	Stroke	Respiratory	Hypo or Hyperglycemia
GI Hemorrhage	Seizure	Sepsis	

- **High-risk patients:**

Age ≥ 60	Syncope with exertion
History of CHF	Syncope with chest pain
Abnormal ECG	Syncope with dyspnea

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

Behavioral Agitation/ Sedation Guide

Behavioral Activity Rating Scale (BARS)

Behavioral Activity Rating Scale
BARS scoring: 1 - 4

YES → No sedation required → Exit to Age Appropriate Protocol(s)

NO

Behavioral Activity Rating Scale
BARS scoring: 5
Agitated but not disruptive
Able to calm and redirect

YES → Verbal De-escalation Procedure ASP 11

NO

Behavioral Activity Rating Scale
BARS scoring: 6

Agitated and disruptive
Not violent

Verbal De-escalation Procedure ASP 11

IV or IO Access Protocol UP 6
if indicated

P

Age ≥ 12
Haloperidol 5 mg IM
Age ≥ 65
2.5 mg IM
May repeat every 5 min as needed!
Maximum 10 mg

AND/OR

Midazolam 2.5 mg IV / IO / IN
5 mg IM
Age ≥ 65 consider half dosing!
Peds: 0.1 – 0.2 mg/kg
IV / IO / IM / IN
Repeat every 2-3 minutes as needed!
Maximum 5 mg (10 mg IM)

Ativan 2 mg IM
Age ≥ 65 consider half dosing!
Peds: 0.1 mg/kg IM
Repeat once in 5 minutes if needed

Consider Restraint Physical Procedure USP 5
Monitor per restraint procedure
if indicated

NO ← Condition Improving? → YES → Exit to Age Appropriate Protocol(s)

NO

Behavioral Activity Rating Scale
BARS scoring: 7

Agitated and violent

→ Exit to Excited Delirium Syndrome/Violent UP 19

Universal Protocol Section

Behavioral
Excited Delirium Syndrome / Violent

Call for help
Call for additional resources
Stage prior to arrival
or
Wthdraw from scene until safe

→ **Behavioral Activity Rating Scale (BARS)**

↓

Behavioral Activity Rating Scale

BARS scoring: 7

↓

P

Haldol 5 mg IM

And

Midazolam 10 mg IM
Age ≥ 65 consider half dose
Peds: 0.1 – 0.2 mg/kg IM
Repeat once in 5 minutes if needed

Or

Ativan 2mg IM
Age ≥ 65 consider half dose
Peds: 0.1 mg kg IM
Repeat once in 5 minutes if needed

Can use Haldol + Midazolam or Haldol + Ativan

IV / IO Protocol UP 6
Preferably 2 large bore

A

Normal Saline 1 L Bolus
May repeat **500 mL** Bolus
as needed
Maximum 2 L

Peds: 20 – 60 mL/kg IV / IO

Restraint Physical Procedure USP 5
Monitor per restraint procedure
if indicated

Restraint Therapeutic Take Down Procedure USP 6
if indicated

Hyperthermia Protocol

P Cardiac Monitor

↓

Notify Destination or Contact Medical Control

General Guidance

- **Use of protocol is indicated when a medical emergency requires a combination of both physical restraint and chemical restraint in order to prevent imminent injury to a patient and/or providers.**
- **Use of this protocol requires medical judgement and consultation with medical control where indicated.**
- **Non-medical personnel requests or opinions should not be used as a factor when implementing this protocol.**

Universal Protocol Section

Behavioral
Excited Delirium Syndrome / Violent

Scene Safety:
The first priority is safety of on-scene personnel. Protect yourself and others by requesting law enforcement. Do not approach patient if armed with any type weapon or reasonable suspicion of weapon. RETREAT FROM SCENE TO SAFE STAGING AREA IF SCENE IS OR BECOMES UNSAFE AT ANY POINT.

General:
Excited Delirium is a hyper-stimulated state usually induced by either a psychiatric condition or drug use (usually stimulants such as cocaine or meth). The surge of catecholamine (the body's natural equivalent of epinephrine and norepinephrine) can induce cardiac arrest and death. Consider this diagnosis in a patient that is severely agitated. The longer the patient is restrained, the higher the risk of cardiac arrest. This is especially true if the patient has been restrained by police prior to your arrival on scene. The longer they fight, the higher the risk. Consider chemical restraint early.
Psychosis is a mental disorder characterized by a disconnection with reality. It may be caused by a medical condition (head trauma, hypoglycemia, acute intoxication, sepsis, CNS insult, hypoxia and ingestions). Psychosis and delirium may be very difficult to distinguish. Search patient for weapons even if law enforcement has already done so.

Chemical Restraint:
Patient must be out of control and posing threat to themselves or others.
Necessary force required for patient control must be done in a way not to inflict harm upon the patient.
Position of patient must not impede airway or breathing. This should be done supine or lateral with one arm raised above the head.
Drug must be able to be given without imparting harm to rescuers or patient.

Pearls

- **Ketamine:**
  - **Ketamine may be used in patients who are outside a Pediatric Medication/Skill Resuscitation System product.**
  - **Ketamine may be used in patients who fit within a Pediatric Medication/Skill Resuscitation System product only with DIRECT ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR or ASSISTANT MEDICAL DIRECTOR.**
- **Excited Delirium Syndrome and Violent:**
  - 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.
  - 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 or substance withdrawal as well as head trauma may also contribute to the condition.
- **Restraint use:**
  - Physical restraints are not contraindicated in agitated or excited delirium, but you must use caution.
  - Once sedated, prevent patient from continued struggle which can worsen metabolic condition.
  - Prevent patient from assuming a prone position for prolonged period, move to supine position as quickly as possible.
  - Team approach for sedation and Restraint Therapeutic Take Down Procedure USP-6:
  - 1 provider for each limb. 1 provider to lead restraint, maintain airway and control head. 1 Provider to administer medication.
  - Do not position prone with restraints as this can impede respiration and ventilation
- Hyperthermia: Assess for and treat hyperthermia.

Universal Protocol Section

Adult Airway

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

YES → Supplemental oxygen
Goal oxygen saturation ≥ 90%
Exit to
Appropriate Protocol(s)

NO

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

Spinal Motion Restriction
Procedure/ Protocol TB 8
if indicated

Altered Mental Status Protocol UP 4
if indicated

Respiratory Distress with a
Tracheostomy Tube
Protocol AR 10
if indicated

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

Airway Obstructed

YES →
- Airway Foreign Body Obstruction Procedure
- A: Direct Laryngoscopy ***Optional***
- P: Airway Cricothyrotomy Surgical Procedure ***if indicated***

NO

Breathing/ Oxygenation
Support needed?

YES →
- Supplemental Oxygen BVM Maintain Oxygen Saturation ≥ 90 %
- B: Consider Airway NIPPV Procedure
- B: Airway BIAD Procedure ***if indicated***
- A: Oral/ Nasotracheal Intubation Procedure ***Optional***
- P: Chest Decompression Procedure ***if indicated***
- P: Consider Airway Drug Assisted Protocol AR 3 ***if available***
- P: Post-intubation/ BIAD Management Protocol AR 8 ***if indicated***

NO

Monitor / Reassess
Supplemental Oxygen
if indicated

Exit to
appropriate protocol(s)

Unable to Ventilate and Oxygenate ≥ 90% during or after one (1) or more unsuccessful intubation attempts

AND/ OR

Anatomy inconsistent with continued attempts

AND/ OR

Three (3) unsuccessful attempts by most experienced Paramedic/ AEMT.

Exit to
Adult Failed Airway
Protocol AR 2

Notify Destination or
Contact Medical Control

Airway Respiratory Protocol Section

Adult Airway

Always weigh the risks and benefits of endotracheal intubation in the field against rapid transport. All pre-hospital 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 pre-hospital airway emergencies cannot be temporized or managed with proper BVM techniques.
Please refer to Protocols 2 and 3 for additional information.

External Laryngeal Manipulation:
Or Bi-manual laryngoscopy: While holding the laryngoscope blade the right hand should be actively manipulating the larynx to improve your glottic view. Patient should be positioned with face parallel to the ceiling and external auditory canal parallel with the sternal notch. Obese patients should be ramped into proper position. The stretcher allows the patient to be placed in optimal position for airway management.


Trauma:

Trauma:
Utilize in-line manual 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

- **See Pearls section of protocols AR 2 and 3.**
- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of≥ 90%, it is acceptable to continue with basic airway measures.**
- **Ventilation rate should be 8-10 per minute to maintain a EtCO2 of 35-45. Avoid hyperventilation.**
- **Anticipating the Difficult Airway and Airway Assessment:**
  - **Difficult BVM Ventilation (MOANS): M**ask seal difficulty (hair, secretions, trauma); **O**bese, obstruction, OB – 2d and 3d trimesters; **A**ge ≥ 55; **N**o teeth; **S**tiff lungs or neck
  - **Difficult Laryngoscopy (LEON): L**ook externally for anatomical problems; **E**valuate 3-3-2 (Mouth opening should equal 3 of patients finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patients finger's width); **O**bese, obstruction, OB – 2d and 3d trimesters; **N**eck mobility limited.
  - **Difficulty BIAD (RODS): R**estricted mouth opening; **O**bese, obstruction, OB – 2d and 3d trimesters; **D**istorted or disrupted airway; **S**tiff lungs or neck
  - **Difficulty Cricothyrotomy / Surgical Airway (SMART): S**urgery scars**; M**ass or hematoma**, A**ccess or anatomical problems**;** **R**adiation treatment to face, neck, or chest; **T**umor.
- **Capnography Monitoring (EtCO2):**
  - **Continuous Waveform or Quantitative Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring (Not validated and may prove impossible in the neonatal population - verification by two (2) other means is recommended in this population.)**
  - **Capnography verification and monitoring is required for BIAD verification and monitoring once available on scene.**
- **Nasotracheal intubation:**
  - **Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation. Contraindicated in combative, anatomically disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.**
- **Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.**
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotrachealtube should be used during all patient moves / transfers.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Adult, Failed Airway

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

NO MORE THAN THREE (3) ATTEMPTS TOTAL

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

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

Failed Airway ↔ Call for additional resources if available

BVM
Adjunctive Airway NPA/ OPA
Maintains
Oxygen Saturation ≥ 90 %

YES → Continue BVM
Supplemental Oxygen
Exit to
Appropriate Protocol(s)

NO

B	Attempt Airway Blind Insertion Airway Device Procedure
A	Airway Video Laryngoscopy Device Procedure ***if available*** ***Optional***
P	Airway Cricothyrotomy Surgical Procedure
	Supplemental oxygen BVM with Airway Adjuncts Maintain Oxygen Saturation ≥ 90 %
	Post-intubation BIAD Management Protocol AR 8

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

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.

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 Adult Airway Protocol AR-1,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. **Optimal position is aligning ear canal to sternal notch with face parallel to ceiling.**
In the obese or late pregnant patient elevating the torso by placing blankets, pillows, or towels will optimize the position. This can also 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 manual 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

- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of≥ 90%, it is acceptable to continue with basic airway measures.**
- **Ventilation rate should be 8-10 per minute to maintain a EtCO2 of 35-45. Avoid hyperventilation.**
- **Anticipating the Difficult Airway and Airway Assessment:**
  - **Difficult BVM Ventilation (MOANS): M**ask seal difficulty (hair, secretions, trauma); **O**bese, obstruction, OB – 2d and 3d trimesters; **A**ge ≥ 55; **N**o teeth; **S**tiff lungs or neck
  - **Difficult Laryngoscopy (LEON): L**ook externally for anatomical problems; **E**valuate 3-3-2 (Mouth opening should equal 3 of patients finger's width, mental area to neck should equal 3 of patient's finger's width, base of chin to thyroid prominence should equal 2 of patients finger's width); **O**bese, obstruction, OB – 2d and 3d trimesters; **N**eck mobility limited.
  - **Difficulty BIAD (RODS): R**estricted mouth opening; **O**bese, obstruction, OB – 2d and 3d trimesters; **D**istorted or disrupted airway; **S**tiff lungs or neck
  - **Difficulty Cricothyrotomy / Surgical Airway (SMART): S**urgery scars**; M**ass or hematoma**, A**ccess or anatomical problems**; R**adiation treatment to face, neck, or chest; **T**umor.
- **Capnography Monitoring (EtCO2):**
  - **Continuous Waveform or Quantitative Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring (Not validated and may prove impossible in the neonatal population - verification by two (2) other means is recommended in this population.)**
  - **Capnography verification and monitoring is required for BIAD verification and monitoring once available on scene.**
- **Nasotracheal intubation:**
  - **Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation. Contraindicated in combative, anatomically disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.**
- **Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.**
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotrachealtube should be used during all patient moves / transfers.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Adult COPD / Asthma Respiratory Distress

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

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

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

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

Adult Allergic Reaction / Anaphylaxis Protocol AM 1 ***as indicated***

B 12 Lead ECG Procedure

A IV/ IO Procedure

P Cardiac Monitor

Following Assessment

WHEEZING

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

STRIDOR

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

A **Epinephrine Nebulizer 1 mg (1:1000) / 2 mL NS**
May repeat x 1

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

B Airway NIPPV Procedure

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

Consider **Epinephrine 1:1000 0.3 – 0.5 mg IM**

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

Magnesium Sulfate 2g IV / IO
Infuse over 10 – 20 minutes

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

Adult COPD / Asthma Respiratory Distress

COPD

Most patients who have COPD have other comorbidities which are often significant.
A COPD exacerbation is a change in the course of the disease marked by change in patient's baseline work of breathing, cough and / or sputum which is different from their day-to-day variations.

Diseases that may mimic acute COPD exacerbations:

Decompensated CHF	Acute MI
Cardiac dysrhythmia	Pulmonary embolism (PE)
Acute asthma	Pneumothorax
Pneumonia	Pericardial or pleural effusion

Oxygen therapy in COPD Exacerbations:

Goal is oxygen saturation of ≥ 94 %. However saturations between 88 and 92 % are often acceptable and you should ask the patient what their typical saturations are in order to determine their normal range. Use side-stream capnography monitoring.

Treatment in COPD Exacerbations:

Albuterol and ipratropium are important treatment mainstays. Use of steroids is also important. Continuous Positive Airway Pressure (CPAP) should be utilized when necessary and is an important treatment modality in COPD.

ASTHMA

Asthma continues to increase in prevalence. Mortality is also increasing in the very young and elderly populations.
Asthma is really two diseases with a chronic inflammatory component and also an acute airflow obstruction component.

Treatment in Asthma Exacerbations:

Oxygen and Albuterol as well as ipratropium are mainstays in treatment. Steroids are also important. Epinephrine is an important adjunct in patients not responding to first line therapies. Magnesium sulfate may offer some benefit in the severe asthma attack but shows better efficacy in the pediatric population.

NIPPV should be considered in the severe asthmatic who does not respond to first line therapies. Intubation should be avoided in the asthma exacerbation patient unless severity dictates. Signs which may signal intubation need include: Worsening dyspnea despite therapy, decreasing pulse oxymetry and increasing capnography, declining mental status and progressive agitation. ***If the asthma patient requires intubation it is very important to match their ventilation rate after you control their airway. If they were breathing 40 times per minute you should attempt to ventilate them at or near that rate as they typically have profound respiratory acidosis by this point.*** This is important and different than in most patients who require ventilation at 8 – 10 breaths per minute.

Pearls

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

Pediatric Airway

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

YES → Supplemental oxygen
Goal oxygen saturation ≥ 94%
Exit to
Appropriate Protocol(s)

NO

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

Spinal Motion Restriction
Procedure / Protocol TB 8
if indicated

Consider AMS Protocol UP 4

Respiratory Distress with a
Tracheostomy Tube
Protocol AR 10
if indicated

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

Airway Obstructed

YES →
- Airway Foreign Body Obstruction Procedure
- **A** Direct Laryngoscopy ***Optional***
- **P** Airway Cricothyrotomy Needle Procedure **See Pearls Section**

NO

Breathing / Oxygenation Support needed

YES →
- Supplemental Oxygen
  BVM
  Maintain
  Oxygen Saturation ≥ 90 %
- **B** Airway BIAD Device Procedure ***if indicated***
- **A** Oral / Tracheal Intubation Procedure ***Optional***
- **P** Chest Decompression Procedure ***if indicated***
- **P** Consider Airway, Drug Assisted Protocol AR 3 ***if available***
- **P** Post-intubation / BIAD Management Protocol AR 8 ***if indicated***

NO

Monitor /Reassess
Supplemental Oxygen
if indicated

Exit to
Appropriate Protocol(s)

Unable to Ventilate and Oxygenate ≥ 90% during or after one (1) or more unsuccessful intubation attempts
AND/ OR
Anatomy inconsistent with continued attempts
AND/ OR
Three (3) unsuccessful attempts by most experienced Paramedic/ AEMT.

Exit to
Pediatric Failed Airway Protocol AR 6

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

Pediatric Airway

Airway management in the pediatric patient has many challenges, including drug dosing and equipment sizes along with the anxiety of managing a critically ill child. The principles of airway management in the pediatric patient are generally the same as in the adult.

1. Differences are most pronounced in the first 2 years of life after which the pediatric airway evolves into that of adult around age 8.
2. Must appreciate age and size related factors which evolve throughout development.

Pediatric airway is prone to obstruction due to poor positioning, swelling, and tongue tends to be large occupying great deal of oropharynx.

Large tonsils and adenoids which may bleed during procedures.

Allow the pediatric patient to assume a position of comfort if able to maintain their own airway.

Pediatric airway is more anterior especially in children 2 years and younger. The glottic opening is at C 1 in infancy and transitions to C 3 / C 4 by age 7 and then to C 5 / C 6 by age 8 which is similar to adults. Cricoid ring is the narrowest portion of airway.

Recommended Miller intubation blade until after age 3.

Large occiput which causes flexion of the airway and also causes tongue to obstruct against the posterior pharynx.

3. Need for alternative airway techniques especially a mastery of the BVM with use of NP and OP airways.

Formula for estimating ETT size in children > 1 year of age:

(16 + age in years) / 4

Cuffed tubes can be used at any age. When used in children ≤ 8 subtract 0.5 mm from estimated ETT.

Use minimal ETT balloon occlusion pressure to effect a seal. Put just enough air in the ETT cuff to prevent leak.

Airway Needle Cricothyrotomy Procedure:

Absolute last resort when all other airway adjuncts have failed with inability to ventilate / oxygenate. **Generally age ≥ 1 and ≤ 11**.

The cricothyroid membrane is small to virtually undetectable in children under 3 – 4 years of age.

Typical age group where most likely to be utilized is age 5 – 10.

Pearls

- **This protocol is for use in patients who FIT within a Pediatric Medication/Skill Resuscitation System Product.**
- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of≥ 90%, it is acceptable to continue with basic airway measures.**
- **Ventilation rate:**
  - **30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 - 10 per minute.**
  - **Maintain a EtCO2 between 35 and 45 and avoid hyperventilation.**
- **Ketamine:**
  - **May be used during airway management of patients who FIT within a Pediatric Medication/Skill Resuscitation System product with a DIRECT, ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR OR ASSISTANT MEDICAL DIRECTOR ONLY.**
  - **Systems using Ketamine in the pediatric population must also be using in their adult population.**
- **Agencies utilizing Ketamine must submit a local systems plan to State Medical Director detailing how the drug is used in yourprogram.**
  - **Ketamine may be used within this protocol only 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.**
- **Capnography Monitoring (EtCO2):**
  - **Continuous Waveform or Quantitative Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring (Not validated and may prove impossible in the neonatal population - verification by two (2) other means is recommended in this population.)**
  - **Capnography verification and monitoring is required for BIAD verification and monitoring once available on scene.**
- **Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.**
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Needle Procedure:**
  - **Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.**
  - **Very little evidence to support it's use and safety.**
  - **A variety of alternative pediatric airway devices now available make the use of this procedure rare.**
  - **Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director / Regional EMS Office.**
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Pediatric Failed Airway

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

NO MORE THAN THREE (3) ATTEMPTS TOTAL

Call for additional resources if available

Failed Aiway

BVM
Adjunctive Airway NP/ OP
Maintains
Oxygen Saturation ≥ 90%

YES → Continue BVM Supplemental Oxygen
Exit to Appropriate Protocol(s)

NO

A Airway Video Laryngoscopy Device Procedure ***if available*** ***Optional***

B Attempt Airway Blind Insertion Airway Device Procedure

P Airway Cricothyrotomy Needle Procedure **See Pearls Section**

BIAD / Cricothyrotomy Successful
Or
Oxygenation / Ventilation Adequate

YES → Exit to Post-intubation/ BIAD Management Protocol AR 8

NO

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

Supplemental oxygen
BVM with Airway Adjuncts
Maintain Oxygen Saturation ≥ 90%

Notify Destination or Contact Medical Control

Pediatric Failed Airway

Risk Factors for Difficult Airways in Pediatrics:
Small airway size which is prone to obstruction from poor positioning and infection / edema.
Provider stress from managing age, anatomical variants and equipment sizes.
Few pediatric patient encounters limiting provider's experience.
While historically not well known in pediatrics obesity may now increase difficulty in airway management similar to adults.

Difficult Airway Management Secondary to Infections:
Epiglottitis (now more common in adults)
Croup
Retropharyngeal abscess
Infection leads to swelling which may compromise the small airway calipers. When stimulated the child may cry which may also cause a functional airway obstruction in the setting of infection. Allow child to assume position of comfort.

Difficult Airway Management Secondary to Non-infections:
Foreign Body
Burns / Trauma
Anaphylaxis / Airway edema

Difficult Airway Management Secondary to Congenital Anomalies:
Craniofacial abnormalities
Micrognathic mandible (small mandible / no-chin)

Airway Needle Cricothyrotomy Procedure:
Absolute last resort when all other airway adjuncts have failed with inability to ventilate / oxygenate.
The cricothyroid membrane is small to virtually undetectable in children under 3 – 4 years of age.
Typical age group where most likely to be utilized is 5 – 10 years of age.

Pearls

- This protocol is for use in patients who FIT within a Pediatric Medication/Skill Resuscitation System Product.
- For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.
- If an effective airway is being maintained by BVM with continuous pulse oximetry values of≥ 90%, it is acceptable to continue with basic airway measures.
- Ventilation rate:
  - 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 - 10 per minute.
  - Maintain a EtCO2 between 35 and 45 and avoid hyperventilation.
- Ketamine:
  - May be used during airway management of patients who FIT within a Pediatric Medication/Skill Resuscitation System product with a DIRECT, ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR OR ASSISTANT MEDICAL DIRECTOR ONLY.
  - Systems using Ketamine in the pediatric population must also be using in their adult population.
- Agencies utilizing Ketamine must submit a local systems plan to State Medical Director detailing how the drug is used in yourprogram.
  - Ketamine may be used within this protocol only 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.
- Capnography Monitoring (EtCO2):
  - Continuous Waveform or Quantitative Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring (Not validated and may prove impossible in the neonatal population - verification by two (2) other means is recommended in this population.)
  - Capnography verification and monitoring is required for BIAD verification and monitoring once available on scene.
- Intubation attempt defined as laryngoscope blade passing the teeth or endotracheal tube passed into the nostril.
- If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- Airway Cricothyrotomy Needle Procedure:
  - Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.
  - Very little evidence to support it's use and safety.
  - A variety of alternative pediatric airway devices now available make the use of this procedure rare.
  - Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director / Regional EMS Office.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Pediatric Asthma
Respiratory Distress

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

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

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

Pediatric Airway Protocol(s) 3, 5 - 7 ***as indicated***

Pediatric Allergic Reaction/ Anaphylaxis Protocol PM 1 ***as indicated***

B 12 Lead ECG Procedure

A IV or IO Access Protocol UP 6 ***if indicated***

P Cardiac Monitor

Following Assessment

WHEEZING / Asthma

B **Albuterol Nebulizer 1.25 - 2.5 mg**
Repeat as needed x 3

STRIDOR / Croup

B **Albuterol Nebulizer 1.25 - 2.5 mg**
Repeat as needed x 3

A **Epinephrine Nebulizer**
1 mg (1:1000) in 2 mL NS
May repeat x 1

Pediatric Airway Protocol(s) 3, 5 - 7 ***as indicated***

A No response: Consider
Epinephrine 1:1000
0.01 mg / kg IM
Maximum 0.3 mg

A **Albuterol Nebulizer**
1.25 - 2.5 mg
+/- Ipratropium 0.5 mg
Repeat as needed x 3

P **Methylprednisolone 2 mg / kg**
IV / IO / IM
Maximum 125 mg

P **Magnesium Sulfate 40 mg/kg IV / IO**
Infuse over 10 – 20 minutes

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

Pediatric Asthma
Respiratory Distress

Respiratory Distress / Respiratory Failure

Respiratory distress is abnormal breathing in terms of rate and / or effort. Assess for respiratory distress by looking for changes in lung sounds and changes in skin color and mental status. Respiratory failure is a state of inadequate oxygenation and / or ventilation. The first priority in managing an ill child is assessment of airway and breathing. Respiratory conditions are a major cause of cardiac arrest in infants and children. Early detection and management of respiratory distress and / or failure means a better chance of favorable outcome in the ill child.
Respiratory distress / tachypnea with normal lung sounds and normal oxygenation may signal hypoglycemia in the young child / infant. Consider CHF in young child / infant with wheezing.

Signs of Respiratory Distress:

Tachypnea	Increased effort (nasal flaring, retractions)
Tachycardia	Poor respiratory effort (hypoventilation, bradypnea)
Pale, cool skin	Abnormal lung sounds (stridor, wheezing, grunting)
Mental status changes	

Signs of Respiratory Failure:

Early signs:	Late Signs:
Marked Tachypnea	Bradypnea
Increased effort	Decreased or no effort
Tachycardia	Bradycardia
Poor / absent air movement	Cyanosis
	Stupor or coma

Refer to Adult COPD / Asthma Protocol AR 4 Purple Section, Page 2

Pearls

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

Post-intubation/ BIAD Management

Capnography Monitoring

- **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
- **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene.**

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

ETT or Blind Insertion Airway Device Successful

NO → Exit to Appropriate Adult or Pediatric Airway Protocol(s) 1 – 7

YES

Continue Airway Adjuncts
Maintain SpO2 ≥ 90%
Preferably > 94%
Ventilate Age Appropriate breaths/ minute
May require faster rate
See Pearls

B	Maintain EtCO2 35 – 45
B	12 Lead ECG Procedure ***as indicated***
A	IV or IO Access Protocol UP 6 (preferably 2 sites)
P	Cardiac Monitor
P	Transport Ventilator Procedure ***If available***

(Awakening or Moving after Intubation / BIAD Placement Evidence of Anxiety / Agitation

NO

YES

P

Ketamine 2.0 mg / kg IV / IO

Fentanyl 50 mcg IV / IO
Repeat every 5 minutes as needed
Maximum 300 mcg
Pediatric: 1 mcg / kg IV / IO / IN
May repeat **0.5 mcg / kg** every 5 minutes as needed
Maximum 2 mcg / kg
Or
Morphine 4 mg IV / IO
Repeat **2 mg** every 5 minutes x3
Maximum 10 mg
Pediatric: 0.1 mg / kg IV / IO
May repeat every 5 minutes as needed x2
Maximum 0.3mg/kg

Pediatric single dose should not exceed adult single dose

Midazolam 2.5 mg IV / IO
Repeat every 3 – 5 minutes as needed
Maximum 10 mg
Pediatric: 0.1 mg / kg IV / IO / IN
Maximum 0.4mg/kg

Consider Rocuronium 1mg/kg (adult only)

Propofol
Interfacility Transfer Protocol / Policy
If available

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

Post-intubation / BIAD Management

Immediately following BIAD or ETT placement:
The patient may experience various levels of stress. The most important initial aspect of immediate post-intubation / BIAD management is to control pain. Mechanical ventilation / BVM / positive pressure ventilation is painful. Immediately begin sedation with **Fentanyl 50 – 100 mcg or 1 – 2 mcg/kg IV / IO**.

Remember benzodiazepines are associated with worse patient outcomes and prolonged ICU stays. Opioid is the best first choice.

The next choice for sedation is Ketamine. Even if Ketamine is given to facilitate airway management it remains an appropriate sedation choice. **Ketamine 1 - 2 mg/kg over 1 – 2 minutes. You may repeat 0.5 mg / kg doses every 5 to 10 minutes as needed**.

Hypotension:
Persistent hypotension should not prevent you from providing appropriate sedation and pain control. Fluid resuscitation should be initiated. Push-dose vasopressors can be started simultaneously and pain medication can be given, such as **Fentanyl 1 50 – 75 mcg or 1 mcg / kg IV / IO.**

Ketamine is also appropriate to use with hypotension as a sedative which also has pain relieving properties and like **Fentanyl** does not provoke hypotension to the extent of other sedative medications.

Persistent inadequate sedation:
Midazolam may be given if repeat doses of opioids and / or **Ketamine** are ineffective or inadequate.

Rocuronium may be used only as a last resort. If utilized make every effort to ensure the patient has adequate pain control. A patient should never be paralyzed without adequate sedation and pain control.

Positioning:
Proper patient positioning is paramount. Raise the head of the bead 10 to 30° depending on underlying condition. This helps prevent aspiration.

Pearls

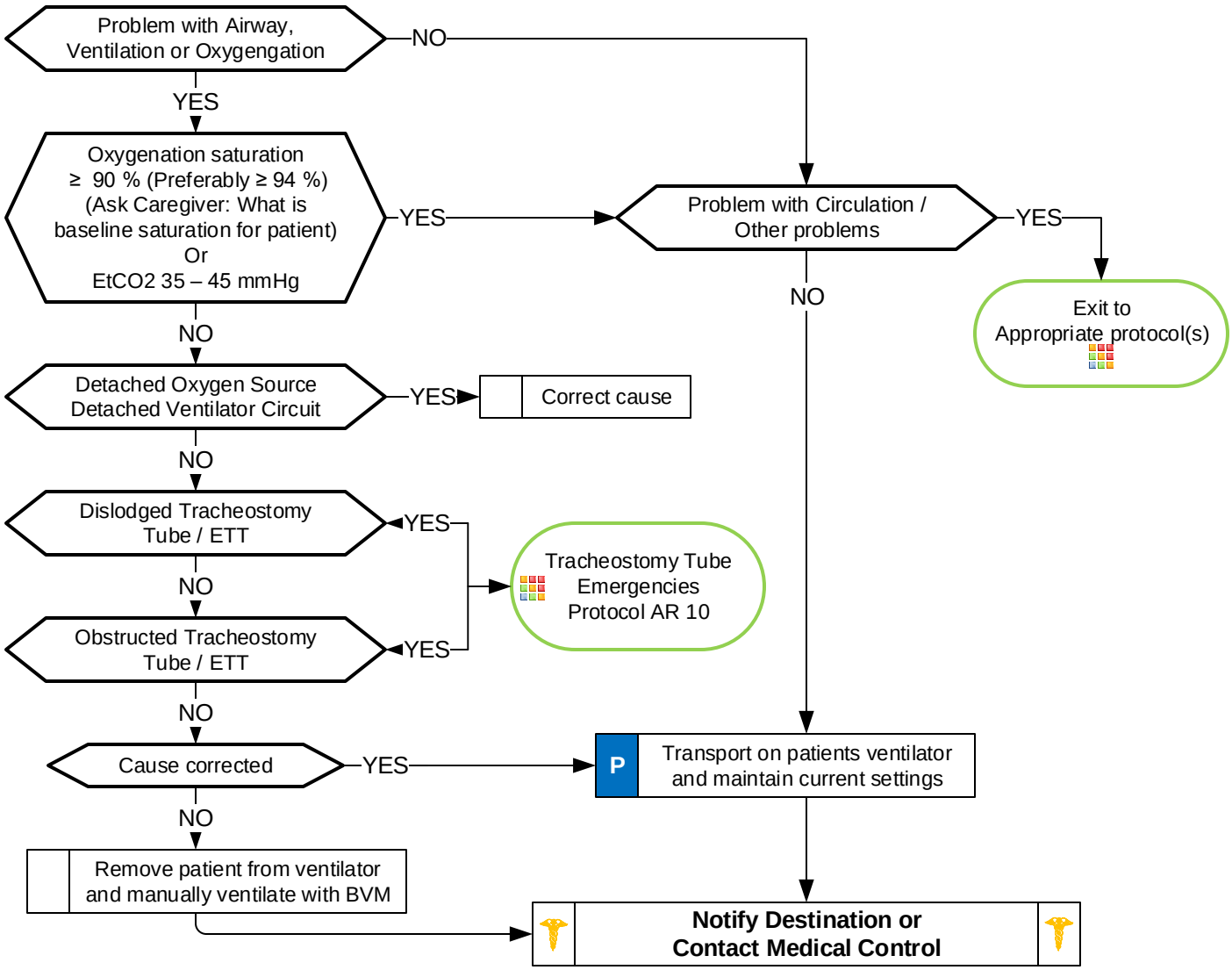
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
- **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
- **Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.**
- **Vital signs such has tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.**
- **Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.**
- **Ventilator / Ventilation strategies will need to be tailored to individual patient presentations. Medical director can indicate different strategies above.**
- In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH20.
- Continuous pulse oximetry and capnography should be maintained during transport for monitoring.
- Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.
- With abrupt clinical deterioration, if mechanically ventilated, disconnect from ventilator to assess lung compliance. Search for dislodged ETT or BIAD, obstruction in tubing or airway, pneumothorax, or ETT balloon leak.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Ventilator Emergencies

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

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

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



Airway Respiratory Protocol Section

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

Tracheostomy Tube Emergencies

History

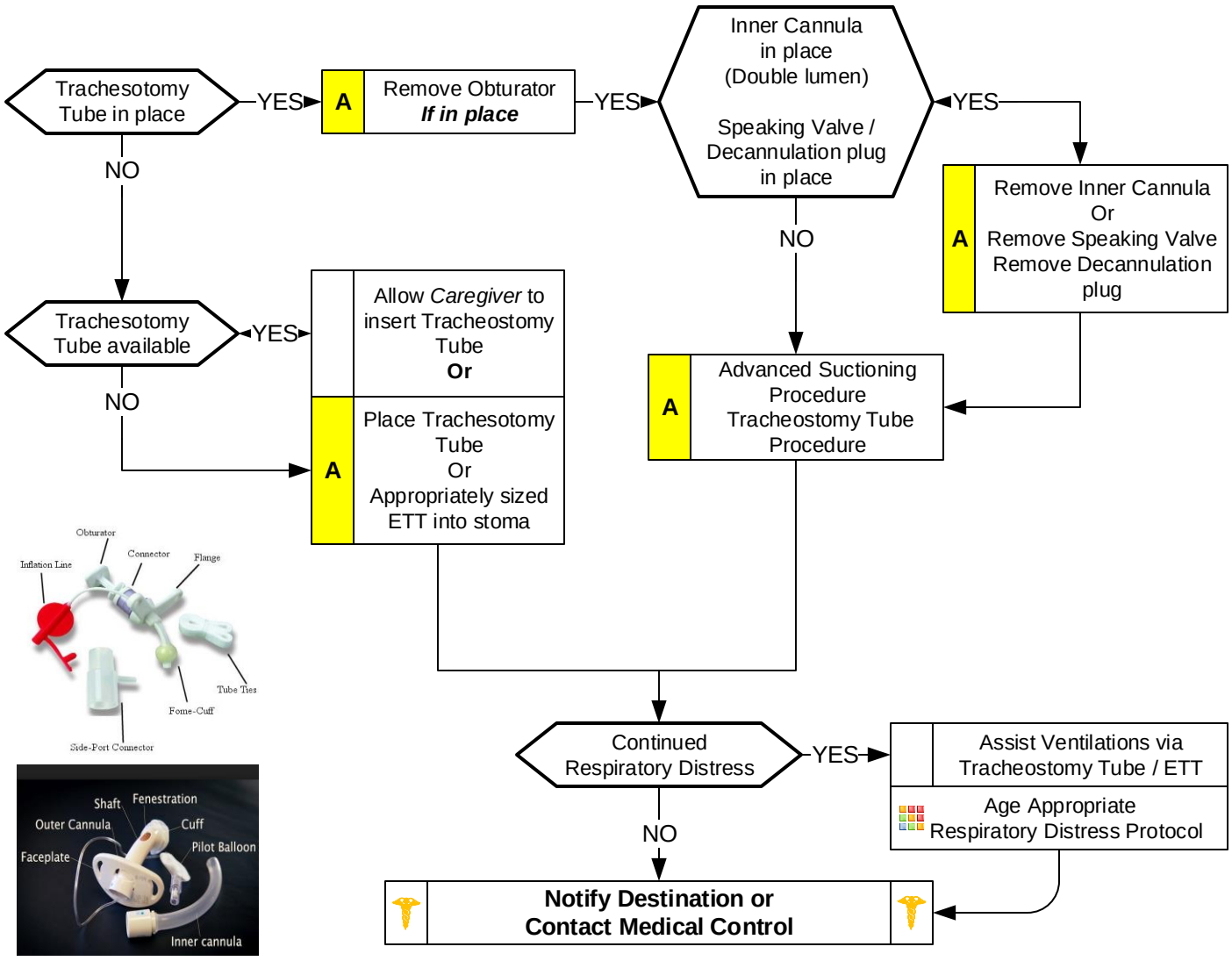
- Birth defect (tracheal atresia, tracheomalacia, craniofacial abnormalities)
- Surgical complications (accidental damage to phrenic nerve)
- Trauma (post-traumatic brain or spinal cord injury)
- Medical condition (bronchial or pulmonary dysplasia, muscular dystrophy)

Signs and Symptoms

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

Differential

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



Airway Respiratory Protocol Section

Pearls

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

Adult Asystole / Pulseless Electrical Activity

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

Signs and Symptoms
- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

Differential
- See Reversible Causes below

Cardiac Arrest Protocol AC 3

Criteria for Death / No Resuscitation
Review DNR / MOST Form

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

Do not begin resuscitation

Follow
Deceased Subjects
Policy

NO ↓

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

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

AED Procedure
if available

P Cardiac Monitor

IV or IO Access Protocol UP 6

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

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

Search for Reversible Causes

Blood Glucose Analysis Procedure
if applicable

P
At 5 minutes from initial Epinephrine Dose
Second Dose: Epinephrine (1:10,000) 1 mg IV / IO
At 10 minutes from initial Epinephrine Dose
Subsequent Doses: Epinephrine (1:10,000) 1 mg IV / IO
Based on EtCO2 level
Every 5 minutes if EtCO2 < 30
Or
Every 10 minutes if EtCO2 30

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

Notify Destination or
Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 10

Reversible Causes
Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Suspected Opioid Overdose
Administer Naloxone per Overdose / Toxic Ingestion Protocol TE 7

Adult Cardiac Protocol Section

Adult Asystole / Pulseless Electrical Activity

Primary focus is on high-quality, continuous and uninterrupted compressions at a rate of:

100 – 120 / minute, = 2 inches depth of compression, allow complete recoil of chest on upstroke.
Do not interrupt compressions for more than 5 seconds optimal and 10 seconds maximum.
Compressor counts aloud every 20th compression and next compressor readies themselves at the 180th compression.
Paramedic should charge the defibrillator at the 180th compression.

Utilize respiratory counter device to ensure **NO HYPERVENTILATION**. Ventilations are to be delivered every 6 seconds.

When faced with either PEA or Asystole the most important aspect is finding a reversible cause.

Consider is this a primary cardiac event or a primary respiratory event, drug overdose, drowning, hanging, suffocation or trauma?

Medication Sequence:

FIRST DOSE: Give Epinephrine 1mg (1:10,000)

SECOND DOSE: At 5 minutes: Give Epinephrine 1mg (1:10,000)

REPEAT DOSE: At 10 minutes: Epinephrine 1mg (1:10,000) based on EtCO2 reading.

Every 5 minutes if EtCO2 < 30
Every 10 minutes if EtCO2 30

.

Atropine not likely beneficial and no longer indicated with PEA or Asystole (can give at discretion of team leader to max of 3 mg.)

Hyperkalemia: Unknown in field setting. End stage renal dialysis patient is at risk and Sodium bicarbonate and Calcium chloride should be given. ECG findings may not reflect common teaching such as peaked T waves. PEA with a bizarre or widened complex may indeed be hyperkalemia.

Toxicology: Consider Calcium Channel Blocker (CCB) and Beta Blocker (BB) overdose with PEA and asystole. If suspected BB overdose give Glucagon 2 mg IV. If you see ECG improvement you may repeat and then contact medical control. Large doses of Glucagon may be needed. Calcium Chloride (or Ca gluconate - preferred) may be beneficial in BB overdose. If suspected CCB overdose administer 1 amp of Calcium Chloride (or Ca gluconate-preferred) over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

Termination of Resuscitation: Follow On Scene Resuscitation / Termination of Resuscitation On Scene Protocol AC 12.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional Team Focused CPR Protocol AC 11 or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT), compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation**.
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol TE 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
  Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Bradycardia; Pulse Present

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

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

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

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

NO → Exit to Appropriate Protocol(s)

YES

Airway Protocol(s) AR 1, 2, 3 ***if indicated***

Respiratory Distress Protocol AR 4 ***if indicated***

Chest Pain: Cardiac and STEMI Protocol AC 4 ***if indicated***

B — Search for Reversible Causes

B — 12 Lead ECG Procedure

IV / IO Protocol UP 6

P — Cardiac Monitor

A — **Normal Saline/LR Fluid Bolus**
500 mL – 2 L NS IV / IO
(Unless Acute CHF)
Maximum 2 L

P — **Atropine 1 mg IV / IO**
May repeat every 3 – 5 minutes
Maximum 3 mg

P — **Epinephrine Push-dose**
5 mcg IV / IO
Repeat every 2 minutes PRN
Titrate to SBP 90 mmHg
Or
Epinephrine 1 - 10 mcg/min IV / IO
Titrate to SBP 90 mmHg

P — **If No Improvement**
Transcutaneous Pacing Procedure
(Consider earlier in 2nd or 3rd AVB)

P — Consider Sedation
Midazolam 2.5 mg
IV / IO / IM / IN
Maximum 10 mg

Notify Destination or Contact Medical Control

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Overdose/ Toxic Ingestion Protocol TE 7

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Adult Cardiac Protocol Section

Bradycardia; Pulse Present

ECG and rhythm information should be interpreted in context of the entire patient assessment.
For example if you have a patient which is ill with a likely infection and fever and is bradycardic there overall symptoms is unlikely related to bradycardia and more likely related to overwhelming sepsis and potentially hypoxia.

Bradycardia is defined as heart rate < 60 but rarely causes symptoms unless < 50 in the adult.
The most important decision point in care is whether the patient is stable or unstable.
Hypoxemia is a common cause of bradycardia.

Unstable:
Refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.

Symptomatic:
Symptomatic implies the arrhythmia is causing the presenting symptoms but the patient may be stable and not in imminent danger.
This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Heart Blocks:

1st degree AV block:
PR > 0.2 seconds. This is typically benign and often seen.

2nd degree AV block:
Mobitz I: Block at AV node. Often transient and asymptomatic.
Mobitz II: Usually below the AV node in the His-Purkinje system. May progress to 3rd degree AV block

3rd degree AV block:
May occur at the AV node, bundle of His or at the bundle branches. May be permanent or transient.

Push-Dose Vasopressors:
Epinephrine
Mix 1:1000 (1mg in 1mL) into 250 mL of NS.
Yields a concentration of 4 mcg/mL of epinephrine which is the same as epi drip.
Give 4 – 8 mcg every 5 minutes to effect SBP > 90 and/or MAP of 65 mmHg.

Epinephrine DRIP
Mix 1 mg in 250 mL NS or D5W
Or
2 mg in 500 mL NS or D5W
(4 mcg / mL)

Dose	mL / min	mL / hr
1 mcg/min	0.25 mL/min	15 mL/hr
2 mcg/min	0.50 mL/min	30 mL/hr
3 mcg/min	0.75 mL/min	45 mL/hr
4 mcg/min	1 mL/min	60 mL/hr
5 mcg/min	1.25 mL/min	75 mL/hr
6 mcg/min	1.50 mL/min	90 mL/hr
7 mcg/min	1.75 mL/min	105 mL/hr
8 mcg/min	2 mL/min	120 mL/hr
9 mcg/min	2.25 mL/min	135 mL/hr
10 mcg/min	2.50 mL/min	150 mL/hr

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Identifying signs and symptoms of poor perfusion caused by bradycardia are paramount.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia. Give Calcium Chloride or Gluconate in addition to Sodium Bicarbonate if hyperkalemia suspected.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Hypoxemia is a common cause of bradycardia. Ensure oxygenation and support respiratory effort.**
- **Atropine:**
  - **Atropine is considered a first line agent in symptomatic bradycardia.**
  - **Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.**
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
  - **If no IV or IO access immediately available start Transcutaneous Pacing, establish IV / IO access, and then administer atropine and/or epinephrine.**
  - **Epinephrine or Dopamine may be considered if no response to Atropine.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic bradycardia usually occurs at rates < 50 beats per minute.**
  - **Search for underlying causes such as hypoxia or impending respiratory failure.**
- **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.**
- **Transcutaneous Pacing Procedure (TCP)**
  - **Indicated with unstable bradycardia unresponsive to medical therapy.**
  - **If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.**
  - **Transvenous / permanent pacemaker will probably be needed.**
  - **Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.**
- Consider treatable causes for bradycardia (Beta Blocker OD, Calcium Channel Blocker OD, etc.)

Cardiac Arrest; Adult

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 10

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 - 120 / min)
Change Compressors every 2 minutes
(sooner if fatigued)
(Limit changes / pulse checks ≤ 10 seconds)

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

ALS Available

NO → AED Procedure ***if available***

YES → **P** Cardiac Monitor

NO ← Shockable Rhythm → YES

NO → AED Procedure

Continue CPR
2 Minutes
Repeat and reassess
Airway
Protocol(s) AR 1, 2, 3

NO ← Shockable Rhythm → YES

Asystole / PEA
Protocol AC 1
as indicated

Airway
Protocol(s) AR 1, 2, 3

VF / VT
Protocol AC 9
Tachycardia
Protocol(s) AC 6, 7
as indicated

Airway
Protocol(s) AR 1, 2, 3

Arrest secondary to Opioid OD?

YES

Naloxone 0.4 – 2 mg IN / IM
Peds: 0.1 mg/kg IN

Maximum 4 mg

A
Naloxone 0.4 – 2 mg
Peds: 0.1 mg/kg
IV / IO / IM / IN / ETT

Maximum 4 mg

NO

Termination on Scene
Protocol AC 12
as indicated

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Cardiac Arrest; Adult

Follow Cardiac Arrest; Protocol AC3 and Team Focused CPR Protocol AC 11 and Termination of Resuscitation On Scene Protocol AC 12.

Primary focus is on high-quality, continuous and uninterrupted compressions at a rate of:

100 – 120 / minute, = 2 inches depth of compression, allow complete recoil of chest on upstroke.
Do not interrupt compressions for more than 5 seconds optimal and 10 seconds maximum.
Compressor counts aloud every 20th compression and next compressor readies themselves at the 180th compression.
Paramedic should charge the defibrillator at the 180th compression.
Compressor-on-deck ensures high-quality CPR visually and by monitor. Everyone on scene is responsible for ensuring high quality, uninterrupted chest compressions.

Utilize respiratory counter device to ensure NO HYPERVENTILATION. Ventilations are to be delivered every 6 seconds.

When faced with either PEA or Asystole the most important aspect is finding a reversible cause.

Medication Sequence:
FIRST DOSE: Give Epinephrine 1mg (1:10,000)
SECOND DOSE: After 5 minutes of CPR - Give Epinephrine 1mg (1:10,000)
REPEAT DOSE: After 10 minutes of CPR give Epinephrine 1mg (1:10,000) as indicated below:
Every 5 minutes if EtCO2 < 30
Every 10 minutes if EtCO2 ≥ 30
When EtCO2 remains < 20, ensure high-quality compressions with proper depth, rate, and equal downstroke and upstroke.

Hyperkalemia: Unknown in field setting. End stage renal disease patient on dialysis is at risk. Sodium bicarbonate and Calcium should be given. A continuous albuterol neb should be administered. ECG findings may not reflect common teaching such as peaked T waves. PEA with a bizarre or widened complex may be hyperkalemia.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
- **IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Defibrillation:**
  Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol TE 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
  Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Chest Pain: Cardiac and STEMI

History
- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies
- Recent physical exertion
- **O**nset **/ 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**
- Women:
  - More likely to have dyspnea,
  - N/V, weakness, back or jaw pain

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

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

Acute MI / STEMI
See box to right

YES →

Transport based on:
STEMI
EMS Triage and Destination Plan
Immediate Notification of Facility
Immediate Transmission of ECG
if capable
Keep Scene Time to ≤ 15 Minutes

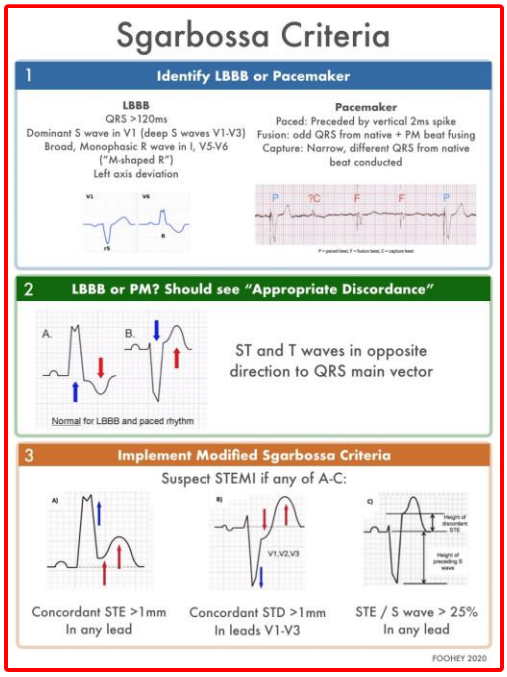
B	*If transporting to Non PCI Center* **Reperfusion Checklist**

NO ↓

	IV / IO Protocol UP 6
A	**Nitroglycerin 0.4 mg SL** Repeat every 5 minutes as needed
	If chest pain resolves: **Nitroglycerin Paste** **SPB 100 mmHg 1 inch** **SPB 150 mmHg 1.5 inch** **SPB 200 mmHg 2 inch**
P	**Fentanyl 50 mcg IV / IO / IN / IM** May repeat every 5 minutes as needed **Maximum 300 mcg**
	Hypotension / Shock Protocol AM 5 ***if indicated***
	CHF / Pulmonary Edema Protocol AC 5 ***if indicated***

Acute MI / STEMI

STEMI Definition:
- **≥ 1 mm ST Segment elevation in ≥ 2 contiguous leads**
- **≥ 2 mm ST/J point elevation in V2-V3 for men**
- **≥ 1.5 mm ST/J point elevation in V2-V3 for women**
- **ECG software diagnoses Acute MI (symptomatic)**



Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Chest Pain: Cardiac and STEMI

Adult Cardiac Protocol Section

Presume chest pain is of a cardiac etiology unless age, circumstances, history and exam clearly suggest a noncardiac cause. Typical features such as chest and left arm pain associated with dyspnea, diaphoresis and nausea are often not present in the elderly, women and patients with diabetes. Their complaints may be very vague such as nausea and weakness or isolated dyspnea.

General:

Utilize oxygen to maintain oxygen saturation 94 %.
Aspirin therapy is very important and should be given when not contraindicated.

Nitroglycerin:

Use in patients who have already taken and had no relief. In patients who gain relief or who have ongoing chest pain, apply nitroglycerin paste when not contraindicated.
Use cautiously in patients with systolic blood pressure approaching 100 and avoid until blood pressures are consistently above 100 mmHg. Use cautiously in patients with bradycardia < 50 or very rapid heart rates > 120 with serious signs / symptoms or heart failure. Use cautiously in patients who have inferior wall MI or who have ST elevation in right sided ECGs in V3 or V4. These patients may require a fluid bolus to increase their preload and nitroglycerin may precipitate hypotension.

STEMI:

Goal is now from first provider contact, YOU, to first device deployment (cardiologist in cath-lab) of 90 minutes when transporting to a PCI-Center. Identify STEMI (ECG < 10 minutes from patient contact) and transmit, expedite transport and notify the receiving hospital immediately. The rate limiting step, especially after business hours, is assembling cath-lab team and having them arrive and prepare for cardiac catheterization. Quick recognition of STEMI and immediate notification of receiving PCI-Center is essential in meeting this goal to improve patient care / outcomes. After business hours the cath-lab team should be traveling to the hospital during your transport. It is of no value to arrive at the hospital quickly when the cath-lab was notified late, the patient still waits until the cath-lab can be prepared for the procedure.

Report 1. Active Chest Pain; 2. ECG meets STEMI criteria; 3. Agreement with ECG.
Establish 2 IV sites preferably both in the Left Upper Extremity if possible and remove all clothing prior to facility arrival.

ALL TRANSMITTED ECGs SHOULD HAVE NAME, AGE and GENDER as available. ECG is a medical record and must have appropriate identifier, especially a correctly spelled First and Last NAME.

Dosing of fentanyl and morphine can always be lower than the protocol dose. Age, weight, blood pressure, respiratory status, etc., may factor into wanting to give a lower dose.

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**
- **Nitroglycerin:**
  - **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.**
  - **Nitroglycerin may cause hypotension during any type myocardial infarction. It is NOT more likely to cause hypotension in an inferior MI and should NOT be avoided unless already hypotensive.**
- **STEMI (ST-Elevation Myocardial Infarction)**
  - **Positive Reperfusion Checklist should be transported to the appropriate facility based on STEMI EMS Triage and Destination Plan.**
  - **Consider placing 2 IV sites in the left arm: Many PCI centers use the right radial artery for intervention.**
  - **Consider placing defibrillator pads on patient as a precaution.**
  - **Consider Normal Saline or Lactated Ringers bolus of 250 – 500 mL as pre-cath hydration.**
  - **Scene time goal is < 15 minutes.**
  - **Document and time-stamp facility STEMI notification and make notification as soon as possible.**
  - **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **Cardiac related symptoms in men and women:**
  - Pressure, squeezing, fullness, or pain in the chest.
  - Pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
  - Shortness of breath with or without chest pain.
  - Sweating, nausea, weakness, and/or lightheadedness.
  - **Women, diabetic patients, and the elderly often experience only weakness, shortness of breath, nausea/ vomiting, and back or jaw pain.**
- If patient has taken nitroglycerin without relief, consider potency of the medication.
- Monitor for hypotension after administration of nitroglycerin and opioids.
- **EMT may administer Nitroglycerin to patients already prescribed medication. May give from EMS supply.**
- Agency medical director may require Contact of Medical Control prior to administration.

CHF / Pulmonary Edema

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

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

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

Airway
Protocol(s) AR 1, 2, 3
as indicated

Chest Pain and STEMI
Protocol AC 4
if indicated

B — 12 Lead ECG Procedure

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

P — Cardiac Monitor

IV / IO Procedure

Assess Symptom Severity

MILD
Normal Heart Rate
Elevated or Normal BP

A — **Nitroglycerin 0.4 mg SL**
Repeat every 5 minutes

A — **Nitroglycerin Paste**
SBP ≥ 100 mmHg 1 inch
SBP ≥ 150 mmHg 1.5 inch
SBP≥ 200 mmHg 2 inch

Improving — NO → B **Airway NIPPV Procedure**

YES

MODERATE / SEVERE
Elevated Heart Rate
Elevated BP

A — **Nitroglycerin 0.4 mg SL**
Repeat every 5 minutes

A — **Nitroglycerin Paste**
SBP ≥ 100 mmHg 1 inch
SBP ≥ 150 mmHg 1.5 inch
SBP≥ 200 mmHg 2 inch

CARDIOGENIC SHOCK
Tachycardia followed by bradycardia
Hypertension followed by hypotension

B — Remove NIPPV
if in place

Adult Hypotension / Shock
Protocol AM 5
if indicated

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

CHF / Pulmonary Edema

Acute decompensated heart failure:
Patients either have heart failure with preserved ejection fraction or heart failure with reduced ejection fraction. Normal ejection fraction, or the amount of blood the heart squeezes forward with each beat, is about 55%.

Ejection Fraction:
Patients who are known to have heart failure may know their ejection fraction – ask the patient if they know.
Heart failure with preserved ejection fraction typically have an ejection fraction of 41%.
Heart failure with reduced ejection fraction have an ejection fraction of 40 %.
Systolic compared to diastolic dysfunction:
Another way to think about heart failure is systolic or diastolic dysfunction.
Systolic dysfunction is due to a weak and thin ventricular myocardium where diastolic dysfunction is due to thickened and stiff myocardium. The heart is unable to squeeze blood effectively with systolic dysfunction. In diastolic dysfunction the heart is not able to fill effectively because the myocardium does not relax and the myocardium is enlarged or thickened and decreases the volume of the heart. It will be difficult to know the patient s underlying pathophysiology because both circumstances produce similar sign and symptoms.

Main therapy considerations:
Airway, oxygenation, and ventilation are most important. NIPPV therapy should be initiated early.
12 Lead ECG is important to acquire early. If patient is experiencing a STEMI, follow the Triage and Destination Protocol for STEMI care.

Therapy related to Systolic Blood Pressure:
Normotensive to Hypertensive:
- Oxygen
- NIPPV
- NTG SL every 5 minutes as needed. ALS may continue NTG with no limit. This effectively provides a NTG drip.

Hypotensive:
- The patient with CHF / Pulmonary edema and hypotension is difficult to treat.
- When the SBP is 90 mmHg give 1 – 2 doses of Normal Saline at 250 mL each. If the patient responds they are likely volume depleted from an intravascular perspective even though they may have peripheral edema and pulmonary edema.
  If responsive to fluid continue to give 250 mL boluses to maintain SBP 90 mmHg. Frequent reassessments of lung status is important to ensure you are not worsening the respiratory status.
- If the SBP 90 mmHg after fluid boluses or initially responsive and now refractory to fluid boluses, add epinephrine at 1 mcg/min and titrate to a SBP of 90 mmHg or MAP of 65 mmHg. See hypotension protocol (AM5) for drip instructions.

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**
- **Diuretics (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.**
- **Nitroglycerin:**
  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.
  Nitroglycerin may cause hypotension during any type myocardial infarction. It is NOT more likely to cause hypotension in an inferior MI and should NOT be avoided unless already hypotensive.
- **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **Consider myocardial infarction in all these patients. Diabetics, geriatric and female patients often have atypical pain, or only generalized complaints.**
- **Cardiac related symptoms in men and women:**
  Pressure, squeezing, fullness, or pain in the chest.
  Pain or discomfort in one or both arms, the back, neck, jaw, or stomach.
  Shortness of breath with or without chest pain.
  Sweating, nausea, weakness, and/or lightheadedness.
  Women, diabetic patients, and the elderly often experience only weakness, shortness of breath, nausea/ vomiting, and back or jaw pain.
- 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.
- Monitor for hypotension after administration of nitroglycerin and opioids.
- Allow the patient to be in their position of comfort to maximize their breathing effort.
- **EMT may administer Nitroglycerin to patients already prescribed medication. May give from EMS supply.**
- Agency medical director may require Contact of Medical Control.

Adult Tachycardia
NARROW (≤ 0.11 sec)

History
- Age
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- **T**ime (onset /duration / repetition)

Signs and Symptoms
- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential
- Trauma vs. Medical
- Sinus Tachycardia vs. dysrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose: Stimulants

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms
HR Typically ≥ 150
Hypotension, Acute AMS, Ischemic Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to tachycardia

YES →

P	Cardioversion Procedure
	Consider Sedation Prior to Cardioversion **Midazolam 2.5 mg IV / IO** May repeat as needed **Maximum 10 mg**
	Syncronized **Narrow and Regular: 100J** **Narrow and Irregular: 200J** *May repeat at 200J with subsequent cardioversion attempts*

NO ↓

B	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Regular Rhythm?

YES →

P	Attempt Vagal Maneuvers Procedure
	Adenosine 6 mg IV / IO Rapid push with flush May repeat **12 mg IV / IO**

NO ↓

P	**Diltiazem** **(drip) 5 – 20 mg/hr IV / IO** **and** **(bolus) 10-20 mg IV / IO** Over 2 – 3 minutes Age ≥ 60 consider ½ dose with repeat ½ dose if well tolerated Titrate drip by 5mg/hr every 5 minutes with goal of heart rate <120 and SBP > 110 Or Amiodarone 150 mg in 100 mL of D5W IV/IO
	Monitor and Reassess
	Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Adult Tachycardia
NARROW (≤ 0.11 sec)

ECG and rhythm information should be interpreted in context of the entire patient assessment:
For example, if you have a patient with fever and tachycardia, their overall symptoms are unlikely related to tachycardia and more likely related to overwhelming sepsis and potentially hypoxia. Rate controlling them can kill them.

Tachycardia is defined as heart rate > 100 but rarely causes symptoms unless > 120 in the adult. The most important decision point in care is whether the patient is stable or unstable.

Rate controlled:
Heart rate is considered controlled when rate is 120 beats per minute.

Unstable:
Refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.

Symptomatic:
Implies the arrhythmia is causing the presenting symptoms but the patient may be stable and not in imminent danger. This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Unstable condition**
  - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
  - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **Typical sinus tachycardia is in the range of 100 to (200 - patient's age) beats per minute.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute.**
    - **Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.**
- **Serious Signs / Symptoms:**
  - **Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.**
- **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.**
- **Regular Narrow-Complex Tachycardia:**
  - Vagal maneuvers and adenosine are preferred. Vagal maneuvers may convert 19% to 54 % of SVT.
  - Using passive leg raise with Valsalva is more effective.
  - Adenosine should be pushed rapidly via proximal IV site followed by 20 mL Normal Saline rapid flush.
  - Adenosine should not be used in the post-cardiac transplant patient without **Contact of Medical Control.**
  - Agencies using both calcium channel blockers and beta blockers should choose one primarily. Giving the agents sequentially requires **Contact of Medical Control**. This may lead to profound bradycardia / hypotension.
- **Irregular Narrow-Complex Tachycardia:**
  - Rate control is more important in pre-hospital setting rather than focus on rhythm conversion.
- **Synchronized Cardioversion:**
  - Recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and SVT.
- Monitor for hypotension after administration of Calcium Channel Blockers or Beta Blockers.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Adult Monomorphic Tachycardia

Wide Complex (≥0.12 sec)

History
- Age
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- Time (onset /duration / repetition)

Signs and Symptoms
- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential
- Trauma vs. Medical
- Sinus Tachycardia vs. dysrrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose: Stimulants

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable/ Serious Signs and Symptoms
HR Typically > 150
Hypotension, Acute AMS, Ischemic Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to tachycardia

YES →

P	Cardiac Monitor
P	Cardioversion Procedure
P	**Consider Sedation Prior to Cardioversion** **Midazolam 2.5 mg IV / IO** May repeat as needed **Maximum 10 mg**
P	**Wide: Regular and Irregular: 200-360J** • **Monomorphic QRS (Synchronized)** • **Polymorphic QRS (Not-Synchronized)** *May repeat and increase dose with subsequent cardioversion attempts*

NO ↓

B	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6
P	**Consider consultation with medical control**

Regular Rhythm?

YES →

P	Attempt Vagal Maneuvers Procedure ***Only if regular monomorphic complex***
P	***Consider*** **Only if regular monomorphic complex** **Adenosine 6 mg IV / IO** Rapid push with flush May repeat **12 mg IV / IO**

NO ↓

P	**Amiodarone 150 mg** in 100 mL of D5W IV / IO Infuse over 10 minutes May repeat if wide complex tachycardia recurs **Lidocaine** **2 g in 500 mL NS (4mg/mL)** **1 – 4 mg/min** Or **Lidocaine 1 mg / kg IV / IO** **May repeat ½ dose** If rhythm converts start drip **Amiodarone 300 mg** **in 250 mL of D5W** **1 mg/min (33 mL/hr) IV / IO**
	Monitor and Reassess
	Notify Destination or Contact Medical Control

Monomorphic QRS:
- **All QRS complexes in a single lead are similar in shape.**

Adult Cardiac Protocol Section

Adult Monomorphic Tachycardia
Wide Complex (≥0.12 sec)

ECG and rhythm information should be interpreted in context of the entire patient assessment:
Tachycardia is defined as heart rate > 100 but rarely causes symptoms unless > 120 in the adult.
The most important decision point in care is whether the patient is stable or unstable.

Unstable:
Refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.

Symptomatic:
Implies the arrhythmia is causing the presenting symptoms, but the patient may be stable and not in imminent danger. This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Tachycardias are identified in several ways based on appearance of the QRS complex, heart rate and if regular or irregular. Main objective is to recognize and differentiate between sinus tachycardia, narrow-complex supraventricular tachycardia and wide complex tachycardia. Next you should identify the underlying cause of the tachycardia and whether it is the primary reason for the problem or secondary to a problem like anxiety, fever, shock or sepsis.

Wide-QRS-Complex Tachycardia (QRS 0.12 sec) in order of frequency:
Ventricular Tachycardia > Ventricular Fibrillation SVT with aberrancy > Wolff-Parkinson-White (WPW) > Ventricular rhythms

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Monomorphic QRS:**
  - **All QRS complexes in a single lead are similar in shape.**
- **Polymorphic QRS:**
  - **QRS complexes in a single lead will change shape from complex to complex.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
- **Unstable condition**
  - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
  - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.**
- **Serious Signs / Symptoms:**
  - **Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.**
- **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.**
- **Regular Wide-Complex Tachycardia:**
  - **Unstable condition:**
    - Immediate defibrillation if pulseless and begin CPR.
  - **Stable condition:**
    - Typically VT or SVT with aberrancy. Adenosine may be given if regular and monomorphic and if defibrillator available.
    - Verapamil contraindicated in wide-complex tachycardias.
    - Agencies using Amiodarone, Procainamide and Lidocaine need choose one agent primarily. Giving multiple anti-arrhythmics requires contact of Medical Control.
    - Atrial arrhythmias with WPW should be treated with Amiodarone or Procainamide
- **Irregular Tachycardia:**
  - Wide-complex, irregular tachycardia: Do not administer calcium channel, beta blockers, or adenosine as this may cause paradoxical increase in ventricular rate. This will usually require cardioversion. Contact Medical Control.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Adult Polymorphic Tachycardia
WIDE (≥ 0.12 sec) Torsades de pointes

History
- Age
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Recent physical exertion
- Palpitations, irregular heart beat
- **T**ime (onset /duration / repetition)

Signs and Symptoms
- Chest pain, heart failure, dyspnea
- AMS
- Shock, poor perfusion, hypotension
- Pale, diaphoresis
- Shortness of breath
- Nausea, vomiting, dizziness

Differential
- Cardiac arrest
- Sinus Tachycardia vs. dysrhythmia
- Fever, sepsis, infection
- Pericarditis, pulmonary embolism
- Aortic dissection or aneurysm
- Overdose

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms
HR Typically ≥ 150
Hypotension, Acute AMS, Ischemic Chest Pain, Acute CHF, Seizures, Syncope, or Shock secondary to tachycardia

YES →

P	Defibrillation Procedure
	Consider Sedation Prior to Defibrillation **Midazolam 2.5 mg IV / IO** **5 mg IN** May repeat as needed
	Wide and Irregular: 200 – 360J **Polymorphic QRS (Not-Synchronized)** *May repeat and increase dose with subsequent cardioversion attempts*

NO

B	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Pulse Present?

YES → P **Consider consultation with medical control**

NO → Exit to Cardiac Arrest Protocol AC 3

QT Interval < 500 msec

P	**Amiodarone 150 mg in 100 mL of D5W IV / IO** Infuse over 10 minutes May repeat if tachycardia recurs or persists **Amiodarone 300 mg in 250 mL of D5W** **1 mg/min (33 mL/hr)** Or **Lidocaine** **1 mg/kg IV / IO** May repeat if refractory **Lidocaine** **0.5 mg/kg IV / IO** **If rhythm converts start drip** **Lidocaine** **2 g in 500 mL NS (4mg/mL)** **1 – 4 mg/min**
	Monitor and Reassess

QT Interval > 500 msec

P	*Consider* **Magnesium 2 g IV / IO** May repeat **Maximum 4 g**
	Monitor and Reassess

Notify Destination or Contact Medical Control

Polymorphic QRS:
- **QRS complexes in a single lead will change shape from complex to complex.**

Adult Cardiac Protocol Section

Adult Polymorphic Tachycardia
WIDE (≥ 0.12 sec) Torsades de pointes

Polymorphic ventricular tachycardia:
A form of ventricular tachycardia in which there are multiple ventricular foci with the resultant QRS complex varying in amplitude, axis, and duration.

Torsades de pointes is a specific form of polymorphic ventricular tachycardia that occurs in the context of QT prolongation. It has characteristic morphology in which the QRS complexes "twist" around the isoelectric line. (Long QT is defined as >500 msec.)

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Monomorphic QRS:**
  - **All QRS complexes in a single lead are similar in shape.**
- **Polymorphic QRS:**
  - **QRS complexes in a single lead will change shape from complex to complex.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
- **Unstable condition**
  - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
  - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.**
- **Serious Signs / Symptoms:**
  - **Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.**
- **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.**
- **Polymorphic / Irregular Tachycardia:**
  - This situation is usually unstable and immediate defibrillation is warranted.
  - If QT length is known, use for decision-making. Prolonged QT length defined as > 500 msec.
  - QT length < 500 msec:
    - Arrhythmia more likely related to ischemia or infarction and Magnesium not likely helpful.
    - May quickly deteriorate into Ventricular Fibrillation.
    - Even when terminated by defibrillation, may recur, so follow with medication therapy.
  - QT prolongation > 500 msec:
    - Magnesium more likely to be helpful.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Ventricular Fibrillation
Pulseless Ventricular Tachycardia

Cardiac Arrest Protocol AC 3

	Begin Continuous CPR Compressions **Push Hard (≥ 2 inches) Push Fast (100 - 120 / min)** **Change Compressors every 2 minutes** **(*sooner if fatigued*)** **(*Limit changes / pulse checks ≤ 10 seconds*)** **Ventilate 1 breath every 6 seconds** **30:2 Compression:Ventilation if no Advanced Airway** ***Monitor EtCO2*** ***if available***
	AED Procedure ***if available***
P	Defibrillation Procedure
	IV / IO Access Protocol UP 6
A	**Epinephrine (1:10,000) 1 mg IV / IO** Repeat every 3 to 5 minutes *If VF / VT refractory to defibrillation, delay Epinephrine administration until after 2d defibrillation*
	Search for Reversible Causes
	Continue CPR Compressions **Push Hard (≥ 2 inches) Push Fast (100 - 120 / min)** **Change Compressors every 2 minutes** **(*sooner if fatigued*)** **(*Limit changes / pulse checks ≤ 10 seconds*)** **<u>If Rhythm Refractory</u>** **Continue CPR and give Agency specific Anti-arrhythmics and Epinephrine** **Continue CPR up to point where you are ready to defibrillate with device charged.** **Repeat pattern during resuscitation.**
P	**At 5 minutes from initial Epinephrine Dose** **Second Dose: Epinephrine (1:10,000) 1 mg IV / IO** **At 10 minutes from initial Epinephrine Dose** **Subsequent Doses: Epi (1:10,000) 1 mg IV / IO** **Based on EtCO2 level** **Every 5 minutes if EtCO2 < 30** **Or** **Every 10 minutes if EtCO2 30** **Amiodarone 300 mg IV / IO** **May repeat 150 mg every 5 min x2** **If converts, amiodarone drip 1mg/min IV / IO** **If refractory Magnesium 2 gm IV / IO** **Administer medications in drug-shock-drug-shock pattern**
	Defibrillation Procedure *If VF / VT refractory after 3 shocks consider changing vector of defibrillation pads*

Notify Destination or Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 10

<u>Reversible Causes</u>

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Adult Cardiac Protocol Section

Ventricular Fibrillation
Pulseless Ventricular Tachycardia

Follow Cardiac Arrest; Protocol AC3 and Team Focused CPR Protocol AC 11 and Termination of Resuscitation On Scene Protocol AC 12.
Primary focus is on high-quality, continuous and uninterrupted compressions at a rate of:
100 – 120 / minute, = 2 inches depth of compression, allow complete recoil of chest on upstroke.
Do not interrupt compressions for more than 5 seconds optimal and 10 seconds maximum.
Compressor counts aloud every 20th compression and next compressor readies themselves at the 180th compression.
Paramedic should charge the defibrillator at the 180th compression.
Compressor-on-deck ensures high-quality CPR visually and by monitor. Everyone on scene is responsible for ensuring high quality, uninterrupted chest compressions.
Utilize respiratory counter device to ensure **NO HYPERVENTILATION.** Ventilations are to be delivered every 6 seconds.
When faced with either PEA or Asystole the most important aspect is finding a reversible cause.
Medication Sequence:
FIRST DOSE: Give Epinephrine 1mg (1:10,000)
SECOND DOSE: After 5 minutes of CPR - Give Epinephrine 1mg (1:10,000)
REPEAT DOSE: After 10 minutes of CPR give Epinephrine 1mg (1:10,000) as indicated below:
Every 5 minutes if EtCO2 < 30
Every 10 minutes if EtCO2 ≥ 30
When EtCO2 remains < 20, ensure high-quality compressions with proper depth, rate, and equal downstroke and upstroke.
Dialysis patients:
Refer to Dialysis / Renal Failure protocol early on in the resuscitation. Give sodium bicarbonate and calcium. They should not be given in succession without 10 mL of NS flushing of catheter between each dose as they may cause a precipitate to form in the IV line. Given in separate IV lines if available.
REFRACTORY VF / Magnesium Sulfate:
Give where VF persists after Amiodarone administered. Give magnesium early-on in the resuscitation in patients with suspected low magnesium states or in Torsades de point. Chronic alcoholics or those who appear malnourished are most at risk. In suspected digitalis toxicity should give early as well. Any patient on digitalis who complains of weakness, nausea and / or vomiting or new confusion pre-arrest may have digitalis toxicity.
Amiodraone drip: Mix 300mg of amiodarone in 250 mL of NS or D5W. Run with micro drip set at 50 drips per minute.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional Team Focused CPR Protocol AC 11 or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- **Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.**
- **IV / IO access and drug delivery is secondary to high-quality chest compressions and early defibrillation.**
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Defibrillation:**
  Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol TE 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Magnesium Sulfate is not routinely recommended during cardiac arrest, but may help with Torsades de points, prolonged QT, low Magnesium States (malnourished / alcoholic), and suspected digitalis toxicity**
- Return of spontaneous circulation: Heart rate should be > 60 when initiating anti-arrhythmic infusions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Post Resuscitation

Return of Spontaneous Circulation

↓

Repeat Primary Assessment

	Optimize Ventilation and Oxygenation • Remove Impedance Threshold Device • Respiratory Rate 10 / minute • Maintain SpO2 94-98% • DO NOT HYPERVENTILATE
B	• ETCO2 ideally 35 – 45 mm Hg
	Airway Protocol(s) AR 1, 2, 3, 4 ***as indicated***
B	12 Lead ECG Procedure
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Monitor Vital Signs / Reassess
	Search for reversible causes

↓

	Chest Pain and STEMI Protocol AC 4 ***if indicated***
	Hypotension / Shock Protocol AM 5 ***as indicated***
A P	**Optimize Systolic BP and Mean Arterial BP** • Systolic BP > 90 mmHg
	Appropriate Arrhythmia Protocol(s) AC 2, 6, 7 ***as indicated***
	Seizure Protocol UP 13 ***as indicated***
	Post Intubation BIAD Management Protocol AR 8

↓

Notify Destination or Contact Medical Control

Transport Destination Decision

Post-resuscitation patient is medically complex.

Consider facility capabilities:

- 24-hour cardiac catheterization laboratory
- Medical ICU service
- Cardiology service
- Neurology service
- Pulmonologyservice
- Targeted Temperature Management

Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate Protocol

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Adult Cardiac Protocol Section

Post Resuscitation

Immediate concerns following Return of Spontaneous Circulation

1. Optimize oxygenation and ventilation to maintain oxygen saturation at 94 % or greater. Hyperventilation must be avoided due to induced hypotension, decreased cardiac output and oxygen injury.
2. Optimize cardiopulmonary function and vital organ perfusion.
3. **Search for and treat correctable / reversible causes:**
   Hypovolemia, Hypoxia, Hydrogen ion (acidosis), Hypo / Hyperkalemia, Hypothermia, Hypoglycemia
   Tension Pneumothorax, Tamponade; cardiac, Toxins / Ingestions, Thrombosis; pulmonary, Thrombosis; coronary
4. Identify and treat STEMI
5. ***All ROSC patients should be taken to a PCI center.***

Sedation / Paralysis / Shivering with BIAD / ETT in place:

In the post-resuscitative phase the patient may require sedation and paralysis. The primary focus is to sedate the patient adequately with Fentanyl preferably, or Morphine, which addresses pain. Pain is the primary cause of agitation in the intubated patient. Midazolam / Diazepam may also be used after an opioid is given, but opioid is the primary agent for sedation. The patient should not be paralyzed unless they are sedated first as this causes tremendous psychological and physical stress.

Airway:

Following ROSC the EMT-Paramedic may elect to exchange a BIAD to ETT. This should be done only if RSI is not required to effect the intubation. The post-cardiac arrest patient is typically hypotensive and acidotic which creates a high-risk situation for RSI and potentially will lead to re-arrest.

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. Titrate FiO_2 to maintain SpO_2 of 92 - 98%.**
- **Pain/sedation:**
  - **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
  - **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
  - **Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.**
  - **Vital signs such has tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.**
  - **Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.**
- **Ventilator / Ventilation strategies:**
  - **Tailored to individual patient presentations. Medical Control can indicate different strategies above.**
  - **In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH20.**
  - **Continuous pulse oximetry and capnography should be maintained during transport for monitoring.**
  - **Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.**
- **EtCO2 Monitoring:**
  - **Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize.**
  - **Goal is 35 – 45 mmHg but avoid hyperventilation to achieve.**
- **Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90– 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.**
- **STEMI (ST-Elevation Myocardial Infarction)**
  - **Consider placing 2 IV sites in the left arm: Many PCI centers use the right radial artery for intervention.**
  - **Consider placing defibrillator pads on patient as a precaution.**
  - **Document and time-stamp facility STEMI notification and make notification as soon as possible.**
  - **Document the time of the 12-Lead ECG in the PCR as a Procedure along with the interpretation (Paramedic).**
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.**
- Targeted Temperature Management (optional):
  - Maintain core temperature between 32 - 36°C.
  - Infusion of cold saline is NOT recommended in the prehospital setting.
  - No evidence suggests improved survival with prehospital cooling.
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with Medical Control.

Team Focused CPR

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES

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

Do not begin resuscitation

Follow Deceased Subjects Policy

NO

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 10

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

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

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
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 AC 3

ALS

A

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

Initiate Defibrillation Automated Procedure
Establish IV / IO Protocol UP 6
Administer Appropriate Medications
Establish Airway with BIAD if not in place

P

Initiate Defibrillation Manual Procedure
Continuous Cardiac Monitoring
Establish IV / IO Protocol UP 6
Administer Appropriate Medications
Establish Airway with BIAD if not in place

Continue Cardiac Arrest Protocol AC 3

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

Typical Tiered Response:

First Arriving BLS / MR:
Initiate Compression Only CPR and call for help / notify of CPR.

Second Arriving BLS / MR:
Assume compressions if First Responder has compressed longer than 2 minutes otherwise will initiate Defibrillation Automated Procedure if available. Depending on time spent during compressions First or Second Responder will place BIAD without interrupting compressions, place respiratory timer, activate, and ventilate every 6 seconds with Red light.

Third or Fourth Arriving BLS / MR:
Allows establishment of Team Leader. Third Arriving may be Team Leader or take direction from Team Leader.

Team Leader:

Responsible for ensuring High Quality / Continuous / Uninterrupted Compressions, change in compressors every 200th compression and ensure the patient is not being hyperventilated. Responsible for talking with family and ensuring they are aware victim has no pulse and is not breathing so they are in effect DEAD. Inform them that everything that can be done is being performed now. Be respectful, direct and compassionate as well as honest. They have a very poor chance of survival, typically < 8 %.

Fire Department / Squad Officer:

In addition to Team Leader. CPR should be managed like any other Fire Scene. Personnel not immediately needed should be moved to a staging area and summoned when needed. This decreases confusion and noise on scene and limits the overwhelming environment the family is likely already experiencing.

ALS On Scene First:

ALS Team Leader is established. Begin compressions if downtime is < 15 minutes. If downtime is > 15 minutes apply ECG monitor / Quick Look and Defibrillation Manual Procedure is initiated if applicable. If asystole consider termination. IV / IO procedure performed and medications are administered per appropriate protocol. BIAD is placed.

Location:

Resuscitation should be performed where the patient is found on-scene. A safe location with ample space should be sought, but patient movement should be limited as this interrupts compressions. If arrest occurs in a public place then effort will be made to maintain patient dignity. Move to unit only if necessary. Resuscitation should not be performed during transport as this degrades performance and places you and the public at risk of injury. If a family insists on transport then do so **non-emergency** to limit injury risk and maximize compression quality. 20 minutes of high-quality resuscitation should be attempted before transport to maximize patient s survivability.

Movement of patient if needed:

A coordinated effort will be employed when moving a patient undergoing CPR. The team leader should make sure everyone is prepared for the move and this should occur when a planned compressor cycle change is indicated. Brief movements of short distances should be interspersed with 4 minutes of compressions / 400 compressions. Moves optimally should not take more than 10 seconds each. Rapid return of continuous chest compressions should resume at the end of each move. Do not perform CPR during move, move quickly, stop and restart compressions.

Talking with Family:

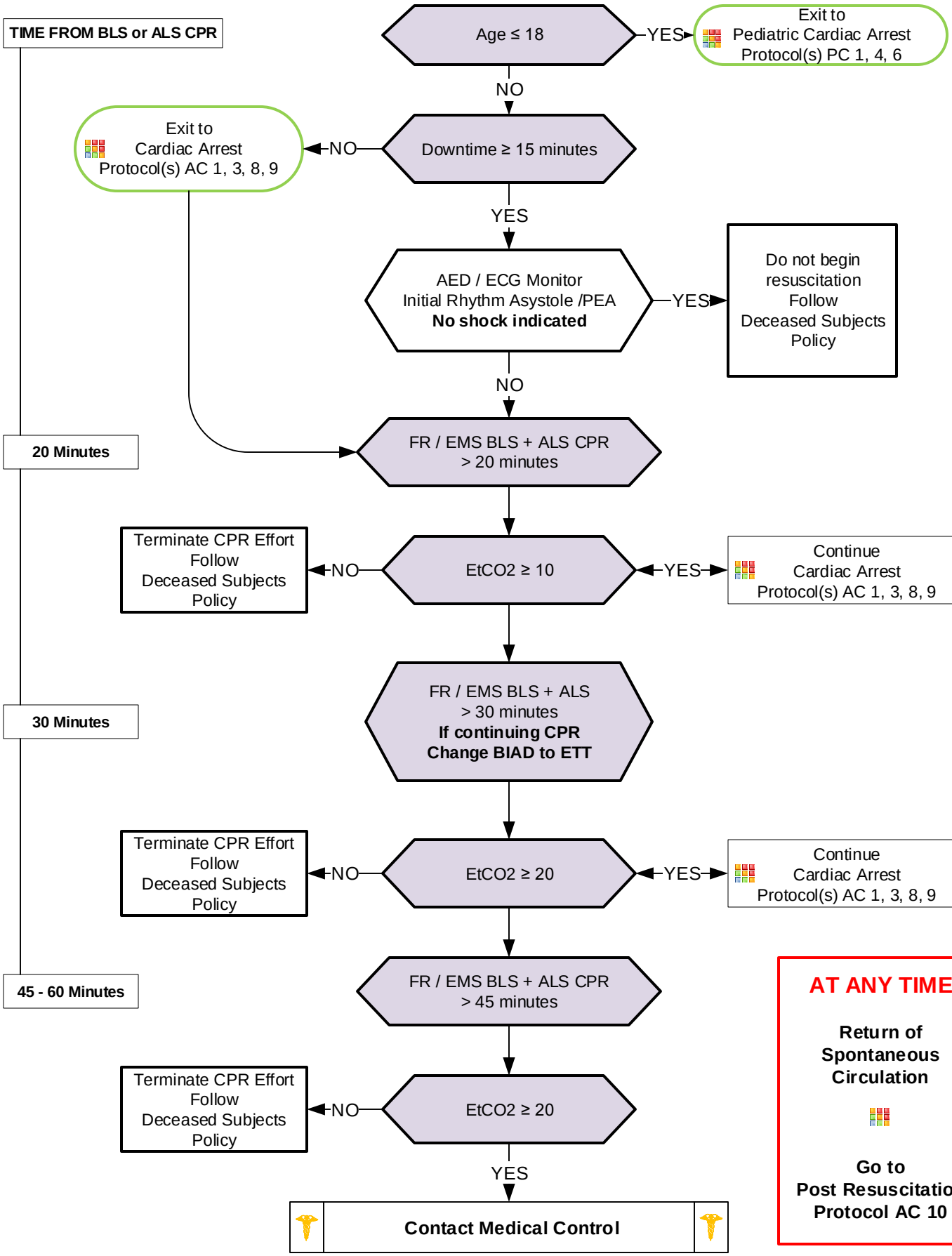
Most important aspect. People don t remember your great intubation or EJ but they will always remember how you interacted with them. Be honest, be straightforward and do not be technical. Begin to gather the information they know and start your explanation from that point. Be very clear the patient is not breathing and their heart is not beating which means they are dead (use the word dead.) Explain what is being done and allow the family to be present for the resuscitation if they desire. Ensure them that all that can be done is being done right now and that transporting will actually worsen their loved ones chance of survival. Let them know that after 30 minutes if we have no response then we should stop as the chance of survival now is less than 1 %. Our goal is to talk / update the family on separate four (4) occasions during the resuscitation. Follow AGLS.

Follow Termination of Resuscitation On Scene Protocol AC-12.

Pearls

- **This protocol is optional and given only as an example. Agencies may and are encouraged to develop their own.**
- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT), compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.**
- Reassess and document BIAD and / or endotracheal tube placement and EtCO2 frequently, after every move, and at transfer of care.
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation**.
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

On Scene Resuscitation
Termination of CPR



Adult Cardiac Protocol Section

On Scene Resuscitation / Termination of CPR

General Approach

Obtain an urgent history only after or while others or performing appropriate medical treatment. Resuscitation measures should not be interrupted while an urgent history is being obtained.

Determine the most legitimate person to elicit the history. Typically spouse, child, or sibling or Durable Health Care Power of Attorney.

Determine the following:

1. Is a terminal illness involved (i.e. COPD, CHF, Cancer, Hospice Care)?
2. Is there an advanced directive such as DNR / MOST?
3. Did patient express to your historian any desires regarding resuscitation and if so what?
4. A living will does not necessarily mean a DNR.

DNR / MOST

Patient assessment should occur promptly and without delay. Never withhold or delay patient assessment to read a document. EMS providers should not attempt to decide if a DNR or MOST is valid. If present and contains a healthcare providers signature it should be considered valid unless an immediate family member or guardian revokes the DNR / MOST.

DNR / MOST situations should be dealt with on an individual basis with appropriate care and decision-making determined accordingly.

Withholding of Resuscitation Efforts

The primary goal of EMS is to render aid and comfort to the suffering and the application of this protocol does not diminish this responsibility. It is however appropriate to withhold resuscitation in specific settings.

Withholding of Resuscitation: 1. Decomposition; 2. Rigor mortis; 3. Dependent lividity; 4. Blunt force trauma; 5. Injury incompatible with life; 6. Downtime > 15 minutes and initial non-shockable rhythm.

Downtime

Downtime is a nebulous concept fraught with inaccuracy. Every effort should be utilized to determine when the estimated time of death occurred. This will likely come from bystanders and / or family members. Time last seen alive is an important piece of information. However when unsure the default is always to initiate resuscitation.

Downtime 15 Minutes with Asystole / PEA or AED indicating NO SHOCK

Studies show that patients presenting in asystole have almost a low chance of survival even if ROSC occurs. Studies also show that patients with confirmed downtimes > 15 minutes with a non-shockable initial rhythm do not survive. When downtime is felt to be confirmed at 15 minutes and the presenting rhythm is non-shockable it is appropriate to withhold resuscitation. However when unsure the default is always to initiate resuscitation.

End Tidal CO2 Monitoring (EtCO2)

EtCO2 monitoring determines when to assess for ROSC and should be utilized instead of pulse checks. If after 20 minutes of high quality CPR the EtCO2 is < 10 mmHg the resuscitation should be terminated as the chance of survival is essentially zero. If after 30 minutes of high-quality CPR the EtCO2 is < 20 mmHg the resuscitation should be terminated. If after 45 minutes the EtCO2 is > 20 contact medical director to discuss continued resuscitation. **When changing BIAD to ETT you have only 10 seconds to place ETT.**

Once EtCO2 is initiated pulse checks should not occur until a spike in EtCO2 is seen. This is typically > 20. When the EtCO2 remains < 20 reassess the quality of compressions to ensure high-quality, uninterrupted chest compressions.

ROSC

Patients undergoing resuscitation may have transient ROSC several times during the resuscitation. Transient ROSC does not equate with survivability. When ROSC is achieved the Post Resuscitation Protocol is then utilized. Remain on scene at least 10 minutes before any patient movement to assess if prolonged ROSC will continue. When the resuscitation effort has reached 30 minutes and ROSC occurs but then is lost, CPR should continue 10 minutes beyond last ROSC before Termination of CPR is performed. Contact Medical Control for guidance.

Talking with Family

Refer to Team Focused CPR Protocol AC 11, page 2

Pearls

- General approach:
  1. **Determine if a terminal disease is involved?**
  2. **Is there an advanced directive such as a DNR / MOST form?**
  3. **Did the patient express to your historian any desires regarding resuscitation and if so what measures?**
  4. **Remember a living will is not a DNR.**
- **Obtain a history while resuscitation efforts are ongoing. Determine the most legitimate person on scene as your information source such as a spouse, child, or sibling or Durable Health Care Power of Attorney.**
- Basic and Advanced Life Support may use for treatment decisions.

Mechanical Circulatory Support
LVAD, RVAD, and Bi-VAD

History
- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR, MOST, or Living Will
- Contact with LVAD coordinator

Signs and Symptoms
- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential
- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Contact VAD coordinator:
- As quickly as possible for troubleshooting and treatment advice, but do not delay emergency treatment
- Follow patient specific emergency plan if present

Rapid assessment
Check for signs of life
Assess for adequate perfusion

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

Unresponsive and Not breathing normally

Responsive or Unresponsive and Breathing normally

Airway Protocol(s) AR 1, 2, 3 ***if indicated***

Respiratory Distress Protocol AR 4 ***if indicated***

Assess LVAD function
Look and listen for alarms
LVAD Alarming?

YES → **Go to Page 2** ← YES

NO

Place stethoscope over heart

Humming sound present?

YES → **Go to Page 3** ← YES

NO

Airway Protocol(s) AR 1, 2, 3 ***if indicated***

Respiratory Distress Protocol AR 4 ***if indicated***

Assume VAD failure
Initiate age appropriate ventilation rate

Go to Page 2

Assume VAD failure
Initiate age appropriate ventilation rate

Go to Page 2

Adult Cardiac Protocol Section

Mechanical Circulatory Support
LVAD, RVAD, and Bi-VAD

History
- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR, MOST, or Living Will
- Contact with LVAD coordinator

Signs and Symptoms
- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential
- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Entering from Page 1
No VAD humming heard and/or
VAD is alarming

Attempt to restart LVAD

Expose VAD control module
Expose VAD power source
Expose VAD driveline

Driveline:
- **Ensure driveline is connected firmly to control module**

Power source (batteries or main power source):
- **Ensure all power connections are firmly connected to control module**

Battery charge:
- **Check by pressing charge indicator**
- **Replace battery(s) if indicated**

LVAD restarted?
Humming sound over heart?

YES → **Go to Page 3**

NO

Spare control module:
- **Attach batteries or main power source to spare control module**
- **Detach driveline and attach to spare control module**

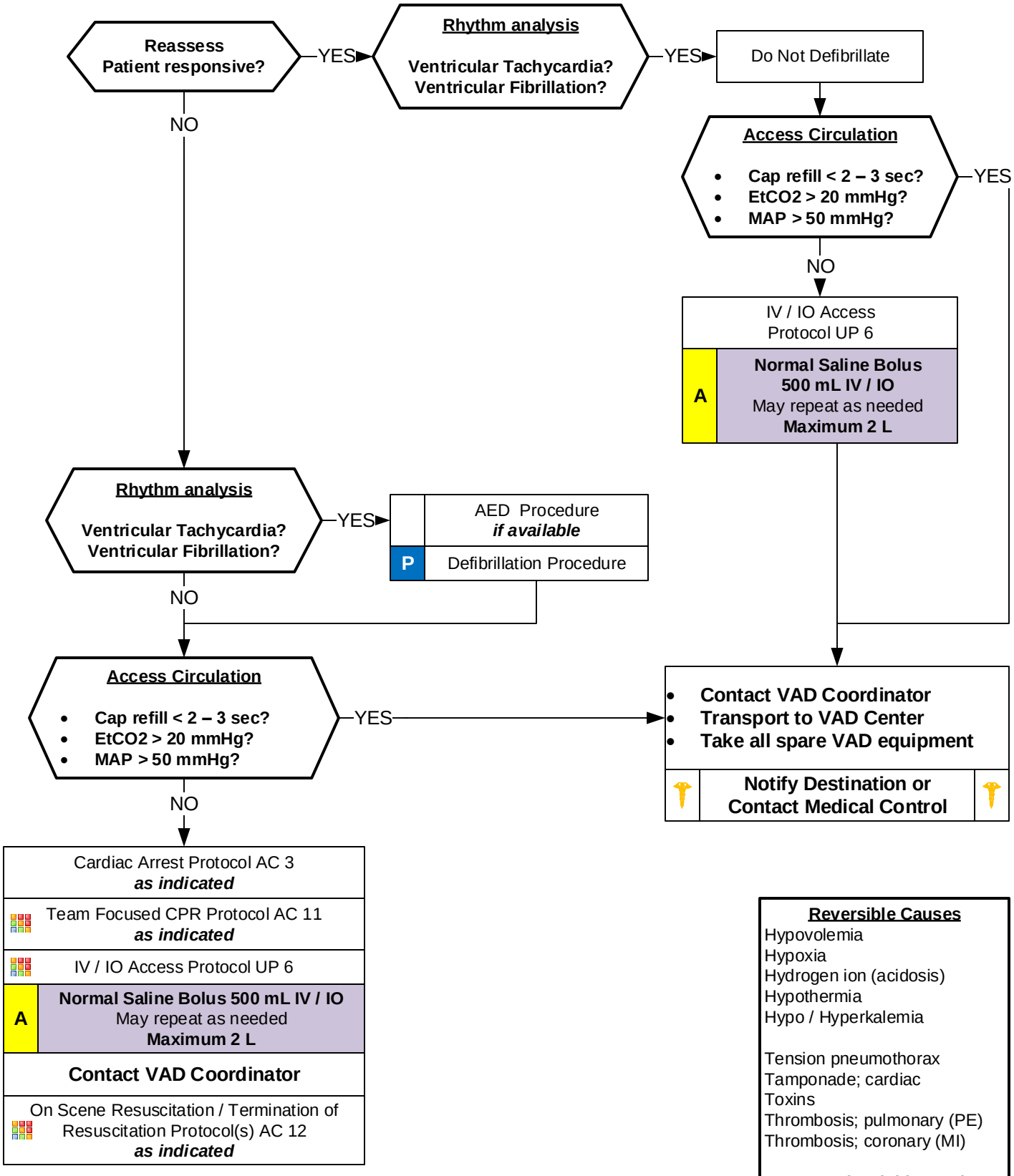
LVAD restarted?
Humming sound over heart?

YES → **Go to Page 3**

NO

Possible driveline cable fracture:
- **Quickly, but gently manipulate cable trying to restore break**
- **If successful, tape driveline in place where functioning restored**

Mechanical Circulatory Support
LVAD, RVAD, and Bi-VAD



Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Suspected Opioid Overdose

Administer Naloxone per Overdose / Toxic Ingestion Protocol TE 7

Left Ventricular Assist Device LVAD Unresponsive or AMS

Wake Forest Baptist Health Heart Line
VAD specific guidance
Call: (336) 716-7370

Pearls

- **Recommended exam: Mental status, skin color, capillary refill, peripheral pulses, blood pressure.**
- **Assessment of blood flow and perfusion status:**
  - **Optimal BP attained by manual BP and Doppler.**
  - **Automated BP devices can measure a BP in about 50% of attempts and is not reliable to assess perfusion**
  - **A MAP of ≥ 60 mmHg is adequate for most LVAD patients.**
  - **Skin color, skin temperature, capillary refill**
- **Mechanical Circulatory Support devices:**
  - **LVAD – Left Ventricular Assist Device**
  - **RVAD – Right Ventricular Assist Device**
  - **BiVAD – Biventricular Ventricular Assist Device**
  - **TAH – Total Artificial Heart**
- **Reasons for use:**
  - **Bridge therapy – patients awaiting transplant or anticipated recovery.**
  - **Destination therapy – advanced heart failure, not candidate for transplant, and will live rest of life with device.**
- **Pump type and assessing pulses:**
  - **Pulsatile flow pumps – older units, not commonly in use now, but generate blood flow with a pulsatile flow and patient will have a palpable pulse.**
  - **Continuous flow pumps – majority of pumps now used and create blood flow in a continuous stream, no pulsatile flow, so patient will not have a palpable pulse.**
  - **Most devices are implanted inside the chest and have an internal pump, a driveline connected from the pump to the controller unit, and a power source consisting of batteries and electrical cord for receptacles.**
- **Common complications:**
  - **Disconnection of power supply, either battery disconnect, or electrical cord to receptacle disconnection.**
  - **Driveline failure or disconnection from controller unit.**
  - **Controller failure**
  - **Blood clot formation, acute stroke, and bleeding (mucosal and gastrointestinal most common sites)**
  - **Infection**
- Abnormal heart rhythm:
  - Pseudo-PEA: Normal cardiac electrical activity in a patient who is alert and well perfused with no palpable pulse. Tachyarrhythmias are usually well tolerated.
- End Tidal CO2 (EtCO2)
  - If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  - If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- Transcutaneous Pacing:
  - Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival

Total Artificial Heart

History
- SAMPLE
- Bridge to transplant
- Destination therapy
- Estimated downtime
- LVAD, RVAD, Bi-Vad, TAH
- DNR, MOST, or Living Will
- Contact with LVAD coordinator

Signs and Symptoms
- Unconsciousness
- Pulseless
- Apneic
- Poor capillary refill / skin color
- AMS or decreased mental status
- No electrical activity on ECG
- No heart tones on auscultation

Differential
- See Reversible Causes below
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Rapid assessment
Check for signs of life
Assess for adequate perfusion

Contact transplant coordinator:
- As quickly as possible for troubleshooting and treatment advice, but do not delay emergency treatment
- Follow patient specific emergency plan if present

DO NOT USE ECG MONITOR
- Total Artificial Heart does not generate ECG

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES → Decomposition, Rigor mortis, Dependent lividity, Blunt force trauma
Injury incompatible with life
Extended downtime
Do not begin resuscitation
Follow Deceased Subjects Policy

NO

Pulse Present?

NO → **Go to Page 2**

YES

- Airway Protocol(s) AR 1, 2, 3 ***if indicated***
- Respiratory Distress Protocol AR 4 ***if indicated***
- Altered Mental Status Protocol UP 4 ***if indicated***

→ **Check Blood Pressure**

Systolic BP ≥ 150 mmHg

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

Maintain SBP ≥ 90 mmHg

P — **Furosemide 40 mg IV / IO** ***if available***
May assist patient taking their antihypertensive medication

Maintain SBP ≥ 90 mmHg

Systolic BP < 150 mmHg And ≥ 90 mmHg

DO NOT USE:
- Manual or mechanical chest compressions
- ECG/Defibrillation/Pacing/AED devices
- Vasopressor medications
- Antiarrhythmic medications

Systolic BP < 90 mmHg

IV / IO Access Protocol UP 6

A — **Normal Saline Bolus or Lactated Ringers**
500 mL IV / IO
May repeat as needed
Maximum 1 L

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Total Artificial Heart

Entering from Page 1
No Pulse Present

DO NOT USE ECG MONITOR
- Total Artificial Heart does not generate ECG

Attempt to restart Total Artificial Heart

Expose Total Artificial Heart control module
Expose Total Artificial Heart power source
Expose Total Artificial Heart driveline

Driveline:
- **Ensure it is connected firmly to control module**
- **Ensure lines are not kinked or bent**

Power source:
- **Ensure all connections firmly to control module (batteries or main power source)**

Battery charge:
- **Check by pressing charge indicator**
- **Replace battery(s) if indicated**

Back up Driver
- **Change to back up driver *if available***

Pulse Present? — YES → **Go to Page 1**

NO

A **Normal Saline Bolus 500 mL IV / IO**
May repeat as needed

Maximum 1 L

Pulse Present? — YES → **Go to Page 1**

NO

Follow Deceased Subjects Policy

Total Artificial Heart

Pearls

- **Recommended exam: Mental status, skin color, capillary refill, peripheral pulses, blood pressure.**
- **Assessment of blood flow and perfusion status:**
  - **Manual and automated BP devices can measure a BP.**
  - **Skin color, skin temperature, capillary refill**
- **ECG and telemetry monitoring:**
  - **The artificial heart does not produre an ECG wave form or tracing.**
  - **Do not use the 12-Lead ECG or ECG monitoring as it will only show asystole.**
- Total Artificial Heart:
  - **Different than Ventricular Assist Device (LVAD, RVAD, or Bi-VAD)**
  - **The patient's left and right ventricles are removed and the artificial heart is connected to the right and left atria.**
  - **The patient is totally dependent on the artificial heart for circulatory support – the native heart is removed.**
  - **There are both a right and left side pump, driven by air, and each side driven by a separate driveline.**
  - **The drivelines are not electric, they are driven by air, so kinking can disrupt the pumping action.**
  - **Artificial heart produces a pulsatile wave form so the patient will have a palpable pulse when operational.**
- Reasons for use:
  - **Bridge therapy – patients awaiting transplant or anticipated recovery.**
  - **Destination therapy – advanced heart failure, not candidate for transplant, and will live rest of life with device.**
- Common complications:
  - **Most common is kinking or bending of the driveline(s) which stops air from moving and stops pumping action.**
  - **Disconnection of power supply, either battery disconnect, or electrical cord to receptacle disconnection.**
  - **Driveline failure or disconnection from controller unit.**
  - **Controller failure**
  - **Blood clot formation, acute stroke, and bleeding (mucosal and gastrointestinal most common sites)**
  - **Infection**
- Blood pressure:
  - **Optimal SBP is < 130 mmHg and > 90 mmHg.**
  - **Hypertension puts great strain on the pump and can cause blood to back up into the lungs and cause pulmonary edema and respiratory failure.**
  - **Epinephrine and vasopressors are ineffective, can cause hypertension, and may worsen the patient's condition.**
- Manual or mechanical chest compressions:
  - **Do not use**
- End Tidal CO2 (EtCO2)
  - Helpful in monitoring adequate perfusion status.
- Defibrillation/Cardioversion:
  - Do not use.
- Transcutaneous Pacing:
  - Do not use.

Wearable Cardioverter Defibrillator Vest

History
- SAMPLE
- Known risk for Sudden Cardiac Death
- Risk for life-threatening arrhythmia
- No implanted defibrillator
- Heart failure – cardiomyopathy
- Decreased ejection fraction

Signs and Symptoms
- Chest pain, dyspnea
- Palpitations
- Received shock from vest
- Poor capillary refill / skin color
- AMS or decreased mental status

Differential
- See Reversible Causes below
- Arrhythmia
- Infection/Sepsis
- Hypovolemia
- Cardiac arrest
- Hemorrhage

Conduct standard patient assessment
Primary/Secondary Surveys

Wearable Cardioverter-Defibrillator Vest Alarming?

YES

Device Silent or Single-Tone Gong Alert
Voice: None – silent
Voice: "Treatment given, call your doctor"
See page 2

NO

Device Siren Alert Two-Tone
Voice: "If patient is not responsive, call for help. Start CPR."
See page 2

Device Siren Alert Two-Tone
Voice: "Press response buttons to delay treatment."
"Bystanders, do not interfere."
See page 2

Cardiac Arrest

YES → Cardiac Arrest Protocol AC 3

NO

Condition requires 12-Lead ECG
And/or
Continuous telemetry monitoring

YES

- Airway Protocol(s) AR 1, 2, 3 ***as indicated***
- Chest Pain and STEMI Protocol AC 4 ***if indicated***
- Age Appropriate Protocol(s) ***as indicated***
- IV / IO Protocol UP 6

Remove cardioverter-defibrillator vest
1. Remove the battery
2. Remove the vest
3. Place ECG electrodes
4. Place pads anterior-lateral or anterior-posterior

- AED Procedure ***if available***

P
- Cardioversion - Defibrillation Procedure(s)
- Cardiac Monitor

Notify Destination or Contact Medical Control

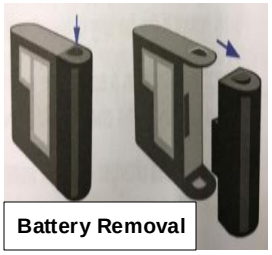
NO

Leave Vest in Place and Operational

Exit to Age Appropriate Protocol(s)

Adult Cardiac Protocol Section

Wearable Cardioverter Defibrillator Vest


Battery Removal


Response button

Pearls

- **Recommended exam: Mental status, skin color, capillary refill, peripheral pulses, blood pressure.**
- **Wearable Cardioverter-Defibrillator Vest:**
  - **Device is preparing to delivery a shock to the patient:**
  - **Before device delivers a shock, it tests to see if patient is conscious – voice prompt instructs patient to press the "response" button (see diagram above).**
  - **Only the patient should press the "response" button.**
  - **Once a treatable arrhythmia is detected it takes between 25 and 60 seconds to deliver the shock.**
- **Audible and tactile warning system:**
  - **The device will provide a vibration, a siren tone, and voice prompts to check if the patient is conscious and give them an opportunity to press the "response" button to abort a shock.**
  - **See audible warning system above.**
- **Reasons for use:**
  - **Currently only device on the market is the Zoll LifeVest.**
  - **Worn by patients at risk of sudden cardiac arrest or risk of abnormal and/or lethal arrhythmia.**
- **Blue gel on the patient's skin from the device:**
  - **Electrode pads release a blue get prior to treatment to improve shock conduction and reduce burning.**
  - **Do not remove the gel if the vest is left in place during treatment.**
  - **Remove gel if vest is removed for prehospital care.**
- **Shock to providers:**
  - **Do not touch the patient when the device is instructing you that a shock will be delivered.**
  - **Providers can be shocked by the device during energy delivery if provider is touching the patient.**
- Removing the device for prehospital care:
  - The device should only be removed when ECG monitor and defibrillator is available.
  - Continuous ECG monitoring and electrode pads should be in place when vest is removed.
- Defibrillation/cardioversion with vest in place:
  - Disconnect the device from the vest before you deliver a cardioversion or defibrillation
- Transcutaneous Pacing:
  - May be utilized with vest in place – disconnect the device from the vest before you perform transcutaneous pacing.

Allergic Reaction/ Anaphylaxis

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

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

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

Assess Symptom Severity / Suspected Exposure to Allergen

MILD
Skin Only

	Diphenhydramine 50 mg PO
A	IV Procedure ***if indicated***
A	**Diphenhydramine 50 mg PO / IV / IM / IO If not already given PO**
B	Monitor and Reassess Monitor for Worsening Signs and Symptoms

MODERATE
2 + Body Systems

	Epinephrine 1:1000 IM 0.3 – 0.5 mg If available
	Diphenhydramine 50 mg PO *See Pearls*
B	**Albuterol Nebulizer 2.5 – 5 mg** Repeat as needed x 3 ***if indicated***
A	**Epinephrine 1:1000 0.3 – 0.5 mg IM** Repeat every 5 minutes if no improvement

SEVERE
2 + Body Systems + hypotension
Or Isolated Hypotension

	Epinephrine 1:1000 IM 0.5 mg *If available*
B	**Albuterol 2.5 – 5 mg** Nebulizer Repeat as needed x 3 ***if indicated***
	Airway Protocol(s) AR 1 - 4 ***if indicated***
	Hypotension/ Shock Protocol AM 5 ***if indicated***

IV or IO Access Protocol UP 6

A	**Diphenhydramine 50 mg PO / IV / IM / IO If not already given PO**
A	**Albuterol Nebulizer 2.5 – 5 mg +/- Ipratropium 0.5 mg (DuoNeb)** Repeat as needed x 3 ***if indicated***
A	**Normal Saline Bolus 500 mL IV / IO** Repeat as needed **Maximum 2 Liters**
P	No improvement with IM Epinephrine **Epinephrine IV / IO** See Pearls for dosing regimen
P	**Methylprednisolone 125 mg IV / IO**

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Allergic Reaction / Anaphylaxis

Allergic reactions occur when a patient is exposed to an allergen (pollen, insect, medication, food, etc.) causing the body to respond by releasing specific immunoglobulins and histamine which causes hives, itching and capillary leaking leading to edema. Most allergic reactions are mild and involve only the skin such as erythema, hives and / or itching and are usually resolved with an anti-histamine like diphenhydramine. Anaphylaxis is a severe form of an allergic reaction and recent studies show it is under-recognized and under-treated.

Anaphylaxis is likely present when any 1 of the 3 criteria below are present:

1. Acute onset of illness (minutes to hours) with skin involvement: Hives, erythema, itching and / or angioedema.

PLUS

Dyspnea, wheezing, stridor or hypoxemia.

OR

Hypotension, poor perfusion, shock, incontinence, syncope.

2. Acute onset of illness (minutes to hours) with 2 or more of the following are present:

a. Hives, erythema, itching and / or angioedema.

b. Dyspnea, wheezing, stridor or hypoxemia.

c. Hypotension, poor perfusion, shock, incontinence

d. Nausea, vomiting and / or abdominal pain / cramping.

3. Acute onset of illness (minutes to hours) with hypotension, poor perfusion, syncope, incontinence after exposure to known allergen.

The main point is that anaphylaxis does not mean the patient must be in shock. Patients who demonstrate skin involvement plus a respiratory complaint have anaphylaxis. Patients who have skin involvement and GI symptoms such as nausea or abdominal cramping have anaphylaxis. And finally a patient may have anaphylaxis and have no skin findings such as rash or erythema.

Epinephrine IV in Severe Allergy unresponsive to IM Epinephrine after 2 doses:

In the patient with severe anaphylaxis who is not responding to Epinephrine IM and fluid resuscitation, IV Epinephrine should be administered. Exit to hypotension protocol and give push dose epinephrine. Give 4 – 8 mcg IV every 5 minutes to effect SBP > 90 and/or MAP of 65 mmHg. Do not give Diphenhydramine (Benadryl) in the setting of hypotension as it can worsen hypotension and cause altered mental status.

Pearls

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

Diabetic; Adult

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

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

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

Blood Glucose Analysis Procedure

B — 12 Lead ECG Procedure ***if indicated***

IV or IO Access Protocol UP 6

P — Cardiac Monitor

Altered Mental Status Protocol UP 4 ***if indicated***

Hypotension/ Shock Protocol AM 5 ***if indicated***

Suspected Stroke Protocol AM 7 ***if indicated***

Seizure Protocol UP 13 ***if indicated***

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

Blood Sugar ≤ 69 mg / dl

Consider Oral Glucose Solution *if available*

Consider Oral Solution (Juices / Food)

A — <u>If no improvement</u>
D10 125 mL – 250 mL IV / IO
Or
D50 12.5 - 25 gm IV / IO
May repeat until Blood Glucose ≥ 80 mg/dL

Blood Sugar 70 – 249 mg / dl

Blood Glucose Analysis Procedure ***if condition changes***

Exit to Appropriate Protocol(s)

Blood Sugar ≥ 250 mg / dl

A — **Normal Saline or Lactated Ringers Bolus**
500 mL IV / IO
May repeat as needed
Then infuse 150 mL / hr

Monitor and Reassess Every 5 minutes Until Blood Glucose ≥ 70 mg / dl

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Diabetic; Adult

Hypoglycemia:
Always suspect hypoglycemia in any patient with altered mental status and perform finger stick glucose procedure.
If Blood Glucose Analysis is not available or not functional give D10 250 mL, D50 12.5 to 25 mg IV / IO, or Glucagon with altered mental status. D10 is preferred even in adults, however if volume overload is suspected give D50 if available.
Dextrose 50 % will raise blood sugar but rebound hypoglycemia is common.

Hyperglycemia:
Diabetic ketoacidosis (DKA) is a complication of diabetes melitus and cannot be diagnosed in the field but can be suspected. DKA is a condition where the body cannot properly utilize insulin to effect glucose metabolism. The body compensates by breaking down fats and proteins leading to a metabolic acidosis. The body also begins to dump excess glucose by excessive urination. Patients typically appear dehydrated, ill and usually have tachypnea. Patients can have marked hyperglycemia without being in DKA. DKA can occur at any level of hyperglycemia typically above 250 mg / dl.

Glucagon:
If IV / IO access is obtained after glucagon administration and the patient remains symptomatic then give D50 as per appropriate treatment arm.

Insulin Pump:
If patient is hypoglycemic turn off the patient s insulin pump. Elicit help from the patient, when able, and / or the family who typically are well versed in it s operation.

Oral Diabetic Agents / Patient Refusal:
Patients taking long acting oral agents who experience hypoglycemia should be strongly encouraged to seek care in the emergency department via EMS. These agents may have very long half lives placing the patient in danger of hypoglycemia hours later (12 – 36). If patient refuses transport make every effort to contact the patient s Primary Care Provider to arrange quick follow up that business day or the next. Patients refusing should also be warned to remain with a responsible person for the next 36 hours in order for help to be summoned if patient becomes incapacitated. Contact medical control for advice concerning oral agents if needed.
Glucophage / Metformin: Patients who ONLY take this medication (orally is only route) do not fit into the category of long acting oral diabetic agents. This medication does not induce hypoglycemia.

Pearls

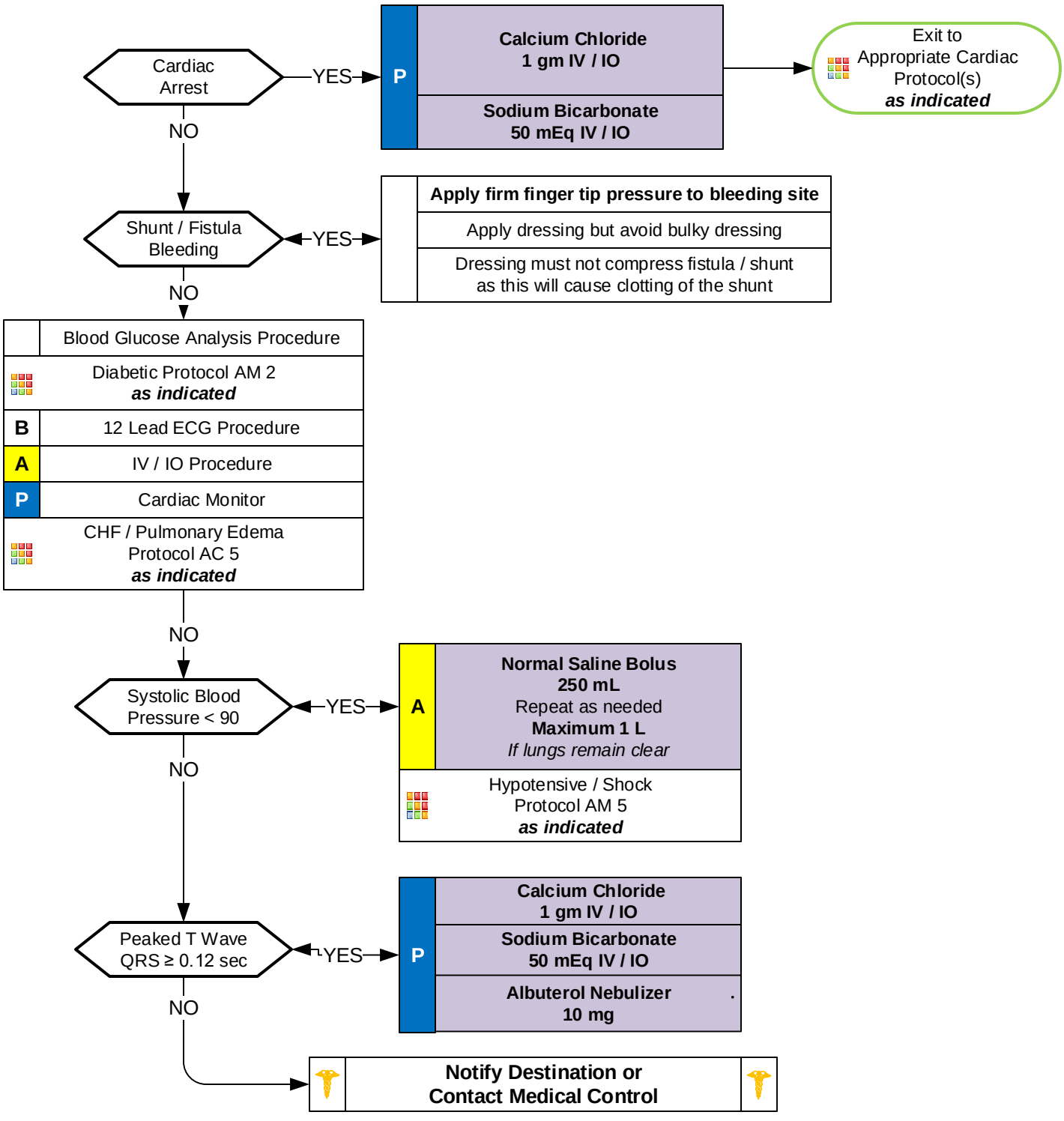
- **Recommended exam: Mental Status, Skin, Respirations and effort, Neuro.**
- **Patients with prolonged hypoglycemia my not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks should be maintained per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

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 Protocol Section

Dialysis / Renal Failure

Peritoneal dialysis:
Patient will have a catheter placed inside the abdomen called a Tenckhoff Catheter. The patient will typically infuse the abdomen full of dialysate at night and will remove in the morning which is called a dwell or more frequently in the day lasting for a few hours. The metabolic waste will be absorbed by osmosis the solution and peritoneal membrane. In addition to the typical problems encountered by the dialysis patient infection, bleeding, occlusion and disruption of the Tenckhoff catheter may occur.

Hemodialysis:
Patient will have a long term catheter or shunt (fistula) placed for this procedure. Catheters are typically placed in the upper chest region or groin. Shunts are typically placed in the arms or forearms. The shunt is created by connecting a vein and an artery together and you will feel a thrill (vibration) over the shunt when palpated and hear a bruit when functioning properly. This typically occurs 3 times per week in 4 hour sessions. Some patients are now performing hemodialysis at home daily for 1 to 2 hours.

Shunt bleeding:
Bleeding after hemodialysis is not uncommon but typically is controlled at the center before leaving. Many dialysis patients receive heparin during their treatment. When faced with a bleeding shunt you should identify the site of bleeding. Typically this will occur in 1 to 4 tiny holes made by needles. A common response is to wrap in a bulky dressing. This will absorb the blood but will NOT control the bleeding.

Direct finger tip pressure should be performed. You may fold a small gauze into a half inch square and place over the bleeding area(s) but direct pressure is key. When the bleeding stops place tape over the gauze but do not remove the gauze to check your progress as this will usually cause more bleeding. Circumferential dressing should NOT be used as this can occlude the shunt and cause clotting of the shunt. The tape should envelope about 180 degrees of the extremity.

Indwelling catheter and shunt access:
In an emergency when vascular access by IV or IO procedure cannot be obtained the paramedic may access the long term vascular catheter for use. Access by this means should only be used in an emergency when no other means of vascular access are available. Use sterile technique as infection is a great risk in this procedure. IO is preferred.

Pearls

- **Recommended exam: Mental status. Neurological. Lungs. Heart.**
- **Consider transport to medical facility capable of providing Dialysis treatment.**
- **Do not take Blood Pressure or start IV in extremity which has a shunt / fistula in place.**
- **Access of shunt indicated in the dead or near-dead patient only with no IV or IO access.**
- **If hemorrhage cannot be controlled with firm, uninterrupted direct pressure, application of tourniquet with uncontrolled dialysis fistula bleeding is indicated.**
- **Hemodialysis:**
  Process which removes waste from the blood stream and occurs about three times each week.
  Some patients do perform hemodialysis at home.
- **Peritoneal dialysis:**
  If patient complains of fever, abdominal pain, and / or back pain, bring the PD fluid bag, which has drained from the abdomen, to the hospital.

Complications of Dialysis Treatment:

Hypotension:
Typically responds to small fluid bolus of 250 mL Normal Saline. May result in angina, AMS, seizure or arrhythmia.

Filtration and decreased blood levels of some medications like some seizure medications:

Disequilibrium syndrome:
Shift of metabolic waste and electrolytes causing weakness, dizziness, nausea and / or vomiting and seizures.

Equipment malfunction:
Air embolism.
Bleeding.
Electrolyte imbalance.
Fever.

- **Fever:**
  Consider sepsis in a dialysis patient with any catheter extending outside the body.
- Always consider Hyperkalemia in all dialysis or renal failure patients.
- Sodium Bicarbonate and Calcium Chloride / Gluconate should not be mixed. Ideally give in separate lines.
- Renal dialysis patients have numerous medical problems typically. Hypertension and cardiac disease are prevalent.

Hypertension

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

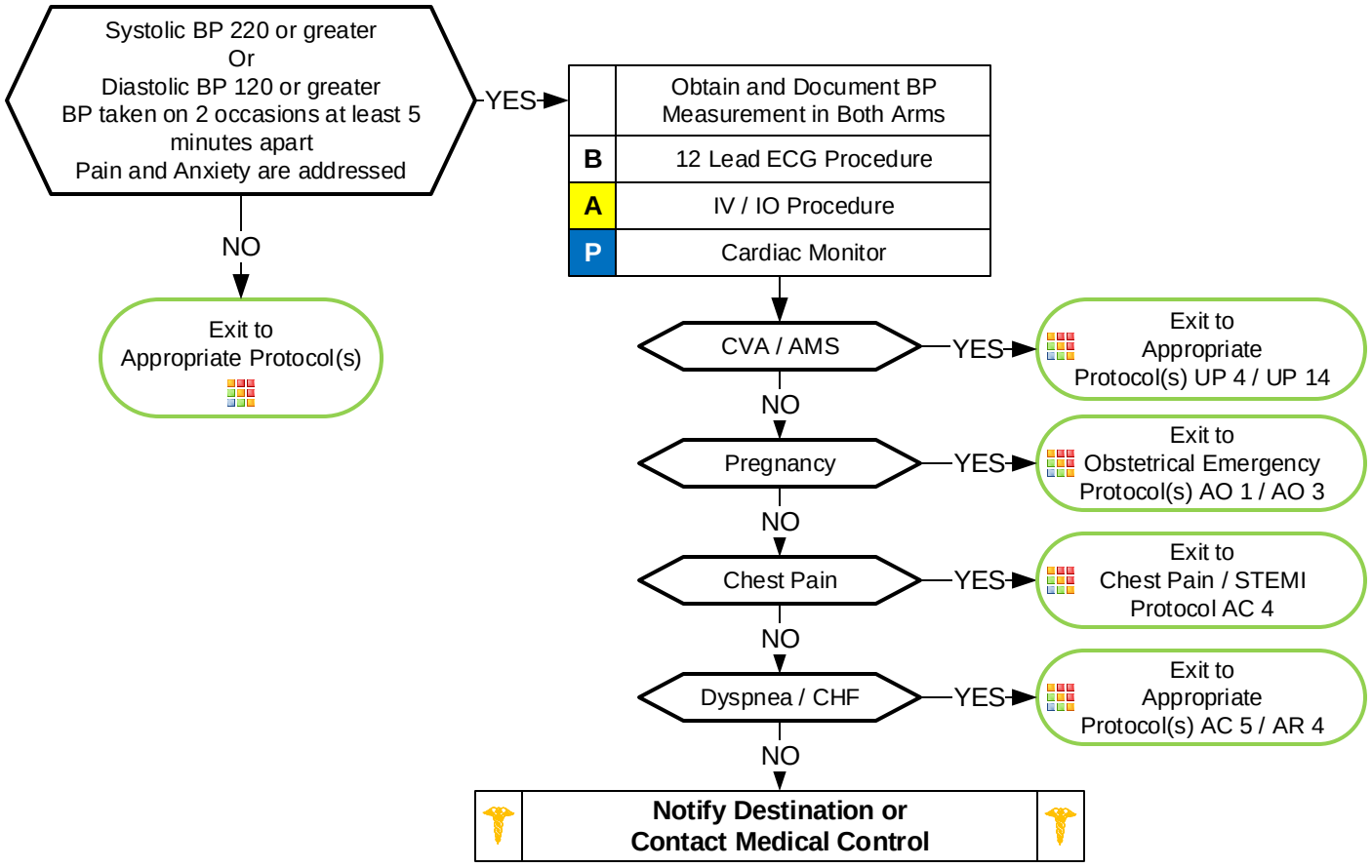
Signs and Symptoms

One of these
- Systolic BP 220 or greater
- Diastolic BP 120 or greater

AND at least one of these
- Headache
- Chest Pain
- Dyspnea
- Altered Mental Status
- Seizure

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

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



Adult Medical Protocol Section

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

Hypotension/ Shock

History
- Blood loss - vaginal or gastrointestinal bleeding, AAA, ectopic
- Fluid loss - vomiting, diarrhea, fever
- Infection
- Cardiac ischemia (MI, CHF)
- Medications
- Allergic reaction
- Pregnancy
- History of poor oral intake

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

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

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure
A	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Airway Protocol(s) ***if indicated***
	Diabetic Protocol AM 2 ***if indicated***

History and Exam Suggest Type of Shock

Cardiogenic

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

Hypovolemic / **Distributive**

Allergy Protocol AM 1 ***if indicated***

Suspected Sepsis Protocol UP 15 ***if indicated***

Multiple Trauma Protocol TB 6 ***if indicated***

Obstructive

P — Chest Decompression-Needle Procedure ***if indicated***

A	**Normal Saline or Lactated Ringers Bolus 500 mL IV** Repeat to effect SBP > 90 **2 L Maximum**
P	**If SBP < 90** consider drip or push dose pressors HR < 120 **Epinephrine**: 5 mcg every 5 min **Epi Drip** 1 – 10 mcg/min Heart Rate > 120 **Phenylephrine**: 50 mcg every 5 min

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Hypotension / Shock

Tranexamic Acid (TXA)
Indications:
Trauma patients with symptoms of shock or early shock, expected to have internal bleeding, and potential need for blood transfusion.
SBP < 90 with suspected hemorrhage / shock / early shock.
TXA must be given within 3 hours of injury
Administer 1 gm over 10 minutes
Infuse during transport only, unless patient entrapped and can be administered without slowing extrication.

Push-Dose Vasopressors:
Epinephrine
Mix 1:1000 (1mg in 1mL) into 250 mL of NS.
Yields a concentration of 4 mcg/mL of Epinephrine which is the same as epi drip.
Give 4 – 8 mcg every 5 minutes to effect SBP > 90 and/or MAP of 65 mmHg.
Use in patients with BP < 90 and Heart Rate < 120.

Phenylephrine
Pre-mixed with a concentration of 10 mcg/mL.
Give 50 - 100 mcg every 5 minutes to effect a BP > 90 and/or MAP of 65 mmHg.
Use in patients with BP < 90 and Heart Rate > 120.

Epinephrine DRIP
Mix 1 mg in 250 mL NS or D5W
Or
2 mg in 500 mL NS or D5W
(4 mcg / mL)

Dose	mL / min	mL / hr
1 mcg/min	0.25 mL/min	15 mL/hr
2 mcg/min	0.50 mL/min	30 mL/hr
3 mcg/min	0.75 mL/min	45 mL/hr
4 mcg/min	1 mL/min	60 mL/hr
5 mcg/min	1.25 mL/min	75 mL/hr
6 mcg/min	1.50 mL/min	90 mL/hr
7 mcg/min	1.75 mL/min	105 mL/hr
8 mcg/min	2 mL/min	120 mL/hr
9 mcg/min	2.25 mL/min	135 mL/hr
10 mcg/min	2.50 mL/min	150 mL/hr

Pearls

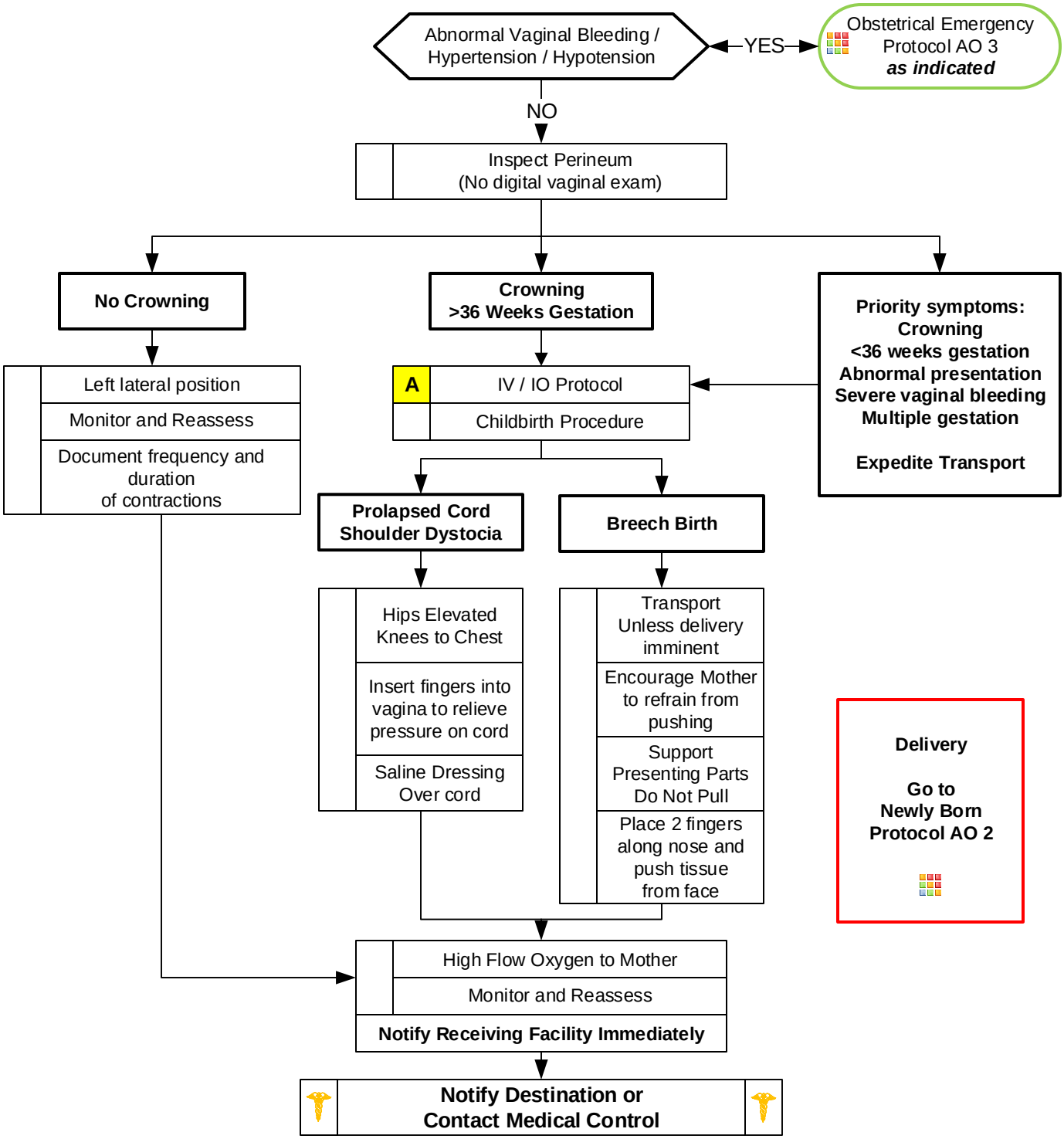
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Hypotension can be defined as a systolic blood pressure of less than 90. This is not always reliable and should be interpreted in context and patients typical BP if known. Shock may be present with a normal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

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



Adult Obstetrical Protocol Section

Childbirth / Labor

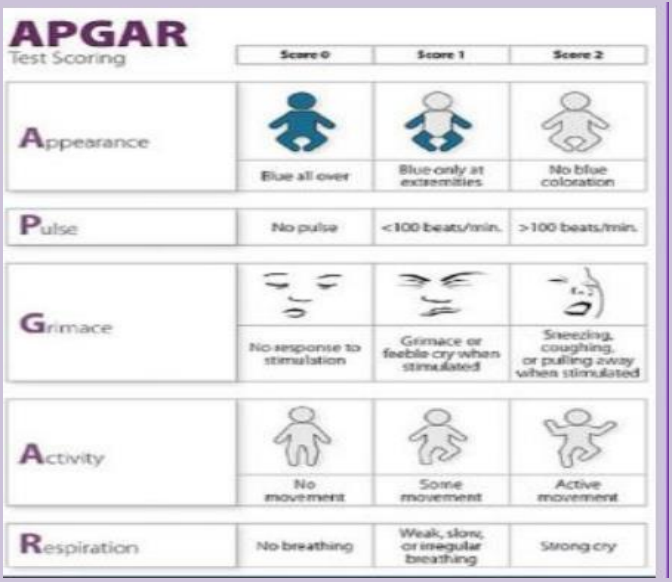
Stages of Labor:

Stage 1:
Dilatation stage. The first stage of labor begins with the onset of true labor contractions and ends with the complete dilatation and effacement of the cervix. Effacement of the cervix means it has become very thin and short. Complete dilatation is 10 cm. The first stage typically lasts for 8 to 10 hours for women experiencing their first pregnancy and 5 to 7 hours for multiparous females. Typically the contractions are mild and last for 15 to 20 seconds and recur about every 10 to 20 minutes. As labor progresses the contractions become intense, lasting about 60 seconds and recur every 2 to 3 minutes.

Stage 2:
Expulsive stage. The second stage begins when the cervix is dilated to 10 cm. This typically lasts 60 minutes for those experiencing their first pregnancy. In the multiparous this this may last only 30 minutes. Contractions in this stage last for 60 to 80 seconds and recur about every 2 minutes. The membranes usually rupture in this stage, back pain and the urge to push are prominent. Crowning occurs when the head or presenting part is visible in the vaginal opening.

Stage 3:
Placental stage. The third stage of labor begins when the infant is delivered and ends when the placenta delivers. The placenta generally delivers within 5 to 30 minutes. Often a rush of blood may be seen, lower abdominal shape change due to uterine contractions may occur and the umbilical cord may lengthen all of which signal the placenta delivery is imminent.

Hypothermia:
Immediately following delivery place infant onto mother s abdomen skin-to-skin and wrap to maintain warmth.



General approach:
Place IV access anticipating need for fluid replacement. Average blood loss during delivery is 500 mL.

Following birth treat pain per pain control protocol.

Do not carry infant. Infant should be with mother, skin-to skin. Carrying the infant is a fall / drop risk.

If you must carry infant, sit in a wheelchair and have someone push you and infant to Labor and Delivery.

Adult Obstetrical Protocol Section

Pearls

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

Newly Born

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

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

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

Breathing or Crying?
Term Gestation?
Good Muscle Tone?

ALL YES →
- Warm / Dry / Stimulate infant
- Infant with mother if possible
- Maintain normal temperature
- Clear airway if necessary
- Monitor and Reassess

ANY NO ↓
- Warm, Dry and Stimulate
- Clear airway if necessary

Agonal breathing or Apnea?
Heart Rate < 100 / min
Labored breathing or Persistent cyanosis

YES →
- Position and clear airway if necessary
- Supplemental Oxygen
- BVM Ventilations with or without O_2
- **B** Pulse Oximetry Right Hand
- **P** Cardiac Monitor / 3 or 4 – Lead

Heart Rate < 100

YES →
- Check chest movement
- Change airway position
- Change BVM Technique and add O_2
- Pediatric Airway Protocol(s) AR 5, 6 ***if no improvement***

NO ↓
- Supplemental Oxygen
- Maintain SpO_2 92 -98 %
- (See Pearls for expected SpO_2)
- Maintain warmth
- Monitor and Reassess

Heart Rate < 60

YES →
- Chest Compressions
- Pediatric Airway Protocol(s) AR 5, 6
- IV / IO Protocol UP 6
- **A** **Epinephrine 1:10,000**
  0.01 mg /kg IV / IO
  Every 3 to 5 minutes as needed
- **A** **Normal Saline Bolus**
  10 mL / kg IV / IO
  If not responding to epinephrine
  May repeat x 1

NO ↓

Notify Destination or Contact Medical Control

Adult Obstetrical Protocol Section

Newly Born

Newborns who do not need resuscitation are generally identified by the following:

1. Term gestation
2. Crying or breathing
3. Good muscle tone

Newborns who do not fit the above categories may need one or more of the following:

1. Initial steps including providing warmth, clear airway if necessary, dry and stimulate
2. Ventilations
3. Chest compressions if heart rate less than 60 bpm
4. Administration of epinephrine or volume resuscitation

Resuscitation of the newborn should always be expected and prepared for in the pre-hospital setting.

Temperature Control:

Infants, especially low birth weight or premature infants are prone to hypothermia. Keeping the baby dry and well covered will prevent hypothermia. If the infant needs no resuscitation, placing infant to mother s chest and abdomen and covering both is advised.

Clearing the Airway:

Amniotic fluid is clear. If it is not clear then there is meconium staining. Suctioning immediately following birth should be reserved for infants who have obstruction to breathing or who require BVM ventilations. **Routine suctioning** of the oropharynx after delivery of the head is **no longer recommended**.

Meconium present:

No good evidence exists to guide decision making here. If meconium staining is present and the infant is non-vigorous then endotracheal intubation with suctioning is warranted. The endotracheal tube should be discarded and the infant reintubated only if not responsive to oxygen and BVM ventilations.

Hypoglycemia:

Routine blood glucose checks are not warranted however with any child failing or slow to respond to normal resuscitative efforts, a blood glucose analysis should be performed. Controversy exists about what constitutes hypoglycemia in the newborn but for our assessment any symptomatic infant with a blood glucose < 60 should receive 10-20cc of D10. To make D10 from D50, expel 2cc from a 10cc syringe of NS and replace with 2cc of D50.

Guidelines for Withholding Resuscitation:

Gestational age < 23 weeks	Gross deformity incompatible with life
Anencephaly	Parents desire DNR

Pearls

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

OB-GYN 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

Known or Suspected Pregnancy Missed Period Vaginal Bleeding Abdominal Pain

YES

- Left lateral recumbant position
- Blood Glucose Analysis Procedure
- A: IV or IO Access Protocol UP 6
- P: Cardiac Monior
- Abdominal Pain Vomiting and Diarrhea Protocol UP 3 ***if indicated***
- Diabetic Protocol AM 2/ PM 2 ***if indicated***
- Hypotension/ Shock Protocol AM 5/ PM 3 ***if indicated***

NO

Exit to Appropriate Protocol(s)

Postpartum Hemorrhage with SBP <90 OR Uncontrolled Vaginal Hemorrhage with signs of shock

YES

P: **TXA 2 gm over 10 minutes IV / IO** *See Pearls*

NO

Field Delivery?

YES

P: **Oxytocin 10 IU IM Administer to mother** ***if available*** **Maximum Dose 20 mg**

NO

Seizure Activity

YES

P: **Midazolam 2.5 mg IV / IO** May repeat every 3 to 5 minutes as needed If no IV/IO access **Midazolam 5 mg IM** **Midazolam 2 mg IN** **Maximum 10 mg**

Magnesium Sulfate 2g IV / IO Over 2 – 3 minutes May repeat x 1

NO

- Childbirth / Labor Protocol AO 1 **if indicated**
- Monitor and Reassess

Notify Destination or Contact Medical Control

Adult Obstetric Protocol Section

Obstetrical Emergency

Abruptio Placentae:
Abruptio Placentae is the premature separation of the placenta from the uterus. During second half of pregnancy < 5 % of patients will have vaginal bleeding. About 30 % of vaginal bleeding during this period may result from Abruptio Placenta. Bleeding during this period may result in fetal distress and is considered an emergency.
Trauma, preeclampsia or maternal hypertension typically precipitate Abruptio Placenta. Other risk factors are women < 20 years of age, advanced maternal age (>35), smoking, prior Abruptio Placenta, multiparity or cocaine use.
Patients with vaginal bleeding, contractions, uterine / abdominal tenderness and decreased or no fetal movement may have this
condition.

Placenta Previa:
Placenta Previa occurs when the placenta implants over the cervical os (opening.) This is a leading cause of vaginal bleeding in the second half of pregnancy. Bleeding is usually bright and painless though about 20 % will have some uterine irritability.
Advanced maternal age (>35), multiparity, smoking and prior C-section are risk factors for this condition.

Uterine Rupture:
Often occurs with onset of labor though more commonly after trauma. This is usually signaled with severe abdominal pain and
shock.

Active Seizure with no IV access:
Midazolam is preferred agent, give IM (may give IN, but IM is preferred route)
It is very important to administer Magnesium Sulfate as the patient most likely has eclampsia but give Midazolam IM first while you are trying to establish IV access.

Pearls

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

Blast Injury / Incident

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

Signs and Symptoms
- Hearing loss (TM rupture)
- Ocular burns/vision changes
- Multiple trauma/penetrating trauma
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing
- Pneumo/hemothorax
- Traumatic amputation (tourniquet)

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

Nature of Device: Agent / Amount. Industrial Explosion. Terrorist Incident. Improvised Explosive Device.
Method of Delivery: Incendiary / Explosive
Nature of Environment: Open / Closed.
Distance from Device: Intervening protective barrier. Other environmental hazards,
Evaluate for: Blunt Trauma / Crush Injury / Compartment Syndrome / Traumatic Brain Injury / Concussion / Tympanic Membrane Rupture / Abdominal hemorrhage or Evisceration, Blast Lung Injury and Penetrating Trauma.

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

Accidental / Intentional Explosions (See Pearls)

- Triage Protocol UP 2 ***as indicated***
- Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 ***as indicated***
- Multiple Trauma Protocol TB 6 ***if indicated***
- IV / IO Protocol UP 6 ***if indicated***
- P — Cardiac Monitor ***if indicated***
- Thermal Burn Protocol TB 9 / Chemical and Electrical Burn Protocol TB 2 ***if indicated***
- Crush Injury Protocol TB 3 ***if indicated***
- Radiation Incident Protocol TB 7 ***if indicated***
- Decontamination Procedure ***if indicated***
- Pain Control Protocol UP 11 ***if indicated***

Blast Lung Injury — YES → Age Appropriate Airway Protocol(s) AR 4, 7 ***as indicated***

NO

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Blast Injury / Incident

Bombs and explosions cause unique patterns of injuries seldom seen outside of combat.
Predominant injuries are both blunt and penetrating trauma.
Blast lung injury is the most common fatal injury among survivors.
Explosions in confined spaces or associated with structural collapse are associated with greater morbidity and mortality.
About 50% of victims may leave the area and seek treatment directly at a medical facility.

High-order explosives:	**Low-order explosives:**
Supersonic over-pressurized shock wave	Subsonic explosion
TNT, C-4, Ammonium Nitrate	Pipe bombs, Gunpowder

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
  - Patients may be hard of hearing due to tympanic membrane rupture.
- **Care of Blast Injury Patients:**
  - Patients may suffer multi-system injuries including blunt and penetrating trauma, shrapnel, barotrauma, burns, and toxic chemical exposure.
  - Consider airway burns which should prompt early and aggressive airway management.
  - Cover open chest wounds with semi-occlusive dressing.
  - Use Lactated Ringers (if available) for all Critical or Serious Burns.
  - Minimize IV fluids resuscitation in patients with no sign of shock or poor perfusion.
- **Blast Lung Injury:**
  - Blast Lung Injury is characterized by respiratory difficulty and hypoxia. Can occur (rarely) in patients without external thoracic trauma. More likely in enclosed space or in close proximity to explosion.
  - Symptoms: Dyspnea, hemoptysis, cough, chest pain, wheezing and hemodynamic instability.
  - Signs: Apnea, tachypnea, hypopnea, hypoxia, cyanosis and diminished breath sounds.
  - Air embolism should be considered and patient transported in left-lateral decubitus position.
  - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyperventilation.
  - Air transport may worsen lung injury as well and close observation is mandated. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.
- **Accidental Explosions or Intentional Explosions:**
  - **All explosions or blasts should be considered intentional until determined otherwise.**
  - Attempt to determine source of the blast to include any potential threat for aerosolization of hazardous materials.
  - Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases.
  - Consider structural collapse / Environmental hazards / Fire.
  - Conditions that led to the initial explosion may be returning and lead to a second explosion.
  - Greatest concern is potential threat for a secondary device.
  - Patients who can, typically will attempt to move as far away from the explosive source as they safely can.
  - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.
  - **If patient is unconscious or there is(are) fatality(fatalities) and you are evaluating patient(s) for signs of life:**
    Before moving note if there are wires coming from the patient(s), or it appears the patient(s) is(are) lying on a package/pack, or bulky item, do not move the patient(s), quickly back away and immediately notify a law enforcement officer.
  - If there are no indications the patient is connected to a triggering mechanism for a secondary device, expeditiously remove the patient(s) from the scene and begin transport to the hospital.
  - Protect the airway and cervical spine, however, beyond the primary survey, care and a more detailed assessment should be deferred until the patient is in the ambulance.
  - If there are signs the patient was carrying the source of the blast, notify law enforcement immediately and most likely, a law enforcement officer will accompany your patient to the hospital.

Chemical and Electrical Burn

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

Signs and Symptoms
- Burns, pain, swelling
- Ocular burns/vision changes
- Loss of consciousness
- Hypotension/shock
- Compartment syndrome
- Airway compromise/distress could be indicated by hoarseness/ wheezing
- Electrical may be misleading with small contact/external burn and major internal injury – burn/trauma center recommended

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

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

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

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

Age Appropriate
Airway Protocol(s) AR 1, 2, 3, 4, 5, 6, 7
if indicated

Thermal Burn Protocol TB 9

Pain Control Protocol UP 11
if indicated

Identify Contact Points

Eye Involvement
Irrigate Involved Eye(s) with Normal Saline for 30 minutes
Continue irrigation during transport

Chemical Exposure / Burn
Flush Contact Area with Normal Saline for 15 minutes
Continue irrigation during transport

Decontamination Procedure
if indicated

Age Appropriate Cardiac Protocol(s)
if indicated

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Chemical and Electrical Burn

Main considerations when encountering a chemical burn:
Emergency Response Guidebook use.
What is the risk of exposure to the providers?

Triage:
Scene size-up and assessment to determine threat to providers

Assessment:
Main focus is to limit ongoing injury and determine extent of exposure.
Remove clothing, flush the area, and then cover with dry sterile dressings.
Gross decontamination consisting of removing clothing typically removes the majority of any chemicals.
Identify the type and nature of the chemical.

Caustics:
Remove powder by brushing then irrigate and flush copiously.

Acids:
Irrigation up to 30 minutes is warranted.

Alkali:
Alkali agents feel slick or soapy.
May require prolonged irrigation.

Main considerations when encountering an electrical burn:
Identify electrical source and determine if patient remains in contact with source.
Electrical source must be disconnected before provider can perform assessment and care.

Potential threats:
Downed power lines, assume they are energized.
Lightning

Lightning strikes:
Reverse triage: Lightning strike victims respond well to basic measures. With more than one victim, institute reverse triage and go to those who appear dead first and deliver CPR unless an injury incompatible with life is determined.
Victims who are awake and breathing following a lightning strike do not typically worsen acutely.

Pearls

- **Recommended Exam: Mental Status, HEENT, Neck, Heart, Lungs, Abdomen, Extremities, Back, and Neuro**
- **Green, Yellow and Red In burn severity do not apply to Triage systems.**
- **Refer to Rule of Nines.**
- **Transport and Destination:**
  - **In general, chemical and electrical burns should be transported to a burn center.**
  - **Burn center should be initial destination choice unless EMS system access is limited by time and/or distance.**
  - **When EMS transport to burn center is limited, transport to and stabilization at local center is appropriate.**
- **Chemical Burns:**
  - Refer to Decontamination Procedure.
  - With dry powders/substances, gently brush or wipe off prior to irrigation. Do not aerosolize by brushing too vigorously.
  - Normal Saline or Sterile Water is preferred, however if not available, do not delay irrigation and use tap water. Other water sources may be used based on availability.
  - Flush the area as soon as possible with the cleanest readily available water or saline solution using copious amounts of fluids.
  - Flush contact area for minimum of 15 minutes and continue until arrival at receiving facility.
  - Hydrofluoric acid burns:
    - Monitor ECG for peaked T waves which can be sign of hypocalcemia.
  - Eye involvement:
    - Irrigation is recommended for a minimum of 30 minutes and continue until arrival at receiving facility.
- **Electrical Burns:**
  - **Remember the extent of the obvious external burn from an electrical source does not always reflect more extensive internal damage not seen. Small external injury may have large internal injury.**
  - **Do not refer to as entry and exit sites or wounds**.
  - 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 (3rd).
  - Cardiac Monitor: Anticipate ventricular or atrial irregularity including VT, VF, atrial fibrillation and / or heart blocks.
  - Attempt to identify the nature of the electrical source (AC / DC), the amount of voltage and the amperage the patient may have been exposed to during the electrical shock.
  - **Lightning strike:**
    - Lightning strike victims are amenable to airway, breathing, cardiac compressions as well as early defibrillation.
    - Use concept of reverse triage with multiple casualties. Resuscitate lightning strikes as the priority.
    - Lightning strike victims found alive do not often deteriorate quickly.

Crush Syndrome Trauma

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

Signs and Symptoms
- Hypotension
- Hypothermia
- Abnormal ECG findings
- Pain
- Anxiety

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

	Age Appropriate Airway Protocol(s) AR 1 - 7 ***as indicated***
B	12 Lead ECG Procedure
A	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Multiple Trauma Protocol TB 6 ***if indicated***
	Thermal Burn Protocol TB 9 Chemical and Electrical Burn Protocol TB 2 ***if indicated***
	Pain Control Protocol UP 11 ***as indicated***

P — Consider
Midazolam 2.5 mg IV / IO / IN
Maximum 5 mg
Pediatric: 0.1 mg / kg IV / IO / IN
Pediatric Maximum 2 mg
Over 2 – 3 minutes as needed

Entrapped < 2 hours

A — **Normal Saline Infusion**
1 Liter per hour IV / IO
Pediatric:
3 x maintenance fluid rate

Entrapped > 2 hours

A — **Give Bolus IV Fluids (See Pearls)**
Then Decrease Normal Saline Infusion
500 mL per hour IV / IO
Pediatric:
Maintenance fluid rate

Abnormal ECG
Peaked T Waves
QRS ≥ 0.12 seconds
QT ≥ 0.46 seconds
Loss of P wave
Or
Hemodynamically Unstable
Or
Asystole / PEA / VF / VT

P
- **Sodium Bicarbonate**
  50 mEq IV / IO
  Pediatric: 1 mEq / kg IV / IO
- **Calcium Chloride 1 g IV / IO**
  Pediatric: 20 mg / kg IV / IO
  Over 2- 3 minutes
- **Albuterol Nebulizer**
  2.5 – 5 mg
  May repeat x 3

Exit to Age Appropriate Cardiac Arrest Protocol AC 3 / PC 4 Arrhythmia Protocol(s) ***if indicated***

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Crush Syndrome Trauma

Crush Syndrome

Crush injury is a compression of the extremities or trunk that causes muscle swelling and / or neurological symptoms in the affected anatomical locations. This most commonly effects the lower extremities (75 %), upper extremities (10 %) and the trunk (9 %). Crush injuries often occur in the settings of bombings, structural collapse and natural disasters.

Crush syndrome is localized crush injury with systemic signs and symptoms. The systemic manifestations are caused by traumatic rhabdomyolosis (literally the breakdown of your muscle) and release of toxic muscle cell enzymes, proteins and electrolytes into the circulation. Crush syndrome may cause local tissue injury, organ dysfunction and metabolic problems such as acidosis, hyperkalemia and hypocalcemia. Fluid retention in extremities (third spacing) may result in hypotension. Metabolic problems may cause cardiac arrhythmias. Acute renal failure may also occur.

Reperfusion Syndrome

Sudden release of a crushed anatomical part may result in acute hypotension / hypervolemia and metabolic problems which can lead to fatal cardiac arrhythmias and sudden death.

Management of Crush Syndrome

Crush syndrome should be considered in any patient where entrapped or obvious crush noted for ≥ 4 hours. Where an anatomical part is entrapped / crushed and abnormal neurological exam or vascular exam is noted this may also signal crush syndrome. Numbness, weakness, heaviness or paresthesias (burning, prickly-type pain) or diminished or absent pulses are signs and symptoms of potential crush syndrome. Vascular compromise can be remembered by the 5 P's: Pain, Pallor, Paresthesias, Pain with Passive movement and Pulselessness.

Hydration:

When crush syndrome is suspected the patient should receive 1 – 2 liters of NS before releasing the crush object when possible. If this is not possible apply a tourniquet to the crushed part if able and maintain until fluids can be delivered. Contract Medical Control before releasing tourniquet.

Cardiac Arrhythmias:

Calcium Gluconate at **2 g IV / IO** is preferred. Pediatric dose is **40 mg/kg IV / IO**. If not available give Calcium Chloride **1 g IV / IO** in the adult and **20 mg/kg IV / IO** in the pediatric patient.
Treat sudden cardiac arrest with sodium bicarbonate and calcium if occurs in the setting of crush syndrome.
Monitor for and treat cardiac arrhythmias.

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

Pearls

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

Extremity Trauma

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

Signs and Symptoms
- Pain and/ or swelling
- Deformity
- Altered sensation/ motor function
- Diminished pulse/ capillary refill
- Decreased extremity temperature

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

Wound care
Control Hemorrhage with Direct Pressure
Splinting as indicated

Consider
Topical Hemostatic Agent/ Dressing
if available

Wound Care WTP 4
Tourniquet Procedure WTP 7
if indicated

A IV or IO Access Protocol UP 6
if indicated

Age Appropriate
Airway Protocol(s) AR 1, 2, 3, 4, 5, 6, 7
if indicated

Multiple Trauma Protocol TB 6
if indicated

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

Pain Protocol UP 11
if indicated

Crush Syndrome Protocol TB 3
as indicated

Amputation and/ or Open Fracture

YES →
- Clean amputated part
- Wrap part in sterile dressing soaked in normal saline or lactated ringers
- Place part/ dressing in air tight container.
- Place container on ice if available.

NO ↓

Monitor and Reassess

P **Cefazolin 2g IV / IO**
Pediatric: 30mg/kg IV / IO (Maximum 2g)
Over 10 minutes

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

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

Head Trauma

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

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

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

Prevent hypoxia, hypotension, and hyperventilation

A <u>single</u> episode of hypoxia, hypotension, and hyperventilation increases mortality

	Age Appropriate Airway Protocol(s) AR 1, 2, 3, 5, 6 ***if indicated***
	Obtain and Record GCS
	Supplemental oxygen Titrate SPO2 to 100% Prevent Oxygen desaturation events
	Blood Glucose Analysis Procedure
B	Maintain EtCO2 35 – 45 mmHg
A	IV or IO Access - UP 6 ***if indicated***
P	Cardiac Monitor
	Altered Mental Status - UP 4 ***if indicated***
	Multiple Trauma - TB 6 ***if indicated***
	Age Appropriate Hypotension/ Shock - AM 5/ PM 3 ***if indicated***
	Seizure - UP 13 ***if indicated***
	Spinal Motion Restriction Protocol TB 8 Procedure WTP 2 ***if indicated***
	Pain Control - UP 11 ***if indicated***
	Monitor and Reassess

<u>DO NOT ROUTINELY</u>
HYPERVENTILATE
Evidence of
Brain Herniation:
Unilateral or Bilateral Dilation
of
Pupils / Posturing
Hyperventilate to maintain
EtCO2 30 – 35 mmHg
See Pearls

Rapid Transport to appropriate destination using
<u>Trauma and Burn:</u>
<u>EMS Triage and Destination Plan</u>

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Head Trauma

Assessment of neurological status:
The Glasgow Coma Score is an important tool to use for assessment and recording that can later be reevaluated and compared by subsequent providers. However a moresimple way to communicate a patient's level of consciousness is the AVPU mnemonic
A- Alert
V- Responds to verbal
P- Responds to painful stimuli
U- Unresponsible

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

Guide to Assessing the Student Athlete for Concussion Symptoms: Any of the following signs indicate a concussion has occurred)
1. PROBLEMS IN BRAIN FUNCTION:
A) Confused state – dazed look, vacant stare, or confusion about what happened or is happening.
B)Memory problems - can't remember assignment on play, opponent, score of game, or period of the game: can't remember how or with whom he or she traveled to the game, what he or she was wearing, or what was eaten for breakfast, etc.
C) Symptoms reported by athlete – Headache, nausea or vomiting, blurred or double vision: oversensitivity to sound, light or touch; ringing in ears; feeling groggy or foggy; dizziness.
D) Lack of sustained attention – difficulty sustaining focus adequately to complete a task, a coherent thought, or a conversation.
2. SPEED OF BRAIN FUNCTION: Slow response to questions, slow slurred speech, incoherent speech, slow body movement, and slow reaction time.
3. UNUSUAL BEHAVIORS: Behaving in a combative, aggressive, or very silly manner; atypical behavior for the individual; repeatedly asking the same question over and over; restless and irritable behavior with constant motion and attempts to return to paly; reactions that seem out of proportion and inappropriate; and having trouble resting or "finding a comfortable position".
4) PROBLEMS WITH BALANCE AND COORDIANTION: Dizziness, slow clumsy movements, inability to walk a straight line or balance on one foot with eyes closed.

Pearls

- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Back, Neuro**
- **GCS is a key performance measure used in the EMS Acute Trauma Care Toolkit.**
- **A single episode of hypoxia and / or hypotension can significantly increase morbidity and mortality with head injury.**
- **Hyperventilation in head injury:**
  - **Hyperventilation lowers CO_2 and causes vasoconstriction leading to increased intracranial pressure (ICP) and should not be done routinely.**
  - **Use in patient with evidence of herniation (blown pupil, decorticate / decerebrate posturing, bradycardia, decreasing GCS).**
  - **If hyperventilation is needed, ventilate at 14 – 18 / minute to maintain $EtCO_2$ between 30 - 35 mmHg.**
  - **Short term option only used for severe head injury typically GCS ≤ 8 or unresponsive.**
- **Do not place in Trendelenburg position as this may increase ICP and worsen blood pressure.**
- **Poorly fitted cervical collars may also increase ICP when applied too tightly.**
- **In areas with short transport times, Drug Assisted Airway protocol is not recommended for patients who are spontaneously breathing and who have oxygen saturations of ≥ 90% with supplemental oxygen including BIAD / BVM.**
- **Hypotension:**
  - Limit IV fluids unless patient is hypotensive.
  - Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
  - Usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
  - Fluid resuscitation should be titrated to maintain at least a systolic BP of > 70 + 2 x the age in years.
  - **Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- An important item to monitor and document is a change in the level of consciousness by serial examination.
- Consider Restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- **Concussions:**
  - Traumatic brain injuries involving any of a number of symptoms including confusion, LOC, vomiting, or headache.
  - Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
  - **EMS Providers should not make return-to-play decisions when evaluating an athlete with suspected concussion. This is outside the scope of practice.**

Multiple Trauma

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

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

Differential (Life threatening)
- Uncontrolled hemorrhage
- Airway obstruction/ deformity
- Chest:
  - Tension pneumothorax
  - Flail chest/ Open chest wound
  - Pericardial tamponade/ Hemothorax
- Head Trauma Protocol TB 5
- Intra-abdominal bleeding
- Pelvis/ Femur/ Extremity fracture
- Spine fracture/ Cord injury
- Hypothermia

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

Control External Hemorrhage Procedure(s) WTP 4, 5, 7
Consider Pelvic Binding
Splint Fractures Procedure WTP 3

P — Chest Decompression Procedure WTP 1 ***if indicated***

IV or IO Access Protocol UP 6

Spinal Motion Restriction Procedure WTP 2
Spinal Motion Restriction Protocol TB 8 ***if indicated***

Obtain and Record GCS

VS / Perfusion Abnormal / Shock?

YES → Age Appropriate Hypotension/ Shock Protocol AM 5/ PM 3 ***if indicated***

P — **TXA 2 g over 10 minutes IV / IO**
Only given if systolic BP is <90 mm/hg

NO

Head Injury Protocol TB 5 ***if indicated***

Altered Mental Status Protocol UP 4 ***if indicated***

Pain Control Protocol UP 11 ***if indicated***

Extremity Trauma Protocol TB 4 ***if indicated***

Crush Syndrome Protocol TB 3 ***if indicated***

Repeat Assessment Adult Procedure

Monitor and Reassess

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Multiple Trauma

One of the major issues in trauma care is how to best balance the need for rapid transport with pre-hospital critical and time-sensitive interventions.

Open Fracture and/or Amputation:
Cefazolin 2 gm over 10 minutes IV / IO.

Vascular Access and Fluid Resuscitation:
Aggressive fluid resuscitation is unclear with current science. IV or IO access should be initiated during transport. Normal Saline should be infused if hypotensive or demonstrating poor perfusion. Normalizing of the blood pressure is NOT the goal. A SBP of ≥ 80 – 90 mmHg is recommended.

Tranexamic Acid (TXA)
Indications:
Trauma patients with symptoms of shock or early shock, expected to have internal bleeding, and potential need for blood transfusion.
SBP < 90 with suspected hemorrhage / shock / early shock.
TXA must be administered within 3 hours of injury.
Administer 1 gm over 10 minutes.
Infuse during transport only, unless patient entrapped and medication can be administered without slowing extrication.
Transport patient who receives TXA to a Trauma Center, unless diverting to local facility for further stabilization.

Pearls

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

Radiation Incident

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

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

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

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

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)

Age Appropriate
Airway Protocol(s) AR 1, 2, 3, 4, 5, 6, 7
if indicated

Eye Involvement
Irrigate Involved Eye(s) with Normal Saline
for 15 – 30 minutes
May repeat as needed

Flush Contact Area with Normal Saline for 15 minutes

Decontamination Procedure
if indicated

Age Appropriate Cardiac Protocol(s)
as indicated

Thermal Burn Protocol TB 9
if indicated

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

Notify Destination or Contact Medical Control

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.·

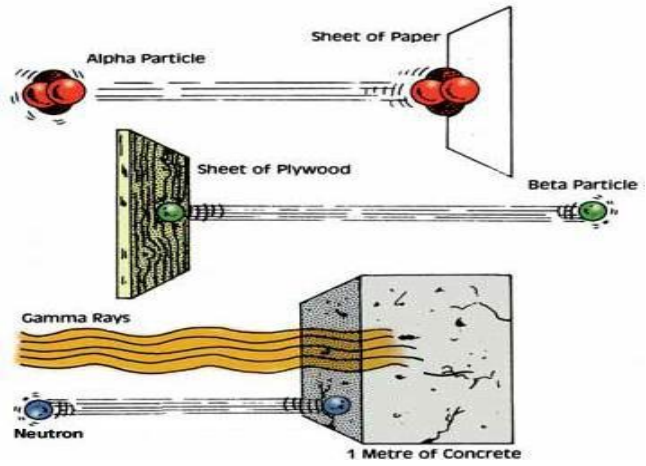
Quantify: Determine exposure (generally measured in Grays/Gy). *Information may be available from those on site who have monitoring equipment, do not delay transport to acquire this information.*

Trauma and Burn Protocol Section

Radiation Incident

General concepts in responding to a radiation incident:

Avoid touching suspected radioactive items
Perform only life saving / critical care tasks near a potential radioactive source
Avoid smoke within 100 meters of a fire or explosion involving potentially radioactive sources
Keep hands away from your mouth
Do not eat or drink until your hands and face are washed
Change clothes and shower as soon as possible



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

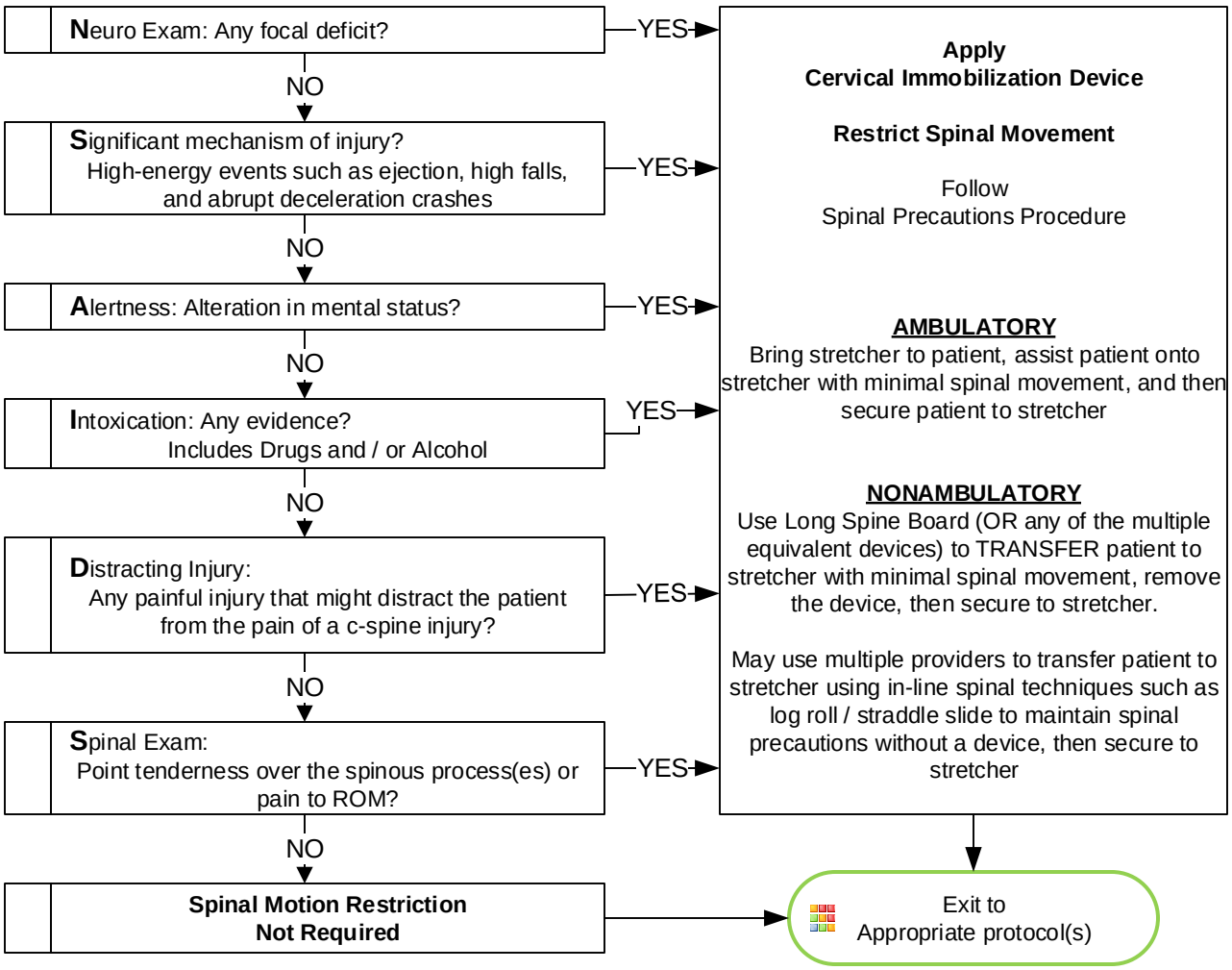
* Hypotension
** Also cardiovascular collapse, fever, shock

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 patients outcome could be grave.
- **The three primary methods of protection from radiation sources:**
  - Limiting time of exposure
  - Distance from
  - Shielding from the source
- Dirty bombs ingredients generally include previously used radioactive material and combined with a conventional explosive device to spread and distribute the contaminated material.
- Refer to Decontamination Procedure / WMD / Nerve Agent Protocol for dirty contamination events.
- If there is a time lag between the time of exposure and the encounter with EMS, key clinical symptom evaluation includes: Nausea/ Vomiting, hypothermia/hyperthermia, diarrhea, neurological/cognitive deficits, headache and hypotension.
- This event may require an activation of the National Radiation Injury Treatment Network, RITN. UNC Hospitals, Wake Forest Baptist and Duke are the NC hospitals, with burns managed at UNC and Wake Forest.

Selective Spinal Motion Restriction



Trauma and Burn Protocol Section

Pearls

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

Thermal Burn

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

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

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

Assess Burn / Concomitant Injury Severity

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

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

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

- Airway Protocol(s) AR 1, 2, 3, 5, 6 ***as indicated***
- Multiple Trauma Protocol TB 6 ***if indicated***
- Remove Rings, Bracelets / Constricting Items
- Dry Clean Sheet or Dressings
- IV / IO Protocol UP 6
  Consider 2 IV sites if ≥ 15 % TBSA

TBSA estimate at ≥ 20%

NO → **A** **Lactated Ringers or Normal Saline**
0.25 mL/kg *X* (TBSA%)/hr

YES → **A** **Lactated Ringers or Normal Saline**
Age: ≤ 5 = 125 mL/hr
Age: 6–14 = 250 mL/hr
Age: ≥ 15 = 500 mL/hr

- Pain Control Protocol UP 11 ***if indicated***
- Carbon Monoxide / Cyanide Protocol TE 2 ***if indicated***
- Monitor and Reassess
- **Rapid Transport** to appropriate destination using Trauma and Burn: EMS Triage and Destination Plan

Notify Destination or Contact Medical Control

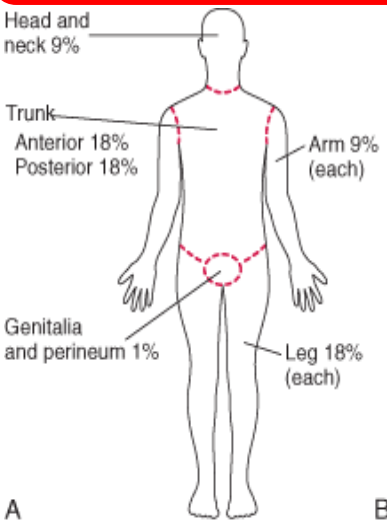
Formula example:
70 kg patient with 15% TBSA

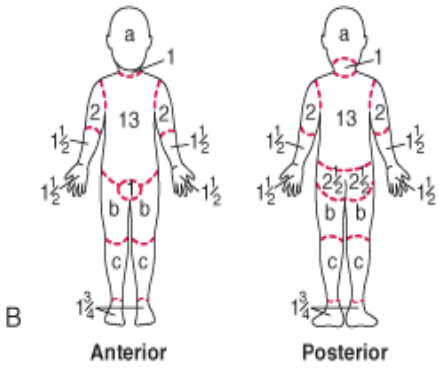
0.25 *x* 70 kg = 17.5
17.5 *x* 15 = 263 mL/hr

1. Lactated Ringers preferred over Normal Saline. Use if available, if not change over once available.

Trauma and Burn Protocol Section

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

- Rarely 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(superficial) 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 (2nd) and Full Thickness (3rd) 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

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

Rule of Nine:
First-degree burns do not count in the calculation of TBSA burns.

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.**
- **Airway considerations:**
  - **For systems performing RSI, Rocuronium is preferred agent (succinylcholine can be used in the first 24-hours)**
  - **Singed nasal hairs, facial burns, and/or carbonaceous sputum are not absolute indications for intubation in a burn patient.**
  - **Utilizing non-rebreather face mask as well as NIPPV procedure are acceptable as tolerated.**
- **Critical or Serious Burns:**
  - **> 5-15% total body surface area (TBSA) 2nd or 3rd degree burns**
  - **3rd (full thickness) degree burns > 5% TBSA for any age group**
  - **Circumferential burns of extremities**
  - **Electrical or lightning injuries**
  - **Suspicion of abuse or neglect**
  - **Inhalation injury**
  - **Chemical burns**
  - **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!)
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Burn patients are prone to hypothermia - never apply ice or cool the burn, must maintain normal body temperature.
- Evaluate the possibility of geriatric abuse with burn injuries in the elderly.
- Never administer IM pain injections to a burn patient.

Traumatic Arrest

Criteria for Death / No Resuscitation
Review DNR / MOST Form

YES →
- Decomposition
- Rigor mortis
- Dependent lividity
- Blunt Force Trauma
- Injury incompatible with life
- Downtime ≥ 15 minutes with asystole

DNR/ MOST Form

Do not begin resuscitation

Follow Deceased Subjects Policy

NO

Blunt Arrest

YES

Apnea — NO

YES

Pulseless — NO

YES

Asystole or PEA < 40 — NO

YES

Do not begin resuscitation
Follow Deceased Subjects Policy

Penetrating Arrest

YES

NO — Apnea

YES

NO — Pulseless

YES

NO — Asystole or PEA < 40

YES

Additional Assessments

YES — Pupil Reflexes

NO

YES — Spontaneous Body Movement

NO

Do not begin resuscitation
Follow Deceased Subjects Policy

Cardiopulmonary Resuscitation Procedure

Airway Protocol(s)
AR 1, 2, 3, 5, 6
if indicated

Control External Hemorrhage
Splint Suspected Fractures
Consider Pelvic Binding

P — Chest Decompression-Needle Procedure
if indicated

Spinal Motion Restriction Procedure
Protocol TB 8
If indicated

A — IV / IO Access

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Traumatic Arrest

General Approach

When a decision is made to perform cardiopulmonary resuscitation on the trauma victim follow protocol AC 11 Team Focused.
Transportation should be initiated to the nearest emergency department or trauma center.
All procedures including IV or IO placement and advanced airway placement should be undertaken during transport.
Effort should be made to control bleeding with tourniquet preferred where appropriate.
Needle decompression of the thorax should be employed with suspected pneumothorax.
Fluid resuscitation should be utilized with a goal SBP of 80 – 90 mmHg.
Unlike a medical arrest the airway is of vital importance and decompression if indicated.
Hypothermia leads to worse outcomes in trauma so ensure warmth of the patient.

Where lightning strike, drowning or situations causing hypothermia are noted resuscitation should be initiated in most cases. In the event of ROSC follow protocol AC 9 / PC 7 Post-Resuscitation. With blunt or penetrating trauma protocol AC 10 Targeted Temperature Management should NOT be utilized and every effort made to maintain warmth of the trauma victim.

If the mechanism of injury does not correlate with the clinical condition and a non-traumatic etiology is suspected standard resuscitation efforts should be initiated.

If the situation poses a danger to the crew and pronouncing death at the scene is predicted to exacerbated conditions, begin cardiopulmonary resuscitation / transport and assess chance of survival in order to determine transport destination.

DNR / MOST

Patient assessment should occur promptly and without delay. Never withhold or delay patient assessment to read a document.
EMS providers should not attempt to decide if a DNR or MOST is valid. If present and contains a healthcare providers signature it should be considered valid unless an immediate family member or guardian revokes the DNR / MOST.
DNR / MOST situations should be dealt with on an individual basis with appropriate care and decision-making determined accordingly.

Withholding of Resuscitation Efforts

The primary goal of EMS is to render aid and comfort to the suffering and the application of this protocol does not diminish this responsibility. It is however appropriate to withhold resuscitation in specific settings.
Withholding of Resuscitation:
1. Decomposition 2. Rigor mortis 3. Dependent lividity 4. Blunt force trauma
5. Injury incompatible with life 6. Extended downtime with asystole (no shock indicated)

Pearls

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

Pediatric Asystole / PEA

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

Signs and Symptoms
- Pulseless
- Apneic
- No electrical activity on ECG
- No heart tones on auscultation

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

Pediatric Pulseless Arrest Protocol

Criteria for Death / No Resuscitation
Review DNR / MOST Form

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

Do not begin resuscitation

Follow Deceased Subjects Policy

NO ↓

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

Ventilation rate:
1 breath every 2 seconds when age < 1
1 breathe every 3 seconds when age ≥ 1
15:2 Compression:Ventilation if no Advanced Airway

AED Procedure
if available

P Cardiac Monitor

IV or IO Access Protocol UP 6

A
Epinephrine1:10,000
0.01 mg/kg IV / IO Maximum Single Dose 1mg
Or
Epinephrine 1:1000 0.1 mg / kg ETT Maximum 2.5 mg
Repeat every 3 – 5 minutes

NS or LR Bolus 20 mL/kg IV / IO
May repeat as needed
Maximum 60 mL/kg

Search for Reversible Causes

Blood Glucose Analysis Procedure
if applicable

↓

Notify Destination or Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Pediatric Cardiac Protocol Section

Pediatric Asystole / PEA

Primary focus is on high-quality, continuous and uninterrupted compressions at a rate of:

100 – 120 / minute, 1.5 inches depth in infant and 2 inches depth of compression in children, allow complete recoil of chest on upstroke.

Do not interrupt compressions for more than 5 seconds optimal and 10 seconds maximum.

Compressor counts aloud every 20th compression and next compressor readies themselves at the 180th compression.

Paramedic should charge the defibrillator at the 180th compression.

Utilize respiratory counter device to ensure NO HYPERVENTILATION. Ventilations are to be delivered every 6 seconds.

When faced with either PEA or Asystole the most important aspect is finding a reversible cause.

Consider is this a primary cardiac event or a primary respiratory event, drug overdose, drowning, hanging, suffocation or trauma?

Medication Sequence:

FIRST DOSE: Give Epinephrine 0.01mg/kg (1:10,000)

SECOND DOSE: At 5 minutes: Give Epinephrine 0.01 mg/kg (1:10,000)

REPEAT DOSE: At 10 minutes: Give Epinephrine 0.01 mg/kg (1:10,000) based on EtCO2 reading.

Every 5 minutes if EtCO2 < 30

Every 10 minutes if EtCO2 30

Hyperkalemia: Unknown in field setting. End stage renal dialysis patient is at risk and Sodium bicarbonate 1 mEq/kg IV / IO and Calcium Chloride 20 mg/kg (max 1G) IV / IO should be given. ECG findings may not reflect common teaching such as peaked T waves. PEAwith a bizarre or

widened complex may indeed be hyperkalemia.

Toxicology: Consider Calcium Channel Blocker (CCB) and Beta Blocker (BB) overdose with PEA and asystole. If suspected BB overdose give Glucagon 0.1 mg/kg IV / IO. If you see ECG improvement you may repeat and then contact medical control. Large doses of Glucagon may be needed. Calcium Chloride may be beneficial in BB overdose. If suspected CCB overdose administer Calcium chloride 20 mg/kg (max 1 G) over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks.**
- **Refer to optional protocol AC 11 or development of local agency protocol.**
- **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.**
- **Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When advanced airway not in place perform 15 compressions with 2 ventilations.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **DO NOT HYPERVENTILATE:**
  If advanced airway in place ventilate:
  Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
  Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- **Airway is a more important intervention in pediatric arrests. This should be accomplished quickly with BVM or BIAD.**
- **Patient survival is often dependent on proper ventilation and oxygenation / airway Interventions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **High-Quality CPR:**
  Make sure chest compressions are being delivered at 100 – 120 / min.
  Make sure chest compressions are adequate depth for age and body habitus.
  Make sure you allow full chest recoil with each compression to provide maximum perfusion.
  Minimize all interruptions in chest compressions to < 10 seconds.
  Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation**.
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol UP 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Bradycardia With a Pulse

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

Bradycardia
Typically HR < 60/min
Hypotension / AMS / Poor Perfusion / Shock

Pediatric Airway Protocol(s) AR 5, 6
as indicated

Identify underlying cause
Search for reversible causes

P — Cardiac Monitor

IV or IO Protocol UP 6

Heart Rate < 60/min
Persists despite oxygenation and ventilation

YES → Exit to Pediatric Cardiac Arrest Protocol(s) PC 1, 4, 7

NO

Identify underlying cause
Search for reversible causes

Blood Glucose Analysis Procedure

IV or IO Protocol UP 6

A — **NS or LR Bolus**
20 ml / kg IV / IO
Repeat as needed x 3
Maximum 60 mL / kg

P — **Push-dose**
Epinephrine 2 mcg IV / IO
Every 2 – 3 minutes as needed
See page 2

P — **Atropine 0.02 mg / kg IV / IO**
May repeat x 1
Minimum single dose 0.1 mg
Maximum single dose 0.5 mg

P — **If no improvement**
Consider
Transcutaneous Pacing Procedure

Notify Destination or Contact Medical Control

Reversible Causes

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

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

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Pediatric Toxicology Protocol

Pediatric Bradycardia With Poor Perfusion

ECG and rhythm information should be interpreted in context of the entire patient assessment.
For example if you have a patient which is ill with a likely infection and fever and is bradycardic there overall symptoms are unlikely related to bradycardia and more likely related to overwhelming sepsis and potentially hypoxia.

Bradycardia is defined as heart rate < 60 but rarely causes symptoms unless < 50 in the pediatric patient.
The most important decision point in care is whether the patient is stable or unstable.
Hypoxemia is a common cause of bradycardia.

Unstable:
Refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.

Symptomatic:
Symptomatic implies the arrhythmia is causing the presenting symptoms but the patient may be stable and not in imminent danger. This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Push-Dose Vasopressors:
Epinephrine
Mix 1:1000 (1mg in 1mL) into 250 mL of NS or D5W.
Yields a concentration of 4 mcg/mL of Epinephrine.
Give 2 mcg every 2 – 3 minutes to titrate SBP > 70 + 2(Age

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

Pearls

- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Bradycardia is often associated with hypoxia so insure patent airway, breathing, and circulation as needed.**
- **Begin CPR immediately with persistent bradycardia and poor perfusion despite adequate oxygenation and ventilation.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological treatment given only when symptomatic, otherwise monitor and reassess.**
- **Consider hyperkalemia with wide complex, bizarre appearance of QRS complex, and bradycardia.**
- **12-Lead ECG:**
  - **12 Lead ECG not necessary to diagnose and treat**
  - **Obtain when patient is stable and/or following rhythm conversion.**
- **Epinephrine is first drug choice for persistent, symptomatic bradycardia.**
- **Atropine:**
  - **Second choice, unless there is evidence of increased vagal tone or a primary AV conduction block, then give atropine first.**
  - **Ineffective and potentially harmful in cardiac transplantation. May cause paradoxical bradycardia.**
- **Symptomatic bradycardia causing shock or peri-arrest condition:**
  - **If no IV or IO access immediately available, start Transcutaneous Pacing, establish IV / IO access, and then administer epinephrine.**
  - **Epinephrine should be administered followed Atropine if no response.**
- **Symptomatic condition**
  - **Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.**
  - **Symptomatic bradycardia usually occurs at rates < 50 beats per minute.**
  - **Search for underlying causes such as hypoxia or impending respiratory failure.**
- **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.**
- **Transcutaneous Pacing Procedure (TCP)**
  - **Indicated with unstable bradycardia unresponsive to medical therapy.**
  - **If time allows transport to specialty center because transcutaneous pacing is a temporizing measure.**
  - **Transvenous / permanent pacemaker will probably be needed.**
  - **Immediate TCP with high-degree AV block (2d or 3d degree) with no IV / IO access.**
- Most maternal medications pass through breast milk to the infant so maintain high-index of suspicion for OD-toxins.
- Hypoglycemia, severe dehydration and narcotic effects may produce bradycardia. Many other agents a child ingests can cause bradycardia, often is a single dose.

Pediatric Pulmonary Edema / CHF

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

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

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

History / Signs / Symptoms consistent with respiratory distress with crackles / rales / known CHF

→ Airway Patent, Ventilations adequate, Oxygenation adequate

NO → Pediatric Airway Protocol(s) 5, 6, 7 ***as indicated***

YES

Allergic Reaction Anaphylaxis

YES → Pediatric Allergic Reaction Anaphylaxis Protocol PM 1

NO

- Pulse Oximetry Monitoring
- B: 12 Lead ECG Procedure
- B: EtCO2 Monitoring
- IV or IO Protocol UP 6 ***if indicated***
- P: Cardiac Monitor

Position child with head of bed in up-position (25-40°)
Flexing hips with support under knees so that they are bent 90°

Transport to a Pediatric Specialty Center ***if available***

Notify Destination or Contact Medical Control

Pediatric Cardiac Protocol Section

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

Pediatric Cardiac Arrest

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

Signs and Symptoms
- Unresponsive
- Cardiac arrest

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

Protocol Age Guidance:

Newborn – 3 days:
AO2 Newly Born

3- days to 15 years:
PC4 Pediatric Cardiac Arrest

≥ 16 years:
AC3 Cardiac Arrest; Adult

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 (≥ 1/3 AP Diameter of Chest)
(1.5 inches Infant / 2 inches in Children)
Push Fast (100 - 120 / min)
Change Compressors every 2 minutes
(sooner if fatigued)
(Limit changes / pulse checks ≤ 10 seconds)

Ventilation rate:
1 breath every 2 seconds when age < 1
1 breathe every 3 seconds when age ≥ 1
15:2 Compression:Ventilation if no Advanced Airway

ALS Available

NO → AED Procedure ***if available***

YES → **P** Cardiac Monitor

Shockable Rhythm

NO → Continue CPR 2 Minutes
Repeat and reassess
Pediatric Airway Protocol(s) 5, 6

YES → Defibrillation Automated
Continue CPR 2 Minutes
Repeat and reassess
Pediatric Airway Protocol(s) 5, 6

Shockable Rhythm

NO → Pediatric Asystole / PEA Protocol PC 1
Pediatric Airway Protocol(s) 5, 6

YES → Pediatric VF / VT Protocol PC 6
Pediatric Tachycardia Protocol PC 5
Pediatric Airway Protocol(s) 5, 6

Arrest secondary to Opioid OD?

YES →
Naloxone 0.4 – 2 mg IN / IM
Peds: 0.1 mg/kg IN
Maximum 4 mg

A **Naloxone 0.4 – 2 mg**
Peds: 0.1 mg/kg
IV / IO / IM / IN / ETT
Maximum 4 mg

NO

Notify Destination or Contact Medical Control

Pediatric Cardiac Protocol Section

Pediatric Cardiac Arrest

Primary focus is on high-quality, continuous and uninterrupted compressions at a rate of:
100 – 120 / minute, 1.5 inches depth in infant and 2 inches depth of compression in children, allow complete recoil of chest on upstroke.
Do not interrupt compressions for more than 5 seconds optimal and 10 seconds maximum.
Compressor counts aloud every 20th compression and next compressor readies themselves at the 180th compression.
Paramedic should charge the defibrillator at the 180th compression.
Utilize respiratory counter device to ensure NO HYPERVENTILATION. Ventilations are to be delivered every 6 seconds.
When faced with either PEA or Asystole the most important aspect is finding a reversible cause.
Consider is this a primary cardiac event or a primary respiratory event, drug overdose, drowning, hanging, suffocation or trauma?
Medication Sequence:
FIRST DOSE: Give Epinephrine 0.01mg/kg (1:10,000)
SECOND DOSE: At 5 minutes: Give Epinephrine 0.01 mg/kg (1:10,000)
REPEAT DOSE: At 10 minutes: Give Epinephrine 0.01 mg/kg (1:10,000) based on EtCO2 reading.
Every 5 minutes if EtCO2 < 30
Every 10 minutes if EtCO2 30
Hyperkalemia: Unknown in field setting. End stage renal dialysis patient is at risk and Sodium bicarbonate 1 mEq/kg IV / IO and Calcium Chloride 20mg/kg (max 1G) IV / IO should be given. ECG findings may not reflect common teaching such as peaked T waves. PEA with a bizarre or widened complex may indeed be hyperkalemia.
Toxicology: Consider Calcium Channel Blocker (CCB) and Beta Blocker (BB) overdose with PEA and asystole. If suspected BB overdose give Glucagon 0.1 mg/kg IV / IO. If you see ECG improvement you may repeat and then contact medical control. Large doses of Glucagon may be needed. Calcium Chloride may be beneficial in BB overdose. If suspected CCB overdose administer Calcium Chloride 20 mg/kg (max 1G) over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.**
- **Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When advanced airway not in place perform 15 compressions with 2 ventilations.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **DO NOT HYPERVENTILATE:**
  If advanced airway in place ventilate:
  Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
  Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- **Patient survival is often dependent on proper ventilation and oxygenation / airway Interventions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **High-Quality CPR:**
  Make sure chest compressions are being delivered at 100 – 120 / min.
  Make sure chest compressions are adequate depth for age and body habitus.
  Make sure you allow full chest recoil with each compression to provide maximum perfusion.
  Minimize all interruptions in chest compressions to < 10 seconds.
  Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:**
  Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation**.
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol UP 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Tachycardia
Narrow Complex (≤ 0.09 sec)

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

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms
AMS, shock, hypotension
HR Typically > 180 Child
HR Typically > 220 Infant

YES →

	Cardiac Monitor
	Cardioversion Procedure
P	**0.5 – 1 J / kg** Repeat and increase to **2 J / Kg** May increase to **4 J / Kg** Or adult maximum
P	Consider sedation Do NOT delay cardioversion **Midazolam 0.1 – 0.2 mg / kg IV / IO / IN** May repeat if needed **Maximum Single Dose 2 mg** **Maximum Total Dose 5 mg**

NO

B	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Single lead ECG able to diagnose and treat arrhythmia

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

Regular Rhythm? NO → **Contact Medical Control**

YES

Probable Sinus Tachycardia

Identify and Treat Underlying Cause

Exit to Age Appropriate Protocol(s)

Probable SVT

	Vagal Maneuvers
P	**Adenosine 0.1 mg / kg IV / IO** **Maximum 6 mg** May repeat **Adenosine 0.2 mg / kg IV / IO** **Maximum 12 mg**

Notify Destination or Contact Medical Control

AT ANY TIME

Pulseless

Go to Pediatric Pulseless Arrest Protocol

Pediatric Cardiac Protocol Section

Pediatric Tachycardia
Narrow Complex (≤ 0.09 sec)

The most important decision point in care is whether the patient is stable or unstable:
Unstable refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.
Symptomatic implies the arrhythmia is causing the presenting symptoms but the patient may be stable and not in imminent danger.
This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Next you must determine if a pulse is present:
This protocol assumes a pulse is present.
The ability to feel a pulse is generally poor so recognition of poor perfusion or arrest situation takes priority.
You may identify signs which indicate no perfusion such as unresponsive, apnea or agonal / irregular breathing and cool / mottled skin.

Midazolam:
Midazolam can be given in **Single Doses to a Maximum of 2 mg**.
A **Total Dose of Midazolam 5 mg** may be given before contact of Medical Control.

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Monomorphic QRS:**
  All QRS complexes in a single lead are similar in shape.
- **Polymorphic QRS:**
  QRS complexes in a single lead will change from complex to complex.
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
- **12-Lead ECG:**
  12-Lead ECG not necessary to diagnose and treat.
  Obtain when patient is stable and/or following rhythm conversion.
  When administering adenosine, obtaining a continuous 12-Lead can be helpful to physicians.
- **Unstable condition:**
  Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
  If at any point patient becomes unstable move to unstable arm in algorithm
  If IV or IO access is in place, may administer adenosine and repeat, prior to synchronized cardioversion.
- **Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.**
- **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
- **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.
- Monitor for respiratory depression and hypotension associated if Diazepam, Lorazepam, or Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.

Pediatric Tachycardia
Wide Complex (> 0.09 sec)

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
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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

Assess tachycardia in context of clinical condition
Identify and treat underlying cause of tachycardia

Unstable / Serious Signs and Symptoms
AMS, shock, hypotension
HR Typically > 180 Child
HR Typically > 220 Infant

YES →

P	
	Cardiac Monitor
	Cardioversion Procedure
	0.5 – 1 J / kg Repeat and increase to **2 J / Kg** May increase to **4 J / Kg** Or adult maximum
	Consider sedation Do NOT delay cardioversion **Midazolam 0.1 – 0.2 mg / kg IV / IO / IN** May repeat if needed **Maximum Single Dose 2 mg** **Maximum Total Dose 5 mg**

NO

B	12 Lead ECG Procedure
P	Cardiac Monitor
	IV or IO Access Protocol UP 6

Single lead ECG able to diagnose and treat arrhythmia

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

Regular Rhythm? — NO → **Contact Medical Control**

YES

Probable Ventricular Tachycardia

P	
	If QRS Regular and Monomorphic **Adenosine 0.1 mg / kg IV / IO** **Maximum 6 mg** May repeat **Adenosine 0.2 mg / kg IV / IO** **Maximum 12 mg**
	Cardioversion Procedure
	0.5 – 1 J / kg Repeat and increase to **2 J / Kg** May increase to **4 J / Kg** Or adult maximum
	Notify Destination or Contact Medical Control

Expert consultation recommended for further medication management

AT ANY TIME

Pulseless

Go to Pediatric Pulseless Arrest Protocol

Pediatric Cardiac Protocol Section

Pediatric Tachycardia
Wide Complex (> 0.09 sec)

The most important decision point in care is whether the patient is stable or unstable:
Unstable refers to patient condition in which a vital organ function is acutely impaired or cardiac arrest is ongoing or imminent.
Symptomatic implies the arrhythmia is causing the presenting symptoms but the patient may be stable and not in imminent danger.
This situation allows you more time to decide on the most appropriate intervention which often is supportive care only.

Next you must determine if a pulse is present:
This protocol assumes a pulse is present.
The ability to feel a pulse is generally poor so recognition of poor perfusion or arrest situation takes priority.
You may identify signs which indicate no perfusion such as unresponsive, apnea or agonal / irregular breathing and cool / mottled skin.

Midazolam:
Midazolam can be given in Single Doses to a Maximum of 2 mg.
A Total Dose of Midazolam 5 mg may be given before contact of Medical Control.

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Monomorphic QRS:**
  All QRS complexes in a single lead are similar in shape.
- **Polymorphic QRS:**
  QRS complexes in a single lead will change from complex to complex.
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **Rhythm should be interpreted in the context of symptoms and pharmacological or electrical treatment given only when symptomatic, otherwise monitor and reassess.**
- **12-Lead ECG:**
  12-Lead ECG not necessary to diagnose and treat.
  Obtain when patient is stable and/or following rhythm conversion.
  When administering adenosine, obtaining a continuous 12-Lead can be helpful to physicians.
- **Unstable condition:**
  Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
  If at any point patient becomes unstable move to unstable arm in algorithm
- **Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.**
- **Serious Signs and Symptoms:**
  Respiratory distress / failure.
  Signs of shock / poor perfusion with or without hypotension.
  AMS
  Sudden collapse with rapid, weak pulse
- **Serious Signs and Symptoms:**
  Respiratory distress / failure.
  Signs of shock / poor perfusion with or without hypotension.
  AMS
  Sudden collapse with rapid, weak pulse
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
  SVT with aberrancy.
  VT: Uncommon in children. Rates may vary from near normal to > 200 / minute. Most children with VT have underlying heart disease / cardiac surgery / long QT syndrome / cardiomyopathy.
  Amiodarone 5 mg / kg over 20 – 60 minutes or Procainamide 15 mg / kg over 30 – 60 minutes IV / IO are recommended agents. They should not be administered together. Consultation with Medical Control is advised when these agents are considered.
- **Torsades de Pointes / Polymorphic (multiple shaped) Tachycardia:**
  Rate is typically 150 to 250 beats / minute.
  Associated with long QT syndrome, hypomagnesaemia, hypokalemia, many cardiac drugs.
  May quickly deteriorate to VT.
  Separating the child from the caregiver may worsen the child's clinical condition.
- Monitor for respiratory depression and hypotension associated if Diazepam, Lorazepam, or Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.

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 PC 4

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

Ventilation rate:
1 breath every 2 seconds when age < 1
1 breathe every 3 seconds when age ≥ 1
15:2 Compression:Ventilation if no Advanced Airway

Automated Defibrillation Procedure

P Defibrillation Manual Procedure
- First shock: 2 J / Kg
- Second shock: 4 J / Kg
- Subsequent shocks ≥ 4 J / kg

Maximum 10 J / kg or adult dose

IV / IO Protocol UP 6

A
Epinephrine1:10,000
0.01 mg/kg IV / IO Maximum 1mg
Or
Epinephrine 1:1000 0.1 mg / kg ETT
Maximum 2.5 mg
Repeat every 3 – 5 minutes

If Rhythm Refractory to defibrillation
- **Continue CPR and give Agency specific Anti-arrhythmic(s) in a drug-shock-drug-shock pattern.**
- **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 first dose of 300 mg
May repeat half dose every 5 min x2

If refractory to Amiodarone
Lidocaine 1 mg / kg IV / IO
Repeat every 5 minutes as needed x2
Maximum singe dose 100 mg
Maximum 3 mg / kg

Notify Destination or Contact Medical Control

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 Protocol Section

Pediatric Ventricular Fibrillation
Pulseless Ventricular Tachycardia

Primary focus is on quality, continuous and uninterrupted compressions at a rate of at least 100 / minute.
Depth should be at least 1.5 inches in the infant and 2 inches in the child / adolescent and should allow for complete chest recoil.
Compressor cycle changes and pulse checks should be done together and take no longer than 5 seconds each with a maximum of 10 seconds.
Best chance of survival is quality compressions and early defibrillation.
After compressions are initiated and defibrillation performed (if indicated) then the airway can be addressed.
See Reversible Causes, page 1.

Defibrillation / Multiple Defibrillation:
Immediately after defibrillation resume chest compressions: Do not check for a pulse following defibrillation. Defibrillation dosing in pediatrics is not completely known.
First defibrillation is at 2 J/kg followed by 4 J/kg. If subsequent shocks are needed you may increase to 6 J/kg. If persistent VF or VT continues you may increase dose up to a maximum of 10 J/kg.

Ventilation:
Do not hyperventilate. With BIAD or ETT provide ventilations at 8 – 10 breaths per minute.

Team Focused CPR:
Follow Team Focused CPR Protocol AC 11.

Ventricular Tachycardia:
Wide-Complex (> 0.09 sec) tachyarrhythmia which arises from the ventricle is uncommon in children.
The ventricular rate may vary from near normal (120 beats per minute) to > 200 beats per minute.
Most children who develop VT have underlying heart disease / previous heart surgery / long QT syndrome / cardiomyopathy / myocarditis.
Other causes may include electrolyte abnormalities and drug toxicity.

Polymorphic VT / Torsades de Pointes:
QRS complexes vary in appearance.
Torsades de Pointes is a specific polymorphic VT characterized by twisting along the baseline or turning on a point.

Pearls

- **Team Focused Approach / Pit-Crew Approach recommended; assigning responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches.**
- **Majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When advanced airway not in place perform 15 compressions with 2 ventilations.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **DO NOT HYPERVENTILATE:**
  If advanced airway in place ventilate:
  Age < 1 year: 1 breath every 2 seconds with continuous, uninterrupted compressions.
  Age ≥ 1 year: 1 breath every 3 seconds with continuous, uninterrupted compressions.
- **Patient survival is often dependent on proper ventilation and oxygenation / airway Interventions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **High-Quality CPR:**
  Make sure chest compressions are being delivered at 100 – 120 / min.
  Make sure chest compressions are adequate depth for age and body habitus.
  Make sure you allow full chest recoil with each compression to provide maximum perfusion.
  Minimize all interruptions in chest compressions to < 10 seconds.
  Use AED or apply ECG monitor / defibrillator as soon as available.
- **Defibrillation:**
  Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
  Charge defibrillator during chest compressions, near the end of 2-minute cycle, to decrease peri-shock pause.
  Following defibrillation, provider should immediately restart chest compressions with no pulse check until end of next cycle.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions. Goal is ≥ 20 mmHg.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **IV / IO access and drug delivery are secondary to high-quality chest compressions and early defibrillation**.
- **IV access is preferred route. Follow IV or IO Access Protocol UP 6.**
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure Protocol AM 3 caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - If suspected, administer Naloxone per Overdose / Toxic Ingestion Protocol UP 7 while ensuring airway, oxygenation, ventilations, and high-quality chest compressions.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

Pediatric Post Resuscitation

History
- Respiratory arrest
- Cardiac arrest

Signs/Symptoms
- Return of pulse

Differential
- Continue to address specific differentials associated with the original dysrhythmia

Transport Destination Decision

Post-resuscitation patient is medically complex.

Consider facility capabilities:
- Pediatric ICU service
- Pediatric Cardiology service
- Pediatric Neurology service
- Targeted Temperature Management

Pediatric Airway Protocol(s) AR 5 - 7 ***as needed***

Monitor Vital Signs / Reassess

Blood Glucose Analysis Procedure

Optimize Ventilation and Oxygenation
- Maintain SpO2 ≥ 92 – 98%
- Advanced airway if indicated
- Age Appropriate Respiratory Rate
- Remove Impedence Threshold Device

DO NOT HYPERVENTILATE

ETCO2 ideally 35 – 45 mm Hg

B 12 Lead ECG Procedure

IV or IO Protocol UP 6

P Cardiac Monitor

Pediatric Diabetic Protocol PM 2 ***if indicated***

Pediatric Hypotension / Shock Protocol PM 3 ***if indicated***

Pediatric Bradycardia Protocol PC 2 ***if indicated***

Pediatric Tachycardia Protocol PC 5, 6 ***as indicated***

Hypotension Age Based

0 – 31 Days
< 60 mmHg

1 Month to 1 Year
< 70 mmHg

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

Antiarrhythmic Medication Given During Arrest

YES

P Continue Antiarrhythmic Utilized
Refer to Appropriate Pediatric Arrhythmia Protocol

Amiodarone 5 mg/kg IV / IO
Maximum first dose of 300 mg
May repeat half dose every 5 min x2

If refractory to Amiodarone
Lidocaine 1 mg / kg IV / IO
Repeat every 5 minutes as needed x2
Maximum singe dose 100 mg
Maximum 3 mg / kg

NO

Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate Protocol

Post-intubation / BIAD Management Protocol AR 8

Notify Destination or Contact Medical Control

Pediatric Cardiac Protocol Section

Pediatric Post Resuscitation

Immediate concerns following Return of Spontaneous Circulation

1. Optimize oxygenation and ventilation to maintain oxygen saturation at 94 % or greater. Hyperventilation must be avoided due to induced hypotension, decreased cardiac output and oxygen injury.
2. Optimize cardiopulmonary function and vital organ perfusion.
3. Search for and treat correctable / reversible causes:
   Hypovolemia, Hypoxia, Hydrogen ion, Hypo / Hyperkalemia, Hypothermia, Hypoglycemia Tension Pneumothorax, Tamponade; cardiac, Toxins / Ingestions, Thrombosis; pulmonary, Thrombosis; coronary
4. Transport to facility capable of caring for post arrest patients.

Sedation / Paralysis with BIAD / ETT in place:

In the post-resuscitative phase the patient may require sedation and paralysis. The primary focus is to sedate the patient adequately with Fentanyl preferably, or Morphine, which addresses pain. Pain is the primary cause of agitation in the intubated patient. Midazolam may also be used after an opioid is given, but opioid is the primary agent for sedation. The patient should not be paralyzed unless they are sedated first as this causes tremendous psychic and physical stress.

Airway:

The post-cardiac arrest patient is typically hypotensive and acidotic which creates a high-risk situation for RSI and potentially will lead to re-arrest.

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

Pearls

- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Goals of care are to preserve neurologic function, prevent secondary organ damage, treat the underlying cause of illness, and optimize prehospital care. Frequent reassessment is necessary.**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided. Titrate FiO_2 to maintain SpO_2 of 92 - 98%.**
- **Use length-based or weight-based pediatric resuscitation system for medication, equipment, cardioversion, and defibrillation guidance. Pediatric paddles should be used in children < 10 kg.**
- **Pain/sedation:**
  - **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
  - **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
  - **Ventilated patients cannot communicate pain / anxiety and providers are poor at recognizing pain / anxiety.**
  - **Vital signs such has tachycardia and / or hypertension can provide clues to inadequate sedation, however they both are not always reliable indicators of patient's lack of adequate sedation.**
  - **Pain must be addressed first, before anxiety. Opioids are typically the first line agents before benzodiazepines. Ketamine is also a reasonable first choice agent.**
- **Ventilator / Ventilation strategies:**
  - **Tailored to individual patient presentations. Medical Control can indicate different strategies above.**
  - **In general ventilation with BVM should cause chest rise. With mechanical ventilation a reasonable tidal volume should be about 6 mL/kg and peak pressures should be < 30 cmH20.**
  - **Continuous pulse oximetry and capnography should be maintained during transport for monitoring.**
  - **Head of bed should be maintained at least 10 – 20 degrees of elevation when possible to decrease aspiration risk.**
- **EtCO2 Monitoring:**
  - **Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize.**
  - **Goal is 35 – 45 mmHg but DO NOT hyperventilation to achieve.**
  - **EtCO2 should be continually monitored with advanced airway in place.**
- **Administer resuscitation fluids and vasopressor agents to maintain SBP at targets listed on page 1. This table represents minimal SBP targets.**
- **Targeted Temperature Management is recommended in pediatrics, but prehospital use is not associated with improved outcomes. Transport to facility capable of intensive pediatric care.**
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.**
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with Medical Control.

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
Skin Only

- **A**
  - **Diphenhydramine 1 mg / kg mg PO**
  - IV Procedure ***If indicated***
  - **Diphenhydramine 1 mg / kg IV / IM / IO / PO** *If not already given PO*
- **B**
  - Monitor and Reassess
  - Monitor for Worsening Signs and Symptoms

MODERATE
2+ Body Systems

- **Epinephrine 1:1000 IM ≥ 30 kg 0.3 – 0.5 mg IM < 30 kg 0.15 mg IM *if available***
- **Diphenhydramine 1 mg / kg PO** *See Pearls*
- **B**
  - **Albuterol Nebulizer 2.5 – 5 mg** Repeat as needed x 3 ***if indicated***
- **A**
  - **Epinephrine 1:1000 IM ≥ 30 kg 0.3 – 0.5 mg IM < 30 kg 0.15 mg IM** Repeat every 5 minutes if no improvement

SEVERE
2 + Body Systems + hypotension Or Isolated Hypotension

- **Epinephrine 1:1000 IM ≥ 30 kg 0.3 – 0.5 mg IM < 30 kg 0.15 mg IM *if available***
- **B**
  - **Albuterol Nebulizer 2.5 – 5 mg** Repeat as needed x 3 ***if indicated***
- Airway Pediatric Protocol(s) ***if indicated***
- Pediatric Hypotension / Shock Protocol PM 3 ***if indicated***

- **A**
  - **Diphenhydramine 1 mg / kg IV / IM / IO *if not given PO (See Pearls)***
  - IV / IO Procedure
  - **NS or LR Bolus 20 mL/kg IV / IO** Titrate to age appropriate SBP 70 + 2 x Age **Maximum 60 mL/kg**
  - **Albuterol Nebulizer 2.5 – 5 mg +/- Ipratropium 0.5 mg** Repeat as needed x 3 ***if indicated***
- **P**
  - No improvement with IM Epinephrine **Epinephrine IV / IO** See page 2
  - **Methylprednisolone 2 mg/kg IV Maximum 125 mg**

Notify Destination or Contact Medical Control

Pediatric Medical Protocol Section

Pediatric Allergic Reaction

Allergic reactions occur when a patient is exposed to an allergen (pollen, insect, medication, food, etc.) causing the body to respond by releasing specific immunoglobulins such as histamine which causes hives, itching and capillary leaking leading to edema. Most allergic reactions are mild and involve only the skin such as erythema, hives and / or itching and are usually resolved with an anti-histamine like diphenhydramine. Anaphylaxis is a severe form of an allergic reaction and recent studies show it is under-recognized and under-treated.

Anaphylaxis is likely present when any 1 of the 3 criteria below are present:

1. Acute onset of illness (minutes to hours) with skin involvement: Hives, erythema, itching and / or angioedema.

PLUS

Dyspnea, wheezing, stridor or hypoxemia.

OR

Hypotension, poor perfusion, shock, incontinence, syncope.

2. Acute onset of illness (minutes to hours) with 2 or more of the following are present:

a. Hives, erythema, itching and / or angioedema.

b. Dyspnea, wheezing, stridor or hypoxemia.

c. Hypotension, poor perfusion, shock, incontinence

d. Nausea, vomiting and / or abdominal pain / cramping.

3. Acute onset of illness (minutes to hours) with hypotension, poor perfusion, syncope, incontinence after exposure to known allergen.

The main point is that anaphylaxis does not mean the patient must be in shock. Patients who demonstrate skin involvement plus a respiratory complaint have anaphylaxis. Patients who have skin involvement and GI symptoms such as nausea or abdominal cramping have anaphylaxis. And finally a patient may have anaphylaxis and have no skin findings such as rash or erythema.

Epinephrine IV in Severe Allergy unresponsive to IM Epinephrine after 2 doses:

In the patient with severe anaphylaxis who is not responding to Epinephrine IM and fluid resuscitation, IV Epinephrine should be administered. Exit to pediatric hypotension protocol (PM3) and start epinephrine drip or give push dose epinephrine. Do not give Diphenhydramine (Benadryl) in the setting of hypotension as it can worsen hypotension and cause altered mental status.

Pearls

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

Pediatric Diabetic

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

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

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

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure ***if indicated***
	IV or IO Access Protocol UP 6
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 ***if indicated***
	Hypotension/ Shock Protocol AM 5 ***if indicated***
	Seizure Protocol UP 13 ***if indicated***

B	***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

	Oral Glucose ½ to 1 Tube If age appropriate
	Consider Oral Solution (Juices / Food)
A	<u>≤ 1 Year of Age:</u> **D10: 5 mL/kg IV / IO** Repeat as needed <u>1 to 2 Years:</u> **D25: 2 mL/kg IV / IO** Repeat as needed <u>≥ 2 Years:</u> **D50: 1 mL/kg IV / IO Maximum 25 g per dose** Repeat as needed

Blood Sugar 70 – 249 mg / dl

	Blood Glucose Analysis Procedure ***if condition changes***

Exit to Appropriate Protocol(s)

Blood Sugar ≥ 250 mg / dl

A	**Normal Saline Bolus 10 - 20 mL/kg IV / IO** **Maximum 20 mL/kg**

	Monitor and Reassess Every 5 minutes Until Blood Glucose ≥ 80 mg / dl

Notify Destination or Contact Medical Control

Pediatric Medical Protocol Section

Pediatric Diabetic

Dextrose Dosing Regimen: Rule of 50

Newborn to 1 year: D10 - 5 mL/kg IV / IO	(D10 x 5 mL/kg = 50)
1 year to 2 years: D25 – 2 mL/kg IV / IO	(D25 x 2 mL/kg = 50)
≥ 2 years: D50 – 1 mL/kg IV / IO	(D50 x 1 mL/kg = 50)

Hypoglycemia:
D10 is preferred agent and may be used in all age ranges. If patient demonstrates evidence of volume overload and if available, more concentrated formulations should be used based on the Rule of 50.

Hyperglycemia:
Diabetic ketoacidosis (DKA) is a complication of diabetes and cannot be diagnosed in the field but can be suspected.
DKA is a condition where the body cannot properly utilize insulin to effect glucose metabolism. The body compensates by breaking down fats and proteins leading to a metabolic acidosis. The body also begins to dump excess glucose by excessive urination. Patients typically appear dehydrated, ill and usually have tachypnea.

Patients can have marked hyperglycemia without being in DKA. DKA can occur at any level of hyperglycemia typically above 200 mg / dl.

Glucagon:
If IV / IO access is obtained after glucagon administration and the patient remains symptomatic then give D50 as per appropriate treatment arm.

Insulin Pump:
If patient is hypoglycemic turn off the patient's insulin pump. Elicit help from the patient, when able, and / or the family who typically are well versed in it's operation.

Pearls

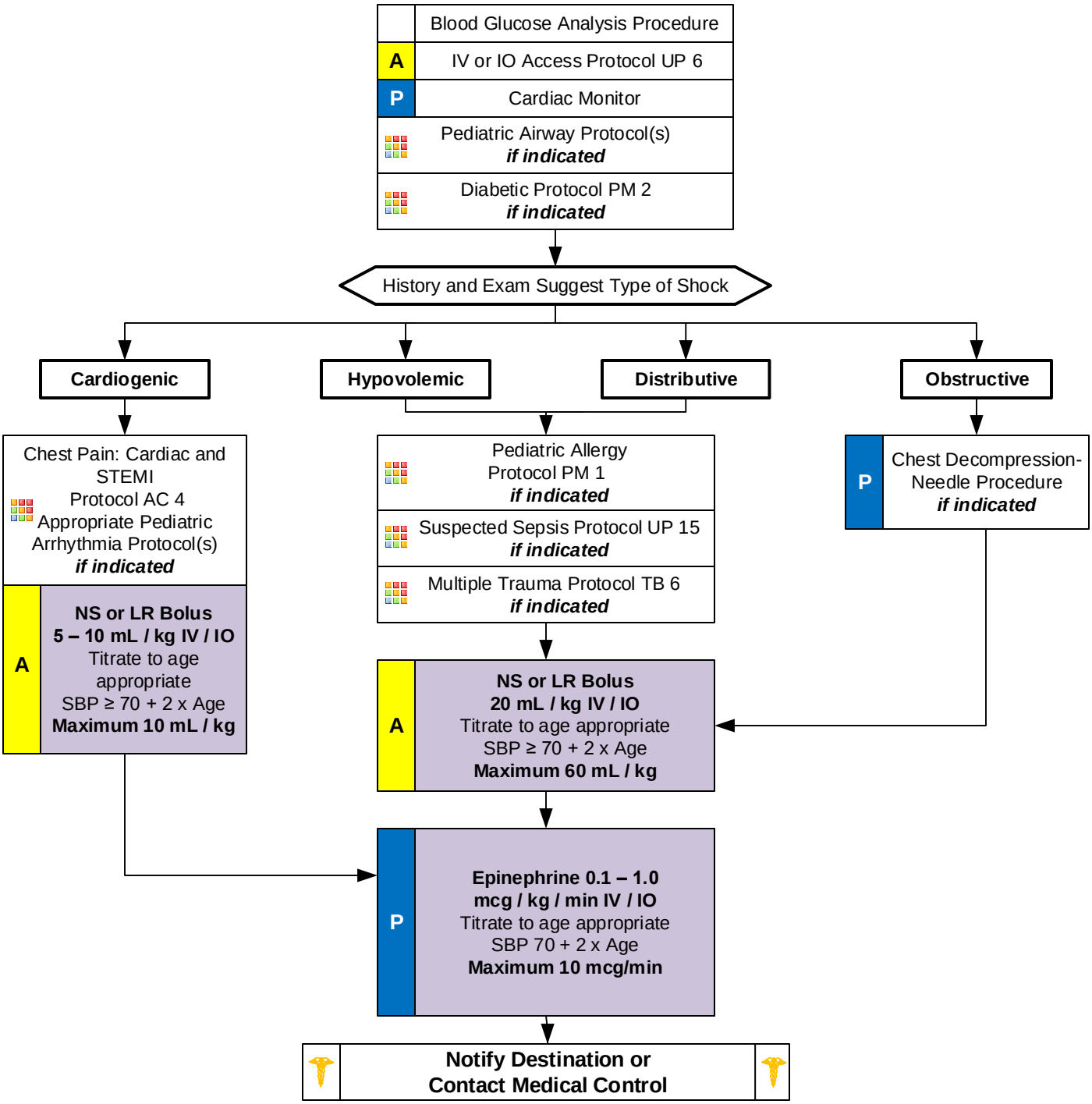
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients with prolonged hypoglycemia my not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks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

Pediatric Hypotension / Shock

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

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

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



Pediatric Medical Protocol Section

Hypotension / Shock

Shock:

Shock results from inadequate tissue delivery of oxygen and nutrients to meet tissue demand. Shock is often characterized by inadequate peripheral and end-organ perfusion. Being in a shock state is not dependent on Blood Pressure. In fact shock often exists when Blood Pressure is normal and even elevated. Early recognition and initiation of treatment of shock is key to improving outcomes.

Compensated Shock:

Pediatric patients can often compensate for shock state for a prolonged period by increasing heart rate, increasing systemic vascular resistence, increasing cardiac contractility and increase in venous smooth muscle tone. Early recognition and early treatment is directed at preventing compensated shock from progressing to hypotensive shock and then cardiac arrest as compensatory mechanisms fail.

Push-Dose Vasopressors:

Epinephrine

Mix 1:1000 (1mg in 1mL) into 250 mL of NS or D5W.
Yields a concentration of 4 mcg/mL of Epinephrine.
Give 2 mcg every 2 – 3 minutes to titrate SBP > 70 + 2(Age).

Epinephrine DRIP
Mix 1 mg in 250 mL NS or D5W
Or
2 mg in 500 mL NS or D5W
(4 mcg / mL)

Dose	mL / min	mL / hr
1 mcg/min	0.25 mL/min	15 mL/hr
2 mcg/min	0.50 mL/min	30 mL/hr
3 mcg/min	0.75 mL/min	45 mL/hr
4 mcg/min	1 mL/min	60 mL/hr
5 mcg/min	1.25 mL/min	75 mL/hr
6 mcg/min	1.50 mL/min	90 mL/hr
7 mcg/min	1.75 mL/min	105 mL/hr
8 mcg/min	2 mL/min	120 mL/hr
9 mcg/min	2.25 mL/min	135 mL/hr
10 mcg/min	2.50 mL/min	150 mL/hr

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:**
  Septic
  Anaphylactic
  Neurogenic: Hallmark is warm, dry, pink skin with normal capillary refill time and typically alert.
  Toxic
- **Obstructive Shock:**
  Pericardial tamponade. Pulmonary embolus. Tension pneumothorax.
  Signs may include hypotension with distended neck veins, tachycardia, unilateral decreased breath sounds or muffled heart sounds.
- **Acute Adrenal Insufficiency or Congenital Adrenal Hyperplasia:**
  Body cannot produce enough steroids (glucocorticoids / mineralocorticoids.) May have primary or secondary adrenal disease, congenital adrenal hyperplasia, or more commonly have stopped a steroid like prednisone. Injury or illness may precipitate. Usually hypotensive with nausea, vomiting, dehydration and / or abdominal pain. **If suspected Paramedic should give Methylprednisolone 125 mg IM / IV / IO or Dexamethasone 10 mg IM / IV / IO. Use steroid agent specific to your drug list. May administer prescribed steroid carried by patient IM / IV / IO. Patient may have Hydrocortisone (Cortef or Solu-Cortef). Dose: < 1y.o. give 25 mg, 1-12 y.o. give 50 mg, and > 12 y.o. give 100 mg or dose specified by patient's physician.**

Bites and Envenomations

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

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

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

Call for help/ additional resources
Stage until scene safe

Contact
Carolinas Poison Control
1-800-222-1222
Or
Agency Specific Number

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

Identification of Animal

Spider Bite/ Bee or Wasp Sting
Venomous

- Keep bite at level of heart ***if able***
- Apply Ice Packs
- **P** **Muscle Spasm**
  Midazolam 2.5 mg IV / IO
  Over 2 to 3 minutes
  Midazolam IN See Page 2
  Maximum 10 mg
  Pediatrics:
  Midazolam 0.1 mg / kg
  IV / IO / IM / IN
  Over 2 to 3 minutes
  Maximum 5 mg IM

Snake Bite
Venomous

- Keep bite at level of heart ***if able***
- Remove any constricting clothing/ bands
- **DO NOT apply ICE**
- Mark Margin of Swelling / Redness and Time

Mammal Bite

Transport
- NO → Contact and Document contact with Animal Control Officer
- YES

Monitor and Reassess

Notify Destination or Contact Medical Control

Toxin-Environmental Protocol Section

Bites and Envenomations

Snake bites:
The majority of venomous snake bites in this area are from copperheads. If the bite occurred in nature, then you can assume it will be covered by Crofab, a polyvalent antivenom that covers all seven of the pit vipers that are indigenous to North America. It is not necessary to bring the snake to the hospital. Take a picture with a cell phone if available. Include head, tail and any distinctive markings. Dead snakes can bite as a reflex hours after death. Do not attempt to handle the snake.

Document time of bite. Remove all constrictive clothing, watches or rings on affected extremity. DO NOT apply ice as this is damaging to envenomated tissue. Do not apply a tourniquet. If a tourniquet is already in place, do not remove it. Immobilize and kept the affected area level with the heart.

With increasing frequency, people are keeping exotic, venomous reptiles as pets. In case of exotic snake, zoo animal, or pet; contact **Carolinas Poison Center at 800-222-1222**. Also, contact Medical Control. If you are instructed the patient may remain at home per the Poison Center and the only complaint is related to toxicology, the patient may remain at home. Otherwise, follow instructions from Carolinas Poison Center. Treat systemic symptoms with supportive care such as fluids, epi drip, etc.

Local symptoms include: Pain and swelling, numbness and tingling and bruising and ecchymosis.
Systemic symptoms include: Metallic or peculiar taste in mouth, hypotension, AMS, bleeding, allergic reaction and shock.

Bee / Wasp stings:
Remove stinger by scraping with a straight edge, like edge of tongue blade.
Do not squeeze or attempt to pick stinger from skin as this will express more venom from the venom sack.

Midazolam IN 5 mg in 1 mL NS		
Wgt kg	Dose mg	Volume mL
2	0.4	0.08
4	0.8	0.16
6	1.2	0.24
8	1.6	0.32
10	2	0.4
12	2.4	0.48
14	2.8	0.56
16	3.2	0.64
18	3.6	0.72
20	4	0.8
22	4.4	0.88
24	4.8	0.96

Pearls

- **Recommended Exam: Mental Status, Skin, Extremities (Location of injury), and a complete Neck, Lung, Heart, Abdomen, Back, and Neuro exam if systemic effects are noted**
- **Immunocompromised patients are at an increased risk for infection: diabetes, chemotherapy, transplant patients.**
- **Consider contacting the North Carolina Poison Control Center for guidance (1-800-222-1222).**
- **Do not put responders in danger attempting to capture and animal or insect for identification purposes.**
- **Evidence of infection: swelling, redness, drainage, fever, red streaks proximal to wound.**
- **Human bites:**
  Human bites have higher infection rates than animal bites due to normal mouth bacteria.
- **Dog / Cat / Carnivore bites:**
  Carnivore bites are much more likely to become infected and all have risk of Rabies exposure.
  Cat bites may progress to infection rapidly due to a specific bacteria (Pasteurella multicoda).
- **Snake bites:**
  Poisonous snakes in this area are generally of the pit viper family: rattlesnake and copperhead.
  Coral snake bites are rare: Very little pain but very toxic. "Red on yellow - kill a fellow, red on black - venom lack."
  Amount of envenomation is variable, generally worse with larger snakes and early in spring.
- **Spider bites:**
  Black Widow spider bites tend to be minimally painful, but over a few hours, muscular pain and severe abdominal pain may develop (spider is black with red hourglass on belly).
  Brown Recluse spider bites are minimally painful to painless. Little reaction is noted initially but tissue necrosis at the site of the bite develops over the next few days (brown spider with fiddle shape on back).

Carbon Monoxide / Cyanide

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

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

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

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

High Suspicion of Cyanide

YES → P: **Hydroxocobalamin 70 mg / kg IV / IO Maximum 5 g** ***If available***

NO

	Continue Care Continue High Flow Oxygen
	Monitor and Reasses

Notify Destination or Contact Medical Control

Toxin-Environmental Protocol Section

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 Motions Restriction Procedure / Protocol TB 8 ***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
- A: IV or IO Access Protocol UP 6 ***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) 1-7 ***as indicated***
- Spinal Motion Restriction Procedure / Protocol TB 8 ***if indicated***
- Altered Mental Status Protocol UP 4 ***as indicated***
- Remove wet clothing
  Dry / Warm Patient
- A: IV / IO Procedure
- P: Cardiac Monitor

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

Notify Destination or Contact Medical Control

Unresponsive

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

Pulse
- YES → Age Appropriate Airway Protocol(s) 1-7 ***as indicated***
- NO → Exit to Age Appropriate Cardiac Arrest Protocol(s) AC 3 / PC 4
  Airway Protocol(s) AR 1 - 7
  Spinal Motion Restriction Protocol TB 8 ***as indicated***

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

Agency specific hyperbaric information

Toxic-Environmental Protocol Section

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

Hyperthermia

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

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

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

Temperature Measurement Procedure
if available

Temperature Measurement should NOT delay treatment of hyperthermia

Remove from heat source to cool environment

Cooling measures

Remove tight clothing

Blood Glucose Analysis Procedure

Age Appropriate
Diabetic Protocol AM 2 / PM 2
as indicated

Assess Symptom Severity

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

PO Fluids as tolerated

Monitor and Reassess

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

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

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

Altered Mental Status
Protocol UP 4
as indicated

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

B 12 Lead ECG Procedure

A IV / IO Procedure

P Cardiac Monitor

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

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

Monitor and Reassess

Notify Destination or Contact Medical Control

Toxic-Environmental Protocol Section

Hyperthermia

Heat Illness

Set of disorders which occur after the body is exposed to heat for an extended period of time. May be triggered by vigorous exercise or work and lack of oral hydration. The very young, old and obese are most at risk.

Heat Cramps:
Common heat-related illness. Typically working in hot environment and develop cramps while at rest. Symptoms of cramping usually involve the lower extremities and abdomen.

Heat Exhaustion:
Heat exhaustion is caused by volume depletion during excessive sweating in a hot environment.

Heat Stroke:
Syndrome where the body loses the ability to regulate temperature.
Signs and Symptoms of Heat Stroke:
AMS / Neurological deficit
Headache
Seizures
Core body temperature > 104 degrees F (40 degrees C)
Tachycardia
Hyperventilation
Loss of sweating
Hypotension
Pulmonary edema
CHF (High-output heart failure with tachycardia, hypotension and pulmonary edema)

Exertional Heatstroke:
Typically young, healthy patients (often athletes) who train in hot environments and may maintain sweating until they decompensate.

Rapid cooling takes precedence over transport as early cooling decreases morbidity and mortality. See Pearls.

Pearls

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

Hypothermia / Frostbite

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

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

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

Temperature Measurement Procedure
if available

Temperature Measurement should NOT delay treatment of hypothermia

Remove wet clothing
Dry / Warm Patient

Passive warming measures

Blood Glucose Analysis Procedure

Age Appropriate
Diabetic Protocol AM 2 / PM 2
as indicated

Hypothermia / Frost Bite

Localized Cold Injury

General Wound Care

DO NOT Rub Skin to warm
DO NOT Massage
Skin to warm

DO NOT allow refreezing

Systemic Hypothermia

Awake with / without AMS

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

Altered Mental Status
Protocol UP 4
as indicated

Active warming measures

B 12 Lead ECG Procedure

IV / IO Procedure

A

Normal Saline Bolus
500 mL IV / IO
Repeat to titrate SBP > 90 mmHg
Maximum 2 L
Pediatric: 20 mL / kg IV / IO
Repeat to titrate Age Appropriate
SBP ≥ 70 + 2 x Age
Maximum 60 mL / kg

P Cardiac Monitor

Age Appropriate
Hypotension/ Shock
Protocol AM 5 / PM 3
Multiple Trauma Protocol TB 6
as indicated

Monitor and Reassess

Unresponsive

Pulse

YES

NO

Exit to
Age Appropriate
Cardiac
Protocol(s)
See Pearls

Notify Destination or Contact Medical Control

Toxic-Environmental Protocol Section

Hypothermia / Frostbite

Frostbite

Frostbite is the formation of ice crystals within local tissues usually where skin is exposed. Commonly occurs in distal extremities.

Risk Factors:
Prolonged exposure to cold temperatures (usually below freezing), exposure to wind, wearing wet clothing, inactivity / immobility, alcohol ingestion and diseases which cause peripheral vascular disease (atherosclerosis / diabetes).

Superficial Frostbite Signs and Symptoms:	Deep Frostbite Signs and Symptoms:
Numbness	Hemorrhagic blisters
Paresthesias	Diminished range of motion
Poor fine motor control	Necrosis, gangrene
Pruritis (itching)	Cold, mottled, gray area (usually after rewarming)
Edema (usually after rewarming)	Immobile tissue (lost elasticity)
Coldness	

Systemic Hypothermia

Core body temperature below 95° F (35° C). Caused by heat loss, decreased heat production or a combination of the two.

Risk Factors:
Prolonged exposure to cold temperatures, exposure to wind, wearing wet clothing, inactivity / immobility, alcohol ingestion and diseases which cause peripheral vascular disease (atherosclerosis / diabetes). Hypothermia can be present when temperatures are well above freezing.

Mild Hypothermia Signs and Symptoms:	Moderate Hypothermia Signs and Symptoms:	Severe Hypothermia Signs and Symptoms:
Shivering	AMS	Hypotension
Dizziness	Poor judgment / difficulty thinking	Ventricular arrhythmias
Nausea	Atrial fibrillation	J wave on ECG
Weakness	Bradycardia	AMS / Coma
Hyperventilation	Bradypnea	Fixed / Dilated pupils
Tachypnea	Diuresis	May have lividity
Tachycardia	Shivering stops	Bradycardia (severe)

Pearls

- **Recommended Exam: Mental Status, Heart, Lungs, Abdomen, Extremities, Neuro**
- **NO PATIENT IS DEAD UNTIL WARM AND DEAD (Body temperature ≥ 93.2° F, 32° C.)**
- **Many thermometers do not register temperature below 93.2° F.**
- **Hypothermia categories:**
  - Mild 90 – 95° F (32 – 35° C)
  - Moderate 82 – 90° F (28 – 32° C)
  - Severe < 82° F (< 28° 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°F (30° C) antiarrhythmics may not work and if given should be given at increased intervals. Contact medical control for direction. Epinephrine / Vasopressin can be administered. Below 86° F (30°C) pacing should not utilized.**
  - **Consider withholding CPR if patient has organized rhythm or has other signs of life. Contact Medical Control.**
  - **If the patient is below 86° F (30° C) then defibrillate 1 time if defibrillation is required. Deferring further attempts until more warming occurs is controversial. Contact medical control for direction.**
  - **Hypothermia may produce severe bradycardia so take at least 60 seconds to palpate a pulse.**
- **Active Warming:**
  - Remove from cold environment and to warm environment protected from wind and wet conditions.
  - Remove wet clothing and provide warm blankets / warming blankets.
  - Hot packs can be activated and placed in the armpit and groin area if available. Care should be taken not to place the packs directly against the patient's skin.

Marine Envenomations / Injury

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

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

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

General Wound Care Procedure

A IV / IO Procedure ***if indicated***

P Cardiac Monitor ***if indicated***

Drowning Protocol TE 3 ***if indicated***

Age Appropriate Allergy / Anaphylaxis Protocol AM 1 / PM 1 ***if indicated***

Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3 ***if indicated***

Pain Control Protocol UP 11 ***if indicated***

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

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

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°F (43 - 46°C) ***if available***

Large Organism
- Immobilize injury
- Multiple Trauma Protocol TB 6 ***if indicated***
- Extremity Trauma Protocol TB 4 ***if indicated***

Monitor and Reassess

Notify Destination or Contact Medical Control

Toxic-Environmental Protocol Section

Marine Envenomations / Injury

Contact of NC Poison Control Center
If you are instructed the patient may remain at home per the Poison Center and the only complaint is related to toxicology the patient may remain at home. Poison Center does provide follow up and recheck via telephone.

Pearls

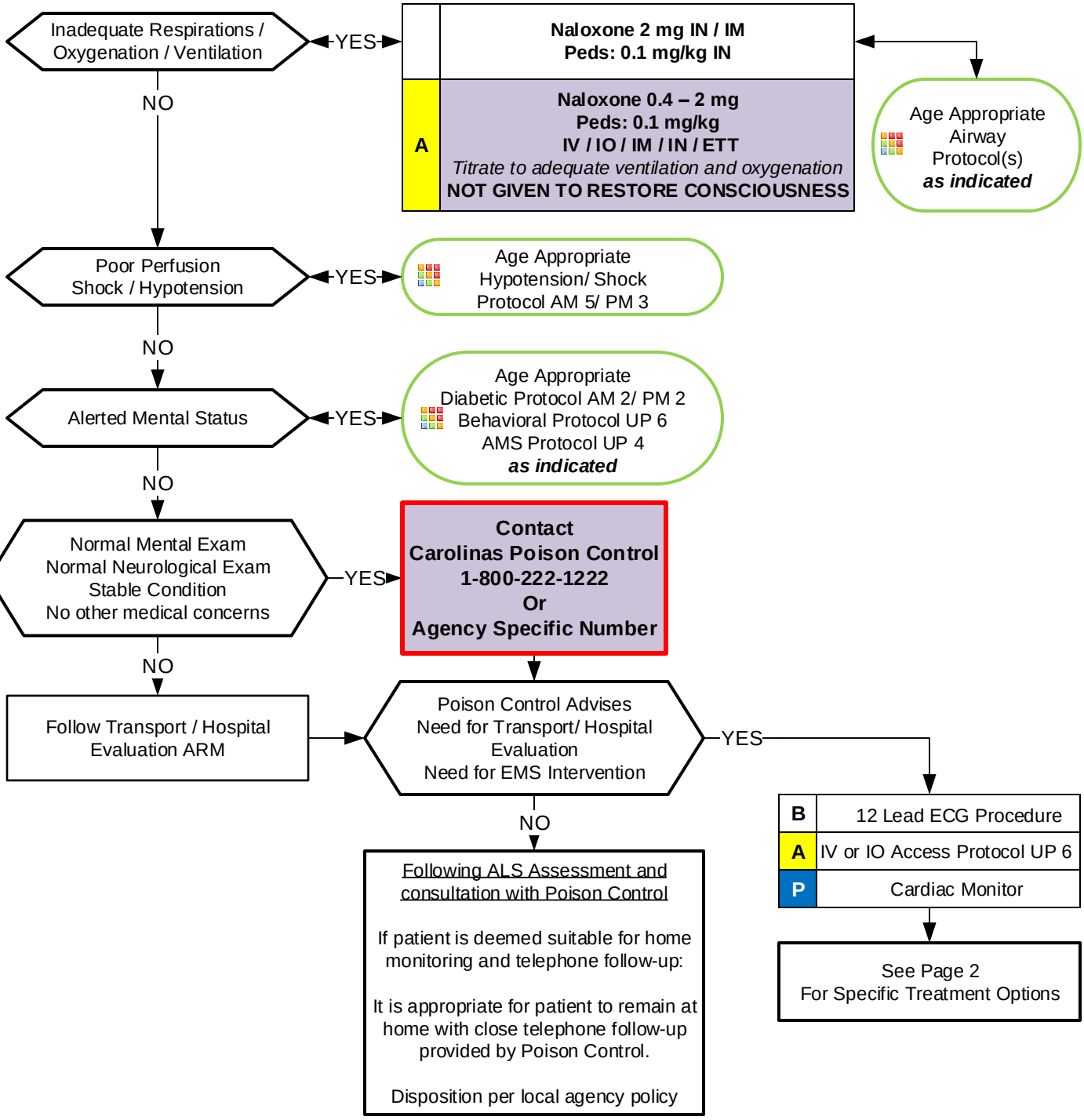
- **Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.**
- **Priority is removal of the patient from the water to prevent drowning.**
- **Coral:**
  - Coral is covered by various living organisms which are easily dislodged from the structure.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

Overdose/ Toxic Ingestion

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

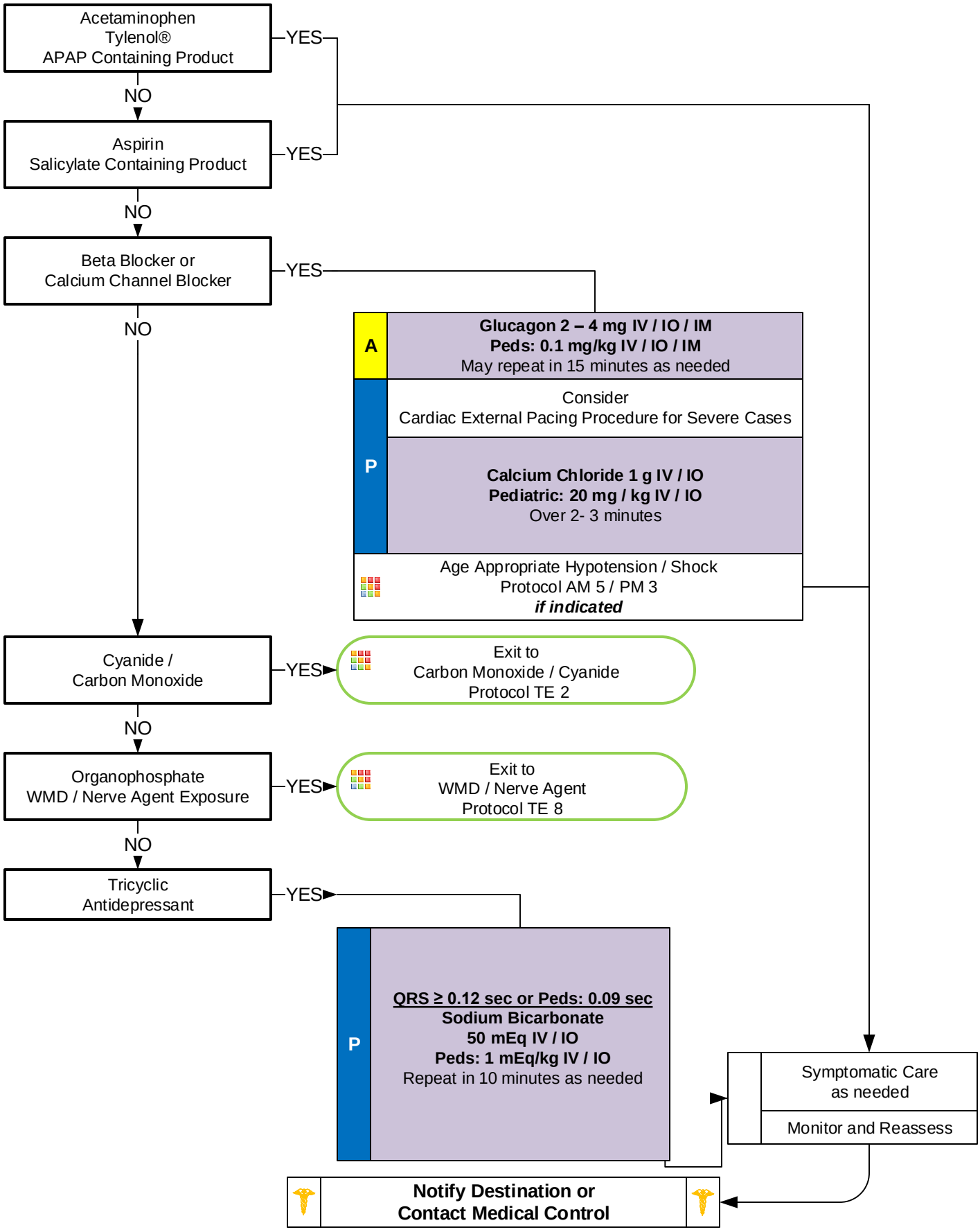
Signs and Symptoms
- Mental status changes
- Hypotension / hypertension
- Decreased respiratory rate
- Tachycardia, dysrhythmias
- Seizures
- S.L.U.D.G.E.
- D.U.M.B.B.E.L.S

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



Toxin-Environmental Protocol Section

Overdose / Toxic Ingestion



Toxin-Environmental Protocol Section

Overdose / Toxic Ingestion

Beta Blockers and Calcium Channel Blockers:

Often OD may have only mild symptoms of dizziness and slow heart rate. Blood pressure may be marginally low. If relatively asymptomatic no treatment is necessary, just monitor and reassess. Glucagon IM can be used with no IV / IO access.

Common Beta Blockers:

Atenolol	Coreg	Nadolol
Labetalo	Propanolol	Tenormin
Inderal	Metoprolol	

Common Calcium Channel Blockers:

Amlodipine	Cardene	Calan
Nicardipine	Norvasc	Isoptin
Adalat	Diltiazem	

Tricyclic Antidepressants:

ECG changes are varied and many. Typically you will see tachycardia though bradycardia can present. Treatment is driven by width of QRS, ventricular arrhythmia, new RBBB and any evident heart blocks. You may note prolonged PR and QT intervals as well as a tall terminal R wave in aVR. Lidocaine is the anti-arrythmic of choice.

Common Tricyclics: Amitriptyline. Imipramine, Clomipramine, Doxepin and Nortryptyline.

The 4mg dose of Narcan is intended to be delivered by IN route by first responders utilizing pre-filled kits. Narcan should otherwise be titrated to respiratory effort. There is no maximum dose for Narcan.

Pearls

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

WMD-Nerve Agent Protocol

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

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

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

Call for help / additional resources
Stage until scene safe

Obtain history of exposure
Observe for specific toxidromes
Initiate triage and/or decontamination as indicated.

Seizure Activity
Go to
Seizure Protocol

Symptom Severity

Asymptomatic

Monitor and Reassess
Every 15 minutes for symptoms
Initiate Treatment per Appropriate Arm

Minor Symptoms:
Respiratory Distress + SLUDGEM

A	IV / IO Procedure
	Nerve Agent Kit IM **2 Doses Rapidly** ***if available***

Major Symptoms:
Altered Mental Status, Seizures, Respiratory Distress, Respiratory Arrest

A	IV / IO Procedure
	Nerve Agent Kit IM **3 Doses Rapidly** ***if available***
P	**Atropine 2 mg IV / IO / IM** **Pediatric: See Pearls** **IV / IO / IM** Repeat every 3 to 5 minutes until symptoms resolve
P	**Pralidoxime (2PAM)** **600 mg IV / IO / IM** **Pediatric: 15 – 25 mg / kg** **IV / IO / IM** Over 30 minutes

Notify Destination or Contact Medical Control

Toxic-Environmental Protocol Section

Pearls
- **Recommended Exam: Mental Status, Skin, HEENT, Heart, Lungs, Gastrointestinal, Neuro**
- **Follow local HAZMAT protocols for decontamination and use of personal protective equipment.**
- **Adult / Pediatric Atropine Dosing Guides:**
  - **Confirmed attack: Begin with 1 Nerve Agent Kit for patients less than 7 years of age, 2 Nerve Agent Kits from 8 to 14 years of age, and 3 Nerve Agent Kits for patients 15 years of age and over.**
  - **If Triage / MCI issues exhaust supply of Nerve Agent Kits, use pediatric atropines (if available).**
  - **Usual pediatric doses: 0.5 mg ≤ 40 pounds (18 kg), 1 mg dose if patient weighs between 40 to 90 pounds (18 to 40 kg), and 2 mg dose ≥ 90 pounds (≥ 40 kg).**
- **Each Nerve Agent Kit contains 600 mg of Pralidoxime (2-PAM) and 2 mg of Atropine.**
- **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 EMR / EMT may carry, self-administer or administer to a patient atropine / pralidoxime by protocol. Agency medical director may require Contact of Medical Control prior to administration.

Suspected Viral Hemorrhagic Fever
Ebola

EMS Dispatch Center

1. Use Emerging Infectious Disease (EID) Surveillance Tool with the following chief complaints:
   - **Typical Flu-Like Symptoms**
     and/or
   - **Unexpected Bleeding**
     (not trauma or isolated nose bleed related)

2. Use EID Card (or equivalent) with the following protocols (or equivalent)
   - EMD 6 Breathing Problem
   - EMD 10 Chest Pain
   - EMD 18 Headache
   - EMD 21 Hemorrhage (medical)
   - EMD 26 Sick Person

3. Ask the following:
   - In the past 21 days have you been to Africa or been exposed to someone who has?
   - If YES:
   - Do you have a fever?

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

Monitor for protocol updates.

Viral Hemorrhagic Fevers:
Ebola is one of many.

YES → **DO NOT DISPATCH FIRST RESPONDERS**

Dispatch EMS Unit only
Discretely notify EMS Supervisor or command staff

NO

EMS

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

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

EMS Immediate Concern

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

AND

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

NO → Exit to Appropriate Protocol(s)

YES

EMS Personal Protective Equipment → Refer to page 2
Place surgical mask on patient
Use Non-rebreather mask if Oxygen Needed
Donning and Doffing Guidelines

NO Routine Aerosol Generating Procedures → Avoid aerosol generating procedures unless medically necessary
NIPPV / Nebulizer therapy / Intubation / BIAD / Suctioning

No Routine IV or IO Lines → Avoid routine IV or IO access unless medically necessary
If IV / IO necessary:
Stop vehicle to lessen exposure risk

EMS Personnel / Equipment / Transport Unit Requires Decontamination → Refer to Page 3

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

Special Circumstances Section

Suspected Viral Hemorrhagic Fever
Ebola

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

DONNING PPE: BEFORE you enter the patient area.

Recommended PPE

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

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

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

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

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

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

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

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

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

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

2) PPE must be double bagged and placed into a regulated medical waste container and disposed of in an appropriate location.
3) Appropriate PPE must be worn while decontaminating / disinfecting EMS equipment or unit.
3) Re-useable PPE should be cleaned and disinfected according to the manufacturer's reprocessing instructions.

Hand Hygiene should be performed by washing with soap and water with hand friction for a minimum of 20 seconds. Alcohol-based hand rubs may be used if soap and water are not available.

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

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

For any provider exposure or contamination contact occupational health.

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

Special Circumstances Section

Pearls

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

Suspected Viral Hemorrhagic Fever
Ebola

EMS Personal
Requires Decontamination

If EMS personnel are exposured to blood, bodily fluids, secretions, or excretions from a patient with suspected or confirmed Ebola should immediately:

1) Stop working and wash the affected skin surfaces with soap and water.
2) Mucous membranes (e.g., conjunctiva) should be irrigated with a large amount of water or eyewash solution;

EMS Equipment / Transport Unit
Requires Decontamination

1) EMS personnel performing decontamination / disinfection should wear recommended PPE
   When performing Decontamination EMS Personnel MUST wear appropriate PPE, which includes:
   - •Gloves (Double glove)
   - •Fluid resistant (impervious) Tyvek Like Full length (Coveralls)
   - •Eye protection (Goggles)
   - •N-95 face mask
   - •Fluid resistant (impervious)-Head covers
   - •Fluid resistant (impervious)-Shoe / Boot covers
2) Face protection (N-95 facemask with goggles) should be worn since tasks such as liquid waste disposal can generate splashes.
3) Patient-care surfaces (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls and work surfaces) are likely to become contaminated and should be decontaminated and disinfected after transport.
4) A blood spill or spill of other body fluid or substance (e.g., feces or vomit) should be managed through removal of bulk spill matter, cleaning the site, and then disinfecting the site. For large spills, a chemical disinfectant with sufficient potency is needed to overcome the tendency of proteins in blood and other body substances to neutralize the disinfectant's active ingredient. An EPA-registered hospital disinfectant with label claims for viruses that share some technical similarities to Ebola (such as, norovirus, rotavirus, adenovirus, poliovirus) and instructions for cleaning and decontaminating surfaces or objects soiled with blood or body fluids should be used according to those instructions.
   (Alternatively, a 1:10 dilution of household bleach (final working concentration of 500 parts per million or 0. 5% hypochlorite solution) that is prepared fresh daily (i.e., within 12 hours) can be used to treat the spill before covering with absorbent material and wiping up. After the bulk waste is wiped up, the surface should be disinfected as described in the section above).
5) Contaminated reusable patient care equipment should be placed in biohazard bags (double-bagged) and labeled for decontamination and disinfection.
6) Reusable equipment should be cleaned and disinfected according to manufacturer's instructions by appropriately trained personnel wearing correct PPE.
7) Avoid contamination of reusable porous surfaces that cannot be made single use. Use only a mattress and pillow with plastic or other covering that fluids cannot get through.
8) To reduce exposure, all potentially contaminated textiles (cloth products) should be discarded. This includes non-fluid-impermeable pillows or mattresses. They should be considered regulated medical waste and placed in biohazard red bags. They must be double-bagged prior to being placed into regulated medical waste containers.

Pearls

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

Suspected Viral Hemorrhagic Fever
Ebola

Special Circumstances Section

Decedent Known or suspected carrier of HVF / Ebola Requires Transportation

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

Donning / Doffing PPE

PPE should be in place **BEFORE** contact with the body

1) Prior to contact with body, postmortem care personnel must wear PPE consisting of: surgical scrub suit, surgical cap, impervious Tyvex-Coveralls, eye protection (e.g., face shield, goggles), facemask, shoe covers, and double surgical gloves.

2) Additional PPE (leg coverings,) might be required in certain situations (e.g., copious amounts of blood, vomit, feces, or other body fluids that can contaminate the environment).

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

1) Use caution when removing PPE as to avoid contaminating the wearer.

2) Hand hygiene (washing your hands thoroughly with soap and water or an alcohol based hand rub) should be performed immediately following the removal of PPE. If hands are visibly soiled, use soap and water.

Preparation of Body Prior to Transport

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

Surface Decontamination

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

Transportation of VHV / Ebola Remains

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

Pearls

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

High Consequence Pathogens

(Respiratory Diseases, SARS, MERS-CoV, COVID-19)

EMD Dispatch Center Screening

1. All calls requiring response from EMS system:

Ask: Do you have FEVER AND/OR RESPIRATORY SYMPTOMS?
(cough, breathing difficulty, or other respiratory symptoms?)

EMD Systems:
PDS – Card 36 Pandemic Flu
APCO – COVID-19 Pandemic Vital Points Card
PowerPhone – Pandemic Influenza Card

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

Monitor for protocol updates.

EMD Screen Positive

Notify All Responding Agencies:
- Positive screening (agency specific code)
- First Responder Response:
  Follow local system guidance

EMD Screen Negative

First Responders and EMS Screening

Do not rely solely on EMD personnel to identify a potential exposure patient:
- EMD may be constrained by time and caller information.
- **First arriving provider (FR or EMS):**
  - If call nature allows, send 1 provider only into scene to complete a quick screen.
  - Stand at a distance of ≥ 6 feet and perform screening question.
  - Patients with Fever and/or Cough *(or other respiratory symptoms are at risk of Influenza and/or COVID-19).*
  - Chills, muscle aches, sore throat, or sudden loss of taste or smell.
  - If patient screens **positive:**
    - Place facemask or covering over patient's mouth and nose and provider dons appropriate PPE based on clinical situation.
- First Responders should stage and limit number of providers entering scene only necessary for care to limit potential exposures and use of PPE.
- Request additional resources as needed. See Page 4.

Negative FR or EMS Screening

Exit to Appropriate Protocol(s)

Positive FR or EMS Screening

EMS PPE

Patient:
- Use non-rebreather mask if oxygen needed
- If unable to tolerate mask, have patient cover mouth and nose when coughing

Providers utilize:
- **Follow PPE precautions listed below:**
- Exam gloves and eye protection
- Facemask minimum
- **Aerosol generating procedure:**
- Respirator (N95, PAPR, or equivalent)
- Goggles, gown (disposable gown, coveralls, or equivalent)
- Create negative pressure in care compartment (See Pearls)

Personnel in ambulance cab utilize:
- Facemask for driver and passenger

PPE Supply Chain Disruptions:
- Prioritize respirators (N95 or equivalent) to aerosol-generating procedures until supply chain restored.
- Prioritize gowns to aerosol-generating procedures.
- It is reasonable for providers to wear a facemask during their duty-shift and change only when soiled or damaged. Adjust use based on supply chain.

EMS General Treatment Considerations

Aerosol generating procedures:
NIPPV / Nebulizer therapy / Intubation / BIAD / Suctioning / CPR
Use all PPE devices and strategies listed above
- **Notify receiving facility of infection control requirements prior to arrival.**

Exit to Appropriate Protocol(s)

Special Circumstances Section

High Consequence Pathogens

(Respiratory Diseases, SARS, MERS-CoV, COVID-19)

Special Circumstances Section

Pearls

- First Responders: Because community spread is now present, every patient contact should be considered to have potential for infection with COVID-19. Limit number of FR when caring for patients to limit exposures and PPE use.
- Place facemask on any patient complaining of respiratory problems with or without a fever.
- Dispatch Screening:
  - If caller interrogation results in positive screen first responders are assigned based on local agency direction.
  - This screening process will result in many False Positive screens in order to be very sensitive.
- First Responder and EMS Screening:
  - Limit distance initially to ≥ 6 feet and conduct a quick screening using the EMD specific question. If this results in a positive screen, immediately place a facemask on the source patient and all providers don appropriate PPE and limit provider number to that which necessary for patient care.
- Close Contact and Duration Definition:
  - Healthcare provider exposure is defined as being within 6 feet for ≥ 15 minutes in a patient with suspected illness.
  - Unprotected (no or incorrect PPE) with direct contact with body fluids, including respiratory generated body fluids.
- Transport:
  - Occupants in cab of vehicle all should wear facemasks. Riders should be discouraged in order to limit PPE use.
  - Limit number of providers in vehicle required to provide patient care in order to limit exposures.
  - Ensure use of correct PPE for crew and passengers when aerosol-producing procedures utilized.
- Recommend facemask and gloves with every patient contact. It is reasonable to wear eye protection on every patient contact.
- Reasonable to wear simple/surgical mask during entire duty-shift when not able to maintain social distance of ≥ 6 feet among fellow providers when not engaged in patient care.
- Negative Pressure in care compartment:
  - Door or window available to separate driver's and care compartment space:
    - Close door/window between driver's and care compartment and operate rear exhaust fan on full.
  - No door or window available to separate driver's and care compartment space:
    - Open outside air vent in driver's compartment and set rear exhaust fan to full.
  - Set vehicle ventilation system to non-recirculating to bring in maximum outside air.
  - Use recirculating HEPA ventilation system if equipped.
- Airborne precautions:
  - Standard PPE with fit-tested N95 mask (or PAPR respirator) and utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions. This level is utilized with Aspergillus, SARS/MERS/COVID-19, Tuberculosis, Measles (rubeola) Chickenpox (varicella-zoster), Smallpox, Influenza, disseminated herpes zoster, or Adenovirus/Rhinovirus.
- Contact precautions:
  - Standard PPE with utilization of a gown or coveralls, change of gloves after every patient contact, and strict hand washing precautions. This level is utilized with GI complaints, blood or body fluids, C diff, scabies, wound and skin infections, MRSA. Clostridium difficile (C diff) is not inactivated by alcohol-based cleaners and washing with soap and water is indicated.
- Droplet precautions:
  - Standard PPE plus a standard surgical mask for providers who accompany patients in the treatment compartment and a surgical mask or NRB O2 mask for the patient. This level is utilized when Influenza, Meningitis, Mumps, Streptococcal pharyngitis, Pertussis, Adenovirus, Rhinovirus, and undiagnosed rashes.
- All-hazards precautions:
  - Standard PPE plus airborne precautions plus contact precautions. This level 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, MERS-CoV, COVID-19).
- **COVID-19 (Novel Coronavirus): For most current criteria to guide evaluations of patients under investigation:** https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html

High Consequence Pathogens

(Respiratory Diseases, SARS, MERS-CoV, COVID-19)

Decontamination Recommendations

EMS Personnel Requires Decontamination

Driver:

- Should wear full PPE as described when caring for patient.
- Remove all PPE, except respiratory (N95, PAPR, or equivalent) and perform hand hygiene prior to entering cab to prevent contamination of driver's compartment. **Cab occupants only need to wear facemasks if respirator not already used.**

Wash hands:

- Thoroughly after transferring patient care and/or cleaning ambulance

Maintain records:

- All prehospital providers exposed to patient at the scene and during ambulance transport (self-monitoring for symptoms for 14 days is recommended, even if wearing appropriate PPE).
  This does not mean the providers can no longer work.
- List all prehospital provider names (students, observers, supervisors, first response etc.) in the Patient Care Report.

EMS Equipment / Transport Unit Requires Decontamination

Safely clean vehicles used for transport:

- Follow standard operating procedures for the containment and disposal of regulated medical waste.
- Follow standard operating procedures for containing and reprocessing used linen.

Wear appropriate PPE when:

- Removing soiled linen from the vehicle. Avoid shaking the linen.
- Clean and disinfect the vehicle in accordance with agency standard operating procedures.
- Personnel performing the cleaning should wear a disposable gown and gloves (a respirator should not be needed) during the clean-up process; the PPE should be discarded after use.
- All surfaces that may have come in contact with the patient or materials contaminated during patient care (e.g., stretcher, rails, control panels, floors, walls, work surfaces) should be thoroughly cleaned and disinfected using an **EPA-registered disinfectant** appropriate for SARS, MERS-CoV, or coronavirus in healthcare settings in accordance with manufacturer's recommendations. **Keep doors open to patient care compartment while cleaning to allow air exchanges.**

EMS Provider Exposure Risk and Monitoring Recommendations

Close Contact
Less than 6 feet for ≥ 15 minutes
Source patient **NOT WEARING A MASK**

PPE Utilized	Exposure Risk	Monitoring	Work Restrictions
NONE	HIGH	Self-monitor Supervision	**If symptomatic:** Fever and Respiratory symptoms (cough, difficulty breathing or other respiratory symptoms) ***THEN*** **Exclude from work:** • At least 72 hours after fever resolution with no use of fever reducing medications. AND • At least 10 days since symptom onset.
No facemask N95 or PAPR	HIGH		
No Eye Protection	MEDIUM		
No Gown/ Coveralls or Gloves	LOW		
All recommended PPE Except facemask instead of N95 or PAPR	LOW		

Close Contact
Less than 6 feet for ≥ 15 minutes
Source patient **WEARING A MASK**

PPE Utilized	Exposure Risk	Monitoring	Work Restrictions
NONE	MEDIUM	Self-monitor Supervision	**If symptomatic:** Fever and Respiratory symptoms (cough, difficulty breathing or other respiratory symptoms) ***THEN*** **Exclude from work:** • At least 72 hours after fever resolution with no use of fever reducing medications. AND • At least 10 days since symptom onset.
No facemask N95 or PAPR	MEDIUM		
No Eye Protection	LOW		
No Gown/ Coveralls or Gloves	LOW		
All recommended PPE Except facemask instead of N95 or PAPR	LOW		

Placing a simple/surgical mask on the patient within 15 minutes of contact decreases exposure risk.

Return to Work Practice and Work Restrictions (if excluded from work OR exposure to suspected or known COVID-19 patient):

- Prior to duty shift, measure temperature and assess for illness symptoms either by provider, infection control officer, or occupational or public health.
- Self-monitoring with oversight by agency's infection control officer, occupation or public health department per agency policy.
- Wear mask at all times and restrict care of immunocompromised patients (Cancer, Transplant, Steroid use) until all symptoms have resolved or 14 days after onset of illness, whichever is longest.
- Social distance: Employee should maintain 6 feet of separation as work duties permit in the workspace.
- Remove from work if employee becomes symptomatic.

- https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-for-ems.html
- https://www.cdc.gov/coronavirus/2019-ncov/healthcare-facilities/hcp-return-work.html
- https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2-covid-19

High Consequence Pathogens
(Respiratory Diseases, SARS, MERS-CoV, COVID-19)

First Responder Guidance

COVID-19 Declared Pandemic with both State and Federal Emergencies Declared

- Many systems are heavily dependent on First Responder agencies to supplement critical prehospital medical care services.
- Community spread is now evident both in NC and in the US.
- Every patient, regardless of medical or injury complaint, is at risk of COVID-19 and all should undergo routine screening questions.
- While EMD is a first step, all providers must screen every patient contact and don appropriate PPE based on clinical situation and COVID-19 screening.
- The citizens we serve continue to have a variety of illness and injury unrelated to COVID-19.
- Limiting PPE use:

  First Responders should consider staging with all incidents and sending 1 provider (or more dependent on situation) into the scene to assess for fever and respiratory complaints.

  Request staged resources as needed only to provide necessary medical care.

  Where patients do not require immediate intervention, first responders may stay in contact with patient, but remain beyond 6 feet until EMS providers arrive to begin assessment and further care.

  Consider calling patient on mobile phones to maintain contact and provide reassurance and explain current situation.

PPE Crisis or Alternative Srategies

N95 Respirators

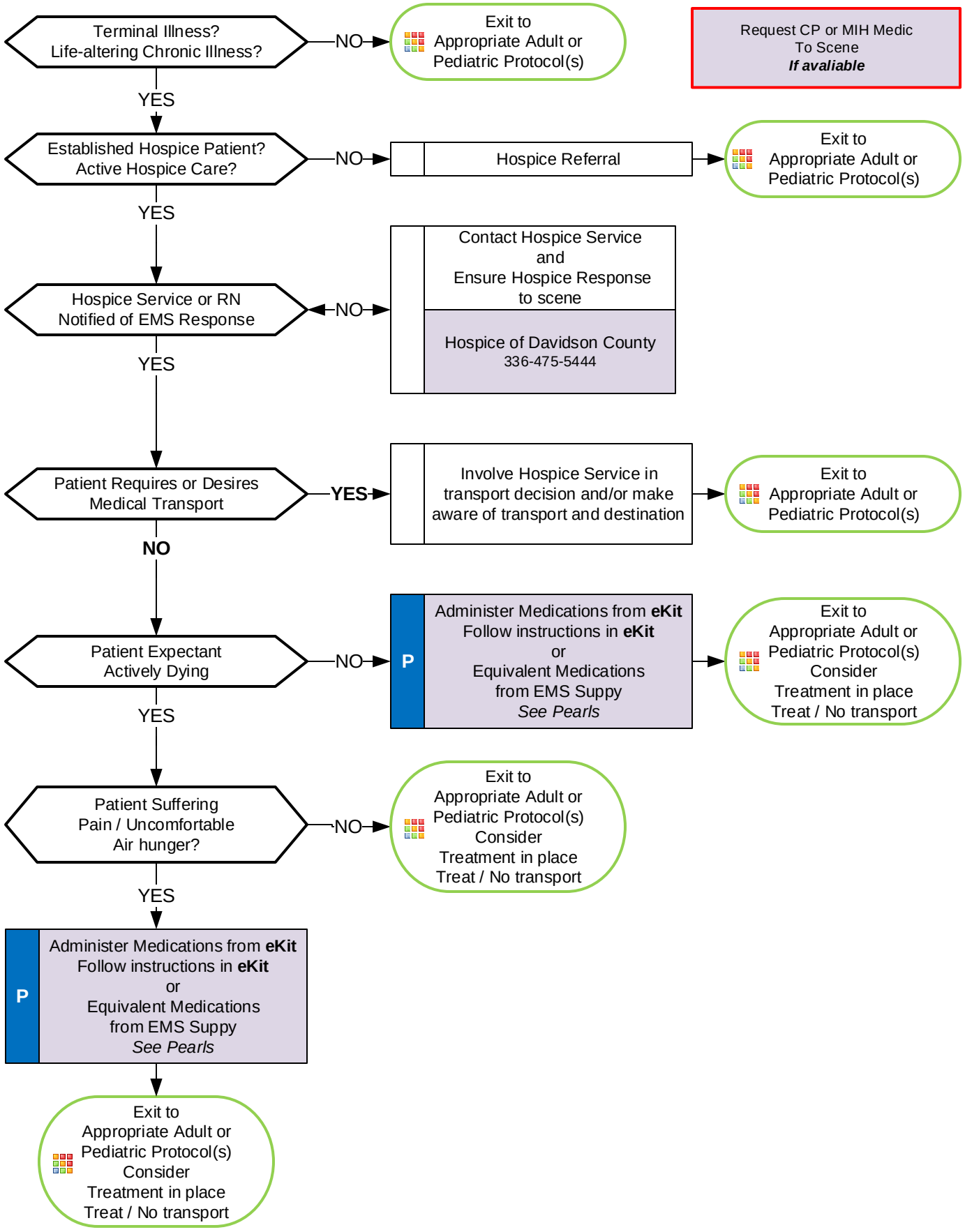
- Use only for aerosol generating procedures (Nebulizer, NIPPV, Suctioning, BVM, BIAD, Intubation).
- Use facemasks in all other scenarios.
- Use respirators (N95 or equivalent) beyond the manufacturing expiration date when not soiled, ripped, torn, or otherwise damaged. Securing straps should also be in good repair and operational:
  Visually inspect straps, nose bridge/foam, and mask in general.
  Perform seal check: https://www.youtube.com/watch?v=pGXiUyAoEd8
- Models tested by CDC and are believed to function properly beyond expiration date:
  3M: 1860, 1860s, 1870, 8210, 9010, 8000
  Gerson 1730
  Medline/Alpha Protech NON27501
  Moldex: 1512, 2201
- Minimize providers caring for patient to the extent possible to conserve.
- Use Self-Contained Breathing Apparatus (SCBA) if needed.
- Re-use respiratory (N95 or equivalent) masks and place in paper bag between use. Do not touch inside of mask. Wash hands thoroughly before removing mask.
- When to discard a respirator (N95 or equivalent):
  After using during an aerosol producing procedure.
  Contamination with blood, body fluids or secretions, following close contact with known COVID-19 patient.

Gowns:

- Use only for aerosol generating procedures (Nebulizer, NIPPV, Suctioning, BVM, BIAD, Intubation).
- Use only for close patient contact, lifting, moving, or transferring where provider contacts patients body.
- May use removable and washable coveralls.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html

Hospice or Palliative Care Patient



Special Circumstances Section

Hospice or Palliative Care Patient

Acute Pain / Air Hunger:

Severity	Medication		
	Morphine (IV/IM/SQ)	Dilaudid (IV/IM/SQ)	Fentanyl (IV/IM/SQ)
Mild	2 mg	0.5 mg	25 mcg
Moderate	4 mg	1 mg	50 mcg
Severe	8 mg	2 mg	100 mcg
Titration	2 mg q 15 minutes IV	0.5 mg q 15 minutes IV	25 mg q 15 minutes IV
Max Total Dose	10mg	4mg	300 mcg

Due to pain associated with IM injection, IM administration should only be used if alternative medications or routes of administration are not available. PICC lines may be accessed for use by EMS with sterile techniques. May access port-a-cath if appropriate equipment is available and provider is trained.

If using IM or SQ injections, delay repeat dosing by 30 minutes to prevent dose stacking.

Consider using moderate / severe dose in opiate tolerant patients:

Opiate tolerant patients have typical daily dose of narcotic is equivalent to ≥ 60 mg of oral Morphine per day (60 OME (Oral Morphine Equivalents).

Examples of opiate dosages equivalent to 60 mg of oral Morphine:

40 mg/day of Oxycodone
25 mcg/hr Fentanyl Transdermal
200 mg/day of Tapentadol
Suboxone
60 mg/day Hydrocodone
15 mg/day of Methadone
16 mg/day of Oxymorphone

Consider total use of multiple types of opiates. If in doubt about the patient's level of opiate tolerance, or amount of total daily opiate use, treat with a lower initial dose of opiate.

Anxiety / Agitation:

Severity	Medication			
	Ativan (IV/IM/SQ)	Versed (IV/IM/SQ)	Valium (IV/IM/SQ)	Haldol (IV/IM/SQ)
Mild / Moderate	0.5 mg	1 mg	2 mg	2 mg
Severe	1 mg	2 mg	5 mg	4 mg

May repeat dose in 15 minutes for IV administration, or 30 minutes for IM or SQ injections.

Nausea / Vomiting:

Zofran IV / IM	Phenergan IV / IM	Haldol IV / IM / SQ	Ativan IV / IM / SQ
4 mg	25 mg	2 mg	0.5 mg

Pearls

- **MOST form Section A and DNR forms are equivalent – if valid, Do Not Resuscitate.**
- **MOST form and DNR forms may be revoked by Health Care Power of Attorney or other appropriate surrogate decision-makers.**
- **Palliative care is specialized care for patients with a chronic and/or terminal illness which focuses on managing symptoms exacerbation and the stress of illness.**
- **Hospice care is specialized care (similar to palliative care) for patients within the last 6 months of life.**
- **Hospice patient may not have a DNR or MOST form completed and still be enrolled in Hospice care.**
- **Emergency Kits (eKit):**
  May be given to patient by Hospice to use at home for acute symptom exacerbation.
  Each eKit is individualized and will be different for each patient, but typically addresses pain, nausea/vomiting, anxiety, and/or secretions. *(EMS is able to administer if within provider's scope of practice.)*
- **Interaction on-scene with Hospice personnel:**
  Hospice nurses are valuable resources in helping patients/families make care/transport decisions.
  EMS should discuss care/transport decision with Hospice nurse.
  After medication administration, if no transport occurs, care may be transferred to Hospice nurse.

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Airway: BIAD-Combitube

	EMR
B	EMT
A	AEMT
P	PARAMEDIC

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

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

Procedure:

1. Preoxygenate the patient.
2. Lubricate the tube.
3. Grasp the patient's tongue and jaw with your gloved hand and pull forward.
4. Gently insert the tube until the teeth are between the printed rings.
5. Inflate line 1 (blue pilot balloon) leading to the pharyngeal cuff with 100 cc of air.
6. Inflate line 2 (white pilot balloon) leading to the distal cuff with 15 cc of air.
7. **Ventilate the patient through the longer blue tube**.
   - Auscultate for breath sounds and sounds over the epigastrium.
   - Look for the chest to rise and fall.
8. **If breath sounds are positive and epigastric sounds are negative, continue ventilation through the blue tube. The tube is in the esophagus.**
   - In the esophageal mode, stomach contents can be aspirated through the #2, white tube relieving gastric distention.
9. If breath sounds are negative and epigastric sounds are positive, attempt ventilation through the shorter, #2 white tube and reassess for lung and epigastric sounds. If breath sounds are present and the chest rises, you have intubated the trachea and continue ventilation through the shorter tube.
10. The device is secured by the large pharyngeal balloon.
11. **Confirm tube placement using end-tidal CO_2 detector or esophageal bulb device.**
12. **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene**
13. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

- **Endotracheal intubation with a Combitube in Place (Only if ventilation unsuccessful):**
  - If you cannot ventilate with the Combitube in place, you should remove the tube, open and suction the airway, and ventilate with a BVM prior to intubation or re-establishment of another BIAD.

Certification Requirements:

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

Airway: BIAD King

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

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

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

Procedure:

1. Preoxygenate the patient.
2. Select the appropriate tube size for the patient.
3. Lubricate the tube.
4. Grasp the patient's tongue and jaw with your gloved hand and pull forward.
5. Gently insert the tube rotated laterally 45-90 degrees so that the blue orientation line is touching the corner of the mouth. Once the tip is at the base of the tongue, rotate the tube back to midline. Insert the airway until the base of the connector is in line with the teeth and gums.
6. Inflate the pilot balloon with 45-90 ml of air depending on the size of the device used.
7. **Ventilate the patient while gently withdrawing the airway until the patient is easily ventilated**.
8. Auscultate for breath sounds and sounds over the epigastrium and look for the chest to rise and fall.
9. The large pharyngeal balloon secures the device.
10. **Confirm tube placement using end-tidal CO_2 detector.**
11. **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene**
12. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: BIAD-Laryngeal Mask Airway (LMA)

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

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

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

Clinical Contraindications:

- Deforming Facial Trauma
- Pulmonary Fibrosis
- Morbid Obesity

Procedure:

1. Select the appropriate tube size for the patient.
2. Check the tube for proper inflation and deflation.
3. Completely deflate the tube prior to insertion.
4. Lubricate with a water-soluble jelly.
5. Pre-Oxygenate the patient with 100% Oxygen
6. Insert the LMA into the hypopharynx until resistance is met.
7. Inflate the cuff until a seal is obtained.
8. Connect the LMA to an ambu bag and assess for breath sounds and air entry.
9. **Confirm tube placement using end-tidal CO_2 detector or esophageal bulb device.**
10. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
11. **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene**
12. Re-verify LMA placement after every move and upon arrival in the ED
13. Document the procedure, time, and result (success) on/with the patient care report (PCR)
14. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: BIAD-i-Gel

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

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

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

Clinical Contraindications:

- Deforming Facial Trauma
- Pulmonary Fibrosis
- Morbid Obesity

Procedure:

1. Pre-Oxygenate the patient with 100% Oxygen
2. Select the appropriate tube size for the patient.
3. Remove the device from the protective cradle and carefully for any signs of damage.
4. Place water-soluble jelly in the middle of the protective cradle.
5. Lubricate the back of the i-Gel on the non-inflatable cuff and ensure no lubricant is in the cuff.
5. Lubricate each side and the tip of the non-inflatable cuff.
6. Grasp along the integral bite block and face the cuff outlet toward the patient's chin.
7. Insert the i-Gel into the mouth in the direction of the hard palate.
8.Glide the device down and back along the hard palate with continuous, gentle pressure, until
9. Connect the i-Gel to an BVM and assess for breath sounds and air entry.
10. **Confirm tube placement using end-tidal CO_2 detector or esophageal bulb device.**
11. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
12. **EtCO2 monitoring is mandatory following placement of a BIAD once available on scene**
13. Re-verify i-Gel placement after every move and upon arrival in the ED
43. Document the procedure, time, and result (success) on/with the patient care report (PCR)
15. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: Cricothyrotomy-Surgical

Clinical Indications:

P PARAMEDIC P

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

Procedure:

1. Have suction and supplies available and ready.
2. Locate the cricothyroid membrane utilizing anatomical landmarks.
3. Prep the area with an antiseptic swab (Betadine).
4. Attach a 5-cc syringe to an 18G - 1 & 1/2-inch needle.
5. Insert the needle (with syringe attached) perpendicularly through the cricothyroid membrane with the needle directed posteriorly.
6. During needle insertion, gentle aspiration should be applied to the syringe. Rapid aspiration of air into the syringe indicates successful entry into the trachea. Do not advance the needle any further. Attach forceps and remove syringe.
7. With the needle remaining in place, make a 1-inch vertical incision through the skin and subcutaneous tissue above and below the needle using a scalpel. Using blunt dissection technique, expose the cricothyroid membrane. This is a bloody procedure. The needle should act as a guide to the cricothyroid membrane.
8. With the needle still in place, make a horizontal stabbing incision approx. 1/2 inch through the membrane on each side of the needle. Remove the needle.
9. Using (skin hook, tracheal hook, or gloved finger) to maintain surgical opening, insert the cuffed tube into the trachea. (Cric tube from the kit or a #6 endotracheal tube is usually sufficient).
10. Inflate the cuff with 5-10cc of air and ventilate the patient while manually stabilizing the tube.
11. All of the standard assessment techniques for insuring tube placement should be performed (auscultation, chest rise & fall, end-tidal CO_2 detector, etc.) Esophageal bulb devices are not accurate with this procedure.
12. Secure the tube.
13. If Available apply end tidal carbon dioxide monitor (Capnography) and record readings on scene, en route to the hospital, and at the hospital.
14. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices used to confirm initial tube placement and after each movement of the patient.
15. Consider placing an NG or OG tube to clear stomach contents after the airway is secured.
16. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
17. **It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

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

Airway: Intubation Oral Tracheal

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

1. Prepare, position and oxygenate the patient with 100% Oxygen.
2. Select proper ET tube (and stylette, if used), have suction ready.
3. Using laryngoscope, visualize vocal cords. (Use Sellick maneuver/BURP to assist you).
4. Limit each intubation attempt to 30 seconds with BVM between attempts.
5. Visualize tube passing through vocal cords.
6. **Confirm and document tube placement using an end-tidal CO_2 monitoring or esophageal bulb device.**
7. Inflate the cuff with 3-to10 cc of air; secure the tube to the patient's face.
8. Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If you are unsure of placement, remove tube and ventilate patient with bag-valve mask.
9. Consider using a Blind Insertion Airway Device if intubation efforts are unsuccessful.
10. If Available apply end tidal carbon dioxide monitor (Capnography) and record readings on scene, en route to the hospital, and at the hospital.
11. Document ETT size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices used to confirm initial tube placement. Also document positive or negative breath sounds before and after each movement of the patient.
12. Consider placing an NG or OG tube to clear stomach contents after the airway is secured with an ET tube.
13. **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**

4. It is strongly recommended that an Airway Evaluation Form be completed with all intubations

Certification Requirements:

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

Airway: Intubation Nasotracheal

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

1. Premedicate the patient with nasal spray.
2. Select the largest and least obstructed nostril and insert a lubricated nasal airway to help dilate the nasal passage.
3. Preoxygenate the patient. Lubricate the tube. The use of a BAAM device is recommended.
4. Remove the nasal airway and gently insert the tube keeping the bevel of the tube toward the septum.
5. Continue to pass the tube listening for air movement and looking for to and fro vapor condensation in the tube. As the tube approaches the larynx, the air movement gets louder.
6. Gently and evenly advance the tube through the glottic opening on the inspiration. This facilitates passage of the tube and reduces the incidence of trauma to the vocal cords.
7. Upon entering the trachea, the tube may cause the patient to cough, buck, strain, or gag. Do not remove the tube! This is normal, but be prepared to control the cervical spine and the patient, and be alert for vomiting.
8. Auscultate for bilaterally equal breath sounds and absence of sounds of the epigastrium. Observe for symmetrical chest expansion. The 15mm adapter usually rests close to the nostril with proper positioning.
9. Inflate the cuff with 5-10 cc of air.
10. **Confirm tube placement using an end-tidal CO_2 monitoring or esophageal bulb device.**
11. Secure the tube.
12. Reassess airway and breath sounds after transfer to the stretcher and during transport. These tubes are easily dislodged and require close monitoring and frequent reassessment.
13. Document the procedure, time, and result (success) on/with the patient care report (PCR).
14. **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
15. **It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

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

Airway: Video Laryngoscopy Glidescope

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patient requires advanced airway.

Procedure:

1. Preoxygenate the patient and use in conjunction with procuedure ASP - 6.
2. Select the appropriate ETT size and GlideRite Rigid Stylette for the patient. Ready suction.
3. Power on GildeScope and allow 30 seconds for anti-fog mechanism to warm.
4. Using GlideScope visualize the vocal cords and facilitate the intubation:
   - **In the mouth:** looking directly into the patient's mouth and with the VL blade in left hand, introduce GlideScope VL into the midline of the oral pharynx.
     Look into the mouth to prevent soft tissue damage.
   - **At the screen:** With GlideScope VL inserted, look to monitor to identify the epiglottis, then manipulate the scope to obtain the best glottic view.
   - **In the mouth:** Looking directly into the patient's mouth, not at screen, carefully guide the distal tip of the ETT into position near the tip of the GlideScope VL.
     Insert the ETT behind or adjacent to the VL blade.
   - **At the screen:** Look to the monitor to complete tracheal intubation. Gently rotate or angle the ETT to redirect as needed.
     Avoid excessive lifting or pushing of the glottis with the VL blade.
     Reducing the elevation applied to the VL blade may facilitate intubation.
   - **Advance the ETT** while simultaneously withdrawing the stylette with the thumb.
     Withdraw the stylette approximately 5 cm (2 inches).
     Do not insert the stylette into the larynx during intubation – this will prevent passing into the glottis.
   - **Secure and verify the proper ETT placement.**

5. Auscultate for breath sounds and sounds over the epigastrium and look for the chest to rise and fall.
6. Secure the ETT tube with tape or mechanical tube holder.
7. **Confirm tube placement using end-tidal CO_2 detector.**
8. **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**

12. **Complete the Airway Evaluation Form.**

Certification Requirements:

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

North Carolina College of Emergency Physicians
Standards Procedure (Skill)
Airway: Drug Assisted Airway

Clinical Indications:

P PARAMEDIC P

- Need for advanced airway control in a patient who has a gag reflex or trismus (jaw clinching)
- Failure to protect the airway. Unable to ventilate and / or oxygenate. Impending airway compromise
- A minimum of 2 EMT-Paramedics on scene able to participate in patient care
- This protocol is only for use in patients with patients longer than a Length-based Resuscitation Tape except in agencies utilizing Ketamine for pediatric airway management with direct online medical control via system medical director or assistant medical director.

Clinical Contraindications:

- Refer to drug list for contraindications regarding use of Succinylcholine and Rocuronium.

Procedure:

1. Perform focused neurological exam
2. Evaluate for difficult airway (LEMON)-see appendix
3. Prepare equipment (intubation kit, BVM, suction, DAI medications, BIAD, Cricothyrotomy kit, waveform capnography, other airway adjuncts as available)
4. Pre-oxygenate patient with 100% oxygen via NRB mask or BVM. Apneic oxygenation: May continue high-flow oxygen via NC during entire procedure
5. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
6. Ensure functioning IV / IO access. Two (2) IV sites are preferable
8. In-line c-spine stabilization by second caregiver (in setting of trauma)
9. Administer Etomidate or Ketamine by rapid IV push
10. Administer Succinylcholine or Rocuronium, await fasciculation and jaw relaxation
11. Perform external laryngeal manipulation to improve view during laryngoscopy with the right hand.
12. Intubate trachea or place BIAD if intubation unsuccessful or felt to be unsuccessful during procedure.
13. Verify ET placement through auscultation, Capnography, and Pulse Oximetry
14. May repeat Succinylcholine or Rocuronium if inadequate relaxation
15. Release cricoid pressure (if utilized) and secure tube
16. **Continuous Capnography and Pulse Oximetry is required for DAI. Pre-intubation, minimal during intubation, and post-intubation readings must be recorded in the PCR.**
17. Re-verify tube placement after every move and upon arrival in the ED
18. Document ETT or BIAD size, time, result (success), and placement location by the centimeter marks either at the patient's teeth or lips on/with the patient care report (PCR). Document all devices/methods used to confirm initial tube placement initially and with patient movement.
19. Consider placing a gastric tube to clear stomach contents after the airway is secured.
20. **Completion of the Airway Evaluation Form is required including a signature from the receiving physician at the Emergency Department confirming proper tube placement.**

Certification Requirements:

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

Airway: Tracheostomy Tube Change

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Presence of Tracheostomy site.
- Urgent or emergent indication to change the tube, such as obstruction that will not clear with suction, dislodgement, or inability to oxygenate/ventilate the patient without other obvious explanation.

Procedure:

1. Have all airway equipment prepared for standard airway management, including equipment of orotracheal intubation and failed airway.
2. Have airway device (endotracheal tube or tracheostomy tube) of the same size as the tracheostomy tube currently in place as well as 0.5 size smaller available (e.g., if the patient has a #6.0 Shilley, then have a 6.0 and a 5.5 tube).
3. Lubricate the replacement tube(s) and check the cuff.
4. Remove the tracheostomy tube from mechanical ventilation devices and use a bag-valve apparatus to pre-oxygenate the patient as much as possible.
5. Once all equipment is in place, remove devices securing the tracheostomy tube, including sutures and/or supporting bandages.
6. If applicable, deflate the cuff on the tube. If unable to aspirate air with a syringe, cut the balloon off to allow the cuff to lose pressure.
7. Remove the tracheostomy tube.
8. Insert the replacement tube. Confirm placement via standard measures except for esophageal detection (which is ineffective for surgical airways).
9. If there is any difficultly placing the tube, re-attempt procedure with the smaller tube.
10. If difficulty is still encountered, use standard airway procedures such as oral bag-valve mask or endotracheal intubation (as per protocol). **More difficulty with tube changing can be anticipated for tracheostomy sites that are immature – i.e., less than two weeks old. Great caution should be exercised in attempts to change immature tracheotomy sites.**
11. Document procedure, confirmation, patient response, and any complications in the PCR

Certification Requirements:

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

Airway: Endotracheal Tube Introducer (Bougie)

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patients meet clinical indications for oral intubation
- Initial intubation attempt(s) unsuccessful
- Predicted difficult intubation

Contraindications:

- Three attempts at orotracheal intubation (utilize failed airway protocol)
- Age less than eight (8) or ETT size less than 6.5 mm

Procedure:

1. Prepare, position and oxygenate the patient with 100% oxygen;
2. Select proper ET tube without stylet, test cuff and prepare suction;
3. Lubricate the distal end and cuff of the endotracheal tube (ETT) and the distal 1/2 of the Endotracheal Tube Introducer (Bougie) (note: Failure to lubricate the Bougie and the ETT may result in being unable to pass the ETT);
4. Using laryngoscopic techniques, visualize the vocal cords if possible using Sellick's/BURP as needed;
5. Introduce the Bougie with curved tip anteriorly and visualize the tip passing the vocal cords or above the arytenoids if the cords cannot be visualized;
6. Once inserted, gently advance the Bougie until you meet resistance or "hold-up" (if you do not meet resistance you have a probable esophageal intubation and insertion should be re-attempted or the failed airway protocol implemented as indicated);
7. Withdraw the Bougie ONLY to a depth sufficient to allow loading of the ETT while maintaining proximal control of the Bougie;
8. Gently advance the Bougie and loaded ET tube until you have hold-up again, thereby assuring tracheal placement and minimizing the risk of accidental displacement of the Bougie;
9. While maintaining a firm grasp on the proximal Bougie, introduce the ET tube over the Bougie passing the tube to its appropriate depth;
10. If you are unable to advance the ETT into the trachea and the Bougie and ETT are adequately lubricated, withdraw the ETT slightly and rotate the ETT 90 degrees COUNTER clockwise to turn the bevel of the ETT posteriorly. If this technique fails to facilitate passing of the ETT you may attempt direct laryngoscopy while advancing the ETT(this will require an assistant to maintain the position of the Bougie and, if so desired, advance the ETT);
11. Once the ETT is correctly placed, hold the ET tube securely and remove the Bougie;
12. Confirm tracheal placement according to the intubation protocol, inflate the cuff with 3 to 10 cc of air, auscultate for equal breath sounds and reposition accordingly;
13. When final position is determined secure the ET tube, reassess breath sounds, apply end tidal CO2 monitor, and record and monitor readings to assure continued tracheal intubation.

Certification Requirements:

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

Standards Procedure (Skill) Airway Section
Airway Intubation Confirmation – End-Tidal CO_2 Detector

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- The End-Tidal CO_2 detector shall be used with any Endotracheal Tube or Blind Insertion Airway Device use.

End-tidal (EtCO2) monitoring is mandatory following placement of an advanced airway.

Procedure:

1. Attach End-Tidal CO_2 detector to the Blind Insertion Airway Device or the Endotracheal Tube.
2. Note color change. A color change or CO_2 detection will be documented on each respiratory failure or cardiac arrest patient.
3. The CO_2 detector shall remain in place with the airway and monitored throughout the prehospital care and transport unless continuous Capnography is used. Any loss of CO_2 detection or color change is to be documented and monitored as procedures are done to verify or correct the airway problem.
4. Tube placement should be verified frequently and always with each patient move or loss of color change in the End-Tidal CO_2 detector.
5. Document the procedure and the results on/with the Patient Care Report (PCR) as well as on the Airway Evaluation Form.

Certification Requirements:

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

Airway: Foreign Body Obstruction

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Sudden onset of respiratory distress often with coughing, wheezing, gagging, or stridor due to a foreign-body obstruction of the upper airway.

Procedure:

1. Assess the degree of foreign body obstruction
   - Do not interfere with a mild obstruction allowing the patient to clear their airway by coughing.
   - In severe foreign-body obstructions, the patient may not be able to make a sound. The victim my clutch his/her neck in the universal choking sign.
2. **For an infant**, deliver 5 back blows (slaps) followed by 5 chest thrusts repeatedly until the object is expelled or the victim becomes unresponsive.
3. **For a child**, perform a subdiaphragmatic abdominal thrust (Heimlich Maneuver) until the object is expelled or the victim becomes unresponsive.
4. **For adults**, a combination of maneuvers may be required.
   - First, subdiaphragmatic abdominal thrusts (Heimlich Maneuver) should be used in rapid sequence until the obstruction is relieved.
   - If abdominal thrusts are ineffective, chest thrusts should be used. Chest thrusts should be used primarily in morbidly obese patients and in the patients who are in the late stages of pregnancy
5. If the victim becomes unresponsive, begin CPR immediately but look in the mouth before administering any ventilations. If a foreign-body is visible, remove it.
6. **Do not perform blind finger sweeps in the mouth and posterior pharynx. This may push the object farther into the airway.**
7. In unresponsive patients, AEMT and Paramedic level professionals should visualize the posterior pharynx with a laryngoscope to potentially identify and remove the foreign-body using Magill forceps.
8. Document the methods used and result of these procedures in the patient care report (PCR).

Certification Requirements:

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

Assessment: Adult

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

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

Certification Requirements:

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

Pain Assessment and Documentation

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

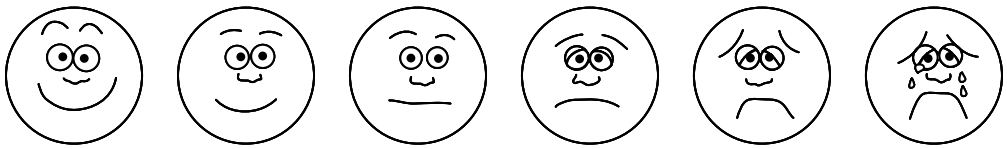
- Any patient with pain.

Definitions:

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

Procedure:

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



0	2	4	6	8	10
No hurt	Hurts little bit	Hurts little more	Hurts even more	Hurts whole lot	Hurts worst

From Hockenberry MJ, Wilson D, Winkelstein ML: Wong's Essentials of Pediatric Nursing, ed. 7, St. Louis, 2005, p. 1259. Used with permission. Copyright, Mosby.

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

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

Certification Requirements:

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

Assessment: Pediatric

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

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

Certification Requirements:

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

Blood Glucose Analysis

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

1. Gather and prepare equipment.
2. Blood samples for performing glucose analysis can be obtained through a finger-stick or when possible simultaneously with intravenous access.
3. Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions.
4. Time the analysis as instructed by the manufacturer.
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.
6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol.
7. Perform Quality Assurance per manufacture recommendation.

Certification Requirements:

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

Capnography

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

1. Attach capnography sensor to the BIAD, endotracheal tube, or oxygen delivery device.
2. Note CO_2 level and waveform changes. These will be documented on each respiratory failure, cardiac arrest, or respiratory distress patient.
3. The capnometer shall remain in place with the airway and be monitored throughout the prehospital care and transport.
4. Any loss of CO_2 detection or waveform indicates an airway problem and should be documented.
5. The capnogram should be monitored as procedures are performed to verify or correct the airway problem.
6. Document the procedure and results on/with the Patient Care Report (PCR) and the Airway Evaluation Form.

Certification Requirements:

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

Pulse Oximetry

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patients with suspected hypoxemia.

Procedure:

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

Certification Requirements:

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

Reperfusion Checklist

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

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

Procedure:

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

Certification Requirements:

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

Stroke Screen: LA Prehospital

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Suspected Stroke Patient

Procedure:

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

Certification Requirements:

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

Temperature Measurement

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

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

Certification Requirements:

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

Orthostatic Blood Pressure Measurement

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

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

Procedure:

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

Certification Requirements:

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

Cardiac: 12 Lead ECG

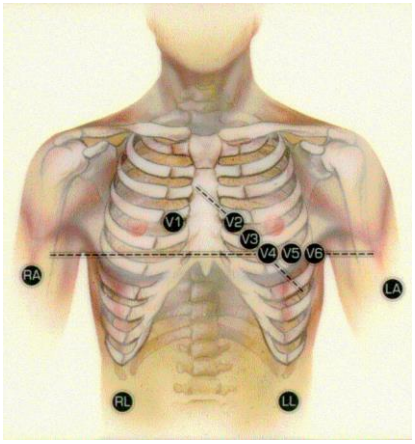
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Suspected cardiac patient
- Suspected tricyclic overdose
- Electrical injuries
- Syncope

Procedure:

1. Assess patient and monitor cardiac status.
2. Administer oxygen as patient condition warrants.
3. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform a 12 Lead ECG.
4. Prepare ECG monitor and connect patient cable with electrodes.
5. Enter the required patient information (patient name, etc.) into the 12 lead ECG device.
6. Expose chest and prep as necessary. Modesty of the patient should be respected.
7. Apply chest leads and extremity leads using the following landmarks:
   - RA -Right arm
   - LA -Left arm
   - RL -Right leg
   - LL -Left leg
   - V1 -4th intercostal space at right sternal border
   - V2 -4th intercostal space at left sternal border
   - V3 -Directly between V2 and V4
   - V4 -5th intercostal space at midclavicular line
   - V5 -Level with V4 at left anterior axillary line
   - V6 -Level with V5 at left midaxillary line



8. Instruct patient to remain still.
9. Press the appropriate button to acquire the 12 Lead ECG.
10. If the monitor detects signal noise (such as patient motion or a disconnected electrode), the 12 Lead acquisition will be interrupted until the noise is removed.
11. Once acquired, transmit the ECG data by fax to the appropriate hospital.
12. Contact the receiving hospital to notify them that a 12 Lead ECG has been sent.
13. Monitor the patient while continuing with the treatment protocol.
14. Download data as per guidelines and attach a copy of the 12 lead to the PCR.
15. Document the procedure, time, and results on/with the patient care report (PCR)

Certification Requirements:

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

Cardiac: Cardioversion

P PARAMEDIC P

Clinical Indications:

- Unstable patient with a tachydysrhythmia (rapid atrial fibrillation, supraventricular tachycardia, ventricular tachycardia)
- Patient is not pulseless (the pulseless patient requires unsynchronized cardioversion, i.e., defibrillation)

Procedure:

1. Ensure the patient is attached properly to a monitor/defibrillator capable of synchronized cardioversion.
2. Have all equipment prepared for unsynchronized cardioversion/defibrillation if the patient fails synchronized cardioversion and the condition worsens.
3. Consider the use of pain or sedating medications.
4. Set energy selection to the appropriate setting.
5. Set monitor/defibrillator to synchronized cardioversion mode.
6. Make certain all personnel are clear of patient.
7. Press and hold the shock button to cardiovert. Stay clear of the patient until you are certain the energy has been delivered. NOTE: It may take the monitor/defibrillator several cardiac cycles to “synchronize”, so there may a delay between activating the cardioversion and the actual delivery of energy.
8. Note patient response and perform immediate unsynchronized cardioversion/defibrillation if the patient’s rhythm has deteriorated into pulseless ventricular tachycardia/ventricular fibrillation, following the procedure for Defibrillation-Manual.
9. If the patient’s condition is unchanged, repeat steps 2 to 8 above, using escalating energy settings.
10. Repeat until maximum setting or until efforts succeed. Consider discussion with medical control if cardioversion is unsucessful after 2 attempts.
11. Note procedure, response, and time in the patient care report (PCR).

Certification Requirements:

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

Cardiac: External Pacing

P PARAMEDIC P

Clinical Indications:

- Patients with symptomatic bradycardia (less than 60 per minute) with signs and symptoms of inadequate cerebral or cardiac perfusion such as:
  - Chest Pain
  - Hypotension
  - Pulmonary Edema
  - Altered Mental Status, Confusion, etc.
  - Ventricular Ectopy
- Asystole, pacing must be done early to be effective.
- PEA, where the underlying rhythm is bradycardic and reversible causes have been treated.

Procedure:

1. Attach standard four-lead monitor.
2. Apply defibrillation/pacing pads to chest and back:
   - One pad to left mid chest next to sternum
   - One pad to mid left posterior chest next to spine.
3. Rotate selector switch to pacing option.
4. Adjust heart rate to 70 BPM for an adult and 100 BPM for a child.
5. Note pacer spikes on EKG screen.
6. Slowly increase output until capture of electrical rhythm on the monitor.
7. If unable to capture while at maximum current output, stop pacing immediately.
8. If capture observed on monitor, check for corresponding pulse and assess vital signs.
9. Consider the use of sedation or analgesia if patient is uncomfortable.
10. Document the dysrhythmia and the response to external pacing with ECG strips in the PCR.

Certification Requirements:

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

Cardiac: Cardiopulmonary Resuscitation (CPR)

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Basic life support for the patient in cardiac arrest

Procedure:

1. Assess the patient's level of responsiveness.
2. If no response, open the patient's airway with the head-tilt, chin-lift and look, listen, and feel for respiratory effort. If the patient may have sustained C-spine trauma, use the modified jaw thrust while maintaining immobilization of the C-spine. For infants, positioning the head in the sniffing position is the most effective method for opening the airway.
3. Check for pulse (carotid for adults and older children, brachial for infants) for at least 10 seconds. If no pulse, begin chest compressions based on chart below:

Age	Location	Depth	Rate
Infant	Over sternum, between nipples (inter-mammary line), 2-3 fingers	At least 1/3 AP diameter of chest About 1.5 inches 4 cm	Continuous compressions at least 100 – 120/minute
Child	Over sternum, just cephalad from xyphoid process, heel of one hand	At least 1/3 AP diameter of chest About 2 inches 5 cm	Continuous compressions at least 100 – 120/minute
Adult	Over sternum, just cephalad from xyphoid process, hands with interlocked fingers	At least 2 inches 5 cm	Continuous compressions at least 100 – 120/minute

4. If patient is an adult, go to step 5. If no respiratory effort in a pediatric patient, give two ventilations. If air moves successfully, go to step 5. If air movement fails, proceed to the Airway Obstruction Procedure.
5. Go to Cardiac Arrest Procedure. Begin ventilations in the adult as directed in the Cardiac Arrest Procedure
6. Provide 1 breath every 6 seconds with the BVM or BIAD. Use EtCO2 to guide your ventilations as directed in the Cardiac Arrest Protocol.
7. Chest compressions should be provided in an uninterrupted manner. Only brief interruptions (< 5 seconds with a maximum of 10 seconds) are allowed for rhythm analysis, defibrillation, and performance of procedures
8. Document the time and procedure in the Patient Care Report (PCR).

Certification Requirements:

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

Cardiac: Defibrillation-Automated

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patients in cardiac arrest (pulseless, non-breathing).
- Age < 8 years, use Pediatric Pads if available.

Contraindication:

- Pediatric patients who are so small that the pads cannot be placed without touching one another.

Procedure:

1. **If multiple rescuers available, one rescuer should provide uninterrupted chest compressions while the AED is being prepared for use.**
2. Apply defibrillator pads per manufacturer recommendations. Based on 2010 guidelines, place pads preferably in AP or AL position when implanted devices (pacemakers, AICDs) occupy preferred pad positions and attempt to avoid placing directly over device.
3. Remove any medication patches on the chest and wipe off any residue.
4. If necessary, connect defibrillator leads: white to the anterior chest pad and the red to the posterior pad.
5. Activate AED for analysis of rhythm.
6. **Stop CPR and clear the patient** for rhythm analysis. Keep interruption in CPR as brief as possible.
7. Defibrillate if appropriate by depressing the "shock" button. **Assertively state "CLEAR" and visualize that no one, including yourself, is in contact with the patient prior to defibrillation.** The sequence of defibrillation charges is preprogrammed for monophasic defibrillators. Biphasic defibrillators will determine the correct joules accordingly.
8. Begin CPR (chest compressions and ventilations) immediately after the delivery of the defibrillation.
9. After 2 minutes of CPR, analyze rhythm and defibrillate if indicated. Repeat this step every 2 minutes.
10. If "no shock advised" appears, perform CPR for two minutes and then reanalyze.
11. Transport and continue treatment as indicated.
12. **Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.**
13. **If pulse returns please use the Post Resuscitation Protocol**

Certification Requirements:

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

Cardiac: Defibrillation-Manual

P PARAMEDIC P

Clinical Indications:

- Cardiac arrest with ventricular fibrillation or pulseless ventricular tachycardia

Procedure:

1. **Ensure that Chest Compressions are adequate and interrupted only when absolutely necessary.**
2. Clinically confirm the diagnosis of cardiac arrest and identify the need for defibrillation.
3. After application of an appropriate conductive agent if needed, apply defibrillation hands free pads (recommended to allow more continuous CPR) or paddles to the patient's chest in the proper position
   - Paddles: right of sternum at 2nd ICS and anterior axillary line at 5th ICS
   - Pads: anterior-posterior position

   For patients with implanted pacers/defibrillators, paddles or pads can be in AP or AL positions. The presence of implanted pacers/defibrillators should not delay defibrillation. Attempt to avoid placing paddles or pads directly above device.
4. Set the appropriate energy level
5. Charge the defibrillator to the selected energy level. **Continue chest compressions while the defibrillator is charging.**
6. If using paddles, assure proper contact by applying 25 pounds of pressure on each paddle.
7. **Hold Compressions, assertively state, "CLEAR" and visualize that no one, including yourself, is in contact with the patient.**
8. Deliver the countershock by depressing the discharge button(s) when using paddles, or depress the **shock button** for hands free operation.
9. Immediately resume chest compressions and ventilations for 2 minutes. After 2 minutes of CPR, analyze rhythm and check for pulse only if appropriate for rhythm.
10. Repeat the procedure every two minutes as indicated by patient response and ECG rhythm.
11. Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.

Certification Requirements:

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

Cardiac: Defibrillation-Dual or Double

Clinical Indications:

P PARAMEDIC P

- Cardiac arrest with persistent ventricular fibrillation or pulseless ventricular tachycardia.
- Refractory ventricular fibrillation or pulseless ventricular tachycardia where ≥ 3 shocks delivered.

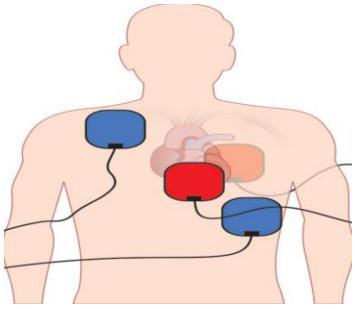
Procedure:

1. Ensure that Chest Compressions are adequate and interrupted only when absolutely necessary.

2. Clinically confirm the diagnosis of cardiac arrest and identify the need for defibrillation.

3. Prepare sites for second pad set attachment and apply defibrillation hands free pads:

- Pads: First defibrillator pads in anterior-posterior position
- Pads: Second defibrillator pads in anterior-lateral position:
- Ensure pads are not in contact with one another.



For patients with implanted pacers/defibrillators:
Avoid placing paddles or pads directly above device.

4. Set the appropriate energy level and assure controls for both defibrillator / monitors are accessible to provider performing defibrillation.

5. At next pulse / rhythm check, if refractory or persistent VF/VT continues:

Charge the defibrillator to the selected energy level.
Continue chest compressions while the defibrillator is charging.

6. Optional: Agencies may provide a single shock at this point with the second defibrillator / monitor to provide a change in energy vector delivered to the heart then move to step 7 if VF / VT persists.

7. When both monitor / defibrillators have reached selected energy setting:

Hold Compressions, assertively state, "CLEAR" and visualize that no one, including yourself, is in contact with the patient.

2 options at this point:

Option 1 (double simultaneous): Provider depresses both defibrillator shock buttons simultaneously.

Option 2 (dual sequential): Provider depresses monitor 1 shock button and then immediately following, depresses monitor 2 shock button.

8. Immediately resume chest compressions and ventilations for 2 minutes. After 2 minutes of CPR, analyze rhythm and check for pulse only if appropriate for rhythm.

9. Repeat the procedure every two minutes as indicated by patient response and ECG rhythm.

10. Keep interruption of CPR compressions as brief as possible. Adequate CPR is a key to successful resuscitation.

Certification Requirements:

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

Standards Procedure (Skill) Cardiac Section

Cardiac: Mechanical CPR - LUCAS

Agency Name:	
Provider Name:	EMT EMR AEMT Paramedic
Instructor Name:	EMT AEMT Paramedic Physician

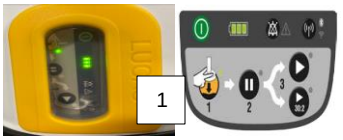
SATISFACTORY	☐
UNSATISFACTORY	☐

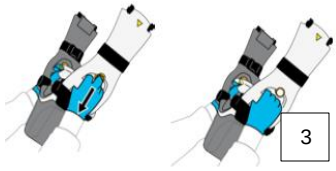
Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
   - YES = Provider completed skill with no assistance from instructor.
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

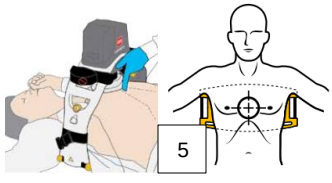
Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

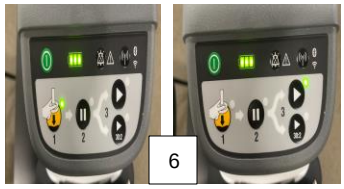
	EMR	
B	EMT	B
A	AEMT	A
P	Paramedic	P

YES NO IL	Verbalizes at least 3 indications for use of LUCAS device: 1. Cardiac arrest in adult patients 2. Augment manual compressions and use during transport if indicated 3. Chest width to 18 inches and sternum height to 12 inches	
YES NO IL	Verbalizes at least 2 contraindications for LUCAS device: 1. Too small: 3 fast alerts when lowering suction arm or cannot use Pause or Active modes. 2. Too large: Cannot lock Upper Part of LUCAS device to Back Plate without compressing the chest.	
YES NO IL	Ensures manual compressions, open case, and press ON/OFF to activate	1
YES NO IL	Ensures Team-Focused CPR is ongoing	
	Place Back Plate under patient below armpits and posterior defibrillation pad at 200th compression cycle change, then immediately restart CPR	2
YES NO IL	Use handles on Support Legs to remove from case. Pull Release Rings once to ensure Claw Locks are open then let go of Release Rings.	3
YES NO IL	Attach Support Leg to Back Plate nearest you, tilting device toward you, allowing manual compressions to continue uninterrupted and wait until next 200 compressor change cycle.	4
YES NO IL	At compression 180 begin to thread the other Support Leg to the opposite Back Plate and lock into place.	4
YES NO IL	Pull up on Support Legs to ensure they are locked to Back Plate	
YES NO IL	During pause at the 200 compression cycle change, quickly position lower edge of Suction Cup immediately above the end of sternum and not over xiphoid process using your finger to mark correction location.	5
YES NO IL	Move device quickly to adjust using the Support Legs as needed	
YES NO IL	Identifies function of buttons on Control Panel	
YES NO IL	Place LUCAS in ADJUST(1) mode and adjust height of Suction Cup to set Start Position Push Suction Cup with 2 fingers until Pressure Pad TOUCHES chest Press PAUSE (2) to lock the start position	6
YES NO IL	Press ACTIVE (3) in CONTINUOUS (top) mode to start compressions	6
YES NO IL	Green LED light blinks every 10 seconds. Ventilate patient every 10 seconds at flash of Green LED light.	
YES NO IL	LUCAS will BEEP every 2 minutes. Charge Defibrillator/Monitor at BEEP and when fully charged press PAUSE (2) to stop compressions and assess rhythm. Then press ACTIVE (3) in CONTINUOUS (top) mode to restart compressions.	6
YES NO IL	Secure patient arms to Support Leg straps	7
YES NO IL	End: Turn LUCAS off and press TRANSMIT	









Instructor notes:

Parenteral Access: Arterial Blood Draw

Clinical Indications:

P PARAMEDIC P

- Arterial blood gas (ABG) analysis
- Other needs for arterial blood as indicated by medical control

Procedure:

1. Assemble ABG kit, ice, alcohol wipes, and gloves.
2. Determine if there is any history of trauma or any other difficulties with circulation to either hand. If a problem does exist, do not use that extremity for the blood draw.
3. Palpate the radial pulse just proximal to the wrist.
4. Clean the skin with an alcohol wipe.
5. Insert the ABG syringe at a 45 to 60 degree angle over the area of the pulse.
6. Slowly advance the syringe, watching for return of arterial blood. You do not need to aspirate but rather allow the syringe to fill from the arterial pressure.
7. Once the sample has been acquired, remove and discard the needle in an approved fashion.
8. Place the small airtight cap over the needle port on the syringe. Remove air from the sample by inverting the syringe and pressing the plunger on the syringe until a small amount of the sample enters the airtight cap.
9. Place the sample on ice as soon as possible
10. Hold pressure over the blood draw sight for at least 5 minutes before checking to ensure hemostasis.
11. Record procedure, time, and any complications in patient care report (PCR)

Certification Requirements:

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

Parenteral Access: Arterial Line Maintenance

Clinical Indications:

P PARAMEDIC P

- Transport of a patient with an existing arterial line.

Procedure:

1. Make certain arterial line is secured prior to transport, including intersection of arterial catheter and IV/Monitoring lines.
2. Use available equipment for monitoring of arterial pressures via arterial line.
3. Do not use the arterial line for administration of any fluids or medications.
4. If there is any question regarding dislodgement of the arterial line and bleeding results, remove the line and apply direct pressure over the site for at least five minutes before checking to ensure hemostasis.

Certification Requirements:

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

Parenteral Access: Venous Blood Draw

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Collection of a patient's blood for laboratory analysis

Procedure:

1. Utilize universal precautions as per OSHA.
2. Select vein and prep as usual.
3. Select appropriate blood-drawing devices.
4. Draw appropriate tubes of blood for lab testing.
5. Assure that the blood samples are labeled with the correct information (a minimum of the patients name, along with the date and time the sample was collected).
6. Deliver the blood tubes to the appropriate individual at the hospital.

Certification Requirements:

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

Parenteral Access: Central Line Maintenance

Clinical Indications:

P PARAMEDIC P

- Transport of a patient with a central venous pressure line already in place

Procedure:

1. Prior to transportation, ensure the line is secure.
2. Medications and IV fluids may be administered through a central venous pressure line. Such infusions must be held while the central venous pressure is transduced to obtain a central venous pressure, but may be restarted afterwards.
3. Do not manipulate the central venous catheter.
4. If the central venous catheter becomes dysfunctional, does not allow drug administration, or becomes dislodged, contact medical control.
5. Document the time of any pressure measurements, the pressure obtained, and any medication administration in the patient care report (PCR).

Certification Requirements:

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

Parenteral Access: Epidural Catheter Maintenance

Clinical Indications:

P PARAMEDIC P

- Presence of an epidural catheter in a patient requiring transport

Procedure:

1. Prior to transport, ensure catheter is secure and that transport personnel are familiar with medication(s) being delivered and devices used to control medication administration.
2. No adjustments in catheter position are to be attempted.
3. No adjustments in medication dosage or administration are to be attempted without direct approval from on-line medical control.
4. Report any complications immediately to on-line medical control.
5. Document the time and dose of any medication administration or rate adjustment in the patient care report (PCR).

Certification Requirements:

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

Parenteral Access: Ventricular Catheter Maintenance

P PARAMEDIC P

Clinical Indications:

- Transport of a patient with an intra-ventricular catheter in place

Procedure:

1. Prior to transport, ensure the catheter is secure.
2. Prior to transport, determine from the referring hospital/physician the desired patient position (e.g., supine, head of bed elevated 30 degrees, etc.).
3. Prior to transport, determine the height at which the drain is to be maintained, given the patient position desired from #2 above (if applicable).
4. Do not manipulate or move the drain.
5. If the patient or height of the drain is altered, immediately correct based on the pre-determined configuration in step 2 and 3 above.
6. Report any problems immediately to on-line medical control.
7. Document the time and any adjustments or problems in the patient care report (PCR).

Certification Requirements:

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

Standards Procedure (Skill) Parenteral Access Section

Parenteral Access: Existing Catheters

Agency Name:	
Provider Name:	Paramedic
Instructor Name:	EMT AEMT Paramedic Physician

SATISFACTORY ☐

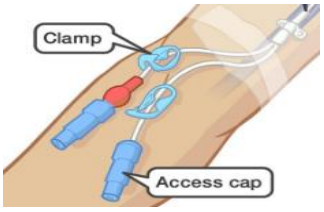
UNSATISFACTORY ☐

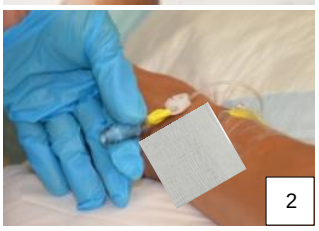
Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
   - YES = Provider completed skill with no assistance from instructor.
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

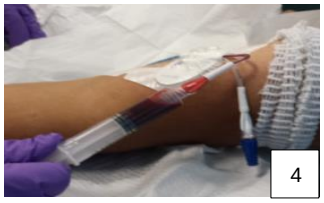
Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

P **Paramedic** P

YES NO IL	<u>Verbalizes at least 3 indications for access of existing parenteral access device:</u> 1. Inability to obtain adequate peripheral access 2. Access of an existing venous catheter for medication or fluid administration 3. Patient requests use of existing parenteral access 4. Device is placed in the venous system and is NOT used for dialysis 5. Access for patient in cardiac arrest 6. Typical catheters: PICC ((Peripherally Inserted Central Catheter); Central Line with 1 to multiple ports; Peripheral IV	
YES NO IL	<u>Verbalizes at least 2 contraindications in access of existing parenteral access device:</u> 1. Catheter used primarily for Hemodialysis and patient is NOT in cardiac arrest 2. Catheter is clogged, clotted, or damaged	
YES NO IL	Perform hand hygiene with soap and water or hand sanitizer	1
YES NO IL	Wear appropriate PPE including gloves (sterile or non-sterile)	2
YES NO IL	Open catheter clamps proximal to access ports	2
YES NO IL	Place sterile dressing between catheter access ports and skin or clothing to provide clean bed to prevent contamination after port cleaning	2
YES NO IL	Generously clean access ports with at least 2 alcohol preps per port or chlorhexidine swab	3
YES NO IL	Hold access ports away from skin or clothing after cleaning until access completed or place ports on sterile dressing to prevent contamination	3
YES NO IL	Insert 10 mL or 20 mL syringe into access port and twist to secure Withdraw 5 – 10 mL of blood and discard in sharps container	4
YES NO IL	Insert 10 mL or 20 mL syringe of Normal Saline into access port and twist to secure connection Flush the catheter with 5 – 10 mL of Normal Saline	5
YES NO IL	If no resistance, no evidence of infiltration, or pain, the begin medication or fluid administration and continue to observe for evidence of infiltration or pain	
YES NO IL	<u>If resistance encountered:</u> Ensure catheter clamps are not closed, open if closed Ensure syringe connection is secure If still unable to flush the catheter, do not use catheter and search for other sites for peripheral access or IO access	
YES NO IL	Record procedure and any complications in Patient Care Report (PCR) Record medication and/or fluid administration in the Patient Care Report (PCR)	







Instructor notes:

Parenteral Access: Existing Catheters

Parenteral Access: Existing Catheters

Objective of Procedure:

Administration of IV medications, IV fluids, blood products and to obtain blood sample through existing access.

Scope of Practice: Paramedic

Indications:

Inability to obtain adequate peripheral access
Access of an existing venous catheter for medication or fluid administration
Patient requests use of existing parenteral access
Device is placed in the venous system and is NOT used for dialysis
Access for patient in cardiac arrest
Typical catheters: PICC ((Peripherally Inserted Central Catheter); Central Line with 1 to multiple ports; Peripheral IV

Contraindications:

Catheter used primarily for Hemodialysis and patient is NOT in cardiac arrest
Catheter is clogged, clotted, damaged, or has signs or symptoms of catheter infection

Clinical Presentation:

Chronic medical conditions requiring recurrent need for IV access for medication, hydration, blood sampling, nutrition, or chemotherapy
Medical condition requiring medication administration outside the hospital.
End-Stage Renal Disease requiring hemodialysis.
Poor peripheral IV access in patients with chronic medical conditions.

Potential Complications:

Pneumothorax
Bleeding
Infection (later finding)
Blood clot
Air embolism

Procedure references:

1. Witt SH, Carr CM, and Krywko DM. (2019). Indwelling Vascular Access Devices: Emergency Access and Management.. Roberts and Hedges' Clinical Procedures in Emergency Medicine and Acute Care. 7th ed.(pp 447-460). Philadelphia, PA. Elsevier. .
2. Paro AP. (2017). Patients with Special Challenges. Emergency Care and Transportation of the Sick and Injured. AAOS. 11th ed. (pp 1336). Burlington, MA. Jones and Bartlett Learning.
3. Practice Parameter. (2012). Practice Guidelines for Central Venous Access: A Report by the American Society of Anesthesiologists Task Force on Central Venous Access.
Anesthesiology 3 2012, Vol.116, 539-573. doi:https://doi.org/10.1097/ALN.0b013e31823c9569

Parenteral Access: External Jugular Access

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- External jugular vein cannulation is indicated in a critically ill patient ≥ 8 years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein is not obtainable.
- External jugular cannulation can be attempted initially in life threatening events where no obvious peripheral site is noted.

Procedure:

1. Place the patient in a supine head down position. This helps distend the vein and prevents air embolism.
2. Turn the patient's head toward the opposite side if no risk of cervical injury exists.
3. Prep the site as per peripheral IV site.
4. Align the catheter with the vein and aim toward the same side shoulder.
5. "Tourniqueting" the vein lightly with one finger above the clavicle, puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual method.
6. Attach the IV and secure the catheter avoiding circumferential dressing or taping.
7. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

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

Parenteral Access: Venous-Extremity

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Any patient where intravenous access is indicated (significant trauma, emergent or potentially emergent medical condition).

Procedure:

1. Saline locks may be used as an alternative to an IV tubing and IV fluid in every protocol at the discretion of the ALS professional.
2. Paramedic/AEMT can use intraosseous access where threat to life exists as provided for in the Venous Access-Intraosseous procedure.
3. Use the largest catheter bore necessary based upon the patient's condition and size of veins.
4. Fluid and setup choice is preferably:
   - Lactated Ringers with a macro drip (10 gtt/cc) for burns
   - Normal Saline with a macro drip (10 gtt/cc) for medical conditions, trauma or hypotension
   - Normal Saline with a micro drip (60 gtt/cc) for medication infusions
5. Inspect the IV solution for expiration date, cloudiness, discoloration, leaks, or the presence of particles.
6. Connect IV tubing to the solution in a sterile manner. Fill the drip chamber half full and then flush the tubing bleeding all air bubbles from the line.
7. Place a tourniquet around the patient's extremity to restrict venous flow only.
8. Select a vein and an appropriate gauge catheter for the vein and the patient's condition.
9. Prep the skin with an antiseptic solution.
10. Insert the needle with the bevel up into the skin in a steady, deliberate motion until the bloody flashback is visualized in the catheter.
11. Advance the catheter into the vein. **Never** reinsert the needle through the catheter. Dispose of the needle into the proper container without recapping.
12. Draw blood samples when appropriate.
13. Remove the tourniquet and connect the IV tubing or saline lock.
14. Open the IV to assure free flow of the fluid and then adjust the flow rate as per protocol or as clinically indicated.

    Rates are preferably:
    - Adult: KVO: 60 cc/hr (1 gtt/ 6 sec for a macro drip set)
    - Pediatric: KVO: 30 cc/hr (1 gtt/ 12 sec for a macro drip set)

    If shock is present:
    - Adult: 500 cc fluid boluses repeated as long as lungs are dry and BP < 90. Consider a second IV line.
    - Pediatric: 20 cc/kg blouses repeated PRN for poor perfusion.
15. Cover the site with a sterile dressing and secure the IV and tubing.
16. Label the IV with date and time, catheter gauge, and name/ID of the person starting the IV.
17. Document the procedure, time and result (success) on/with the patient care report (PCR).

Certification Requirements:

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

Parenteral Access: Femoral Line – Page 1 of 2

P PARAMEDIC P

Clinical Indications:

- Central venous access in a patient with an urgent need for fluid or medication administration.
- Inability to obtain adequate peripheral access.
- Patient aged greater than 16 years.
- No evidence of pelvic trauma.
- No evidence of trauma in the extremity in which the catheter is to be placed.

Procedure:

1. Obtain central access kit with 6.0 to 8.0 French cordis and equipment to place catheter by Selinger technique.
2. Completely expose the groin area on the side where the catheter is to be placed.
3. Palpate the femoral pulse in the inguinal crease. Recall that the inguinal ligament connects the pubic symphysis with the anterior, superior iliac spine and that all attempts at access should be made inferior to this ligament to avoid inadvertent entry into the abdominal cavity.
4. Once the femoral pulse has been palpated distal to the ilio-inguinal ligament, prep a large area of the skin with Betadine.
5. Use sterile gloves and place sterile drapes around the Betadine-prepped field.
6. With one hand, palpate the femoral pulse. The femoral vein will be located medially when compared with the femoral artery.
7. With the introducing needle from the kit, enter the skin over the anticipated position of the femoral vein. Gently aspirate as the needle is advanced. Angle the needle approximately 45 to 60 degrees in reference to the skin on the thigh.
8. Once non-pulsatile, venous blood is obtained, stop advancing the needle and hold the needle in position. Remove the syringe and observe the hub for pulsatile flow. If the blood appears arterial and/or is pulsatile, immediately remove the needle and apply direct pressure over the site. Once bleeding is controlled, return to step 7 above or consider the other extremity, if there are no contraindications.
9. If the needle appears to be in the femoral vein, insert the guide wire with sterile technique. Stop advancing the wire if there is any resistance; you may gently withdraw the wire and attempt re-insertion so long as sterility is maintained.
10. Stop advancing the wire in order to leave approximately 10 cm of the wire external to the hub of the needle.
11. **DO NOT LET GO OF THE WIRE.**
12. Holding the wire in the distal hand, remove the needle over the wire. Once the needle reaches the end of the wire, use the proximal hand to control the wire and the distal hand to remove the needle from the wire.
13. Use the scalpel to create a small incision in the skin at the base of the wire. Make certain the incision extends completely to the wire so there is no skin tag.

CONTINUED VENOUS ACCESS: FEMORAL LINE - PAGE 2

14. Place the catheter over the wire; use the wire a guide to place the catheter. Some
15. Gentle force may be required as the catheter enters the skin; this should not, however, require excessive force. Again, one hand should always maintain control of the wire.
16. Once the catheter is completely inserted, remove the wire.
17. Attach a syringe to the port of the catheter, release the clamp, and aspirate for blood. There should be an easy flow of venous blood.
18. Once all of the air has been removed from the catheter by aspirating blood, re-clamp the line.
19. Attach the desired IV fluid/blood/etc and begin infusion. **Note that "wide-open" lines will deliver large amounts of fluid quickly – monitor the patient's fluid status closely.**
20. Secure the catheter with sterile dressing or sutures.
21. Document procedure, complications, and clinical results in the patient care report (PCR)

Certification Requirements:

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

Parenteral Access: Intraosseous

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Rapid, regular IV access is unavailable with any of the following:
- Cardiac arrest.
- Multisystem trauma with severe hypovolemia.
- Severe dehydration with vascular collapse and/or loss of consciousness.
- Respiratory failure / Respiratory arrest.
- Burns.

Contraindications:

- Fracture proximal to proposed intraosseous site.
- History of Osteogenesis Imperfecta
- Current or prior infection at proposed intraosseous site.
- Previous intraosseous insertion or joint replacement at the selected site.

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.).
2. **Proximal tibia:** Identify anterior-medial aspect of the proximal tibia (bony prominence below the knee cap). The insertion location will be 1-2 cm (2 finger widths) below this.
   Distal tibia: If this site is not suitable, and patient is an adult, identify the anterior-medial aspect of the distal tibia (2 cm proximal to the medial malleolus).
   Distal femur: If this site is not suitable, and patient is a pediatric, identify the patella with the leg out-stretched to prevent bending of the knee. The insertion site is approximately 1 cm above the patella and approximately 1 – 2 cm medially.
   Proximal humerus: Acceptable insertion site for adult patients. Locate the insertion site 1 – 2 cm above the surgical neck on the most prominent aspect of the greater tubercle. This is located on the lateral aspect of the ball of the humerus. Direct the needle at a 45 degree angle or toward the opposite hip.
3. Prep the site recommended by the device manufacturer with providone-iodine ointment or solution.
4. For manual pediatric devices, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, twist the needle handle with a rotating grinding motion applying controlled downward force until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further.
5. For the EZ-IO intraosseous device, hold the intraosseous needle at a 60 to 90 degree angle, aimed away from the nearby joint and epiphyseal plate, power the driver until a “pop” or “give” is felt indicating loss of resistance. Do not advance the needle any further. Utilize the yellow needle for the proximal humerus. The pink needle is only intended for use in neonatal patients.
6. For the Bone Injection Gun (BIG), find and mark the manufacturers recommended site. Position the device and pull out the safety latch. Trigger the BIG at 90° to the surface and remove the injection device.
7. Remove the stylette and place in an approved sharps container.
8. Attach a syringe filled with at least 5 cc NS; aspirate bone marrow for manual devices only, to verify placement; then inject at least 5 cc of NS to clear the lumen of the needle.
9. Attach the IV line and adjust flow rate. A pressure bag may assist with achieving desired flows.
10. Stabilize and secure the needle with dressings and tape.
11. Paramedic may administer 10 to 20 mg (1 to 2 cc) of 2% Lidocaine in adult patients who experience infusion-related pain. This may be repeated prn to a maximum of 60 mg (6 cc).
12. Following the administration of any IO medications, flush the IO line with 10 cc of IV fluid.
13. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

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

Parenteral Access: Swan-Ganz Catheter Maintenance

P PARAMEDIC P

Clinical Indications:

- Transport of a patient with a Swan-Ganz catheter that is in place prior to transport.

Procedure:

1. Make certain catheter is secure prior to transport.
2. Under the supervision of the nurse or physician caring for the patient, make certain the transport personnel are aware of the depth at which the catheter is secured.
3. **UNDER NO CIRCUMSTANCES SHOULD TRANSPORT PERSONNEL ADVANCE THE SWAN-GANZ CATHETER.**
4. The sterile plastic sheath that surrounds the catheter should not be manipulated.
5. The ports of the catheter may be used to continue administration of medications or IV fluids that were initiated prior to transport. These should be used as any other IV port with attention to sterile technique.
6. If applicable, measurements from the catheter may be obtained during transport and used to guide care as per local protocols and medical control orders.
7. If at anytime during the transport difficulties with the function of the Swan-Ganz catheter is noted, contact medical control.
8. Document the time and any adjustments or problems associated with the catheter in the patient care report (PCR).

Certification Requirements:

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

Airway: Suctioning-Advanced

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient currently being assisted by an airway adjunct such as a naso-tracheal tube, endotracheal tube, Combitube, tracheostomy tube, or a cricothyrotomy tube.

Procedure:

1. Ensure suction device is in proper working order.
2. Preoxygenate the patient as is possible.
3. Attach suction catheter to suction device, keeping sterile plastic covering over catheter.
4. Using the suprasternal notch and the end of the airway into the catheter will be placed as guides, measure the depth desired for the catheter (judgment must be used regarding the depth of suctioning with cricothyrotomy and tracheostomy tubes).
5. If applicable, remove ventilation devices from the airway.
6. With the thumb port of the catheter uncovered, insert the catheter through the airway device.
7. Once the desired depth (measured in #4 above) has been reached, occlude the thumb port and remove the suction catheter slowly.
8. A small amount of Normal Saline (10 ml) may be used if needed to loosen secretions for suctioning.
9. Reattach ventilation device (e.g., bag-valve mask) and ventilate the patient
10. Document time and result in the patient care report (PCR).

Certification Requirements:

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

Respiratory: Suctioning-Basic

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Obstruction of the airway (secondary to secretions, blood, or any other substance) in a patient who cannot maintain or keep the airway clear.

Procedure:

1. Ensure suction device is in proper working order with suction tip in place.
2. Preoxygenate the patient as is possible.
3. Explain the procedure to the patient if they are coherent.
4. Examine the oropharynx and remove any potential foreign bodies or material which may occlude the airway if dislodged by the suction device.
5. If applicable, remove ventilation devices from the airway.
6. Use the suction device to remove any secretions, blood, or other substance.
7. The alert patient may assist with this procedure.
8. Reattach ventilation device (e.g., bag-valve mask) and ventilate or assist the patient
9. Record the time and result of the suctioning in the patient care report (PCR).

Certification Requirements:

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

Respiratory: Nebulizer Inhalation Therapy

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patients experiencing bronchospasm.

Procedure:

1. Gather the necessary equipment.
2. Assemble the nebulizer kit.
3. Instill the premixed drug (such as Albuterol or other approved drug) into the reservoir well of the nebulizer.
4. Connect the nebulizer device to oxygen at 4 - 6 liters per minute or adequate flow to produce a steady, visible mist.
5. Instruct the patient to inhale normally through the mouthpiece of the nebulizer. The patient needs to have a good lip seal around the mouthpiece.
6. The treatment should last until the solution is depleted. Tapping the reservoir well near the end of the treatment will assist in utilizing all of the solution.
7. Monitor the patient for medication effects. This should include the patient's assessment of his/her response to the treatment and reassessment of vital signs, ECG, and breath sounds.
8. Assess and document peak flows before and after nebulizer treatments.
9. Document the treatment, dose, and route on/with the patient care report (PCR).

Certification Requirements:

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

Standards Procedure (Skill) Respiratory Section
Respiratory: NIPPV
(Non-Invasive Positive Pressure)

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Non-Invasive Positive Airway Pressure (NIPPV) is indicated in all patients whom inadequate ventilation is suspected.
  This could be as a result of Pulmonary Edema, CHF, COPD, Pneumonia, or Asthma.
- Agencies may utilize Continuous and/or Bi-Level Positive Airway Pressure Devices

Clinical Contraindications:

- Decreased Mental Status.
- Facial features or deformities that prevent an adequate mask seal.
- Excessive respiratory secretions.

Procedure:

1. Ensure adequate oxygen supply to ventilation device.
2. Explain the procedure to the patient.
3. Consider placement of a nasopharyngeal airway.
4. Place the delivery mask over the mouth and nose. Oxygen should be flowing through the device at this point.
5. Secure the mask with provided straps starting with the lower straps until minimal air leak occurs.
6. If the Positive Pressure is adjustable on the NIPPV device adjust and slowly titrate to achieve a positive pressure as follows:

Continuous pressure device:

5 – 25 cmH_20 for Pulmonary Edema, CHF, COPD, Asthma, Drowning, possible aspiration, or pneumonia.

Bi-Level pressure device:

IPAP 10 – 15 over EPAP 5 – 7 cmH_2O for Pulmonary Edema, CHF, COPD, Asthma, Drowning, possible aspiration, or pneumonia.

During titration keep IPAP – EPAP at least a difference of 5 cmH_2O

25 cmH_20 is maximum pressure that should be utilized with NIPPV.

Increasing positive pressure can cause hypotension.

Use caution or remove and re-evaluate with Systolic Blood Pressures consistently < 100 mmHg.

7. Evaluate the response of the patient assessing breath sounds, oxygen saturation, and general appearance.
8. Titrate oxygen levels to the patient's response. Many patients respond to low FIO2 (30-50%).
9. Encourage the patient to allow forced ventilation to occur. Observe closely for signs of complications. The patient must be breathing for use of the NIPPV device.
10. Document time and response on patient care report (PCR).

Certification Requirements:

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

Respiratory: Respirator Operation

A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Transport of an intubated patient

Procedure:

1. Confirm the placement of tube as per airway protocol.
2. Ensure adequate oxygen delivery to the respirator device.
3. Preoxygenate the patient as much as possible with bag-valve mask.
4. Remove BVM and attach tube to respiration device.
5. Per instructions of device, set initial respiration values. For example, set an inspiratory:expiratory ratio of 1:4 (for every 1 second of inspiration, allow 4 seconds and expiration) with a rate of 12 to 20.
6. Assess breath sounds. Allow for adequate expiratory time. Adjust respirator setting as clinically indicated.
7. **It is required that patients on a transport ventilator should be monitored continuously through Capnography and Pulse Oximetry. The ventilatory rate should adjusted to maintain a pulse oximetry of >90 (preferably ≥ 94%) while maintaining a pCO2 of 30-35.**
8. If any worsening of patient condition, decrease in oxygen saturation, or any question regarding the function of the respirator, remove the respirator and resume bag-valve mask ventilations.
9. Document time, complications, and patient response on the patient care report (PCR).

Certification Requirements:

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

Respiratory: Ventilator Operation

P PARAMEDIC P

Clinical Indications:

- Management of the ventilation of a patient during a prolonged or interfacility transport of an intubated patient.

Procedure:

1. Transporting personnel should review the operation of the ventilator with the treating personnel (physician, nurse, or respiratory therapy) in the referring facility prior to transport if possible.
2. All ventilator settings, including respiratory rate, FiO_2, mode of ventilation, and tidal volumes should be recorded prior to initiating transport. Additionally, the recent trends in oxygen saturation experienced by the patient should be noted.
3. Prior to transport, specific orders regarding any anticipated changes to ventilator settings as well as causes for significant alarm should be reviewed with the referring medical personnel as well as medical control.
4. Once in the transporting unit, confirm adequate oxygen delivery to the ventilator.
5. Frequently assess breath sounds to assess for possible tube dislodgment during transfer.
6. Frequently assess the patient's respiratory status, noting any decreases in oxygen saturation or changes in tidal volumes, peak pressures, etc.
7. Note any changes in ventilator settings or patient condition in the PCR.
8. Consider placing an NG or OG tube to clear stomach contents.
9. **End-tidal (EtCO2) monitoring is mandatory following placement of an endotracheal tube.**
10. If any significant change in patient condition, including vital signs or oxygen saturation or there is a concern regarding ventilator performance/alarms, remove the ventilator from the endotracheal tube and use a bag-valve mask with 100% O_2. Contact medical control immediately.

Certification Requirements:

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

Childbirth

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Imminent delivery with crowning

Procedure:

1. Delivery should be controlled so as to allow a slow controlled delivery of the infant. This will prevent injury to the mother and infant.
2. Support the infant's head as needed.
3. Check the umbilical cord surrounding the neck. If it is present, slip it over the head. If unable to free the cord from the neck, double clamp the cord and cut between the clamps.
4. Suction the airway with a bulb syringe.
5. Grasping the head with hands over the ears, gently pull down to allow delivery of the anterior shoulder.
6. Gently pull up on the head to allow delivery of the posterior shoulder.
7. Slowly deliver the remainder of the infant.
8. Clamp the cord 2 inches from the abdomen with 2 clamps and cut the cord between the clamps.
9. Record APGAR scores at 1 and 5 minutes.
10. Follow the **Newly Born Protocol** for further treatment.
11. The placenta will deliver spontaneously, usually within 5 minutes of the infant. Do not force the placenta to deliver.
12. Massaging the uterus may facilitate delivery of the placenta and decrease bleeding by facilitating uterine contractions.
13. Continue transport to the hospital.

Certification Requirements:

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

Decontamination

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Any patient who may have been exposed to significant hazardous materials, including chemical, biological, or radiological weapons.

Procedure:

1. In coordination with HazMAT and other Emergency Management personnel, establish hot, warm and cold zones of operation.
2. Ensure that personnel assigned to operate within each zone have proper personal protective equipment.
3. In coordination with other public safety personnel, assure each patient from the hot zone undergoes appropriate initial decontamination. This is specific to each incident; such decontamination may include:
    - Removal of patients from Hot Zone
    - Simple removal of clothing
    - Irrigation of eyes
    - Passage through high-volume water bath (e.g., between two fire apparatus) for patients contaminated with liquids or certain solids. Patients exposed to gases, vapors, and powders often will not require this step as it may unnecessarily delay treatment and/or increase dermal absorption of the agent(s).
4. Initial triage of patients should occur after step #3. Immediate life threats should be addressed prior to technical decontamination.
5. Assist patients with technical decontamination (unless contraindicated based on #3 above). This may include removal of all clothing and gentle cleansing with soap and water. All body areas should be thoroughly cleansed, although overly harsh scrubbing which could break the skin should be avoided.
6. Place triage identification on each patient. Match triage information with each patient's personal belongings which were removed during technical decontamination. Preserve these personnel affects for law enforcement.
7. Monitor all patients for environmental illness.
8. Transport patients per local protocol.

Certification Requirements:

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

Gastric Tube Insertion

Clinical Indications:

P PARAMEDIC P

- Gastric decompression in intubated patients or for administration of activated charcoal in patients with altered mental status.

Procedure:

1. Estimate insertion length by superimposing the tube over the body from the nose to the stomach.
2. Flex the neck **if not contraindicated** to facilitate esophageal passage.
3. Liberally lubricate the distal end of the tube and pass through the patient's nostril along the floor of the nasal passage. Do not orient the tip upward into the turbinates. This increases the difficulty of the insertion and may cause bleeding.
4. In the setting of an intubated patient or a patient with facial trauma, oral insertion of the tube may be considered or preferred after securing airway.
5. Continue to advance the tube gently until the appropriate distance is reached.
6. Confirm placement by injecting 20cc of air and auscultate for the swish or bubbling of the air over the stomach. Additionally, aspirate gastric contents to confirm proper placement.
7. Secure the tube.
8. Decompress the stomach of air and food either by connecting the tube to suction or manually aspirating with the large catheter tip syringe.
9. Document the procedure, time, and result (success) on/with the patient care report (PCR).

Certification Requirements:

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

Injections: Subcutaneous and Intramuscular

B	*EMT**	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- When medication administration is necessary and the medication must be given via the SQ or IM route (not auto-injector), or as an alternative route in selected medications.

Procedure:

1. Receive and confirm medication order or perform according to standing orders.
2. Prepare equipment and medication expelling air from the syringe.
3. Explain the procedure to the patient and reconfirm patient allergies.
4. The most common site for subcutaneous injection is the arm.
    - Injection volume should not exceed 1 cc.
5. The possible injection sites for intramuscular injections include the arm, buttock and thigh.
    - Injection volume should not exceed 1 cc for the arm
    - Injection volume should not exceed 2 cc in the thigh or buttock.
6. The thigh should be used for injections in pediatric patients and injection volume should not exceed 1 cc.
7. Expose the selected area and cleanse the injection site with alcohol.
8. Insert the needle into the skin with a smooth, steady motion

SQ: 45-degree angle
skin pinched

IM: 90-degree angle
skin flattened

9. Aspirate for blood
10. Inject the medication.
11. Withdraw the needle quickly and dispose of properly without recapping.
12. Apply pressure to the site.
13. Monitor the patient for the desired therapeutic effects as well as any possible side effects.
14. Document the medication, dose, route, and time on/with the patient care report (PCR).

** EMT may administer Epinephrine for anaphylaxis, by IM route, if approved by the system medical director.*

Certification Requirements:

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

Standards Procedure (Skill) Universal Section

Restraints: Physical

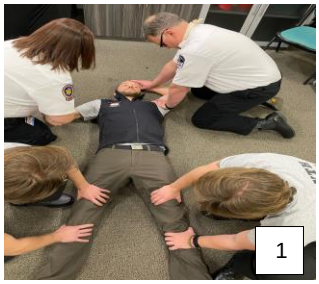
Agency Name:	SATISFACTORY ☐
Provider Name: Paramedic	UNSATISFACTORY ☐
Instructor Name: EMT AEMT Paramedic Physician	

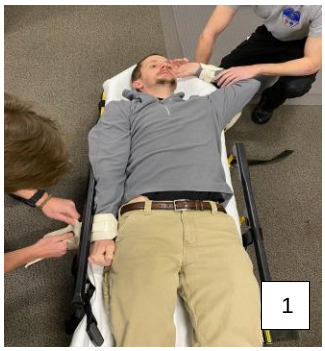
Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
   - YES = Provider completed skill with no assistance from instructor.
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

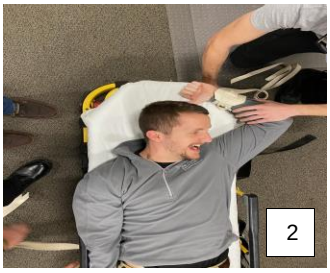
Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

	EMR	
B	EMT	B
A	AEMT	A
P	Paramedic	P

YES NO IL	Verbalizes indications for physical restraints: 1. Used to ensure the physical safety of the patient, provider, or others 2. Clear and immediate danger to the patient (self), provider, or others 3. When less restrictive alternatives are unsuccessful (e.g.. verbal de-escalation) 4. Delay in restraint will subject patient (self) , providers, or others to risk of serious harm
YES NO IL	Verbalizes contraindications for physical restraints: 1. Patient has medical decision-making capacity and refuses care 2. Patient is not a danger to self, provider, or others 3. Less restrictive alternatives have not been considered or used
YES NO IL	Verbalizes assessment of resource needs: Request Law Enforcement if indicated Contact Medical Control if indicated Call for additional providers if indicated Withdraw from scene if unsafe
YES NO IL	Assemble appropriate equipment and personnel: 1. 3 – 6 providers preferably 2. Don appropriate PPE 3. Soft nylon or leather restraints specifically manufactured for use as restraints
YES NO IL	Remove potential items from all providers that can be used as weapons: 1. Stethoscope, shears or scissors, hemostats, writing pens, badges, pins 2. Window punch, pocket knives, communication devices
YES NO IL	Team leader assign roles to providers and discusses plans and strategies: Team leader explains procedure to patient: If patient standing and will not follow directions use Procedure USP – 6. If patient already on cot or flat surface: • 1 Provider to control the head and airway • 1 Provider for each extremity 1 Team leader attempts verbal instructions to move patient to cot if possible: • 2 Providers take control of both wrists and elbows • 2 Providers take control of both ankles and knees • 1 Provider controls head/airway and 1 Provider is available for medications • **May place in lateral decubitus position – DO NOT place prone:**
YES NO IL	Soft nylon or leather manufacture restraints are applied to wrist and ankles Secure restraints to cot with quick-release tie Examine patient for potential injuries following restrain application
YES NO IL	Both lower extremities restrained extended, cross restraints beneath lower extremities One upper extremity restrained extended by patient's side One upper extremity restrained flexed over patient's head 2 Do not tie restraint to cot undercarriage
YES NO IL	Assess pulse, motor, and sensory immediately following application Perform pulse, motor, and sensory assessments every 15 minutes afterwards
YES NO IL	Patient must remain under constant observation by EMS at all times Appropriate monitoring equipment required based on clinical circumstances
YES NO IL	Patient care report documentation requirements (restraint checklist recommended): Indication for restraint use Type of restrain applied and time of application Pulse, motor, and sensory exams and time of exam







Instructor notes:

Restraints: Physical

Clinical Information for physical restraints

Objective of Procedure:

To protect a patient from self-harm and/or protection of providers or others on scene
Used when less restrictive alternatives have failed
Used as last resort

Scope of Practice: EMR, EMT, AEMT, and Paramedic

Indications:

Physically combative patient not responding to less restrictive means of de-escalation
Immediate danger of self-harm or harm to providers, or others on scene

Contraindications:

Less restrictive techniques have not been used or considered prior to physical restraint
Intact medical decision-making capacity refusing treatment and not a danger to self or others

Clinical Presentation:

Behavioral health crisis
Altered Mental Status with combativeness
Agitation and violence

Potential Complications:

Positional asphyxiation
Injury to patient, providers, or others
Increased mental stress to patient
Injury following escape from restraints
Bodily fluid exposure

Positioning Considerations:

Do not place patient in a supine position or place objects on top of patient
One arm should be restrained above the head
Both legs should be restrained fully extended
May place in a lateral decubitus position, supine is preferred
Head of bed should be elevated to about 30°

Procedure references:

1. Kowalski JM. (2019). Physical and Chemical Restraint. Roberts and Hedges' Clinical Procedures in Emergency Medicine and Acute Care. 7th ed.(pp 1481 - 1498). Philadelphia, PA. Elsevier.
2. Heiner JD, Moore GP. (2018). The combative and difficult. Rosen's Emergency Medicine: Concepts and Clinical Practice. 9th ed. (pp 2375 - 2386). Philadelphia, PA. Elsevier.
3. Booth JS. (2018, Dec 19). Four-Point Restraint. Retrieved from https://emedicine.medscape.com/article/1941454-overview.
4. Bradley S. (2017). Psychiatric Emergencies. AAOS Emergency Care and Transportation of the Sick and Injured. 11th ed. (pp.802 – 827). Burlington, MA. Jones and Bartlett Learning.

Standards Procedure (Skill) Universal Section

Restraints: Therapeutic Take Down

Agency Name:	
Provider Name:	Paramedic
Instructor Name:	EMT AEMT Paramedic Physician

SATISFACTORY ☐

UNSATISFACTORY ☐

Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
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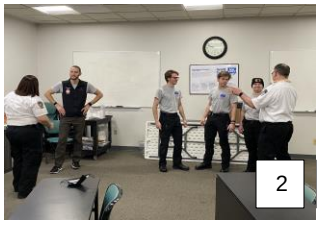
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

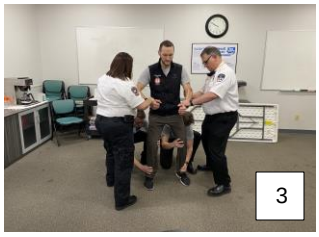
Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

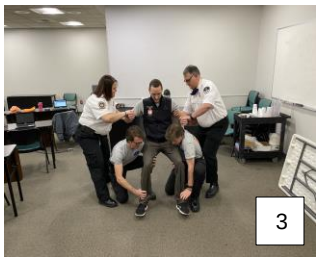
	EMR	
B	EMT	B
A	AEMT	A
P	Paramedic	P

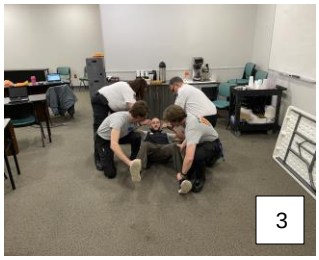
YES NO IL	Verbalizes indications for physical restraints: 1. Used to ensure the physical safety of the patient, provider, or others 2. Clear and immediate danger to the patient (self), provider, or others 3. When less restrictive alternatives are unsuccessful (e.g.. verbal de-escalation) 4. Delay in restraint will subject patient (self) , providers, or others to risk of serious harm	1
YES NO IL	Verbalizes contraindications for physical restraints: 1. Patient has medical decision-making capacity and refuses care 2. Patient is not a danger to self, provider, or others 3. Less restrictive alternatives have not been considered or used	1
YES NO IL	Verbalizes assessment of resource needs: Request Law Enforcement if indicated Contact Medical Control if indicated Call for additional providers if indicated Withdraw from scene if unsafe	2
YES NO IL	Assemble appropriate equipment and personnel: 1. 4 – 6 providers preferably 2. Don appropriate PPE 3. Soft nylon or leather restraints specifically manufactured for use as restraints	2
YES NO IL	Remove potential items from all providers that can be used as weapons: 1. Stethoscope, shears or scissors, hemostats, writing pens, badges, pins 2. Window punch, pocket knives, communication devices	
YES NO IL	Team leader assign roles to providers and discusses plans and strategies: Team leader explains procedure to patient If patient already on cot: 1 Provider to control the head and airway 1 Provider for each extremity 1 Provider to administer medications, if indicated If patient standing or walking: Team leader attempts verbal instructions to move patient to cot if possible 2 Providers approach from front and take control of both wrists and elbows 2 Providers approach from rear and take control of both ankles and knees 1 Provider controls head/airway and 1 Provider is available for medications	3
YES NO IL	With patient supine on cot (may place in lateral decubitus – DO NOT place prone): 2 Providers approach from front and take control of both wrists and elbows 2 Providers approach from rear and take control of both ankles and knees 1 Provider controls head/airway and 1 Provider is available for medications	
YES NO IL	Soft nylon or leather manufacture restraints are applied to wrist and ankles Secure restraints to cot with quick-release tie Examine patient for potential injuries following restrain application	
YES NO IL	Assess pulse, motor, and sensory immediately following application Perform pulse, motor, and sensory assessments every 15 minutes afterwards	
YES NO IL	Patient must remain under constant observation by EMS at all times Appropriate monitoring equipment required based on clinical circumstances	
YES NO IL	Patient care report documentation requirements (restraint checklist recommended): Indication for restraint use Type of restrain applied and time of application Pulse, motor, and sensory exams and time of exam	

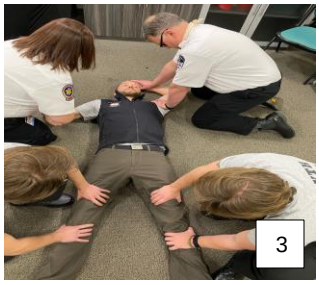
Instructor notes:











Restraints: Therapeutic Take Down

Clinical Information for physical restraints

Objective of Procedure:

To protect a patient from self-harm and/or protection of providers or others on scene
Used when less restrictive alternatives have failed
Used as last resort

Scope of Practice: EMR, EMT, AEMT, and Paramedic

Indications:

Physically combative patient not responding to less restrictive means of de-escalation
Immediate danger of self-harm or harm to providers, or others on scene

Contraindications:

Less restrictive techniques have not been used or considered prior to physical restraint
Intact medical decision-making capacity refusing treatment and not a danger to self or others

Clinical Presentation:

Behavioral health crisis
Altered Mental Status with combativeness
Agitation and violence

Potential Complications:

Positional asphyxiation
Injury to patient, providers, or others
Increased mental stress to patient
Injury following escape from restraints
Bodily fluid exposure

Positioning Considerations:

Do not place patient in a supine position or place objects on top of patient
One arm should be restrained above the head
May place in a lateral decubitus position, supine is preferred
Head of bed should be elevated to about 30°

Procedure references:

1. Kowalski JM. (2019). Physical and Chemical Restraint. Roberts and Hedges' Clinical Procedures in Emergency Medicine and Acute Care. 7th ed.(pp 1481 - 1498). Philadelphia, PA. Elsevier.
2. Heiner JD, Moore GP. (2018). The combative and difficult. Rosen's Emergency Medicine: Concepts and Clinical Practice. 9th ed. (pp 2375 - 2386). Philadelphia, PA. Elsevier.
3. Booth JS. (2018, Dec 19). Four-Point Restraint. Retrieved from https://emedicine.medscape.com/article/1941454-overview.
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Standards Procedure (Skill) Universal Section

Urinary Catheterization

Agency Name:	SATISFACTORY ☐
Provider Name: Paramedic	UNSATISFACTORY ☐
Instructor Name: EMT AEMT Paramedic Physician	

Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
   - YES = Provider completed skill with no assistance from instructor.
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

P Paramedic P

YES NO IL

Verbalizes indications for urinary catheterization:
1. Monitoring patient's fluid state and/or response to therapy during transport
2. Collection of urine sample for laboratory analysis
3. Maintaining and monitoring chronic indwelling urinary catheter

YES NO IL

Verbalizes contraindications for urinary catheterization:
1. Suspected or known trauma to the abdomen, pelvis, or genitalia
2. Grossly bloody urine
3. Pediatric patient

YES NO IL

Prepare patient and explain the procedure:
1. Explain procedure to patient and the need for sterility
2. Ensure privacy and good lighting
3. Use a chaperone for assistance and observation regardless of age or gender

YES NO IL

Assemble appropriate equipment:
1. Use or pre-packaged commercial kit is recommended containing:
   - Sterile gloves, sterile lubricant, sterile water
   - Forceps, cotton balls, and cleansing pads
   - Urinary catheter and collection bag
   - Male catheter size: 14 – 16 Fr. Female catheter size: 12 – 14 Fr.

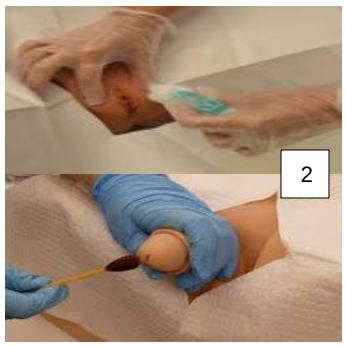
1

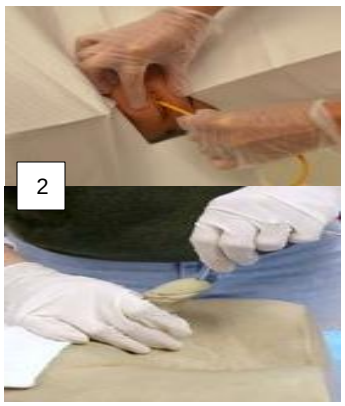
YES NO IL

Insertion of urinary catheter:
1. Wash hands before and after procedure with soap/water or alcohol-based product
2. Open urinary catheter kit maintaining sterility of contents
3. Don sterile gloves and arrange kit contents for efficient use
4. Attach sterile water syringe to catheter balloon, inflate with 10 mL, and deflate while checking for leaks
5. Attach urinary catheter to collection bag and clamp port
6. Apply drapes to patient in sterile fashion
7. Using your non-dominant hand expose the urinary meatus, hand remains in place until catheter is placed with urine flow and is now unsterile
   - Female: spread the labia apart
   - Male: Retract foreskin exposing entire glans and hold penis straight and perpendicular to the trunk

2

8. Using your dominant hand, clean the meatus with Betadine, circling out from the male meatus and top to bottom in female
10. Lubricate the catheter tip with sterile lubricant
11. Gently place the catheter tip into the urinary meatus and advance slowly until you have flow of urine, then advance an additional 2 inches
    - Stop immediately if you feel resistance and cannot advance the catheter
12. Inflate the catheter balloon with 10 mL of sterile water and place gently traction on the catheter by withdrawing until you feel resistance.
13. Place the collection bag in a dependent condition relative to the genitalia and secure the catheter to the abdomen or thigh with device supplied





YES NO IL

Patient care report documentation requirements:
1. Time of insertion, volume of urine obtained on placement, and total volume at end of call
2. Any complications noted

Instructor notes:

Urinary Catheterization

Clinical Information for urinary catheterization

Objective of Procedure:

To introduce or maintain a urinary catheter when urine function has been compromised by illness or surgery.
To monitor fluid output.

Scope of Practice: Paramedic

Indications:

Monitoring patient's fluid state and/or response to therapy during transport
Collection of urine sample for laboratory analysis
Maintaining and monitoring chronic indwelling urinary catheter

Contraindications:

Suspected or known trauma to the abdomen, pelvis, or genitalia
Grossly bloody urine
Pediatric patient

Clinical Presentation:

Medical illness requiring assessment of urine output due to ongoing therapy
Chronic indwelling catheter in urethral, condom, or suprapubic location

Potential Complications:

Trauma to urethra and/or bladder
Urinary infection and/or sepsis
Bodily fluid exposure

Positioning Considerations:

Prone to head of bed elevated to about 30°
Male: Lower extremities can be extended
Female: Lower extremities with knees bent and elevated and abducted

Procedure references:

1. Ortega R, Ng L, Sekhar Pavan, et al. (2008, April 3). Female Urethral Catheterization. Retrieved from https://www.nejm.org/doi/full/10.1056/nejmvcm0706671
2. Thomsen TW, Setnik GS. (2006, May 25). Male Urethral Catheterization. Retrieved from https://www.nejm.org/doi/full/10.1056/nejmvcm054648.

Standards Procedure (Skill) Wound Care / Trauma Section

Chest Decompression-Needle

Agency Name:	
Provider Name:	Paramedic
Instructor Name:	EMT AEMT Paramedic Physician

SATISFACTORY ☐

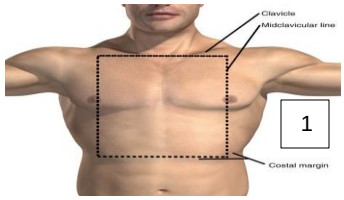
UNSATISFACTORY ☐

P Paramedic P

Instructor:
1. Evaluate providers skill performance using the check off list below.
2. Circle performance indicator.
   - YES = Provider completed skill with no assistance from instructor.
   - NO = Provider unable to complete skill satisfactorily following instructor intervention.
   - IL = Provider able to complete skill satisfactorily following Instructor Led (teaching) intervention.

Satisfactory performance indicated with ≥ 12 YES / IL completions. (Combination of both YES and IL)

YES NO IL	<u>Verbalizes indications for chest needle decompression:</u> 1. Traumatic arrest (if applicable) 2. Tension pneumothorax with Hypotension: (SBP < 90 or < 70 + 2(age) mmHg) <u>PLUS</u> Dyspnea Absence of lung sounds Hyper-resonance to percussion Decreased compliance with ventilation Late findings: Tracheal Deviation JVD	
YES NO IL	Verbalizes contraindications: Simple pneumothorax (hemodynamically stable)	
YES NO IL	Verbalizes complications: Pneumothorax, Bleeding, Infection, Organ inury	
YES NO IL	Don appropriate PPE	
YES NO IL	Conduct appropriate airway management with supplemental oxygen	
YES NO IL	<u>Identifies landmark for the "cardiac box:"</u> Borders: Clavicles to costal margins Both nipples in midclavicular line Verbalizes need to avoid area during needle/catheter insertion.	1
YES NO IL	<u>Names at least 3 important structures in the cardiac box or mediastinum:</u> Heart, aorta, aortic valve, vena cava	
YES NO IL	Option 1: Locate 2d intercostal space just lateral to the mid-clavicular line Option 2: Locate 4th or 5th intercostal space in the mid-axillary line	2
YES NO IL	Clean and prepare site chosen with generous amount of povidine-iodine solution, chlorhexidine, or alcohol swabs (less preferred)	
YES NO IL	<u>Chooses correct catheter/needle size and length:</u> Adult: 2.5 – 3.25 inch length and 14 – 16 gauge size Pediatric (≤ 15): 1.5 inch length and 14 – 16 gauge size (may require 2.5 inch in larger body habitus pediatric patients)	
YES NO IL	Option 1: May attach 10 or 20 cc syringe to aspirate catheter/needle during insertion. Option 2: May attach 10 or 20 cc syringe with 2 cc of normal saline to create air bubbles during aspiration of catheter/needle	
YES NO IL	Insert large bore decompression needle (catheter over needle) into skin over the top of the rib below intercostal space identified. After passing over the rib direct needle perpendicular to the spine during insertion. <u>Verbalizes 3 structures avoided by directing needle over the rib:</u> Intercostal artery, vein, and nerve.	3
YES NO IL	Advance catheter/needle through the skin, muscle, and parietal pleura until you feel a "pop" or loss of resistance, then hold needle in place and advance only the catheter. (*May here hiss or rush of air*)	3
YES NO IL	Secure the catheter hub to the chest wall. Attach Heimlich valve, flutter valve, or agency equivalent.	4
YES NO IL	Re-evaluate patient and assess for improvement	



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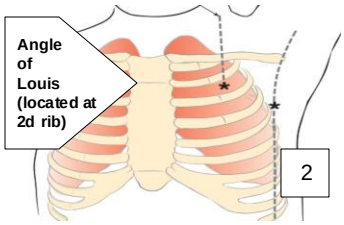

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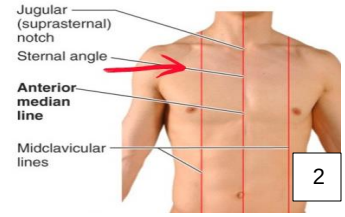

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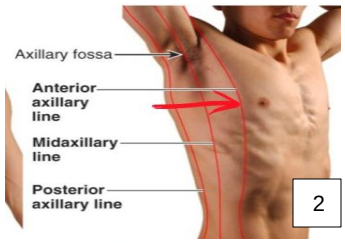

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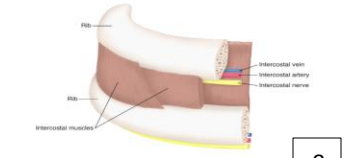
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Instructor notes:

Chest Decompression-Needle

Clinical Information for Chest Decompression-Needle

Objective of Procedure:

Improve hemodynamic function through relief of a tension pneumothorax
Release of increased intrathoracic pressure negatively impacting cardiac output

Scope of Practice: Paramedic

Indications:

Tension pneumothorax
Traumatic arrest (bilateral) in appropriate clinical situation

Contraindications:

Simple pneumothorax
No hemodynamic compromise present.

Clinical Presentation:

History of blunt or penetrating trauma
Respiratory distress
Decreased or absent breath sounds in affected lung
Hypotension
Tachycardia
Chest pain
COPD / Asthma exacerbation
Positive pressure ventilations
Late findings:
- Jugular Venous Distention (JVD)
- Tracheal deviation away from affected lung

Potential Complications:

Pneumothorax
Bleeding
Infection (later finding)
Injury to underlying thoracoabdominal organs

Procedure references:

1. Margolis AM and Kirsch TD. (2019). Tube Thoracostomy. Roberts and Hedges' Clinical Procedures in Emergency Medicine and Acute Care. 7th ed.(pp 196-220). Philadelphia, PA. Elsevier.
2. Raja AS. (2018). Thoracic Trauma. Rosen's Emergency Medicine: Concepts and Clinical Practice. 9th ed. (pp 382-402). Philadelphia, PA. Elsevier.
3. Vaughan WJ. (2017). Chest Injuries. Emergency Care and Transportation of the Sick and Injured. AAOS. 11th ed. (pp 1030-1053). Burlington, MA. Jones and Bartlett Learning.
4. Alson RA and Braithwaite S. (2014). Needle Decompression of Tension Pneumothorax. International Trauma Life Support Position Statement. https://www.itrauma.org/wp-content/uploads/2014/07/Needle-Decompression-Resource-Document-FINAL-Publication-6-28-14.pdf

Spinal Motion Restriction

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Need for Spinal Motion Restriction as determined by protocol.
- **<u>Guidelines for appropriate use of long spine board (LSB) OR any equivalent device below:</u>**

1. **Spine boards or similar rigid devices, should NOT be used during transport or during inter-facility transfers.** They should be utilized for extrication and / or patient transfers, as well as support for chest compressions. They DO NOT improve outcomes and can induce pain, agitation / anxiety, respiratory compromise, and decreased tissue perfusion at pressure points.

2. Devices such as the long or short spine board, scoop stretcher, soft-body splints, etc., should be considered extrication devices rather than transport-devices. Instead, use of Spinal Motion Restriction which includes a rigid cervical collar, manual in-line spine stabilization, maintaining spinal alignment with movement and transfers, and securing to the ambulance stretcher.
3. Penetrating trauma to head, torso, or back with no evidence of spinal injury does not require Spinal Motion Restriction.

Procedure:

1. Gather LSB, scoop, ambulance cot, or other Spinal Motion Restriction device, securing devices, and appropriate C-collar.
2. Explain the procedure to the patient and assess / record neurological exam and pulse status.
3. Place the patient in an appropriately sized C-collar while maintaining in-line stabilization of the C-spine by second provider. In-line stabilization should not involve traction / tension, but rather maintain the head in a neutral, midline position while the first rescuer applies the collar.
4. Once the collar is secure, the second rescuer should still maintain their position to ensure stabilization (the collar is helpful but will not do the job by itself.)
5. If indicated, place patient on a Spinal Motion Restriction device with log-roll or similar technique dependent on circumstances, if patient is supine or prone. During extrication or where otherwise unable to be placed prone or supine, place on Spinal Motion Restriction device by the safest method available that allows maintenance of in-line spinal stability.
6. Stabilize the patient with straps / head rolls / tape / other devices as needed. Once the head is secured to the Spinal Motion Restriction device / stretcher, the second rescuer may release manual in-line stabilization. **Once the patient arrives at the stretcher, REMOVE the rigid Spinal Motion Restriction device while maintaining spinal alignment using log-roll or multi-rescuer lift techniques and transfer and secure to the stretcher for transport.**
7. NOTE: Spinal precautions may be achieved by many methods. Never force a patient into a certain position to immobilize them. Such situations may require a second rescuer to maintain manual stabilization throughout the transport to the hospital. Special equipment such as football players in full pads and helmet may remain immobilized with helmet and pads in place.
8. Document the time of the procedure in the patient care report (PCR).

Certification Requirements:

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

Splinting

	EMR
B	EMT
A	AEMT
P	PARAMEDIC

Clinical Indications:

- Immobilization of an extremity for transport, either due to suspected fracture, sprain, or injury.
- Immobilization of an extremity for transport to secure medically necessary devices such as intravenous catheters

Procedure:

1. Assess and document pulses, sensation, and motor function prior to placement of the splint. If no pulses are present and a fracture is suspected, consider reduction of the fracture prior to placement of the splint.
2. Remove all clothing from the extremity.
3. Select a site to secure the splint both proximal and distal to the area of suspected injury, or the area where the medical device will be placed.
4. Do not secure the splint directly over the injury or device.
5. Place the splint and secure with Velcro, straps, or bandage material (e.g., kling, kerlex, cloth bandage, etc.) depending on the splint manufacturer and design.
6. Document pulses, sensation, and motor function after placement of the splint. If there has been a deterioration in any of these 3 parameters, remove the splint and reassess
7. If a femur fracture is suspected and there is no evidence of pelvic fracture or instability, the following procedure may be followed for placement of a femoral traction splint:
    - Assess neurovascular function as in #1 above.
    - Place the ankle device over the ankle.
    - Place the proximal end of the traction splint on the posterior side of the affected extremity, being careful to avoid placing too much pressure on genitalia or open wounds. Make certain the splint extends proximal to the suspected fracture. If the splint will not extend in such a manner, reassess possible involvement of the pelvis
    - Extend the distal end of the splint at least 6 inches beyond the foot.
    - Attach the ankle device to the traction crank.
    - Twist until moderate resistance is met.
    - Reassess alignment, pulses, sensation, and motor function. If there has been deterioration in any of these 3 parameters, release traction and reassess.
8. Document the time, type of splint, and the pre and post assessment of pulse, sensation, and motor function in the patient care report (PCR).

Certification Requirements:

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

Wound Care-General

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Protection and care for open wounds prior to and during transport.

Procedure:

1. Use personal protective equipment, including gloves, gown, and mask as indicated.
2. If active bleeding, elevate the affected area if possible and hold direct pressure. Do not rely on "compression" bandage to control bleeding. Direct pressure is much more effective.
3. Once bleeding is controlled, irrigate contaminated wounds with saline as appropriate (this may have to be avoided if bleeding was difficult to control). Consider analgesia per protocol prior to irrigation.
4. Cover wounds with sterile gauze/dressings. Check distal pulses, sensation, and motor function to ensure the bandage is not too tight.
5. Monitor wounds and/or dressings throughout transport for bleeding.
6. Document the wound and assessment and care in the patient care report (PCR).

Certification Requirements:

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

Wound Care-Hemostatic Agent

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Serious hemorrhage that can not be controlled by other means.

Contraindications:

- Wounds involving open thoracic or abdominal cavities.

Procedure:

1. Apply approved non-heat-generating hemostatic agent per manufacturer's instructions.
2. Supplement with direct pressure and standard hemorrhage control techniques.
3. Apply dressing.

Certification Requirements:

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

Wound Care-Conducted Electrical Weapon Removal

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Patient with uncomplicated conducted electrical weapon probes embedded subcutaneously in non-sensitive areas of skin.
- Conducted electrical weapon probes are barbed metal projectiles that may embed themselves up to 13 mm into the skin.

Contraindications:

- Patients with conducted electrical weapon probe penetration in vulnerable areas of body as mentioned below should be transported for further evaluation and probe removal
- Probes embedded in skin above level of clavicles, female breasts, or genitalia
- Suspicion that probe might be embedded in bone, blood vessel, or other sensitive structure.

Procedure:

- Ensure wires are disconnected from weapon.
- Stabilize skin around probe using non-dominant hand.
- Grasp probe by metal body with pliers or hemostats to prevent puncture wounds to EMS personnel.
- Remove probe in single quick motion.
- Wipe wound with antiseptic wipe and apply dressing.

Certification Requirements:

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

Wound Care-Tourniquet

	EMR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Life threatening extremity hemorrhage that can not be controlled by other means.
- Serious or life threatening extremity hemorrhage and tactical considerations prevent the use of standard hemorrhage control techniques.

Contraindications:

- Non-extremity hemorrhage
- Proximal extremity location where tourniquet application is not practical

Procedure:

1. Place tourniquet proximal to wound
2. Tighten per manufacturer instructions until hemorrhage stops and/or distal pulses in affected extremity disappear.
3. Secure tourniquet per manufacturer instructions
4. Note time of tourniquet application and communicate this to receiving care providers
5. Dress wounds per standard wound care protocol
6. If delayed or prolonged transport and tourniquet application time > 45 minutes: consider reattempting standard hemorrhage control techniques and removing tourniquet

Certification Requirements:

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

Table of Contents

Policy

Criteria for Death / Withholding Resuscitation

Policy:

CPR, BLS and ALS treatment are to be withheld only if the patient is obviously dead (see procedure section) or a valid (*properly completed, signed, dated, and unexpired*) **North Carolina Do Not Resuscitate (DNR)** form and/or **Medical Orders for Scope of Treatment (MOST)** form is present (Disposition Policy 5).

EMS personnel shall also honor a valid **POLST (Physician Orders for Life Sustaining Treatment), POST (Physician Orders for Scope of Treatment), MOST and/or DNR** (*properly completed, signed, dated, and unexpired*) from another state or US military form. NCGS Article 23: 90-320.

Purpose:

The purpose of this policy is to:

- Honor those who have obviously expired prior to EMS arrival.
- To honor the terminal wishes of the patient
- To prevent the initiation of unwanted resuscitation

Procedure:

1. If a patient is in complete cardiopulmonary arrest (clinically dead) and meets one or more of the criteria below, CPR and ALS therapy need not be initiated:

    - Body decomposition
    - Rigor mortis
    - Dependent lividity
    - Blunt force trauma
    - Injury not compatible with life (i.e., decapitation, burned beyond recognition, massive open or penetrating trauma to the head or chest with obvious organ destruction)
    - Extended downtime (> 15 minutes) with Asystole on the ECG
    - Meets criteria established in AC 12 Termination of CPR Protocol
    - Meets criteria established in TB 10 Traumatic Arrest Protocol

2. If a bystander or first responder has initiated CPR or automated defibrillation prior to ALS personnel (Paramedic or AEMT) arrival and any of the above criteria (signs of obvious death) are present, the ALS provider may discontinue CPR / resuscitation efforts. All other EMS personnel levels must communicate with medical control prior to discontinuation of the resuscitative efforts unless specifically addressed in AC 12 Termination of CPR Protocol and/ or TB 10 Traumatic Arrest Protocol.

3. If doubt exists, start resuscitation immediately. Once resuscitation is initiated, continue resuscitation efforts until either:
    a) Resuscitation efforts meet the criteria for implementing the **Discontinuation of Prehospital Resuscitation Policy** (Disposition Policy 3).
    b) Patient care responsibilities are transferred to the destination hospital staff.

Deceased Subjects

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Do not remove lines or tubes from unsuccessful cardiac arrests/codes unless directed below.

2. Notify the law enforcement agency with jurisdiction if applicable.

3. If subject was found deceased by EMS, the scene is turned over to law enforcement.

4. If EMS has attempted to resuscitate the patient and then terminated the resuscitative efforts, EMS personnel should contact the primary care provider (medical cases) or medical examiner (traumatic cases or primary care provider unavailable) to provide information about the resuscitative efforts.

   <u>Cases that require notification of the Medical Examiner when death results from:</u>

   Accident — Poisoning
   Homicide — Suicide
   Violence
   Occurring in jail, prison, correctional institution, or in LEO custody
   Occurring under suspicious, unusual, or unnatural circumstances
   Sudden unexpected death when in otherwise good health
   No current primary care or specialty physician care

5. Transport arrangements should be made in concert with law enforcement and the family's wishes.

6. If the deceased subject's death is not under the jurisdiction of the medical examiner, any line(s) or tube(s) placed by EMS should be removed prior to transport.

7. Document the situation, name of primary care provider or Medical Examiner contacted, the patient care report form (PCR).

8. Physician Assistants and/or Nurse Practitioners may sign a North Carolina death certificate when specially authorized by their supervising physician.

9. Follow Disposition Policy 9 Organ Procurement Agency Notification

Discontinuation of Prehospital Resuscitation

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Discontinuation of CPR, BLS, and ALS intervention may be implemented **prior to contact with Medical Control if <u>ALL</u>** of the following criteria have been met:

    - Patient must be ≥ 18 years of age
    - High quality CPR administered
    - Airway successfully managed:
        Acceptable airway management techniques include orotracheal intubation, Blind Insertion Airway Device (BIAD) placement, or cricothyrotomy
        EtCO2 monitoring for airway confirmation utilized if available
    - IV or IO access has been achieved
    - No hypothermia (body temperature ≥ 93.2°F or 32°C)
    - Protocol AC 12 On Scene Resuscitation Termination of CPR or TB 10 Traumatic Arrest utilized as applicable
    - All EMS BLS and ALS personnel involved in the patient's care agree that discontinuation of the resuscitation is appropriate

2. If all of the above criteria are not met and discontinuation of prehospital resuscitation is desired, **contact Medical Control**.

3. The **Deceased Subjects Policy** should be followed.

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

Disposition (Patient Instructions)

Policy:

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

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

Purpose:

To provide for the documentation of:

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

Procedure:

1. All patient encounters, which result in some component of an evaluation, must have a Patient Care Report completed.

2. All patients who refuse any component of the evaluation or treatment, based on the complaint, must have a Disposition Form completed.

3. All patients who are NOT transported by EMS must have a Disposition (patient instruction) Form completed including the Patient Instruction Section.

4. A copy of the Patient Disposition Form should be maintained with the official Patient Care Report (PCR)

North Carolina Do Not Resuscitate and MOST Form

Policy:

CPR, BLS and ALS treatment are to be withheld only if the patient is obviously dead (see procedure section) or a valid (*properly completed, signed, dated, and unexpired*) **North Carolina Do Not Resuscitate (DNR)** form and/or **Medical Orders for Scope of Treatment (MOST)** form is present (Disposition Policy 5).

EMS personnel shall also honor a valid **POLST (Physician Orders for Life Sustaining Treatment), POST (Physician Orders for Scope of Treatment), MOST and/or DNR** (*properly completed, signed, dated, and unexpired*) from another state or US military form. NCGS Article 23: 90-320.

Purpose:

- Honor those who have obviously expired prior to EMS arrival.
- To honor the terminal wishes of the patient
- To prevent the initiation of unwanted resuscitation

Procedure:

1. When confronted with a patient or situation involving the NC DNR and/or MOST form(s), the following form content must be verified before honoring the form(s) request.

    - The form(s) must be either an original North Carolina DNR or North Carolina MOST form
    - The effective date and expiration date must be completed and current
    - The DNR and/or MOST Form must be signed by a physician, physician's assistant, or nurse practitioner.
    - <u>Out-of-state or US military form:</u>
        Must be an original MOST, DNR, POLST (Physician Orders for Life Sustaining Treatment) or POST (Physician Orders for Scope of Treatment).
        The effective date and expiration date must be completed and current
        The DNR and/or MOST Form must be signed by a physician, physician's assistant, or nurse practitioner
2. A valid DNR or MOST form may be overridden by the request of (N.C.G.S. 90-21.13):
    Court appointed guardian
    Health care power of attorney
    Spouse
    Majority of patient's reasonably available parents and/or children who are ≥ 18 years old
    Majority of patient's reasonably available siblings who are ≥ 18 years old
    Patient's attending physician
    *EMS personnel should contact **Medical Control** to obtain assistance and direction if clarification is necessary.*
3. A living will (other legal document) that identifies the patient's desire to withhold CPR or other medical care may be honored with the approval of **Medical Control**. Ideally, consultation with patient's family and personal physician is suggested as time allows.

Patient Without a Protocol

Policy:

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

Purpose:

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

Procedure:

1. Treatment and medical direction for all patient encounters, which can be triaged into an EMS patient care protocol, is to be initiated by protocol.

2. When confronted with an emergency or situation that does not fit into an existing EMS patient care protocol, the patient should be treated by the **Universal Patient Care Protocol** and a **Medical Control Physician** should be contacted for further instructions.

Physician on Scene

Policy:

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

Purpose:

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

Procedure:

1. When a non medical-control physician offers assistance to EMS or the patient is being attended by a physician with whom they do not have an ongoing patient relationship, EMS personnel must review the On-Scene Physician Form with the physician. All requisite documentation must be verified and the physician must be approved by on-line medical control.

2. When the patient is being attended by a physician with whom they have an ongoing patient relationship, EMS personnel may follow orders given by the physician if the orders conform to current EMS guidelines, and if the physician signs the PCR. Notify medical control at the earliest opportunity. Any deviation from local EMS protocols requires the physician to accompany the patient to the hospital.

3. EMS personnel may accept orders from the patient's physician over the phone with the approval of medical control. The paramedic should obtain the specific order and the physician's phone number for relay to medical control so that medical control can discuss any concerns with the physician directly.

Organ Procurement Agency Notification

Policy:

When cardiopulmonary resuscitation (CPR), basic life support (BLS), and other advanced life support (ALS) interventions are withheld or discontinued on scene, EMS will report the death to the appropriate organ procurement organization servicing the county where death occurred in a timely manner. EMS will share information relevant to the donation process with the appropriate organ procurement organization.

Purpose:

To ensure an organ procurement organization is notified of deaths pronounced in the field by EMS in order to:

- Honor the decedent's registered declaration of eye and/or tissue donation.
- Preserve family's opportunity to support eye and/or tissue donation.
- Service the public health by facilitating eye and tissue donation.

Procedure:

EMS will notify the appropriate organ procurement organization of deaths pronounced outside of the hospital. Potential donors between ages of newborn – 100 years old will be referred.

Essential information to be provided to the organ procurement organization include:

- Caller name, title, and agency contact information
- Patient demographics
- Last seen alive date/time or time of death
- Circumstances of death (notify organ procurement agency even if medical examiner case)
- Medical interventions and medical history
- Next of kin name and contact information
- Who is taking custody of the decedent's body (ex: funeral home, hospital, M.E.)
- EMS **SHOULD NOT** discuss eye or tissue donation with next of kin. Coordinators specializing in family support will attempt to contact appropriate family members about organ donation.
- Document all patient care and interactions with the patient's family, personal physician, medical examiner, law enforcement, and medical control in the EMS electronic patient care report (ePCR).

Contact information for Organ Procurement Organizations:

LifeShare to the Carolinas		LifeNet Health	HonorBridge
1 (800) 932-4483		1 (800) 847-7831	1 (800) 252-2672
Anson	Jackson	Currituck	All other NC counties
Buncombe	Lincoln		
Burke	Macon		
Cabarrus	Madison		
Cherokee	Mecklenburg		
Clay	Polk		
Cleveland	Rutherford		
Gaston	Stanly		
Graham	Swain		
Haywood	Transylvania		
Henderson	Union		

Documentation of Vital Signs

Policy:

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

Purpose:

To insure:

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

Procedure:

1. An **initial** complete set of vital signs includes:
    - Pulse rate
    - Systolic **AND** diastolic blood pressure
    - Respiratory rate
    - Pain / severity (when appropriate to patient complaint)
    - GCS for Injured Patients

2. When no ALS treatment is provided, palpated blood pressures are acceptable for **REPEAT** vital signs.

3. Based on patient condition and complaint, vital signs may also include:
    - Pulse Oximetry
    - Temperature
    - End Tidal CO2
    - Breath Sounds
    - Level of Response

4. If the patient refuses this evaluation, the patient's mental status and the reason for refusal of evaluation must be documented. A patient disposition form must also be completed.

5. Document situations that preclude the evaluation of a complete set of vital signs.

6. Record the time vital signs were obtained.

7. Any abnormal vital sign should be repeated and monitored closely.

EMS Dispatch Center Time

Policy:

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

Definition:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. A public calls into the 911 Communications Center requesting emergency medical assistance will never be required to speak with more than two persons before a formal EMS Unit is dispatched.

2. In EMS Dispatch Centers where Emergency Medical Dispatch (EMD) has been implemented, EMS Units will be dispatched by EMD certified personnel in accordance with the standards developed by the Medical Director and the Emergency Medical Dispatch Protocols.

3. EMS Units will be dispatched hot (with lights and sirens) or cold (no lights and sirens) by the 911 Call Center based on predetermined criteria. If First Responders are dispatched as a component of the EMS response, they should typically be dispatched hot (with lights and sirens).

4. Without question, exception, or hesitation, EMS Units will respond as dispatched (hot or cold). This includes both requests to respond on active calls and requests to "move-up" to cover areas of the System that have limited EMS resources available.

5. EMS Units may, at their discretion, request for a First Responder on Non-First Responder calls in situations where additional resources are required such as manpower, extreme response time of the EMS Unit, need for forcible entry, etc.

EMS Dispatch Center Time

6. EMS Units dispatched with a cold (no lights and sirens) response, will not upgrade to a hot (with lights and sirens) response **UNLESS**:
   - Public Safety personnel on-scene requests a hot (with lights and sirens) response.
   - Communications Center determines that the patient's condition has changed, and requests you to upgrade to a hot (with lights and sirens) response.

7. An EMS Unit may divert from a current cold (no lights and sirens) call to a higher priority hot (with lights and sirens) call **ONLY IF:**
   - The EMS Unit can get to the higher priority call before it can reach the lower priority call. Examples of High Priority Calls: Chest Pain, Respiratory Distress, CVA, etc.
   - The diverting EMS Unit must notify the EMS Dispatch Center that they are diverting to the higher priority call.
   - The diverting EMS Unit ensures that the EMS Dispatch Center dispatches an EMS Unit to their original call.
   - Once a call has been diverted, the next EMS Unit dispatched must respond to the original call. A call cannot be diverted more than one (1) time.

8. Any EMS Dispatch Center Time delays resulting in a prolonged EMS Dispatch Center Time for emergent hot (with lights and sirens) events will be documented in Patient Care Report (PCR) as an "EMS Dispatch Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.

9. All EMS Dispatch Delays will be reviewed regularly within the EMS System Peer Review Committee.

Child with Special Health Care Needs (NC Kidbase)

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Caregivers who call 911 to report an emergency involving a child with special health care needs may report that the emergency involves a “Kidbase child” (if they are familiar with the NC Kidbase program) or may state that the situation involves a special needs child.

2. Responding EMS personnel should ask the caregiver of a special needs child for a copy of the “Kidbase Form”, which is the North Carolina terminology for the Emergency Information Form (EIF).

3. EMS personnel may choose to contact the child’s primary care physician for assistance with specific conditions or devices or for advice regarding appropriate treatment and/or transport of the child in the specific situation.

4. Transportation of the child, if necessary, will be made to the hospital appropriate for the specific condition of the child. In some cases this may involve bypassing the closest facility for a more distant yet more medically appropriate destination.

Infant Abandonment

Policy:

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

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

Purpose:

To provide:

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

Procedure:

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

EMS Back in Service Time

Policy:

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

Definition:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. The EMS Unit's priority upon arrival at the medical facility will be to transfer the care of the patient to medical facility staff as soon as possible.

2. EMS personnel will provide a verbal patient report on to the receiving medical facility staff.

3. EMS personnel will provide an interim (PreMIS Preliminary Report or equivalent) or final Patient Care Report (PCR) to the receiving medical facility staff, prior to leaving the facility, that documents at a minimum the patient's evaluation and care provided by EMS prior to arrival at the medical facility. A complete PCR should be completed as soon as possible but should not cause a delay in the EMS Back in Service Time.

4. The EMS Unit will be cleaned, disinfected, and restocked (if necessary) during the EMS Back in Service Time interval.

5. Any EMS Back in Service Time delay resulting in a prolonged EMS Back in Service Time will be documented in Patient Care Report (PCR) as an "EMS Turn-Around Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.

6. All EMS Turn-Around Delays will be reviewed regularly within the EMS System Peer Review Committee.

EMS Wheels Rolling (Turn-Out) Time

Policy:

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

Definition:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. In EMS Dispatch Centers where Emergency Medical Dispatch (EMD) has been implemented, EMS Units will be dispatched by EMD certified personnel in accordance with the standards developed by the Medical Director and the Emergency Medical Dispatch Protocols.

2. The EMS Unit Wheels Rolling (Turn-out) time will be less than 90 seconds from time of dispatch, 90% of the time. If a unit fails to check en route within 2:59 (mm:ss), the next available EMS unit will be dispatched.

3. Without question, exception, or hesitation, EMS Units will respond as dispatched (hot or cold). This includes both requests to respond on active calls and requests to "move-up" to cover areas of the System that have limited EMS resources available.

4. An EMS Unit may divert from a current cold (no lights and sirens) call to a higher priority hot (with lights and sirens) call **ONLY IF:**
   - The EMS Unit can get to the higher priority call before it can reach the lower priority call. Examples of High Priority Calls: Chest Pain, Respiratory Distress, CVA, etc.
   - The diverting EMS Unit must notify the EMS Dispatch Center that they are diverting to the higher priority call.
   - The diverting EMS Unit ensures that the EMS Dispatch Center dispatches an EMS Unit to their original call.
   - Once a call has been diverted, the next EMS Unit dispatched must respond to the original call. A call cannot be diverted more than one (1) time.

5. Any EMS Wheels Rolling (Turn-out) Time delay resulting in a prolonged EMS Response Time for emergent hot (with lights and sirens) events will be documented in Patient Care Report (PCR) as an "EMS Response Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.

6. All EMS Response Delays will be reviewed regularly within the EMS System Peer Review Committee.

State Poison Center

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

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

Air Transport

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

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

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

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

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

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

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

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

Safe Transport of Pediatric Patients

Policy:

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

Purpose:

To provide:

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

Procedure:

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

Transport

Policy:

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

Purpose:

To provide:

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

Procedure:

1. All trauma patients with significant mechanism or history for multiple system trauma will be transported as soon as possible. The scene time should be 10 minutes or less.

2. All acute Stroke and acute ST-Elevation Myocardial Infarction patients will be transported as soon as possible. The scene time should be 10 minutes or less for acute Stroke patients and 15 minutes or less (with 12 Lead ECG) for STEMI patients

2. Other Medical patients will be transported in the most efficient manner possible considering the medical condition. Advanced life support therapy should be provided at the scene if it would positively impact patient care. Justification for scene times greater than 20 minutes should be documented.

3. No patients will be transported in initial response non-transport vehicles.

4. In unusual circumstances, transport in other vehicles may be appropriate when directed by EMS administration.

Pediatric
EMS Triage and Destination Plan

Pediatric Patient

* **Any patient less than 16 years of age with a life-threatening illness (Not Trauma)**

Life Threatening Illness

* **Decreased Mental Status (GCS<13)**
* **Non-Responsive Respiratory Distress**
* **Intubation**
* **Post Cardiac Arrest**
* **Non-Responsive Hypotension (shock)**
* **Severe Hypothermia or Hyperthermia**
* **Status Epilepticus**
* **Potential Dangerous Envenomation**
* **Life Threatening Ingestion/Chemical Exposure**
* **Children with Special Healthcare Needs** (and destination choice based on parental request)

The Purpose of this plan is to:

* Rapidly identify pediatric patients who call 911 or present to EMS with a life-threatening illness
* Minimize the time from EMS contact to definitive care
* Quickly diagnose patients with pediatric life-threatening illness for EMS treatment and stabilization
* Rapidly identify the best hospital destination based on symptom onset time, vital signs, response to treatment, and predicted transport time
* Early activation/notification to the hospital prior to patient arrival
* Minimize scene time with a “load and go” approach
* Provide quality EMS service and patient care to the EMS community
* Continuously evaluate the EMS System based on North Carolina’s EMS performance measures

Pediatric Patient with Life Threatening Illness
(Not Trauma/Injury)

Pediatric Patient too unstable to transport beyond closest hospital?

Yes → **Transport to closest Community Hospital Listed**
Early Notification/Activation if Life Threatening

Lexington Medical Center
Thomasville Medical Center
Forsyth Medical Center
High Point Medical Center
Rowan Medical Center
Kernersville Medical Center
Randolph Health

No

Pediatric Capable Hospital within a 50 minute EMS transport?

No → (Community Hospital)

Yes

Transport to closest Pediatric Capable Hospital Listed
Early Notification/Activation

Brenner's Children's Hospital

Pediatric EMS Triage and Destination Plan

Pearls and Definitions

* **All Pediatric Patients with a life-threatening illness must be triaged and transported using this plan. This plan is in effect 24/7/365.**
* **The Trauma and Burn Triage and Destination Plan should be used for all injured patients regardless of age.**
* **All Patient Care is based on the EMS Pediatric Protocol**
* **Pediatric Capable Hospital** = a hospital with an emergency and pediatric intensive care capability including but not limited to:
  * Emergency Department staffed 24 hours per day with board certified Emergency Physicians
  * An inpatient Pediatric Intensive Care Unit (with a physician pediatric intensivist available in-house or on call 24/7/365)
  * Accepts all EMS patients regardless of bed availability
  * Provides outcome and performance measure feedback to EMS including case review
* **Community Hospital** = a local hospital within the EMS System’s service area which provides emergency care but does not meet the criteria of a Pediatric Capable Hospital
* **Pediatric Specialty Care Transport Program** = an air or ground based specialty care transport program that has specific pediatric training and equipment addressing the needs of a pediatric patient that can assume care of a pediatric patient from EMS or a Community Hospital and transport the patient to a Pediatric Capable Hospital.

Davidson County EMS System

This protocol has been developed by the North Carolina Office of EMS

STEMI
EMS Triage and Destination Plan

STEMI Patient
(ST Elevation Myocardial Infarction)

- **Cardiac symptoms greater than 15 minutes and less than 12 hours**

And

- **12 lead ECG criteria of 1 mm ST elevation in 2 or more contiguous leads**

or

- **Left Bundle Branch Block NOT KNOWN to be present in the past**

The Purpose of this plan is to:

- Rapidly identify STEMI patients who call 911 or present to EMS
- Minimize the time from onset of STEMI symptoms to coronary reperfusion
- Quickly diagnose a STEMI by 12 lead ECG
- Complete a reperfusion checklist (unless being transported directly to a PCI hospital) to determine thrombolytic eligibility
- Rapidly identify the best hospital destination based on symptom onset time, reperfusion checklist, and predicted transport time
- Early activation/notification to the hospital prior to patient arrival
- Minimize scene time to 15 minutes or less (including a 12 lead ECG)
- Provide quality EMS service and patient care to the EMS Systems citizens
- Continuously evaluate the EMS System based on North Carolina's STEMI EMS performance measures

Active Symptoms of Cardiac Chest Pain
12 Lead ECG Findings = STEMI

PCI Capable Hospital within 30 minutes EMS transport time?

Yes → **Transport to closest PCI Capable Hospital Listed**
Early Notification/Activation

Atrium Wake Forest Baptist Health
Forsyth Medical Center
High Point Medical Center
Rowan Medical Center

No

Reperfusion Checklist

Contraindications to Thrombolysis

No → **Closest Non-PCI Hospital within 50 minutes EMS transport time?**

Yes

Air Medical SCTP within 30 minutes of patient's location?

No

Yes

Activate Air Medical SCTP

Transport to closest PCI Capable Hospital Listed
Early Notification/Activation

Atrium Wake Forest Baptist Health
Forsyth Medical Center
High Point Medical Center
Rowan Medical Center

No

Yes

Transport to closest Non-PCI Hospital Listed
Early Notification/Activation

Lexington Medical Center
Thomasville Medical Center
Kernersville Medical Center
Randolph Health

STEMI EMS Triage and Destination Plan

Pearls and Definitions

- **All STEMI Patients must be triaged and transported using this plan. This plan is in effect 24/7/365**
- **All Patient Care is based on the EMS Chest Pain and STEMI Protocol**
- **Consider implementing a prehospital thrombolytic program if a STEMI patient cannot reach a hospital within 90 minutes using air or ground EMS transport.**
- **PCI (Percutaneous Coronary Intervention) Capable Hospital** = a hospital with an emergency interventional cardiac catheterization laboratory capable of providing the following services to acute STEMI patients. Free standing emergency departments and satellite facilities are not considered part of the PCI Capable Hospital.
  - 24/7 PCI capability within 30 minutes of notification (interventional cardiologist present at the start of the case)
  - Single Call Activation number for use by EMS
  - Accepts all patients regardless of bed availability
  - Provides outcome and performance measure feedback to EMS including case review
- **Non-PCI Hospital** = a local hospital within the EMS System's service area which provides emergency care, including thrombolytic administration, to an acute STEMI patient but does NOT provide PCI services.
- **Specialty Care Transport Program** = an air or ground based specialty care transport program which can assume care of an acute STEMI patient from EMS or a Non-PCI hospital and transport the patient to a PCI capable hospital.

Davidson County EMS System

This protocol has been developed by the North Carolina Office of EMS

STROKE and LVO Stroke
EMS Triage and Destination Plan

Stroke Patient
- Signs and symptoms of an acute Stroke identified on EMS Stroke Screen Assessment.

Last Known Well (LKW)
- Refer to UP 14 Suspected Stroke Protocol

The Purpose of this plan:
- Use plan in conjunction with UP 14 Suspected Stroke Protocol
- Rapidly identify acute Stroke patients presenting to EMS system and minimize the time from Stroke onset to definitive care
- Rapidly identify most appropriate facility destination in region
- Provide quality EMS service and patient care to the EMS system's citizens
- Maintain performance improvement of the EMS system based on NC Stroke Performance measures

Stroke Screening Tool: LA Prehospital Stroke Screen
Age >45
No h/o seizure disorder
Blood Sugar 60-400
Symptoms <24 hours
Ambulatory at baseline
Unilateral facial droop, grip weakness, or arm weakness

Stroke Screen/Severity Tool: Race Score
LVO Suspect Score >5

Facial Palsy	Mild	1
	Moderate	2
Arm Motor	Mod weakness	1
	Severe weakness	2
Leg Motor	Mod weakness	1
	Severe weakness	2
Head/gaze Deviation	Present	1
Aphasia/Agnosia	Moderate	1
	Severe	2

Positive Stroke Screen Tool and/or Positive Stroke Screen/ Stroke Severity Tool

Last Known Well Greater than 24 Hours — YES → **Transport to Destination A or B:** Nearest facility or certified stroke center honoring patient/family preference

NO

LVO Suspected Stroke Severity Score >5 — YES → **Contraindications to fibrinolysis?** *Reperfusion Checklist Or See box →* — YES → **Transport to Destination B**

Transport to Destination B
May transport to Destination A
- If patient needs stabilization
- Requires definitive airway management

NO → **Last Known Well Greater than 3.5 hours** — YES → **Transport to Destination B**

NO

Transport to Destination A
May transport to Destination B
- If it is the closest facility

DESTINATION A	DESTINATION B
Rapid / Early Notification of receiving facility Activation of Stroke Team Nearest Certified Stroke Center and/or patient/family preference	Rapid / Early Notification of receiving facility Activation of Stroke Team Thrombectomy Capable Stroke Center (TSC) Comprehensive Stroke Center (CSC)
Lexington Medical Center Thomasville Medical Center Rowan Medical Center High Point Medical Center Kernersville Medical Center	Atrium Wake Forest Baptist Health Forsyth Medical Center

Stroke EMS Triage and Destination Plan

STROKE
EMS Triage and Destination Plan

Consider Air Transport for anticipated transport times greater than 60 minutes. If the patient is unable to give complete history, time of symptom onset, or consent to treatment, a family member should be transported with the patient. It is helpful to bring the patient's medications with them as some medications (Xarelto, Eliquis, Coumadin) are relative contraindications to systemic thrombolytics. Having a stroke within the last three months is an absolute contraindication to thrombolytics. Obtaining this history during transport can assist hospital staff in determining treatment options.

Pearls

- **Use the AHA resource document for assistance on transport decision-making: https://www.ahajournals.org/doi/10.1161/STROKEAHA.120.033228**
- **Agencies may reconfigure this document to align with EMS and regional stroke care resources.**
- **If unstable airway or unstable hemodynamic condition may divert transport to closest appropriate facility.**
- **All Stroke patients should be triaged and transported using this plan.**
- **Expectation: EMS agency will collaborate with their regional stroke resources to establish point-to-point and inter-facility transport workflows for patient requiring higher level of acute care in consideration of potential EMS system impact and regional approach to stroke care.**
- **Stroke Severity/Large Vessel Occlusion (LVO) Tool and Score:**
  - **Score severity and LVO score level should be set based on collaboration with all stroke centers where EMS agency routinely transports in the region. Majority of strokes are NOT large vessel occlusion strokes and inappropriately low severity scores can result in an over-triage of patients to TSC / CSC negatively impacting both the EMS and healthcare system.**
- **EMS Transport Times in Destination Decisions:**
  - **EMS Transport times should be set based on collaboration with all stroke centers where EMS agency routinely transports in the region.**
- **Reperfusion Checklist and contraindications to fibrinolysis in acute stroke patients:**
  - **Systems may use the Reperfusion Checklist or may establish regionally agreed upon absolute contraindications.**
- **Many EMS systems have a variety of stroke certified medical facilities within similar transport time parameters.**
- **Destination choices should use regional stroke system of care plans and patient/family preferences in choosing most medically appropriate facility.**
- **Modality of transport in acute stroke depends on multiple factors, but safest and fastest should be considered, whether ground EMS, air medical EMS, or specialty/critical care ground transport.**
  - **Consider air medical transport options when no Comprehensive or Thrombectomy Capable Stroke Centers are within a 60 minute total transport time.**
- **Acute Stroke-Ready Hospital Components:**
  - Director of stroke care, written emergency stroke care protocols and transfer agreements with a neurosurgical capable hospital, 24-hour CT capability, and ability to administer thrombolytics.
  - Facility may have Telemedicine / Telestroke capability for consultation with neurologic specialist.
- **Primary Stroke Center:**
  - Has same capabilities as Acute Stroke-Ready Hospital.
  - Accredited and certified by the Joint Commission.
- **Thrombectomy-Capable Stroke Center:**
  - Has same capabilities as Primary Stroke Center.
  - Capable of providing mechanical thrombectomy with no day or hour limitation.
- **Comprehensive Stroke Center:**
  - Has same capabilities as a Primary Stroke Center.
  - Capable of offering full spectrum, state-of-the art Stroke care with no day or hour limitation.
  - Ability to treat stroke patients with catheter-based procedures to remove or dissolve blood clots.
  - Accredited and certified by the Joint Commission.
- Guidelines only for prioritization of hospital choices based on capabilities:
  - Prioritize rural hospitals that have formal agreements with Comprehensive Stroke Center or Thrombectomy-Capable Stroke Center with access to expert stroke consultation.
  - Prioritize rural hospitals with stroke center certification and/or those actively engaged in stroke center certification and who track their performance on evidenced-based stroke care.
  - Prioritize Primary Stroke Centers over Acute Stroke Ready Hospitals when total transport time is < 30 minutes difference.
  - Prioritize Comprehensive Stroke Center over Thrombectomy-Capable Stroke Center when total transport time is < 30 minutes difference.

Trauma and Burn
EMS Triage and Destination Plan

Trauma or Burn Patient = Any patient less (regardless of age) with a significant injury or burn

The Purpose of this plan is to:

- Rapidly identify injured or burned patients who call 911 or present to EMS
- Minimize the time from injury to definitive care for critical injuries or burns
- Quickly identify life or limb threatening injuries for EMS treatment and stabilization
- Rapidly identify the best hospital destination based on time of injury, severity of injury, and predicted transport time
- Early activation/notification to the hospital of a critically injured or burned patient prior to patient arrival
- Minimize scene time to 10 minutes or less from patient extrication with a "load and go" approach
- Provide quality EMS service and patient care to the EMS Systems citizens
- Continuously evaluate the EMS System based on North Carolina's EMS performance measures

Acutely Injured or Burned Patient

Evidence of extreme shock or un-manageable airway — Yes → **Transport to the Nearest Hospital for Stabilization Unless Minimal Additional Time to a Trauma Center**

No ↓

Any Abnormal Vital Signs?
- Glasgow Coma Score: <13 or intubated
- Systolic Blood Pressure: <90 mmHg
- Respiratory Rate: <10 or >29 breaths per min. (<20 in infant aged <1 year)

Yes → **Trauma Center (Burn Center for isolated Burn Injury) within 30 minutes of EMS Transport?**

No ↓

Critical Injury by Assessment?
- Penetrating injury to head, neck, torso, or extremities proximal to elbow and knee
- Flail Chest or Pneumothorax
- Two or more proximal long-bone fractures
- Crushed, degloved, or mangled extremity
- Amputation proximal to wrist and ankle
- Pelvic fractures
- Visibly Open or depressed skull fracture
- Paralysis
- Critical or Serious Burns (per EMS Burn Protocol)

Yes → **Air Medical SCTP within 30 minutes of patient's location or helipad?**

No ↓

Special Considerations?
- Anticoagulation and bleeding disorders
- Pregnancy >20 weeks

Yes → **Transport to closest Community Hospital Listed Unless Trauma Center can be reached in a near equal time**
Early Notification/Activation

Lexington Medical Center
Thomasville Medical Center
Forsyth Medical Center
High Point Medical Center
Rowan Medical Center
Kernersville Medical Center
Randolph Health

No ↓

Significant Mechanism?
- Falls: Adults >20 ft, Children >10 ft.
- MVC: Intrusion >12 inches occupant side, >18 inches any site; Ejection; Death in same vehicle; Vehicle Telemetry with high risk injury
- Auto vs. pedestrian/bicyclist thrown, run over
- Motorcycle crash >20 mph

Yes → **Transport to closest Community Hospital Listed Unless Trauma Center can be reached in a near equal time**
Early Notification/Activation

Lexington Medical Center
Thomasville Medical Center
Forsyth Medical Center
High Point Medical Center
Rowan Medical Center
Kernersville Medical Center
Randolph Health

Yes → **Activate Air or Ground SCTP**

Transport to closest Trauma Center (Burn Center for isolated Burn)
- Choose a Level 3 Trauma Center if EMS transport time is less than 50 minutes compared to a Level 1 or 2 Trauma Center

Early Notification/Activation

Atrium Wake Forest Baptist Health

Yes → **Transport to closest Trauma Center (Burn Center for isolated Burn)**

Trauma and Burn EMS Triage and Destination Plan

Pearls and Definitions

- **All Injury and Burn Patients must be triaged and transported using this plan. This plan is in effect 24/7/365**
- **All Patient Care is based on the EMS Trauma Protocols**
- **Designated Trauma Center** = a hospital that is currently designated as a Trauma Center by the North Carolina Office of Emergency Medical Services. Trauma Centers are designated as Level 1, 2, or 3 with Level 1 being the highest possible designation. Free standing emergency departments and satellite facilities are not considered part of the Trauma Center.
- **Burn Center** = a ABA verified Burn Center co-located with a designated Trauma Center
- **Community Hospital** = a local hospital within the EMS System's service area which provides emergency care but has not been designated as a Trauma Center
- **Specialty Care Transport Program** = an air or ground based specialty care transport program which can assume care of an acutely injured patient from EMS or a Community Hospital and transport the patient to a designated Trauma Center.

Davidson County EMS System

This protocol has been developed by the North Carolina Office of EMS