Davidson County

Emergency Services

2017 Patient Treatment

Protocols – Procedures -- Policies

Effective Date 5/1/2018

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Universal Protocol Section

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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
Glucose
GCS

If Indicated:
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

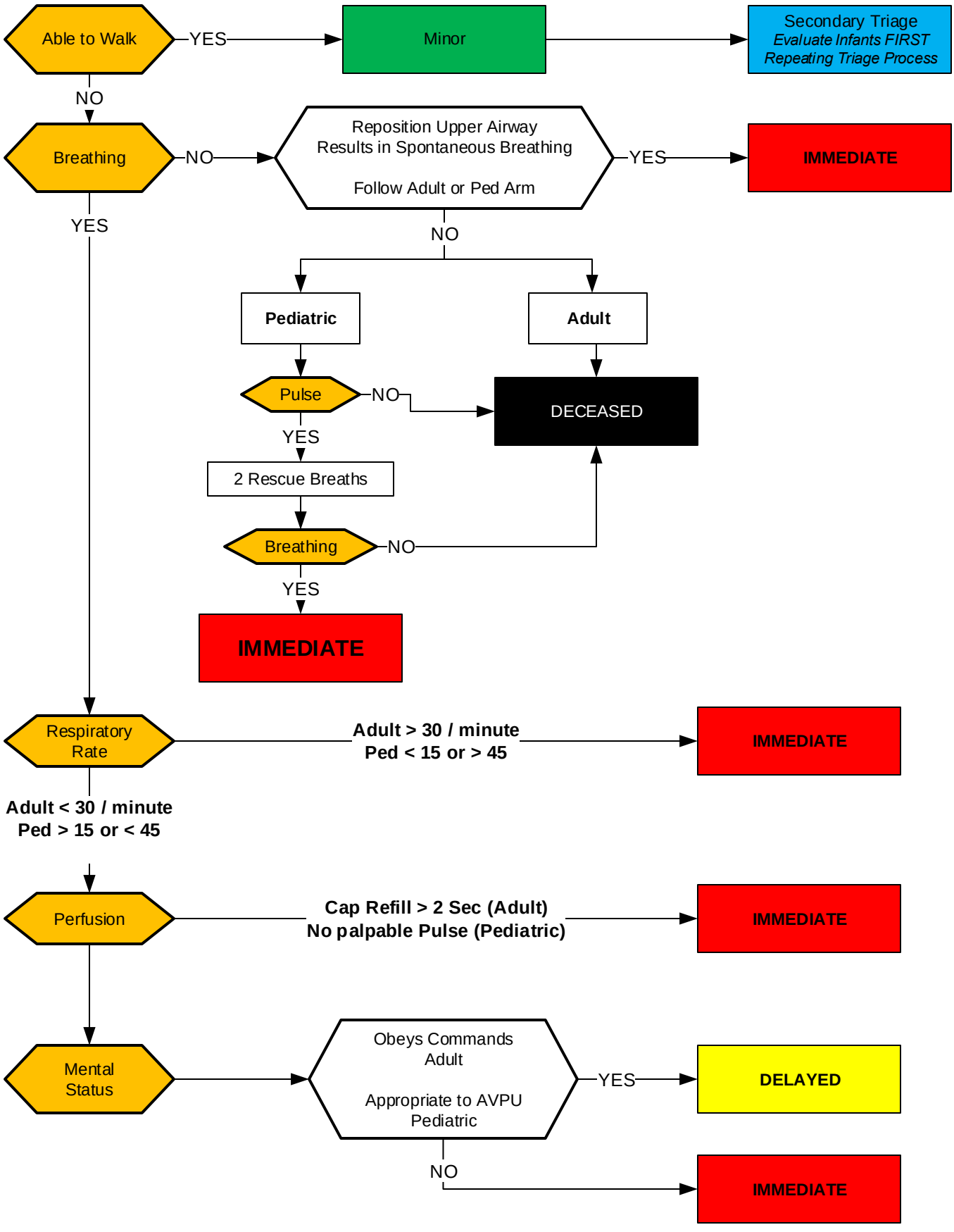
Oxygen is ubiquitous in pre-hospital patient care and probably over utilized. Oxygen is a drug with indications, contraindications as well as untoward side effects. Recent research demonstrates a link with increased mortality when oxygen is over-utilized (hyperoxia / hyperventilation) in cardiac arrest. 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 transport.**
- **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 (Broselow-Luten).
  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


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

Triage

Universal Protocol Section

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.

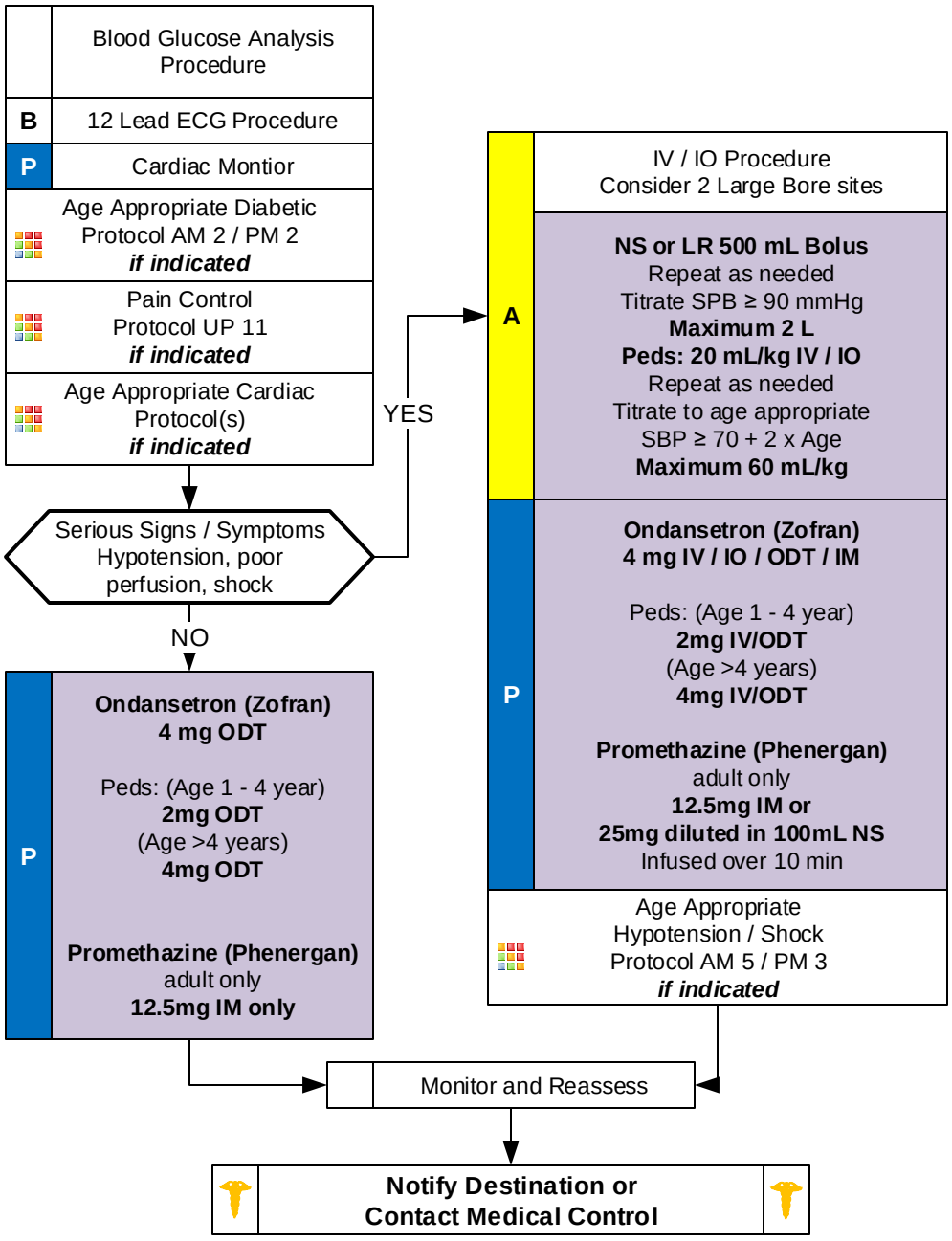
Abdominal Pain Vomiting and Diarrhea

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



Universal Protocol Section

Abdominal Pain
Vomiting and Diarrhea

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.

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.**
- Beware of vomiting in the absence of other symptoms. Isolated vomiting may be caused by pyloric stenosis, bowel obstruction, and CNS processes (bleeding, tumors, or increased CSF pressures).
- Document the mental status and vital signs prior to administration of Promethazine (Phenergan).
- 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

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. See UP6 Behavioral.

Pearls

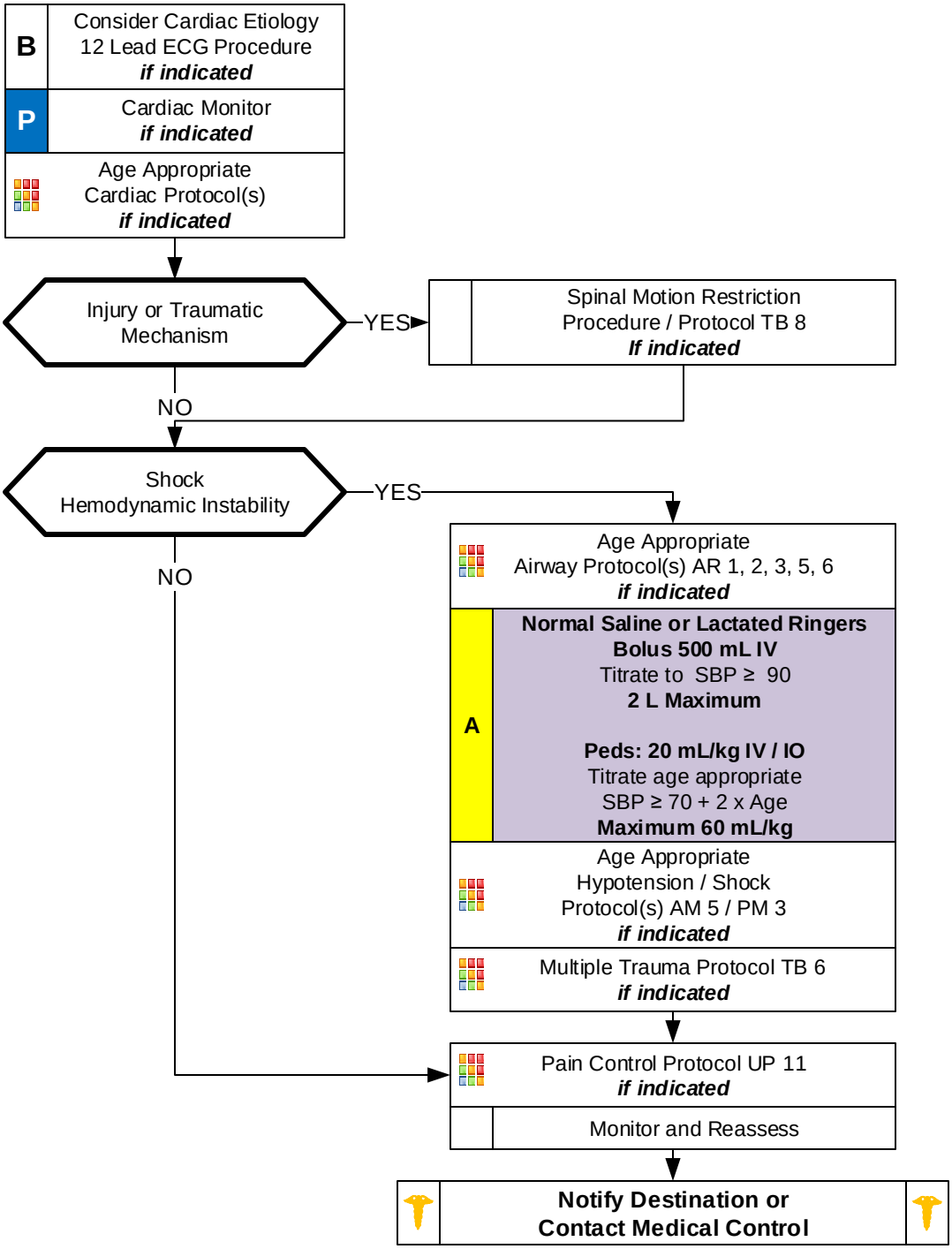
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro.**
- **AMS may present as a sign of an environmental toxin or Haz-Mat exposure - protect personal safety.**
- **General:**
  - **The patient with AMS poses one of the most significant challenges.**
  - **A 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



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.

Behavioral

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

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

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

Call for help / additional resources
Stage until scene safe

Blood Glucose Analysis Procedure

Age Appropriate Diabetic Protocol AM 3 / PM 2 if indicated

Altered Mental Status Protocol UP 4
Overdose / Toxic Ingestion Protocol TE 7 if indicated

Head Trauma Protocol TB 5
Multiple Trauma Protocol TB 6 if indicated

Excited Delirium Syndrome
Paranoia, disorientation, hyper-aggression, hallucination, tachycardia, increased strength, hyperthermia

YES

Consider Restraint Physical Procedure

Monitor per restraint procedure ***if indicated***

A IV / IO Procedure

P
Age ≥ 12
Geodon 10 – 20 mg IM only
Use half doses for age ≥65

Midazolam 2.5 mg IV / IO / IN
5 mg IM
Consider half dose for Age ≥ 65
Peds: 0.1 – 0.2 mg/kg
IV / IO / IM / IN
Repeat every 2-3 minutes as needed
Maximum 10 mg
or
Ativan 2mg IV
May repeat every 5 min x2
Max 6mg
Peds: 0.1 mg/kg
Max 0.3 mg/kg

NO

Aggressive, Violent, Agitation

Threat to Self / others
Setting of Psychosis

YES

NO

P Evaluation and Screening Mental Health and Substance Use Protocol

Triage and Alternative Destination
Mental Health / Substance Abuse
If available

P
Midazolam 2.5 mg IV / IO / IN
5 mg IM
Consider half dose for Age ≥ 65
Peds: 0.1 – 0.2 mg/kg
IV / IO / IM / IN
Repeat every 2-3 minutes as needed
Maximum 10 mg
or
Ativan 2mg IV
May repeat every 5 min x2
Max 6mg
Peds: 0.1 mg/kg
Max 0.3 mg/kg

A
IV / IO Procedure
Preferably 2 large bore

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

External Cooling Measures

Consider Restraint Physical Procedure

Monitor per restraint procedure ***if indicated***

P Cardiac Monitor

Monitor and Reassess

Notify Destination or Contact Medical Control

Universal Protocol Section

Behavioral

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

General:
Behavioral emergencies may be precipitated by an underlying medical condition even with known psychiatric disease.
Be vigilant in your assessment to make sure an underlying medical condition is not the cause, but assume medical condition is precipitating cause.
Psychosis may include head trauma, hypoglycemia, acute intoxication, sepsis, CNS insult, hypoxia and ingestions. Psychosis and delirium may be very difficult to distinguish. **Search patient to ensure no weapons even if law enforcement has done so.**

Use SAFER model:

Stabilize the situation by containing and lowering the stimuli (remove unnecessary personnel, remove patient from stress, reassure, calm and establish rapport.) Position yourself between patient and an exit. Keep hands in front of your body (non-threatening posture.) Only one provider should communicate with patient. Outline the patient's choices and calmly set some boundaries of acceptable behavior.
Assess and acknowledge crisis
Facilitate resources (Friends, family, police, chaplain)
Encourage patient to use resources available and take actions in their best interest
Recovery or referral: Patient in care of responsible person, professional or transport to medical facility.

Physical Restraints:
Patient must be out of control and posing a threat to themselves or others.
Use minimum necessary force required for patient control must be done in a way not to inflict harm upon the patient.
Position of patient must not impede airway or breathing. This should be done supine or lateral with one arm raised above the head. Need minimum of 5 providers: Team Leader controls head and 1 provider for each extremity.
Restraints must not impede circulation. **Do not restrain patient in prone position.** Do not allow patient to continue to struggle against restraint: This can cause life threatening condition. Contact Medical Control if necessary for Chemical restraint advice.

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

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

Universal Protocol Section

Pearls

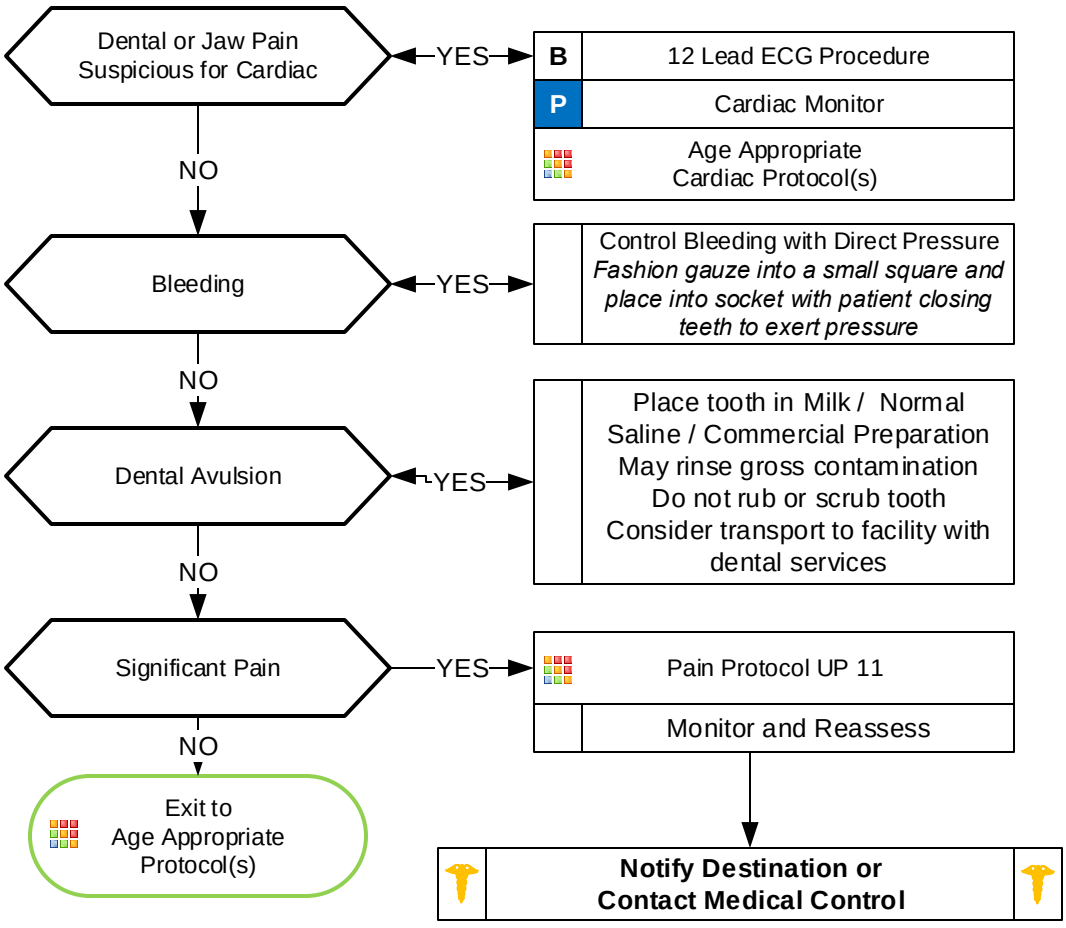
- **Recommended Exam: Mental Status, Skin, Heart, Lungs, Neuro**
- **Crew / responders safety is the main priority.**
- **Any patient who is handcuffed or restrained by Law Enforcement and transported by EMS must be accompanied by law enforcement in the ambulance.**
- **Consider Haldol or Ziprasidone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

Dental Problems

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

Signs and Symptoms
- Bleeding
- Pain
- Fever
- Swelling
- Tooth missing or fractured

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



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

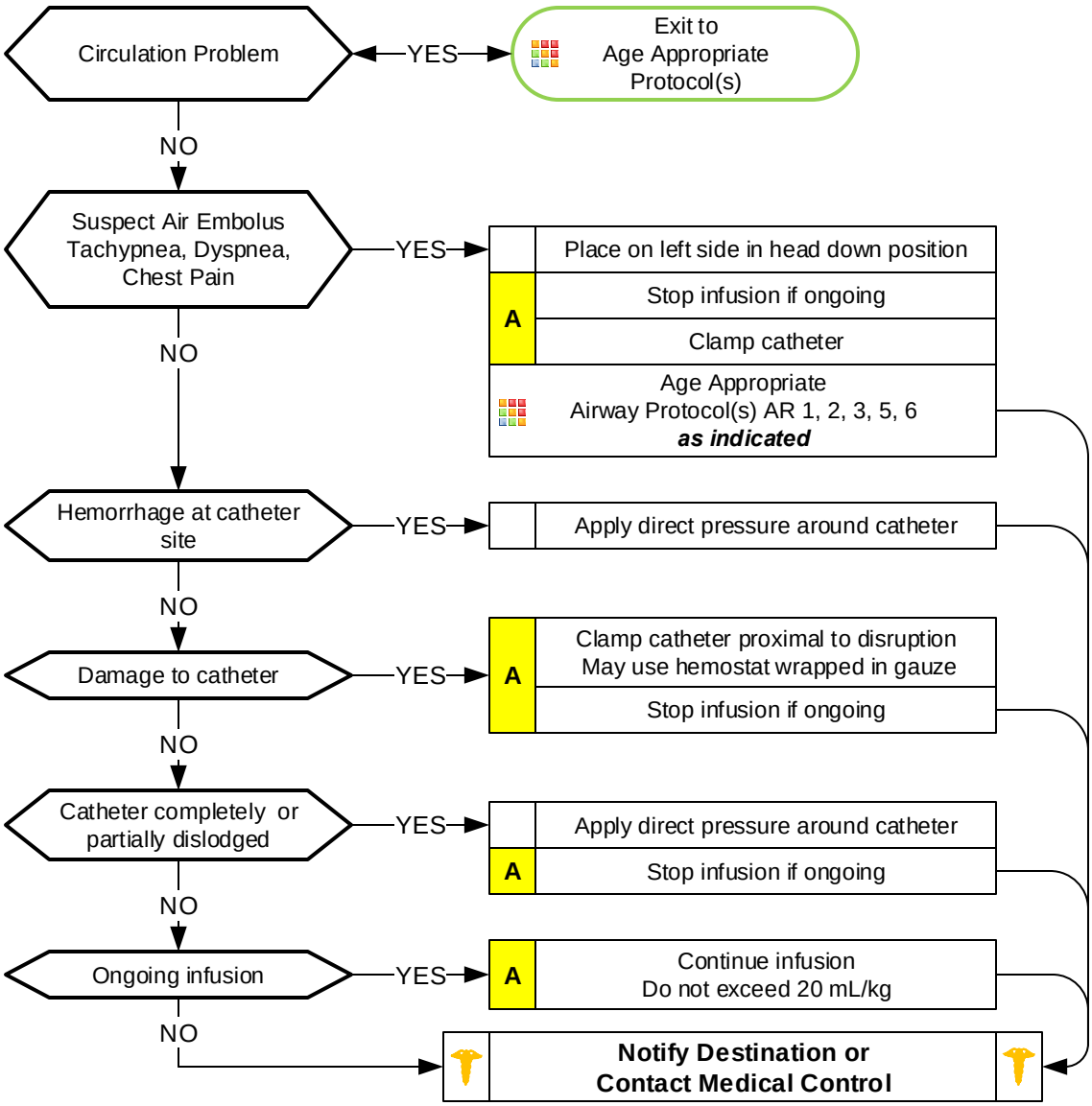
- Central Venous Catheter Type
  - Tunneled Catheter (Broviac / Hickman)
  - PICC (peripherally inserted central catheter
  - Implanted catheter (Mediport / Hickman)
- Occlusion of line
- Complete or partial dislodge
- Complete or partial disruption

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

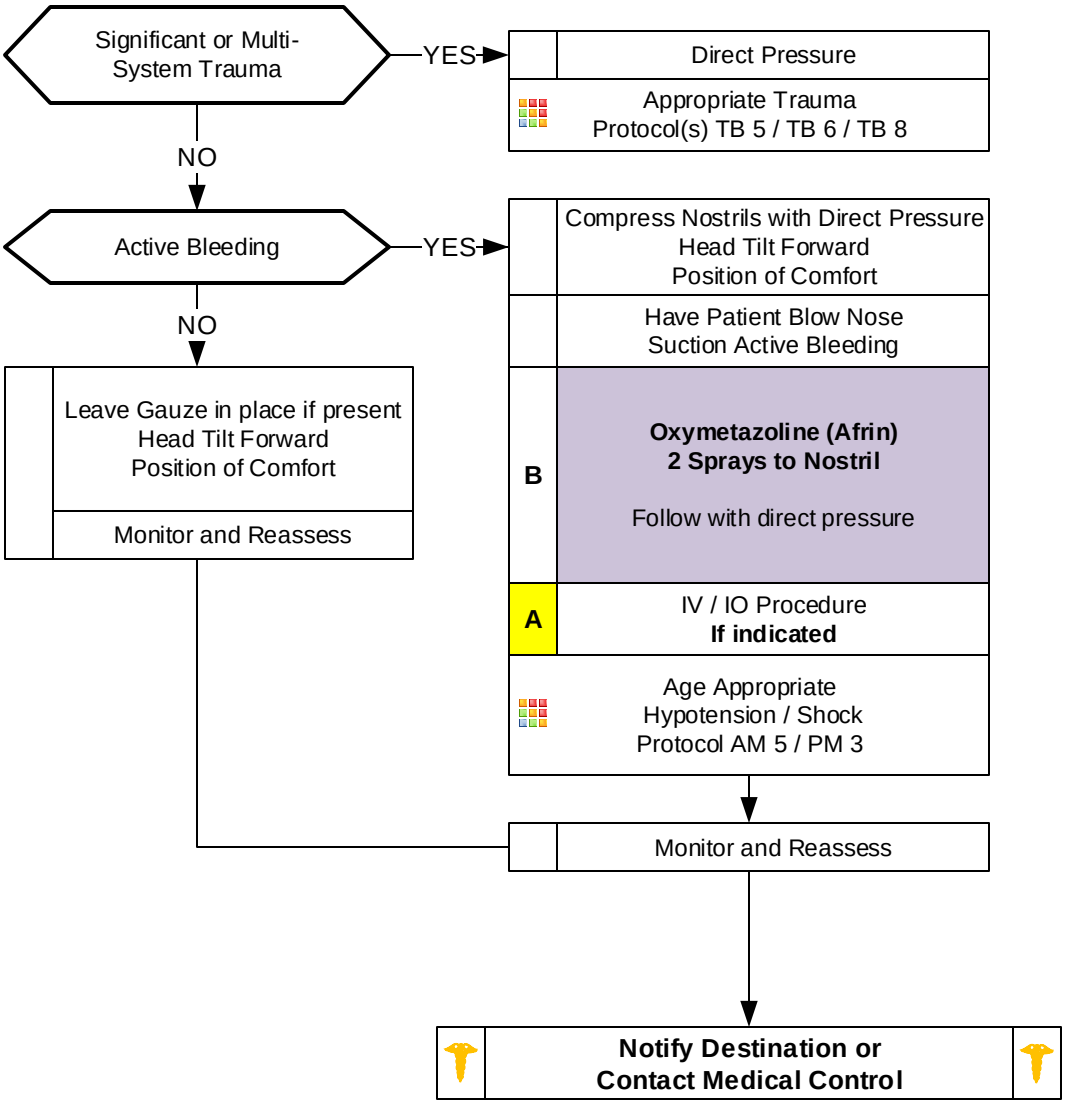
- **Always talk to family / caregivers as they have specific knowledge and skills.**
- **Use strict sterile technique when accessing / manipulating an indwelling catheter.**
- **Cardiac arrest: May access central catheter and utilize if functioning properly.**
- Do not attempt to force catheter open 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

	Contact, Droplet, and Airborne Precautions
B	Temperature Measurement Procedure ***if available***
A	IV / IO Procedure ***If indicated***

Temperature ≥ 100.4° F (38° C)

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

YES →

B	**Pediatric Ibuprofen 10 mg / kg PO** (if age > 6 months) **Adult Ibuprofen 400 – 600 mg PO** And / Or **Pediatric Acetaminophen 15 mg / kg PO** **Adult Acetaminophen 325 – 1000 mg PO**

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

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

Pain Control

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

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

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

Enter from
Protocol based on **Specific Complaint**

Assess Pain Severity

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

Mild

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

Moderate to Severe

A	IV / IO Procedure
P	Cardiac Monitor
P	**Fentanyl 100 mcg IV / IO / IM / IN** May repeat every 5 minutes **Maximum 300 mcg** **Peds: 1 mcg/kg IV / IO / IM / IN** May repeat 0.5 mg/kg every 5 minutes **Maximum 2 mcg/kg** Or **Morphine 4 mg IV / IO / IM** May repeat **2 mg** every 5 minutes **Maximum 10 mg** **Peds: 0.1 mg/kg IV / IO / IM** May repeat every 5 minutes **Maximum 0.3 mg/kg** Pediatric single dose should not exceed adult single dose
	Monitor and Reassess Every 10 minutes following administration

Monitor and Reassess

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:

1. 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 sledge hammer. 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 the 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 an 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. Vitals signs and pain scale will be documented before and after each dose administered.

Universal Protocol Section

Pearls

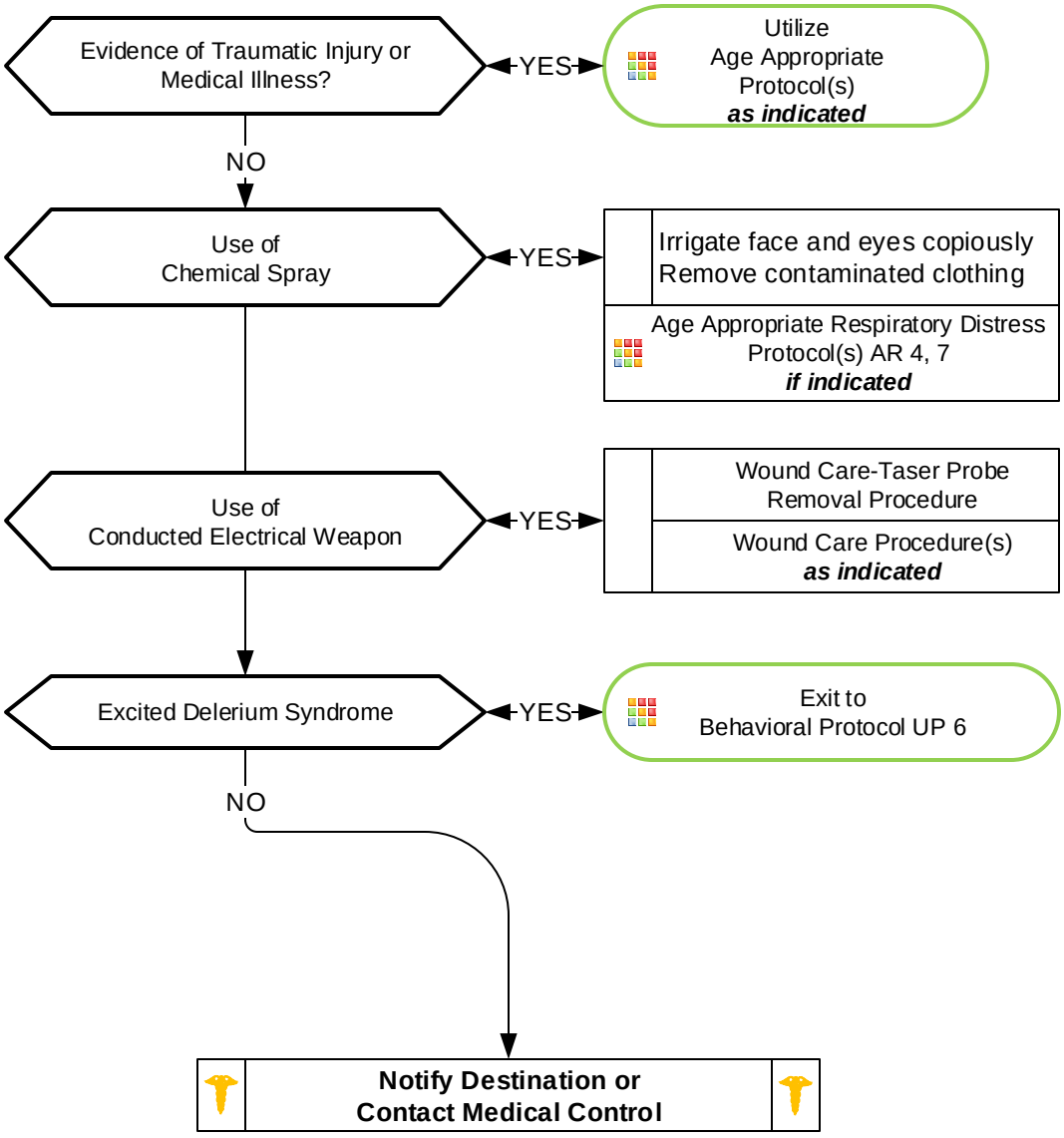
- **Recommended Exam: Mental Status, Area of Pain, Neuro**
- **Pain severity (0-10) is a vital sign to be recorded before and after PO, IV, IO or IM medication delivery and at patient hand off. Monitor BP closely as sedative and pain control agents may cause hypotension.**
- **Both arms of the treatment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

Police Custody

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

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

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



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

- **Patient does not have to be in police custody or under arrest to utilize this protocol.**
- **Local EMS agencies should formulate a policy with local law enforcement agencies concerning patients requiring EMS and Law Enforcement simultaneously. Agencies should work together to formulate a disposition in the best interest of the patient.**
- **Patients restrained by law enforcement devices must be transported accompanied by a law enforcement officer in the patient compartment who is capable of removing the devices. However, when rescuers have utilized restraints in accordance with Restraint Procedure, the law enforcement agent may follow behind the ambulance during transport.**
- **All patients who receive either physical or chemical restraint must be continuously observed by ALS personnel on scene or immediately upon their arrival.**
- The responsibility for patient care rests with the highest authorized medical provider on scene per North Carolina law.
- If an asthmatic patient is exposed to pepper spray and released to law enforcement, all parties should be advised to immediately contact EMS if wheezing/difficulty breathing occurs.
- All patients with decision-making capacity in police custody retain the right to participate in decision making regarding their care and may request care or refuse care of EMS.
- If extremity / chemical / law enforcement restraints are applied, follow Restraint Procedure.
- **Consider Haldol or Ziprasidone for patients with history of psychosis or a benzodiazepine for patients with presumed substance abuse.**
- **Haldol is acceptable treatment in pediatric patients ≥ 12 years old. Safety and efficacy is not established in younger ages.**
- **Excited Delirium Syndrome:**

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

  If patient suspected of EDS suffers cardiac arrest, consider a fluid bolus and sodium bicarbonate early.
- Do not position or transport any restrained patient is such a way that could impact the patients respiratory or circulatory status.
- Patients exposed to chemical spray, with or without history of respiratory disease, may develop respiratory complaints up to 20 minutes post exposure.

Seizure

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

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

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

Loosen any constrictive clothing
Protect patient

Blood Glucose Analysis Procedure

Altered Mental Status
Protocol UP 4
if indicated

Behavioral Protocol UP 6
if indicated

A IV / IO Procedure
if indicated

P Cardiac Monitor
if indicated

Active Seizure Activity

YES →

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

Obstetrical Emergency Protocol AO 1
Childbirth Protocol AO 3
if indicated

P

Midazolam 2.5 mg IV / IO / IN
Or 5 mg IM
May repeat every 3 to 5 minutes
Maximum 10 mg
Peds: 0.1 mg/kg IV / IO / IM / IN
Maximum 0.4 mg/kg

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

Pediatric single dose should not exceed adult single dose

NO →

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

Universal Protocol Section

Pearls

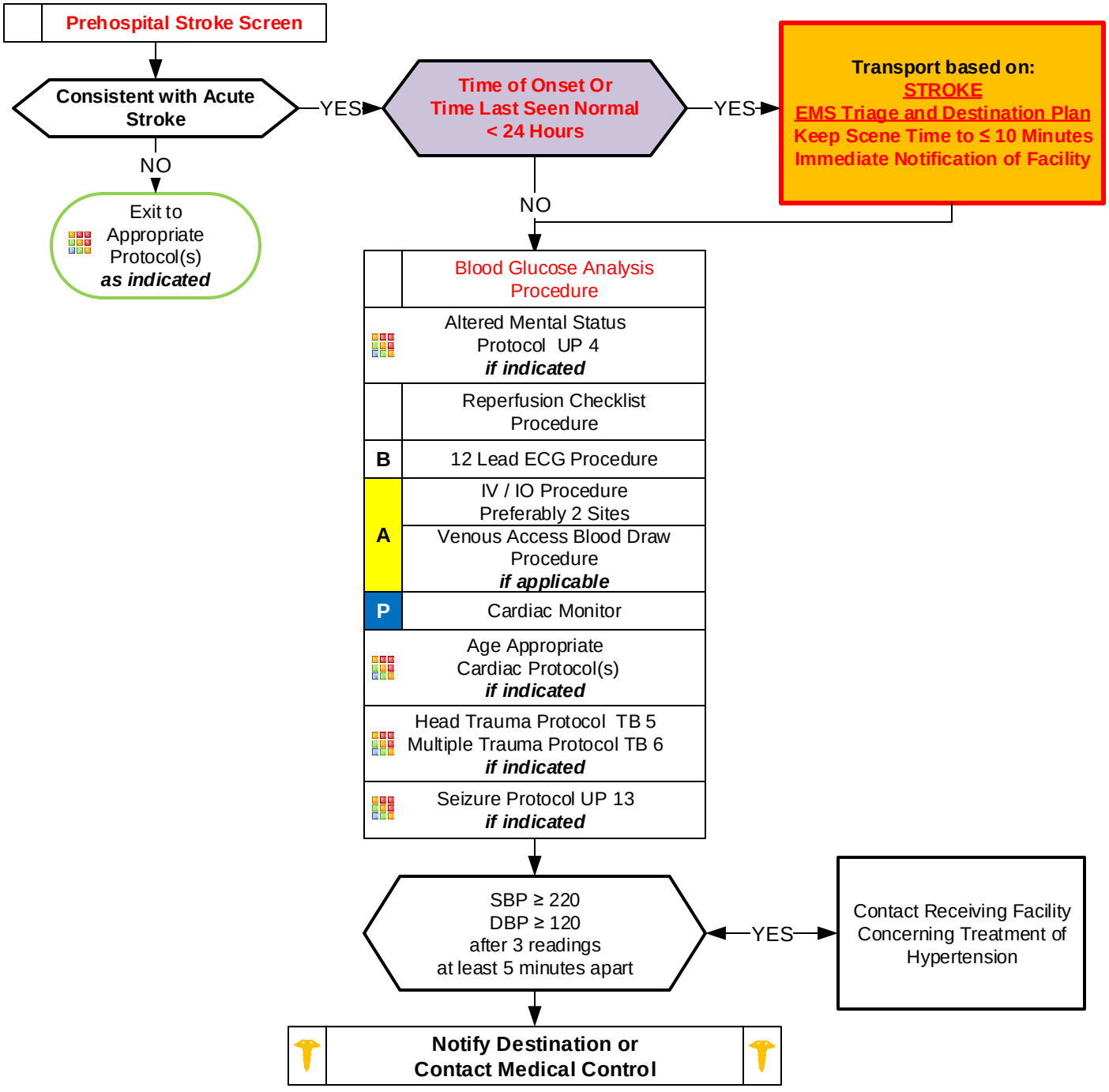
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Extremities, Neuro**
- **Items in Red Text are key performance measures used to evaluate protocol compliance and care**
- **Adult:**
  Midazolam 5 – 10 mg IM is effective in termination of seizures. Do not delay IM administration with difficult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

Suspected Stroke

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

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

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



Universal Protocol Section

Suspected Stroke

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: Mental Status, HEENT, Heart, Lungs, Abdomen, Extremities, Neuro**
- **Items in Red Text are key performance measures used in the EMS Acute Stroke Care Toolkit.**
- **Acute Stroke care is evolving rapidly. Time of onset / last seen normal may be changed at any time depending on the capabilities and resources of your hospital based on Stroke: EMS Triage and Destination Plan.**
- **Time of Onset or Last Seen Normal:**
  - **One of the most important items the pre-hospital provider can obtain, of which all treatment decisions are based.**
  - **Be very precise in gathering data to establish the time of onset and report as an actual time (i.e. 13:47 NOT "about 45 minutes ago.")**
  - **Without this information patient may not be able to receive thrombolytics at facility.**
  - **Wake up stroke: Time starts when patient last awake or symptom free.**
- **You are often in the best position to determine the actual Time of Onset while you have family, friends or caretakers available. Often these sources of information may arrive well after you have delivered the patient to the hospital. Delays in decisions due to lack of information may prevent an eligible patient from receiving thrombolytics.**
- **The Reperfusion Checklist should be completed for any suspected stroke patient. With a duration of symptoms of less than** 24 hrs **, scene times should be limited to ≤ 10 minutes, early notification / activation of receiving facility should be performed and transport times should be minimized.**
- **If possible place 2 IV sites.**
- **Blood Draw:**
  - **Many systems utilize EMS venous blood samples. Follow your local policy and procedures.**
- The differential listed on the Altered Mental Status Protocol should also be considered.
- Be alert for airway problems (swallowing difficulty, vomiting/aspiration).
- Hypoglycemia can present as a localized neurologic deficit, especially in the elderly.
- Document the Stroke Screen results in the PCR.
- Agencies may use validated pre-hospital stroke screen of choice.
- **Pediatrics:**
  - Strokes do occur in children, they are slightly more common in ages < 2, in boys, and in African-Americans. Newborn and infant symptoms consist of seizures, extreme sleepiness, and using only one side of the body. Children and teenagers symptoms may consist of severe headaches, vomiting, sleepiness, dizziness, and/or loss of balance or coordination.

Suspected Sepsis

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

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

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

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

Consider: Contact, Droplet, and Airborne Precautions

Temperature Measurement Procedure ***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 / IO Procedure ***If indicated***

P Cardiac Monitor and EtCO2

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
EtCO2 < 25 mmHg

Pediatrics SIRS Criteria
Temperature
Same as adult

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

A
NS or LR 1L Bolus
Repeat **1L Bolus**
Maximum 30 mL/kg
Max 500mL for CHF

Peds: 20 mL/kg IV / IO
Repeat as needed x2
Titrate to Age Appropriate SBP ≥ 70 + 2 x Age
Maximum 60 mL/kg

P
If SBP < 90 or MAP < 65 in adult consider drip or push dose pressors
(see Page 2 for mixing instructions)
HR<120
Epinephrine:
4 - 8 mcg every 5 min
HR>120
Phenylephrine:
50 - 100 mcg every 5 min

Age Appropriate Hypotension / Shock Protocol AM 5 / PM 3

MAP
(Mean Arterial Pressure)

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

Notify Destination or Contact Medical Control

Universal Protocol Section

Suspected Sepsis

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 / IO Procedure
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**

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 x2 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

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 is increased heart rate. Tachycardia increases as dehydration becomes more severe. Patient is very unlikely to be significantly dehydrated if heart rate is close to normal, unless they are on a beta blocker.**
- Syncope with no preceding symptoms or event may be associated with arrhythmia.
- Assess for signs and symptoms of trauma if associated or questionable fall with syncope.
- Consider dysrhythmias, GI bleed, ectopic pregnancy, and seizure as possible causes of syncope.
- These patients should be transported. Patients who experience syncope associated with headache, neck pain, chest pain, abdominal pain, back pain, dyspnea, or dyspnea on exertion need prompt medical evaluation.
- More than 25% of geriatric syncope is cardiac dysrhythmia based.

Adult Medical Protocol Section

AM 1 Allergic Reaction / Anaphylaxis

AM 2 Diabetic; Adult

AM 3 Dialysis / Renal Failure

AM 4 Hypertension

AM 5 Hypotension / Shock

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*	MODERATE *2 + Body Systems*	SEVERE *2 + Body Systems + hypotension* *Or Isolated Hypotension*
Diphenhydramine **25 - 50 mg PO**	**Epinephrine 1:1000 IM** **0.3 – 0.5 mg** ***if available***	**Epinephrine 1:1000 IM** **0.3 – 0.5 mg** ***if available***
A: IV Procedure ***if indicated***	**Diphenhydramine** **25 - 50 mg PO** *See Pearls*	B: **Albuterol 2.5 – 5 mg** Nebulizer Repeat as needed x 3 ***if indicated***
A: **Diphenhydramine** **25 - 50 mg IV / IM / IO** *If not already given PO*	B: **Albuterol Nebulizer** **2.5 – 5 mg** Repeat as needed x 3 ***if indicated***	Airway Protocol(s) AR 1 - 4 ***if indicated***
	A: IV / IO Procedure	Hypotension / Shock Protocol AM 5 ***if indicated***
B: Monitor and Reassess Monitor for Worsening Signs and Symptoms	A: **Diphenhydramine** **25 - 50 mg IV / IM / IO** *if not already given PO*	A: IV / IO Procedure
		A: **Normal Saline Bolus** **500 mL IV / IO** Repeat as needed **Maximum 2 Liters**
		P: No improvement with IM Epinephrine **Epinephrine IV / IO** See page 2
		If hypotension resolves
		P: **Diphenhydramine** **25 - 50 mg IV / IM / IO**
		P: **Methylprednisolone** **125 mg IV / IO**

Notify Destination or Contact Medical Control

Adult Medical Protocol Section

Allergic Reaction / Anaphylaxis

Adult Medical Protocol Section

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.
- **EMT may administer diphenhydramine by oral route only and may administer from EMS supply**. Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency Medical Director may require contact of medical control prior to EMT / EMR administering any medication.
- The shorter the onset from exposure to symptoms the more severe the reaction.

Diabetic; Adult

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

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

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

	Blood Glucose Analysis Procedure
B	12 Lead ECG Procedure ***if indicated***
A	IV / IO Procedure
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 ***if indicated***
	Hypotension / Shock Protocol AM 5 ***if indicated***
	Suspected Stroke Protocol UP 14 ***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 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 Bolus** **500 mL IV / IO** May repeat as needed **Then infuse 150 mL / hr**

	Monitor and Reassess Every 5 minutes Until Blood Glucose ≥ 80 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 or oral glucose 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

Cardiac Arrest → YES

P: **Calcium Gluconate 2 gm IV / IO (Or Calcium Chloride 1 gm IV / IO)**; **Sodium Bicarbonate 50 mEq IV / IO**

→ Exit to Appropriate Cardiac Protocol(s) ***as indicated***

NO

Shunt / Fistula Bleeding → YES

- **Apply firm finger tip pressure to bleeding site**
- Apply dressing but avoid bulky dressing
- Dressing must not compress fistula / shunt as this will cause clotting of the shunt

NO

- Blood Glucose Analysis Procedure
- Diabetic Protocol AM 2 ***as indicated***
- B: 12 Lead ECG Procedure
- A: IV / IO Procedure
- P: Cardiac Monitor
- CHF / Pulmonary Edema Protocol AC 5 ***as indicated***

NO

Systolic Blood Pressure < 90 → YES

A: **Normal Saline Bolus 250 mL** Repeat as needed **Maximum 1 L** *If lungs remain clear*

Hypotensive / Shock Protocol AM 5 ***as indicated***

NO

Peaked T Wave / Wide complex bradycardia / QRS ≥ 0.12 sec → YES

P: **Calcium Gluconate 2 gm IV / IO (Or Calcium Chloride 1 gm IV / IO)**; **Sodium Bicarbonate 50 mEq IV / IO**; **Albuterol Nebulizer 10 mg**

NO

Notify Destination or Contact Medical Control

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

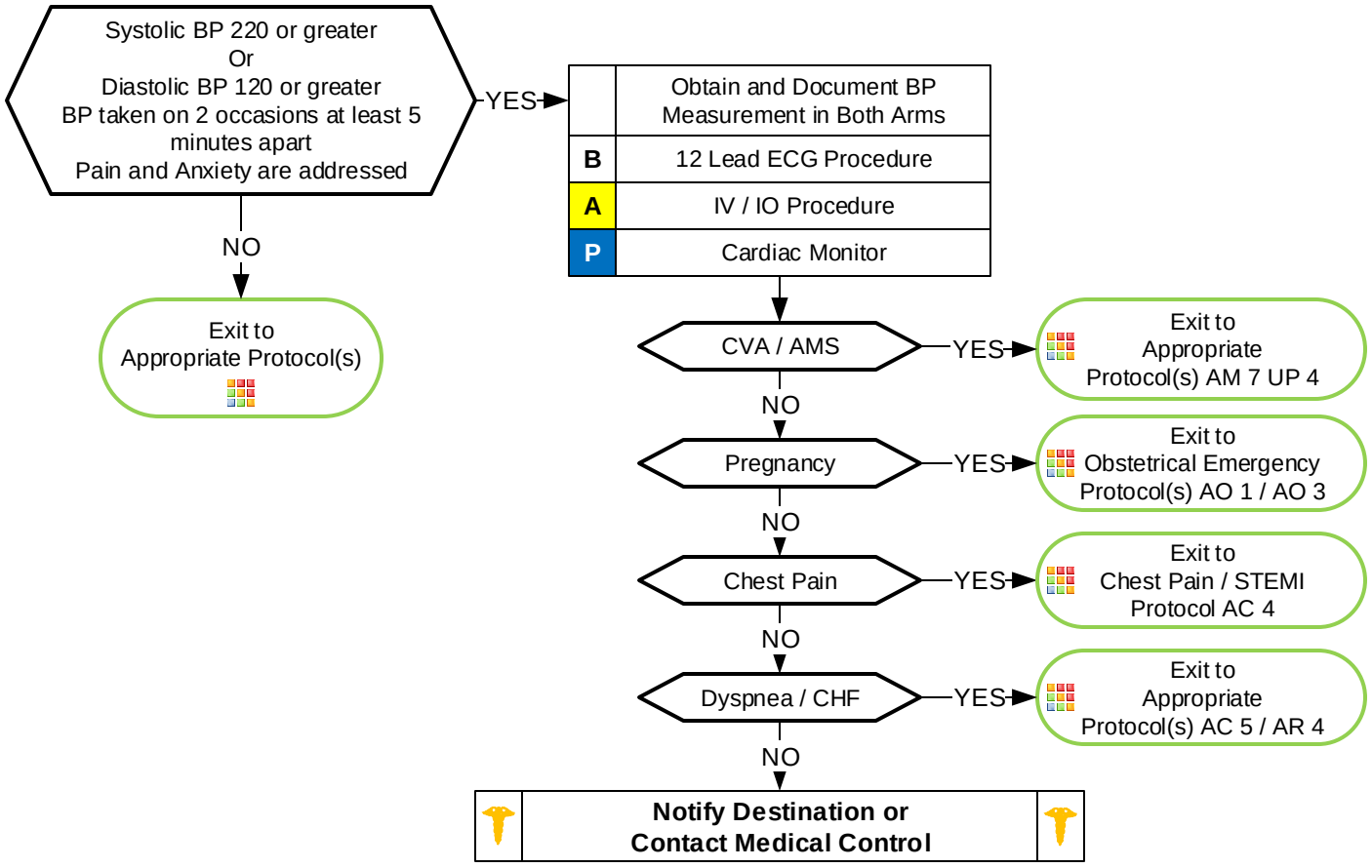
History
- Documented Hypertension
- Related diseases: Diabetes; CVA; Renal Failure; Cardiac Problems
- Medications for Hypertension
- Compliance with Hypertensive Medications
- Erectile Dysfunction medications
- Pregnancy

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
- Pulmonary Edema

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 / IO Procedure
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***

SBP ≥ 90 mmHg

YES

NO

A	**Normal Saline Bolus 250 mL IV / IO** Repeat x 2 doses to effect SBP > 90 **500 mL Maximum**
P	**Epinephrine 1 - 10 mcg / min IV / IO** To effect SBP > 90

Hypovolemic / **Distributive**

	Allergy Protocol AM 1 ***if indicated***
	Suspected Sepsis Protocol UP 14 ***if indicated***
	Multiple Trauma Protocol TB 6 ***if indicated***

A	**Normal Saline Bolus 500 mL IV** Repeat to effect SBP > 90 **2 L Maximum**
P	**See page 2 Push dose regimen**
P	**Epinephrine drip 1 - 10 mcg / min IV / IO** To effect SBP > 90

Obstructive

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

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 and/or HR > 110 with suspected hemorrhage / shock / early shock.
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.**

Adult Cardiac Protocol Section

AC 1 Adult Asystole / Pulseless Electrical Activity

AC 2 Bradycardia; Pulse Present

AC 3 Cardiac Arrest; Adult

AC 4 Chest Pain: Cardiac and STEMI

AC 5 CHF / Pulmonary Edema

AC 6 Adult Tachycardia Narrow Complex (0.11 sec) Regular Rhythm

AC 7 Adult Tachycardia Wide Complex (> 0.12 sec) Regular Rhythm

AC 8 Ventricular Fibrillation Pulseless Ventricular Tachycardia

AC 9 Post Resuscitation

AC 11 Team Focused CPR

AC 12 On Scene Resuscitation Termination of CPR (Optional)

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 200 compressions (sooner if fatigued)
(Limit changes / pulse checks 5 - 10 seconds)

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

AED Procedure ***if available***

Search for Reversible Causes

P Consider Chest Decompression Procedure

P Cardiac Monitor

A IV / IO Procedure

A **Epinephrine (1:10,000) 1 mg IV / IO**
First Dose: Then Follow Dosing Regimen Below

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

Adult Rhythm Appropriate Protocol(s) ***as indicated***

P **<u>At 5 minutes from initial Epinephrine Dose</u>**
Second Dose: Epinephrine (1:10,000) 1 mg IV / IO

P **<u>At 10 minutes from initial Epinephrine Dose</u>**
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

<u>Reversible Causes</u>

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 9

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

Transcutaneous Pacing:

- Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

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

A IV / IO Procedure

P Cardiac Monitor

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

P **Atropine 0.5 mg IV / IO**
May repeat every 3 – 5 minutes
Maximum 3 mg

P **Epinephrine Push-dose**
4 – 8 mcg IV / IO
Repeat every 5 minutes
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)

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

P Consider Sedation

Midazolam 2.5 mg
IV / IO / IM / IN

Maximum 10 mg

Notify Destination or Contact Medical Control

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.

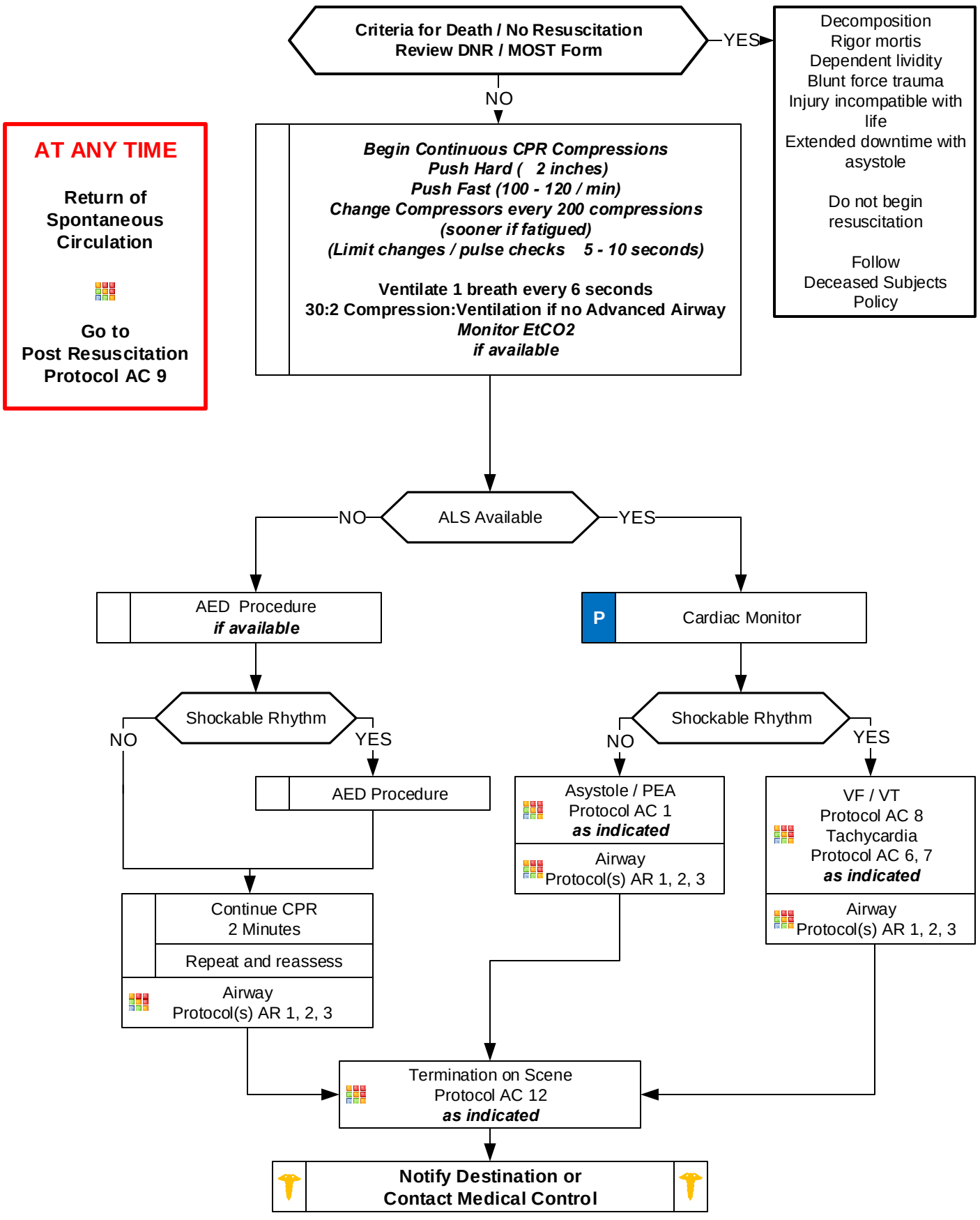
Epinephrine DRIP
Mix 1 mg in 250 mL NS or D5W
Or
2 mg in 500 mL NS or D5W
(4 mcg / mL)

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

Cardiac Arrest; Adult



Adult Cardiac Protocol Section

Cardiac Arrest; Adult

Adult Cardiac Protocol Section

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**.
- **Defibrillation:** Follow manufacture's recommendations concerning defibrillation / cardioversion energy when specified.
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**
  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.
  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.
  Opioid Overdose - Naloxone cannot be recommended in opioid-associated cardiac arrest. If suspected, attention to airway, oxygenation, and ventilation increase in importance. Naloxone is not associated with improved outcomes in cardiac arrest.
  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**
  Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.
- Discussion with Medical Control can be a valuable tool in developing a differential diagnosis and identifying possible treatment options.

Chest Pain: Cardiac and STEMI

History
- Age
- Medications (Viagra / sildenafil, Levitra / vardenafil, Cialis / tadalafil)
- Past medical history (MI, Angina, Diabetes, post menopausal)
- Allergies
- Recent physical exertion
- **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 0.3 / 0.4 mg Sublingual Repeat every 5 minutes x 3 ***if prescribed to patient and (BP 100)***
P	Cardiac Monitor

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

YES →

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

NO ↓

A	IV / IO Procedure
A	**Nitroglycerin 0.3 / 0.4 mg SL** Repeat every 5 minutes as needed
A	If chest pain resolves: **Nitroglycerin Paste** **SPB ≥ 100 mmHg 1 inch** **SPB ≥ 150 mmHg 1.5 inch** **SPB ≥ 200 mmHg 2 inch**
P	**Fentanyl 100 mcg IV / IO / IN / IM** May repeat every 5 minutes as needed **Maximum 300 mcg** Or **Morphine 4 mg IV / IO / IM** May repeat **2 mg** every 5 minutes x3 **Maximum 10 mg**
	Hypotension / Shock Protocol AM 5 ***if indicated***
	CHF / Pulmonary Edema Protocol AC 5 ***if indicated***

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Chest Pain: Cardiac and STEMI

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

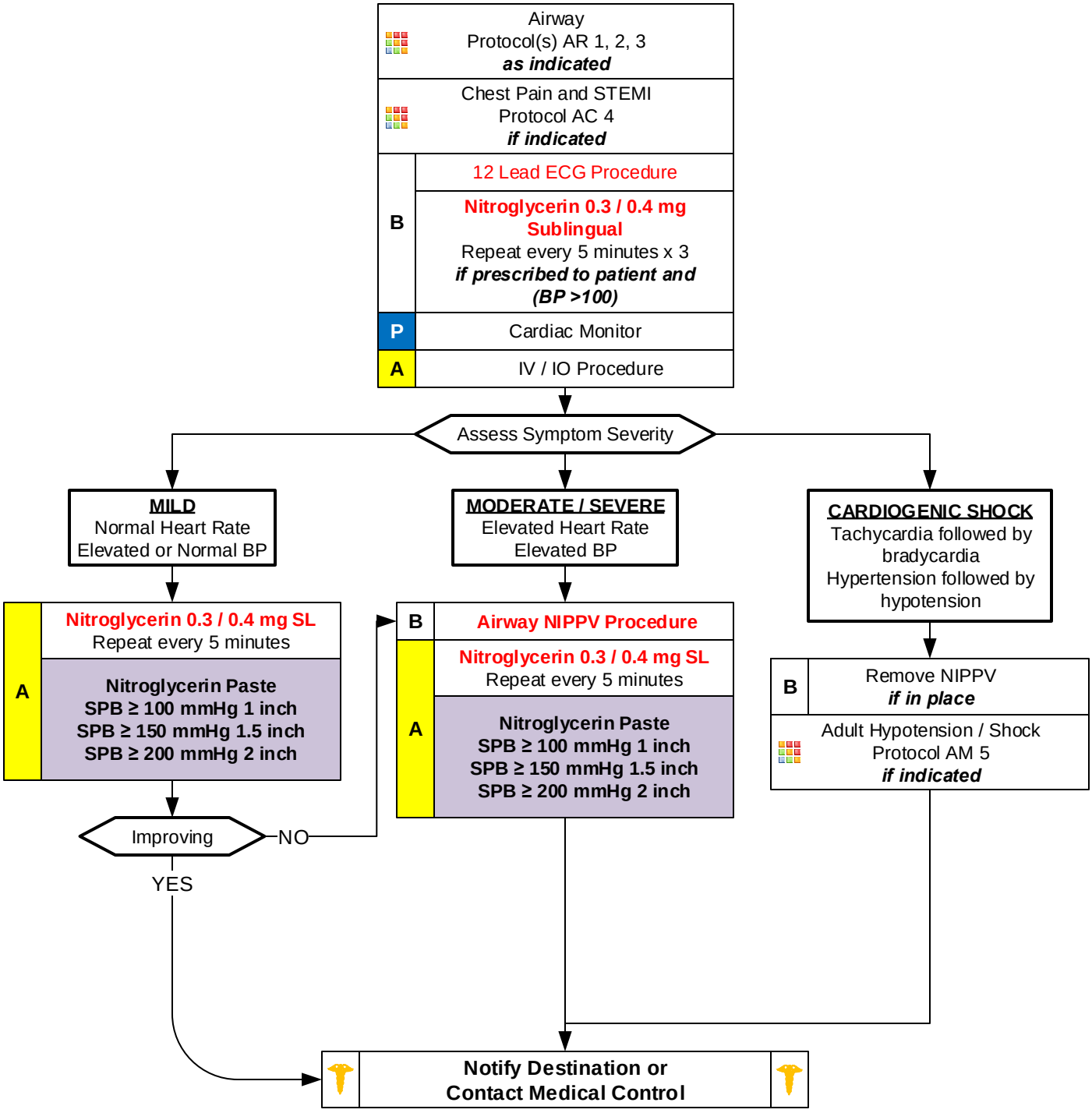
- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Items in Red Text are the key performance indicators for the EMS Acute Cardiac (STEMI) Care Toolkit**
- **Avoid Nitroglycerin in any patient who has used Viagra (sildenafil) or Levitra (vardenafil) in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

CHF / Pulmonary Edema

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

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

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



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

Adult Tachycardia

Narrow Complex (≤ 0.11 sec) REGULAR RHYTHM

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

Narrow and Regular: 100 J

Narrow and Irregular: 100 J

May repeat and increase dose with subsequent cardioversion attempts

Consider Sedation Prior to Cardioversion

Midazolam 2.5 mg IV / IO
May repeat as needed
Maximum 10 mg

Exit to Appropriate Protocol(s) ***if rhythm converts***

NO ↓

B — 12 Lead ECG Procedure

A — IV / IO Procedure

P — Cardiac Monitor

P — Attempt Vagal Maneuvers Procedure

P — **Adenosine 6 mg IV / IO**
Rapid push with flush
May repeat **12 mg IV / IO**
May repeat **12 mg IV / IO**

P — **Normal Saline Bolus**
500 mL IV
Repeat to effect SBP > 90
2 L Maximum

P — **Diltiazem 10 – 20 mg IV / IO**
Over 2 – 3 minutes
Age ≥ 60
Give ½ the dose and give remainder in 5 minutes if SBP ≥ 100 mmHg

May repeat in 5 min if SBP > 100

Single lead ECG able to diagnose and treat arrhythmia

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

RHYTHM CONVERTS

YES → B — 12 Lead ECG Procedure; Monitor and Reassess

NO ↓

Monitor and Reassess

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Adult Tachycardia

Narrow Complex (≤ 0.11 sec) IRREGULAR RHYTHM

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

Narrow and Regular: 100 J

Narrow and Irregular: 100 J

May repeat and increase dose with subsequent cardioversion attempts

Consider Sedation Prior to Cardioversion

Midazolam 2.5 mg IV / IO
May repeat as needed
Maximum 10 mg

Exit to Appropriate Protocol(s) ***if rhythm converts***

NO ↓

B — 12 Lead ECG Procedure

A — IV / IO Procedure

Cardiac Monitor

Attempt Vagal Maneuvers Procedure

P

Normal Saline Bolus
500 mL IV
Repeat to effect SBP > 90
2 L Maximum

Diltiazem 10 – 20 mg IV / IO
Over 2 – 3 minutes
Age ≥ 60
Give ½ the dose and give remainder in 5 minutes if SBP ≥ 100 mmHg

May repeat in 5 min if SBP > 100

Single lead ECG able to diagnose and treat arrhythmia

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

RHYTHM CONVERTS

YES → B — 12 Lead ECG Procedure; Monitor and Reassess

NO ↓

Monitor and Reassess

Notify Destination or Contact Medical Control

Adult Cardiac Protocol Section

Adult Tachycardia
Narrow Complex (≤ 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.

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**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **Rhythm should be interpreted in the context of symptoms.**
- **Unstable condition**
  Condition which acutely impairs vital organ function and cardiac arrest may be imminent.
  If at any point patient becomes unstable move to unstable arm in algorithm.
- **Symptomatic condition**
  Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
  Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs / Symptoms:**
  Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute CHF.
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g. Diltiazem) or Beta Blockers. Use caution with Adenosine and give only with defibrillator available.**
- Typical sinus tachycardia is in the range of 100 to (200 - patient's age) beats per minute.
- **Regular Narrow-Complex Tachycardias:**
  Vagal maneuvers and adenosine are preferred. Vagal maneuvers may convert up to 25 % of SVT.
  Adenosine should be pushed rapidly via proximal IV site followed by 20 mL Normal Saline rapid flush.
  Agencies using both calcium channel blockers and beta blockers should choose one primarily. Giving the agents sequentially requires **Contact of Medical Contro**l. This may lead to profound bradycardia / hypotension.
- **Irregular Tachycardias:**
  First line agents for rate control are calcium channel blockers or beta blockers.
  Agencies using both calcium channel blockers and beta blockers should choose one primarily. Giving the agents sequentially requires **Contact of Medical Control**. This may lead to profound bradycardia / hypotension.
  Adenosine may not be effective in identifiable atrial fibrillation / flutter, yet is not harmful and may help identify rhythm.
  Amiodarone may be given in CHF, risk of rhythm conversion in patients with arrhythmia > 48 hours.
- **Synchronized Cardioversion:**
  Recommended to treat UNSTABLE Atrial Fibrillation, Atrial Flutter and Monomorphic-Regular Tachycardia (VT.)
- Monitor for hypotension after administration of Calcium Channel Blockers or Beta Blockers.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention

Adult Tachycardia

Wide Complex (≥0.12 sec) REGULAR RHYTHM

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

YES →

P	Cardioversion Procedure
	Wide and Regular: 200 J
	Wide and Irregular: 200 J (Not Synchronized)
	May repeat and increase dose with subsequent cardioversion attempts
	Consider Sedation Prior to Cardioversion
	Midazolam 2.5 mg IV / IO **5 mg IN** May repeat as needed **Maximum 10 mg**

NO ↓

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

↓

REGULAR RHYTHM and Monomorphic QRS Complex

NO → (skip to Consider consultation with medical control if patient is stable)

YES ↓

P	**Adenosine 6 mg IV / IO** Rapid push with flush May repeat **12 mg IV / IO** May repeat **12 mg IV / IO**

↓

P	**Amiodarone** **150 mg in 100mL D5W IV / IO** Give over 10 min May repeat x1 dose if needed If rhythm converts start drip **Amiodarone** **300 mg in 250 mL of D5W** **At 1 mg/min (50 drips per min)** Or **Lidocaine 1 mg / kg IV / IO** **May repeat ½ dose** If rhythm converts start drip **Lidocaine** **2 g in 500 mL NS (4mg/mL)** **1 – 4 mg/min**

↓

P	**Consider consultation with medical control if patient is stable**

↓

Notify Destination or Contact Medical Control

Rate Controlled or Rhythm Conversion

B	12 Lead ECG Procedure

↓

Exit to Appropriate Protocol(s)

Single lead ECG able to diagnose and treat arrhythmia

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

Adult Cardiac Section

Adult Tachycardia

Wide Complex (≥0.12 sec) IRREGULAR RHYTHM

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

YES

P	Cardioversion Procedure
	Wide and Regular: 200 J **Wide and Irregular: 200 J (Not Synchronized)** *May repeat and increase dose with subsequent cardioversion attempts*
	Consider Sedation Prior to Cardioversion **Midazolam 2.5 mg IV / IO** **5 mg IN** May repeat as needed **Maximum 10 mg**

NO

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

IRREGULAR RHYTHM and MONOMORPHIC QRS Complex

P

Amiodarone
150 mg in 100mL D5W IV / IO
Give over 10 min
May repeat x1 dose if needed

If rhythm converts start drip
Amiodarone
300 mg in 250 mL of D5W
At 1 mg/min (50 drips per min)

Or

Lidocaine 1 mg / kg IV / IO
May repeat ½ dose

If rhythm converts start drip
Lidocaine
2 g in 500 mL NS (4mg/mL)
1 – 4 mg/min

Exit to
Appropriate Protocol(s)
if rhythm converts

P **Consider consultation with medical control if patient is stable**

Notify Destination or Contact Medical Control

IRREGULAR RHYTHM and POLYMORPHIC QRS Complex

Exit to
Adult Ventricular Fibrillation
Pulseless Ventricular Tachycardia
and
Adult Cardiac Arrest Protocol(s)

Rate Controlled or Rhythm Conversion

B	12 Lead ECG Procedure

Exit to
Appropriate
Protocol(s)

Single lead ECG able to diagnose and treat arrhythmia

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

Adult Cardiac Section

Adult 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

Intranasal Midazolam Dose:
Refer to Protocol AC-6

Pearls

- **Recommended Exam: Mental Status, Skin, Neck, Lung, Heart, Abdomen, Back, Extremities, Neuro**
- **Most important goal is to differentiate the type of tachycardia and if STABLE or UNSTABLE and SYMPTOMATIC.**
- **Rhythm should be interpreted in the context of symptoms**
- **Unstable condition**
  - **Condition which acutely impairs vital organ function and cardiac arrest may be imminent.**
  - **If at any point patient becomes unstable move to unstable arm in algorithm.**
- **Symptomatic condition**
  Arrhythmia is causing symptoms such as palpitations, lightheadedness, or dyspnea, but cardiac arrest is not imminent.
  Symptomatic tachycardia usually occurs at rates ≥ 150 beats per minute. Patients symptomatic with heart rates < 150 likely have impaired cardiac function such as CHF.
- **Serious Signs / Symptoms:**
  Hypotension. Acutely altered mental status. Signs of shock / poor perfusion. Chest pain with evidence of ischemia (STEMI, T wave inversions or depressions.) Acute congestive heart failure.
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- **If patient has history or 12 Lead ECG reveals Wolfe Parkinson White (WPW), DO NOT administer a Calcium Channel Blocker (e.g., Diltiazem) or Beta Blockers. Use caution with Adenosine and give only with defibrillator available.**
- **Search for underlying cause of tachycardia such as fever, sepsis, dyspnea, etc.**
- Typical sinus tachycardia is in the range of 100 to (220 – patients age) beats per minute.
- **Regular Wide-Complex Tachycardias:**
  Unstable condition:
  Immediate defibrillation if pulseless and begin CPR.
  Stable condition:
  Typically VT or SVT with aberrancy. Adenosine may be given if regular and monomorphic and if defibrillator available.
  Verapamil contraindicated in wide-complex tachycardias.
  Agencies using Amiodarone, Procainamide and Lidocaine need choose one agent primarily. Giving multiple anti-arrhythmics requires contact of medical control.
  Atrial arrhythmias with WPW should be treated with Amiodarone or Procainamide
- **Irregular Tachycardias:**
  Wide-complex, irregular tachycardia: Do not administer calcium channel, beta blockers, or adenosine as this may cause paradoxical increase in ventricular rate. This will usually require cardioversion. Contact medical control.
- **Polymorphic / Irregular Tachycardia:**
  This situation is usually unstable and immediate defibrillation is warranted.
  When associated with prolonged QT this is likely Torsades de pointes: Give 2 gm of Magnesium Sulfate slow IV / IO.
  Without prolonged QT likely related to ischemia and Magnesium may not be helpful.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.

Ventricular Fibrillation
Pulseless Ventricular Tachycardia

Cardiac Arrest Protocol AC 3

Begin Continuous CPR Compressions
Push Hard (≥ 2 inches) Push Fast (100 - 120 / min)
Change Compressors every 200 compressions
(*sooner if fatigued*)
(*Limit changes / pulse checks 5 - 10 seconds*)

<u>At the end of each 2 minute cycle</u>
Check AED / ECG Monitor
If shockable rhythm, deliver shock and immediately continue chest compressions

Search for Reversible Causes

A

IV / IO Procedure

Epinephrine (1:10,000) 1 mg IV / IO
First Dose: Then Follow Dosing Regimen Below

<u>Reversible Causes</u>

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol AC 9

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

<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

<u>At 5 minutes from initial Epinephrine Dose</u>
Second Dose: Epinephrine (1:10,000) 1 mg IV / IO

<u>At 10 minutes from initial Epinephrine Dose</u>
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

Refractory after 5 Defibrillations Attempts
Consider Dual Sequential Defibrillation Procedure
if available

Notify Destination or Contact Medical Control

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

Post Resuscitation

Airway
Protocol(s) AR 1, 2, 3, 4
as indicated

Optimize Ventilation and Oxygenation
- Maintain SpO2 ≥ 90%
- Preferably SpO2 ≥ 94%
- Advanced airway if indicated
- Respiratory Rate 8- 10 breaths / minute
- Remove Impedence Threshold Device

DO NOT HYPERVENTILATE

Monitor Vital Signs / Reassess

Blood Glucose Analysis Procedure

B ETCO2 ideally 35 – 45 mm Hg

B 12 Lead ECG Procedure

A IV / IO Procedure

P Cardiac Monitor

Monitor Vital Signs / Reassess

Chest Pain and STEMI
Protocol AC 4
if indicated

Hypotension / Shock
Protocol AM 5
as indicated

Adult Diabetic Protocol AM 2
if indicated

Appropriate Arrhythmia
Protocol(s) AC 2, 6, 7
as indicated

Antiarrhythmic Medication Given and/or defibrillation During Arrest

YES

P Continue Antiarrhythmic Utilized
Refer to Appropriate Arrhythmia Protocol

P
Amiodarone
300 mg in 250mL of D5W
1 mg / min
(50 drips per min)
Or
Lidocaine
2 g in 500 mL NS (4mg/mL)
1 – 4 mg/min

NO

Consider cooling with ice packs in groin, axilla and carotids.

Post Intubation BIAD Management
Protocol AR 8

Notify Destination or Contact Medical Control

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Adult patients with ROSC should be taken to a hospital capable of cardiac catheterization unless the cause of the code is clearly respiratory

Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate Protocol

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. Targeted Temperature Management unless contraindicated – use ice packs to carotids, axillary, and femoral artery locations.
4. 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
5. Identify and treat STEMI
6. 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.

Shivering:

Shivering may occur during cooling.
Shivering can also be seizure activity.
Fentanyl 100 mcg and repeat q 5 minutes to maximum of 500mcg.
Versed in 2.5 mg doses q 5 minutes to a maximum of 10 mg.
Rocuronium 1 mg/kg if no improvement.
Ensure patient is adequately sedated prior to use.
Note any focal activity or seizure-like activity and report to receiving facility.
Rocuronium will mask seizure activity.

- **Pearls**
- **Recommended Exam: Mental Status, Neck, Skin, Lungs, Heart, Abdomen, Extremities, Neuro**
- **Continue to search for potential cause of cardiac arrest during post-resuscitation care.**
- **Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided at all costs. Titrate FiO2 to maintain SpO2 of ≥ 94%.**
- **Initial End tidal CO2 may be elevated immediately post-resuscitation, but will usually normalize. While goal is 35 – 45 mmHg avoid hyperventilation to achieve.**
- Most patients immediately post resuscitation will require ventilatory assistance.
- **Titrate fluid resuscitation and vasopressor administration to maintain SBP of 90 – 100 mmHg or Mean Arterial Pressure (MAP) of 65 – 80 mmHg.**
- **STEMI:**
- **Transport to a primary cardiac catheter facility with evidence of STEMI on 12 Lead ECG.**
- **Targeted Temperature Management:**
- **Maintain core temperature between 32 - 36°C.**
- **Infusion of cold saline is NOT recommended in the prehospital setting.**
- **Consider transport to facility capable of managing the post-arrest patient including hypothermia therapy, cardiology / cardiac catheterization, intensive care service, and neurology services.**
- The condition of post-resuscitation patients fluctuates rapidly and continuously, and they require close monitoring. Appropriate post-resuscitation management may best be planned in consultation with medical control.

Team Focused CPR

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 200 compressions (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

ALS

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

A

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

P

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

Continue Cardiac Arrest Protocol

Utilize this Protocol with

Cardiac Arrest Protocol

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

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

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

Adult Cardiac Section

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:

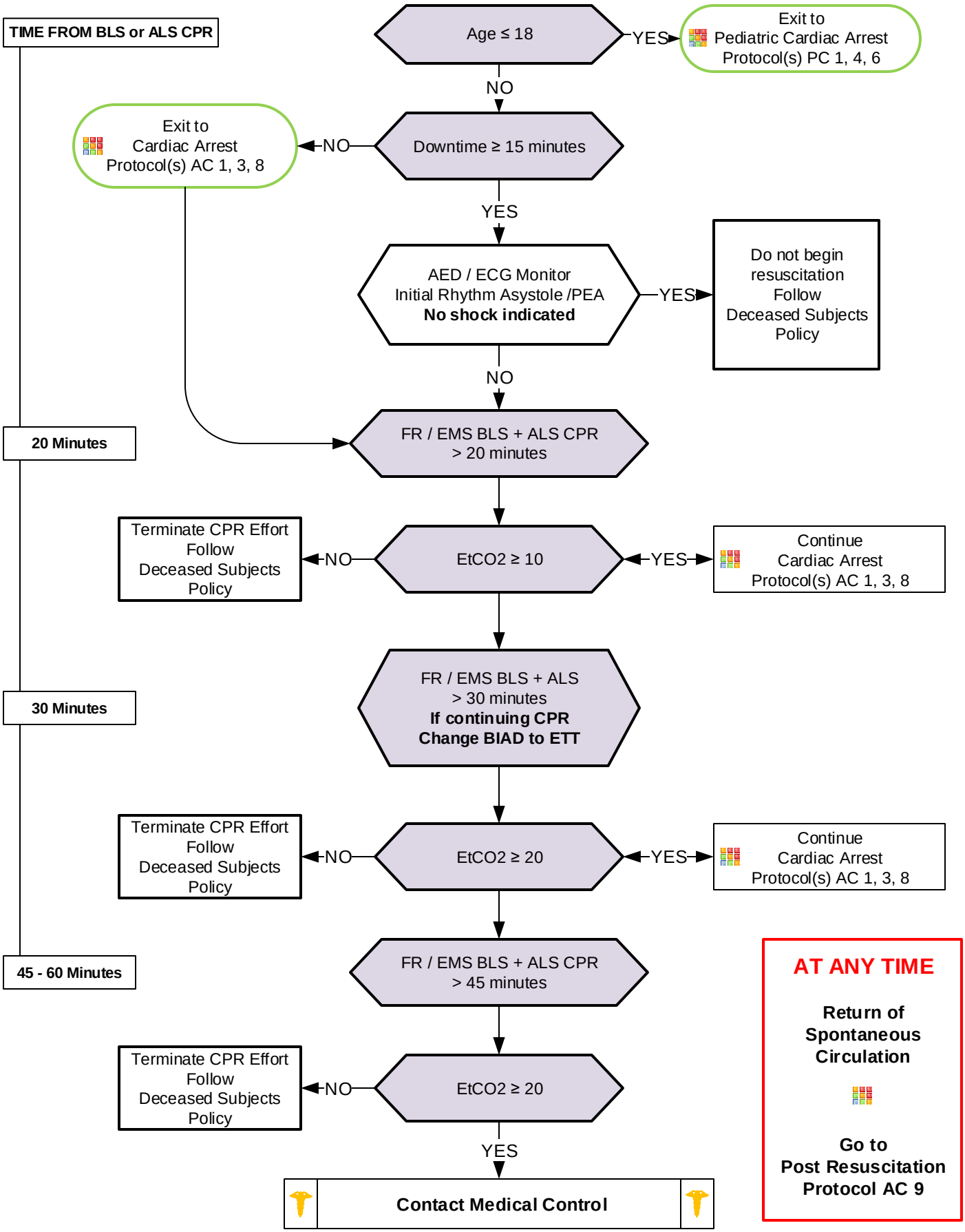
Most important aspect. People don't remember your great intubation or EJ but they will always remember how you interacted with them. Be honest, be straightforward and do not be technical. Begin to gather the information they know and start your explanation from that point. Be very clear the patient is 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; assign responders to predetermined tasks. Refer to optional protocol or development of local agency protocol.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated.**
- **DO NOT HYPERVENTILATE: If no advanced airway (BIAD, ETT) compression to ventilation ratio is 30:2. If advanced airway in place, ventilate 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Passive oxygenation optional in agencies practicing Team Focused Approach / Pit-Crew Approach.** Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work.

On Scene Resuscitation
Termination of CPR (Optional)



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.**

Airway Respiratory Protocol Section

AR 1 Adult Airway

AR 2 Adult, Failed Airway

AR 3 Airway, Drug Assisted (Optional)

AR 4 Adult COPD / Asthma Respiratory Distress

AR 5 Pediatric Airway

AR 6 Pediatric Failed Airway

AR 7 Pediatric Asthma Respiratory Distress

AR 8 Post-intubation / BIAD Management

AR 9 Ventilator Emergencies

AR 10 Tracheostomy Tube Emergencies

Adult Airway

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

YES → Supplemental oxygen
Goal oxygen saturation ≥ 90%
Preferably ≥ 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

Altered Mental Status Protocol UP 4
if indicated

Respiratory Distress with a
Tracheostomy Tube
Protocol AR 10
if indicated

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

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 %
  Preferably ≥ 94 %
- **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:
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.**
- **Intubation Attempt is passing the laryngoscope blade past the teeth or ETT inserted into the nasal passage.**
- **Capnometry or capnography is mandatory with all methods of intubation. Continuous capnography (EtCO2) is strongly recommended for the monitoring of all patients with a BIAD and mandatory with monitoring of an endotracheal tube.**
- **Ventilatory 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.
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- **Nasotracheal intubation: Procedure requires spontaneous breathing and may require considerable time, exposing patient to critical desaturation. Contraindicated in combative, anatomical disrupted or distorted airways, increased ICP, severe facial trauma, basal skull fracture, and head injury. Orotracheal route is preferred.**
- Maintain spinal motion restriction for patients with suspected spinal injury.
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients if available or time allows.
- It is important to secure the endotracheal tube well to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Adult, Failed Airway

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

Unable to Ventilate and Oxygenate ≥ 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

↓

Failed Airway ↔ Call for additional resources if available

↓

BVM
Adjunctive Airway NP / OP
Maintains
Oxygen Saturation ≥ 90 %
Preferably ≥ 94 %

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 % Preferably ≥ 94 %
	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.**
- **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.
- **If first intubation attempt fails, make an adjustment and then consider:**
  - Different laryngoscope blade / Video or other optical laryngoscopy devices
  - Gum Elastic Bougie
  - Different ETT size
  - Change head positioning
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Continuous pulse oximetry should be utilized in all patients with inadequate respiratory function.
- Continuous EtCO2 should be applied to all patients with respiratory failure or to all patients with advanced airways.
- **Notify Medical Control AS EARLY AS POSSIBLE concerning the patient's difficult / failed airway.**
- **DOPE: D**isplaced tracheostomy tube / ETT, **O**bstructed tracheostomy tube / ETT, **P**neumothorax and **E**quipment failure.

Airway, Drug Assisted
(*OPTIONAL*)

Indications for Drug Assisted Airway
Failure to protect the airway
and/or
Unable to oxygenate
and/or
Unable to ventilate
and/or
Impending airway compromise

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

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

Must have two (2) Paramedics on scene

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

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

Hypoxic Or Hypotension Or Dangerously Combative? — YES

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

NO

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

	Consider Restraints Physical Procedure
P	Consider Gastric Tube Insertion Procedure

Awakening or Moving after intubation — NO

YES

Exit to Post-intubation / BIAD Management Protocol AR 8

Notify Destination or Contact Medical Control

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

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

Airway Respiratory Protocol Section

Airway, Drug Assisted
(*OPTIONAL*)

Most important caveat is determining the patient NOT APPROPRIATE for Rapid Sequence Intubation.

High Risk Patients:
Brain illness/injury; Underlying respiratory disease; Underlying cardiac disease; Aortic disease; Obese patients; Pregnant patients; and Age > 55. Patients with anticipated difficult airway who can be managed by basic maneuvers / BVM / CPAP with adequate oxygenation and ventilation may require rapid transport only.
Specifically make sure you assess the difficulty in using a Bag Valve Mask, Laryngoscopy, BIAD, and Cricothyrotomy with each patient.

Preparation:
Assemble and test equipment. Oxygen, BVM, Suction, Laryngoscope, Gum Elastic Bougie, BIAD, Syringes, Medications, and Cricothyrotomy device. Assure large bore IV with 2 sites preferable.

Pre-oxygenate:
Pre-oxygenation should optimally occur during initial assessment. Provide at least 3 minutes of high flow oxygen before rapid sequence intubation. CPAP is an effective means to provide adequate pre-oxygenation.

Sedate and Paralyze:
Give Etomidate or Ketamine first then Succinylcholine or Rocuronium in rapid succession, via rapid IV push with normal saline flushes of 10 mL. Once medications are given DO NOT VENTILATE unless patient de-saturates below 92%: Continue high flow (15 L/min) oxygen by nasal cannula and maintain jaw thrust to keep airway open providing *apneic oxygenation*. Maintain until intubation conditions are reached and you begin your intubation attempt. Optimal condition should be reached in about 30 to 90 seconds. Calculate Etomidate / Succinylcholine according to dosing below:
Etomidate 20 mg = Succinylcholine 100 mg, Etomidate 25 mg = Succinylcholine 150 mg, Etomidate 30 mg = Succinylcholine 200 mg, Etomidate 35 mg = Succinylcholine 250 mg. Etomidate 40 mg = Succinylcholine 300 mg. Round doses to nearest 5 or 10 mg.

Position:
Optimal position is aligning ear canal to sternal notch with face parallel to ceiling. May need to elevate head / torso (pillows or stretcher) in the obese or pregnant patient. If difficulty is anticipated use your stretcher to place the patient's nose at same height as your umbilicus.
Trauma: *Utilize in-line cervical stabilization during intubation, BIAD or BVM use. During intubation or BIAD the cervical collar front should be open or removed to facilitate translation of the mandible / mouth opening. Refer to Protocol AR 2 Adult, Failed Airway.*

Place endotracheal tube into trachea:
Cricoid pressure may worsen your view and may increase risk of aspiration in some patients. Use if it improves your view.
Bimanual laryngoscopy: Use your right hand to externally manipulate the thyroid cartilage and / or head to give you the best glottic view.
Confirm placement of endotracheal tube into glottis by: Direct visualization; Chest rise and fall; Increasing oxygen saturation; End tidal CO2 device.
Maintain continuous waveform capnometry at all times to assure endotracheal tube does not become dislodged.

Post-intubation management:
Give Fentanyl (preferred) for sedation (most agitation arises from pain.) After 2 – 3 doses of Fentanyl then Versed may be uses as well.
Expect transient hypotension immediately following RSI.
Use Vecuronium only after adequate sedation if excessive patient movement is noted. Repeated doses of paralytics are discouraged.

- **Pearls**
- **Agencies must maintain a separate Performance Improvement Program specific to Drug Assisted Airway.**
- **See Pearls section of protocols AR 1 and 2.**
- **This procedure requires at least 2 Paramedics. Divide the workload – ventilate, suction, cricoid pressure, drugs, intubation.**
- **Patients with hypoxia and/or hypotension are at risk of cardiac arrest when a sedative and paralytic medication are administered. Hypoxia and hypotension require resuscitation and correction prior to use of these combined agents. Ketamine allows time for appropriate resuscitation to occur during airway management.**
- **This protocol is only for use in patients who are longer than the Broselow-Luten Tape.**
- **Ketamine may be used during airway management of patients who FIT on the Broselow-Luten Tape with a DIRECT, ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR OR ASSISTANT MEDICAL DIRECTOR ONLY.**
- **KETAMINE:**
  - **Ketamine may be used with and without a paralytic agent in conjunction with either a OP, NP, BIAD or endotracheal tube.**
  - **Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management. Once hypoxia and hypotension are corrected, use of a sedative and paralytic can proceed if indicated.**
  - **Ketamine may be used in the dangerously combative patient requiring airway management IM. IV / IO should be established as soon as possible.**
  - **Ketamine may NOT be used for purposes of sedation only – it must be used only during airway management procedures.**
- **Continuous Waveform Capnography and Pulse Oximetry are required for intubation verification and ongoing patient monitoring, though this is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended in this population.)**
- **Before administering any paralytic drug, screen for contraindications with a thorough neurologic exam.**
- **If First intubation attempt fails, make an adjustment and try again: (Consider change of provider in addition to equipment)**
- **Different laryngoscope blade**
- **Different ETT size**
- **Change head positioning**
- **Change cricoid pressure; No longer routinely recommended and may worsen your view.**
- **Align external auditory canal with sternal notch / proper positioning.**
- **Consider applying BURP maneuver (Back [posterior], Up, and to patient's Right)**
- Paramedics / AEMT should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Protect the patient from self-extubation when the drugs wear off. Longer acting paralytics may be needed post-intubation.
- Drug Assisted Airway is not recommended in an urban setting (short transport) when able to maintain oxygen saturation ≥ 90 %.
- Consider Naso or orogastric tube placement in all intubated patients to limit aspiration and decompress stomach if needed.
- **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) AR 1 - 3 ***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) AR 1 - 3 ***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 ≥ 90%
Preferably ≥ 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 UP 13 ***if indicated***

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 % Preferably ≥ 94 %
- 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

- **For this protocol, pediatric is defined as any patient which can be measured within the Broselow-Luten tape.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of ≥ 90%, it is acceptable to continue with basic airway measures.**
- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **An intubation attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.**
- **Capnometry (color) or capnography is mandatory with all methods of intubation. Document results.**
- **Continuous capnography (EtCO2) is strongly recommended with BIAD or endotracheal tube use though this is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended).**
- **Ventilatory rate: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 - 10 per minute. Maintain a EtCO2 between 35 and 45 and avoid hyperventilation.**
- **Ketamine may be used during airway management of patients who FIT on the Broselow-Luten Tape with a DIRECT, ONLINE MEDICAL ORDER, by the system MEDICAL DIRECTOR OR ASSISTANT MEDICAL DIRECTOR ONLY. Specific use in this population of patients must also be for use in individual agencies by the NC OEMS State Medical Director prior to use.**
- **Agencies utilizing Ketamine must submit a local systems plan to State Medical Director detailing how the drug is used in your program.**
  - **Ketamine may be used with and without a paralytic agent in conjunction with either a OP, NP, BIAD or endotracheal tube.**
  - **Ketamine may be used during the resuscitation of hypoxia or hypotension in conjunction with airway management.**
  - **Ketamine may be used in the dangerously combative patient requiring airway management IM. IV / IO should be established as soon as possible.**
  - **Ketamine may NOT be used for purposes of sedation only – it must be used only during airway management procedures.**
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Needle Procedure:**
  - **Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.**
  - **Very little evidence to support 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 %
Preferably ≥ 94 %

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

Supplemental oxygen
BVM with Airway Adjunts
Maintain Oxygen Saturation ≥ 90 %
Preferably ≥ 94 %

Notify Destination or Contact Medical Control

Airway Respiratory Protocol Section

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

- **For this protocol, pediatric is defined as any patient which can be measured within a Length-based Resuscitation Tape.**
- **If an effective airway is being maintained by BVM with continuous pulse oximetry values of ≥ 90%, it is acceptable to continue with basic airway measures instead of using a BIAD or Intubation.**
- **For the purposes of this protocol a secure airway is when the patient is receiving appropriate oxygenation and ventilation.**
- **An intubation attempt is defined as passing the laryngoscope blade or endotracheal tube past the teeth or inserted into the nasal passage.**
- **Capnometry (color) or capnography is mandatory with all methods of intubation. Document results.**
- **Continuous capnography (EtCO2) is strongly recommended with BIAD or endotracheal tube use though this is not validated and may prove impossible in the neonatal population (verification by two (2) other means is recommended).**
- **Ventilatory rate: 30 for Neonates, 25 for Toddlers, 20 for School Age, and for Adolescents the normal Adult rate of 8 – 10 per minute. Maintain a EtCO2 between 35 and 45 and avoid hyperventilation.**
- **It is strongly encouraged to complete an Airway Evaluation Form with any BIAD or Intubation procedure.**
- **If first intubation attempt fails, make an adjustment and then try again:** Different laryngoscope blade; Gum Elastic Bougie; Different ETT size; Change cricoid pressure; Apply BURP; Change head positioning
- AEMT and Paramedics should consider using a BIAD if oral-tracheal intubation is unsuccessful.
- During intubation attempts use External Laryngeal Manipulation to improve view of glottis.
- Gastric tube placement should be considered in all intubated patients.
- It is important to secure the endotracheal tube well and consider c-collar (even in absence of trauma) to better maintain ETT placement. Manual stabilization of endotracheal tube should be used during all patient moves / transfers.
- **Airway Cricothyrotomy Needle Procedure:**
  Indicated as a lifesaving / last resort procedure in pediatric patients ≤ 11 years of age.
  Very little evidence to support it's use and safety.
  A variety of alternative pediatric airway devices now available make the use of this procedure rare.
  Agencies who utilize this procedure must develop a written procedure, establish a training program, maintain equipment and submit procedure and training plan to the State Medical Director / Regional EMS Office.
- **DOPE: 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) 5 - 7 ***as indicated***

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

B 12 Lead ECG Procedure

A IV / IO Procedure ***if indicated***

P Cardiac Monitor

Following Assessment

WHEEZING / Asthma

B **Albuterol Nebulizer 1.25 - 2.5 mg**

STRIDOR / Croup

B **Albuterol Nebulizer 1.25 - 2.5 mg**

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

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

A

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

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

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 patient's supply for repeat nebulizers or agency's supply.
- **EMT may administer Albuterol if patient already prescribed and may administer from EMS supply.** Agency medical director may require Contact of Medical Control prior to administration.

Post-intubation / BIAD Management

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

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
	12 Lead ECG Procedure ***as indicated***
A	IV / IO Procedure (preferably 2 sites)
P	Cardiac Monitor
	Transport Ventilator Procedure ***If available***

Awakening or Moving after Intubation / BIAD Placement

Evidence of Anxiety / Agitation

NO → **Propofol** Interfacility Transfer Protocol / Policy ***If available***

YES

P

Ketamine 2.0 mg / kg IV / IO

Fentanyl 100 mcg IV / IO / IM / IN
May repeat every 5 minutes x4
Maximum 500 mcg
Peds: 1 mcg/kg IV / IO / IM / IN
May repeat 0.5 mg/kg every 5 minutes x2
Maximum 2 mcg/kg
Or
Morphine 4 mg IV / IO / IM
May repeat **2 mg** every 5 minutes x3
Maximum 10 mg
Peds: 0.1 mg/kg IV / IO / IM
May repeat every 5 minutes x2
Maximum 0.3 mg/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
Maximum 0.4 mg/kg

Consider **Rocuronium 1 mg/kg** (adult only)

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

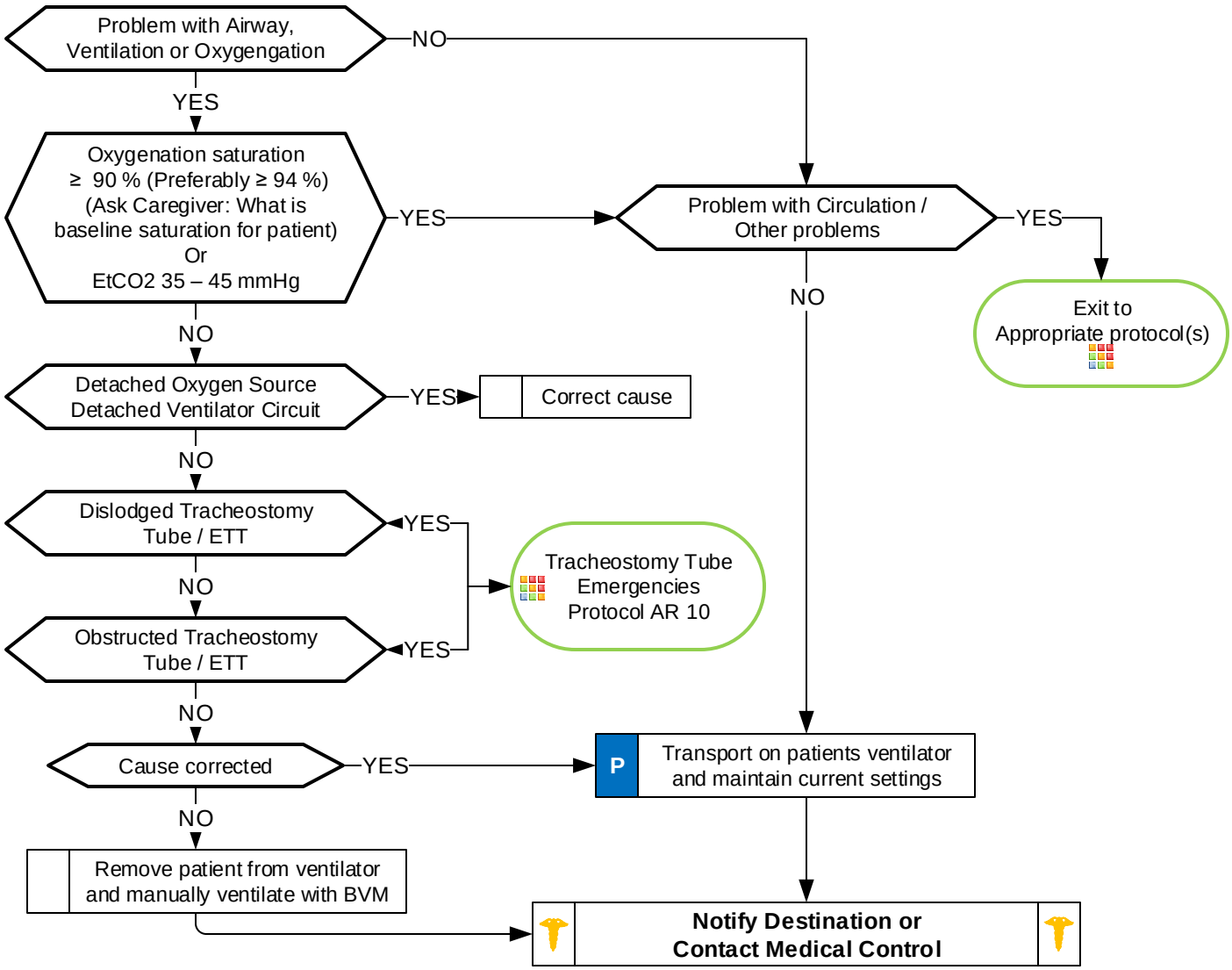
- **Recommended Exam: Mental Status, HEENT, Heart, Lungs, Neuro**
- **Patients requiring advanced airways and ventilation commonly experience pain and anxiety.**
- **Unrelieved pain can lead to increased catecholamine release, ischemia, immunosuppression, and prolonged hospitalization.**
- **Ventilated 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 patient's ventilator to hospital even if not functioning properly.
- Typical alarms: Low Pressure / Apnea: Loose or disconnected circuit, leak in circuit or around tracheostomy site.
  Low Power: Internal battery depleted.
  High Pressure: Plugged / obstructed airway or circuit.
- **DOPE: 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

Trachesotomy Tube in place — YES → **A** Remove Obturator ***If in place*** → Inner Cannula in place (Double lumen) / Speaking Valve / Decannulation plug in place — YES → **A** Remove Inner Cannula Or Remove Speaking Valve Remove Decannulation plug

Trachesotomy Tube in place — NO → Trachesotomy Tube available — YES → Allow *Caregiver* to insert Tracheostomy Tube **Or** **A** Place Trachesotomy Tube Or Appropriately sized ETT into stoma

Inner Cannula in place (Double lumen) / Speaking Valve / Decannulation plug in place — NO → **A** Advanced Suctioning Procedure Tracheostomy Tube Procedure

Continued Respiratory Distress — YES → Assist Ventilations via Tracheostomy Tube / ETT; Age Appropriate Respiratory Distress Protocol

Continued Respiratory Distress — NO → **Notify Destination or Contact Medical Control**

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 Obstetrical Protocol Section

AO 1 Childbirth / Labor

AO 2 Newly Born

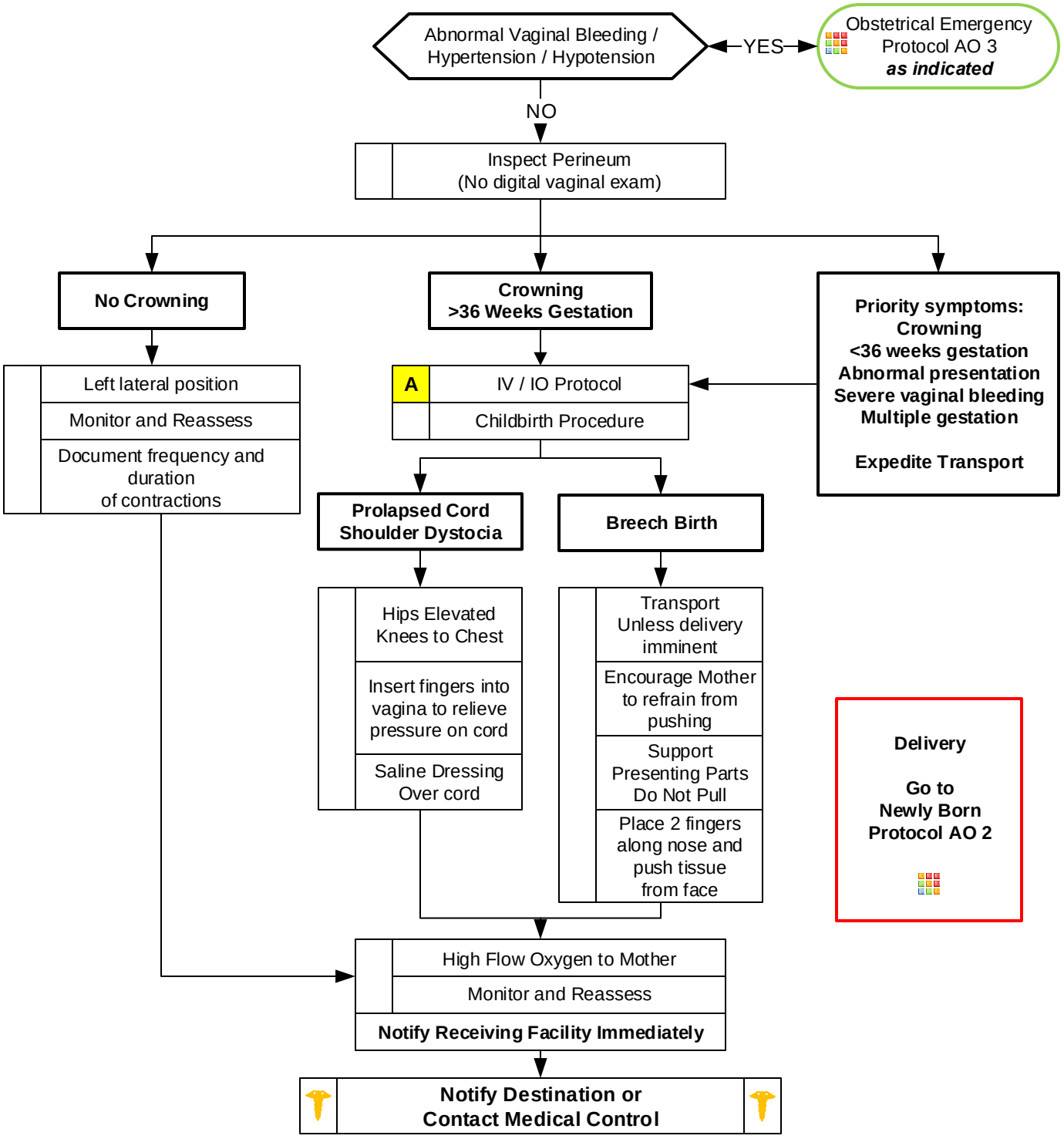
AO 3 Obstetrical Emergency

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

Adult Obstetrical Protocol Section

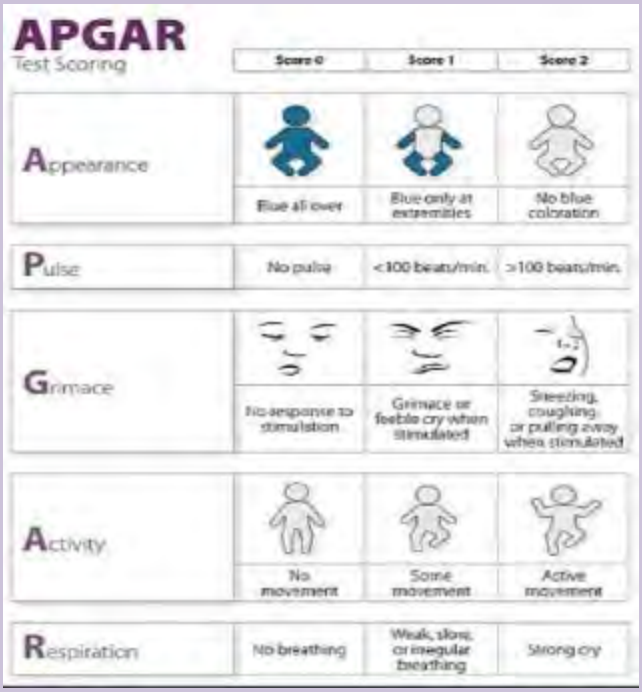
Stages of Labor:

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.

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 →
- Infant with mother if possible
- Provide warmth / Dry infant
- 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
- **B** Pulse Oximetry Right Hand
- **P** Cardiac Monitor / 3 – Lead

Heart Rate < 100

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

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

Heart Rate < 60

YES →
- Chest Compressions
- Pediatric Airway Protocol(s) AR 5, 6
- IV / IO Procedure
- **A** **Epinephrine 1:10,000**
  0.01 mg /kg IV / IO
  Every 3 to 5 minutes as needed
- **Normal Saline Bolus**
  10 mL / kg IV / IO
  May repeat x 1

NO ↓

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 re-intubated 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**
- **Document 1 and 5 minute Apgars in PCR**
- **Most newborns requiring resuscitation respond to ventilations / BVM, compressions, and/or epinephrine. If infant not responding consider hypovolemia, pneumothorax, and/or hypoglycemia (< 40 mg/dL).**
- **Term gestation, strong cry / breathing and with good muscle tone generally will need no resuscitation. Routine suctioning is no longer recommended.**
- **Most important vital signs in the newly born are respirations / respiratory effort and heart rate.**
- **Maintain warmth of infant following delivery; cap, plastic wrap, thermal mattress, radiant heat.**
- **Meconium staining:**
  Infant born through meconium staining who is not vigorous: Positive pressure ventilation is recommended, direct endotracheal suctioning is no longer recommended.
- **Expected Pulse Oximetry readings immediately following birth:**

1 minute	**60 – 65%**
2 minutes	**65 – 70%**
3 minutes	**70 – 75%**
4 minutes	**75 – 80%**
5 minutes	**80 – 85%**
10 minutes	**85 – 95%**

- Heart rate is critical during the first few moments of life and is best assessed by 3-lead ECG.
- Pulse oximetry should be applied to the right upper arm, wrist, or palm.
- CPR in infants is 120 compressions/minute with a 3:1 compression to ventilation ratio. 2-thumbs encircling chest and supporting the back is recommended. Limit interruptions of chest compressions.
- Maternal sedation or narcotics will sedate infant (Naloxone NO LONGER recommended-supportive care only).
- D10 = D50 diluted (1 ml of D50 with 4 ml of Normal Saline)

Obstetrical Emergency

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

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

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

Known or Suspected Pregnancy
Missed Period
Vaginal Bleeding
Abdominal Pain

YES

NO → Exit to Appropriate Protocol(s)

- Left lateral recumbant position
- Blood Glucose Analysis Procedure
- **A** IV / IO Procedure
- **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 5 **if indicated**

Seizure Activity

YES

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

Pediatric Medical Protocol Section

PM 1 Pediatric Allergic Reaction

PM 2 Pediatric Diabetic

PM 3 Pediatric Hypotension / Shock

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

- **Diphenhydramine 1 mg / kg mg PO**

A
- IV Procedure ***If indicated***
- **Diphenhydramine 1 mg/kg IV / IM** *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
- IV / IO Procedure
- **Diphenhydramine 1 mg/kg IV / IM / IO / PO** *if not already given PO*

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
- IV / IO Procedure
- **Normal Saline Bolus 20 mL/kg IV / IO**
  Titrate to age appropriate SBP ≥ 70 + 2 x Age
  Maximum 60 mL/kg

P
- Continued hypotension/shock
  Epinephrine IV / IO
  See page 2

If hypotension resolves

A
- **Diphenhydramine 1 mg/kg IV / IM / IO / PO**

P
- **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***
A	IV / IO Procedure
P	Cardiac Monitor
	Altered Mental Status Protocol UP 4 ***if indicated***
	Hypotension / Shock Protocol AM 5 ***if indicated***
	Seizure Protocol UP 13 ***if indicated***

A

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

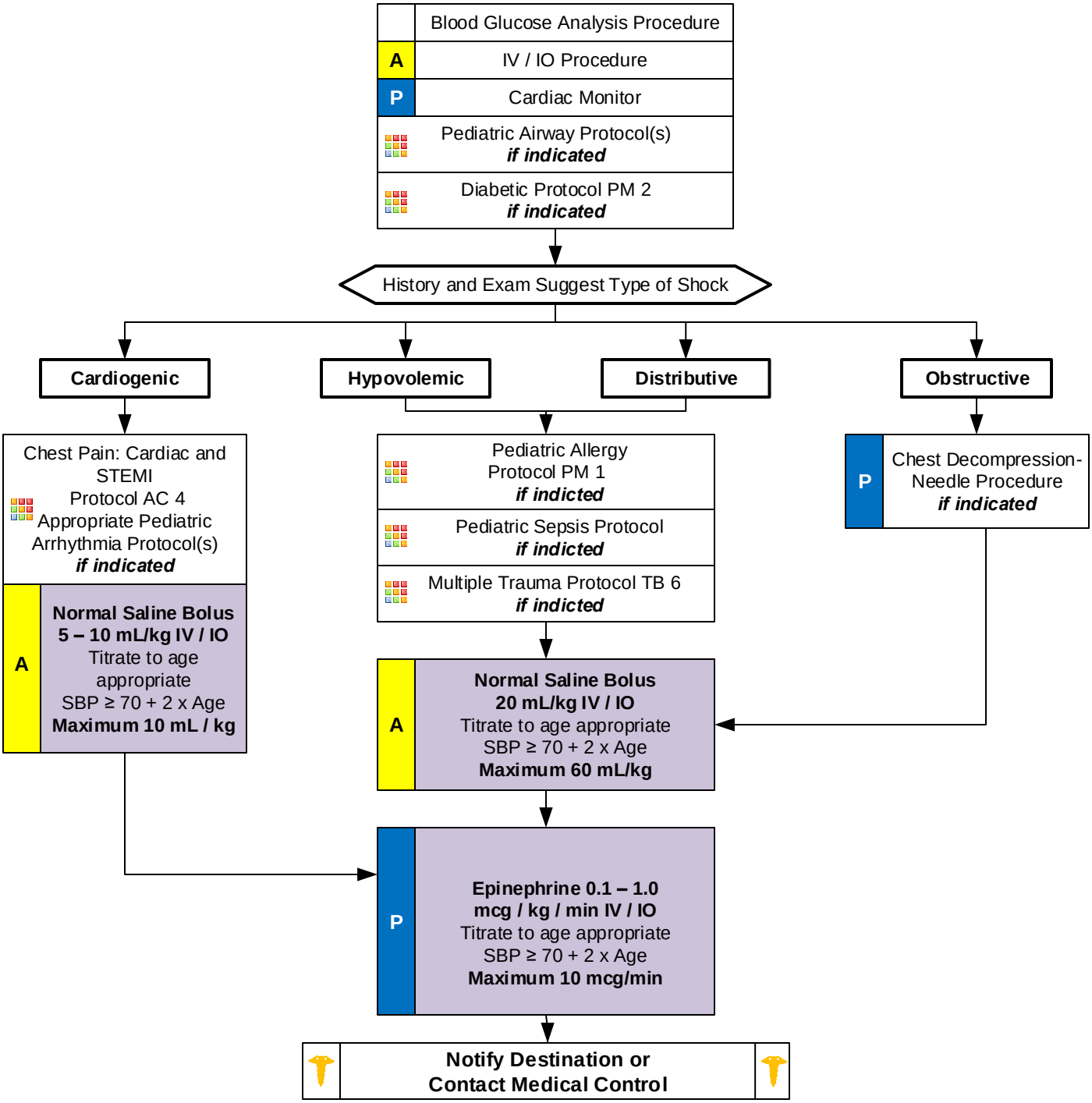
- **Recommended Exam: Mental Status, HEENT, Skin, Heart, Lungs, Abdomen, Back, Extremities, Neuro**
- **Patients with prolonged hypoglycemia my not respond to glucagon.**
- **Do not administer oral glucose to patients that are not able to swallow or protect their airway.**
- **Quality control checks 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



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.**

Pediatric Cardiac Protocol Section

PC 1 Pediatric Asystole / PEA

PC 2 Pediatric Bradycardia with Poor Perfusion

PC 3 Pediatric Pulmonary Edema / CHF

PC 4 Pediatric Cardiac Arrest

PC 5 Pediatric Tachycardia

PC 6 Pediatric Ventricular Fibrillation Pulseless Ventricular Tachycardia

PC 7 Pediatric Post Resuscitation

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 (1.5 inches Infant / 2 inches in Children)
(≥ 1/3 AP Diameter of Chest)
Push Fast (100 - 120 / min)
Change Compressors every 2 minutes
(Limit changes / pulse checks 10 seconds)

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

AED Procedure
if available

Search for Reversible Causes

Blood Glucose Analysis Procedure

P Cardiac Monitor

P Consider Chest Decompression-Needle Procedure

A IV / IO Procedure

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

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

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

P **After 5 minutes of CPR**
Give Epinephrine (1:10,000) 0.01 mg/kg IV / IO

After 10 minutes of CPR
Give Epinephrine (1:10,000) 0.01 mg/kg IV / IO

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

Notify Destination or Contact Medical Control

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

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 gluconate 40 mg/kg 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 (or Ca gluconate - preferred) may be beneficial in BB overdose. If suspected CCB overdose administer **Calcium gluconate 40 mg/kg** over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

Pearls

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

Pediatric Bradycardia With Poor Perfusion

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

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

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

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

Suspected Beta-Blocker or Calcium Channel Blocker

Follow Pediatric Toxicology Protocol

Pediatric Airway Protocol(s) AR 5, 6 **as indicated**

- Identify underlying cause
- Blood Glucose Analysis Procedure

→ Exit to Appropriate Pediatric Protocol(s)

- **P** Cardiac Monitor
- Search for reversible causes
- IV / IO Procedure
- **A** **Normal Saline 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
- **A** **Atropine 0.02 mg / kg IV / IO**
  May repeat x 1
  Minimum single dose 0.1 mg
  Maximum single dose 0.5 mg
- **P** Consider Cardiac Pacing Procedure

Reversible Causes

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Midazolam
Pediatric: 0.1 mg/kg IV / IO / IN
May repeat x3
Maximum 0.4 mg/kg

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

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

NO

Notify Destination or Contact Medical Control

Pediatric Cardiac Protocol Section

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

Pediatric Pulmonary Edema / CHF

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

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

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

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
	EtCO2 Monitoring
A	IV / IO Procedure ***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

Criteria for Death / No Resuscitation
Review DNR / MOST Form
YES → Do not begin resuscitation Follow Deceased Subjects Policy

NO

Newly Born / ≤ 31 days old
YES → Exit to Newly Born Protocol AO 2

NO

≥ 16 years old
YES → Exit to Adult Cardiac Arrest Protocol AC 3

NO

AT ANY TIME

Return of Spontaneous Circulation

Go to Post Resuscitation Protocol

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

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

Defibrillation Automated
if available

ALS Available
NO → Shockable Rhythm
NO → Continue CPR 5 Cycles / 2 Minutes Repeat and reassess
Pediatric Airway Protocol(s) 5, 6
YES → Defibrillation Automated

YES → 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

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 gluconate 40 mg/kg 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 (or Ca gluconate - preferred) may be beneficial in BB overdose. If suspected CCB overdose administer **Calcium gluconate 40 mg/kg** over 3 minutes. If you see ECG improvement you may repeat and then contact medical control.

Pearls

- **Recommended Exam: Mental Status**
- **Beginning compressions first is recommended in pediatric patients during CPR. However, the majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When 1 provider is present, perform 30 compressions with 2 ventilations.**
- **When 2 providers are present, perform 15 compressions with 2 ventilations.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: If advanced airway in place ventilate 8 – 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Defibrillation: First defibrillation is 2 J/kg, second defibrillation is 4 J/kg, subsequent shocks ≥ 4 J/kg (Maximum 10 J/kg or adult dose)**
- **End Tidal CO2 (EtCO2)**

  If EtCO2 is < 10 mmHg, improve chest compressions.

  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Special Considerations**

  Maternal Arrest - Treat mother per appropriate protocol with immediate notification to Medical Control and rapid transport preferably to obstetrical center if available and proximate. Place mother supine and perform Manual Left Uterine Displacement moving uterus to the patient's left side. IV/IO access preferably above diaphragm. Defibrillation is safe at all energy levels.

  Renal Dialysis / Renal Failure - Refer to Dialysis / Renal Failure protocol caveats when faced with dialysis / renal failure patient experiencing cardiac arrest.

  Opioid Overdose - Naloxone cannot be recommended in opioid-associated cardiac arrest. If suspected, attention to airway, oxygenation, and ventilation increase in importance. Naloxone is not associated with improved outcomes in cardiac arrest.

  Drowning / Suffocation / Asphyxiation / Hanging / Lightning Strike – Hypoxic associated cardiac arrest and prompt attention to airway and ventilation is priority followed by high-quality and continuous chest compressions and early defibrillation.
- **Transcutaneous Pacing:**

  Pacing is NOT effective in cardiac arrest and pacing in cardiac arrest does NOT increase chance of survival
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach / Pit-Crew Approach assigning responders to predetermined tasks. Refer to optional protocol.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg)** via ETT (**Maximum 2.5 mg**)

Pediatric Tachycardia

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

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

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

Single lead ECG able to diagnose and treat arrhythmia

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

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

YES

P — Cardioversion Procedure
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 mg/kg
IV / IO / IM / IN
May repeat if needed
Maximum Single Dose 2 mg
Maximum Total Dose 5 mg

NO

B — 12 Lead ECG Procedure
A — IV / IO Procedure
P — Cardiac Monitor

QRS ≥ 0.09 seconds

NO → Probable Sinus Tachycardia → Identify and Treat Underlying Cause → Exit to Appropriate Protocol(s)

NO → Probable SVT

P — Vagal Maneuvers
Adenosine
0.1 mg / kg IV / IO
Maximum 6 mg
May repeat
Adenosine
0.2 mg / kg IV / IO
Maximum 12 mg

YES → Possible VT → Unstable Hypotension / AMS / Poor perfusion

YES → P — Cardioversion Procedure (see above)

NO

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

Only if rhythm is regular and QRS are monomorphic

B — Rhythm Converts
12 Lead ECG Procedure

Notify Destination or Contact Medical Control

AT ANY TIME

Pulseless

Go to Pediatric Pulseless Arrest Protocol

Pediatric Cardiac Protocol Section

Pediatric Tachycardia

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**
- **Serious Signs and Symptoms:**
  - **Respiratory distress / failure.**
  - **Signs of shock / poor perfusion with or without hypotension.**
  - **AMS**
  - **Sudden collapse with rapid, weak pulse**
- **Narrow Complex Tachycardia (≤ 0.09 seconds):**
  - Sinus tachycardia: P waves present. Variable R-R waves. Infants usually < 220 beats / minute. Children usually < 180 beats / minute.
  - SVT: > 90 % of children with SVT will have a narrow QRS (≤0.09 seconds.) P waves absent or abnormal. R-R waves not variable. Usually abrupt onset. Infants usually > 220 beats / minute. Children usually > 180 beats / minute.
  - Atrial Flutter / Fibrillation
- **Wide Complex Tachycardia (≥ 0.09 seconds):**
  - SVT with aberrancy.
  - VT: Uncommon in children. Rates may vary from near normal to > 200 / minute. Most children with VT have underlying heart disease / cardiac surgery / long QT syndrome / cardiomyopathy.
  - **Amiodarone 5 mg / kg over 20 – 60 minutes** is recommended agents. Consultation with Medical Control is advised when these agents are considered.
- **Torsades de Pointes / Polymorphic (multiple shaped) Tachycardia:**
  - Rate is typically 150 to 250 beats / minute.
  - Associated with long QT syndrome, hypomagnesaemia, hypokalemia, many cardiac drugs.
  - May quickly deteriorate to VT.
  - Administer **Magnesium Sulfate 40 mg / kg IV / IO over 10 minutes**. Cardiac arrest given over 2 minutes.
- **Vagal Maneuvers:**
  - Breath holding. Blowing a glove into a balloon. Have child blow out “birthday candles” or through an obstructed straw. Infants: May put a bag of ice water over the upper half of the face careful not to occlude the airway.
- Separating the child from the caregiver may worsen the child's clinical condition.
- Pediatric pads should be used in children < 10 kg or Broselow-Luten color Purple if available.
- Monitor for respiratory depression and hypotension associated if Diazepam, Lorazepam, or Midazolam is used.
- Continuous pulse oximetry is required for all SVT Patients if available.
- Document all rhythm changes with monitor strips and obtain monitor strips with each therapeutic intervention.
- Generally, the maximum sinus tachycardia rate is 220 – the patient’s age in years.

Pediatric Ventricular Fibrillation
Pulseless Ventricular Tachycardia

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

Signs and Symptoms
- Unresponsive
- Cardiac Arrest

Differential
- Respiratory failure / Airway obstruction
- Congenital heart disease
- Airway obstruction
- Hypothermia

Pediatric Pulseless Arrest Protocol

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

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

A

Defibrillation Automated
if available

IV / IO Procedure

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

P

Defibrillation Manual Procedure 2 J / Kg
Subsequent shocks ≥ 4 J / kg
Maximum 10 J / kg or adult dose

<u>After 5 minutes of CPR</u>
Give Epinephrine (1:10,000) 0.01 mg/kg IV / IO

<u>After 10 minutes of CPR</u>
Give Epinephrine (1:10,000) 0.01 mg/kg IV / IO

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

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

<u>Reversible Causes</u>

Hypovolemia
Hypoxia
Hydrogen ion (acidosis)
Hypothermia
Hypo / Hyperkalemia

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

Persistent VF / VT
Or
<u>Torsades de Points</u>

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

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.

Reversible causes include:

Hypovolemia	Tension pneumothorax
Hypoxia	Tamponade; cardiac
Hydrongen ion (acidosis)	Toxins Hypothermia
Hypo / Hyperkalemia	Thrombosis; pulmonary (PE)
Hypoglycemia	Thrombosis; coronary

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

- **Recommended Exam: Mental Status**
- **Beginning compressions first is recommended in pediatric patients during CPR. However, the majority of pediatric arrests stem from a respiratory insult or hypoxic event. Compressions should be coupled with ventilations.**
- **When 1 provider is present, perform 30 compressions with 2 ventilations.**
- **When 2 providers are present, perform 15 compressions with 2 ventilations.**
- **Efforts should be directed at high quality and continuous compressions with limited interruptions and early defibrillation when indicated. Compress ≥ 1/3 anterior-posterior diameter of chest, in infants 1.5 inches and in children 2 inches. Consider early IO placement if available and / or difficult IV access anticipated.**
- **DO NOT HYPERVENTILATE: If advanced airway in place ventilate 8 – 10 breaths per minute with continuous, uninterrupted compressions.**
- **Do not interrupt compressions to place endotracheal tube. Consider BIAD first to limit interruptions.**
- **Defibrillation: First defibrillation is 2 J/kg, second defibrillation is 4 J/kg, subsequent shocks ≥ 4 J/kg (Maximum 10 J/kg or adult dose)**
- **End Tidal CO2 (EtCO2)**
  If EtCO2 is < 10 mmHg, improve chest compressions.
  If EtCO2 spikes, typically > 40 mmHg, consider Return of Spontaneous Circulation (ROSC)
- **Antiarrhythmic agents:**
  Adenosine: First dose: 0.1 mg / kg (Maximum 6 mg) Second dose: 0.2 mg / kg (Maximum 12 mg)
  Amiodarone 5 mg / kg IV / IO (single dose Maximum 300 mg). May repeat x 2 to a Maximum of 15 mg / kg.
  Lidocaine 1 mg / kg IV / IO. Infusion 20 – 50 mcg / kg / min. If infusion is initiate > 15 minutes from first bolus, repeat 0.5 mg / kg bolus.
  Magnesium Sulfate 40 mg / kg IV / IO over 10 – 20 minutes. In Torsades de pointes give over 1 – 2 minutes. Maximum 2 g.
  Procainamide 15 mg / kg IV / IO over 30 – 60 minutes. Monitor for increased QRS and increased QT.
- Success is based on proper planning and execution. Procedures require space and patient access. Make room to work. Consider Team Focused Approach / Pit-Crew Approach assigning responders to predetermined tasks. Refer to optional protocol.
- In order to be successful in pediatric arrests, a cause must be identified and corrected.
- If no IV / IO access may use **Epinephrine 1:1000 0.1 mg/kg (0.1 mL/kg)** via ETT (**Maximum 2.5 mg**)

Pediatric Post Resuscitation

History
- Respiratory arrest
- Cardiac arrest

Signs/Symptoms
- Return of pulse

Differential
- Continue to address specific differentials associated with the original dysrhythmia

	Pediatric Airway Protocol(s) AR 5 - 7 ***as needed***
	Monitor Vital Signs / Reassess
	Blood Glucose Analysis Procedure
	Optimize Ventilation and Oxygenation • Maintain SpO2 ≥ 90% • Preferably SpO2 ≥ 94% • 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
A	IV / IO Procedure
P	Cardiac Monitor
	Pediatric Diabetic Protocol PM 2 ***if indicated***
	Pediatric Hypotension / Shock Protocol PM 3 ***if indicated***
	Pediatric Bradycardia Protocol PC 2 ***if indicated***
	Pediatric Tachycardia Protocol PC 5 ***if indicated***
	Post-intubation / BIAD Management Protocol AR 8

Hypotension Age Based

0 – 31 Days
< 60 mmHg

1 Month to 1 Year
< 70 mmHg

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

Arrhythmias are common and usually self limiting after ROSC

If Arrhythmia Persists follow Rhythm Appropriate Protocol

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 / recurrence of cardiac arrest in post resuscitation phase and must be avoided.**
- **Target oxygenation to ≥ 94 %. 100 % FiO2 is not necessary, titrate oxygen accordingly.**
- **EtCO2 should be continually monitored with advanced airway in place.**
- **Administer resuscitation fluids and vasopressor agents to maintain SBP at targets listed on page 1. This table represents minimal SBP targets.**
- **Targeted Temperature Management is recommended in pediatrics, but prehospital use is not associated with improved outcomes. Transport to facility capable of intensive pediatric care.**
- **Antiarrhythmic agents:**
  - **Adenosine: First dose: 0.1 mg / kg (Maximum 6 mg) Second dose: 0.2 mg / kg (Maximum 12 mg)**
  - **Amiodarone 5 mg / kg IV / IO (single dose Maximum 300 mg). May repeat x 2 to a Maximum of 15 mg / kg.**
  - **Lidocaine 1 mg / kg IV / IO. Infusion 20 – 50 mcg / kg / min. If infusion is initiated > 15 minutes from first bolus, repeat 0.5 mg / kg bolus.**
  - **Magnesium Sulfate 40 mg / kg IV / IO over 10 – 20 minutes. In Torsades de pointes give over 1 – 2 minutes. Maximum 2 g.**
  - **Procainamide 15 mg / kg IV / IO over 30 – 60 minutes. Monitor for increased QRS and increased QT.**
- **Vasopressor agents:**
  - **Dopamine 2 – 20 mcg / kg / min IV / IO**
  - **Epinephrine 0.1 – 1 mcg / kg / min IV / IO**
  - **Norepinephrine 0.1 – 2 mcg / kg / min IV / IO**
  - **Dose Calculation: mL / hour = kg x dose(mcg / kg / min) x 60 (min / hr) / concentration (mcg / mL)**
- If pediatric weight is known, use in drug and fluid calculations. Use actual body weight for calculating initial medication dosages. If unknown then use a body length tape system.
- Appropriate post-resuscitation management may best be planned in consultation with medical control.

Trauma and Burn Protocol Section

TB 1 Blast Injury / Incident

TB 2 Chemical and Electrical Burn

TB 3 Crush Syndrome Trauma

TB 4 Extremity Trauma

TB 5 Head Trauma

TB 6 Multiple Trauma

TB 7 Radiation Incident

TB 8 Selective Spinal Motion Restriction

TB 9 Thermal Burn

TB 10 Traumatic Arrest (Optional)

Blast Injury / Incident

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

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

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

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

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

Accidental / Intentional Explosions (See Pearls)

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

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

NO

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

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

Blast Injury / Incident

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 prone and in slight left-lateral decubitus position.
  - Blast Lung Injury patients may require early intubation but positive pressure ventilation may exacerbate the injury, avoid hyperventilation.
  - Air transport may worsen lung injury as well and close observation is mandated. Tension pneumothorax may occur requiring chest decompression. Be judicious with fluids as volume overload may worsen lung injury.
- **Accidental Explosions or Intentional Explosions:**
  - **All explosions or blasts should be considered intentional until determined otherwise.**
  - Attempt to determine source of the blast to include any potential threat for aerosolization of hazardous materials.
  - Evaluate scene safety to include the source of the blast that may continue to spill explosive liquids or gases.
  - Consider structural collapse / Environmental hazards / Fire.
  - Conditions that led to the initial explosion may be returning and lead to a second explosion.
  - Greatest concern is potential threat for a secondary device.
  - Patients who can, typically will attempt to move as far away from the explosive source as they safely can.
  - Evaluate surroundings for suspicious items; unattended back packs or packages, or unattended vehicles.
  - **If patient is unconscious or there is(are) fatality(fatalities) and you are evaluating patient(s) for signs of life:**
    Before moving note if there are wires coming from the patient(s), or it appears the patient(s) is(are) lying on a package/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
- Dizziness
- Loss of consciousness
- Hypotension/shock
- Airway compromise/distress could be indicated by hoarseness/ wheezing / Hypotension

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

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

Assess Burn / Concomitant Injury Severity

< 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

Identify Contact Points

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

Chemical Exposure / Burn
Flush Contact Area with Normal Saline for 15 minutes

Decontamination Procedure
if indicated

Age Appropriate Cardiac Protocol(s)
if indicated

Thermal Burn Protocol TB 9

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

Crush Syndrome Trauma

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

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

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

	Age Appropriate Airway Protocol(s) AR 1, 2, 3, 4, 5, 6, 7 ***as indicated***
B	12 Lead ECG Procedure
A	IV / IO Procedure
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 – 0.2 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 — **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 Gluconate 2 g IV / IO**
  Or
  (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, 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 - Tourniquet Procedure
if indicated

A IV / IO Procedure
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 and place in air tight container.

Place container on ice if available.

NO

P **Cefazolin 1g IV / IO**
Pediatric: 10 – 15mg / kg IV / IO
Over 10 minutes
if available

Monitor and Reassess

Notify Destination or Contact Medical Control

Trauma and Burn Protocol Section

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

Head Trauma

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

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

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

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

Obtain and Record GCS

Supplemental oxygen
Maintain SpO2 ≥ 90%
Preferably ≥ 94%

Prevent Oxygen desaturation events < 90%

Maintain EtCO2
35 – 45 mmHg

Blood Glucose Analysis Procedure

A IV / IO Procedure
if indicated

P Cardiac Monitor

Altered Mental Status
Protocol UP 4
if indicated

Multiple Trauma Protocol TB 6
if indicated

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

Seizure Protocol UP 13
if indicated

Spinal Motion Restriction
Procedure / Protocol TB 8
if indicated

Pain Control Protocol UP 11
if indicated

Monitor and Reassess

DO NOT ROUTINELY 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
Trauma and Burn:
EMS Triage and Destination Plan

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 more simple way to communicate a patient's level of consciousness is the AVPU mnemonic
A - Alert
V – Responds to verbal stimuli
P – Responds to painful stimuli
U – Unresponsive

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, 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 foggy or groggy; 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 movements 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 play; reactions that seem out of proportion and inappropriate; and having trouble resting or "finding a comfortable position."
4. PROBLEMS WITH BALANCE AND COORDINATION:
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 CO2 and causes vasoconstriction leading to increased intracranial pressure (ICP) and should not be done routinely.**
  - **Use in patient with evidence of herniation (blown pupil, decorticate / decerebrate posturing, bradycardia, decreasing GCS).**
  - **If hyperventilation is needed, ventilate at 14 – 18 / minute to maintain EtCO2 between 30 - 35 mmHg.**
  - **Short term option only used for severe head injury typically GCS ≤ 8 or unresponsive.**
- **Do not place in Trendelenburg position as this may increase ICP and worsen blood pressure.**
- **Poorly fitted cervical collars may also increase ICP when applied too tightly.**
- **In areas with short transport times, Drug Assisted Airway protocol is not recommended for patients who are spontaneously breathing and who have oxygen saturations of ≥ 90% with supplemental oxygen including BIAD / BVM.**
- **Hypotension:**
  - Limit IV fluids unless patient is hypotensive.
  - Increased intracranial pressure (ICP) may cause hypertension and bradycardia (Cushing's Response).
  - Usually indicates injury or shock unrelated to the head injury and should be aggressively treated.
  - Fluid resuscitation should be titrated to maintain at least a systolic BP of > 70 + 2 x the age in years.
  - **Lowest blood pressure by age: < 31 days: > 60 mmHg. 31 days to 1 year: > 70 mmHg. Greater than 1 year: 70 + 2 x age in years.**
- An important item to monitor and document is a change in the level of consciousness by serial examination.
- Consider Restraints if necessary for patient's and/or personnel's protection per the Restraint Procedure.
- **Concussions:**
  - Traumatic brain injuries involving any of a number of symptoms including confusion, LOC, vomiting, or headache.
  - Any prolonged confusion or mental status abnormality which does not return to normal within 15 minutes or any documented loss of consciousness should be evaluated by a physician ASAP.
  - **EMS Providers 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)
- Chest: Tension pneumothorax
  Flail chest
  Pericardial tamponade
  Open chest wound
  Hemothorax
- Intra-abdominal bleeding
- Pelvis / Femur fracture
- Spine fracture / Cord injury
- Head injury (see Head Trauma)
- Extremity fracture / Dislocation
- HEENT (Airway obstruction)
- Hypothermia

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

Control External Hemorrhage
Consider Pelvic Binding
Splint Suspected Fractures

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

Obtain and Record GCS

A — IV / IO Procedure

P — Cardiac Monitor

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

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

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

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

VS / Perfusion / GCS

Normal

Repeat Assessment Adult Procedure

Monitor and Reassess

Abnormal

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

P — **TXA 1 gm over 10 minutes IV / IO** ***if indicated***

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 1 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 and/or HR > 110 with suspected hemorrhage / shock / early shock.
Administer 1 gm over 10 minutes
Infuse during transport only, unless patient entrapped and 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.·

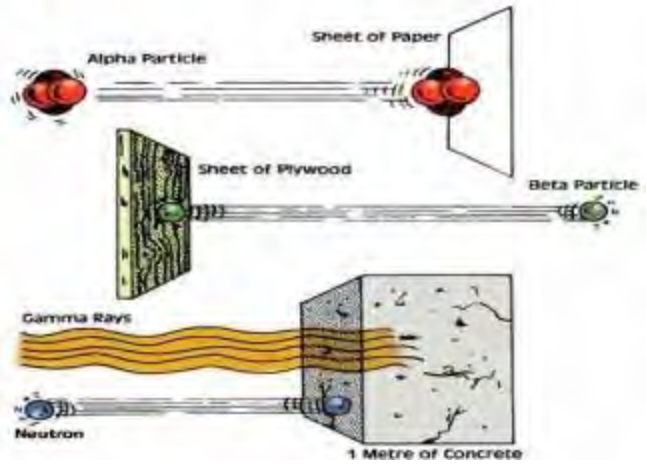
Quantify: Determine exposure (generally measured in Grays/Gy). *Information may be available from those on site who have monitoring equipment, do not delay transport to acquire this information*

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

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

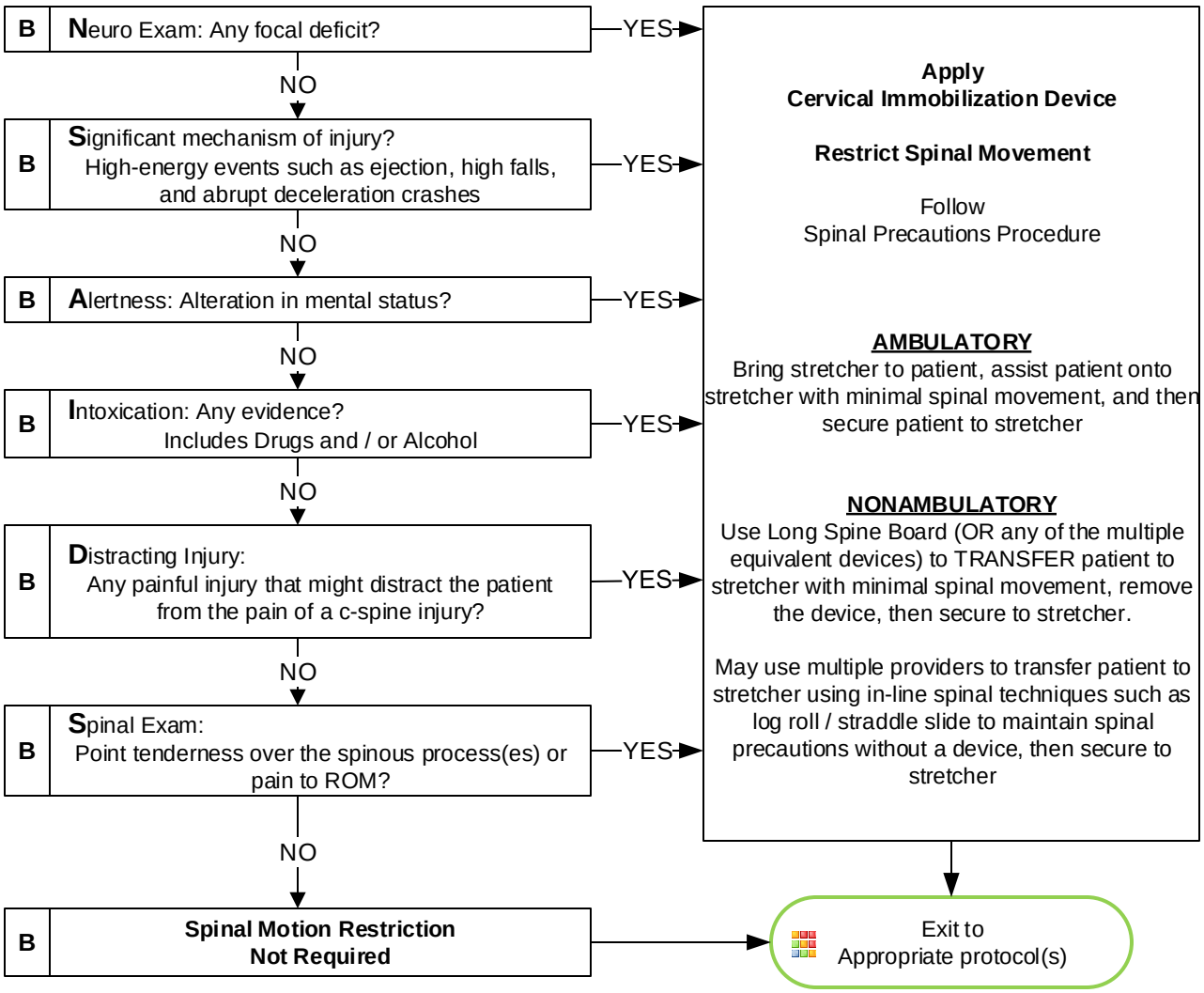
* Hypotension
** Also cardiovascular collapse, fever, shock

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

Pearls

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

Selective Spinal Motion Restriction



Pearls

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

Thermal Burn

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

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

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

Assess Burn / Concomitant Injury Severity

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

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

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

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

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

Remove Rings, Bracelets / Constricting Items

Dry Clean Sheet or Dressings

A

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

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

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

Carbon Monoxide / Cyanide Protocol TE 2 ***if indicated***

Monitor and Reassess

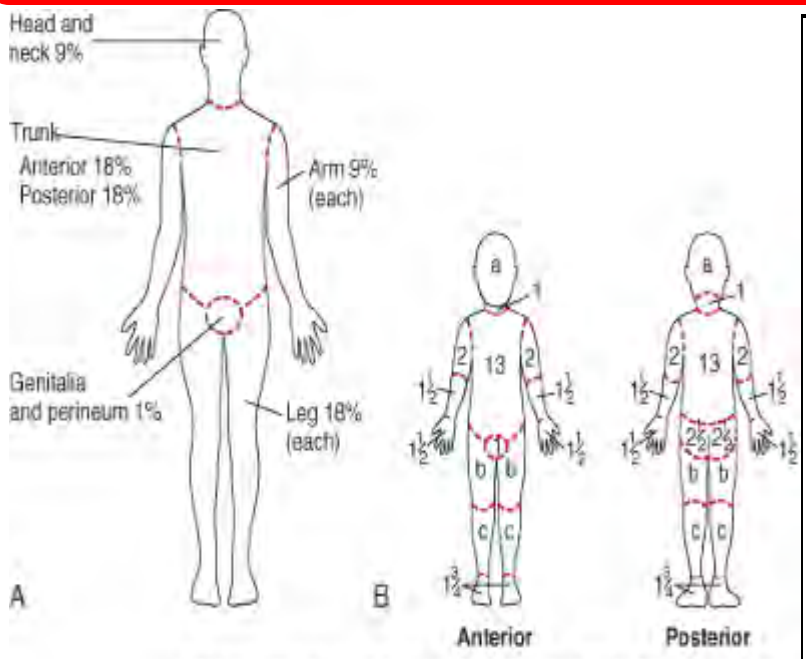
Rapid Transport to appropriate destination using
Trauma and Burn:
EMS Triage and Destination Plan

Notify Destination or Contact Medical Control

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

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

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

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

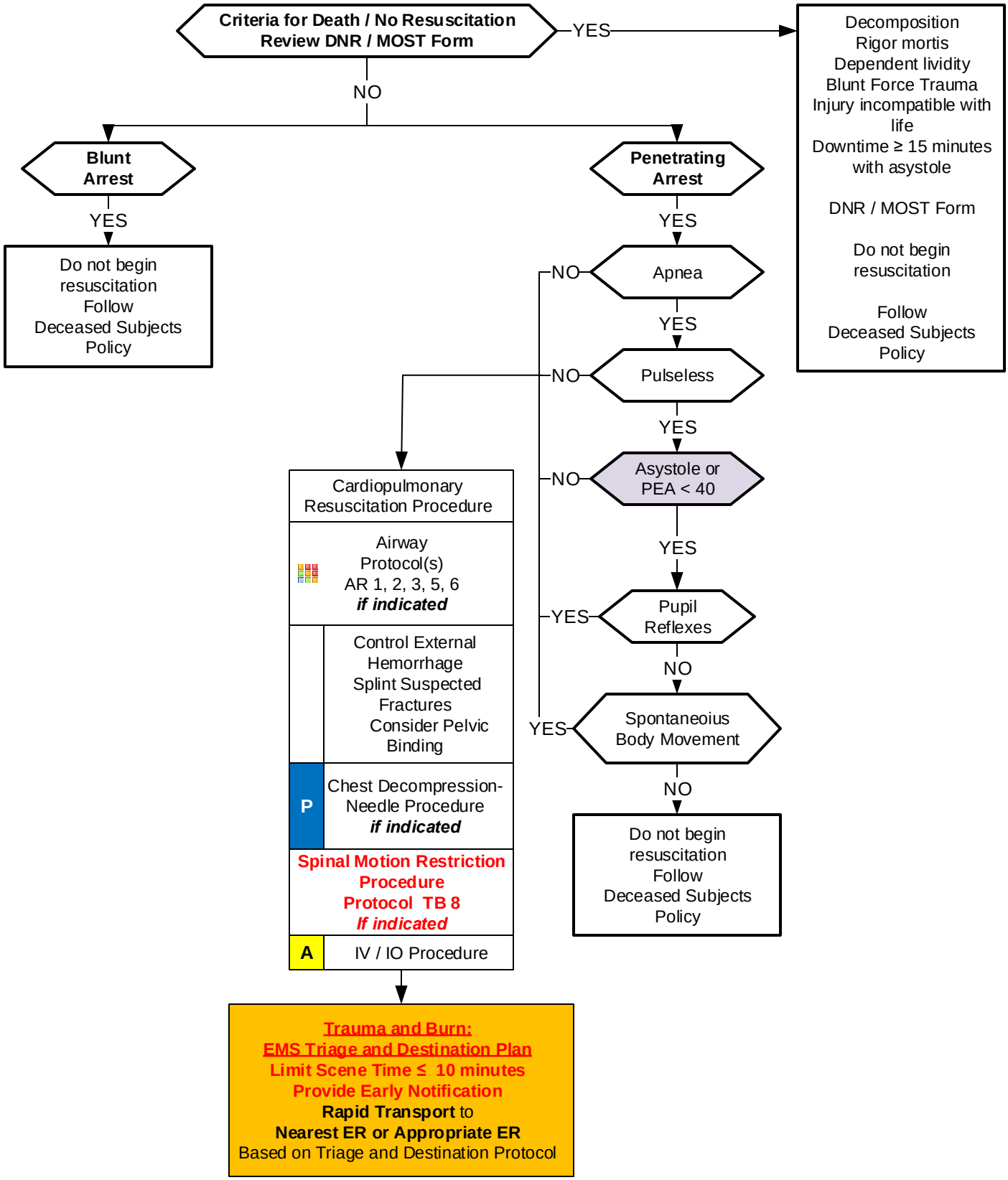
IV / IO Infusion Rates:
Lactated Ringer is preferred IV solution. Normal Saline may be used if LR unavailable.
0.25 mL/kg x (TBSA% burn) / hour = mL/hr IV rate of inufusion.

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.**
- **Critical or Serious Burns:**
  - ***> 5-15% total body surface area (TBSA) 2nd or 3rd degree burns, or***
  - ***3rd degree burns > 5% TBSA for any age group, or***
  - ***circumferential burns of extremities, or***
  - ***electrical or lightning injuries, or***
  - ***suspicion of abuse or neglect, or***
  - ***inhalation injury, or***
  - ***chemical burns, or***
  - ***burns of face, hands, perineum, or feet***
- Require direct transport to a Burn Center. Local facility should be utilized only if distance to Burn Center is excessive or critical interventions such as airway management are not available in the field.
- Burn patients are trauma patients, evaluate for multisystem trauma.
- Assure whatever has caused the burn is no longer contacting the injury. (Stop the burning process!)
- Early intubation is required when the patient experiences significant inhalation injuries.
- Circumferential burns to extremities are dangerous due to potential vascular compromise secondary to soft tissue swelling.
- Burn patients are prone to hypothermia - never apply ice or cool the burn, must maintain normal body temperature.
- Evaluate the possibility of geriatric abuse with burn injuries in the elderly.
- Never administer IM pain injections to a burn patient.

Traumatic Arrest (Optional)



Traumatic Arrest (Optional)

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.

Toxin-Environmental Protocol Section

TE 1 Bites and Envenomations

TE 2 Carbon Monoxide / Cyanide

TE 3 Drowning

TE 4 Hyperthermia

TE 5 Hypothermia / Frostbite

TE 6 Marine Envenomations / Injury

TE 7 Overdose / Toxic Ingestion

TE 8 WMD-Nerve Agent Protocol

Bites and Envenomations

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

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

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

Call for help / additional resources
Stage until scene safe

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

- General Wound Care Procedure
- Immobilize Injury
- Remove any constricting clothing / bands / jewelry
- **A** IV / IO Procedure ***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
- Keep bite at level of heart ***if able***
- Apply Ice Packs
- **P** **<u>Muscle Spasm</u>**
  Midazolam 2 – 2.5 mg IV / IO
  Over 2 to 3 minutes
  Midazolam IN See Page 2
  Maximum 10 mg
  Pediatrics:
  Midazolam 0.1 – 0.2 mg / kg
  IV / IO / IM / IN
  Over 2 to 3 minutes
  Maximum 5 mg IM

Snake Bite
- 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.
- **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

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 / IO Procedure ***if indicated***
- P: Cardiac Monitor ***as indicated***

Awake but with AMS

- 5 Breaths via BVM / mouth-to-mouth ***as tolerated***
- Supplemental Oxygen ***as tolerated***
- Age Appropriate Airway Protocol(s) 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***

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***

Notify Destination or Contact Medical Control

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

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

PO Fluids as tolerated

Monitor and Reassess

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

Systemic Hypothermia

Localized Cold Injury

Awake with / without AMS

Unresponsive

Pulse
- YES → Age Appropriate Airway Protocol(s) AR 1 - 7 ***as indicated***
- NO → Exit to Age Appropriate Cardiac Protocol(s) ***See Pearls***

Localized Cold Injury
- General Wound Care
- DO NOT Rub Skin to warm
  DO NOT Massage
  Skin to warm
- DO NOT allow refreezing

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

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

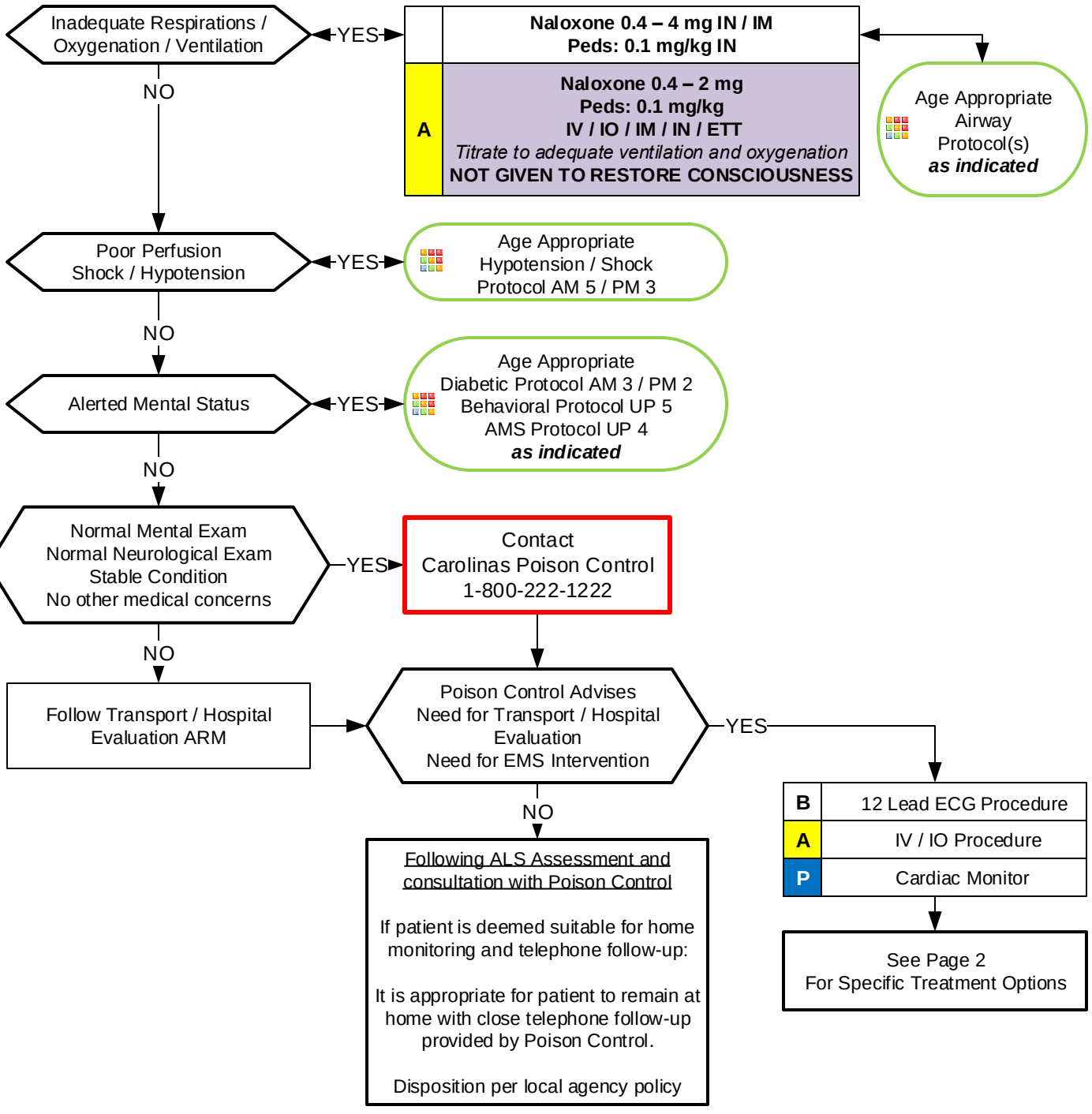
- **Ensure your safety: Avoid the organism or fragments of the organism as they may impart further sting / injury.**
- **Priority is removal of the patient from the water to prevent drowning.**
- **Coral:**
  - Coral is covered by various living organisms which are easily dislodged from the structure.
  - 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)



Overdose / Toxic Ingestion

Acetaminophen
Tylenol®
APAP Containing Product

YES

NO

Aspirin
Salicylate Containing Product

YES

NO

Beta Blocker or
Calcium Channel Blocker

YES

NO

A **Glucagon 2 – 4 mg IV / IO / IM**
Peds: 0.1 mg/kg IV / IO / IM
May repeat in 15 minutes as needed

Consider
Cardiac External Pacing Procedure for Severe Cases

P **Calcium Gluconate 2 g IV / IO**
Or
(Calcium Chloride 1 g IV / IO)
Pediatric: 20 mg / kg IV / IO
Over 2- 3 minutes

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

Cyanide /
Carbon Monoxide

YES

Exit to
Carbon Monoxide / Cyanide
Protocol TE 2

NO

Organophosphate
WMD / Nerve Agent Exposure

YES

Exit to
WMD / Nerve Agent
Protocol TE 8

NO

Tricyclic
Antidepressant

YES

P <u>QRS ≥ 0.12 sec or Peds: 0.09 sec</u>
Sodium Bicarbonate
50 mEq IV / IO
Peds: 1 mEq/kg IV / IO
Repeat in 10 minutes as needed
or
Mix 100mEq of Sodium Bicarbonate In 1000mL or NS and infuse at 200mL/hr

Symptomatic Care
as needed

Monitor and Reassess

Notify Destination or
Contact Medical Control

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:			**Common Calcium Channel Blockers:**		
Atenolol	Coreg	Nadolol	Amlodipine	Cardene	Calan
Labetalol	Propanolol	Tenormin	Nicardipine	Norvasc	Isoptin
Inderal	Metoprolol		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.

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 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

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. Give if available.**
- **Activity: Any benzodiazepine by any route is acceptable.**
- For patients with major symptoms, there is no limit for atropine dosing.
- Carefully evaluate patients to ensure they not from exposure to another agent (e.g., narcotics, vesicants, etc.)
- The main symptom that the atropine addresses is excessive secretions so atropine should be given until salivation improves.
- EMS personnel, public safety officers and EMR / EMT may carry, self-administer or administer to a patient atropine / pralidoxime by protocol. Agency medical director may require Contact of Medical Control prior to administration.

Section 10 Special Operations Section

SO 1 Scene Rehabilitation: General (Optional)

SO 2 Scene Rehabilitation: Responder (Optional)

Scene Rehabilitation: General (Optional)

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

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

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

YES → Exit to Scene Rehabilitation Responder Protocol

NO

Heat or Cold stress

YES → **HEAT STRESS**

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

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

YES → **COLD STRESS**

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

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

NO

Reassess responder after 20 Minutes in General Rehabilitation Section
Reassess VS

HR ≥ 110 → YES → Responder Cannot Wear Protective Gear
NO

Temp ≥ 100.6 → YES → Extend Rehabilitation Time Until VS Improve
NO

Temp ≥ 100.6 → YES → Extend Rehabilitation Time Until VS Improve
NO

HR ≥ 110 → YES → Extend Rehabilitation Time Until VS Improve
NO

Discharge Responder from General Rehabilitation Section

Reports for Reassignment

VITAL SIGN CAVEATS

Blood Pressure:
Prone to inaccuracy on scenes. Must be interpreted in context.

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

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

Temperature:
Firefighters may have increased temperature during rehabilitation.

Special Operations Section

Scene Rehabilitation: General (Optional)

Criteria for Establishing Rehabilitation Section:
Any incident or activity that is large in size, long in duration and / or labor intensive will rapidly deplete the energy and strength of personnel and therefore merits consideration for rehabilitation section.
Each agency should develop a policy outlining when rehabilitation is warranted on initial notification of an incident.
Fire, EMS, First Responders and Law Enforcement should consider rehabilitation during initial stages of response.
Environment conditions indicating the need to establish rehabilitation are Heat Stress Index > 90 degrees / Wind-Chill Index < 10 degrees but this should not be the sole indicators.

Site Characteristics of a Rehabilitation Section:
In addition to Pearls:
Locate where physical and mental rest is allowed as well as protection from environmental conditions.
Ensure location allows prompt reentry into operations upon recuperation with entry and exits clearly identified.

Criteria for Rehabilitation of Responder:
In addition to Pearls:
Objective evaluation or self assessment of responders fatigue level shall also determine mandatory rehabilitation.

Hydration:
Maintenance of water and electrolytes are critical in the prevention of heat injury.
Water must be replaced during exertion and at incidents. During heat stress the responder should consume at least one (1) quart or Liter of water each hour.
Re-hydration solution optimally should be a 50 / 50 mixture of water and a commercially prepared activity beverage at 40 degrees.
Avoid carbonated or caffeinated beverages.
Re-hydration is important even during cold stress conditions especially where protective equipment is worn.

Nourishment:
Typically required where incidents extend more than three (3) hours.
Soup, broth or stew is recommended as this is digested easier than sandwiches / fast food products.
Fruits such as apples, oranges and bananas are also recommended.
Fatty / salty foods should be avoided.

Recovery:
Responders should maintain high level of re-hydration during recovery of at least 10 minutes or longer as needed.
Do not move responder from a hot environment to a cold environment such as air conditioning.
Air conditioning is acceptable after period of cool down at ambient temperature.

Special Operations Section

Pearls

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

Scene Rehabilitation: Responder (Optional)

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

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

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

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

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

Use in conjunction with General Rehabilitation Protocol

20 Minute Rest Period

Pulse Rate > 85 % NFPA Age Predicted Maximum — YES → **A**

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

NO

Systolic BP ≥ 160
Or
Diastolic BP ≥ 100 — YES

NO

Respirations < 8 or > 40 — YES

NO

Pulse oximetry < 90 %
SPCO > 10 % — YES

NO

Temperature ≥ 100.6 — YES

NO

Discharge Responder from General Rehabilitation Section

Reports for Reassignment

No improvement after 30 minutes of additional rehabilitation

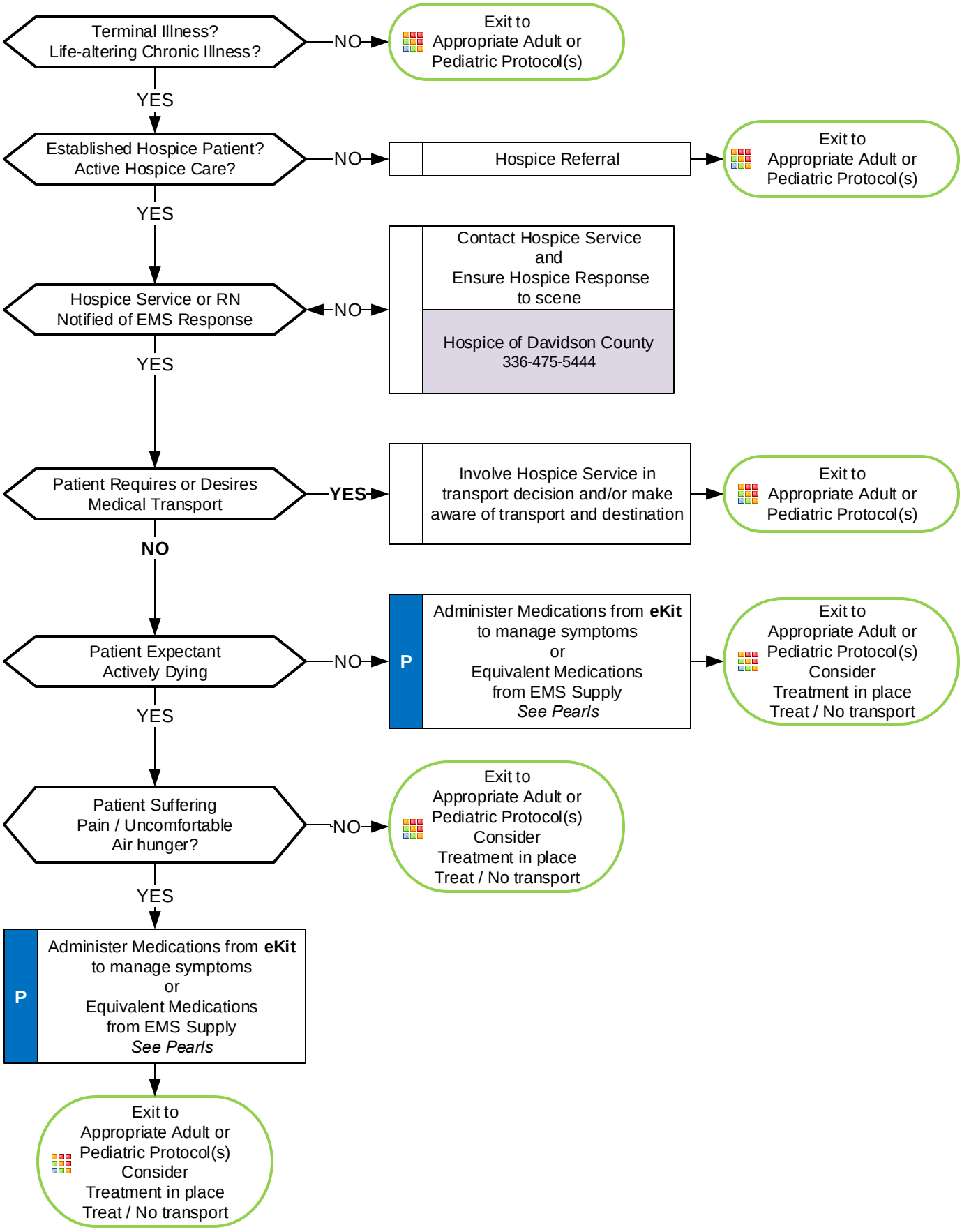
Mandatory Rest Period
Rehydration is Most Important
Re-evaluate in 10 minutes

Notify Destination or Contact Medical Control

Special Operations Section

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

Hospice Patient



Special Operations Section

Hospice 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

Consider using moderate / severe dose in opiate tolerant patients:

Opiate tolerant patients have typical daily dose of narcotic 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
60 mg/day Hydrocodone
15 mg/day of Methadone
16 mg/day of Oxymorphone

If in doubt about 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 (x1) 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

May use more than one agent if nausea persists.

Pearls

- The eKit is given to the patient by Hospice to use at home for acute symptoms. Each eKit may be different for each patient. They typically contain something for pain, nausea, anxiety and secretions.
- Palliative care is specialized care for persons with a terminal illness where the care focuses on managing symptoms and stress of the illness.
- Patients DO NOT have to be DNR to receive hospice care. Patients or POAs can revoke a DNR at any time.
- If a MOST(Medical Orders for Scope of Treatment) form is completed in SECTION A – DO NOT ATTEMPT RESUSCITATION, this is as valid as a completed golden DNR form.
- DNR status does not necessarily mean do not treat or transport. Hospice nurse should be involved in the decision to transport if possible. Hospice nurses are a valuable resource in helping patients and families make care decisions.
- If you give medications and the patient does not want to be transported, care can be transferred to the Hospice nurse, family or the patient.
- IM injections are painful and should be reserved for patients without other means of access.
- If IM or SC injections of opiates are used, titration should be delayed for 30 minutes to avoid dose stacking.
- If a patient has an accessed port or PICC line at home, it may be used to administer medication.

Special Circumstances Section

SC 1 Suspected Viral Hemorrhagic Fever Ebola

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

2017 NCCEP PROCEDURE INDEX

Airway: BIAD-Combitube

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 (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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
13. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

- **Endotracheal intubation with a Combitube in Place (Only if ventilation unsuccessful):**
  - If you cannot ventilate with the Combitube in place, you should remove the tube, open and suction the airway, and ventilate with a BVM prior to intubation or re-establishment of another BIAD.

Certification Requirements:

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

Airway: BIAD King

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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
12. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: BIAD-Laryngeal Mask Airway (LMA)

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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
12. Re-verify LMA placement after every move and upon arrival in the ED
13. Document the procedure, time, and result (success) on/with the patient care report (PCR)
14. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: BIAD-i-Gel

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 resistance is met. Tape to secure or use a commercial tube holder.
9. Connect the i-Gel to an BVM and assess for breath sounds and air entry.
10. **Confirm tube placement using end-tidal CO_2 detector or esophageal bulb device.**
11. Monitor oxygen saturation with pulse oximetry and heart rhythm with ECG
12. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
13. Re-verify i-Gel placement after every move and upon arrival in the ED
43. Document the procedure, time, and result (success) on/with the patient care report (PCR)
15. **It is strongly recommended that an Airway Evaluation Form be completed with any BIAD use.**

Certification Requirements:

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

Airway: Cricothyrotomy-Surgical

Clinical Indications:

P PARAMEDIC P

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

Procedure:

1. Have suction and supplies available and ready.
2. Locate the cricothyroid membrane utilizing anatomical landmarks.
3. Prep the area with an antiseptic swab (Betadine).
4. Attach a 5-cc syringe to an 18G - 1 & 1/2-inch needle.
5. Insert the needle (with syringe attached) perpendicularly through the cricothyroid membrane with the needle directed posteriorly.
6. During needle insertion, gentle aspiration should be applied to the syringe. Rapid aspiration of air into the syringe indicates successful entry into the trachea. Do not advance the needle any further. Attach forceps and remove syringe.
7. With the needle remaining in place, make a 1-inch vertical incision through the skin and subcutaneous tissue above and below the needle using a scalpel. Using blunt dissection technique, expose the cricothyroid membrane. This is a bloody procedure. The needle should act as a guide to the cricothyroid membrane.
8. With the needle still in place, make a horizontal stabbing incision approx. 1/2 inch through the membrane on each side of the needle. Remove the needle.
9. Using (skin hook, tracheal hook, or gloved finger) to maintain surgical opening, insert the cuffed tube into the trachea. (Cric tube from the kit or a #6 endotracheal tube is usually sufficient).
10. Inflate the cuff with 5-10cc of air and ventilate the patient while manually stabilizing the tube.
11. All of the standard assessment techniques for insuring tube placement should be performed (auscultation, chest rise & fall, end-tidal 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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
14. **It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

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

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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
15. **It is strongly recommended that an Airway Evaluation Form be completed with all intubations**

Certification Requirements:

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

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. **Airway should be monitored continuously through Capnography and Pulse Oximetry.**

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.

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.

Airway Intubation Confirmation – End-Tidal CO_2 Detector

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.

It is strongly recommended that continuous Capnography be used in place of or in addition to the use of an End-Tidal CO_2 detector.

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

	MR	
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

	MR	
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 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

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

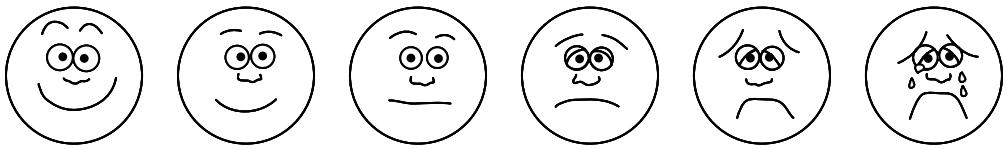
- Any patient with pain.

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

Clinical Indications:

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

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Procedure:

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

	MR	
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 on glucometers at least once every 7 days, if any clinically suspicious readings are noted, and/or as recommended by the manufacturer and document in the log.

Certification Requirements:

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

Capnography

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

	MR	
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

	MR	
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

	MR	
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

	MR	
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

	MR	
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

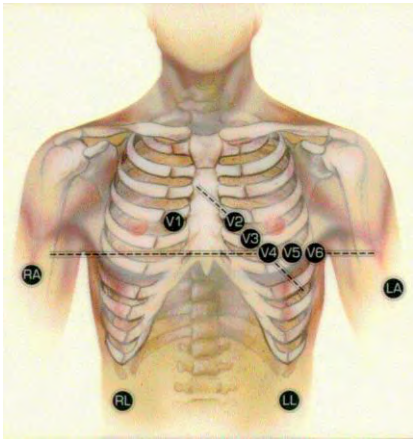
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

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)

	MR	
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

	MR	
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.

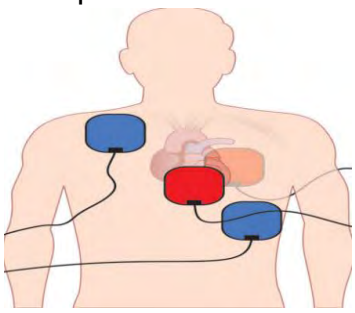
Procedure:

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.

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.

Parenteral Access: Existing Catheters

Clinical Indications:

P PARAMEDIC P

- Inability to obtain adequate peripheral access.
- Access of an existing venous catheter for medication or fluid administration.
- Central venous access in a patient in cardiac arrest.

Procedure:

1. Clean the port of the catheter with alcohol wipe.
2. Using sterile technique, withdraw 5-10 ml of blood and discard syringe in sharps container.
3. Using 5cc of normal saline, access the port with sterile technique and gently attempt to flush the saline.
4. If there is no resistance, no evidence of infiltration (e.g., no subcutaneous collection of fluid), and no pain experienced by the patient, then proceed to step 5. If there is resistance, evidence of infiltration, pain experienced by the patient, or any concern that the catheter may be clotted or dislodged, do not use the catheter.
5. Begin administration of medications or IV fluids slowly and observe for any signs of infiltration. If difficulties are encountered, stop the infusion and reassess.
6. Record procedure, any complications, and fluids/medications administered in the Patient Care Report (PCR).

Certification Requirements:

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

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

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.

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. **It is strongly recommended that the airway (if equipment is available) be monitored continuously through Capnography and Pulse Oximetry.**
10. If any significant change in patient condition, including vital signs or oxygen saturation or there is a concern regarding ventilator performance/alarms, remove the ventilator from the endotracheal tube and use a bag-valve mask with 100% 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

	MR	
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

	MR	
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.

Restraints: Physical

B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

Clinical Indications:

- Any patient who may harm himself, herself, or others may be gently restrained to prevent injury to the patient or crew. This restraint must be in a humane manner and used only as a last resort. Other means to prevent injury to the patient or crew must be attempted first. These efforts could include reality orientation, distraction techniques, or other less restrictive therapeutic means. Physical or chemical restraint should be a last resort technique.

Procedure:

1. Attempt less restrictive means of managing the patient.
2. Request law enforcement assistance and **Contact Medical Control**.
3. Ensure that there are sufficient personnel available to physically restrain the patient safely.
4. Restrain the patient in a lateral or supine position. No devices such as backboards, splints, or other devices will be on top of the patient. The patient will never be restrained in the prone position.
5. The patient must be under constant observation by the EMS crew at all times. This includes direct visualization of the patient as well as cardiac and pulse oximetry monitoring.
6. The extremities that are restrained will have a circulation check at least every 15 minutes. The first of these checks should occur as soon after placement of the restraints as possible. This MUST be documented on the PCR.
7. Documentation on/with the patient care report (PCR) should include the reason for the use of restraints, the type of restraints used, and the time restraints were placed. Use of the Restraint Checklist is highly recommended.
8. If the above actions are unsuccessful, or if the patient is resisting the restraints, consider administering medications per protocol. (Chemical restraint may be considered earlier.)
9. If a patient is restrained by law enforcement personnel with handcuffs or other devices EMS personnel can not remove, a law enforcement officer must accompany the patient to the hospital in the transporting EMS vehicle.

Certification Requirements:

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

Urinary Catheterization

P PARAMEDIC P

Clinical Indications:

- Monitoring a patient's fluid status and/or response to therapy during transport.
- Collection of urine for laboratory analysis.
- Patients with medical (but NOT TRAUMA) complaints over the age of 16.

Procedure:

1. Explain the procedure to the patient. Maximize patient privacy. Have a second crewmember or other chaperone if performing the procedure on a member of the opposite sex.
2. If there is any question of traumatic injury in the Genitourinary (GU) region, do not perform this procedure.
3. Open the catheter kit. Test the balloon at the catheter tip. Connect the catheter to the urine collection system. Maintain the sterility of contents.
4. Use sterile gloves from the kit. Use one hand to come in contact with the patient and the other to use items from the kit. Recall that once your hand touches the patient, it is no longer sterile and cannot be used to obtain items from the kit.
5. Using the Betadine swabs from the kit, thoroughly cleanse the area surrounding the urethra. For males, this will require retracting the foreskin for uncircumcised males and cleansing of the glans for all males. For females, this will require retraction of the labia majora and cleansing of the area around the urethra.
6. Once the patient has been prepped with Betadine, place sterile sheet(s).
7. Lubricate the tip of the catheter.
8. Gently guide the catheter through the external opening of the urethra. Advance the catheter slowly until there is return of urine. Do not force the catheter through resistance. If resistance is encountered, withdraw the catheter slightly and gently re-direct the catheter.
9. Once urine is returned, gently inflate the balloon and secure the urine collection device.
10. Record procedure and amount of urine returned in the Patient Care Report (PCR).

Certification Requirements:

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

Chest Decompression

P PARAMEDIC P

Clinical Indications:

- Patients with hypotension (SBP <90), clinical signs of shock, and at least one of the following signs:
  - Jugular vein distention.
  - Tracheal deviation away from the side of the injury (often a late sign).
  - Absent or decreased breath sounds on the affected side.
  - Hyper-resonance to percussion on the affected side.
  - Increased resistance when ventilating a patient.

- Patients in traumatic arrest with chest or abdominal trauma for whom resuscitation is indicated. These patients may require bilateral chest decompression even in the absence of the signs above.

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.).
2. Administer high flow oxygen.
3. Identify and prep the site:
   - Locate the second intercostals space in the mid-clavicular line on the same side as the pneumothorax.
   - If unable to place anteriorly, lateral placement may be used at the fourth ICS mid-axillary line.
   - Prepare the site with providone-iodine ointment or solution.
4. Insert the catheter (14 gauge for adults) into the skin over the third rib and direct it just over the top of the rib (superior border) into the interspace.
5. Advance the catheter through the parietal pleura until a “pop” is felt and air or blood exits under pressure through the catheter, then advance catheter only to chest wall.
6. Remove the needle, leaving the plastic catheter in place.
7. Secure the catheter hub to the chest wall with dressings and tape.
8. Consider placing a finger cut from an exam glove over the catheter hub. Cut a small hole in the end of the finger to make a flutter valve. Secure the glove finger with tape or a rubber band. (Note – don’t waste much time preparing the flutter valve; if necessary control the air flow through the catheter hub with your gloved thumb.)

Certification Requirements:

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

Spinal Motion Restriction

	MR	
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

	MR	
B	EMT	B
A	AEMT	A
P	PARAMEDIC	P

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

	MR	
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

	MR	
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

	MR	
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

	MR	
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.

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Policy

Criteria for Death / Withholding Resuscitation

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. If a patient is in complete cardiopulmonary arrest (clinically dead) and meets one or more of the criteria below, CPR and ALS therapy need not be initiated:

    - Body decomposition
    - Rigor mortis
    - Dependent lividity
    - Blunt force trauma
    - Injury not compatible with life (i.e., decapitation, burned beyond recognition, massive open or penetrating trauma to the head or chest with obvious organ destruction)
    - Extended downtime with Asystole on the ECG

2. If a bystander or first responder has initiated CPR or automated defibrillation prior to an EMS paramedic's arrival and any of the above criteria (signs of obvious death) are present, the paramedic may discontinue CPR and ALS therapy. All other EMS personnel levels must communicate with medical control prior to discontinuation of the resuscitative efforts.

3. If doubt exists, start resuscitation immediately. Once resuscitation is initiated, continue resuscitation efforts until either:
    a) Resuscitation efforts meet the criteria for implementing the **Discontinuation of Prehospital Resuscitation Policy** (see separate policy)
    b) Patient care responsibilities are transferred to the destination hospital staff.

Deceased Subjects

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Do not remove lines or tubes from unsuccessful cardiac arrests/codes unless directed below.

2. Notify the law enforcement agency with jurisdiction if applicable.

3. If subject was found deceased by EMS, the scene is turned over to law enforcement.

4. If EMS has attempted to resuscitate the patient and then terminated the resuscitative efforts, the EMS personnel should contact the family physician (medical cases) or medical examiner (traumatic cases or family physician unavailable) to provide information about the resuscitative efforts.

5. Transport arrangements should be made in concert with law enforcement and the family's wishes.

6. If the deceased subject's destination is other than the county morgue, any line(s) or tube(s) placed by EMS should be removed prior to transport.

7. Document the situation, name of Physician or Medical Examiner contacted, the agency providing transport of the deceased subject, and the destination on the patient care report form (PCR).

Discontinuation of Prehospital Resuscitation

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Discontinuation of CPR and ALS intervention may be implemented **prior to contact with Medical Control if ALL** of the following criteria have been met:

   - Patient must be 18 years of age or older
   - Adequate CPR has been administered
   - Airway has been successfully managed with verification of device placement. Acceptable management techniques include orotracheal intubation, nasotracheal intubation, Blind Insertion Airway Device (BIAD) placement, or cricothyrotomy
   - IV or IO access has been achieved
   - No evidence or suspicion of any of the following:
     -Drug/toxin overdose **-Active internal bleeding**
     -Hypothermia **-Preceding trauma**
   - Rhythm appropriate medications and defibrillation have been administered according to local EMS Protocols for a total of 3 cycles of drug therapy without return of spontaneous circulation (palpable pulse)
   - All EMS paramedic personnel involved in the patient's care agree that discontinuation of the resuscitation is appropriate

2. If all of the above criteria are not met and discontinuation of prehospital resuscitation is desired, **contact Medical Control**.

3. The **Deceased Subjects Policy** should be followed.

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

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:

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

Purpose:

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

Procedure:

1. When confronted with a patient or situation involving the NC DNR and/or MOST form(s), the following form content must be verified before honoring the form(s) request.

    - The form(s) must be an original North Carolina DNR form (yellow form - not a copy) and/or North Carolina MOST form (bright pink – not a copy)
    - The effective date and expiration date must be completed and current
    - The DNR and/or MOST Form must be signed by a physician, physician's assistant, or nurse practitioner.

2. A valid DNR or MOST form may be overridden by the request of:

    - The patient
    - The guardian of the patient
    - An on-scene physician

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

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

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

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

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.

EMS Documentation and Data Quality

Policy:

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

Definition:

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

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

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

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

Purpose:

The purpose of this policy is to:

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

EMS Documentation and Data Quality

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. The EMS Patient Care Report (PCR) shall be completed as soon as possible after the time of the patient encounter. **Documentation should be completed prior to leaving the destination facility unless call demand dictates otherwise, in which case documentation must be completed prior to the end of the personnel's shift.**

2. **A copy of the patient care report form SHOULD be provided to the receiving medical facility. If the final PCR is not available at the time the patient is left with the emergency department or other healthcare facility, an interim report such as the PreMIS Preliminary Report Form MUST be provided.**

3. The PCR must be completed in the PreMIS System or electronically submitted to the PreMIS System within 24 hours of the EMS event or patient encounter's completion. The EMS data quality feedback provided at the time of the electronic submission into PreMIS should be reviewed and when possible any identified errors will be corrected within each PCR. Each PCR may be electronically resubmitted to PreMIS as many times as needed.

4. The EMS Data Quality Scores for the EMS System, EMS Agency, and individual EMS personnel will be reviewed regularly within the EMS System Peer Review Committee.

Documentation of Vital Signs

Policy:

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

Purpose:

To insure:

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

Procedure:

1. An **initial** complete set of vital signs includes:
    - Pulse rate
    - Systolic **AND** diastolic blood pressure
    - Respiratory rate
    - Pain / severity (when appropriate to patient complaint)
    - GCS for Injured Patients

2. When no ALS treatment is provided, palpated blood pressures are acceptable for **REPEAT** vital signs.

3. Based on patient condition and complaint, vital signs may also include:
    - Pulse Oximetry
    - Temperature
    - End Tidal CO2
    - Breath Sounds
    - Level of Response

4. If the patient refuses this evaluation, the patient's mental status and the reason for refusal of evaluation must be documented. A patient disposition form must also be completed.

5. Document situations that preclude the evaluation of a complete set of vital signs.

6. Record the time vital signs were obtained.

7. Any abnormal vital sign should be repeated and monitored closely.

EMS Dispatch Center Time

Policy:

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

Definition:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. A public calls into the 911 Communications Center requesting emergency medical assistance will never be required to speak with more than two persons before a formal EMS Unit is dispatched.

2. In EMS Dispatch Centers where Emergency Medical Dispatch (EMD) has been implemented, EMS Units will be dispatched by EMD certified personnel in accordance with the standards developed by the Medical Director and the Emergency Medical Dispatch Protocols.

3. EMS Units will be dispatched hot (with lights and sirens) or cold (no lights and sirens) by the 911 Call Center based on predetermined criteria. If First Responders are dispatched as a component of the EMS response, they should typically be dispatched hot (with lights and sirens).

4. Without question, exception, or hesitation, EMS Units will respond as dispatched (hot or cold). This includes both requests to respond on active calls and requests to "move-up" to cover areas of the System that have limited EMS resources available.

5. EMS Units may, at their discretion, request for a First Responder on Non-First Responder calls in situations where additional resources are required such as manpower, extreme response time of the EMS Unit, need for forcible entry, etc.

EMS Dispatch Center Time

6. EMS Units dispatched with a cold (no lights and sirens) response, will not upgrade to a hot (with lights and sirens) response **UNLESS**:
   - Public Safety personnel on-scene requests a hot (with lights and sirens) response.
   - Communications Center determines that the patient's condition has changed, and requests you to upgrade to a hot (with lights and sirens) response.

7. An EMS Unit may divert from a current cold (no lights and sirens) call to a higher priority hot (with lights and sirens) call **ONLY IF:**
   - The EMS Unit can get to the higher priority call before it can reach the lower priority call. Examples of High Priority Calls: Chest Pain, Respiratory Distress, CVA, etc.
   - The diverting EMS Unit must notify the EMS Dispatch Center that they are diverting to the higher priority call.
   - The diverting EMS Unit ensures that the EMS Dispatch Center dispatches an EMS Unit to their original call.
   - Once a call has been diverted, the next EMS Unit dispatched must respond to the original call. A call cannot be diverted more than one (1) time.

8. Any EMS Dispatch Center Time delays resulting in a prolonged EMS Dispatch Center Time for emergent hot (with lights and sirens) events will be documented in Patient Care Report (PCR) as an "EMS Dispatch Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.

9. All EMS Dispatch Delays will be reviewed regularly within the EMS System Peer Review Committee.

Drug Assisted Airway

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. In addition to other monitoring devices, Waveform Capnography and Pulse Oximetry are required to perform Drug Assisted Airways and must be monitored throughout the procedure.

2. Two Paramedics or higher-level providers must be present and participate in the airway management of the patient during the procedure.

3. All staff must be trained and signed off by the EMS Medical Director prior to performing Drug Assisted Airways.

4. A printed copy or electronic download from the monitor defibrillator including the pulse oximetry, heart rate, heart rhythm, waveform capnography, and blood pressure must be stored with the patient care report.

5. An EMS Airway Evaluation Form must be completed on all Drug Assisted Airway Attempts.

6. The EMS Airway Evaluation Form must be reviewed and signed by the EMS Medical Director within 14 days of the Drug Assisted Airway attempts.

7. All Drug Assisted Airways must be reviewed by the EMS System or Agency and issues identified addressed through the System Peer Review Committee.

8. A copy of the EMS Airway Evaluation form for each Drug Assisted Airways must be forwarded to the appropriate OEMS Regional Office listed below at the end of each month for state review.

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

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

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

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

Child with Special Health Care Needs (NC Kidbase)

Policy:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

1. Caregivers who call 911 to report an emergency involving a child with special health care needs may report that the emergency involves a "Kidbase child" (if they are familiar with the NC Kidbase program) or may state that the situation involves a special needs child.

2. Responding EMS personnel should ask the caregiver of a special needs child for a copy of the "Kidbase Form", which is the North Carolina terminology for the Emergency Information Form (EIF).

3. EMS personnel may choose to contact the child's primary care physician for assistance with specific conditions or devices or for advice regarding appropriate treatment and/or transport of the child in the specific situation.

4. Transportation of the child, if necessary, will be made to the hospital appropriate for the specific condition of the child. In some cases this may involve bypassing the closest facility for a more distant yet more medically appropriate destination.

Infant Abandonment

Policy:

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

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

Purpose:

To provide:

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

Procedure:

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

EMS Back in Service Time

Policy:

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

Definition:

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

Purpose:

The purpose of this policy is to:

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

Procedure:

The following procedures shall be implemented to assure policy compliance:

1. The EMS Unit's priority upon arrival at the medical facility will be to transfer the care of the patient to medical facility staff as soon as possible.

2. EMS personnel will provide a verbal patient report on to the receiving medical facility staff.

3. EMS personnel will provide an interim (PreMIS Preliminary Report or equivalent) or final Patient Care Report (PCR) to the receiving medical facility staff, prior to leaving the facility, that documents at a minimum the patient's evaluation and care provided by EMS prior to arrival at the medical facility. A complete PCR should be completed as soon as possible but should not cause a delay in the EMS Back in Service Time.

4. The EMS Unit will be cleaned, disinfected, and restocked (if necessary) during the EMS Back in Service Time interval.

5. Any EMS Back in Service Time delay resulting in a prolonged EMS Back in Service Time will be documented in Patient Care Report (PCR) as an "EMS Turn-Around Delay" as required and defined in the North Carolina College of Emergency Physicians (NCCEP) EMS Dataset Standards Document.

6. All EMS Turn-Around Delays will be reviewed regularly within the EMS System Peer Review Committee.

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.

Disposition Instruction Form

Instructions

The EMS Patient Disposition Information (PDI) form has been designed to be used by EMS personnel to legally document a variety of situations. This duplicate form consists of a single page. The front of the page is used to describe the situation and the back lists a variety of specific patient instructions by complaint.

The form should be used to document any refusal of care by a patient (complete refusal or refusal of specific aspects of care) and to document the patient / guardian's understanding of medical instructions.

To understand the intent of this form, it is probably simplest to walk through several common patient encounter situations.

1. Complete refusal of EMS care or transport: The first box "Patient Refusal" should be marked. In the first section, the appropriate blocks for "paramedic recommendation" should also be marked. This section should be explained to the patient or guardian, who should understand that their refusal may result in complications up to and including death. The patient or guardian should be asked to sign the form, indicating that he/she understands the seriousness of the situation and the information provided. If the situation warrants, the paramedic should explain the risks of the refusal using the patient instructions section and the back of the form for assistance. If the instructions section is used, the appropriate blocks should also checked.

2. Refusal of a specific procedure (IV therapy, for example): The first box "Patient Refusal" should be marked. In the first section, the specific refused procedure should be marked. The first section should be explained to the patient or guardian, who should understand the potential consequences of their refusal. The patient or guardian should be asked to sign the form, indicating that he/she understands the seriousness of the situation.

3. The box "Patient Instructions" and the appropriate blocks in that section should be marked. This section and the specific instructions (on the back) should all be carefully explained to the patient and/or guardian, who must understand them. The patient or guardian should be asked to sign the form, indicating that he/she understands the instructions and the seriousness of the situation.

In all situations, the top part of the form should be completed, and as much of the signature portion as necessary. It is preferable to have witnesses, particularly if the patient or guardian refuses to sign. The original form should be kept on file, while a duplicate copy should be provided for the patient or guardian.

PCR Number

Emergency Medical Services (EMS)
Patient Disposition Information

Patient's name	Date of Birth	Date
Patient's Address	Phone	EMS Professionals Name No.

PATIENT REFUSAL

☐ *This section only applies if this box is marked*

The Paramedic has recommended:

- ☐ Measuring the patient's blood pressure
- ☐ A backboard and neck collar for the patient
- ☐ Ambulance transportation for the patient
- ☐ A complete physical exam of the patient
- ☐ Giving the patient oxygen
- ☐ Starting an IV for the patient
- ☐ Giving the patient medicine _____
- ☐ Other _____

I refuse the care that the Paramedic has recommended. I understand that my refusal may result in serious injury or death to the patient. I accept full responsibility for this decision. I assume all risks and consequences resulting from my refusal of care. I will not hold the EMS service or its officers, agents, or employees responsible for any bad things that happen to the patient because of my refusal.

My signature below attests that I understand what has been recommended, what the consequences may be if that is not done, and I still refuse to have the recommended care provided by the EMS service.

PATIENT INSTRUCTIONS

☐ *This section only applies if this box is marked*

You have not been evaluated by a doctor.

You should contact or see your doctor immediately.

The patient is being released to:

- ☐ Family member
- ☐ Guardian
- ☐ Law Enforcement Officer
- ☐ Other: _____

Follow the instructions (printed on the back of this form) indicated:

- ☐ Abdominal Pain
- ☐ Back Pain
- ☐ Head Injury
- ☐ Insect Bite/Sting
- ☐ Extremity Injury
- ☐ Vomiting / Diarrhea
- ☒ Universal
- ☐ Fever
- ☐ Respiratory Distress
- ☐ Wound Care

Other instructions: _____

Guardian's name (printed)	☐ Patient ☐ Guardian ☐ Refused to Sign	Patient / Guardian Signature	
Guardian's address ☐ Same as Patient		Date of Signatures	EMS Personnel's Signature
Witness Signature	Witness Signature	Patient's Physician Name / Phone Number	

Discharge Instructions

UNIVERSAL INSTRUCTIONS:

• YOU HAVE NOT RECEIVED A COMPLETE MEDICAL EVALUATION. SEE A PHYSICIAN AS SOON AS POSSIBLE.

• IF AT ANY TIME AFTER YOU HAVE TAKEN ANY MEDICATION, YOU HAVE TROUBLE BREATHING, START WHEEZING, GET HIVES OR A RASH, OR HAVE ANY UNEXPECTED REACTION, CALL 911 IMMEDIATELY.

• IF YOUR SYMPTOMS WORSEN AT ANY TIME, YOU SHOULD SEE YOUR DOCTOR, GO TO THE EMERGENCY DEPARTMENT OR CALL 911.

ABDOMINAL PAIN:

- Abdominal pain is also called belly pain. Many illnesses can cause abdominal pain and it is very difficult for EMS to identify the cause.
- Take your temperature every 4 hours.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- Your pain gets worse or is now only in 1 area
- You vomit (throw up) blood or find blood in your bowel movement
- You become dizzy or faint
- Your abdomen becomes distended or swollen
- You have a temperature over 100° F
- You have trouble passing urine
- You have trouble breathing

BACK PAIN:

- Apply heat to the painful area to help relieve pain. You may use a warm heating pad, whirlpool bath, or warm, moist towels for 10 to 20 minutes every hour.
- Stay in bed as much as possible the first 24 hours.
- Begin normal activities when you can do them without causing pain.
- When picking things up, bend at the hips and knees. Never bend from the waist only.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- You have shooting pains into your buttocks, groin, legs, or arms or the pain increases.
- You have trouble urinating or lose control of your stools or urine.
- You have numbness or weakness in your legs, feet, arms, or hands.

FEVER:

- Always take medications as directed. Tylenol and Ibuprofen can be taken at the same time.
- If you are taking antibiotics, take them until they are gone, not until you are feeling better.
- Drink extra liquids (1 glass of water, soft drink or gatorade per hour of fever for an adult)
- If the temperature is above 103° F, it can be brought down by a sponge bath with room temperature water. Do not use cold water, a fan, or an alcohol bath.
- Temperature should be taken every 4 hours .

Call or see a physician, go to the emergency department, or call 911 immediately if:

- Temperature is greater than 101° F for 24 hours
- A child becomes less active or alert.
- The Temperature does not come down with Acetaminophen (Tylenol) or Ibuprofen with the appropriate dose.

HEAD INJURY:

- Immediately after a blow to the head, nausea, and vomiting may occur.
- Individuals who have sustained a head injury must be checked, and if necessary awakened, every 2 hours for the first 24 hours.
- Ice may be placed on the injured area to decrease pain and swelling.
- Only drink clear liquids such as juices, soft drinks, or water the first 12 hours after injury..
- Acetaminophen (Tylenol) or Ibuprofen only may be used for pain.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- The injured person has persistent vomiting, is not able to be awakened, has trouble walking or using an arm or leg, has a seizure, develops unequal pupils, has a clear or bloody fluid coming from the ears or nose, or has strange behavior.

INSECT BITE/STING:

- A bite or sting typically is a red lump which may have a hole in the center. You may have pain, swelling and a rash. Severe stings may cause a headache and an upset stomach (vomiting).
- Some individuals will have an allergic reaction to a bite or sting. Difficulty breathing or chest pain is an emergency requiring medical care.
- Elevation of the injured area and ice (applied to the area 10 to 20 minutes each hour) will decrease pain and swelling.
- Diphenhydramine (Benadryl) may be used as directed to control itching and hives.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- You develop any chest pain or difficulty breathing.
- The area becomes red, warm, tender, and swollen beyond the area of the bite or sting.
- You develop a temperature above 101° F.

RESPIRATORY DISTRESS:

- Respiratory Distress is also known as shortness of breath or difficulty breathing.
- Causes of Respiratory Distress include reactions to pollen, dust, animals, molds, foods, drugs, infections, smoke, and respiratory conditions such as Asthma and COPD. If possible avoid any causes which produce respiratory distress.
- If you have seen a physician for this problem, take all medication's as directed.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- Temperature is greater than 101° F.
- The cough, wheezing, or breathing difficulty becomes worse or does not improve even when taking medications.
- You have Chest Pain.
- Sputum (spit) changes from clear to yellow, green, grey, or becomes bloody.
- You are not able to perform normal activities.

EXTREMITY INJURY:

- Extremity Injuries may consist of cuts, scrapes, bruises, sprains, or broken bones (fractures).
- Apply ice on the injury for 15 to 20 minutes each hour for the first 1 to 2 days.
- Elevate the extremity above the heart as possible for the first 48 hours to decrease pain and swelling.
- Use the extremity as pain allows.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- Temperature is greater than 101° F.
- The bruising, swelling, or pain gets worse despite the treatment listed above.
- Any problems listed on the **Wound Care instructions** are noted.
- You are unable to move the extremity or if numbness or tingling is noted.
- You are not improved in 24 to 48 hours or you are not normal in 7 to 10 days.

VOMITING/DIARRHEA:

- Vomiting (throwing up) can be caused by many things. It is common in children, but should be watched closely.
- Diarrhea is most often caused by either a food reaction or infection.
- Dehydration is the most serious problem associated with vomiting or diarrhea.
- Drink clear liquids such as water, apple juice, soft drinks, or gatorade for the first 12 hours or until things improve. Adults should drink 8 to 12 glasses of fluids per day with diarrhea. Children should drink 1 cup of fluid for each loose bowel movement.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- Temperature is greater than 101° F.
- Vomiting or Diarrhea lasts longer than 24 hours, gets worse, or blood is noted.
- You cannot keep fluids down or no urination **is** noted in 8 hours.

WOUND CARE:

- Wounds include cuts, scrapes, bites, abrasions, or puncture wounds.
- If the wound begins to bleed, apply pressure over the wound with a clean bandage and elevate the wound above the heart for 5 to 10 minutes.
- Unless instructed otherwise, clean the wound twice daily with soapy water, and keep the wound dry. It is safe to take a shower but do not place the wound in bath or dish water.
- See a physician for a tetanus shot if it has been 10 years or more since your last one.

Call or see a physician, go to the emergency department, or call 911 immediately if:

- See the **Extremity Injury instructions**.
- Temperature is greater than 101° F.
- Bruising, swelling, or pain gets worse or bleeding is not controlled as directed above.
- Any signs of infection, such as redness, drainage of yellow fluid or pus, red streaks extending from the wound, or a bad smell is noted.

On-Scene Physician Form

This EMS service would like to thank you for your effort and assistance. Please be advised that the EMS Professionals are operating under strict protocols and guidelines established by their medical director and the State of North Carolina. As a licensed physician, you may assume medical care of the patient. In order to do so, you will need to:

1. Receive approval to assume the patient's medical care from the EMS Agencies Online Medical Control physician.
2. Show proper identification including current North Carolina Medical Board Registration/ Licensure.
3. Accompany the patient to the hospital.
4. Carry out any interventions that do not conform to the EMS Agencies Protocols. EMS personnel cannot perform any interventions or administer medications that are not included in their protocols.
5. Sign all orders on the EMS Patient Care Report.
6. Assume all medico-legal responsibility for all patient care activities until the patient's care is transferred to another physician at the destination hospital.
7. Complete the "Assumption of Medical Care" section of this form below.

Assumption of Medical Care

I, _____, MD; License #: _____,
(Please Print your Name Here)

have assumed authority and responsibility for the medical care and patient management for

_____.
(Insert Patient's Name Here)

I understand that I must accompany the patient to the Emergency Department. I further understand that all EMS personnel must follow North Carolina EMS Rules and Regulations as well as local EMS System protocols.

_____, MD Date: _____/_____/_____Time: _____AM/PM
(Physician Signature Here)

_____, EMS _____ Witness
(EMS Lead Crew Member Signature Here) **(Witness Signature Here)**

Apgar Score

The Apgar score should be obtained and recorded initially and at 5 minutes with the birth of delivery of any infant.

- Each of the 5 parameters should be scored and then totaled.
- The Minimum score is 0
- The Maximum score is 10

Sign	0	1	2
Heart Rate	Absent	<100 min.	>100 min.
Respiratory Effort	Absent	Weak Cry	Strong Cry
Muscle Tone	Limp	Some Flexion	Good Flexion
Reflex Irritability (when feet stimulated)	No Response	Some Motion	Cry
Color	Blue; Pale	Body Pink Extremities Blue	Pink

Los Angeles Prehospital Stroke Screen (LAPSS)

1. Patient Name: _____ (last name) _____ (first name)

2. Information/History from: [ ] Patient [ ] Family Member [ ] Other

_____ (name - if other than patient) _____ (phone)

3. Last known time patient was at baseline or deficit free and awake:

_____ (military time) _____ (date)

SCREENING CRITERIA

	Yes	Unknown	No
4. Age > 45	[ ]	[ ]	[ ]
5. History of seizures or epilepsy absent	[ ]	[ ]	[ ]
6. Symptom duration less than 24 hours	[ ]	[ ]	[ ]
7. At baseline, patient is not wheelchair bound or bedridden	[ ]	[ ]	[ ]
8. Blood glucose between 60 and 400	[ ]	[ ]	[ ]

9. Exam: **LOOK FOR OBVIOUS ASYMMETRY**

	Normal	Right	Left
Facial smile/grimace	[ ]	[ ] Droop	[ ] Droop
Hand grip	[ ]	[ ] Weak	[ ] Weak
		[ ] No grip	[ ] No grip
Arm strength	[ ]	[ ] Drifts dn	[ ] Drifts dn
		[ ] Falls fast	[ ] Falls fast

Based on exam, patient has only unilateral (not bilateral) weakness: [ ] **YES** [ ] **NO**

10. **Items 4, 5, 6, 7, 8, 9 all YES's (or unknown) --- LAPSS screening criteria met**:

[ ] **YES** [ ] **NO**

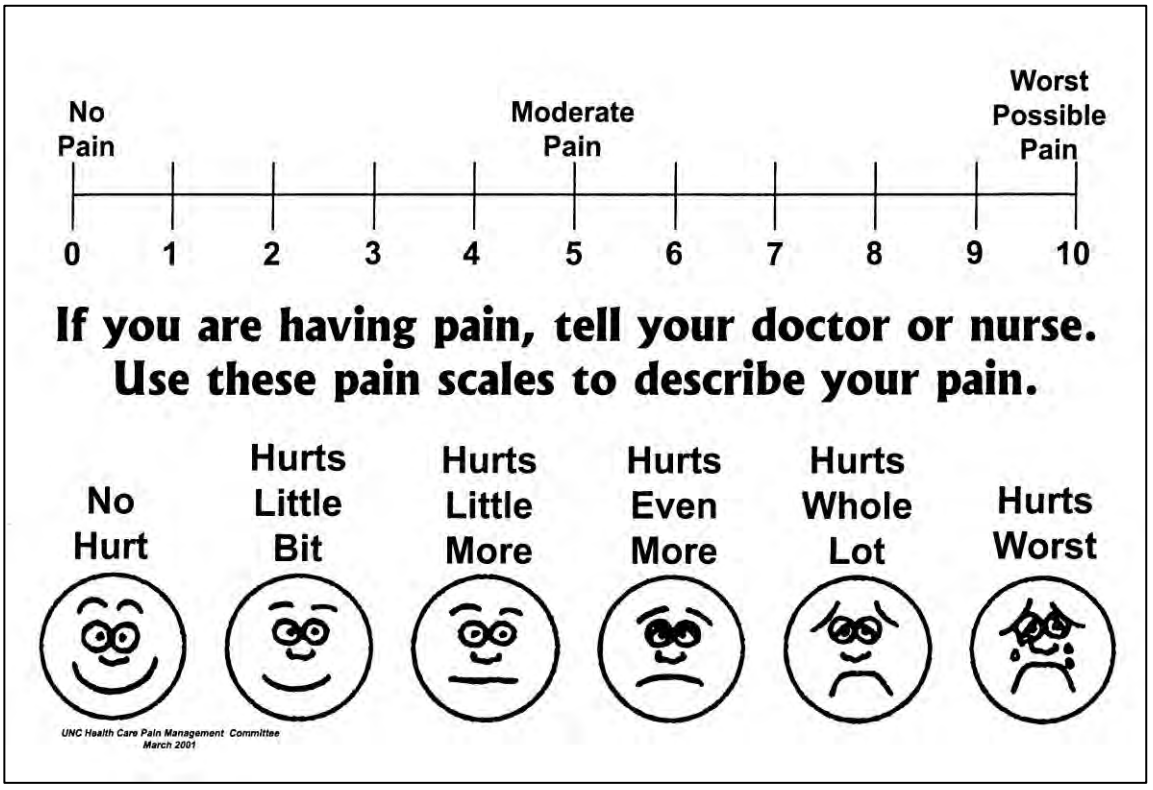
11. If LAPSS criteria for stroke are met, alert the receiving hospital of a possible stroke patient. If not, then return to the appropriate treatment protocol.

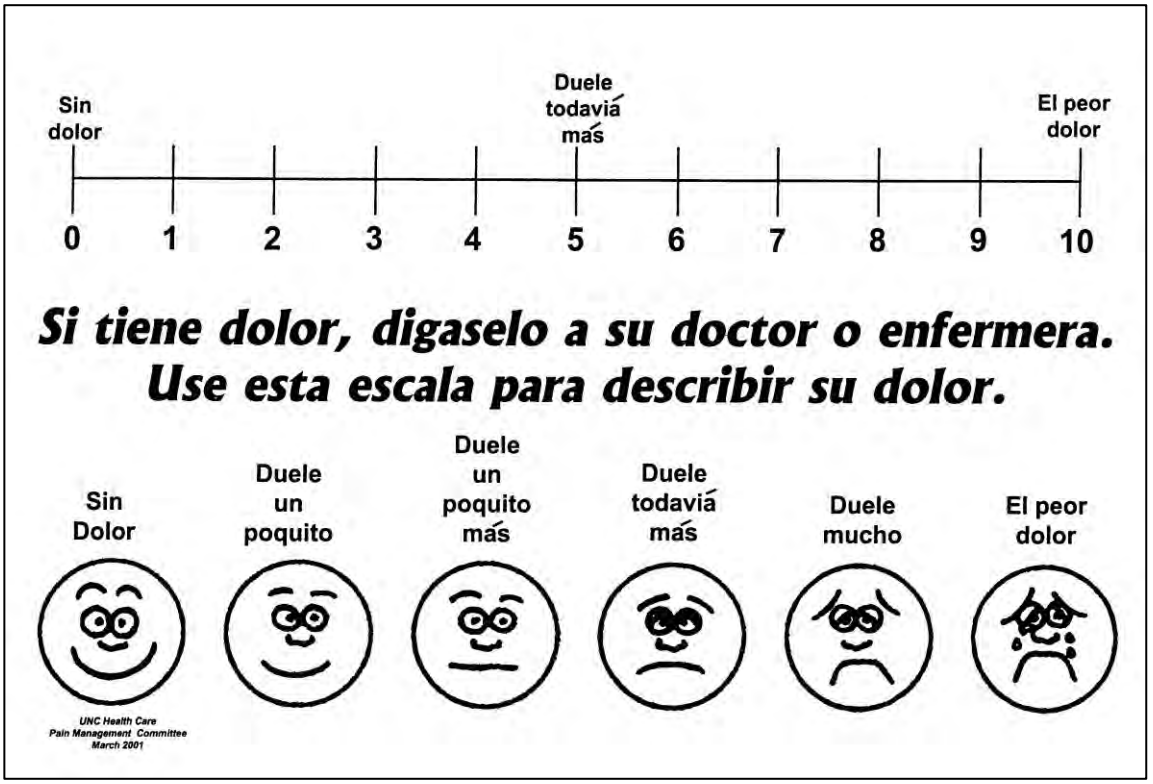
(Note: the patient may be experiencing a stroke even if the LAPSS criteria are not met.)

12. Time LAPSS Exam Performed: Military Time:_____

13. Form Completed by:_____

Pain Scale Forms





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.

Restraint Checklist

Patient's Name: _____

PCR Number:_____ **Date:** _____

It is recommended that a Restraint Checklist be completed with any restraint use.

1. Reason for restraint (check all that apply):

- ☐ Patient attempting to hurt self
- ☐ Patient attempting to hurt others
- ☐ Patient attempting to remove medically necessary devices

2. Attempted verbal reassurance / redirection?

- ☐ Yes
- ☐ No

3. Attempted environmental modification? (i.e. remove patient from stressful environment)

- ☐ Yes
- ☐ No

4. Received medical control order for restraints?

- ☐ Yes _____, MD
- ☐ No **(Medical Control Physician Name Here)**

5. Time and Type of restraint applied (check all that apply):

Date: _____/_____/_____Time: _____AM/PM

Limb restraints:

- ☐ LUE
- ☐ RUE
- ☐ LLE
- ☐ RLE

Chemical Restraint:

- ☐ Yes
- ☐ No

If Yes: Drug Used: _____

Total Dose: _____

6. Vital signs and extremity neurovascular exam should be taken every 15 minutes.

7. Transport Position (Patient should NOT be in prone position)

- ☐ Supine position for transport
- ☐ Lateral recumbent position for transport

Signature: _____

(EMS Lead Crew Member)

Approved Medical Abbreviations

The following is a list of approved medical abbreviations. In general, the use of abbreviations should be limited to this list.

A&O x 3	- alert and oriented to person, place and time
A&O x 4	- alert and oriented to person, place, time and event
A-FIB	- atrial fibrillation
AAA	- abdominal aortic aneurysm
ABC	- airway, breathing, circulation
ABD	- abdomen (abdominal)
ACLS	- advanced cardiac life support
AKA	- above the knee amputation
ALS	- advanced life support
AMA	- against medical advice
AMS	- altered mental status
AMT	- amount
APPROX	- approximately
ASA	- aspirin
ASSOC	- associated
BG	- blood glucose
BILAT	- bilateral
BKA	- below the knee amputation
BLS	- basic life support
BM	- bowel movement
BP	- blood pressure
BS	- breath sounds
BVM	- bag-valve-mask
C-SECTION	- caesarean section
C-SPINE	- cervical spine
C/O	- complaint of (complains of)
CA	- cancer
CABG	- coronary artery bypass graft
CAD	- coronary artery disease
CATH	- catheter
CC	- chief complaint
CEPH	- cephalic
CHF	- congestive heart failure
CNS	- central nervous system
COPD	- chronic obstructive pulmonary disease
CP	- chest pain
CPR	- cardiopulmonary resuscitation
CSF	- cerebrospinal fluid
CT	- cat scan
CVA	- cerebrovascular accident (stroke)

Approved Medical Abbreviations

D5W	- 5% dextrose in water
DKA	- diabetic ketoacidosis
DNR	- do not resuscitate
DOA	- dead on arrival
DT	- delirium tremens
Dx	- diagnosis
ECG	- electrocardiogram
EEG	- electroencephelogram
ET	- endotracheal
ETOH	- ethanol (alcohol)
ETT	- endotracheal tube
EXT	- external (extension)
FB	- foreign body
FLEX	- flexion
Fx	- fracture
g	- gram(s)
GI	- gastrointestinal
GSW	- gunshot wound
gtts	- drops
GU	- gastrourinary
GYN	- gynecology (gynecological)
H/A	- headache
HEENT	- head, eyes, ears, nose, throat
HR	- heart rate (hour)
HTN	- hypertension
Hx	- history
ICP	- intracranial pressure
ICU	- intensive care unit
IM	- intramuscular
IV	- intravenous
JVD	- jugular vein distension
kg	- kilogram
KVO	- keep vein open

Approved Medical Abbreviations

L-SPINE	- lumbar spine
L/S-SPINE	- lumbarsacral spine
L&D	- labor and delivery
LAT	- lateral
lb	- pound
LLQ	- left lower quadrant
LMP	- last mestrual period
LOC	- level of consciousness (loss of consciousness)
LR	- lactated ringers
LUQ	- left upper quadrant
MAST	- military anti-shock trousers
mcg	- microgram(s)
MED	- medicine
mg	- milligram(s)
MI	- myocardial infarction (heart attack)
min	- minimum / minute
MS	- mental status
MS	- mental status change
MSO4	- morphine
MVC	- motor vehicle crash
N/V	- nausea/vomiting
N/V/D	- nausea/vomiting/diarrhea
NAD	- no apparant distress
NC	- nasal cannula
NEB	- nebulizer
NKDA	- no known drug allergies
NRB	- non-rebreather
NS	- normal saline
NSR	- normal sinus rhythm
OB/GYN	- obstetrics/gynecology
PALP	- palpation
PAC	- premature atrial contraction
PE	- pulmonary embolus
PEARL	- pupils equal and reactive to light
PMHx	- past medical history
PO	- orally
PRB	- partial rebreather
PRN	- as needed
PT	- patient
PVC	- premature ventricular contraction

Approved Medical Abbreviations

RLQ	- right lower quadrant
RUQ	- right upper quadrant
Rx	- medicine
RXN	- reaction
S/P	- status post
SOB	- shortness of breath
SQ	- subcutaneous
ST	- sinus tachycardia
SVT	- supraventricular tachycardia
Sx	- symptom
SZ	- seizure
T-SPINE	- thoracic spine
T	- temperature
TIA	- transient ischemic attack
TKO	- to keep open (refers to IV's - same as KVO)
Tx	- treatment
UOA	- upon our arrival
URI	- upper respiratory infection
UTI	- urinary tract infection
VF	- ventricular fibrillation
VS	- vital signs
VT	- ventricular tachycardia
WAP	- wandering atrial pacemaker
WNL	- within normal limits
YO (YOA)	- years old (years of age)
M or ♂	- male
F or ♀	- female
+	- positive
-	- negative
?	- questionable
Ψ	- psychiatric
~	- approximately
>	- greater than
<	- less than
=	- equal

Approved Medical Abbreviations

$\overline{\uparrow}$	- upper (increased)
$\overline{a}$	- before
$\overline{p}$	- after
$\overline{c}$	- with
s	- without
Δ	- change
L	- left
R	- right
$\downarrow$	- lower (decreased)
1°	- primary
2°	- secondary

Reperfusion Checklist

The Reperfusion Checklist is an important component in the initial evaluation, treatment, and transport of patients suffering from an acute ST-elevation myocardial infarction (STEMI) or acute Stroke. Both of these conditions can be successfully treated using fibrinolysis (thrombolytics) if the patient arrives at the appropriate hospital within the therapeutic window of time.

This form should be completed for all acute STEMI and acute Stroke patients.

Patient's Name: _____

PCR Number:_____ Date: _____

1. Has the patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?

☐ Yes ☐ No

2. Has the patient developed a sudden neurologic deficit with a positive Los Angeles Prehospital Stroke Screen?

☐ Yes ☐ No

3. Are there any contraindications to fibrinolysis?

If any of the following are checked "Yes", fibrinolysis MAY be contraindicated.

☐ Yes	☐ No	Systolic Blood Pressure greater than 180 mm Hg
☐ Yes	☐ No	Diastolic Blood Pressure greater than 110 mm Hg
☐ Yes	☐ No	Right vs. Left Arm Systolic Blood Pressure difference of greater than 15 mm Hg
☐ Yes	☐ No	History of structural Central Nervous System disease (tumors, masses, hemorrhage, etc.)
☐ Yes	☐ No	Significant closed head or facial trauma within the previous 3 months
☐ Yes	☐ No	Recent (within 6 weeks) major trauma, surgery (including laser eye surgery), gastrointestinal bleeding, or severe genital-urinary bleeding
☐ Yes	☐ No	Bleeding or clotting problem or on blood thinners
☐ Yes	☐ No	CPR performed greater than 10 minutes
☐ Yes	☐ No	Currently Pregnant
☐ Yes	☐ No	Serious Systemic Disease such as advanced/terminal cancer or severe liver or kidney failure.

4. (STEMI Patients Only) Does the patient have severe heart failure or cardiogenic shock?
These patients may benefit more from a percutaneous coronary intervention (PCI) capable hospital.

☐ Yes	☐ No	Presence of pulmonary edema (rales greater than halfway up lung fields)
☐ Yes	☐ No	Systemic hypoperfusion (cool and clammy)

<u>If any contraindication is checked as "Yes" and an acute Stroke is suspected by exam or a STEMI is confirmed by ECG, activate the EMS Stroke Plan or EMS STEMI Plan for fibrinolytic ineligible patients.</u> 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.

Difficult Airway Evaluation

Evaluating for the difficult airway

Between 1 – 3% of patients who require endotracheal intubation have airways that make intubation difficult. Recognizing those patients who may have a difficult airway allows the paramedic to proceed with caution and to keep as many options open as possible. It also allows the paramedic to prepare additional equipment (such as a cricothyrotomy kit) that may not ordinarily be part of a standard airway kit. The pneumonic LEMON is useful in evaluating patients for signs that may be consistent with a difficult airway and should raise the paramedic's index of suspicion.

Look externally

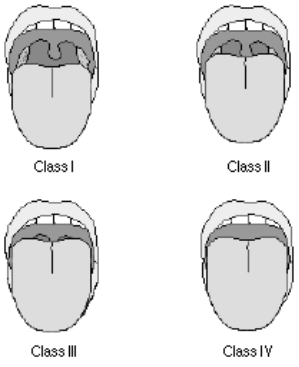
External indicators of either difficult intubation or difficult ventilation include: presence of a beard or moustache, abnormal facial shape, extreme cachexia, edentulous mouth, facial trauma, obesity, large front teeth or "buck teeth", high arching palate, receding mandible, short bull neck.

Evaluate 3-3-2 Rule

3 fingers between the patient's teeth (patient's mouth should open adequately to permit three fingers to be placed between the upper and lower teeth)
3 fingers between the tip of the jaw and the beginning of the neck (under the chin)
2 fingers between the thyroid notch and the floor of the mandible (top of the neck)

Mallampati

This scoring system is based on the work of Mallampati et al published in the Canadian Anaesthesia Society Journal in 1985. The system takes into account the anatomy of the mouth and the view of various anatomical structures when the patient opens his mouth as wide as possible. This test is performed with the patient in the sitting position, the head held in a neutral position, the mouth wide open, and the tongue protruding to the maximum. Inappropriate scoring may occur if the patient is in the supine position (instead of sitting), if the patient phonates or if the patient arches his or her tongue.



Class I (easy) = visualization of the soft palate, fauces, uvula, anterior and posterior pillars.
Class II = visualization of the soft palate, fauces and uvula.
Class III = visualization of the soft palate and the base of the uvula.
Class IV (difficult) = soft palate is not visible at all.

Obstruction?

Besides the obvious difficulty if the airway is obstructed with a foreign body, the paramedic should also consider other obstructers such as tumor, abscess, epiglottis, or expanding hematoma.

Neck Mobility

Ask the patient to place their chin on their chest and to tilt their head backward as far as possible. Obviously, this will not be possible in the immobilized trauma patient.

Burns Resources

Fluid Formula

Formula for Fluid Resuscitation of the Burn Patient (Also known as the Parkland Formula)

Pts Wt kg x %TBSA x 4.0cc LR infused over 24 hours with half given in the first 8 hours.

(For the equation, the abbreviations are: PW x TBSA x 4.0 cc)

EMS focuses on the care given during the 1st hour or several hours following the event. Thus the formula as adapted for EMS and the first 8 hours is:

PW x TBSA x 4.0 cc, divide by 2

to take this to the hourly rate, divide that solution by 8 and the equation becomes:

PW x TBSA x 4.0cc / 2 / 8 = total to be infused for each of the first 8 hours.

Another way to state the equation is to use:
PW x TBSA x 0.25cc = total to be infused for each hour of the first 8 hours.

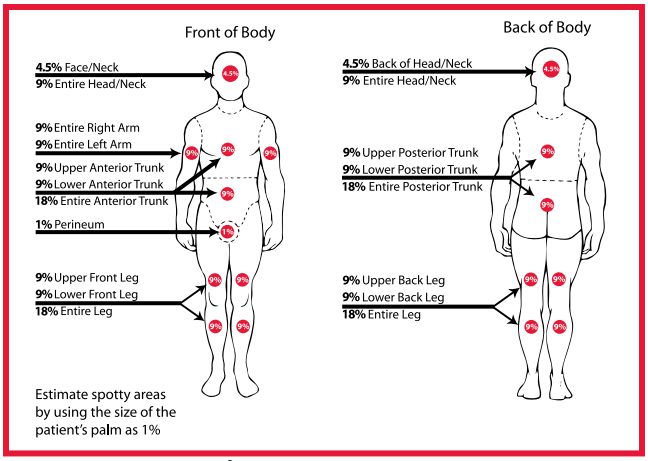
Example, 80 kg patient with 50 %TBSA x 0.25 cc = 1000 cc/hr.

Remember:
Patient's Weight in kg (2.2 lbs = 1.0 kg) example: 220 lbs adult = 100 kg

% TSBA = Rule of Nine Total Body Surface Area

Factor for the 1st hr. and each hr. for the 1st 8 hrs. = 0.25

(Reminder, if two IV's are running, divide total amount to be infused each hr. by 2)



Wt (kg)	% TBSA	Factor	/Hr for 1st 8 Hrs of Care	60 gtt set, gtt/ min	20 gtt set, gtt/ min	15 gtt set, gtt/ min	10 gtt set, gtt/ min
10	10	0.25	25	25	8.3	6.3	4.2
10	20	0.25	50	50	16.7	12.5	8.3
10	30	0.25	75	75	25.0	18.8	12.5
10	40	0.25	100	100	33.3	25.0	16.7
10	50	0.25	125	125	41.7	31.3	20.8
20	10	0.25	50	50	16.7	12.5	8.3
20	20	0.25	100	100	33.3	25.0	16.7
20	30	0.25	150	150	50.0	37.5	25.0
20	40	0.25	200	200	66.7	50.0	33.3
20	50	0.25	250	250	83.3	62.5	41.7
30	10	0.25	75	75	25.0	18.8	12.5
30	20	0.25	150	150	50.0	37.5	25.0
30	30	0.25	225	225	75.0	56.3	37.5
30	40	0.25	300	300	100.0	75.0	50.0
30	50	0.25	375	375	125.0	93.8	62.5
40	10	0.25	100	100	33.3	25.0	16.7
40	20	0.25	200	200	66.7	50.0	33.3
40	30	0.25	300	300	100.0	75.0	50.0
40	40	0.25	400	400	133.3	100.0	66.7
40	50	0.25	500	500	166.7	125.0	83.3
50	10	0.25	125	125	41.7	31.3	20.8
50	20	0.25	250	250	83.3	62.5	41.7
50	30	0.25	375	375	125.0	93.8	62.5
50	40	0.25	500	500	166.7	125.0	83.3
50	50	0.25	625	625	208.3	156.3	104.2
60	10	0.25	150	150	50.0	37.5	25.0
60	20	0.25	300	300	100.0	75.0	50.0
60	30	0.25	450	450	150.0	112.5	75.0
60	40	0.25	600	600	200.0	150.0	100.0
60	50	0.25	750	750	250.0	187.5	125.0
70	10	0.25	175	175	58.3	43.8	29.2
70	20	0.25	350	350	116.7	87.5	58.3
70	30	0.25	525	525	175.0	131.3	87.5
70	40	0.25	700	700	233.3	175.0	116.7
70	50	0.25	875	875	291.7	218.8	145.8
80	10	0.25	200	200	66.7	50.0	33.3
80	20	0.25	400	400	133.3	100.0	66.7
80	30	0.25	600	600	200.0	150.0	100.0
80	40	0.25	800	800	266.7	200.0	133.3
80	50	0.25	1000	1000	333.3	250.0	166.7
90	10	0.25	225	225	75.0	56.3	37.5
90	20	0.25	450	450	150.0	112.5	75.0
90	30	0.25	675	675	225.0	168.8	112.5
90	40	0.25	900	900	300.0	225.0	150.0
90	50	0.25	1125	1125	375.0	281.3	187.5
100	10	0.25	250	250	83.3	62.5	41.7
100	20	0.25	500	500	166.7	125.0	83.3
100	30	0.25	750	750	250.0	187.5	125.0
100	40	0.25	1000	1000	333.3	250.0	166.7
100	50	0.25	1250	1250	416.7	312.5	208.3

Critical (Red)

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

Serious (Yellow)

5-15% TBSA 2nd/3rd Degree Burn
Suspected Inhalation injury or requiring intubation for airway stabilization
Hypotension
GCS < 14
(When reasonable accessible, transport to either a Level I Burn Center or a Trauma Center)

Minor (Green)

< 5% TBSA 2nd/3rd Degree Burn
No inhalation injury, Not Intubated, Normotensive
GCS>14
(Transport to the Local Hospital)

North Carolina EMS Airway Evaluation Form

The NC EMS Airway Evaluation Form is required to be completed with all patients receiving Drug-Assisted Intubation in the Pre-hospital Environment.

FOR ORAL ROUTE:
Each Insertion of Blade into Oropharynx = 1 Attempt

FOR NASAL ROUTE:
Pass of Tube Past the Nares = 1 Attempt

1. Patient Demographic Information

Date: ___/___/___ Dispatch Time: ___:___ am/pm

PCR # _____

EMS Agency Name:_____

Patient Age (yr): _____ Patient Sex: ❑ M ❑ F

2. Glasgow Coma Score (GCS) before intubation

Eye	❑ (1)	❑ (2)	❑ (3)	❑ (4)		
Verbal	❑ (1)	❑ (2)	❑ (3)	❑ (4)	❑ (5)	
Motor	❑ (1)	❑ (2)	❑ (3)	❑ (4)	❑ (5)	❑ (6)

3. Was ETI successful for the overall encounter?

❑ Yes ❑ No ❑ Uncertain

4. Was intubation attempt due to Trauma?

❑ Yes ❑ No

5. Level of training of each rescuer assisting with intubation

Rescuer A	Rescuer B	Rescuer C
State ID:	**State ID:**	**State ID:**
❑ Paramedic	❑ Paramedic	❑ Paramedic
❑ EMT-I	❑ EMT-I	❑ EMT-I
❑ Medic Student	❑ Medic Student	❑ Medic Student
❑ Nurse	❑ Nurse	❑ Nurse
❑ Phys. Assist	❑ Phys. Assist	❑ Phys. Assist
❑ MD/DO	❑ MD/DO	❑ MD/DO
❑ Other: _____	❑ Other: _____	❑ Other: _____

6. Indicate drugs given to facilitate intubation

❑ Atropine _____ mg
❑ Etomidate _____ mg
❑ Lidocaine _____ mg
❑ Midazolam _____ mg
❑ Rocuronium _____ mg
❑ Succinylcholine _____ mg
❑ Vecuronium _____ mg
❑ Other–Specify _____–_____ mg
❑ Other–Specify _____–_____ mg

7. Times and Vital Signs

	Time	Heart Rate	Resp. Rate	Blood Pressure	Pulse Oximetry	ECTO$_2$
Pre-Airway Assessment Values	:			/		
Successful Airway Obtained	:					
Post-Airway Assessment Values	:			/		

8. Provide information for each laryngoscopy attempt.

Attempt	ETI Method	Rescuer	Successful?
1	❑ Direct ❑ Nasal ❑ Video	❑ A ❑ B ❑ C	❑ Yes ❑ No
2	❑ Direct ❑ Nasal ❑ Video	❑ A ❑ B ❑ C	❑ Yes ❑ No
3	❑ Direct ❑ Nasal ❑ Video	❑ A ❑ B ❑ C	❑ Yes ❑ No
4	❑ Direct ❑ Nasal ❑ Video	❑ A ❑ B ❑ C	❑ Yes ❑ No

9. Who verified placement of ET Tube?

❑ Rescuer performing intubation
❑ Another rescuer on the same team
❑ Receiving helicopter/EMS crew
❑ Receiving hospital team
❑ Other: _____

10. If all attempts FAILED, indicate secondary airway technique used (Check *all* that apply)

❑ Bag-Valve-Mask (BVM) ❑ Combitube
❑ Open Cricothyroidotomy ❑ King LTD
❑ LMA ❑ Other_____

11. Endotracheal tube confirmation

	Auscultation	ETCO2	Breath Sounds	Absent Epigastric
Placement Confirmation	❑	❑	❑	❑
Tube Size		**Tube Depth**		
Security Method				

12. Were pulses maintained while under agencies care?

❑ Yes ❑ No

13. Signature of Receiving Physician/Healthcare Provider (Confirming Destination/Transfer Tube Placement)

❑ Yes ❑ No ❑ Uncertain

Date and Time: ____ : ____ am/pm

14. Signature of EMS Medical Director (Confirming Review of Completed Form)

❑ Chart Review Done ❑ Remediation Required ❑ Approved

Date:

Unit Information

Date	Agency Name	Agency Number	PreMiS Preliminary Report* Revision 2	Type of Service Requested
				☐ 911 Resp. (Scene) ☐ Interfacility Trans. ☐ Medical Trans. ☐ Standby ☐ Intercept ☐ Mutual Aid

Transport Unit #	Call Sign #	EMT B / I / P	EMT B / I / P	PCR #

Patient Name	Age	Date of Birth	Sex M F	Phone Number	Work Related/Occup.

Patient Address	City	State	Zipcode	Race/Eth.	Social Security Number

Legal Guardian if Patient is a Minor	Relation to Patient	Insurance Company

Situation

Location / Address of Call or Incident
☐ Same as Above

Other Agencies

Response Mode to Scene
☐ Lights and Sirens ☐ No Lights and Sirens ☐ Downgraded to No L&S ☐ Upgraded to L&S

Dispatch Complaint

EMD Performed ☐
EMD Card #

CPR	AED On Scene Prior to EMS	Prior to Arrival	Arrest Witnessed By	Downtime	Performed By:
	Yes No	Yes No Time Started	EMS/1st R/PD Family Bystander Unknown	< 5 minutes 5-10 minutes 10-15 minutes Unknown	EMS/1st R PD Family Bystander

Chief Complaint

Duration Min Hrs Days | Severity (1-10)

Other Complaints

Duration Min Hrs Days | Severity (1-10)

Mechanism of Injury

Mechanism or Cause?

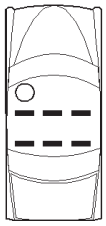
- ☐ Steering Wheel Deformity
- ☐ Windshield Spider
- ☐ Dash Deformity
- ☐ Side Post Deformity
- ☐ Ejection
- ☐ DOA Same Vehicle
- ☐ Rollover
- ☐ Space Intrusion > 1 ft.
- ☐ Fire

- ☐ Lap Seat Belt
- ☐ Shoulder Belt
- ☐ Helmet
- ☐ Infant Carseat
- ☐ Airbag

Extraction Time (min)
Fall (ft)

(Circle Pt. and Vehicle Impact Area)

Car
Sport Utility
Stationwagon
Truck
Van
Motorcycle
Bicycle
Boat



DATES and TIMES

- PSAP Call Date/Time
- Unit Notified by Dispatch Date/Time
- Unit En Route Date/Time
- Unit Arrived on Scene Date/Time
- Arrived at Patient Date/Time
- Unit Left Scene Date/Time
- Patient Arrived at Destination Date/Time
- Unit Back in Service Date/Time
- Unit Back at Home Location Date/Time

ODOMETER

- Beginning Odometer
- On-Scene Odometer
- Destination Odometer
- Loaded Mileage

Patient Survey

Vital Signs

Time	BP	HR	RR	Glucose	CO2	SaO2	Temp.

Past History

		Meds	

Evidence of Alcohol Ingestion? Yes No | DNR/MOST Form ☐ | Living Will ☐

Allergies
☐ Denies

Narrative

Protocols Used

Skin
Normal
Pale
Cyanotic
Clammy
Jaundiced
Cold
Warm
Diaphoretic

HEENT / Neck
Normal
JVD
Tracheal Dev.
SQ Air
Stridor
Lac. / Lesion

Chest
Normal BS
Decreased BS
Tenderness
Acc. Muscles
Flail Segment
Rhonchi / Wheezing
Rales
Lac. / Lesion

Heart
Normal
Decreased Sounds
Murmur
Monitor/ECG/FHT'S
1
2

Abdomen
Normal
Distention
Tenderness
Guarding
Mass
Lac./Lesions
R L UQ LQ

Pelvis / Gen.
Normal
Tender
Unstable
Genital Injury
Crowning
Lac./Lesions

Extremities

Normal	Tenderness		Abnormalities			
☐	☐	RUE				
☐	☐	LUE				
☐	☐	RLE				
☐	☐	LLE				

Back
Normal
Tender Sp. Process
No C T L
Tender Paraspinous
No C T L
Pain to ROM
No C T L
Lac./Lesions

Neuro

Pupils
L: React. Dil __ mm Nonreact. Blind
R: React. Dil __ mm Nonreact. Blind

Findings
Normal Confused Combative Unresponsive Hallucinations Seizures Post-ictal Obtunded Tremors

Deficit
Dysphasia
Hemiplegia: R L

Stroke Screen
☐ Positive
☐ Negative

Glasgow Coma Scale

Eyes		Verbal		Motor	
Spontaneous	4	Oriented	5	Obeys Commands	6
To Voice	3	Confused	4	Localizes to Pain	5
To Pain	2	Inappropriate Sounds	3	Withdraws (Pain)	4
None	1	Incomprehensible Sounds	2	Flexion (Pain)	3
		None	1	Extension (Pain)	2
				None	1

Total GCS Score ☐

Adult Trauma Score

Resp. Rate		Systolic BP		GCS Points	
10 - 29	= 4	> 89	= 4	13 - 15	= 4
> 29	= 3	76 - 89	= 3	9 - 12	= 3
6 - 9	= 2	50 - 75	= 2	6 - 8	= 2
1 - 5	= 1	1 - 49	= 1	4 - 5	= 1
None	= 0	None	= 0	3	= 0

Total Adult Trauma Score ☐

Reperfusion Check Sheet
☐ No Contraindicators
☐ Contraindicators

Procedures & Medications

Time	Procedure	Size	Tech State ID	Success	Time	Medication	Dose/Route	Tech State ID
				Y N				
				Y N				
				Y N				
				Y N				
				Y N				

Disposition

ETT Confirmation and Signature at Destination

Time	Cardiac Rhythm or 12 Lead Interpretation

Transport Mode from Scene
☐ Lights and Sirens ☐ No Lights and Sirens ☐ Downgraded to No L&S ☐ Upgraded to L&S

Transport
☐ **Refused**
☐ **Cancelled**

Moved to Ambulance
☐ Walk
☐ Stretcher
☐ Carry
☐ Stairchair

Transport Position
☐ Prone ☐ Supine
☐ L. Lateral ☐ Sitting
☐ Trendelenberg ☐ Head Elevated
☐ Fowlers

Safety
☐ Gloves
☐ Mask
☐ Gown
☐ Eyewear

Patient's Condition on Arrival
☐ Improved
☐ Same
☐ Worse

Reason for Choosing Destination (circle)
Diversion
Closest Facility
Insurance Status
Family Choice
On-Line Medical Direction
Law Enforcement Choice
Patient Choice
Patient's Physician Choice
Protocol
Specialty Resource Center

Treatment Authorized by MD MICN

Patient Received by

Destination Name and/or Address

EMT Signature

EMT-P State ID

Medical Control Signature

*** This is a preliminary document. This is not the final EMS Patient Care Report.**

HIPAA PERMITS DISCLOSURE OF MOST TO OTHER HEALTH CARE PROFESSIONALS AS NECESSARY

Medical Orders
for Scope of Treatment (MOST)

This is a Physician Order Sheet based on the patient's medical condition and wishes. Any section not completed indicates full treatment for that section. **When the need occurs, first follow these orders, then contact physician.**

Patient's Last Name:	Effective Date of Form:
Patient's First Name, Middle Initial:	Patient's Date of Birth:

Section A *Check One Box Only*

CARDIOPULMONARY RESUSCITATION (CPR): Patient has no pulse and is not breathing.

☐ **Attempt Resuscitation (CPR)** ☐ **Do Not Attempt Resuscitation (DNR/no CPR)**

When not in cardiopulmonary arrest, follow orders in **B, C**, and **D**.

Section B *Check One Box Only*

MEDICAL INTERVENTIONS: Patient has pulse and/or is breathing.

☐ **Full Scope of Treatment:** Use intubation, advanced airway interventions, mechanical ventilation, cardioversion as indicated, medical treatment, IV fluids, etc.; also provide comfort measures. **Transfer to hospital if indicated.**

☐ **Limited Additional Interventions:** Use medical treatment, IV fluids and cardiac monitoring as indicated. Do not use intubation or mechanical ventilation. May consider use of less invasive airway support such as BiPAP or CPAP. Also provide comfort measures. **Transfer to hospital if indicated. Avoid intensive care.**

☐ **Comfort Measures:** Keep clean, warm and dry. Use medication by any route, positioning, wound care and other measures to relieve pain and suffering. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. **Do not transfer to hospital unless comfort needs cannot be met in current location.**

Other Instructions _____

Section C *Check One Box Only*

ANTIBIOTICS

☐ **Antibiotics if indicated**

☐ **Determine use or limitation of antibiotics when infection occurs**

☐ **No Antibiotics** (use other measures to relieve symptoms)

Other Instructions _____

Section D *Check One Box Only in Each Column*

MEDICALLY ADMINISTERED FLUIDS AND NUTRITION: Offer oral fluids and nutrition if physically feasible.

☐ **IV fluids if indicated**	☐ **Feeding tube long-term if indicated**
☐ **IV fluids for a defined trial period**	☐ **Feeding tube for a defined trial period**
☐ **No IV fluids** (provide other measures to ensure comfort)	☐ **No feeding tube**

Other Instructions _____

Section E *Check The Appropriate Box*

DISCUSSED WITH AND AGREED TO BY:

☐ Patient
☐ Parent or guardian if patient is a minor
☐ Health care agent
☐ Legal guardian of the patient
☐ Attorney-in-fact with power to make health care decisions
☐ Spouse
☐ Majority of patient's reasonably available parents and adult children
☐ Majority of patient's reasonably available adult siblings
☐ An individual with an established relationship with the patient who is acting in good faith and can reliably convey the wishes of the patient

Basis for order must be documented in medical record.

MD/DO, PA, or NP Name (Print):	**MD/DO, PA, or NP Signature and Date** (Required):	**Phone #:**

Signature of Patient, Parent of Minor, Guardian, Health Care Agent, Spouse, or Other Personal Representative
(Signature is required and must either be on this form or on file)

I agree that adequate information has been provided and significant thought has been given to life-prolonging measures. Treatment preferences have been expressed to the physician (MD/DO), physician assistant, or nurse practitioner. This document reflects those treatment preferences and indicates informed consent.

If signed by a patient representative, preferences expressed must reflect patient's wishes as best understood by that representative. Contact information for personal representative should be provided on the back of this form.

You are not required to sign this form to receive treatment.

Patient or Representative Name (print)	Patient or Representative Signature	Relationship (write "self" if patient)

SEND FORM WITH PATIENT/RESIDENT WHEN TRANSFERRED OR DISCHARGED

HIPAA PERMITS DISCLOSURE OF MOST TO OTHER HEALTH CARE PROFESSIONALS AS NECESSARY

Contact Information			
Patient Representative:	Relationship:	Phone #: Cell Phone #:	
Health Care Professional Preparing Form:	Preparer Title:	Preferred Phone #:	Date Prepared:

Directions for Completing Form

Completing MOST

- MOST must be reviewed and prepared by a health care professional in consultation with the patient or patient representative.
- MOST is a medical order and must be signed and dated by a licensed physician (MD/DO), physician assistant, or nurse practitioner to be valid. **Be sure to document the basis for the order in the progress notes of the medical record.** Mode of communication (e.g., in person, by telephone, etc.) also should be documented.
- The signature of the patient or his/her representative is required; however, if the patient's representative is not reasonably available to sign the original form, a copy of the completed form with the signature of the patient's representative must be placed in the medical record and "on file" must be written in the appropriate signature field on the front of this form or in the review section below.
- Use of original form is required. **Be sure to send the original form with the patient.**
- MOST is part of advance care planning, which also may include a living will and health care power of attorney (HCPOA). If there is a HCPOA, living will, or other advance directive, a copy should be attached if available. **MOST may suspend any conflicting directions in a patient's previously executed HCPOA, living will, or other advance directive.**
- **There is no requirement that a patient have a MOST.**
- MOST is recognized under N. C. G en. Stat. 90-21.17.

Reviewing MOST

Review of the MOST form is recommended when:

- The patient is admitted to and/or discharged from a health care facility; or
- There is a substantial change in the patient's health status.

This MOST must be reviewed if:

- The patient's treatment preferences change.

If MOST is revised or becomes invalid, draw a line through Sections A – E and write "VOID" in large letters.

Revocation of MOST

A patient with capacity or the patient's representative (if the patient lacks capacity) can revoke the MOST at any time and request alternative treatment based on the known preferences of the patient or, if unknown, the patient's best interests.

Review of MOST

Review Date	Reviewer and location of review	MD/DO, PA, or NP Signature (required)	Signature of patient or representative (preferred)	Outcome of Review
				☐No Change ☐FORM VOIDED, new form completed ☐FORM VOIDED, **no** new form
				☐No Change ☐FORM VOIDED, new form completed ☐FORM VOIDED, **no** new form
				☐No Change ☐FORM VOIDED, new form completed ☐FORM VOIDED, **no** new form
				☐No Change ☐FORM VOIDED, new form completed ☐FORM VOIDED, **no** new form
				☐No Change ☐FORM VOIDED, new form completed ☐FORM VOIDED, **no** new form

SEND FORM WITH PATIENT/RESIDENT WHEN TRANSFERRED OR DISCHARGED

DO NOT ALTER THIS FORM!

NCDHHS/DHSR/OEMS
112

North Carolina Department of Health and Human Services • Division of Health Service Regulation • Office of Emergency Medical Services
www.ncdhhs.gov • www.ncdhhs.gov/dhsr/EMS/ems.htm
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STOP
DO NOT
Resuscitate

Effective Date: _____

Expiration Date, if any _____

☐ Check box if no expiration

DO NOT RESUSCITATE ORDER

Patient's full name _____

In the event of cardiac and/or pulmonary arrest of the patient, efforts at cardiopulmonary resuscitation of the patient SHOULD NOT be initiated. This order does not affect other medically indicated and comfort care.

I have documented the basis for this order and the consent required by the NC General Statute 90-21.17(b) in the patient's records.

_____

Signature of Attending Physician/Physician Assistant/Nurse Practitioner

_____

Printed Name of Attending Physician

_____

Address

_____

City, State, Zip

Telephone Number (office) _____

Telephone Number (emergency) _____

Do Not Copy **Do Not Alter**

Recommended EMS Guidelines for Children and Youth with Special Health Care Needs (CYSHCN)*

Office of Emergency Medical Services
NC EMSC Advisory Committee
2009

Table of Contents

*** These guidelines are meant to provide general guidance only and are not meant to supercede state and local medical protocols. Perform procedures in line with current scope of practice and consult local medical control when necessary.**

I. Important Considerations for Providing Care to Children and Youth with Special Health Care Needs

- Treat ABCs first
    - Treat the child, not the equipment
    - If the emergency is secondary to the child's equipment, use your own equipment
- Remember to always speak with the family since they are the experts on their child. Find out the child's baseline vital signs, medications, allergies, and other medical information, which may not be typical.
    - CYSHCN have many allergies. Ask about LATEX allergy, especially for patients with spina bifida. Make sure latex-free equipment is stocked ahead of time.
    - Ask for help from the parents and home health staff. They are generally trained to troubleshoot equipment and respond to emergencies. Practice TEAM (Trust Every Available Member)
- Physical handicaps do not necessarily imply mental deficits. Remember to communicate with the child. Assess and communicate with the child based on his/her developmental age, not chronological age.
- Ask for the ***"go bag"*** which generally has the child's spare equipment and supplies and bring this with you during transport. Also, this may have equipment you need on scene.
- Do not use excessive force to straighten or manipulate contracted extremities. The patient may be osteopenic and prone to fractures. (Some CYSHCN will not be able to straighten extremities beyond a nominal degree)
    - A slow, careful transfer with two or more people is preferable.
- Know which children in a given geographic area have special needs
    - Ask if they have a brief emergency medical information form, card, or notebook.
        - KIDBASE form
    - Look for MedicAlert® jewelry
- Transfer the child if possible to their medical "home" hospital.

II. Respiratory Distress in the Child with a Tracheostomy Tube

1. Secure the scene
2. ABCs
    a. Open the airway using a head tilt/chin lift

3. Assess the tracheostomy tube
    a. Is the tube in place?
    b. Has the obturator (stylet) been removed?
    c. In a double lumen trach tube, is the inner cannula in place?
    d. Has a decannulation plug or speaking valve been removed?

4. Breathing
    a. Assess rate, auscultation, inspection, effort and adequacy of chest rise
    b. ALS: Check pulse oximetry, EtCO2
    c. Respiratory distress (retractions, altered mental status, hypoxia, etc.)?
        i. Mucous or debris obstructing the tracheostomy tube is very common
    d. Attempt to suction the trach tube.
        i. Ask if family has a suction catheter. If so, use theirs, as it will be appropriately sized.
        ii. If no suction catheter, ask family and use the size they generally use.
        iii. If they do not know size, estimate the suction catheter size by doubling the inner diameter of trach and rounding down to an available catheter size, or use the largest size that will easily pass.
        iv. Determine suction depth: ask family, or length of spare trach, or no more than 3-6 cm. **Suction with 100 mm Hg and instill 2-3 cc of saline before suctioning if secretions are thick.** Do not suction for more than 10 seconds and attempt to preoxygenate before getting started. NEVER FORCE THE CATHETER.
        v. For a double lumen trach: take inner cannula out to suction then replace before assisted ventilations.
    e. If unable to pass suction catheter the tracheostomy tube should be changed.
        i. Direct Technique:
            - Allow the family to help change the tracheostomy tube.
            - For a double lumen trach, remove the inner cannula before insertion, and then, once inserted, replace inner cannula before confirming placement with BVM.
            - If the old trach has a cuff, deflate the cuff before removal.
            - Remove the old trach by pulling outward and toward the patient's feet.
            - Gently insert the new tracheostomy tube in the anatomical direction: curve downward and the tube aimed toward the

patient's feet... Make sure the obturator is in place for insertion then remove once trach is placed.

ii. *Facilitated Technique:*
- Allow the family to help change the tracheostomy tube.
- If the old trach has a cuff, deflate the cuff before removal.
- Remove the old trach by pulling outward and toward the patient's feet.
- Before placing the new trach, slide a catheter through the trach.
- Pass the suction catheter into the stoma and gently advance 3-6 cm
- Advance the new trach over the suction catheter, using the catheter as a guide.
- Once the trach is in place, remove the suction catheter.

iii. If the new trach tube does not pass, attempt again with a smaller tube.

iv. Confirm placement by assessment of breath sounds and adequacy of chest expansion.

f. If a new tracheostomy tube cannot be placed, one is not available or it does not advance easily, place a similar or smaller internal-diameter size endotracheal tube (preferably cuffed) and advance only as far as a tracheostomy tube would have been advanced.

g. If a new trach or ETT cannot be placed through the stoma, attempt orotracheal intubation if possible.
   i. If orotracheal intubation is unsuccessful, use mask-to-mouth bag ventilation with stoma occluded.
   ii. If ventilation still inadequate, attempt infant mask-to-stoma bag ventilation.

h. For severe respiratory distress despite suctioning, persistent hypoxia, or respiratory arrest, begin assisted ventilations through trach tube with appropriate ventilation bag with 100% high flow oxygen.

5. Reassess frequently. Monitor pulse oximetry and EtCO2

6. If the patient has a trach and bronchospasm present: follow Wheezing protocol.

7. Assess circulation and follow appropriate protocols.

8. Keep warm. Expose only if necessary.

9. Contact Medical Control as necessary.

10. Remember: DOPE
    a. D-displaced, dislodged or damaged
    b. O-obstructed (mucus, food, blood, secretions)
    c. P-pulmonary problems

d. E-equipment failure (bent tubing, ventilator malfunction, depleted oxygen supply

III. Emergencies Involving Indwelling Central Lines

General Information:

- Types of central venous catheter:
  - Tunneled catheter-Broviac or Hickman
  - Implanted catheter-Mediport
  - Peripheral inserted catheter-PICC
- These catheters are used to deliver nutritional substances or special medications directly into a central vein.
- Most emergencies with lines include: blockage of the line, complete or partial accidental removal, or complete or partial laceration of the line
- Children with indwelling catheters are always at risk for blood stream and catheter infections. Always use strict sterile technique when dressing or accessing the catheter.

1. Ask parents/caretakers about child's underlying condition: may be experiencing complications from underlying medical condition
2. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history
3. Whenever assessing a child who has a central intravenous catheter, check the site where the tube is placed to see if it appears clean and well maintained.
4. Identify location of central line:
   a. Check for blockage of the line
   b. Check for accidental removal or laceration of the line

5. ***If line is blocked***, do not attempt to force catheter open

6. ***If line is lacerated***, clamp proximal to laceration utilizing a padded clamp and do not use.

7. ***If line is out or partially out:***
   a. Do not push the line back in
   b. Apply direct pressure to skin site
   c. Stop any infusions*
   d. Always bring line with you to the hospital

8. Estimate blood loss and assess for signs and symptoms of an air embolism (tachypnea, chest pain, shortness of breath, or loss of consciousness) or blood clots. If an air embolism is suspected, clamp the central line with the clamp on the tube itself, place the child on the left side in a head down position, and administer high flow oxygen.

9. If the indwelling catheter is not damaged, is functioning, and does not have a continuous infusion already running, it may be used for fluid and medication administration.
    a. Allow caregiver or home health personnel to access implanted catheters.
    b. Use strict sterile technique when accessing an indwelling catheter.
    c. In the event of a cardiac arrest, the indwelling central catheter is the preferred route of medication administration.

***There are some infusions that may be detrimental to stop, even briefly. Ask the caregiver if it is all right to stop or change the infusion first. Contact Medical Control for additional instructions.**

Summary:

D	Displaced, dislodged, or damaged	Stop infusing and do not use Direct pressure if bleeding from site Clamp or tie tubing if bleeding from catheter
O	Obstructed (blood clot, medication)	If line does not flush easily it needs to be replaced
P	Pulmonary Embolism	Clamp catheter and lie patient on left side with head down
E	Equipment failure (bent tubing, infusion pump malfunction	If tube flushes easily the problem is probably with the pump

IV: Emergencies in Children with Gastrostomy Tubes and/or Feeding Tubes

Definitions:

- *Non-surgical feeding tubes:* Used for short term use:
    - Nasogastric tube (NGT): runs through the nose to the stomach
    - Nasojejunal Tube (NJT): runs through the nose into the small intestine
    - Orogastric tube (OGT): runs through the mouth into the stomach

- *Surgical Feeding Tubes:*
    - Gastrostomy Tube (GT): passes through the abdomen into the stomach
    - Jejunostomy Tube (JT): passes through the abdomen into the small intestine

<u>Complications with gastrostomy tubes include: obstruction or dislodgement</u>

1. When examining a child with a surgically implanted feeding tube, check for irritation and bleeding at the site where the tube enters the skin.
    a. Treat minor bleeding with direct pressure and sterile dressings
    b. A leaking feeding tube may cause skin irritation.
        i. If there are any signs of infection at the entry site, the child should be transported for further medical attention.
        ii. Cover the site with a sterile dressing and assess the abdomen.

2. Obstruction is usually not an emergency but the child requires transport. If the child is dependent on the feeds then the tube will need correction immediately.
3. Dislodgement is not life threatening but the tube should be replaced as soon as possible.
    a. Keep the child flat on his/her back to prevent gastric fluid from leaking
    b. If a new gastrostomy tube is available and stoma is open, attempt to reinsert the new tube.
    c. If any resistance is met when inserting the gastrostomy tube STOP and cover the site with a clean dressing and assess the abdomen
    d. If the new tube passes easily, secure with sterile dressing and tape BUT DO NOT REINFLATE BALLOON.
    e. If caregiver is trained to replace gastrostomy tube, assist in placing new tube. If the new gastrostomy tube is successfully placed, DISCUSS TRANSPORT OPTIONS WITH CAREGIVER AND MEDICAL DIRECTOR
    f. If no new gastrostomy tube is available, a foley catheter (same size or one size smaller) may be used and inserted…please follow same recommendations as above.
    g. If tube does not pass easily: *Do not attempt to replace the tube; it is not as easy as it seems and there may be other complications.* Bring the dislodged tube with the child to the hospital.
    h. Remember to cover the site with a clean dressing and control any bleeding with direct pressure
4. If there is formula infusing through the feeding tube, determine the nature of the fluids and the time that the fluids were started and stopped.
5. Assess for dehydration and/or hypoglycemia. Treat as necessary.
6. For non-surgical tubes (nasal or oral), assess for respiratory symptoms which may be a sign of placement in the respiratory tract.
    a. If respiratory distress severe, remove tube carefully and treat respiratory symptoms.
7. Non-emergent transport to the nearest facility capable of replacing the tube.
8. If the parent has extra replacement tubes, bring these to the hospital.

V. Emergencies in Children on Ventilators

General Information:

- Children on mechanical ventilators may have a sudden or gradual deterioration, cardiac arrest, increased oxygen demand, increased respiratory rate, retractions, or change in mental status. This may be related to malfunction of the ventilator or due to worsening in their underlying disease.
- Common reasons for chronic mechanical ventilation in children include chronic respiratory failure and neurologic disease causing impaired airway control or respiratory effort.

- Some children requiring chronic mechanical ventilation never have a "normal" respiratory exam. Parents and other caregivers can provide information about the child's baseline exam.

1. Pulse oximetry and End-tidal CO2
2. If there is no increased respiratory distress, normal pulse oximetry, normal End-tidal CO2, and normal mental status, the child should be transported on ventilator on current settings.
3. If there is respiratory distress, desaturation below baseline levels, or altered mental status:
   a) Examine the child quickly for possible causes of distress which can be easily corrected: detached oxygen source, dislodged or obstructed tracheostomy tube, detached ventilator circuit.
   b) Look at the ventilator and determine alarm code (i.e. apnea, low respiratory rate, low minute ventilation, high pressure, etc.) (See "Ventilator Troubleshooting" below)
      - Do not delay treatment while assessing the ventilator. Treat the patient, not the machine.
   c) Remove the child from the ventilator and manually bag with a secure oxygen source
   d) Look for normal chest rise, breath sounds on both sides, and improvement in oxygen saturation.
   e) If the chest rise is shallow, adjust the patient's airway position, check to see that the bag-value device is securely connected to the tracheostomy tube, and use higher pressure if necessary.
   f) Assess and treat problems with tracheostomy according to protocol.
4. Obtain relevant history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival.
5. Obtain any medical information forms that the caregivers may have for emergency medical providers.
6. Transport the child to the appropriate medical facility. Bring the ventilator to the hospital.
7. Some caregivers carry a "go bag" for their children with extra supplies. Bring this with the child if available.

Ventilator Troubleshooting

Alarm	***Possible Causes***	***Interventions***
Low pressure/apnea	Loose or disconnected circuit Leak in circuit Leak around tracheostomy site	Ensure all circuits are connected Check tracheostomy balloon Ensure tracheostomy well seated
Low power	Internal battery depleted	Plug the ventilator into a power outlet
High Pressure	Plugged or obstructed airway	Clear obstruction Suction tracheostomy

	Coughing/bronchospasm	Administer bronchodilator
Setting Error	Settings incorrectly adjusted	Manually ventilate patient Transport ventilator and patient
Power Switchover	Unit switched from AC to internal battery	Press "Alarm silent" button after ensuring battery is powering ventilator

Remember if the problem can not be remedied, EMS provider should remove the child from the ventilator, ventilate the child with a BVM, and take the ventilator with them to the hospital so a more qualified person can troubleshoot.

VI. Emergencies in Children with Urinary Drainage Catheters

General Information:

- Types of Urinary catheters:
  - Foleys: From urethra to bladder
  - Nephrostomy: From skin directly into kidney
  - Suprapubic: From skin directly into bladder
  - Ureterostomy: From skin into ureter
- These catheters are used to drain urine.
- Most emergencies with catheters include: Blockage, bleeding or dislodgement.

1. Ask caretakers about child's underlying condition: may be experiencing complications from underlying medical condition
2. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history
3. Most skin catheters will make the skin slightly erythematous and encrusted

If catheter is blocked:

a. Flush once with 5cc of saline.
b. Do not flush more than once.
c. If catheter works well after flushing, discuss with caregiver and medical director.
d. If catheter remains blocked, transport to appropriate medical facility.

If catheter is lacerated:

a. Do not remove.
b. Tape in place to avoid dislodgement
c. Allow to continue to drain
d. Transport to appropriate medical facility

If catheter is partially out:

a. Do not push the line back in
b. Secure to skin to avoid complete dislodgement
c. Transport to appropriate medical facility

If catheter is completely out:

a. Cover opening with sterile gauze
b. Transport to appropriate medical facility

If blood is seen in catheter:

a. Allow catheter to drain
b. Secure to skin to prevent dislodgement
c. Transport to appropriate medical facility

VII. Emergencies in Children with Hemodialysis Lines

General Information:

- Types of hemodialysis catheters:
  - Hemodialysis catheters (External tubing from a large artery to the skin)
  - Hemodialysis grafts (Gortex tubing under skin to artery and vein)
- These catheters are used to filter/clean the blood in patients with renal failure.
- Most emergencies with lines include: Infection of the line, bleeding from the line, and complete or partial dislodgement from trauma
- Children with indwelling catheters are always at risk for blood and catheter infections. Always use strict sterile technique when dressing or accessing the catheter.

1. Ask caretakers about child's underlying condition: may be experiencing complications from underlying medical condition.

2. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history.

3. Whenever assessing a child who has a hemodialysis catheter, check the site where the tube is placed to see if it appears clean and well maintained.

4. Identify location of DIALYSIS LINE:
   a. Check for accidental removal or laceration of the line

5. ***If line is blocked*** DO NOT MANIPULATE

6. ***If line is lacerated***, clamp proximal to laceration utilizing a padded clamp and do not use.

7***. If line is out or partially out:***

- Do not push the line back in
- Apply direct pressure to skin site
- Stop any infusions*
- Always bring line with you to the hospital

8. Estimate blood loss and assess for signs and symptoms of an air embolism (tachypnea, chest pain, shortness of breath, or loss of consciousness) or blood clots. If an air embolism is suspected, clamp the central line with the clamp on the tube itself, place the child on the left side in a head down position, and administer high flow oxygen.

9. If the indwelling catheter is not damaged, UNLIKE CENTRAL LINES, do not use for IV access. Infection and sepsis are frequent in large bore dialysis catheters compared to Broviacs.

10. In a life threatening emergency these large lines are excellent for IV access and can be used.

***There are some infusions that may be detrimental to stop, even briefly. Ask the caregiver if it is all right to stop or change the infusion first. Contact Medical Control for additional instructions.**

Transport all patients with hemodialysis lines to the appropriate medical facility.

VIII. Emergencies in Children with Peritoneal Dialysis Catheters

General Information:

- Peritoneal dialysis catheters run from the skin into the peritoneum.
- Dialysis is done by using the peritoneal lining as the dialysis membrane.
- Fluid is placed into the peritoneum and left for hours or overnight
- It is then drained removing extra electrolytes, acid, etc. from the patient.
- Dialysis is usually done at home by the patient or a nurse.
- Most emergencies with catheters include: Infection of the abdomen (peritonitis), infection of the catheter entry site, fracture of the catheter, bleeding from the catheter, and complete or partial dislodgement.
- Children with indwelling catheters are at risk for catheter infections. Always use strict sterile technique when dressing or accessing the catheter.
- These are not vascular lines and ***can not*** be used for IV access.

There are two major complications of peritoneal catheters: Infection and Outflow obstruction.

Exit Site Infections:

Drainage with blood and/or pus from the exit site
Associated with redness, tenderness, overgrown granulation tissue and swelling

Peritonitis:

Staphylococcus aureus
Caused by auto-inoculation by touch or contamination with respiratory secretions

Symptoms:

- Abdominal pain
- Abdominal tenderness
- Abdominal distention
- Cloudy peritoneal dialysis fluid
- Fever
- Nausea and vomiting

1. Ask Caretakers about child's underlying condition: may be experiencing complications from underlying medical condition

2. Obtain a complete medical history for the patient, including whether there is fluid presently in the abdomen or if it is drained.

3. Whenever assessing a child who has a peritoneal dialysis catheter, check the site where the tube is placed to see if it appears clean and well maintained.

4. ***If catheter is blocked*** DO NOT MANIPULATE.

5. ***If catheter is fractured***, clamp proximal to fractured utilizing a padded clamp and do not use.

6. ***If catheter is out or partially out:***

- Do not push back in
- Apply direct pressure to skin site if bleeding.
- Stop any infusions
- Always bring catheter with you to the hospital

7***. If the catheter is leaking clear fluid:***

- Cover with sterile gauze.

Transport all patients with peritoneal dialysis catheters to the appropriate medical facility.

IX. Care of the Following Equipment:

a. Tracheostomy tubes (included in protocol I.)
b. Central lines (included in protocol III.)
c. Feeding tubes (included in protocol IV.)
d. Ventilators (included in protocol V.)
e. Apnea monitors
f. VP shunts
g. Internal pacemakers
h. Vagal nerve stimulators
i. Colostomy bags

e. Apnea Monitors

ABCs
Pulse oximetry

If the patient is not breathing, open airway and begin bag-valve ventilation with 100% oxygen
Check the pulse: if no pulse, start chest compressions
Assess circulation and perfusion
Ask the caregiver for baseline vital signs
Look at the apnea monitor and determine the alarm code (i.e. heart rate, apnea etc.)
Check the electrodes or monitor chest belt and ensure proper placement
Make sure the monitor is powered and is not low on batteries

If the child has respiratory distress or cardiac arrest, call for ALS support and follow the appropriate algorithm and transport to the nearest appropriate facility.

Bring any of the child's emergency medical records and supplies or "go bag" with the patient to assist in the care of the child.

Bring the apnea monitor to the hospital with the child, so that it may be evaluated and stored information can be downloaded for analysis.

f. VP shunts

A cerebral spinal fluid shunt (CSF shunt) is a catheter that is inserted into the ventricles within the brain and then threaded under the skin from the skull to the right atrium (VA shunt) or the peritoneum of the abdomen (VP shunt). It drains excess CSF that would otherwise build up in the brain.

The child with a CSF shunt is vulnerable to brain infections. The shunt can develop an obstruction, and if this occurs it can result in any of the following signs & symptoms:

*Have a heightened awareness of the following:**
Altered mental status
Irritability
Listlessness
Increased sleep
High-pitched cry
Nausea and vomiting
Fever
Headaches
Blurred vision
Difficulty walking
Apnea
Bradycardia or other arrhythmias
Seizures
Redness along the shunt track
Rapid worsening of mental status

Prehospital personnel should*… *Provide appropriate initial intervention and transport:
Establish responsiveness
Assess the patient's airway and breathing: ABCs
Maintain a patent airway
Provide high flow oxygen, positive pressure with bag-valve-mask mask if necessary
Check pulse, if no pulse, begin chest compressions
Assess circulation and perfusion
Ask caregiver for the child's baseline vital signs
Assess for signs and symptoms of shunt obstruction or infection*
Obtain a complete history of present illness and past medical history
Rapid transport to the appropriate facility

g. Internal Pacemakers

Pacemakers are implanted medical devices that regulate the heart rate.

For the child with an internal pacemaker, the following questions need to be asked:
What type of heart problem does the child have?
What is the child's baseline rhythm and rate?
What type of pacemaker does the child have?
Is the child dependent on the pacemaker?
How long has the child had the pacemaker? (Generally 3-5yr battery life)

An internal cardiac defibrillator (ICD) or automatic implantable cardiac defibrillator (AICD) is an electronic device implanted under the skin. It monitors the heart rhythm and can slow down or stop excessively fast rates that originate in the ventricles.

For the child with an internal defibrillator:
What type of heart problem does the child have?

What is the child's baseline rhythm and rate?
What heart rate causes the defibrillator to fire?
How many shocks has the child felt?
Has the child experienced any of the following?
- Felt more than 3 shocks in a row
- Unusual symptoms like dizziness or palpitations after a shock
- Sensation of dizziness, lightheadedness or palpitations, for a period of time without any shocks

When was the defibrillator implanted? (3-5yr battery life)

EMS Care Tips

The internal pacemaker can easily be felt near the clavicle or in a small child in the abdomen.
Never place defibrillator paddles, or pacing patches directly over the internal pacemaker or defibrillator generator.
Remember the battery life is 3-5 years

Common Problem: Failure

1. Assess heart rate and perfusion
2. Treat for shock
3. Follow ABCs
4. Transport

h. Vagal Nerve Stimulators (VNS)

What is a vagal nerve stimulator? Device that is surgically implanted in the patient's chest, under the skin with the electrodes to the vagus nerve on the left side of the neck. This device produces electrical energy which works to dissipate seizures.

Ask the following questions:

Any recent trauma to the left side of neck or chest over the device?
Has the patient noticed anything different regarding the device?
When was the VNS implanted?
When was the VNS last checked?
What are the current settings?
Is the child having seizures when the device is functioning properly?
If seizures are still present, is the magnet being used?
Have you noticed any change in your child's seizures recently?
- Increased intensity?
- Increase in frequency?

i. Colostomies and Ileostomies

Colostomy or ileostomy: a portion of the large or small intestine is attached to the abdominal wall and an external bag is in place to collect the digestive waste.

Assess carefully for signs or symptoms of dehydration and/or shock, particularly if there has been any history of diarrhea or decreased oral intake.

Check the ostomy site for signs of infection or irritation:

Signs of infection include: red, warm, tender skin spreading away from the site
Ask the child or parents if the area is more tender than usual.
If any concerns, transport for further evaluation.

If the ostomy bag breaks, the parent or caregiver can usually help and replace it.

If another bag is not available, circle the ostomy with moist gauze and attach any available bag that can serve as a substitute until a proper replacement bag is obtained.

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This document was compiled by the members of the North Carolina Emergency Medical Services for Children Advisory Committee. The main contributors were Donna Moro-Sutherland, MD (Chair of the EMSC Research and Education Committee) and Ben Alexander, MD (Past Chair of the EMSC Advisory Committee).

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General Medical
EMS Triage and Destination Plan

General Medical Patient

- **A patient with signs and/or symptoms that cannot be categorized into STEMI, Stroke, Pediatric or Trauma and Burn Triage Destination Plans.**

The purpose of this plan is to:

- Identify general medical patients who call 911 or present to EMS
- Minimize field decision making on transport destinations
- Identify those patients that should be transported to the closest facility based on complaint and facility capabilities
- Identify those patients that may be transported to a geographically distant facility based on complaint and facility capabilities
- Maximize EMS system resource utilization
- Provide quality EMS service and patient care to the EMS System's citizens
- Continuously evaluate the EMS System based on North Carolina's EMS performance measures.

Patient has life threatening injury or illness signs/symptoms identifying: Acute Stroke, STEMI, Trauma or Burn

Yes → **Appropriate Triage and Destination Plan based on complaint: STEMI, Stroke, Pediatric, Trauma and Burn**

No ↓

Patient falls into one of the following categories:

- Non-Critical injury requiring immediate attention
- Non-Critical injury requiring immediate interventions that are available at the closest facility
- Critical illness requiring immediate attention
- Non-Critical illness without a destination preference

Yes → **Transport to closest appropriate facility**

Facilities

Lexington Memorial Hospital
Thomasville Medical Center
Forsyth Medical Center
Wake Forest University Baptist Medical Center
High Point Regional Hospital
Rowan Regional Hospital
Randolph Hospital
Stanly Regional Medical Center
Kernersville Medical Center
CMC - Northeast

No ↓

Non-Critical illness with a destination preference, which is supported by the need for evaluation based on current complaint, past medical history or past physician / patient relationship(s)

No → **Transport to patient's destination preference. If preference is other than one of the facilities listed above, the on duty supervisor should be contacted for approval**

Yes ↓

General Medical EMS Triage and Destination Plan

Pearls and Definitions

- **All General Medical patients should be triaged and transported using this plan. This plan is in effect 24/7/365**
- **Appropriate Facility** = a hospital which provides emergency care 24/7/365 that is determined, based on complaint, to be capable of addressing the primary patient condition.
- **Non-Critical Injury** = Injuries that may be considered time sensitive but not life threatening, i.e. fracture with loss of PMS
- **Critical Illness** = Any potentially life-threatening complaint that does not meet the criteria for STEMI, Stroke, Pediatric or Trauma and Burn Triage and Destination Protocols.
- **Non-Critical Illness** = Any non life-threatening complaint (illness) that meets the guidelines for medical necessity of ambulance transport.
- Individual insurance plan requirements should not be a factor in determining the appropriate facility. Consideration of insurance plan requirements may be construed as treatment based on the ability to pay and such practices are prohibited.
- The closest appropriate facility may be determined by mileage distance, travel time, weather conditions or other mitigating circumstances. This determination is at the discretion of the attending crew who may obtain further guidance from the on-duty supervisor as needed.

Davidson County EMS System 2010

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

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

- **Forsyth Medical Center**
- **Thomasville Medical Center**
- **High Point Regional Hospital**
- **Lexington Memorial Hospital**

↓ **No**

Pediatric Capable Hospital within a 50 minute EMS transport?

→ **No** → (Transport to closest Community Hospital Listed)

↓ **Yes**

Transport to closest Pediatric Capable Hospital Listed
Early Notification/Activation

Wake Forest University Baptist Medical Center

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.

This protocol has been developed by the North Carolina Office of EMS (Final Version 11-1-2009)

STEMI
EMS Triage and Destination Plan

STEMI Patient
(ST Elevation Myocardial Infarction)

- **Cardiac symptoms greater than 15 minutes and less than 12 hours**

And

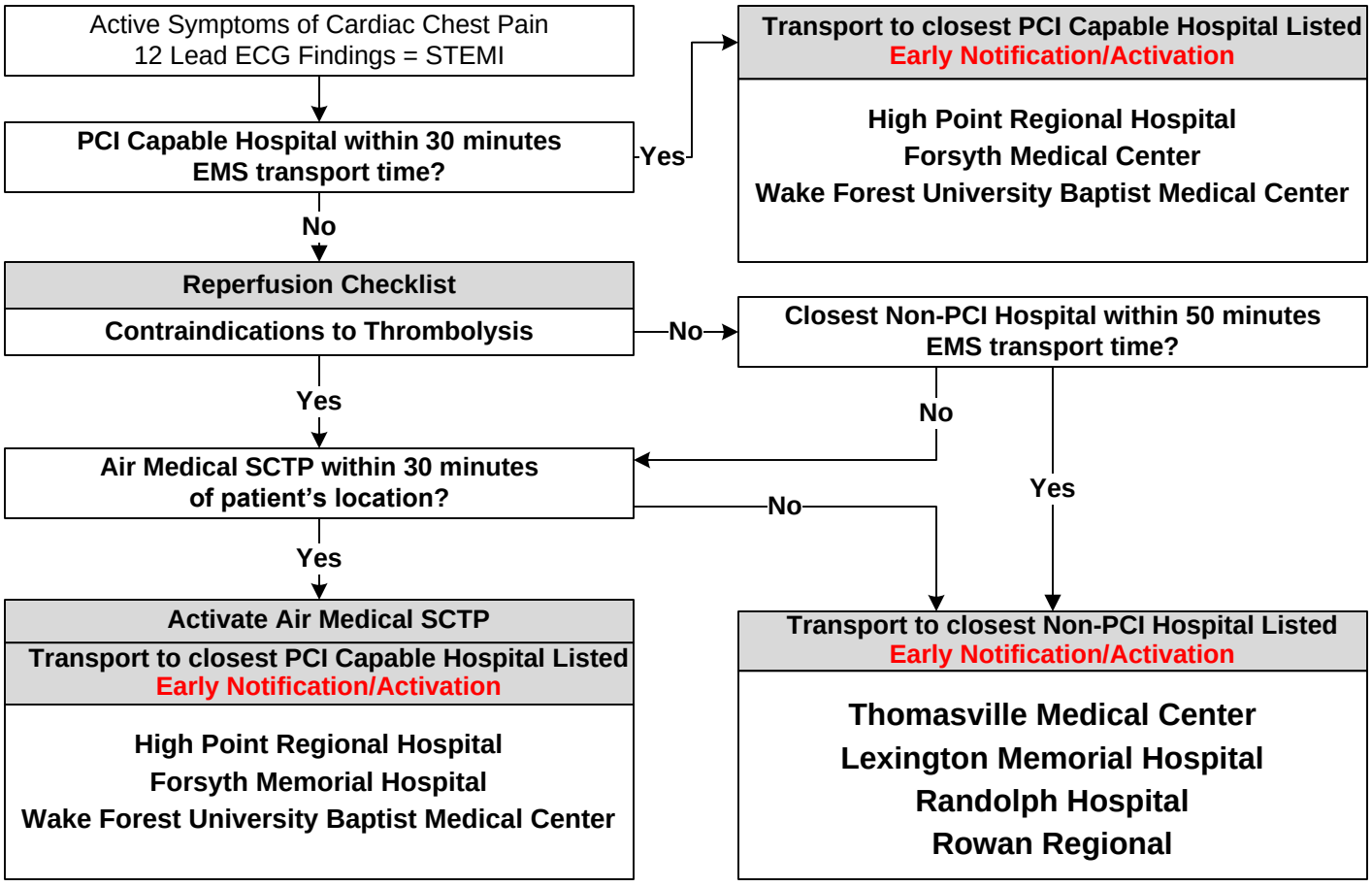
- **12 lead ECG criteria of 1 mm ST elevation in 2 or more contiguous leads**

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



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 **2009**

This protocol has been developed by the North Carolina Office of EMS (Final Version 11-1-2009)

Stroke
EMS Triage and Destination Plan

Stroke Patient

* **A patient with symptoms of an acute Stroke as identified by the EMS Stroke Screen**

Time of Symptom Onset

* **Defined as the last witnessed time the patient was symptom free (i.e. the time of onset for a patient awakening with stroke symptoms would the last time he/she was known to be symptom free before the sleep period)**

The Purpose of this plan is to:

* Rapidly identify acute Stroke patients who call 911 or present to EMS
* Minimize the time from onset of Stroke symptoms to definitive care
* Quickly diagnose a Stroke using validated EMS Stroke Screen
* Complete a reperfusion checklist (unless being transported directly to a Stroke Capable 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 10 minutes or less
* Provide quality EMS service and patient care to the EMS Systems citizens
* Continuously evaluate the EMS System based on North Carolina's Stroke EMS performance measures

Symptoms of Acute Stroke
Positive Stroke Screen

Stroke Center or Stroke Capable Hospital within 2 hours from onset of patient's symptoms and no greater than 30 minutes EMS transport time?

Yes → **Transport to closest Primary Stroke Center or Stroke Capable Hospital Listed**
Early Notification/Activation

Thomasville Medical Center
Forsyth Medical Center
Wake Forest University Baptist Medical Center
High Point Regional
Lexington Memorial Hospital

No ↓

Reperfusion Checklist
Contraindications to Thrombolysis

Yes → **Air Medical SCTP within 50 minutes of patient's location and patient clearly a NEW onset stroke patient?**

No ↓

Transport to closest Community Hospital Listed

Forsyth Medical Center
Thomasville Medical Center
High Point Regional Hospital
Lexington Memorial Hospital

No ← **Air Medical SCTP within 50 minutes of patient's location and patient clearly a NEW onset stroke patient?**

Yes ↓

Consider Activating Air or Ground SCTP

Transport to closest Primary Stroke Center Listed
Early Notification/Activation

TMC, FMC, WFUBMC
HPRH, LMH

Stroke EMS Triage and Destination Plan

Pearls and Definitions

* **All Stroke 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 Suspected Stroke Protocol**
* **Primary Stroke Center** = a hospital that is currently accredited by the Joint Commission as a Primary Stroke Center. Free standing emergency departments and satellite facilities are not considered part of the Primary Stroke Center.
* **Stoke Capable Hospital** = a hospital which provides emergency care with a commitment to Stroke and the following capabilities:
  * CT availability with in-house technician availability 24/7/365
  * Ability to rapidly evaluate an acute stroke patient to identify patients who would benefit from thrombolytic administration
  * Ability and willingness to administer thrombolytic agents to eligible acute Stroke patients
  * Accepts all 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 for a Primary Stroke Center or Stroke Capable Hospital
* **Specialty Care Transport Program** = an air or ground based specialty care transport program which can assume care of an acute Stroke patient from EMS or a Hospital and transport the patient to a Primary Stroke Center.

This protocol has been developed by the North Carolina Office of EMS (Final Version 11-1-2009)

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 → **Trauma Center (Burn Center for isolated Burn Injury) within 30 minutes of EMS Transport?**

No → **Air Medical SCTP within 30 minutes of patient's location or helipad?**

Yes → **Activate Air or Ground SCTP**

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

Forsyth Medical Center
Thomasville Medical Center
High Point Regional Hospital
Lexington Memorial Hospital

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 the Nearest Hospital for Stabilization Unless Minimal Additional Time to a Trauma Center**

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

Wake Forest Baptist Medical Center (Level 1)
High Point Regional Hospital (Level 3)

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.

This protocol has been developed by the North Carolina Office of EMS (Final Version 10-1-2009)