KENTUCKY BOARD OF EMERGENCY MEDICAL SERVICES

EMT-Basic
EMT-Advanced
EMT-Paramedic
NELSON COUNTY EMS

Patient Care Protocols

06/2020 Revision

The Kentucky Patient Care Protocols are adapted from the 2007 New Hampshire EMS Protocols with gracious permission of the Medical Control Board of the NH Bureau of EMS and TMC Books.

Table of Contents

General Protocols

Commonwealth of Kentucky

On-Scene Medical Personnel

- The medical care provided at the scene is the responsibility of the highest level of EMS provider who has responded by usual dispatch systems to that scene. Passersby who stop to help, even though possibly more highly trained than the system providers, may **not** assume responsibility (except as outlined below) but may be allowed to help in care at the discretion of the lead EMS provider and assuming they have proof of licensure.

- When an EMS provider, under medical control (on- or off-line), arrives at the scene of an emergency, the provider acts as the agent of medical control.

- Any healthcare provider (MD, PA, RN, nurse midwife, non-KY licensed EMS provider, etc.) who is not an active member of the responding EMS unit, and who is either at the scene at the time of EMS‘ arrival or arrives after an EMS unit provider has initiated care, and who desires to continue to participate, should be put in touch with the on-line medical control physician.

- At no time should an EMS provider provide care outside of their scope of training and/or protocols.

- In the event that a Mass Casualty Incident (MCI) is declared, all Providers should follow the Mass Casualty Incidents Uniform Prehospital MCI Procedure outlined in this document or similar approved Incident Command System.

Use of Lights and Sirens

Purpose

The estimated EMS fatality rate (12.7 per 100,000 workers) is more than twice the national rate. Vehicles crashes of all types remain the leading cause of death in EMS. The use of Lights and Sirens in the transport of a patient from the scene to the hospital by EMS personnel should be consistent with "best practices", be medically defensible and conform to Kentucky state law. It is not without risk and should be used only when there is a likely benefit to the patient. This is to ensure the safety of our patients, our staff, our citizens and ourselves.

Policy

KRS 189.910 to KRS 189.950 outline the legal parameters under which an emergency vehicle may be exempt from certain traffic regulations. The vehicle operator should be familiar with these statutes. Specifically:

189.940 Exemptions from traffic regulations.

- The speed limitations set forth in the Kentucky Revised Statutes do not apply to emergency vehicles:
  - When responding to emergency calls; or
  - To police vehicles when in pursuit of an actual or suspected violator of the
  - law; or
  - To ambulances when transporting a patient to medical care facilities; and
  - The driver thereof is giving the warning required by subsection (5)(a) and (b) of this section.

No portion of this subsection shall be construed to relieve the driver of the duty to operate the vehicle with due regard for the safety of all persons using the street or highway.

The law permits such emergency vehicles only **on emergency calls or when transporting to a medical care facility** to utilize lights and sirens. EMS personnel are instructed to follow the state laws and use lights and sirens while going to the hospital only when it is medically necessary for the patient to be rapidly transported. Rapid transport to the scene may be necessary in certain instances to evaluate the situation for possible life threats. It is then that the EMS personnel in charge of patient care will make the appropriate transportation decision. Although time is typically saved, studies have shown the savings to be from less than one minute to less than four minutes and rarely clinically significant to the patient. Transport in this manner is not without risk to the patient. The EMS personnel in charge will have to weigh the risks and benefits to the patient, and document this rationale on the EMS run form. This policy does not restrict the EMS personnel from changing a non-emergency transport back into an emergency transport if conditions change

Determination of Death - Dead on Scene

If it appears that a patient you have been called to attend is dead, this protocol shall be followed prior to final determination.

1. The Paramedic shall determine and document that the following signs of death are present:
    - Unresponsiveness
    - Apnea
    - The absence of a palpable pulse at the carotid site
    - Bilaterally fixed and dilated pupils; and
    - Asystole determined in two (2) leads on an electrocardiograph in accordance with the American Heart Association guidelines, except in cases of trauma **or** when presented with a standard form or identification evidencing a patient‘s desire not to be resuscitated in accordance with KRS 311.623 (DNR regulation).

2. The Paramedic shall determine, in addition, that one (1) or more of the following factors or conditions exist:
    - Lividity of any degree
    - Rigor mortis of any degree (In the non-hypothermic patient)
    - The presence of venous pooling in the body
    - Damage or destruction of the body which is incompatible with life, or
    - A standard form or identification evidencing a patient‘s desire not to be resuscitated in accordance with KRS 311.623 (DNR regulation).

3. If the Paramedic has determined and documented that the conditions above (sections 1 and 2) have been met, the Paramedic may declare the patient dead.

4. The Paramedic may contact the on duty MEDICAL CONTROL for advice and assistance in making a determination required by this protocol.

5. If ANY patient meets the criteria described above as a non-resuscitation candidate, access to the scene should be limited as much as possible with due care to disturb the scene as little as possible. As in all cases of out-of –hospital deaths, every effort should be made to console family, friends, survivors, and witnesses without interfering with ongoing investigations.

Determination of Death - Dead on Scene continued

6. The Paramedic shall document all items required on the Kentucky EMS Ambulance Run Report including the usual patient assessment, medical history, and surrounding events information. It is especially important to note:

    - Body position and location when discovered, including differences from when last seen alive.
    - Patient condition when last seen alive.
    - Clothing and condition of clothing.
    - Conditions of residence/business/location found.
    - Statements made on the scene by significant individuals.
    - Any unusual circumstances.

7. If the Paramedic determines a patient to be dead, the paramedic shall remain on the scene until the arrival of a law enforcement officer or until the Paramedic is released from the scene by the coroner.

IT IS TO BE EXPRESSLY UNDERSTOOD THAT IN THE EVENT OF ANY UNCERTAINTY AS TO THE PATIENT STATUS, THE CREW IS TO INITIATE NORMAL RESUSCITATIVE EFFORTS

Determination of Death - Discontinuance of Resuscitation by a Paramedic

1. A Paramedic may discontinue resuscitation if, prior to transport:
   a. The patient has suffered cardiac arrest.
   b. The Paramedic has attempted and documented the resuscitative efforts specified in the Asystole Protocol including successful endotracheal intubation, IV access, and IV administration of Epinephrine.
   c. The resuscitative efforts were unsuccessful; and
   d. The patient meets the following criteria:
      - Unresponsiveness
      - Apnea
      - The absence of a palpable pulse at the carotid site
      - Bilaterally fixed and dilated pupils; and
      - Asystole determined in two (2) leads on an electrocardiograph in accordance with the American Heart Association guidelines, except in cases of trauma **or** when presented with a standard form or identification evidencing a patient‘s desire not to be resuscitated in accordance with KRS 311.623 (DNR regulation).

2. A Paramedic may discontinue resuscitation initiated by someone if:
   a. The patient has suffered cardiac arrest;
   b. The patient meets the following criteria:
      - Unresponsiveness
      - Apnea
      - The absence of a palpable pulse at the carotid site
      - Bilaterally fixed and dilated pupils; and
      - Asystole determined in two (2) leads on an electrocardiograph in accordance with the American Heart Association guidelines, except in cases of trauma **or** when presented with a standard form or identification evidencing a patient‘s desire not to be resuscitated in accordance with KRS 311.623 (DNR regulation).
   c. The Paramedic shall determine, in addition, that one (1) or more of the following factors or conditions exist:
      - Lividity of any degree
      - Rigor mortis of any degree (In the non-hypothermic patient)
      - The presence of venous pooling in the body
      - Damage or destruction of the body which is incompatible with life, or
      - A standard form or identification evidencing a patient‘s desire not to be resuscitated in accordance with KRS 311.623 (DNR regulation).

Determination of Death - Discontinuance of Resuscitation by a Paramedic continued

3. The Paramedic shall contact the on duty MEDICAL CONTROL, for advice and assistance prior to making the determination. MEDICAL CONTROL approval must be obtained prior to the discontinuance of resuscitative efforts.

4. The Paramedic shall document all items required on the Kentucky EMS run report including, the usual patient assessment, medical history and surrounding events information. It is especially important to note:
    - Body position and location when discovered, including differences from when last seen alive.
    - Patient condition when last seen alive.
    - Clothing and condition of clothing.
    - Condition of residence/business/location found.
    - Statements made on the scene by significant individuals.
    - Any unusual circumstances.

IT IS TO BE EXPRESSLY UNDERSTOOD THAT IN THE EVENT OF ANY UNCERTAINTY AS TO THE PATIENT STATUS, THE CREW IS TO INITIATE NORMAL RESUSCITATIVE EFFORTS

Kentucky Emergency Medical Services
Do Not Resuscitate (DNR) Order

Person's Full Legal Name _____

Surrogate's Full Legal Name (if applicable) _____

I, the undersigned person or surrogate who has been designated to make health care decisions in accordance with Kentucky Revised Statutes, hereby direct that in the event of my cardiac or respiratory arrest that this DO NOT RESUSCITATE (DNR) ORDER be honored. I understand that DNR means that if my heart stops beating or if I stop breathing, no medical procedure to restart breathing or heart function, more specifically the insertion of a tube into the lungs, or electrical shocking of the heart or cardiopulmonary resuscitation (CPR) will be started by emergency medical services (EMS) personnel

I understand this decision will *not* prevent emergency medical services personnel from providing other medical care.

I understand that I may revoke this DNR order at any time by destroying this form, removing the DNR bracelet, or by telling the EMS personnel that I want to be resuscitated. Any attempt to alter or change the content, names, or signatures on the EMS DNR form shall make the DNR form invalid.

I understand that this form, or a standard EMS DNR bracelet must be available and must be shown to EMS personnel as soon as they arrive. If the form or bracelet is not provided, the EMS personnel will follow their normal protocols which could include cardiopulmonary resuscitation (CPR) or other resuscitation procedures. I understand that should I die, EMS personnel will require this form and/or bracelet for their records.

I give permission for information about this EMS DNR Order to be given to the prehospital emergency medical care personnel, physicians, nurses, or other health care personnel as necessary to implement this directive.

I hereby state that this ***'Do Not Resuscitate (DNR) Order'*** is my authentic wish not be resuscitated.

_____ _____
Person/Legal Surrogate Signature Date

Commonwealth of Kentucky County of _____

Subscribed and sworn to before me by _____ to be his/her own free act and deed, this _____ day of _____, 20_____.

_____, Notary Public

My commission expires: _____

In lieu of having this Form notarized, it may be witnessed by two persons not related to the individual noted above.

WITNESSED BY:
1. _____

2. _____

This EMS Do Not Resuscitate Form was approved by the Kentucky Board of Medical Licensure at their March 1995 meeting.

Complete the portion below, cut out, fold, and insert in DNR bracelet

_____

I certify that an EMS Do Not Resuscitate (DNR) form has been executed.
Person's Name (print or type) _____
Person's or Legal Surrogate's Signature _____

INSTRUCTIONS

PURPOSE

This standardized EMS DNR Order has been developed and approved by the Kentucky Board of Medical Licensure, in consultation with the Cabinet for Human Resources. It is in compliance with KRS Chapter 311 as amended by Senate Bill 311 passed by the 1994 General Assembly, which directs the Kentucky Board of Medical Licensure to develop a standard form to authorize EMS providers to honor advance directives to withhold or terminate care.

For covered persons in cardiac or respiratory arrest, resuscitative measures to be withheld include external chest compressions, intubation, defibrillation, administration of cardiac medications and artificial respiration. The EMS DNR Order does **not** affect the provision of other emergency medical care, including oxygen administration, suctioning, control of bleeding, administration of analgesics and comfort care.

APPLICABILITY

This **EMS DNR Order** applies only to resuscitation attempts by health care providers in the **prehospital** setting(i.e., certified EMT-First Responders, Emergency Medical Technicians, and Paramedics) — in patients' homes, in a long-term care facility, during transport to or from a health care facility, or in other locations outside acute care hospitals.

INSTRUCTIONS

Any adult person may execute an EMS DNR Order. The person for whom the Order is executed shall sign and date the Order and my either have the Order notarized by a Kentucky Notary Public or have their signature witness by two persons not related to them. The executor of the Order must also place their printed or typed name in the designated area and their signature on the EMS DNR Order bracelet insert found at the bottom of the EMS DNR Order form. The bracelet insert shall be detached and placed in a hospital type bracelet and placed on the wrist or ankle of the executor of the Order.

If the person for whom the EMS DNR Order is contemplated is unable to give informed consent, or is a minor, the person's legal surrogate shall sign and date the Order and may either have the form notarized by a Kentucky Notary Public or have their signature witnessed by two persons not related to the person for which the form is being executed or related to the legal health care surrogate. The legal health care surrogate shall also complete the required information on the EMS DNR bracelet insert found at the bottom of the EMS DNR Order form. The bracelet shall be detached and placed in a hospital type bracelet and placed on the wrist or ankle of the person for which this Order was executed.

The original, completed EMS DNR Order or the EMS DNR Bracelet must be readily available to EMS personnel in order for the EMS DNR Order to be honored. Resuscitation attempts may be initiated until the form or bracelet is presented and the identity of the patient is confirmed by the EMS personnel. It is recommended that the EMS DNR Order be displayed in a prominent place close to the patient and/or the bracelet be on the patient's wrist or ankle.

REVOCATION

An EMS DNR Order may be revoked at any time orally or by performing an act such as burning, tearing, canceling, obliterating or by destroying the order by the person on whose behalf it was executed or by the person's legal health care surrogate.

IT SHOULD BE UNDERSTOOD BY THE PERSON EXECUTING THIS EMS DNR ORDER OR THEIR LEGAL HEALTH CARE SURROGATE, THAT SHOULD THE PERSON LISTED ON THE EMS DNR ORDER DIE WHILE EMS PREHOSPITAL PERSONNEL ARE IN ATTENDANCE, THE EMS DNR ORDER OR EMS DNR BRACELET MUST BE GIVEN TO THE EMS PREHOSPITAL PERSONNEL FOR THEIR RECORDS

Trauma Triage

Purpose

Victims of major trauma have better outcomes when transported to a designated trauma center in a timely manner. The American College of Surgeons (ACS) has developed triage criteria that is useful in identifying patients that may benefit from evaluation at a trauma center.

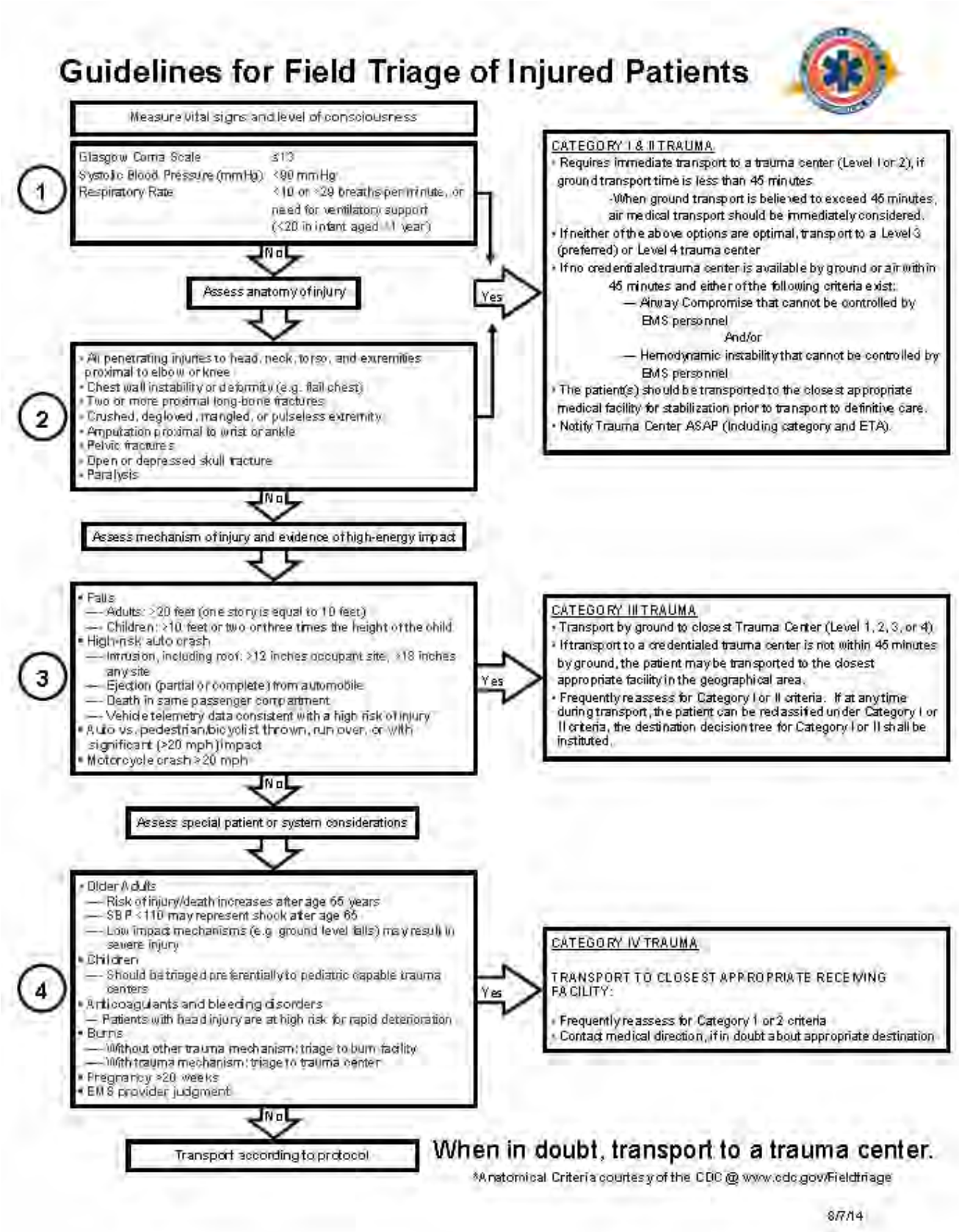
In general consider the following guidelines:

It is in the best interest of the patient to be transported to a designated trauma center if the patient meets ACS criteria and a designated trauma center is within thirty minutes transport time.

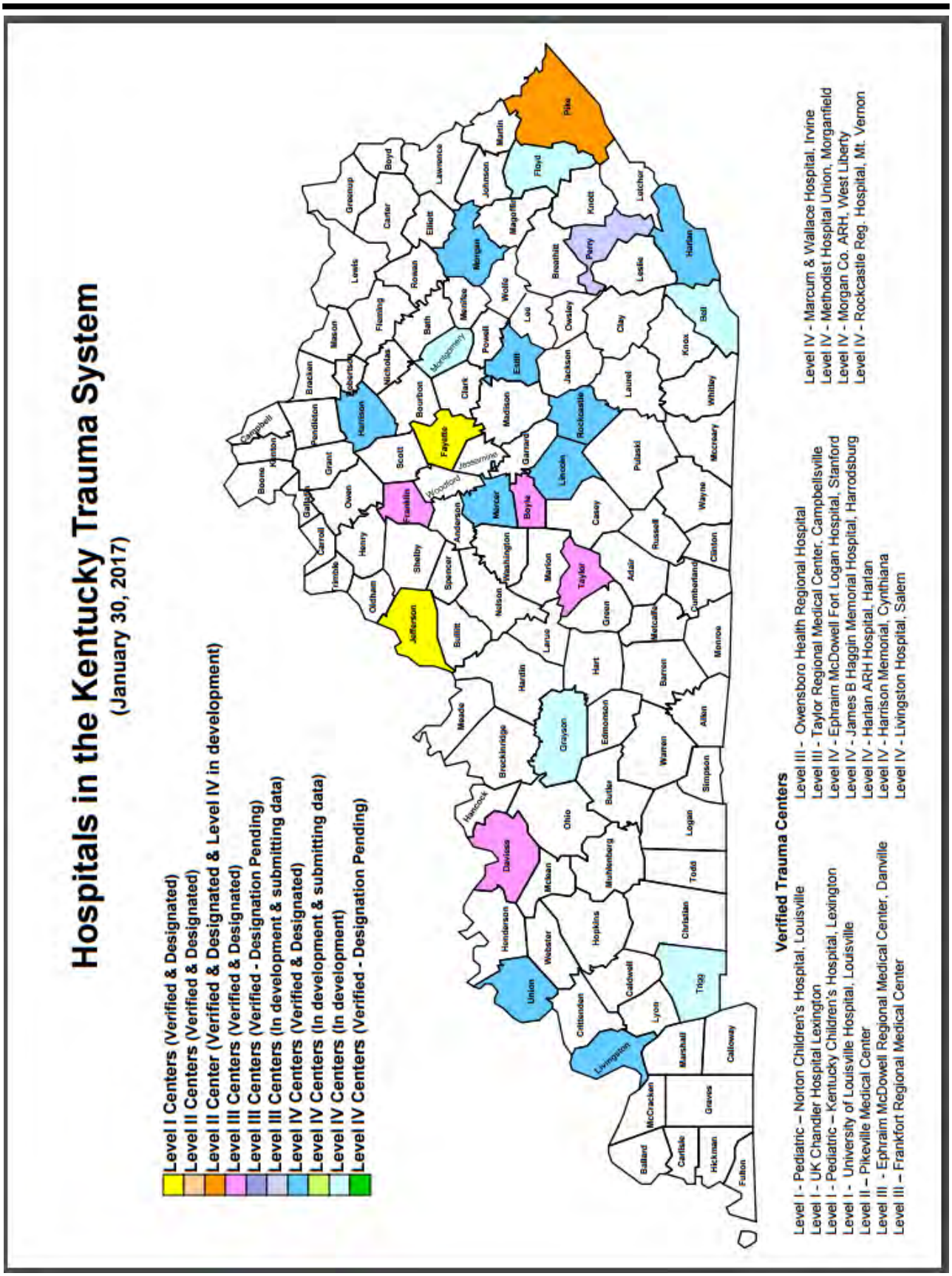
Patients with a compromised airway may be best served by transport to the closest hospital with rapid transfer to a trauma center.

Consider air medical resources but do not delay transport unnecessarily. (See Helicopter Criteria for Scene Transport).

Trauma Triage Criteria Algorithm



Verified Trauma Centers in Kentucky



Air Medical/ Helicopter Safety

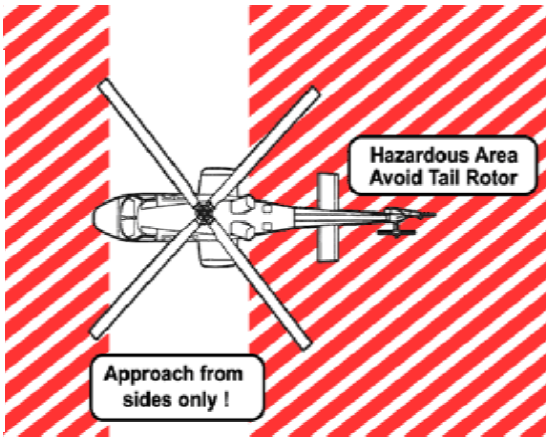
Landing Zone and Safety. Without exception, safety is air medical service's top priority.

Requesting a helicopter

- ► Private Citizens - call 9-1-1.
- ► Police, fire and EMS - Request a helicopter through the appropriate agency, such as your dispatch center, with the following information:
  - Location cross street
  - Location LAT/LONG coordinates
  - Any prominent features at the scene
  - Notify all involved communications centers if any other air medical service has been contacted and the status of that agency. Always inform all communications centers if other aircraft are anticipated to be in the area.
  - Your call-back number
  - Scene radio frequency and CTCSS tone
  - Call sign of LZ (Landing Zone) Command.. One person should be designated to coordinate LZ setup and communicate with responding aircraft. This person should not be involved with patient care.
  - Weather, including low ceilings, poor visibility, icing, and high winds
  - Patient status, such as number, condition, age, approximate patient weight, mechanism of injury, and hazards
  - LZ details. The preferred landing zone is 100 x 100 feet.
  - ALWAYS RELAY ANY INFORMATION PERTAINING TO HAZMAT TO THE COMMUNICATIONS CENTER WHEN REQUESTING AIR MEDICAL SERVICE.

Important Tips

- Never approach the aircraft until instructed to do so and only as instructed by the pilot or flight crew aboard
- Approach angles over obstacles should be less than 20 degrees
- Always keep LZ clear of people and other potential hazards
- Under no circumstances should you ever approach the aircraft from the rear



Landing Zone Setup

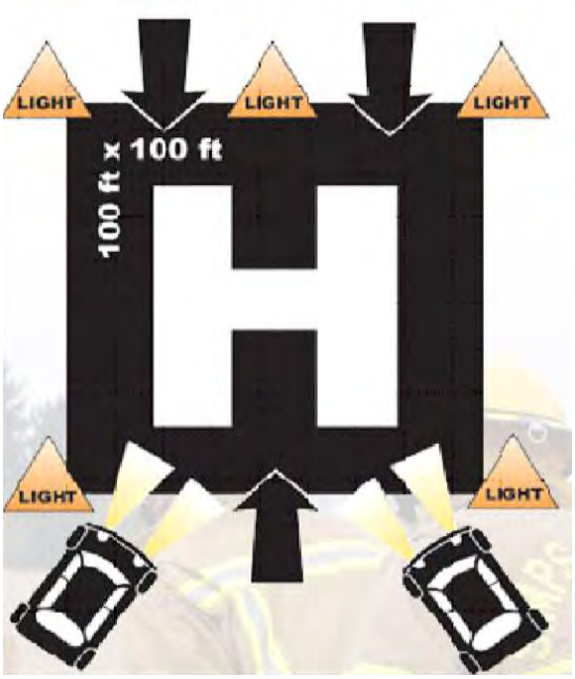
► Set up the LZ as follows:
- SIZE should be 100 feet by 100 feet
- LEVEL: Select a LZ as level as possible (minimal slope)
- LANDING SURFACE: Select a hard surface, grassy surface, or hard-packed snow. Avoid loose dirt, dust, or powder snow.
- CLEAR OVERHEAD free of obstructions such as wires, antennas, or poles
- CLEAR AREA free of debris, large rocks, posts, stumps, vehicles, people, animals, and other hazards
- MARK THE AREA clearly using five weighted cones or beacons, one at each corner of the LZ and one on the side that wind is coming from
- SELECT AN ALTERNATE LZ. Plan for an alternate LZ because the pilot may determine your LZ to be unsafe.
- HAZMAT: Always relay any information pertaining to HAZMAT to the communications center when requesting air medical service. Always inform the pilot and medical crew of HAZMAT. When selecting a LZ find a site at least 1/4 to 1 mile UPWIND from the incident depending on the type and materials involved. Avoid low areas where vapors may collect. The patient must be removed from the hot zone. All patients must be decontaminated PRIOR to flight.

When the helicopter is overhead

► Air medical service will establish radio contact on the assigned frequency with LZ Command three to five minutes out. Describe the following:
- LZ location
- Lighting
- Hazards
- Overhead wires, including wires along the approach path to the LZ
- Obstructions
- Slope
- Surface conditions
- Wind direction and speed if known
- Maintain radio contact at all times until the helicopter has landed, loaded, and departed the area.

Night Landing Zone

- ► DO NOT SHINE LIGHTS DIRECTLY AT THE HELICOPTER
- ► Set up night landing zones with five strobes or other secured lights. Do not use cones, flares, or tape to mark the site.
- ► Emergency vehicles may be parked so their headlights intersect the middle of the landing site and/or parked underneath wires to mark them. Turn strobes of emergency vehicles off as the aircraft approaches.
- ► Lights may be shown onto poles indicating wires between the poles
- ► Night landing zones always require good communications, lighting, and alertness
- ► Turn off all emergency lights after aircraft has started approach
- ► One strobe should be on the side that the wind is coming from
- ► If no strobes are available mark with other lighting systems
- ► If no other portable lights are available, cross headlight beams into the wind at the center of the landing zone



Helicopter Utilization Criteria for Scene Response

Purpose:

Air Medical Services (AMS) are a valuable, yet limited resource in the Commonwealth. It is important that Emergency Medical Service personnel utilize consistent and appropriate criteria when requesting an air medical service for assistance with patient care and transport.

Air Medical Services (AMS) are a valuable, yet limited resource. It is important that Emergency Medical Service personnel utilize consistent and appropriate criteria when requesting an air medical service for assistance with patient care and transport. The following represents a combination of the current criteria in use throughout the state. These criteria are consistent with national AMS utilization criteria. It is important that review of appropriate helicopter utilization be a part of EMS training, as well as a component of the agency and regional level retrospective quality assurance process.

Criteria:

1. The helicopter is an air ambulance and an essential part of the EMS system. It may be considered in situations wherein:
   - The use of the helicopter would speed a patient's arrival to the hospital capable of providing definitive care and this is felt to be significant to the patient's condition, or;
   - If specialized services offered by the air medical service would benefit the patient prior to arrival at the hospital.
2. The following criteria should be used when considering use of an air medical service:
   - The patient's condition is a "life or limb" threatening situation demanding intensive multidisciplinary treatment and care. This may include but not be limited to:
   - Patients with ***physical findings*** defined in the adult and pediatric major trauma protocols (see attached)
   - Critical burn patients (see attached)
   - Critically ill medical patients requiring care at a specialized center to include, but not be limited to: acute stroke or ST elevation MI.
   - ***Patients in cardiac arrest who are not hypothermic should be excluded from these criteria***
3. Dispatch, Police, Fire or EMS will evaluate the situation/condition and if necessary, may place the helicopter on standby.

Helicopter Utilization Criteria for Scene Response continued

4. The helicopter may be requested to respond to the scene when:
   - ALS personnel request the helicopter.
   - BLS personnel request the helicopter, when ALS is delayed or unavailable.
   - In the absence of an EMS agency, any emergency service may request the helicopter, if it is felt to be medically necessary.
5. When EMS arrive, they should assess the situation. If the MOST HIGHLY TRAINED EMS PERSONNEL ON THE SCENE determine, that the helicopter is not needed, it should be cancelled as soon as possible.
6. When use of air medical services is not specifically defined by the protocol, the on scene EMS provider should establish communication with medical control to discuss the situation with the on line physician.
7. Air medical services may be considered in situations where the patient is inaccessible by other means or, if utilization of existing ground transport services threatens to overwhelm the local EMS system.
8. The destination facility will be determined by the AMS crew based upon medical appropriateness with consideration for patient preference and on line medical direction, in compliance with regional protocols.
9. An EMS service should not wait on the scene or delay transport waiting for the helicopter to arrive. If the patient is packaged and ready for transport, the EMS service should initiate transport to the hospital and reassign the landing zone. The helicopter may intercept with an ambulance during transport at an alternate-landing site.

THIS IS A GUIDELINE AND IS NOT INTENDED TO SPECIFICALLY DEFINE EVERY CONDITION IN WHICH AIR MEDICAL SERVICES SHOULD BE REQUESTED. GOOD CLINICAL JUDGEMENT SHOULD BE USED AT ALL TIMES.

Transfer of Patient Care, Documentation and Quality Assurance:

1. As with other instances where care of a patient is transferred, it is expected that all patient related information, assessment findings and treatment will be communicated to the flight crew.
2. At the completion of the EMS call, all of the details of the response, including, but not limited to all patient related information, assessment findings and treatment must be documented.
3. As with all EMS responses, helicopter utilization, the treatment and transportation of patients will be reviewed as a part of a Quality Assurance process.

Helicopter Utilization Criteria for Scene Response continued

Guidelines for Helicopter Utilization Criteria for Scene Response

ADULT MAJOR TRAUMA

1. GCS less than or equal to 13
2. Respiratory Rate less than 10 or more than 29 breaths per minute
3. Pulse rate is less than 50 or more than 120 beats per minute
4. Systolic blood pressure is less than 90mmHg
5. Penetrating injuries to head, neck, torso or proximal extremities
6. Two or more suspected proximal long bone fractures
7. Suspected flail chest
8. Suspected spinal cord injury or limb paralysis
9. Amputation (except digits)
10. Suspected pelvic fracture
11. Open or depressed skull fracture

PEDIATRIC MAJOR TRAUMA

1. Pulse greater than normal range for patient's age
2. Systolic blood pressure below normal range
3. Respiratory status inadequate (central cyanosis, respiratory rate low for the child's age, capillary refill time greater than two seconds)
4. Glasgow coma scale less than 14
5. Penetrating injuries of the trunk, head, neck, chest, abdomen or groin
6. Two or more proximal long bone fractures
7. Flail chest
8. Combined system trauma that involves two or more body systems, injuries or major blunt trauma to the chest or abdomen
9. Spinal cord injury or limb paralysis
10. Amputation (except digits)

CRITICAL BURNS

1. Greater than 20% Body Surface Area (BSA) second or third degree burns
2. Evidence of airway/facial burns
3. Circumferential extremity burns

****Note that for patients with burns and coexisting trauma, the traumatic injury should be considered the first priority and the patient should be triaged to the closest appropriate trauma center for initial stabilization.**

CRITICAL MEDICAL CONDITIONS

1. Suspected Acute Stroke
   - Positive Cincinnati Pre-hospital Stroke Scale
   - Total prehospital time (time from when the patient's symptoms and/or signs first began to when the patient is expected to arrive at the Stroke Center) is less than two (2) hours.

2. Suspected Acute Myocardial Infarction
   - Chest pain, Shortness of breath or other symptoms typical of a cardiac event
   - EKG findings of
     - ST elevation 1mm or more in 2 or more contiguous leads OR
     - LBBB (QRS duration >.12msec and Q wave in V1 or V2

Abuse and Neglect – Child, Elder or other Vulnerable Individuals

To provide the process for identification, assessment, management and reporting of patients with suspected physical abuse (children, elderly, or other vulnerable individuals), exploitation, and/or neglect.

PROCEDURE FOR ASSESSMENT

- ► Treat and document only physical injuries requiring immediate attention using the appropriate medical treatment protocol, without causing undue emotional trauma for non life-threatening injuries.
- ► Secure and bag (in paper), whenever possible, any clothing or items that could be preserved for evidence.
- ► Interview with patient shall be conducted calmly, with respect and privacy, and should include close observation for
  - ♦ Over-sedation
  - ♦ Inappropriate fears
  - ♦ Avoidance behaviors
  - ♦ Poor parent-child bonding
  - ♦ Inappropriate interaction with caregiver
- ► Do not address specifics of abuse or neglect.
- ► Obtain pertinent history relating to presenting injuries.
- ► Carefully and specifically, document verbatim any patient statements of instances of rough handling, sexual abuse, alcohol/drug abuse, verbal or emotional abuse, isolation or confinement, misuse of property, threats, and gross neglect such as restriction of fluids, food, or hygiene.
- ► Note problems with living conditions and environment.
- ► Note any of the following potential indicators of an abusive history or environment
  - ♦ Unsolicited history provided by the patient
  - ♦ Delay in seeking care for injury
  - ♦ Injury inconsistent with history provided
  - ♦ Conflicting reports of injury from patient and care-giver
  - ♦ Patient unable, or unwilling, to describe mechanism of injury
  - ♦ Lacerations, bruises, ecchymosis in various stages of healing
  - ♦ Multiple fractures in various stages of healing
  - ♦ Scald burns with demarcated immersion lines without splash marks
  - ♦ Scald burns involving anterior or posterior half of extremity
  - ♦ Scald burns involving buttocks or genitalia
  - ♦ Cigarette burns
  - ♦ Rope burns or marks
  - ♦ Patient confined to restricted space or position
  - ♦ Pregnancy or presence of sexually transmitted disease in a child less than 12 years

Abuse and Neglect – Child, Elder or other Vulnerable Individuals continued

SPECIAL CONSIDERATIONS

- ► Law enforcement may be contacted at the discretion of the EMS provider, however assure the safety of EMS personnel before entering the scene.
- ► If patient is not transported, the suspected abuse must still be reported. If a parent/guardian refuses treatment of a minor child whom you feel needs medical attention, contact law enforcement immediately.
- ► Careful and specific documentation is vital because the "story" often changes as the investigation proceeds.
- ► Minors do not need parental consent for treatment of sexually transmitted diseases (KRS 214.185).
- ► A minor 12 years of age or older may voluntarily submit himself to treatment for drug dependency as defined in KRS 214.185.
- ► Child Abuse: You must make a verbal report. Informing hospital personnel does not fulfill your legal reporting responsibilities.
- ► Child Abuse/Elder Abuse: KRS 620.030, if you have reason to believe a child/elder is being abused or neglected, you are obligated to report it. Call 1-800-752-6200: Department of Community Based Services or local law enforcement. (KRS 620.030/KRS 209.030).

Crime Scene/Preservation of Evidence

If you believe a crime has been committed, contact law enforcement immediately. Protect yourself and other EMS personnel. You will not be held liable for failing to act if a scene is not safe to enter. Initiate patient contact and medical care only after law enforcement has deemed the scene is safe.

- ► Do not touch or move anything at a crime scene unless it is necessary to do so for patient care.
- ► Have all EMS providers use the same path of entry and exit.
- ► Do not walk through fluids on the floor.
- ► Observe and document original location of items moved by crew.
- ► When removing patient clothing, leave intact as much as possible.
- ► Do not cut through clothing holes made by gunshot or stabbing.
- ► If you remove any items from the scene, such as an impaled object or medication bottle, document your action and advise investigating officers.
- ► Do not sacrifice patient care to preserve evidence.
- ► Consider requesting a law enforcement officer to accompany the patient in the ambulance to the hospital.
- ► Document statements made by the patient or bystanders on the EMS patient care report.
- ► Inform staff at the receiving hospital this is a "crime scene” patient.
- ► If the patient is obviously dead, contact medical control for directions to withhold resuscitative measures and do not touch the body.
- ► For traffic accidents, preserve the scene by parking away from skid marks and debris.

Sexual Assault

It is of the utmost importance that the sexual assault survivor feel acceptance and support regardless of his/her emotional response.

Do not evaluate or pass judgment on the credibility of the circumstances of the assault.

- ► Routine Patient Care.
- ► Identify yourself to the patient and assure them that they are safe and in no further danger.
- ► Contact law enforcement if they have not been notified.
- ► If no life-threatening situation is present, prehospital care may require waiting for police to secure the scene which is a potential crime scene.
- ► Try to attend to maintenance of forensic evidence. Try not to cut through tears or stains in clothing. Do not cleanse any skin area more than necessary, to provide immediate care.
- ► Advise the patient not to eat, drink, smoke, bathe, change clothing or go to the bathroom if at all possible to preserve any forensic evidence. If they must urinate, request that they do not wipe.
- ► If the patient changed clothes after the attack, each piece of clothing should be separately bagged in a PAPER BAG and brought to the hospital with the patient.
- ► If possible, suggest the victim take other clothing to be worn home.
- ► When transporting the patient, it is preferable whenever possible, to have a same sex provider as the primary provider. If the assault is a same sex assault, a provider of the opposite sex may be preferable to the patient.
- ► For privacy and confidentiality, minimize radio communication and consider land line communication to hospital.
- ► IF possible, transport to a facility that has the capability of performing a SEXUAL ASSAULT FORENSIC EXAMINATION.

Restraint Protocol - Prehospital

PURPOSE

On occasion, EMS personnel must render care to patients who are either a danger to themselves or to others. Physical restraint devices for such patients are intended to minimize the risk of bodily harm both to the patient and to EMS personnel caring for the patient. The intent of this protocol is to establish consistent guidelines among EMS personnel for the safe use of patient physical restraint devices in the field.

DEFINITION

Physical restraints are restrictive devices which are intended to promote EMS personnel and patient safety by preventing the movement of a patient‘s limbs and/or body.

RESTRAINT DEVICES

A. Soft (cloth) restraints: The primary physical restraint device used in the prehospital setting.
B. Gurney straps (Velcro, Buckle): may also be used to supplement the soft restraints.
C. Cravats may be used if soft restraints are not available.
D. Metal handcuffs: **EMS personnel shall not apply handcuffs.** They shall be limited to situations where the patient is exceptionally combative and assistance is not readily available for placement of soft restraints AND police personnel are involved in the run. If handcuffs are in use, the police officer shall transport in the ambulance along with the EMS personnel and shall be given deference in the use of handcuff devices.
E. Leather restraints: Shall be limited to patients that can not be restrained by other means. If leather restraint is locked, the restraint key shall *always* be in the possession of the EMS personnel who is monitoring the patient during transport.
F. Chest restraints: Consisting of gurney straps and/or rolled sheet (five-point) shall be used for exceptionally combative patient as needed. The chest restraint shall never interfere with adequate ventilatory motion of chest wall muscles and diaphragm.
G. NOT AUTHORIZED: Any use of any restraint type not authorized by this policy is prohibited. Examples of unauthorized restraint types include: chemical restraints not specifically authorized by the Board, tape, rope, or other binding materials or physical choke holds.

GENERAL POLICY

Restraints are to be used only when necessary in situations where the patient is violent or potentially violent and may be a danger to themselves or others. EMS providers must remember that aggressive violent behavior may be a symptom of a medical condition such as but not limited to:

Shock	Drug/alcohol intoxication	Toxicological ingestion
Hypertension	Seizure	Electrolyte imbalance
Myocardial ischemia/infarction	Dysrhythmias	Hypoxia
Stroke	Infection	Anemia
Hypoglycemia	Head trauma	Agitated Delirium
Pulmonary embolism	Metabolic disorders	

Protocol

1. Patient health care management remains the responsibility of the EMS provider. The method of restraint shall not restrict the adequate monitoring of vital signs, ability to protect the patient's airway, compromise peripheral neurovascular status or otherwise prevent appropriate and necessary therapeutic measures. It is recognized that the evaluation of many patient parameters requires patient cooperation and thus may be difficult or impossible.

2. The least restrictive means shall be employed.

3. Verbal de-escalation
    a. Validate the patient‘s feelings by verbalizing the behaviors the patient is exhibiting and attempt to help the patient recognize these behaviors as threatening.
    b. Openly communicate, explaining everything that has occurred, everything that will occur, and why the imminent actions are required.
    c. Respect the patient‘s personal space (i.e. asking permission to touch the patient, take pulse, examine patient, etc.).

Restraint Protocol - Prehospital continued

EMS personnel shall use an escalating scale of restraint options whereby the level of verbal or physical containment is appropriate to the patient‘s presenting situation.

4. Assistance is Readily Available to EMS Personnel for Patient Restraint:
    a. Cooperative patient with mildly impaired judgment: Verbal Containment; may or may not use soft restraints.
    b. Aggressively uncooperative patient with severely impaired judgment: Soft restraints applied to all extremities (four point restraint). A chest (five point restraint) may be used only if the patient is exceptionally combative.

5. Assistance Is not Readily Available to EMS Personnel for Patient Restraint:
    a. Cooperative patient with mildly impaired judgment: Soft restraints applied to all four extremities (four point restraint).
    b. Aggressively uncooperative patient with severely impaired judgment: Temporary application of cravats, only if other restraint devices are not readily available. Soft restraints shall always be applied when assistance is available and the patient situation is controlled either in the prehospital setting or the receiving hospital setting. Leather restraints shall always be removed after arrival at the receiving hospital when additional personnel is available.

EMS personnel shall first try to restrain patients in the lateral position. The supine position is permitted if EMS personnel are unable to safely place the patient in the lateral position due to their combativeness. The applied restraints shall be attached to the gurney frame. EMS personnel shall frequently assess the patient to ensure that the restrained patient‘s airway is patent, distal limb circulation is adequate, and that restraints can be released quickly should the patient require cardiopulmonary resuscitation. Airway and suction equipment shall always be available for the restrained patient. EMS personnel shall never leave the restrained patient unattended.

IT IS NEVER OK TO TRANSPORT A PATIENT IN A PRONE POSITION OR HOBBLED. If a patient has been restrained by police in a prone position this patient must be turned to a supine position for transport.

If a combative patient aggressively breaks away (escapes) from EMS personnel, the patient shall not be pursued unless there is adequate assistance from the appropriate public safety agency to secure the scene and assure safety.

Restraint Protocol - Prehospital continued

EMS personnel shall always seek assistance from the appropriate public safety agency to assist with securing the scene. Restraint placement should be managed by police personnel whenever possible. EMS personnel must remain on the scene and available to assist the officer and to assess the patient once the restraints are applied. If the police declare that the scene is not safe, EMS personnel may retreat to safety until the police are able to make the scene safe.

All EMS personnel shall receive training by their individual employer in the use of any restraint devices listed in this guideline that they utilize.

In the event that a patient is spitting or biting, place the patient on a non-rebreather mask with high flow oxygen flowing to the mask unless medically contraindicated. Monitor the patient‘s airway continuously while the mask is on the patient.

Physical Restraints

1. All restraints should be easily removable by EMS personnel.

2. Restraints applied by law enforcement (i.e. handcuffs) require law enforcement officer to remain available to adjust restraints as necessary for the patient's safety. The policy is not intended to negate the need for law enforcement personnel to use appropriate restraint equipment to establish scene control.

3. Restrained extremities should be monitored for color, nerve, and motor function, pulse quality and capillary refill at the time of application and at least every 15 minutes

NOTE: The patient needs to be assessed and monitored as you would any other medical patient. Keep in mind that there is likely a medical reason that this person is out of control.

Restraint Protocol - Prehospital continued

Documentation of Restraints

1. Patient restraint shall be documented on the run sheet and address any or all the following appropriate criteria:

    a. That an emergency existed and the need for treatment was explained to the patient.
    b. That the patient refused treatment or was unable to consent to treatment (such as unconscious patient).
    c. Evidence of the patient's lack of decision-making capacity.
    d. Failure of less restrictive methods of restraint (if conscious, failure of verbal attempts to convince the patient to consent to treat).
    e. Assistance of law enforcement officials with restraints, or orders from medical control to restrain the patient, or any exigent circumstances requiring immediate action, or adherence to system restraint protocols.
    f. That the treatment and/or restraints were for the patient's benefit and safety.
    g. The type of restraint employed (soft, leather, mechanical).
    h. Any injuries that occurred during or after the restraint.
    i. The limbs restrained ("four points").
    j. Position in which the patient was restrained.
    k. Circulation checks every 15 minutes or less (document findings and time).

2. The behavior and/or mental status of the patient before and after the restraint.

CAUTION: OVERSTEPPING THE BOUNDRIES OF RESTRAINT MAY BE PERCEIVED AS BATTERY, ASSAULT, CIVIL RIGHTS VIOLATION OR FALSE IMPRISONMENT.

This is a controversial and dangerous area within the law. Each individual service utilizing this protocol should consult appropriate legal consultation.

KRS 503.110 Use of force by person with responsibility for care, discipline, or safety of others.

1. The use of physical force by a defendant upon another person is justifiable when the defendant is a person responsible for the operation of or the maintenance of order in a vehicle or other carrier of passengers and the defendant believes that such force is necessary to prevent interference with its operation or to maintain order in the vehicle or other carrier, except that deadly physical force may be used only when the defendant believes it necessary to prevent death or serious physical injury.

2. The use of physical force by a defendant upon another person is justifiable when the defendant is a doctor or other therapist or a person assisting him at his direction, and:

    a. The force is used for the purpose of administering a recognized form of treatment which the defendant believes to be adapted to promoting the physical or mental health of the patient; and

    b. The treatment is administered with the consent of the patient or, if the patient is a minor or a mentally disabled person, with the consent of the parent, guardian, or other person legally competent to consent in his behalf, or the treatment is administered in an emergency when the defendant believes that no one competent to consent can be consulted and that a reasonable person, wishing to safeguard the welfare of the patient, would consent.

Restraint and Transportation - Pediatric

Patient Transport

An ill or injured child must be restrained directly to the cot in a manner that prevents ramping or sliding in a collision, using the ACR4 (Ambulance Child Restraints)

- ► A belt/strap looped over each shoulder and attached to a non-sliding cot member.
- ► A soft, sliding, or breakaway connector holding the shoulder straps together on chest.
- ► Belt/strap anchored to non-sliding cot member and routed over thighs, not around waist.

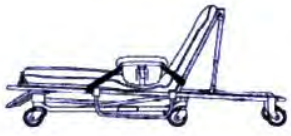
Note: Standard belt systems do not adequately secure child to the cot during a crash.

Ill or injured child/infant (5 to 80 lbs) who can tolerate a semi-upright position may be secured using a child passenger safety seat.

- ► Use a convertible child safety seat that has a front and rear belt path. ACR4 (Ambulance Child Restraints)
- ► Position safety seat on cot facing the foot-end with backrest fully elevated.
- ► Consider removing mattress.
- ► Secure safety seat with 2 pairs of belts in both the forward & rear positions.
- ► Place the shoulder straps of the harness through slots just below child‘s shoulders.
- ► For infants, place rolled towels on sides of child to maintain centered position.

Note: Non-convertible safety seats cannot be secured properly to the cot.

For infants who cannot tolerate a semi-upright position or who must lie flat:



- ► Use car bed, if available, that can be secured against both rearward and forward motion.
- ► Position car bed across cot so child lies perpendicular to cot.
- ► Fully raise cot‘s backrest and anchor car bed to cot with 2 belts.
- ► Fasten car bed harness snugly to infant.

NOTE: The ACR4 (Ambulance Child Restraints include 4 sizes from neonate to a child 45kg. The ACR Restraints should be used on all pediatric transports.

The ACR4 contains 4 color coded restraints for easy selection in 4 different sizes; EXTRA SMALL 4-11 lbs, SMALL 11-26 lbs, MEDIUM 22-55 lbs and LARGE 44-99 lbs.

Use of Child Passenger Safety Seat after Involvement in Motor Vehicle Crash

Child safety seats may be used after involvement in a minor crash. **All** of the following must apply to be considered a minor crash.

- ► Visual inspection including inspection under movable seat padding does not reveal any cracks or deformation.
- ► The vehicle in which the child safety seat was installed was capable of being driven from the scene of the crash.
- ► The vehicle door nearest the child safety seat was undamaged.
- ► There were no injuries to any of the vehicle occupants.
- ► The air bags (if any) did not deploy..

Safe Infants Act - Safe Infants Protocol for Prehospital Providers

Any parent or person acting on behalf of the parent may come to a police station, firehouse, EMS station, or hospital unannounced and leave a newborn infant. When this event occurs, the police officer, firefighter, EMS worker, or hospital worker ***SHALL*** accept the infant. This situation must meet the following criteria.

1. The newborn infant must be medically determined to be less than 72 hours old.
2. The newborn infant cannot have indicators of child abuse, maltreatment, or neglect after birth.

- ► Perform a primary and secondary survey of the infant and initiate any necessary procedure to protect the child‘s health and safety. Keep the newborn warm especially the head.
- ► Consider rapid glucose determination.
- ► Kentucky law requires that any care provider who suspects child abuse, neglect, or maltreatment SHALL report it. You should call the Department for Community Based Services (DCBS) hotline at 1-800-752-6200 to make your report. You have no authority to detain, follow or pursue the parent.
- ► Summon EMS for transport of the infant.
- ► Notify your supervisor and follow any policies and procedures your agency has implemented.
- ► Retrieve and open an "Abandoned Infant Pack”. Complete the enclosed checklist.
- ► Place the numbered band around the ankle of the infant.
- ► Ensure that the band‘s stub remains attached to the Medical Information Form and copy the stub number directly onto the Medical Information Form.
- ► You will offer the parent information regarding medical needs of the mother who is post partum, a written explanation of the parent‘s legal rights, and services available to the parent, which have been provided in the packet.
- ► Newborn infants should be transported in an age appropriate car seat if available. Otherwise, newborns should be transported using appropriate immobilization measures.
- ► Newborn infants may be fed with SIMILAC or ENFAMIL if a lengthy transport time is anticipated. Newborns normally eat 2-2.5 ounces of formula at feeding. Feeding is not advised for any infant that is experiencing any respiratory or circulatory abnormality.

Safe Infants Act - Safe Infants Protocol for Prehospital Providers

KRS211.951, 2216B.190, 311.6526, 405.075 and 620.355 is known as the Thomas J. Burch Safe Infants Act. The law provides a safe place for unwanted newborn babies. Parents may now leave an unwanted infant with any Kentucky EMS provider, police station, fire station or hospital without consequence. I hope that preventing any unwanted newborn from being left in a dangerous or deadly environment.

You've Just Had a Baby! "Copy and Provide to Mother"

You have made a courageous decision to leave your baby in the safe and good care of a hospital, police station, fire station or emergency medical services (EMS) provider. Your baby will be well taken care of and, eventually, be adopted into a safe, loving, permanent home. Now it's time to make sure that you are healthy.

It's a good idea to see a doctor or go to the health department for an examination. For information about your local health department, call (800) 462-6122.

What is normal after you've just had a baby? It takes your body about three to six weeks to return to its pre-pregnant state. You may experience several normal changes to your body during the first few days and weeks after delivery.

Vaginal bleeding: This is blood coming from the uterus. It is a sign that the uterus is healing. At first, it is like a heavy period. The bleeding will start out as bright red, change to pink, and then change to a clear or yellow discharge. You should stop bleeding after three weeks. There should never be large blood clots or a foul odor.

What to do: Use sanitary pads only (no tampons). Do not take tub baths until the bleeding stops. Call a doctor if the bleeding becomes bright red again, you pass large clots or there is a foul odor.

Abdominal cramping: This is a sign that the uterus is contracting back down to its normal size. These cramps are like mild menstrual cramps and will last a few days.

What to do: Take an over-the-counter pain reliever.

Breast engorgement: This means the breasts are becoming full and very sore, and it is a sign that the breasts are filling with milk. This happens around the third day after delivery. Your breasts will become swollen, firm, tender and warm to the touch. Severe breast engorgement should not last more than 36 hours.

What to do: Wear a good-fitting support bra at all times and remove it only for showers. Apply an ice pack to the breasts for 20 minutes, four times a day. Avoid things that will stimulate the breasts. Avoid heat and hot showers.

"Postpartum blues": Most women feel depressed for one to two weeks after delivery. You may feel angry, sad, tired and unable to sleep or eat during this time. These feelings are brought on by the many changes that take place in your body and brain during and after delivery.

You've Just Had a Baby! "Copy and Provide to Mother"

What to do: Know that this is normal and will go away. Find a family member or close friend to talk to about your feelings. Call a doctor if these feelings do not go away or if they intensify.

Call a doctor if you have any of these warning signs:

- Heavy, bright red vaginal bleeding
- Foul-smelling vaginal discharge
- Dizziness or fainting
- Fever above 100.4 degrees F
- Pain around your vaginal area that does not go away or gets worse
- Pain or burning when you empty your bladder
- Pain or swelling in your legs
- Red streaks or painful new lumps in your breasts
- Cramps that are more painful than normal menstrual cramps
- Nausea and vomiting
- Chest pain or cough
- Feeling so sad that you aren't able to take care of yourself
- Feelings that you might hurt yourself

Do these things to take care of yourself after your delivery:

- Rest as much as you can. Your normal energy will return in a few weeks.
- Eat healthy foods. Drink six to eight glasses of water a day. If you have prenatal vitamins, continue to take one a day.
- Continue to wear a good-fitting bra for about three weeks.
- Change your pad every time you go the bathroom to prevent infection in the vaginal area. Wipe yourself from front to back every time you urinate or have a bowel movement. Wash your hands every time you change your pad or go to the bathroom.
- Do not take a tub bath for three weeks. Take showers only.
- Gradually resume your normal physical activity. Don't lift anything over 10 pounds. Don't drive a car for one week. Don't climb stairs for one week (if you have to climb steps, climb one step at a time).
- Avoid sexual intercourse for at least six weeks after delivery. Do not have intercourse if you are still bleeding vaginally. It is possible to become pregnant before you start having periods again, so talk to a doctor about ways to prevent another pregnancy.

You've Just Had a Baby! "Copy and Provide to Mother"

- Get a medical examination four to six weeks after delivery. Your doctor or health department will keep your records confidential to protect you against any invasion of personal privacy.

For information about:

- Family planning and contraception, call (800) 462-6122.
- Substance abuse counseling, call, toll free, (888) 729-8028.
- Domestic violence and abuse, call (800) 752-6200.

For information about health care specific to women, log onto:
Http://chfs.ky.gov/dph/ach/mch.htm

Important!

If you left your baby at a safe place and have decided that you want your baby back, contact the Kentucky Cabinet for Health and Family Services at (800) 752-6200. If you do not contact the Cabinet within 30 days after leaving your newborn, the Cabinet will proceed with termination of parental rights and place your baby for adoption.

A copy of this material may be obtained from the following Web site:
http://chfs.ky.gov/dcbs/dpp/Child_Safety.htm
For more information about the Safe Infants Act, call (800) 752-6200

Bloodborne/Airborne Pathogens

BLOODBORNE PATHOGENS

Emergency Medical Services personnel should assume that all bodily fluids and tissues are potentially infectious with bloodborne pathogens including HIV (causing AIDS) and HBV (causing hepatitis), and must protect themselves accordingly by use of body substance isolation (BSI).

Body substance isolation procedures include the appropriate use of hand washing, protective barriers (such as gloves, masks, goggles, etc.), and care in the use and disposal of needles and other sharp instruments. EMTs are also encouraged to obtain the hepatitis B vaccine series to decrease the likelihood of hepatitis B transmission. EMTs who have exudative lesions, weeping dermatitis, or open wounds should refrain from all direct patient care and from handling patient-care equipment as they are at increased risk of transmission and reception of bloodborne pathogens through these lesions. Transmission of bloodborne pathogens has been shown to occur when the blood of the infected patient is able to come in direct contact with the blood of the health-care worker.

EMTs who have had a direct bloodborne pathogen exposure should immediately wash the exposed area with soap and water and a suitable disinfectant. The exposed area should then be covered with a sterile dressing. Upon arrival at the destination hospital, after responsibility for the patient has been transferred to the emergency department, the EMT should thoroughly cleanse the exposed site, complete a state of Kentucky Emergency Response/Public Safety Worker Incident Report Form, and sign in to the Emergency Department as a worker‘s compensation patient. The only exception to this latter step is when the squad has a designated exposure officer and medical advisor wherein the exposed EMT has definitive and immediate medical care elsewhere.

AIRBORNE PATHOGENS

EMTs who believe they have been exposed to an airborne pathogen may proceed as above in getting timely medical care. It is expected that a properly filled out Patient Care Report will allow hospital infection control staff to contact EMTs involved in patient care where that patient was subsequently found to have a potential airborne pathogen such as Tuberculosis, Neisseria meningitis, SARS, etc.

Airborne Personal Protective Equipment (APPE)

- ► Recommended APPE consists of a N95 respirator, prior fit testing is recommended.
- ► Apply APPE if the patient presents with the following signs or symptoms
  - ♦ Cough
  - ♦ Fever
  - ♦ Rash

Bloodborne/Airborne Pathogens continued

- ► Limit the number of personnel in contact with suspected patients to reduce the potential of exposure to other providers and bystanders.
- ► Patients suspected of being infected with a possible airborne pathogen should be masked if tolerated.
- ► Patients requiring oxygen therapy should receive oxygen through a mask with a surgical mask placed over the oxygen mask to block pathogen release. Close monitoring of the patient‘s respiratory status and effort should be maintained.
- ► APPE should be in place when performing suctioning, airway management and ventilation assistance (Bag-Valve-Mask) for suspect patients.
- ► Limit procedures that may result in the spread of the suspected pathogen, e.g. nebulizer treatments.
- ► Exchange of fresh air into the patient compartment is recommended during transport of patient with a suspected airborne pathogen.
- ► Early notification to the receiving hospital should be made such that the receiving hospital may enact its respective airborne pathogen procedures.

DECONTAMINATION

- ► In addition to accepted decontamination steps of cleaning surfaces and equipment with an approved solution and proper disposal of contaminated disposable equipment, the use of fresh air ventilation should be incorporated (open all doors and windows to allow fresh air after arrival at the hospital).
- ► All personnel in contact with the patient should wash their hands thoroughly with warm water and an approved hand-cleaning solution.
- ► Ambulances equipped with airborne pathogen filtration systems should be cleaned and maintained in accordance with manufacturer guidelines

Adult Medical Protocols

Commonwealth of Kentucky

MASTER MEDICATION LIST

Medications in the following list **MUST** be present on ANY **Basic Life Support Ambulance** when using the KBEMS State EMS Protocol:

- Albuterol
- Acetaminophen
- Aspirin
- Epinephrine 1:1,000
- Ibuprofen
- Naloxone (Narcan)
- Oral Glucose
- Oxygen

Medications in the following list **MUST** be present on ANY **Advanced Life Support Ambulance** when using the KBEMS State EMS Protocol:

- Adenosine (Adenocard)
- Amiodarone
- Atropine
- Dextrose 50% (D50%)[AEMT]
- Dextrose 25% (D25%)
- Diazepam (Valium) and/or Lorazepam (Ativan)
- Diphenhydramine (Benadryl)
- Dopamine
- Epinephrine 1:10,000
- Fentanyl and/or Morphine Sulfate
- Furosemide (Lasix)
- Ipratropium Bromide (Atrovent)
- Lactated Ringers[AEMT]
- Midazolam (Versed)
- Nitroglycerin (Sublingual or Spray)[AEMT]
- Normal Saline[AEMT]
- Ondansetron (Zofran) and/or Promethazine (Phenergan)
- Sodium Bicarbonate

Medications in the following list are **OPTIONAL** for **agencies** to utilize at the **Paramedic** level when using the KBEMS State EMS Protocol unless notated with [AEMT]:

- Calcium Chloride and/or Calcium Gluconate
- Cetacaine
- CYANOKIT
- Diazepam Auto-Injector
- Diltiazem (Cardizem)
- Etomidate (Amidate)
- Glucagon[AEMT]
- Hydroxocobalamin
- Ketorolac (Toradol)
- Lidocaine
- Magnesium Sulfate
- Mark-1 Kit Auto-Injectors
- Methylprednisolone (Solu-Medrol)
- Metoprolol (Lopressor)
- Pralidoxime Chloride (2-PAM Chloride)
- Prednisone
- Procainamide
- Proparacaine
- Sotalol

Routine Patient Care Guidelines - Adult

All levels of provider will complete an initial & focused assessment on every patient, and as standing order, use necessary and appropriate skills and procedures for which the provider has been trained and certified or approved to perform in order to maintain the patient‘s airway, breathing, and circulation.

Initial Assessment

Scene Size-Up

- ► Review dispatch information.
- ► Assess the scene for safety, mechanism of injury, number and location of patients.
- ► General impression of patient.
- ► Assess need for body substance isolation.
- ► Notify the receiving facility as early as possible.
- ► Request additional resources as needed: e.g. ALS intercepts, air medical transport, additional ambulances, extrication, hazardous materials team, etc.
- ► Use Incident Management/Command System (IM/CS) when possible.

Level of Consciousness

- ► Assess level of consciousness using the AVPU scale.
- ► Manually stabilize the patient‘s cervical spine if trauma is involved or suspected.
- ► Apply and use AED and initiate cardiopulmonary resuscitation in accordance with current guidelines, as trained and credentialed, if indicated.

Airway

- ► Assess the patient for a patent airway.
- ► Open the airway using a head-tilt/chin-lift, or a jaw thrust if suspicious of cervical spine injury.
- ► Suction the airway as needed.
- ► Consider an oropharyngeal or nasopharyngeal airway.
- ► Consider advanced airway interventions as appropriate and if trained in use.

Breathing

- ► Assess patient‘s breathing taking note of rate, rhythm, and quality of the respirations. Assess lung sounds.
- ► Look for nasal flaring or accessory muscle usage.
- ► Assess the chest for symmetrical chest rise, intercostal or supraclavicular retractions, instability, open pneumothorax, tension pneumothorax, or other signs of trauma.
- ► Treat foreign body airway obstruction in accordance with current guidelines.

- Assist ventilations when the respiratory rate is less than 10 per minute or greater than 40 for adults, or when the patient exhibits signs of impending respiratory failure.

Circulation
- Assess the patient's pulse taking note of rate, rhythm, and quality.
- Look for and control any obvious gross bleeding.
- Assess patient's skin color, temperature, and moisture.
- IV access and fluid resuscitation as appropriate for the patient's condition per appropriate protocol. After IV is established, administer fluids to maintain systolic blood pressure >90 mmHg. Routes of medication administration when written as "IV" can also include "IO".

Disability
- Movement of extremities.
- Facial asymmetry.
- Speech.

Expose
- Expose and examine head, neck, chest, abdomen, pelvis and back.

Secondary Assessment

Head-to-toe Survey

Neurological Assessment
- Glasgow Coma Score.

Assess Vital Signs
- Respiration.
- Pulse.
- Blood pressure.
- Capillary refill.
- Skin condition.
  - Color.
  - Temperature.
  - Moisture.
- Lung sounds.

Obtain Medical History
- ***S***ymptoms.
- ***A***llergies.
- ***M***edication.
- ***P***ast Medical History.
- ***L***ast Oral Intake.
- ***E***vents leading to Illness or Injury.

Other Assessment Techniques
- Cardiac Monitoring.
- Pulse oximetry.
- Glucose determination.
- Temperature.
- End-tidal CO_2.

Acute Coronary Syndromes - Adult

Basic Standing Orders

B

- ► Routine Patient Care
- ► Oxygen 15 L/min by non-rebreather mask.
- ► Aspirin 324 mg PO (chewable) If patient states they cannot take ASA due to stomach problems or doctors' orders, call medical control for guidance
- ► Facilitate administration of patient's own nitroglycerin if SBP> 90, every 5 minutes up to 3
- ► Avoid NTG for patients who have taken Sildenafil (Viagra), Cialis (tadalafil) or Levitra (vardenafil) in past 48 hours
- ► Complete the following fibrinolytic questionnaire (below)
- ► Minimize scene time
- ► Obtain a 12 lead EKG and transmit to the ED (if possible).
- ► Consider Paramedic intercept

Fibrinolytic Questionnaire

- ► No current or recent active bleeding within last month
- ► No LP, spinal anesthesia, or stroke within last month
- ► No known bleeding disorder or clinical suspicion of aortic dissection
- ► SBP <180 at baseline or after Rx with NTG and/or metoprolol

Prehospital Fibrinolytic Checklist*

Step 1

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

YES → Does ECG show STEMI or new or presumably new LBBB?

NO → STOP

YES → **Step 2**

NO → STOP

Step 2

Are there contraindications to fibrinolysis?
If ANY of the following is CHECKED YES, fibrinolysis MAY be contraindicated.

Systolic BP >180 to 200 mm Hg or diastolic BP >100 to 110 mm Hg	YES	NO
Right vs left arm systolic BP difference >15 mm Hg	YES	NO
History of structural central nervous system disease	YES	NO
Significant closed head/facial trauma within the previous 3 months	YES	NO
Stroke >3 hours or <3 months	YES	NO
Recent (within 2-4 weeks) major trauma, surgery (including laser eye surgery), GI/GU bleed	YES	NO
Any history of intracranial hemorrhage	YES	NO
Bleeding, clotting problem, or blood thinners	YES	NO
Pregnant female	YES	NO
Serious systemic disease (eg, advanced cancer, severe liver or kidney disease)	YES	NO

Step 3

Is patient at high risk?
If ANY of the following is CHECKED YES, consider transfer to PCI facility.

Heart rate ≥100/min AND systolic BP <100 mm Hg	YES	NO
Pulmonary edema (rales)	YES	NO
Signs of shock (cool, clammy)	YES	NO
Contraindications to fibrinolytic therapy	YES†	NO
Required CPR	YES	NO

*Contraindications for fibrinolytic use in STEMI are viewed as advisory for clinical decison making and may not be all-inclusive or definitive. These contraindications are consistent with the 2004 ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction.

†Consider transport to primary PCI facility as destination hospital.

Prehospital fibrinolytic checklist. Adapted from Antman EM, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Revise the 1999 Guidelines for the Management of Patients with Acute Myocardial Infarction). *Circulation.* 2004;110:e82-e292, with permission from Lippincott Williams & Wilkins. Copyright 2004, American Heart Association.

Acute Coronary Syndromes – Adult continued

Advanced Standing Orders

A

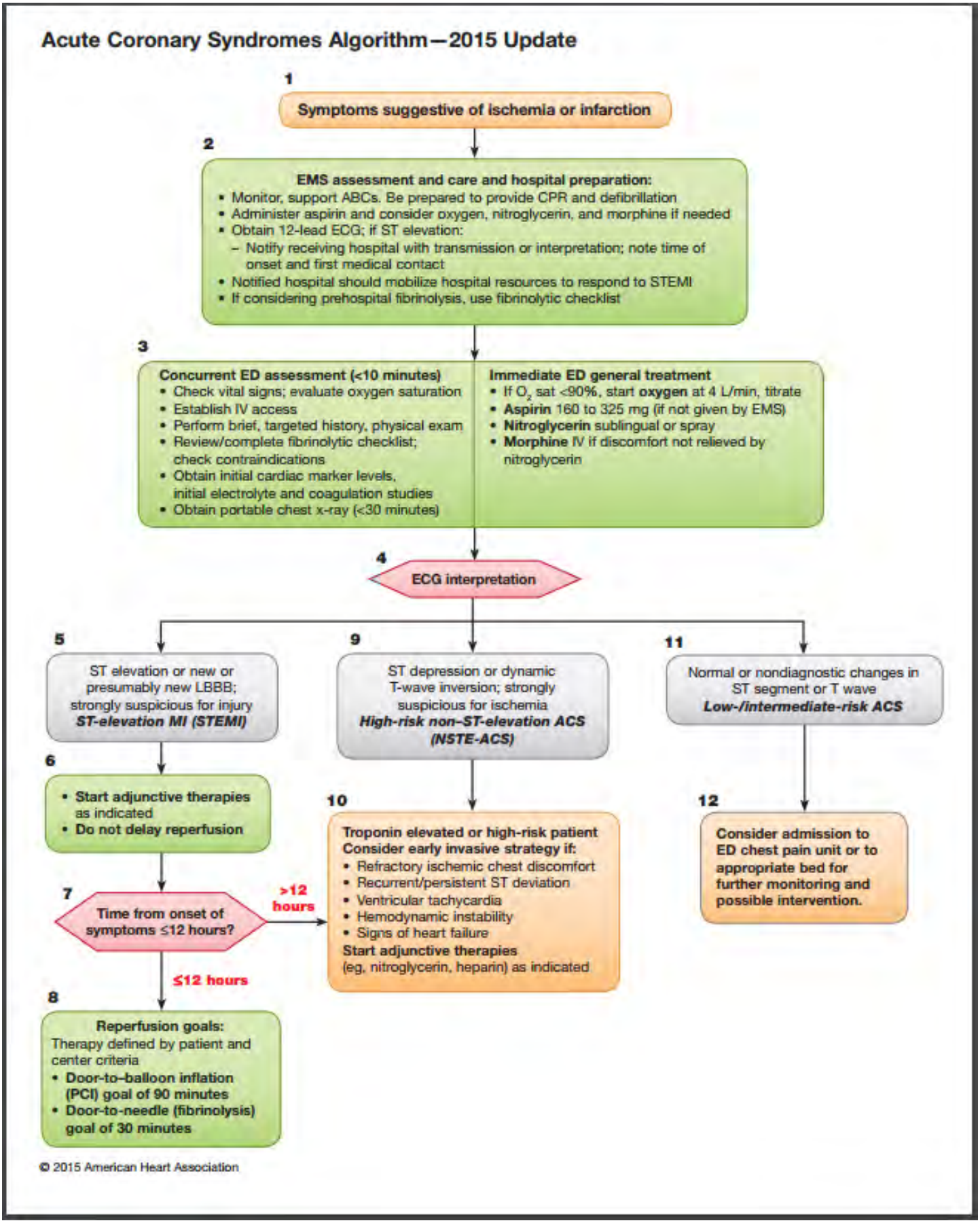
- IV access and administer fluids to maintain systolic blood pressure > 90 mmHg.
- Nitroglycerin 0.4mg SL every 5 minutes while symptoms persist if SBP > 90 mmHg.

Paramedic Standing Orders

P

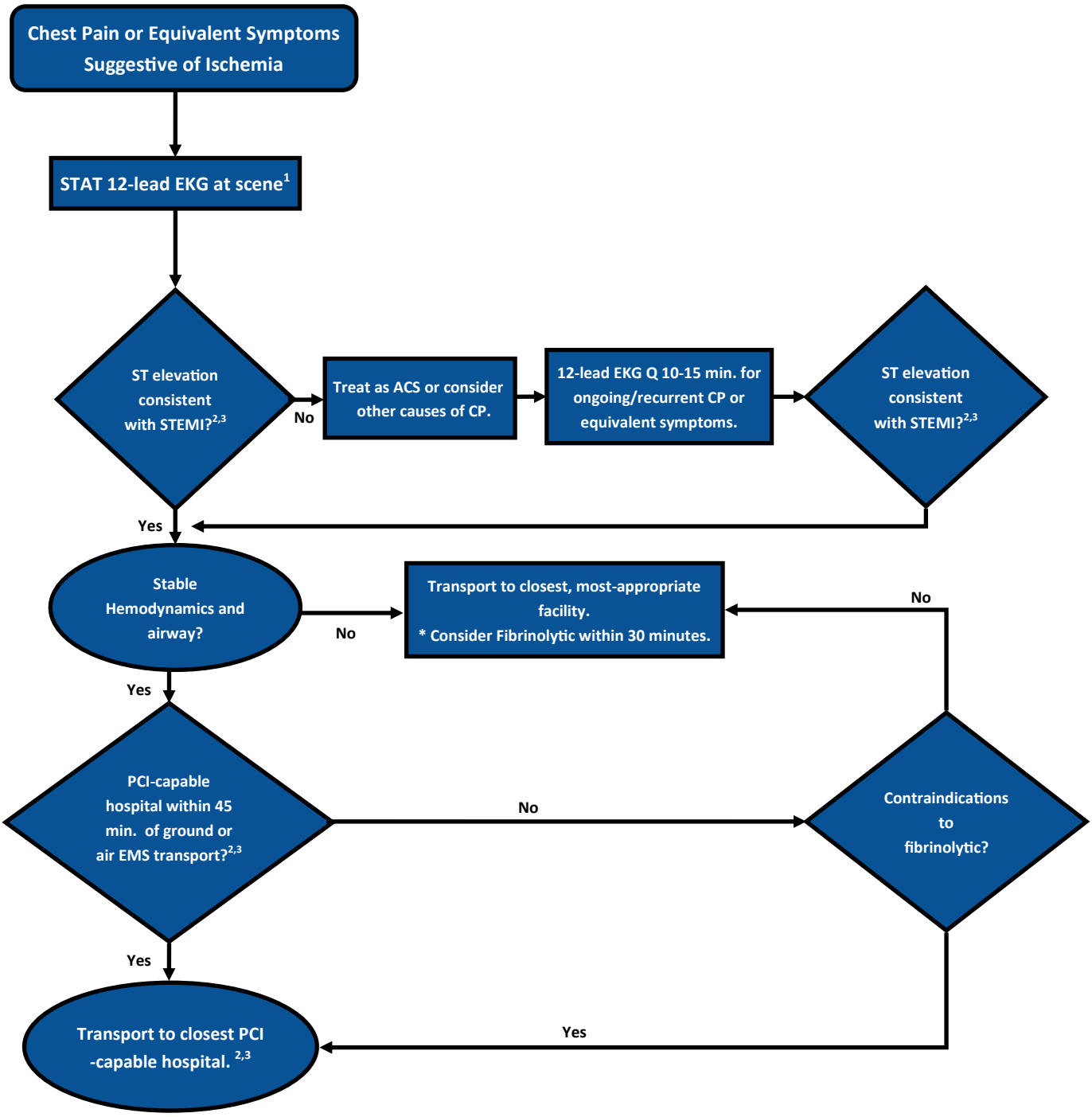
- Place patient on monitor.
- If EKG suggests AMI, consider morphine, 2mg IVP every 5 minutes up to 10 mg if pain persists and SBP > 90.
- Consider Fentanyl 25-50 mcg for patients with a morphine allergy or known right ventricular infarction.
- Treat dysrhythmias PRN; refer to appropriate protocol.
- Contact Receiving Facility to possibly Activate Cath Lab Team.

Acute Coronary Syndromes Algorithm



KENTUCKY BOARD OF EMERGENCY MEDICAL SERVICES

STEMI Destination Plan (2015)



[1]12-lead EKG by EMS at the site of first medical contact (FMC) is recommended. Methods of EKG interpretation of a STEMI include paramedic read (preferred), machine read (i.e., ***ACUTE MI SUSPECTED***) and/or EKG transmission with receiving physician read.

[2]Provide early notification from the field to the receiving hospital for all STEMI patients.

[3]Pre-hospital activation of the cath lab with direct transport to the lab (bypassing the ED) by EMS is preferred if FMC to device deployment can be achieved < 90 minutes.

EMS transport directly to a PCI-capable hospital for primary PCI is the recommended treatment strategy for patients with a STEMI, with an ideal FMC-to-device time system goal of ≤ 90 minutes (Class I, LOE: A). Immediate transfer to a PCI-capable hospital for primary PCI is the recommended triage strategy for patients with a STEMI who initially arrive at or are transported to a non-PCI-capable hospital, with an FMC-to-device time system goal of ≤ 120 minutes (Class I, LOE: B).
In the absence of contraindications, fibrinolytic therapy should be administered to patients with a STEMI at a non-PCI-capable hospital when the anticipated FMC-to-device at a PCI-capable hospital exceeds 120 minutes because of unavoidable delays (Class I, LOE: B).

"PCI-capable" refers to a hospital capable of performing 24/7 PCI on emergent STEMI patients. "Non-PCI-capable" refers to a local hospital within the EMS system's service area which provides emergency care, including fibrinolytic therapy, but does not have the capability to perform 24/7 PCI on emergent STEMI patients.

O'Gara PT, Kushner FG, Ascheim DD et al. ACCF/AHA guideline for the management of ST-elevation myocardial infarction: A report of the ACCF/AHA guideline task force on practice. Jo Am Coll Cardiol. 2013; 61:e78-140.

***Refer to local or Kentucky Board of EMS approved protocols. This algorithm is to be used as a guide.**

Table 6.

Contraindications and Cautions for Fibrinolytic Therapy in STEMI*

Absolute contraindications
• Any prior ICH
• Known structural cerebral vascular lesion (e.g., arteriovenous malformation)
• Known malignant intracranial neoplasm (primary or metastatic)
• Ischemic stroke within 3 mo.
• EXCEPT acute ischemic stroke within 4.5 h
• Suspected aortic dissection
• Active bleeding or bleeding diathesis (excluding menses)
• Significant closed-head or facial trauma within 3 mo.
• Intracranial or intraspinal surgery within 2 mo.
• Severe uncontrolled hypertension (unresponsive to emergency therapy)
• For streptokinase, prior treatment within the previous 6 mo.
Relative contraindications
• History of chronic, severe, poorly controlled hypertension
• Significant hypertension on presentation (SBP >180 mm Hg or DBP >110 mm Hg)
• History of prior ischemic stroke >3 mo.
• Dementia
• Known intracranial pathology not covered in absolute contraindications
• Traumatic or prolonged (>10 min) CPR
• Major surgery (<3 wk.)
• Recent (within 2 to 4 wk.) internal bleeding
• Noncompressible vascular punctures
• Pregnancy
• Active peptic ulcer
• Oral anticoagulant therapy

* Viewed as advisory for clinical decision making and may not be all-inclusive or definitive.

* CPR indicates cardiopulmonary resuscitation; DBP; diastolic blood pressure; ICH, intracranial hemorrhage; SBP, systolic blood pressure; and STEMI, ST-elevation myocardial infarction.

Cardiac Arrest

Basic Standing Orders

B

- Routine Patient Care – with focus on CPR.
- Apply and use AED if available.
- For Trauma:
  - Minimize on-scene time or consider termination of efforts or not attempting resuscitation
- Airway management as appropriate and trained.
- Request paramedic intercept.

Advanced Standing Orders

A

- Consider treatable causes: overdose/poisoning, hypothermia; treat as per specific protocol.
- IV/IO access and administer fluids at wide open rate.
- For trauma, do not delay transport for IV, airway management, or medications.

Paramedic Standing Orders

P

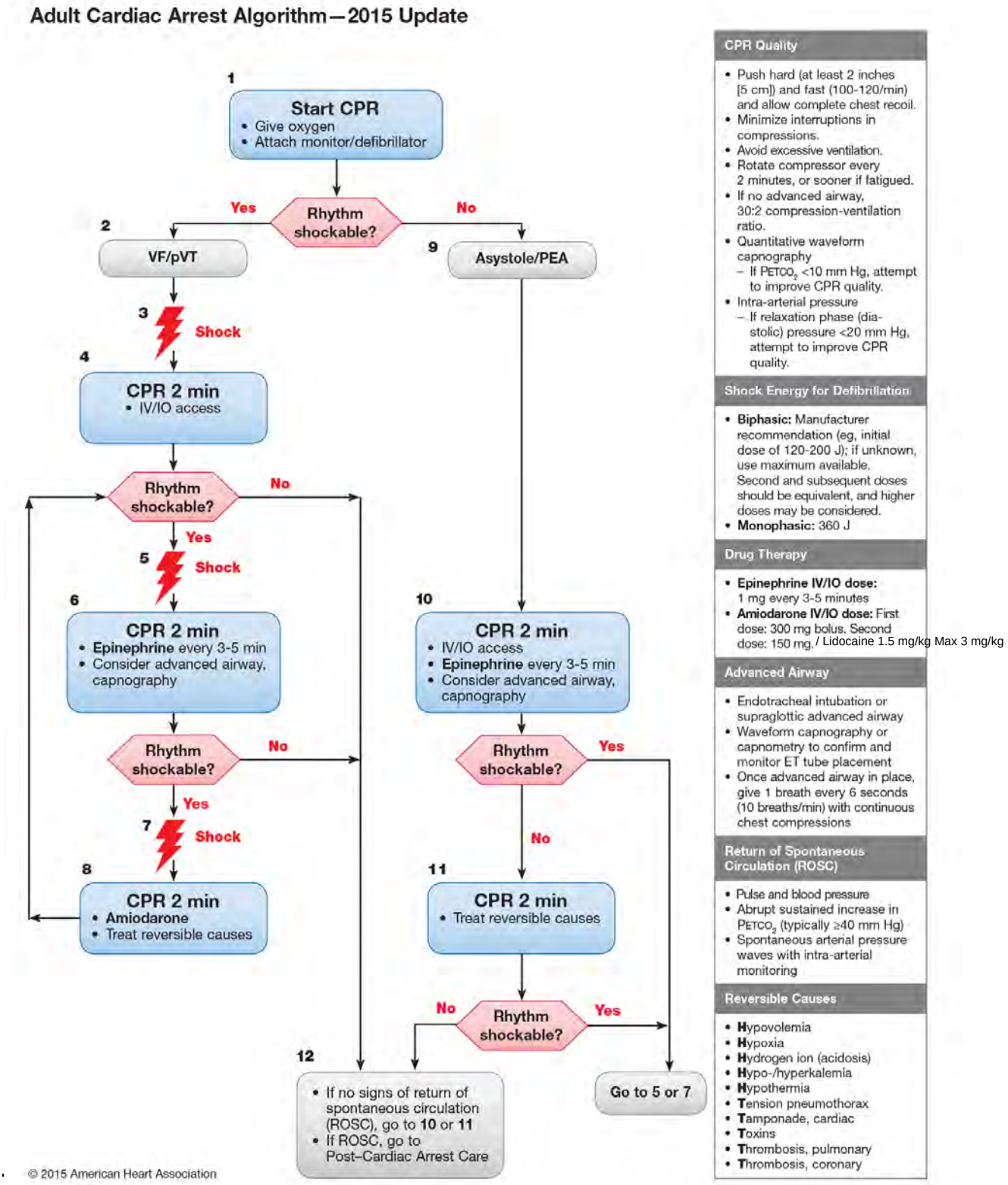
For Ventricular Fibrillation (VF)/Pulseless Ventricular Tachycardia (VT)

- If bystander CPR is not being performed, CPR for 5 cycles/2 min; then defibrillation (all energy levels are defibrillator and local protocol dependent) followed immediately by CPR for 5 cycles/2 min.; then rhythm check; repeat defibrillation attempts for VF/VT after each 5 cycles of CPR.
- Establish IV/IO access and advanced airway.
- Epinephrine (1:10,000) 1 mg IV; repeat every 3 -5 minutes.
- Consider Amiodarone, Lidocaine, or Magnesium as appropriate.

For ASYSTOLE or Pulseless Electrical Activity (PEA)

- Continue CPR for 5 cycles/2 min.
- Epinephrine (1:10,000) 1 mg IV; repeat every 3 -5 minutes.
- Continue CPR for 5 cycles/2 min. between interventions; stop only for rhythm check or return of circulation.
- Treat reversible causes.
- Advanced airway management.
- NOTE: IV/IO administration of medications is preferred to administration via ETT.
- For Trauma Arrest– consider bilateral needle chest decompression.

Cardiac Arrest Algorithm



Bradycardia (Symptomatic) - Adult

Definition: Heart rate < 60 and inadequate clinical perfusion (e.g. acute altered mental status, ongoing chest pain, hypotension or other signs of SHOCK.

Basic Standing Orders

B

- Routine Patient Care.
- If available, perform 12-lead EKG and transmit to receiving facility.
- Consider Paramedic intercept.

Advanced Standing Orders

A

- Establish IV/IO access.

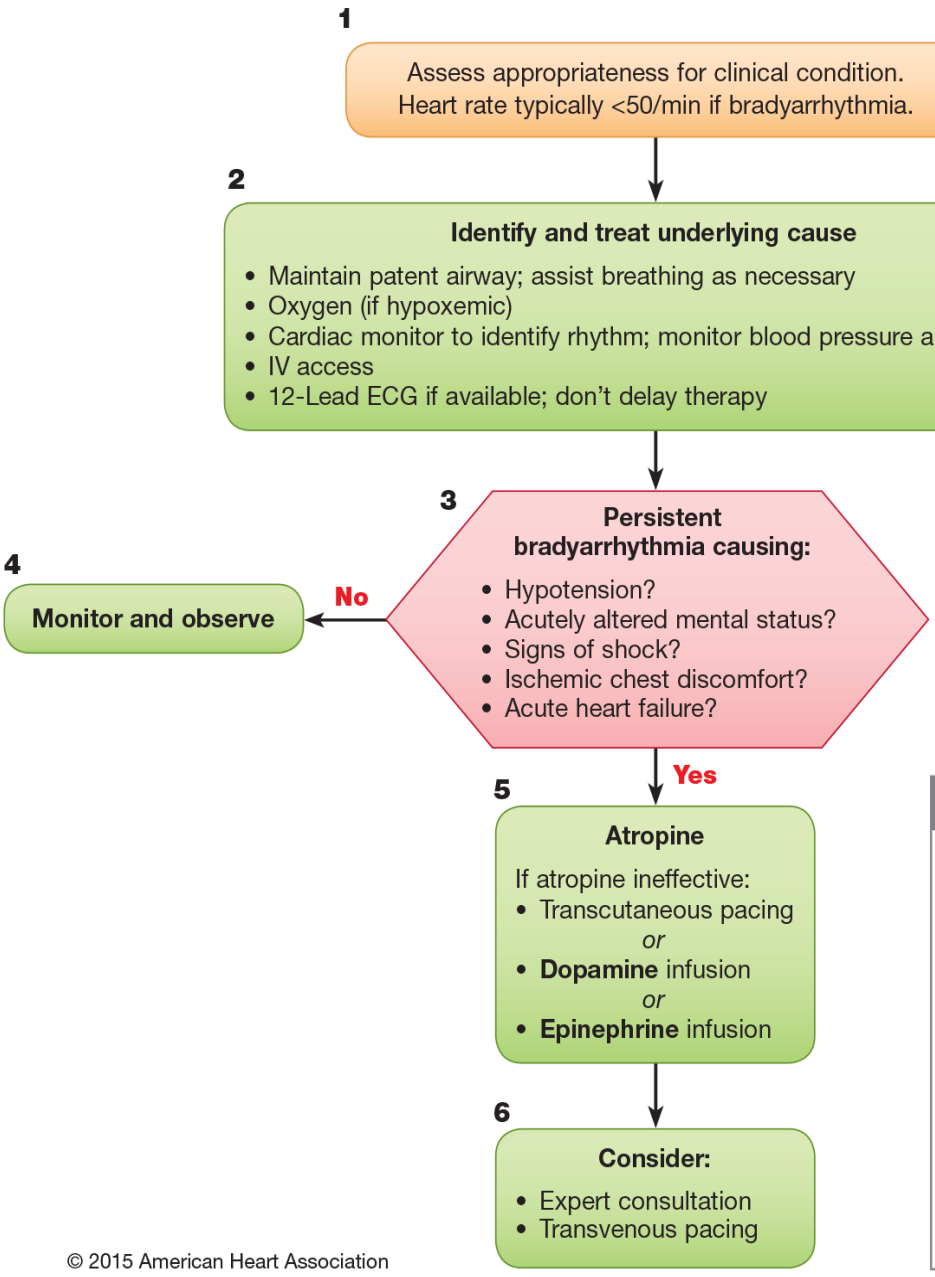
Paramedic Standing Orders

P

- Consider atropine 0.5 mg IVP every 3-5 minutes to total of 3mg.
- Consider transcutaneous pacing if available. Attempt capture at 80 bpm at minimum output and increase until capture achieved. Use without delay for high degree block (Type II second degree block or third degree block).
- Consider procedural sedation prior to pacing:
  - Lorazepam 1 mg IV or 2 mg IM, may repeat once in 5 minutes, **or**
  - Midazolam 2.5 mg IV, may repeat once in 5 minutes or
- Dopamine (2 to 10 ug/kg/min) or Epinephrine (2 to 10 ug/min) infusion while awaiting Pacer or if pacing ineffective.
- Consider Glucagon 2-5 mg IV, IM or SQ over 2-5 minutes in adults for suspected overdose of a beta-blocker or calcium channel blocker.

Bradycardia (Symptomatic) Algorithm - Adult

Adult Bradycardia With a Pulse Algorithm



Doses/Details
Atropine IV dose: First dose: 0.5 mg bolus. Repeat every 3-5 minutes. Maximum: 3 mg.
Dopamine IV infusion: Usual infusion rate is 2-20 mcg/kg per minute. Titrate to patient response; taper slowly.
Epinephrine IV infusion: 2-10 mcg per minute infusion. Titrate to patient response.

Tachycardia - Adult

Basic Standing Orders

B

- Routine Patient Care.
- Provide high-flow oxygen and consider assisting ventilation.
- Monitor blood pressure and oximetry. Identify and treat reversible causes.
- Consider ALS intercept.

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure > 90mmHg.

Paramedic Standing Orders

P

- Identify rhythm using cardiac monitor and 12-lead ECG if available.
- **Unstable**
  (Hypotension, altered mental status, signs of poor perfusion)
  - Synchronized cardioversion
    - Narrow irregular 120-200J biphasic or 200J monophasic
    - Narrow regular: 50-100J
    - Wide regular: 100J
    - Wide irregular: Defibrillation dose (not synchronized)
  - Consider procedural sedation if practicable (Midazolam 2.5 mg IV or Diazepam 5 mg IV)

- **Stable**
  PSVT or narrow complex tachycardia (with ventricular rate consistently greater than 140-150 BPM)
  - Consider vagal maneuvers (avoiding carotid sinus massage in the elderly).
  - If vagal maneuvers fail, give adenosine 6 mg rapid IVP (if regular), repeat dose of 12 mg once if needed.
  - Consider Beta Blocker or Calcium Channel Blocker
  - Do NOT give adenosine to patients with asthma

Tachycardia – Adult continued

Paramedic Standing Orders

P

► **Stable continued**

Atrial fib, atrial flutter with narrow complex (With Ventricular Rate consistently greater than 140- 150 BPM)
- Monitor and transport

For VT or uncertain wide complex tachycardia
- Monitor and transport

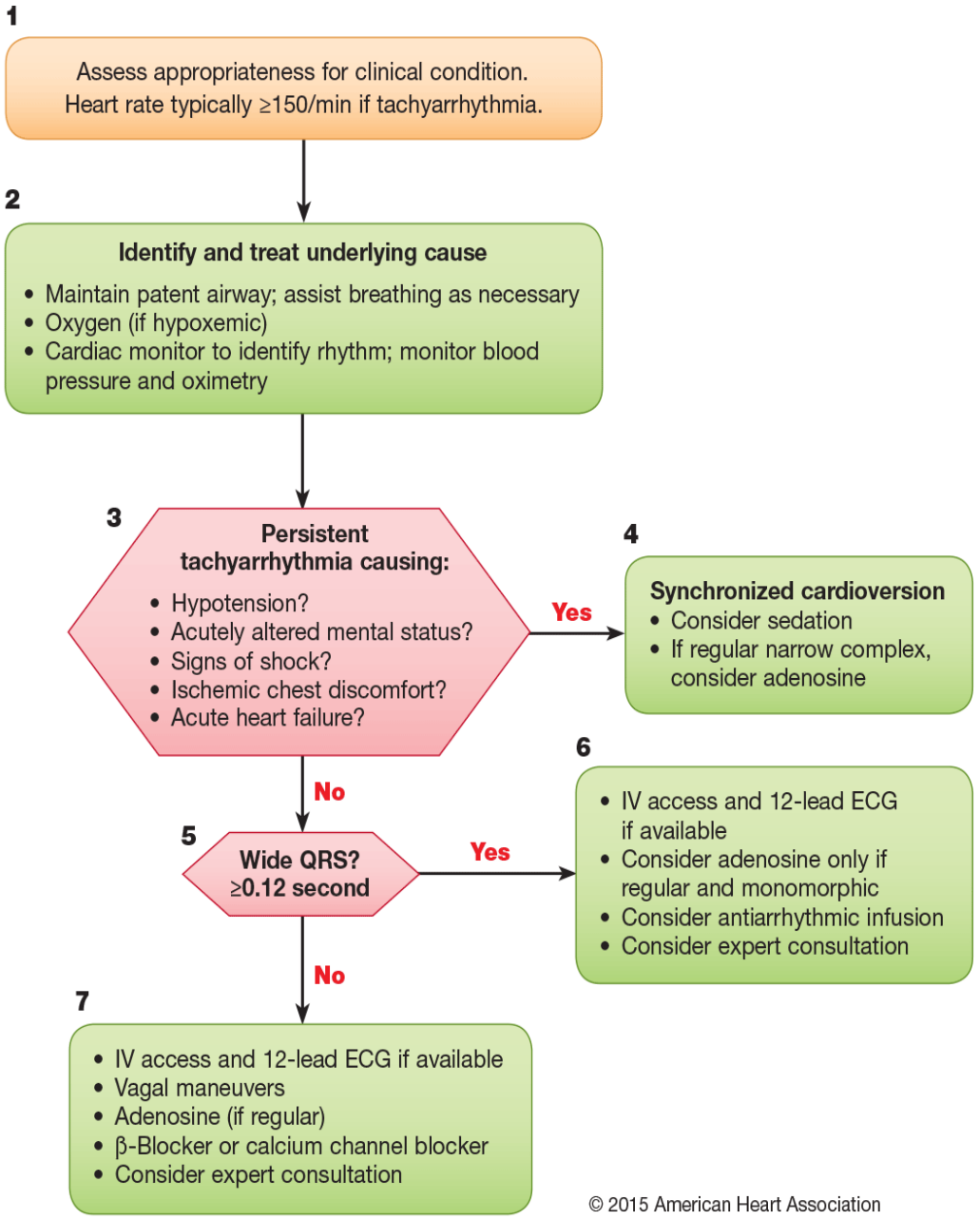
For polymorphic VT / torsades
- Monitor and transport

For Known WPW
- Monitor and transport

If patient becomes unstable during monitoring and transport, treat as unstable.

Tachycardia Algorithm - Adult

Adult Tachycardia With a Pulse Algorithm



Doses/Details

Synchronized cardioversion:
Initial recommended doses:
- Narrow regular: 50-100 J
- Narrow irregular: 120-200 J biphasic or 200 J monophasic
- Wide regular: 100 J
- Wide irregular: defibrillation dose (*not* synchronized)

Adenosine IV dose:
First dose: 6 mg rapid IV push; follow with NS flush.
Second dose: 12 mg if required.

Antiarrhythmic Infusions for Stable Wide-QRS Tachycardia

Procainamide IV dose:
20-50 mg/min until arrhythmia suppressed, hypotension ensues, QRS duration increases >50%, or maximum dose 17 mg/kg given. Maintenance infusion: 1-4 mg/min. Avoid if prolonged QT or CHF.

Amiodarone IV dose:
First dose: 150 mg over 10 minutes. Repeat as needed if VT recurs. Follow by maintenance infusion of 1 mg/min for first 6 hours.

Sotalol IV dose:
100 mg (1.5 mg/kg) over 5 minutes. Avoid if prolonged QT.

Lidocaine IVP 1.5 mg/kg, Repeat 3-5 minutes
Max 3 mg/kg followed by infusion of 2gm/500ml 1-4 mg/min

Congestive Heart Failure/Pulmonary Edema - Adult

Basic Standing Orders

B

- Routine Patient Care.
- Place patient in semi-sitting or full sitting position.
- Administer oxygen at a rate to keep oxygen saturation above 90%. Facilitate administration of patient's own nitroglycerin - if SBP> 90 every 5 minutes as needed.
- Consider Paramedic intercept.

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mmHg.
- Consider Continuous Positive Airway Pressure (CPAP) with maximum 10cm H2O pressure support
  Indications for CPAP: Respiratory distress in the conscious patient suffering from presumed pulmonary edema who is non-responsive to simple oxygenation via non-rebreather.

Paramedic Standing Orders

P

- Consider nitroglycerin 0.4 mg SL every 5 minutes prn if SBP> 90 mmHg.
- Consider furosemide 0.5 mg – 1 mg/kg IV or bumetanide 1 mg IV.
- Consider morphine sulfate 1 mg – 5 mg slow x 1. If not improving with above measures and systolic BP remains above 90 mm Hg, consider CPAP (*see indications in Advanced Standing Orders*).

Allergic Reaction/Anaphylaxis – Adult

Allergic reaction is suspected when there is a suspected exposure and patient(s) exhibit signs and symptoms consistent with an allergic reaction such as:

- ***Skin***: Hives, Itching, Flushing
- ***Respiratory:*** Wheezing, Dyspnea, Stridor, Sneezing, Coughing, Chest tightness
- ***Cardiovascular:*** Vasodilation, Tachycardia, Hypotension, Shock
- ***Gastrointestinal:*** Nausea, Vomiting, Cramping, Diarrhea
- ***CNS:*** Dizziness, Headache

Common allergens include venom (i.e. bee stings), foods, (i.e. nuts, berries, seafood), plant pollen, and medications.

Consider ***Mild, Moderate*** and ***Severe*** protocols to be hierarchical and building on prior intervention in Evolving Treatment Plan.

Allergic Reaction/Anaphylaxis – Adult-Mild

Symptomatic, no dyspnea, stable vital signs (systolic > 110 mmHg).

Basic Standing Orders

B

- ► Routine Patient Care.
- ► Maintain airway and administer oxygen at high flow, preferably by non-rebreather facemask at 12-15L/min to maintain oxygen saturation of at least 95%.
  - ♦ Remove allergen
  - ♦ Check vital signs frequently
  - ♦ Begin transport, consider ALS intercept
  - ♦ Consider patient assisted medication

Paramedic Standing Orders

P

- ► Consider Diphenhydramine 25-50 mg, PO, IM, IV.

Allergic Reaction/Anaphylaxis – Adult-Moderate

Basic Standing Orders

B

- Routine Patient Care.
- Maintain airway and administer oxygen at high flow, preferably by non-rebreather facemask at 12-15L/min to maintain oxygen saturation of at least 95%.
  - Remove Allergen
  - Check Vital Signs Frequently
  - Begin transport, consider Paramedic intercept
  - Consider patient assisted medication
- Consider Albuterol 2.5 mg in 3 ml of NS via nebulizer every 5 minutes X 4 total doses.
- Consider Epinephrine (1:1000) 0.3 mg SQ. *Contact medical control if there is a history or risk factor for coronary artery disease.*

Advanced Standing Orders

A

- Establish an IV of 0.9% NaCl (Normal Saline) at KVO.

Paramedic Standing Orders

P

- Diphenhydramine 25-50 mg IM or IV.

Allergic Reaction/Anaphylaxis – Adult-Severe

Edema, hives, severe dyspnea, wheezing, unstable vital signs (systolic < 90 mmHg), cyanosis, laryngeal edema.

Basic Standing Orders

B

- ► Ensure adequate ABCs. Administer oxygen to keep SaO_2>90%.
- ► If patient was exposed to an allergen **and** exhibits severe respiratory distress or shock, Administer Epinephrine Auto injector, or Epinephrine (1:1000) 0.3 mg (0.3 ml) SQ or IM.
- ► Consider Albuterol 2.5 mg in 3 ml of NS via nebulizer every 5 minutes X 4 total doses.
- ► Begin Transport and request Paramedic intercept.
- ► Monitor ABCs and Vital Signs. Assist ventilations if necessary.

NOTE: ***If signs and symptoms do not resolve, contact Medical Control for orders to repeat Epinephrine.

Advanced Standing Orders

A

- ► Establish an IV of 0.9% NaCl (Normal Saline) at KVO.

NOTE: ***If signs and symptoms do not resolve, contact Medical Control for orders to repeat Epinephrine.

Paramedic Standing Orders

P

In addition to prior therapies, consider:

- ► Diphenhydramine 25-50 mg IM or IV.
- ► Prednisone 60 mg PO, or
- ► Methylprednisolone 125 mg IV.
- ► BY ONLINE MEDICAL CONTROL ORDER: Consider Epinephrine (1:10,000) 0.1 mg increments (1.0 ml diluted in 9 ml NS for final 10ml 1:100,000) SLOW IV (over 5-10 minutes). May repeat increments prn up to 1.0mg total. .
- ► Consider early intubation.

NOTE: Use Caution when administering Epinephrine with known Cardiovascular Disease

Asthma/COPD/RAD (Reactive Airway Disease) – Adult

Basic Standing Orders

B

- Routine Patient Care.
- Wear N95 mask if bioterrorism related event or highly infectious agent suspected.
- Administer oxygen at the appropriate rate for the patient's condition and medical history.
- Patients with COPD who are on home oxygen, increase their rate by 1-2 liters per minute.
- Attempt to keep oxygen saturation above 90%; increase the rate with caution and observe for fatigue, decreased mentation, and respiratory failure.
- If available, request ALS intercept/intervention ASAP.
- Assist patient with his/her own MDI, if appropriate; only MDIs containing beta adrenergic bronchodilators (e.g. albuterol, Ventolin, Proventil, Combivent) may be used: 2 puffs; repeat every 5 minutes as needed while transporting; contact medical control if delayed.
- If available, consider albuterol 2.5 mg in 3 ml normal saline via nebulizer prn every 5 minutes x 4 total doses.

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure > 90 mmHg.
- Consider albuterol 2.5mg in 3 ml normal saline via nebulizer prn every 5 minutes x 4 total doses.
- For COPD patients, CPAP*, if available and trained to use; maximum 10 cmH2O pressure support.

Paramedic Standing Orders

P

- Consider combining ipratropium 0.5mg in 2.5 ml normal saline with albuterol 2.5mg in 3 ml normal saline as the first nebulizer treatment.
- For patients exhibiting signs/symptoms consistent with CHF, see Congestive Heart Failure/Pulmonary Edema Protocol.
- If available, measure peak flow pre-/post-treatment.

Asthma/RAD (Reactive Airway Disease) – Adult continued

Paramedic Standing Orders

P

- Consider methylprednisolone 125 mg IV.
- For patients who do not respond to nebulizer treatments or for impending respiratory failure, consider:
  - Epinephrine (1:1,000) 0.3mg (0.3 ml) SQ or IM. Contact medical control if there are cardiac risk factors.
  - Magnesium sulfate 2 grams in 100 ml 0.9% NaCl (normal saline) IV over 10 minutes.
- For COPD patients, CPAP*, if available and trained to use; maximum 10 cmH2O pressure support.

*Continuous Positive Airway Pressure (CPAP) has been shown to be effective in preventing intubation and decreasing mortality in selected patients in acute respiratory failure.

Diabetic Emergencies: Hypoglycemia

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- If the patient can swallow and hypoglycemia is present, administer oral glucose.
- If available and indicated, consider assisting family in administration of patient's glucagon 1 mg IM
- Consider ALS intercept.

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90mmHg.
- If glucose level is <80mg/dl with associated signs and symptoms, administer dextrose (D50) 25 gm IV. Re-check glucose 5 minutes after administration of dextrose (D50). Repeat dextrose (D50) 25 gm IV if glucose level is less than 80mg/dL.
- If unable to obtain IV access, administer glucagon 1mg IM or SQ

Diabetic Emergencies: Hyperglycemia

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- Consider ALS intercept for abnormal vitals signs or altered level of consciousness.

Advanced Standing Orders

A

- IV access and administer Normal Saline to maintain systolic blood pressure >90 mmHg.
- Maintain patent airway and adequate ventilations.
- Transport.

Paramedic Standing Orders

P

- Airway management as needed.
- Transport.

Non-transport of Insulin Dependent Diabetic

Historical Findings

1. Decreased level of consciousness without suspected trauma.
2. Prior medical history of insulin-dependent diabetes mellitus.
3. Following treatment, patient is conscious, alert to time, date and place, and requests that they not be transported to the hospital.
4. No other associated findings of serious illnesses or circumstances that may have contributed to the hypoglycemic episode, including excessive alcohol consumption, shortness of breath, chest pain, headaches, etc.
5. The patient's history reveals circumstances that may have contributed to the hypoglycemic episode such as lack of oral intake or an insulin reaction.
6. Not on oral hypoglycemic medication such as glypizide, glyburide, or chlorpropamide.

Physical Findings

1. Patient is initially found to have a decreased level of consciousness.
2. Systolic blood pressure > 90 mm Hg or child with normal perfusion.
3. Patient has rapid glucose test of ≤ 60 mg/dL.
4. The patient responds quickly (< 10 minutes) to oral or IV glucose (D50W) to normal level of consciousness.
5. Repeat rapid glucose test is > 100 mg/dL.

EKG Findings

1. Heart rate > 60.
2. Normal EKG.

Protocol

1. The patient is assessed and treated per the Diabetic Emergencies protocol.
2. Repeat blood pressure is at least 90 mm Hg, pulse rate is at least 60, and the repeat rapid glucose test is at least 100 mg/dL.
3. The patient is given written instructions for follow-up care prior to being released.
4. The patient is released to the care of a responsible adult who will remain with the patient as an observer for a reasonable time and can call 911 should the symptoms recur.

Notes

1. Patients who have extensive medical history or other signs and symptoms unrelated to insulin-dependent diabetes mellitus should be strongly encouraged to be transported.
2. If the patient is on an oral hypoglycemic medication such as glypizide, glyburide, or chlorpropamide, the hypoglycemic episode may last hours or days. Patients on oral hypoglycemic agents should be strongly encouraged to be transported, regardless of their response to field treatment.
3. When treating patients who warrant transportation based on the above criteria but who refuse transport, paramedics shall contact medical control for assistance.
4. Instructions for follow-up care should include the following:
   - Take action to prevent a recurrent episode such as remain in the care of another adult observer, consume a light meal to maintain a sufficient blood glucose level, monitor their blood glucose, and advise their personal physician of this episode.
   - Watch for signs and symptoms of another episode. Those signs and symptoms include:
   - If another episode occurs, contact 911 immediately!
5. EMS should provide the patient with both verbal and written instructions on follow-up care following patient refusal of transport.

Fever (>101.5° F/38.5° C) – Adult

This protocol is **not** intended for patients suffering from environmental hyperthermia (Hyperthermia Protocol).

Basic Standing Orders

B

- Routine Patient Care.
- Wear N95 mask if bioterrorism related event or highly infectious agent suspected.
- Obtain temperature.
- Passive cooling; remove excessive clothing/bundling.
- Do not cool to induce shivering.
- For temperatures of 101.5°F (38.5°C) or greater and no acetaminophen in last 4 hours, consider administering acetaminophen 500 - 1000mg PO in absence of signs/symptoms of nausea & vomiting.
- If acetaminophen has been administered within last 4 hours and temperature is still >101.5, then consider administering ibuprofen 400 – 800 mg PO if no contraindications (e.g. age > 65, known GI intolerance, known ulcer) and is without signs/symptoms of nausea & vomiting.

Nausea/Vomiting – Adult

Basic Standing Orders

B

- Routine Patient Care.

Advanced Standing Orders

A

- Consider IV access and administer fluids to maintain systolic blood pressure > 90mmHg. .

Paramedic Standing Orders

P

- Prochlorperazine 2.5mg IV or 5mg IM, **or**
- Promethazine 6.25mg IV diluted in 10 ml of normal saline, which is administered over 2 minutes via the furthest port from the vein.
- May repeat either of the above medications once after 10 minutes if nausea persists.
- Ondanestron 4 mg IV administered over 30 seconds. May repeat dose in 30 minutes.
- For dystonic reactions caused by EMS administration of prochlorperazine or promethazine administer diphenhydramine 50 mg IV/IM.

Non-Traumatic Abdominal Pain - Adult

This protocol should be used for patients that complain of abdominal pain without a history of trauma.

Assessment should include specific questions pertaining to the GI/GU systems.

Abdominal physical assessment includes:
Ask patient to point to area of pain (palpate this area last).
Gently palpate for tenderness, rebound tenderness, distension, rigidity, guarding, and pulsatile masses. Also palpate flank for CVA tenderness.

Abdominal history includes:

History of pain (OPQRST)
History of nausea/vomiting (color, bloody, coffee grounds)
History of bowel movement (last BM, diarrhea, bloody, tarry)
History of urine output (painful, dark, bloody)
History of abdominal surgery
History of acute onset of back pain
SAMPLE (attention to last meal)

Additional questions should be asked of the female patient regarding OB/GYN history. All female patients of childbearing age complaining of abdominal pain should be considered to have an ectopic pregnancy (even if vaginal bleeding is absent) until proven otherwise.

Non-traumatic abdominal pain can be caused by: appendicitis, cholecystitis, duodenal ulcer perforation, diverticulitis, abdominal aortic aneurysm, pelvic inflammatory disease (PID), and pancreatitis).

Basic Standing Order

B

- ► Routine Patient Care.
- ► Nothing by mouth.
- ► Oxygen 2-4 L/min, increase as warranted.
- ► Transport in position of comfort.

Advanced Standing Orders

A

- ► Consider obtaining IV access with NS or RL.

Paramedic Standing Orders

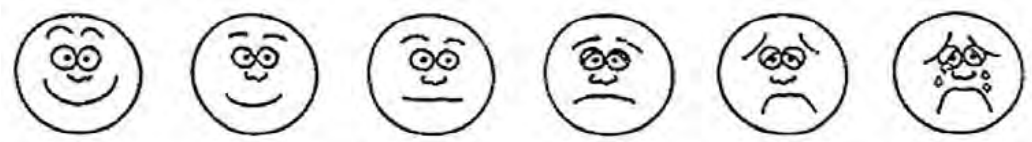
- ► Place patient on monitor.
- ► If signs of decreased perfusion or shock develop, initiate fluid resuscitation (See Trauma Assessment and Management Protocol).
- ► Be aware that ischemic cardiac pain can present as abdominal pain.

Pain Management - Adult

Basic Standing Orders

B

- Routine Patient Care.
- Place the patient in a position of comfort if possible.
- Give reassurance, psychological support, and distraction.
- Use ample padding for long and short spinal immobilization devices. Use ample padding when splinting possible fractures, dislocations, sprains and strains. Elevate injured extremities if possible. Consider application of cold pack for 30 minutes.
- Have the patient rate their pain on a 0 to 10 (or similar) scale*.
- Reassess the patient‘s pain level and vital signs every 5 minutes.*0-10 Scale: Avoid coaching the patient, simply ask them to rate their pain on a scale from 0-10, where 0 is no pain at all and 10 is the worst pain ever experienced by the patient.
- "Wong-Baker faces” scale: The faces correspond to numeric values from 0-10. The scale can be documented with the numeric value or the textual pain description.
- Consider paramedic intercept if needed for pain management.



0	2	4	6	8	10
NO HURT	HURTS A LITTLE	HURTS A LITTLE MORE	HURTS EVEN MORE	HURTS WHOLE LOT	HURTS WORST

Paramedic Standing Orders

P

- ► IV access and administer fluids to maintain systolic blood pressure >90.
- ► Unless the patient has altered mental status, multi-systems trauma or abdominal pain, the paramedic may consider
  - ♦ Ketorolac: 15 mg IVP or 30 mg IM (no repeat) [Consider as first line in renal colic. Avoid Ketorolac in patients if they are likely to go to the OR, NSAID allergy, aspirin sensitive asthma known peptic ulcer disease or if pregnant or nursing.]
  - ♦ Morphine: 1-5 mg IV/IM every 10 minutes to a total of 15 mg titrated to pain and SBP>90.
  - ♦ Fentanyl: 25-50 mcg slow IV every 5 minutes up to a total of 150 mcg.
- ► For hypoventilation from opiate administration by EMS personnel, administer naloxone 0.4 mg IV prn.
- ► Nausea: Refer to Nausea Protocol.

NOTE: **Contact medical control** for guidance with all patients with altered mental status, multi-systems trauma, or for requests to provide additional doses of a medication.

Poisoning: Overdose-Adult

Basic Standing Orders

B

- Consider waiting for law enforcement to secure the scene.
- Remove patient from additional exposure.
- Routine Patient Care.
- Suspected Narcotic Overdose: Administer Naloxone 2-4mg Intranasal (IN).
- Absorbed poison
  - Remove clothing and fully decontaminate.
  - If eye is involved, irrigate at least 20 minutes without delaying transport.
- Inhaled/injected poison:
  - Administer high-flow oxygen.
  - **Note**: Pulse oximetry may not be accurate for some toxic inhalation patients.
- Ingested poison:
  - Contact Poison Control at (800) 222-1222 as soon as practicable if you have any questions.
  - Review circumstances of overdose with medical control and poison control.
  - Bring container to receiving hospital.
- Envenomations:
  - Immobilize extremity in dependent position. Consider ice pack for bee stings.
- For MCI related to organophosphate exposure see Nerve Agents & Organophosphates Adult.
- For suspected isolated cyanide poisoning see cyanide protocol.
- Consider ALS intercept/Air Medical Transport.

Poisoning: Overdose-Adult continued

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mmHg.
- Suggested Narcotic Antidotes: Naloxone 0.4–2 mg IV push, IM, SQ. Intranasal (IN) dose is 2-4mg. If no response, may repeat initial dose every 5 minutes to a total of 10 mg.

Paramedic Standing Orders

P

Suggested Antidotes

► Tricyclic	Sodium bicarbonate 1 mEq/kg IV.
► Beta-Blocker	Glucagon 2 – 5 mg IV, IM, SQ.
► Ca Channel Blocker	Calcium Chloride 1-2 g IV bolus followed by 20-40 mg/kg/hr infusion. Glucagon 2– 5 mg IV, IM, SQ.
► Dystonic Reaction	Diphenhydramine 25 – 50 mg IVP for dystonic reactions induced by antipsychotics, such as haloperidol, or anti-emetics such as prochlorperazine or promethazine.
► Organophosphates	Atropine: 2 mg IV every 5 minutes as needed and Pralidoxime: 1-2 gram IV over 30–60 minutes.
► Isolated Cyanide Poisoning:	Cyanokit®

Poisoning: Cyanide - Adult

Symptoms: headache, confusion, dyspnea, chest tightness, nausea.

Signs: change in LOC, seizure, dilated pupils, tachypnea + hypertension (early), bradypnea + hypotension (late), shock, vomiting.

Basic Standing Orders

B

- ► Routine Patient Care.
- ► Decontamination concurrent with initial resuscitation
  - ♦ If patient exposed to gas only and does not have skin or ocular irritation, does not need decontamination.
  - ♦ If patient exposed to liquid, decontamination required. Avoid self-contamination.
- ► Consider ALS intercept/air medical transport.

Advanced Standing Orders

A

- ► Obtain IV access if situation permits.

Paramedic Standing Orders

P

- ► Hydroxocobalamin is the preferred treatment. If clinical suspicion of cyanide poisoning is high, hydroxocobalamin should be administered without delay.
- ► Hydroxocobalamin: 5 gm dose over 15 min. Using a Cyanokit**, The starting dose of CYANOKIT for adults is 5 gm (contained in a single vial) administered by IV infusion over 15 mins (Approximately 15ml/min) Depending upon the severity of the poisoning and the clinical response, a second dose of 5 gm may be administered by IV infusion for a total dose of 10 gm. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 120 minutes, as clinically indicated.

NOTE: ** Cyanokit ®: each kit contains one glass vial (200ml), each containing 5 gm lyophilized hydroxocobalamin for injection, one sterile transfer spike, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included. NS is recommended)

Poisoning: Nerve Agents and Organophosphates MCI

Basic Standing Orders

B

Assessment of the Scene:

- Use dispatch information. Does something just not sound right about the information you are receiving from dispatch?
- FIGHT "***TUNNEL VISION***"! Look at the whole scene on arrival. Are you sure it's safe to enter? If you are not trained or equipped, DO NOT ENTER!
- Has there been a release of a known agent?
- Do you find multiple patients with signs and symptoms commensurate with nerve agent contamination?.
- Are there multiple casualties at a large event or in a heavily populated area with no explained cause?
- Assess for SLUDGEM(salivation, lacrimation, urination, defecation, gastric upset, emesis, muscle twitching) and KILLERBs: (Bradycardia, Bronchorrhea, Bronchospasm).

General Patient Treatment

- Take body substance isolation precautions.
- Remove patient's clothing.
- Remove to cold zone after decontamination and monitor for symptoms.
- Administer oxygen via non-rebreather mask at 15 LPM.
- Contact medical control for authorization to use Mark I auto-injectors.
- If medical control can not be contacted or is unavailable, the auto-injector may be administered if the following criteria are met:
  - **The patient is clearly having difficulty breathing (dyspnea, or bilateral wheezing),** *and*
  - **Has other evidence of nerve gas exposure,** *or*
  - **Has evidence of shock (altered mental status, diaphoresis, hypotensive).**
  - ***At least two symptoms of nerve agent poisoning should be identified before administering the Mark I injector.***
- If the decision is made to inject, act quickly. Time can mean the difference between life and death for the affected patient(s).
- Obtain baseline vital signs.
- Complete the decontamination process.
- Care should be used in the administration of atropine to patients with a cardiac history. The antidote should not be withheld.
- Treatment using Mark-1 Kit Auto-injectors only in Mass Casualty Incidents.
- Treatment using Diazepam Injector only in Casualty Incidents where ChemPaks are deployed.

Poisoning: Nerve Agents and Organophosphates MCI

Basic Standing Orders

B

General Patient Treatment continued:

- Antidotal therapy should be started as soon as symptoms appear.
- All injections must be given IM.

Procedure for Auto-Injector:

- Remove the antidote kit from it's package.
- With your non-dominant hand, hold the auto-injectors by the plastic clip so that the larger auto-injector is on top and both are positioned in front of you at eye level.
- With your dominant hand grasp the **atropine** auto-injector (the smaller of the two) with the thumb and first two fingers.
- DO NOT cover or hold the needle end with your hand, thumb, or fingers-you might accidentally inject your self. An accidental injection into the hand WILLNOT deliver an effective dose of the antidote, especially if the needle goes through the hand.
- Pull the injector out of the clip with a smooth motion. **The auto-injector is now armed**.
- The injection site for administration is normally in the **outer thigh muscle.** It is important that the injections be given into a large muscle area. If the individual is thinly-built, then the injections should be administered into the **upper outerquadrant of the buttocks**.
- Place the tip of the auto-injector firmly against the injector site. Re-check to make certain that the injector is loaded prior to placing it firmly against the injection site.
- Push hard until you hear or feel the injector activate. Hold the injector in place until the medication is fully injected (a minimum of ten (10) seconds).
- Once administered, record the time administered, and try to properly discard the auto-injector in an appropriate sharps container.
- Next pull the **2 PAM** Chloride injector (the larger of the two) out of the clip.
- Inject the patient in the same manner as previously described for the atropine auto-injector, holding the black (needle) end against the outer thigh (or buttocks).
- Massage the injection sites, if time permits.
- After administering the first set of injections, wait 5 to 10 minutes.
- After administering one set of injections, you should initiate decontamination procedures, as necessary to allow the patient to be transported to a medical facility.

Poisoning: Nerve Agents and Organophosphates MCI

Basic Standing Orders

B

Procedure for Auto-Injector continued:

- Severe symptoms include unconsciousness, convulsions, apnea, flaccid paralysis.
- Mild/Moderate symptoms include sweating, muscle fasciculations, nausea, vomiting, weakness, dyspnea, anxiety, restlessness, confusion and constricted pupils.

Patient Monitoring Following Administration

- Patients may have symptoms re-develop even after administration of the antidote kit.
- Atropine may only be repeated every 10 - 15 minutes as needed. (Note: multiple doses of atropine may be needed.)
- Albuterol 2.5 mg in 3 ml normal saline via nebulizer.

Tag Color	Exposure, SLUDGEM	Mark-1 Kit Diazepam Monitoring Interval	Repeat Dosing	Maintenance Dose
RED	Severe Symptoms	3 Adult Mark-1 kits 1 Adult Diazepam (10mg) Auto-injector	Diazepam Auto-Injector may be repeated 3 times at 10-15 min. intervals.	1 Adult Mark-1 kit every hour for 3 hours
YELLOW	Mild to Moderate Symptoms	1 Adult Mark-1 kit for minor symptoms. Monitor every 10 minutes	If symptoms progress: 2 Adult Mark-1 kits & 1 Adult Diazepam Auto-injector. Diazepam may be repeated 3 times at 10-15 min. intervals.	
GREEN	No	None. Monitor every 10 minutes for evidence of exposure.		

Poisoning: Nerve Agents and Organophosphates MCI

Advanced Standing Orders

A

- Obtain IV access if situation permits.

Paramedic Standing Orders

P

- If field conditions permit, initiate cardiac monitoring and consider the administration of IV medications.
- If symptoms persist after the administration of 3 Mark 1 kits
  - Atropine: 2 mg IV, Repeat every 5 minutes until secretions cleared.
  - Pralidoxime: 1-2 gram IV over 30–60 minutes.
  - Diazepam 10 mg IM/IV repeat every 5 to 10 minutes as needed.

  Instead of diazepam, may use either
  - Lorazepam 2 – 4 mg IM/IV, repeat every 5 -10 minutes as needed, **or**
  - Midazolam 2.5 – 5.0 mg IM/IV, repeat every 5 to 10 minutes as needed.

Poisoning: Nerve Agents and Organophosphates MCI Provider Protection

Basic Standing Orders

B

- If first responder(s) display symptoms, notify dispatch immediately.
- All first responders will evacuate area until secured by Hazmat Team.
- Remove clothing and decontaminate yourself and/or assist other responders.
- Routine Patient Care.
- Assess for SLUDGEM (salivation, lacrimation, urination, defecation, gastric upset, emesis, muscle twitching) and KILLERB's (Bradycardia, Bronchorrhea, Bronchospasm).
- Use Mark-1 Auto-Injectors (or DuoDote) only if nerve agent symptoms are present. Mark-1 kits offer no prophylactic protection and use prior to appearance of symptoms may be harmful.
- Atropine (tube#1) should always be given before 2-PAMchloride (tube#2). ***All injections must be given IM.***
- Treatment using Diazepam Auto Injector only in Mass Casualty Incidents where ChemPaks are deployed.
- Severe symptoms include unconsciousness, convulsions, apnea, and flaccid paralysis.
- Mild/Moderate symptoms include sweating, muscle fasciculations, nausea, vomiting, weakness, dyspnea, anxiety, restlessness, confusion and constricted pupils.
- Consider Albuterol 2.5 mg in 3 ml normal saline via nebulizer.

Advanced Standing Orders

A

- Albuterol 2.5 mg in 3 ml normal saline via nebulizer.

Paramedic Standing Orders

P

- If field conditions permit, initiate cardiac monitoring and consider the administration of IV medications.
- If symptoms persist after the administration of 3 Mark 1 kits
  - Atropine: 2 mg IV, Repeat every 5 minutes until secretions cleared.
  - Pralidoxime: 1-2 gram IV over 30–60 minutes.
  - Diazepam 10 mg IM/IV repeat every 5 to 10 minutes as needed.

  Instead of diazepam, may use either
  - Lorazepam 2 – 4 mg IM/IV, repeat every 5 -10 minutes as needed, **or**
  - Midazolam 2.5 – 5.0 mg IM/IV, repeat every 5 to 10 minutes as needed.

Poisoning: Radiation Injuries MCI

Exposure to radioactive source or radioactive materials/debris.

Basic Standing Orders

B

- Remove patient from scene and decontaminate by appropriately trained personnel.
- Wear N95 mask.
- Triage tools for mass casualty incident:
  - If vomiting starts
    - within 1 hour of exposure, survival is unlikely and patient should be tagged —"Expectant."
    - after less than 4 hours of exposure, patient needs immediate decontamination and evaluation and should be tagged —"Immediate."
    - after 4 hours, re-evaluation can be delayed 24 – 72 hours if no other injury is present and patient tagged —"Delayed."
- Treat traumatic injuries and underlying medical conditions.
- Patients with residual contamination risk from wounds, shrapnel, and internal contamination should be wrapped in water-repellent dressings to reduce cross contamination.

Advanced Standing Orders

A

- IV access and administer fluids to adults hemodynamically stable if situation permits.

Paramedic Standing Orders

P

- Consider anti-emetic.
- Consider pain control.

Seizures – Adult

Basic Standing Orders

B

- Routine Patient Care.
- Do not attempt to restrain the patient; protect the patient from injury.
  - Suction as needed.
  - Consider nasopharyngeal airway.
  - Oxygen 15LPM via non-rebreather mask.
  - Assist ventilations with 100% oxygen via bag valve mask if necessary to maintain oxygen saturation >95%.
  - Protect patient from injury – place on side.
- History preceding seizure is very important. Find out what precipitated seizure (e.g. medication non-compliance, active infection, trauma, hypoglycemia, substance abuse, their-trimester pregnancy, etc.)
  - Has diazepam rectal gel been prescribed by patient's physician? If yes, advise caregiver to administer according to patient's prescribed treatment.
  - Determine if emergency is related to implanted vagus nerve stimulator. Determine:
    - when vagus nerve stimulator was implanted
    - when last checked by physician
    - current settings
    - history of magnet use
    - changes in seizure intensity.
- Obtain blood glucose. If blood glucose reading less than 80 mg/dl, see Diabetic Emergencies Protocol.
- Request Paramedic intercept for ongoing or recurrent seizure activity.

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure > 90 mmHg.

Paramedic Standing Orders

P

- Consider advanced airway control as needed.
- Monitor vital signs, EKG and pulse oximeter.
- Saline lock or IV = 0.9% NaCl (normal saline) @ rate to maintain appropriate hemodynamic status.
- If generalized seizure activity is present consider:
  - Lorazepam 1-2 mg IV or IM repeated every 5 minutes to total of 4mg, **or**
  - Diazepam 5 mg IV (then 2.5 mg IV every 5 minutes to total of 10 mg), **or**
  - Midazolam 1 -2.5 mg IV/IM/IO repeated every 5 minutes to a total of 5 mg or until seizure activity is abolished.
- Consider Magnesium Sulfate 4 grams IV over 5 minutes in presence of seizure in 3rd trimester of pregnancy

SUSPECTED STROKE PROTOCOL

This protocol is for patients who have an acute episode of neurological deficit without any evidence of trauma. Signs consistent with acute Stroke:

- Sudden onset of weakness or numbness in the face, arm, or leg, especially on one side of the body
- Sudden onset of trouble seeing in one or both eyes
- Sudden onset of trouble walking, dizziness, loss of balance or coordination
- Sudden onset of confusion, trouble speaking or understanding
- Sudden onset of severe headache with no known cause
- Consider other causes of altered mental status, i.e., hypoxia, hypoperfusion, hypoglycemia, trauma, or overdose

ABSOLUTE CONTRAINDICATIONS FOR FIBRINOLYTIC THERAPY:

- Intracranial hemorrhage on CT
- History of Intracranial hemorrhage
- Systolic B/P >185mm Hg or Diastolic B/P >110 mm Hg
- Serious Head Trauma or Stroke within three (3) months.
- Thrombocytopenia and Coagulopathy
- Blood Glucose <50mg/dl or >400mg/dl

Basic Standing Orders:

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- Administer oxygen to keep SPO2 > 94%, suction as necessary, and be prepared to assist ventilation.
- Perform Cincinnati Pre-hospital Stroke Scale.
- If positive, determine time of onset of symptoms. Time of onset of stroke is critical:
  - To patient: When was the last time you were normal?
  - To family or bystander: When was the last time you saw the patient normal?
- Obtain mobile phone contact of an informant, encourage transportation of family member.
- Maintain normal body temperature.
- Obtain 12-lead EKG during transport.
- Protect any paralyzed or partially paralyzed extremity.
- Early notification of the emergency department is critical.
- Consider Paramedic intercept / air medical transport.
- Perform a stroke severity scale for large-vessel involvement such as the CSTAT.

Advanced Standing Orders:

Do not delay transport for ALS procedures

- Large bore IV access with 0.9% Normal Saline 100 ml per hour, unless contraindicated. **Avoid dextrose in the absence of hypoglycemia.**

Paramedic Standing Orders:

Do not delay transport for ALS procedures

- Treat blood pressure elevation of > 220/120 with 1 single dose of IV Beta Blocker or Calcium Channel Blocker **(NOT NTG)** if still elevated in 15 minutes contact medical control.
- Manage compromised airway.
- Continuously reassess.

Appendix: Stroke Assessment Resources

Is this a stroke?

Cincinnati Pre-Hospital Stroke Scale

This scale evaluates for facial palsy, arm weakness, and speech abnormalities. Items are scored as either normal or abnormal.

Facial Droop
The patient shows teeth or smiles.

Normal Both sides of face move equally
Abnormal One side of face does not move as well as the other.

Arm Drift
The patient closes their eyes and extends both arms straight out for 10 seconds.

Normal Both arms move the same, or both arms do not move at all.
Abnormal One arm either does not move, or one arm drifts down compared to the other.

Speech
The patient repeats "You can't teach an old dog new tricks," or some other simple, familiar saying.

Normal The patient says correct words with no slurring of words.
Abnormal The patient slurs words, says the wrong words, or is unable to speak

http://www.metrohealth.org/?id=473&sid=1

How severe is this stroke? C-STAT

The Cincinnati Prehospital Stroke Severity Scale's individual items and scoring.

Cincinnati Prehospital Stroke Severity Scale

2 points: Conjugate gaze deviation (≥ 1 on NIHSS item for Gaze)

1 point: Incorrectly answers at least one of two level of consciousness questions on NIHSS (age or current month) **and** does not follow at least one of two commands (close eyes, open and close hand) (≥ 1 on the NIHSS item for Level of Consciousness 1b and 1c)

1 point: Cannot hold arm (either right, left or both) up for 10 seconds before arm(s) falls to bed (≥ 2 on the NIHSS item for Motor Arm)

2 or >= Positive C-STAT

Brian S. Katz et al. Stroke. 2015;46:1508-1512

Updated Certified Stroke Centers in Kentucky can be located here: https://kbems.kctcs.edu/medical_direction/Stroke%20Centers.pdf

- St. Elizabeth Edgewood
- St. Elizabeth Ft. Thomas
- St. Elizabeth Florence
- St Elizabeth Covington
- St Elizabeth Grant

- University of Louisville Hospital, Louisville
- Baptist Health Louisville
- Jewish Hospital, Louisville
- Sts. Mary and Elizabeth Hospital, Louisville
- Norton Hospital , Louisville
- Norton Audubon Hospital-Louisville
- Norton Brownsboro Hospital-Louisville
- Norton Suburban Hospital, Louisville

- Baptist Health Lexington
- University of Kentucky Hospital, Lexington
- Saint Joseph Hospital

- Baptist Health LaGrange

- Highlands Regional Medical Center

- The Medical Center, Bowling Green
- TriStar Greenview Regional Hospital
- Hardin Memorial Health, Elizabethtown
- Pikeville Medical Center, Pikeville
- Owensboro Health, Owensboro
- King's Daughter's Medical Center, Ashland
- Baptist Health Paducah
- Lake Cumberland Regional Hospital
- Jackson Purchase Medical Center
- Baptist Health Floyd, Indiana
- Harlan ARH

- Three Rivers Medical Center
- Frankfort Regional Medical Center

Map Last Updated Feb. 2018

Scan This QR Code for Most Up-To-Date Map

OH – 7 ASR,
69 PSC and 10 CSC's

WV – 5 PSC's

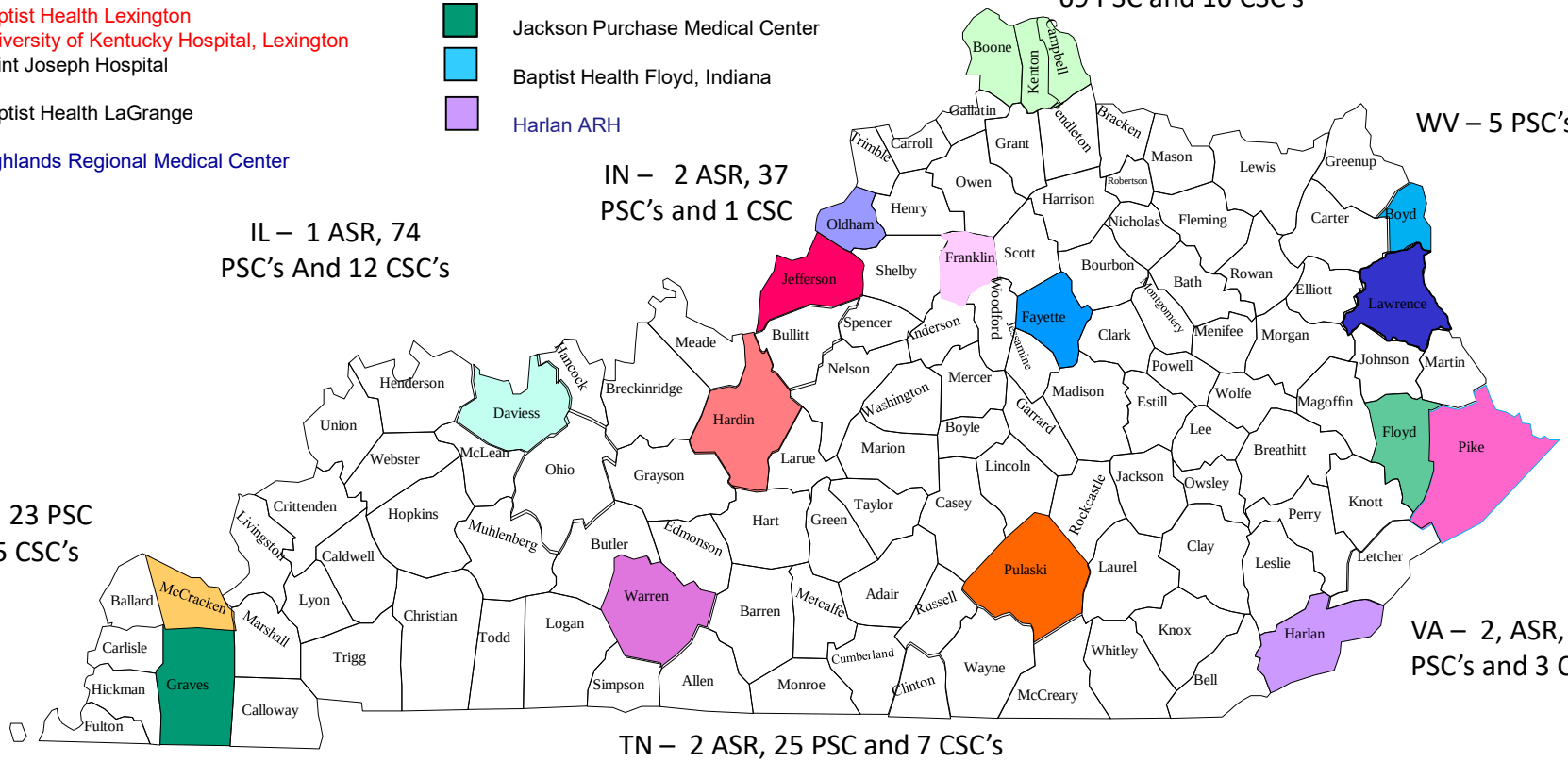
IN – 2 ASR, 37
PSC's and 1 CSC

IL – 1 ASR, 74
PSC's And 12 CSC's

MO – 23 PSC
and 5 CSC's

VA – 2, ASR, 29
PSC's and 3 CSC

TN – 2 ASR, 25 PSC and 7 CSC's



The Joint Commission, HFAP and DNV Certified Primary Stroke Centers in Kentucky (22)

TJC Comprehensive Stroke Centers (4) Acute Stroke Ready Hospitals (5)

SEVERITY-BASED STROKE TRIAGE ALGORITHM FOR EMS

* THE PATIENT SHOULD BE TRANSPORTED TO THE APPROPRIATE FACILITY AS SOON AS POSSIBLE.

EMS Dispatch notifies responding EMS Unit of possible stroke call. EMS crew dispatched per regional stroke protocol or on scene suspicion of acute stroke by EMS providers

Upon arrival– Provide any needed ABC interventions, request dispatch of higher level of provider if necessary for unstable patients and interview patient, family and other witnesses.

Perform and document results of pre-hospital stroke identification screen (CSTAT, etc.) and POC blood glucose

STROKE SCREEN POSITIVE? STROKE SUSPECTED?

YES

NO

Stroke not suspected

Treat and transport as indicated per patient presentation

Identify and document Time Last Known Well (LKW) & Time of symptom discovery

Perform and document results from severity tool used to assess potential LVO (CSTAT, RACE, etc.)

LVO SUSPECTED?

NO

YES

CAN PATIENT ARRIVE AT AN (ASRH OR PSC) IN LESS THAN 3 HOURS FROM LKW?

YES

NO

WILL TRANSPORT TO CSC PRECLUDE THE USE OF IV ALTEPLASE?

YES

NO

Call stroke alert, pre-notify receiving facility and transport to the closest appropriate stroke center (ASRH, PSC, CSC) per your local stroke systems of care policy

Call Stroke Alert, pre-notify receiving facility and transport directly to an appropriately certified Comprehensive Stroke Center (CSC) that is within the acceptable transport time, if no CSC meets the criteria, then transport to the nearest designated EVT-capable center.

ON SCENE

- Each EMS agency should utilize the Cincinnati Prehospital Stroke Scale (CPSS) to assess patients with non-traumatic onset of focal neurologic deficits. Patients with a positive CPSS should be further assessed using the Cincinnati Stroke Severity Assessment Tool (C-STAT) to assess for possible Large Vessel Occlusion (LVO).
- Interview patient, family members and other witnesses to determine Last Known Well (LKW) time and time of Symptom Discovery.
- Attempt to identify possible stroke mimics (eg, seizure, migraine, intoxication) and determine pre-stroke existing essential disability (need for nursing homecare or inability to walk without help from others).
- Patients who are eligible for IV Alteplase if transported to nearest Acute Stroke Ready Hospital (ASRH) or PSC should not be rerouted to a CSC or EVT-capable Center if doing so would result in a delay that would make them ineligible for IV Alteplase.
- Collect a list of current medications (especially anticoagulants) and obtain patient history including co-morbid conditions (eg. serious kidney or liver disease, recent surgery, procedures or stroke) that may impact treatment decisions.
- Encourage family to go directly to Emergency Department if not transported with patient and obtain mobile number of next of kin and witnesses.

Obstetrical Emergencies

Basic Standing Orders

B

- ► Routine Patient Care.
- ► Gather specific information:
  - ♦ Length of pregnancy, number of previous pregnancies, number of previous live births, last menstrual period, due date, pre-natal care, number of expected babies, drug use.
  - ♦ Signs of near delivery: membrane rupture ("water broke") or bloody show, contractions, urge to move bowels, urge to push, etc.
  - ♦ Signs of pre-eclampsia: hypertension, swelling of face and/or extremities.
- ► Oxygen at high concentration to benefit mother and fetus.
- ► If the mother is having contractions, perform a visual inspection of the external genitalia and perineum for bulging or crowning. Have your partner be present during the exam. **IF THERE IS CROWNING, PREPARE FOR IMMEDIATE DELIVERY.**
  - ♦ Update responding ALS unit if available.
  - ♦ Inform the mother of the need for immediate delivery.
  - ♦ Ensure a private, clean delivery area and sanitary equipment.
  - ♦ Position and drape the mother.
  - ♦ Get several towels, warm if possible.
- ► Do not digitally examine or insert anything into vagina. Exceptions: to manage baby's airway in breech presentation or to treat prolapsed cord as below, you may insert a hand.
- ► Contact medical control if:
  - ♦ Active labor and delivery is imminent.
  - ♦ Post-partum hemorrhage.
  - ♦ Breech presentation.
  - ♦ Prolapsed cord.
- ► Place mother in left-lateral recumbent position except as noted.
- ► Never delay or restrain delivery under normal circumstances.
- ► Prolapsed cord: knee-chest position or Trendelenberg position; immediately and continuously support infant head or body with your hand to permit blood flow through cord. Transport at once to closest hospital with obstetrical capabilities.

Obstetrical Emergencies – Normal Delivery Procedure

Basic Standing Orders

B

Delivery Procedures:

- During delivery support the infant's head with one hand while gently guiding it out of the birth canal to prevent an explosive delivery. Using your other hand with a sterile dressing, support the perineum (area between the vagina and the anus) to help prevent tearing during delivery of the head.
- If the amniotic sac has not broken, use your finger or a clamp to puncture the sac and pull it away from the infant's head and mouth as they appear.
- Attempt to prevent the infant's head from coming in contact with fecal material or other contaminants.
- **As soon as the head delivers** continue to support the infant's head with one hand. **Tell the mother to stop pushing**. Inspect the infant for the umbilical cord wrapped around the neck.
  - **If the umbilical cord is wrapped around the infant's neck:** Gently loosen the cord and slip it over the infant's head.
  - **If the umbilical cord is wrapped too tightly around the infant's neck or wrapped around the neck more than once, preventing the delivery of the infant, immediately** clamp the umbilical cord with two clamps and cut the cord between them.
- Suction the infant's oropharynx.
  - Insert a compressed bulb syringe 1 –1 ½ inches into the infant's mouth.
  - Suction the infant's oropharynx while controlling the release of the bulb syringe with your fingers.
  - Repeat suction as necessary.
- Suction each of the infant's nostrils.
  - Insert a compressed bulb syringe no more than ½ inch into the infant's nostrils.
  - Suction the infant's nostrils while controlling the release of the bulb with your fingers.
  - Repeat suctioning as necessary.
- Instruct the mother to begin pushing during contractions.
- **As soon as the infant has delivered,** quickly dry the infant and place the infant on a warm towel (if available) in a face-up position with the head lower than the feet. **Keep the infant at the level of the mother's vagina until the cord is cut!**

Basic Standing Orders

Delivery Procedures continued:

.

B

► Perform an initial assessment of the infant. Quickly assess the infant's respiratory status, pulse and general condition.

- **If the infant is breathing spontaneously and crying vigorously and has a pulse greater than 100/min:**
  - Clamp the umbilical cord with two clamps three inches apart and cut the cord between them. The first clamp will be 8 – 10 inches from the baby. Place the second clamp 3 inches from the first clamp towards the mother.
  - Cover the infant's scalp with an appropriate warm covering.
  - Wrap the infant in a dry, warm blanket or towels ***and*** a layer of foil over the layer of blankets or towels, ***or*** use a commercial-type infant swaddler if one is provided with the OB kit. **Do not use foil alone!**
  - Provide an oxygen-rich environment for the infant by creating an oxygen hood out of foil or by cupping the end of the oxygen tubing with your hand. **Do not blow the stream of oxygen directly into the infant's face!**
  - Ongoing assessment. Obtain and record vital signs, as often as the situation indicates.
  - **Keep the infant warm and free from drafts.**
- **Monitor the infant's respirations continuously. If the infant is *not* breathing spontaneously and crying vigorously:**
  - **If the infant's respirations are absent or depressed (less than 30/minute in a newborn):**
    i. Rub the infant's lower back **gently**.
    ii. Snap the bottom of the infant's feet with your index finger **gently**.
  - **If the respirations remain absent or become depressed (less than 30/minute in a newborn) despite stimulation, or if cyanosis is present:**
    i. Clear the infant's airway by suctioning the mouth and nose **gently** with a bulb syringe.
    ii. Administer high concentration oxygen as soon as possible.

Obstetrical Emergencies – Normal Delivery Procedure continued

Basic Standing Orders

B

Delivery Procedures continued:

- **If respirations remain absent or depressed (less than 30/minute in a newborn) despite stimulation and oxygen:**
  - Insert the proper size oral airway **gently**.
  - Ventilate the infant with high concentration oxgyen at a rate of 30 – 60 /minute with an appropriately sized pocket mask or bag-valve-mask as soon as possible. **Assure that the chest rises with each ventilation.**
- **Monitor the infant's pulse rate continuously**.
  - **If the pulse rate drops below 100 beats per minute at any time, assist ventilations at a rate of 30 – 60/minute with supplemental oxygen.**
  - **If the pulse rate drops below 60 beats per minute at any time add chest compressions to assisted ventilations following AHA/ARC/NSC guidelines.**
- Ongoing assessment of the newborn. Obtain and record the vital signs of all patients, and repeat enroute as often as the situation indicates.
- **Transport immediately**, keeping the infant warm. **Do not wait for the placenta to be delivered before transporting!**
- Prepare for deliver of the placenta during transport. Delivery of the placenta ***usually*** occurs within 20 minutes of the delivery of the infant. After delivery of the placenta, place the placenta in a plastic bag or other container and deliver to the receiving hospital. Massage the mother's abdomen where the fundus can be palpated.
- Ongoing assessment of the mother.
  - Reassess the mother for hypoperfusion. Obtain and record the vital signs of all patients, repeat enroute as often as the situation indicates.
  - Record all patient care information, including the mother's medical history and all treatment provided for each patient on a separate run report for each patient.

Obstetrical Emergencies – Normal Delivery Procedure continued

<u>Advanced Standing Orders</u>

A

- Establish one or two IV's of lactated ringers with large bore needle.

<u>Paramedic Standing Orders</u>

P

- Routine Patient Care.
- Follow Neonatal Resuscitation Protocol.
- Monitor the patient.

Obstetrical Emergencies – Complicated Childbirth

Basic Standing Orders

B

Breech Birth

► **Do not delay transport! Load and Go to closest appropriate hospital.**

- **If the buttocks presents first:**
  - Administer high concentration oxygen to the mother.
  - Attempt to establish an open path in the birth canal to the infant's mouth with sterile-gloved fingers. If possible, turn the infant so that the back is toward you.
  - **Transport the mother immediately** in a face-up position with her hips elevated, while maintaining an open path in the birth canal to the infant's mouth. Allow mother to push baby out. DO NOT PULL.
- **If a limb presents first:**
  - Administer high concentration oxygen to the mother.
  - Place the mother in a face-up position with her hips elevated and **transport immediately!**

Prolapsed Umbilical Cord

- Administer high concentration oxygen to the mother.
- Place the mother in a face-up position with her hips elevated, and using a sterile gloved hand, palpate the cord for pulses.
- Insert a sterile gloved hand into the vagina and gently push up on the presenting part of the fetus to keep pressure off of the cord. Continue to hold the presenting part away from the cord until you are relieved by the ED staff. **Do not insert the cord back into the uterus!**
- Wrap the exposed cord with sterile towel or dressings. The cord must be kept warm.
- **Transport immediately** while protecting the umbilical cord from pressure during transportation.

Multiple Births

- Obtain additional help as needed.
- Deliver each multiple birth according to the above protocol for **Uncomplicated Childbirth**, making sure to clamp and cut each umbilical cord between births.
- **If the anticipated second birth does not occur after 10 minutes, transport immediately!**
- A Prehospital Care Report (PCR) must be completed for each patient.

Obstetrical Emergencies – Complicated Childbirth continued

Advanced Standing Orders

A

- Establish one or two IV's of lactated ringers with large bore needle.

Paramedic Standing Orders

P

- Routine Patient Care.
- Follow Neonatal Resuscitation Protocol
- Monitor the patient.

Unresponsive/Altered Mental Status (AMS) Patient - Adult

Basic Standing Orders

B

- Routine Patient Care.
- Scene and patient management per General Guidelines.
- Administer 100% oxygen by face-mask.
- Immobilize if evidence of trauma.
- Determine level of consciousness (AVPU).
- Perform focused history and physical examination.
- Determine blood glucose level.
- Administer naloxone 2-4mg intranasal (IN). If no response, may repeat initial dose every 5 minutes up to a total of 10mg.
- Transport.

Advanced Standing Orders

A

- Establish intravenous access.
- Administer naloxone 2 mg IVP, or intranasal (IN) 2-4mg. If no response, may repeat initial dose every 5 minutes up to a total of 10mg.
- If hypoglycemia is suspected, go to Hypoglycemia Protocol.

Paramedic Standing Orders

P

- Maintain airway and ventilation.
- Continuously monitor ECG and Sa02.

Adrenal Crisis

KBEMS Approved 2/11/2015

Adrenal Crisis or Acute adrenal insufficiency occurs in patients with a history of adrenal insufficiency in times of stress (infections, fevers, trauma, recent surgery) or non-compliance with medications. It would be a rare incidence that an EMS agency would encounter an undiagnosed acute adrenal insufficiency patient.

Adrenal insufficiency results when the body does not produce the essential life-sustaining hormones cortisol and aldosterone. These hormones are vital to maintain blood pressure, cardiac contractibility, water and salt balance.

Chronic adrenal insufficiency can be caused by number of conditions:

- Disorders of the adrenal gland
- Disorders of the pituitary gland
- Long-term use of steroids (DOPD, asthma, rheumatoid arthritis, and transplant patients)

Acute adrenal crisis can result in refractory shock or death in patients (on maintenance dose of hydrocortisone (SoluCortef)/ prednisone) who have acute illness or trauma in which there is a need for additional cortisone for the body to response to the acute stress. It is critical that these patients receive a stress dose of hydrocortisone as soon as possible.

Signs and symptoms of acute adrenal crisis include

- Pallor
- Dizziness
- Headache
- Weakness/lethargy
- Abdominal pain
- Vomiting/ nausea
- Hypoglycemia
- Hypernatremia
- Hyperkalemia
- Hypotension
- Shock
- Heart Failure
- Fever
- Confusion, disorientation

Treatment Goals:

1. Restore intravascular volume
2. Give stress dose Steroids
3. Treat hypoglycemia
4. Vasopressors for refractory shock

Treatment guide for Adrenal Crisis:

Fluids: 20 mL/kg bolus of Normal Saline , repeat up to 60 mL/kg

Hydrocortisone: 100mg IM/IV/IO

Glucose:
Adult: 25gm of D50
Infant up to age 12: 2.5 ml/kg of 10% dextrose
Kids > 12: 1 mL.kg of 25% dextrose

Vasopressors: Use for shock refractory to 60 mL/kg fluid bolus

Dosing of **steroids** is as indicated below with **HYDROCORTISONE** being the **PREFERRED** medication if available (may use patient's own medication if available):

Adult patients:
Administer **hydrocortisone** sodium succinate (Solu-Cortef) 100mg IM/IO/IV Push
Or
Administer **methylprednisolone** (Solu-Medrol) 125mg IM/IO/IV Push
Or
Administer **dexamethasone** (Decadron) 4 or 5 mg IM/IO/IV Push

Pediatric patients:
Administer **hydrocortisone** sodium succinate (Solu-Cortef) 2mg/kg IM/IO/IV push (to maximum 100mg)
Or
Administer **methylprednisolone** (Solu-Medrol) 2mg/kg IM/IO/IV Push (to maximum 125mg)
Or
Administer **dexamethasone** (Decadron) 4 or 5 mg IM/IO/IV Push

Alternative Pediatric Dosing:	**Hydrocortisone**	**Methylprednisolone**	**Dexamethasone**
Newborn to infant (up to 1 year)	25mg	25 mg	1 mg
1 year old to 7 years old	50mg	50 mg	2 mg
7 years and older	100mg	125 mg	4-5 mg

Solu-Cortef Act-O-Vial (most common home hydrocortisone prep):
To Use: Push down on the top which will break the seal and mix the liquid and powdered hydrocortisone together. The vial contains 100mg of hydrocortisone in 2ml of diluent. Give the entire contents of the vial to the patient either IV/IM /IO.

References:
1. Tucci V, Sokari T. The Clinical Manifestations, Diagnosis and Treatment of Adrenal Emergencies. Emerg Med Clin North Am 32 (2014) 465-484.

Medical Pediatric Protocols

Commonwealth of Kentucky

Routine Patient Care Guidelines - Pediatric

All levels of provider will complete an initial and focused assessment on every patient, and as standing order, use necessary and appropriate skills and procedures for which the provider has been trained and certified or approved to perform in order to maintain the patient‘s airway, breathing, and circulation.

For the purposes of the protocol, a "pediatric patient” is defined as a child who fits on the length-based resuscitation tape (36 kg or 145 cm). If longer than the length-base resuscitation tape, they are considered an adult. Use of a length-based resuscitation tape is recommended if administering medications or performing other invasive procedures on all pediatric patients.

While this recommendation does not address some emotional and developmental issues, for most therapies, the use of length-based determination of equipment and medications is evidence based. Use of the length-based resuscitation tape is particularly helpful in a situation where there is no confirmed weight or age (e.g. in a disaster setting).

The legal definition of a child is one who has not yet reached his/her eighteenth birthday and is not emancipated.

With the exception of life-threatening emergencies, EMS personnel are to attempt to contact the child‘s parent or legal guardian and obtain the guardian‘s informed consent to treat and transport the child.

Initial Assessment

Scene Size-Up

- ► Review dispatch information.
- ► Assess the scene for safety, mechanism of injury, number and location of patients.
- ► General impression of patient.
- ► Assess need for body substance isolation.
- ► Notify the receiving facility as early as possible.
- ► Request additional resources as needed: e.g. ALS intercepts, air medical transport, additional ambulances, extrication, hazardous materials team, etc.
- ► Use Incident Management/Command System (IM/CS) when possible.

Level of Consciousness

- ► Assess level of consciousness using the AVPU scale.
- ► Manually stabilize the patient‘s cervical spine if trauma is involved or suspected.
- ► Use AED (if at least 1 year of age; use pediatric pads)and initiate cardiopulmonary resuscitation in accordance with current guidelines.

Routine Patient Care Guidelines – Pediatric continued

Airway

- ► Assess the patient for a patent airway.
- ► Open the airway using a head-tilt/chin-lift, or a jaw thrust if suspicious of cervical spine injury.
- ► Suction the airway as needed.
- ► Consider an oropharyngeal or nasopharyngeal airway.
- ► Consider advanced airway interventions as appropriate and if trained in use.

Breathing

- ► Assess patient‘s breathing taking note of rate, rhythm, and quality of the respirations. Assess lung sounds.
- ► Look for nasal flaring or accessory muscle usage.
- ► Assess the chest for symmetrical chest rise, intercostal or supraclavicular retractions, instability, open pneumothorax, tension pneumothorax, or other signs of trauma.
- ► Treat foreign body airway obstruction in accordance with current guidelines.
- ► Assist ventilations when outside the ventilation guideline for pediatrics, and when the respiratory rate is less than 10 per minute or greater than 40 for adults, or when the patient exhibits signs of impending respiratory failure.

Circulation

- ► Assess the patient‘s pulse taking note of rate, rhythm, and quality.
- ► Look for and control any obvious gross bleeding.
- ► Assess patient‘s skin color, temperature, and moisture.
- ► IV access and fluid resuscitation as appropriate for the patient‘s condition per appropriate protocol. After IV is established, administer fluids to maintain systolic blood pressure >90 mmHg for adults and at age specific range for pediatric per chart "Pediatric Vital Signs by Age.” Routes of medication administration when written as —IV can also include “IO”.

Disability

- ► Movement of extremities.
- ► Facial asymmetry.
- ► Speech.

Expose

- ► Expose and examine head, neck, chest, abdomen, pelvis and back.

Secondary Assessment

Head-to-toe Survey

Neurological Assessment
- Glasgow Coma Score.
- Pupillary response to light.

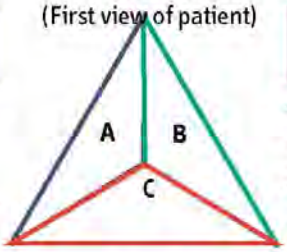
Assess Vital Signs
- Respiration.
- Pulse.
- Blood pressure.
- Capillary refill.
- Skin condition.
  - Color.
  - Temperature.
  - Moisture.

Obtain Medical History
- ***S***ymptoms.
- ***A***llergies.
- ***M***edication.
- ***P***ast Medical History.
- ***L***ast Oral Intake.
- ***E***vents leading to Illness or Injury.

Other Assessment Techniques
- Cardiac Monitoring.
- Pulse oximetry.
- Glucose determination.
- Temperature.
- End-tidal CO_2

PEDIATRIC ASSESSMENT

General Impression
(First view of patient)



Airway & Appearance
(Open/Clear – Muscle Tone /Body Position)

Abnormal: Abnormal or absent cry or speech.
Decreased response to parents or environmental stimuli.
Floppy or rigid muscle tone or not moving.

Normal: Normal cry or speech. Responds to parents or to environmental stimuli such as lights, keys, or toys.
Good muscle tone.
Moves extremities well.

Work of Breathing
(Visible movement / Respiratory Effort)

Abnormal: Increased/excessive (nasal flaring, retractions or abdominal muscle use) or decreased/absent respiratory effort or noisy breathing.

Normal: Breathing appears regular without excessive respiratory muscle effort or audible respiratory sounds.

Circulation to Skin
(Color / Obvious Bleeding)

Abnormal: Cyanosis, mottling, paleness/ pallor or obvious significant bleeding.

Normal: Color appears normal for racial group of child. No significant bleeding.

Decision/Action Points:

- **Any abnormal findings or life-threatening chief complaint** such as major trauma/burns, seizures, diabetes, asthma attack, airway obstruction, etc (urgent) – proceed to Initial Assessment.
- **All findings normal** (non-urgent) – proceed to Initial Assessment.

Initial Assessment
(Primary Survey)

Airway & Appearance
(Open/Clear – Mental Status)

Abnormal: Obstruction to airflow.
Gurgling, stridor or noisy breathing.
Verbal, Pain, or Unresponsive on AVPU scale.

Normal: Clear and maintainable. Alert on AVPU scale.

Breathing
(Effort / Sounds / Rate / Central Color)

Abnormal: Presence of retractions, nasal flaring, stridor, wheezes, grunting, gasping or gurgling. Respiratory rate outside normal range. Central cyanosis.

Normal: Easy, quiet respirations. Respiratory rate within normal range. No central cyanosis.

Circulation
(Pulse Rate & Strength / Extremity Color & Temperature / Capillary Refill / Blood Pressure)

Abnormal: Cyanosis, mottling, or pallor. Absent or weak peripheral or central pulses; Pulse or systolic BP outside normal range; Capillary refill > 2 sec with other abnormal findings.

Normal: Color normal. Capillary refill at palms, soles, forehead or central body ≤2 sec. Strong peripheral and central pulses with regular rhythm.

Decision/ Action Points:

- **Any abnormal finding (C, U, or P) –**
  Check for causes such as diabetes, poisoning, trauma, seizure, etc. Assist patient with prescribed bronchodilators or epinephrine auto-injector, if appropriate.
- **All findings on assessment of child normal (S) –** Continue assessment, detailed history & treatment.

Normal Respiratory Rate:		Normal Pulse Rate:		Lower Limit of Normal Systolic BP:	
Infant (<1yr):	30- 60	Infant:	100-160	Infant:	>60 (or strong pulses)
Toddler (1-3yr):	24 -40	Toddler:	90-150	Toddler:	>70 (or strong pulses)
Preschooler (4-5yr):	22- 34	Preschooler:	80-140	Preschooler:	>75
School-age (6-12yr):	18 -30	School-age:	70-120	School-age:	>80
Adolescent(13-18yr):	12 -20	Adolescent:	60-100	Adolescent:	>90
		Pulses slower in sleeping child / athlete		Estimated min.SBP >70 + (2 x age in yr)	

Developed by New York State EMSC

(Estimate valid ≤ 10 years.)

Pediatric CUPS (with examples)

Critical	**Absent airway, breathing or circulation** (cardiac or respiratory arrest or severe traumatic injury)
Unstable	**Compromised airway, breathing or circulation** (unresponsive, respiratory distress, active bleeding, shock, active seizure, significant injury, shock, near-drowning, etc.)
Potentially Unstable	**Normal airway, breathing & circulation but significant mechanism of injury or illness** (post-seizure, minor fractures, infant < 3mo with fever, etc.)
Stable	**Normal airway, breathing & circulation** **No significant mechanism of injury or illness** (small lacerations or abrasions, infant ≥3mo with fever)

Glasgow Coma Score

Infants		Children /Adults
Eye Opening		
Spontaneous	4	Spontaneous
To speech/sound	3	To speech
To pain	2	To pain
No response	1	No response
Verbal Response		
Coos or babbles	5	Oriented
Irritable crying	4	Confused
Cries to pain	3	Inappropriate words
Moans to pain	2	Incomprehensible
None	1	None
Motor Response		
Spontaneous	6	Obeys commands
Withdraws touch	5	Localizes pain
Withdraws pain	4	Withdraws pain
Abnormal flexion	3	Abnormal flexion
Abnormal extension	2	Abnormal extension
No response	1	No response

Neonatal Resuscitation

Dry, Warm, Position, Tactile Stimulation.
Suction Mouth then Nose.
Call for ALS back-up. Administer O_2 as needed.

Apnea/Gasping, HR <100 or central cyanosis

Ventilate with BVM @ 40-60/min

HR<60 after 30 sec BVM

Chest Compressions @ 120/min - 3:1
1/3 to 1/2 chest depth
2 thumb encircle chest or 2 fingers

ALS available & HR <60

Intubate
Epinephrine
0.01-0.03mg/kg
IV/IO/ET
1:10,000
q 3-5 min

For Epinephrine the IV route is strongly preferred over ET.

Respiratory / Cardiac Arrest Treatment

	Infant <1yr	Child 1-8yr	Teen 9-18yr
Ventilation only	**12-20 bpm**	**12-20 bpm**	**10-12 bpm**
CPR method	2 fingers	1 hand	2 hand
Depth	**1/3-1/2 of the depth of the chest**		
Compression Rate	100/min	100/min	100/min
Ratio	**30:2/15:2**	**30:2/15:2**	**30:2**

CPR should be started for HR<60.
AED should be used on patients ≥1–8 yr of age (with energy reducer).

ALS Guidelines

Asystole or PEA	Bradycardia	VF or pulseless VT
Assess airway & start CPR Intubate & ventilate with oxygen Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO 0.1 mg/kg 1:1000 ET Continue Epinephrine q 3-5 min, same dose Consider hi dose 0.1 mg/kg 1:1000 IV/IO/ET Consider possibility of hypoxia, hypovolemia, hypothermia, hyper/hypokalemia, tamponade, tension pneumothorax, toxins/poisons/drugs or thromboembolism & treat if present.	Assess airway & give oxygen Intubate if decreased consciousness Start CPR if HR<60. Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO 0.1 mg/kg 1:1000 ET Continue Epinephrine q 3-5 min, same dose Atropine 0.02 mg/kg IV/ IO / ET minimum dose 0.1 mg maximum dose 0.5 mg child; 1.0 mg teen	Assess airway & start CPR - Defibrillate at 2j /kg Start CPR, intubate, ventilate with O2 Epinephrine: 0.01 mg/kg 1:10,000 IV/ IO 0.1 mg/kg 1:1000 ET Defibrillate 4j / kg Amiodarone 5mg/kg IV/IO *or* Lidocaine 1mg / kg IV/ IO/ ET *or* Magnesium 25-50mg/kg IV/ IO (for torsades de pointes or hypomagnesemia) Defibrillate 4j / kg

Developed by New York State EMSC

Apparent Life Threatening Event (ALTE) – Pediatric

Definition: An Apparent Life-Threatening Event (ALTE) is defined as an episode that is frightening to the observer and is characterized by some combination of:

1. Apnea (central or obstructive)
2. Color change (cyanosis, pallor, erythema)
3. Marked change in muscle tone
4. Unexplained choking or gagging

INCIDENCE: The incidence of ALTE episodes for the general infant population is reported to vary between 0.5% and 6%. Although it usually occurs in infants <12 months old, any child under 24 months who experiences any of the above may be considered at risk for an ALTE episode.

CONDITIONS RESPONSIBLE FOR ALTE: A wide variety of illnesses and etiologies are associated with an ALTE episode. These include:

1. Airway disease
2. Cardiac arrhythmias /anomalies
3. Child abuse
4. Gastroesophageal reflux
5. Infantile botulism Infections
6. Inborn errors of metabolism
7. Sepsis
8. Intracranial hemorrhage
9. Meningitis
10. "Near-miss" SIDS
11. Pertussis (whooping cough)
12. Respiratory syncytial virus
13. Seizure

Basic Standing Orders

B

- Routine Patient Care.
- ABCs; consider use of the Pediatric Assessment Triangle.
- Measure and record temperature (and degree of any reported fever).
- Provide blow-by oxygen as tolerated; perform pulse oximetry for reported apneic events.
- Obtain glucose reading.
- ***Transport all infants with an ALTE. If transport is being refused contact medical control.***
- Consider ALS transport, if patient is symptomatic.

Paramedic Standing Orders

P

- Check cardiac rhythm.
- Consider possible overdose.
- ***Transport all infants with an ALTE. If transport is being refused contact medical control.***

Sudden Infant Death Syndrome (SIDS)

Definition: The unexpected, sudden death of seemingly normal, healthy infants that occur during sleep with no physical evidence of disease.

Note the position and condition of the patient and surroundings and preserve the scene. Use extreme tact and professionalism. Do not let emotions or prejudices interfere with carrying out appropriate patient care or family support.

- ► Do not make judgments concerning the situation.
- ► Do not add to the parents' sense of guilt or helplessness.
- ► Remember, people react differently to stressful situations.

Basic Standing Orders

B

- ► Begin resuscitation immediately unless rigor mortis, severe lividity, or early tissue breakdown is evident. If any doubt, resuscitate. Refer to Pediatric Cardiac Arrest Protocol.
- ► If resuscitation is begun:
  - ♦ Transport, continue treatment enroute.
- ► Contact medical control.
- ► Call for ALS backup.

Paramedic Standing Orders

P

- ► Refer to Pediatric Cardiac Arrest Protocol.

KEY POINTS: Don't let emotions interfere with treatment. Provide emotional support for the parents. Document all aspects of scene and environmental conditions.

Neonatal Resuscitation

Basic Standing Orders

B

- Position the airway.
- Suction the mouth and nasopharynx.
- Dry and keep warm with thermal blanket or dry towel. Cover scalp with stocking cap.
- Stimulate by drying vigorously including the head and back. Clamp and cut the cord.
- Evaluate respirations.
- Assisted bag-valve-mask ventilation 40-60 breaths/minute with 100% oxygen if patient has apnea, severe respiratory depression, or heart rate < 100/min. Use blow by or mask with 100% oxygen for mild distress.
- Check heart rate at umbilical cord stump, or brachial artery.

Advanced Standing Orders

A

< 60/min	60-100/min	>100/min
♦ Continued assisted ventilation. ♦ Begin chest compression at a rate of 120 events/min. (i.e. 3:1 as 90 compressions and 30 breaths) ♦ If no improvement after 30 seconds, provide positive pressure ventilations. ♦ If no improvement, establish vascular access. ♦ Consider paramedic intercept	♦ Continue assisted ventilation. ♦ Reassess heart rate and respiration enroute. Provide positive pressure ventilations.	♦ Check skin color. If central cyanosis, give oxygen by mask or blow by. ♦ Reassess heart rate and respirations enroute.

Neonatal Resuscitation (cont.)

Paramedic Standing Orders

P

< 60/min	60-100/min	>100/min
♦ Continued assisted ventilation. ♦ Begin chest compression at a rate of 120 events/min. (i.e. 3:1 as 90 compressions and 30 breaths) ♦ If no improvement after 30 seconds, perform tracheal intubation. ♦ If no improvement, establish vascular access and give epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV or IO, or 0.03 mg/kg (0.3 ml/kg) ET. Repeat q 3-5 min. prn.	♦ Continue assisted ventilation. ♦ Reassess heart rate and respiration enroute. Perform tracheal intubation if no improvement.	♦ Check skin color. If central cyanosis, give oxygen by mask or blow by. ♦ Reassess heart rate and respirations enroute.

Cardiac Arrest - Pediatric

Basic Standing Orders

B

- Routine Patient Care – with focus on CPR.
- If age–appropriate AED is available on scene, providers may use/continue to use it.
  - Use age–appropriate pads.
  - Follow manufacturer's instructions
- If age–appropriate AED is not available, may use adult pads if patient is > 1 year of age. Do not let pads contact each other.
- For trauma, minimize scene time.
- Consider treatable causes: overdose/poisoning, hypothermia; treat as per specific protocol.
- Request paramedic intercept.
- Consider placement of a Blind Insertion Airway Device (BIAD)

Advanced Standing Orders

A

- Do not delay transport for IV/IO access, BIAD, or medications.
- Consider intraosseous access, or 1 or 2 large bore IV's en route, bolus 0.9% NaCl (normal saline) 20 ml/kg.
- Request paramedic intercept

Paramedic Standing Orders

P

- Document presenting cardiac rhythm in two separate leads if possible.
- Advanced airway management.
- Consider intraosseous access
- IV/IO administration of medication is preferred over administration via ETT.
- Consider nasogastric or orogastric tube to decompress the stomach of intubated patients.

For Asystole or PEA

- Give Epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV. Repeat every 3 - 5 minutes.
- Give 5 cycles of CPR, then check rhythm.

Paramedic Standing Orders continued

P

- ► If no rhythm, continue epinephrine and 5 cycles of CPR until:
  - pulse obtained
  - shockable rhythm obtained, or
  - decision made to discontinue further efforts.
- ► If rhythm noted, determine if it is shockable if so, go to VF/Pulseless VT; if not, continue Epinephrine and 5 cycles of CPR until:
  - pulse obtained,
  - shockable rhythm obtained, or
  - decision made to discontinue further efforts.

For VF/Pulseless VT

- ► Defibrillate at 2 J/kg; deliver 5 cycles of CPR and recheck rhythm; if still a shockable rhythm, defibrillate at 4 J/kg; deliver 5 cycles of CPR; give Epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV/IO
  - Repeat every 3 - 5 minutes
- ► If still a shockable rhythm, defibrillate at 4 J/kg; deliver 5 cycles of CPR; consider:
  - Amiodarone 5 mg/kg (maximum 300 mg) IV **or**
  - Lidocaine 1mg/kg IV
  - Magnesium sulfate 25 – 50 mg/kg (max. 2 grams) IV/IO over 1 – 2 minutes for torsades de pointes.
- ► If pulse obtained, begin post-resuscitation care.

Consider treatable causes

- ► For trauma consider bilateral needle chest decompressions.
- ► For suspected or known hyperkalemia (dialysis patient), or known tricyclic antidepressant overdose, consider sodium bicarbonate 1 mEq/kg IVP.

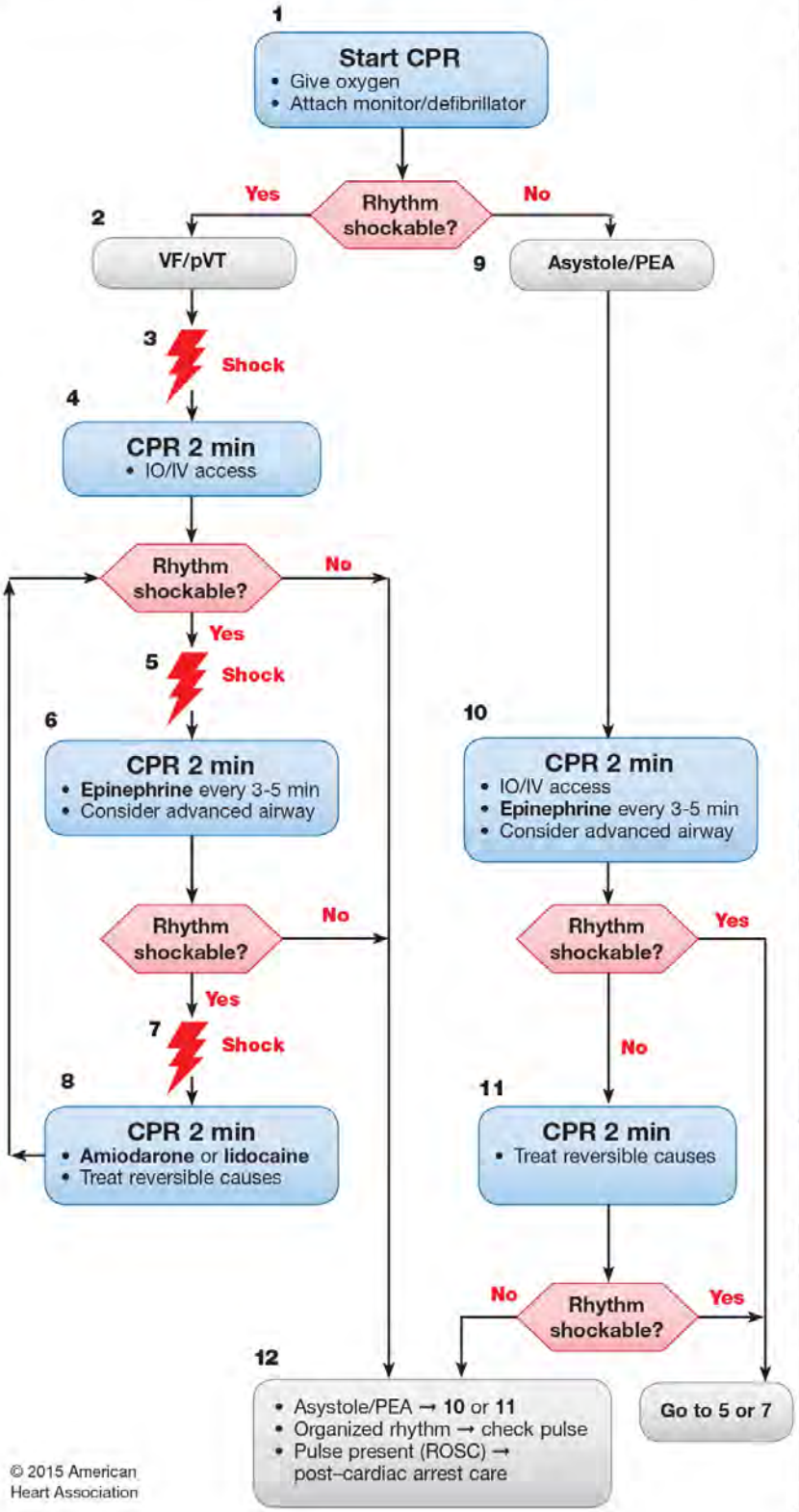
For Post-resuscitation hypotension

- ► IV Normal Saline 20 ml/kg and/or
- ► Consider:
  - *Dopamine infusion 5 – 20 mcg/kg/min.

* Note: An infusion pump is required for the use of pressor agents.

Cardiac Arrest Algorithm

Pediatric Cardiac Arrest Algorithm—2015 Update



CPR Quality

- Push hard (≥⅓ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil.
- Minimize interruptions in compressions.
- Avoid excessive ventilation.
- Rotate compressor every 2 minutes, or sooner if fatigued.
- If no advanced airway, 15:2 compression-ventilation ratio.

Shock Energy for Defibrillation

First shock 2 J/kg, second shock 4 J/kg, subsequent shocks ≥4 J/kg, maximum 10 J/kg or adult dose

Drug Therapy

- **Epinephrine IO/IV dose:** 0.01 mg/kg (0.1 mL/kg of 1:10 000 concentration). Repeat every 3-5 minutes.
  If no IO/IV access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of 1:1000 concentration).
- **Amiodarone IO/IV dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 2 times for refractory VF/pulseless VT.
- **Lidocaine IO/IV dose:** Initial: 1 mg/kg loading dose. Maintenance: 20-50 mcg/kg per minute infusion (repeat bolus dose if infusion initiated >15 minutes after initial bolus therapy).

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement
- Once advanced airway in place, give 1 breath every 6 seconds (10 breaths/min) with continuous chest compressions

Return of Spontaneous Circulation (ROSC)

- Pulse and blood pressure
- Spontaneous arterial pressure waves with intra-arterial monitoring

Reversible Causes

- **H**ypovolemia
- **H**ypoxia
- **H**ydrogen ion (acidosis)
- **H**ypoglycemia
- **H**ypo-/hyperkalemia
- **H**ypothermia
- **T**ension pneumothorax
- **T**amponade, cardiac
- **T**oxins
- **T**hrombosis, pulmonary
- **T**hrombosis, coronary

Bradycardia (Symptomatic) - Pediatric

AGE	Mean	Lower limit of normal
Newborn to 3 months	140	85 (80 sleep)
3 months to 2 years	130	100 (70 sleep)
2 years to 10 years	80	60
>10 years	75	60

Basic Standing Orders

B

- Routine Patient Care.
- Maintain airway.
- Consider underlying causes of bradycardia (e.g. hypoxia).
- Provide high-flow oxygen and consider assisting ventilations.
- Monitor vital signs, including pulse oximetry.
- Begin/continue CPR in child if HR< 60bpm and hypoperfusion despite oxygen.
- Request ALS intercept.

Advanced Standing Orders

A

- IV access and administer fluids to maintain hemodynamic status.

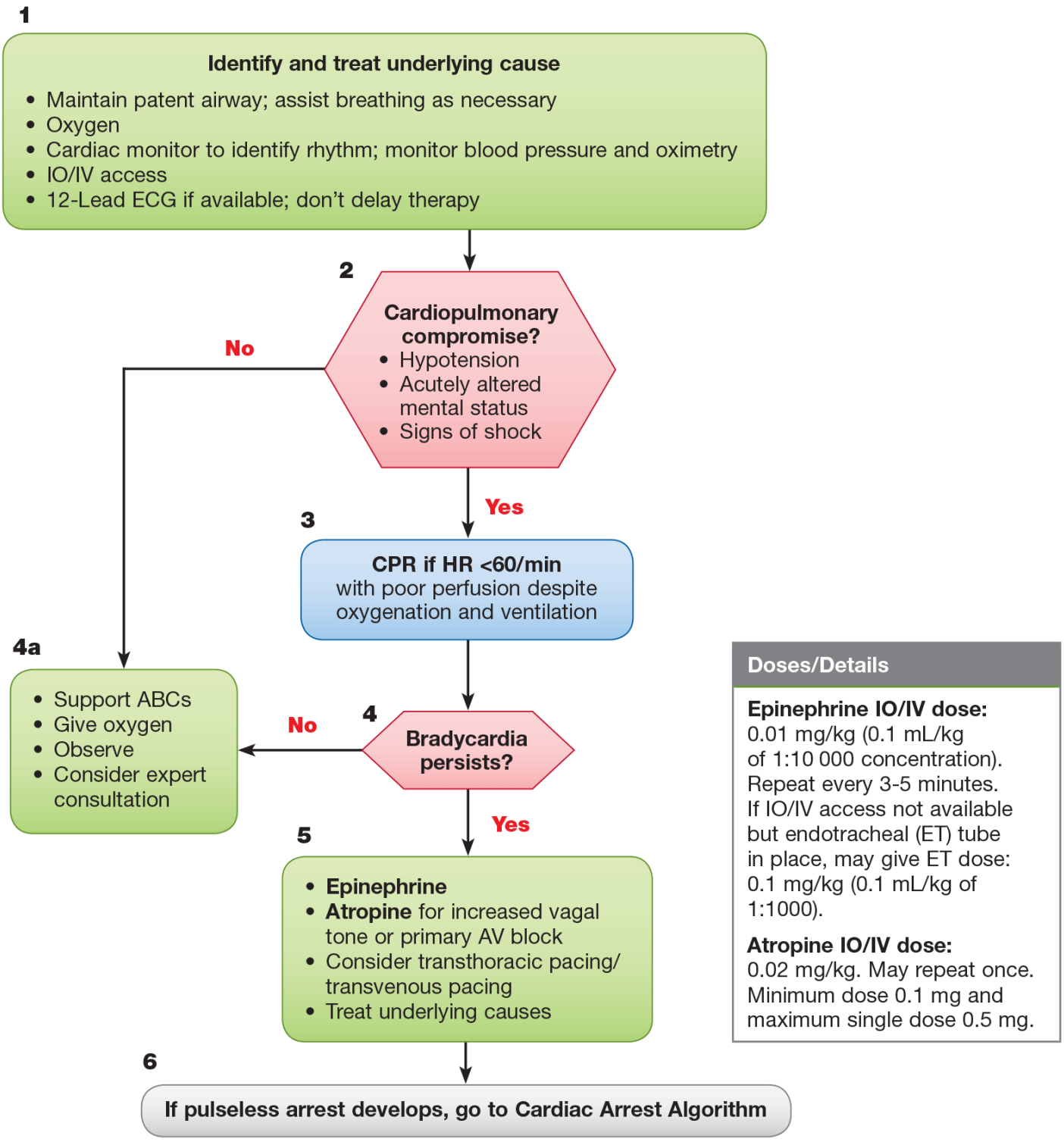
Paramedic Standing Orders

P

- Epinephrine 0.01 mg/kg IV/IO (0.1 ml/kg of **1:10,000**) every 3-5 minutes
- Consider atropine 0.02mg/kg IV/IO (min single dose 0.1mg, - total max dose is 1 mg) for increased vagal tone or primary AV block.
- Consider transcutaneous pacing at minimum output and increase until capture achieved for rate appropriate to age.
- Consider procedural sedation prior to pacing
  - Midazolam 0.05 mg/kg IV, **or**
  - Diazepam 0.05 mg/kg IV
- Consider glucose if hypoglycemia suspected.

Bradycardia (Symptomatic) Algorithm – Pediatric

Pediatric Bradycardia With a Pulse and Poor Perfusion Algorithm



Tachycardia - Pediatric

AGE	Mean	Upper limit of normal
Newborn to 3 months	140	205
3 months to 2 years	130	190
2 years to 10 years	80	140
>10 years	75	100

Basic Standing Orders

B

- Routine Patient Care.
- Assess and support ABC's as needed.
- Provide high-flow oxygen and consider assisting respiration.
- Consider Paramedic intercept.

Advanced Standing Orders

A

- IV/IO access and administer fluids to maintain systolic blood pressure >minimum for age and signs of adequate perfusion.

Paramedic Standing Orders

P

- Identify rhythm using cardiac monitor and 12-lead EKG if available.
- Evaluate QRS duration.
- Consider treatable causes.

Consider procedural sedation prior to cardioversion

- Midazolam 0.05 mg/kg IV, **or**
- Diazepam 0.05 mg/kg IV.

PSVT or narrow complex tachycardia

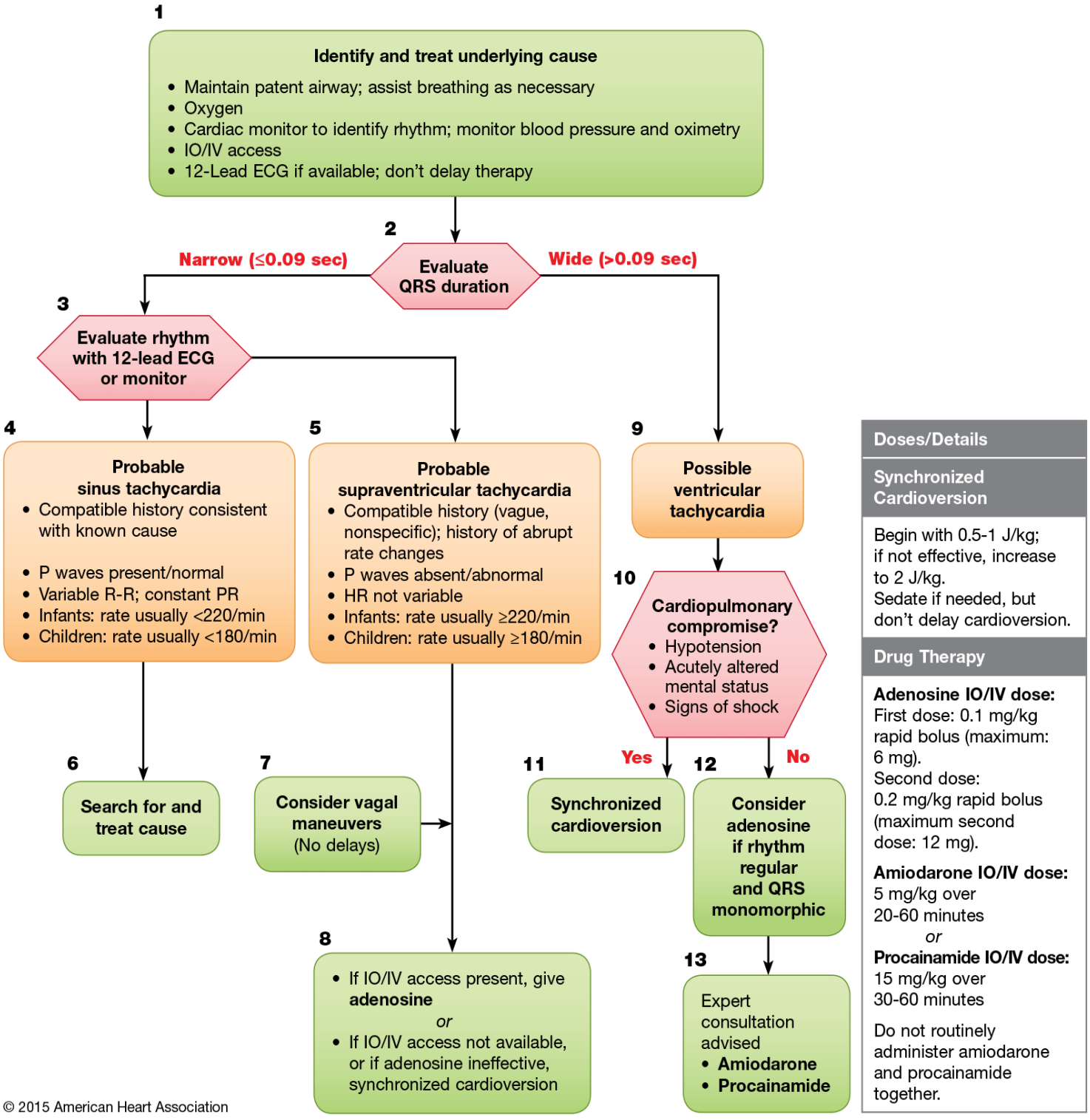
- **Consider vagal stimulation unless patient is very unstable or if it does not unduly delay chemical or electrical cardioversion:**
  - **Infants and Young Children**: apply ice to face without occluding airway.
  - **Older Children:** Valsalva. Blow through obstructed straw.
- Adenosine 0.1mg/kg IV not to exceed 6 mg (first dose). May repeat once at 0.2mg/kg not to exceed 12mg (subsequent dose).
- If unstable, synchronized cardioversion 0.5 to 1 J/kg, increase to 2 J/kg if not effective.

For suspected VT (wide complex >0.08 sec)

- If unstable, synchronized cardioversion 0.5 to 1 J/kg

Tachycardia Algorithm- Pediatric

Pediatric Tachycardia With a Pulse and Poor Perfusion Algorithm



Shock - Pediatric

Hypoperfusion or shock is defined as decreased effective circulation, with inadequate delivery of oxygen to tissues. Shock may be present in its early stage (compensated) or its late stage (decompensated). Pediatric shock may exist with normal, high, or low blood pressure.

Basic Standing Orders

B

- Refer to Routine Patient Care Guidelines.
- Identify signs and symptoms of shock:
- Poor capillary refill
  - Decreased peripheral pulses
  - Cool, mottled extremities
  - Altered level of consciousness: lethargy, hallucinations, agitation, coma
  - Tachycardia
  - Tachypnea
  - Decreased urine output
- If trauma with ongoing bleeding, stop external hemorrhage.
- Use pulse oximeter, if available. Apply 100% oxygen by non-rebreather mask.
- Obtain blood glucose
- Airway management as appropriate and trained
- Transport and call for additional orders.

Advanced Standing Orders

A

HYPOVOLEMIA

- Vascular access. IO may be indicated if peripheral IV access attempts fail.
- Fluid boluses: 20 ml/kg IV or IO of NS or LR.
- Obtain blood glucose and follow hypoglycemia protocol if < 60 mg/dl.
- If suspected history of volume loss and no improvement after initial fluid bolus, administer additional fluid boluses at 20 ml/kg.

Paramedic Standing Orders

P

CARDIOGENIC

- Consider rhythm disturbance. If supraventricular tachycardia or ventricular tachycardia with a pulse and evidence of low cardiac output, follow protocol for Pediatric Tachycardia.
- Fluid bolus, 20 ml/kg NS or LR, IV or IO.
- Consider dopamine.

Paramedic Standing Orders continued

P

DISTRIBUTIVE (Septic)

- ► Fluid boluses: 20 ml/kg NS or LR IV or IO.
- ► If history of fever or suspected infection, give additional boluses of 20 ml/kg prn, to 60 ml/kg.
- ► If suspected allergic reaction, follow protocol for Pediatric Anaphylaxis.
- ► Consider dopamine.
- ► Contact medical control for permission and rate of dopamine. Use premixed dopamine with infusion pump.
- ► Stop dopamine for IV extravasation or extremity blanching distal to IV.

Key Points/Considerations

- ► Use appropriate barrier precautions.

Allergic Reaction/Anaphylaxis – Pediatric

Anaphylaxis is determined by suspected exposure to an allergen ***and*** one or more of the following:

- ► Severe respiratory distress.
- ► Airway compromise/impending airway compromise (wheezing, swelling of the lips/tongue, throat tightness).
- ► Signs of shock.

Allergic Reaction/Anaphylaxis – Pediatric: Minor

Basic Standing Orders

B

- Routine Patient Care
- Maintain Airway and administer high flow oxygen:
  - Infants via infant mask @ 6-10 L/min.
  - Small child (1-8 yrs.) via pediatric mask @ 6-10L/min.
  - Older child (9-15 years) via non-rebreather mask @ 12-15 L/min.
  - If mask not tolerated, administer via blow-by method.
  - Remove allergen.
  - Check vital signs frequently.
  - Begin transport, consider Paramedic intercept.
  - Consider patient assisted medication.
- Consider:
  - Albuterol 1 nebulizer treatment:

    <1 year or < 10kg: mix 1.25mg in 1.5ml NS (Normal Saline) 0.083%)

    > 1 year or > 10 kg: mix 2.5 mg in 3 ml NS (Normal Saline) 0.083%.

    May repeat twice PRN

Paramedic Standing Orders

P

- Consider diphenhydramine 1 mg/kg (maximum 25 mg) IM or IV.

Allergic Reaction/Anaphylaxis – Pediatric: Moderate

Basic Standing Orders

B

- Routine Patient Care
- Maintain Airway and administer high flow oxygen, preferably by non-rebreather facemask at 12-15L/min to maintain oxygen saturation of at least 95%.
  - Remove allergen.
  - Check vital signs frequently.
  - Begin transport, consider Paramedic intercept.
  - Consider patient assisted medication.
- Consider:
  - Albuterol 1 nebulizer treatment:
    - ***<1 year or < 10kg:*** mix 1.25mg in 1.5ml NS (Normal Saline) 0.083%)
    - ***1 year or > 10 kg:*** mix 2.5 mg in 3 ml NS (Normal Saline) 0.083%. *May repeat twice PRN*
  - Epinephrine (1:1000) 0.01 mg/kg (maximum 0.15 mg) SQ.

Paramedic Standing Orders

P

- Consider diphenhydramine 1 mg/kg (maximum 25 mg) IM or IV.

Allergic Reaction/Anaphylaxis – Pediatric: Severe

Basic Standing Orders

B

- Ensure adequate ABCs. Administer oxygen to keep SaO_2 >90%.
- If patient was exposed to an allergen and exhibits severe respiratory distress or shock administer ONE of the following:
  - Epipen Autoinjector (8 years or older) or
  - Epipen Jr. Autoinjector (less than 8 years/55 lbs.) or
  - Epinephrine 1:1000, 0.3 mg (0.3ml) (8 years of age or older) or
  - Epinephrine 1:1000, 0.15 mg (0.15ml) (less than 8 years/55 lbs.).
- Begin transport and request paramedic intercept.
- Monitor ABCs and vital signs. Assist ventilations if necessary.
- Consider:
  - Albuterol 1 nebulizer treatment:
    - ***<1 year or < 10kg:*** mix 1.25mg in 1.5ml NS (Normal Saline) 0.083%)
    - ***1 year or > 10 kg:*** mix 2.5 mg in 3 ml NS (Normal Saline) 0.083%. *May repeat twice PRN*

NOTE: ***If signs and symptoms do not resolve, contact medical control for orders to repeat epinephrine.

Advanced Standing Orders

A

- Obtain IV/IO access as appropriate.
- If hypotensive, infuse 0.9% NaCl (Normal Saline) 20 ml/kg to maintain hemodynamic status.

Paramedic Standing Orders

P

- Methylprednisolone (Solu-Medrol®) 2 mg/kg IV/IO, max dose 125 mg).
- Diphenhydramine 1 mg/kg (maximum 25 mg) IM/IV/IO.
- May repeat epinephrine (1:1000) 0.1 mg/kg (maximum 0.15 mg) SQ.
- Consider early intubation.

Asthma/RAD/Croup - Pediatric

BRONCHOSPASM

A silent chest is an ominous sign indicating that respiratory failure or arrest is imminent.

Definition: Bronchospasm is usually accompanied by respiratory distress with the following findings:

- ► wheezing
- ► prolonged expiration
- ► increased respiratory effort (decreased effort may be noted as patient's condition approaches respiratory failure)
- ► severe agitation, lethargy
- ► hypoxemia
- ► suprasternal and substernal retractions
- ► tripod positioning

Basic Standing Orders

B

- ➢ Routine Patient Care
- ➢ Wear N95 mask if bioterrorism related event or highly infectious agent suspected. If suspected epiglottitis, limit evaluation/interventions to only those necessary.
- ➢ If available request paramedic intercept/intervention as soon as possible.
- ➢ Assist patient with his/her own MDI, if appropriate; only MDIs containing beta adrenergic bronchodilators (e.g. albuterol, Ventolin, Proventil) may be used: 2 puffs; repeated every 5 minutes as needed while transporting; contact medical control if delayed.
- ➢ Obtain pulse oximetry reading.
- ➢ Oxygen 15 LPM via nonrebreather or 4 LPM via nasal cannula if mask not tolerated.
- ➢ For patients with croup, provide humidified oxygen.
- ➢ Assist ventilations with BVM and 100 % oxygen if respiratory effort is ineffective.
- ➢ Consider albuterol 2.5 mg (0.5ml of 0.5% solution) in 3ml normal saline solution via nebulizer every 5 minutes x 4 total doses.
- ➢ Do not delay transport to administer medications

Advanced Standing Orders

A

- Assess circulation, perfusion and mental status.
- Consider albuterol 2.5mg (0.5 ml of 0.5% solution) in 3 ml normal saline solution via nebulizer every 5 minutes x 4 total doses.
- Consider epinephrine (**1:1,000**) 0.01mg/kg SQ (maximum 0.3mg = 0.3 ml) for patients unable to inhale nebulized albuterol.
- IV access and administer fluids to maintain hemodynamic status.

Paramedic Standing Orders

P

- Consider methylprednisolone 1 mg/kg (maximum 125 mg) IV for severe exacerbation or patient who does not respond after first nebulizer treatment.
- If airway not maintained by other means, including attempts at assisted ventilation or if prolonged assisted ventilation is anticipated, consider endotracheal intubation.
- Initiate cardiac monitoring.
- Perform focused history and detailed physical exam enroute to the hospital.

Key Points - It is extremely important to reassure a frightened child. IV access should be reserved for situations when the line is necessary to **treat.**

Diabetic Emergencies: Hypoglycemia - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- If the patient can swallow and hypoglycemia is present, administer oral glucose.
- Consider ALS intercept.

Advanced Standing Orders

A

- IV access and administer fluids to maintain hemodynamic status.
- **Age < 30 Days**: administer dextrose 0.25 gm/kg IVP(2.5 ml/kg) of D10 (or D25 diluted 1:1).
- **Age > 30 Days and < 2 Years**: administer dextrose (D25) 0.25 gm/kg (1 ml/kg) IVP (D50 diluted 1:1 for a 25% solution).
- **2 Years or more**: administer dextrose (D50) 0.25 gm/kg (0.5 ml/kg) IVP (maximum 25 gms).
- If unable to obtain IV or IO access: administer glucagon 1mg IM or SQ for patients > 30 Days.

Diabetic Emergencies: Hyperglycemia - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- Consider ALS intercept for abnormal vitals signs or altered level of consciousness.

Advanced Standing Orders

A

- IV access and administer Normal Saline to maintain systolic blood pressure >minimum and signs of adequate perfusion.
- Maintain patent airway and adequate ventilations.
- Transport.

Paramedic Standing Orders

P

- Airway management as needed.
- Transport.

Non-Traumatic Abdominal Pain - Pediatric

This protocol should be used for patients that complain of abdominal pain without a history of trauma. Assessment should include specific questions pertaining to the GI/GU systems.

Abdominal physical assessment includes:
Ask patient to point to area of pain (palpate this area last).
Gently palpate for tenderness, rebound tenderness, distension, rigidity, guarding, and pulsatile masses. Also palpate flank for CVA tenderness.

Abdominal history includes:
History of pain (OPQRST)
History of nausea/vomiting (color, bloody, coffee grounds)
History of bowel movement (last BM, diarrhea, bloody, tarry)
History of urine output (painful, dark, bloody)
History of abdominal surgery
SAMPLE (attention to last meal)

Additional questions should be asked of the female adolescent patient regarding OB/GYN history. An acute abdomen can be caused by appendicitis, diabetic ketoacidosis, incarcerated hernia, intussuception, UTI, kidney stone, pelvic inflammatory (PID).

Basic Standing Order

B

- Routine patient care.
- Nothing by mouth.
- Supplemental oxygen as warranted with NC, blow-by, or non-rebreather mask.
- Transport in position of comfort..

Advanced Standing Orders

A

- Consider establishing an IV access with NS or RL and administer a fluid bolus of 20 ml/kg.

Paramedic Standing Orders

P

- Cardiac Monitoring.
- Refer to Shock-Pediatric Protocol.

Poisoning: Overdose - Pediatric

Basic Standing Orders

B

- Consider waiting for law enforcement to secure the scene.
- Remove patient from additional exposure.
- Routine Patient Care.
- Absorbed poison:
  - Remove clothing and fully decontaminate.
  - If eye is involved, irrigate at least 20 minutes without delaying transport.
- Inhaled/injected poison:
  - Administer high-flow oxygen.
  - **Note**: Pulse oximetry may not be accurate for some toxic inhalation patients.
- Ingested poison:
  - Contact Poison Control at (800) 222-1222 as soon as practicable if you have any questions.
  - Review circumstances of overdose with medical control and poison control.
  - Bring container to receiving hospital.
- Envenomations:
  - Immobilize extremity in dependent position. Consider ice pack for bee stings.
- For MCI related to organophosphate exposure see Nerve Agents & Organophosphates.
- Suggested Narcotic Antidotes: Naloxone 0.1 mg/kg up to 2mg IN. If no response, may repeat initial does every 5 minutes to a total of 10.
- Consider paramedic intercept/Air Medical Transport

Poisoning: Overdose - Pediatric continued

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure greater than minimum for age, and signs of adequate perfusion.
- Suggested Narcotic Antidotes: Naloxone 0.1 mg/kg up to 2mg IV/IM/IO/IN. If no response, may repeat initial does every 5 minutes to a total of 10.

Paramedic Standing Orders

P

Suggested Antidotes

Tricyclic antidepressant	Sodium bicarbonate 1 mEq/kg IV.
Beta-Blocker	Glucagon 0.025-0.05 mg IV, IM, SQ.
Ca Channel Blocker	Calcium Chloride 20 mg/kg/dose IV over five minutes, repeat if necessary. Glucagon 0.025-0.05 mg/kg/ IV.
Cyanide	Cyanokit®*.
Organophosphates	Atropine: 0.05 - 0.1 mg/kg IV or IM (minimum dose of 0.1 mg, maximum dose 5 mg), repeat 2-5 minutes as needed. Pralidoxime: 25 - 50 mg/kg/dose IV for maximum dose 1gm or IM for maximum dose of 2 gm, repeat within 30-60 minutes as needed, and every hour for 1–2 doses as needed.

Hydroxocobalamin: 5 gm dose over 15 min. Using a Cyanokit**, the starting dose of CYANOKIT for adults is 5 gm (contained in a single vial) administered by IV infusion over 15 mins (Approximately 15ml/min). Depending upon the severity of the poisoning and the clinical response, a second dose of 5 gm may be administered by IV infusion for a total dose of 10 gm. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 120 minutes, as clinically indicated.

NOTE: ** Cyanokit ®: each kit contains one glass vial (200ml), each containing 5 gm lyophilized hydroxocobalamin for injection, one sterile transfer spike, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included. NS is recommended)

Poisoning: Cyanide Poisoning - Pediatric

Symptoms: headache, confusion, dyspnea, chest tightness, nausea

Signs: change in LOC, seizure, dilated pupils, tachypnea + HTN (early), bradypnea + hypotension (late), shock, vomiting.

Basic Standing Orders

B

- ► Routine Patient Care.
- ► Decontamination concurrent with initial resuscitation:
  - If patient exposed to gas only and does not have skin or ocular irritation, does not need decontamination.
  - If patient exposed to liquid, decontamination required.
- ► Consider Paramedic intercept/air medical transport.

Advanced Standing Orders

A

- ► Obtain IV access if situation permits.

Paramedic Standing Orders

P

- ➢ Cyanokit: Hydroxocobalamin:
  70mg/kg IV dose over 15 min. Using a Cyanokit**, the starting dose of CYANOKIT for Pediatrics is 70mg/kg (contained in a single vial) administered by IV infusion over 15 mins. Depending upon the severity of the poisoning and the clinical response, a second dose of 70mg/kg may be administered by IV infusion for a total dose of 10 gm.

  The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 120 minutes, as clinically indicated.

  NOTE: ** Cyanokit ®: each kit contains one glass vial (200ml), each containing 5 gm lyophilized hydroxocobalamin for injection, one sterile transfer spike, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included. NS is recommended)

Poisoning: Nerve Agents and Organophosphates MCI – Pediatric

Basic Standing Orders

B

- ► Routine Patient Care
- ► Assess for SLUDGEM (salivation, lacrimation, urination, defecation, gastric upset, emesis, muscle twitching) and KILLERBs: (Bradycardia, Bronchorrhea, Bronchospasm).
- ► Remove to cold zone after decontamination and monitor for symptoms.
- ► Antidotal therapy should be started as soon as symptoms appear. Mark-1 Kit Auto-injectors for use only in Mass Casualty Incidents
- ► All injections must be given IM.
- ► Atropine (tube#1) should always be given before 2-PAM chloride (tube#2).
- ► Albuterol 2.5mg in 3ml normal saline via nebulizer.
- ► Determine dosing according to the following guidelines:

Triage	Symptoms	Triage Level: Disposition	Atropine Correct hypoxia before IV (risk of torsades, V-fib)	Pralidoxime	Diazepam May use other benzodiazepines (e.g. Midazolam)
RED	Apnea, Convulsions, Cardiopulmonary Arrest	Immediate – Severe: Admit intensive care status	0.05-0.1 mg/kg IV, IM per ETT ⇨No maximum ⇨Repeat q5-10 minutes as above	25-50 mg/kg IV or IM as above	
YELLOW	Miosis and any other symptom	Immediate – Moderate: Admit	0.05 mg/kg IV or IM Repeat as needed q5-10 minutes until respiratory status improves	25-50 mg/kg IV or IM May repeat q 1 hour. Watch for: ⇨Muscle rigidity ⇨Laryngospasm ⇨Tachycardia	For any neurologic effect: ⇨30 days to 5 years-0.05 to 0.3 mg/kg/IV to a maximum dose of 5mg/dose. ⇨5 years and older-0.05 to 0.3 mg/kg IV to a maximum dose of 10/mg/dose. May repeat q15-30 minutes
GREEN	Asymptomatic: Miosis, mild rhinnorhea	Admit or observe PRN	None	None	None

Poisoning: Nerve Agents and Organophosphates MCI – Pediatric

Advanced Standing Orders

A

- Obtain IV access if situation permits.

Poisoning: Radiation Injuries MCI

Exposure to radioactive source or radioactive materials/debris.

Basic Standing Orders

B

- ► Remove patient from scene and decontaminate by appropriately trained personnel.
- ► Wear N95 mask.
- ► Triage tools for mass casualty incident:
  - ♦ If vomiting starts
    - ○ within 1 hour of exposure, survival is unlikely and patient should be tagged "Expectant."
    - ○ after less than 4 hours of exposure, patient needs immediate decontamination and evaluation and should be tagged —"Immediate."
    - ○ after 4 hours, re-evaluation can be delayed 24 – 72 hours if no other injury is present and patient tagged —"Delayed."
- ► Treat traumatic injuries and underlying medical conditions.
- ► Patients with residual contamination risk from wounds, shrapnel, and internal contamination should be wrapped in water-repellent dressings to reduce cross contamination.

Advanced Standing Orders

A

- ► IV access and administer fluids to adults hemodynamically stable if situation permits.

Paramedic Standing Orders

P

- ► Consider anti-emetic.
- ► Consider pain control.

Seizures - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Do not attempt to restrain the patient; protect the patient from injury.
  - Suction as needed.
  - Consider nasopharyngeal airway.
  - Oxygen 15LPM via non-rebreather mask.
  - Assist ventilations with 100% oxygen via bag valve mask if necessary to maintain oxygen saturation > 95%.

  Protect patient from injury – place on side.
- History preceding seizure is very important. Find out what precipitated seizure (e.g. medication non-compliance, active infection, trauma, hypoglycemia, substance abuse, third-trimester pregnancy, etc.).
  - Has diazepam rectal gel been prescribed by patient's physician? If yes, advise caregiver to administer according to patient's prescribed treatment.
  - Determine if emergency is related to implanted vagus nerve stimulator. Also determine:
    - o when vagus nerve stimulator was implanted
    - o when last checked by physician
    - o current settings
    - o history of magnet use
    - o changes in seizure intensity
- Obtain patient's temperature (rectal route preferred as appropriate), see Fever-Pediatric Protocol.
- Obtain Blood Glucose
- Request Paramedic intercept for ongoing or recurrent seizure activity.

Advanced Standing Orders

A

- Monitor vital signs and pulse oximeter.
- IV access and administer fluids to maintain hemodynamic status.
- If blood glucose reading less than 60 mg/dl see Diabetic Emergencies: Hypoglycemia.

Paramedic Standing Orders

P

- Consider advanced airway control as needed.
- Monitor EKG.
- If generalized seizure activity is present, consider
  Lorazepam 0.1 mg/kg IV/IO (single maximum dose 4 mg), **or**
  Midazolam 0.1 mg/kg IV/IM/IO (single maximum dose 2 mg)
  Diazepam 0.2 mg/kg IV or 0.5 mg/kg PR (single maximum dose 5 mg or 10 mg PR).
- Any of the above may be repeated once in 5 minutes.

FEVER (>101.5°F/38.5°C) – Pediatric

This protocol is **not** intended for patients suffering from environmental hyperthermia.

Any child less than 60 days old with a documented temperature (by parent/caregiver or EMS) ≥ 100.4° rectally (99.4° axillary) must be transported for evaluation. Medical control must be contacted prior to accepting any refusal.

Basic Standing Orders

B

- ► Routine Patient Care.
- ► Wear N95 mask if bioterrorism related event or highly infectious agent suspected.
- ► Obtain temperature – (rectal temperature preferred as appropriate).
- ► Passive cooling; remove excessive clothing/bundling.
- ► Do not cool to induce shivering.

For temperatures of 101.5°F (38.5°C) or greater

- ► If child has had acetaminophen more than 4 hours ago, then consider administer of acetaminophen 15 mg/kg PO/PR.
- ► If last dose of acetaminophen was given less than 4 hours ago, but was less than 15 mg/kg, then consider administering a "make-up" dose to bring total dose up to 15 mg/kg.
- ► If child has had maximum dose of acetaminophen less than 4 hours ago and still has temperature greater than 101.5°F (38.5°C), then consider ibuprofen 10 mg/kg PO (contraindicated in children under 6 months of age).
- ► If child has had ibuprofen within the last 6 hours and dose was less than 10 mg/kg, then administer "make-up" dose to bring total dose up to 10 mg/kg (contraindicated in children less than 6 months of age).

Nausea/Vomiting –Pediatric

Basic Standing Orders

B

- Routine Patient Care.

Advanced Standing Orders

A

- IV access and administer fluids to maintain hemodynamic status.

Paramedic Standing Orders

P

- Medications to be administered with online medical control.
- Ondansetron 0.1 mg/kg (maximum single dose of 4mg).

Dehydration – Pediatric

Dehydration may be caused by vomiting, diarrhea and poor fluid intake.
This may be exhibited by poor capillary refill, tachycardia, decreased (altered) mental status, and lower blood pressure.

Infants may have a sunken fontanelle or eyes, poor skin turgor and hypoglycemia.

Basic Standing Orders

B

- Routine Patient Care.
- Maintain patient airway.
- Oxygen 15 LPM via non-rebreather or 4 LPM via nasal cannula, if mask is not tolerated, consider blow by.
- Obtain glucose reading via glucometer.
- Obtain history.
- Consider ALS backup if available, if patient is hemodynamically abnormal.
- Transport.

Advanced Standing Orders

A

- If patient is hemodynamically abnormal, establish IV with Normal Saline or LR. If unsuccessful after 2 attempts, consider IO.
- If signs of inadequate perfusion, give 20cc/kg bolus of normal saline, may repeat 3 times.
- Monitor vital signs and Pulse Oximetry.

Paramedic Standing Orders

P

- Monitor EKG.
- Contact medical control for further orders, if needed.
- Transport.

Note: Monitor for signs of pulmonary edema when administering fluid bolus.

Unresponsive/Altered Mental Status (AMS) Patient - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Scene and patient management per General Guidelines.
- Administer 100% oxygen by bag-valve mask.
- Thorough medical history including recent illness, medication, accidental ingestion.
- Determine blood glucose level.
- Administer naloxone 2mg intranasal (IN). If no response, may repeat initial dose every 5 minutes up to a total of 10mg.
- Continuously monitor Sp02.
- Request paramedic intercept.

Advanced Standing Orders

A

- Establish intravenous access (intraosseous may be appropriate if cardiorespiratory compromise exists).
- Determine blood glucose level:
  - If BG < 80 mg/dl, or cannot be determined, administer dextrose via IV or IO*.
  - Follow Diabetic Emergencies: Hypoglycemia Protocol.*

  NOTE:** ***Ensure age appropriate dextrose concentration
- Administer naloxone 0.1 mg/kg (maximum dose of 2 mg) IV or IO.
- If evidence of shock (hypotension, tachycardia, poor capillary refill), administer NS bolus of 20 ml/kg. If evidence of shock persists, you may repeat the 20 ml/kg bolus 2 times.

Paramedic Standing Orders

P

- Maintain airway and ventilation.
- Transport.
- Contact medical control for additional instructions.

Children with Special Health Care Needs

These protocols cover specific types of special healthcare needs in pediatric patients. Children with special healthcare needs are those who have or are at risk for chronic physical, developmental, behavioral, and emotional conditions that necessitate use of health and related services of a type or amount not usually required by typically developing children."

The general approach to children with special healthcare needs includes the following:

- ► Priority is given to the ABCs.
- ► Do not be overwhelmed by the machines.
- ► Listen to the caregiver.
- ► If a nurse is present, rely on their judgment.
- ► Remember: the child's cognitive level of function may be altered.
- ► Assume that the child can understand exactly what you say.
- ► Bring all medications and equipment to the hospital.
- ► Ask about any form that may delineate specific resuscitation limitations.

Obtaining a history includes asking the parent/caregiver the following:

- ► Child's normal vital signs.
- ► Child's actual weight.
- ► Developmental level of the child.
- ► Child's allergies—include latex.
- ► Pertinent medications/therapies.

Listen to the caregivers. They know their child best. Inquire about:

- Child's baseline abilities
- Syndromes/Diseases
- What is Different Today
- Devices and Medications
- Usual Vital Signs
- Symptoms

- ► Assess & communicate with the child based on developmental age.
- ► Look for MedicAlert® jewelry or health forms, if usual caregiver is not available.
- ► Bring necessary specialized equipment into the ED with the child if possible (ventilator, trach or gastrostomy tube, etc).
- ► Ask caregivers best way to move the child, particularly if the child is very prone to fractures, such as in osteogenesis imperfecta (brittle bone disease). If child suffers a fracture & has a brace on the affected area, leave the brace on when immobilizing.
- ► Down Syndrome patients may have upper cervical instability and may be more prone to spinal cord injury. Immobilization is important in any mechanism of injury in which there has been significant movement of the neck.
- ► Cardiac patients may have absent pulses in some limbs. They may be chronically hypoxic or have hypoxic spells.

Children with Special Health Care Needs - Central Intravenous Catheters

Indwelling intravenous access.

Uses

- Medication administration, parenteral (IV) hydration / nutrition administration.

Types

- Totally Implanted (such as Mediport®) or multilumen catheters (such as Hickman® or Broviac® catheters).

Assessment Issues

- Evaluate for DOPE & Infection
  - **Displaced** – total or partial dislodgement or movement out of vein into internal tissues
  - **Obstructed** – blood clot, protein, crystallized medications / IV nutrition
  - **Pericardial Tamponade** - fluid in the pericardial sac due to perforation by catheter **or**
  - **Pulmonary problems** – pneumothorax, pulmonary embolism from clot or catheter shear
  - **Equipment** – tubing kinked or cracked, infusion pump failure.

Basic Standing Orders

B

- Direct pressure if bleeding at site or clamp / tie if tubing leaking. Administer oxygen as needed.

Paramedic Standing Orders

P

- **ALS**: Aspirate / flush only if inserviced on special device. IV or IO fluids if signs of shock.

Children with Special Health Care Needs - Colostomy

Drainage of fecal material.

Uses
- Temporary or permanent malfunction or obstruction of intestine..

Types
- Open stomas draining into plastic pouches.

Assessment Issues
- Evaluate infection, irritation / trauma, peritonitis.

Basic Standing Orders

B

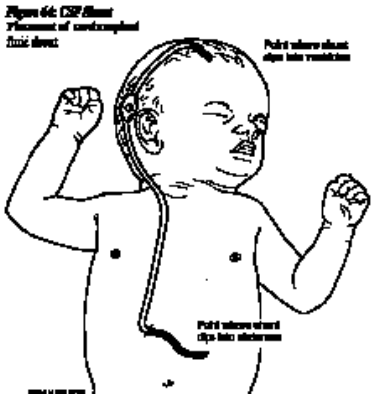
- Direct pressure if bleeding at site. Saline moistened sterile dressing covered by dry dressing if stoma exposed.

Paramedic Standing Orders

P

- IV or IO fluids if signs of dehydration or shock.

Children with Special Health Care Needs - CSF Shunt (Ventriculoperitoneal or V-P shunt)



Uses

- Post meningitis, brain injury / surgery / tumors, hydrocephalus ("water on the brain").

Types

- Polyethylene tubing with reservoir from brain ventricles to abdomen or heart.

Assessment Issues

- Evaluate for DOPE & Infection (including meningitis or infected shunt)
  - **Displaced** – movement of tip into abdominal or heart lining
  - **Obstructed** – blood clot, protein, kinked tubing causing increased intracranial pressure
  - **Peritonitis, Perforation or Pseudocyst** – of stomach / bowel
  - **Equipment** – damaged or separated tubing or reservoir.

Basic and Paramedic Standing Orders

B

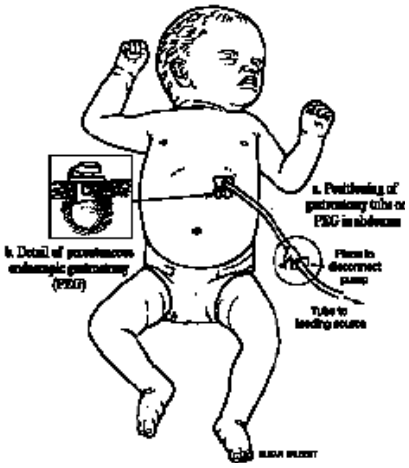
- Administer oxygen as needed.
- Hyperventilate if signs of brain herniation such as unresponsiveness with unequal pupils, fixed dilated or unresponsive pupils, or increased BP and decreased heart rate.

Children with Special Health Care Needs – Enteral Tubes

Feeding tube

Uses

- Total or enhanced feeding & / or medication administration
- Abdominal / gastrointestinal problems
- Neurological or neuromuscular – brain damage, muscular dystrophy, etc.



Types

- Gastrostomy (G) tube: Percutaneous into stomach.
- Jejunal (J) tube: Percutaneous into jejunum.
- Nasogastric (NG) or nasojejunal (NJ) tube

Assessment Issues

- Evaluate for DOPE & Infection (including peritonitis or cellulitis)
  - **Displaced** – total or partial removal of tube
  - **Obstructed** – blood, crystallized feeding / medications, abdominal tissues
  - **Peritonitis or Perforation** of stomach / bowel
  - **Equipment** – tubing kinked or cracked, feeding infusion pump failure

Basic Standing Orders

B

- Direct pressure if bleeding at site. Dry sterile dressing over area if tube is dislodged, or tape partially dislodged tube in place. If tube blocked, stop feeding & plug tube.
- Transport for evaluation of abdominal symptoms or for reinsertion / replacement of tube. (Stoma can close off within hours).
- If abdominal distension or vomiting, may leave tube open and draining into a cup.
- Bring old tube to ED for sizing purposes.

Paramedic Standing Orders

P

- **ALS**: IV or IO fluids if signs of dehydration or shock.

.

Children with Special Health Care Needs - Tracheostomy

Technology-Assisted Children – Among Children with Special Health Care Needs is a growing sub-population of children with chronic illnesses who are dependent on medical devices. Several of the most common devices are summarized below with information to assist in the care of children with those devices.

Tracheostomy – breathing tube into trachea through opening in neck.

Uses

- ► Respiratory problems – narrow or obstructed airways, bronchopulmonary dysplasia (chronic lung disease seen in premature babies), etc.
- ► Neurological or Neuromuscular conditions – brain damage, muscular dystrophy, etc.
- ► May be ventilator dependent totally or part of time or may breathe on own.

Types

- ► Uncuffed – infant & young child; Cuffed – older child (usually >age 8yr) & adolescent.
- ► Fenestrated – hole in stem allows breathing through vocal cords to permit talking, or weaning off tracheostomy.
- ► May be single tube or have inner cannula, which can be removed & cleaned.

Assessment Issues

- ► Evaluate for DOPE & Infection (tracheal or pulmonary).
  - ♦ **Displaced** – total or partial removal of tube.
  - ♦ **Obstructed** – mucus plug, blood, foreign body, or moved against soft tissues.
  - ♦ **Pulmonary problems** – pneumothorax, pneumonia, reactive airway, aspiration.
  - ♦ **Equipment** – ventilator malfunction, oxygen depletion, tubing kinked.
- ► Reassess pulse/respiratory rates frequently.

Children with Special Health Care Needs - Tracheostomy continued

Basic Standing Orders

B

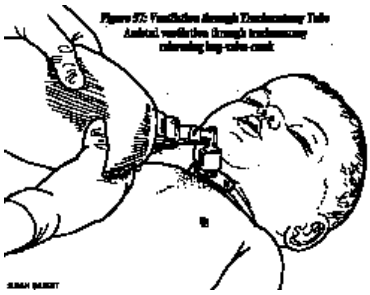
- **If on ventilator**, disconnect and attempt to oxygenate with BVM using tracheostomy adaptor (if needed). **Call ALS** if available, especially if respiratory distress present.
- **If not on ventilator,** administer oxygen with mask or blow-by oxygen over trach as needed.

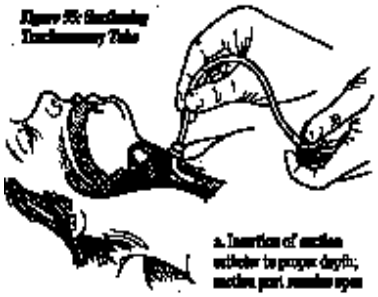
Paramedic Standing Orders

P

- **If above do not work, and you are unable to ventilate,** you may remove tube and either reinsert new tube or use endotracheal tube of same approximate size.
- **If unable to find opening**, thread suction catheter through tube and use catheter tip to probe opening, sliding tube over catheter into opening and then removing catheter.
- **Suction as needed**- no more than 10 sec. Insert no more than ¾ length of the neck.
- **If unable to suction** because of thick secretions, instill 2-3 ml of saline, then suction.
- **If inner cannula present,** may remove and clean with saline.
- **If unable to ventilate,** plug opening and ventilate over mouth and nose.

.





Children with Special Health Care Needs – Ureterostomy, Nephrostomy Tube or Foley Catheter

Drainage of urine.

Uses

- Temporary or permanent malfunction or obstruction of urinary system.

Types

- Open stomas draining into plastic pouches or through catheter in urethra.

Assessment Issues

- Evaluate infection, irritation / trauma, peritonitis, blocked urinary drainage.

Basic Standing Orders

B

- Direct pressure if bleeding at site. Saline moistened sterile dressing covered by dry dressing if stoma exposed.

Paramedic Standing Orders

P

- IV or IO fluids if signs of dehydration or shock.

Adrenal Crisis

KBEMS Approved 2/11/2015

Adrenal Crisis or Acute adrenal insufficiency occurs in patients with a history of adrenal insufficiency in times of stress (infections, fevers, trauma, recent surgery) or non-compliance with medications. It would be a rare incidence that an EMS agency would encounter an undiagnosed acute adrenal insufficiency patient.

Adrenal insufficiency results when the body does not produce the essential life-sustaining hormones cortisol and aldosterone. These hormones are vital to maintain blood pressure, cardiac contractibility, water and salt balance.

Chronic adrenal insufficiency can be caused by number of conditions:

- Disorders of the adrenal gland
- Disorders of the pituitary gland
- Long-term use of steroids (DOPD, asthma, rheumatoid arthritis, and transplant patients)

Acute adrenal crisis can result in refractory shock or death in patients (on maintenance dose of hydrocortisone (SoluCortef)/ prednisone) who have acute illness or trauma in which there is a need for additional cortisone for the body to response to the acute stress. It is critical that these patients receive a stress dose of hydrocortisone as soon as possible.

Signs and symptoms of acute adrenal crisis include

- Pallor
- Dizziness
- Headache
- Weakness/lethargy
- Abdominal pain
- Vomiting/ nausea
- Hypoglycemia
- Hypernatremia
- Hyperkalemia
- Hypotension
- Shock
- Heart Failure
- Fever
- Confusion, disorientation

Treatment Goals:

1. Restore intravascular volume
2. Give stress dose Steroids
3. Treat hypoglycemia
4. Vasopressors for refractory shock

Treatment guide for Adrenal Crisis:

Fluids: 20 mL/kg bolus of Normal Saline , repeat up to 60 mL/kg

Hydrocortisone: 100mg IM/IV/IO

Glucose:
Adult: 25gm of D50
Infant up to age 12: 2.5 ml/kg of 10% dextrose
Kids > 12: 1 mL.kg of 25% dextrose

Vasopressors: Use for shock refractory to 60 mL/kg fluid bolus

Dosing of **steroids** is as indicated below with **HYDROCORTISONE** being the **PREFERRED** medication if available (may use patient's own medication if available):

Adult patients:
Administer **hydrocortisone** sodium succinate (Solu-Cortef) 100mg IM/IO/IV Push
Or
Administer **methylprednisolone** (Solu-Medrol) 125mg IM/IO/IV Push
Or
Administer **dexamethasone** (Decadron) 4 or 5 mg IM/IO/IV Push

Pediatric patients:
Administer **hydrocortisone** sodium succinate (Solu-Cortef) 2mg/kg IM/IO/IV push (to maximum 100mg)
Or
Administer **methylprednisolone** (Solu-Medrol) 2mg/kg IM/IO/IV Push (to maximum 125mg)
Or
Administer **dexamethasone** (Decadron) 4 or 5 mg IM/IO/IV Push

Alternative Pediatric Dosing:	**Hydrocortisone**	**Methylprednisolone**	**Dexamethasone**
Newborn to infant (up to 1 year)	25mg	25 mg	1 mg
1 year old to 7 years old	50mg	50 mg	2 mg
7 years and older	100mg	125 mg	4-5 mg

Solu-Cortef Act-O-Vial (most common home hydrocortisone prep):
To Use: Push down on the top which will break the seal and mix the liquid and powdered hydrocortisone together. The vial contains 100mg of hydrocortisone in 2ml of diluent. Give the entire contents of the vial to the patient either IV/IM /IO.

References:
1. Tucci V, Sokari T. The Clinical Manifestations, Diagnosis and Treatment of Adrenal Emergencies. Emerg Med Clin North Am 32 (2014) 465-484.

Adult Trauma Protocols

Commonwealth of Kentucky

Trauma Assessment and Management - Adult

The priorities in trauma management are to prevent further injury, provide rapid transport, notify the receiving facility, and initiate definitive treatment. **Trauma patients cannot be treated completely in the field.** On-scene time should be as short as possible unless there are extenuating circumstances, such as extrication, hazardous conditions, or multiple patients. Document these circumstances on the patient record. Determine how the patient should be transported as soon as possible so that activation of a special transport service, such as an air ambulance, if appropriate, can be performed in a timely manner. Notification of the receiving hospital of patient conditions and status should be done as early as possible. This allows the receiving hospital additional time to mobilize any necessary resources. **The pre-hospital assessment and management of a trauma patient should be performed under the direction of one person.** Although the presence of alcohol or other drugs may mask some of the signs of severe trauma, assume that the patient‘s condition is caused by trauma until proved otherwise.

Despite a rapid and effective out-of-hospital and trauma center response, patients with out-of-hospital cardiac arrest due to trauma rarely survive. Those patients with the best outcome from trauma arrest generally are young, have treatable penetrating injuries, have received early (out-of-hospital) endotracheal intubation, and undergo prompt transport (typically <=10 minutes) to a trauma care facility. Cardiac arrest in the field due to blunt trauma is fatal in all age groups. Briefly assess and/or treat for field-correctable causes (e.g tension pneumothorax, airway obstruction). Further resuscitation is probably not indicated.

Basic Standing Orders

B

- Take body substance isolation precautions. This is best performed en route to the call location.
- Ensure scene safety. First priority should be given to the safety of the rescuers and then to altering the scene to make it a safe working environment or, if necessary, moving the patient from the scene.
- Perform a scene survey to assess environmental conditions and mechanism of injury and number of patients.
- Establish patient responsiveness. Manually stabilize the spine. Protect patient from heat loss.
- Open the airway:
  - Use the head tilt/chin lift if no spinal trauma is suspected.
  - Use the modified jaw thrust if spinal trauma is suspected.
- Establish and maintain a patent airway while protecting the cervical spine. Suction as necessary. Insert an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. The nasopharyngeal airway is contraindicated in the presence of maxillary facial trauma.
- Evaluate breathing – Is the patient breathing spontaneously? Are respirations adequate in rate and depth? Environmental factors should be considered when removing the patient's clothing for evaluation.
- Initiate pulse oximetry, if available.

LOOK	LISTEN	FEEL
▪ cyanosis ▪ rapid respirations ▪ retractions ▪ asymmetry of chest wall ▪ open wounds or bruising of chest wall	▪ breathing ▪ abnormal breath sounds ▪ stridor – indicates partial airway obstruction ▪ gurgling sounds indicate fluid or blood in airway	▪ rib fractures ▪ crepitus

Basic Standing Orders

B

- Treat based on findings:
  - If breathing is inadequate, assist ventilations with high flow, 100% concentration oxygen (e.g. bag-valve-mask, flow-restricted oxygen-powered ventilation device etc.). Two-rescuer bag-valve-mask ventilation has been found to be more effective, if there is an adequate number of rescuers. Consider the use of cricoid pressure (Sellick maneuver) to prevent/decrease gastric distention. Monitor for abdominal distention and the development of pneumothorax.
  - If breathing remains difficult for the patient, and he/she has an obvious chest injury, refer to appropriate protocol for management of chest trauma.
  - If breathing is adequate, administer high flow, 100% concentration oxygen using a non-rebreather mask or blow-by as tolerated.
- Assess circulation and perfusion:
  - Check for the presence of a pulse. If the patient is in cardiac arrest, consider withdrawing resuscitation.
  - Check rate and quality of pulse.
  - Inspect for obvious bleeding.
  - Check blood pressure.
  - Observe skin color and temperature, and
  - Observe capillary refill time – in children.
- Control hemorrhage with direct pressure or a pressure dressing. This may include pelvic binding, tourniquet use, and/or wound packing.
- If the patient is hypotensive, place the patient in a supine position.
- Assess mental status.
- If spinal trauma is suspected, place a rigid cervical collar and immobilize the patient as appropriate.
- Expose the patient as necessary to perform further assessments. Care should be taken to maintain the patient‘s body temperature.
- Initiate transport to a higher level medical facility. Rescuers should begin transport no more than 10 minutes after their arrival on the scene unless extenuating circumstances exist.
- Splint suspected fractures of long bones en route, as possible.
- Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.
- Reassess patient frequently throughout transport.
- Contact medical direction for additional instructions and/or notify receiving facility.

Advanced Standing Orders

A

- Consider BIAD placement, as appropriate. An assistant must maintain in-line cervical stabilization throughout this procedure.
- Obtain intravenous access using age-appropriate large bore needle and an isotonic solution, (e.g. normal saline or Lactated Ringer's). If the patient shows signs of shock, initiate intravenous access in two sites using large bore needles. Do not delay transport to obtain intravenous access; this can be done en route. Consider a saline lock if fluids are not immediately required.
- Consider intraosseous (IO) access in all patient age groups when peripheral IV access is unobtainable and patient is hemodynamically unstable.

Paramedic Standing Orders

P

- If intubation is made difficult by factors such as clenched teeth, combativeness, etc., consider rapid sequence intubation. (See Appendix B: RSI)
- If a tension pneumothorax is suspected by mechanism of injury and as evidenced by severe respiratory distress, absent or decreased breath sounds, and hypotension/shock, perform needle decompression on the affected side with a large bore needle at the second intercostal space over the third rib at the midclavicular line.
- Initiate cardiac monitoring. Treat cardiac dysrhythmias as indicated.
- Consider pain management.

Advanced Spinal Assessment

Purpose

To define patients who do not require spinal immobilization or who may have spinal immobilization devices removed in the field.

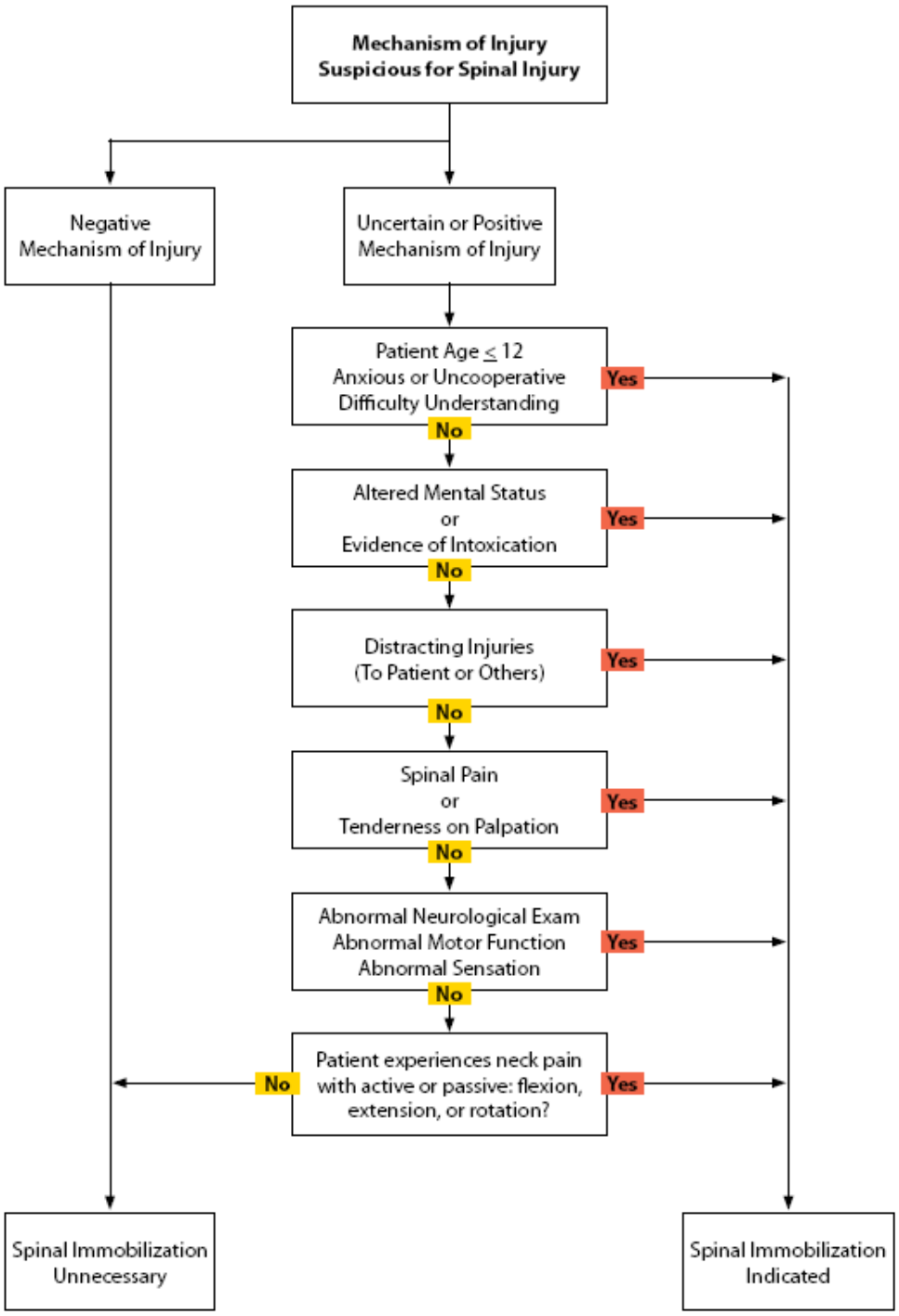
Procedure for assessment

- ► Reliable Patient
  - ♦ ≥ 12 years
  - ♦ Calm and cooperative
  - ♦ No altered mental status (dementia, brain injury, developmental delay, psychosis, etc.)
  - ♦ No evidence of alcohol or drug intoxication
  - ♦ No acute stress reaction
  - ♦ Not distracted by circumstances or injuries to self or others
  - ♦ No communication barriers (deafness, language, etc.)
- ► History of Present Illness
  - ♦ No paresthesias or other neurologic symptoms
  - ♦ Denies Spinal Pain
- ► Physical Exam
  - ♦ No Spinal Tenderness with Palpation
  - ♦ Motor Exam Intact
    - • Finger abduction/adduction
    - • Finger/wrist flexion/extension
    - • Foot/great toe extension/flexion
  - ♦ Neurosensory Exam Intact
    - • Soft/sharp touch discrimination in upper and lower extremities

Finally…..

- ► If the patient meets the criteria above, and then, they can flex/extend/rotate their neck without pain or assistance, then spinal immobilization is not necessary.

Advanced Spinal Assessment – Mechanism of Injury



Selective Spinal Immobilization

KBEMS Approved 2/11/2015

Spine precautions are intended to prevent spinal cord injury in a patient presenting with an unstable spinal fracture, and to potentially prevent worsening cord injury.
Traditional use of backboards for immobilization of patients has never been proven to be beneficial and newer studies show harm can occur from backboard immobilization without clear indications. Studies also show EMS providers are able to safely evaluate and identify patients with suspected spinal injuries in the field and employ selective spinal immobilization appropriately.

The National Association of EMS Physicians and the American College of Surgeons Committee on Trauma believe that:

- Long backboards are commonly used to attempt to provide rigid spinal immobilization among emergency medical services (EMS) trauma patients. However, the benefit of long backboards is largely unproven.
- The long backboard can induce pain, patient agitation, and respiratory compromise. Further, the backboard can decrease tissue perfusion at pressure points, leading to the development of pressure ulcers.
- Utilization of backboards for spinal immobilization during transport should be judicious, so that the potential benefits outweigh the risks.
- Appropriate patients to be immobilized with a backboard may include those with:
    - Blunt trauma and altered level of consciousness
    - Spinal pain or tenderness
    - Neurologic complaint (e.g., numbness or motor weakness)
    - Anatomic deformity of the spine
    - High-energy mechanism of injury and any of the following:
        - Drug or alcohol intoxication
        - Inability to communicate
        - Distracting injury

- Patients for whom immobilization on a backboard is not necessary include those with all of the following:
    - Normal level of consciousness (Glasgow Coma Score [GCS] 15)
    - No spine tenderness or anatomic abnormality
    - No neurologic findings or complaints
    - No distracting injury
    - No intoxication

- Patients with penetrating trauma to the head, neck, or torso and no evidence of spinal injury should not be immobilized on a backboard.
- Spinal precautions can be maintained by application of a rigid cervical collar and securing the patient firmly to the EMS stretcher, and may be most appropriate for:
    - Patients who are found to be ambulatory at the scene
    - Patients who must be transported for a protracted time, particularly prior to interfacility transfer
    - Patients for whom a backboard is not otherwise indicated
- Whether or not a backboard is used, **attention to spinal precautions** among at-risk patients is paramount. **These include application of a cervical collar, adequate security to a stretcher, minimal movement/transfers, and maintenance of inline stabilization during any necessary movement/ transfers.**

Patients should be removed from backboards as soon as practical in an emergency department.

References:

1. National Association of EMS Physicians: Ems Spinal Precautions And The Use Of The Long Backboard –Resource Document T o The Position Stateme nt Of The National Association Of Ems Physicians And The American College Of Surgeons Committee On Trauma. *Prehosptial Emergency Care*. (Jan/March 2014), 1-9. doi: 10.3109/10903127.2014.884197
2. Vallancourt et al: The Out of Hospital Validation of the Canadian C-Spine Rule by Paramedics. *Annals of Emergency Medicine*. 2009 Nov 54 (5); 663-670. doi: 10.1016/j.annemergmed.2009.03.008

Adult Trauma Protocol
Selective Spine Immobilization

KBEMS Approved 2/11/2015

Spine Immobilization Evaluation in the setting of trauma (age >8 yo and able to communicate)

If **ANY** of the following is true….

- Blunt trauma with altered level of consciousness
- Spinal pain or tenderness
- Neurologic Complaint (numbness or motor weakness from traumatic injury)
- Anatomic deformity of the spine
- High-energy mechanism of injury and any of the following:
  - Drug or alcohol intoxication
  - Inability to communicate
  - Distracting injury

Spine precautions

Selective Spine Immobilization with C-Collar and Long Backboard

Transport time > 20 minutes?

NO

- Transport Immobilized to appropriate trauma center.

YES

- Transport **OFF** long spine board but maintain spine precautions including **C-collar**
- Log roll, scoop stretcher, slider or LBB transfer to hospital stretcher.

If **ALL** the following is true….

- Normal level of consciousness (GCS 15)
- No spine tenderness or anatomic abnormality
- No neurologic findings or complaints
- No distracting injury
- No intoxication.

NO long spine board Immobilization is needed (see c-spine clearance for c-collar clearance)

Penetrating Trauma does NOT need Immobilization

INTERFACILITY TRANSFERS DO NOT REQUIRE IMMOBILIZATION ON SPINE BOARDS FOR TRANSFER. SPINE PRECAUTIONS, WITH C-COLLARS, SHOULD BE OBSERVED DURING TRANSPORT.

Adult Trauma Protocol
Selective Spine Immobilization

KBEMS Approved 2/11/2015

The Cervical Spine Evaluation

1. Any One High-Risk Factor Which Mandates Immobilization?
   - Age ≥ 65
   - Dangerous mechanism*
   - Numbness or tingling in extremities

YES → **C-Spine Immobilization**

NO ↓

2. Any One Low-Risk Factor that may restrict Range of Motion Evaluation?
   - More than a simple rear-end MVC**
   - Non-Ambulatory at scene
   - Neck pain at scene when asked
   - Pain during midline c-spine palpation

YES → **C-Spine Immobilization**

NO ↓

3. Patient Voluntarily Able to Actively Rotate Neck 45° Left and Right When Requested, Regardless of Pain?

NO → **C-Spine Immobilization**

YES → **No C-spine Immobilization**

*** Dangerous Mechanism**

- fall from elevation ≥ 3 feet / 5 stairs
- axial load to head, e.g. diving
- MVC high-speed ≥65mph, rollover, ejection
- ATV
- Bicycle collision with object i.e. post, car

****Simple Rear-ended MVC Excludes:**

- Pushed into oncoming traffic
- Hit by bus / large truck
- Rollover
- Hit by high speed vehicle (≥ 65 mph)

The C-Spine Rule is for alert (Glasgow Coma Scale score 15) and stable trauma patients for whom cervical spine injury is a concern, including patients with either posterior neck pain with any blunt mechanism of injury or no neck pain but some visible injury above the clavicles.

Reference:

Vallancourt et al: The Out of Hospital Validation of the Canadian C-Spine Rule by Paramedics. *Annals of Emergency Medicine*. 2009 Nov 54 (5);663-670. doi: 10.1016/j.annemergmed.2009.03.008

Head Trauma - Adult

The recommendations for the management of traumatic brain injury (TBI) contained within these guidelines are adapted from the Prehospital Management of Traumatic Brain Injury developed by the Brain Trauma Foundation, © 2000. Field treatment is directed at preventing secondary injury, which is brain injury caused by hypoxia and shock after the initial injury has occurred. Evaluation and support of the patient's ABC's should be the first priority. As with all trauma patients, complete therapy for head and spine injuries must take place in the hospital. Delays at any level may be harmful to the patient.

Patients with closed head injuries can worsen quickly, even though they appear stable initially. Although the presence of alcohol and other drugs may make evaluation of head injuries difficult, always assume symptoms are the result of the trauma and treat as such. **Routine use of hyperventilation in the patient with traumatic brain injury is not recommended.**

Objects penetrating the head and neck should be stabilized whenever possible. Objects that are impaled in the cheek may be removed, as compression of both sides of the wound is easily accomplished.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol.
- If pulse oximetry is available, monitor and maintain oxygen saturation (SpO_2) greater than 90%. Note that even a single instance of SpO_2 less than 90% can significantly affect patient outcome.
- Ventilation and hyperventilation in the patient with TBI
  - If breathing is inadequate, assist ventilation using a bag-valve-mask device with high flow, 100% concentration oxygen.
    - Adult, 10 breaths/minute.
- If breathing is adequate, administer high flow, 100% concentration oxygen using a non-rebreather mask or blow-by, as tolerated.
- **If a TBI is suspected, hyperventilate the patient only if one or more of the following signs of brain herniation exists:**
  - Fixed or asymmetric pupils.
  - Abnormal extension (decerebrate posturing).
  - Rapid deterioration of Glasgow Coma Score to less than 9.

Basic Standing Orders

B

- Blood pressure in the head injured patient: Hypotension in an adult, except as a terminal event, is not caused by isolated closed head injuries. You should assess the chest, abdomen, pelvis, and thighs for additional injuries. Patients with TBIs who also have external bleeding may suffer fatal blood loss; control bleeding with direct pressure.
- Assess mental status using the GCS every five minutes to track changes. Changes in mental status are the most sensitive indicator of traumatic brain injury.
- Evaluate pupil size and reactivity. A unilaterally dilated pupil or bilaterally fixed and dilated pupils is a sign of brain herniation and requires emergent interventions to lower the intracranial pressure (ICP). Unequal pupils in the conscious patient is not an indicator of brain herniation or increased ICP.
- Remember to suspect spinal injuries in any patient with a head injury and significant mechanism of injury. Evaluate spinal cord integrity:
  - In a conscious patient by recording ability to move extremities to command. Perform gross sensory exam with sharp sensation or light touch.
  - Document patient complaints of numbness, tingling, or shooting pain.
  - In an unconscious patient by recording presence or absence of extremity movement to painful stimulus.
- Reassess patient frequently throughout transport, as a head injured patient may deteriorate rapidly. Changes in the ongoing exam can be more important than the initial exam.

Advanced Standing Orders

A

- Perform airway management as appropriate and trained if the airway cannot be maintained by the patient, if prolonged assisted ventilation is anticipated, if hypoxemia is not corrected by supplemental oxygen, or if the GCS is 8 or less consider placing BIAD.
- Obtain intravenous or intraosseous access and, if needed, administer isotonic solution, (e.g. normal saline or lactated Ringer's). Avoid the use of dextrose-containing IV fluids in TBI patients (Treat hypoglycemia as indicated).
- In patients with multi-organ trauma with an associated TBI, titrate IVs to maintain systolic blood pressure above 90. A systolic BP below 90 has been shown to increase morbidity and mortality in the patient with a TBI.

Paramedic Standing Orders

P

- Endotracheal intubation if needed to maintain oxygenation or for therapeutic hyperventilation when indicated.
- Ventilate to maintain an ETCO2 of 30-35mmHg only if signs of herniation are present.
- If intubation required, consider administration of lidocaine 1 mg/kg IV (maximum dose 100mg) prior to intubation.

Glasgow Coma Scale - Head Trauma

BEST EYE OPENING		
Adult & Child	Infant (12 months)	Points
Spontaneous	Spontaneous	4
To Command	To Voice	3
To Pain	To Pain	2
None	None	1
	TOTAL	
BEST VERBAL RESPONSE		
Adult & Child	Infant (12 months)	Points
Oriented	Coos and Babbles (or crying after non-painful stimulation)	5
Confused	Irritable Cry	4
Inappropriate	Only cries to Pain	3
Incomprehensible	Moans to Pain	2
None	None	1
	TOTAL	
BEST MOTOR RESPONSE		
Adult & Child	Infant (12 months)	Points
Obeys Command	Spontaneous Movements	6
Localizes Pain	Withdraws (Touch)	5
Withdraws	Withdraws (Pain)	4
Flexion to Pain	Flexion to Pain	3
Extension to Pain	Extension to Pain	2
None	None	1
	TOTAL	
Total: Best Eye Opening		
Total: Best Verbal Response		
Total: Best Pain Response		
Glasgow Coma Score		

Chest Trauma - Adult

- ► Chest trauma can lead to severe internal injuries that are often difficult to diagnose. A history of chest trauma should lead rescuers to suspect a serious injury, and patients should be treated with that expectation.
- ► Three major chest injury syndromes can lead to rapid death. They must be recognized and treated rapidly. They include:
  - Bleeding from rupture of a major chest vessel;
  - Mechanical decrease of cardiac output (which may be caused by tension pneumothorax, cardiac tamponade or cardiac contusion with or without dysrhythmia);
    and
  - Respiratory distress (which may be caused by tension pneumothorax, flail chest, pulmonary contusion or an open chest wound).
- ► If chest injury interferes with breathing, it must be managed during the initial assessment.
- ► Objects penetrating the chest wall should be stabilized whenever possible, and not removed unless absolutely necessary for extrication or transport.

Basic Standing Order

B

- ► Follow Trauma Assessment and Management Protocol. Examine the patient looking for distended neck veins. Look at the chest wall for asymmetry of movement, open wounds, and bruises. Expose the patient's chest, as needed, to inspect the entire chest wall, front and back, maintaining cervical immobilization and log rolling when indicated. Respiratory distress, despite an open airway, may suggest a tension pneumothorax, a flail chest, or an open chest wound.
  - Signs of a tension pneumothorax include diminished breath sounds, hypotension, respiratory distress, distended neck veins, subcutaneous emphysema, shock, apprehension/agitation, and increasing resistance to ventilation.
  - If a penetrating chest wound has been sealed, temporarily unseal the wound and allow air to escape.
  - Assist ventilation with positive pressure oxygen if available.
  - Transport patient in the position of comfort unless otherwise contraindicated
- ► Signs of flail chest may include paradoxical movement of the chest wall, or crepitus of multiple ribs in two or more areas. Assist ventilation with positive pressure as needed to maintain adequate oxygenation.
- ► A wound in the chest may be an open chest wound, especially when it presents with subcutaneous emphysema, and air movement through the opening.
  - Cover with a sterile occlusive dressing taped on three sides.
  - Observe closely for signs of developing tension pneumothorax.
- ► Uncontrolled external hemorrhage from a penetrating injury should be packed with or without hemostatic dressings when necessary.

Chest Trauma - Adult (cont.)

Advanced Standing Orders

A

- Follow Trauma Assessment and Management Protocol. Examine the patient looking for distended neck veins. Look at the chest wall for asymmetry of movement, open wounds, and bruises. Expose the patient's chest, as needed, to inspect the entire chest wall, front and back, maintaining cervical immobilization and log rolling when indicated. Respiratory distress, despite an open airway, may suggest a tension pneumothorax, a flail chest, or an open chest wound.
  - Signs of a tension pneumothorax include diminished breath sounds, hypotension, respiratory distress, distended neck veins, subcutaneous emphysema, shock, apprehension/agitation, and increasing resistance to ventilation.
  - If a penetrating chest wound has been sealed, temporarily unseal the wound and allow air to escape.
  - Assist ventilation with positive pressure oxygen if available.
  - Consider airway management as appropriate and trained.
  - Transport patient in the position of comfort unless otherwise contraindicated
- Signs of flail chest may include paradoxical movement of the chest wall, or crepitus of multiple ribs in two or more areas. Assist ventilation with positive pressure as needed to maintain adequate oxygenation.
- A wound in the chest may be an open chest wound, especially when it presents with subcutaneous emphysema, and air movement through the opening.
  - Cover with a sterile occlusive dressing taped on three sides.
  - Observe closely for signs of developing tension pneumothorax.
- Treat for hypotension.

Paramedic Standing Orders

P

- Positive pressure ventilation may be needed, but is likely to worsen unrelieved tension pneumothorax. Be prepared to decompress the patient's chest. If a tension pneumothorax is suspected by mechanism of injury and as evidenced by hypotension, respiratory distress, and/or diminished breath sounds, perform needle decompression with a large bore needle at the second intercostal space over the third rib at the midclavicular line.
  - This is an airway procedure and must be performed early, if indicated.
  - A patient may have bilateral pneumothoraces; if condition does not improve after decompression of one lung, decompress the other side.
- Initiate cardiac monitoring.
- Consider analgesia for isolated chest trauma.
- Treat for hypotension.

Abdominal Trauma - Adult

Pre-hospital care of abdominal injuries should focus on controlling external bleeding and rapid transport as there are no specific prehospital treatments for internal bleeding. Penetrating trauma injures the area of entry and may damage any tissue along the line of penetration. Blunt trauma may be widely transmitted and cause damage to any or all organs within the abdominal cavity. Trauma to the abdomen may also cause injury to organs outside the abdominal cavity including those in the chest. Injuries from the nipple line through the tenth rib can involve either the chest and/or abdomen. Ongoing re-evaluation of the abdomen includes assessment of the chest as well.

As with all trauma patients, complete treatment for abdominal injuries must take place in the hospital. Delays at any level can be harmful to the patient. Evaluation of abdominal trauma is part of the rapid trauma assessment. It should be performed only after the patient‘s ABCs have been evaluated and supported.

Objects penetrating the abdominal wall should be stabilized whenever possible, and not removed unless absolutely necessary for extrication or transport.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol. Assess the abdomen for tenderness, rigidity, and distension.
- Uncontrolled external hemorrhage from a penetrating injury should be packed with our without hemostatic dressings when necessary.
- Reassess abdomen every 5 – 10 minutes, for tenderness, rigidity and distention. Shock, increasing distention, and abdominal rigidity are signs of intra-abdominal bleeding, although a person may have life-threatening bleeding without distention or abdominal rigidity.
- Any organs protruding from abdominal wounds should not be replaced into the abdominal cavity; cover the organs with saline-moistened gauze and a vapor barrier.
- If mechanism of injury permits, transport the patient in the position of comfort.

Paramedic Standing Orders

P

- ALS considerations for the patient with abdominal injuries are those listed in the Trauma Assessment and Management Protocol.

Pelvic Trauma - Adult

A person may lose enough blood from pelvic fractures to exsanguinate. Disruption of the pelvic ring increases potential space in the pelvic cavity. This increased space will accommodate more blood than the standard pelvis. The goals of pelvic immobilization are to decrease movement of the bones and to decrease the potential space for bleeding. Apply circumferential pressure to tamponade internal hemorrhage.

Signs of pelvic fracture may include instability, crepitus, decreased peripheral pulses, swelling, and blood at the urinary meatus.

When assessing for pelvic trauma, gentle downward, then inward pressure should be applied to the iliac crests. If instability or crepitus is noted, this test should not be repeated.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol.
- Control external hemorrhage with direct pressure or a pressure dressing. Hemorrhage control may be improved by closing and stabilizing pelvic fractures.
- Uncontrolled external hemorrhage from a penetrating injury should be packed with or without hemostatic dressings when necessary.
- Pelvic fractures may be stabilized in several ways, three of which are easily applied in the pre-hospital setting.
  - Use of the pelvic sheet wrapping technique
  - Commercially available pelvic binding device
  - Application of the PASG
- Assess circulatory, motor, and sensory function before and after application of pelvic stabilization.
- Attempt to minimize unnecessary movement in patients with pelvic fractures.

Extremity Trauma - Adult

In the severely injured patient, management of extremity injuries takes a relatively low priority. Most extremity hemorrhage can be controlled by direct pressure or pressure dressings. As with all trauma patients, definitive treatment for extremity injuries takes place in the hospital. Delays at any level can be harmful to the patient. Evaluation of extremity trauma is part of the focused physical exam and should be performed only after the patient's ABCs have been evaluated and supported.

Consider femur or pelvic fractures when the degree of shock seems greater than indicated by the amount of external bleeding.

Basic Standing Order

B

- ► Follow Trauma Assessment and Management Protocol.
- ► Control external hemorrhage with well-aimed direct pressure or a pressure dressing, or elevation and pressure points.
- ► A tourniquet should be used if bleeding cannot be controlled by other methods. Though tourniquets are infrequently needed, do not delay application when other bleeding control methods have failed.
- ► Hemorrhage control in a patient with femur fracture(s) may be improved by using a traction splint, apply pressure directly over the fracture.
- ► Examine the patient for extremity injures (deformities, contusions, avulsions, amputations, punctures, penetrations, burns, tenderness, lacerations, or swelling).
- ► Check for motion and sensation distal to deformities (both light touch and sharp sensation should be checked).
- ► Check circulation distal to deformities.
- ► The primary concern when treating extremity injuries is to maintain proper distal circulation beyond the site of the injury. This may involve straightening the extremity. ("Make limbs look like limbs.")
- ► Stop if severe resistance is encountered or if the patient has significantly increased pain during an attempt at straightening the extremity. No more than two attempts at straightening the limb should be made.
  - ♦ In general, joint injures are left in the position found if there is adequate circulation. If there is no pulse distal to the joint injury, an EMT should attempt to align the joint in its normal anatomic position by applying traction.
  - ♦ Straighten any grossly angulated long bone into its anatomic position by applying traction.

Basic Standing Order

B

- When splinting open fractures, apply the appropriate splint (e.g. traction splint for fractured femurs) in the usual manner. The bone ends may slip under the skin during splinting, this is acceptable, as the patient will need to have the wound cleaned in the operating room whether the bone ends remain above the skin or have slipped back into the wound. (Notify the receiving facility if this occurs.) Flush gross contamination from wounds before applying the splint. If, after attempting to straighten the extremity, the bone ends remain above the skin, cover with a moist dressing.
- Amputated parts should be wrapped in sterile gauze moistened with normal saline, protected from contamination (e.g., placed in an examination glove or Ziploc®-type bag) and put in ice water. Do not allow the amputated part to freeze.
- A cold pack may be applied to the site of an extremity injury to help reduce pain and swelling. Care should be taken not to freeze the tissues.

Paramedic Standing Orders

P

- Pain management is strongly encouraged for patients with isolated extremity injuries, unless there is a contraindication to pain medication (e.g. hypotension, allergy). Medicating the patient before splinting may be appropriate in the patient with an isolated extremity injury.

Eye and Dental Injuries-Adult

Basic Standing Orders

B

- ► Routine Patient Care
- ► Obtain visual history (use of corrective lenses, surgeries, use of protective equipment).
- ► Obtain visual acuity, if able.
- ► Chemical irritants: flush with copious amounts of water, or normal saline.
- ► Thermal burns to eyelids: patch both eyes with cool saline compress.
- ► Impaled object: immobilize object and patch both eyes.
- ► Puncture wound: place protective device over both eyes (e.g. eye shield). Do not apply pressure.
- ► Foreign body: patch both eyes.
- ► In the event patient is unable to close eyelids, keep eye moist with sterile saline compress.
- ► Consider ALS intercept.

Dental Avulsions

- ► Dental avulsions should be placed in an obviously labeled container with saline or cell-culture medium (Save-a-Tooth®).

Advanced Standing Orders

A

- ► IV access and administer fluids to maintain systolic blood pressure >90 mmHg.

Paramedic Standing Orders

P

- ► Proparacaine 2 drops to affected eye, repeat every 5 minutes as needed. Consider use of Morgan lens for irrigation.
- ► Refer to the Pain Management Protocol.
- ► Refer to the Nausea Protocol.

Burns (Thermal) - Adult

Effective treatment of patients with burns must be started as soon as possible after injury, as these patients frequently require specialized care which includes fluid resuscitation, pain management, and wound care. The goal is to transfer the patient to a facility capable of providing the necessary level of care for that individual.

Burns that require specialized care in a recognized burn center or unit include:

- ► Partial-thickness and full-thickness burns of greater than 10% total body surface area (TBSA) in patients <10 years of age or >50 years of age.
- ► Partial-thickness and full-thickness burns of greater than 20% TBSA in all other patients.
- ► Partial-thickness and full-thickness burns involving the face, eyes, ears, hands, feet, major joints, genitalia, or perineum.
- ► Full-thickness burns totaling 5% TBSA or more in any age group.
- ► Electrical burns including lightning injury.
- ► Significant chemical burns.
- ► All burns associated with inhalation injury.
- ► Circumferential burns of the chest, neck, or extremities.
- ► Burns associated with concomitant major trauma.
- ► Burn injury occurring in patients with pre-existing medical disorders.
- ► Burn injury in patients who will require special social and emotional or long-term rehabilitative support, including cases involving suspected child abuse and neglect.

Basic Standing Orders

B

- ► When treating patients with chemical burns, it is imperative to ensure rescuer safety. Patients contaminated with chemicals should have their clothing removed. Do NOT transport patients prior to appropriate decontamination. Notify the receiving facility of a patient with chemical exposure to allow adequate time for preparation. All chemical burns should be flushed with copious amounts of water.
  - ♦ Brush dry chemicals off the skin before flushing.
  - ♦ For chemical burns of the eye, flush the eye immediately with at least one liter of normal saline or water (at least 10 to 20 minutes is preferred). More fluids may be beneficial, especially if the chemical is alkaline.
- ► Stop the burning process. If on scene quickly after the burn occurred, cooling affected parts (e.g. with cool water immersion) may limit the depth and extent of the burn. More than a few minutes after the burn, there is little benefit except pain relief. Note that with burns from tar, asphalt, paraffin or oils that retain heat (or when melted fabric adheres to skin) cooling may help for a longer period of time.

Burns (Thermal) – Adult continued

Basic Standing Orders continued

B

- If cooling for pain relief, do not cool or moisten more than 10% of the TBSA at any one time. This can cause hypothermia.
- Remove all clothing and jewelry in the area of the burn and distal to the injury.
- Administer high flow, 100% concentration oxygen by non-rebreather mask for potential inhalation injury or any serious burn. Consider the possibility of carbon monoxide or other toxic inhalation. Oxygen saturation readings may be falsely elevated.
- Assess circulation and perfusion. Circumferential burns of extremities can interfere with perfusion of that extremity.
- If spinal trauma is suspected, place a rigid cervical collar and immobilize the patient as appropriate.
- Consider ALS intercept for patients with serious burns and electrical injuries; in electrical injuries there is a possibility of cardiac dysrhythmias.
- Estimate the TBSA involved using the "Rule of Nines" provides a rough estimate of TBSA involved (see following page).
- Describe the body surface area as well as the depth of burn (e.g. 30% superficial burn, 20% partial thickness, and 15% full thickness burn).
- Apply dressings to burns as tolerated.
  - In burns over 10% BSA, apply a dry sheet, a dry burn sheet or dry sterile dressings to burn areas. Insulate the patient over this dressing to lessen the chance of hypothermia.
  - In burns less than 10% BSA, apply moist dressings (e.g. commercially available burn dressings or saline-soaked gauze)
  - A vapor barrier may be useful in patients with longer transport times.

Burns (Thermal) – Adult continued

Advanced Standing Orders

A

- Start two large bore IVs in patients meeting any of the burn criteria in the beginning of this section. These may be inserted through burn area, if necessary.
- Fluid administration:
  - First 24 hours: 4cc normal saline (NS) or lactated ringers (LR) x patient weight (Kg) x %TBSA (for fluid calculations include only partial thickness and full thickness burns). If more than two or three liters of fluid are to be given lactated ringers is preferred.
  - Half of this amount is to be given in the first 8 hours after injury not the time after arrival at the patient's side. (Note: this means that the EMS provider should determine the time of injury)
  - The remaining half is to be given over the next 16 hours.

Example: A 70 Kg man who had sustained a 50% TBSA would require a total of 14,000cc in the first 24 hours, 7,000cc would be given in the first 8 hours. If the patient is not seen until 4 hours after the time of burn, that amount should be given over the next 4 hours. Second 24 hours: give normal maintenance fluids in sufficient volume to maintain a normal urinary output. 4cc normal saline (NS) or lactated Ringer's (LR) x 70 (Kg) x 50 %TBSA = 14,000 cc in the first 24 hours

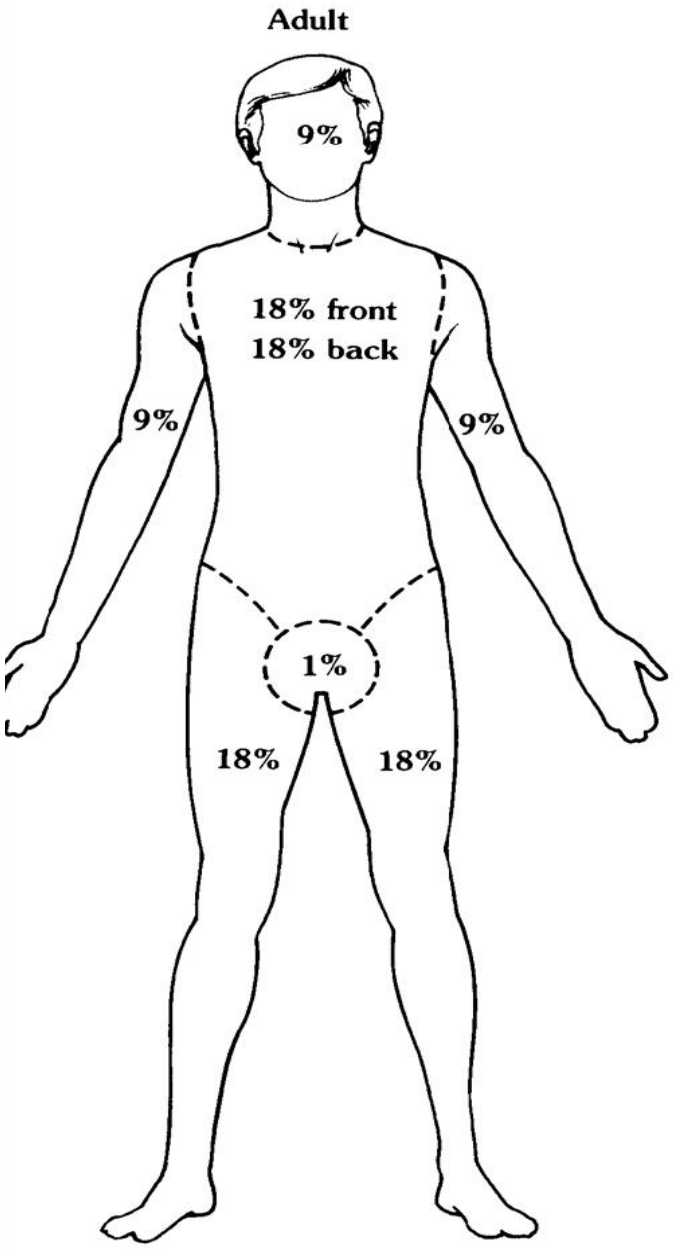
Paramedic Standing Orders

P

- Be alert for signs of inhalation injury (e.g. stridor, muffled voice, singed facial/nasal hairs, soot around nose or mouth, carbonaceous sputum, confinement in an enclosed space fire). Be prepared to secure the airway.
- If the injury involves an electrical burn, initiate cardiac monitoring. Treat cardiac dysrhythmias as directed.
- Electrical burn fluid management:
  - In electrical burns where there is a large amount of pigment (hemoglobin or myoglobin) in the urine, the urinary output should be maintained at 1.0 – 2.0 cc/Kg/hour until the urine is grossly clear, then fluids may be cut back to maintain the output in the range of 0.5 to 1.0 cc/Kg/hour in adults.
  - In addition, 44 – 50mEq of $NaHCO_3$ per liter of LR is administered to keep the urine alkaline as long as visible pigment is present.
- Consider Pain Management. Small doses IV titrated to effective pain control; monitor for respiratory depression.
- Give all medications intravenously.

Rule of Nines Chart – Burns (Thermal)

Burn Chart – Rule of Nines



Pediatric Trauma Protocols

Commonwealth of Kentucky

Trauma Assessment and Management - Pediatric

Children experience different types of injuries and have different physiologic reactions to injury as compared to adults. Patient outcome depends on the time it takes to get the patient to the hospital. Therefore, assessment and treatment are frequently done at the same time and scene time should be minimized to less than 10 minutes, if possible.

Continual assessment of children is imperative. A child may initially appear stable, then decompensate suddenly.

If tension pneumothorax is suspected, perform needle decompression with an over-the-needle catheter at the second intercostal space over the third rib at the midclavicular line.

When obtaining intravenous access, use an age appropriate large-bore catheter with large-caliber tubing and administer normal saline or lactated Ringer‘s at a sufficient rate to keep the vein open. If the patient shows signs of shock, initiate intravenous access in two sites. Consider saline locking IVs if fluids are not immediately required. Carefully monitor fluid administration to avoid fluid overload in children.

If signs of shock are present (such as, tachycardia, decreased level of consciousness, poor color, capillary refill greater than 2 seconds, decreased blood pressure, etc.) administer a bolus of normal saline or lactated Ringer‘s at 20 cc/kg. Bolus therapy with reassessment is more effective than high IV flow rates for ensuring pediatric patients receive adequate fluids. Two additional fluid boluses at 20 cc/kg may be given if the patient remains in shock. If intravenous access cannot be obtained, consider intraosseous access in pediatric trauma patients with decreased consciousness.

The priorities in trauma management are to prevent further injury, provide rapid transport, notify the receiving facility, and initiate definitive treatment. **Trauma patients cannot be treated completely in the field.** On-scene time should be as short as possible unless there are extenuating circumstances, such as extrication, hazardous conditions, or multiple patients. Document these circumstances on the patient record. Determine how the patient should be transported as soon as possible so that activation of a special transport service, such as an air ambulance, if appropriate, can be performed in a timely manner. Notification of the receiving hospital of patient conditions and status should be done as early as possible. This allows the receiving hospital additional time to mobilize any necessary resources. **The pre-hospital assessment and management of a trauma patient should be performed under the direction of one person.** Although the presence of alcohol or other drugs may mask some of the signs of severe trauma, assume that the patient‘s condition is caused by trauma until proved otherwise.

Trauma Assessment and Management – Pediatric continued

Despite a rapid and effective out-of-hospital and trauma center response, patients with out-of-hospital cardiac arrest due to trauma rarely survive. Those patients with the best outcome from trauma arrest generally are young, have treatable penetrating injuries, have received early (out-of-hospital) endotracheal intubation, and undergo prompt transport (typically <=10 minutes) to a trauma care facility. Cardiac arrest in the field due to blunt trauma is nearly universally fatal in all age groups. Nonetheless, the literature suggests that survival in young children may be higher than that found in older children and adults for a variety of postulated reasons. Unless faced with a mass casualty situation or a patient with injuries obviously incompatible with life, briefly assess and/or treat for field-correctable causes (e.g tension pneumothorax, airway obstruction) followed immediately by transportation. During transportation, treat for other causes of arrest including hemorrhage. Early notification to the receiving hospital is extremely important.

Basic Standing Orders

B

- Take body substance isolation precautions. This is best performed en route to the call location.
- Ensure scene safety. First priority should be given to the safety of the rescuers and then to altering the scene to make it a safe working environment or, if necessary, moving the patient from the scene.
- Perform a scene survey to assess environmental conditions and mechanism of injury and number of patients.
- Establish patient responsiveness. Manually stabilize the spine. Protect patient from heat loss.
- Open the airway:
  - Use the head tilt/chin lift if no spinal trauma is suspected.
  - Use the modified jaw thrust if spinal trauma is suspected.
- Establish and maintain a patent airway while protecting the cervical spine. Suction as necessary. Insert an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. The nasopharyngeal airway is contraindicated in the presence of maxillary facial trauma.
- Evaluate breathing – Is the patient breathing spontaneously? Are respirations adequate in rate and depth? Environmental factors should be considered when removing the patient's clothing for evaluation.
- Initiate pulse oximetry, if available.

LOOK	LISTEN	FEEL
▪ nasal flaring ▪ cyanosis ▪ rapid respirations ▪ retractions ▪ asymmetry of chest wall ▪ open wounds or bruising of chest wall	▪ breathing ▪ abnormal breath sounds ▪ stridor – indicates partial airway obstruction ▪ gurgling sounds indicate fluid or blood in airway	▪ rib fractures ▪ crepitus

Basic Standing Orders continued

B

- Treat based on findings:
  - If breathing is inadequate, assist ventilations with high flow, 100% concentration oxygen (e.g. bag-valve-mask, flow-restricted oxygen-powered ventilation device etc.). Two-rescuer bag-valve-mask ventilation has been found to be more effective, if there is an adequate number of rescuers. Consider the use of cricoid pressure (Sellick maneuver) to prevent/decrease gastric distention. Monitor for abdominal distention and the development of pneumothorax.
  - If breathing remains difficult for the patient, and he/she has an obvious chest injury, refer to appropriate protocol for management of chest trauma.
  - If breathing is adequate, administer high flow, 100% concentration oxygen using a non-rebreather mask or blow-by as tolerated.
- Assess circulation and perfusion:
  - Check for the presence of a pulse. If the patient is in cardiac arrest, consider withdrawing resuscitation.
  - Check rate and quality of pulse.
  - Inspect for obvious bleeding.
  - Check blood pressure.
  - Observe skin color and temperature, and
  - Observe capillary refill time – in children.
- Control hemorrhage with direct pressure or a pressure dressing. This may include pelvic binding, tourniquet use, and/or wound packing.
- If the patient is hypotensive, place the patient in a supine position.
- Assess mental status.
- If spinal trauma is suspected, place a rigid cervical collar and immobilize the patient as appropriate.
- Expose the patient as necessary to perform further assessments. Care should be taken to maintain the patient‘s body temperature.
- Initiate transport to a higher level medical facility. Rescuers should begin transport no more than 10 minutes after their arrival on the scene unless extenuating circumstances exist.
- Splint suspected fractures of long bones en route, as possible.
- Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.
- Reassess patient frequently throughout transport.
- Contact medical direction for additional instructions and/or notify receiving facility.

Advanced Standing Orders

A

- Airway management as needed. An assistant must maintain in-line cervical stabilization throughout this procedure.
- When obtaining intravenous access, use an age appropriate large-bore catheter with large-caliber tubing and administer normal saline or lactated Ringer‘s at a sufficient rate to keep the vein open. If the patient shows signs of shock, initiate intravenous access in two sites. Consider saline locking IVs if fluids are not immediately required. Carefully monitor fluid administration to avoid fluid overload in children.
- If signs of shock are present (such as, tachycardia, decreased level of consciousness, poor color, capillary refill greater than 2 seconds, decreased blood pressure, etc.) administer a bolus of normal saline or lactated Ringer‘s at 20 cc/kg. Bolus therapy with reassessment is more effective than high IV flow rates for ensuring pediatric patients receive adequate fluids . Two additional fluid boluses at 20 cc/kg may be given if the patient remains in shock. If intravenous access cannot be obtained, consider intraosseous access in pediatric trauma patients with decreased consciousness.
- Devices are available to initiate intraosseous (IO) access in all patient age groups and may be considered when peripheral IV access is unobtainable.

Paramedic Standing Orders

P

- Consider placing a gastric tube in any patient who requires assisted ventilations.
- If tension pneumothorax is suspected, perform needle decompression with an over-the-needle catheter at the second intercostal space over the third rib at the midclavicular line.
- Initiate cardiac monitoring. Treat cardiac dysrhythmias as dictated by standing orders.
- Consider fentanyl for treating pain in the multi-trauma patient, as it has a better hemodynamic profile than morphine.
- Consider pressors for shock refractory to adequate fluid resuscitation. **This intervention should be made only after direct contact with physician medical control.**

Trauma Assessment and Management – Pediatric continued

A child is considered to have incurred serious trauma if any one of the following is met:

- ► A numerical triage score ≤ 9 using the **Glasgow Coma Scale.**
- ► A color triage score of one black box or two gray boxes using the **Pediatric Trauma Triage Criteria.**
- ► Penetrating wounds to the head, neck, torso, or extremities proximal to the elbow or knee.
- ► Two or more long bone fractures, pelvic fracture, or flail chest.
- ► Open or depressed skull fracture.
- ► Full thickness (3°) burns, partial thickness (2°) burns > 10% BSA or burns combined with trauma.
- ► Paralysis.
- ► Amputation proximal to the wrist or ankle

PEDIATRIC GLASGOW COMA SCALE			
	Infants		**Children**
M	Moves Spontaneously	6	Obeys Commands
O	Withdraws from Touch	5	Localizes Painful Stimuli
T	Withdraws from Pain	4	Withdraws from Pain
O	Abnormal Flexion	3	Abnormal Flexion
R	Abnormal Extension	2	Abnormal Extension
	No Response	1	No Response
V	Coos and Babbles	5	Oriented
E	Irritable Cry	4	Confused
R	Cries to Pain	3	Inappropriate Words
B	Moans to Pain	2	Incomprehensible
A	No Response	1	No Response
L			
E	Spontaneous	4	Spontaneous
Y	To Speech/Sound	3	To Speech/Sound
E	To Pain	2	To Pain
	No Response	1	No Response

PEDIATRIC TRAUMA TRIAGE CRITERIA			
Component	+2	+1	-1
Weight	> 20 kg	10-20 kg	< 10 kg
Airway	Normal	oxygen adjunct: mask, cannula, oral or nasal airway	**Assisted/Intubated bag-valve-mask/ETT Cricothyrotomy**
Level of Consciousness	Awake	Altered or history of loss of consciousness	**Coma Unresponsive**
Circulation	Peripheral pulses good SBP > 90 mmHg	Brachial / Femoral pulses palpable SBP 90-50 mmHg	**Weak or no peripheral pulses SBP < 50 mmHg**
Fracture	None seen or suspected	Single closed fracture	Any open or multiple fractures
Cutaneous	No visible injury	Contusion, abrasion or laceration < 7cm, not through fascia	**Tissue loss laceration > 7cm Penetrating injury**

Head Trauma - Pediatric

Children are anatomically prone to head injuries because of their large heads, weak neck muscles, and immature brain tissue. Head injuries in children are common. Blunt mechanisms like falls and motor vehicle crashes are the most common causes of head injuries in children.

Suspect a TBI in the child who:

- ► is inconsolable
- ► is irritable
- ► has a high pitched cry
- ► vomits repeatedly
- ► is unusually quiet
- ► has difficulty walking (if ambulatory at the scene prior to EMS arrival)
- ► has a bulging fontanel, and/or
- ► has Battle‘s sign or raccoon eyes

The recommendations for the management of traumatic brain injury (TBI) contained within these guidelines are adapted from the Prehospital Management of Traumatic Brain Injury developed by the Brain Trauma Foundation, © 2000. Field treatment is directed at preventing "secondary injury,” which is brain injury caused by hypoxia and shock after the initial injury has occurred. Evaluation and support of the patient‘s ABC‘s should be the first priority. As with all trauma patients, complete therapy for head and spine injuries must take place in the hospital. Delays at any level may be harmful to the patient.

Patients with closed head injuries can worsen quickly, even though they appear stable initially. Although the presence of alcohol and other drugs may make evaluation of head injuries difficult, always assume symptoms are the result of the trauma and treat as such. **Routine use of hyperventilation in the patient with traumatic brain injury is not recommended.**

Objects penetrating the head and neck should be stabilized whenever possible. Objects that are impaled in the cheek may be removed, as compression of both sides of the wound is easily accomplished.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol.
- If pulse oximetry is available, monitor and maintain oxygen saturation (SpO2) greater than 90%. Note that even a single instance of SpO2 less than 90% can significantly affect patient outcome.
- Ventilation and hyperventilation in the patient with TBI:
  - If breathing is inadequate, assist ventilation using a bag-valve-mask device with high flow, 100% concentration oxygen. Consider advanced airway device. Monitor for gastric distention.
    - Child, under age 8, 20 breaths/minute; and
    - Infants, 25 breaths/minute.
  - If breathing is adequate, administer high flow, 100% concentration oxygen using a non-rebreather mask or blow-by, as tolerated.
- **If a TBI is suspected, hyperventilate the patient only if one or more of the following signs of brain herniation exists:**
  - Fixed or asymmetric pupils.
  - Abnormal extension (decerebrate posturing).
  - Glasgow coma scale (GCS) of less than 9 with a further decrease of 2 or more points.
- Blood pressure in the head injured patient: Hypotension, except as a terminal event, is not caused by isolated closed head injuries. You should assess the chest, abdomen, pelvis, and thighs for additional injuries. Patients with TBIs who also have external bleeding may suffer fatal blood loss; control bleeding with direct pressure.
- Assess mental status using the GCS every five minutes to track changes. Changes in mental status are the most sensitive indicator of traumatic brain injury.
- Evaluate pupil size and reactivity. A unilaterally dilated pupil or bilaterally fixed and dilated pupils is a sign of brain herniation and requires emergent interventions to lower the intracranial pressure (ICP). Unequal pupils in the conscious patient is not an indicator of brain herniation or increased ICP.

Head Trauma – Pediatric continued

Basic Standing Order continued

B

- ► Remember to suspect spinal injuries in any patient with a head injury and significant mechanism of injury. Evaluate spinal cord integrity:
  - ♦ In a conscious patient by recording ability to move extremities to command. Perform gross sensory exam with sharp sensation or light touch.
  - ♦ Document patient complaints of numbness, tingling, or shooting pain.
  - ♦ In an unconscious patient by recording presence or absence of extremity movement to painful stimulus.
- ► Reassess patient frequently throughout transport, as a head injured patient may deteriorate rapidly. Changes in the ongoing exam can be more important than the initial exam.
- ► Consider ALS intercept/air medical transport.

Head Trauma – Pediatric continued

Advanced Standing Order

A

- Children can present with signs of shock secondary to severe scalp lacerations. If a child with a severe scalp laceration is showing signs of shock, be sure to gain IV or IO access and give a 20 cc/kg bolus of normal saline or lactated Ringer's. Be sure to evaluate the pediatric patient to rule out internal bleeding.
- Check blood glucose, if hypoglycemic see Diabetic Emergencies: Hypoglycemia Protocol.
- Obtain intravenous or intraosseous access and, if needed, administer isotonic solution, (e.g. normal saline or lactated Ringer's). Avoid the use of dextrose-containing IV fluids in TBI patients (Treat hypoglycemia as indicated.).
- In patients with multi-organ trauma with an associated TBI, titrate IVs to maintain systolic blood pressure above 90. A systolic BP below 90 has been shown to increase morbidity and mortality in the patient with a TBI.
- Child: Administer fluid bolus 20 ml/kg, may repeat x 2 (maximum total 60 ml/kg to maintain SBP above.
  - 12-16 years: 90 mmHg
  - 5-12: 80 mmHg
  - 1-5 years: 75 mmHg
  - <1 years: 65 mmHg
  - Administer fluid in children with normal SBP and who have other signs of decreased perfusion including tachycardia, loss of central pulses, increased capillary filling time of > 2 seconds.

Paramedic Standing Orders

P

- If end-tidal CO2 is available, ventilate to maintain an end-tidal CO2 of 30-35 mmHg only if signs of herniation present.
- If intubation required, consider administration of lidocaine 1 mg/kg IV (maximum dose 100 mg) prior to intubation.

Chest Trauma - Pediatric

- Chest trauma can lead to severe internal injuries that are often difficult to diagnose. A history of chest trauma should lead rescuers to suspect a serious injury, and patients should be treated with that expectation.
- Three major chest injury syndromes can lead to rapid death. They must be recognized and treated rapidly. They include:
  - Bleeding from rupture of a major chest vessel;
  - Mechanical decrease of cardiac output (which may be caused by tension pneumothorax, cardiac tamponade or cardiac contusion with or without dyshythmia);
    and
  - Respiratory distress (which may be caused by tension pneumothorax, flail chest, pulmonary contusion or an open chest wound).
- If chest injury interferes with breathing, it must be managed during the initial assessment.
- Objects penetrating the chest wall should be stabilized whenever possible, and not removed unless absolutely necessary for extrication or transport.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol. Examine the patient looking for distended neck veins. Look at the chest wall for asymmetry of movement, open wounds, and bruises. Expose the patient's chest, as needed, to inspect the entire chest wall, front and back, maintaining cervical immobilization and log rolling when indicated. Respiratory distress, despite an open airway, may suggest a tension pneumothorax, a flail chest, or an open chest wound.
  - Signs of a tension pneumothorax include diminished breath sounds, hypotension, respiratory distress, distended neck veins, subcutaneous emphysema, shock, apprehension/agitation, and increasing resistance to ventilation.
    - If a penetrating chest wound has been sealed, temporarily unseal the wound and allow air to escape.
    - Assist ventilation with positive pressure oxygen if available.
    - Consider advanced airway adjuncts.
    - Transport patient in the position of comfort unless otherwise contraindicated.
- Signs of flail chest may include paradoxical movement of the chest wall, or crepitus of multiple ribs in two or more areas.
  - Use positive pressure ventilation.
  - Consider stabilizing with ipsilateral arm and swathe.
- A wound in the chest may be an open chest wound, especially when it presents with subcutaneous emphysema, and air movement through the opening.
  - Cover with a sterile occlusive dressing taped on three sides.
  - Observe closely for signs of developing tension pneumothorax.
- Uncontrolled external hemorrhage from a penetrating injury should be packed with or without hemostatic dressings when necessary.

Chest Trauma - Pediatric

Advanced Standing Orders

A

- Treat for hypotension

Paramedic Standing Orders

P

- Positive pressure ventilation may be needed, but is likely to worsen unrelieved tension pneumothorax. Be prepared to decompress the patient's chest. If a tension pneumothorax is suspected by mechanism of injury and as evidenced by hypotension, respiratory distress, and/or diminished breath sounds, perform needle decompression with an over-the-catheter needle placed at the second intercostal space at the midclavicular line.
  - This is an airway procedure and must be performed early, if
  - indicated.
  - A patient may have bilateral pneumothoraces; if condition does not improve after decompression of one lung, decompress the other side.
- Initiate cardiac monitoring.
- Consider analgesia for isolated chest trauma.
- Treat for hypotension.

Abdominal Trauma - Pediatric

Solid organs of the upper abdominal cavity (the liver, spleen and kidneys) are proportionally larger and more exposed in children, and the abdominal muscles of the child are relatively underdeveloped and the ribs are more pliable. This predisposes pediatric patients to potentially serious blood loss and shock from abdominal injuries.

Pre-hospital care of abdominal injuries should focus on controlling external bleeding and rapid transport as there are no specific pre-hospital treatments for internal bleeding. Penetrating trauma injures the area of entry and may damage any tissue along the line of penetration. Blunt trauma may be widely transmitted and cause damage to any or all organs within the abdominal cavity. Trauma to the abdomen may also cause injury to organs outside the abdominal cavity including those in the chest. Injuries from the nipple line through the tenth rib can involve either the chest and/or abdomen. Ongoing re-evaluation of the abdomen includes assessment of the chest as well.

As with all trauma patients, complete treatment for abdominal injuries must take place in the hospital. Delays at any level can be harmful to the patient. Evaluation of abdominal trauma is part of the rapid trauma assessment. It should be performed only after the patient‘s ABCs have been evaluated and supported.

Objects penetrating the abdominal wall should be stabilized whenever possible, and not removed unless absolutely necessary for extrication or transport.

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol. Assess the abdomen for tenderness, rigidity, and distension.
- Uncontrolled external hemorrhage from a penetrating injury should be packed with or without hemostatic dressings when necessary.
- Reassess abdomen every 5 – 10 minutes, for tenderness, rigidity and distention. Shock, increasing distention, and abdominal rigidity are signs of intra-abdominal bleeding, although a person may have life-threatening bleeding without distention or abdominal rigidity.
- Any organs protruding from abdominal wounds should not be replaced into the abdominal cavity; cover the organs with saline-moistened gauze and a vapor barrier.
- If mechanism of injury permits, transport the patient in the position of comfort.

Abdominal Trauma – Pediatric continued

Advanced Standing Orders

A

- ALS considerations for the patient with abdominal injuries are those listed in the Trauma Assessment and Management Protocol.

Paramedic Standing Orders

P

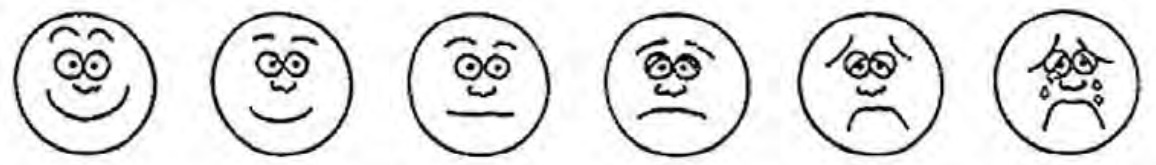
- Abdominal distention decreases lung capacity and makes the pediatric patient more difficult to ventilate.
- ALS providers should consider placement of a gastric tube.

Pain Management - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Place the patient in a position of comfort if possible.
- Give reassurance, psychological support, and distraction.
- Use ample padding for long and short spinal immobilization devices. Use ample padding when splinting possible fractures, dislocations, sprains and strains. Elevate injured extremities if possible. Consider application of cold pack for 30 minutes.
- Have the patient rate their pain on a 0 to 10 (or similar) scale*.
- Reassess the patient‘s pain level and vital signs every 5 minutes.*0-10 Scale: Avoid coaching the patient, simply ask them to rate their pain on a scale from 0-10, where 0 is no pain at all and 10 is the worst pain ever experienced by the patient.
- *Wong-Baker "faces” scale: The faces correspond to numeric values from 0-10. The scale can be documented with the numeric value or the textual pain description.
- Consider paramedic intercept if needed for pain management.



0	2	4	6	8	10
NO HURT	HURTS A LITTLE	HURTS A LITTLE MORE	HURTS EVEN MORE	HURTS WHOLE LOT	HURTS WORST

Pain Management – Pediatric continued

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >minimum for age and signs of adequate perfusion.

Paramedic Standing Orders

P

- IV access, obtain blood sample and administer fluids to maintain systolic blood pressure >minimum for age and signs of adequate perfusion.
- Unless the patient has altered mental status, multi-systems trauma or abdominal pain, the paramedic may consider
  - Morphine: 0.1 mg/kg IV every 10 minutes. May be repeated up to 2 doses.
  - Fentanyl: 0.5 mcg/kg IV every 5 minutes. May be repeated up to 3 doses
- For hypoventilation from opiate administration by EMS personnel, administer naloxone 0.1 mg/kg up to 2 mg prn.
- Nausea: See Nausea Protocol.

NOTE: **Contact medical control** for guidance with all patients with altered mental status, multi-systems trauma, or for requests to provide additional doses of a medication.

Pelvic Fractures– Pediatric

A person may lose enough blood from pelvic fractures to exsanguinate. Disruption of the pelvic ring increases potential space in the pelvic cavity. This increased space will accommodate more blood than the standard pelvis. The goals of pelvic immobilization are to decrease movement of the bones and to decrease the potential space for bleeding. Apply circumferential pressure to tamponade internal hemorrhage.

Signs of pelvic fracture may include instability, crepitus, decreased peripheral pulses, swelling, and blood at the urinary meatus.

When assessing for pelvic trauma, gentle downward, then inward pressure should be applied to the iliac crests. If instability or crepitus is noted, this test should not be repeated.

Basic Standing Orders

B

- Follow Trauma Assessment and Management Protocol.
- Control external hemorrhage with direct pressure or a pressure dressing. Hemorrhage control may be improved by closing and stabilizing pelvic fractures.
- Pelvic fractures may be stabilized in several ways, three of which are easily applied in the pre-hospital setting.
  - Use of the pelvic sheet wrapping technique
  - Commercially available pelvic binding device
  - Application of the PASG
- Assess circulatory, motor, and sensory function before and after application of pelvic stabilization.
- Attempt to minimize unnecessary movement in patients with pelvic fractures

Advanced Standing Orders

A

- Follow Trauma Assessment and Management Protocol.
- Control external hemorrhage with direct pressure or a pressure dressing. Hemorrhage control may be improved by closing and stabilizing pelvic fractures.
- Pelvic fractures may be stabilized in several ways, three of which are easily applied in the pre-hospital setting.
  - Use of the pelvic sheet wrapping technique
  - Commercially available pelvic binding device
  - Application of the PASG
- Assess circulatory, motor, and sensory function before and after
- application of pelvic stabilization.
- Attempt to minimize unnecessary movement in patients with pelvic fractures
- Treat for hypotension.

Extremity Trauma - Pediatric

Bones in children are more pliable than those in adults; they are prone to fractures that involve the bone bending (e.g. "greenstick fractures"), which may be more difficult to straighten.

Children may fracture their bones at the growth plates, which are located near joints. Injuries involving joints should only be straightened when there is decreased circulation distal to the injury (unless it is an ankle injury). If using commercially available devices to splint fractures in children, be sure that they are of an appropriate size for the child.

In the severely injured patient, management of extremity injuries takes a relatively low priority. Most extremity hemorrhage can be controlled by direct pressure or pressure dressings. As with all trauma patients, definitive treatment for extremity injuries takes place in the hospital. Delays at any level can be harmful to the patient. Evaluation of extremity trauma is part of the focused physical exam and should be performed only after the patient's ABCs have been evaluated and supported.

Consider femur or pelvic fractures when the degree of shock seems greater than indicated by the amount of external bleeding.

Extremity Trauma – Pediatric continued

Basic Standing Order

B

- Follow Trauma Assessment and Management Protocol.
- Control external hemorrhage with well-aimed direct pressure or a pressure dressing, or elevation and pressure points.
- A tourniquet should be used if bleeding cannot be controlled by other methods. Though tourniquets are infrequently needed, do not delay application when other bleeding control methods have failed.
- Hemorrhage control in a patient with femur fracture(s) may be improved by using a traction splint, apply pressure directly over the fracture.
- Examine the patient for extremity injures (deformities, contusions, avulsions, amputations, punctures, penetrations, burns, tenderness, lacerations, or swelling).
- Check for motion and sensation distal to deformities (both light touch and sharp sensation should be checked).
- Check circulation distal to deformities.
- The primary concern when treating extremity injuries is to maintain proper distal circulation beyond the site of the injury. This may involve straightening the extremity. ("Make limbs look like limbs.")
- Stop if severe resistance is encountered or if the patient has significantly increased pain during an attempt at straightening the extremity. No more than two attempts at straightening the limb should be made.
  - In general, joint injures are left in the position found if there is adequate circulation. If there is no pulse distal to the joint injury, an EMT should attempt to align the joint in its normal anatomic position by applying traction.
  - Straighten any grossly angulated long bone into its anatomic position by applying traction.

Paramedic Standing Orders

P

- Pain management is strongly encouraged for patients with isolated extremity injuries, unless there is a contraindication to pain medication (e.g. hypotension, allergy). Medicating the patient before splinting may be appropriate in the patient with an isolated extremity injury.

Eye and Dental Injuries-Pediatric

Basic Standing Orders

B

- Routine Patient Care
- Obtain visual history (use of corrective lenses, surgeries, use of protective equipment).
- Obtain visual acuity, if able.
- Chemical irritants: flush with copious amounts of water, or normal saline.
- Thermal burns to eyelids: patch both eyes with cool saline compress.
- Impaled object: immobilize object and patch both eyes.
- Puncture wound: place protective device over both eyes (e.g. eye shield). Do not apply pressure.
- Foreign body: patch both eyes.
- In the event patient is unable to close eyelids, keep eye moist with sterile saline compress.
- Consider intercept.

Dental Avulsions

- Dental avulsions should be placed in an obviously labeled container with saline or cell-culture medium (Save-a-Tooth®).

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >minimum for age and signs of adequate perfusion.

Paramedic Standing Orders

P

- Proparacaine 2 drops to affected eye, repeat every 5 minutes as needed. Consider use of Morgan lens for irrigation.
- Refer to the Pain Management Protocol.
- Refer to the Nausea Protocol.

Burns (Thermal) Pediatric

Children under 5 years of age represent the age group most often found with burns resulting from child abuse. Look for characteristic burns that should make you suspect they are the result of child abuse. The child with burns to the back, buttocks, and posterior neck should alert your suspicion of abuse. Circumferential scald burns of hands or feet that are clearly demarcated and uniform with no splash marks are also characteristic of child abuse.

Effective treatment of patients with burns must be started as soon as possible after injury, as these patients frequently require specialized care which includes fluid resuscitation, pain management, and wound care. The goal is to transfer the patient to a facility capable of providing the necessary level of care for that individual.

Burns that require specialized care in a recognized burn center or unit include:

- Partial-thickness and full-thickness burns of greater than 10% total body surface area (TBSA) in patients <10 years of age.
- Partial-thickness and full-thickness burns of greater than 20% TBSA in all other patients.
- Partial-thickness and full-thickness burns involving the face, eyes, ears, hands, feet, major joints, genitalia, or perineum.
- Full-thickness burns totaling 5% TBSA or more in any age group.
- Electrical burns including lightning injury.
- Significant chemical burns.
- All burns associated with inhalation injury.
- Circumferential burns of the chest, neck, or extremities.
- Burns associated with concomitant major trauma.
- Burn injury occurring in patients with pre-existing medical disorders.
- Burn injury in patients who will require special social and emotional or long-term rehabilitative support, including cases involving suspected child abuse and neglect.

Basic Standing Orders

B

- Glucose may be necessary in a child with a severe burn. Monitor blood sugar periodically.
- When treating patients with chemical burns, it is imperative to ensure rescuer safety. Patients contaminated with chemicals should have their clothing removed. Do NOT transport patients prior to appropriate decontamination. Notify the receiving facility of a patient with chemical exposure to allow adequate time for preparation. All chemical burns should be flushed with copious amounts of water.

Basic Standing Orders

B

- Brush dry chemicals off the skin before flushing.
- For chemical burns of the eye, flush the eye immediately with at least one liter of normal saline or water (at least 10 to 20 minutes is preferred). More fluids may be beneficial, especially if the chemical is alkaline.

► Stop the burning process. If on scene quickly after the burn occurred, cooling affected parts (e.g. with cool water immersion) may limit the depth and extent of the burn. More than a few minutes after the burn, there is little benefit except pain relief. Note that with burns from tar, asphalt, paraffin or oils that retain heat (or when melted fabric adheres to skin) cooling may help for a longer period of time.

► If cooling for pain relief, do not cool or moisten more than 10% of the TBSA at any one time. This can cause hypothermia.

► Remove all clothing and jewelry in the area of the burn and distal to the injury.

► Administer high flow, 100% concentration oxygen by non-rebreather mask for potential inhalation injury or any serious burn. Consider the possibility of carbon monoxide or other toxic inhalation. Oxygen saturation readings may be falsely elevated.

► Assess circulation and perfusion. Circumferential burns of extremities can interfere with perfusion of that extremity.

► If spinal trauma is suspected, place a rigid cervical collar and immobilize the patient as appropriate.

► Consider ALS intercept for patients with serious burns and electrical injuries; in electrical injuries there is a possibility of cardiac dysrhythmias.

► Estimate the TBSA involved. The "Rule of Nines” provides a rough estimate of TBSA involved (see following page).

► Describe the body surface area as well as the depth of burn (e.g. 30% superficial burn, 20% partial thickness, and 15% full thickness burn).

► Apply dressings to burns as tolerated.

- In burns over 10% BSA, apply a dry sheet, a dry burn sheet or dry sterile dressings to burn areas. Insulate the patient over this dressing to lessen the chance of hypothermia.
- In burns less than 10% BSA, apply moist dressings (e.g. commercially available burn dressings or saline-soaked gauze).
- A vapor barrier may be useful in patients with longer transport times.

Burns (Thermal) – Pediatric continued

Advanced Standing Orders

A

- ► Monitor blood sugar.
- ► Start two large bore IVs in patients meeting any of the burn criteria in the beginning of this section. These may be inserted through burn area, if necessary.
- ► Fluid administration:
  - ♦ First 24 hours: 4cc normal saline (NS) or lactated ringers (LR) x patient weight (Kg) x %TBSA (for fluid calculations include only partial thickness and full thickness burns). If more than two or three liters of fluid are to be given lactated ringers is preferred.
  - ♦ Half of this amount is to be given in the first 8 hours after injury not the time after arrival at the patient's side. (Note: this means that the EMS provider should determine the time of injury)
  - ♦ The remaining half is to be given over the next 16 hours.

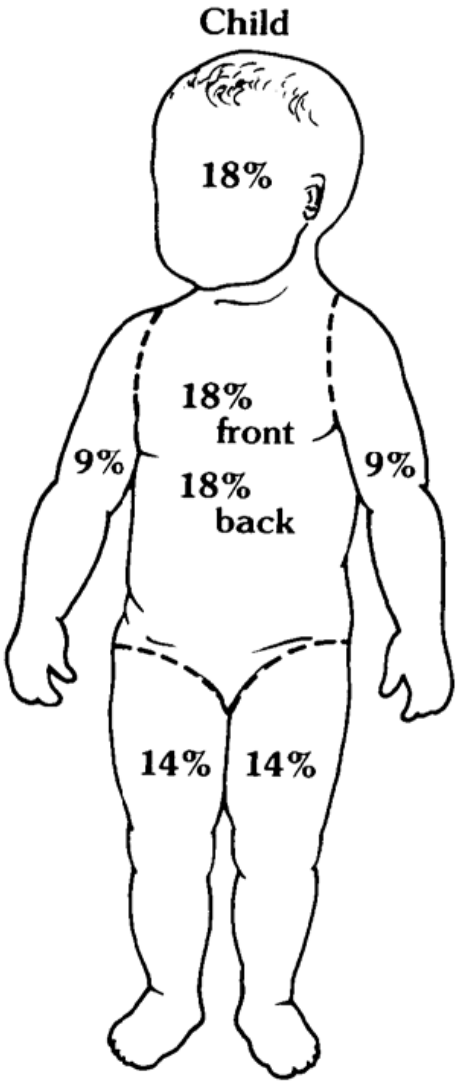
Paramedic Standing Orders

P

- ► Be alert for signs of inhalation injury (e.g. stridor, muffled voice, singed facial/nasal hairs, soot around nose or mouth, carbonaceous sputum, confinement in an enclosed space fire). Be prepared to secure the airway.
- ► If the injury involves an electrical burn, initiate cardiac monitoring. Treat cardiac dysrhythmias as directed.
- ► Electrical burn fluid management:
  - ♦ In electrical burns where there is a large amount of pigment (hemoglobin or myoglobin) in the urine, the urinary output should be maintained at 1.0 – 2.0 cc/Kg/hour until the urine is grossly clear, then fluids may be cut back to maintain the output in the range of 0.5 to 1.0 cc/Kg/hour in adults.
  - ♦ In addition, 44 – 50mEq of $NaHCO_3$ per liter of LR is administered to keep the urine alkaline as long as visible pigment is present.
- ► Insert nasogastric tube if burns are 20% TBSA or more.
- ► Consider Pain Management. Small doses IV titrated to effective pain control; monitor for respiratory depression.
- ► Give all medications intravenously.

Rule of Nines - Burn Chart - Pediatric

When measuring TBSA in children, an alternate method is to use the child‘s palm (not including the fingers) or clenched fist, which equals 1% of the body surface area. This serves as a quick method. But be sure to use the child‘s palm or fist and not your own.



Selective Spinal Immobilization

KBEMS Approved 2/11/2015

Spine precautions are intended to prevent spinal cord injury in a patient presenting with an unstable spinal fracture, and to potentially prevent worsening cord injury.
Traditional use of backboards for immobilization of patients has never been proven to be beneficial and newer studies show harm can occur from backboard immobilization without clear indications. Studies also show EMS providers are able to safely evaluate and identify patients with suspected spinal injuries in the field and employ selective spinal immobilization appropriately.

The National Association of EMS Physicians and the American College of Surgeons Committee on Trauma believe that:

- Long backboards are commonly used to attempt to provide rigid spinal immobilization among emergency medical services (EMS) trauma patients. However, the benefit of long backboards is largely unproven.
- The long backboard can induce pain, patient agitation, and respiratory compromise. Further, the backboard can decrease tissue perfusion at pressure points, leading to the development of pressure ulcers.
- Utilization of backboards for spinal immobilization during transport should be judicious, so that the potential benefits outweigh the risks.
- Appropriate patients to be immobilized with a backboard may include those with:
    - Blunt trauma and altered level of consciousness
    - Spinal pain or tenderness
    - Neurologic complaint (e.g., numbness or motor weakness)
    - Anatomic deformity of the spine
    - High-energy mechanism of injury and any of the following:
        - Drug or alcohol intoxication
        - Inability to communicate
        - Distracting injury

- Patients for whom immobilization on a backboard is not necessary include those with all of the following:
    - Normal level of consciousness (Glasgow Coma Score [GCS] 15)
    - No spine tenderness or anatomic abnormality
    - No neurologic findings or complaints
    - No distracting injury
    - No intoxication

- Patients with penetrating trauma to the head, neck, or torso and no evidence of spinal injury should not be immobilized on a backboard.
- Spinal precautions can be maintained by application of a rigid cervical collar and securing the patient firmly to the EMS stretcher, and may be most appropriate for:
    - Patients who are found to be ambulatory at the scene
    - Patients who must be transported for a protracted time, particularly prior to interfacility transfer
    - Patients for whom a backboard is not otherwise indicated
- Whether or not a backboard is used, **attention to spinal precautions** among at-risk patients is paramount. **These include application of a cervical collar, adequate security to a stretcher, minimal movement/transfers, and maintenance of inline stabilization during any necessary movement/ transfers.**

Patients should be removed from backboards as soon as practical in an emergency department.

References:

1. National Association of EMS Physicians: Ems Spinal Precautions And The Use Of The Long Backboard –Resource Document T o The Position Stateme nt Of The National Association Of Ems Physicians And The American College Of Surgeons Committee On Trauma. *Prehosptial Emergency Care*. (Jan/March 2014), 1-9. doi: 10.3109/10903127.2014.884197
2. Vallancourt et al: The Out of Hospital Validation of the Canadian C-Spine Rule by Paramedics. *Annals of Emergency Medicine*. 2009 Nov 54 (5); 663-670. doi: 10.1016/j.annemergmed.2009.03.008

Adult Trauma Protocol
Selective Spine Immobilization

KBEMS Approved 2/11/2015

Spine Immobilization Evaluation in the setting of trauma (age >8 yo and able to communicate)

If **ANY** of the following is true….

- Blunt trauma with altered level of consciousness
- Spinal pain or tenderness
- Neurologic Complaint (numbness or motor weakness from traumatic injury)
- Anatomic deformity of the spine
- High-energy mechanism of injury and any of the following:
  - Drug or alcohol intoxication
  - Inability to communicate
  - Distracting injury

Spine precautions

Selective Spine Immobilization with C-Collar and Long Backboard

Transport time > 20 minutes?

NO

- Transport Immobilized to appropriate trauma center.

YES

- Transport **OFF** long spine board but maintain spine precautions including **C-collar**
- Log roll, scoop stretcher, slider or LBB transfer to hospital stretcher.

If **ALL** the following is true….

- Normal level of consciousness (GCS 15)
- No spine tenderness or anatomic abnormality
- No neurologic findings or complaints
- No distracting injury
- No intoxication.

NO long spine board Immobilization is needed (see c-spine clearance for c-collar clearance)

Penetrating Trauma does NOT need Immobilization

INTERFACILITY TRANSFERS DO NOT REQUIRE IMMOBILIZATION ON SPINE BOARDS FOR TRANSFER. SPINE PRECAUTIONS, WITH C-COLLARS, SHOULD BE OBSERVED DURING TRANSPORT.

Adult Trauma Protocol
Selective Spine Immobilization

KBEMS Approved 2/11/2015

The Cervical Spine Evaluation

1. Any One High-Risk Factor Which Mandates Immobilization?
   - Age ≥ 65
   - Dangerous mechanism*
   - Numbness or tingling in extremities

YES → **C-Spine Immobilization**

NO ↓

2. Any One Low-Risk Factor that may restrict Range of Motion Evaluation?
   - More than a simple rear-end MVC**
   - Non-Ambulatory at scene
   - Neck pain at scene when asked
   - Pain during midline c-spine palpation

YES → **C-Spine Immobilization**

NO ↓

3. Patient Voluntarily Able to Actively Rotate Neck 45° Left and Right When Requested, Regardless of Pain?

NO → **C-Spine Immobilization**

YES → **No C-spine Immobilization**

*** Dangerous Mechanism**

- fall from elevation ≥ 3 feet / 5 stairs
- axial load to head, e.g. diving
- MVC high-speed ≥65mph, rollover, ejection
- ATV
- Bicycle collision with object i.e. post, car

****Simple Rear-ended MVC Excludes:**

- Pushed into oncoming traffic
- Hit by bus / large truck
- Rollover
- Hit by high speed vehicle (≥ 65 mph)

The C-Spine Rule is for alert (Glasgow Coma Scale score 15) and stable trauma patients for whom cervical spine injury is a concern, including patients with either posterior neck pain with any blunt mechanism of injury or no neck pain but some visible injury above the clavicles.

Reference:

Vallancourt et al: The Out of Hospital Validation of the Canadian C-Spine Rule by Paramedics. *Annals of Emergency Medicine*. 2009 Nov 54 (5);663-670. doi: 10.1016/j.annemergmed.2009.03.008

Environmental Protocols

Commonwealth of Kentucky

Electrical/Lightning Injury

First and foremost, be certain the scene is safe to approach.

A unique feature to multiple patients affected by a lightning strike or electrical discharge is to treat those in respiratory arrest or cardiac arrest FIRST

Basic Standing Orders

B

- Routine Patient Care.
- High flow oxygen as indicated.
- Consider Burn Protocol.
- Remove rings, watches or constricting bands on affected extremities.
- Transport.
- Consider 12-lead EKG.
- Request paramedic intercept.

Advanced Standing Orders

A

- Establish IV/IO access

Paramedic Standing Orders

P

- Assess airway status.
- Assess need for advanced airway skills.
- Initiate continuous Cardiac Monitoring.
- Monitor patient.
- Consider pain management protocol.
- If injury suggest risk of rhabdomyolysis, consider 50meq Sodium Bicarbonate in 1000 ml NS wide open.
- Consider Trauma Center if available.

Snake Bites

General Considerations

Important documentation items include appearance of snake, time of bite, prior first-aid by patient or friends and unusual symptoms such as peculiar or metallic taste sensations. Severe envenomations may result in hypotension, coma, and bleeding. Early systemic signs are a bad prognosticator.

Basic Standing Order

B

- ► Routine Patient Care.
- ► Provide oxygen.
- ► Remove rings or other bands which may become tight with local swelling.
- ► Immobilize bitten extremity.
- ► Minimize venom absorption by keeping bite area still and patient quiet. Apply lymphatic band 2-3” above bite. (Lymphatic band should be at least 1” wide and allow 2 fingers to be easily inserted under the band.)
- ► Mark time and extent of erythema and edema with pen.
- ► Transport promptly for definitive observation and treatment.
- ► Do not use ice or refrigerants**.**
- ► Consider ALS for systemic symptoms or pain control

Advanced Standing Orders

A

- ► Establish IV access.

Paramedic Standing Orders

P

- ► Consider pain management – see Pain Management Protocol.

Submersion Injuries – Adult and Pediatric

Key points:

- Do not become a victim. Assess scene safety and rescue resources.
- Routine cervical spine stabilization may impede airway management and is not necessary unless the circumstances indicate that trauma is likely.
- Aggressive pulmonary support is essential.
- If possible, rescue breathing should begin while the patient is in the water.
- Chest compressions while in the water are ineffective.
- There is no need to clear the airway of water prior to rescue breathing.
- Attempts to remove water from the breathing passages by any means other than suction is not necessary.
- The Heimlich maneuver should be reserved for patients > 1 year of age with suspected airway occlusion by a foreign body.

Basic Standing Orders

B

- Routine Patient Care.
- Conscious patients with submersion injuries should be transported to the hospital.
- Initiate resuscitation as quickly as possible.
- Follow specific resuscitation protocol including AED.
- Manage cervical spine based on likelihood of cervical trauma. Obtain specific history:
- Time
- Temperature. Consider hypothermia. Associated trauma.
- Request paramedic intercept

Advanced Standing Orders

A

- Routine Patient Care.
- Conscious patients with submersion injuries should be transported to the hospital.
- Initiate resuscitation as quickly as possible.
- Follow specific resuscitation protocol including AED.
- Manage cervical spine based on likelihood of cervical trauma. Obtain specific history:
- Time
- Temperature Consider hypothermia. Associated trauma.
- Treat for hypotension
- Consider CPAP if no contraindications
- Initiate IV/IO access, but do not delay transport.
- Request paramedic intercept

Paramedic Standing Orders

P

- Follow appropriate ACLS algorithm.

Heat Cramps/Heat Exhaustion – Adult and Pediatric

Heat Cramps: Brief, intermittent and other severe muscle cramps associated with large amounts of sweating with hypotonic fluid replacement.

Heat Exhaustion: Water or salt depletion in the face of fluid loss in a hot environment. Symptoms are variable and nonspecific and include weakness, fatigue, headache, impaired judgment, vertigo, nausea and vomiting. Orthostatic hypotension may occur.

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- Remove victim to a cool area and shield from sun or any external heat source.
- Monitor vital signs and mental status.
- Consider active cooling with tepid water mist and fanning the patient Cardiac monitor
- If alert and oriented, provide commercially available flavored electrolyte solution.

Advanced Standing Orders

A

- Consider IV access.
- IV bolus of 0.9% NaCl (normal saline): 250 ml for adults, 20ml/kg for pediatrics; may repeat if systolic pressure dictates.

Hyperthermia (Environmental) – Adult and Pediatric

Mental status changes in the heat-challenged victim signal the onset of potentially severe heat illness and heat stroke. Mortality and morbidity are directly related to the length of time the victim is subject to the heat stress. Consider pharmacological causes as well.

Basic Standing Orders

B

- Routine Patient Care
- Move victim to a cool area and shield from the sun or any external heat source.
- Remove as much clothing as is practical and loosen any restrictive garment remaining.
- If alert and oriented, give small sips of cool liquids.
- Monitor and record vital signs and level of consciousness
- If temperature >104F(40C) or if altered mental status: begin active cooling by
  - Continually mist the exposed skin with tepid water while fanning the victim
  - Truncal ice packs may be used, but are less effective than evaporation
  - If shivering occurs discontinue active cooling and notify medical control

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mm Hg (adults) or >minimum for age and signs of adequate perfusion.
- IV bolus of 0.9% NaCl (normal saline): 250 ml for adults, 20ml/kg for pediatrics; may repeat if systolic pressure dictates.

Paramedic Standing Orders

P

- Adults: If uncontrolled shivering occurs during cooling, lorazepam 0.5 – 1mg IV/IM or diazepam 2 mg IV or 5 mg deep IM.

Hypothermia (Environmental) – Adult and Pediatric

Basic Standing Orders

All Cold Patients

- Routine Patient Care
- Careful handling is the highest priority
- Prevent further heat loss.
  - Insulate from the ground and shield from wind and water.
  - Remove wet clothing if in shelter. Cut clothing off to avoid excessive movement.
  - Cover the head and neck.
  - Insulate above and below.
  - Protect from the wind.
  - Apply insulated heat packs to high heat transfer/loss areas such as the head, neck, underarms, sides of the chest, and groin.
  - Cover with a vapor barrier (such as a plastic garbage bag).
  - Move the patient to a warm environment.
  - Consider covering patient's mouth and nose with a light surgical mask to reduce heat loss through respirations.
  - Chemical heat packs slow cooling but do not rewarm. They are best used on hands and feet to prevent frostbite.
  - Obtain temperature (rectal preferred as appropriate).
- Rewarm
  - If patient is alert enough to swallow, give food and drinks high in calories. The calories will increase ability to shiver which is most effective field rewarming.
  - Exercise drops temperature and then increases it but, this is not as effective as shivering. If dry and fed and shivering, mild exercise is OK.
- Oxygen should be heated and humidified, if possible to a maximum of 108 ° F (42° C).
- Splinting should be performed, when indicated, with caution to prevent additional injuries to frostbitten tissues.
- Treat and transport to a medical facility.

B

Hypothermia (Environmental) – Adult and Pediatric continued

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mm Hg (adults) or > minimum for age and signs of adequate perfusion.

Paramedic Standing Orders

P

If core temperature <30°C (86°F)

- CPR if indicated.
- Withhold IV medications.
- Attempt defibrillation once (use 360 joules for monophasic and 120 – 200 joules for biphasic defibrillators). Peds: 2J/kg.

If core temperature >30°C (86°F)

- CPR if indicated.
- Give IV medications based on dysrhythmia (but at longer intervals).
- Repeat defibrillation for ventricular fibrillation/ventricular tachycardia as core temperature rises.

Severity Levels of Hypothermia and Associated Symptoms		
MILD	97°F – 95°F (36.1°C – 35°C)	cold sensation, shivering, unable to perform complex tasks with hands
MODERATE	95°F – 93°F (35°C - 33.9°C)	intense shivering, clumsy and uncoordinated, mild confusion, slow and labored movements
	93°F –90°F (33.9°C – 32.2°C)	violent shivering, difficulty with speech, sluggish thinking, mild amnesia, may appear drunk
SEVERE	90°F –86°F (32.2°C - 30°C)	shivering stops, unable to walk, incoherent, irrational
	<86°F (30°C)	progressive stupor to unconsciousness, loss of awareness
	<82°F (27.8°C)	unconscious, respiration and heartbeat erratic, pulse not palpable, pulmonary edema, cardiac and respiratory arrest, death

Hypothermia (Environmental) – Adult and Pediatric- Mild

Cold sensation, shivering, unable to perform complex tasks with hands.

Basic Standing Orders

B

- Treat the patient as outlined above.
- If there is no way to get to a medical facility, rewarm the patient gradually by:
  - Warm showers or warm bath if the patient is alert.
  - Placing patient in a sleeping bag and providing contact with a warm body.

Advanced Standing Orders

A

- Many hypothermic patients may require aggressive fluid resuscitation. The field goal is volume expansion not rewarming.
- Use bolus therapy for volume expansion to endpoint of normalization of vital signs; specifically heart rate.
- IV's should be heated to patient‘s current core temperature or greater. 98-104° F (37-40° C) is ideal.
- The recommended fluid for rehydration is a balanced salt solution, such as normal saline or ringer's lactate.
- Do not use TKO lines in hypothermic patients. Use a saline lock.

Hypothermia (Environmental) – Adult and Pediatric - Moderate

Violent shivering, sluggish labored movements, confusion, may appear drunk.

Basic Standing Orders

B

- Treat the patient as outlined above with the following exceptions:
  - Do not put patient in shower or bath.
  - Do not give a patient oral fluids unless he is capable of swallowing and protecting his/her airway.
  - Do not attempt to increase heat production through exercise.

Advanced Standing Orders

A

IV THERAPY

- Many hypothermic patients are dehydrated and may require aggressive fluid resuscitation. The field goal is volume expansion not rewarming.
- Use bolus therapy for volume expansion to endpoint of normalization of vital signs; specifically heart rate.
- IV's should be heated to patient‘s current core temperature or greater. 98-104° F (37-40° C) is ideal.
- The recommended fluid for rehydration is a balanced salt solution, such as normal saline or ringer's lactate.
- Do not use TKO lines in hypothermic patients. Use a saline lock.

Paramedic Standing Orders

P

MEDICATIONS:

- Indications for medications are the same for mildly hypothermic patients as they are for normothermic patients.
- In the patient with a core temperature of less than 86°F (30° C) medications should be withheld.
- Medications are inefficient and poorly metabolized in the hypothermic patient. In addition, due to delayed metabolism, medications given in normal therapeutic doses to severely hypothermic patients can result in toxicity when the patient is rewarmed.
- As with any person with altered consciousness, Narcan and 50% dextrose should be considered when there is a reasonable suspicion that their use is warranted.
- Sodium bicarbonate is not to be used unless specifically ordered by a physician.

Hypothermia (Environmental) – Adult and Pediatric - Severe

Shivering stops, incoherent progressing to unconscious, erratic respiration and heartbeat, unstable vital signs.

Basic Standing Orders

B

- If victim is not breathing, provide rescue breathing via bag-valve mask.
- Use heated humidified oxygen if available.

Advanced Standing Orders

A

- Airway management as needed
- Avoid hyperventilation
- Use heated humidified oxygen if possible (42 C – 46 C or 108 F – 115 F)
- Rewarming is key to arrest survival in hypothermia. Field techniques are ineffective. The goal is to deliver a viable patient to a facility that can perform effective rewarming (most clinics and hospitals).
- Use AED as appropriate.
- If no pulse (after checking for up to 60 seconds) and no respirations and no contraindications, start CPR. Be careful to not hyperventilate.

Paramedic Standing Orders

P

- If resuscitation has been provided in conjunction with rewarming techniques for more than 60 minutes without the return of spontaneous pulse or respiration, contact medical control for recommendations.

Frostbite – Adult and Pediatric

Management

► **Concerns:**

- ► Do not rub the frozen part.
- ► Do not allow the patient to have alcohol or tobacco.
- ► Do not apply ice or snow.
- ► Do not attempt to thaw the frostbitten part in cold water.
- ► Do not attempt to thaw the frostbitten part with high temperatures such as those generated by stoves, exhaust, etc.
- ► break blisters which may form.

Basic Standing Orders

B

- ► Treatment of deep frostbite is usually extremely painful and best accomplished in a medical facility. In most circumstances, the risks posed by improper rewarming or refreezing outweigh the risks of delaying treatment for deep frostbite.
- ► If transporting a patient with frostbite that will not be rewarmed in the field, the medical provider should protect the frostbitten parts from additional injury and temperature changes.
- ► Protect the rewarmed area from refreezing and other trauma during transport. A frame around the frostbitten area should be constructed to prevent blankets from pressing directly on the injured area.
- ► Do not allow an individual who has frostbitten feet to walk except when the life of the patient or rescuer is in danger. Once frostbitten feet are rewarmed, the patient becomes nonambulatory.
- ► Shock due to frostbite is very uncommon. However, medical personnel should always be alert for shock and begin treatment at the earliest sign it is developing. If the frostbite patient develops shock, personnel should perform a thorough examination for additional injuries.

Airway and Ventilation Management

Commonwealth of Kentucky

Drug Assisted Intubation (DAI)

NOTE: Paramedic will require specific training and authorization prior to utilizing (DAI) procedure and skill. Adult and Pediatric RSI is restricted to Critical Care Transport and Air Medical Programs.

Definition

RSI: The administration of pharmacologic agents, including paralytic agents, to facilitate endotracheal intubation. RSI is not authorized at Nelson County EMS

DAI: The administration of pharmacologic agents, excluding paralytic agents, to facilitate endotracheal intubation.

Indications: Inability to tolerate laryngoscopy due to gag reflex, failure or contraindication of other means: BNTI, LMA, combitube, King LT and:

- Hypoxia (Sp02 < 90 %) with failed interventions to improve oxygenation.
- Respiratory arrest that cannot be intubated due to non-flaccid state.
- Head injury with GSC < 9 with need for definitive airway and mechanical ventilation.
- Unconsciousness or altered mental status with airway compromise of risk pulmonary aspiration.
- Potential for airway compromise due to burns or anaphylaxis.
- Uncontrolled seizure activity requiring airway control.
- Combative patient with airway compromise.

Contraindications

- Ability to oxygenate and ventilate with a less invasive approach.
- Anatomic findings on clinical exam that predict a difficult intubation or cause sufficient doubt about the ability to successfully intubate. Examples:
  - Morbid obesity
  - Obese "bull" neck
  - Obvious malignancy
  - Ankylosis
  - Direct laryngeal trauma
- Succinylcholine is contraindicated in: Succinylcholine is not authorized at Nelson County EMS
  - Burns greater than 24 hours old.
  - Spinal cord injury greater than 24 hours old.
  - Known neuromuscular disease (Guillain-Barré Syndrome), myasthenia gravis, amyotrophic lateral sclerosis, muscular dystrophy.
  - Chronic failure in hemodialysis presence of hemodialysis.
  - History of malignant hyperthermia.
- Non- arrested croup or epiglottis

Drug Assisted Intubation (DAI) continued

Procedure

- ► Maintain manual, in-line spine motion restriction by a second provider and remove the anterior portion of the cervical collar during intubation.
- ► Assemble and check all necessary equipment: suction, laryngoscopes, BVM, Eschmann or Bougie stylet, endotracheal tube, Blind Insertion Airway Device (BIAD).
- ► Calculate drug dosages and prepare and label syringes.
- ► Assure IV is patent, secure and free flowing.
- ► Monitor EKG, B/P, and Sp02. Prepare ETC02 monitoring and EID.
- ► Attempt to raise Sp02 to > 94 % with 100% oxygen by either NRB oxygen mask or BVM ventilation if necessary.
- ► Prior to drug administration, ensure that a neurologic assessment with GCS has been performed and documented.
- ► Premedication: (3 min. required for pre-treatment effects)
    - Pediatric patients (newborn to age 7): Atropine 0.01 mg/kg IVP, minimum dose 0.1 mg and maximum dose 0.5 mg
    - Lidocaine 1.5 mg/kg IVP in patients with head injury, CVA, and hypertensive crisis.

► DAI drug administration

- DAI:
    - Sedate the awake patient with Etomidate (Amidate) 0.1-0.3 mg/kg IVP (maximum 20 mg) or Midazolam (Versed) 0.1 mg/kg IVP (maximum 5 mg). Use lower doses in the hypotensive or elderly patient. Sedation drugs can be omitted in the unconscious patient.
    - Flush the IV line with 10 cc of IV fluids following drug administration.

Drug Assisted Intubation (DAI) continued

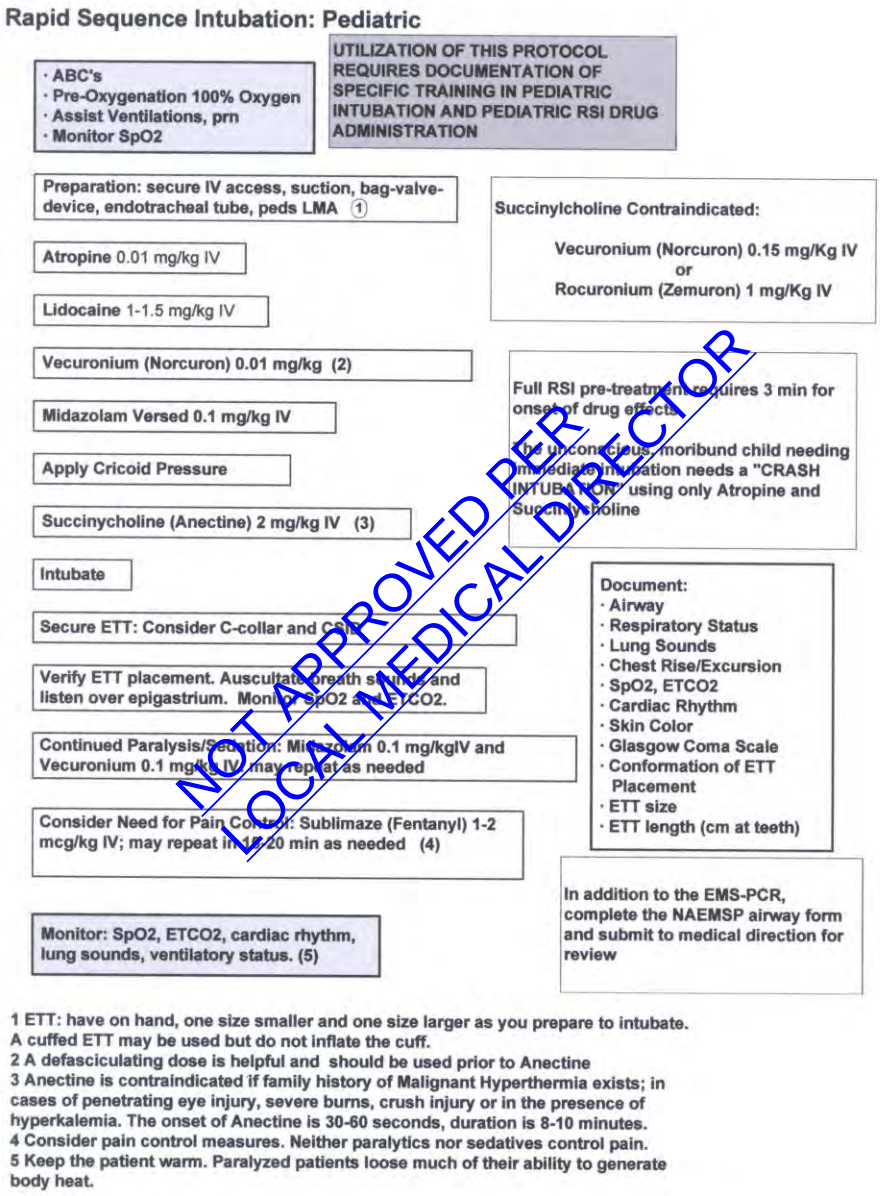
- A third provider applies cricoid pressure immediately after sedatives are administered and maintains cricoid pressure until the endotracheal tube is secured in the trachea.
- Wait 30-60 seconds after the Etomidate administration to begin intubation. relaxation correlates with vocal cord paralysis.
- After two attempts at intubation by any one provider, the Failed Airway Algorithm should be followed. If a second provider is available, he or she may be allowed two attempts at intubation provided the SpO2 is maintained at > 90 % with BVM between attempts. A maximum of four (4) attempts is allowed.
- Second attempts at intubation should include at least one of the following:
    - Improved positioning
    - Use of the Eschmann or Bougie stylet
    - Manual laryngeal movement: OELM / BURP
    - Suction to clear the airway
    - Change laryngoscope blades
    - Change to a second provider
- If intubation cannot be successfully accomplished, oxygenation and ventilation may be provided with a BVM and a combination of oral and nasal airways. If unable to ventilate a *rescue airway* must be established.
- If intubation is unsuccessful and oxygenation cannot be maintained with a Sp02 > 90 % with either the BVM or *rescue airway* then a cricothyrotomy should be performed by the needle techniques.
- Following endotracheal tube placement, correct position is confirmed by both clinical and technical measurements:
    - Direct visualization of ETT passing through the cords and the ETT balloon inflating below the cords.
    - Absence of epigastric sounds on ventilation.
    - Presence of breath sounds on ventilation.
    - Chest rise on ventilation.
    - Presence of ETC02 waveform on capnography or correct color change on colorimetric ET C02 analysis.
    - Correct re-inflation of EID device.
    - Sustained improvement in Sp02.

Drug Assisted Intubation (DAI) continued

- ► Secure the successfully placed oral ETT with a commercial device or with circumferential tape and an oral airway. In CVA or head injured patients be careful not to occlude the jugular veins and obstruct blood flow from the head. Place a C-collar and cervical immobilization device for the purpose of ETT stabilization.
- ► Ventilatory management should consist of a tidal volume of about 7 cc/kg or just enough to see the chest rise and a ventilatory rate of 12-15 breaths per minute. Avoid hyperventilation except in the case of head injury and signs of herniation syndrome and even then, avoid extremes of hyperventilation.
- ► Consider placing an oral or nasogastric tube to decompress the stomach. This is especially important in the pediatric patient and can be accomplished with a straight suction catheter.
- ► Frequently assess ETT positioning. Continuous capnography with data storage and download capability is the best tool for ETT monitoring. Reassess ETT position after every patient move and on change of providers.
- ► Bradycardia developing during intubation is usually due to hypoxia and is best treated by improving oxygenation by halting the intubation attempt and ventilating with 100% oxygen by BVM with oral and/or nasal airways. Bradycardia in the adult that is not responsive to improved oxygenation can be treated with Atropine 0.5 mg IVP.
- ► Maintenance of sedation
    - o Immediately after the ETT is secured and repeat Etomidate 0.1 mg/kg

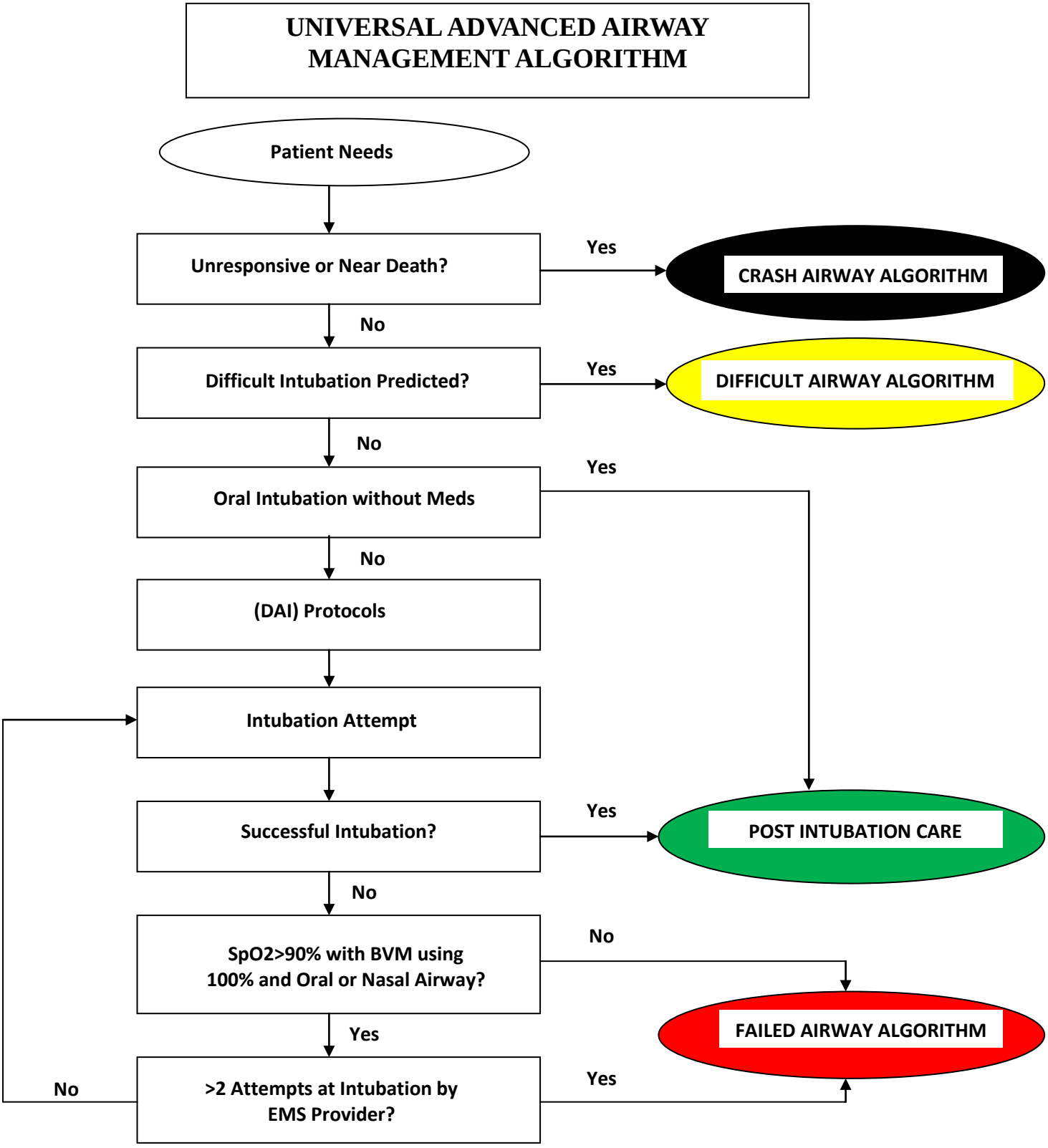
      Continuous ETCO2 capnography must be used.
    - o If the patient was conscious, sedation can be maintained with Midazolam (Versed) 0.05-0.1 mg/kg IVP as needed.
    - o If pain control is required in the hemodynamically stable trauma patient, Fentanyl 1-2 mcg/kg IVP may be administered as needed.
- ► During transport, monitoring should include EKG, B/P, SpO2, ETCO2, breath sounds.

Rapid Sequence Intubation Algorithm-Pediatric



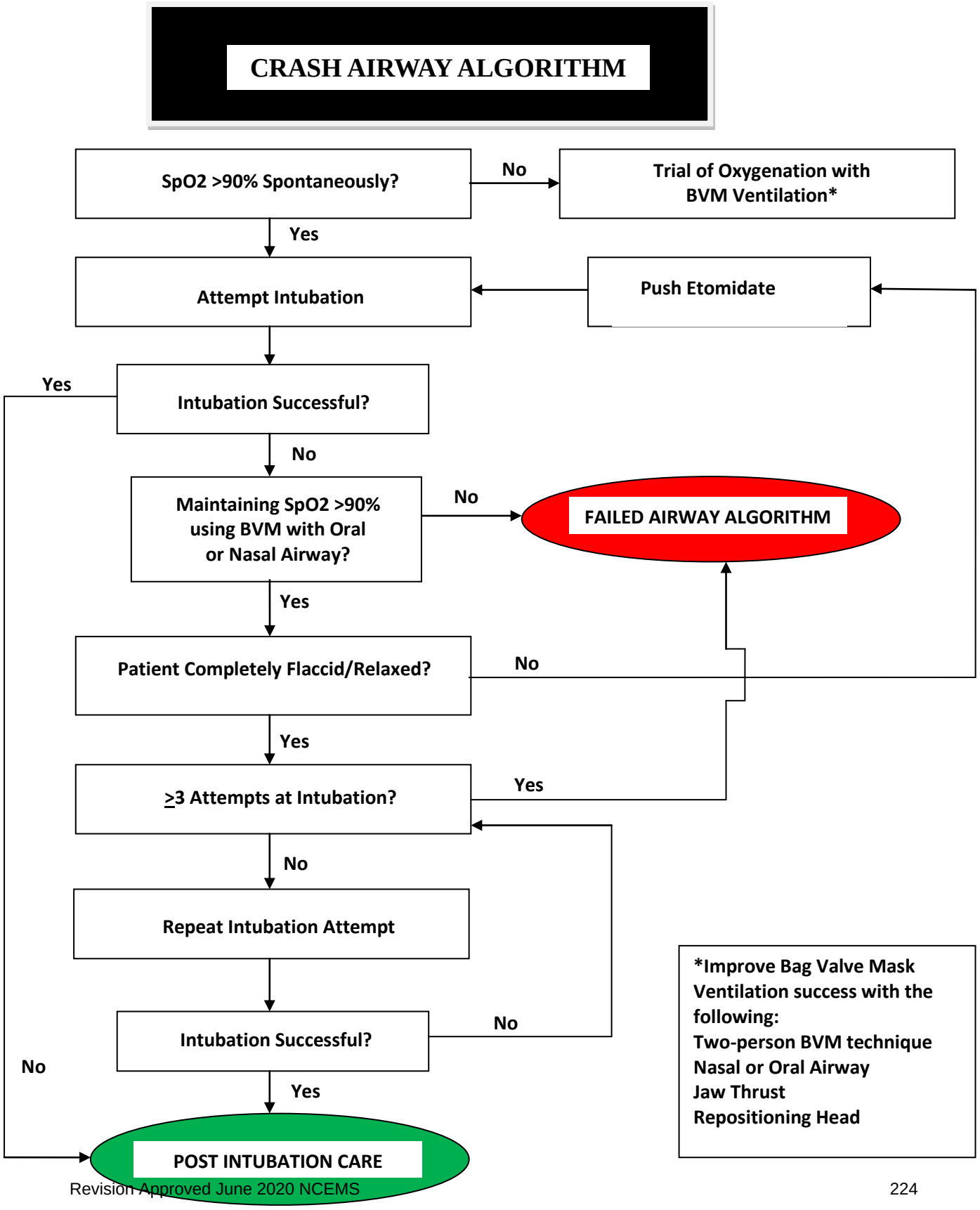
NOTE: This procedure is restricted to Critical Care Transport and Air Medical Programs. A service and paramedic will require specific authorization from the Board prior to utilizing this procedure and skill.

Universal Advanced Airway Management Algorithm

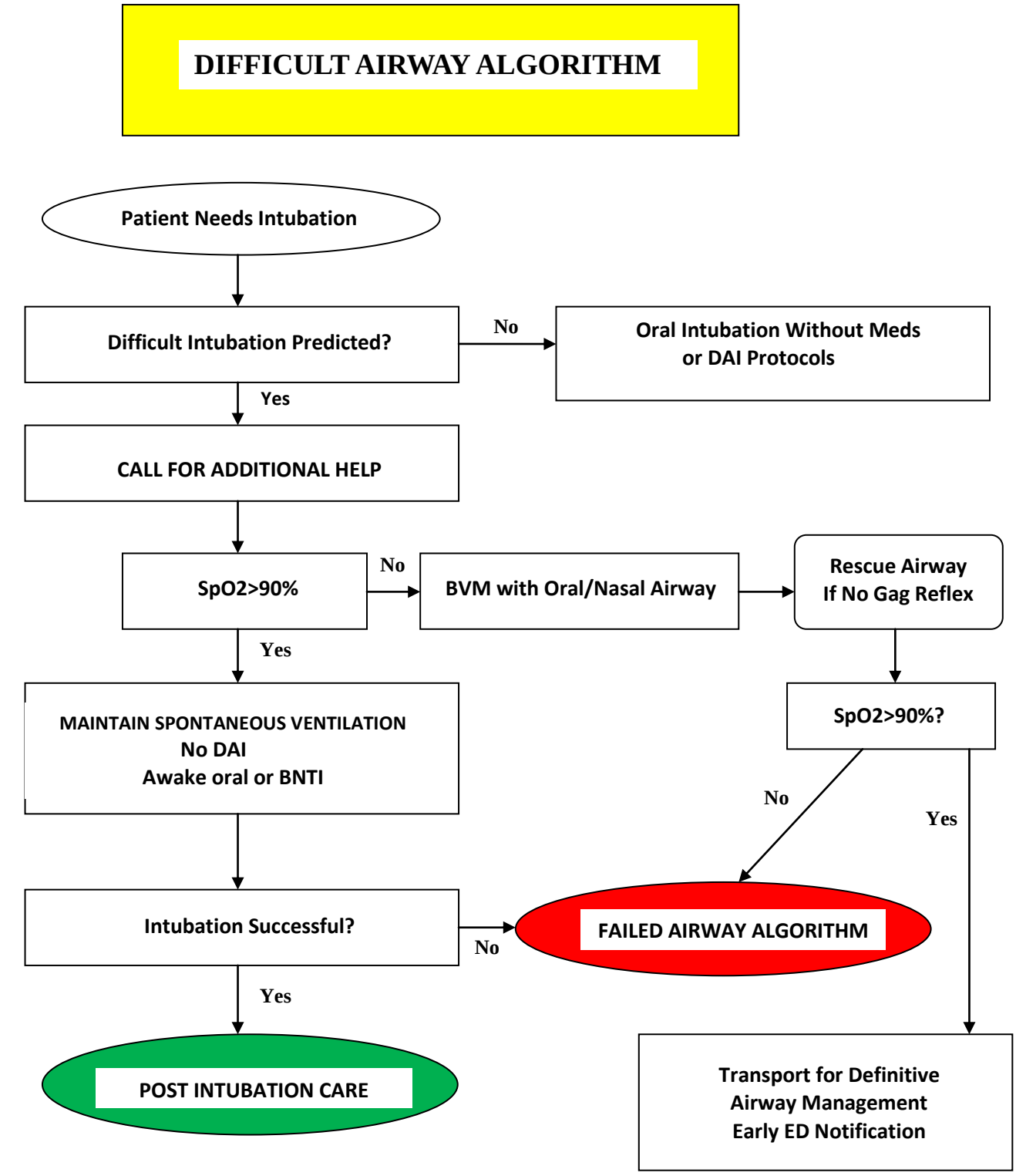


NOTE: Service and paramedic will require specific training and authorization prior to utilizing this procedure and skill.

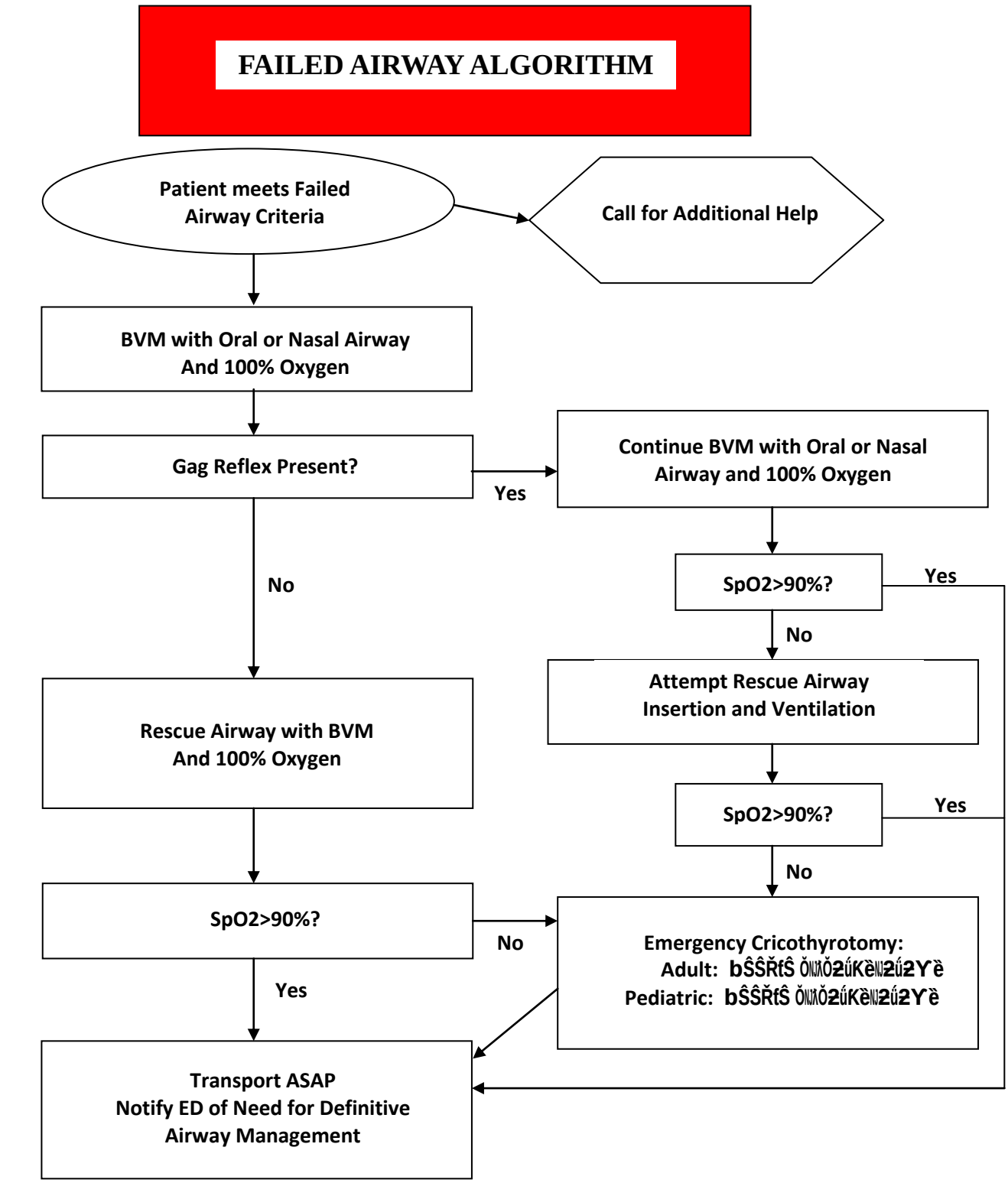
Crash Airway Algorithm



Difficult Airway Algorithm



Failed Airway Algorithm



Airway Management - Pediatric

PEDIATRIC AIRWAY MANAGEMENT

I. Initial Assessment: Using Pediatric Assessment Triangle / Rapid Cardiopulmonary Assessment

A. Appearance
1. Alertness
2. Distractibility
3. Consolability
4. Eye Contact
5. Speech / Cry
6. Spontaneous Motor Activity
7. Color

B. Work of Breathing
1. Appearance
2. Use of Accessory Muscles
   a. Retractions
   b. Diaphragmatic Breathing
3. Tidal Volume (chest rise)
4. Other Signs of Distress:
   a. Nasal Flaring
   b. Grunting
   c. Cyanosis

C. Circulation to the Skin
1. Strength of Pulses (central vs. peripheral)
2. Color / Temperature of Extremities
3. Capillary Refill Time
4. Blood Pressure

II. Initial Assessment Indicates Spontaneous Breathing Without Compromise.

A. Monitor breathing during transport.
B. Administer oxygen
1. Infants via infant mask @ 10-12 L/min.
2. Small child (1-8 y/o) via pediatric mask @ 12-15 L/min.
3. If mask is not tolerated, administer by blow-by method.

III. Initial Assessment Indicates Spontaneous Breathing With Respiratory Distress

A. Maintain airway with manual maneuvers.
B. Suction as needed.
C. Administer oxygen (II. B above).
D. If unable to maintain an airway, insert an oral or nasal airway.
E. Assist ventilations with BVM as needed.
F. Monitor with EKG and pulse oximetry as soon as possible and capnography if available.

IV. Initial Assessment Indicates Breathing is Absent or Severe Respiratory Distress

A. Maintain airway with manual maneuvers.
B. Suction as needed.
C. Insert an oral or nasal airway.
D. Ventilate with BVM and 100% oxygen @ 20/min for a child and 30/ min for an infant.
E. Monitor EKG and pulse oximetry as soon as possible and capnography if available.
F. Establish IV or IO vascular access.
G. Consider need for endotracheal intubation.

V. Continued BVM Ventilation vs. Endotracheal Intubation

A. BVM with oral and or nasal airway should be the initial technique used for ventilatory support .
B. Endotracheal intubation should be used when BVM ventilation is ineffective or transport time is prolonged.
C. Continued ventilation with BVM with oral/nasal airways can provide acceptable ventilation and oxygenation in the pediatric patient.
D. Pre-hospital pediatric intubation is a controversial skill:
    1. Specific pediatric training and ongoing continuing education is required.
    2. Proven to be a high risk / low frequency event.
    3. Hypoxia /hypoventilation are risks during intubation attempts.
    4. At present, no documented outcome benefit when compared to continued BVM.

VI. Airway Management with Bag Valve Mask (BVM) Ventilation

A. Purpose:
    1. BVM ventilation is the preferred technique for providing rescue breathing for pediatric patients with inadequate respiratory effort or cardio-respiratory arrest. Patients who are in respiratory distress and failure may respond to BVM ventilation and not require pre-hospital endotracheal intubation.
    2. BVM may also be used to administer bronchodilators in patients with bronchospastic airway disease.

B. Indications:
   1. Inadequate respiratory rate:
      a. Adolescent: < 12/min
      b. Child: < 16/min
      c. Infant / Toddler: < 20 / min
   2. Inadequate respiratory effort:
      a. Absent or diminished breath sounds.
      b. Paradoxical breathing (chest and abdomen moving in opposite directions).
      c. Persistent cyanosis on 100% oxygen by non-rebreather mask.
   3. Symptomatic bradycardia:
      a. Child: HR < 80 / min
      b. Infant: HR < 100 / min
   4. Cardiac Arrest
   5. Altered Mental Status with GSC < 9

C. Contraindications: None

D. Adverse Effects / Complications

   1. Gastric distension.
   2. Vomiting.
   3. Increased ICP or vagal reflex bradycardia if pressure is applied by mask over the patient‘s eyes.

E. Procedure:
   1. Have suction available since vomiting may occur.
   2. Use an appropriately sized oral or nasal airway adjunct with BVM ventilation.
   3. Use an appropriate sized mask for best fit and to avoid pressure over the eyes.
   4. For the single provider, use the "E-C clamp” technique of holding the mask.
   5. Monitor EKG, pulse oximetry and capnography if available.
   6. Ventilate with 100% oxygen with a tidal volume of approximately 6-10 cc/kg or with just enough volume to see the chest rise.
   7. Rate of ventilation should be approximately 20/ min for a child and 30/ min for an infant. If capnography is available, ventilate to maintain the end tidal CO2 at 35-40 mmHg. If head injury and signs of herniation are present, increase ventilation to maintain an end tidal CO2 of 30 mmHg.
   8. If the patient does not have an adequate chest rise with BVM ventilations:

a. Assure the airway is open and clear.
b. Use a two hand jaw lift technique.
c. Use an oral and nasal airway.
d. Increase the volume of ventilation if the airway is clearly open and maintained.
e. Evaluate for gastric distension and the need for decompression with an orogastric tube.
f. Consider the need for endotracheal intubation if BVM is unsuccessful and skilled personnel are available.

VII. Pediatric Orotracheal Intubation

A. Purpose:

1. Oral endotracheal intubation involves the passage of an endotracheal tube under direct vision via the oral cavity through the larynx and into the trachea to provide direct maximum ventilatory support of the patient.

B. Indications:

1. Cardiac arrest.
2. Severe respiratory distress, patient without a gag reflex.
3. Coma, patient without a gag reflex.
4. Patient is extremis, severe respiratory distress with poor air exchange, or agonal respirations.
5. Unsuccessful airway management with BVM and oral/nasal airways.

C. Contraindications:

1. Lack of equipment.
2. Lack of skilled personnel.
3. Successful BVM ventilation with a short transport time.

D. Adverse Effects / Complications:

1. Unrecognized esophageal intubation.
2. Prolonged hypoxia and hypoventilation during intubation attempts.
3. Trauma to oropharynx, vocal cords, esophagus, or trachea.
4. Right mainstem bronchus intubation.
5. Vomiting and pulmonary aspiration.
6. Increased intracranial pressure due to vagal stimulation.
7. Pneumothorax or tension pneumothorax due to excessive ventilatory pressures.

E. Procedure:

1. Complete a "primary survey" and assure A-B-C's with basic life support skills
   a. Oxygenate with 100% oxygen with non-rebreather mask.
   b. Ventilate with BVM if needed.
   c. Monitor EKG, pulse oximetry and continuous capnography if available.
   d. Manual cervical spine motion restriction if trauma mechanism.
2. Prepare equipment:
   a. BVM
   b. Suction
   c. Working, appropriate sized laryngoscope (see chart for equipment sizes).
   d. Endotracheal tubes (ETT) and stylet
      i. ETT size: (4 + Age/4).
      ii. Check chart or age based resuscitation tape.
      iii. ETT depth in cm : (12 + Age/2) or (ETT size X 3).
      iv. Place the lubricated stylet into the ETT and bend the distal tip into a gentle curve.
      v. Assure that the tip of the stylet does not extend out the end of the ETT.
      vi.. Have the next half-size smaller ETT at hand.
   e. Oral and nasal airways.
   f. Pediatric BIAD if available (see chart in BIAD protocols).
3. Oxygenate and ventilate with BVM prior to laryngoscopy.
4. Maintain cervical immobilization in trauma patients.
5. Have an assistant apply cricoid pressure.
6. Insert laryngoscope into the right corner of the mouth, sweep tongue upward and to the left by using a lifting motion, not a prying motion.
7. Identify the epiglottis.
8. Elevate the epiglottis exposing the glottic opening.
   a. In infants and toddlers, the straight blade may be successfully used to place into the vallecula and elevate the epiglottis indirectly by lifting the base of the tongue. The shape and position of the infant/toddler epiglottis makes it more difficult to directly pick-up with the straight laryngoscope blade.
9. Holding the ETT like a dart, place the tube through the vocal cords and into the trachea under direct vision and insert approximately 2 cm below the cords.

a. It is generally recommended to use an un-cuffed ETT in children < 8 y/o. However, this is controversial in the current literature. A cuffed ETT may be used in the child < 8 y/o but extreme care must be used to assure that the cuff remains completely deflated unless a large air leak is detected.

10. Remove the laryngoscope and hold the ETT in place.
11. Attach the BVM and ventilate with 100% oxygen.
12. Confirmation of correct ETT placement: No single method of ETT confirmation is 100% reliable, the position of the ETT must be assessed to be properly in the trachea by all means available to the pre-hospital EMS provider. The following methods may be used to confirm the correct placement of the ETT.
    a. Visualization of the ETT passing through the cords and into the trachea
    b. Auscultation of all lung fields to confirm adequate air exchange
    c. Auscultation of the epigastrium to confirm the absence of disturbance of the gastric fluids during ventilation
    d. Observation of bilateral expansion of the thorax
    e. End tidal CO2 detection device:
        i. At a minimum the colorimetric devices assessed initially and after six breaths.
        ii. Capnometry devices that give a numeric end tidal CO2 reading.
        iii. The preferred device is continuous capnography that is downloadable and printable.
    f. Esophageal intubation detector device.
        i. Useful if child > 8 y/o
    g. Other clinical signs of improved perfusion and ventilation/oxygenation
        i. Stable heart rate.
        ii. Pupillary response.
        iii. Stable and rising oxygen saturation.
        iv. Improved skin color.
13. Once correct ETT placement is confirmed, the ETT must be secured.
    a. Commercial device with built in bite block.
    b. Oral airway with tape. Tape ETT to the maxilla, not the mandible.
    c. Minimize head and neck movement with the use of a cervical collar, cervical spine immobilization device and spine board.

d. Note and document depth of ETT placement.
i. 3-5 cm of ETT movement may occur with neck flexion or extension.

14. Ventilation:
    a. Use care to avoid hyperventilation.
    b. Tidal volume of 6-10 cc/kg or just enough ventilation to see the chest rise.
    c. Use a rate of 20/min for a child and 30/min for an infant or toddler.
    d. If continuous end tidal CO2 monitoring is available, maintain an ETCO2 of 35-40 mmHg (30 mmHg in cases of head injury with signs of herniation).
15. Re-confirm correct ETT position during on-going assessments. At a minimum reconfirmation should occur:
    a. Anytime patient is moved.
    b. Anytime dislodgement is suspected.
    c. Anytime care is transferred to another provider.
16. Documentation
    a. Full report to Emergency Department Physician.
    i. Specifically report any intubation difficulties or airway management problems.
    b. Complete supplemental NAEMSP Airway Form as well as the run report.

VIII. Pediatric Pharmacologic Assisted Intubation (DAI)

A. See "Drug Assisted Intubation: Pediatric" Protocol

1. Advanced provider certification required: Critical Care Transport Paramedic, Flight Paramedic Certification, Certified Flight Registered Nurse, or other certification approved by the Kentucky Board of EMS and the program Medical Director
2. Documentation of initial clinical training, ongoing continuing medical education, and clinical experience in specific pediatric airway management and use of medications for DAI
3. Documentation of active Medical Director involvement in pediatric airway management education, ongoing training, and quality assurance and improvement activities.

Post Intubation Care

- ► Confirmation of correct ETT position
  - No single technique is 100% reliable for ETT confirmation.
  - Pre-hospital EMS providers should use all available means to determine correct ETT position.
  - A minimum of two clinical and one instrumental method of determination is recommended.
  - The following methods may be used to confirm correct ETT placement.
    - Direct visualization of the ETT passing through the vocal cords into the trachea.
    - Auscultation of all lung fields to confirm adequate air exchange.
    - Auscultation of the epigastrium to confirm the absence of disturbance of the gastric fluids during ventilation.
    - Observation of bilateral expansion of the thorax during ventilation.
    - Use of end tidal CO2 detection
      - Colorimetric devices (pediatric size for child < 15 kg)
        - Patient with a pulse
          - YELLOW: ETT is in trachea
          - TAN: Consider possible causes of poor perfusion or poor CO2 production. Give 6 breaths and monitor color of detector. If color changes to yellow or remains tan, ETT is in the trachea. If color changes to purple, apply cricoid pressure, remove the ETT, oxygenate with BVM and re-intubate.
          - PURPLE: ETT not in trachea. Apply cricoid pressure, remove ETT, oxygenate with BVM and re-intubate.
        - Patient without a pulse: Lack of color change is common even with proper placement in cardiac arrest.
          - YELLOW: ETT is in the trachea
          - TAN: Consider possible causes of poor perfusion and evaluate quality of CPR. Give 6 breaths and monitor color of detector. If color changes to yellow or remains tan, ETT is in the trachea. If color changes to purple, CO2 is not being detected because the ETT is not in the trachea or no CO2 is being delivered to the lungs in the arrest state. Confirm placement via other means.
      - Capnometry device that provides a numeric value for end tidal CO2.
      - Capnography device that provides a continuous waveform and digital readout of end tidal CO2.
      - Capnography that is continuous and has the capability to electronically download and print data is the preferred device.
        - Normal values for end tidal CO2 is 5% to 6% which is equivalent to 35-45 mmHg.

Post Intubation Care continued

- Esophageal intubation detector device (see EID protocol)
  - Useful for pediatric patients in children > 8 y/o
- Other clinical signs of improved perfusion and improved ventilation and oxygenation
  - Stable heart rate
  - Pupillary response
  - Stable and rising oxygenation saturation
  - Improved skin color

► Depth of ETT placement
- Correct depth avoids right mainstem bronchus intubation and inadvertent extubation.
- General depths of placement at the teeth or gums:
  - Adult male: 21-23 cm
  - Adult female: 19-21 cm
  - Infant: 10-11 cm
  - Child over 1 y/o: (12cm + Age/2) or (ETT size X 3)
- Direct visualization of cuff of ETT below the vocal cords.
- Inflated cuff of the ETT can be palpated in the sternal notch when the pilot balloon is compressed.

► Securing the ETT
- Initially manually secure ETT in place with your thumb and forefinger.
- A commercial ETT securing device with an incorporated bite block is recommended.
- At a minimum, place an oral airway and tape the ETT in place.
  - If circumferential taping is utilized, use care not to occlude venous blood flow from the head.
  - To avoid excess motion, tape the ETT to the maxilla, not the mandible.
- To further minimize head movement, place a cervical collar, immobilize with a cervical spine immobilization device.

► Following the securing of the ETT, note and document the depth of ETT placement.

Post Intubation Care continued

- ► Ventilation
  - With an ETT and 100% oxygen, large tidal volumes and hyperventilation are not necessary and have been shown in recent studies to be detrimental to patient outcome.
  - Use care to avoid hyperventilation. The exception is the head injured patient with signs of herniation and then only modest hyperventilation is necessary (see below).
  - Ventilate with a tidal volume of approximately 6-10 cc/kg or clinically, just enough ventilation to see the chest rise with each administered breath.
  - Rate of ventilation:
    - Adult: 10-12 / min
    - Child: 20 / min
    - Infant / Toddler: 30 / min
  - If continuous ETCO2 monitoring is available, maintain an ETCO2 of 35-40 mmHg.
    - If the patient has a head injury and signs of herniation, modestly hyperventilate to an ETCO2 of approximately 30 mmHg.
- ► Maintenance of Sedation, Analgesia, Neuromuscular Blockade
  - Purpose: To provide additional sedation, analgesia, and/or neuromuscular blockade in order to maintain ETT placement to facilitate continued oxygenation and ventilation in an intubated patient.
  - Indications
    - Patients awakening from medications used for drug assisted intubation.
    - Comatose patients recovering from paralytic drugs used for rapid sequence intubation.
    - Patients initially intubated without pharmacologic assistance but are now recovering due to improved oxygenation and ventilation.
  - Medications: All should be administered IV or IO and in smaller, titrated doses in the elderly, debilitated or unstable patient.
    - Sedation
      - Benzodiazepines are the most commonly used medications for continued sedation.
      - Single dose of Etomidate (Amidate) for initial intubation is safe. Repeat doses should be avoided due to inhibition of endogenous steroid synthesis.

- Midazolam (Versed): Adult and Peds dose: 0.05-0.1 mg/Kg IV (maximum 5 mg) repeat every 5 min PRN.
- Diazepam (Valium)
  - Adult: 1-5 mg IV, repeat every 5 min PRN
  - Peds: 0.1-0.5 mg/kg IV, repeat every 5 min PRN to a total dose of 5 mg in child < 5 y/o or 10 mg in child > 5 y/o.
- Lorazepam (Ativan)
  - Adult: 1-2 mg IV, repeat X 1 PRN
  - Peds: 0.05 mg/kg IV (max 4 mg), repeat X 1 PRN

- Analgesia
  - Appropriate pain control will facilitate ventilation and oxygenation and allow the use of smaller doses of sedatives and may avoid the need for pharmacologic paralysis with neuromuscular blockers.
  - Narcotics are the primary medications used for analgesia in intubated patients.
  - Fentanyl
    - Potent analgesic and respiratory depressant.
    - No histamine release as compared to morphine.
    - Large doses can rarely cause chest wall rigidity requiring neuromuscular blockade.
    - Rapid onset (5 min) and short duration (15 min).
    - Dosage: Adult and Peds: 1-2 mcg/kg IV, may repeat every 15-20 min PRN
      - Administer over 1-2 min
      - Concentration: 50 mcg/ml
      - Fentanyl 100 mcg = 10 mg Morphine
  - Morphine
    - Classic narcotic used for analgesia.
    - Histamine release causes vasodilation resulting in decreased venous return, decreased B/P, and relief of pulmonary congestion.
      - Valuable for the cardiac patient but a dangerous side effect for the debilitated patient or unstable trauma patient.
      - More of a sedation effect than Fentanyl.
    - Dosage:
      - Adults: 2-5 mg IV every 10-15 min PRN
      - Peds: 0.1 mg/kg IV every 10-15 min PRN

Post Intubation Care continued

- Neuromuscular Blocking Drugs (NMB‘s) (Paralytics)
  - The non-depolarizing class of NMB‘s are preferred for maintenance for the initial paralysis of the successfully intubated patient with DAI meds or in patients intubated without pharmacologic assistance. I
  - **CAUTION**

    MAINTAIN ADEQUATE SEDATION AND ANALGESIA
    CONTINUOUSLY MONITOR OXYGENATION, VENTILATION, AND ETT POSITION WHEN ADMINISTERING PARALYTICS, SEDATION, AND ANALGESIA.

► Re-Confirming ETT Position
- Anytime patient is moved.
- Anytime dislodgement is suspected.
- Anytime care is transferred to another provider.
- Perform the initial ETT confirmation steps.
- Repeat laryngoscopy and directly confirm ETT position in the trachea if there is any question of correct position or any of the other confirmatory tests are equivocal.

► Documentation
- Full report to the receiving physician or designated staff.
  - Specifically report any difficulties or complications related to airway management.
  - Include times and dosages of all medications given.
- Complete the run report.
- Complete the NAEMSP airway form and forward to the Medical Director.

Mechanical Ventilation

Mechanical Ventilation – Automatic Transport Ventilator only

NOTE: This is an advanced procedure. Agencies utilizing ventilators for interfacility transfers should maintain documentation of device-specific training, competency, and medical director approval for each participating paramedic.

- Maintain oxygen saturation of greater than or equal to 92%.
- Attach cardiac monitor, end-tidal CO2 monitor.
- Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes en-route.
- Reassess patient frequently during transport and document findings.
- Collect all transfer documentation: transfer sheet, EKG's, lab, other pertinent information.
- Contact the online medical director (medical control), document indication and order for the mechanical ventilation during transport.
- Consider arterial blood gas prior to transport.
- Document ventilator settings and patient response.
- Document correct tracheal tube placement and secure appropriately.
- Maintain chemical paralysis if utilized pre-transport.
    - Monitor for motor activity.
    - Norcuron (Vecuronium) 0.1-0.15 milligram per kilogram slow IV push; duration of action is 20-30 minutes.
    - Alternative paralytics include atracurium (Tracrium) and rocuronium (Zemuron).
- Maintain adequate sedation
    - Inadequate sedation may present as an unexplained increase in heart rate or blood pressure; the non-paralyzed patient may also demonstrate agitation, anxiety and/or restlessness.
    - Midazolam (Versed) 0.035 milligram per kilogram IV over 2-3 minutes.
- Maintain adequate analgesia.
    - Fentanyl (Sublimase) 1.0-3.0 micrograms per kilogram slow IV push; duration of action 30-60 minutes.

CPAP/BIPAP USE

Indications:
- ► Adult Patient.
- ► Conscious patient in severe respiratory distress due to suspected pulmonary edema, COPD or burn inhalation injuries.
- ► Shortness of breath with pulse oximetry < 92% on high-flow oxygen via NRB mask.

Contraindications:
- ► Suspected Pneumothorax.
- ► Inability to maintain own airway.
- ► Altered mental status.
- ► Agitated or Combative behavior.
- ► Facial trauma or burns.

System Requirements:
- ► Prehospital CPAP/ BiPAP equipment that meets DOH requirements.

Procedure:
- ► Assess patient and initiate high flow oxygen as indicated.
- ► Monitor pulse oximetry.[1]
- ► Apply CPAP/ BiPAP if oxygen saturation < 92% on high flow oxygen via NRB mask.
    - o Connect CPAP/BiPAP device to suitable oxygen supply.
    - o Attach breathing circuit to CPAP/BiPAP device and ensure device is functioning properly.
    - o Apply and secure appropriate size breathing circuit mask to patient.
    - o Titrate positive airway pressure up until improvement in patient pulse oximetry and symptoms.
        - ▪ WARNING: Do not exceed pressures of 10 cm H2O.
- ► Reassess the patient.
- ► Follow CHF or Asthma protocols if appropriate.[2,3]
- ► Transport
- ► Contact Medical control. [4]

[1]Pulse oximetry should be monitored continuously during use of CPAP/BiPAP
[2]If appropriate, nebulized bronchodilators may be administered during PAP ventilation via a side port.
[3]When appropriate, nitroglycerine should be administered by tablets rather than spray when a patient is receiving PAP ventilation.
[4]Advise the receiving ED of CPAP use as soon as possible. Many EDs do not have CPAP within the ED and may need to obtain it from within the hospital.

Combitube

Indications:

- Apneic patient when endotracheal intubation is not possible or not available.
- Standard Combitube: patient must be at least 5 feet tall.
- Combitube SA (small adult): patient 4 – 5 1/2 feet tall.

Contraindications:

- Intact gag reflex.
- Patients < 4 feet tall.
- Known esophageal disease such as cancer.
- Caustic ingestion.
- Allergy or sensitivity to latex (the pharyngeal balloon contains latex).

Procedure:

- Prepare Combitube
- Test balloons.
- Proximal pharyngeal cuff (blue pilot balloon) – 100 ml
- Distal esophageal cuff (white pilot balloon) – 15 ml
- Lubricate device with water-soluble lubricant.
    - Pre-oxygenate and hyperventilate the patient, if time permits.
    - Grasp the patient's tongue and jaw with your gloved hand and pull forward.
    - Gently insert the tube until the teeth (or gums) are between the printed rings.
    - Inflate cuff #1 (blue pilot balloon) with 100 ml of air.
    - Inflate cuff #2 (white pilot balloon) with 15 ml of air.
    - Ventilate taller blue tube (#1) with bag valve mask.
    - Auscultate for breath sounds and sounds over the epigastrium. Look for rise and fall of chest.
    - If breath sounds are present and epigastric sounds are absent, continue to ventilate through the blue tube. The tube is properly positioned in the esophagus. In the case above you can aspirate stomach contents through the #2 white tube to relieve some gastric distention.
    - If breath sounds are absent and epigastric sounds are present, attempt to ventilate through the shorter white (#2) tube and assess for breath sounds and epigastric sounds. breath sounds are present and epigastric sounds are absent, continue to ventilate through the white tube (#2); you have intubated the trachea.
    - In addition to auscultation, confirm tube placement by using at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector (note: this device should be used prior to ventilation to be accurate).This should be repeated often, especially after movement of the patient.
    - Secure the device.

King LT-D

Indications:
- ► Apneic patient when endotracheal intubation is not possible or not available.

Contraindications:
- ► Intact gag reflex.
- ► Known esophageal disease such as cancer.
- ► Caustic ingestion.

Procedure:
- ► Choose correct size:

Size	Height	Weight	Cuff Volume (ml)
2	35-40 inches	12-25 kg	25-35
2.5	41-51 inches	25-35 kg	30-40
3	4-5 feet	N/A	45-60
4	5-6 feet	N/A	60-80
5	6 feet	N/A	70-90

- ► Prepare King LT-D
- ► Test cuffs for leaks (see volume above).
- ► Lubricate device with water-soluble lubricant.
- ► Preoxygenate and hyperventilate the patient, if time permits.
- ► Grasp the patient‘s tongue and jaw with your gloved hand and pull forward.
- ► With the King LT-D rotated laterally at 45-90 degrees such that the blue orientation line is touching the corner of the mouth, introduce tip into mouth and advance behind base of tongue.
- ► As tube tip passes under tongue, rotate tube back to midline (blue orientation line faces chin).
- ► Advance tube until base of connector is aligned with teeth or gums.
- ► Inflate cuffs to appropriate volume as listed above.
- ► Connect the King LT-D to a bag-valve device and ventilate the patient. If there is resistance to ventilation slowly withdraw tube until resistance to ventilation is relieved.
- ► Assess for adequate placement by auscultation (equal breath sounds over the chest and lack of sounds over the epigastrium with bagging), symmetrical chest wall rise and at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector (note: this device should be used prior to ventilation to be accurate).This should be repeated often, especially after movement of the patient.
- ► Secure the device.

Laryngeal Mask Airway (LMA)

Indications:

- ► Inability to place ETT for airway management.

Contraindications:

- ► Intact gag reflex
- ► Pulmonary Fibrosis
- ► Morbid Obesity

Procedure:

- ► Check tube for proper inflation/deflation.
- ► Lubricate the back of the mask with a water-soluble jelly.
- ► Pre-oxygenate the patient.
- ► Insert the LMA into the hypopharynx until resistance is met. Inflate the cuff until a seal is obtained. (**Note**: This airway does not prevent aspiration of stomach contents.)
- ► Connect the LMA to a bag-valve device and ventilate the patient.
- ► Assess for adequate placement by auscultation (equal breath sounds over the chest and lack of sounds over the epigastrium with bagging), symmetrical chest wall rise and at least one additional method: colorimetric end-tidal CO2 detector, capnography, or esophageal tube detector (note: this device should be used prior to ventilation to be accurate). This should be repeated often, especially after movement of the patient.
- ► Secure the device.

Digital Intubation

Indications:

- ► Inability to intubate via direct visualization or via BNTI.
- ► Patient should be either unresponsive or extremely cooperative.

Contraindications:

- ► Patient condition that may result in biting of paramedic fingers.
- ► Caution: Human bite wounds can result in life/extremity threatening infections. Use caution with this procedure. Consider the option of the RSI protocol.

Procedure:

- ► Pre-oxygenate with 100% oxygen by NRB for 3-5 minutes
- ► Assemble equipment
  - o ETT'S, BVM, Stylet, Bite block, Suction, Syringe, Securing device.
- ► Monitor Patient
  - o EKG, B/P, Sp02, prepare ETC02 detector device.
- ► Maintain manual cervical spine motion restriction if trauma is suspected. The front of the cervical collar may be removed as long as manual immobilization is maintained.
- ► Lubricate stylet and place into the ETT with the distal tip bent into a "J" shape.
- ► Stand or kneel facing the patient.
- ► Place a bite block to prevent injury to the fingers.
- ► Using the index and middle fingers of the non-dominate hand, pull forward on the tongue and jaw and walk down the tongue to palpate the epiglottis with the middle finger.
- ► Insert the lubricated ETT/stylet at the corner of the mouth on the side of the dominant hand.
- ► Advance the tube over the tongue, between the fingers, over the epiglottis and into the trachea. The index finger can be used to steer the tube into the glottis.
- ► The index finger keeps the ETT against the epiglottis.
- ► As the ETT is advanced toward the glottis lift the middle finger and press the tube anteriorly.
- ► Spontaneous air movement will also guide the tube placement.
- ► Remove the stylet, inflate the cuff, ventilate and verify ETT position.
- ► Secure the ETT in place. Consider the use of a cervical collar to minimize head movement.
- ► Re-check ETT position after each patient movement and upon transfer of care to receiving hospital or other care provider.

References

1. Stewart, C. Advanced Airway Management. Brady. 2002. Chapt.6. Pg. 104-105.

Blind Nasal Endotracheal Intubation

Indications:

- ► Adult spontaneously breathing patient requiring intubation.

Contraindications:

- ► Apnea
- ► Severe maxillofacial injuries
- ► Abnormal pharyngeal/supraglottic anatomy (mass, abscess, etc).

Procedure:

- ► Preoxygenate with 100% oxygen by NRB mask.
- ► Obtain secure IV access.
- ► Consider sedation (See Sedation/Analgesia Protocol) but avoid respiratory depression.
- ► For the awake patient consider applying Lidocaine gel to the ETT and nasal airways and spray the nasopharynx with Lidocaine or Cetacaine spray.
- ► Assemble equipment
    - o ETT (0.5-1.0 mm size smaller than for an oral intubation), BVM, Suction, Syringe, Securing device, Laryngoscopes and Rescue Airway Devices.
    - o An Endotrol ETT is often useful.
- ► Monitor the patient with EKG, B/P, Sp02, and prepare ETC02 detector device.
- ► Maintain manual cervical spine motion restriction if trauma is suspected.
- ► Apply a vasoconstrictor spray to both nares. Lubricate and insert progressively larger sizes of nasal air ways to dilate the nasal passage.
- ► Gently insert a lubricated ETT and pass the ETT using steady, firm pressure.
- ► While advancing the ETT, use a jaw thrust or chin lift maneuver to elevate the epiglottis. This may be performed by an assistant. Listen for continuous breath sounds coming through the ETT. Try to close the mouth with a gloved hand and occlude the opposite nare allowing for maximal breath sounds through the ETT.
- ► Apply cricoid pressure to minimize risk of regurgitation and aspiration and to manipulate larynx to obtain maximum breath sounds.
- ► Just proximal to the glottis, the breath sounds will become louder. Advance the ETT with inspiration.
- ► Inflate the ETT cuff, ventilate, and verify correct ETT position by two clinical methods and presence of ET C02. (See oral intubation protocol)
- ► Secure the ETT in place (approximately 26 cm in females, 27 cm for males at nares).
- ► Consider the use of a cervical collar to limit head movement.
- ► Re-check ETT position with each patient movement
- ► Assist ventilations with a BVM or use a mechanical ventilator (if approved).

References:

1. Stewart, C. Advanced Airway Management. Brady. 2002 Chap. 6. Pg. 91-98.
2. Advanced Trauma Life Support Text. 7 th Edition. 2004. American College of Surgeons. Pg. 57-58.

Melker-cuffed Percutaneous Guide-Wire Assisted Cricothyrotomy

Purpose

To establish an emergency airway through an opening made directly into the trachea.

Indications:

- Situations where a patient cannot be ventilated and oxygenated due to an upper airway obstruction that cannot be relieved by traditional non-surgical methods (Example: upper airway burns with edema)
- Where direct laryngoscopy and other rescue airways have failed or are impossible due to maxillofacial trauma or severe bleeding that obscures anatomic landmarks.
- Situations where the medical crew deems that Melker percutaneous guide wire assisted cricothyrotomy is the best approach for airway management given the circumstances of the individual case.

Contraindications:

- Inability to locate the cricothyroid membrane.
- Any mass over the cricoid cartilage.
- Stenosis (narrowing) in the cricothyroid membrane region.
- Transection or retraction of the trachea due to blunt force trauma to the neck.

Relative Contraindications:

- Enlarged thyroid
- Peritracheal malignancy
- Neck Abcess

Complications:

- Inadequate oxygenation leading to hypoxia and death
- Aspiration
- Bleeding / Hematoma
- Esophageal laceration
- Laceration of posterior tracheal wall
- Pneumomediasatinum

Melker-cuffed Percutaneous Guide-Wire Assisted Cricothyrotomy continued

Procedure:

- ► Continue ventilation and oxygenation with oral/nasal airways and BVM with 100% oxygen while preparations are being made.
- ► Assemble the Cook Melker Cuffed Cricothyrotomy Kit.
- ► Place patient in the supine position with the neck neutral.
- ► Prep the anterior neck with betadine or alcohol.
- ► Palpate the thyroid notch, cricothyroid membrane, cricoid cartilage and sternal notch to obtain anatomic landmark orientation.
- ► Stabilize the thyroid cartilage with the non-dominant hand and maintain this stabilization until the trachea is intubated.
- ► With the scalpel blade make a 1 cm vertical incision in the midline over the cricothyroid membrane
- ► With the 6 cc syringe attached to the 18 gauge TFE catheter/needle assembly, advance it through the incision into the airway at a 45 degree angle to the frontal plane in the midline in a caudal direction. When advancing the needle assembly, aspirate continuously to verify entrance into the airway and free return of air.
- ► Once free air is aspirated, carefully advance the TFE catheter into the trachea and remove the syringe and needle leaving the catheter in place.
- ► Advance the soft, flexible end of the guide wire through the catheter and into the trachea for several centimeters. Leave about 8 inches of the guidewire outside the trachea.
- ► Remove the TFE catheter leaving the guide wire in place. Use the scalpel blade to make a small horizontal stab incision into the cricothyroid membrane immediately next to the guidewire.
- ► Prepare the airway catheter by advancing the handled dilator, tapered end first, into the connector of the cuffed airway catheter until the handle stops at the connector. Lubricate the surface of the dilator to enhance placement.
- ► Advance the dilator and airway catheter assembly over the guide wire until the proximal stiff end of the guide wire is completely visible at the handle end of the dilator. ALWAYS VISUALIZE THE PROXIMAL END OF THE GUIDE WIRE DURING THE AIRWAY INSERTION PROCEDURE TO PREVENT ITS INADVERTENT LOSS INTO THE TRACHEA.
- ► Advance the dilator and airway catheter assembly through the incision using a twisting motion and maintaining secure position of the guidewire
- ► Direct the catheter assembly posteriorly initially and then downward into the trachea.
- ► Once the airway catheter assembly is completely inserted, remove the dilator and guidewire from the airway catheter.
- ► Inflate the cuff on the airway catheter, ventilate with a BVM with 100% oxygen.
- ► Confirm airway catheter placement by at least two clinical methods and $ETC0_2$.
- ► Secure the catheter with the cloth tracheostomy tape provided in the kit.

Needle Cricothyrotomy

Purpose:

- ► To establish an emergency airway through an opening made directly into the trachea.

Indications:

- ► Situations where a patient cannot be ventilated and oxygenated due to an upper airway obstruction that cannot be relieved by traditional non-surgical methods (Example: upper airway burns with edema)
- ► Where direct laryngoscopy and other rescue airways have failed or are impossible due to maxillofacial trauma or severe bleeding that obscures anatomic landmarks.
- ► Situations where the medical crew deems that needle cricothyrotomy is the best approach for airway management given the circumstances of the individual case.

Contraindications:

- ► Inability to locate the cricothyroid membrane.
- ► Any mass over the cricoid cartilage.
- ► Stenosis (narrowing) in the cricothyroid membrane region.
- ► Transection or retraction of the trachea due to blunt force trauma to the neck.

Relative Contraindications:

- ► Enlarged thyroid
- ► Peritracheal malignancy
- ► Neck Abscess

Complications:

- ► Aspiration
- ► Inadequate oxygenation leading to hypoxia and death
- ► Bleeding / Hematoma
- ► Esophageal laceration
- ► Laceration of posterior tracheal wall
- ► Pneumomediastinum

Needle Cricothyrotomy continued

Procedure:

- ► Continue ventilation and oxygenation of the patient using oral/nasal airways, BVM with 100% oxygen while preparations are being made.
- ► Assemble and prepare equipment (best done beforehand).
- ► A commercial 50 PSI jet insufflation system with a manual demand valve switch is preferred but often not available.
- ► Oxygen tubing, with a hole cut near one end, connected to a 50 PSI oxygen source.
- ► Ideally place the patient in a supine position.
- ► Assemble a 12 or 14 (16 or 18 gauge for pediatrics) gauge over the needle catheter and attach to a 10 cc syringe.
- ► Prep the area of the neck over the cricothyroid cartilage with alcohol or betadine.
- ► Using your non-dominant hand, palpate and secure the cricothyroid membrane between your thumb and forefinger.
- ► Puncture the skin in the mid-line over the cricothyroid membrane with the needle/catheter assembly. If a #11 knife blade is available, a small vertical incision over the cricothyroid membrane makes the passage of the needle/catheter assembly easier.
- ► Direct the needle/catheter caudally at a 45 degree angle while applying negative pressure to the syringe.
- ► Carefully insert the needle/catheter through the lower half of the cricothyroid membrane, continually aspirate as the needle/catheter is advanced.
- ► Aspiration of air indicates entry into the tracheal lumen.
- ► Remove the syringe and needle and carefully advance the catheter downward into position being careful not to perforate the posterior tracheal wall.
- ► Attach the catheter to the prepared oxygen delivery system.
- ► Intermittent ventilation can be accomplished by triggering the demand valve or occluding the hole in the oxygen tubing. Allow one second for ventilation and 4 seconds for exhalation. Passive exhalation should occur when the oxygen hole is uncovered. Efforts may be required to open the upper airways to allow for exhalation. Adequate oxygenation may be maintained for 30-40 minutes but $C0_2$ accumulation develops more rapidly. It is best to manually secure the catheter in place.
- ► Visualize the chest for adequate inflation and listen for breath sounds.

Reference: ATLS textbook. Am College of Surgeons. 2004. Pg.65-66. 11.Stewart C. Advanced Airway Management. Brady.2002. Chapt. 8:Surgical Airways. Pg. 135-140.

Standard Surgical Cricothyrotomy

NOTE: This is a restricted procedure. A service and paramedic will require specific authorization from the Board prior to utilizing this procedure and skill.

Purpose:

- To establish an emergency airway through an opening made directly into the trachea.

Indications:

- Situations where a patient cannot be ventilated and oxygenated due to an upper airway obstruction that cannot be relieved by traditional non-surgical methods (Example: upper airway burns with edema).
- Where direct laryngoscopy and other rescue airways have failed or are impossible due to maxillofacial trauma or severe bleeding that obscures anatomic landmarks.
- Situations where the medical crew deems that standard surgical cricothyrotomy is the best approach for airway management given the circumstances of the individual case.

Contraindications:

- Endotracheal intubation can be accomplished or a rescue airway results in adequate ventilation and oxygenation.
- Transection of the trachea with retraction of the distal end into the mediastinum.
- Fractured larynx or significant damage to the cricoid cartilage or larynx.
- Massive neck edema.
- Children < 12 years of age.
- Coagulopathy / bleeding diathesis.

Complications:

- Inadequate oxygenation leading to hypoxia and death
- Bleeding
- Aspiration
- Creation of a false passage into neck tissues.
- Subglottic stenosis / edema.
- Laryngeal stenosis.
- Laceration of the esophagus.
- Laceration of the trachea.
- Mediastinal emphysema
- Vocal cord paralysis or hoarseness.

Standard Surgical Cricothyrotomy continued

Procedure:

- ► Continue ventilation and oxygenation attempts with oral/nasal airways and BVM with 100% oxygen while preparations are being made.
- ► Place patient supine with neck in a neutral position. Palpate the thyroid notch, cricoid cartilage, cricothyroid membrane, and sternal notch for anatomic landmark orientation. Assemble the necessary equipment:
  - o #10 scalpel blade with handle
  - o #5.0 or #6.0 cuffed ETT or tracheostomy tube
  - o Prep solution: betadine or alcohol
- ► Prep the anterior neck with betadine or alcohol.
- ► Stabilize the thyroid cartilage with the non-dominant hand and maintain stabilization until the trachea is intubated.
- ► Make a 2-3 cm vertical midline incision from the mid thyroid cartilage down over the cricoid cartilage. Use care not to transect the cricoid cartilage. Note: Bleeding may be brisk, continue the procedure.
- ► With the index finger of the dominant hand, separate the incision skin edges and identify the cricothyroid membrane.
- ► A midline, short horizontal stabbing incision is made about 1 cm wide in the lower portion of the cricothyroid membrane near the cricoid cartilage. Use care not to transect the cricoid cartilage.
- ► Using the handle of the scalpel, widen the incision in the cricothyroid membrane by rotating the handle 90 degrees.
- ► Insert the ETT through the incision in the cricothyroid membrane and direct the tube distally into the trachea, being careful not to perforate the posterior tracheal membraneous wall.
- ► Inflate the cuff and ventilate the patient.
- ► Confirm ETT position by two clinical methods and ETC02.
- ► Secure the ETT. Consider using a C-collar, CSID/LSB to limit head movement.
- ► Confirm ETT position after each patient movement and on transfer of care to another provider.
- ► Use 4X4's and direct pressure to control bleeding.

References

1. ATLS text. 7 th edition. 2004. Am College of Surgeons. Chapt 2. Pg. 66.

2. Stewart C. Advanced Airway Management. Brady. 2002. Chapt. 8. Pg. 124-135.

Tracheostomy Care – Adult

Basic Standing Orders

- ► Routine Patient Care.
- ► Consult with patient‘s caregivers for assistance.
- ► Assess tracheostomy tube: look for possible causes of distress that may be easily correctable, such as a detached oxygen source.
- ► Obtain pulse oximeter reading.
- ► Consider ALS intercept.

Paramedic Standing Orders

- ► Assist ventilations using bag-valve-mask device with high flow oxygen.
- ► If on a ventilator, remove patient from the ventilator prior to using bag-valve-mask device, as there may be a problem with the ventilator or oxygen source.
- ► Suction if unable to ventilate via tracheostomy or respiratory distress continues. Use no more than 100 mm/Hg suction pressure. If the tracheostomy tube has a cannula, remove it prior to suctioning. Determine proper suction catheter length by measuring the obturator. If the obturator is unavailable, insert the suction catheter approximately 2 to 3 inches into the tracheostomy tube. **Do not use force.** Two to three ml of sterile saline may be used in the tracheostomy tube.
- ► If patient remains in severe distress:
    - o continue ventilation attempt using bag-valve-mask with high-flow oxygen via the tracheostomy. Refer to Asthma/COPD/RAD Protocol if indicated.
    - o If patient‘s breathing is adequate but exhibits continued signs of respiratory distress, administer high flow oxygen via non-rebreather mask or blow-by as tolerated.
- ► If patient continues in severe respiratory distress
    - o Remove tube and attempt bag-valve mask ventilation.
    - o If another tube is available from caregivers, insert into stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned.)
    - o If unable to replace tube with another tracheostomy tube or endotracheal tube, assist ventilations with bag-valve-mask and high-flow oxygen.

Advanced Suctioning

Indication:

- ► Obstruction of the airway (secondary to secretions, blood, and/or any other substance) in a patient currently being assisted by an airway adjunct such as an endotracheal tube, Combitube, tracheostomy tube, or a cricothyrotomy tube.

Procedure:

- ► Ensure the suction device is operable.
- ► Pre-oxygenate the patient.
- ► While maintaining aseptic technique, attach the suction catheter to the suction unit.
- ► If applicable, remove ventilation devices from the airway.
- ► Insert the sterile end of the suction catheter into the tube without suction. Insert until resistance is met, pull back approximately 1-2 cm.
- ► Once the desired depth is met, apply suction by occluding the port and slowly remove the catheter from the tube, using a twisting motion.
- ► Suctioning duration should not exceed 15 seconds.
- ► Saline flush may be used to help loosen secretions and facilitate suctioning.
- ► Re-attach the ventilation device and oxygenate the patient.

Esophageal Intubation Detector (EID) Device

The EID's action is based on the principle that the trachea is held open as a semi rigid tube by the tracheal cartilages while the esophagus is usually collapsed flat.

When an endotracheal tube is correctly placed into the trachea, the collapsed EID will re-inflate when attached to the endotracheal tube. If the EID is placed on an endotracheal tube incorrectly placed into the esophagus, the suction on the EID will cause the esophagus to further collapse and the EID will not inflate.

Two variations of the EID are available. A suction bulb and a 60 cc syringe. The suction bulb is made more rigid by cold temperatures and is thus not as effective in extreme cold.

The major benefit of the EID is in the cardiac arrest patient or the patient in profound shock who is not generating enough pulmonary blood flow to generate a reliable ETC02.

The EID is not reliable in the following clinical situations:

- ► Endotracheal tube obstruction
- ► Morbid Obesity
- ► Pregnancy
- ► Pulmonary edema
- ► Mainstem bronchus intubation
- ► Severe bronchospastic lung disease
- ► Severe COPD

Procedure Protocols

Commonwealth of Kentucky

Application of Electrocardiogram Electrodes and Monitor (Optional Skill – EMT-B)

This protocol reflects an optional Kentucky EMT-B skill. An EMT-B working for an ambulance service contracted with a physician medical director and offering this procedure in patient care shall be required to obtain the necessary training based on the Board approved state curriculum.

This protocol is primarily designed for EMT-B personnel to assist an Advanced Life Support (ALS) provider in patient care. It is not within the scope of practice of the EMT-B for them to discern the various heart rhythms. Distinguishing the various heart rhythms is the responsibility of ALS personnel.

- ► Electrode placement on the patient
  - You can obtain different views of the heart by placing electrodes over different areas of the heart.
  - Electrodes are sized as adult or pediatric.
  - Electrodes are placed on the patient to correspond to the preferred view (I, II, or Modified Chest Left (MCL1)
    - The skin under the electrode should be dry.
    - The skin may need to be abraded to rid of old skin and dirt for better adhesion of the electrode.
    - Peel the electrode off the paper or peel the paper off the electrode (depending on the brand of electrodes).
    - Apply the electrode to the skin.
  - Generally only 3 lead placements are used.
    - I
    - II
    - MCL1
  - Placement of Lead I
    - The positive electrode is placed on the left arm.
    - The negative electrode is placed on the right arm.
    - The Lead Selector is placed on Lead I.
  - Placement of Lead II
    - The positive electrode is placed on the left leg.
    - The negative electrode is placed on the right arm.
    - The Lead Selector is placed on Lead II.
  - Placement of Lead MCL1
    - The positive electrode is placed on the 4th intercostal space to the right of the sternum.
    - The negative electrode is placed on the left arm.
    - The Lead Selector is placed on Lead III.

Application of Electrocardiogram Electrodes and Monitor, continued. (Optional Skill – EMT-B)

- ► EKG Monitor Set-up
  - Turn the monitor on.
  - Connect the lead wires to the monitor.
  - Connect the lead wires to the electrodes.
    - Select the proper Lead selection on the monitor to correspond to the Lead placement on the patient.
    - Record a strip.
    -
- ► Trouble shooting
  - Monitor does not come on
    - Not turned on
    - Dead batteries
  - Flat base line appears on monitor
    - Lead wires not connected to the monitor
  - Wavy base line appears on monitor
    - Lead wires not connected to the electrodes
    - 60 cycle interference
  - Small complexes on screen
    - Turn gain up
    - Make sure Lead selected corresponds to Lead placement
  - Volume
    - Too low - turn volume up
    - Too loud - turn volume down
  - No printout
    - Check if paper is jammed
    - Replace paper if out

Mark I Auto-Injector Administration

Procedure for Auto-Injector:

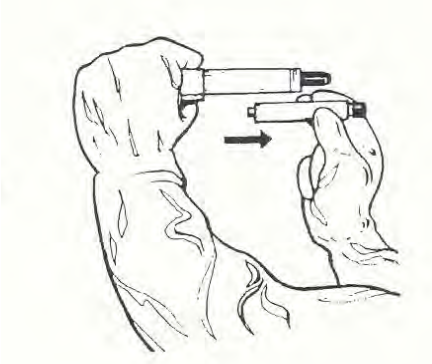
1. Remove the antidote kit from it‘s package.

2. With your non-dominant hand, hold the auto-injectors by the plastic clip so that the larger auto-injector is on top and both are positioned in front of you at eye level.

3. With your dominant hand grasp the **atropine** auto-injector (the smaller of the two) with the thumb and first two fingers.

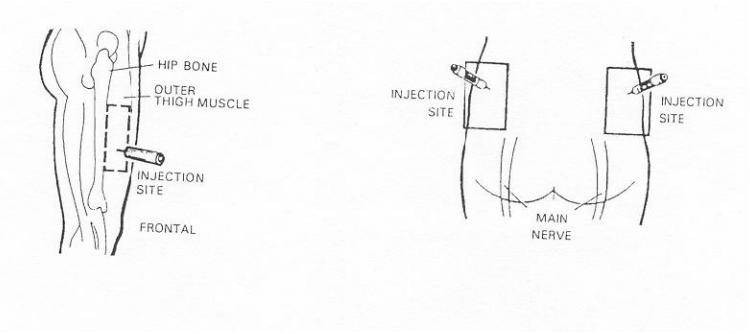
4. DO NOT cover or hold the needle end with your hand, thumb, or fingers-you might accidentally inject yourself. An accidental injection into the hand WILL NOT deliver an effective dose of the antidote, especially if the needle goes through the hand.

5. Pull the injector out of the clip with a smooth motion. **The auto-injector is now armed**.

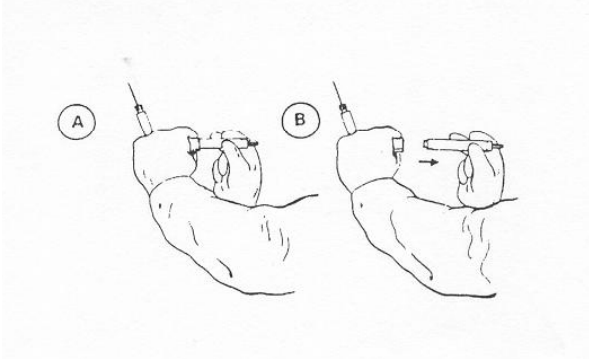


Mark I Auto-Injector Administration continued

6. The injection site for administration is normally in the **outer thigh muscle.** It is important that the injections be given into a large muscle area. If the individual is thinly-built, then the injections should be administered into the **upper outer quadrant of the buttocks.**



7. Place the tip of the auto-injector firmly against the injector site. Re-check to make certain that the injector is loaded prior to placing it firmly against the injection site.



8. Push hard until you hear or feel the injector activate. Hold the injector in place until the medication is fully injected (a minimum of ten (10) seconds).
9. Once administered, record the time administered, and try to properly discard the auto-injector in an appropriate sharps container.
10. Next pull the **2 PAM** Chloride injector (the larger of the two) out of the clip.
11. Inject the patient in the same manner as previously described for the atropine auto-injector, holding the black (needle) end against the outer thigh (or buttocks).
12. Massage the injection sites, if time permits.
13. After administering the first set of injections, wait 5 to 10 minutes.
14. After administering one set of injections, you should initiate decontamination procedures, as necessary to allow the patient to be transported to a medical facility.

Patient Monitoring Following Administration

1. Patients may have symptoms re-develop even after administration of the antidote kit.
2. Atropine may only be repeated every 10 - 15 minutes as needed. (Note: multiple doses of atropine may be needed.)

Mark I Auto-Injector Administration continued

Dosing

1. Mild Exposure
    a. Initial Dosing
        i. 2 PAM Chloride – 1 auto-injector (600 mg)
        ii. Atropine – 1 auto-injector (2mg)
    b. Repeat Dosing
        i. Atropine – 1 auto-injector (2mg) at 5 and 10 minutes following initial dose as needed until patient is stable.
2. Moderate Exposure
    a. Initial Dosing
        i. 2 PAM Chloride – 1 auto-injector (600 mg)
        ii. Atropine – 1 auto-injector (2mg)
    b. Repeat Dosing
        i. Atropine – 1 auto-injector (2mg) at 5 and 10 minutes following initial dose as needed until patient is stable.
3. Severe Exposure
    a. Initial Dosing
        i. 2 PAM Chloride – 3 auto-injectors (1800 mg)
        ii. Atropine – 3 auto-injectors (6mg)
    b. Repeat Dosing
        i. Atropine – 1 auto-injector (2mg) at 5 and 10 minutes following initial dose as needed until patient is stable.

External Jugular IV Access

Criteria

► Patient in need of fluid administration for volume expansion or medication administration.

Exclusion Criteria

► Patient has a functioning peripheral extremity IV.
► Patient has an indwelling central venous line and is hemodynamically unstable.

Procedure

► **All Patients**

- Explain the procedure to the patient whenever possible.
- Position the patient: supine, elevate feet if patient condition allows (this may not be necessary or desirable if congestive heart failure or respiratory distress is present). Turn patient‘s head to opposite side from procedure.
- Expose vein by having patient bear down if possible, and isolate vein with finger pressure just above clavicle.
- **Scrub** insertion site (Betadine v. alcohol is less important than vigor.)
- Do not palpate, unless necessary, after prep.
- Align the cannula in the direction of the vein, with the point aimed toward the shoulder on the same side.
- Puncture the skin over the vein first, then puncture vein itself. Use other hand to traction vein near clavicle to prevent rolling.
- Attach syringe and aspirate if the pressure in the vein is not sufficient to give flashback. Advance cannula well into vein once it is penetrated. Occlude catheter with gloved finger until IV tubing is connected to help prevent air embolism. Attach IV tubing.
- If initial attempt is unsuccessful, a second attempt may be made on the same side as the first prior to contacting medical control. Medical control must be contacted prior to making more than 2 attempts or if bilateral attempts are considered.
- Open IV tubing clamp full to check flow and placement, then slow rate to TKO or as directed.
- Cover puncture site with appropriate dressing. Secure tubing with tape, making sure of at least one 180° turn in the taped tubing to be sure any traction on the tubing is not transmitted to the cannula itself.
- Recheck to be sure IV rate is as desired, and monitor.
- Document fluid type, size of catheter, site and complications on run report.

Intraosseous Infusion - EZ-IO®

Definition

► Intraosseous infusion establishes access in a patient where venous access cannot be rapidly obtained. The bone marrow space serves as a noncollapsible vein and provides access to the general circulation for the administration of fluids and resuscitation drugs. This protocol applies to all appropriate IO insertion sites.

Indications

► Adult patients age ≥ 8 and/or 40 kg or greater

► Intravenous fluids or medications needed and a peripheral IV cannot be established AND exhibit 1 or more of the following:

- An altered mental status (GCS of 12 or less).
- Respiratory compromise (SaO2 80% after appropriate oxygen therapy, respiratory rate < 10 or > 40 per minute.
- Hemodynamic instability (Systolic BP of < 90).

Contraindications

► Fracture of the tibia or femur (consider alternate tibia)

► Previous orthopedic procedures (IO within 24 hours, Knee replacement) (consider alternate tibia)

- Pre-Existing medical condition (tumor near site or peripheral vascular disease).
- Infection at insertion site.
- Inability to locate landmarks due to significant edema.
- Excessive tissue at insertion site.

Considerations

► *Flow rates:* Due to the anatomy of the IO space you will note flow rates to be slower than those achieved with IV catheters.

- Ensure the administration of a 10 ml rapid bolus(flush) with a syringe.
- Use a pressure bag or pump for continuous infusions.

► *Pain:* Insertion of the EZ-IO® in conscious patients causes mild to moderate discomfort and is usually no more painful than a large bore IV. IO infusion may cause severe discomfort for conscious patients.

- Prior to IO bolus or flush on a conscious patient, slowly administer 20-50 mg of 2% lidocaine (preservative free), (i.e. 1-2.5 ml) through the EZ IO® hub.
- Consider pain management.

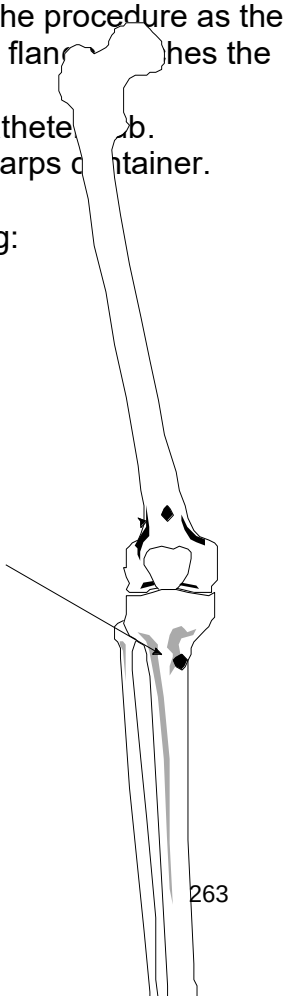
Equipment

EZ-IO® Driver	EZ-IO® needle set
Alcohol or betadine swab	Extension set or EZ-connect
10 ml syringe	Normal Saline
Tape or gauze	2% lidocaine

Procedure

► The preferred site is the proximal tibia, one finger width (1-3 cm) below the prominence (tibial tuberosity) on the flat anteromedial surface. A different bone should be chosen if the primary bone is fractured or the overlying skin is burned or infected.

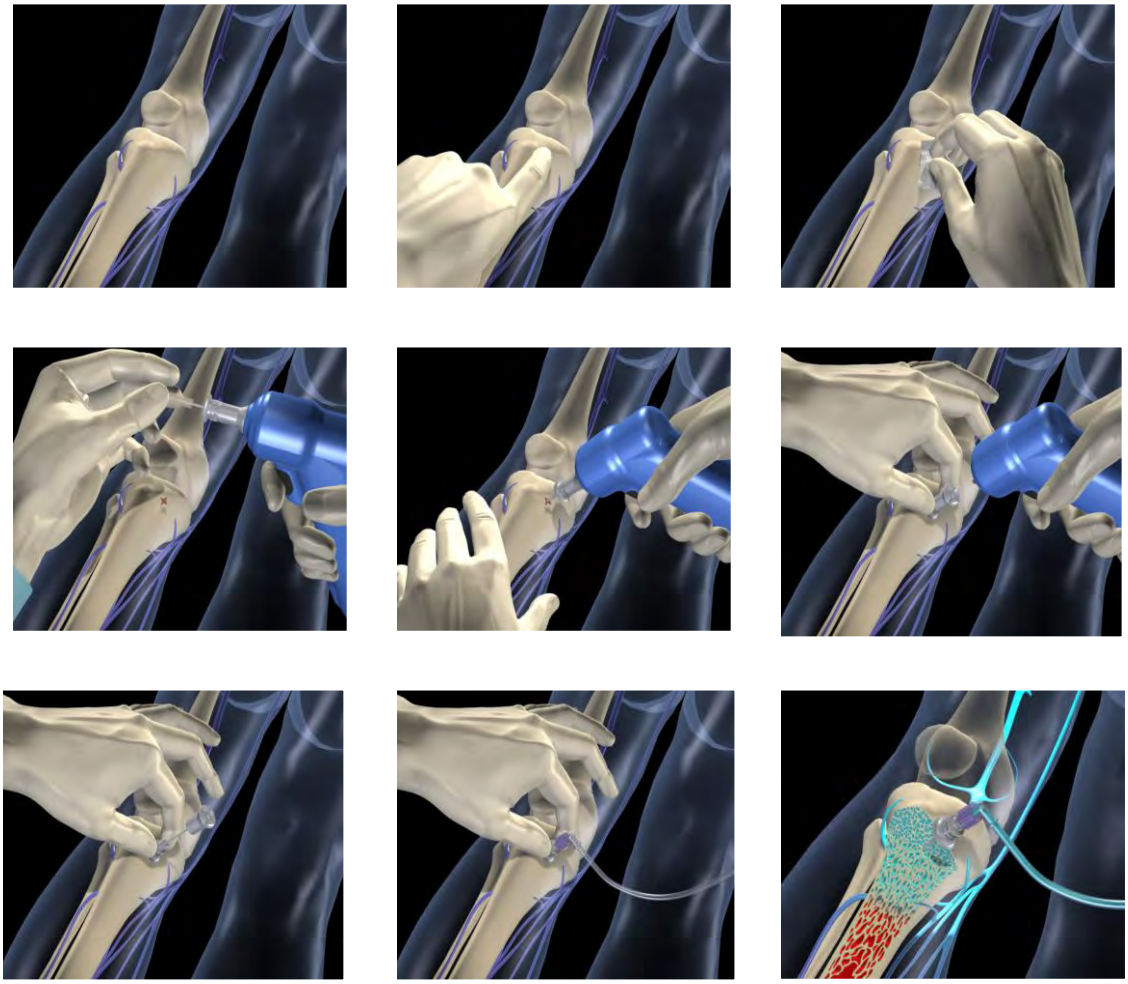
- Wear appropriate Body Substance Isolation Equipment.
- Determine EZ-IO® indications.
- Rule out contraindications.
- Locate insertion site (see note above).
- Cleanse insertion site using aseptic technique.
- For conscious patients, you may consider pain control.
- Prepare the EZ-IO® driver and needle set.
- Stabilize leg and insert EZ-IO® needle set. This should be done at a 90º angle. Power the needle set through the skin until you feel it encounter the bone. If the 5mm mark is not visible, you should abandon the procedure as the needle set may not be long enough. Stop when the needle flange reaches the skin.
- Remove EZ-IO® driver from needle set while stabilizing catheter hub.
- Remove stylet from needle set, place stylet in shuttle or sharps container.
- Confirm proper placement and look for signs of infiltration.
  Proper Placement is confirmed through any of the following:
  - The IO catheter stands straight up at a 90º angle.
  - Blood at the tip of the stylet.
  - Aspiration of a small amount of bone marrow with a syringe.
  - A free flow of drugs or fluids without difficulty or evidence of infiltration.



Intraosseous Infusion EZ-IO® – continued

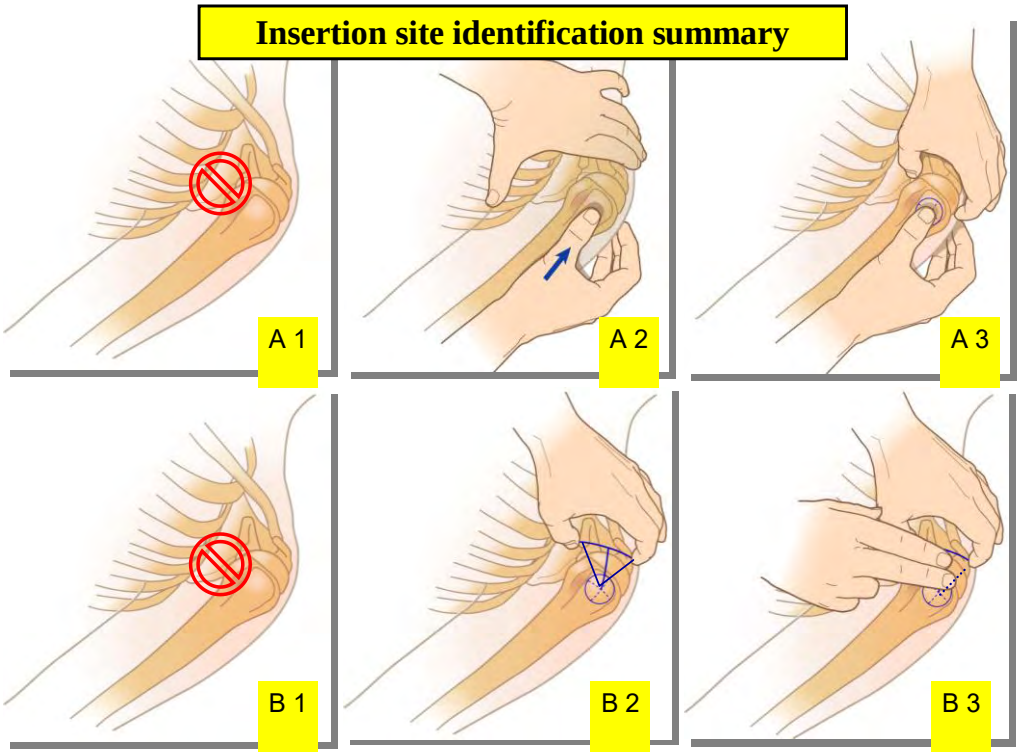
Procedure continued

- Connect primed EZ-Connect®.
- Conscious patients should receive 20 – 50 mg 2% lidocaine IO.
- Flush or bolus the IO catheter with 10 ml of normal saline.
- Begin infusion.
- Dress site, secure tubing and apply wristband.
- Monitor EZ-IO® site and patient condition.



Procedure – Secondary Site

► The head of the Humerus is a site that has been approved by the FDA and the manufacturer of the EZ-IO device. **This site shall only be used if access is not available through the tibia.**



Reference: Vidacare Corporation, EZ – IO AD humeral head insertion

- Expose shoulder and adduct Humerus by placing patient in the supine position with arm against body and elbow resting on the ground and stretcher. The forearm should be resting on the abdomen.
- Palpate and identify the mid-shaft Humerus and continue palpating toward the proximal aspect or humeral head.
- With the opposite hand you may consider pinching the anterior and inferior aspects of the humeral head while confirming the identification of the greater tubercle.
- Confirm proper identification of the greater tubercle.
- Clean site with aseptic technique.
- Stabilize and insert the EZ-IO AD catheter at a 90 degree angle.
- Stabilize catheter and remove driver.
- Stabilize hub and remove stylet.
- Confirm placement and flush with 10 ml of saline.
- Secure needle.

Procedure – Secondary Site continued

- **Notes**

  - Medications and fluids should be given push since gravity flow is often slow.

  - If there is swelling around the site due to fluids in the soft tissues, consider the following:
    - The fluid may be leaking from a previous puncture site.
    - It may be leaking through the hole around the needle which was enlarged by bumping or jiggling the needle.
    - The needle may have gone all the way through the bone and fluid is leaking from the end of the needle on the other side. You must remove the needle and attempt access in another bone.

Intraosseous Access

► Definition

Intraosseus infusion establishes access in a patient where venous access cannot be rapidly obtained. The bone marrow space serves as a noncollapsible vein and provides access to the general circulation for the administration of fluids and resuscitation drugs. This protocol applies to all appropriate IO insertion sites.

► Indication

- Drug or fluid resuscitation of a patient in need of immediate life-saving intervention and unable to obtain peripheral IV access.

► Contraindications

- Placement in or distal to a fractured bone.
- Placement at a burn or infected site.

► Complications

- Infusion rate may not be adequate for resuscitation of ongoing hemorrhage or severe shock, extravasation of fluid, fat embolism, and osteomyelitis (rare).

► Equipment

- 15 to 19 gauge bone marrow needle or FDA approved commercial intraosseous infusion device
- Betadine and gloves
- Primed IV tubing, stopcock, IV solution
- 10 ml syringe with 0.9% NaCl (normal saline)
- Pressure pump/bag or 60 ml syringe for volume infusion or slow push
- 1 vial 1% lidocaine
- 5 ml syringe

► Procedure

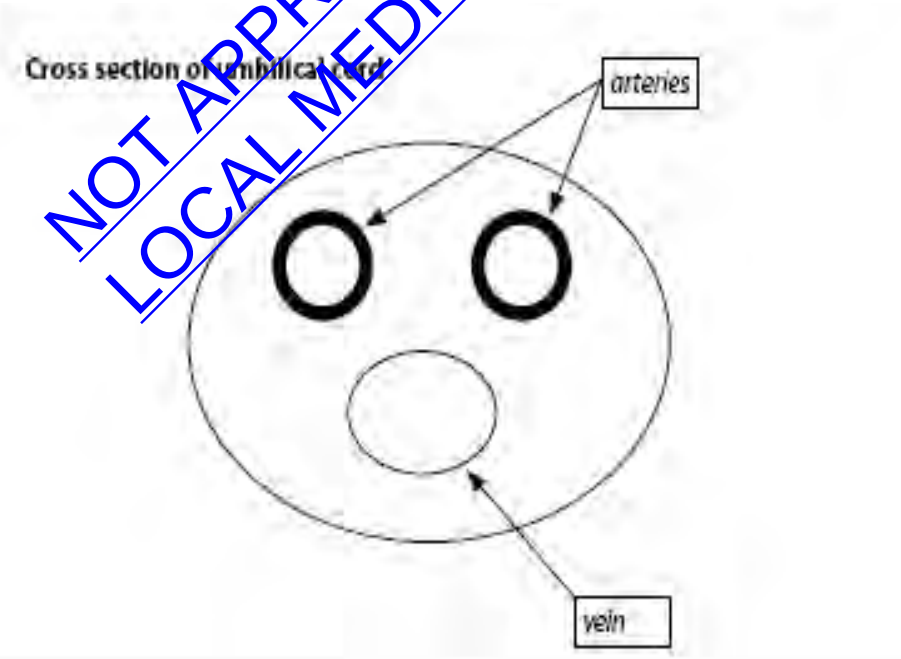
1. When using a FDA-approved commercial IO device, follow manufacturer‘s instructions.
2. Place the patient in a supine position.
3. Identify the bony landmarks. The site of choice for pediatric patients is the proximal tibia, 1-2 cm medially and 1-2 cm distal to the tibial tuberosity on the anteromedial surface.
4. Prep the site with Betadine.

Intraosseous Infusion Access continued

5. When using bone marrow, direct and insert the needle with the stylet in place perpendicular to the bone or angled away from the joint, avoiding the epiphyseal plate. Insert with pressure and a boring or screwing motion until penetration into the marrow, which is marked by a sudden lack of resistance, and then remove the stylet.
6. Needle is appropriately placed if the following are present
   - Aspiration with syringe yields blood with marrow particulate matter.
   - Infusion of saline does not result in infiltration at the site.
   - Needle stands without support.
7. Attach IV tubing, with or without stopcock.
8. If the patient experiences pain during infusion, inject lidocaine into the marrow cavity.
   - Adult: 2 - 5 ml (20 - 50mg) 1% lidocaine
   - Pediatric: 0.5mg/kg 1% lidocaine
9. Flow rates to gravity may be unacceptably slow. Consider placing an IV solution in a pressure bag inflated to 300 torr or pushing the fluid bolus with a syringe and 3-way stopcock.
10. Stabilize needle on both sides with sterile gauze and secure with tape (avoid tension on needle).

Umbilical Vein Cannulation

- Indication
  - Intravenous access needed for resuscitation and stabilization of a newborn.
- Contraindication
  - Ability to obtain peripheral venous access.
- Procedure
  - Prep umbilical cord with povidone-iodine solution.
  - Place a constricting loop around umbilical cord using umbilical tape, but do not tighten at this time.
  - Cut umbilical cord proximal to previous clamp site.
  - Identify the umbilical vein. Typically, it is located at six o'clock and has a thinner wall and larger lumen than the umbilical arteries.
  - Insert umbilical vein catheter 3.5 Fr (preterm) or 5.0 Fr (full term) and advance 1 – 2 cm beyond point at which blood returns freely. Advancing catheter too far can result in placement within the liver and can lead to liver necrosis. If a commercial catheter is not available, a peripheral angiocath can be used as an alternative.
  - Gently tighten purse string to help secure catheter in place and to prevent bleeding.



Vascular Access Via Central Catheter

NOTE: This is a restricted procedure. A service and paramedic will require specific authorization from the Board prior to utilizing this procedure and skill.

- ► Indications
  - ♦ Emergent venous access when patient's life is in imminent danger or patient is in cardiorespiratory arrest, and
  - ♦ A peripheral IV cannot be established after two attempts (attempts can include actual venipunctures or looking at two different sites to find a vein), and
  - ♦ Patient has central venous access device (CVAD) present (PICC Line, Port-a-Cath).
- ► Contraindications
  - ♦ Prophylactic IV access
  - ♦ Suspected infection at skill site
- ► Determine type of catheter: PICC, Mediport or Port-a-Cath
  - ♦ Procedure for peripherally inserted central catheter
    - ○ Prepare equipment: 10 ml syringe (empty), 10 ml syringe (normal saline), and sterile gloves (if available).
    - ○ If more than one lumen is available (PICCs and Boviacs can have one, two, or three lumens), select the largest lumen available.
    - ○ Remove cap on the end of the catheter.
    - ○ Prep the end of the lumen with an alcohol swab.
    - ○ Using a 10 ml syringe, (after unclamping the lumen) aspirate 3-5 ml of blood with the syringe and discard. If unable to aspirate blood, re-clamp the lumen and attempt to use another lumen (if present). clots are present, contact medical control before proceeding. Re-clamp the lumen.
    - ○ Flush the lumen with 3 – 5 ml normal saline using a 10 ml syringe. If catheter does not flush easily (note that a PICC line will generally flush more slowly and with greater resistance than a typical intravenous catheter), re-clamp the selected lumen and attempt to use another lumen (if present).
    - ○ Attach IV administration set and observe for free flow of fluid.
    - ○ If shock is not present, allow fluid to run at rate of 10 ml/hour to prevent the central line from clotting.

Note: The maximum flow rates for a PICC line is 125 ml/hour for less than 2.0 Fr. sized catheter and 250 ml/hour for catheters over 2.0 Fr. sized catheters.
Note: Avoid taking a blood pressure reading in the same arm as the PICC.

- Procedure for implanted catheter (portacath, Pas Port, mediport)
  - Prepare all necessary equipment: 10 ml syringe (empty), 10 ml syringe (normal saline) and sterile gloves (if available). Identify the access site; usually located in the chest.
  - Clean the access site with Betadine; remove Betadine with alcohol swab.
  - Secure the access point firmly between two fingers and attach 10 ml syringe to Huber Needle.
  - Aspirate 3-5 ml of blood with the syringe. If unable to aspirate blood, re-clamp the catheter and do not attempt further use. If clots are present, contact medical control before proceeding. Re-clamp the catheter.
  - Flush the catheter with 3 – 5 ml normal saline using a 10 ml syringe. If catheter does not flush easily, re-clamp the catheter and do not attempt further use.
  - Attach IV administration set and observe for free flow of fluid.
  - If shock is not present, allow fluid to run at rate of 10 ml/hour to prevent the central line from clotting.

Inter-Facility Protocols

Commonwealth of Kentucky

Inter-Facility Transfer

Paramedic Inter-Facility Transfer (PIFT)
Interfacility transfer means —Any transfer, after initial assessment and stabilization, from and to a health care facility." [NHTSA. (2006). Guide for Interfacility Patient Transfer]

Interfacility transfers are done every day within the normal scope of practice as defined by Kentucky EMS regulations.

If the normal scope of practice is not exceeded, then no further assistance or special circumstance is needed as long as the patient is otherwise stable.

Examples:
- EMT transfers a patient with a saline lock
- Paramedic transfers a patient on a Lidocaine drip

Occasionally, the needs of the patient exceed the capabilities and scope of practice of the EMS provider. Under normal circumstances these patients would require hospital staff to accompany the crew in transport. The hospital RN would be part of the team and hold ultimate responsibility for administering and monitoring the "Non-EMS" medications, devices, and treatments.

Examples:
- A stable patient with a chest tube
- A 26 week pregnant female in active labor with mag sulfate drip

Stability
- ► To be eligible for a PIFT transfer, a patient must be "stable." A patient is considered "stable" when there is no foreseeable likelihood of material deterioration in the condition of the patient because of or during the transport.
- ► Assessment of stability will require: Hemodynamic and neurologic signs which have demonstrated no deterioration from the acute presentation of the patient, or are within acceptable limits of variation on existing therapy and may be reasonably predicted to remain so during the transport without the need for further adjustments to such therapy.
- ► The pathophysiology of the patient's acute condition is known to favorably respond to the therapeutic interventions which have been undertaken at the sending hospital
    - Patient reports and detailed physician orders are critical components of a stability decision.
    - The paramedic must have a detailed understanding of the patient history as it relates to this current treatment plan as well as additional relevant patient history and physician instructions for managing patient change during transport.

The final decision on whether the patient can be transported under the PIFT program will be made by the transporting paramedic.

Inter-Facility Transfer continued

Medical/Legal Aspects of Interfacility Transfer Overriding Principals

- The law requires that patients who are being transferred from one facility to another facility for a higher level of care continue to receive appropriate medical care during transport.
- The sending facility is legally responsible for ensuring that the mode of transport and personnel accompanying the patient during the transport are appropriate for this particular patient at this particular time.

Emergency Medical Treatment and Active Labor Act (EMTALA)

- Originally passed in 1985 as part of The Consolidated Omnibus Budget Reconciliation Act (COBRA).
- Sometimes referred to as the Anti-Dumping law since it was passed to prevent hospitals from refusing to treat indigent persons or transferring them inappropriately to other facilities.

Principals of EMTALA

- Requires hospitals to provide a medical screening examination for all patients seeking medical attention in order to determine if an emergency medical situation exists.
- A patient may not be transferred to another facility if they are at risk to deteriorate from or during transfer unless the current hospital cannot meet the needs of the patient.
- The patient may not be transferred if they are unstable and remain at risk of deterioration unless the sending physician certifies in writing that the benefits to be obtained at the receiving hospital justify the risks of transfer.
- The patient must be accepted by the receiving hospital prior to transfer; the receiving hospital must accept the patient if it has the space and the skills necessary to care for the patient.
- The patient or a legally responsible person must request the transfer after being advised of the risks and benefits of transfer.
- The sending hospital must provide whatever treatment is within its capabilities to ensure that the patient is stabilized before transfer.
- All relevant medical records must be sent with the patient.
- There are many interfacility transfers that will not be eligible for paramedic interfacility transfer and therefore must utilize hospital staff (physician, RN or other staff).
    - Patients who are not stable according to the definition listed previously.
    - Patients who are on medications or equipment that is not included in paramedics training.
    - Situations where the paramedic is not comfortable transporting without additional hospital personnel.

Excluding a weather or disaster related incident that preclude the use of available air medical or ground-based specialty transport systems the transport of unstable patients by a ground transport system with paramedic without specialty training is ill-advised and may be a violation of federal law.

Paramedic Interfacility Transport Allowable Medication Classification

Paramedics, with documented training and approved protocols may transport patients who, in the sending physician‘s (and paramedic‘s) opinion, are hemodynamically stable and have one or more of the following classifications of medications infusing:

- Anticoagulants
- Anticonvulsants
- Antidiabetics
- Antidysrhythmics
- Antihypertensives
- Anti-infectives
- Antipsychotics
- Cardiac Glycosides
- Corticosteroids
- Gastrointestinal Agents (including H2 Blockers, PPI‘s, antiemetics, and Somatostatin or its analogues)
- IV Fluids, Electrolytes (including Dextran, Albumin, and Hetastarch)
- Pitocin
- Narcotics (including all routes except epidural)
- Parenteral Nutrition and Vitamins
- OTC Medications
- Platelet Aggregation Inhibitors (including IIb/IIIa Inhibitors)
- Respiratory Medications (Beta Agonists, Anticholinergics, Mucolytics and Steroids)
- Sedatives (Benzodiazepines, Barbiturates)

***** Anesthetics (Propofol)

- Vasoactive Agents (Antihypertensives, Pressors/sympathomimetics.

Maintenance of Blood or Blood Products

Purpose:

Establish guidelines for Paramedic administration of blood or blood products.

Definition of Scope:

"***Maintenance***" of Blood or Blood Products (PRBCS, FFP, Platelets, Whole Blood, et al..) includes the administration of ***ordered*** blood or blood products. This may include the continuation of multiple units or "bags" of blood or blood products that are ordered prior to departure from a facility during an interfacility transfer.

The "changing of tubing and/or units/bags" of blood or blood products does not constitute the "initiation" of blood; rather, this is considered the "maintenance" of a therapy that has previously been ordered by a referring physician.* This therapy may be utilized by a **Licensed Paramedic with appropriate training and through this or other Medical Director approved protocols.

"***Initiation***" of blood or blood product administration is a *clinical decision* reserved **ONLY** for the board-recognized **Critical Care Paramedic** per established Medical Director approved protocols. To "***initiate***" the administration of blood or blood products means to ***begin*** blood or blood products for a patient that does not have them previously ordered by a physician in the prehospital or interfacility environment. The *clinical decision* to begin the administration of blood or blood products shall constitute the "initiation" of this therapy and is limited to the Critical Care Paramedic only.

Procedure:

1. Type and Cross Matched Packed Red Blood Cells and administration orders should be obtained from referring facility prior to departure.
2. The referring physician should inform the patient or responsible party of the indications and risks and benefits of blood transfusion. Permission for the transfusion should be documented in the transfer record.
3. Assure that the patient is wearing an ID bracelet with his/her name and hospital ID number from the referring hospital. Confirm the patient's name and ID number on the bracelet match those on the unit of blood, and verify the patient's identity and matching numbers with two providers.
4. Blood transfusions are administered through a blood filter and through a primary infusion of Normal Saline.
5. Obtain a complete set of vital signs.
6. Vital signs are monitored 5 minutes after the start of each unit of blood and at least every 15 minutes thereafter unless needed more often as dictated by the clinical situation.
7. Paramedics may monitor and maintain pre-established blood or blood products infusions during inter-facility transfer. Once the last bag of blood has infused, paramedics will:
    a. Provide continuous cardiac monitoring.
    b. Provide oxygen therapy.
    c. Confirm flow rate and settings.

d. Receive from transferring facility a bag of premixed Dopamine.
e. Confirm flow rate settings on IV pump with the transferring physician's written or verbal order.

8. Document blood unit number, vitals (including temperature), and any signs and symptoms of allergic reaction accordingly on the transport record.
9. Once the last bag of blood has infused, paramedics will:
    a. Spike a bag of Normal Saline.
    b. Infuse the bag of normal Saline at KVO or a rate that will maintain patient's hemodynamic status.
    c. Document time of re-spiking of the bag, and amount of Saline that infused into the patient.
    d. Upon arrival at the receiving facility give used blood bag(s) to receiving facility staff.
    e. The following documentation shall be provided for each bag of blood administered:
        i. Beginning Time
        ii. Ending Time
        iii. Lot number, and the patient “R” number

10. Identification and Management of Complications : Contact Medical Direction for consultation.
    a. Hemolytic Transfusion Reaction
        i. Signs and Symptoms: facial flushing, hyperventilation, tachycardia, hives, chest pain, wheezing, fever chills, cyanosis, dark urine, sense of impending doom.
        ii. Management
            1. Stop transfusion, change all tubing, infuse normal saline, collect blood bags for lab analysis.
            2. Maintain normovolemia with normal saline
            3. Consider Lasix 0.5-1.0 mg/kg and/or Mannitol 12.5 grams IV.
            4. If hypotensive consider Dopamine at 2-5 mcg/kg/min.
    b. Febrile Non-hemolytic Transfusion Reaction
        i. Signs and symptoms: headache, fever, chills.
        ii. Management:
            1. Stop transfusion, change all tubing, infuse normal saline, collect blood bags for lab analysis.
            2. Benadryl 25-50 mg IV.
            3. Acetaminophen 325 mg po.
    c. Anaphylactic Reaction
        i. Signs and Symptoms: hives, hypotension, tachycardia, itching, wheezing.
        ii. Management:
            1. Stop transfusion, change all tubing, if hypotensive bolus normal saline at 10-20 cc/kg IV, collect blood bags for lab.

2. Epinephrine (1:1000) 0.3-0.5 mg SQ or IM in adults and 0.01 mg/kg SQ or IM in children for mild allergic reactions.
3. Epinephrine (1:10.000) 0.3 – 0.5 mg IV if the allergic reaction is severe and the patient is hypotensive.
4. Benadryl 25-50 mg IV.
5. Consider intubation for signs of upper airway obstruction.

d. Circulatory Overload
   i. Signs and symptoms: dyspnea, orthopnea, hypertension, CHF.
   ii. Management:
      1. Stop transfusion.
      2. Elevate patient into a sitting position.
      3. Consider Lasix 0.5-1.0 mg/kg IV.

Thoracostomy Tube Monitoring

NOTE: This is an advanced procedure. Agencies providing interfacility transfer of a patient with a chest tube should maintain documentation of training, competency, and medical director approval for each participating paramedic.

- Maintain oxygen saturation of greater than or equal to 92%.
- Attach cardiac monitor.
- Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes en-route.
- Reassess patient frequently during transport and document findings.
- Collect all transfer documentation: transfer sheet, EKG's, lab, other
  - pertinent information.
- Contact the online medical director (medical control), document indication
  - and order for the thoracostomy tube during transport.
- Document order to maintain tube to gravity or to suction (specify amount of suction to be maintained during transport) and patient response.
- If possible elevate head of gurney to 45 degrees.
- Tape all tube connections securely.
- In the event of an air leak, recheck all connections.
- Do not pull on the tube.
- Secure the collection chamber to the side of the gurney (do not tip over).
- Keep the collection chamber below the level of the chest.
- Avoid clamping or kinking of the tube and dependent loops of fluid filled tubing.
- If chest tube is partially pulled out:
  - Do not push tube back into chest.
  - Secure the tube in place.
- If chest tube is pulled out, place occlusive dressing over the insertion site.
- If patient becomes dyspneic:
  - Assess breath sounds.
  - Needle thoracostomy may need to be performed.

Amiodarone Hydrochloride Infusion Monitoring

Intravenous Infusion of Amiodarone Hydrochloride

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes enroute.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
- ► The patient‘s orders must provide for the maintaining of the Amiodarone infusion during transport.
- ► The medication must be administered by an infusion pump.
- ► Contact the online medical director (medical control), document indication and order for drug during transport.
- ► Document drip rate at the beginning of transport and patient‘s response.
- ► Medication concentration must be a minimum concentration of 150mg/250ml (0.6 mg/ml); unstable in more dilute solutions.
- ► Infusion rates must remain constant during transport with no regulation of rates being performed by the paramedic, except for the discontinuation of the infusion.
- ► Infusion rates may vary between 0.5 – 1.0 mg/min.
- ► Physician orders must specify the infusion rate.
- ► Vital signs are to be monitored as indicated in the transfer orders, not less frequently than every 15 minutes.
- ► Y-injection incompatibility; the following will precipitate with amiodarone hydrochloride:
  - o Heparin Sodium
  - o Sodium Bicarbonate
- ► Amiodarone hydrochloride intravenous infusion monitoring is not approved for patients < 14 years old without base physician contact.
- ► For infusions longer than one hour, amiodarone hydrochloride concentrations should not exceed 2mg/ml unless a central venous catheter is used.
- ► If the IV fails, the paramedic may restart a peripheral line use caution to prevent inadvertent overdose.
- ► Discontinue drip if infusion pump fails. Contact medical control.

Heparin Infusion Monitoring

Intravenous Infusion of Heparin

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes enroute.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
- ► The patient‘s orders must provide for the maintenance of the Heparin Infusion during transport. The medication must be administered by infusion pump.
- ► Contact the online medical director (medical control), document indication and order for drug during transport.
- ► Document drip rate at beginning of transport and patient response.
- ► Drip rate change during transport:
    - o Medication concentration will not exceed 100 units/ml of IV fluid (25,000 units/250 ml or 50,000 units/500 ml)
    - o Infusion rates must remain constant during transport with no regulation of rates being performed by the PARAMEDIC, except for the discontinuation of the infusion (e.g., as in a case of bleeding).
    - o If patient develops an unexplained decrease in blood pressure, discontinue drip and contact medical control.
    - o If patient develops unexplained neurological symptoms such as headache, numbness, weakness, seizure, etc., discontinue drip and contact medical control.
- ► If IV fails, the paramedic may restart a peripheral line.
- ► Discontinue drip if infusion pump fails. Contact medical control.

Lidocaine Infusion Monitoring

Intravenous Infusion of Lidocaine

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor, end-tidal CO2 monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes en-route.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
- ► The patient‘s orders must provide for the maintenance of the lidocaine infusion during transport.
- ► The medication must be administered by an infusion drip.
- ► Contact the online medical director (medical control), document indication and order for the mechanical ventilation during transport.
- ► Document drip rate at the beginning of transport and patient‘s response.
- ► Infusion fluid shall be either NS or D5W. Medication concentration shall be either 1 gram/250cc or 2 grams/500cc.
- ► Regulation of the infusion rate shall occur within the parameters as defined by the transferring physician, but in no case will changes be in greater than 1 mg/minute increments every 3 – 5 minutes.
- ► The paramedic may initiate two infusion rate changes prior to consulting with the base hospital. Any additional changes must be made only with base hospital approval.
- ► INFUSION RATE MAY NOT EXCEED 4 mg/min.
- ► If the IV fails, the paramedic may restart a peripheral line use caution to prevent inadvertent overdose.
- ► Discontinue drip if infusion pump fails. Contact medical control.

Lidocaine Standard Strength
1 gram/250 cc D5W or NS or 2 gram/500 cc

cc/hr	mg/min
15	1
30	2
45	3
60	4

Magnesium Sulfate Infusion Monitoring

The Emergency Medical Treatment and Labor Act (EMTALA), specifically addresses the pregnant patient. A pregnant patient in labor is defined as an "unstable" patient until the woman delivers the child and the placenta. The transferring physician must declare, in part, that the benefits of the transfer outweigh the risks to the mother and unborn child. Within the Commonwealth, there are numerous specialty services that have the capability to manage the mother, monitor the child and provide state-of-the-art medical care while enroute. Staffing, at a minimum, will include two paramedics.

Magnesium Sulfate (10 grams/100ml NS) Intravenous Infusion

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor.
- ► Assess and record vital signs including a baseline temperature every 5 to 10 minutes. These will include fetal heart tones, level of consciousness, patellar reflexes, respiratory rate and heart rate.
- ► Contact the online medical control, document indication and order for drug during transport.
- ► Transport patient on her left side.
- ► Indwelling urinary catheter should be in place for patients with Pregnancy Induced Hypertension (PIH).
- ► Document urine output during transport.
- ► Document pump drip rate at the beginning of transport and patient‘s response.
- ► Drip rate changes during transport. Consider magnesium sulfate if ordered by medical control:
    - o Begin with a loading dose of 4 - 6 grams of magnesium sulfate (8 ml of 50% solution in) 100ml of LR over 30 minutes. After loading dose, start magnesium sulfate infusion. Place 10 grams of magnesium sulfate (20ml of 50% solution) in 250ml of LR and infuse at 50 ml/hr (2grams/hr). Remember, magnesium sulfate can cause respiratory depression with cardiovascular collapse. Antidote is calcium chloride IV over 5 minutes.
    - o If patient experiences an absent patella reflex, decreasing respiratory rate or other evidence of respiratory difficulty, discontinue drip, prepare to manage airway, consider calcium gluconate or calcium chloride, contact medical control.
- ► Decrease the drip rate by half and contact the online medical control for any of the following:
    - o Decrease in systolic pressure of 20mm from baseline.
    - o Decrease in diastolic pressure of 10mm from baseline.
    - o Decrease in patella reflex.

Nitroglycerin Infusion Monitoring

Intravenous Infusion of Nitroglycerin

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor, end-tidal CO2 monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes en-route.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
- ► The patient‘s orders must provide for the maintaining of the nitroglycerine infusion during transport.
- ► Contact the online medical control, document indication and order for the nitroglycerin infusion during transport.
- ► Document drip rate at the beginning of transport and patient‘s response.
    - If systolic blood pressure drops below 100, decrease the nitroglycerine by 5 mcg/min (1.5 ml/hr) or 3.3 mcg/min (1.0 ml/hr) depending on your pump and contact the online medical control.
    - If systolic blood pressure drops below 90, stop the nitroglycerine drip, place patient in trendelenberg, consider a fluid bolus and contact the online medical control.
- ► If IV fails, the paramedic may restart a peripheral line. Use caution to prevent inadvertent overdose.
- ► Discontinue drip if infusion pump fails. Contact medical control.
- ► Infusion will be either NS or D5W. Medication concentration will be either half-strength (25 mg/250ml or 50 mg/500 ml) or full-strength (50mg/250 ml).
- ► Regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but in no case will changes be in greater than 5 mcg/minute increments every 5 – 10 minutes.
- ► Paramedic‘s may institute two infusion rate changes prior to consulting with medical control. Any additional changes must be made only after contact with medical control.
- ► INFUSION RATE MAY NOT EXCEED 50 mcg/minute.
- ► In cases of severe hypotension (systolic pressure less than 90 mm Hg), the medication infusion will be discontinued and notification made to both transferring physician and medical control.
- ► Place the patient in trendelenberg and consider fluid bolus..

IV Nitroglycerin Infusion Rates Chart

ml/hr	mcg/min	
	Half-strength concentration (100 mcg/ml)	Full-strength concentration (200 mcg/ml)
	25 mg/250 ml or 50 mg/500 ml	50 mg/250 ml
1	1.7	3.3
2	3.3	6.7
3	5.0	10.0
4	6.7	13.3
5	8.3	16.7
6	10.0	20.0
7	11.7	23.3
8	13.3	26.7
9	15.0	30.0
10	16.7	33.3
11	18.3	36.7
12	20.0	40.0
13	21.7	43.3
14	23.3	46.7
15	25.0	50.0
16	26.7	
17	28.3	
18	30.0	
19	31.7	
20	33.3	
22	36.7	
24	40.0	
26	43.3	
28	46.7	
30	50.0	

Potassium Chloride Infusion Monitoring

Potassium Chloride (KCl)

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes enroute.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
- ► The patient‘s orders must provide for the maintenance of the KCl infusion during transport. The medication must be administered with an infusion pump.
- ► Contact the online medical control, document indication and order for drug during transport.
- ► Document drip rate at beginning of transport and patient response.
- ► Medication concentration will not exceed 40 mEq per liter of IV fluid.
- ► Infusion rates must remain constant during transport with no regulation of rate being performed by the paramedic.
- ► Potassium must be administered via a pump at a rate not to exceed 250 ml per hour or 10 mEq per hour.

Tissue Plasminogen Activator (TPA) Infusion Monitoring

In the treatment of acute myocardial infarction, T-PA is given intravenously as soon as possible in a total dose of 100 mg: the total dose should not exceed 1.5 mg/kg in patients weighing less than 65kg.

Maintain oxygen saturation of greater than or equal to 92%.
Attach cardiac monitor.
Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes enroute.
Reassess patient frequently during transport and document findings.
Collect all transfer documentation: transfer sheet, EKG‘s, lab, other pertinent information.
Contact the online medical control, document indication and order for drug during transport.
Document drip rate at beginning of transport and patient response.
The patient‘s orders must provide for the maintaining of the T-PA infusion during transport.
The medication must be administered by an infusion pump.

Myocardial Infarction, Acute

Accelerated Infusion < 67 kg
Dose: 15 mg IV x 1, then 0.75 mg/kg (max 50 mg) over 30 minutes, then 0.5 mg/kg (max 35 mg) over 60 minutes.

Accelerated Infusion > 67 kg
Dose: 15 mg IV x 1, then 50 mg/kg over 30 minutes, then 35 mg over 60 minutes.

3 Hr Infusion < 65 kg
Dose: 1.25 mg/kg IV over three hours; give 60% of dose over one hour with 6-10% of dose as IV bolus, then 20% over second hour; then 20% over third hour.

3 Hr Infusion > 65 kg
Dose: 100 mg IV over three hours; give 60 mg of dose over one hour with 6-10% of dose as IV bolus, then 20 mg over second hour; then 20 mg over third hour.

EMS Inter-facility Transfer Protocol

Inter-facility Transfer Guideline for Stroke Patient Receiving IV tPA

All patients need to be sent by ALS Ambulance Service ONLY

Sending facility must be able to maintain systolic blood pressure below 180 mmHg and diastolic blood pressure below 105 mmHg prior to transport

↓

Prior to transport sending facility to:

- ☐ Ensure peripheral IV access is patent
  (Two large-bore IV's - one in right antecubital space in case endovascular procedure is required)
- ☐ Prepare document for EMS and receiving facility
  - ☐ Imaging- hard copy must be sent with EMS
  - ☐ Copy of visit record- faxed to receiving facility and/or hard copy with EMS
    - ■ *Onset information, assessment including exam and NIH Stroke Scale Results, orders, test results, vital signs, etc.*
    - ■ *tPA information including exact dose, bolus start time and infusion end time if applicable*
- ☐ If tPA will be infusing during transportation assure IV pump can go with the patient. Pump education and return demonstration is required
- ☐ Document patient status, including vital signs and NIH Stroke Scale just prior to transport

↓

tPA Considerations

- When mixing IV tPA waste excess where only the calculated dose remains in the bottle
- Standard dosing is as follows: 0.9 mg/kg, with 10% given as a one minute IV push bolus, and the remainder is infused over one hour. The maximum dose is 90 mg.
- Label the bottle with the exact dose that the patient is to receive/what is in the bottle
- 50 ml of normal saline must be infused at the same rate as the tPA infusion, after the tPA ends, clear the IV tubing of remaining tPA. *(If IV tubing must be changed, ensure that volume of medication in tubing is included in calculation.)*

↓

HAND-OFF COMMUNICATION

Sending facility to provide the following to EMS and receiving facility:

- ☐ Family/caregiver contact information, including phone number
- ☐ Contact number of sending and receiving physicians
- ☐ Time patient last known normal
- ☐ Time patient arrived at sending facility for treatment
- ☐ Time the EMS was called for transport
- ☐ All information about tPA dose and administration times
- ☐ Last assessment results, including vital signs and NIH Stroke Scale

↓

During Transport:

- ☐ Keep patient strictly NPO, including medications
- ☐ Provide continuous pulse oximetry monitoring, keeping SPO2 > 94%, and ETCO2 between 35-40mmHg
- ☐ Provide continuous cardiac monitoring
- ☐ If patient condition deteriorates notify receiving facility MD of condition change immediately
- ☐ If blood pressure > 180/105 or hypotension develops notify receiving facility MD immediately
- ☐ Perform and document vital signs and neurological assessment every 15 minutes on EMS-Inter-facility transfer flow sheet
- ☐ Contact receiving facility at least 10 minutes prior to arrival

↓

Upon Arrival at Receiving Facility:

- ☐ Handoff all documentation provided by sending facility
- ☐ Handoff all transportation documentation including inter-facility transfer flow sheet
- ☐ Report any changes in condition status
- ☐ Report status of tPA infusion: amount of remaining infusion or completion time, amount of normal saline infusion after tPA if applicable
- ☐ Report all care provided during transport

Rev. 2/15, 3/15, 4/15, 7/15, 9/15, 1/16

EMS – INTER-FACILITY TRANSFER PROTOCOL:

Stroke Patient During or After IV t-PA

ALS Transport Required

Sending facility must be able to maintain systolic blood pressure below 180 mmHg and diastolic blood pressure below 105 mmHg prior to transport and if t-PA still infusing IV pump must go with the patient

Transferring Hospital: _____

Family/Caregiver or Emergency contact number: _____

Contact number for receiving physician: _____

10% of IV t-PA dose is administered via a one minute IV push, then the rest drips in over one hour. This must be followed by 50 ml normal saline - infused at the same rate to clear the t-PA from the IV tubing and ensure maximum dose infused.

No other medications through t-PA infusion line.

*****It is important to note the start and end time of IV t-PA*****

1. Perform and document **Vital Signs and Neurological Exam:**
   (EMS Neurological Exam = Cincinnati Pre-Hospital Stroke Scale and Glasgow Coma Scale with pupil exam)
   - ☐ **From start of IV t-PA**: every 15 minutes x 2 hours, then every 30 minutes x 6 hours, or until arrival at destination hospital

PRN for SBP >180 or DBP >105 mmHg:
- ☐ Consider IV Labetalol 10 mg IV over 2 minutes
- ☐ Recheck in 5 minutes, may repeat one time

PRN for SBP <120 mmHg:
- ☐ HOB flat
- ☐ Discontinue antihypertensive medications

PRN for SBP <90 mmHg: **NO DEXTROSE**
- ☐ 1 liter Normal Saline – wide open rate
- ☐ Notify receiving hospital

2. Continuous cardiac monitoring

3. Continuous pulse oximetry monitoring
   - ☐ Apply oxygen by nasal cannula or mask to maintain Sp02 >94%

4. Monitor for acute worsening conditions and decline in neurologic status *(new headache or nausea, decline in mental status, vomiting, signs of bleeding, or angioedema)*:
   - ☐ **FIRST stop IV tPA** - then call receiving facility.

5. Strict NPO including medication and ice chips

Contact receiving facility with cardiac or blood pressure issues or acute worsening conditions or decline in neurological status.
Tell the operator you need the stroke physician on-call emergently.

6. Contact receiving facility with an update and ETA at least 10 minutes prior to arrival

Hand-Off Communication Upon Arrival Must Include:
- Documentation and imaging from sending facility
- Completed Transfer Protocol Documentation Form or other form that includes required documentation components listed above
- Verbal report, including changes in condition and/or concerns, and care provided
- Status of IV t-PA infusion and normal saline infusion, including completion time if finished in route

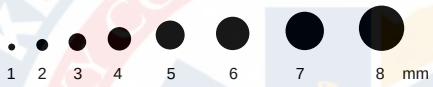
EMS – INTER-FACILITY TRANSFER PROTOCOL:

Stroke Patient During or After IV t-PA

Vital Signs: (Goal: *SBP < 180 mmHg and DBP < 105 mmHg*)

Date/Time from start of tPA	Blood Pressure	Heart Rate	Respiratory Rate
15 MIN			
30 MIN			
45 MIN			
60 MIN			
1 HR 15 MIN			
1 HR 30 MIN			
1 HR 45 MIN			
2 HR			
2 HR 15 MIN			
2 HR 30 MIN			
2 HR 45 MIN			
3 HR			
3 HR 15 MIN			
3 HR 30 MIN			

Neurological Exam:



GLASGOW COMA SCALE	
EYE OPENING:	
Spontaneous	4
To Speech	3
Only with noxious stimuli	2
No eye opening	1
VERBAL RESPONSE:	
Oriented	5
Disoriented, confused	4
Inappropriate speech	3
Incomprehensible sounds	2
No verbal response	1
MOTOR RESPONSE:	
Obeys verbal commands	6
Response to noxious stimuli	
Localizes	5
Withdraws	4
Flexor posturing	3
Extensor posturing	2
No motor	1

Date/Time from start of tPA	Glasgow Coma Scale			Pupils		CPSS
	Eye Opening	Verbal Response	Motor Response	Left	Right	-Facial Droop -Abnormal Speech -Arm Drift (Specify Side)
15 MIN						
30 MIN						
45 MIN						
60 MIN						
1 HR 15 MIN						
1 HR 30 MIN						
1 HR 45 MIN						
2 HR						
2 HR 15 MIN						
2 HR 30 MIN						
2 HR 45 MIN						
3 HR						
3 HR 15 MIN						
3 HR 30 MIN						

Cincinnati Pre-Hospital Stroke Scale (CPSS): ≥ 1 positive finding is abnormal

*****Notify receiving physician if changes in assessment identified*****

EMS Signature: _____ Date: _____

EMS Signature: _____ Date: _____

*Communicate to receiving facility, provide this completed form, and provide electronic ePCR.

Maintenance of Intravenous Medication
PROPOFOL

Drug Characteristics:

Classification: Anesthetic/Sedative/hypnotic

Onset action: 30-45 sec

Duration: 2-64 mins.

Indications for Use:

Sedation for intubated, mechanically ventilated patients

Contraindications:

1. Lack of ventilator support
2. Increased Intracranial Pressure
3. Impaired Cerebral Circulation
4. Lipid Metabolism Disorders
5. Severe cardiac dysfunction
6. Documented hypersensitivity to drug
7. Use in labor and delivery may cause neonatal depression

Precautions:

1. Use in hypovolemic patients may see a significant drop in blood pressure (Hypotension is seen in about 26% of adult and 17% pediatric patients)
2. Closely monitor patients for cardiac dysfunction including arrhythmias
3. Anxiety, agitation, and resistance to mechanical ventilation may occur with abrupt withdrawal

Adverse effects:

Cardiac: bradycardia, hypotension, hypertension, decreased cardiac output, Torsades de Pointes (responds well to MgSo4)
GI: Nausea and vomiting
MSK: involuntary muscle movements

Maintenance dose:

Typical Range: 5-50 mcg/kg/min IV
Available solution concentration: 100ml vial (10mg/mL)

Guidelines for use:

1. A Critical Care Paramedic or a Paramedic with a second ALS attendant (second paramedic, R.N. or M.D.) is authorized to monitor a pre-established infusion of Propofol.
2. Propofol **must** be administered through an infusion pump.
3. Paramedics may not initiate Propofol therapy, but they may restart the infusion if it is interrupted due to infiltration, accidental disconnection of the IV line, malfunctioning pump, etc. All infusions must be restarted in accordance with the transferring orders.
4. When receiving report from the transferring R.N. or M.D., always verify the physician's orders for infusion rate and check pump flow rate.
5. Patients shall be placed and maintained on cardiac, pulse oximetry and continuous waveform capnography monitors during transport.
6. Vital signs shall be assessed and documented at 15 minute intervals (unless patient condition and /or interventions dictates more frequent intervals)
7. For maintenance of sedation in intubated patients, Propofol dosage will be initiated at the setting the transferring facility achieved sedation. If the infusion is not already initiated, advise the facility to begin at 5mcg/kg/min IV. Titrate by 5-10mcg/kg/min every 5 minutes until desired effect reached or patient becomes hypotensive.
8. If infusion pump failure occurs and cannot be corrected, the Paramedic shall:
   a. Discontinue the infusion
   b. Utilize alternative sedation in accordance with local protocols
   c. Document in Patient Care Report.

Medication Reference

Commonwealth of Kentucky

Not included in Service Medication Inventory

ACTIVATED CHARCOAL

Class

Adsorbent

Mechanism of Action

Adsorbs toxic substances from the GI Tract; onset of action is immediate.

Indications

Most oral poisonings and medication overdoses; can be used after evacuation of poisons.

Contraindications

Oral administration to comatose patient; after ingestion of corrosives, caustics or petroleum distillates (ineffective and may induce vomiting); simultaneous administration with other oral drugs.

Adverse Reactions

May induce nausea and vomiting; may cause constipation; may cause black stools.

Drug Interactions

Bonds with and generally inactivates whatever it is mixed with, e.g., syrup of ipecac.

How supplied

25 gm (black powder) / 125 ml bottle (200 mg/ml)
50 gm (black powder) / 250 ml bottle (200 mg/ml)

Dosage and Administration

Note, if not in Pre-mixed slurry, dilute with 1-part charcoal/ 4 parts water.

Adult: 1-2 gm/kg PO or via NGT
Pediatric: 1-2 gm/kg PO or via NGT

Duration of action

depends upon GI function; will act until excreted.

Special Considerations

Often used in conjunction with magnesium citrate
Must be stored in a closed container
Does **not** adsorb cyanide, lithium, iron, lead and arsenic.

ADENOSINE

Class

Endogenous Nucleotide

Mechanism of action

Slows conduction time through the AV Node; can interrupt re-entrant pathways; slows heart rate; acts directly on sinus pacemaker cells. Drug of choice for PSVT.

Indications Conversion of PSVT to sinus rhythm. May convert PSVT due to Wolff-Parkinson-White syndrome. Not effective m converting atrial fibrillation / flutter.

Contraindications

Second or third-degree " block or Sick Sinus Syndrome
Atrial flutter / atrial fibrillation
Ventricular Tachycardia
Hypersensitivity to adenosine

Adverse Reactions

Facial flushing, shortness of breath, chest pain, headache, paresthesia, diaphoresis, palpitations, hypotension, nausea, metallic taste.

Drug Interactions

Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine.
Dipyridamole (Persantine) potentiates the effects of adenosine
Carbamazepine (Tegretol) may potentiate the AV Node blocking effects of adenosine.
May cause bronchoconstriction in asthmatic patients.

How Supplied

Three mg/ml in 2-ml flip-top vials for IV injection

Dosage and Administration

Adult: 6 mg over 1-3 seconds; If no response after 1-2 minutes, administer 12 mg over 1-3 seconds, Maximum total dose = 30 mgs.
Pediatric: 0.1 - 0.2 mg/kg rapid IV; maximum single dose = 12 mgs.

Duration of action

Onset and peak effects in seconds; duration 12 seconds.

Special Considerations

Short half-life limits side effects in most patients.
Pregnancy safety: Category C.

ALBUTEROL

Class

Sympathomimetic, bronchodilator.

Mechanism of Action

Selective β-2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.

Indications

Treatment of bronchospasm in patients with reversible obstructive airway disease (COPD/asthma). Prevention of exercise-induced bronchospasm.

Contraindications

Known prior hypersensitivity reactions to Albuterol.
Tachycardia dysrhythmias, especially those caused by digitalis.

Adverse Reactions

Often dose-related and include restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilatation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm.

Drug Interactions

Tricyclic antidepressants may potentiate vasculature effects.
Beta-blockers are antagonistic.
May potentiate hypokalemia caused by diuretics.

How Supplied

Solution for aerosolization: 0.5% (5 mg/ml)
Metered Dose Inhaler: 90 mcg/metered spray (17 gm canister with 200 inhalations)
Syrup: 2 mg/5 ml

Dosage and Administration

Adult:	Administer 2.5 mg. Dilute 0.5 ml of 0.5% solution for inhalation with 2.5 ml normal saline in nebulizer and administer over 10-15 minutes. MDI: 1-2 inhalations (90-180 mcg). Five minutes between inhalations
Pediatric:	Administer solution of 0.01 - 0.03 ml (0.05 - 0.15 mg/kg/ dose diluted in 2 ml of 0.9% Normal Saline. May repeat every 20 minutes three times.

Duration of Action

Onset in 5-15 minutes with peak effect in 30-minutes - two hours and duration of 3-4 hours.

Special Considerations

Pregnancy Safety: Category C.
Antagonized by beta-blockers.
May precipitate angina pectoris and dysrhythmias.
Should only be administered by inhalation methodology in pre-hospital management.

Not included in Service Medication Inventory

AMIODARONE

Class

Antidysrhythmic.

Mechanism of Action

Prolongation of Action Potential; non-competitive alpha and beta sympathetic blocking effects; Calcium channel blocking effects.

Indications

Suppression of Ventricular Fibrillation refractory to defibrillation and Lidocaine. Suppression of Ventricular Tachycardia refractory to cardioversion and Lidocaine.

Contraindications

Second or Third Degree heart block.. Medication-induced Ventricular dysrhythmias. Hypotension, Bradycardia, Torsades de Pointes. Profound Sinus Bradycardia.

Adverse Reactions

Hypotension, Bradycardia, Pulseless Electrical Activity, Congestive Heart Failure, Nausea, fever, abnormal Liver Function Tests, Thrombocytopenia.

Drug Interactions

Will precipitate with Sodium Bicarbonate: incompatible. Compatible with: Dopamine, Dobutamine, Isoproterenol, Lidocaine, NTG, Norepinephrine, Phenylephrine, KCL, Procainamide.

How Supplied:

150 mg in 3 ml vials.

Dosage and Administration

Adult: 300 mg slow IV Push over 1-2 minutes in 10 ml Normal Saline, (For ACLS VF/ Pulseless VT) IV Drip 0.5-1mg per minute. (For malignant ventricular arrhythmias) per ordering physician.

Duration of Action: Onset: 5-15 minutes. Peak Effect: Variable. Duration: Variable

Special Considerations Pregnancy safety: Category C Maintain at room temperature and protect from light in storage (light protection not required during administration). Hypotension usually responsive to slowing infusion rate, IV Normal Saline. Administer cautiously in patients with Heart Failure or poor systolic function. May be especially effective in high-risk patients with recent acute MI.

ASPIRIN

Class

Platelet inhibitor, anti-inflammatory agent.

Mechanism of Action

Prostaglandin inhibition.

Indications

New onset chest pain suggestive of Acute Myocardial Infarction. Signs and symptoms suggestive of recent cerebrovascular accident.

Contraindications

Hypersensitivity.
Gastrointestinal bleeding.

Adverse Reactions

Heartburn.
GI bleeding.
Nausea, vomiting.
Wheezing in allergic patients.
Prolonged bleeding.

Drug Interactions

Use with caution in patients allergic to NSAIDS.

How Supplied

81 mg or 325 mg tablets (chewable and standard).

Dosage and Administration

81 mg - 325 mg PO.

Duration of Action

Onset: 30-45 minutes.
Peak effect: variable.
Duration: Variable.

Special Considerations

Pregnancy Safety: Category D.
Not recommended in pediatric population.

ATROPINE SULFATE

Class

Anticholinergic agent.

Mechanism of Action

Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites.

Increases heart rate in life-threatening bradydysrhythmias.

Indications

Hemodynamically significant bradycardia.

Asystole.

Drug of choice for organophosphate poisoning.

Bronchospastic pulmonary disorders.

Contraindications

Tachycardia.

Hypersensitivity.

Unstable cardiovascular status in acute hemorrhage and myocardial ischemia.

Narrow-angle glaucoma.

Adverse Reactions

Headache, dizziness, palpitations, nausea and vomiting.

Tachycardia, dysrhythmias, anticholinergic effects (blurred vision, dry mouth, urinary retention).

Paradoxical bradycardia when pushed slowly or at low doses.

Flushed, hot dry skin.

Drug Interactions

Potential adverse effects when administered with digoxin, cholinergics, physostigmine.

Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.

How Supplied

Prefilled syringes: 1.0 mg in 10 ml of solution.

Nebulizer: 0.2% (1 mg in 0.5 ml) and 0.5% (2.5 mg in 0.5 ml).

Injection Solution as Sulfate: 0.5mg/ml (1ml);
1mg/ml (1ml); 0.1mg/ml (5ml,10ml);
0.4mg/ml (1ml, 20ml) Autoinjectors: (See
Nerve Agent Antidote)

Dosage and Administration

Adult:

- Bradydysrhythymias: 0.5 - 1.0 mg IV every 3-5 minutes as needed to maximum total dose of 0.04 mg. (may be given Endotracheally if IV not established: 2.0 mg followed by 2.0 ml of Normal Saline Solution).
- Asystole: 1.0 mg IV push every 3-5 minutes as needed to maximum total dose of 3 mg / kg (may be given Endotracheally if IV not yet established: 2.0 mg followed by 2.0 ml Normal Saline Solution).

Pediatric:

- Bradydysrhythmias: 0.2 mg / kg IV / ET / IO (minimum single dose 0.1 mg, maximum single dose 1.0 mg). If administered via ET, follow with 2.0 ml sterile Normal Saline Solution.
- Asystole: Same as for Bradydysrhythmias: minimum dose 0.1 mg; maximum dose 0.5 mg for a child and 1.0 mg for adolescent.

Duration of Action

Onset: Immediate.
Peak Effect: Rapid to 1-2 minutes.
Duration: 2-6 hours.

Special Considerations

Pregnancy Safety: Category C.
Moderate doses dilate pupils.

Not included in Service Medication Inventory

CALCIUM CHLORIDE / CALCIUM GLUCONATE

Class

Electrolyte.

Mechanism of Action

Increases cardiac contractile state (positive inotropic effect).
May enhance ventricular automaticity.

Indications

Hypocalcemia, magnesium sulfate overdose, hyperkalemia, calcium channel blocker toxicity.
Adjunctive therapy in treatment of insect bites and stings.

Contraindications

Hypercalcemia, VF during cardiac resuscitation; digitalis toxicity.

Adverse Reactions

Bradycardia, asystole, hypotension, peripheral vasodilation, metallic taste, local necrosis, coronary and cerebral artery spasm, nausea, vomiting.

Drug Interactions

May worsen dysrhythmias secondary to digitalis.
May antagonize effects of Verapamil.
Flush line before and after administration of sodium bicarbonate.

How Supplied

10% solution in 10 ml ampules, vials and prefilled syringes (100 mg/ ml).

Dosage and Administration

Adult:	2-4 mg/kg of 10% solution slowly IV over 5 minutes; may repeat in 10 minutes. (maximum: 1 gm dose)
Pediatric:	20 mg/kg/dose of 10% solution slow IV/ IO (Maximum: 1 gm dose); May repeat in 10 minutes.

Duration of Action

Onset: 5-15 minutes.
Peak effects: 3-5 minutes.
Duration: 15-30 minutes but may persist for 4 hours (dose dependent).

Special Considerations

Pregnancy safety: Category C.
For pediatrics: if calcium gluconate is unavailable, 1-2 ml of 10% calcium chloride solution, diluted with IV fluid, may be substituted.

Not included in Service Medication Inventory

DEXAMETHASONE SODIUM PHOSPHATE

Class

Corticosteroid.

Mechanism of Action

Suppresses acute and chronic inflammation; immunosuppressive effects.

Indications

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), as an adjunct to treatment of shock.

Contraindications

Hypersensitivity to product.

Adverse Reactions

Hypertension, sodium and water retention, GI bleeding.

None from single dose.

Drug Interactions

Calcium

Metaraminol.

How Supplied

100 mg/ 5 ml vials or 20 mg/1 ml vials.

Dosage and Administration

Adult: 10-100 mg IV (1 mg/kg slow IV bolus). (considerable variance through Medical Control).

Pediatric: 0.25-1.0 mg/kg/dose IV, IO, IM.

Duration of Action

Onset: Hours.

Peak effects: 8-12 hours.

Duration of action: 24-72 hours.

Special Consideration

Pregnancy safety: unknown.

Protect medication form heat.

Toxicity and side effects with long-term use.

DEXTROSE

Class

Carbohydrate, hypertonic solution.

Mechanism of Action

Rapidly increases serum glucose levels.
Short-term osmotic diuresis.

Indications

Hypoglycemia, altered level of consciousness, coma of unknown etiology, seizure of unknown etiology, status epilepticus (controversial).

Contraindications

Intracranial hemorrhage, delirium tremens, ineffective without thiamine,

Adverse Reactions

Extravasation leads to tissue necrosis.
Warmth, pain, burning, thrombophlebitis, rhabdomyositis.

Drug Interactions

Sodium bicarbonate, coumadin.

How Supplied

25 gm/ 50 ml pre-filled syringes (500 mg/ml).

Dosage and Administration

Adult: 12.5-25 gram slow IV; may be repeated as necessary.
Pediatric: 0.5-1 gm/kg/dose slow IV; may be repeated as necessary.

Duration of Action

Onset: less than 1 minute.
Peak effects: variable.
Duration: Variable.

Special Considerations

Administer thiamine prior to D50 in known alcoholic patients.
Draw blood sugar before administering.
Do not administer to patients with known CVA unless hypoglycemia documented.

DIAZEPAM

Class

Benzodiazepine, sedative-hypnotic, anticonvulsant.

Mechanism of Action

Potentiates effects of inhibitory neurotransmitters.
Raises seizure threshold.
Induces amnesia and sedation.

Indications

Acute anxiety states, acute alcohol withdrawal, muscle relaxant, seizure activity, agitation.
Analgesia for medical procedures (fracture reduction, cardioversion).
Delirium tremens.

Contraindications

Hypersensitivity, glaucoma. coma, shock, substance abuse, head injury.

Adverse Reactions

Respiratory depression, hypotension, drowsiness, ataxia, reflex tachycardia, nausea, confusion, thrombosis and phlebitis.

Drug Interactions

Incompatible with most drugs, fluids.

How Supplied

10 mg/5 ml prefilled syringes, ampules, vials and Tubex.

Dosage and Administration Seizure activity:

Adult: 5-10 mg IV q 10-15 minutes prn (5 mg over 5 min.)(maximum dose = 30 mgs.) Seizure activity:

Pediatric: 0.2-0.3 mg/kg/dose IV every 15-30 minutes (no faster than 3 mg over 5 minutes) (max. = 10 mg/kg). Rectal diazepam: 0.5 mg/kg via 2” rectal catheter and flush with 2-3 ml air after administration. Sedation for cardioversion: 5- 15 mg IV over 5-10 minutes prior to cardioversion.

Duration of Action

Onset: 1-5 minutes.
Peak effect: minutes.
Duration: 20-50 minutes.

Special Considerations

Pregnancy safety: Category D
Short duration of anticonvulsant effect.
Reduce dose 50% in elderly patient.

DIAZOXIDE

Class

Vasodilator.

Mechanism of Action

Non-diuretic antihypertensive; arteriolar vasodilatation.

Indications

Hypertensive crisis, especially in pre-eclampsia.

Contraindications

Hypotension, dissecting aortic aneurysm, labor.

Adverse Reactions

Reflex tachycardia, angina, cerebral ischemia, CVA, dysrhythmia, hyperglycemia, nausea, vomiting.

Drug Interactions

Incompatible with heat, light or acid solutions.

How Supplied

5 mg/ml 20 ml ampules.

Dosage and Administration

Adult: 5 mg/kg IV push over 10-30 seconds.
Pediatric: 5 mg/kg IV push over 10-30 seconds.

Duration of Action

Onset: Immediate.
Peak effects: 5 minutes.
Duration of action: 3-12 hours.

Special Considerations

Administer only to patient in supine position.
Extravasation can cause tissue necrosis.

DILTIAZEM HCL

Class

Calcium channel blocker.

Mechanism of Action

Block influx of calcium ions into cardiac muscle: prevents spasm of coronary arteries. Arterial and venous vasodilator. Reduces preload and afterload. Reduces myocardial oxygen demand.

Indications

Control of rapid ventricular rates due to atrial flutter, atrial fibrillation, PSVT.
Angina pectoris.

Contraindications

Hypotension, sick sinus syndrome, second or third degree AV block, cardiogenic shock.
Wide-complex tachycardias.

Adverse Reactions

Bradycardia, second or third-degree AV blocks, chest pain, CHF, syncope.
V-Fib, V-tach, nausea, vomiting, dizziness, dry mouth, dyspnea, headache.

Drug Interactions

Caution in patients using medications that affect cardiac contractility.
In general, should not be used in patients on Beta-blockers.

How Supplied

25 mg / 5 ml vial; 50 mg / 10 ml vial.
Non - refrigerated: LYO-JECT syringe.

Dosage and Administration

Adult: Initial bolus: 0.25 mg/ kg (average dose 20 mg) IV over two (2) minutes. If inadequate response, may re-bolus in 15 minutes: 0.35 mg/kg IV over two minutes. Maintenance infusion: 5-15 mg/hour.

Pediatric: Not recommended.

Duration of Action

Onset: 2-5 minutes.
Peak effect: Variable.
Duration: 1-3 hours.

Special Considerations

Pregnancy safety: category C.
Use in caution in patients with renal or hepatic dysfunction.
PVCs may be noted at time of conversion of PSVT to sinus rhythm.

DIPHENHYDRAMINE

Class

Antihistamine; anticholinergic.

Mechanism of Action

Blocks cellular histamine receptors; decreases vasodilation; decreases motion sickness. Reverses extrapyramidal reactions.

Indications

Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions (phenothiazines).

Blood administration reactions; used for motion sickness, hay fever.

Contraindications

Asthma, glaucoma, pregnancy, hypertension, narrow angle glaucoma, infants, patients taking monoamine oxidase inhibitors (MOAIs).

Adverse Reactions

Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat, paradoxical CNS excitation in children.

Drug Interactions

Potentiates effects of alcohol and other anticholinergics, may inhibit corticosteroid activity, MAOIs prolong anticholinergic effects of diphenhydramine.

How Supplied

Tablet: 25, 50 mg; Capsules: 25, 50 mg.

50 or 100 mg prefilled syringes, vials (IV or IM); elixir 12.5 mg/5 ml.

Dosage and Administration

Adult: 25 - 50 mg IM or IV or P.O.

Pediatric: 1-2 mg/kg IV, IO slowly or IM. If given PO: 5 mg./ kg./ 24 hours.

Duration of Action

Onset: 15-30 minutes.

Peak effect: 1 hour.

Duration: 3-12 hours.

Special Considerations

Not used in infants or in pregnancy: Category B.

If used in anaphylaxis, will be in conjunction with epinephrine, steroids.

DOPAMINE

Class

Sympathomimetic, inotropic agent.

Mechanism of Action

Immediate metabolic precursor to Norepinephrine. Increases systemic vascular resistance, dilate renal and splanchnic vasculature. Increases myocardial contractility and stroke volume.

Indications

Cardiogenic, septic or spinal shock, hypotension with low cardiac output states. Distributive shock.

Contraindications

Hypovolemic shock, pheochromocytoma, tachydysrhythmias, VF.

Adverse Reactions

Cardiac dysrhythmias, hypertension, increased myocardial oxygen demand, extravasation may cause tissue necrosis.

Drug Interactions

Incompatible in alkaline solutions.
MAOIs will enhance effects of dopamine.
Beta blockers may antagonize effects of dopamine.
When administered with Phenytoin: may cause hypotension, bradycardia and seizures.

How Supplied

200 mg / 5 ml - 400 mg / 5 ml prefilled syringes, ampules for IV infusion.
400 mg in 250 ml D5W premixed solutions.

Dosage and Administration

Adult: 2- 20 mcg / kg / min. (Rate determined by physician).
Pediatric: 2 - 20 mcg / kg / min. (Rate determined by physician).

Duration of Action

Onset: 1-4 minutes.
Peak Effect: 5-10 minutes.
Duration: Effects cease almost immediately after infusion shut off.

Special Considerations

Pregnancy safety not established.
Effects are dose-dependent
Dopaminergic response: 2-4 mcg / kg / min.: dilates vessels in kidneys; inc. urine output.
Beta-adrenergic response: 4- 10 mcg / kg / min.: Increased chronotropy and inotropy
Adrenergic response: 10-20 mcg / kg / min.: Primarily alpha stimulant / vasoconstriction.
Greater than 20 mcg / kg / min.: reversal of renal effects / override alpha effects.
Always monitor drip rate.
Avoid extravasation injury.

Etomidate (Amidate)

Class

Sedative/hypnotic

Mechanism of Action

Short-acting, sedative hypnotic; rapid onset of action and recovery; for general induction during drug assisted orotracheal intubation with minimal cardiac and respiratory-depressive effects; causes no histamine release; useful in patients with compromised cardiopulmonary function.

Indications

General anesthesia Induction agent for Drug Assisted Intubation if unable to intubate or achieve sufficient relaxation prior to procedure

Contraindications

Hypersensitivity; may induce cardiac depression in hypertensive geriatric patients. Do not administer by prolonged infusion.

Dosage and Administration

For general anesthesia induction,

Intravenous / Intraosseous dosage

Adults, Adolescents, and Children>=10 years

0.2-0.6 mg/kg IV/IO administered over 30-60 seconds; the usual dose is 0.3 mg/kg IV; Patients geriatrics may require a lower dose, individualized per patient.

If sufficient sedation, consider additional dose of 0.1mg/kg

Duration of Action

Etomidate is rapidly metabolized with an onset of action of less than 1 minute.

Duration is dose dependant, usually lasting 3---5 minutes when an average dose of (0.3 mg/kg) is used.

Special Considerations

Pregnancy and breast feeding mothers, safety not yet established

Effects are individualized dose dependant

Special consideration with geriatric patients may require lower doses.

Adverse Reactions

Severe

Apnea, laryngospasm, Bradycardia, arrhythmia exacerbation, anaphylactic reactions

Moderate

Myocloria, Tachypnea, respiratory depression, hypoventilation, hypertension, hypotension, tachycardia,

Mild

Injection site reaction, nausea, vomiting, hyperventilation, hiccups

EPINEPHRINE

Class

Sympathomimetic.

Mechanism of Action

Direct acting alpha and beta agonist.
Alpha: bronchial, cutaneous, renal and visceral arteriolar vasoconstriction.
Beta 1: positive inotropic and chronotropic actions, increases automaticity.
Beta 2: bronchial smooth muscle relaxation and dilation of skeletal vasculature
Blocks histamine release.

Indications

Cardiac arrest, asystole, PEA, VF unresponsive to initial defib.
Severe bronchospasm, asthma, bronchiolitis.
Anaphylaxis, acute allergic reactions.

Contraindications

Hypertension, hypothermia, pulmonary edema, coronary insufficiency, hypovolemic shock.

Adverse Reactions

Hypertension, dysrhythmias, pulmonary edema, anxiety, psychomotor agitation, nausea, angina, headache, restlessness.

Drug Interactions

Potentiates other sympathomimetics.
Deactivated by alkaline solutions.
MAOIs may potentiate effects of epinephrine.

How Supplied

1 mg / ml (1:1,000) ampules and 0.1 mg / ml (1:10,000) prefilled syringes. Auto-injectors: EPI-Pen: 0. 3 mg / ml EPI-Pen Jr.: 0.15mg/ml

Dosage and Administration

<u>Adult</u>
Anaphylaxis/asthma: 0.3 - 0.5 mg (0.3 - 0.5 ml 1:1000) SC
Anaphylaxis: 0.3 - 0.5 mg (3- 5 ml 1:10,000) IV
Cardiac Arrest: 1 mg IV push (1:10,000) every 3- 5 minutes.
Endotracheal: 2.0- 2.5 mg (1:1,000) every 3- 5 minutes in 10ml NS
<u>Pediatric</u>
Anaphylaxis/asthma: 0.01 mg/kg (0.01 mL/kg 1:1000) SC to maximum of 0.5 mg.
Cardiac Arrest:
Standard initial dose: IV, IO: 0.01 mg/kg (1:10,000, 0.1mL/kg)
ET: 0.1 mg/kg (1:1,000, 0.1mL/kg)
Second and subsequent doses: 0.1 mg/kg (1:1000, 0.1mL/kg)

Duration of Action

Onset: Immediate.
Peak Effects: Minutes.
Duration: Several minutes.

Special Considerations

Pregnancy safety: category C.
Syncope in asthmatic children.

FENTANYL CITRATE

Class

Opioid analgesic (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions.
Depresses respiration.
Suppresses anxiety.
Less histamine release than morphine.

Indications

Analgesia for moderate to severe pain.

Contraindications

Allergic to Fentanyl.
Undiagnosed abdominal pain, depressed respiratory drive, head injury.

Adverse Reactions

Respiratory depression, hypotension, decreased levels of consciousness, nausea, vomiting.

Drug Interactions

Potentiates sedation with phenothiazines and other opiates and other sedative agents.

How Supplied

Injection solution: 0.05 mg/ml (500 mcg/ml)

Dosage and Administration

Adult: 25-50 mcg slow IV over 5 minutes to a maximum dose of 150 mcg (microgram).
Pediatric: 0.5 mcg/kg IV over five minutes.

Duration of Action

Onset: immediate.
Peak Effect: minutes.
Duration: 1-2 hours.

Special Considerations

Pregnancy safety: Category C.
Use with caution in geriatric population, patient with respiratory depression or hypovolemia.

FUROSEMIDE

Class

Loop diuretic.

Mechanism of Action

Inhibits electrolyte reabsorption and promotes excretion of sodium, potassium, chloride.

Indications

CHF; Pulmonary edema, hypertensive crisis.

Contraindications

Hypovolemia, anuria, hypotension (relative contraindication); hypersensitivity, hepatic coma.

Adverse Reactions

May exacerbate Hypovolemia, hypokalemia, ECG changes, dry mouth, hypochloremia, hyponatremia, hyperglycemia (due to hemoconcentration).

Drug Interactions

Lithium toxicity may be potentiated by sodium depletion.
Digitalis toxicity may be potentiated by potassium depletion.

How Supplied

100 mg / 5 ml, 20 mg / 2 ml, 40 mg / 4 ml vials.

Dosage and Administration

Adult: 0.5-1.0 mg / kg injected slowly IV.
Pediatric: 1 mg / kg / dose IV, IO.

Duration of Action

Onset: 5 minutes.
Peak Effects: 20-60 minutes.
Duration: 4-6 hours.

Special Considerations

Pregnancy safety: Category C.
Ototoxicity and deafness can occur with rapid administration.
Should be protected from light.

Not included in Service Medication Inventory

GLUCAGON

Class

Hyperglycemic agent, pancreatic hormone, insulin antagonist.

Mechanism of Action

Increases blood glucose by stimulating glycogenesis.
Unknown mechanism of stabilizing cardiac rhythm in beta-blocker overdose.
Minimal positive inotrope and chronotrope.
Decreases GI motility and secretions.

Indications

Altered level of consciousness when hypoglycemia is suspected.
May be used as inotropic agent in beta-blocker overdose.

Contraindications

Hyperglycemia, hypersensitivity.

Adverse Reactions

Nausea, vomiting.
Tachycardia, hypertension.

Drug Interactions

Incompatible in solution with most other substances.
No significant drug interactions with other emergency medications.

How Supplied

1 mg ampules (requires reconstitution with diluent provided).

Dosage and Administration

Adult: 0.5 - 1 mg IM, SC, or slow IV; may repeat q 20 minutes PRN.
Pediatric: 0.03 -0.1 mg / kg / dose (maximum dose 1 mg) q 20 min. IM, IO, SC, slow IV.

Duration of Action

Onset: 1 minute.

Special Considerations

Pregnancy safety: Category C.
Ineffective if glycogen stores depleted.
Should be used in conjunction with 50% dextrose whenever possible.
If patient does not respond to second dose glucagon, 50% dextrose must be administered.

GLUCOSE - ORAL

Class

Hyperglycemic.

Mechanism of Action

Provides quickly absorbed glucose to increase blood glucose levels.

Indications

Conscious patients with suspected hypoglycemia.

Contraindications

Decreased level of consciousness, nausea, vomiting.

Adverse Reactions

Nausea, vomiting.

Drug Interactions

None.

How Supplied

Glucola: 300 ml bottles.

Glucose pastes and gels in various forms.

Dosage and Administration

Adult: Should be sipped slowly by patient until clinical improvement noted.

Pediatric: Same as adult.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: Variable.

Special Considerations

As noted in indications section.

Not included in Service Medication Inventory

GLYCOPROTEIN IIb / IIIa INHIBITORS

Class

Chimeric monoclonal antibody fragment specific for platelet glycoprotein IIb/IIIa receptors.

Mechanism of Action

Blocks Platelet aggregation and thrombus formation.

Indications

Adjunct to percutaneous transluminal angioplasty..
Adjunct to thrombolytic agents.
Unstable angina not responsive to conventional medical therapy when percutaneous angioplasty is planned within 24 hours.

Contraindications

Active internal hemorrhage.
Clinically significant hemorrhage (GI, GU) within last 6 weeks.
Cerebrovascular accident within past 2 years.
Bleeding disorders.
Thrombocytopenia (low platelets / < 100,000).
Major surgery or trauma within last 6 weeks.
Intracranial tumor, A/V malformation or aneurysm.
Severe Hypertension, Vasculitis.
Use of Dextran before PTCA or intent to use Dextran during PTCA.
Hypersensitivity.

Adverse Reactions

Major bleeding.
Intracranial bleeding.
Thrombocytopenia.

Drug Interactions

Oral anticoagulants contraindicated.
Concurrent Dextran contraindicated.
Concurrent Heparin will increase risk of bleeding.

How Supplied

Intravenous doses (bolus / infusion), variable depending upon brand utilized.

Dosage and Administration

Variable depending upon Brand utilized.

Duration of Action

Onset: Variable: 1.5 -2.5 Hours.
Peak Effect: Variable: 2 - 3 Hours.
Duration: 2 Hours - 2 Days.

Special Considerations

Major bleeding in 14% of coronary angioplasty patients.
Bleeding from open areas may occur (catheter site).
Pregnancy Category: C.

Not included in Service Medication Inventory

HEPARIN SODIUM

Class

Anticoagulant.

Mechanism of Action

Prevents conversion of fibrinogen to fibrin and affect clotting factors: IX, XI, XII, plasmin.

Does not lyse existing clots.

Indications

Prophylaxis and treatment of : venous thrombosis, pulmonary embolus, coronary occlusion, disseminated intravascular coagulation (DIC), post-operative thrombosis.

To maintain patency of IV injection devices and indwelling catheters.

Contraindication

Hypersensitivity.

Patients on antiplatelet drugs (relative contraindication).

Adverse Reactions

Hemorrhage, thrombocytopenia, allergic reactions (chills, fever, back pain).

Drug Interactions

Salicylates, some antibiotics and quinidine may increase risk of bleeding.

How Supplied

Heparin lock flush solutions in 10 and 100-unit / ml ampules and prefilled syringes.

1,000 - 40,000 units / ml ampules.

Dosage and Administration

Adult: Loading dose: 80 units/kg IV; maintenance dose: 18 units/kg/hour IV.

Pediatric: Loading dose: 50 u / kg IV; maintenance dose: 7.5 units/kg/ hour IV.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: 4 hours after continuous infusion discontinued.

Special Considerations

May be neutralized with protamine sulfate at 1 mg protamine / 100 u Heparin: give slowly IV over 1-3 minutes.

Not included in Service Medication Inventory

HYDROXOCOBALAMIN

Class

Cyanide antidote

Mechanism of Action

Hydroxylated active forms of vitamin B12. One molecule binds with one cyanide to form cyanocobalamin (Vitamin B12) which is then excreted renally.

Indications

Known or suspected cyanide poisoning.

Contraindication

No specific contraindications known.

Adverse Reactions

Transient elevation in blood pressure.
Erythema in nearly 100% of patients.
Pruritis and rash.

Drug Interactions

Incompatible with any other medications.
Compatible with D5W, NS and Lactated Ringers.

How Supplied

Single kit with two 2.5 gm vials.

Dosage and Administration

Adult: 5 grams given IV over 15 minutes. If clinically indicated, an additional 5 grams may be repeated over 15 minutes to 2 hours for a maximum dose of 10 grams.

Pediatric: In non-US marketing experience, 70 mg/kg given IV over 15 minutes. May repeat once over 15 minutes.

Duration of Action

Mean half-life is 26 to 31 hours with 60-70% excreted in they urine.

Special Considerations

Contact Poison Control 1(800) 222-1222 to assist in diagnosis or management of cyanide poisoning.
Blood pressure changes can be significant but transient.

Not included in Service Medication Inventory

INSULIN

Class

Antidiabetic.

Mechanism of Action

Allows glucose transport into cells of all tissues; converts glycogen to fat; produces intracellular shift of potassium and magnesium to reduce elevated serum levels of these electrolytes.

Indications

Not used in emergency pre-hospital setting.
Diabetic ketoacidosis or other hyperglycemic state.
Hyperkalemia. (Insulin and D50 used together to lower hyperkalemic state).
Non-ketotic hyperosmolar coma.

Contraindications

Hypoglycemia, hypokalemia.

Adverse Reactions

Hypokalemia, hypoglycemia,, weakness, fatigue, confusion, headache, tachycardia, nausea, diaphoresis.

Drug Interactions

Incompatible in solution with all other drugs..
Corticosteroids, dobutamine, epinephrine and thiazide diuretics decrease the hypoglycemic effects of insulin.
Alcohol and salicylates may potentiate the effects of insulin.

How Supplied

10 ml Vials of 100 Units / ml.

Dosage and Administration

Dosage adjusted relative to blood sugar levels. May be given SC, IM or IV. Standard doses for diabetic coma.

Adult: 10-25 units Regular insulin IV, followed by infusion of 0.1 units / kg /hour.

Pediatric: 0.1 - 0.2 units / kg / hour IV or IM followed by infusion: 50 units of regular insulin mixed in 250 ml of NS (0.2 units / ml), at a rate of 0.1 - 0.2 units / kg / hour.

Duration of Action

Onset: Minutes
Peak Effect: Approximately 1 hour (short-acting); 3-6 hours (intermediate acting); 5-8 hours (long-acting).
Duration: Approximately 6-8 hours (short-acting); 24 hour (intermediate-acting); 36 hour (long-acting).

Special Considerations

Insulin is drug of choice for control of diabetes in pregnancy.
Usually require refrigeration.
Most rapid absorption if injected in abdominal wall; next most rapid absorption: arm; slowest absorption if injected into the thigh.

IPRATROPRIUM BROMIDE

Class

Bronchodilator

Mechanism of Action

Blocks the action of acetycholine at the parasympathetic sites in bronchial smooth muscle causing bronchodilitation.

Indications

Used in bronchospasm especially associated with COPD, and emphysema.

Contraindications

Hypersensitivity to atropine or its derivatives**.**

Adverse Reactions

Poorly absorbed from the lung, so systemic effects are rare.
>10% CNS: Dizziness, Headache, Nervousness.
Respiratory: Cough
1-10% Cardiac: Hypotension, palpitations.

How Supplied

Nebulizing Ampule: 0.02% (2.5ml)
Inhaler: 18mcg/actuation

Dosage and Administration

Adult:	2-3 puffs via metered dose inhaler (MDI) tid-qid; maximum 12 puffs/day. ALT: 500mcg NEB q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)
Pediatric:	< 12 yo: 1-2 puffs(MDI) tid-qid; max: 8 puffs. ALT: 250mcg NEB q 6-8hrs (may mix solution with Albuterol if used within 1 hour).

Kinetics

Onset: 1-3 minutes after administration Peak effects: Within 1.5- 2 hours Duration of Action: Up to 4-6 hours T1/2: 2 hrs after inhalation

Special Considerations

Pregnancy Safety: Category B.

Not included in Service Medication Inventory

KETOROLAC TROMETHAMINE

Class

Non-steroidal anti-inflammatory drug.
Analgesic

Mechanism of Action

NSAID, blocks prostaglandin complex formation and production.
It is a potent analgesic that does not possess any sedative or anxiolytic activities.

Indications

Pain relief, short-term.

Contraindications

Pain relief prior to major surgery.
Allergy, bleeding risk, stroke suspected or confirmed, aspirin allergy.

Adverse Reactions

Allergic reaction, bleeding, rash.

Drug Interactions

Avoid other non-steroidal drugs, Furosimide.

How Supplied

Oral: tablet 10mg
Injection solution: 15 mg/ml, 30 mg/ml
Intravenous solution: 15 mg/ml, 30mg/ml

Dosage and Administration

Adult: 15-30 mg IVP or 30-60 mg IM

Duration of Action

Onset: Minutes.
Peak Effects: 30 minutes. .

Special Considerations

Pregnancy safety: Category C.
Avoid with history of aspirin or NSAID drug.
Increases risk of bleeding, therefore do not use in a patient that may need to go to surgery.

LIDOCAINE HCL (2%)

Class

Antidysrhythmic.

Mechanism of Action

Decreases automaticity by slowing the rate of spontaneous Phase 4 depolarization.

Indications

Suppression of ventricular dysrhythmias (V-tach, VF, PVCs).
Prophylaxis against recurrence after conversion from V-tach, VF.

Contraindications

Second degree and third degree blocks in absence of artificial pacemaker).
Hypotension.
Stokes Adams Syndrome.

Adverse Reactions

Slurred speech, seizures, altered mental status, confusion, lightheadedness, blurred vision, bradycardia.

Drug Interactions

Apnea induced with succinylcholine may be prolonged with high doses of Lidocaine.
Cardiac depression may occur in conjunction with IV Dilantin.
Procainamide may exacerbate the CNS effects.
Metabolic clearance decreased in patients with liver disease or those patients taking beta-blockers.

How Supplied

100 mg in 5 ml solution prefilled syringes.
1 and 2 gram additive syringes.
100 mg in 5 ml solution ampules.
1 and 2 gram vials in 30 ml of solution.

Dosage and Administration

Adult: Cardiac arrest VT/ VF: 1.5 mg / kg IV push; repeat q 3-5 minutes to maximum dose of 3 mg/kg. After conversion to NSR, begin drip at 2-4 mg / min.

Pediatric: VF or Pulseless V-tach: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.

Duration of Action

Onset: 1-5 minutes.
Peak Effect: 5-10 minutes.
Duration: Variable (15 minutes-2 hours)

Special Considerations

Pregnancy safety: Category B.
Reduce maintenance infusions by 50% if patient is over 70 years of age, has liver disease, or is in CHF or shock.
A 75-100 mg bolus maintains levels for only 20 minutes.
Exceedingly high doses of Lidocaine can result in coma or death.
Avoid Lidocaine for reperfusion dysrhythmias after thrombolytic therapy.
Cross-reactivity with other forms of local anesthetics.

LORAZEPAM

Class

Benzodiazepine; sedative; anticonvulsant.

Mechanism of Action

Anxiolytic, anticonvulsant and sedative effects, suppresses propagation of seizure activity produced by foci in cortex, thalamus and limbic areas.

Indications

Initial control of status epilepticus or severe recurrent seizures.
Severe anxiety.
Sedation.

Contraindications

Acute narrow-angle glaucoma.
Coma, shock or suspected drug abuse.

Adverse Reactions

Respiratory depression, apnea, drowsiness, sedation, ataxia, psychomotor impairment, confusion.
Restlessness, delirium.
Hypotension, bradycardia.

Drug Interactions

May precipitate CNS depression if patient is already taking CNS depressant medications.

How Supplied

2 and 4 mg / ml concentrations in 1 ml vials.

Dosage and Administration

Note: When given IV or IO must dilute with equal volume of sterile water or sterile saline.

Adult:	2-4 mg slow IV at 2 mg / min; may repeat in 15-20 minutes to maximum dose of 8 mg. For sedation: 0.05 mg / kg up to 4 mg IV.
Pediatric:	0.05 - 0.20 mg / kg slow IV, IO slowly over 2 minutes; may repeat in 15-20 minutes to maximum dose of 0.2 mg / kg.

Duration

Onset of action: 1-5 minutes.
Peak effect: variable.
Duration of action: 6-8 hours.

Special Considerations

Pregnancy safety: Category D.
Monitor BP and respiratory rate during administration.
Have advanced airway equipment readily available.
Inadvertent arterial injection may result in vasospasm and gangrene.
Lorazepam expires in 6 weeks if not refrigerated.

Note From Drug Control Program: Re: Storage of Lorazepam. According to stability information, Lorazepam injection requires refrigeration and should be stored at 2 - 8º C (35 - 45º F). Lorazepam injection should be protected from light, which can be accomplished by retaining the vial in the carton until ready for use. In addition, freezing of the injection should be avoided. Ambulances are required to ensure stability of all drug products stored on site. Those ambulances unable to meet the above-mentioned storage conditions should refrain from using Lorazepam.

MAGNESIUM SULFATE

Class

Electrolyte.

Mechanism of Action

Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholinesterase release at the myoneural junction; manages seizures in toxemia of pregnancy; induces uterine relaxation; can cause bronchodilation after beta-agonists and anticholinergics have been used.

Indications

Seizures of eclampsia (Toxemia of pregnancy).
Torsades de Pointes.
Hypomagnesemia.
TCA overdose-induced dysrhythmias.
Digitalis-induced dysrhythmias.
Class IIa agent for refractory VF and VT after administration of Lidocaine doses.

Contraindications

Heart blocks.
Renal diseases.

Adverse Reactions

Respiratory and CNS depression.
Hypotension, cardiac arrest and asystole may occur.
Facial flushing, diaphoresis, depressed reflexes.
Circulatory collapse.

Drug Interactions

May enhance effects of other CNS depressants.
Serious changes in overall cardiac function may occur with cardiac glycosides.

How Supplied

2 ml and 20 ml vials of a 50% solution.

Dosage and Administration

Adult: Seizure activity associated with pregnancy: 1-4 gm IV push over 3 minutes. For Torsades de Pointes or Refractory VF/VT: 1-2 grams IV push over 1-2 minutes.
Pediatric: Not recommended.

Duration of Action

Onset: Immediate.
Peak effect: variable.
Duration: 3-4 hours.

Special Considerations

Pregnancy safety: Recommended that drug not be given in the 2 hours before delivery, if possible.
IV calcium gluconate or calcium chloride should be available as antagonist if needed.
The cure for toxemia is delivery of the baby.
Use with caution in patients with renal failure.
Magnesium sulfate is being used for acute MI patients in some systems under Medical Direction.

Not included in Service Medication Inventory

MANNITOL 20%

Class

Osmotic diuretic.

Mechanism of Action

Promotes the movement of fluid form the intracellular space to the extracellular space.
Decreases cerebral edema and intracranial pressure.
Promotes urinary excretion of toxins.

Indications

Cerebral edema.
Reduce intracranial pressure for certain cause (space-occupying lesions).
Rhabdomyolysis (myoglobinuria).
Blood transfusion reactions.

Contraindications

Hypotension, renal failure, electrolyte depletion, dehydration, intracranial bleeding.
Severe CHF with pulmonary edema.
Hyponatremia.

Adverse Reactions

CHF, pulmonary edema, hypertension, nausea, vomiting, headache, seizures, chest pain, tachycardia. Electrolyte depletion, dehydration, hypotension, sodium depletion.

Drug Interactions

May precipitate digitalis toxicity in when given concurrently.

How Supplied

250 ml and 500 ml of a 20% solution for IV infusion (200 mg / ml).
25% solution in 50 ml for slow IV push.

Dosage and Administration

Adult: 0.5 g -2 g / kg IV infusion over 15-30 minutes; may repeat after 5 minutes if no effect.
Pediatric: 0.5 - 1g / kg / dose IV, IO infusion over 30-60 minutes; may repeat after 30 minutes if no effect.

Duration of Action

Onset: 1-3 hours for diuretic effect; 15 minutes for reduction of intracranial pressure.
Peak effect: variable.
Duration: 4-6 hours for diuretic effect; 3-8 hours for reduction of ICP.

Special Considerations

Pregnancy safety: Category C.
May crystallize at temperatures below 7.8 degrees Centigrade.
In-line filter should always be used.
Effectiveness depends upon large doses and an intact blood-brain barrier.
Usage and dosages in emergency care are controversial.

Not included in Service Medication Inventory

METOPROLOL

Class

Antianginal; Antihypertensive Agent; Beta Blocker

Mechanism of Action

Selective inhibitor of beta1-adrenergic receptors; completely blocks beta1 receptors, with little or no effect on beta 2 receptors at doses <100 mg.

Indications

Treatment of hypertension and angina pectoris; prevention of myocardial infarction, atrial fibrillation, flutter, symptomatic treatment of hypertrophic subaortic stenosis; to reduce increased sympathetic stimuli in acute MI.

Contraindications

Hypersensitivity to metoprolol or any component of the formulation; sinus bradycardia; heart block greater than first degree (except in patients with a functioning artificial pacemaker); cardiogenic shock; uncompensated cardiac failure; pregnancy (2nd and 3rd trimesters).

Adverse Reactions

Respiratory: Bronchospasm

Cardiovascular: Bradycardia, palpitations, edema, congestive heart failure, reduced peripheral circulation.

Central nervous system: Drowsiness, insomnia.

Drug Interactions

Drugs which slow AV conduction (**digoxin**): effects may be additive with beta-blockers. **Glucagon**: Metoprolol may blunt the hyperglycemic action of glucagon. **Verapamil or diltiazem** may have synergistic or additive pharmacological effects when taken concurrently with beta-blockers; avoid concurrent I.V. use.

How Supplied

Metoprolol tartrate, is a selective beta1-adrenoreceptor blocking agent, available as 50- and 100-mg tablets for **oral** administration and in 5-ml (1mg/ml) ampules for **intravenous** administration.

Dosage and Administration

Adults: I.V.: Hypertension: Has been given in dosages 1.25-5 mg every 6-12 hours in patients unable to take oral medications

Myocardial infarction (acute): I.V.: 5 mg every 5-10 minutes up to 3 doses in early treatment of myocardial infarction.

Duration of Action

Peak antihypertensive effect: Oral: Within 1.5-4 hours

Duration: 10-20 hours

Half-life: 3-4 hours; End-stage renal disease: 2.5-4.5 hours

Special Considerations

Pregnancy Safety: Category C (manufacturer); D (2nd & 3rd trimesters - expert analysis).

Not recommended in pediatric population. The safety and effectiveness of Metoprolol have not been established in children.

MIDAZOLAM

Class

Short-acting benzodiazepine CNS depressant.

Mechanism of Action

Anxiolytic and sedative properties similar to other benzodiazepines.
Memory impairment.

Indications

Sedation, Anxiolytic prior to endotracheal or nasotracheal intubation.

Contraindications

Glaucoma, shock, coma, alcohol intoxication, overdose patient.
Depressed vital signs.
Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics.

Adverse Reactions

Hiccough, cough, over-sedation, nausea, vomiting, injection site pain, headache, blurred vision.
Hypotension, respiratory depression and arrest.

Drug Interactions

Should not be used in patients who have taken CNS depressant.

How Supplied

2, 5, 10 ml vials (1 mg / ml).
1, 2 , 5, 10 ml vials (5 mg/ ml).

Dosage and Administration

Adult: 0.5 - 2.5 mg slow IV push; (may be repeated to total maximum: 0.1 mg / kg).

Pediatric: To facilitate intubation: Medical control may order: (6 months- 5 years) Midazolam 0.05-0.1 mg/kg IV maximum dose of 5 mg. (6-12 year old) Midazolam 0.1 mg/kg IV maximum dose of 8 mg.

WMD: (See APPENDIX Dosing Table)

Duration of Action

Onset: 1-3 minutes IV and dose dependent.
Peak effect: variable.
Duration: 2-6 hours and dose dependent.

Special Considerations

Pregnancy safety: category D.
Administer immediately prior to intubation procedure.
Requires continuous monitoring of respiratory and cardiac function.
Never administer as IV bolus.

MORPHINE SULFATE

Class

Opioid analgesic. (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions.
Suppresses fear and anxiety centers in brain.
Depresses brain stem respiratory centers.
Increases peripheral venous capacitance and decreases venous return.
Decreases preload and afterload, decreasing myocardial oxygen demand.

Indications

Analgesia for moderate to severe acute and chronic pain (use with caution).
Severe CHF, pulmonary edema.
Chest pain associated with acute MI.

Contraindications

Head injury, exacerbated COPD, depressed respiratory drive, hypotension.
Undiagnosed abdominal pain, decreased level of consciousness.
Suspected hypovolemia.
Patients who have taken MAOIs within past 14 days.

Adverse Reactions

Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting.
Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth.

Drug Interactions

Potentiates sedative effects of phenothiazines.
MAOIs may cause paradoxical excitation.

How Supplied

10 mg in 1 ml of solution, ampules and Tubex syringes.

Dosage and Administration

Adult: 1-3 mg IV, IM, SC every 5 minutes titrated to maximum of 10 mg.
Pediatric: 0.1 - 0.2 mg / kg / dose IV, IO, IM, SC every 5 minutes titrated to maximum of 5 mg.

Duration of Action

Onset: Immediate.
Peak effect: 20 minutes.
Duration: 2 - 7 hours.

Special Considerations

Pregnancy safety: Category C.
Morphine rapidly crosses the placenta.
Safety in neonate not established.
Use with caution in geriatric population and those with COPD, asthma.
Vagotonic effect in patient with acute inferior MI (bradycardia, heart block).
Naloxone should be readily available as antidote.

NALOXONE

Class

Narcotic antagonist.

Mechanism of Action

Competitive inhibition at narcotic receptor sites.
Reverse respiratory depression secondary to depressant drugs.
Completely inhibits t effect of morphine.

Indications

Opiate overdose, coma. Complete or partial reversal of CNS and respiratory depression induced by opioids.
Decreased level of consciousness.
Coma of unknown origin.

Contraindications

Use with caution in narcotic-dependent patients.
Use with caution in neonates of narcotic-addicted mothers.

Adverse Reactions

Withdrawal symptoms in the addicted patient.
Tachycardia, hypertension, dysrhythmias, nausea, vomiting, diaphoresis.

Drug Interactions

Incompatible with bisulfite and alkaline solutions.

How Supplied

0.02 mg / ml (neonate); 0.4 mg/ml, 1 mg/ml ; 2.0 mg / 5 ml ampules; 2 mg/5 ml prefilled syringe.

Dosage and Administration

Adult: 0.4 - 2.0 mg IV, IM, SC. Nasal atomizer 2-4mg. ET (diluted); min. recommended = 2.0 mg.; repeat at 5 minute intervals to 10 mg maximum dose. (Medical Control may request higher amounts). Infusion: 2 mg in 500 ml of D5W (4 mcg/ml), infuse at 0.4 mg / hr (100 ml/hour).

Pediatric: 0.1 mg / kg / dose IV, IM, SC, ET (diluted); maximum of 0.8 mg; if no response in 10 minutes, administer an additional 0.1 mg / kg /dose.

Duration of Action

Onset: within 2 minutes.
Peak effect: variable.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: category B. Seizures without causal relationship have been reported. May not reverse hypotension. Use caution when administering to narcotic addicts (violent behavior, etc).

NERVE AGENT ANTIDOTES (AUTO-INJECTORS)

DuoDote: Nerve Agent Antidote Kit
Each **DuoDote** contains Atropine (2.1 mg/0.7 ml)
and Pralidoxime Chloride (600-mg/2 **ml**).

(ATNAA):Antodote Treatment Nerve Agent Auto-Injector Each Dual Chamber (ATNAA) auto-Injector delivers 2.1 mg Atropine in 0.7 ml and 600 mg Pralidoxime Chloride in 2 ml sequentially using a single needle.

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

<u>ATOX ComboPen: Delivers 220 mg Obidoxime Chloride and 2 mg Atropine in 2 ml. (Available outside the U.S.,pending FDA approval later this year.)</u>

Meridian Medical Technologies, Inc

Pralidoxime Chloride Injector (2-Pam) 600mg Pralidoxime Chloride in 2 ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

DIAZEPAM AUTO-INJECTOR: CONVULSANT ANTIDOTE NERVE AGENT (CANA): Each **CANA Autoinjector** contains 10mg diazepam in 2ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

Pediatric AtroPen® Autoinjector: Four strengths of ATROPEN are available in color coded containers: 0.25mg (black, in 0.3ml), 0.5mg (blue); 1.0mg (Dark Red) **or** 2.0 mg (Green) Each ATROPEN delivers atropine in 0.7 ml. of sterile solution.

NITROGLYCERIN

Class

Vasodilators.

Mechanism of Action

Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle.

Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the myocardial work load and oxygen demand.

Indications

Acute angina pectoris.

Ischemic chest pain.

Hypertension.

CHF, pulmonary edema.

Contraindications

Hypotension, hypovolemia.

Intracranial bleeding or head injury.

Adverse Reactions

Headache, hypotension, syncope, reflex tachycardia, flushing.

Nausea, vomiting, diaphoresis, muscle twitching.

Drug Interactions

Additive effects with other vasodilators.

Incompatible with other drugs IV.

How Supplied

Tablets: 0.15 mg (1/400 grain); 0.3 mg (1/200 grain); 0.4 mg (1/150 grain); 0.6 mg (1/100 grain).

NTG spray: 0.4 mg - 0.8 mg under the tongue.

NTG IV (TRIDIL).

Dosage and Administration

Adult: Tablets: 0.3 - 0.4 mg SL; may repeat in 3-5 minutes to maximum of 3 doses. NTG spray: 0.4 mg under the tongue; 1-2 sprays. NTG IV infusion: 5 ug / min.; increase by 5-10 ug / min. every 5 minutes until desired effect.

Pediatric: not recommended.

Duration of Action

Onset: 1-3 minutes.

Peak effect: 5-10 minutes.

Duration: 20-30 minutes or. if IV, 1-10 minutes after discontinuation of infusion.

Special Considerations

Pregnancy safety: category C.

Hypotension more common in geriatric population.

NTG decomposes if exposed to light or heat.

Must be kept in airtight containers.

Active ingredient may have a stinging effect when administered SL..

NITROPASTE

Class

Vasodilator

Mechanism of Action

Smooth muscle relaxant acting on vascular, bronchial uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the myocardial work load and oxygen demand.

Indications

Angina pectoris and chest pain associated with acute MI, CHF/PE; Hypertension (HTN).

Contraindications

Hypotension, hypovolemia, Intracranial bleeding or head injury.

Adverse Reactions

Headache, hypotension, syncope, reflex tachycardia, flushing. Nausea, vomiting, diaphoresis, muscle twitching.

How Supplied

Topical Ointment: (Nitrol ®) 2% [20 mg/g] (30g, 60g)

Dosage and Administration

Adult:	For CHF/PE; HTN Ointment: Apply 1 inch, cover with plastic wrap and secure with tape.
Pediatric:	not recommended.

Duration of Action

Onset: 30 minutes.
Peak effect: Variable.
Duration: 18-24 hours.

Special Considerations

Pregnancy safety: Category C.
Apply in thin uniform layer on non-hairy area.
1 inch equals approximately 15 mg nitroglycerin.
Avoid using fingers to spread paste.
Store past in cool place with tube tightly capped.
Erratic absorption rates quite common.

ONDANSETRON (Zofran)

Class

Anti-emetic.

Mechanism of Action

Zofran is an anti-emetic that acts by selective antagonism of the 5HT3 receptors.

Indications

Nausea and vomiting.

Contraindications

Avoid if history of known hypersensitivity

Avoid repeat dosing in patients with known abnormal liver function.

Adverse Reactions

Headache

Dizziness

Drowsiness

How Supplied

8 mg/ml and 2 mg/ml parenteral

8 mg and 4 mg oral

Dosage

Adult – 4 mg IV, may repeat X 1 in 30 minutes if n.eeded

Peds – 0.1 mg/kg IV up to a maximum of 4 mg

OXYGEN

Class

Naturally occurring atmospheric gas.

Mechanism of Action

Reverses hypoxemia.

Indications

Confirmed or expected hypoxemia.
Ischemic chest pain.
Respiratory insufficiency.
Prophylactically during air transport.
Confirmed or suspected carbon monoxide poisoning.
All other causes of decreased tissue oxygenation.
Decreased level of consciousness.

Contraindications

Certain patients with COPD, emphysema who will not tolerate Oxygen concentrations over 35%.
Hyperventilation.

Adverse Reactions

Decreased level of consciousness and respiratory depression in patients with chronic CO2 retention.
Retrolental fibroplasia if given in high concentrations to premature infants. (maintain 30-40% 02)

Drug Interactions

None.

How Supplied

Oxygen cylinders (usually green and white) of 100% compressed oxygen gas.

Dosage and Administration

Adult: Cardiac arrest and Carbon Monoxide poisoning: 100%. Hypoxemia: 10-15 L/ min. via non-rebreather. COPD: 0-2 L/ min. via nasal cannula or 28-35% venturi mask. Be prepared to provide ventilatory support if higher concentrations of oxygen needed.

Pediatric: Same as for adult with exception of premature infant.

Duration of Action

Onset: Immediate.
Peak effect: not applicable.
Duration: Less than 2 minutes.

Special Considerations

Be familiar with liter flow and each type of delivery device used.
Supports possibility of combustion.

Not included in Service Medication Inventory

PRALIDOXIME CHLORIDE

Class

Cholinesterase reactivator.

Mechanism of Action

Reactivation of cholinesterase to effectively act as an antidote to organophosphate pesticide poisoning. This action allows for destruction of accumulated acetylcholine at the neuromuscular junction.

Indications

As an antidote in the treatment of poisoning by organophosphate pesticides and chemicals.

In the pre-hospital arena, is used when atropine is or has become ineffective in management of organophosphate poisoning.

Contraindications

Use with caution in patients with reduced renal function.

Patients with myasthenia gravis and organophosphate poisoning.

Adverse Reactions

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia, hyperventilation, muscular weakness, excitement and manic behavior.

Drug Interactions

No direct drug interactions, however, patients with organophosphate poisoning should not be given barbiturates, morphine, theophylline, aminophylline, succinylcholine, reserpine and phenothiazines.

How Supplied

Emergency Single Dose Kit containing:

- One 20 ml vial of 1 gram sterile Protopam Chloride.
- One 20 ml ampule of sterile diluent.
- Sterile, disposable 20 ml syringe.
- Needle and alcohol swab.

Dosage and Administration

NOTE: If Protopam is to be used, it should be administered almost simultaneously with atropine.

Adult:	Initial dose of 1-2 grams as an IV infusion with 100 ml saline over 15-30 minutes.
Pediatric:	20-40 mg / kg as IV infusion over 15-30 minutes. Doses may be repeated every 1 (one) hour if muscle weakness persists. If IV administration is not feasible, IM or SC injection may be utilized.

Duration of Action

Onset: Minutes.

Peak Effects: Variable.

Duration: Variable.

Special Considerations

Pregnancy safety unknown. Most effective if given within a few hours of poisoning. Cardiac monitoring should be considered in severe cases of organophosphate poisoning.

Not included in Service Medication Inventory

PROCAINAMIDE

Class

Antidysrhythmic Class Ia.

Mechanism of Action

Suppresses phase IV depolarization in normal ventricular muscle and Purkinje fibers, reducing automaticity of ectopic pacemakers; suppresses reentry dysrhythmias by slowing intraventricular conduction.

Indications

Suppress PVCs refractory to Lidocaine.
Suppress VT with a pulse refractory to Lidocaine.
PSVTs with wide-complex tachycardia of unknown origin (drug of choice when associated with WP).

Contraindications

Second and Third Degree block.
Torsades de Pointes.
Lupus.
Digitalis toxicity.
Myasthenia gravis.

Adverse Reactions

PR, QRS, and QT widening, AV Block, cardiac arrest, hypotension, seizures. nausea, vomiting, reflex tachycardia, PVCs, VT, VF, CNS depression, confusion.

Drug Interaction

None with other emergency drugs.

How Supplied

1 gram in 10 ml vial (100 mg / ml).
1 gram in 2 ml vials (500 mg / ml) for infusion.

Dosage and Administration

Adult: 20-30 mg / min.; maximum total dose is 17 mg / kg. Maintenance infusion: 1-4 mg / min.

Pediatric: 2-6 mg / kg IV, IO at less than 20 mg / min.; maximum dose is 17 mg/kg. Maintenance infusion: 20-80 micrograms/kg/min**.**

Duration of Action

Onset: 10-30 minutes.
Peak effect: Variable.
Duration: 3-6 hours.

Special Considerations

Discontinue infusion if hypotension develops, the QRS complex widens by 50% of its original width or a total of 17 mg / kg has been administered or if the dysrhythmia is suppressed.
Pregnancy safety: Category C.
Potent vasodilating and inotropic effects.
Hypotension with too rapid an infusion.
Carefully monitor vital signs and ECG.
Administer cautiously to patients with renal, hepatic or cardiac insufficiency.
Administer cautiously to patients with asthma or digitalis-induced dysrhythmias.

SODIUM BICARBONATE 8.4%

Class

Buffer, alkalinizer

Mechanism of Action

Reacts with hydrogen ions to form water and carbon dioxide thereby acting as a buffer for metabolic acidosis.

Indications

Known pre-existing bicarbonate-responsive acidosis.
Upon return of spontaneous circulation after long arrest interval.
TCA overdose.
Hyperkalemia.
Phenobarbital overdose.
Alkalinization for treatment of specific intoxications.

Contraindications

Metabolic and respiratory alkalosis.
Hypocalcemia and hypokalemia.
Hypocloremia secondary to GI loss and vomiting.

Adverse Reactions

Metabolic alkalosis, hypokalemia, hyperosmolarity, fluid overload.
Increase in tissue acidosis.
Electrolyte imbalance and tetany, seizures.
Tissue sloughing at injection site.

Drug Interactions

May precipitate in calcium solutions.
Half-lives of certain drugs may increase through alkalinization of the urine.
Vasopressors may be deactivated.

How Supplied

50 mEq in 50 ml of solvent.

Dosage and Administration

Bolus:	1 mEq / kg IV; may repeat with 0.5 mEq / kg every 10 minutes.
Infusion:	1 – 4 amps in 1 liter D5W or NS, rate determined by sending physician.

Duration of Action

Onset: 2-10 minutes.
Peak effect: 15-20 minutes.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: Category C.
Must ventilate patient after administration.
Whenever possible, blood gas analysis should guide use of bicarbonate.
Intracellular acidosis may be worsened by production of carbon dioxide.
May increase edematous states. May worsen CHF.

Not included in Service Medication Inventory

STREPTOKINASE

Class

Thrombolytic agent.

Mechanism of Action

Combines with plasminogen to produce an activator complex that converts free plasminogen to the proteolytic enzyme plasmin. Plasmin degrades fibrin threads as well as fibrinogen, causing clot lysis.

Indications

Acute evolving MI.
Massive pulmonary emboli.
Arterial thrombosis and embolism.

Contraindications

Hypersensitivity.
Active bleeding, recent surgery (within 2-4 weeks), recent CVA.
Prolonged CPR.
Intracranial or intraspinal neoplasm, arteriovenous malformation or surgery.
Recent significant trauma (particularly head trauma).
Uncontrolled hypertension.

Adverse Reactions

Bleeding (GU, GI, intracranial, other sites).
Allergic reactions, hypotension, chest pain.
Reperfusion Dysrhythmias.
Abdominal pain.

Drug Interactions

Aspirin may increase risk of bleeding as well as improve outcome.
Heparin and other anticoagulants may increase risk of bleeding as well as improve outcome.

How Supplied

250,000, 750,000, 1.5 Million IU vials.

Dosage and Administration

NOTE: Reconstitute by slowly adding 5 ml sodium chloride or D5W, directing stream to side of vial instead of into powder. Gently roll and tilt vial for reconstitution. Dilute slowly to 45 ml total.

Adult: 500,000 - 1,500,000 IU diluted to 45 ml IV over one (1) hour.
Pediatric: safety not established.

Duration of Action

Onset: 10 - 20 minutes. (fibrinolysis 10-20 minutes; clot lysis: 60 - 90 minutes).
Peak effects: Variable.
Duration: 3-4 hours (prolonged bleeding times up to 24 hours).

Special Considerations

Pregnancy safety: Category A.
Do not administer IM injections to patients receiving thrombolytics.
Obtain blood sample for coagulation studies prior to administration.
Carefully monitor vital signs.
Observe patient for bleeding.

TERBUTALINE

Class

Sympathomimetic bronchodilator.

Mechanism of Action

Selective beta-2 adrenergic receptor activity resulting in relaxation of smooth muscles of the bronchial tree and peripheral vasculature. Minimal cardiac effects.

Indications

Bronchial asthma.

Reversible bronchospasm associated with exercise, chronic bronchitis, and emphysema.

Contraindications

Hypersensitivity.

Tachydysrhythmias.

Adverse Reactions

Usually transient and dose-related, restlessness, apprehension, palpitations, tachycardia.

Chest pain, coughing, bronchospasm, nausea, facial flushing.

Drug Interactions

Cardiovascular effects exacerbated by other sympathomimetics.

MAOIs may potentiate dysrhythmias.

Beta blockers may antagonize terbutaline.

How Supplied

MDI: 200 mcg / metered spray.

Parenteral: 1 mg / ml ampule.

Dosage and Administration

Adult:	0.25 mg SC; may repeat in 15-30 minutes to maximum dose of 0.5 mg in 4 hours period. 400 mcg (two inhalations by MDI) every 4-6 hours; allow 1-2 minutes between inhalations.
Pediatric:	Not recommended for children under 12 years of age. 0.01 mg / kg / dose SC every 15-20 minutes PRN to maximum 0.25 mg dose. 0.03 -0.05 mg / kg in 1.25 ml saline for aerosolization every 4 hours.

Duration of Action

Onset: SC: 15-30 minutes; MDI: 5-30 minutes.

Peak effect: Variable.

Duration: SC: 1.5-4 hours; MDI: 3-6 hours.

Special Considerations

Pregnancy safety: Category B.

Carefully monitor vital signs.

Use with caution in patients with cardiovascular disease or hypertension.

Patient should receive oxygen before and during bronchodilator administration.

Not included in Service Medication Inventory

TETRACAINE

Class

Local Anesthetic.

Mechanism of Action

Blocks the initiation and conduction of nerve impulses.

Indications

Topically applied local anesthetic for eye examination.

Contraindications

Hypersensitivity to ester anesthetics; not to be applied in large amounts or to infants (less than 1 year old).

Adverse Reactions

1-10% Dermal: Angioedema, burning, contact dermatitis, stinging. < 1%: Methemoglobinemia in infants

How Supplied

Ophthalmic: 0.5% [5mg/ml] (1ml, 2ml, 15ml)

Dosage and Administration

Adult: Ophthalmic Solution: Instill 1-2 drops.

Pediatric: Safety and efficacy have not been established.

Kinetics

Onset: Within 60 seconds.

Special Considerations

Pregnancy category C.

Store in a light resistant container.

Lasts 6 months refrigerated or 4 weeks at room temperature.

Discard if solution discolors (should be clear).

Caution in Child < 6 years old.

Not included in Service Medication Inventory

THIAMINE

Class

Vitamin (B1)

Mechanism of Action

Combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

Indications

Coma of unknown origin.
Delirium tremens.
Beriberi.
Wernicke‘s encephalopathy.

Contraindications

None

Adverse Reactions

Hypotension from too rapid injection or too high a dose.
Anxiety, diaphoresis, nausea, vomiting.
Rare allergic reaction.

Drug Interactions

Give thiamine before glucose under all circumstances.

How Supplied

1,000 mg in 10 ml vial (100 mg / ml).

Dosage and Administration

Adult: 100 slow IV or IM.
Pediatric: 10-25 mg slow IV or IM.

Duration of Action

Onset: Rapid.
Peak effects: variable.
Duration: Dependent upon degree of deficiency.

Special Considerations

Pregnancy safety: Category A.
Large IV doses may cause respiratory difficulties.
Anaphylaxis reactions reported.

Not included in Service Medication Inventory

TISSUE PLASMINOGEN ACTIVATOR (T-PA)

Class

Thrombolytic agent.

Mechanism of Action

Binds to fibrin-bound plasminogen at the clot site, converting plasminogen to plasmin. Plasmin digests the fibrin strands of the clot restoring perfusion.

Indications

Acute evolving myocardial infarction.
Massive pulmonary emboli.
Arterial thrombosis and embolism.

Contraindications

Recent surgery (within three weeks).
Active bleeding, recent CVA, prolonged CPR, intracranial or intraspinal surgery.
Recent significant trauma, especially head trauma.
Uncontrolled hypertension (generally BP over 200 mm Hg).

Adverse Reactions

GI, GU intracranial and other site bleeding.
Hypotension, allergic reactions, chest pain, abdominal pain, CVA.
Reperfusion dysrhythmias.

Drug Interactions

Acetylsalicylic acid may increase risk of hemorrhage.
Heparin and other anticoagulants may increase risk of hemorrhage.

How Supplied

20 mg with 20 ml diluent vial.
50 mg with 50 ml diluent vial.

Dosage and Administration

Adult: 10 mg bolus IV over 2 minutes; then 50 mg over one hour, then 20 mg over the second hour and 20 mg over the third hour for a total dose of 100 mg. (other doses may be prescribed through Medical Direction.)
Pediatric: safety not established.

Duration of Action

Onset: clot lysis most often within 60-90 minutes.
Peak effect: variable.
Duration: 30 minutes with 80% cleared within 10 minutes.

Special Considerations

Pregnancy safety: contraindicated.
Closely monitor vital signs.
Observe for bleeding.
Do not give IM injection to patient receiving T-PA.

Not included in Service Medication Inventory

VASOPRESSIN

Class

Endocrine-metabolic agent.

Mechanism of Action

Pressor effect due to vasoconstriction.

Indications

Cardiac arrest.

Contraindications

History of allergy or anaphylaxis.

Adverse Reactions

Anaphylaxis.

Drug Interactions

Increased risk of cardiotoxicity with amiodarone and lidocaine.

How Supplied

Injection solution 20 U/ml.

Dosage and Administration

40 U/IV to replace first dose of epinephrine.

Duration of Action

Duration: 10-20 minutes.

Special Considerations

One time dosing.

Pregnancy Category C.

Specialized Protocols

Commonwealth of Kentucky.

Taser Subdued Patient

Local law enforcement agencies may use a conductive energy weapon called a Taser. This device is a less-lethal tool. When used, the device discharges a wire that contains at the distal end an arrow-like barbed projectile that penetrates the suspect's skin and embeds itself. This allows the officer to administer a 5-second or longer incapacitating electric shock**.** Officers may initiate EMS response when the device is discharged**.** EMS personnel shall transport the patient if the Taser strikes the patient in the face, neck, groin or spinal column or other complications arise. Transport shall be recommended for all Taser patients but may be refused by the patient or officer if standard decisional capacity criteria are met. The most common injury from Taser use is trauma from a fall due to the person‘s incapacitation.

Scene Safety Consideration:
Before touching any patient who has been subdued using a Taser, EMS personnel shall ensure the officer has disconnected the wires from the hand held unit. In most cases the wires will be cut prior to EMS arrival.

Basic Standing Orders

- ► Routine Patient Care.
- ► Perform initial assessment and treat ABC problems.
- ► Identify the location of probes on the patient's body. If a probe has contacted the face, neck, groin, or spinal area, transport the patient to an Emergency Department.
- ► Confer with the officer and determine the patient's condition from the time of the Taser discharge until EMS arrival.
- ► Consider Overdose or other medical problems, which may be the underlying cause of the situation.
- ► Obtain baseline vitals.
- ► Obtain history from the patient including date of last tetanus shot and any cardiac history.
- ► Consider accu-check glucose level.

Treatment and Follow up instructions:

- ► Clean puncture sites and bandage.
- ► Secure any embedded probes.
- ► Transport patient to the emergency department.

NOTE: If possible, transport should be under the care of a Paramedic with cardiac monitoring, and other ACLS as necessary.

Paramedic Standing Orders

- ► Evaluate for medical reasons for patient‘s behavior.
- ► Consider EKG monitoring for cardiac abnormalities and, if patient is greater than 35 years old, consider 12-lead evaluation.
- ► Consider 12-lead EKG.

Strenuous Activity / Firefighter Rehabilitation

Medical Evaluation Of Firefighters And Other Emergency Responders On Emergency Incidents And training Exercises

Purpose

To examine and evaluate the physical and mental status of firefighters and other emergency responders working at an emergency incident or a training exercise and determine what treatment, if any, is necessary.

Implementation

A Rehab Area shall be set up at the discretion of the Incident Commander. When a Rehab Area has been established by the Incident Commander, the first available Paramedic will be responsible for the management and coordination of the Rehab Area.

Location

Establish a Rehab Area away from environmental hazards (e.g., shady, cool place, upwind away from smoke and traffic) that is readily accessed by Rescue personnel for transport and supplies. Air truck and canteen service will be stationed in this area. Multiple Rehab Areas may be needed on large incidents.

Manning

Assign a minimum of two Rescue personnel to monitor and assist firefighters and other emergency responders in the Rehab Area.

Medical Evaluations

When the Incident Commander has established a Rehab Area, firefighters and other emergency responders shall be evaluated following:

- Two SCBA‘s and/or thirty minutes of strenuous activity (e.g., use of chemical PPE, advancing hose lines, forcible entry, ventilation, etc.) Note: This does not preclude an Officer from having a member evaluated if he/she deems it appropriate. A member may be evaluated at any time he/she feels it is necessary.
- SCBA failure.
- Weakness, dizziness, chest pain, muscle cramps, nausea, altered mental status, difficulty breathing, etc.
- Discretion of Incident Commander, Rehab Officer, Safety Officer, C.I.S.M. Coordinator or Company Officer.

NOTE - A medical evaluation form shall be completed on all personnel entering the Rehab Area (see form located in this section).

Examination

Examination shall occur at ten-minute intervals and will involve a minimum of:

- ► Glasgow coma score
- ► Pupils
- ► Vital Signs (BP, P, R, CR)
- ► EKG (if applicable)
- ► Lung sounds
- ► Skin condition
- ► Temperature
- ► Signs and symptoms

An EMS Run Report shall be completed on each firefighter or other emergency responder when he or she is not routinely returned to normal duties.

Guidelines for Rehab

Normal Examination Findings - firefighter or other emergency responder will rehydrate and rest before reporting to Manpower.

Abnormal Examination Findings

- ► Firefighter or other emergency responder will rehydrate and rest. Firefighter or other emergency responder will report to Manpower when findings are normal. Findings should return to normal within fifteen minutes.
- ► Firefighter or other emergency responder will receive ALS treatment and transport if findings are abnormal for more than fifteen minutes.
- ► Firefighter or other emergency responder with chest pain, difficulty breathing and altered mental status will receive immediate ALS treatment and transport.
- ► Any other abnormal findings or complaints shall result in treatment and transport if the paramedic deems it to be in the best interest of the firefighter/responder.

Treatment

Prior to taking anything orally, the firefighter or other emergency responder will clean hands and face. On scene rescue will provide water and cleaning agent.

- ► Rest
- ► Oral rehydration and nutrition; minimum of 1–2 quarts of fluids over a 15 minute time period (Water first, then half-strength Gatorade® or 10-K®). Avoid any substance containing caffeine (e.g. soda, tea, coffee).
- ► Oxygen (humidified, nebulizer).
- ► Cool environment (e.g., shade, electric fan, air conditioning, removal of bunker gear, showers, etc.).
- ► ALS Protocols

Return to Emergency Duties

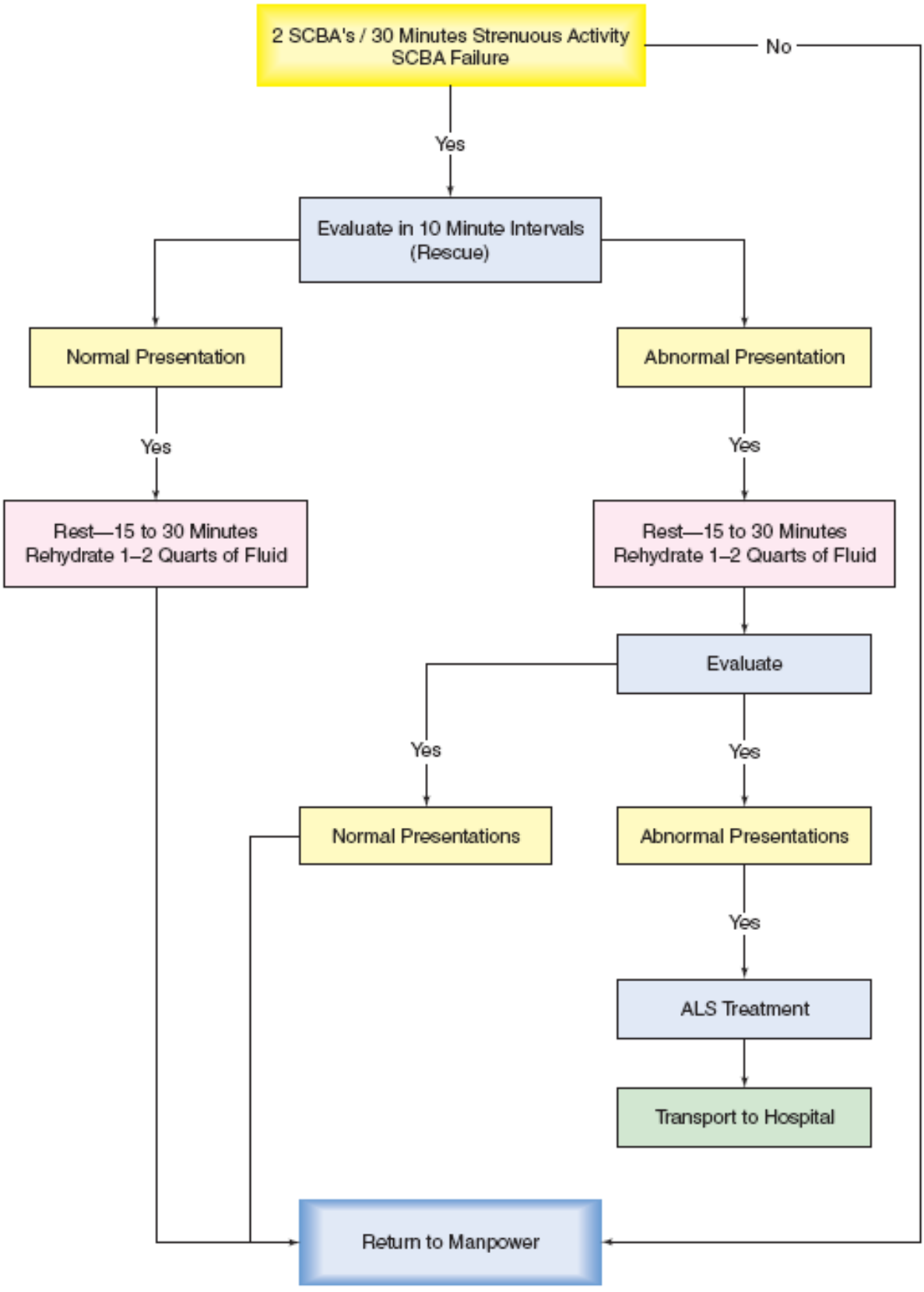
Report to Manpower or Incident Commander when:

- ► Vital signs within normal limits.
- ► Absence of abnormal signs and symptoms.
- ► Minimum period of 15 minutes for rest and rehydration.

Documentation

A Rehab Medical Evaluation Form shall be completed on all personnel evaluated in the Rehab Area and forwarded to the appropriate Rescue (EMS) Division following all applicable patient confidentiality guidelines (e.g. HIPAA).

Strenuous Activity / Firefighter Rehabilitation continued



Rehabilitation Area - Medical Evaluation Form										
Alarm No.:		Incident:			Date:		Unit:			

Name:		Age:		Sex:		Badge #:		Agency:	
Medical History:				Medications:					
Rehab. Time (in):				Complaint:					
Symptoms:				Signs:					

Time	GCS	Eye	BP	Cap-refill	Pulse	EKG	Resp/ Effort	Lungs	Skin	Comments

Treatment:					
Assignment:		Duration:		Release Time (out):	

Name:		Age:		Sex:		Badge #:		Agency:	
Medical History:				Medications:					
Rehab. Time (in):				Complaint:					
Symptoms:				Signs:					

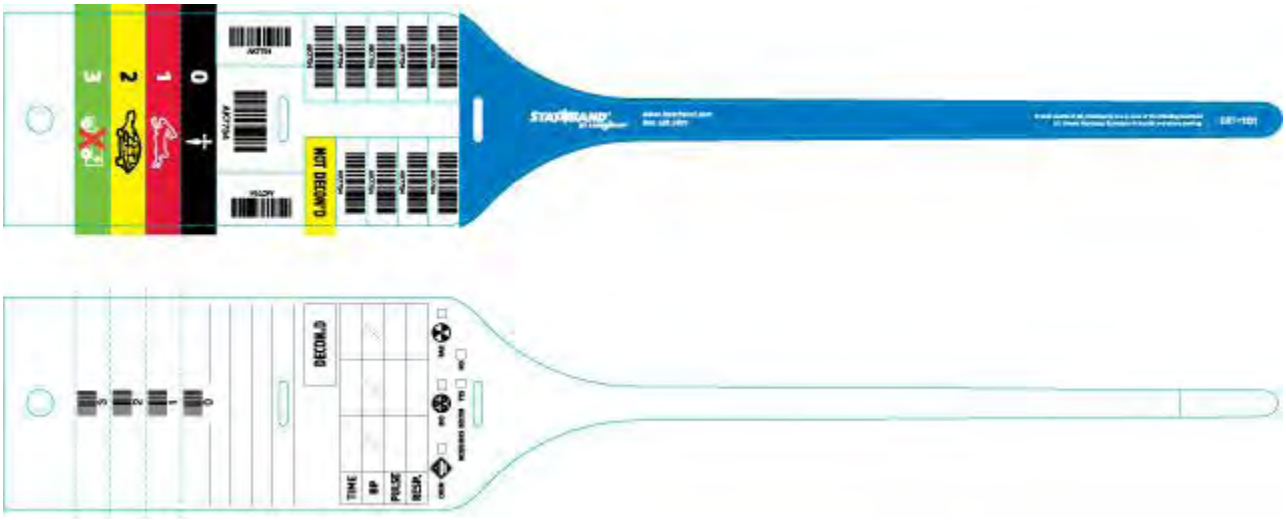
Time	GCS	Eye	BP	Cap-refill	Pulse	EKG	Resp/ Effort	Lungs	Skin	Comments

Treatment:					
Assignment:		Duration:		Release Time (out):	

Forward form to Rescue (EMS) Division following all applicable patient confidentiality laws (e.g. HIPAA).

STARTBand – Emergency Response Tag System

SB-Rapid, everyday emergency tag (LaserBand, Inc.). This all-in-one customizable triage tag enables responders to quickly and accurately identify, record and track the injured at the scene of an emergency.



This tag has been adopted by the Kentucky Public Health Preparedness Branch for use with the Patient/Evacuee Tracking system based on EMTrack. Each tag is bar-coded, weatherproof with multiple removable bar code tags and sections. It can be written on the reverse side. This is the preferred tag for major incidents within the Commonwealth.

Example of its utility include: having multiple labels allows the building of relationships between the original person, and something or someone else. For example, in a multiple-car MVA a sticker could be placed on the wrecked vehicle to ID which car the patient came from, a sticker on a bag of personal belongings, and if a child is tagged (even with the RAPID tag) you could put a sticker from the PARENTS triage tag on the back (and a kids tag on the parents tag) to show that the kid belongs to the parent. If they are entered in to EMTrack, there is a place to enter the relationship tag numbers.

STARTBand – Emergency Response Tag System-continued

The tag numbers can be entered into EMTrack system via any of the following:

- ► from the field using a laptop with an aircard or connected through a WiFi hotspot; entered into a laptop or PDA and held until there is connectivity (store and forward);
- ► pre-hospital hardware (scanners and PDA units) connected to the internet (either directly or through a field "command kit");
- ► at the hospital going through triage (We have provided some hospitals with scanners so they can connect a computer at the triage desk and scan people directly in to the system).
- ► entered by a dispatcher.
- ► entered by a registration clerk at a shelter site or POD location.

The RAPID Tag is recommended for day to day operations

http://www.laserband.com.

START System of Triage

Introduction

- This procedure will be based on the **S**imple **T**riage **A**nd **R**apid **T**reatment or START method for adult victims and the JumpSTART adaptations for the pediatric victim. These methods of triage are designed to assess a large number of victims objectively, efficiently, and rapidly and can be used by personnel with limited medical training.

Procedure

- **Initial Triage**—Using the START or JumpSTART methods (Sections III or IV).
  - Locate and direct all of the walking wounded into one location away from the incident if possible. Assign someone to keep them together (Fire Department Personnel, Law Enforcement Officer, or capable bystander).
  - Begin assessing all non-ambulatory victims where they lay.
  - Utilize the Triage Ribbons (color-coded plastic strips). One should be tied to an upper extremity in a VISIBLE location.
    - **RED** - Immediate.
    - **YELLOW** - Delayed.
    - **GREEN** - Ambulatory (minor).
    - BLACK - Deceased (non-salvageable).
  - Independent decisions should be made for each victim. Do not base triage decisions on the perception of too many REDs, not enough GREENs, etc.
  - If borderline decisions are encountered, always triage to the more urgent priority (e.g. GREEN/YELLOW patient, tag YELLOW).

- **Secondary Triage**
  - Performed on all victims during the Treatment Phase. If a victim is
  - identified in the initial triage phase as a RED and transport is available, do not delay transport to perform a secondary assessment
  - The Triage priority determined in the Treatment Phase should
  - be the priority used for transport. If trauma related, the Trauma Criteria will be applied to trauma victims during the secondary triage in the Treatment Phase (see General Protocol 1.10—Trauma Transport).
  - Utilize the Triage Tags (Disaster Management System Tag or METTAGS) and attempt to assess for and complete all information required on the tag.
  - Affix the tag to the patient and remove ribbon.

NOTE - Remember the pneumonic ***RPM*** (***R***espirations, ***P***erfusion, ***M***ental Status). The first assessment that produces a RED stops further assessment. Only corrections of life-threatening problems, such as airway obstruction or severe hemorrhage should be managed during triage.

START Triage (refer to the START flowchart).

- Assess **RESPIRATIONS:**
  - If respiratory rate is 30/min. or less go to PERFUSION assessment.
  - If respiratory rate is over 30/min, Prioritize RED.
  - If victim is not breathing, open the airway, remove obstructions, if seen, and assess for (1) or (2) above.
  - If victim is still not breathing, Prioritize BLACK.
- Assess **PERFUSION:**
  - Performed by assessing a radial pulse or assessing capillary refill (CR) time.
  - If radial pulse is present or CR is 2 seconds or less, go to MENTAL STATUS assessment.
  - No radial pulse or CR is greater than 2 seconds, Prioritize RED.
  - Any major external bleeding should also be controlled at this time.
- Assess **MENTAL STATUS:**
  - Assess the victim‘s ability to follow simple commands and their orientation to time, place, and person (COAx3).
  - If the victim does not follow commands, is unconscious, or is disoriented, Prioritize RED.
  - If the victim follows commands, oriented X3, Prioritize GREEN.

  NOTE - Depending on injuries (e.g. burns, fractures, bleeding) it may be necessary to Prioritize YELLOW.

START System of Triage -JumpSTART

JumpSTART TRIAGE (refer to the JumpSTART flowchart).

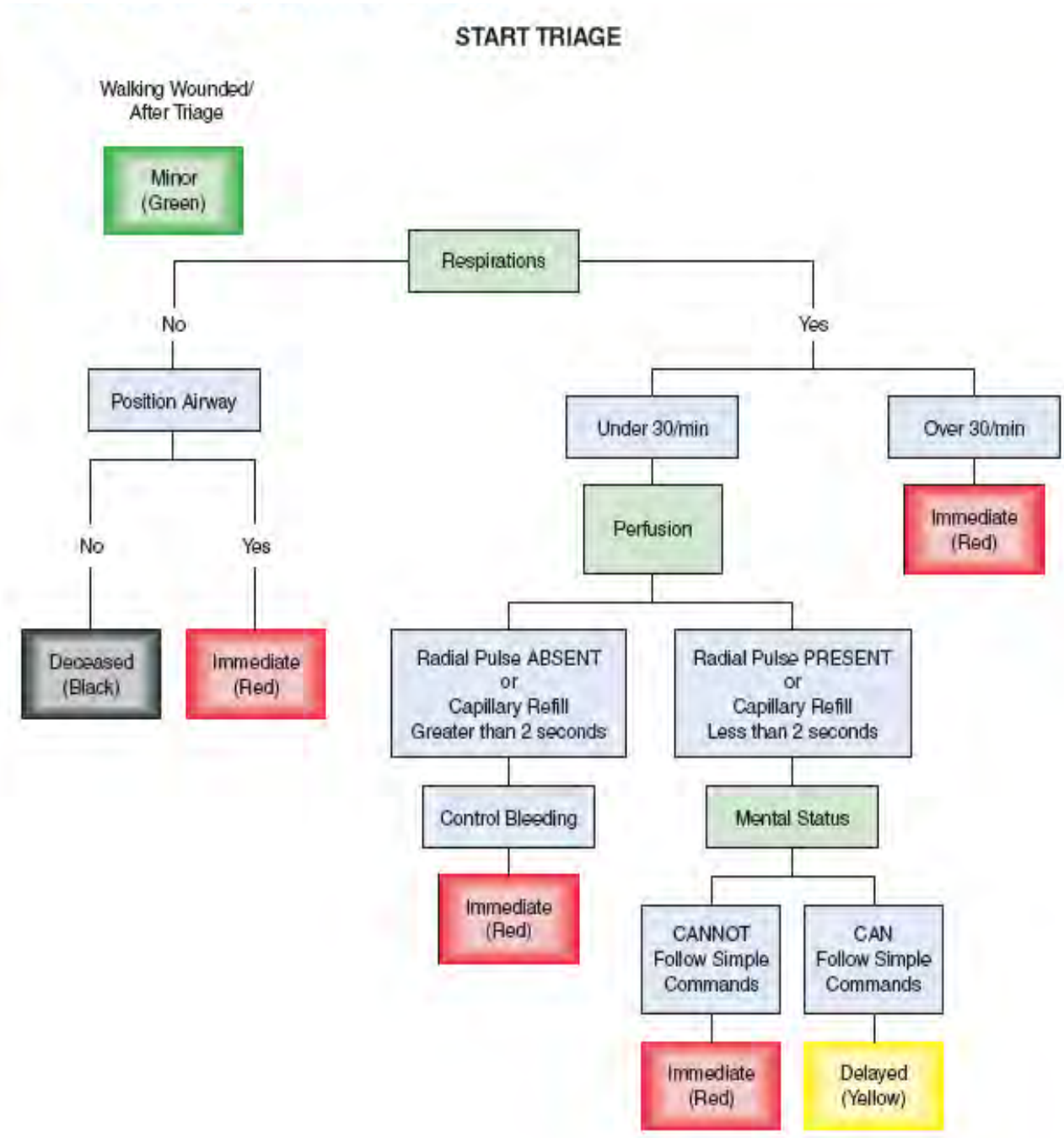
Physiological differences in children necessitate adapting the standard START triage method to children ≤ 8 years of age or those victims with the anatomical or physiological features of a child in the age group. The same parameters (R.P.M.) will be utilized with the adaptations indicated.

- ► Assess **RESPIRATIONS:**
  - o If respiratory rate is between 15 and 45/min. go to PERFUSION assessment.
  - o If respiratory rate is over 45/min or under 15/min, Prioritize RED.
  - o If victim is not breathing, open the airway, remove obstructions if seen, and assess for (1) or (2) above.
  - o If victim is still not breathing and no obstructions are present, check a peripheral (radial or pedal) pulse. If peripheral pulse is present, provide five (5) ventilations (approximately 15 seconds) via any type of barrier device. If spontaneous respirations resume, Prioritize RED.
  - o If victim is still not breathing, Prioritize BLACK.
- ► Assess **PERFUSION:**
  - o Performed by assessing a peripheral pulse.
  - o If peripheral pulse is present, go to MENTAL STATUS assessment.
  - o If peripheral pulse is absent, Prioritize RED.
  - o Any major external bleeding should also be controlled at this time.
- ► Assess **MENTAL STATUS:**
  - o Assess the child through AVPU scale. Assess whether the victim is either ALERT, responds to VERBAL stimuli, responds to PAINFUL stimuli, or is UNCONSCIOUS.
  - o If the victim is unconscious or only responds to painful stimuli, Prioritize RED.
  - o If the victim is alert or responds to verbal stimuli, assess for further injuries, Prioritize YELLOW or GREEN.

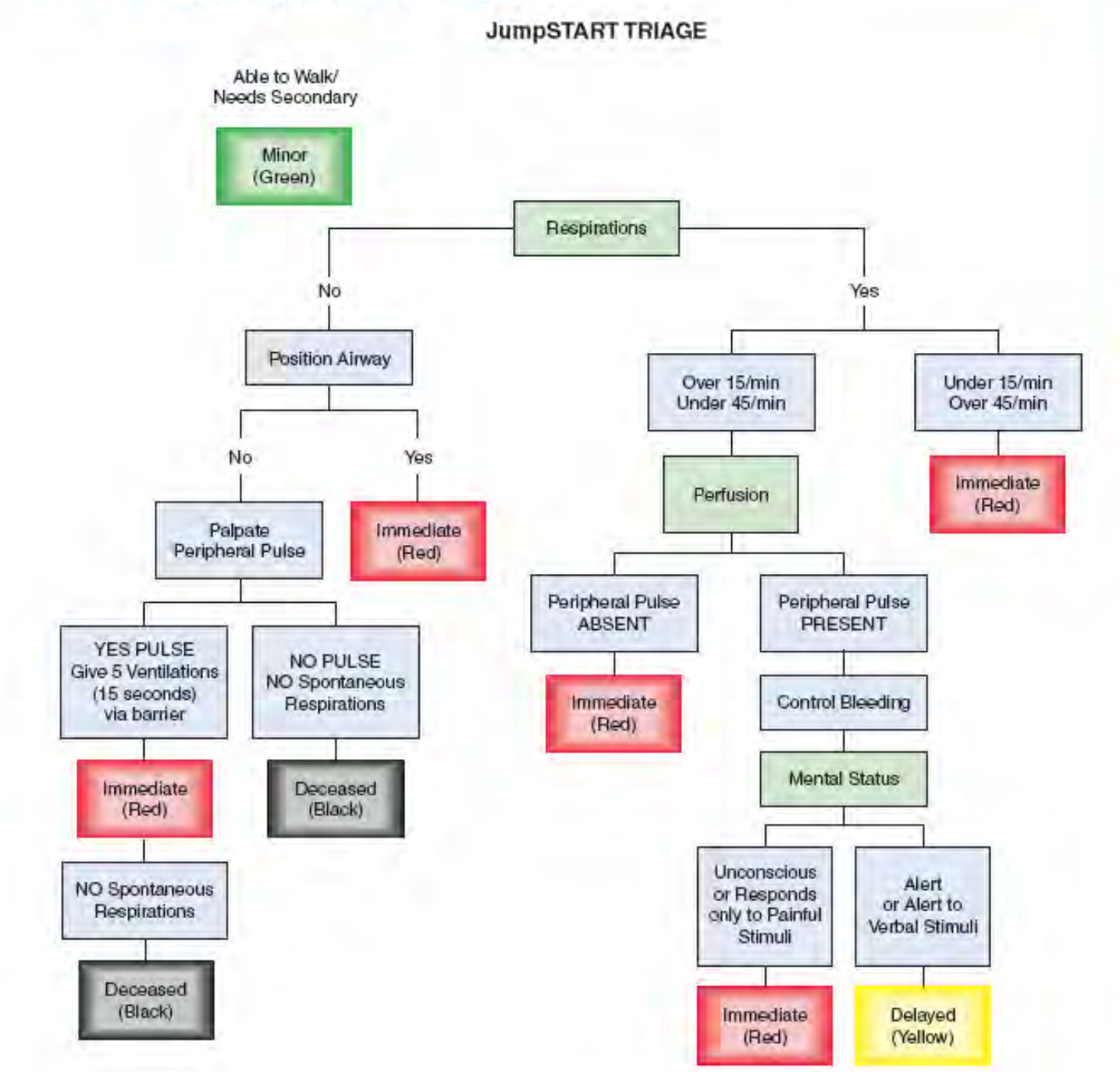
NOTE - Infants who are developmentally unable to walk should be triaged using JumpSTART algorithm either during initial triage or in the GREEN area if carried out by a non-rescuer. During triage, if they do not fulfill the criteria of a RED victim and there are no other outward signs of significant injury, they may be triaged as a GREEN victim.

NOTE - START Triage system developed by Newport Beach Fire Rescue and Hoag Hospital. JumpStart Triage system developed by Lou Romig, MD (Miami Children‘s Hospital).

START Triage Algorithm



JumpSTART Triage Algorithm



Mass Casualty Incidents: Uniform Prehospital – MCI Procedure

Purpose

To efficiently triage, treat and transport victims of multiple casualty incidents (MCIs). The following protocol is applicable to all multiple victim situations. This protocol is intended for the everyday MCI when the number of injured exceed the capabilities of the first arriving unit, as well as large scale MCIs. The number of casualties may exceed the capabilities of the local jurisdiction and will require assistance from other EMS providers.

Procedure

- The officer of the first arriving unit will establish COMMAND and:
    - Perform a size up and estimate the number of victims.
    - Request a Level 1, 2, 3, 4, or 5 response (see II.D.) and request additional units and/or specialized equipment as required.
    - Identify a staging area.
    - Direct the remaining crewmembers and any additional personnel arriving to initiate triage using the START or JumpSTART system.
    - Locate and direct the walking wounded to one location away from the incident, if possible. These victims need to be assessed as soon as possible. Assign someone to keep the walking wounded together.
- As additional units arrive, COMMAND will designate the following officers:
    - TRIAGE (Initially the responsibility of the First Arriving Officer).
    - TREATMENT.
    - TRANSPORT.
    - STAGING.
- Additional Branches/Sections may be required depending on the complexity of the incident. These officers may include, but are not limited to:
    - Medical Branch
    - Landing Zone/Helispot
    - Extrication
    - Haz Mat
    - Rehabilitation
    - Safety
    - Public Information Officer (PIO)
    - Medical Intelligence—To Assist With WMD Events For Decon, Antidotes And Treatment

MCI Pre-determined Response Plan

- Considerations:
  - An MCI shall be classified by different levels, depending on the number of victims. The number of victims will be based on the initial size-up, prior to triage.
  - Levels of response will augment the units already on the scene. Units on scene or en-route will be included in the assignment. The exception would be when in conjunction with a Fire Alarm assignment (e.g. Fire with multiple victims may be a Second Alarm with a MCI Level 3 response—this will be two separate assignments).
  - COMMAND can downgrade or upgrade the assignment at any time. All units will respond to the Staging Area unless otherwise directed by COMMAND. When announcing an MCI, specify the general category (trauma, HAZMAT, smoke inhalation, etc.).
  - Any victim meeting Trauma Transport Criteria should go to a Trauma Center. Trauma Transport Criteria will be determined during the secondary triage in the Treatment Phase.
  - Consider air transport for special needs, mass transit resources for multiple "walking wounded," and private BLS transport units.
  - Consider Mobile Command Vehicles, Medical Supply Trailers and Communication Trailers.
  - Upon declaration of a MCI—Medical Control will gather each hospital's capability and relay this information to the Transport Officer or Medical Communication Officer.
  - Request Law Enforcement set up a safety perimeter.

Mass Casualty Incidents Uniform Prehospital – MCI Procedure - continued

► **Definitions:**

- **Strike Team**—is a specified combination of the same kind and type of resources with common communications and a leader (e.g. ALS Transport Unit Strike Team would be 5 ALS Transport Units with a leader).
- **Task Force**—is a group of resources with common communications and a leader (e.g. MCI Task Force would be 2 ALS Transport Units, 2 BLS Transport Units and 1 Suppression Unit with a leader).
- **Litter Bearer**—A team of personnel assigned to TRIAGE to move victims from the incident site to the Treatment Area or Transport Units.

► **MCI LEVEL 1 (5–10 victims)**

- 4 ALS Transport Units
- 2 Suppression Units
- 1 Shift Supervisor
- 1 EMS Supervisor

****NOTE -** The 2 closest hospitals & Trauma Center to the incident will be notified by Medical Control (MedCom or local communication center).

► **MCI LEVEL 2 (11–20 victims)**

- 6 ALS Transport Units
- 3 Suppression Units
- 2 Shift Supervisors
- 2 EMS Supervisors

****NOTE -** The 3 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control.

► **MCI LEVEL 3 (21–100 victims)**
- 8 ALS Transport Units
- 4 Suppression Units
- 3 Shift Supervisors
- 3 EMS Supervisors
- 1 Operations Chief
- 1 Command Vehicle
- 1 Supply Trailer

****NOTE -** The 4 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control. The Local Warning Point will notify the Emergency Management Agency.

► **MCI LEVEL 4 (101–1000 victims)**
- 5 MCI Task Forces (25 units)
- 2 ALS Transport Unit Strike Teams (10 units)
- 1 Suppression Unit Strike Team (5 units)
- 2 BLS Transport Unit Strike Teams (10 units)
- 2 Mass Transit Buses
- 5 Shift Supervisors
- 3 EMS Supervisors
- 1 EMS Chief
- 1 Operations Chief
- 1 Command Vehicle
- 2 Supply Trailers
- 1 Communications Trailer

****NOTE -** The 10 closest hospitals & 5 Trauma Centers to the incident will be notified by Medical Control. The Local Warning Point will notify the Emergency Management Agency. Metropolitan Medical Response System (MMRS) and Disaster Medical Assistance Team (DMAT) may be notified.

► **MCI LEVEL 5 (Over 1000 victims)**
- 10 MCI Task Forces (50 units)
- 4 ALS Transport Unit Strike Teams (20 units)
- 2 Suppression Unit Strike Teams (10 units)
- 4 BLS Transport Unit Strike Teams (20 units)
- 4 Mass Transit Buses
- 10 Shift Supervisors
- 6 EMS Supervisors
- 2 EMS Chiefs
- 2 Operations Chiefs
- 2 Command Vehicles
- 4 Supply Trailers
- 1 Communications Trailer

****NOTE -** The 20 closest hospitals & 10 Trauma Centers to the incident will be notified by Medical Control.

Mass Casualty Incidents Uniform Prehospital – MCI Procedure - continued

- Officer Responsibilities
  - **Command**
    - Established by the First Arriving Officer. Radio designation: COMMAND.
    - Follow Field Operations Guide FOG #1.
    - Remain in a fixed and visible location, uphill and upwind.
    - Determine the MCI Level (1, 2, 3, 4, or 5).
    - Designate a Staging Area.
    - Assign positions to perform the functions of TRIAGE, TREATMENT, TRANSPORT and STAGING.
    - Advise Communications Center of the number of victims and their categories once triage is complete.
    - During large scale or complex MCIs (e.g. fire with multiple victims), designate a Medical Branch to reduce the span of control.
    - If the incident is due to Weapons of Mass Destruction (WMD Event), refer to FOG #8 and establish a Medical Intelligence Officer to assist with documentation, antidotes and treatment of victims.
    - Ensure proper security of incident site, treatment area and loading area, as well as traffic control and access for emergency vehicles with law enforcement.

  - **Medical Branch**
    - Radio designation: MEDICAL. Follow FOG #2.
    - Work directly with COMMAND.
    - Assure TRIAGE, TREATMENT and TRANSPORT has been established. If established by COMMAND, then TRIAGE, TREATMENT and TRANSPORT will report to MEDICAL.
    - Work with COMMAND and direct and/or supervise on-scene personnel from agencies such as Medical Examiner‘s Office, Red Cross, private ambulance companies and hospital volunteers. Ensure notification of Medical Control (Medcom/MRCC).
    - If the incident is due to a known or suspected Weapon of Mass Destruction (WMD Event), refer to FOG #8 and establish (in conjunction with COMMAND) a Medical Intelligence Officer to assist with decontamination, antidotes and treatment of victims.
    - Ensure proper security of incident site, treatment area and loading area, as well as traffic control and access for emergency vehicles with law enforcement (in conjunction with COMMAND).

- **Triage Officer.**
  - Radio designation: TRIAGE. Follow FOG #3.
  - Organize the Triage Team to begin initial triaging of victims, utilizing the START/JumpSTART triage system. Assemble the walking wounded and uninjured in a safe area. Use bullhorn/PA if necessary.
  - Advise COMMAND (or MEDICAL if established), as soon as possible, if there is a need for additional resources.
  - Coordinate with TREATMENT to ensure that priority victims are treated first.
  - Ensure that all areas around the MCI scene have been checked for potential victims, walking wounded, ejected victims, etc., and that all victims have been triaged.
  - Supervise the Triage Personnel, Litter Bearers and Medical Examiner Personnel.
  - Maintain security and control of the Triage Area. Request Law Enforcement.
  - Report to COMMAND or MEDICAL upon completion of duties for further assignments.

- **Treatment Officer.**
  - Reports to COMMAND or MEDICAL. Supervises the Treatment Managers of the RED, YELLOW, and GREEN Areas.
  - Coordinates the re-triage and tagging of all victims and on-site medical care.
  - Directs the movement of victims to loading area(s).
  - Radio designation: TREATMENT. Follow FOG #4.
  - Consider assigning a "Documentation Aide" to assist with paperwork.
  - Direct personnel to either begin treatment on the victims where they lay or establish a centralized Treatment Area.
  - Considerations for a Treatment Area:
  - Capable of accommodating the number of victims and equipment.
  - Consider weather, safety and the possibility of hazardous materials.
  - Designate entrance and exit areas, which are readily accessible (funnel points).
  - On large-scale incidents, divide Treatment Area into three distinct areas based on priority. Designate a Treatment Manager for each area (Red, Yellow, Green). Use color tarps if available.

- Complete a "Treatment Log" as victims enter the area.
- Ensure that all victims are re-triaged through a secondary exam and the assessment is documented on the Triage tag (Disaster Management System Tag [DMS Tag] or METTAG). The rescuer filling out the DMS Tag or METTAG will keep a corner of the tag for future documentation.
- All Red tagged victims will be transported immediately as transport units become available. These victims should not be delayed in the Treatment Area.
- Ensure that enough equipment is available to effectively treat all victims.
- Establish communicates with TRANSPORT to coordinate proper transport of the appropriate victims. Direct movement of victims to the ambulance loading area(s).
- Provide periodic status reports to COMMAND/MEDICAL.

NOTE - RED, YELLOW, GREEN TREATMENT MANAGERS—report to the TREATMENT Officer and are responsible for the treatment and continual re-triaging of victims in their assigned areas. Notify TREATMENT Officer of victim readiness and priority for transportation. Assure that appropriate victim information is recorded.

- **Transport Officer.**
  - Reports to COMMAND or MEDICAL. Supervises the Medical Communication Coordinator and Documentation Aide(s). The TRANSPORT Officer is responsible for the coordination of victims and maintenance of records relating to victim identification, injuries, mode of transportation and destination.
  - Radio designation: TRANSPORT. Follow FOG #5.
  - Assign a Documentation Aide with a radio to assist with paperwork and communications.
  - Assign a Medical Communication Coordinator to establish continuous contact with Medical Control (MedComm).
  - Establish a victim loading area. Advise STAGING of the location and direction of travel. Consider Law Enforcement for security of loading area.
  - Arrange for the transport of victims from the Treatment Area. Maintain "Hospital Transportation Log" #5B. Keep piece of triage tag for future documentation.

- Communicate with the Landing Zone (LZ)/ Helispot Officer and relay the number of victims to be transported by air. Air transported victims should be assigned to distant hospitals, unless the victim‘s needs dictate otherwise (e.g. Trauma Center, burn unit, etc.).

- **Medical Communication Coordinator.**
  - Reports to the TRANSPORT Officer and is responsible for maintaining communication with Medical Control to assure proper victim transport information and destination.
  - Radio designation: COMMUNICATIONS. Follow FOG #5A.
  - Establish communication with Medical Control (Medcom/MRCC). Advise Medical Control of the overall situation (e.g. smoke inhalation, trauma, burns, Hazmat exposure, etc.), amount and category of victims. Medical Control will survey area hospitals to determine their capabilities and capacities and then relay this information. Document this information on the Hospital Capability Worksheet #5C and maintain this for the duration of the incident.
  - When units are prepared to transport, advise Medical Control and supply them with the following information:
  - The unit transporting.
  - The number of the victims being transported.
  - Their priority: Red, Yellow, or Green.
  - Any special need victims (e.g. cardiac, burns, trauma, etc.).
  - The Medical Communication Coordinator, in conjunction with Medical Control, will determine the most appropriate facility. Ground transported victims should be assigned to hospitals on a rotating basis.
  - Once Medical Control receives the information from the Medical Communication Coordinator, Medical Control will notify the appropriate hospital.
  - Transporting units will not contact the individual hospital on their own, unless there is a need for medical direction/care outside of protocols.
- **Medical Supply Coordinator.**
  - Reports to MEDICAL and is responsible for acquiring and maintaining control of all medical equipment and supplies.
  - Radio designation: SUPPLY. Follow FOG #6.
  - Assure necessary equipment is available on the transporting vehicle.
  - Provide an inventory of medical supplies at the Staging Area for use on scene.

- **Staging Officer.**
  - Reports to COMMAND and is responsible for managing all activities within the Staging Area.
  - Radio designation: STAGING. Follow FOG #7.
  - Establish the location of a Staging Area and notify the Communications Center to direct any incoming units.
  - Maintain a "Unit Staging Log" #7A.
  - Ensure that all personnel stay with their vehicles unless otherwise directed by COMMAND. If personnel are directed to assist in another function, ensure that the keys stay with each vehicle.
  - Coordinate with the TRANSPORT Officer the location for a victim loading area and best route to the area.
  - Maintain a reserve of at least 2 transport vehicles. When the reserve is depleted request additional units through COMMAND.

► Documentation.
- The Incident Commander will, at the completion of the incident, coordinate the gathering of all pertinent documentation.
- A Post Incident Analysis (PIA) should be conducted on all MCIs.

NOTE - MRCC - Medical Resource Coordination Center - prime function is to maintain a status as to the number of victims and the hospital readiness status to accept victims, coordinate transportation and direct them to the appropriate hospital during a disaster or other situation requiring a high demand of medical resources.

Mass Casualty Incidents Uniform Prehospital – MCI Procedure - continued

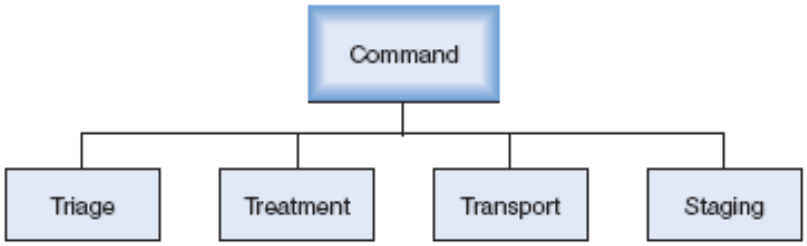
► **MCI Kits**.

Each Unit will carry an MCI bag. Included in the MCI bag will be:

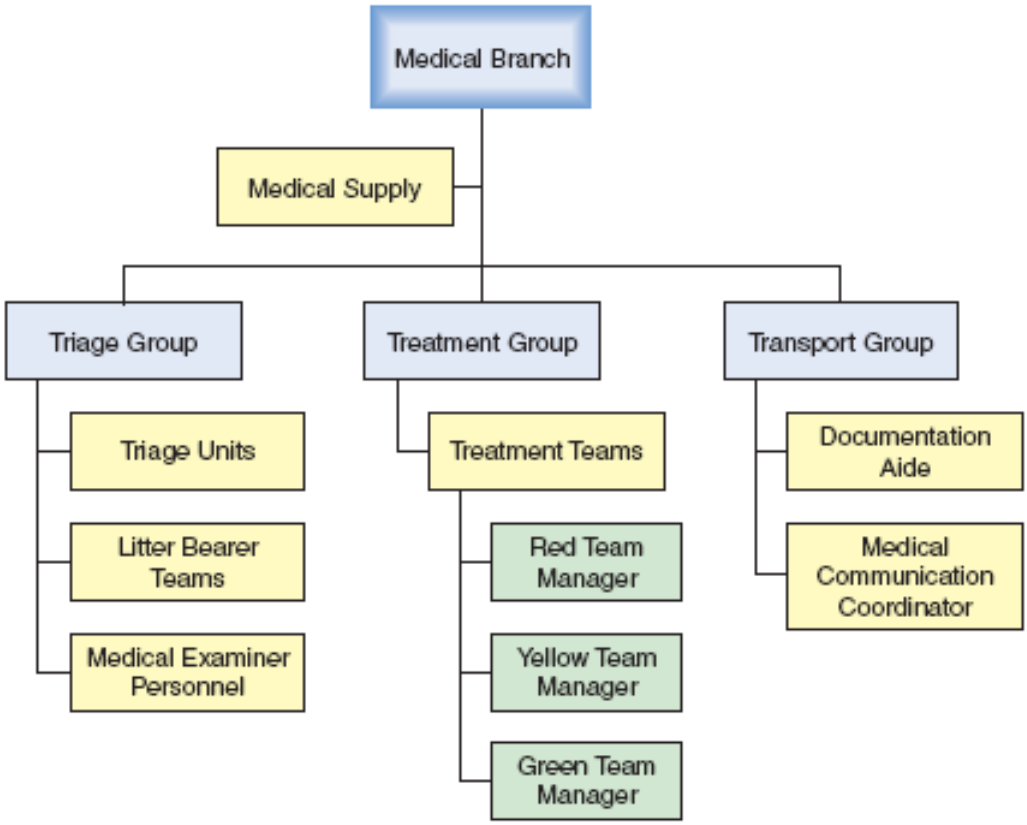
- Two (2) Triage packs with:
  - Four (4) combine dressings
  - Six (6) 4 x 4‘s
  - Six (6) pairs of gloves
  - One (1) pediatric face mask, assorted oropharyngeal (OPA) and nasopharyngeal (NPA) airways
  - Two (2) clip rings containing triage ribbons paired in red and yellow, green and black. There are 15 ribbons of each color per ring.
- One (1) additional set of triage ribbons.
- Fifty (50) Triage tags—Disaster Management Tags (DMS tags) or METTAGs.
- Three (3) mechanical pencils and three (3) grease pencils.
- The following MCI FOG‘s, logs, and associated paperwork for each Officer:
  - Command FOG #1
  - Medical FOG #2
  - Triage FOG #3
  - Treatment FOG #4
  - Treatment Log #4A
  - Transport FOG #5
  - Medical Communication FOG #5A
  - Hospital Transport Log #5B
  - Hospital Capability Worksheet #5C
  - Medical Supply FOG #6
  - Staging FOG #7
  - Unit Staging Log #7A
  - MCI-WMD/Terrorist Event FOG #8

- The following identification vests:
  - White for COMMAND.
  - Blue for the MEDICAL Officer.
  - Yellow for the TRIAGE Officer.
  - Red for the TREATMENT Officer.
  - Green for the TRANSPORT Officer.
  - Green Striped for the MEDICAL COMMUNICATION COORDINATOR.
  - Blue Striped for the MEDICAL SUPPLY Officer.
  - Orange for the STAGING Officer.

Basic MCI Command Structure for Medical Responses



Complex MCI Command Structure for Medical Responses



COMMAND - FOG #1

- ► Don the appropriate vest and use the radio designation "COMMAND." Establish the Command Post in a safe, visible and fixed location, uphill and upwind. Consider assigning an aide. If WMD involved also use FOG #8.

- ► Perform the initial size-up, including wind direction. Determine any special needs such as fire suppression, Hazmat, extrication, etc. and request additional units as needed.

- ► Approximate the number of victims and category of injury (trauma, burns, smoke inhalation, chemical exposure, etc.).

MCI	Level 1	Level 2	Level 3	Level 4	Level 5
Victims	5–10	11–20	21–100	101–1000	>1000

- ► Establish Staging Area as soon as possible. Request additional units early, as needed: consider HAZMAT, TRT, extrication, Air Rescue.
- ► Utilize the EMS Tactical Command Worksheet when available.
- ► Assign positions to perform the following functions:
    - MEDICAL BRANCH (as needed).
    - TRIAGE.
        - Litter Bearers.
    - TREATMENT.
    - RED, YELLOW, GREEN Treatment Managers.
    - TRANSPORT.
        - Documentation Aide.
        - Medical Communication Coordinator.
    - STAGING.
    - MEDICAL SUPPLY, REHAB, SAFETY, DECON, EXTRICATION, PIO (as needed).

- ► Advise Communication Center of the exact number of victims and their categories once reported from TRIAGE.
- ► Request Law Enforcement for security for all areas, traffic control and access for emergency vehicles.
- ► When applicable, have a liaison of each involved party at the Command Post. Some examples would include: Law Enforcement, Medical Examiner, Emergency Management Agency, Occupancy owner/representative, etc.
- ► If incident is due to a known or suspected WMD Event, refer to WMD FOG #8 and assign Medical Intelligence Officer to assist with decontamination, antidotes and treatment of victims.

(Paper color - White, Two-sided, with Predetermined Response Plan on back).

MCI Predetermined Response Plan (for Command FOG #1 and #2)

For the back of COMMAND FOG #1 and MEDICAL FOG #2

MCI LEVEL 1 (5–10 victims)

4 ALS Transport Units	1 Shift Supervisor
2 Suppression Units	1 EMS Supervisor

NOTE
The 2 closest hospitals & Trauma Center to the incident will be notified by Medical Control (MedCom or local communication center).

MCI LEVEL 2 (11–20 victims)

6 ALS Transport Units	2 Shift Supervisors
3 Suppression Units	2 EMS Supervisors

NOTE
The 3 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control.

MCI LEVEL 3 (21–100 victims)

8 ALS Transport Units	3 Shift Supervisors
4 Suppression Units	3 EMS Supervisors
1 Command Vehicle	1 Operations Chief
1 Supply Trailer	

NOTE
The 4 closest hospitals & 2 Trauma Centers to the incident will be notified by Medical Control.

MCI LEVEL 4 (101–1000 victims)

5 MCI Task Forces (25 units)
2 ALS Transport Unit Strike Teams (10 units)

1 Suppression Unit Strike Team (5 units)	5 Shift Supervisors
2 BLS Transport Unit Strike Teams (10 units)	3 EMS Supervisors
2 Mass Transit Buses	1 EMS Chief
1 Command Vehicle	1 Operations Chief
2 Supply Trailers	1 Communications Trailer

NOTE
The 10 closest hospitals & 5 Trauma Centers to the incident will be notified by Medical Control.

MCI Predetermined Response Plan (for Command FOG #1 and #2) continued

For the back of COMMAND FOG #1 and MEDICAL FOG #2

MCI LEVEL 5 (Over 1000 victims)

10 MCI Task Forces (50 units)
4 ALS Transport Unit Strike Teams (20 units)
2 Suppression Unit Strike Teams (10 units)
4 BLS Transport Unit Strike Teams (20 units)
4 Mass Transit Buses
2 Command Vehicles
4 Supply Trailers

10 Shift Supervisors
6 EMS Supervisors
2 EMS Chiefs
2 Operations Chiefs
1 Communications Trailer

NOTE

The 20 closest hospitals & 10 Trauma Centers to the incident will be notified by Medical Control.

MEDICAL - FOG #2

- ► Don the appropriate vest and use the radio designation "MEDICAL."
- ► Establish in a safe, fixed and visible location or co-join command post.
- ► Utilize the EMS Tactical Command Worksheet.
- ► Verify that COMMAND has requested appropriate number of units.
- ► Assign the following functions (if not done by COMMAND):
    - o TRIAGE.
        - ▪ Litter Bearers.
        - ▪ Medical Examiner Personnel.
    - o TREATMENT.
        - ▪ RED, YELLOW, GREEN Treatment Managers.
    - o TRANSPORT.
        - ▪ Documentation Aide.
        - ▪ Medical Communication Coordinator.
    - o STAGING.
        - ▪ Medical Supply Officer.

- ► Advise the Communication Center of the exact number of victims and their categories, once reported from TRIAGE.
- ► Determine amount and type of additional medical supplies needed. Consider Medical Supply Officer.
- ► If the incident is due to a known or suspected WMD Event refer to WMD FOG #8 and establish a Medical Intelligence Officer to assist with decontamination, antidotes and treatment of victims.

(Paper color - Blue, Two-sided, with Predetermined Response Plan on back).

Triage Officer – FOG #3

- ► Don the appropriate vest and use the radio designation "TRIAGE."
- ► Assign personnel to triage the "walking wounded." Use bullhorn/PA system to direct victims to a specific location or to decon area if needed.
- ► Direct personnel to triage and tag victims where they lie if the scene is safe.
- ► Prioritize victims using colored triage ribbons.
- ► Request Litter Bearer Teams from COMMAND/MEDICAL to assist with movement of victims from the incident site to the Treatment Area. Coordinate movement with the TREATMENT Officer.
- ► Victims that are Black tagged/deceased should be left where they are found and notify the medical examiner/law enforcement.
- ► Report to COMMAND/MEDICAL the number and category of victims.
- ► Ensure that all areas of the incident have been checked for victims and that all victims have been triaged.
- ► Once triage is completed contact COMMAND for further assignment.
- ► If victims are contaminated, use the Disaster Management System (DMS) tag to identify victims contaminated, and any antidotes administered. Have victims remove clothing and place in bags—use ID strip from DMS tags to label—have law enforcement secure items.
- ► If the incident is due to a known or suspected WMD Event refer to WMD FOG #8.

(Paper color—Yellow).

Treatment – FOG #4

- ► Don the appropriate vest and use the radio designation "TREATMENT."
- ► Direct personnel to either begin treatment on victims where they lie OR establish a centralized Treatment Area. Ensure security with Law Enforcement.
- ► Coordinate the movement of victims into the Treatment Area with the Litter Bearers.
- ► Consider obtaining a Documentation Aide to assist with paperwork.
- ► Request additional medical supplies as necessary from the MEDICAL SUPPLY Coordinator.
- ► ensure personnel perform a secondary triage and tag victims with a triage tag. Personnel will then remove the colored ribbon.
- ► If the incident size warrants it, designate a "Treatment Team Manager" for each color category (RED, YELLOW, GREEN).
- ► Advise TRANSPORT of victim(s) requiring immediate transportation.
- ► Account for all victims triaged and treated on the *Treatment Log.*
- ► Advise COMMAND/MEDICAL as to any changes in the victim count.
- ► If victims are contaminated, use the Disaster Management System (DMS) tag to identify victims contaminated, and any antidotes administered. Have victims remove clothing and place in bags—use ID strip from DMS tags to label—have law enforcement secure items.
- ► If incident is due to a known or suspected WMD Event, refer to WMD FOG #8. Work with the Medical Intelligence Officer to assist with decontamination, antidotes and treatment of victims.

(Paper color—Red).

Transport Officer – FOG #5

- ► Don the appropriate vest and use the radio designation "TRANSPORT."
- ► Obtain a Medical Communication Coordinator to maintain continuous communication with Medical Control and document the hospital information on the Hospital Capability Worksheet.
- ► Obtain a Documentation Aide(s) to record the triage tag numbers, victim name, age/sex, transporting unit and hospital destination for each victim on the *Hospital Transport Log.* Keep a portion of the triage tag.
- ► Establish a Victim Loading Area accessible to the Treatment Area and preferably having clear entry and exit points.
- ► Consult with TREATMENT on the amount and priority of victims.
- ► Coordinate the loading of patients by priority to transport units and helicopter—if needed coordinate with the Landing Zone Officer/Helispot.
- ► Assign 2–3 victims to each unit, ensuring adequate transport crew. The severity of victims should be mixed if multiple victims are assigned to a unit.
- ► Assign a hospital destination to each transporting unit; provide verbal and/or written travel instructions.
- ► Request additional transport units from STAGING.
- ► If incident is due to a known or suspected WMD Event, refer to WMD FOG #8.

(Paper color—Green).

Medical Communications – FOG #5A

- ► Don the appropriate vest and use the radio designation "MEDICAL COMMUNICATIONS."
- ► Establish early contact with Medical Control (MedCom/MRCC).
- ► Advise Medical Control of overall situation (e.g. smoke inhalation, trauma, burns, HazMat exposure, etc.) amount and priority of victims.
- ► Medical Control will gather hospital capabilities and capacities. Document this hospital information on the Hospital Capability Worksheet.
- ► When units are prepared to transport, advise Medical Control and supply them with the following information:
  - o The unit transporting.
  - o The number of victims to be transported.
  - o Patient priority:
    RED = Immediate.
    YELLOW = Delayed.
    GREEN = Ambulatory (minor).
  - o Any special need victims, cardiac, burn, trauma, etc.
- ► Ground transported victims should be assigned to hospitals on a rotating basis.
- ► Notify hospital of HAZMAT/WMD exposure and any antidotes given.

(Paper color—Green)

Supply – FOG #6

- ► Don the appropriate vest and use the radio designation "SUPPLY.”
- ► Assure necessary equipment is available on the transporting vehicle.
- ► Consult with TREATMENT on the need for medical supplies in the Treatment Area.
- ► Provide an inventory of medical supplies at the Staging Area.

Staging Officer – FOG #7

- ► Don the appropriate vest and use the radio designation "STAGING.”
- ► Maintain Staging Area established by COMMAND or establish a location and notify the Communication Center to direct all incoming units.
- ► Establish a visible location in the Staging Area.
- ► Maintain a Unit Staging Log.
- ► Ensure that personnel stay with their vehicle unless otherwise directed.
- ► Organize arriving units, keep like units together. If personnel leave their vehicle, keep the keys with each vehicle.
- ► Have arriving units put "BLS” or “ALS” on their front windshield using a marker, sign or tape.
- ► Coordinate with TRANSPORT the need for units and direct units to the victim loading zone.
- ► Maintain a reserve of at least 2 transport units. Should this go down, advise COMMAND.

MCI – WMD/Terrorist Event – FOG #8

- **Enroute**
  - Request additional resources.
  - Use DOT Emergency Response Guidebook (ERG) recommendations; Use the Florida Incident Field Operations Guide (FOG) book, and/or Emergency Response to Terrorism Job Aid.
  - Respond in a combined approach of Fire-Rescue, Law Enforcement, and HAZMAT Task Force.
  - Approach cautiously; from uphill/upwind if possible. Establish a safe staging area early. Do not use radios/cell phones in close proximity to suspicious devices (within 500ft).
  - Park a safe distance from an identified hazard or area that could endanger personnel or equipment. Use binoculars, look for unusual sights, sounds and be prepared to relocate if odor/cloud/casualties are noted, consider victim‘s signs, symptoms and mechanism (Thermal, Radiological, Asphyxiant, Chemical, Etiological, Mechanical, Psychological - TRACEM—P)
  - Consider secondary devices and request Law Enforcement to sweep the area for a secondary device.

- **On-Scene**
  - Establish Command, be prepared to establish a Unified Command with all agencies having jurisdiction and assess security of command post.
  - Initiate on-scene size up and hazard risk assessment, continually size up the incident, evaluate hazards and risks.
  - Establish incident perimeter - Secure the scene, deny entry, establish control zones (Hot, Warm, Cold zones). Request Law Enforcement to assist with the safety perimeter.
  - Direct victims using bullhorns/PA systems to gross decon area use large volumes of water (elevated master streams, hose lines, showers, sprinkler system, etc.). Be aware of run off.
  - Ensure personnel wear proper PPE (consult with HAZMAT/poison control as needed).
  - If needed use a HAZMAT toxic antidote kit from fire-rescue units or the MCI/WMD trailers. If a MARK 1 auto injector is administered tie an ORANGE plastic ribbon on the victim to verify type and amount of antidote given. If CANA (valium) auto injector is administered use a WHITE plastic ribbon. Also write this information on the Disaster Management System (DMS) tag.

- For contaminated victims -use the DMS tag to identify victims contaminated, direct the victims to remove all clothing and place in bags, use ID strip from DMS tags to label; advise Law Enforcements to secure. Preserve evidence if found and notify Law Enforcement.
- Notify hospitals/Medcom of HAZMAT hazard, antidotes given and degree of decontamination completed; transport decontaminated victims only (gross decon as a minimum).

► **Emergency Evacuation Procedure**
The term "Emergency Traffic" shall be used to clear radio traffic. The communication center will sound a radio alert tone followed by clear text identifying the type of emergency. If an evacuation is warranted the Incident Commander (IC) shall designate a specific vehicle(s) to sound the evacuation signal. The signal will consist of repeated short blasts of the air horn for approximately 10 seconds, followed by 10 seconds of silence this will be done 3 times. Following this the IC should conduct a Personal Accountability Report (PAR).

EMS Plan for Responding to Pandemic Influenza

Policy: This plan outlines protocols that each EMS Provider is to incorporate for the emergency care and transport of patient with suspected or confirmed pandemic influenza.

- **General Considerations**
  - Patients are to be transported using the minimum number of Emergency Medical Services (EMS) personnel and without other patients/passengers in the vehicle.
  - Sufficient infection control supplies are to be on board to support the expected duration of transport plus additional time should the vehicle experience traffic delays.
  - Receiving facilities are to be notified prior to transport of patients to facilitate preparation of appropriate infection control procedures and facilities.
  - Concerns regarding movement of suspect or confirmed cases of pandemic influenza patients in the United States are to be discussed with appropriate local and state health authorities, who will provide the latest guidance available.

- **Infection Control**
  - Protective equipment is not to be removed during patient transport.
  - Personal activities (including: eating, drinking, application of cosmetics, and handling of contact lenses) is not to be performed during patient transport.
  - In addition to respiratory droplet and possible airborne spread, this influenza virus may also be transmitted if residual infectious particles on environmental surfaces are brought into direct contact with the eyes, nose or mouth. Therefore, hand hygiene and sanitation is of primary importance for all first responders working with possible influenza patients.

- **Protective Equipment and Procedures**
  - Disposable, non-sterile gloves are to be worn for all patient contact.
  - Gloves are to be removed and discarded in biohazard bags after patient care is completed (e.g., between patients) or when soiled or damaged.
  - Hands are to be washed or disinfected with a waterless hand sanitizer immediately after removal of gloves.
  - Disposable fluid-resistant gowns are to be worn for all patient care activity. If gowns were not used, ALL responders promptly change into clean attire upon return to station.
  - Gowns are to be removed and discarded in biohazard bags after patient care is completed or when soiled or damaged.
  - Goggles or face-shields are to be worn in the patient-care compartment and when working within 6 feet of the patient. Corrective eyeglasses alone are not appropriate protection.
  - Hooded PAPR with appropriate HEPA cartridge or fit-tested N-95 respirators are to be worn by personnel in the patient-care compartment at all times.
  - Hooded PAPR with appropriate HEPA cartridge or fit-tested N-95 respirators are to be worn by the driver, if the driver's compartment is open to the patient-care compartment. Drivers that provide direct patient care (including moving patients on stretchers) must wear a disposable gown, eye protection, and gloves as described above during patient-care activities. Gowns and gloves are not required for personnel whose duties are strictly limited to driving.
  - Vehicles that have separate driver and patient compartments and can provide separate ventilation to these areas are preferred for transport of patients. If a vehicle without separate compartments and ventilation must be used, main dashboard vents should remain open with rear ventilation fans turned on at the highest setting during transport patients to maximize air-exchange.

- The patient may wear a mask to reduce droplet production, if tolerated.
- Oxygen delivery with simple and non-rebreather facemasks may be used for patient oxygen support during transport.
- Cardiopulmonary resuscitation (CPR) should only be performed using a resuscitation bag-valve mask, equipped with HEPA filtration of expired air or a separate filter in the airway circuit.
- All aerosolized treatments such as nebulizer or CPAP should use a HEPA filtration system. If HEPA filtration systems are not available, alternative treatment to aerosol medication must be utilized.

► **Mechanically Ventilated Patients**

- Mechanical ventilators for patient transport must provide HEPA filtration of airflow exhaust.
- Emergency Medical Services MUST consult their ventilator equipment manufacturer to confirm appropriate filtration capability and the effect of filtration on positive pressure ventilation.

► **Waste disposal**

- Dry solid waste, e.g., used gloves, dressings, etc., is to be collected in biohazard bags for disposal as regulated medical waste in accordance with local requirements at the destination medical facility.
- Waste that is saturated with blood, body fluids, or excreta is to be collected in leak-proof biohazard bags or containers for disposal as regulated medical waste in accordance with local requirements at the destination medical facility.
- Sharp items such as used needles are to be collected in puncture resistant sharps containers for disposal as regulated medical waste in accordance with local requirements at the destination medical facility.
- Suctioned fluids and secretions are to be stored in sealed containers for disposal as regulated medical waste in accordance with local requirements at the destination medical facility. Handling that might create splashes or aerosols during transport are to be avoided.
- Suction device exhaust is not to be vented inside the vehicle without HEPA filtration. Portable suction devices are to be fitted with in-line HEPA filters.

- **Cleaning and Disinfection After Transporting Patient**
  - Compressed air that might re-aerosolize infectious material is not to be used for cleaning the vehicle or reusable equipment.
  - Non-patient-care areas of the vehicle are to be cleaned and maintained according to vehicle manufacturer's recommendations.
  - Cleaning personnel are to wear non-sterile gloves, disposable gowns, masks and eye protection while cleaning the patient-care compartment.
  - Patient-care compartments (including stretchers, railings, medical equipment control panels, and adjacent flooring, walls and work surfaces likely to be directly contaminated during care) are to be cleaned using an EPA-registered hospital disinfectant in accordance with manufacturer's recommendations.
  - Spills of body fluids during transport are to be cleaned by placing absorbent material over the spill and collecting the used cleaning material in a biohazard bag. The area of the spill is to be cleaned using an EPA-registered hospital disinfectant. Cleaning personnel are to be notified of the spill location and initial clean-up performed.
  - Contaminated reusable patient care equipment is to be placed in biohazard bags and labeled for cleaning and disinfection utilizing proper procedures.
  - Personnel are to wear non-sterile gloves, disposable gowns, eye protection and face masks while cleaning reusable equipment.
  - Reusable equipment is to be cleaned and disinfected according to manufacturer's instructions.
  - Periodic decontamination of the interior compartment of the transport vehicle with vaporized hydrogen peroxide should be considered if it is available based upon level of suspected contamination and/or number of transports of potentially infected patients.
- **Follow-up of EMS Personnel Who Transport Patients**
  - After transportation, the service is to provide the following information to the medical director: date and route of transport; duration of patient transport; names, contact information, and specific duties (including estimated duration of direct patient care provided) of transport personnel.
  - Services should designate individuals to monitor personnel who have transported patients for evidence of fever or respiratory illness. EMS personnel who transport patients are to be assessed (directly or by telephone) at least daily for 10 days after transporting patient.
  - Asymptomatic personnel may continue work during the follow-up period.
  - Symptomatic personnel must be relieved of EMS duties, directed to seek medical care, and be reported to the state health department.

TOXMEDIC Emergency Care Protocols

Developed by: Brandon Johnson, Anthony Schebon and Dr. Robert Hudepohl, Hebron Fire Protection District

Purpose

- It is the intent of the Toxmedic program and these protocols to provide advanced medical care/support to the **HAZMAT response team**, coordinate rapid medical intervention to the victims of hazardous materials exposures and or acts of toxic terrorism. To operate in this environment, a provider should maintain Advanced Hazmat Life Support verification (Provider or Instructor). The objectives of the Toxmedic are to identify the offending substance, alter absorption by decontamination, determine the severity of the exposure, recognize toxidromes, and execute the appropriate treatment protocol. The goal of the Toxmedic program is to reduce morbidity and mortality from Hazardous materials exposures and acts of toxic terrorism.

Procedure

- The following Protocols are specifically designed for use during the treatment of victims of hazardous materials exposure and or acts of toxic terrorism. These interventions are only supplements to the standing orders and protocols; in the vast majority of cases basic and advanced life support supportive care will be sufficient.

    - Irritant gases: Ammonia, Formaldehyde, Sulfur dioxide, etc.
    - Asphyxiants: CO, Methemoglobin-forming compounds, Cyanides and Cyanogenic compounds.
    - Cholinesterase inhibitors: Pesticides Organophosphates and Carbamates.
    - Corrosives: Acids, Bases, Oxidizers and Phosphorus.
    - Hydrocarbons and Halogenated Hydrocarbons.
    - Hydrofluoric Acid and Fluorides.
    - Hydrazines
    - Ethylene Glycol and Methanol
    - Chemoterrorism: Nerve Agents, Vesicants
    - Mark 1 Kit administration.
    - Ocular irrigation: Morgan lens procedure.
    - Antidote Reference.

Antidote/Medication List

Oxygen
Atropine
Pralidoxime / 2-PAMCL
Pyridoxine
Mark 1 Auto-injector kit or DuoDote injector (Atropine 2mg / Pralidoxime 600mg)
Methylene Blue
Amyl Nitrite
Sodium Nitrite
Sodium Thiosulfate
Calcium Gluconate
Diazepam
Proparacaine
Albuterol
Thiamine (Vitamin B-1)

TOXMEDIC: Irritant gases / Toxic Inhalations

Description

Irritant gases are corrosive toxicants with local toxic effects. The primary routes of exposure are, contact with skin and mucous membranes and inhalation. Irritant gases damage the moist surfaces that they contact including the eyes, nose, mouth, and the upper/lower airways. Irritant gases are not absorbed systemically and generally do not cause systemic intoxication. Although their effects are usually localized to the tissues they contact, they will however cause airway compromise secondary to airway irritation, swelling, bronchospasm, and non-cardiogenic pulmonary edema. Irritant gases are classified by their water solubility. The depth and severity of injury to the airways and the tracheobronchial tree can be anticipated by determining the gases water solubility, concentration, and duration of the exposure. Examples of irritant gases are: Ammonia, Formaldehyde, Hydrogen Chloride, and Chlorine.

Treatment

- ► Remove patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM. Intubate if necessary. Administer Albuterol 2.5 mg via HHNT if bronchospasm or wheezing is present.
- ► Monitor ECG/ACLS per protocol.
- ► IV Normal Saline to KVO.
- ► If patient has moderate to severe irritation to the conjunctiva and eyes, a Morgan lens may be placed bilaterally and the eyes flushed with normal saline. The therapeutic end point for irrigation is a ph of 7 in the conjunctival sac. (See Morgan lens procedure).

TOXMEDIC: Asphyxiants – Simple/Systemic

Description

Asphyxiants are chemicals that interfere with the body's ability to perform aerobic metabolism. Simple asphyxiants are those, which displace oxygen from the ambient atmosphere effectively reducing the concentration of oxygen available for inhalation. Hypoxia will result from the low oxygen atmosphere. Examples of simple asphyxiants include carbon dioxide, methane, and propane. Systemic or chemical asphyxiants interfere with oxygen transport via hemoglobin, or they interfere with oxygen utilization at the cellular level by blocking the mitochondrial enzyme Cytochrome oxidase (Cytochrome a, a3). Cytochrome oxidase is the final electron receptor in the electron transport chain. Cytochrome oxidase acts directly with molecular oxygen to produce aerobic metabolism.

Treatment

- ► Remove the patient from the oxygen deficient atmosphere.
- ► Administer oxygen 100% NRBM. Intubate if necessary.
- ► Monitor ECG and perform 12 lead EKG/ACLS per protocol
- ► I.V. Normal Saline to KVO.
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

TOXMEDIC: Systemic Asphyxiants

Methemoglobing-Forming Compounds, Aniline Dyes, Nitrites, Nitrates, Nitrobenzene, & Nitrogen Dioxide

Description

Commonly found in fertilizers, paints, inks, and dyes methemoglobin-forming compounds oxidize the ferrous iron in hemoglobin to ferric iron. This ferric state of hemoglobin is called Methemoglobin and is incapable of transporting oxygen. This impairs oxygen transport causing hypoxia and causes a shift to anaerobic metabolism. The primary routes of exposure are inhalation, skin and mucous membranes, and ingestion. Venous and arterial blood will turn a chocolate brown color, which may be seen upon venipuncture.

Treatment

- Decon as appropriate. Anilines are bases that are corrosive to the eyes. If the patient has moderate to severe conjunctival irritation, irrigate bilaterally per the Morgan lens procedure.
- Administer oxygen 100% NRBM. Intubate if necessary.
- Monitor ECG and perform 12 lead EKG/ACLS per protocol.
- Quantify level of SpMetHb if non-invasive blood chemistry device is available.
- I.V. Normal saline to KVO. If patient is or becomes hypotensive, bolus with normal saline 500cc-1000cc.
- If patient is unstable or presents with cardiorespiratory distress, Administer Methylene Blue 1-2 mg/kg I.V. over 5 min. May be repeated in 60 min if no response. Pediatric dosing same as adult.
- If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

Caution Note: Administration of Methylene Blue is contraindicated in patients with a known glucose-6-phosphate dehydrogenase (G6PD) deficiency. Ask the patient and/or check for a med-alert device.

TOXMEDIC: Systemic Asphyxiants – Carbon monoxide

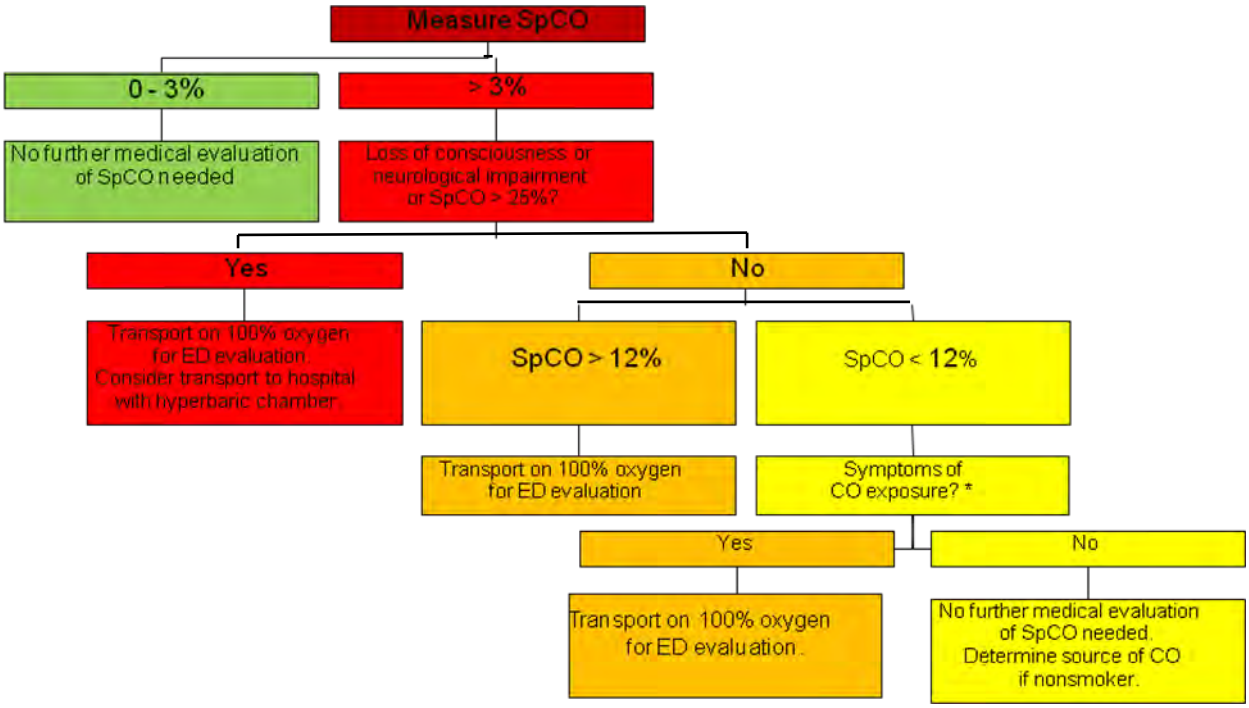
Description

Carbon monoxide is an odorless, tasteless, non-irritating gas. Carbon monoxide binds to the oxygen binding sites in the hemoglobin molecules of the erythrocytes creating carboxyhemoglobin, which has a much-decreased ability to transport oxygen. Although not fully understood, carbon monoxide is known to have an effect on the mitochondrial enzyme cytochrome oxidase causing a disruption in oxygen utilization within the cell. Primary route of exposure is inhalation.

Treatment

- ► Remove patient from the toxic atmosphere.
- ► Administer oxygen 100% NRBM. Intubate if necessary.
- ► Monitor ECG and perform 12 lead EKG/ACLS per protocol.
- ► Quantify level SpCO with non-invasive CO Oximeter or exhaled breath CO device.
- ► I.V. Normal saline to KVO.
- ► Consider transport to a hospital with hyperbaric oxygen treatment capabilities.
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

Caution note: Standard pulse oximeters will report falsely high/normal oxygen saturations in patients with carbon monoxide exposure. Evaluate the patient‘s status by exposure history, signs, and symptoms.


Measure SpCO
0 - 3%
> 3%
No further medical evaluation of SpCO needed
Loss of consciousness or neurological impairment or SpCO > 25%?
Yes
No
Transport on 100% oxygen for ED evaluation. Consider transport to hospital with hyperbaric chamber.
SpCO > 12%
SpCO < 12%
Transport on 100% oxygen for ED evaluation
Symptoms of CO exposure? *
Yes
No
Transport on 100% oxygen for ED evaluation.
No further medical evaluation of SpCO needed. Determine source of CO if nonsmoker.

TOXMEDIC: Systemic Asphyxiants

Systemic Asphyxiants - Cyanides / Cyanogenic Compounds & Hydrogen Sulfide

Description

Cyanides/Cyanogenic compounds and Hydrogen Sulfide have a high affinity for ferric iron and bind with ferric iron in Cytochrome oxidase (Cytochrome a, a3). Cyanides inhibit the utilization of oxygen at Cytochrome a, a3, resulting in reduced ATP production. Inadequate ATP production results in cellular dysfunction and cell death. The CNS and the cardiovascular system are most dependent on a consistent supply of energy and thus are among the first systems to manifest signs and symptoms of cyanide toxicity. Routes of exposure are inhalation, ingestion, and contact with skin and mucous membranes.

Treatment

- Remove the patient from the toxic atmosphere and decon as appropriate.
- Administer oxygen 100% NRBM. Intubate if necessary.
- Monitor ECG and perform 12 lead EKG/ACLS per protocol.
- I.V. Normal saline to KVO.
- Administer Cyanokit / 2.5g Hydroxocabalamin I.V. over 15-20 minutes. Repeat initial dose after 30 minutes
- If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

Caution Note: It is imperative that all healthcare personnel avoid contact with bodily fluids and take respiratory precautions against off gassing of cyanide gas from patient respirations, belching, emesis, etc. Transport patient in a well ventilated vehicle.

TOXMEDIC: Cholinesterase Inhibitors

Cholinesterase Inhibitors - Organophosphates and Carbamates

Description

Organophosphates and Carbamates are commonly used as pesticides in agriculture and home pest control. Organophosphates and Carbamates target the CNS and PNS by binding to and inhibiting the enzyme acetylcholinesterase that is responsible for terminating the effects of acetylcholine at muscarinic and nicotinic receptors. An accumulation of acetylcholine at these receptor sites results in uncontrolled receptor stimulation and produces the classic cholinergic toxidrome. Acetylcholinesterase hydrolyzes the neurotransmitter acetylcholine into its constituents, choline and acetic acid, which are reabsorbed into the nerve cell for resynthesis into acetylcholine. Common routes of exposure are inhalation, and contact with skin and mucous membranes.

Cholinergic Toxidrome / Signs & Symptoms

Muscarinic	Nicotinic
Diarrhea	Mydriasis
Urination	Tachycardia
Miosis	Weakness
Bradycardia, Bronchorrhea, Bronchospasm	Hypertension
Emesis	Fasiculations
Lacrimation	
Salivation, Sweating	

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM. Intubate if necessary. Be prepared for acute respiratory failure.
- ► Monitor ECG/ACLS per protocol.
- ► I.V. Normal Saline at KVO.
- ► If patient presents with muscarinic signs and symptoms, administer atropine 1-2 mg IV q5 minutes until bronchial secretions and hemodynamically significant bradycardia have abated. Pediatric dose is 0.02mg/kg to a maximum single dose of:
    - Infant < 2yrs 0.5 mg / 1.0 mg in severe cases.
    - Child 2-10yrs 1.0 mg / 2.0 mg in severe cases.
    - Adolescent 10-16yrs 2.0 mg / 4.0 mg in severe cases.

Note: In severe cases (i.e. unconscious, seizures, respiratory extremis, or cardiorespiratory arrest), begin with a starting initial dose of 6 mg of Atropine I.V. in adults, and then repeat with 2 mg q5 minutes until the therapeutic end points from above are reached. Pediatric doses in severe cases are initial dose 2 times the single dose amounts calculated above (i.e. 0.04 mg/kg) with maximum single dose also doubled, then repeat with 0.02 mg/kg q5 minutes until the therapeutic end points from above are reached.

- ► Administer Pralidoxime (2-PAM) 1 gram (1000mg) I.V. over 10 minutes. Pediatric dose is 20-40 mg/kg over 10 minutes. Rapid I.V. administration of Pralidoxime can cause serious untoward effects (laryngospasm and neuromuscular blockade with paralysis) therefore it should be given slowly. Be prepared for rapid endotracheal intubation.
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, a benzodiazepine per the seizure protocol.

Note: The use of the Mark 1 antidote kit/DuoDote shall be reserved for those patients involved in MCI involving Organophosphates or acts of toxic terrorism. However, if I.V. Pralidoxime is not available due to shortage or other extenuating circumstances it is appropriate to substitute IM Pralidoxime. The provider will utilize the dosing guidelines from the Mark 1 administration protocol for IM Pralidoxime only. All other medications will be administered IV.

TOXMEDIC: Corrosives

Description

The primary toxicodynamic effect of virtually all acids, bases, oxidizers, and white phosphorus is the production of chemical burns due to their corrosive, local toxic effects. When acids contact tissue they produce a pathological change termed coagulative necrosis, resulting in a thick hardened scab (coagulum). Bases act in much the same way except bases do not produce coagulative necrosis. Bases produce liquefactive necrosis. Liquefactive necrosis liquefies and destroys the tissue usually resulting in a much deeper burn. Routes of exposure are Inhalation, ingestion, and contact with the skin and mucous membranes.

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% as needed. Intubate if necessary. Assess for airway burns and signs of upper airway compromise/obstruction (i.e. hoarseness, stridor, coughing).
- ► Administer Albuterol 2.5 mg via HHNT if bronchospasm or wheezing is present.
- ► Monitor ECG.
- ► I.V. Normal saline to KVO. Severe burns may cause third spacing and hypolvolemia, monitor for shock and treat accordingly.
- ► If patient has moderate to severe irritation to the conjunctiva and eyes, a Morgan lens may be placed bilaterally and the eyes flushed with normal saline. The therapeutic end point for irrigation is a ph of 7 in the conjunctival sac. (See Morgan lens procedure).
- ► Apply dry sterile dressings to burns after sufficient decontamination and protect patient from exposure/heat loss.

TOXMEDIC: Hydrocarbons & Halogenated Hydrocarbons

Description

Volatile hydrocarbons and halogenated hydrocarbons predominantly affect the CNS and the myocardium. They are CNS anesthetic agents that produce decreased LOC, coma, and can lead to death. All hydrocarbons sensitize the myocardium to endogenous catecholamines thereby lowering the threshold for ventricular fibrillation. Dermal exposure can result in defatting dermatitis and chemical burns. Highly volatile hydrocarbons are simple asphyxiants producing potential hypoxia. The most significant hazard for most hydrocarbons is their flammability and their ability to form explosive mixtures in air. Routes of exposure are inhalation, ingestion, and contact with the skin and mucous membranes.

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM. Intubate if necessary.
- ► Monitor ECG. Be prepared to manage ventricular dysrhythmias per current ACLS protocols.
- ► I.V. Normal saline to KVO.
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.
- ► If patient has moderate to severe irritation of the conjunctiva and eyes, a Morgan lens may be placed bilaterally and the eyes flushed with normal saline. The therapeutic end point for irrigation is a ph of 7 in the conjunctival sac. (See Morgan lens procedure).
- ► Hydrocarbons and halogenated hydrocarbons sensitize the myocardium to endogenous catecholamines. Keep patient calm, and avoid the administration of sympathomimetic agents if possible.

TOXMEDIC: Hydrofluoric Acid and Fluorides

Description

Although hydrofluoric acid is an acid and liberates the hydrogen ion in water, it is a relatively weak acid when compared to a strong acid such as hydrochloric acid. Nonetheless it will produce chemical burns. The primary toxicity of hydrofluoric acid, hydrogen fluoride, and all soluble fluorides is due to the fluoride anion. The fluoride anion combines with endogenous calcium and magnesium to produce insoluble calcium fluoride and magnesium fluoride. This results in hypocalcemia, hypomagnesemia, and hyperkalemia. These electrolyte abnormalities have the most profound effect on the excitable tissues in the nervous system, skeletal muscle, and the cardiac muscle. This is manifest as severe burning and pain at the site of contact. Toxic exposures may also present with muscle twitching, seizure, myocardial irritability, prolonged QT interval, and an increased potential for Torsades de Pointes. Common routes of exposure are inhalation, ingestion, and contact with skin and mucous membranes.

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM as Needed / Intubate if necessary.
- ► Monitor ECG and obtain 12 Lead EKG. Be prepared to manage ventricular dysrhythmias per current ACLS protocols. Consider Magnesium Sulfate as primary antidysrhythmic if hypomagnesemia is known or suspected.
- ► For local dermal exposure with severe pain, apply Calcium Gluconate gel to burned area. (Mix 10cc of a 10% Calcium Gluconate into a 2oz tube of water-soluble jelly). Massage into the affected area.
- ► If patient has moderate to severe irritation to the conjunctiva and eyes, a Morgan lens may be placed bilaterally and the eyes flushed with a solution of normal saline 500 ml and 50 ml 10% Calcium Gluconate . The therapeutic end point for irrigation is a ph of 7 in the conjunctival sac. (See Morgan lens procedure).
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

TOXMEDIC: Hydrazines

Description

Hydrazines are colorless, alkali liquids with ammonia like odors. Ammonia-like compounds such as hydrazines are excellent fuels as well as reducing agents. They are are also widely used in the production of spandex. Hydrazines have numerous system toxicities; they are strong bases that produce severe burns with liquifactive necrosis. Hydrazines also antagonize the function of GABA, and inhibit GABA formation in the brain. The resulting GABA deficiency results in over excitation of the brain and seizures that can be intractable, unless pyridoxine is given. Massive exposures of hydrazines may be hepatotoxic, which may result in acute liver failure.

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM as needed. Intubate if necessary.
- ► Monitor ECG and obtain 12 Lead EKG. Be prepared to manage ventricular dysrhythmias per current ACLS protocols.
- ► Normal saline to KVO. Severe burns may cause third spacing, monitor for shock and treat accordingly.
- ► If seizures develop administer Pyridoxine 10% 25mg/kg (adult & peds) slowly over 5 minutes. If seizures persist, administer a benzodiazepine per the seizure protocol.
- ► If patient has moderate to severe irritation to the conjunctiva and eyes, a Morgan lens may be placed bilaterally and the eyes flushed with normal saline. The therapeutic end point for irrigation is a ph of 7 in the conjunctival sac. (See Morgan lens procedure).

TOXMEDIC: Ethylene Glycol and Methanol

Description

Ethylene Glycol is a commonly found product (radiator fluid) and a common poisoning, especially in children. The clinical manifestations are described in three phases

1. 30mins to 12 hours – inebriation, metabolic acidosis, seizures, and coma.
2. 12 to 36 hours – tachycardia, tachypnea, hypertension, and pulmonary edema.
3. 36 to 48 hours – crystalluria, acute tubular necrosis with oliguria, and renal failure.

Methanol is a highly toxic alcohol commonly found in automobile windshield washer solvent and gas line antifreeze among others. Many new uses for methanol, predominantly as an alternative energy source, have also been proposed. If these new applications are developed, methanol is likely to become even more accessible in the future and therefore, more available for misuse.

Toxic Effects

- ► Cardiovascular effects – dysrhythmias, hypotension, and pulmonary edema.
- ► Respiratory effects – respiratory insufficiency or arrest, pulmonary edema and chemical pneumonitis.
- ► CNS - CNS Depression, seizures, coma, headache, muscle weakness, and delirium.
- ► GI – GI bleeding, nausea and vomiting, and diarrhea.
- ► Eye – Chemical conjunctivitis
- ► Skin – irritation to full thickness burns

Treatment

- ► Remove the patient from the toxic atmosphere and decon as appropriate.
- ► Administer oxygen 100% NRBM. Intubate if necessary. Be prepared for acute respiratory failure.
- ► Monitor ECG/ACLS per protocol.
- ► I.V. Normal saline to KVO.
- ► In cases of metabolic acidosis i.e. respiratory rate twice the normal for the patient consider sodium bicab 8.4% 1meq/kg IV.
- ► Administer thiamine 100mg IV.
- ► If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

TOXMEDIC: Chemoterrorism Nerve Agents

Description

Nerve agents were first developed in Germany during the early 1930‘s as chemical warfare agents. These agents are traditionally divided into two classes, the G and V agents. The G agents, Tabun (GA), Sarin (GB), and Soman (GD) were synthesized in Germany. The V agent, VX was developed in the United Kingdom. Nerve agents inhibit the enzyme acetylcholinesterase, which is responsible for deactivating the neurotransmitter acetylcholine. Therefore acetylcholine accumulates at all cholinergic receptors, resulting in uncontrolled receptor stimulation, thereby producing the cholinergic toxidrome. Nerve agents are derived from organophosphate compounds, nerve agents will irreversibly bind to acetylcholinesterase (aging) unless the antidote Pralidoxime is administered.

Aging half-times

Agent	Synonym	Aging Half-Time
Soman	GD	< 2minutes
Sarin	GB	5 hours
Tabun	GA	> 40 hours
VX	None	> 40 hours
Commercial organophosphates		several days

Cholinergic Toxidrome / Signs & Symptoms

Muscarinic	Nicotinic
Diarrhea	Mydriasis
Urination	Tachycardia
Miosis	Weakness
Bradycardia, Bronchorrhea, Bronchospasm	Hypertension
Emesis	Fasiculations
Lacrimation	
Salivation, Sweating	

Treatment

- Remove the patient from the toxic atmosphere and decon as appropriate.
- Administer oxygen 100% NRBM. Intubate if necessary. Be prepared for acute respiratory failure.
- Monitor ECG/ACLS per protocol.
- I.V. Normal saline to KVO.
- If patient presents with muscarinic signs & symptoms, Administer Atropine 1-2 mg I.V. q5 minutes until bronchial secretions and hemodynamically significant Bradycardia have abated. Pediatric dose is 0.02 mg/kg to a maximum single dose of:
  - Infant < 2yrs 0.5 mg / 1.0 mg in severe cases.
  - Child 2-10yrs 1.0 mg / 2.0 mg in severe cases.
  - Adolescent 10-16yrs 2.0 mg / 4.0 mg in severe cases.
- Administer Pralidoxime (2-PAM) 1 gram (1000mg) I.V. over 10 minutes. Pediatric dose is 20-40 mg/kg over 10 minutes. Rapid I.V. administration of Pralidoxime can cause serious untoward effects (laryngospasm and neuromuscular blockade with paralysis) therefore it should be given slowly. Be prepared for rapid endotracheal intubation.
- If the patient develops seizures despite adequate oxygenation and normal blood glucose values, administer a benzodiazepine per the seizure protocol.

Note: The use of the Mark 1 antidote kit shall be reserved for those patients involved in MCI involving Organophosphates or acts of toxic terrorism. However, if I.V. Pralidoxime is not available due to shortage or other extenuating circumstances it is appropriate to substitute IM Pralidoxime. The provider will utilize the dosing guidelines from the Mark 1 administration protocol for IM Pralidoxime only. All other medications will be administered IV.

Note: In severe cases (i.e. unconscious, seizures, respiratory extremis, or cardiorespiratory arrest), begin with a starting initial dose of 6 mg of Atropine I.V. in adults, and then repeat with 2 mg q5 minutes until the therapeutic end points from above are reached. Pediatric doses in severe cases are initial dose 2 times the single dose amounts calculated above (i.e. 0.04 mg/kg) with maximum single dose also doubled, then repeat with 0.02 mg/kg q5 minutes until the therapeutic end points from above are reached.

Auto-Injector kit administration - Nerve agent Mass casualty

Description

The Mark 1 Kit was developed by the US Armed Forces as an antidote auto-injector for battlefield management of nerve agent exposure. Today these kits have been made available to nearly all areas of the healthcare system. Recent history has proven that a mass casualty incident involving a nerve agent is not only possible, but also quite probable. However remote, the possibility does exist for a MCI involving one or more of these agents. The utilization of the Mark 1 Kit is reserved for an event such as this. The Mark 1 Kit is a highly pressurized auto-injector kit made to penetrate thick military uniforms. Due to the pain associated with administration, they should not be self administered unless absolutely necessary. The kit contains Atropine 2mg I.M. and Pralidoxime 600mg I.M. Mark 1 dosing is based solely upon the severity of clinical signs and symptoms. See the dosage chart below.

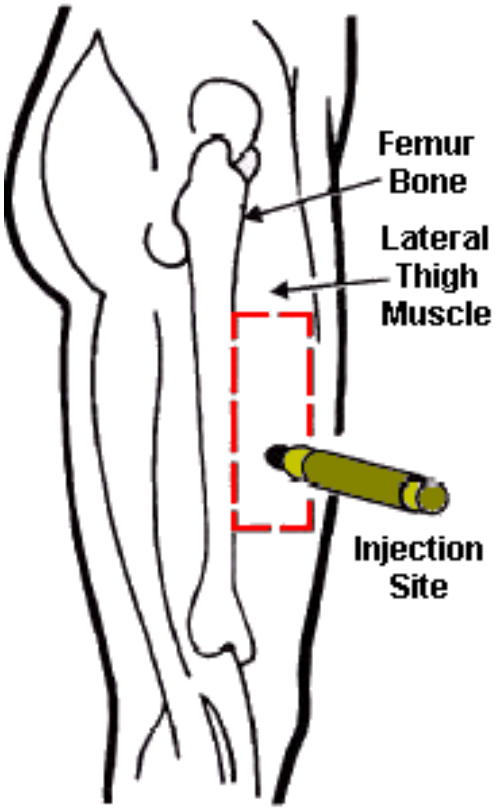
Note: Duodote, the newest auto-injector for the treatment of cholinesterase inhibitor poisoning contains Pralidoxime 600mg and Atropine 2mg in one injector. Administer per Mark I protocol.

Mild	Moderate	Severe
Ambulatory	Seated or prostrate	In extremis
Miosis	Moderate dyspnea	Unconscious
Eye pain	Coughing	Seizures
Mild dyspnea	Wheezing	Paralysis
Rhinorrhea	Vomiting	Resp. Arrest
Blurred vision	Fasiculations	Card. Arrest
Lacrimation	Weakness	

1 Mark 1 kit	2 Mark 1 kits	3 Mark 1 kits

Mark 1 kit administration - Nerve agent Mass casualty

PROCEDURE FOR INTRAMUSCULAR INJECTION OF THE MARK 1 KIT



Apply firm, even pressure (not jabbing motion) to the injector until it pushes the needle into your thigh (or buttocks). Using a jabbing motion may result in an improper injection or injury to the thigh or buttocks.

Hold the injector firmly in place for at least 10 seconds. The seconds can be estimated by counting "one thousand one," "one thousand two," and so forth.

Firm pressure automatically triggers the coiled spring mechanism. This plunges the needle through the clothing into the muscle and at the same time injects the antidote into the muscle tissue.

Carefully remove the auto injector from your injection site.

TOXMEDIC: Ocular irrigation – Morgan lens

Description

The Morgan Lens is a most effective method for treating ocular trauma. It is widely used by physicians, nurses and other medical personnel for emergency eye irrigation. In seconds, the eye can be receiving the lavage necessary to treat chemical and thermal burns or to remove non-embedded foreign materials in the eye. The Morgan Lens is designed to be attached to the Morgan Lens Delivery Set (or a standard IV setup) and an irrigation solution of choice. The patient may then be comfortably transported while one or both eyes receive the most complete and comfortable ocular irrigation possible.

Procedure

- ► Instill topical ocular anesthetic: 2 drops of 0.5% Tetracaine or Proparacaine.
- ► Attach Morgan Lens Delivery Set, IV, or syringe using solution and rate of choice; start flow so the lens floats atop the fluid.
- ► Have patient look down, insert lens under upper lid.
- ► Have patient look up, retract lower lid, and drop lens in place.
- ► Release the lower lid over lens and adjust flow.
- ► Tape tubing to patient‘s forehead to prevent accidental lens removal.
- ► Place towel around head to absorb outflow.
- ► The therapeutic end point is a pH of 7.0 in the conjunctival sac, or 15 minutes in the case of a non-corrosive.
- ► Remove lens: Continue flow, have patient look up, retract lower lid and hold.
- ► Slide lens out.
- ► Terminate flow.

Normobaric Oxygen

- Indications
  - Hypoxemia
  - Tissue hypoxia
  - Simple asphyxiant poisonings
  - Systemic asphyxiant poisonings
  - Significant methemoglobinemia
  - Carbon monoxide poisoning
  - Cyanide & cyanogenic compound poisonings
  - Azide & hydrozoic acid poisonings
  - Hydrogen sulfide & sulfide poisonings

- Contraindications (Relative)
  - Severe chronic lung disease (e.g., COPD) that requires hypoxic ventilatory drive.
  - Paraquat poisoning, unless the patient cannot maintain his SpO2 90% while breathing room air.

- Complications & Adverse Effects
  - Usually none.
  - Ablation of hypoxic ventilatory drive in patients with chronic obstructive pulmonary disease (COPD) and chronic hypercarbia.
  - Long-term, high concentration administration can lead to ocular complications in neonates and pulmonary complications in infants through adults.

- Dosage
  - As close to 100% as can be obtained by the various devices.

- Route of Administration
  - Inhalation

- How Supplied
  - 15 L/min nonrebreather reservoir mask (preferred, if the patient has adequate ventilation).
  - Bag-valve-mask with 100% oxygen (preferred, if the patient has inadequate ventilation prior to endotracheal intubation).
  - Endotracheal tube with 100% oxygen (if the patient requires endotracheal intubation).

- Mechanism of Action
  - Supplies oxygen for aerobic metabolism.

Hyperbaric Oxygen

- Indications
  - Significant carbon monoxide poisoning with syncope, seizures, coma, lactic acidosis, myocardial ischemia, myocardial infarction, abnormal psychometric testing, a carboxyhemoglobin level > 25% in a nonpregnant patient, a carboxyhemoglobin level > 15% in pregnant patients, etc. Consult a hyperbaric physician.
  - Significant cyanide & cyanogenic compound poisonings. Consult a hyperbaric physician.

- Experimental uses:
  - Significant methemoglobinemia unresponsive to or with known contraindications to methylene blue, e.g., with known G6PD deficiency.
  - Hydrogen sulfide & sulfide poisonings.
  - Azide & hydrazoic acid poisonings.

- Relative Contraindications

History of spontaneous pneumothorax	Hyperthermia
Intractable claustrophobia	Pregnancy
Epilepsy	Active malignancy
Sinusitis	Cisplatinum
Otitis	Bleomycin
COPD	Adriamycin
Asthma	Steroids
Lung diseases	Insulin
History of thoracic surgery	Sulfamylon
History of reconstructive ear surgery	Opiates
Upper respiratory infection	Opioids
Hereditary spherocytosis	Alcohol
Optic neuritis	Nicotine
Acidosis	

- Absolute Contraindications
  - Pneumothorax
  - Consult a hyperbaric physician for questions regarding contraindication.

- Complications & Adverse Effects
  - Seizures
  - Dysbaric injuries
    - Pneumothorax
    - Tension pneumothorax
    - Middle ear damage
    - Tympanic membrane hemorrhage & rupture
    - Sinus squeeze

Hyperbaric Oxygen

- Dosage
  - 100% oxygen at 2 to 3 atmospheres absolute (ATA) for 90 minutes and repeated as required, with a second treatment no sooner than 8 hours after the first. Consult a hyperbaric physician.

- Route of Administration
  - Inhalation

- How Supplied
  - Hyperbaric chamber

- Mechanism of Action
  - For carbon monoxide poisoning there is more rapid elimination of carbon monoxide and there is some evidence that post-carbon monoxide poisoning encephalopathy may be somewhat mitigated by HBO treatment.

  - In cyanide and hydrogen sulfide poisoning the evidence is less clear and is controversial, but anecdotal reports suggest patients who have not satisfactorily responded to supportive and specific antidotal therapy have survived after receiving HBO therapy.

  - For patients with methemoglobinemia enough oxygen can be dissolved in the plasma to sustain life even when very little hemoglobin is left to transport oxygen.

Methylene Blue

- Indications
  - Methemoglobinemia with signs or symptoms of cardiac or cerebral hypoxia such as dyspnea, chest pain, ischemic EKG changes, agitation, confusion, seizures, or coma. Methemoglobinemia ≥ 30%.

- Relative Contraindications
  - Known methemoglobin reductase deficiency.
  - Lack of indications. A patient usually does not require treatment with methylene blue if he is cyanotic, but is not in cardiorespiratory distress and has a methemoglobin level < 30%.
  - Severe renal failure.
  - Reversal of nitrite-induced therapeutic methemoglobinemia for treatment of cyanide or nitrile poisoning; however, some evidence indicates methylene blue can be used safely to treat rare cases of excessive methemoglobinemia caused by nitrite antidotes used to treat cyanide or cyanogenic compound poisoning.

- Absolute Contraindications
  - Known glucose-6-phosphate dehydrogenase (G6PD) deficiency. Lethal hemolysis is possible!
  - Allergy.

- Complications & Adverse Effects
  - Nausea .
  - Vomiting
  - Headache
  - Blue-green urine (expected side effect)
  - Methemoglobinemia (if given in high doses [> 7mg/kg] or if given too fast)
  - Hemolysis (if given in normal doses to patients who are G6PD deficient, or if patients with normal G6PD receive > 15 mg/kg)

- Dosage
  - Adult dosage: 1-2 mg/kg IV, slowly over 5 minutes. This dose can be repeated in 30-60 minutes, if symptoms persist. If no response occurs after two doses, do not repeat again; consider G6PD deficiency or methemoglobin reductase deficiency.
  - Pediatric Dosage: Same as adults.

- Route of Administration
  - IV, over 5 minutes

- How Supplied
  - 1% solution (10 mg /1mL). 10 mL /1 ampule.

Methylene Blue

- Mechanism of Action
  - Methylene blue serves as a cofactor for NADPH-dependent methemoglobin reductase, allowing more rapid reduction of the ferric iron (Fe+3) of methemoglobin back to the ferrous iron (Fe+2) of normal hemoglobin.

- Ineffective in the following:
  - Sulfhemoglobinemia.
  - Hemoglobin M disease.
  - NADPH-dependent methemoglobin reductase deficiency.

Amyl Nitrite

- Indications
  - First aid treatment for patients with significant sulfide poisoning.
  - Amyl nitrite's use and ambulance stocking can be deleted, if desired, because of its lack of proved efficacy and abuse potential.

- Relative Contraindications
  - Significant hypotension
  - Methemoglobinemia > 40%
  - Carbon monoxide poisoning

- Absolute Contraindication
  - Allergy

- Complications & Adverse Effects
  - Headache
  - Hypotension
  - Reflex tachycardia
  - Hypoperfusion (shock)

- Dosage
  - 1 ampule inhaled for 30 seconds out of each minute; change ampules every 3 minutes. Ampules may be broken in medical gauze and held next to the mouth or nose of spontaneously breathing patients. Alternatively, ampules may be broken and placed inside the lip of a face mask or oxygen-powered breathing device (avoid ingestion or aspiration), or into a ventilation bag. Discontinue use when sodium nitrite is administered.

- Route of Administration
  - Inhalation

- How Supplied
  - 0.3 mL./crushable ampule.
  - 12 crushable ampules/ United States cyanide antidote kit.

- Mechanism of Action
  - The mechanism of action may be by inducing low levels of methemoglobinemia. Another postulated mechanism is by acting through nitric oxide synthetase. Airway management and provision of supplemental oxygen increases efficacy.

- Ineffective
  - For azide poisoning

Sodium Nitrite

- Indications
  - Significant sulfide poisoning

- Relative Contraindications
  - Significant hypotension
  - Methemoglobinemia > 40%
  - Carbon monoxide poisoning
- Absolute Contraindication
  - Allergy

- Complications & Adverse Effects
  - Headache
  - Hypotension
  - Reflex tachycardia
  - Hypoperfusion (shock)
  - Excessive methemoglobinemia

- Dosage
  - Adult Dosage: 1 ampule, over no less than 5 minutes
  - Pediatric Dosage: 0.12 to 0.33 mL/kg (up to a maximum of 10 mL), over no less than 5 minutes.

  - Adult or Pediatric Dosages
  - Half the initial dose may be repeated, if an adequate clinical response has not occurred in 30 minutes.

- Route of Administration
  - IV, over absolutely no less than 5 minutes, with frequent blood pressure monitoring. The usual dose can be diluted in 50 to 100 mL of D5W or NS and given more slowly.

- How Supplied
  - 3% solution (300 mg / 10 mL ampule).
  - 2 ampules/ United States cyanide antidote kit.

- Mechanism of Action
  - Postulated to induce low levels of methemoglobinemia or by acting through nitric oxide synthetase. Airway management and provision of supplemental oxygen increases efficacy.

- Ineffective
  - For azide poisoning

Pralidoxime

- Indications
  - Organophosphate pesticide or military nerve agent poisoning.
  - Unknown cholinesterase inhibitor poisoning.
  - Controversial for carbamate pesticide poisoning.

- Relative Contraindications
  - Myasthenia gravis
  - Renal failure

- Absolute Contraindications
  - Inability to perform endotracheal intubation, if neuromuscular blockade were to occur (a rare, dose and rate related complication).

- Complications & Adverse Effects
  - Generally safe.
  - Neuromuscular blockade, laryngospasm, muscular rigidity, and tachycardia have occurred with rapid IV administration, or with doses much higher than those usually administered.
  - Rare: Visual disturbances, weakness, blurred vision, diplopia, dizziness, headache, nausea, hyperventilation, tachycardia, transiently elevated blood pressure, and asystole (1 reported case only).

- Dosage
  - Adult Dosage:
    - Bolus & Infusion: 1-2 g IV over 5-10 minutes. This dose may be repeated 1 hour after the first, if weakness or fasciculations have not resolved. 500 mg/h IV infusion for 24 hours after initial bolus.
  - Pediatric Dosage:
    - Bolus & Infusion: 20-40 mg/kg IV over 10 minutes.
    - 5-10 mg/kg/h IV infusion for 24 hours after initial bolus.

- How Supplied
  - 1g/20 mL solution

- Mechanism of Action
  - Dephosphorylates (reactivates) phosphorylated (deactivated) cholinesterase that has not irreversibly "aged." The average "aging" time varies from minutes with some military nerve agents to a few days with some organophosphate pesticides.

- Ineffective
  - For nicotine poisoning.
  - For tobacco (nicotine) poisoning.

Atropine

- ► Indications
  - Organophosphate or carbamate pesticide poisoning
  - Organophosphate military nerve agent poisoning

- ► Relative Contraindications
  - Narrow angle (angle-closure) glaucoma
  - Obstructive uropathy
  - Myasthenia gravis
  - Patients who cannot tolerate an elevated heart rate such as those with coronary artery disease (CAD), congestive heart failure, tachydysrhythmias, hypertension, thyrotoxicosis, etc.

- ► Absolute Contraindication
  - Absence of significant muscarinic effects

- ► Complications & Adverse Effects
  - Hot dry skin
  - Visual disturbances (blurred vision)
  - Photophobia (light hurts the eyes) due to cycloplegia (paralysis of the iris and the ciliary muscle that focuses the lens)
  - Mydriasis (dilated pupils)
  - Acute narrow angle (angle-closure) glaucoma
  - Dry mouth
  - Constipation
  - Urinary retention
  - Tachycardia
  - Myocardial ischemia and infarction due to tachycardia with increased myocardial oxygen demand
  - Central anticholinergic syndrome (hallucinations, agitation, combative)

- ► Dosage
  - Adult Dosage
    - Range: 0.5 mg (usual IV ACLS dose) to 6 mg (maximum IM dose for organophosphate military nerve agent severe poisoning).
    - Recommendations: 1-2 mg, IV, every 5 minutes, until bronchial secretions and significant bradycardia are controlled. Very large doses may be required with organophosphates.
  - Pediatric Dosage
    - Range: 0.01-0.04 mg/kg (Never give less than 0.1 mg!)
    - Recommendations: 0.02 mg/kg, IV, every 5 minutes, until bronchial secretions and significant bradycardia are controlled. Very large doses may be required with organophosphates. Required doses are larger than those used in ACLS.

Atropine

- Routes of Administration
  - IV preferred
  - IM possible
  - Endotracheal possible

- How Supplied
  - 8 mg/20 mL solution
  - Use preservative (phenol)-free formulations for massive dosing that requires many repeat boluses or a continuous IV atropine infusion.

- Mechanism of Action
  - Competitive antagonism of acetylcholine at muscarinic receptors

- Ineffective
  - At nicotinic receptors

Calcium Gluconate

- Indications
  - Hydrofluoric acid burns.
  - Hydrogen fluoride or other fluoride systemic toxicity (such as hypocalcemia, hypomagnesemia, and/or hyperkalemia.

- Contraindications
  - Concurrent toxicity of digoxin or other cardiac glycosides.

- Complications & Adverse Effects
  - Hypercalcemia
  - Precipitation or exacerbation of cardiac glycoside toxicity.
  - Local irritation & pain at injection sites.

- Dosage
  - Topical: Topical application (inunction) with an extemporaneously made gel (2.5 to 10%), or used undiluted (10%) without gel, inside a surgical glove, for fingertip, thumb, and hand exposures.
  - Subcutaneous: Subcutaneous injection titrated to relief of pain with 0.5 mL per cm2 of skin surface area.
  - Eyes: a Morgan lens may be placed bilaterally and the eyes flushed with a solution of normal saline 500 ml and 50 ml 10% Calcium Gluconate.
  - Adult Dosage:
    - 10-30 mL IV for systemic fluoride poisoning. Titrated to control cardiac dysrhythmias, conduction disturbances, hypocalcemia, hypomagnesemia, and hyperkalemia.
  - Pediatric Dosage: 0.2-0.3 mL/kg, IV

- Routes of Administration
  - Topical
  - Subcutaneous
  - IV
  - Morgan Lens

- How Supplied
  - Extemporaneously prepared 2.5% to 10% gel or solution for dermal application.
  - 10% solution for intravenous, or subcutaneous injection.
  - Each 10 ml- vial of calcium gluconate contains 1 g of calcium gluconate.

- Mechanism of Action
  - Calcium ions bind with fluoride ions to produce the inactive calcium fluoride salt (CaF2). Calcium repletes depleted stores of endogenous calcium and counteracts the effects of hyperkalemia.

Calcium Chloride

- Indications
  - Hydrogen fluoride or other fluoride systemic toxicity such as hypocalcemia, hypomagnesemia, and/or hyperkalemia

- Contraindications
  - Concurrent hypercalcemia
  - Concurrent toxicity of digoxin or other toxicity cardiac glycosides.

- Complications & Adverse Effects
  - Hypercalcemia
  - Precipitation or exacerbation of cardiac glycoside toxicity.
  - Local irritation & pain at injection sites.
  - Tissue necrosis, if given subcutaneously, or if it extravasates!

- Dosage
  - Intravenous injection for systemic fluoride poisoning. Titrated to control cardiac dysrhythmias, conduction disturbances, hypocalcemia, hypomagnesemia, and hyperkalemia.
  - Adult Dosage: 5-10 mL, slowly, IV.
  - Pediatric Dosage: 0.1-0.2 mL, slowly, IV.

- Route of Administration
  - IV only

- How Supplied
  - 10% solution.
  - Each 10 mL vial of calcium chloride contains 1 g of calcium chloride, i.e., 13.6 mEq of calcium.

- Mechanism of Action
  - Soluble calcium ions (Ca +2) bind with soluble fluoride ions (F) to produce the insoluble and therefore inactive calcium fluoride salt (CaF2). In addition, exogenous medicinal calcium repletes depleted stores of endogenous calcium and counteracts the effects of hyperkalemia.

Tablet -1: Comparing & Contrasting Calcium Gluconate with Calcium Chloride

Parameter	Calcium Gluconate	Calcium Chloride
Concentration	10%	10%
Volume per vial	10 mL	10 mL
Mass of calcium salt per vial	1 g	1 g
Milliequivalents of calcium per vial	4.6 mEq	13.6 mEq

Pyridoxine

- Indications
  - Hydrazine poisonings
- Contraindications
  - None
- Complications & Adverse Effects
  - None acutely
  - Peripheral neuropathy with chronic, excessive dosing
  - Pyridoxine withdrawal seizures in neonates of mothers who took chronic, excessive doses of pyridoxine during pregnancy
- Dosage
  - Adult & Pediatric: 25 mg/kg, over 5 minutes.
- Route of Administration
  - IV
- How Supplied
  - 10% solution.
  - 100mg/ml 1ml vial
- Mechanism of Action
  - Hydrazines deplete the major cerebral inhibitory neurotransmitter, gamma-aminobutyric acid (GABA), resulting in intractable seizures that usually do not respond to standard anticonvulsants. Pyridoxine is a required synthetic cofactor that enables the brain to regenerate GABA and stop seizing.
- Ineffective
  - For seizures not caused by GABA depletion

Thiamine

- Indications
  - Ethylene glycol and methanol poisonings.

- Contraindications
  - Allergy

- Complications & Adverse Effects
  - Adverse effects are highly unusual.
  - Headache, irritability, tremors, nausea, vomiting, and palpitations.
  - Eczematous reactions and Herpes-Zoster may occur.
  - Anaphylactoid reactions: anxiety, pruritus, respiratory distress, nausea, abdominal pain, angioneurotic edema and cardiovascular collapse.

- Dosage
  - Adult: 100mg.
  - Pediatric: 50mg.

- Route of Administration
  - IV

- How Supplied
  - 100mg/mL 2mL vial

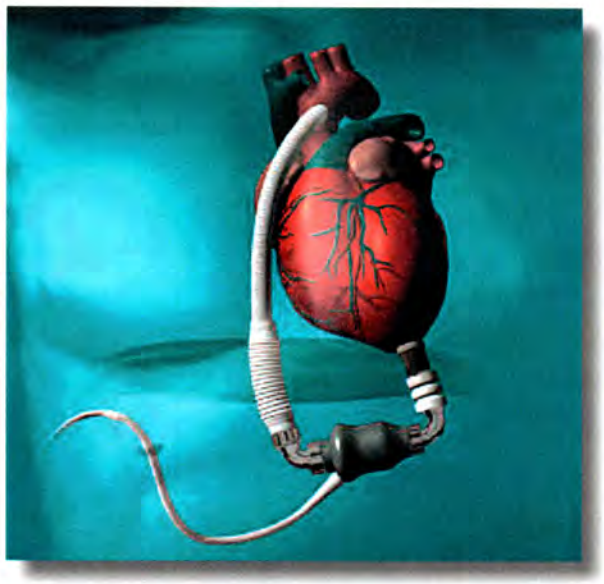
- Mechanism of Action
  - Thiamine is one of the B vitamins, a group of water-soluble vitamins that participate in many of the chemical reactions in the body.
  - Thiamine (vitamin B1) helps the body cells convert carbohydrates into energy. It is also essential for the functioning of the heart, muscles, and nervous system.

- Ineffective
  - Not applicable

Questions and Answers
Ventricular Assist Device

What is a Ventricular Assist Device (VAD)?

A ventricular assist device (VAD) is a mechanical pump that's used to support heart function and blood flow in people who have weakened hearts.



How does a VAD work?

The device takes blood from a lower chamber of the heart and helps pump it to the body and vital organs, just as a healthy heart would.

What are the parts of a VAD?

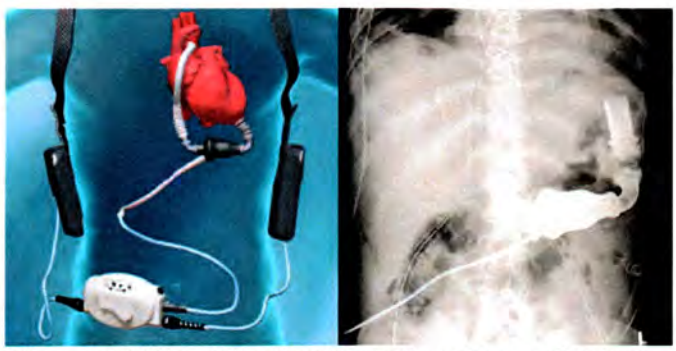
The basic parts of a VAD include: a small tube that carries blood out of your heart into a pump; another tube that carries blood from the pump to your blood vessels, which deliver the blood to your body; and a power source.

What is the power source?

The power source is either batteries or AC power. The power source is connected to a control unit that monitors the VAD's functions. The batteries are carried in a case usually located in a holster in a vest wrapped around the patients shoulders.

What does the control unit or controller do?

The control unit gives warnings, or alarms, if the power is low or if it senses that the device isn't working right. It is a computer.



The portability of the HeartMate II enables patients to resume many of their normal daily activities.

Color Coding System

MOST patients have a tag located on the controller around their waist that says what type of device it is, what institution put it in and a number to call. Most importantly is the color of the tag – it matches this EMS Field Guide and allows you to quickly locate the device you are caring for.

HEARTMATE III

HEARTMATE II

HEARTWARE

JARVIK 2000

FREEDOM DRIVER
Total Artificial Heart

Patient Management For VADs

1. Assess the patients airway and intervene per your protocol.
2. Auscultate Heart Sounds to determine if the device is functioning and what type of device it is. If it is continuous flow device, you should hear a "whirling sound".
3. Assess the device for any alarms.
4. Look on controller usually found around the waist of the patient and to see what color tag and device it is.
5. Match the color on the device tag to the EMS Guide.
6. Intervene appropriately based on the type of alarm, tag (device) and EMS Guide.
7. Start Large Bore IV.
8. Assess vital signs – Use Mean BP with Doppler – with the first sound you hear is the Mean Arterial Pressure (MAP).
9. If no Doppler, use the Mean on the non invasive blood pressure machine.
10. Transport to closest VAD center. Call the number on the device to get advice.
11. Bring all of the patients equipment.
12. Bring the significant other if possible to act as a expert on the device in the absence of consciousness in the patient.

HeartMate III® with Pocket Controllers

1. **Can I do external CPR?**
   Only if absolutely necessary
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 2.5 lpm. Can give a bolus of normal saline and transport to an LVAD center.
4. **How can I speed up the rate of the device?**
   No, it is a fixed speed.
5. **Do I need to heparinize the patient if it slows down?**
   Usually no, but you will need to check with implanting center.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   Likely they will not because it is a continuous flow device, however some patients may have a pulse as this pump was designed with an "artificial pulse."
9. **What are acceptable vital sign parameters?**
   MAP 70 - 90 mm Hg with a narrow pulse pressure.
10. **Can this patient be externally paced?**
    Yes.

FAQs

- Pump has "artificial pulse" created by speeding up & slowing down of pump. This can be heard when auscultating the heart and differs from other continuous flow devices.
- May not be able to obtain cuff pressure (continuous flow pump).
- Pump connected to electric line exiting patient's abdominal area and is attached to computer which runs the pump.
- Pump does not affect EKG.
- All ACLS drugs may be given.
- A set of batteries last 14 – 16 hours
- Any emergency mode of transportation is ok. These patients are permitted to fly.
- Be sure to bring **ALL** of the patient's equipment with them.

Trouble Shooting HeartMate III® with Pocket Controllers

When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see Changing Batteries section on next page)*
- If pump does not restart, change controllers. *(see Changing Controllers section on next page)*

Alarms: Emergency Procedures

Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.

January 2019

Trouble Shooting HeartMate III®

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 1 and 2)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 3)
- Controller will start beeping and flashing yellow signals and will read **POWER DISCONNECT** on the front screen. (Figure 4)
- Replace with new battery by lining up **RED** arrows on battery and clip. Gently tug on battery to ensure connection. If battery is properly secured, the beeping and yellow flashing will stop. (Figure 5)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the **RED** arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.

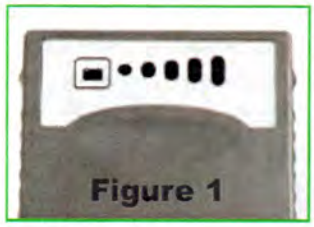


Figure 1


Figure 2


Figure 3

Figure 4


Figure 5

CAUTION—Investigational device. Limited by Federal (or United States) law to investigational use.

This guide does not supersede manufacturer instructions. Copy with permission only.

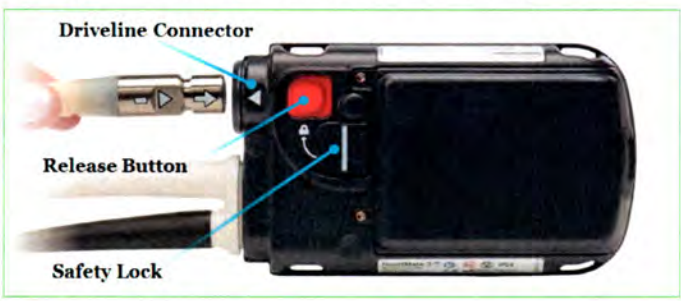
January 2019

Trouble Shooting HeartMate III® with Pocket Controllers

Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.
- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the RED arrows.

- On the back of the replacement controller, rotate down the perc lock so the red tab is fully visible. Repeat this step on the original controller until the red tab is fully visible.




SAFETY LOCK UNLOCKED


SAFETY LOCK LOCKED

- Disconnect the drive-line from the original controller by pressing down on the red tab and gently pulling on the metal end. The pump will stop and an alarm will sound. **Note:** The alarm will continue until the original controller is put to sleep. You can silence the alarm by pressing the silence button.

Getting the replacement controller connected and pump restarted is the first priority.

- Connect the replacement Controller by aligning the **BLACK ARROWS** on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the power source to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate up the perc lock on the new controller so the red tab is fully covered. If unable to engage perc lock to a fully locked position, gently push the driveline into the controller to assure proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.
- Hold down battery symbol for 5 full seconds for complete shutdown of old controller.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

January 2019

Trouble Shooting HeartMate III® with Pocket Controllers

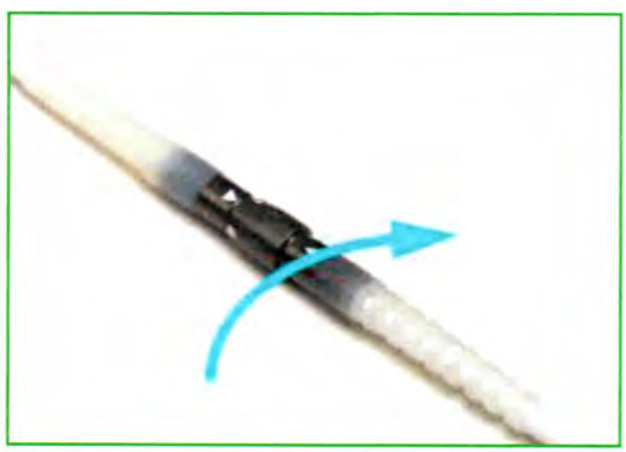
Modular Cable

The HeartMate 3 has a modular cable connection near the exit site of the driveline (Figure 1). This allows a damaged driveline to be quickly replaced (if damage is external).

- When disconnecting a driveline, **NEVER** use the modular cable connection.
- If this section of the driveline requires replacement, this must be performed at and by the implanting center. Patients are not given a back-up modular cable.
- If the connection is loose, there will be a yellow/green line at the connection showing (Figure 2). If the line is visible, it can be retightened by turning with the arrow in the locked direction. It will ratchet and stop turning once tight.

Figure 1

Figure 2



CAUTION—Investigational device. Limited by Federal (or United States) law to investigational use.

January 2019

HeartMate II®

1. **Can I do external CPR?**
   Only if absolutely necessary
2. **If not, is there a "hand pump" or external device to use?**
   No.
3. **If the device slows down (low flow state), what alarms will go off?**
   A red heart alarm light indicator and steady audio alarm will sound if less than 2.5 lmp. Can give a bolus of normal saline and transport to an LVAD center.
4. **How can I speed up the rate of the device?**
   No, it is a fixed speed.
5. **Do I need to heparinize the patient if it slows down?**
   Usually no, but you will need to check with implanting center.
6. **Can the patient be defibrillated while connected to the device?**
   Yes.
7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.
8. **Does the patient have a pulse with this device?**
   May have weak pulse or lack of palpable pulse.
9. **What are acceptable vital sign parameters?**
   MAP 70 - 90 mm Hg with a narrow pulse pressure
10. **Can this patient be externally paced?**
    Yes.

FAQs

- May not be able to obtain cuff pressure (continuos flow pump).
- Pump connected to electric line exiting patient's abdominal area and is attached to computer which runs the pump.
- Pump does not affect EKG
- All ACLS drugs may be given.
- No hand pump is available.
- A set of black batteries last approximately 3 hours, gray batteries last 8-10 hours.
- Any emergency mode of transportation is ok. These patients are permitted to fly.
- Be sure to bring **ALL** of the patient's equipment with them.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press.

Trouble Shooting HeartMate II®

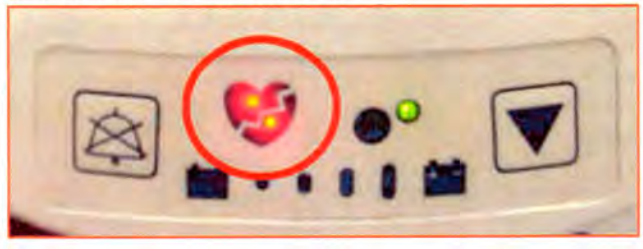
When the Pump Has Stopped

- Be sure to bring ALL of the patient's equipment with them.
- Fix any loose connection(s) to restart the pump.
- If the pump does not restart and the patient is connected to batteries replace the current batteries with a new, fully-charged pair. *(see changing batteries section on next page)*
- If pump does not restart, change controllers. *(see changing controllers section on next page)*

Alarms: Emergency Procedures

Yellow or Red Battery Alarm: Need to Change Batteries. See changing batteries section on next page.

Red Heart Flashing Alarm: This may indicate a Low Flow Hazard. Check patient--the flow may be too low. If patient is hypovolemic, give volume. If patient is in right heart failure-- treat per protocol. If the pump has stopped check connections, batteries and controllers as instructed in the section above.



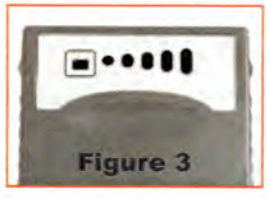
January 2019

Trouble Shooting HeartMate II®

Changing Batteries

WARNING: At least one power lead must be connected to a power source AT ALL TIMES. Do not remove both batteries at the same time or the pump will stop.

- Obtain two charged batteries from patient's accessory bag or battery charger. The charge level of each gray battery can be assessed by pressing the battery button on the battery. (Figures 3 and 4)
- Remove only **ONE** battery from the clip by pressing the button on the grey clip to unlock the battery. (Figure 1)
- Controller will start beeping and flashing green signals.
- Replace with new battery by lining up RED arrows on battery and clip. (Figure 2)
- Slide a new, fully-charged battery (Figure 4) into the empty battery clip by aligning the RED arrows. The battery will click into the clip. Gently tug at battery to ensure connection. If battery is properly secured, the beeping and green flashing will stop.
- Repeat previous steps with the second battery and battery clip.



Changing Controllers

- Place the replacement Controller within easy reach, along with the batteries/battery clips. The spare Controller is usually found in the patient's travel case.
- Make sure patient is sitting or lying down since the pump will momentarily stop during this procedure.

- Attach the battery clips to the spare controller by lining up the half moons and gently pushing together and attach the batteries to the spare controller by aligning the RED arrows. **ALARMS WILL SOUND-THIS IS OK.**
- Depress the silence alarm button (upside-down bell with circle) until the alarm is silenced on the new, replacement Controller.
- Rotate the perc lock on the replacement controller in the direction of the "unlocked" icon until the perc lock clicks into the fully- unlocked position. Repeat this same step for the original Controller until the perc lock clicks into the unlocked position.

- Disconnect the perc lead/driveline from the original controller by pressing the metal release tab on the connector socket. The pump will stop and an alarm will sound.

Note: The alarm will continue until power is removed from the original Controller. ***Getting the replacement Controller connected and the pump restarted is the first priority.***

- Connect the replacement Controller by aligning the BLACK LINES on the driveline and replacement Controller and gently pushing the driveline into the replacement Controller. The pump should restart, if not complete the following steps:

Step 1. Firmly press the Silence Alarm or Test Select Button to restart the pump.

Step 2. Check the powersource to assure that power is going to the controller.

Step 3. Assure the perc lead is fully inserted into the socket by gently tugging on the metal end. **DO NOT** pull the lead.

- After the pump restarts, rotate the perc lock on the new controller in the direction of the "locked" icon until the perc lock clicks into the fully-locked position. If unable to engage perc lock to the locked position, gently push the driveline into the controller to assure a proper connection. Retry to engage perc lock.
- Disconnect power from the original Controller. The original Controller will stop alarming once power is removed.

January 2019

HeartMate II® Controller Comparison Guide

POCKET CONTROLLER™

3 Modes: Run, Charge, Sleep

Run: Driveline + Power source connected.
Charge: Only power source connected.
Sleep: No driveline or power source connected; ready to use.

Backup Battery

An emergency backup battery is built into Pocket Controller, powering the pump for 15 minutes in the absence of an external power source. The backup battery is supplied NONSTERILE.

Event Logger

Pocket Controller includes date/time records in event history. Pocket Controller can store 240 events.

Green Pump Running Symbol

Green "pump running" symbol signifies that the pump is on and running.

Controller Buttons

Display Button: Enables viewing of pump parameters and backup battery charge status.
Silence Alarm Button: Silences hazard alarms for 2 minutes and advisory alarms for 4 hours.
Display Button + Silence Alarm Button Together: Displays previous six alarms.
Battery Button: Displays the battery power gauge when pressed. Activates a self test when held for 5 seconds then released. Enters sleep mode when driveline and external power are disconnected and button is held for 5 seconds then released.

Self Test

Press and hold the Battery Button for 5 seconds.

Low Power

Yellow Diamond Symbol: Displayed when only 15 minutes of external power is remaining.
Red Battery Symbol: Displayed when only 5 minutes of external power is remaining.
Backup Battery Mode: Entered after external power is depleted. Provides 15 minutes of internal emergency backup battery power.
Power Saver Mode: Entered when pump has run on backup battery for 15 minutes. Pump Speed is reduced to the set Low Speed Limit.

Starting the Pump

>8000 RPM: Pump starts automatically.
<8000 RPM with Backup Battery: Start pump by pressing any button on Pocket Controller.
<8000 RPM with no Backup Battery: Pump can only be started via System Monitor.

System Monitor Event History Screen

PI Event:

10/04/13 07:20	4.8	9590	5.6	5.4	PI Event	

System Information:

10/04/13 01:30	4.8	6900	5.7	6.6	*	System Information

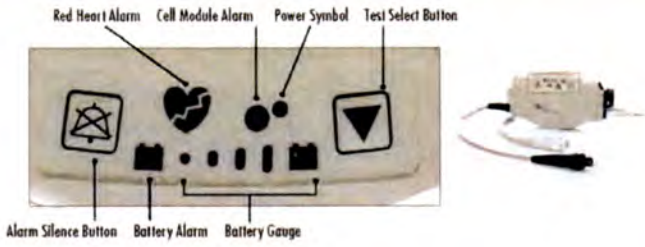
Compatibility

System Monitors I and II, Power Module, Power Module Patient Cable (14 Volt), 14 Volt Lithium-Ion Batteries and Battery Clips.

Alarms

For a review of alarms and their meanings, reference HeartMate II Alarms for Clinicians, item 107526. Pocket Controller includes a yellow wrench icon to denote advisory alarms. Note that Pocket Controller includes drivelines fault detection.

EXTERNAL PERIPHERAL CONTROLLER (EPC)



2 Modes: On, Off

On: Driveline + Power source connected.
Off: No driveline or power source connected.

Cell Module Battery

No backup battery. The cell module battery powers an audible tone if EPC is removed from power while the driveline is connected. The cell module battery is supplied STERILE.

Event Logger

EPC does not include date/time records in event history. EPC can store 120 events.

Green Power Symbol

Green light only means that the controller is receiving power. Listen over the pump pocket for confirmation that the pump is running.

Controller Buttons

Alarm Silence Button: Displays the battery fuel gauge. Also silences hazard alarms for 2 minutes and advisory alarms for 4 hours.
Test Select Button: Activates a self test when held for 3 seconds.
Note: EPC does not include a display button or user interface screen. The Display Module is used to view pump parameters and alarm events.

Self Test

Press and hold the Test Select Button for 3 seconds.

Low Power

Yellow Battery Symbol: Displayed when only 15 minutes of external power is remaining.
Red Battery Symbol: Displayed when only 5 minutes of external power is remaining.
Power Saver Mode: Entered when the battery voltage falls to a critically low level. Pump Speed is reduced to 8000 RPM.

Starting the Pump

>8000 RPM: Pump starts automatically.
<8000 RPM: Start pump by pressing Alarm Silence Button or Test Select Button on EPC.

System Monitor Event History Screen

PI Event:

10/04/13 07:20	4.8	9590	5.6	5.4	

System Information:

10/04/13 01:30	4.8	6900	5.7	6.6	*

Compatibility

System Monitors I and II, Power Module, Power Base Unit (PBU), Power Module Patient Cable (12 Volt and 14 Volt), 14 Volt Lithium-Ion Batteries and Battery Clips, 12 Volt SLA and NiMH Batteries and Clips.

Alarms

For a review of alarms and their meanings, reference HeartMate II Alarms for Clinicians, item 103851. Note that EPC does not include driveline fault detection.

January 2019

HeartMate II Controller Comparison Guide

DRIVELINE CONNECTION

Pocket Controller:
A safety tab is located on the back of the controller.

Unlocked

Locked

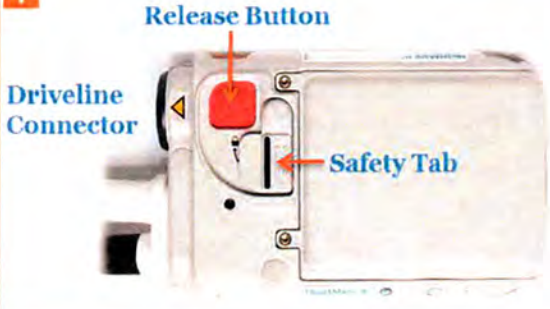
External Peripheral Controller (EPC):
A percutaneous lock is located on the side of the controller.

Unlocked

Locked

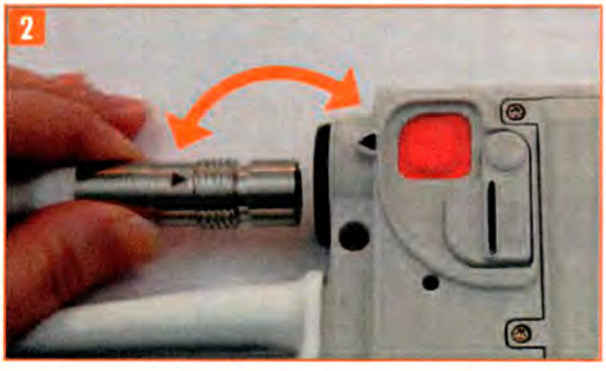
The Pocket Controller driveline connection and locking mechanism are different from the EPC. To insert and lock the driveline into Pocket Controller:

1



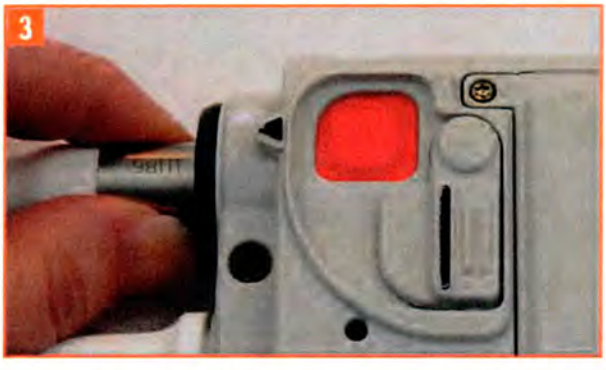
Slide the safety tab back to expose the red button.

2



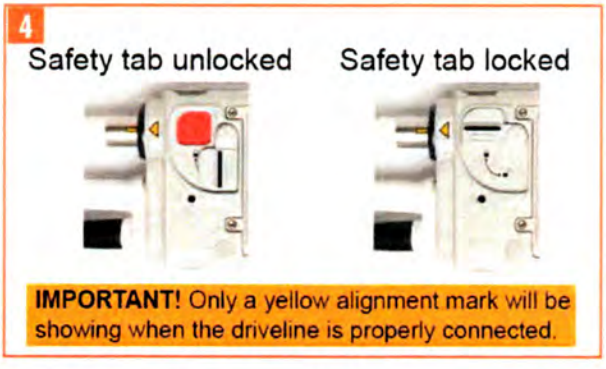
Align the arrow on the driveline to the arrow on the Pocket Controller. Firmly insert the driveline until it snaps into place.

3



Tug gently on the metal portion of the driveline to ensure that it is fully engaged.

4



Slide the safety tab over the red button. Ensure the safety tab completely covers the red button.

THORATEC CORPORATION for Life

January 2019

HeartWare® Ventricular Assist System

1. **Can I do external CPR?**

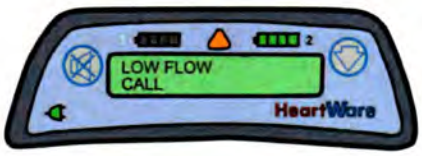
   Chest compressions may pose a risk of dislodgment – use clinical judgment. If chest compressions are administered, confirm function and positioning of the pump.

2. **If not, is there a "hand pump" or external device to use?**

   No.

3. **If the device slows down (low flow state), what alarms will go off?**

   The device runs at a fixed speed. If a low flow state occurs, an alarm will be heard, and the controller display will show a yellow triangle and "Low Flow – Call" message.



4. **How can I speed up the rate of the device?**

   It is not possible to adjust the pump speed in the prehospital setting. Okay to give IV fluids.

5. **Do I need to heparinize the patient if it slows down?**

   Call the accepting VAD facility for guidance.

6. **Can the patient be defibrillated while connected to the device?**

   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**

   No, defibrillate per protocol.

8. **Does the patient have a pulse with this device?**

   The patient may not have a palpable pulse. Depending on the patient's own heart function, you may be able to feel a thready pulse.

9. **What are acceptable vital sign parameters?**

   Goal Mean Arterial Pressure (MAP) is <85 mmHg. Use a Doppler as the first option to assess blood pressure. If you are using a Doppler, place the blood pressure cuff on the patient arm. As you release the pressure in the blood pressure cuff, the first sound you hear with the Doppler is the MAP. If that is not available, use a non-invasive BP (NIBP).

10. **Can this patient be externally paced?**

    Yes

FAQs

- May not be able to obtain cuff pressure (continuous flow pump)
- Pump connected to electric line (driveline) exiting patient's abdominal area and is attached to computer (controller) which runs the pump.
- Pump does not affect EKG, but patient may or may not be symptomatic even iwth ventricular arrhythmias.
- All ACLS drugs may be given.
- No hand pump is available. This is a rotary (continuous flow) pump with typical speed ranges of 2400 – 3200 RPMs. The patient should have back-up equipment.
- The controller draws power from one battery at a time. A fully charged battery will provide 4-6 hours of power. Both the battery and controller have status lights to indicate the amount of power remaining.
- Transport by ground to implanting facility if possible.
- Be sure to bring **ALL** of the patient's equipment with them.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice. 4th ed., Mosby. 2010 in press.

January 2019

HeartWare® Ventricular Assist System
Emergency Operation

CONTROLLER

BATTERY

ALARM ADAPTER

- Used to silence the internal NO POWER ALARM.
- Should only be used on a controller that is NOT connected to a patient's pump.
- Must be inserted into the blue connector of the original controller after a controller exchange BUT before the power sources are disconnected or the NO Power alarm will sound for up to two hours.

DRIVELINE CONNECTION

To Connect to Controller:

- Align the two red marks and push together. An audible click will be heard confirming proper connection. (Figure A)
- The Driveline Cover must completely cover the Controller's silver driveline connector to protect against static discharge. (Figure B)
- NOTE: an audible click should be heard when connecting the Driveline or Driveline extension to the controller. Failure to use the Driveline Cover may cause an Electrical Fault Alarm.

Figure A

Figure B

CONNECTING POWER TO CONTROLLER

To Connect a Charged Battery:

- Grasp the cable of the charged battery at the back end of the connector (leaving front end of connector free to rotate)
- Line up the solid white arrow on the connector with the white dot on the Controller.
- Gently push (but DO NOT twist) the battery cable into the Controller until it naturally locks into place; you should hear an audible click.
- Confirm that the battery cable is properly locked on the controller by gently pulling the cable near the controller power connector.
- DO NOT force the battery cable into the controller connector without correct alignment as it may result in damaged connectors .

TO DISCONNECT A DEPLETED BATTERY

- Make sure there is a fully charged battery available to replace the depleted one.
- Disconnect the depleted battery by turning the connector sleeve counterclockwise until it stops.
- Pull the connector straight out from the controller.

January 2019

HeartWare® Ventricular Assist System
Emergency Operation

STEPS TO EXCHANGE THE CONTROLLER

Step 1: Have the patient sit or lie down.

Step 2: Place the new controller within easy reach.

Step 3: Connect back-up power sources (batteries or AC Power) to the new controller.

- Confirm that the power cables are properly locked on the controller by gently pulling on the cable near the connector.
- A "Power Disconnect" alarm will activate if a second power source is not connected to the new controller within 20 seconds of controller power up
- A "VAD Stopped" alarm will activate if the pump driveline is not connected to the new controller within 10 seconds - this alarm will resolve once the pump driveline is connected

Step 4: Pull back the white driveline cover from the original controller's silver connector.

Step 5: Disconnect the driveline from the original controller by pulling the silver connector away from the controller. Do not disconnect by pulling on the driveline cable. A "VAD Stopped" alarm may activate. Don't panic. You can silence the alarm after restarting the pump, which is the priority.

Step 6: Connect the driveline to the new controller (align the two red marks and push together). If the "VAD Stopped" alarm was active on the new controller, it will now resolve.

Step 7: The pump should restart. Verify the pump is working (RPM, L/min, Watts).

Step 8: **IF THE PUMP DOES NOT RESTART, CALL FOR MEDICAL ASSISTANCE IMMEDIATELY.**

Step 9: Insert the Alarm Adapter into the blue connector on the original controller.

- Disconnect both power sources from the original controller.
- The controller will be turned off and all alarms silenced.

Step 10: Slide the white driveline cover up to cover new controller's silver connector.

Step 11: Contact the VAD Center or Implanting hospital for a new backup controller.

Step 3

Step 4

Step 6

Step 9

Step 10

January 2019

DARK BLUE DARK BLUE DARK BLUE DARK BLUE

HeartWare® Ventricular Assist System Troubleshooting

ALARM TYPE	ALARM DISPLAY (Line 1)	ACTION (Line 2)
High - Critical (FLASHING RED)	VAD STOPPED	CONNECT DRIVELINE
	VAD STOPPED	CHANGE CONTROLLER
	CRITICAL BATTERY 1	REPLACE BATTERY 1
	CRITICAL BATTERY 2	REPLACE BATTERY 2
	CONTROLLER FAILED	CHANGE CONTROLLER
MEDIUM (FLASHING YELLOW)	CONTROLLER FAULT	CALL ACCEPTING VAD HOSPITAL
	CONTROLLER FAULT	CALL: ALARMS OFF
	HIGH WATTS	CALL ACCEPTING VAD HOSPITAL
	ELECTRICAL FAULT	CALL ACCEPTING VAD HOSPITAL
	LOW FLOW	CALL ACCEPTING VAD HOSPITAL
	SUCTION	CALL ACCEPTING VAD HOSPITAL
LOW (SOLID YELLOW)	LOW BATTERY 1	REPLACE BATTERY 1
	LOW BATTERY 2	REPLACE BATTERY 2
	POWER DISCONNECT	RECONNECT POWER 1
	POWER DISCONNECT	RECONNECT POWER 2

January 2019

DARK BLUE DARK BLUE DARK BLUE DARK BLUE

Jarvik 2000® VAS

1. **Can I do external CPR?**
   Yes, only as a last resort.

2. **If not, is there a "hand pump" or external device to use?**
   No.

3. **If the device slows down (low flow state), what alarms will go off?**
   No alarm for low flow. If pump is off, the red "Pump Stop" symbol will light with a continuous alarm.

4. **How can I speed up the rate of the device?**
   There is a speed dial on the side of the controller (see picture on next page). Turning the dial in the direction of the arrow increases the speed. Each increment is 1,000 RPM. It is recommended not to change the speed without consulting the implanting center.

5. **Do I need to heparinize the patient if it slows down?**
   Typically yes, if the pump is stopped (red "Pump Stop" alarm). Check with the implanting center.

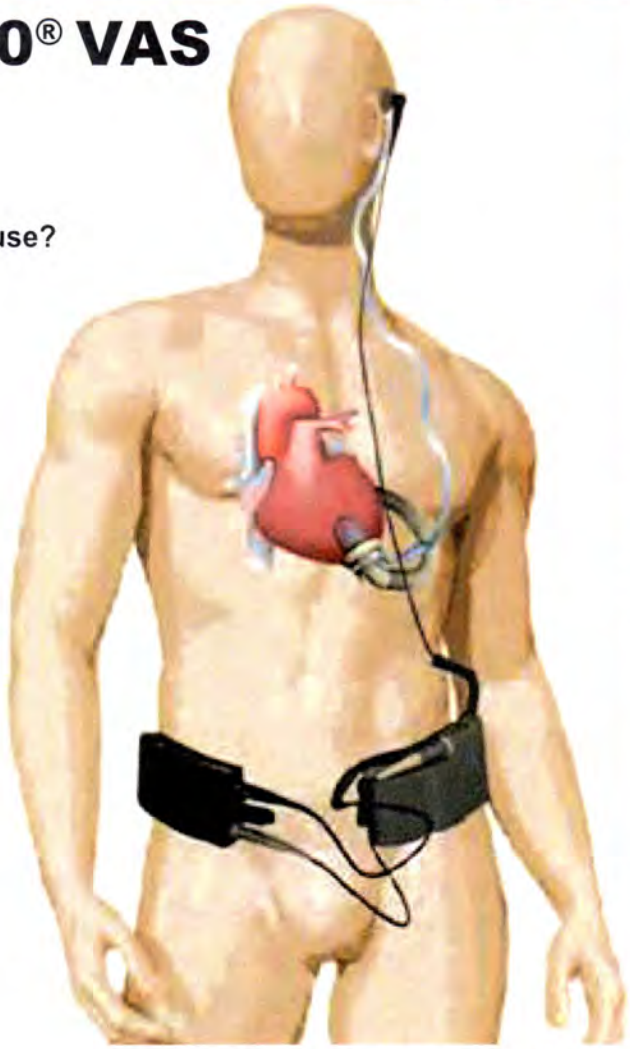
6. **Can the patient be defibrillated while connected to the device?**
   Yes.

7. **If the patient can be defibrillated, is there anything I have to disconnect before defibrillating?**
   No.

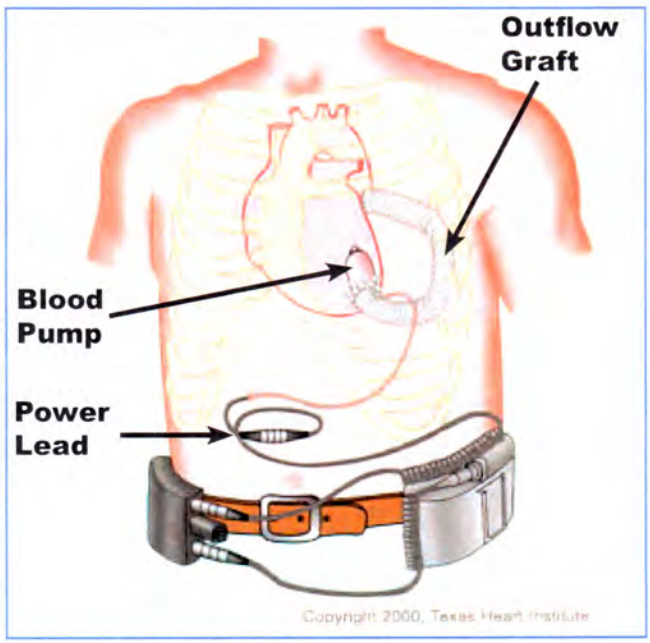
8. **Does the patient have a pulse with this device?**
   Most patients have a faint palpable pulse. If the controller is marked "ILS" (see below), the speed is automatically reduced every minute for 8 seconds & the patients pulse may increase during this time.

9. **What are acceptable vital sign parameters?**
   MAP 65 - 80mm Hg.

10. **Can this patient be externally paced?**
    Yes.



Jarvik 2000 with Post-Auricular exit site.

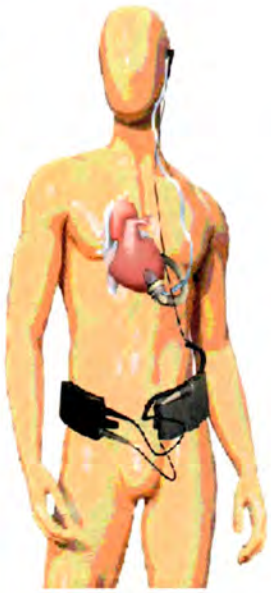


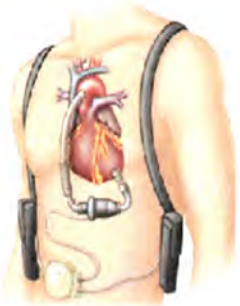
Jarvik 2000 with Abdominal exit site.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice. 4th ed., Mosby. 2010 in press. This guide does not supersede manufacturer instructions. Copy with permission only. March 2019 Jarvik 2000®

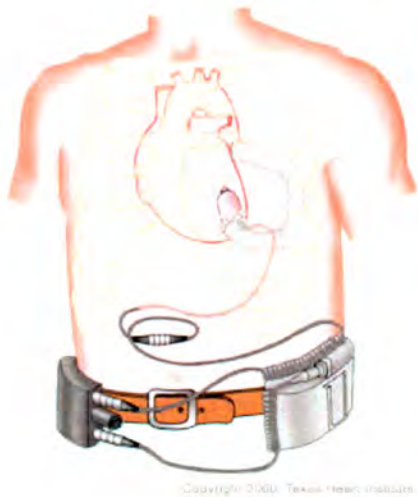
January 2019

Jarvik 2000® VAS





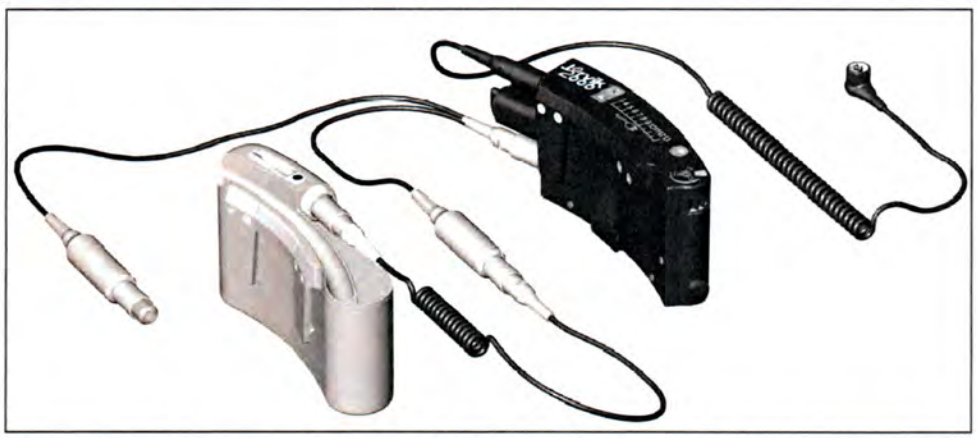
The Jarvik 2000® VAS is available in two models: the Jarvik 2000® VAS, Post-Auricular Cable (JHI-001) and the Jarvik 2000® VAS, Abdominal Cable (JHI-002). The main difference between the two models is the exit site of the drive cable. The drive cable of the Jarvik 2000® VAS, Abdominal Cable exits the abdomen and the drive cable of the Jarvik 2000® VAS, Post-Auricular Cable exits at a Pedestal surgically attached to the skull behind the ear.



Jarvik 2000® VAS, Post-Auricular Cable.

Jarvik 2000® VAS, Abdominal Cable.

External Equipment for Jarvik 2000® VAS, Abdominal Cable.



External Equipment for Jarvik 2000® VAS, Post-Auricular Cable.

NOTE: This Field Guide is NOT intended to replace the Operator Manual and Patient Handbook.

January 2019

Jarvik 2000® VAS

Li-ion Battery.

Reserve Battery/Charger.

FlowMaker® Controller.

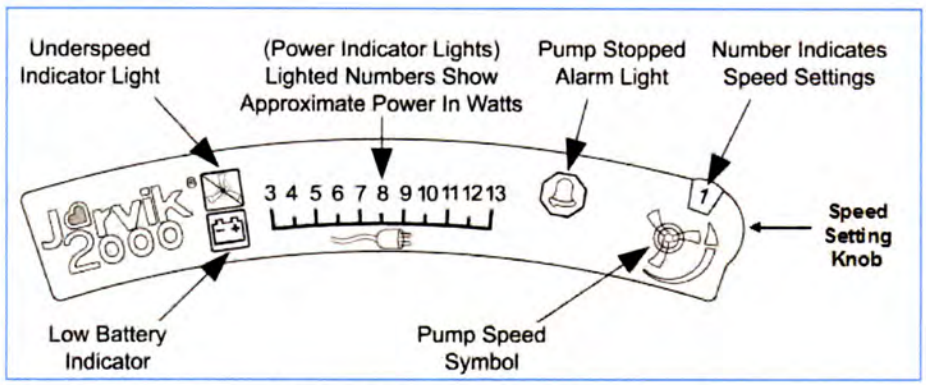


Diagram of FlowMaker® Controller Top Panel.

Dial Setting	Speed Rpm	Flow L/min	Power Watts
1	8,000	1-2	3-4
2	9,000	2-3	4-5
3	10,000	4-5	5-6-7
4	11,000	5-7	7-8-9
5	12,000	7-8.5	8-9-10

The FlowMaker Controller provides:

1. power to the implanted blood pump,
2. user settable speeds at which the pump runs, and
3. alarms and warnings.

The **FlowMaker®** Controller does not monitor the actual blood flow that the **Jarvik 2000® Ventricular Assist Device** (VAD) is pumping. In general, the higher the setting number the more blood the Jarvik 2000 VAD will pump. The tabulated flow estimates are based on research measurements in healthy animals. The actual blood flow may vary and will depend on several factors including blood pressure and the condition of the natural heart.

Jarvik HEART™

January 2019

Jarvik 2000® VAS

Speed Setting, Alarms, and Warnings

Only one control adjustment to the **Jarvik 2000® VAD** can be made. The **Jarvik 2000® VAD speed** can be selected by turning the knob on the side of the **FlowMaker® Controller**. The setting number appears in the window on the top panel. The arrow indicates the direction to turn the knob to increase the speed.

Power Indicator Lights The numbers indicate the electrical power (Watts) that the VAD is using. One, two, or three numbers may be lit at any moment, and the lights may change rhythmically with the heartbeat of the natural heart. A power measure of 13 watts or more indicates malfunction. The High Power Indicator, number 13, will light yellow. This condition should receive prompt medical attention.

When the battery powering the **Jarvik 2000® VAD** is low, the **Low Battery Alarm** on the **FlowMaker® Controller lights yellow** and the alarm sound beeps. Remaining running time with the portable Li-ion Battery is about 5-10 minutes; with the Reserve Battery/Charger for approximately 15 minutes

If the **Jarvik 2000® VAD** stops or if the VAD speed drops to below 5,000 RPM for any reason, a steady alarm sound is heard and the **Pump Stopped Alarm** on the **FlowMaker® Controller lights red**. **The Pump Stopped Alarm** will also sound if the intermittent low speed featured on the ILS FlowMaker® Controller fails to function for any reason. Immediate attention is required. **Follow the Pump Stopped Alarm procedure for the appropriate Jarvik 2000® VAS model (Post-Auricular Cable or Abdominal Cable) which is included in this Field Guide.**

The **Underspeed Indicator light will glow yellow** when the **Flowmaker® Controlle**r detects that the **Jarvik 2000 ® VAD** speed is slower than the dial setting selected. The most common reason is the battery voltage is too low.

In this case, corrective actions are to:
1 Select a lower speed setting on the **Flowmaker® Controller** and/or **2** Change the battery to a fully charged Li-ion Battery. If the underspeed indicator light is still lit, then the cause may be a fault in the system. Replace all external components; and if the underspeed light is still on after replacing all external components, treat the situation as an emergency and seek immediate medical attention. *See Patient Handbook and Operator Manual for more details.*

A non-rechargeable **Alarm Battery** is used to assure that the **FlowMaker Controlle**r has enough power for the alarms if the main battery fails, if the battery cable fails, or if the main battery becomes accidentally disconnected.

This **Alarm Battery** is located in a small housing on the end of the **FlowMaker® Controller** between the connectors for the cables. Be sure that the **Alarm Battery Cap** holding the Alarm Battery in place on the **FlowMaker® Controller** is screwed on finger tight whenever the **FlowMaker® Controlle**r is used. If the **Alarm Battery Cap** is not screwed finger tight in place, the backup power for the alarms will not function. Every time the **Alarm Battery Cap** is tightened, the Controller's back-up Alarm needs to be tested. With a caregiver present, briefly disconnect the main battery (Li-ion Battery or Reserve Battery/Charger) to be sure the Pump Stopped Alarm sounds. The disconnection should be brief and the main battery should be reconnected almost immediately. If the Pump Stopped Alarm does not sound, retighten the Alarm Battery Cap and repeat the test. Contact the implant center immediately if the alarm does not sound during this test.

Jarvik HEART™

January 2019

Jarvik 2000® VAS

Procedure to Resolve Pump Stopped Alarm
Jarvik 2000® VAS, Post-Auricular Cable

The most likely reason for the **Jarvik® 2000 VAD** (pump) to stop is a completely **discharged battery** or a **disconnected** or **damaged cable.** If the cause of a component failure is clearly identifiable (i.e. low battery, physical damage, etc.) replace that cable or component **first.**
If the cause is unknown, follow these step-by-step instructions with the assistance of a support person. The patient should sit down or lie down. This procedure should be completed quickly. Back-up equipment must be immediately available.

1. Be sure the alarm is not an intermittent beeping which only indicates a low battery. If the alarm is beeping, change the battery as usual.

2. If the Jarvik 2000® VAD is stopped (steady alarm sounding, red light on):

   a. **Disconnect the Pedestal Cable from the Pedestal at the skull, and set aside all the attached components.** Disconnect the Li-ion Battery Cable and also partially unscrew the Alarm Battery Cap on the FlowMaker® Controller to silence the alarm.

   b. Plug in a backup Pedestal Cable into the Pedestal and into a backup FlowMaker® Controller. Make sure the FlowMaker® Controller is set at speed setting 1. Make sure to tighten the Alarm Battery Cap on the backup FlowMaker® Controller to activate the alarm.

   c. Using the backup Li-ion Battery Cable, plug a fully charged Li-ion Battery into the FlowMaker® Controller.

   d. If the Jarvik 2000® VAD now runs, and the patient is feeling well, red tag the original components that were set aside in step 2a.

   e. Set the FlowMaker® Controller back at the speed the user was using prior to the alarm.

3. **If the Jarvik 2000 VAD (pump) is still stopped call the medical emergency number immediately.**

4. Red tag all components of the system that were set aside before changing to the backup components in step **2a.** This should be done with the assistance of a medical support person if possible.

5. It is possible that one of the connectors is not fully plugged in and is not making contact. Recheck all connectors.

6. If the Jarvik 2000® VAD still has not started, the patient should lie down and the support person should double check batteries and connectors. Try changing batteries again. It is possible that a discharged battery was removed and the same discharged battery was accidentally plugged back into the system. It is possible that neither battery is charged. If no lights illuminate on either battery, use a third battery. It is also possible that one of the connectors is not fully plugged in and is not making contact. Recheck all connectors.

7. If all of the above steps have been followed and all cables and components have been replaced without successfully restarting the Jarvik 2000® VAD, **disconnect the power to the Jarvik 2000® VAD by unplugging the battery.** Also partially unscrew the Alarm Battery Cap on the FlowMaker® Controller. **(The alarm should stop sounding).** If the Li-ion Battery or Reserve Battery/Charger is not disconnected, the FlowMaker® Controller will apply power to the Jarvik 2000® VAD which could be harmful. Disconnecting the battery reduces the chance of a clot forming inside the Jarvik 2000® VAD by allowing the rotor to spin as blood flows across it.

Note: Return any failed or suspect component(s) to your Clinical Center for evaluation by Jarvik Heart, Inc.

Jarvik HEART™

January 2019

Jarvik 2000® VAS

Procedure to Resolve Pump Stopped Alarm
Jarvik 2000® VAS, Abdominal Cable

The most likely reason for the **Jarvik 2000® VAD** (pump) to stop is a completely **discharged battery** or a **disconnected** or **damaged cable.** If the cause of a component failure is clearly identifiable (i.e. low battery, physical damage, etc.) replace that cable or component **first.**
If the cause is unknown, follow these step-by-step instructions with the assistance of a support person. The patient should sit down or lie down. This procedure should be completed quickly. Back-up equipment must be immediately available.

1. Be sure the alarm is not an intermittent beeping which only indicates a low battery. If the alarm is beeping, change the battery as usual.
2. If the Jarvik 2000® VAD is stopped (steady alarm sounding, red light on):

a. **Disconnect the Extension Cable from the drive cable at the abdomen, and set aside all the attached components.** Disconnect the Li-ion Battery Cable and also partially unscrew the Alarm Battery Cap on the FlowMaker® Controller to silence the alarm.

b. Plug the drive cable (the cable exiting the skin at the abdomen) directly into the backup FlowMaker® Controller (eliminating the Extension Cable). Make sure the FlowMaker® Controller is set at speed setting 1. Make sure to tighten the Alarm Battery Cap on the backup FlowMaker® Controller to activate the alarm.

c. Using the backup Li-ion Battery Cable, plug a fully charged Li-ion Battery into the FlowMaker® Controller.

d. If the Jarvik 2000® VAD now runs and the patient is feeling well, red tag the original components that were set aside in step 2a.

e. Set the FlowMaker® Controller back at the speed the user was using prior to the alarm.

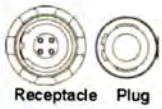
3. **If the Jarvik 2000® VAD (pump) is still stopped call your medical emergency number immediately.**
4. Red tag all components of the system that were set aside before changing to the backup components in step **2a.**
5. Be sure that all external cables and connectors have been changed and check to see if the connector at the end of the drive cable exiting the skin at the abdomen is broken. If it is broken and has come apart – try to put it back together where it is broken. If the Jarvik 2000® VAD does not run, take the connector apart again – rotate the parts 90° and put the connector back together again. Repeat three times. The Jarvik 2000 VAD may start. The connector may then be held together with tape while the patient is transported to the hospital for it to be repaired.
6. It is possible that one of the connectors is not fully plugged in and is not making contact. Recheck all connectors.
7. If the Jarvik 2000® VAD still has not started, the patient should lie down and the support person should double check batteries and connectors. Try changing batteries again. It is possible that a discharged battery was removed and the same discharged battery was accidentally plugged back into the system. It is possible that neither battery is charged. If no lights illuminate on either battery, use a third battery. It is also possible that one of the connectors is not fully plugged in and is not making contact. Recheck all connectors.
8. If all of the above steps have been followed and all cables and components have been replaced without successfully restarting the Jarvik 2000® VAD, **disconnect the power to the Jarvik 2000 VAD by unplugging the battery.** Also partially unscrew the Alarm Battery Cap on the FlowMaker® Controller. **(The alarm should stop sounding).** If the Li-ion Battery or Reserve Battery/Charger is not disconnected, the FlowMaker® Controller will apply power to the Jarvik 2000® VAD which could be harmful. Disconnecting the battery reduces the chance of a clot forming inside the Jarvik 2000® VAD by allowing the rotor to spin as blood flows across it.

Note: Return any failed or suspect component(s) to your Clinical Center for evaluation by Jarvik Heart, Inc.

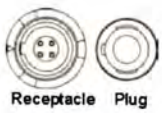
Jarvik HEART™

Jarvik® 2000

Jarvik 2000® Adult Ventricular Assist System—Quick Reference Guide



Connection from Jarvik 2000 VAD to FlowMaker Controller: The black receptacle on the FlowMaker Controller is located above the housing for the small back-up Alarm Battery. The receptacle has double key slots for a black plug. The Extension Cable and the Pedestal Cable (depending on the model of the device used) also have double key slots.



Connection from FlowMaker Controller to Y Cable or battery: The gray receptacle on the FlowMaker Controller is located below the housing for the small back-up Alarm Battery. This receptacle has a single key slot for the gray plug of the Y Cable, Li-ion Battery Cable, and Reserve Battery/Charger.

Note that the single and double keys on the plugs and receptacles are easily visible and must be placed in the proper rotational position, with the arrows on receptacle and plug lined up, for the connectors to go together. The connectors are attached and removed by a push-pull latch mechanism, not by a screw thread. Place the plug into the receptacle with slight pressure and gently rotate the plug until the key-way engages. Then push the connector together. The connector should click into place and should not come apart if the cable is tugged. To remove the plug, hold it close to the receptacle and pull.

- Never attempt to disconnect any connector by twisting.
- Do not attempt to pull the connector apart by the wire or by the strain relief.
- Never force a connector together. If the plug does not go into the receptacle easily, gently rotate it until it is aligned properly. When it is fully engaged, a soft click can be heard.
- If a connector is damaged or pins are bent, do not attempt to repair but replace the cable instead.

The **Y Cable** for the Jarvik 2000 VAS is used to allow battery changes without removing power from the Jarvik 2000 VAD. Before unplugging a discharged battery, a recharged battery should be plugged into the Y Cable. If the battery cable is unplugged prior to attaching a charged battery to the other end of the Y Cable, the Jarvik 2000 VAD stops, but the natural heart continues to beat. If this occurs, the beeping tone of the alarm will change to a steady tone, indicating that the Jarvik 2000 VAD is stopped. After the used battery is replaced with a fresh one, always remove the discharged battery from the Y Cable.

Cables & Connectors

The portable **Li-ion Battery** will run the Jarvik 2000 VAS for 7-12 hours under usual conditions. The Li-ion Battery has an indicator with 5 lights that indicates how much power is remaining. Depress the black button to turn on the indicator lights:

Indicator	Approximate Remaining Time
All 5 LEDS lit	8-12 hours
4 LEDs lit	6-10 hours
3 LEDs lit	5-8 hours
2 LEDs lit	3-5 hours
1 LED lit	5 minutes - 2 hours

Li-ion Battery Charger

When the Li-ion Battery Charger is first connected to wall power, the green light next to the vertical green bar will turn on. The second light will simultaneously turn on green for approximately 1-3 seconds, followed by the startup sequence below:

- Flashing yellow for approximately 18-24 seconds
- Solid green for approximately 1-3 seconds
- Off

The Li-ion Battery Charger is not required to go through the startup sequence each time it is connected to a Li-ion Battery. It will only occur when wall power is first applied to the Li-ion Battery Charger.

Never connect the Li-ion Battery to the Li-ion Battery Charger while the second light is green. If a connection is made during this brief period of time, the Li-ion Battery will not charge.

When disconnecting the Li-ion Battery Charger from a fully charged Li-ion Battery, always wait for the second light to turn off before connecting another Li-ion Battery.

The **Reserve Battery/Charger** has both a battery and a charger built into a single unit; however, they are not electrically connected to each other.

Reserve Battery Use:

1. Unplug the gray cable from the battery charger and plug it into the gray connector of the Y cable or the FlowMaker Controller.
2. Unplug the black power cord from the Reserve Battery/Charger and the wall plug.
3. If the Reserve Battery/Charger is used for under 12 hours and then recharged, it will last for more than 1000 recharge cycles. If it is not recharged until it is fully discharged (>24 hrs capacity) and the low battery alarm sounds, it will last for fewer than 200 recharge cycles.
4. Use the Reserve Battery/Charger for less than 12 hours each night and recharge it each morning after switching to the Li-ion Battery.

Reserve Battery Use

Charging the Reserve Battery

Charging the Reserve Battery:

Disconnect the gray plug from the Y Cable or FlowMaker Controller and plug it into the gray receptacle on the Reserve Battery/Charger.

A yellow light next to the Charge label on the Reserve Battery/Charger will turn on to indicate charging. When the Reserve Battery/Charger is near fully charged, the yellow light will turn off and automatically start to safely slow charge the battery. Continue charging the battery after the yellow light goes out and whenever the battery is not in use.

The green light next to the Power label on the Reserve Battery only indicates that wall power is connected to the charger section of the unit. The green light does not indicate the Reserve Battery/Charger is fully charged.

The Reserve Battery/Charger is near fully charged only when the Charge light turns off and the gray cable is plugged into the gray receptacle on the unit.

If the gray cable is not plugged into the receptacle on the Reserve Battery/Charger while the unit is also plugged into the wall, the Reserve Battery/Charger will not charge.

It is not possible to run the Jarvik 2000 VAS from wall power even if the Reserve Battery/Charger is plugged into wall power. It is also not possible to charge the Reserve Battery/Charger while the same Reserve Battery/Charger is being used to run the Jarvik 2000 VAD. At all times, the Jarvik 2000 VAD is run only from battery power.

Adapted from Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport in ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010 in press. This guide does not supersede manufacturer instructions. Copy with permission only. March 2019 Jarvik 2000®

JANUARY 2019

Total Artificial Heart EMS Guide

January 2019

International Consortium of Circulatory Assist Clinicians

It is produced by VAD Coordinators from some of the largest and most successful VAD implantation hospitals in the US. It has been vetted by experts on VADS in Air Medical Transport and EMS. It should not replace the operator manual as the primary source of information.

Patient Management For TAHs

1. Assess the patients airway and intervene per your protocol.

2. Auscultate heart sounds but you can usually hear them without a stetho scope. Since this is pulsatile you should hear two sounds if properly functioning.

3. Assess the device for any alarms.

4. Look on controller usually found around the waist of the patient and to see what color tag and device it is. The backpack or freedom driver should have a pink tag on it. It will have the type of device this is and contact information to the implantation center.

5. Match the color on the device tag to the EMS Guide. The tag on the backpack or freedom driver's colored tag should matches the ems guide. This will tell you how to manage any alarms.

6. Intervene appropriately based on the type of alarm, tag (device) and EMS Guide.

7. Start Large Bore IV.

8. Assess Vital Signs. REMEMBER THERE IS NO EKG. THE PATIENT IS ASYSTOLIC.

9. YOU SHOULD BE ABLE TO GET A SYSTOLIC AND DIASTOLIC BLOOD PRESSURE.

10. Transport to the closest center that can care for a TAH. Look on the PINK tag to find out this information.

11. Bring all of the patients equipment.

12. Bring the significant other if possible to act as a expert on the device in the absence of consciousness in the patient.

Questions and Answers for Total Artificial Heart

What Is A Total Artificial Heart?

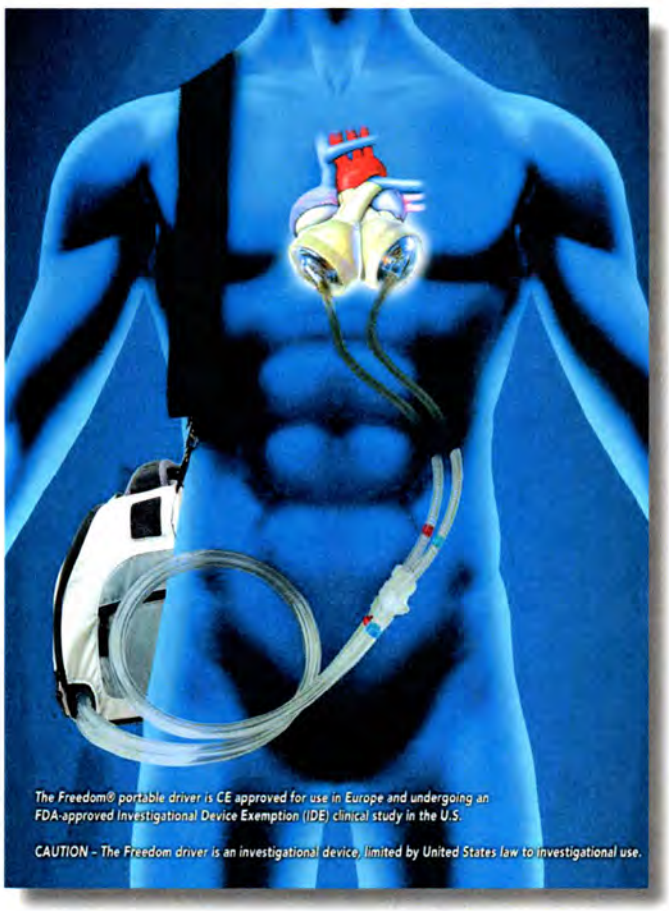
A total artificial heart (TAH) is a device that replaces the two lower chambers (ventricles) of the heart. You might benefit from a TAH if both of your ventricles don't work due to end-stage heart failure.

What are the parts of a TAH?

The SYNCARDIA has tubes that, through holes in the abdomen, run from inside the chest to an outside power source.

What is the power source?

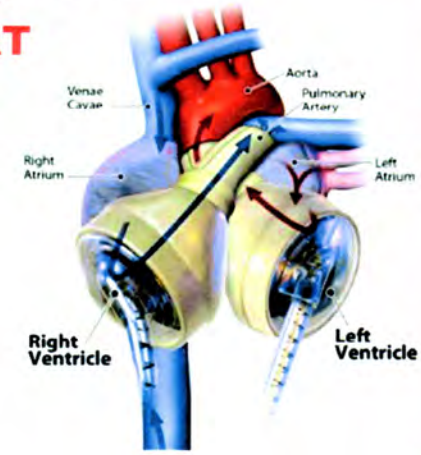
Shortly after the TAD is implanted, the patient is switched to the Freedom driver. This is a mobile "driver" for patients to who are ambulatory. The patient considered discharge from the hospital while awaiting a transplant but ultimately received a heart transplant while still an inpatient. Higher rates of survival to transplant have already been proved with the TAH. Potential benefits for the portable Freedom driver include increased mobility, decreased cost, and improved quality of life.



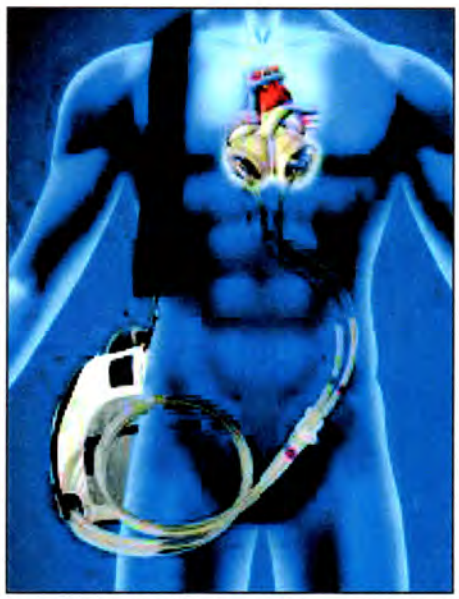
The portability of the Total Artificial Heart (TAH) enables patients to resume many of their normal daily activities.

Total Artificial Heart Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART
(not a left ventricular assist device-LVAD)



1. **Can I do external CPR?**
   No. Will need to rapidly exchange to the backup driver.
2. **Is there a "hand pump" or external backup device to use?**
   No.
3. **Can I give vasopressive IV drugs like epinephrine, dopamine or dobutimine?**
   Never give vasopressive drugs, especially epinephrine. These patients primarily have sysmptomatic hypertension and rarely have symptoms of hypotension. Most IV vasopressive drugs can be fatal to a TAH (Total Artificial Heart) patient.
4. **Can I speed up the rate of the device?**
   No. The device has a fixed rate between 120-140-BPM.
5. **What is the primary emergency intervention for a TAH (Total Artificial Heart)?**
   Nitroglycerin sublingual for symptomatic hypertension.
6. **Can the patient be defibrillated or externally paced while connected to the device?**
   No. There is no heart.
7. **What if the patient is symptomatic and the Freedom Driver is alarming with a continuous alarm and the red light ?**
   If the pump has failed or a line is disconnected or kinked, the patient may pass out within 30 seconds. Even when alarming, the device should continue to pump. When in doubt, immediately change out he Freedom™ Driver immediately. Then quickly check for loose or kinked connections.
8. **Does the patient have a pulse with this device?**
   Yes. The device produces Pulsatile flow. The device is pneumatically driven and is normally loud.
9. **What are acceptable vital sign parameters?**
   The BP will vary. Normal range 100-130 systolic and 60-90 diastolic.
10. **What kind of Cardiac rhythm should be displayed?**
    Asystole.



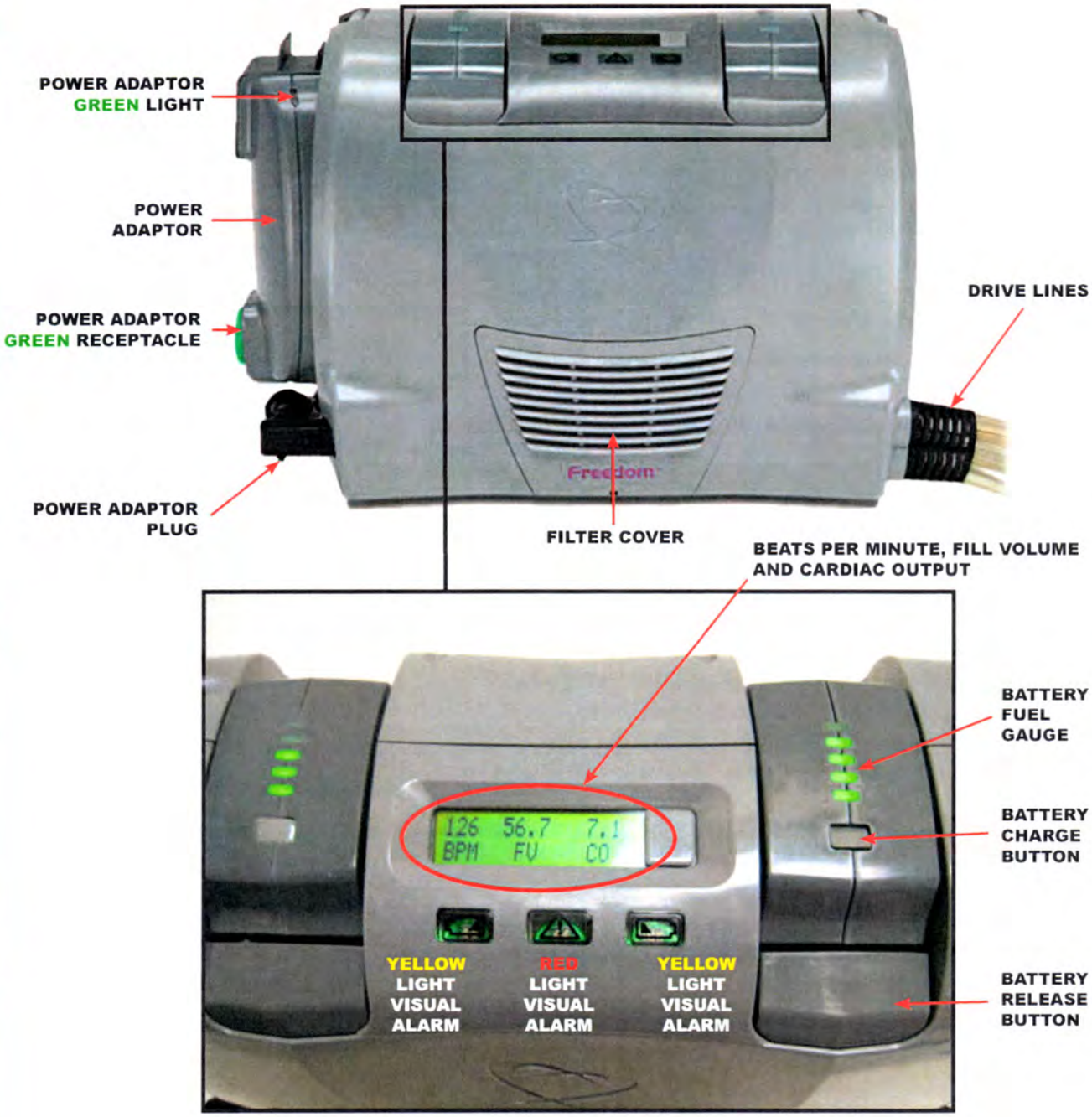
"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

JANUARY 2019

Trouble Shooting Freedom™ Driver System

This Patient is on an ARTIFICIAL HEART

(not a left ventricular assist device -LVAD)



Freedom™ Driver System

IN THE EVENT OF AN EMERGENCY

Immediately notify VAD coordinator listed on the medical alert bracelet or tag attached to the console - please identify the device as a total artificial heart.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice. 4th ed., Mosby, 2010"

JANUARY 2019

HOW TO RESPOND TO FREEDOM™ DRIVER ALARMS

There is no way to mute an Alarm.

ALARM	HEAR	SEE	MEANING	WHAT YOU SHOULD DO
Battery Alarm	Loud Intermittent Tone	Yellow Battery LED Flashing	One or both of the Onboard Batteries have less than 35% remaining charge (only two green lights display on the Battery Fuel Gauge).	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power (NOTE: Once the batteries are charged above 35% the Battery Alarm will stop) .
			Onboard Battery is incorrectly installed.	Reinsert Onboard Battery until locked in place. If Battery Alarm continues, insert a new Onboard Battery.
			One Onboard Battery missing.	Insert charged Onboard Battery into Freedom™ Driver until locked in place.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The temperature of the Driver is too hot or too cold.	Remove any objects that are blocking the Filter Cover and/or Fan and check the filter.
			The internal temperature of the Driver is too hot.	Move the Freedom Driver to a cooler or warmer area.
Fault Alarm	Loud Continuous Tone	Red Alarm LED Solid	Valsalva Maneuver: Strenuous coughing or laughing, vomiting, straining during a bowel movement, or lifting a heavy weight.	Relax/interrupt Valsalva Maneuver.
			Kinked or disconnected drive lines.	Straighten or connect drive lines.
			Driver is connected to External Power without at least one correctly inserted Onboard Battery.	Insert a charged Onboard Battery into the Freedom™ Driver until locked into place.
			One or both of the Onboard Batteries have less than 30% remaining charge.	Replace each low Onboard Battery, one at a time, with a charged Onboard Battery or connect to external power. (NOTE: the Fault Alarm will continue and will change into a Battery Alarm as the Onboard Batteries recharge. Once the Onboard Batteries are charged above 35%, the Battery Alarm will stop.)
			Malfunction of the Driver	If the steps above do not stop the Fault Alarm, switch to Backup Freedom Driver. Return to implant hospital.
Temperature Alarm	Loud Intermittent Tone	Red Alarm LED Flashing	The internal temperature of the Driver is too hot.	Remove any objects that are blocking the Filter Cover and / or Fan and check filter.
			The temperature of the Onboard Batteries is too hot or too cold.	Move the Freedom Driver to a cooler or warmer area.

You must immediately address the issue that caused the Alarm.

"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

JANUARY 2019

Switching from Primary to Backup Freedom™ Driver

CAUTION: It is recommended to have TWO people exchange the primary Freedom Driver for the backup Freedom Driver. Make sure all items and accessories are closely available before attempting to exchange Drivers.

Setting up the Backup Freedom™ Driver

1. Remove the drive line caps from the ends of the Drive lines.
2. Insert one charged Onboard Battery. The driver will immediately start pumping. (*Figure 1*)
3. Remove the Orange Dummy Battery. (*Figure 1*)
4. Insert the second charged Onboard Battery. (*Figure 2*)
5. If possible, connect the backup Driver into a wall power outlet.
6. Your Freedom™ Driver is now ready to connec to the patient.

FIGURE 1

FIGURE 2

BEATS PER MINUTE, FILL VOLUME AND CARDIAC OUTPUT

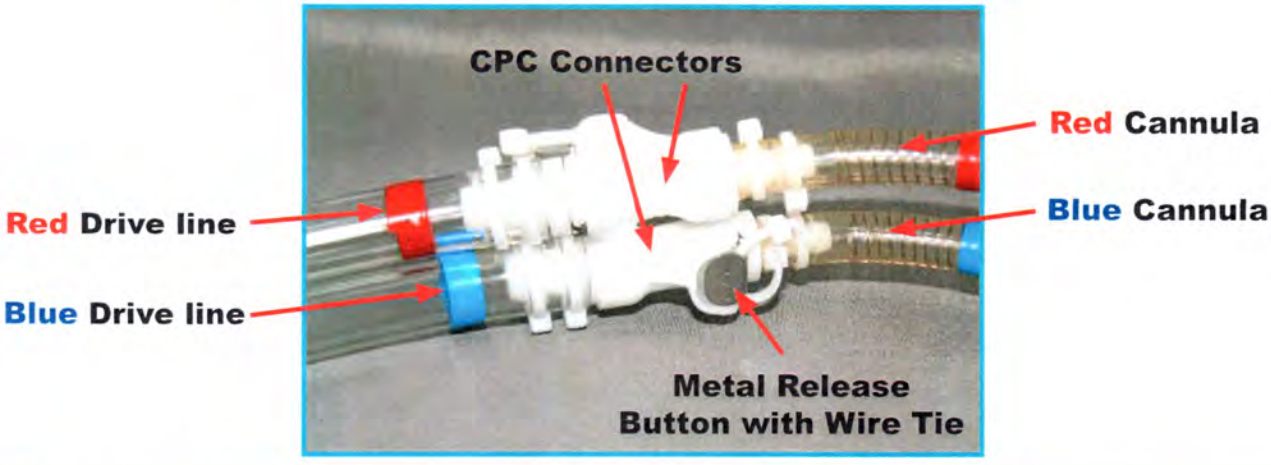
FIGURE 3

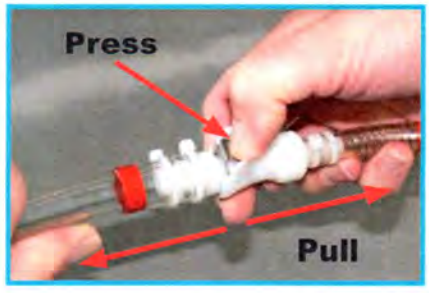
Continued on next page.

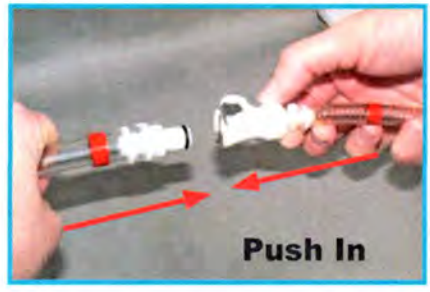
"Sweet, L. and Wolfe, Jr., A. Mechanical Circulatory Devices in Transport .ASTNA: Patient Transport Principles and Practice, 4th ed., Mosby, 2010"

Switching from Primary to Backup Freedom™ Driver

Continued on from previous page







1. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the RED TAH-t Cannula to the RED Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.
2. With the Wire Cutter Tool, cut the Wire Tie under the metal release button of the CPC Connector that secures the BLUE TAH-t Cannula to the BLUE Freedom Drive line. Gently pull to remove the Wire Tie and discard. DO NOT DISCONNECT THE CANNULA FROM THE DRIVE LINE YET.

CAUTION: Before disconnecting the Drive lines of the primary Freedom Driver, you must have the Drive lines of the backup Freedom Driver within reach. The backup Driver must be turned on. Perform steps 3 and 4 simultaneously.

3. Disconnect the RED Cannula from the RED Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the RED Cannula away from the RED Drive line.
   - Immediately insert the RED Cannula into the new RED Drive line from the backup Freedom Drive Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
4. Simultaneously disconnect the BLUE Cannula from the BLUE Drive line of the primary Freedom Driver:
   - Press and hold down the metal release button. Pull the BLUE Cannula away from the BLUE Drive line.
   - Immediately insert the BLUE Cannula into the new BLUE Drive line from the backup Freedom Driver.
   - Insert until a click is heard and lightly tug on the connection to make sure that it is secure.
5. Slide a Wire Tie under the metal release button of each CPC connector. Create a loose loop in the tie, taking care not to depress and disconnect the connectors. Cut off the excess length of both Wire Ties.
6. Patient must notify Hospital Contact Person of the switch.
7. The Hospital should notify SynCardia Systems that the Driver has been switched and return the faulty Driver.

JANUARY 2019