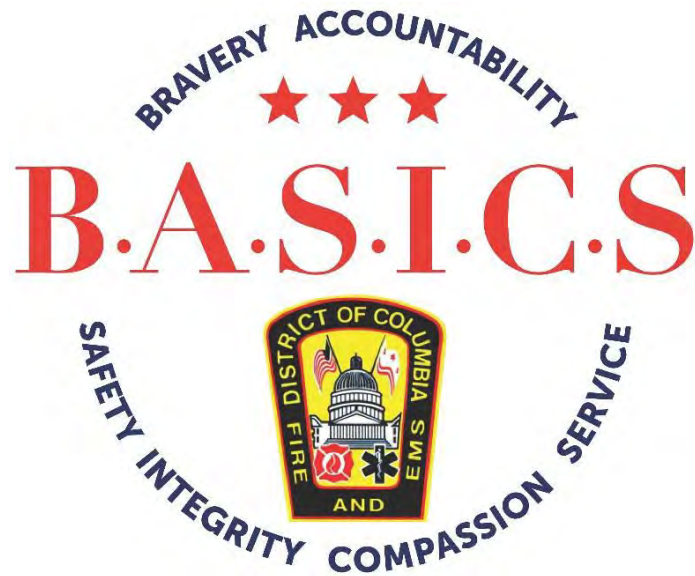


District of Columbia Fire and EMS Department



Emergency Medical Services Manual and Pre-hospital Treatment Protocols Effective: June 23, 2023

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DC Fire and EMS Pre-Hospital Treatment Protocols

Introduction

Foreword 1.2

These protocols were developed under the direct auspices of the Medical Director for the District of Columbia Fire and Emergency Medical Services Department (DCFEMS). The clinical pathways are consistent with current medical practice and adhere to treatment regimens established by professional organizations such as the National Association of EMS Physicians. The sources of the manual represent the consolidation of medical procedures and emergency pre-hospital guidelines and publications that are nationally and regionally accepted as the standard of practice.

The District of Columbia Department of Health (DOH) and the United States Department of Transportation (USDOT) have established a standardized Scope of Practice for each level of EMS field provider. DCFEMS providers meet or exceed National Registry of EMT's and DOH standards. This Pre-Hospital Patient Care Manual establishes the standardized medical direction for patient care that should be provided by all Emergency Medical Services providers under the authority of the DCFEMS Medical Director.

The following policies, procedures, and pathways are to be used as directives for the delivery of emergency medical care. These medical directives are the established standards of authorized practice and care for the providers of this Department. If a provider has questions about any procedure or standard of care, they are instructed to consult with a Medical Control physician for orders.

Treatment protocols are orders that guide actions that an emergency medical service provider (EMS) is expected to take. Treatment protocols should be followed unless the protocol requires such contact with a Medical Control physician. It is imperative that providers establish contact with Medical Control for confirmation of medical care and further medical direction in situations that are not covered in treatment protocols.

Our commitment is to provide the best possible care and service to the citizens, public and private sector employees, and visitors of the Nation's Capital.



Providers must contact **Medical Control** to administer other prescribed rescue medications not specifically mentioned in the District of Columbia Fire and EMS Medical Protocols or formulary (i.e. Diastat rectal diazepam or Solu-cortef). The rescue medication must be provided by the patient or caregiver and the label must have the patient's name and the amount of medication to be given. The mechanism of delivery must be within the provider's scope of practice.

In certain therapies multiple medications can be used to produce similar therapeutic effects. In those instances where the Medical Director has authorized the use of more than one medication, the following graphic will be used to designate when alternate medication choices are authorized.

<u>Adult</u>	<u>Pediatric</u>
Medication X # mg IV	Contact Medical Control



or

<u>Adult</u>	<u>Pediatric</u>
Medication Y # mg IV	Contact Medical Control



The order of the listing in the protocol does not dictate a favoring of one medication over the other. The provider should utilize whichever medication is immediately available from the DCFEMS medical supply services at property.

This measure has been instituted to introduce flexibility if supply chains are disrupted due to manufacturing shortages or an inability to procure one of the medications.

Emergency Medical Services for Children (EMSC) Bear

The EMC Bear symbolizes when Pediatric Care is warranted, and Medical Control is required.





DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Medical Communications 2.1

Medical communications is a vital component of pre-hospital care. Information reported should be concise and provide an accurate description of the patient's condition as well as treatment rendered. Therefore, a complete patient assessment and set of vital signs should be completed prior to contacting Medical Control or a receiving facility. Regardless of the destination, early and timely notification of Medical Control or the receiving hospital is essential for prompt care to be delivered by all involved.

1. Medical communications with Medical Control or a receiving facility should be conducted for every **Priority 1** patient.
2. Contact Medical Control as soon as feasible in accordance with protocols for medication or treatment modality orders. For seriously injured or critically ill patients notification to the receiving facility is required. It is preferred that this be accomplished by the transport unit, however, notification through the Office of Unified Communications is acceptable.
3. When communicating with Medical Control or a receiving facility, a verbal report should include these essential elements:
 - Identify unit, level of provider and name
 - Destination hospital and ETA
 - Patient's age, sex
 - Mental status
 - Patient's chief complaint
 - Brief pertinent history of the present illness
 - Baseline vital signs to include EKG, glucose, or other pertinent assessments
 - Pertinent findings of the physical exam
 - Past medical history, current meds and allergies
 - Treatment rendered in the field
 - Patient response to emergency care given
 - Orders requested, repeat granted orders back to physician
 - If Medical Control is obtained, document the physician's name
4. Advise receiving facility of change occurring in patient's condition en route to the medical facility.
5. When transmitting patient information, **DO NOT** include personal or sensitive information (e.g. name, social security number, address, race, etc.).



Responsibility for patient care in the pre-hospital setting may be transferred between pre-hospital personnel according to established procedures. These procedures are applicable for turnover responsibility to or from EMS providers or to hospital staff.

I. ALS Provider Transfer of Care to and equal or higher level provider

1. Non-transport ALS provider to transporting ALS provider
 - When first on-scene, the non-transporting ALS provider should transfer patient care authority upon arrival of the transporting ALS provider.
 - When the transferring ALS provider has initiated ALS care and the transfer of care might negatively affect patient care, the non-transporting ALS provider should maintain patient care authority during transport.
 - The transferring ALS provider should provide the transporting ALS provider a full patient report to include vital signs and physical assessment if applicable.

II. ALS Provider Transfer of Care to a BLS provider

1. Once a patient has received medications administered by any level of DCFEMS provider, the patient is categorically considered an ALS level patient. BLS providers are directed to transport the patient to the hospital if the estimated time of arrival of an ALS resource is greater than the transport time to the closest appropriate hospital. If an ALS resource arrives on the scene, the ALS provider shall assume patient care responsibilities and accompany the patient to the hospital.
2. No patient will be turned over to BLS care once ALS interventions (Medications, Airway) have been initiated. An exception to this rule can be made in a Mass Casualty or disaster scenario.
3. Patients must be stable with complaints that would be cared for at the BLS level. Prior to transferring care to the BLS provider, the examining paramedic will reasonably determine that there are no anticipated changes in the patient's present condition that would deem the patient unstable.
4. Transfer of care can take place if:
 - The patient has a patent airway, maintained without assistance or adjuncts.
 - The patient is hemodynamically stable. Vital signs should be steady and commensurate with the patient's condition.



- The patient is at his or her baseline mental status and not impaired as a result of medications or drug ingestion.
- No mechanism or injury warrants a trauma alert or activation.
- No cardiac, respiratory, or neurological complaints that warrant ALS intervention exist.
- The ALS provider provides the BLS provider with a full patient report to include vital signs and physical assessment.
- The EMT who will be in attendance is comfortable with the patient's condition and will assume care.

III. Transfer of Care at the Medical Facility

1. Upon arriving at a receiving facility, EMS providers will not initiate new medical care once they cross the threshold of the facility. Examples include, spiking new IV bags, starting O₂, immobilization, and restraint application.
2. EMS providers will continue any and all pre-hospital care initiated during the transport until the patient has been triaged or until the time-limit detailed below is reached, whichever occurs first. Examples include pre-hospital O₂; maintaining IV's begun in the field until they run out, and maintaining of splints applied in the field.
3. Hospitals will designate personnel to assess patients brought by EMS transport units with **the goal of transferring care and releasing the unit within 10 minutes** of the patient's arrival to the Emergency Department (ED). Transfer of care includes movement of the patient to the hospital-owned equipment, i.e. bed, stretcher, waiting room etc.
4. Transfer of care will be documented on the patient care report (PCR). The triaging personnel will be expected to sign the time stamped receipt of delivery of the patient at the time transfer of care takes place.
5. In the event that transfer of care is delayed for longer than 20 minutes, the EMS provider will contact the EMS Liaison Officer (ELO), who will in-turn contact the authorized hospital point of contact and attempt to resolve the delay in patient transfer until release.
6. If the EMS provider is still unable to obtain a signature, this fact will be documented by the EMS provider in lieu of the signature itself, and the ELO will inform the authorized hospital personnel that the process outlined in paragraph 7 below will be followed.



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Transfer of Care Policy 2.2

7. Patients that have been assessed by hospital personnel and are placed in a stable category will be escorted to the waiting room intake by EMS personnel and presented to the hospital's ambulatory patient intake personnel. The EMS crew will then go back in service.



I. Purpose:

To establish guidelines for the management and documentation of situations where patients refuse treatment or transportation, or insist on transportation to a destination other than that recommended by the EMS provider.

The Definition of a Patient for purposes of this policy shall be:

- Obtaining a history or interview of a client
- AND/OR**
- Physical exam, vital signs, assessment, or mental status examination that leads to clinical decision making actions such as treatment, transport, refusal or referral to another agency/service provider.

II. Guidelines:

1. Obtain Consent

- A. Informed Consent – when a competent patient or guardian is informed of the potential benefits and risks of a process or procedure, alternatives to that procedure, and the possible consequences related to each.
- B. Expressed Consent – written or verbal request to be evaluated and treated.
- C. Implied Consent – when a patient is unable to express consent because of altered mental status or severe distress.

2. Patient Assessment

- A. Providers should attempt to obtain a history and perform a physical assessment in as much detail as is permitted by the patient.
- B. Conduct Three Assessments: Providers should attempt to assess the following three major areas prior to permitting a patient to refuse care and/or transportation:
 - Legal Capacity to Refuse Care
 - Ensure that the patient is at least 18 years of age in order to refuse care.
 - If the patient is a minor, he or she may refuse care if he or she is emancipated (over age 16) by declaration of the court, or is married.



- Any minor of any age may consent or refuse care for health services for prevention, diagnosis or treatment of the following conditions:
 1. Pregnancy or its lawful termination
 2. Substance Abuse to include drug and alcohol abuse
 3. Mental or Emotional Condition
 4. Sexually transmitted disease
- Patients subject to a court decree of incapacity are not legally competent to refuse care.
- Mental Capacity to Refuse Care
 - Ensure that patient is oriented to person, place, time and purpose.
 - Establish that patient is not a danger to himself or others.
 - Ensure that patient is capable of understanding the risks of refusing care or transportation and any proposed alternatives.
- Medical or situational capacity
 - Ensure that patient is suffering from no acute medical conditions that might impair his or her ability to make an informed decision to refuse care or transportation.
 - Check to be sure that patient is exhibiting no other signs or symptoms of potential mental incapacity, including drug or alcohol intoxication, unsteady gait, slurred speech, post ictal period after seizure, cognitive deficits after hypoglycemia or drug intoxication. etc.
 - If possible, rule out conditions such as hypovolemia, hypoxia, head trauma, metabolic emergencies (e.g., diabetic shock); hypothermia, hyperthermia, etc.
 - Attempt to determine if patient lost consciousness for any period of time.

III. Who May Refuse Care

1. The Patient:
 - A. If patient has legal, mental, medical and situational capacity to understand the risks and alternatives to treatment and transportation, the patient has a right to refuse care. Obtain refusal signature.
 - B. Implied consent -- if patient is unconscious lacks capacity and/or is seriously injured or in need of further medical attention, treat and transport patient despite patient's inability to consent or the unavailability of another party to provide consent.



2. Parent:

- A. A custodial parent (i.e., a parent with a legal right to custody of a minor child) may refuse care on behalf of a minor child. Obtain refusal signature from parent.
- B. A parent of a patient who is 18 years of age or older may not refuse care on behalf of his or her child (unless the parent also happens to be a legal guardian – see below).
- C. A minor (i.e., under 18 years of age) may refuse care for his or her child. Obtain refusal signature from the minor parent.

3. Guardian:

- A. A legal guardian is one who is appointed by a court to act as “guardian of the person” of an individual who has been found by a court to be incapacitated.
- B. Legal guardian may also be appointed in lieu of parents for a minor. If a person indicates they are a legal guardian to the patient, attempt to obtain documentation of this fact (court order, etc.). If no such documentation is available, you may obtain refusal signature from the guardian as long as you do so in good faith and do not have any evidence or knowledge that the person is misrepresenting himself as a legal guardian of the patient.

4. Health Care Agent (“Attorney-in-Fact”):

- A. A person appointed by the patient in a durable power of attorney document may refuse care on behalf of the patient if the power of attorney contains such authorization.
- B. Attempt to obtain a copy of the durable power of attorney document to attach to the patient care report (PCR). If no such documentation is available, you may obtain refusal signature from a health care agent (“attorney-in-fact”) as long as you do so in good faith and do not have any evidence or knowledge that the person is misrepresenting himself as the health care agent or “attorney-in-fact” of the patient.

IV. Managing Incompetent Patients and Patients who lack Medical or Situational capacity:

- 1. Take all reasonable steps to secure treatment or transportation for a patient who is legally or mentally incompetent to refuse care, but do not put yourself or your crew in jeopardy.
- 2. The Metropolitan Police Department should be summoned to the scene to assist with patients that you believe may be mentally incompetent and refusing services. A Battalion EMS Supervisor will also be requested to the scene to facilitate the FD 12 process with the responding law enforcement officer.



3. If a patient lacks medical or situational capacity, and no other authorized individual is available to provide a refusal signature, the patient may be treated and transported as long as you act in good faith and without knowledge that the patient or authorized individual would refuse care. Patients may be transported against their objections if they lack medical or situational capacity to refuse care.

V. Refusal Procedures:

1. If the patient does not speak English as a primary language and requests language translation services, the language line will be used for formal translation services.
2. If patient refuses care, or insists on being transported to a facility that is on closure or a facility other than the destination recommended by EMS personnel, have the patient or designee complete the refusal of treatment or transport section of the patient care report (PCR).
 - A. Conduct a thorough patient assessment to include vital signs and blood glucose level.
 - B. Inform the patient that units responded to the scene for the purpose of providing emergency medical care and with the expectation of terminal outcome that the patient would accept transport to the hospital for further evaluation and treatment.
 - C. Review form with patient or designee. If required the body of the text shall be read aloud to the patient.
 - D. Provide detailed explanation of possible risks and danger signs to patient or other designee.
 - E. Inform the patient to call 911, call their doctor or go to an emergency department if symptoms persist or get worse or any of the danger signs you inform them of appear.
 - F. Obtain the signature of the patient or designee. If the patient refuses to sign, document this fact on the patient care report (PCR).
 - G. Have the patient or designee date the patient care report (PCR).
 - H. Obtain signature of a witness; preferably the witness should be someone who witnessed your explanation of risks and benefits to the patient, and who watched the patient sign the form. Witnesses may include law enforcement personnel. All witnesses should be 18 years of age or older if possible.
 - I. Contact the EMS Liaison Officer or Battalion EMS Supervisor to provide an update via radio consultation confirming that all evaluation and inclusion criteria have been met. If a Battalion EMS Supervisor is on the scene, providers may dispense with the radio consult.



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Standard Operating Guidelines

Person Dead on Arrival (PDOA) 2.4

The purpose of this protocol is to address when cardiac arrest resuscitation should NOT be initiated in the prehospital setting. All providers must utilize sound judgment and perform a thorough assessment in determining if a patient meets the criteria to be pronounced dead on arrival (PDOA). In cases where the patient's status is unclear and the appropriateness of withholding resuscitation efforts is questioned, FEMS personnel should initiate CPR immediately and then contact an EMS Supervisor or Medical Control Physician for further guidance.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is in cardiac arrest (adult or pediatric).
- Patient presentation indicates that an attempt at resuscitation would be futile, inappropriate, or inhumane.

Exclusion Criteria:

- None

Procedure:

1. Criteria for determining a patient should be pronounced PDOA shall include ALL of the following Primary Criteria and AT LEAST one of the following Secondary Criteria:

- **Primary Criteria (ALL must be met)**
 - Pulseless
 - Apneic
 - No signs of life (such as spontaneous movement or pupillary response)
- **Secondary Criteria (at LEAST ONE must be met)**
 - Rigor mortis: body stiffening, usually occurring several hours after death
 - Dependent lividity: reddish-blue discoloration of the skin resulting from the gravitational pooling of blood in the lower lying parts of the body in the position of death.
 - Decomposition or putrefaction: skin bloating or rupture, with or without soft tissue sloughed off. The presence of at least one of these signs indicates death occurred at least 24 hours previously.
 - Decapitation: the complete severing of the head from the remainder of the patient's body
 - Transection of the torso: the body is completely cut across below the shoulders and above the hips through all major organs and vessels. The spinal column may or may not be severed.
 - Incineration (i.e. burned beyond recognition): 90% of body surface area with



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Person Dead on Arrival (PDOA) 2.4

full thickness burns as exhibited by ash rather than clothing and complete absence of body hair with charred skin

- Massive whole-body crush injury
- Obvious displacement of brain matter
- Valid MOST Form indicating DNR status in Section A or other actionable end-of-life medical order (e.g., POLST Form, DNR order, or Advanced Directive) is present on scene
- A valid DC licensed physician on scene, familiar with the patient's medical status, orders that resuscitation not be attempted (e.g., nursing home or palliative care physician)
- "Compelling reasons" to withhold resuscitation in cases where efforts would be inappropriate and or inhumane. See "compelling reasons" below.
- During a mass casualty incident, (MCI) the patient is designated as deceased (black tag) or expectant (grey tag) in accordance with the MCI Protocol. Such patients should be reevaluated as resources allow.

❖ Important Note: recent penetrating trauma (e.g., GSW or stabbing) is NOT considered an injury incompatible with life and should be managed per the Traumatic Cardiac Arrest protocol.

❖ Important Note: an ALS assessment or EKG/rhythm check is NOT necessary to declare a patient PDOA per this protocol. BLS providers do NOT need to request an ALS resource simply to perform a rhythm check when the above PDOA criteria are met.

2. Compelling reasons to withhold resuscitation can be invoked when written directive (e.g., valid MOST Form or other DNR order) is not readily available on scene, yet the situation suggests that the resuscitation effort will be futile, against the patient's wishes, and or inhumane. FEMS personnel may withhold resuscitation from a patient in cardiac arrest under "compelling reasons" when two criteria are BOTH present:

- End stage of a terminal condition (e.g., cancer, heart failure, dementia etc.)
AND
 - Written or verbal information from family, caregivers or patient stating that the patient did not want aggressive resuscitation efforts such as CPR or intubation.
- ❖ If both criteria are met, you may withhold resuscitation. If resuscitation was already started, you may stop resuscitation. An on-scene EMS supervisor or the ELO shall verify compliance with this protocol and that withholding further efforts are in accordance with the patient's wishes. Contact FEMS Medical Director or Medical Control Physician if the situation is unclear.



DC Fire and EMS Pre-Hospital Treatment Protocols

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Person Dead on Arrival (PDOA) 2.4

- ❖ You must clearly document these compelling reasons when they are used as a basis for withholding resuscitation.
- 3. If resuscitation was started (e.g., CPR) and upon further examination the patient has obvious signs of prolonged death or after obtaining additional information such as a valid MOST Form, the patient meets PDOA criteria, resuscitation efforts may be terminated immediately.
- 4. If the patient meets PDOA criteria as defined above, FEMS personnel are NOT required to continue resuscitation efforts initiated by others. This includes bystander or health care facility CPR.
- 5. If any of the findings are different than those described above, clinical death is not confirmed, and resuscitative measures should be immediately initiated or continued. After resuscitation efforts have been attempted, termination may still occur via the Termination of Resuscitation Protocol or the Traumatic Cardiac Arrest protocol as applicable.
- 6. If a patient meets PDOA criteria, the appropriate law enforcement agency (MPD, USPP, etc.) shall be requested to the scene to investigate and assume responsibility for the deceased person. Complete all necessary documentation and note the responsible law enforcement officer's badge number in the EPCR.
- 7. At a suspected crime scene, disturb as little potential evidence as possible.
- 8. **Pronouncement of Death for PDOA:**
 - Online Medical Control Physicians should NOT be used as the pronouncing physician for PDOA patients.
 - The current DC Fire and EMS Medical Director shall be listed on the EPCR as the pronouncing physician. The time the FEMS provider confirmed that the patient was dead shall be listed as the time of death. Wording in the following format must be entered into the EPCR: "The patient was pronounced dead on **date** at **time** by **Dr. first and last name of DC Fire and EMS Medical Director** by standing order."

MEDICAL CONTROL OPTIONS

1. Contact Medical Control with any questions.

General notes:



DC Fire and EMS Pre-Hospital Treatment Protocols

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Person Dead on Arrival (PDOA) 2.4

- Rigor mortis takes a variable amount of time to begin depending upon the physical condition of the deceased prior to death as well as the temperature of the environment. The face and neck begin to stiffen between two and five hours after death. After seven to nine hours, rigor mortis will affect the arms and chest. By twelve hours after death, rigor mortis is usually firmly established. As still more time passes (12 hours or longer), there is degradation of the protein in the muscles, causing the stiffening of rigor mortis to relax and the body to become limp.
- Post-mortem dependent lividity also called *livor mortis* will begin to occur, unless the victim has suffered a large blood loss, about one to two hours after death, and peak at about six hours.
- Patients who are mentally competent have the right to refuse medical care, including resuscitation. Patients who are dying have the same rights. Consistent with the DCFEMS core values, you have the responsibility to determine a patient's resuscitation wishes and honor them if possible. Clearly it is much easier when families are prepared with a written advanced directive, but in many cases, the written paperwork is not present on scene. The compelling reasons guidelines allow FEMS personnel to honor patient wishes even if there is no written directive.
- It is not uncommon for 911 to be called for a person with a DNR order, or a person who is clearly dead and on whom resuscitation will not be attempted. Sometimes families call because they don't know what else to do and are overwhelmed by the realities of death, which may include significant pain, shortness of breath, bleeding or seizures. In other cases, they may believe that 911 notification is required by law, or they may simply want confirmation of death. Don't assume that a call to 911 is done with an expectation of resuscitative efforts. Talk to family members and caregivers to determine their needs, expectations, and wishes.
- Regarding disagreements among family members at the scene of an expected natural death. While uncommon, this does occur, and there is no single "right" way to deal with every situation. A signed DNR order reflecting a patient's wishes, supported by a family member who has power of attorney, is strong support for withholding resuscitation, even if other family members disagree. In these situations, calmly telling family members that you want to honor the documented wishes of their loved one is often enough to defuse the situation.



DC Fire and EMS PDOA Checklist		
Criteria		Yes?
Primary Criteria (<u>ALL must be met</u>)	Pulseless	
	Apneic	
	No signs of life (such as spontaneous movement or pupillary response)	
Secondary Criteria (<u>at LEAST ONE must be met</u>)	Rigor mortis	
	Dependent lividity	
	Body decomposition	
	Decapitation	
	Transection of the torso	
	Incineration	
	Whole body crush injury	
	Severe displacement of brain matter	
	Valid prehospital MOST Form or DNR Order	
	On scene physician termination	
	“Compelling Reasons” (must have both criteria) <ul style="list-style-type: none"> Currently end stage of a terminal condition (e.g., cancer) Written or verbal information from family, caregivers or patient stating that the patient did not want resuscitation 	
	Black or grey tag during MCI	
All primary criteria and at least one secondary criterion must be met to meet PDOA criteria.		
❖ Important Note: recent penetrating trauma (e.g., GSW or stabbing) is NOT considered an injury incompatible with life and should be managed per the Traumatic Cardiac Arrest protocol.		
❖ Important Note: an ALS assessment or EKG/rhythm check is NOT required to declare a patient PDOA. BLS providers do NOT need to request ALS resources simply to perform a rhythm check when the above PDOA criteria are met.		



The purpose of this protocol is to affirm the right of all competent adults to control decisions relating to their own health care and to have their rights and intentions in end-of-life matters respected and implemented if they become incapable of making or communicating decisions for themselves.

The District of Columbia Medical Orders for Scope of Treatment (MOST) program was established under The Health-Care Decisions Amendment Act of 2015 (D.C. Official Code § 21-2221) and replaces the EMS Comfort Care Order-Do Not Resuscitate (CCO-DNR) program. The MOST program provides a more comprehensive approach, empowering terminally ill patients to make decisions on their end-of-life care options in consultation with their DC-licensed authorized healthcare provider (MD, DO, or APRN, NP only). The MOST program is administered by DC Department of Health (DC Health) Health Emergency Preparedness and Response Administration's (HEPRA) EMS Office.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive)

Exclusion Criteria:

- None

Definitions:

1. "Authorized representative" means a person who is authorized to make a health-care decision on behalf of an incapacitated individual or minor in accordance with D.C. Official Code [§ 21-2205](#) and [§ 21-2210](#).
2. "Medical Orders for Scope of Treatment Form" or "MOST Form" means a set of portable, medical orders on a form issued by DC Health that results from a patient's or a patient's authorized representative's informed decision-making with a health care professional.
3. "Patient" means a person who has been determined by an authorized health care professional to be approaching the end stage of a serious, life-limiting illness or frailty such that the person's life expectancy is 12 months or less.
4. "MD, DO, APRN, NP" are the suffix used by healthcare providers behind their name designating them as a physician (MD or DO) or advanced practice registered nurse /nurse practitioner (APRN or NP). For example, John Smith, MD or John Smith, APRN. These are the healthcare providers authorized to sign a valid MOST Form.



DC MOST Form

1. Filling out a MOST Form is entirely voluntary. No patient is required to complete or execute a MOST Form.
2. The DC MOST Form is typically printed on bright colored paper (e.g., bright blue paper) so that it can be easily located and differentiated from other medical documents in the event of a medical emergency, and to alert healthcare providers that the patient participates in the MOST program.
3. The MOST form is divided into four (4) sections (A-D) simplifying patient preferences for life-sustaining treatments, including:
 - Cardio-Pulmonary Resuscitation (CPR)
 - Medical Interventions/Treatment Options
 - Antibiotics and Medically Assisted Nutrition
4. Any incomplete section of the MOST Form implies full treatment for that specific section.
5. Sections A, B, and D are the most important sections for EMS Providers:
 - Section A: medical orders for when the patient has no pulse and is not breathing. (i.e., Attempt Resuscitation/CPR or Do Not Attempt Resuscitation / Allow Natural Death)
 - Section B: medical orders for when the patient has a pulse and/or is breathing. (i.e., Full Treatment or Selective Treatment or Comfort Focused Treatment)
 - Section D: Signatures by a MD/DO/APRN/NP and patient or patient's authorized representative.
6. To be considered valid, the MOST form must be signed in Section D by a MD/DO/APRN/NP and patient or the patient's authorized representative.
 - Exception: Inside of a healthcare facility, verbal orders are acceptable with follow-up signature by a MD/DO/APRN/NP in accordance with the facility policy.
7. The most recent MOST Form to have been signed/completed shall be followed.
8. All copies of a valid MOST Form serve as actionable medical orders, with identical authority as the original document.
9. The patient must have a copy of the MOST Form on their person or in the immediate available vicinity for it to be honored. If this is not the case, see Section 2 "Compelling Reasons" in the PDOA Protocol for further guidance.



10. The MOST Form shall be honored in any setting including hospitals, long-term care facilities, clinics, hospice, private medical practices, and in the prehospital setting.

Revocation of the MOST FORM

1. The MOST Form may be revoked at any time by the patient or patient's authorized representative:
 - To cancel the form, patients or their authorized representative are instructed to write the words "VOID" across the form and put a line through "Medical Orders for Scope of Treatment" at the top of the first page.
 - Revocation can also occur verbally to EMS providers or an authorized DC-licensed healthcare provider.

Decision to withhold resuscitation during cardiac arrest (MOST Form Section A)

1. Inspect the MOST Form to ensure it is intact, current, and belongs to the patient in question.
2. Ensure the current emergency is related to the underlying terminal condition. If it is not, disregard the MOST Form and provide resuscitative efforts.
 - Example: A patient who is currently choking on food has a MOST Form indicating their DNR status due to metastatic cancer. In this case, the MOST Form does not apply, and efforts should be made to treat the choking event.
3. Check Section D for valid signatures.
4. Check Section A for medical orders when patient has no pulse and is not breathing.
5. If the MOST Form is valid AND the Do Not Attempt Resuscitation / Allow Natural Death box is selected:
 - Do NOT start resuscitation efforts
 - If resuscitation was started prior to the discovery of a valid MOST Form and Return of Spontaneous Circulation (ROSC) has not yet been achieved, stop additional efforts immediately.
 - If resuscitation was started and ROSC achieved prior to the discovery of a valid MOST form, the patient should be transported to the nearest appropriate receiving facility with no further procedures or pharmacological measures undertaken, except by authorization from a medical control physician. Communication with a physician should be established.
6. In cases where the patient's DNR status is unclear and the appropriateness of withholding resuscitation efforts is questioned, FEMS personnel should initiate CPR immediately and then contact an EMS Supervisor or Medical Control Physician for further guidance.

DC Fire and EMS Pre-Hospital Treatment Protocols



Standard Operating Guidelines

Do Not Resuscitate (DNR)

Medical Orders for Scope of Treatment (MOST)

2.5

7. If resuscitation is withheld based on the MOST form, declare patient dead per PDOA protocol.
 - Online Medical Control Physicians should NOT be used as the pronouncing physician for PDOA patients.
 - The current DC Fire and EMS Medical Director shall be listed on the EPCR as the pronouncing physician. The time the FEMS provider confirmed that the patient was dead shall be listed as the time of death. Wording in the following format must be entered into the ECPR: “The patient was pronounced dead on **date** at **time** by **Dr. first and last name of DC Fire and EMS Medical Director** by standing order.”
 - Immediately notify law enforcement and remain on scene until they arrive to take custody of the body. Document the badge number of the responsible law enforcement officer.

Decision to resuscitate during cardiac arrest

1. Resuscitate the patient if:
 - The MOST form is revoked, unreadable, or not valid as determined above.
 - The MOST form has been defaced or tampered with in any way.
 - The patient has attempted suicide, or is the victim of a homicide.

Comfort Focused Treatment (MOST Form Section B)

1. Inspect the MOST Form to ensure it is intact, current, and belongs to the patient in question.
2. Ensure the current emergency is related to the underlying terminal condition. If it is not, disregard the MOST Form and provide resuscitative efforts.
 - Example: A patient who is currently choking on food has a MOST Form indicating their DNR status due to metastatic cancer. In this case, the MOST Form does not apply, and efforts should be made to treat the choking event.
3. Check Section D for valid signatures.
4. Check Section B for medical orders when patient has a pulse and/or is breathing.
 - Do NOT assume that if the patient is DNR in Section A that they will be Comfort Focused Treatment in Section B. Many patients are DNR in Section A but desire more aggressive treatment in section B (i.e., they still have a pulse and/or are still breathing)
5. If the MOST Form is valid AND the Comfort Focused Treatment box is selected in Section B:
 - Primary goal for the patient is maximizing comfort.
 - Patient prefers not to be transferred to the hospital.



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Do Not Resuscitate (DNR)

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- Exception: when comfort cannot be achieved in the current setting, the person should be transferred to a setting able to provide comfort (e.g., treatment and transport of a suspected hip fracture after a fall) Contact Medical Control as needed with any questions.
- May provide the following interventions as needed, to a patient for comfort or to alleviate pain:
 - Clear the airway and provide oxygen, without the use of artificial ventilation, supraglottic airway, or endotracheal intubation
 - Administer suction
 - Administer pain medication (may start an IV if necessary, to enhance comfort)
 - Control bleeding
 - Make any other necessary comfort adjustments

Reciprocity

1. All FEMS personnel shall recognize and act upon a MOST Form or similar documentation (e.g., POLST Form, DNR Order, or Advanced Directive) executed in another state as if the documentation were executed in accordance with the laws of that state (D.C. Official Code § 21-2221.09. Reciprocity)

MEDICAL CONTROL OPTIONS

1. Contact Medical Control with any questions.

General notes:

- See attached DC MOST FORM

DC Fire and EMS Pre-Hospital Treatment Protocols



Standard Operating Guidelines

Do Not Resuscitate (DNR)

Medical Orders for Scope of Treatment (MOST)

2.5

DC HEALTH		GOVERNMENT OF THE DISTRICT OF COLUMBIA MURIEL BOWSER, MAYOR	
HIPAA PERMITS DISCLOSURE OF THIS DOCUMENT TO OTHER HEALTH CARE PROVIDERS AS NECESSARY			
DC Medical Orders for Scope of Treatment (MOST)			
Patient Last Name / First Name / Middle Initial			
Address			
City/State/Zip Code		Medical Conditions/Patient Goals:	
Date of Birth (MM/DD/YYYY)		<input type="checkbox"/> Male <input type="checkbox"/> Female	
Last 4 Digits of SSN (optional)		<input type="checkbox"/> Transgender <input type="checkbox"/> Other	
Instructions for Responding Providers: FIRST follow these orders, THEN contact physician or nurse practitioner. The MOST is a set of medical orders intended to guide medical treatment based on a person's current medical condition and goals. Any section not completed implies full treatment for that section. Completing a MOST form is always voluntary. Everyone shall be treated with dignity and respect. PLEASE email completed form as a PDF document to DC.MOST@dc.gov or fax to 202-671-0707. To print the DC MOST form, go to: dchealth.dc.gov/most			
A	Cardio-Pulmonary Resuscitation (CPR): <u>Person has no pulse and is not breathing.</u>		
Check One	<input type="checkbox"/> Attempt Resuscitation/CPR When not in cardiopulmonary arrest, go to part B.		
	<input type="checkbox"/> Do Not Attempt Resuscitation (DNAR) / Allow Natural Death (AND) Choosing DNAR will include appropriate comfort measures.		
B	Medical Interventions: <u>Person has pulse and/or is breathing.</u>		
Check One	<input type="checkbox"/> FULL TREATMENT - primary goal of prolonging life by all medically effective means. Includes care described below. Use intubation, advanced airway interventions, mechanical ventilation and cardioversion as indicated. Transfer to hospital if indicated. Includes intensive care.		
	<input type="checkbox"/> SELECTIVE TREATMENT - goal of treating medical conditions while avoiding burdensome measures. Includes care described below. Use medical treatment, IV fluids and cardiac care as indicated. Do not intubate. May use less invasive airway support (e.g. CPAP, BiPAP). Transfer to hospital if indicated. Avoid intensive care if possible.		
	<input type="checkbox"/> COMFORT FOCUSED TREATMENT - primary goal of maximizing comfort. Relieve pain and suffering with medication by any route as needed. Use oxygen, oral suction and manual treatment of airway obstruction as needed for comfort. Patient prefers no hospital transfer. EMS consider contacting medical control to determine if transport is indicated to provide adequate comfort.		
	Additional Orders: (e.g. dialysis)		
C	Medical Treatment Preferences:		
Check One	Medically-assisted Nutrition: <u>(Always offer food and liquids by mouth if feasible.)</u>		
	<input type="checkbox"/> Trial period of medically-assisted nutrition by tube. (Goal: _____)		
	<input type="checkbox"/> No medically-assisted nutrition by tube.		
	<input type="checkbox"/> Long-term medically-assisted nutrition by tube.		
	Antibiotics:		
	<input type="checkbox"/> Use antibiotics for prolongation of life. <input type="checkbox"/> Do not use antibiotics except when needed for symptom management		
	Additional orders: (e.g. dialysis, blood products, implanted cardiac devices. Attach additional orders if necessary.)		

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DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Do Not Resuscitate (DNR)

Medical Orders for Scope of Treatment (MOST)

2.5



DC HEALTH

GOVERNMENT OF THE
DISTRICT OF COLUMBIA
MURIEL BOWSER, MAYOR

D Signatures: The signatures below verify that these orders are consistent with the patient's medical condition, known preferences and best known information. If signed by an authorized representative, the patient must be mentally incapacitated and the person signing is the legal authorized representative.			
Discussed with: <input type="checkbox"/> Patient <input type="checkbox"/> Parent of Minor <input type="checkbox"/> Guardian with Health Care Authority <input type="checkbox"/> Spouse/Domestic Partner <input type="checkbox"/> Health Care Agent (Durable Power of Attorney for Healthcare) <input type="checkbox"/> Adult child of patient		PRINT — MD/DO/APRN Name (required) MD/DO/APRN Signature (required) MD/DO/APRN License Number (required)	
		Phone Number Date (required)	
PRINT — Patient or Legal Authorized Representative Name Patient or Legal Authorized Representative Signature (required)		Phone Number Date (required)	
Person has: <input type="checkbox"/> Health Care Directive (Living Will) <input type="checkbox"/> Durable Power of Attorney for Health Care Encourage all advance care planning documents to accompany MOST			
KEEP ORIGINAL DC MOST FORM WITH PATIENT'S MEDICAL RECORDS			
Health Care Professional Information:			
Completing MOST <ul style="list-style-type: none"> Completing a MOST form is always voluntary. Treatment choices documented on this form should be the result of shared decision-making by an individual or their authorized representative and medical provider based on the person's preferences and medical condition. MOST must be signed by a MD/DO/APRN and patient, or their authorized representative, to be valid. Verbal orders are acceptable with follow-up signature by a MD/DO/APRN in accordance with facility/community policy. Using MOST <ul style="list-style-type: none"> Any incomplete section of MOST implies full treatment for that section. This MOST is valid in all care settings including hospitals until replaced by new physician orders. The MOST is a set of medical orders. The MOST does not replace an advanced directive. An advance directive is encouraged for all competent adults regardless of their health status. An advance directive allows a person to document in detail his/her future health care instructions and/or name an authorized representative decision maker to speak on his/her behalf. When available, all documents should be reviewed to ensure consistency, and the forms updated appropriately to resolve any conflicts. 		NOTE: A person with capacity may always consent to or refuse medical care interventions, regardless of information represented on any document, including this one. SECTIONS A, B and C: <ul style="list-style-type: none"> No defibrillator should be used on a person who has chosen "Do Not Attempt Resuscitation" When comfort cannot be achieved in the current setting, the person should be transferred to a setting able to provide comfort (e.g., treatment of a hip fracture). An IV medication to enhance comfort may be appropriate for a person who has chosen "Comfort-Focused Treatment". Treatment of dehydration is a measure which may prolong life. A person who desires IV fluids should indicate "Selective" or "Full Treatment". Oral fluids and nutrition must always be offered if medically feasible. SECTION D: <ul style="list-style-type: none"> Patient/Authorized Representative and MD/DO/APRN signatures. Reviewing MOST This MOST should be reviewed periodically whenever: <ol style="list-style-type: none"> The person is transferred from one care setting or care level to another, or There is a substantial change in the person's health status, or The person's treatment preferences change. To void this form, draw a line through "Medical Orders" and write "VOID" in large letters. Any changes require a new MOST.	
Review of this MOST Form			
Review Date	Reviewer	Location of Review	Review Outcome
			<input type="checkbox"/> No Change <input type="checkbox"/> Form Voided <input type="checkbox"/> New form completed
			<input type="checkbox"/> No Change <input type="checkbox"/> Form Voided <input type="checkbox"/> New form completed

Version 4.29.19

Photocopies and faxes of signed MOST forms are legal and valid. May make copies for records.

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DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

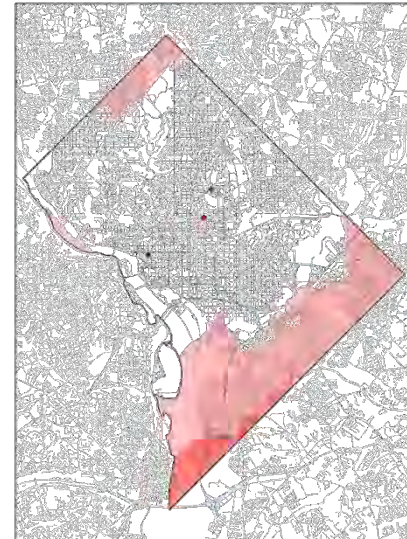
Air Transportation Utilization 2.6

Air medical transport may be utilized to reduce transport time for critically injured patients when operational and logistical conditions are favorable. The purpose of this protocol is to 1) Identify the clinical criteria that best predicts those patients who may benefit from air medical transport to the hospital from within the District and 2) Define the high risk “red zones” within the District where, depending on the time of day and traffic congestion, ground ambulance transport to a trauma center may take longer than air medical transport.

ALL PROVIDER LEVELS

Definitions:

1. Air Medical Transport: the United States Park Police (USPP) Aviation Unit “Eagle One” is the primary scene response air medical resource within the District of Columbia.
2. High-Risk “Red” Zones: areas within the District where depending on the time of day and traffic congestion, ground ambulance transport may exceed 15 minutes and the total prehospital event time for a critically injured patient may approach or even exceed 60 minutes. These areas in general correspond with the first due response areas of engine 15, 19, 25, 27, 30, 32, and 33. Critically injured persons within these high-risk “red” zones are the primary patients most likely to benefit from air medical transport.



- Pink: > 15-minute transport at an average transport speed of 15 mph
- Red: > 15- minute transport at an average transport speed of 30 mph

General Responsibilities:

1. The decision to use air medical transport should be made as early in the incident as possible to allow ample time for the arrival of the helicopter resource.
 - Unit officers can make a “pre-flight” request to USPP via OUC with call location information if there is credible prearrival information (e.g., multiple-callers or MPD is on scene) that a critical trauma patient meeting flight criterion exists.
 - Patient assessment and the decision to fly should take less than 60 seconds



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Air Transportation Utilization 2.6

- ❖ Please Note: Any potential time to trauma center benefit of air medical transport over ground ambulance transport is rapidly lost with any delay in activating the air medical resource.
- 2. The highest-level on scene care provider treating the patient shall determine if the patient is a candidate for air medical transport and make a request for this resource to the incident commander
- 3. The highest-level on scene care provider and incident commander must consider the following operational and logistical factors when deciding to use air transportation:
 - Incident location
 - Weather conditions
 - Landing zone location in proximity to the scene
 - Landing zone hazards
 - Terrain
 - Additional resources needed for landing zone
 - Availability and location of ALS ground transport resources (ALS transport unit or BLS transport unit plus paramedic from another apparatus)
 - Patient condition (risk of suffering cardiac arrest while in flight)
 - Weight of the patient
- 4. If a DC Fire and EMS member is requested to assist with/continue patient care during air medical transport, the member shall:
 - Be an independent ALS Provider
 - Follow DC Fire and EMS Pre-Hospital Treatment Protocols
 - Operate within the established scope of practice
 - Wear a helmet and protective eye wear
 - Follow all instructions provided by the flight crew (e.g., communications, seat belt use, unloading, etc.)
 - Document in the ePCR the care provided during air medical transport

Clinical Indications for Utilizing Air Medical Transport:

Air medical transport may be considered for the following patients or incidents:

1. Penetrating trauma

- Day time incident in the red zone
- Penetrating trauma to the neck, core torso (i.e., chest, abdomen, pelvis, back) or junctional region. (i.e., arm pit or groin)
- Hypotensive (systolic blood pressure < 90 mmHg) or unconscious
- Ability to land the helicopter at or very near the scene

2. High Speed MVC with entrapment



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Air Transportation Utilization 2.6

- Day OR nighttime incident in the red zone
- Anticipated prolonged or complicated extrication (i.e., estimated time to extricate exceeds the estimated time to activate and land the helicopter)
- Hypotensive (systolic blood pressure < 90 mmHg) or unconscious
- Ability to land the helicopter at or very near the scene

3. **Mass Casualty Incident**

- When deemed necessary by the incident commander, air medical transport may be utilized to transport stable trauma patients to distant trauma centers (e.g., Baltimore) in order to decompress local trauma centers who will likely receive the most critically injured patients transported rapidly by ground.

Contraindications for use of air medical transport

Patients with the following conditions should not be transported by air medical transport:

- Cardiac arrest or high likelihood to arrest during transport
- Penetrating trauma to the head
- Contaminated with hazardous materials
- Violent or erratic behavior
- If the transport by ground will be faster than by air

Aborting Air Medical Transport

If there is any unanticipated delay in requesting, activating, or landing the aircraft, abort the flight and proceed with transport by ground.



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Transport to OCME 2.7

This protocol applies to adult and pediatric patients who are declared deceased in the prehospital setting (either PDOA or terminated after a resuscitation attempt) and special scene factors dictate the deceased be transported directly to the Office of the Chief Medical Examiner (OCME) by DC FEMS instead of left on scene in police custody.

- ❖ Important Note: DC FEMS transporting deceased persons directly to OCME shall NOT be a routine or regular practice. This shall only occur in the rare circumstances outlined below. Deceased persons shall be preferentially left on scene in police custody.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient meets deceased criteria outlined in one of the following four protocols:
 - [Person Dead on Arrival](#)
 - [Do Not Resuscitate \(DNR\) / Medical Orders for Scope of Treatment \(MOST\)](#)
 - [Termination of Resuscitation - Medical Cardiac Arrest.](#)
 - [Traumatic Cardiac Arrest - Resuscitation and Termination.](#)

AND

- One of two special scene factors prevent leaving the deceased on scene in police custody:
 - Imminent danger exists that requires the patient to be rapidly moved to an ambulance and or removed from the scene for safe assessment, treatment, and disposition. (e.g., shooting victim with aggressive or hostile bystanders)

OR

- The deceased is in such a public place that not removing the body from the scene would cause significant public disruption or distress. (e.g., motorcycle crash in the middle of the highway with all lanes of traffic blocked)

Exclusion Criteria:

- Patient does not meet deceased criteria as outlined above.
- Scene factors allow for the deceased person to be left in police custody per normal PDOA or termination procedures.

Definitions:

1. Office of the Chief Medical Examiner: located at 401 E Street, SW, Washington DC 20024. To report a death, call [\(202\)-698-9000](tel:202-698-9000) Option #1.



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Transport to OCME 2.7

Procedure:

1. OIC or ACIC shall confirm patient meets deceased criteria as outlined above.
2. OIC or ACIC shall determine that special scene factors prevent safe assessment and disposition of the patient on scene and or leaving the deceased on scene in police custody.
3. OIC or ACIC shall request an EMS Supervisor be dispatched if one is not already on scene or dispatched.
4. As soon as the decision is made to transport directly to OCME, the appropriate law enforcement agency shall be notified, and the name of the lead law enforcement officer shall be obtained.
5. Once the deceased is loaded into a transport unit, transport directly to OCME may be initiated without delay.
 - Transport to OCME shall occur without the use of red lights and siren.
 - Notify ELO of OCME transport destination.
6. Once the decision is made to transport directly to OCME and the name of the lead law enforcement officer has been obtained, the EMS Supervisor shall call the OCME at [\(202\)-698-9000](tel:(202)698-9000) Option #1 to report the death.
 - OCME will require the following information at time of notification:
 - Demographics of the deceased
 - Physical description of the deceased (height and weight)
 - Name of the lead law enforcement officer
 - The EMS Supervisor does NOT need to transport with or accompany the deceased to OCME but should be available to answer any questions from OCME staff or DC FEMS personnel.
 - Once direct transport to OCME has been arranged, the EMS Supervisor shall notify the on-duty EMS Battalion Chief by phone.
7. Upon arrival at OCME the transporting crew, using the department cell phone, shall contact the OCME staff at the telephone number provided by OCME.
8. When directed by OCME staff, the transporting crew shall pull into the loading dock located at the B-C corner of the building 401 E Street, SW. Enter the loading dock from School Street SW. See pictures below.
9. Once inside of the loading dock, the transporting crew shall remove the decedent from the DC FEMS transport unit.



DC Fire and EMS Pre-Hospital Treatment Protocols

Standard Operating Guidelines

Transport to OCME 2.7

10. OCME staff will then transfer the decedent from the DC FEMS stretcher onto a mortuary cart. The transporting crew shall assist OCME staff with the transfer as needed.
11. The transporting crew shall then complete the OCME Transfer of Custody documents as requested by OCME staff.
12. Once the body has been transferred to OCME staff, the transporting crew shall:
 - Notify the ELO that the transport is complete.
 - Decon at their fire station per normal procedures.
 - Return to service.
13. Transport to OCME shall be documented as Hospital 30 in the electronic Patient Care Record.

General Notes:



Figure 1: OCME 401 E Street, SW

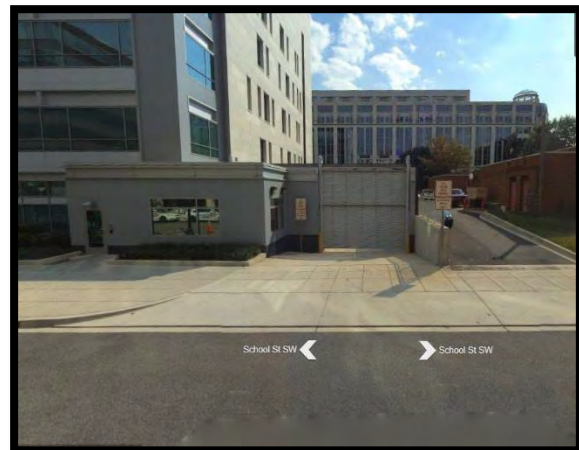


Figure 2: B-C corner, enter loading dock off School Street SW



I. Initial Scene Survey and Size Up

1. Survey the scene for possible hazards and re-survey periodically.
2. Protect yourself first, then victims, from hazards. Do not become a victim.
3. Identify all potential patients. Refer to MCI Bulletin if greater than 9 patients.
4. In cases of a lightning strike a reverse triage process should be utilized and patients in cardiac arrest should be treated first.
5. Summon additional resources as necessary to manage the incident. Additional resources include, but are not limited to: fire, rescue, advanced life support, or law enforcement
6. Assess mechanism of injury and/or nature of illness.
 - Medical – determine nature of the illness from the patient, family or bystanders. Why EMS was activated?
 - Trauma – determine the mechanism of injury from the patient, family or bystanders, and inspection of the scene.
7. If injury or illness is the result of exposure to a hazardous chemical, the patient should be completely decontaminated before treatment.
8. Patients that are identified to be unresponsive and do not have a witness to attest as to the mechanism of the change in mental status shall be treated as if they have a cervical spinal injury. Appropriate spinal immobilization precautions shall be employed while the assessment and care is being performed.

II. Primary Patient Assessment

1. Form a general impression of the patient (Critical, In Distress, or Non-Critical) with the understanding that management of scene time is critical when managing major trauma patients.
2. Assess mental status (AVPU)
 - **A** ---Alert
 - **V** ---Responsive to verbal stimulus
 - **P**--- Responsive to painful stimulus
 - **U** ---Unresponsive
3. Briefly note body position and extremity movement.
4. Determine the chief complaint/apparent life threats.



Immediate Recognition and Action Plan

1. If the patient is unresponsive and presents with apnea or agonal respirations immediately assess for the presence of a pulse. If a pulse is absent, initiate CPR and proceed with resuscitation. If the patient is very cold due to hypothermia, assess the pulse for 45 seconds before determining that a pulse is absent. If the patient meets criteria for Presumed Dead on Arrival (PDOA) do not initiate resuscitation.
2. Identify active hemorrhage and control bleeding by applying a pressure dressing or tourniquet as needed.
3. Utilize an Impedance Threshold Device (ResQPOD™) for patients eight (8) years of age or older in a non-traumatic cardiac arrest (If available). Remove the device immediately in the event of a Return of Spontaneous Circulation (ROSC).
4. CPR should be continued until an AED becomes available and is readied for use.
5. Defibrillate as applicable and refer to appropriate treatment protocol.

Airway

1. Assess airway status. **If cervical spinal trauma is suspected, manually stabilize the spine.** If the airway is blocked use a jaw thrust to relieve the obstruction.
2. Inspect the mouth for foreign objects, vomitus or blood. If present, remove it, or suction as needed. Utilize mechanical aids such as direct laryngoscopy (ALS), or any other approved method of obstruction relief.
3. When the airway is open, insert an oral or nasopharyngeal airway as tolerated. If the patient is pulseless and/or apneic, insert the King Airway as the primary airway of choice. BLS measures should be left in place as long as the device continues to be effective. ALS providers should immediately attempt to intubate using the Endotracheal Tube if BLS measures are deemed ineffective.
4. If none of these are successful, advanced life support providers should consider advanced airway alternatives such as needle cricothyroidotomy.

Breathing and Ventilation

1. Assess rate, rhythm, and quality of breathing. If the patient's respiratory rate is normal or near normal, administer oxygen as per the specific protocol.



2. If the patient's respiratory rate is unusually rapid or slow for their age, the quality of respiration is insufficient, or if the patient is not breathing, ventilate with a bag-valve-mask (BVM) every 6 seconds or ten times a minute.
3. Seal sucking wounds with an occlusive dressing.
4. Splint flail segments with at least a heavy bulky dressing.
5. If tension pneumothorax is suspected, ALS providers should immediately perform a needle thoracostomy of the affected side. Perform bilateral needle thoracostomy for patients in cardiac arrest with chest trauma.
6. Frequently reassess the patient's breathing and intervene as necessary.
7. Continuous Quantitative Waveform Capnography (ETCO₂) shall be utilized for any patient with moderate-severe respiratory distress, any patient requiring ventilatory assistance via BVM, or any patient that has been intubated with a King Airway or Endotracheal Tube.
8. Any patient that has been intubated with a King Airway or Endotracheal Tube shall have a cervical collar applied (full spinal immobilization is not required) with the expressed intent of stabilizing the head and neck to assist in stabilizing the airway and maintaining the flow and stabilization of an IV line that may have been established in the external jugular vein.

Circulation

1. Identify active hemorrhage and control bleeding by applying a pressure dressing or tourniquet as needed.
2. Heart rate: compare to normal rate for age and situation.
3. Central/truncal pulses (radial, brachial, femoral, carotid): strong, weak or absent.
4. Distal/peripheral pulses: present/absent, thready, weak, or strong.
5. Check perfusion by evaluating skin color, temperature, and moisture.
6. Hydration status: anterior fontanel in infants, mucous membranes, skin turgor, crying tears, urine output history.
7. Identify the priority of the patient based on assessment findings.



Disability

1. Evaluate neurological status by noting:
 - Mental status and level of consciousness.
 - Presence or absence of movement in the extremities, either spontaneously or in response to stimuli.
 - Pupil size and reactivity.
 - General evidence of trauma to the head or neck.
2. Initiate spinal movement restrictions, if indicated.

Expose and Examine

1. Remove as much clothing as necessary to determine the presence or absence of an emergency condition or injury.
2. Perform a rapid full body scan and identify injuries. Treat life threatening conditions as they are recognized. Inspect and palpate each of the major body systems for the following:
 - **D** -- Deformities
 - **C** -- Contusions
 - **A** -- Abrasions
 - **P** -- Penetrations/punctures
 - **B** -- Burns
 - **T** -- Tenderness
 - **L** -- Lacerations
 - **S** -- Swelling/edema
 - **I** -- Instability
 - **C** -- Crepitus

Categorize Complaint and Determine Transport Priority

1. Determine patient transport priority. Expedite transport for high priority patients.
2. Establish if the patient's complaint is medical or traumatic in nature. Proceed to appropriate assessment pathway.



III. History Taking

1. Investigate the chief complaint and history of the present illness or event. You should use the mnemonic, “OPQRST-I” to evaluate any kind of pain.
 - **Onset** – When did the pain/discomfort begin?
 - **Provocation/Palliative** – What worsens or lessens the pain/discomfort?
 - **Quality** – What does the pain/discomfort feel like?
 - **Region/Radiation/Referral** – Where is the pain/discomfort? Does it move anywhere?
 - **Severity** – How severe is the pain/discomfort?
 - **Timing** – How long/often has this been occurring?
 - **Interventions** – Any intervention performed prior to EMS arrival and any effect they may have had?
2. Inquire about pertinent past medical history. You may use the acronym, “SAMPLE”.
 - **Signs/Symptoms**
 - **Allergies**
 - **Medication**
 - **Past medical history**
 - **Last oral intake**
 - **Events** leading up to illness or injury
3. Inquire about pertinent negatives as they can frequently narrow the focus of treatment. Pertinent negatives should be recorded in the patient care report.

IV. Secondary Assessments

Medical Complaints

1. Assess Vital Signs and blood glucose level.
2. Use appropriate monitoring devices to monitor the patient such as EKG (4-lead and 12-lead), Temperature, Pulse oximetry with Carbon Monoxide probe, and/or Continuous Quantitative Waveform Capnography (ETCO₂).
3. Inquire about current health status.



4. Medical (responsive patient): assess body systems related to the patient's complaints.
5. Conduct a focused physical examination.
6. Based on the formulated impression refer to the appropriate treatment protocol.

Trauma Complaints

1. Perform primary assessment, initial stabilization and load into Transport unit and start transport for all Patients that satisfy criteria for Field Trauma Triage Algorithm.
2. Assess Vital Signs and blood glucose level.
3. Perform a detailed focused physical examination while en route to the hospital or at the landing zone (fly-out) only after lifesaving assessments and interventions have been completed.
4. Based on the formulated impression refer to the appropriate treatment protocol.
5. Do not delay transport to initiate IV therapy.

Baseline Vital Signs and EKGs

1. Reassess respiratory rate, depth, quality, and rhythm (pattern).
2. Reassess pulse rate, rhythm, and quality. **DO NOT** utilize the pulse oximeter or the EKG tracing as the sole means for determining pulse rate.
3. Skin color, temperature and moisture.
4. **PEDS** - Capillary refill status.
5. At a minimum limb lead EKG monitoring should be completed at an early phase of patient evaluation. EKG assessment is essential when managing patients reporting complaints such as:
 - Chest discomfort of any kind.
 - Respiratory distress/shortness of breath.
 - Upper back pain.
 - Neck or jaw pain.
 - Epigastric discomfort.
 - Syncope / Near Syncope.
 - Acute onset of general malaise or weakness.



6. A **12 lead EKG** will be obtained on **patients with any one of the complaints mentioned in line item # 5** and who is greater than **30 years of age** and reports to have a **history of any one of the following cardiac risk factors**:

- Coronary Artery Disease
- Diabetes
- Hypertension
- Obesity
- Family History of Cardiac Issues
- Smoker
- Use of recreational drugs
- High Cholesterol
- Use of medications not prescribed to that individual
- Is a member of an at risk population

Patients with complaints consistent with suspected cardiac etiology or Acute Coronary Syndrome (ACS) who are 30 years of age or older and have risk factors noted above must be transported ALS unless Medical Control approves the downgrade of the patient to BLS. All patients in which EKG monitor is utilized or a 12 Lead EKG is obtained will have such data uploaded to the electronic medical record.

7. Obtain blood pressure. The initial blood pressure shall be obtained by auscultation on all patients. Subsequent blood pressures can be obtained manually or by electronic non-invasive blood pressure devices.
8. Obtain Blood Glucose reading unless procedure is declined by the patient.
9. Vital signs should be monitored at a minimum of every 5 minutes for all critical patients and every 15 minutes for all other patients.
10. In addition to obtaining vital signs, providers shall perform these additional skills to assist with patient assessment as needed:
- Pulse Oximetry.
 - EKG: 4-lead and 12-lead.
 - Continuous Quantitative Waveform Capnography (ETCO₂).
 - Temperature, as needed.
 - Carbon Monoxide (RAD 57 or Lifepak 15 with Rainbow probe).



Normal Vital Signs

	Respirations	Pulse	Systolic BP*
Adult	12 - 20	60 -100	90 - 140
Adolescent	12 - 24	60 -100	>90
Children (1 to 10 years)	22 - 34	80 -140	>75
Infants (1 month to 1 year)	24 - 40	90 -150	>70
Neonate (0 to 28 days)	30 - 60	100 -160	>60

❖ *For children 1 to 10 years of age, you can determine the lower limit of an acceptable blood pressure using the following formula:*

Minimal systolic blood pressure = $70 + (2 \times \text{age in years})$.

V. Focused Physical Examination

1. Performed to detect non-life threatening conditions and to provide care for those conditions/injuries. Perform enroute to the medical facility if the patient is unstable.

Head

1. Inspect facial features for symmetry.
2. Note color of face.
3. Note presence of swelling or excessive perspiration.
4. Assess the pupils and observe their size, equality and reactivity.
5. Inspect ear canals for discharge or presence of fluids.
6. If evidence of head trauma, have suction ready and prepare for seizure activity.

Neck

1. Note the trachea's position.
2. Inspect the neck of the upright patient for jugular venous distention.
3. Observe supra-sternal areas for retractions or use of accessory muscles.



Chest

1. Assess rate, depth, quality, and pattern of breathing.
2. Observe chest wall movement for symmetry, and auscultate breath sounds on both sides of the chest and anterior and posterior if the situation allows. Inspect the integrity of the chest wall.
3. Inspect and palpate for indwelling medical devices.

Abdomen and Pelvis

1. Assess the abdomen for pain, tenderness, swelling, guarding, or distention.
2. Palpate for the presence of rigidity, pulsations, masses, distention, rigidity and rebound tenderness.
3. Inspect and palpate for indwelling medical devices.
4. Using gentle pressure, evaluate the pelvis for crepitus and instability.

Extremities

1. Palpate distal pulses and evaluate skin presentation and temperature.
2. Inspect and palpate extremities for tenderness, gross deformity, swelling, lacerations and abrasions. Note motor, sensory, and vascular integrity in each extremity. Dress and splint extremity injuries as required and as time allows. When possible, elevate injured extremities.

Back

1. Examine the patient's back, if possible, for gross deformities or penetrating injuries.
2. Initiate spinal movement immobilization if indicated.

VI. Reassessment

1. To effectively maintain awareness of changes in the patient's condition, repeated assessments are essential and should be performed:
 - **Unstable patient:** at least every 5 minutes
 - **Stable patient:** at least every 15 minutes
2. Repeat the primary assessment.
3. Reassess circulation including pulses, hemorrhage control and skin perfusion.
4. Re-establish patient priority.



5. Reassess and record vital signs.
6. Repeat focused assessment regarding patient complaint or injuries.
7. Assess interventions.
8. Assess response to management.
9. Maintain or modify management plan.

VII. Transport Decision

Adult Patients

1. Major trauma patients should be transported to one of the designated adult trauma centers.
2. Burn patients are to be transported to the Burn Center at the Washington Hospital Center entering through MedStar (H04)
3. Burn patients with critical trauma other than the burns should be transported to the closest available burn center for the management of life threatening conditions.
4. Patients presenting with signs and symptoms that lead to a clinical impression of acute myocardial infarction (AMI) or STEMI should be transported to the closest STEMI referral center that is capable of emergent Percutaneous Coronary Angioplasty
5. Patients presenting with signs and symptoms that lead to a clinical impression of a CVA or TIA should be transported to the closest appropriate stroke receiving center.

Pediatric Patients

1. Major trauma and burn patients less than 15 years of age should be transported to Children's National Medical Center (H02).
2. Major trauma and burn patients 15 years of age or greater (adult sized) should be transported to a trauma or burn facility capable of handling adult patients.
3. Medical or minor trauma patients less than 18 years of age should be transported to a medical facility capable of handling pediatric patients.
4. Sexual assault patients less than 18 years of age should be transported to Children's National Medical Center (H02)



Special Situations

1. Patients with isolated eye trauma should be transported to Howard University Hospital. If significant trauma is associated the patient should be transported to the closest major trauma facility.
2. Patients with an amputation should be transported to the closest trauma facility.
3. Adult sexual assault patients who have sustained major single or multiple system trauma should be transported to the closest trauma facility. Adult sexual assault patients with no trauma or minor trauma will be transported to Washington Hospital Center (H13).
4. Patients with left ventricular assist devices (LVAD) should be transported to an LVAD referral facility. Currently the only facility in the District of Columbia is Washington Hospital Center (H13)

VIII. Considerations

1. For the purposes of determining pediatric versus adult dosing for medication the following criteria is to be applied:
 - Pediatric doses apply to pediatric patients weighing less than 45 kg (100 lbs.).
 - For pediatric patients equal to or greater than 45 kg (100 lbs.), utilize adult dosing.
 - Where applicable and available, the Broselow Tape, pediatric dose cards and/or electronic application should be utilized.



This protocol establishes standard practices for airway management and oxygen therapies. Unless otherwise indicated in a specific protocol, the mechanisms and therapeutic modalities in this protocol will be universally applicable.

ALL PROVIDER LEVELS

1. Patients that are identified to be unresponsive and do not have a witness to attest as to the mechanism of the change in mental status shall be treated as if they have a cervical spine injury. Appropriate spinal immobilization precautions shall be employed while the airway is being assessed and managed.
2. If cervical spine trauma is indicated, cervical spine stabilization will be maintained and the modified jaw thrust will be used to open the airway.
3. If cervical spine injury is not indicated, either the head tilt-chin lift method or modified jaw thrust method may be utilized to open the airway.
4. If the airway is obstructed refer to the **Obstructed Airway protocol**.
5. Suction the airway as needed. The tongue-jaw lift maneuver should be utilized to facilitate suctioning.

Suctioning Time Limits		
<u>Adult</u>	<u>Child</u>	<u>Infant</u>
15 seconds	10 seconds	5 seconds

Placement of Airway Adjuncts

1. An oropharyngeal airway (OPA) or King Airway should be sized and inserted if a gag reflex is absent.
2. If the patient has an intact gag reflex, a nasopharyngeal airway (NPA) should be sized, lubricated, and inserted. Use of the nasopharyngeal airway is contraindicated in patients with:
 - Head trauma with epistaxis
 - Potential basilar skull fracture
 - History of fractured nasal bone
 - Significant head or facial trauma or bleeding



Artificial Ventilation and Assisted Ventilation

1. If spontaneous respirations are insufficient or absent provide ventilatory assistance via BVM with supplied oxygen. Insufficient respiratory effort includes but is not limited to:
 - Less than
 - 8 respirations per minute in adults or;
 - Below the lower limits of normal limits for pediatric patients
 - Greater than:
 - 26 respirations per minute in adults or;
 - above of the higher limits of normal for pediatric patients
 - No visible chest rise with inspiratory effort
 - Pulse Oximetry reading of less than 90% SpO₂ after oxygen therapy without a corresponding rise in SpO₂.
2. Patients requiring artificial ventilation or assisted ventilations shall be ventilated with a bag valve mask (BVM) with 100% supplemental oxygen at the following rates:

Ventilation Rate		
<u>Adult</u>	<u>Child</u>	<u>Infant</u>
1 breath every 6 – 8 seconds	1 breath every 3 – 5 seconds	1 breath every 3 – 5 seconds

3. If a tracheostomy tube is present, attach the BVM to the 15 mm adapter of the tracheostomy tube. Close and seal the patient's mouth and nose before providing ventilations if no tracheostomy cuff is present. If the patient has a stoma and no tracheostomy tube is present, use a pediatric mask to form a seal over the stoma and ventilate with the appropriate BVM. Close and seal the patient's mouth and nose before ventilating. Release the seal of patient's mouth and nose to allow for exhalation.
4. Ventilations should be delivered over 1-2 seconds in sufficient volume to produce visible chest rise.
5. Routine hyperventilation and hyperinflation must be avoided.

Supplemental Oxygen Therapy

1. Administer supplemental oxygen via an appropriate device and at a flow rate sufficient enough to maintain a SpO₂ >94%. Patients should not routinely be given oxygen if oxygen saturation is adequate with a SpO₂ >94%.



2. Nebulized medications shall be driven by a flow rate of 10 liters per minute (lpm) or as prescribed by the manufacturer's recommendations.
3. Patients exhibiting signs of moderate to severe respiratory distress due to pulmonary edema or near drowning should be placed on the **Continuous Positive Air Pressure (CPAP)** system.
 - ALS providers should apply the nasal cannula ETCO₂ device before placing the CPAP mask into position.
 - Where indicated, nebulizer systems shall be inserted as part of the in-line circuit of the CPAP system. The oxygen flow rate driving the nebulized medication shall remain at 10 lpm or as prescribed by the manufacturer's recommendations.
4. If the patient has a stoma or tracheostomy, a tracheostomy mask may be used as the delivery device. If a tracheostomy mask is not available, a non-rebreather mask (NRB) should be placed over the opening.

ADVANCED LIFE SUPPORT PROVIDERS

1. Patients requiring advanced airway control due to the ineffectiveness of BLS measures should be intubated via either the oropharyngeal or nasopharyngeal route.
2. During early resuscitation phases of patients in cardiac arrest, the King Airway shall be used as the primary airway. If the King LT(S)-D airway is used and suction is available, the gastric contents can be suctioned via an 18 gauge French suction catheter inserted through the suction channel at first practicable opportunity.
3. If a tracheostomy is present and ventilatory support is required, insert a 6.0 or smaller Endotracheal Tube into the tracheostomy until the cuff is barely visible. Inflate the cuff until a seal is formed.
4. Intubation with a King Airway or ET Tube requires the attachment of continuous quantitative waveform capnography. **ETCO₂** readings should be maintained at a level of **35-45 mmHg**.
5. **Needle Thoracostomy** should be employed on patients with clinical indications of tension pneumothorax. **Bilateral Needle Thoracostomies** should be performed on any patient that is in cardiac arrest secondary to trauma and has associated chest injuries. Tension pneumothorax is a clinical diagnosis and should be managed when signs and symptoms are recognized. ALS providers should not delay management waiting for tracheal shift to manifest.
6. Refer to the **Medication Facilitated Intubation protocol** as required.
7. **Needle Cricothyroidotomy** should be implemented when indicated if upper airway is obstructed despite interventions.



After assessment of a patient, the ALS or BLS provider must assign a treatment priority. The following examples of priorities are not inclusive and sound judgment should be used when assessing patients.

I. Priority 1: Unstable Patients

1. Cardiac Arrest.
2. Post arrest with successful resuscitation.
3. Unconscious or GCS <13 and does not respond to therapy.
4. Moderate to severe respiratory distress with a respiratory rate >24, cyanosis, use of accessory muscles, or altered mental status.
5. Hypotensive (BP <90 systolic) with signs and symptoms of hypoperfusion.
6. Hypertensive (BP >220 systolic or >120 diastolic) with altered mental status or neurological deficit.
7. Cardiac related chest pain unrelieved by therapy with hypotension or cardiac dysrhythmia.
8. Suspected acute myocardial infarction.
9. Obstructed or uncontrolled airway.
10. Continuous vaginal hemorrhage with signs and symptoms of hypoperfusion.
11. Abnormal deliveries.
12. Evidence of prolapsed cord.
13. Eclampsia.
14. Allergic reaction with acute respiratory distress and hypotension (BP <90 systolic).
15. Status epilepticus.
16. Uncontrolled hemorrhage following trauma.
17. Multiple trauma patient(s).
18. Unstable chest injuries.
19. Penetrating wounds head, neck, chest, abdomen or pelvis.
20. Burn patients:
 - Respiratory burns.
 - 2nd degree burn with greater than 20% BSA any age.
 - Any 3rd degree burn larger than 1% BSA, or the size of the patient's hand.
 - Electrical burns.



- Chemical burns.
 - 2nd or 3rd degree burns hands, face, feet or perineum.
21. Acute neurological deficit less than four (4) hours.
 22. Unstable fracture with neurovascular compromise.
 23. Any patient that is deemed unstable by the senior provider.

II. Priority 2: Potentially Unstable Patients

1. Cardiac related chest pain.
2. Respiratory distress (mild to moderate).
3. Hypertensive (BP >220 systolic or >120 diastolic) without signs and symptoms.
4. Patients involved in trauma with a GCS of 15, without signs and symptoms of hypoperfusion and associated with one of the below:
 - MVC >40 mph
 - Hit by vehicles >20 mph
 - Patients thrown from moving vehicles
 - Rollover MVC
 - Falls ≥20 feet without altered mental status or hypoperfusion
5. Burn patients.
 - 2nd degree burns 10-20% BSA any age.
6. Any patient that is deemed potentially unstable by the senior provider.

III. Priority 3: Stable Patients

1. Uncomplicated fractures.
2. Minor burns.
3. Lacerations requiring suturing, with bleeding controlled.
4. Seizure patients with a return of a GCS 15.
5. Any patient that is deemed stable by the senior provider.



DC Fire and EMS Pre-Hospital Treatment Protocols

General Patient Management

Hospital Capability Chart 3.4

Medical Facility															
	Hospital Number	Adult Medical	Adult Major Trauma	Pediatric Medical up to 14 yrs	Ped. Major Trauma <15 yrs	Critical Burns	STEMI / ROSC Facility	ECMO/ECPR	Primary Stroke Center	Comprehensive Stroke Center	Obstetrics	Neonatal Care ("If accepts <32 weeks old)	Adult Sexual Assault Center	Ped. Sexual Assault Center	Eye Trauma
United Medical Center	01	✓													
Childrens National Hospital	02		✓	✓											
Medstar	04	✓	✓	✓	✓										
Howard University Hospital	05	✓	✓	✓	✓	✓									
Psychiatric Institute of Washington	06														
Georgetown University Hospital	07	✓	✓												
George Washington University Hospital	08	✓	✓		✓	✓	✓	✓	✓	✓			✓	✓	✓
Childrens National @ United Medical Center	09			✓											
Sibley Hospital	12	✓													
Washington Hospital Center	13	✓				✓	✓	✓	✓	✓				✓	✓
Veterans Administration Hospital	15	✓													
U of MD Capital Region Med Ctr	16	✓	✓	✓		✓		✓	✓	✓					
Holy Cross Hospital Silver Spring	17	✓				✓		✓	✓	✓					
White Oak Medical Center	19	✓		✓		✓		✓	✓	✓					
Southern Maryland Hospital	20	✓		✓		✓		✓	✓	✓					
Fort Washington Medical Center	21	✓													
Suburban Hospital	22	✓	✓	✓		✓		✓	✓	✓					
Walter Reed National Military Medical Center	23	✓	✓	✓				✓	✓	✓					
Doctor's Community Hospital	25	✓		✓				✓							
Virginia Hospital Center	26	✓	✓			✓		✓	✓	✓					
Inova Alexandria Hospital	27	✓		✓		✓		✓	✓	✓					
Inova Fairfax Hospital	29	✓	✓	✓		✓		✓	✓	✓					
Fort Belvoir Community Hospital	39	✓		✓											
Inova Mount Vernon Hospital	43	✓						✓							

* ECMO / ECPR for refractory VF/VT cardiac arrest is only available at H8 during weekday (M-F) business hours (0800-1700)



DC Fire and EMS Pre-Hospital Treatment Protocols

General Patient Management

Medical Control 3.5

Medical Control may be contacted at any step in patient care, and if a patient's condition is unusual and is not covered by a specific protocol. When a patient's presentation is atypical and the protocol treatment may not be the best treatment for the patient or in any situation where the EMS provider is not sure about the best treatment for the patient contact Medical Control.

Each hospital will serve as its own Medical Control for patients being transported to them. **Children's National Medical Center (H02)** will be the designated Medical Control for **ALL Pediatric patients**. When Medical Control is required, providers should ask to speak to the Emergency Physician. If genuinely unable to contact Medical Control, precede with standing orders only, **DO NOT** initiate Medical Control options. Providers should make every effort to utilize Hospitals 5, 8 or 13 as a back-up for adult patients. In the event of a communications failure, notify the receiving Emergency Department and the ELO upon arrival.

Purpose of Medical Control contact:

- EMS personnel will provide care within their scope of practice and will follow D.C. Fire and EMS orders when delivering EMS care.
- Medical Control must order any ALS or BLS treatment (medication or procedure) that EMS provides when that treatment is not included in or is a deviation from the approved protocols.
- In certain circumstances, as defined by the protocols, Medical Control shall be contacted by EMS (BLS or ALS) personnel.
- Protocols cannot adequately address every possible patient scenario. EMS personnel can contact Medical Control when confronted with a situation that is not addressed by the protocols or when the EMS personnel have any doubt about the appropriate care for a patient.

Contact with Medical Control may be particularly helpful in the following situations:

- Patients with time-dependent illnesses or injuries who may benefit from transport to a specific facility with special capabilities (e.g. acute stroke, acute ST-elevation MI).
- Patients with conditions that have not responded to the usual protocol treatments.
- Patients with unusual presentations that are not addressed in protocols.
- Patients with rare illnesses or injuries that are not frequently encountered by EMS personnel.
- Patients who may benefit from uncommon treatments (e.g. unusual overdoses with specific antidotes).



This protocol applies to all medical “crashing patients.” A crashing patient is one who upon EMS arrival presents in extremis and or is at risk of rapidly deteriorating into cardiac arrest (i.e., peri-arrest). This deterioration into cardiac arrest often occurs while attempting to move, package, or load the patient into a transport unit. It is imperative to not only rapidly recognize the “crashing patient” but to also take immediate action to stabilize the condition(s), where you encounter the patient, prior to loading and initiating transport. This protocol provides a prioritization of the goal directed treatments aimed at stabilizing the crashing patient with the intent of preventing deterioration into cardiac arrest.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient in whom cardiac or respiratory arrest appears imminent.
- Patient with provider impression of extremis. This includes but is not limited to:
 - New onset altered mental status (“not following commands” – motor GCS < 6)
 - Airway compromise
 - Severe respiratory distress/failure
 - Signs and symptoms of shock/poor perfusion

Exclusion Criteria:

- Patient is in cardiac arrest. [See Cardiac Arrest protocol.](#)
- Patient is a crashing trauma patient. See General Trauma Management protocol.
- Patient is not in extremis.

Definitions:

- **“Crashing Patient”** is one who presents in extremis and or is at risk of rapidly deteriorating to the point of cardiac arrest shortly after the arrival of EMS. Often referred to as a “pre-code” or “peri-arrest” patient.
- **Post-Arrival Respiratory/Cardiac Arrest (PARCA)** is a cardiac arrest that occurs after the arrival of EMS. Often referred to as an “EMS-witnessed” cardiac arrest.

Treatment and Interventions:

1. Stop all efforts to package, move, or load the patient until the stabilization treatments in this protocol are initiated.
 - ❖ Important Note: there are only two exceptions to this directive:
 - When the scene is truly not safe for patient care.
 - In these rare cases, the patient should be moved to a safe location and stabilization efforts shall begin as soon as possible.
 - When transport has already been initiated prior to clinical deterioration.



DC Fire and EMS Pre-Hospital Treatment Protocols

General Patient Management

Crashing Patient - Medical 3.6

- In these cases, transport may continue while stabilization efforts are completed enroute.
- 2. Attempt to gain 360° access to the patient.
- 3. If not already dispatched, request the closest available ALS resource(s). This may include an EMS Supervisor.
 - ❖ Important Note: unless logistically impossible, every effort shall be made to ensure that crashing patients are cared for by two paramedics on scene and throughout transport to an emergency department.
- 4. Initiate a complete patient assessment on scene, prior to moving, packaging, or loading the patient.
- 5. Obtain a full set of vital signs on scene, prior to moving, packaging, or loading the patient.
 - Blood pressure
 - Heart Rate
 - Respiratory Rate
 - Pulse Oximetry
 - Temperature
 - Blood Glucose.
- 6. Immediate Actions: perform as soon as possible on scene, prior to moving, packaging, or loading the patient. Patient assessment and indicated treatments should occur simultaneously based on number of providers on scene.
 - Airway: assess the patient's ability to maintain and protect their airway.
 - Insert 2 NPAs and an OPA as indicated and tolerated if not following commands (GCS motor < 6) or no response to verbal stimuli.
 - Breathing: assess patient's ability to oxygenate and ventilate.
 - When logistically possible, sit patient up or elevate head of bed.
 - If patient presents in respiratory distress (e.g., increased work of breathing, inability to speak full sentences, accessory muscle use, nasal flaring/pursed lips, SpO₂ < 90%).
 - Initiate high flow O₂ via NRB at 15 L/Min.
 - Maintain a low threshold for initiating CPAP if patient has significant respiratory distress/hypoxia.
 - Treat underlying cause of respiratory distress per protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

General Patient Management

Crashing Patient - Medical 3.6

- If patient presents in respiratory failure (e.g., poor respiratory effort or hypoventilation, apnea, unable to speak due to severe dyspnea, loss of muscle tone, altered mental status, $SpO_2 < 90\%$ despite O_2)
 - Initiate two-person, two thumbs down technique BVM ventilation with a [PEEP valve](#).
 - If logistically feasible, ventilations can and should be assisted via BVM with the patient in a sitting or head of bed elevated position.
- Circulation: assess for signs of shock/hypoperfusion.
 - Apply AED or monitor/defibrillator pads.
 - Consider potential causes of shock and treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
 - Keep the patient warm and prevent heat loss unless the patient has a fever.
 - If there is a history of adrenal insufficiency, treat in conjunction with [Adrenal Crisis protocol](#).
 - If patient has a Ventricular Assist Device (VAD), treat in conjunction with [VAD protocol](#).
- Glucose: Treat per [Hypoglycemia protocol](#) as clinically indicated.
- 7. If patient suffers PARCA at any time during initial stabilization efforts, treat per [Cardiac Arrest protocol](#).
 - ❖ Important Note: EMS witnessed medical cardiac arrest is NOT by itself an indication for transport. Resuscitate the witnessed medical cardiac arrest on scene per the Cardiac Arrest protocol.
 - ❖ Important Note: to minimize the incidence of PARCA, all cases of PARCA will be reviewed by the Office of the Medical Director for compliance with this protocol.
- 8. Move, package, and or load patient only after these critical stabilization efforts have been initiated and patient care optimized.
 - Limit patient exertion during movement. Do NOT ask the patient to walk or stand.
 - Important Note: the patient shall remain on the cardiac monitor for the entirety of patient movement, packaging and loading into a transport unit unless extreme logistical constraints prevent this from occurring. In these rare cases, every effort shall be made to place the patient back on continuous monitoring equipment as soon as possible during patient movement.
- 9. Transport patient with a minimum of two providers in the patient compartment.
 - Consider pre-positioning the LUCAS device prior to transport of patients in extremis.



DC Fire and EMS Pre-Hospital Treatment Protocols

General Patient Management

Crashing Patient - Medical 3.6

10. Pre-notify receiving hospital of unstable priority 1 patient as soon as possible.

ADVANCED LIFE SUPPORT PROVIDERS

1. Reassess effectiveness of initial BLS airway interventions and plan for continued airway management. Consider advanced airway placement as needed based on clinical presentation.
 2. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
 3. Obtain [12 lead EKG](#) and evaluate for cardiac causes of extremis/peri-arrest state.
 - Unstable bradycardia. Treat per [Bradycardia protocol](#).
 - Unstable tachycardia. Treat per [Wide Complex Tachycardia](#) or [Narrow Complex Tachycardia protocol](#) as indicated.
 - Cardiogenic Shock and or Myocardial ischemia. Treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
 4. Place patient on continuous ETCO₂.
 - Depending on the cause of shock, a reading < 30 mmHg indicates poor perfusion and ≤ 25 mmHg suggests worsening acidosis and increased likelihood of death.
 5. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
 6. Initiate IV fluid bolus and vasopressor therapy as indicated per [Hypoperfusion / Non-Traumatic Shock protocol](#).
 - ❖ Important Note: vasopressor therapy may be initiated immediately in conjunction with an IV fluid bolus for patients who are severely hypotensive (systolic BP < 70 mmHg) and or in a peri-cardiac arrest state.
 - [Push dose epi \(See Push Dose Epi Procedure\)](#).
- OR**
- [Epinephrine infusion \(See Epinephrine Infusion Chart\)](#).
 - ❖ Important Note: when using vasopressors target age-appropriate goal blood pressure (e.g., adult goal SBP > 90 mmHg or MAP > 65 mmHg)



7. Treat any other life threats identified on physical exam.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- The goal of this protocol is to ensure that patients who present in extremis receive immediate stabilizations efforts where they are found on scene, prior to movement. These initial stabilization efforts may prevent cardiac arrest. See this [20-minute video](#) for more information.
- Trending of vital signs is critically important to determining stability; a single set of vital signs does not verify stability.
- Optimize hemodynamics prior to performing [Medication Facilitated Intubation](#).
- Two person BVM is more effective than one person BVM. The 2 thumbs down technique is more effective than the traditional C-E technique and thus is the preferred method.

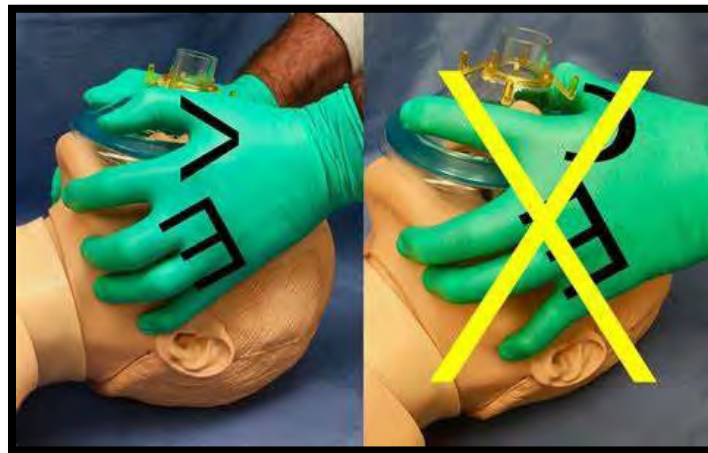


Figure 1: Left: Preferred two thumbs down BVM technique.
Right: Traditional C-E technique



CRASHING PATIENT PROTOCOL

For ALL patients who present in extremis at any point during their care. This includes acute unresponsiveness, airway compromise, respiratory distress/failure, or signs of shock.



STOP all efforts to move, package, or load the patient until treatments in this protocol are complete.

Request additional ALS if two paramedics are not on scene or already enroute.



Initiate a complete Assessment & Obtain a full set of vital signs.
(BP, HR, RR, SPo₂, EKG, ETCO₂, Temp, BGL)



Place patient on continuous cardiac monitoring, waveform capnography, pulse oximetry, and consider applying defib pads.



Assess Airway. Open airway using appropriate maneuvers and adjuncts. (Positioning, OPA, NPA, iGEL, intubation).
Goal is to maintain airway patency.



Assess breathing. Aggressively treat respiratory distress and respiratory failure. High flow O₂, BVM with PEEP, CPAP.
Goal is SpO₂ ≥ 94%.



Assess circulation. Gain IV/IO access. Treat SBP < 90 or MAP < 65 with appropriate therapy (fluids, push dose epi, electrical therapy).
Goal: age-appropriate BP in kids & SBP > 90, MAP > 65 in adults



Only consider moving pt once vitals obtained, monitoring is in place, therapies initiated, and hemodynamic goals met.
Transport with at least two providers in the pt compartment. Consider pre-positioning LUCAS device. Pre-notify hospital of unstable patient.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

This protocol applies to all patients, except newborns, who are unconscious/unresponsive and have no palpable pulse. It provides the overall framework and initial guidance for cardiac arrest management. Providers are referred to specific protocols as applicable. For pediatric patients greater than or equal to 14 years old, the adult medication / resuscitation guidelines should be followed. If the patient meets the criteria for being dead on arrival (PDOA), resuscitative efforts shall not be attempted, and notification of law enforcement shall be made.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is unconscious/unresponsive
- Patient is apneic or has abnormal breathing (i.e., only gasping)
- Patient has no pulse
 - Pulse check shall occur at the carotid or femoral artery
 - Pulse should only be checked for a maximum of 10 seconds, if no definite pulse is felt, assume the patient is in cardiac arrest and start CPR

Exclusion Criteria:

- Patient is responsive
- Patient has a palpable pulse
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) Protocol](#).
- Patient meets PDOA criteria. [See Person Dead on Arrival Protocol](#).
- Patient is a newborn. [See Newborn Resuscitation Protocol](#).

Treatment and Interventions:

1. BLS and ALS care must be started on all patients who are found apneic and pulseless unless:
 - A patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive). [See DNR / Medical Orders for Scope of Treatment \(MOST\) Protocol](#).
 - Patient meets PDOA criteria. [See Person Dead on Arrival Protocol](#).
 - During a mass casualty incident, (MCI) the patient is designated as deceased (black tag) or expectant (grey tag) in accordance with the [MCI protocol](#). Such patients should be reevaluated as resources allow.
2. Given the time-sensitive nature of cardiac arrest, treatment is most effective when performed on scene. Except when specifically noted in another protocol (e.g., refractory ventricular fibrillation) or the scene is truly not safe for patient care, high quality on-scene resuscitation shall be prioritized for all patients, including infant/pediatric patients, instead of immediate transport.



3. Initiate [General Assessment and Universal Patient Care Protocol](#).
 - In cases of cardiac arrest, the initial patient assessment should be focused on obtaining only enough information to reveal the patient is unresponsive and pulseless.
 - Once pulselessness is established, chest compressions should be initiated immediately, and any further history must be obtained while treatment is ongoing.
4. Immediately initiate high-quality manual chest compressions in cases with no bystander CPR or take over chest compressions from bystanders.
 - Resuscitation should generally be conducted where the victim is found, so long as high-quality CPR can be administered safely and effectively in that location.
 - Utilize a Pit Crew CPR approach for resuscitation. [See Pit Crew CPR Procedure Protocol](#).
 - Push hard (2.0-2.4 inches in adults, or greater than 1/3 chest diameter in pediatrics).
 - Push fast (100-120 compressions per minute).
 - Allow for complete chest recoil between each compression. Avoid leaning on the chest in between compressions.
 - Minimize interruptions in chest compressions. **All interruptions in CPR shall be as short as possible and no greater than 10 seconds.**
 - Switch chest compressors every 2 minutes (or after 5 cycles of compressions and ventilations at a ratio of 30:2) to prevent a decrease in the quality of compressions.
5. A second provider shall attach the [AED](#) or [monitor/defibrillator](#) as soon as possible after initiation of chest compressions. Minimize interruptions in chest compressions to place pads.
 - Separate the compression sensor from the pads and place it in the center of the chest.
 - Pad Placement: anterior/posterior placement should be utilized as the first line approach for all cardiac arrests.

Anterior Posterior Pad Placement

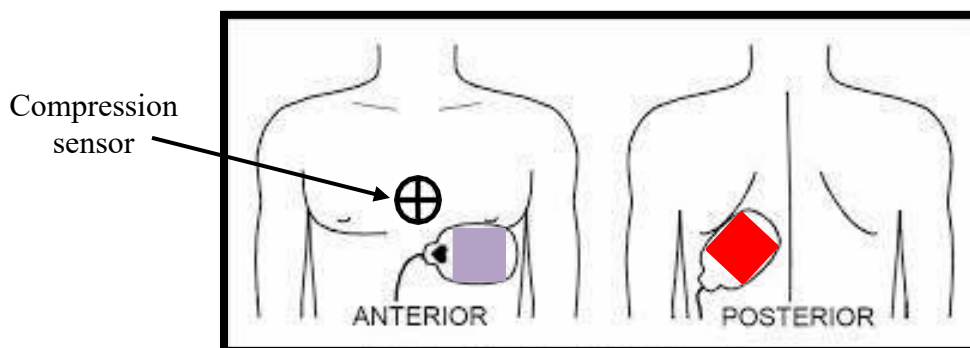


Figure 1: “Red to Bed” or “Red to Rear”: the red Zoll pad is placed to the left of the spine just below the scapula at the level of the heart.

The purple apex pad is placed over the anterior heart. Position under breast on a female.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

6. Once the AED or monitor/defibrillator is attached, utilize the compression sensor and CPR Dashboard to maximize the effectiveness of manual chest compressions.
 - Follow the audio prompts that provide feedback on the depth and rate of chest compressions.
 - ❖ Important Note: the AED or monitor/defibrillator shall be placed in a position where the provider performing chest compressions can see the CPR feedback prompts.



Figure 2: CPR Dashboard for Zoll AED 3 BLS

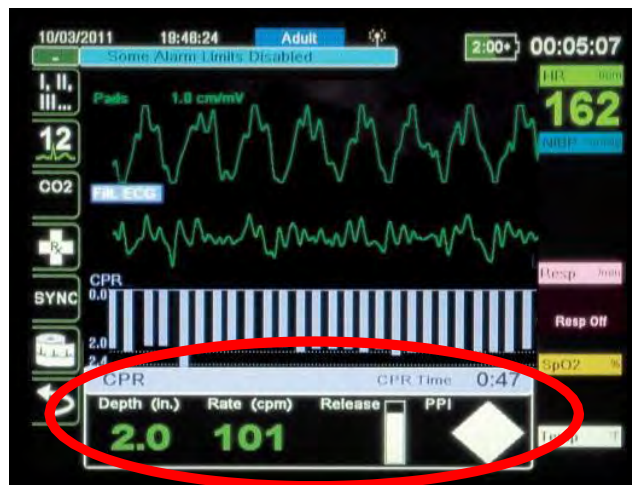


Figure 3: CPR Dashboard for Zoll X Series

- ❖ Important Note: ideal compressions are “green-green-full-full” i.e., compression depth and rate are within recommended range and displayed in green. The chest recoil release bar and the perfusion performance indicator (PPI) diamond are full.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

7. Once the AED or monitor/defibrillator is attached, analyze the rhythm, and defibrillate as indicated.
8. If utilizing an AED, follow the audio instructions. [See AED Procedure.](#)
 - If “shock advised” by the AED:
 - Clear all people from the patient and defibrillate.
 - Immediately resume CPR for 2 minutes before another pulse check and rhythm analysis is performed.
 - Continue providing CPR and following AED instructions until ALS care arrives.
 - If “no shock advised” by the AED:
 - Immediately resume CPR for 2 minutes before another pulse check and rhythm analysis is performed.
 - Continue providing CPR and following AED instructions until ALS care arrives.
 - If ROSC is achieved and the patient later re-arrests, immediately resume CPR and ensure the AED is On with the pads attached to the patient. Follow AED prompts.
9. Continue resuscitation in 2-minute cycles of CPR, brief (< 10 second) pulse/rhythm checks and defibrillation (if indicated) until ROSC occurs, termination of resuscitation criteria are met, or transport is complete.
10. Open airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen Protocol.](#)
 - Ventilate SLOWLY with each breath delivered over 1 second.
 - Deliver only enough tidal volume to produce visible chest rise.
 - Avoid excessive ventilation rates and tidal volumes.
 - Monitor ETCO₂ throughout patient care when available on scene.
11. Without an advanced airway in place, BVM ventilations shall be performed as follows:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
30:2 compression to ventilation ratio	15:2 compression to ventilation ratio when > 1 rescuer
	30:2 compression to ventilation ratio when only 1 rescuer



DC Fire and EMS Pre-Hospital Treatment Protocols

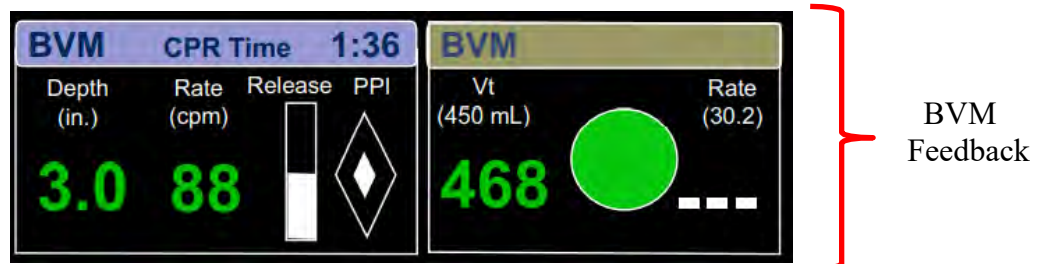
Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

12. Once an advanced airway (e.g., endotracheal tube or iGel) is in place, continuous chest compressions shall be provided, and ventilations shall occur at the following rate:

<i>Adult</i>	<i>Pediatric</i>
10 breaths/minute (1 breath every 6 seconds)	20-30 breaths/minute (1 breath every 2-3 seconds)

13. When utilizing the Zoll X Series monitor, use the Real BVM Help display to guide ventilation rate and volume:



- ❖ Important: ensure the member providing ventilations can see the BVM feedback display to avoid hyperventilation.
14. When a mechanical compression device (e.g., LUCAS) becomes available, the device can be utilized as the primary means of providing chest compressions with the following mandates:
- The LUCAS shall NOT be placed until all Pit Crew positions are in place, first rhythm analysis has occurred, and at least two cycles of manual CPR have been performed.
 - Providers shall attach the mechanical CPR device to the patient in a coordinated multi-step fashion to limit any interruptions in CPR to less than 10 seconds.
 - The LUCAS neck and wrist straps must be applied to prevent migration of suction cup and ineffective chest compressions.
 - The Zoll compression sensor shall be directly under the LUCAS mechanical CPR piston/suction cup.
15. If the cause of cardiac arrest is a traumatic etiology refer to the [Traumatic Cardiac Arrest Protocol](#).
16. If ROSC is achieved, assess patient, obtain a complete set of vital signs, and continue care per [ROSC Protocol](#).
17. At a suspected crime scene, disturb as little potential evidence as possible.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

18. Transport Destination:

- All patients in a refractory shockable rhythm (3 or more defibrillations) shall be transported immediately to an emergency ECMO capable facility.
- All adult patients in whom ROSC is achieved, regardless of cardiac arrest rhythm, shall be transported to a cardiac/STEMI receiving facility.
- All pediatric patients (< 18 years old) in whom ROSC is achieved shall be transported to Hospital 2 (Children's National Hospital).

19. If ROSC has not been achieved after 30 minutes of resuscitation in a medical cardiac arrest, consider termination of resuscitative efforts as detailed in the [Termination of Resuscitation Medical Cardiac Arrest Protocol](#).

20. Family-Centered care best practices during cardiac arrest:

- All EMT's and Paramedics are expected to act in accordance with the departments core values: Bravery, Accountability, Safety, Integrity, Compassion, Service.
- Whenever possible, family members should be given the option to be present during the resuscitation. If the presence of family members is considered detrimental to the resuscitation, then they should be respectfully asked to leave.
- Identify a provider to interact with family members on scene during the resuscitation to keep the family updated and answer their questions.
- Use language interpreter services as needed.
- Make eye contact when speaking to family members. Identify yourself by name and rank. Nod in understanding when family is speaking. Use courtesy titles for family members (e.g., Mr. Ms.)
- Explain equipment and procedures (e.g., intubation, LUCAS device) in clear, factual terms. Do not assume that family members cannot understand explanations.
- Watch for verbal and non-verbal cues from family members about the amount of information they want and whether they understand what you are telling them.
- When asked by a family member if the patient will survive, know that it is acceptable to say "I don't know" but follow that answer with "we will do everything we can to reach the best possible outcome for your husband, daughter, etc.")
- Acknowledge feelings of family members, demonstrate empathy, and offer support. (e.g., "I cannot imagine what you have been through today, how can I help you?")
- Allay family member's guilt by calling attention to something the family has done right. (e.g., "I know it was scary. You were doing excellent CPR when we arrived. You were right to call 911.")
- Avoid confrontations with other health care providers in the presence of patients or family members.
- Ensure family knows what hospital their family member is being transported too.
- Provide those family members who will drive themselves to the hospital with directions including a reminder to drive safely and to obey traffic laws.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

- If patient is transported, record family member name and phone number to provide to hospital staff.

21. Documentation of cardiac arrest care:

- All AED and monitor/defibrillator data shall be transmitted to RescueNet immediately upon completion of the cardiac arrest.
- All treatments and procedures performed shall be documented in the EPCR utilizing the correct data drop down fields.
- The name of the provider performing each treatment and procedure shall be accurately documented utilizing the data drop down fields.
- In addition to the documentation of the treating/transporting unit, the first arriving company shall document the mandatory CARES data in their EPCR. (e.g., witnessed arrest, presence of bystander CPR on arrival, AED shock advised)

ADVANCED LIFE SUPPORT PROVIDERS

- 1 Establish large gauge IV access as the preferred route for medication and fluid administration during cardiac arrest.
 - If peripheral IV access is unsuccessful, then obtain IO access.
 - IO placement in the humerus (preferred in adults) or tibia can be the first venous access procedure only if insertion of an IV would disrupt CPR.
- 2 Initiate crystalloid fluid (e.g., normal saline) at a rate of KVO.
- 3 Operation of the Zoll X series may be conducted in either manual or AED mode.
 - Operating the Zoll X series in AED mode can decrease the cognitive load on the lead paramedic, provides a countdown timer for pulse checks, and may expedite rhythm analysis and defibrillation if indicated.
 - If operating the Zoll X series in manual mode, utilize the See-Thru CPR technology to expedite rhythm analysis and defibrillation if indicated.
- 4 Initiate cardiac rhythm specific patient care:
 - [See Pulseless Electrical Activity/Asystole protocol.](#)
 - [See Ventricular Fibrillation and Pulseless Ventricular Tachycardia protocol.](#)
 - [See Refractory Ventricular Fibrillation and Pulseless Ventricular Tachycardia protocol.](#)
- 5 Use Handtevy for pediatric medication dosing.
- 6 Each medication given through an IV/IO should be followed by a 10 mL flush.



- 7 Reassess effectiveness of initial BLS airway interventions and plan for continued airway management. The best airway management strategy during cardiac arrest has not been defined and many options for airway management exist. Regardless of the option selected, **airway management should not interfere with chest compressions and defibrillation.**

Options for continued airway management include:

- BVM ventilation with an oral pharyngeal airway in place
 - Advanced airway placement
 - [Endotracheal intubation via video laryngoscopy.](#)
 - [Supraglottic airway placement \(i.e., iGel\).](#)
- 8 The correct placement of advanced airway devices and the effectiveness of all airway management strategies (including BVM ventilation) must be confirmed and continuously monitored using quantitative waveform capnography (ETCO₂).
- 9 In addition to confirming airway placement, ETCO₂ can help guide resuscitation:
- An abrupt and sustained increase in ETCO₂ (typically more than 10 mmHg) may indicate ROSC at the next pulse check.
 - Depending on how long resuscitation efforts have been ongoing, ETCO₂ < 10 mmHg should prompt:
 - Re-evaluation that the advanced airway is correctly placed.
 - Confirm performance of high-quality chest compressions. Ensure LUCAS device suction cup has not accidentally migrated from its target location.
 - Consideration that future treatment is futile.
- D If the patient experiences CPR induced consciousness/awareness or exhibits signs of pain during chest compressions but ROSC has not been achieved, administer ketamine per [Procedural Dissociation protocol.](#)

MEDICAL CONTROL OPTIONS

1. Consider termination of resuscitation per [Termination of Resuscitation Medical Cardiac Arrest protocol.](#)

General Notes:

- CPR is the single-most important intervention for a patient in cardiac arrest. High quality, uninterrupted chest compressions are the most critical component of CPR and should be provided as soon as possible.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

- 40-60% of victims of out of hospital cardiac arrest (OHCA) have agonal breathing on presentation. Agonal breathing is a common reason to misdiagnose a patient as not being in cardiac arrest.
- Healthcare providers often take too long to check for a pulse and have difficulty determining if a pulse is present or absent. Thus, providers are directed to quickly check for a pulse and to promptly start compressions when a pulse is not definitely palpated.
- Initiation of chest compressions in patients who are unconscious but not in cardiac arrest is associated with low rates of significant adverse events. This contrasts with the significant risk of withholding CPR when a patient is in cardiac arrest. **When in doubt, start chest compressions.**
- The five components of high-quality CPR are:
 - 1) Ensuring chest compressions of adequate rate
 - 2) Ensuring chest compression of adequate depth
 - 3) Allowing full chest recoil between compressions
 - 4) Minimizing interruptions in chest compressions
 - 5) Avoiding excessive ventilation.
- A 2020 ILCOR systematic review comparing IV versus IO (principally pretibial placement) drug administration during cardiac arrest found the IV route was associated with better clinical outcomes compared with IO in 5 retrospective studies. Further research is needed; however, the AHA notes it is reasonable to first attempt establishing IV access for drug administration in cardiac arrest.
- The routine use of cricoid pressure in cardiac arrest is not recommended. There is no evidence that cricoid pressure facilitates ventilation or reduces the risk of aspiration in cardiac arrest patients. Cricoid pressure may impede ventilation and the placement of supraglottic airways or intubation and increase the risk of airway trauma during intubation.
- Published literature demonstrates that the use of a mechanical CPR device does not result in improved survival with good neurological outcomes compared to high-quality traditional chest compressions.
- Excessive ventilation (tidal volume and or ventilation rate) is unnecessary and can result in decreased cardiac arrest survival. Excessive ventilation can cause gastric inflation, regurgitation, and aspiration. It can also be harmful by increasing intrathoracic pressure,



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

decreasing venous return of blood to the heart, diminishing cardiac output and coronary perfusion.

- Anterior/Posterior pad placement is preferred for defibrillation as preliminary evidence suggests this configuration is superior to anterior/lateral pad placement in shock resistant cardiac arrests. In addition, initial anterior/posterior pad placement at the start of a cardiac arrest allows for easier deployment of double sequential defibrillation if indicated under the refractory VF/pVT protocol.
- Utilize Handtevy for pediatric medication dosing. Recommend consulting and preparing the Handtevy application enroute to the incident.
- When using an AED on infants and children < 8 years old, use of reduced energy pediatric specific pads is recommended. If a manual defibrillator nor an AED equipped with reduced energy pediatric specific pads is available, an AED without the reduced energy pads may be used.
- Cuffed endotracheal tubes (ETTs) should be used instead of uncuffed ETTs for intubating infants and children. Cuffed ETTs improve capnography accuracy, reduce the need for ETT exchanges (resulting in high-risk reintubations), reduce the risk of aspiration, and improve pressure and tidal volume delivery.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

DC Fire and EMS CPR in Progress Checklist	
Task	Done
Team lead identified with recap done.	
Scene characteristics optimized for resuscitation.	
Emphasis on high quality compressions: RATE, DEPTH, RECOIL.	
Monitor is visible to compressor, ventilator, and team lead.	
Compressor and ventilator managing their own performance using monitor feedback information.	
Emphasis on every two-minute pulse check/rhythm analysis with pre-charged monitor or utilize AED mode.	
Spare oxygen cylinder with regulator affixed ready for use.	
ETCO ₂ waveform in use on BVM, i-gel, or endotracheal tube.	
Team leader monitoring femoral pulse with compressions prior to pausing CPR. Maintain view of monitor.	
Avoid excessive ventilatory volumes, use real BVM help.	
Treat per rhythm specific protocol. 3 or more shocks, See ECMO checklist.	
Family support is being provided.	
At least two cycles of manual compressions completed before LUCAS applied.	
LUCAS NECK STRAP IN PLACE with CPR sensor under piston.	
NG tube placement once advanced airway in place.	
Consider starting second point of vascular access.	
If CPR induced pain or agitation, treat per procedural dissociation protocol.	
Reversible Causes - treat suspected etiology of arrest	
Hypovolemia	
Hypoxia	
Hydrogen Ion (acidosis)	
Hyperkalemia/ Hypokalemia	
Hypothermia	
Toxicology	
Thrombosis (ACS/PE)	
Tension Pneumothorax	



DC Fire and EMS Pre-Hospital Treatment Protocols

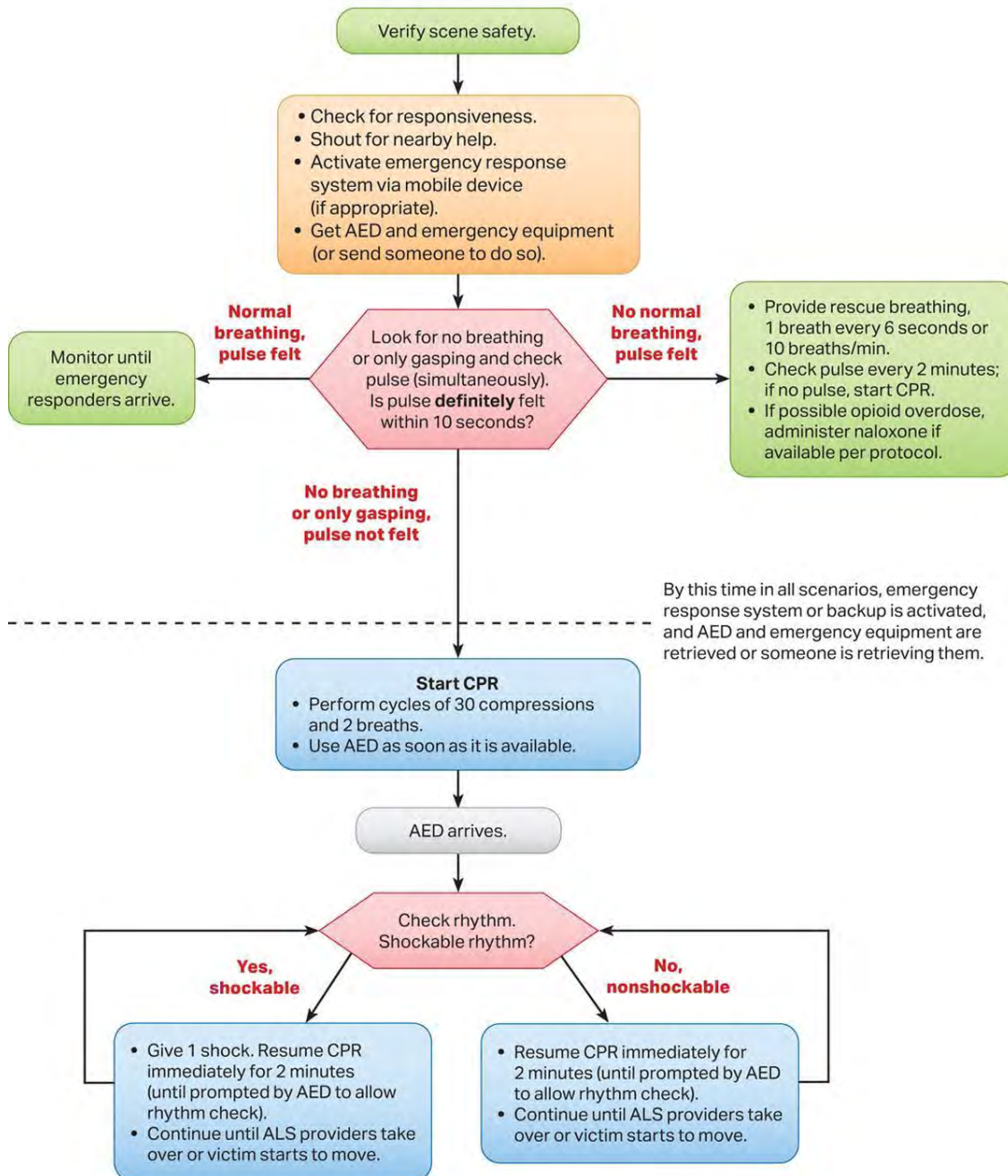
Treatment Protocols - Resuscitation

Cardiac Arrest 4.1

DC Fire and EMS Resuscitation Family Care Checklist	
Task	Done
All EMT's and Paramedics are expected to act in accordance with the departments core values: Bravery, Accountability, Safety, Integrity, Compassion, Service.	
Whenever possible, family members should be given the option to be present during the resuscitation.	
Identify a provider to interact with family members on scene during the resuscitation to keep the family updated and answer their questions.	
Use language interpreter services as needed.	
Make eye contact when speaking to family members. Identify yourself by name and rank.	
Nod in understanding when family is speaking. Use courtesy titles for family members (e.g., Mr. Ms.)	
Explain equipment and procedures (e.g., intubation, LUCAS device) in clear, factual terms. Do not assume that family members cannot understand explanations.	
Watch for verbal and non-verbal cues from family members about the amount of information they want and whether they understand what you are telling them.	
When asked by a family member if the patient will survive, know that it is acceptable to say "I don't know" but follow that answer with "we will do everything we can to reach the best possible outcome for your husband, daughter, etc."	
Acknowledge feelings of family members, demonstrate empathy, and offer support. (e.g., <i>"I cannot imagine what you have been through today, how can I help you?"</i>)	
Allay family member's guilt by calling attention to something the family has done right. (e.g., <i>"I know it was scary. You were doing excellent CPR when we arrived. You were right to call 911."</i>)	
Avoid confrontations with other health care providers in the presence of patients or family members.	
Ensure family knows what hospital their family member is being transported too.	
Provide those family members who will drive themselves to the hospital with directions including a reminder to drive safely and to obey traffic laws.	
If patient is transported, record family member name and phone number to provide to hospital staff.	



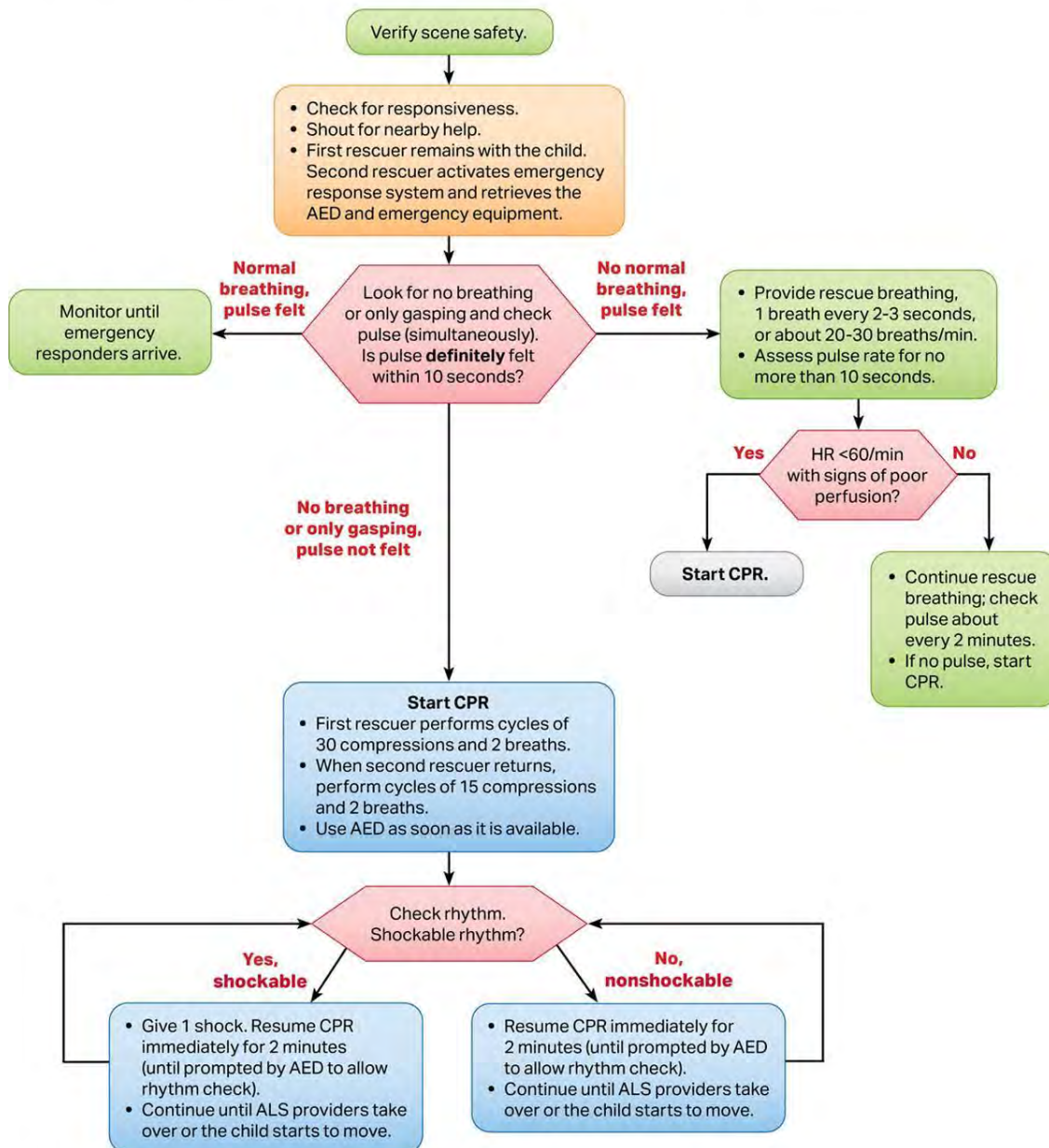
Adult Basic Life Support Algorithm for Healthcare Providers



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Pediatric Basic Life Support Algorithm for Healthcare Providers—2 or More Rescuers



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DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Pulseless Electrical Activity (PEA) / Asystole

4.2

This protocol applies to all patients, except newborns, experiencing a non-traumatic cardiac arrest. For pediatric patients ≥ 14 years old, the adult medication / resuscitation guidelines should be followed. If the patient meets the criteria for being dead on arrival (PDOA), resuscitative efforts shall not be attempted, and notification of law enforcement shall be made.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is unconscious/unresponsive
- Patient is apneic or has abnormal breathing (i.e., only gasping)
- Patient has no pulse
 - Pulse check shall occur at the carotid or femoral artery
 - Pulse should only be checked for a maximum of 10 seconds, if no definite pulse is felt, assume the patient is in cardiac arrest and start CPR
- AED findings: No shock advised
- EKG findings: Organized cardiac rhythm with QRS complexes indicating PEA, or electrical flatline indicating asystole

Exclusion Criteria:

- Patient is responsive
- Patient has a palpable pulse
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) Protocol](#).
- Patient meets PDOA criteria. [See Person Dead on Arrival Protocol](#).
- Patient is a newborn. [See Newborn Resuscitation Protocol](#).
- Patient is in cardiac arrest due to traumatic etiology. [See Traumatic Cardiac Arrest Protocol](#).

Treatment and Interventions:

- 1 Initiate and continue patient care as described in the [Cardiac Arrest Protocol](#).
- 2 Ensure high-quality uninterrupted CPR is performed throughout the entire cardiac arrest.
- 3 Hypoxia is a main cause of PEA. Effectiveness of oxygenation and ventilation should be evaluated and frequently reassessed.



ADVANCED LIFE SUPPORT PROVIDERS

- 1 Administer **first dose of epinephrine IV/IO as soon as possible** during a PEA/asystole cardiac arrest.
 - ❖ Important note: first dose of epinephrine should be given as soon as possible during PEA/asystole cardiac arrest, but this is distinctly different from a VF/pVT cardiac arrests where epinephrine should not be given until after the second defibrillation attempt.
- 2 Administer additional doses of epinephrine IV/IO every 3-5 minutes throughout the cardiac arrest.

<i>Adult</i>	<i>Pediatric</i>
Epinephrine 1 mg IV/IO	Epinephrine 0.01 mg/kg IV/IO Max dose 1mg

- 3 Consider the potential causes of cardiac arrest and provide appropriate treatment as indicated:

<i>Cause</i>	<i>Treatment</i>
Hypovolemia	Normal Saline Boluses <ul style="list-style-type: none">• Adult: 1-2 L IV/IO as needed. Maximum total 2 L• Pediatric: 20 ml/kg IV/IO as needed. May repeat to a maximum of three boluses as needed
Hypoxia	Oxygenate with 100% Oxygen
Hyperkalemia	Calcium <ul style="list-style-type: none">• Adult: Calcium Chloride 10% 10 ml (1 g) IV/IO• Pediatric: 20 mg/kg IV/IO Sodium Bicarbonate <ul style="list-style-type: none">• Adult: Sodium Bicarbonate 1 mEq/kg IV/IO• Pediatric: Sodium Bicarbonate 1 mEq/kg IV/IO
Hypoglycemia	D10 IV/IO. See Hypoglycemia Protocol.
Hypothermia	Prevent further heat loss. Move to warm environment. Remove wet clothing and dry skin. Initiate prehospital rewarming.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Pulseless Electrical Activity (PEA) / Asystole

4.2

	Handle patient gently. See Special Circumstances in Cardiac Arrest Protocol.
Hydron Ion (acidosis)	Normal Saline boluses and appropriate ventilation via airway management
Tension Pneumothorax	See Needle Thoracostomy Procedure.
Cardiac Tamponade	Normal Saline Boluses and rapid transport. In-hospital pericardiocentesis
Thrombosis (e.g., STEMI or Massive PE)	In-hospital management
Trauma	Control hemorrhage and refer to trauma protocols
Toxins	See Overdose/Poisoning Protocol.

- 4 Routine use of sodium bicarbonate for treatment of cardiac arrest is NOT recommended. **Sodium bicarbonate should NOT be administered for “prolonged down time.”**
Administer Sodium Bicarbonate 1 mEq/kg IV/IO push only if the patient is believed to have suffered cardiac arrest from:
 - Hyperkalemia
 - Tricyclic Anti-Depressant Overdose
 - Excited Delirium
- 5 Routine use of calcium for treatment of cardiac arrest is NOT recommended. However, calcium should be considered in dialysis patients and those known or suspected to be hyperkalemic.
- 6 Routine use of magnesium for treatment of cardiac arrest is NOT recommended.
- 7 Routine use of Narcan for treatment of cardiac arrest is NOT recommended.
 - Once an opioid overdose has deteriorated to cardiac arrest, standard ACLS management should be initiated with a focus on high quality CPR and effective airway management.
- 8 If ROSC is achieved, continue care per [ROSC Protocol](#).
- 9 Transport Destination:
 - All adult patients in whom ROSC is achieved, regardless of cardiac arrest rhythm, shall be transported to a cardiac/STEMI receiving facility.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Pulseless Electrical Activity (PEA) / Asystole

4.2

- All pediatric patients in whom ROSC is achieved shall be transported to Hospital 2 (Children's National Hospital).
- D If ROSC has not been achieved after 30 minutes, consider termination of resuscitative efforts as detailed in the [Termination of Resuscitation Medical Cardiac Arrest Protocol](#).

MEDICAL CONTROL OPTIONS

1. Consider termination of resuscitation per Termination of Resuscitation Protocol

General notes:

- Multiple studies have found an association between earlier epinephrine administration and ROSC for patients with nonshockable rhythms (i.e., asystole or PEA) This contrasts with shockable rhythms where the literature supports giving epinephrine only if initial CPR and defibrillation attempts are unsuccessful in achieving ROSC.



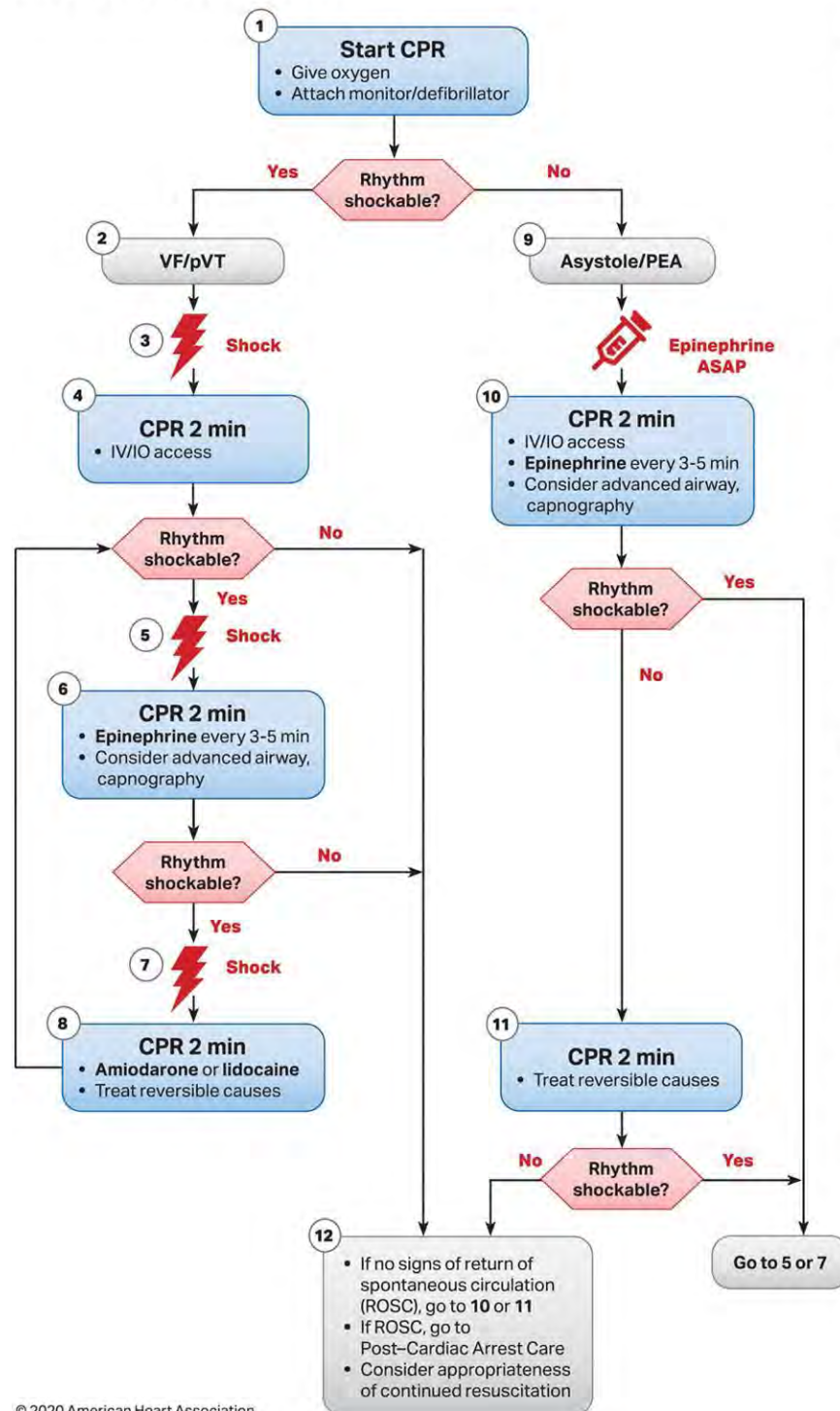
DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Pulseless Electrical Activity (PEA) / Asystole

4.2

Adult Cardiac Arrest Algorithm

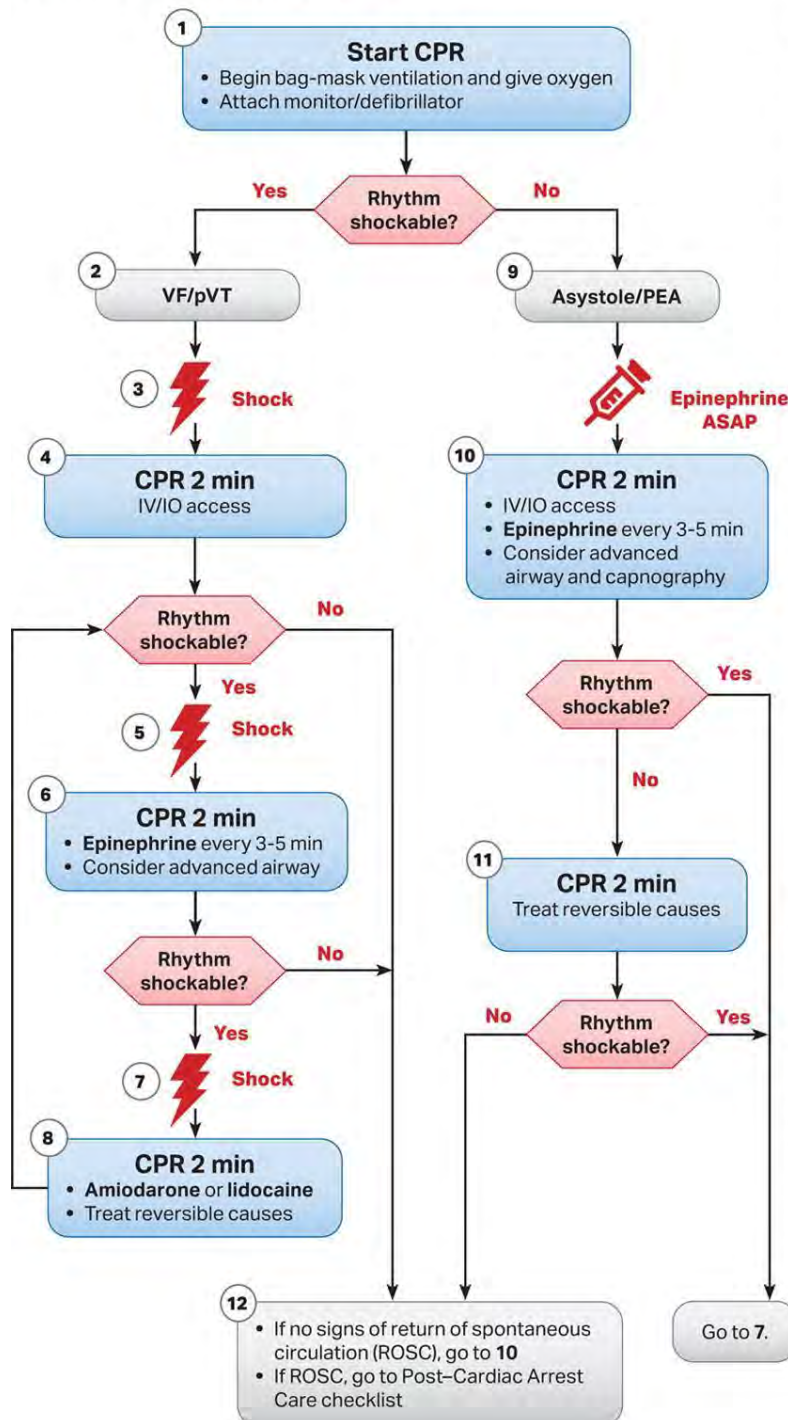


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CPR Quality
<ul style="list-style-type: none">• Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil.• Minimize interruptions in compressions.• Avoid excessive ventilation.• Change compressor every 2 minutes, or sooner if fatigued.• If no advanced airway, 30:2 compression-ventilation ratio.• Quantitative waveform capnography<ul style="list-style-type: none">– If PETCO₂ is low or decreasing, reassess CPR quality.
Shock Energy for Defibrillation
<ul style="list-style-type: none">• Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered.• Monophasic: 360 J
Drug Therapy
<ul style="list-style-type: none">• Epinephrine IV/IO dose: 1 mg every 3-5 minutes• Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg.• Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
Advanced Airway
<ul style="list-style-type: none">• 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)
<ul style="list-style-type: none">• Pulse and blood pressure• Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg)• Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
<ul style="list-style-type: none">• Hypovolemia• Hypoxia• Hydrogen ion (acidosis)• Hypo-/hyperkalemia• Hypothermia• Tension pneumothorax• Tamponade, cardiac• Toxins• Thrombosis, pulmonary• Thrombosis, coronary



Pediatric Cardiac Arrest Algorithm



CPR Quality

- Push hard ($\geq \frac{1}{2}$ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

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 IV/IO dose:** 0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration). Max dose 1 mg. Repeat every 3-5 minutes. If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:** 5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT or
- **Lidocaine IV/IO dose:** Initial: 1 mg/kg loading dose

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia 4.3

This protocol applies to all patients, except newborns, experiencing a non-traumatic cardiac arrest. For pediatric patients ≥ 14 years old, the adult medication / resuscitation guidelines should be followed. If the patient meets the criteria for being dead on arrival (PDOA), resuscitative efforts shall not be attempted, and notification of law enforcement shall be made.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is unconscious/unresponsive
- Patient is apneic or has abnormal breathing (i.e., only gasping)
- Patient has no pulse
 - Pulse check shall occur at the carotid or femoral artery
 - Pulse should only be checked for a maximum of 10 seconds, if no definite pulse is felt, assume the patient is in cardiac arrest and start CPR)
- AED findings: Shock advised
- EKG findings: Ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT)

Exclusion Criteria:

- Patient is responsive
- Patient has a palpable pulse
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) Protocol.](#)
- Patient meets PDOA criteria. [See Person Dead on Arrival Protocol.](#)
- Patient is a newborn. [See Newborn Resuscitation Protocol.](#)

Treatment and Interventions:

- 1 Initiate and continue patient care as described in the [Cardiac Arrest Protocol.](#)
- 2 Ensure high-quality uninterrupted CPR is performed throughout the entire cardiac arrest.
- 3 Along with high-quality CPR, early defibrillation is critical to survival when sudden cardiac arrest is caused by VF or pVT.

ADVANCED LIFE SUPPORT PROVIDERS

1. If rhythm is VF/pVT at pulse check/rhythm analysis and the monitor is already precharged, defibrillate immediately.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia

4.3

- If the monitor is not already precharged, resume chest compressions after the pulse check/rhythm analysis while charging the monitor/defibrillator.

<i>Defibrillation #1</i>	
<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
120 J	2 J/kg

2. After each defibrillation immediately resume CPR. Continue CPR for 2 minutes before another pulse or rhythm check is performed. Do NOT check for a pulse immediately after defibrillation.
3. Recheck rhythm after each 2-minute cycle of CPR is complete and defibrillate if indicated.

<i>Defibrillation #2</i>	
<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
150 J	4 J/kg

4. Administer first dose of epinephrine IV/IO after the second defibrillation attempt.
 - Do NOT give epinephrine prior to the second defibrillation attempt.
 - Administer epinephrine every 3-5 minutes IV/IO up to a maximum of 3 doses.
 - Do NOT give more than 3 doses of epinephrine to a patient in refractory or recurrent VF/pVT

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Epinephrine 1 mg IV/IO	Epinephrine 0.01 mg/kg IV/IO Max dose 1mg

5. After a total of 2 defibrillations (AED and or monitor/defibrillator) begin to prepare the patient for possible transport to ECMO capable facility.
6. Recheck rhythm after each 2-minute cycle of CPR is complete and defibrillate if indicated.

<i>Defibrillation #3</i>	
<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
200 J	4 J/kg



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia 4.3

7. **After a total of 3 defibrillations in adult patients (AED and or monitor/defibrillator) proceed immediately to the Refractory VF Protocol and transport to ECMO capable facility.**
8. Administer first dose of Amiodarone IV/IO after the third defibrillation attempt.
9. Administer a second dose of Amiodarone IV/IO in 3-5 minutes if still in VF/pVT.

<u>Adult</u>	<u>Pediatric</u>
Amiodarone <u>Initial dose: 300 mg IV/IO</u> <u>Second dose: 150 mg IV/IO</u>	Amiodarone <u>Initial dose: 5 mg/kg IV/IO</u> Max single dose 300 mg <u>Additional doses: 5 mg/kg IV/IO</u> May repeat to a maximum total of 3 doses or 15 mg/kg

10. Administer Magnesium Sulfate IV/IO for suspected polymorphic ventricular tachycardia (Torsades de Pointes). Routine use of magnesium for treatment of cardiac arrest is NOT recommended.

<u>Adult</u>	<u>Pediatric</u>
Magnesium Sulfate <u>Dose: 2 gm slow IV/IO.</u> Mix 2 gm in 10 ml of NS and administer over 2 minutes	Magnesium Sulfate <u>Dose: 50 mg/kg IV/IO, up to a maximum single dose of 2 gm.</u> Mix 2 gm in 10 ml of NS and administer over 2 minutes

11. Consider the potential causes of cardiac arrest and provide appropriate treatment as indicated:

<u>Cause</u>	<u>Treatment</u>
Hypovolemia	Normal Saline Boluses <ul style="list-style-type: none">• Adult: 1-2 L IV/IO as needed. Maximum total 2 L• Pediatric: 20 ml/kg IV/IO as needed. May repeat to a maximum of three boluses as needed
Hypoxia	Oxygenate with 100% Oxygen



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia

4.3

Hyperkalemia	Calcium <ul style="list-style-type: none">• Adult: Calcium Chloride 10% 10 ml (1 g) IV/IO• Pediatric: 20 mg/kg IV/IO Sodium Bicarbonate <ul style="list-style-type: none">• Adult: Sodium Bicarbonate 1 mEq/kg IV/IO• Pediatric: Sodium Bicarbonate 1 mEq/kg IV/IO
Hypoglycemia	D10 IV/IO. See Hypoglycemia Protocol.
Hypothermia	Prevent further heat loss. Move to warm environment. Remove wet clothing and dry skin. Initiate prehospital rewarming. Handle patient gently. See Special Circumstances in Cardiac Arrest Protocol.
Hydron Ion (acidosis)	Normal Saline boluses and appropriate ventilation via airway management
Tension Pneumothorax	See Needle Thoracostomy Procedure.
Cardiac Tamponade	Normal Saline boluses and rapid transport. In-hospital pericardiocentesis
Thrombosis (e.g., STEMI or Massive PE)	In-hospital management
Trauma	Control hemorrhage and refer to trauma protocols
Toxins	See Overdose/Poisoning Protocol.

12. Routine use of sodium bicarbonate for treatment of cardiac arrest is NOT recommended.

Sodium bicarbonate should NOT be administered for “prolonged down time.”

Administer Sodium Bicarbonate 1 mEq/kg IV/IO push only if the patient is believed to have suffered cardiac arrest from:

- Hyperkalemia
- Tricyclic Anti-Depressant Overdose
- Excited Delirium

13. Routine use of calcium for treatment of cardiac arrest is NOT recommended. However, calcium should be considered in dialysis patients and those known to be hyperkalemic.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia

4.3

14. Routine use of Narcan for treatment of cardiac arrest is NOT recommended.
 - Once an opioid overdose has deteriorated to cardiac arrest, standard ACLS management should be initiated with a focus on high quality CPR and effective airway management.
15. If ROSC is achieved, continue care per [ROSC Protocol](#).
16. Transport Destination:
 - All patients in a refractory shockable rhythm (3 or more defibrillations) shall be transported immediately to an emergency ECMO capable facility.
 - All adult patients in whom ROSC is achieved, regardless of cardiac arrest rhythm, shall be transported to a cardiac/STEMI receiving facility.
 - All pediatric patients (< 18 years old) in whom ROSC is achieved shall be transported to Hospital 2 (Children's National Hospital).
17. Termination of Resuscitation should NOT occur during use of this protocol. [See Termination of Resuscitation Medical Cardiac Arrest Protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact medical control with any questions regarding management options.

General Notes:

- Along with CPR, early defibrillation is critical to survival when sudden cardiac arrest is caused by VF or pVT. Defibrillation is most successful when administered as soon as possible after onset of VF/VT
- The defibrillation energy setting should be based on the defibrillator's manufacturer specification.
- Anterior/Posterior pad placement is preferred for defibrillation as preliminary evidence suggests this configuration is superior to anterior/lateral pad placement in shock resistant cardiac arrests. In addition, initial anterior/posterior pad placement at the start of a cardiac arrest allows for easier deployment of double sequential defibrillation if indicated under the refractory VF/pVT protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia 4.3

- Particular attention should be paid to minimizing interruptions in chest compressions while charging the monitor/defibrillator. Two approaches are reasonable: either charging the defibrillator before a rhythm check or resuming chest compressions briefly after a rhythm check while the defibrillator charges.
- Immediately resume CPR after every defibrillation. Even when successful, defibrillation is often followed by a variable (and sometimes protracted) period of asystole or PEA during which providing CPR while waiting a return of rhythm and pulse is critical.
- Multiple studies have found an association between earlier epinephrine and ROSC for patients with nonshockable rhythms (i.e., asystole or PEA) This is in contrast to shockable rhythms where the literature supports giving epinephrine only if initial CPR and defibrillation attempts are unsuccessful in achieving ROSC.



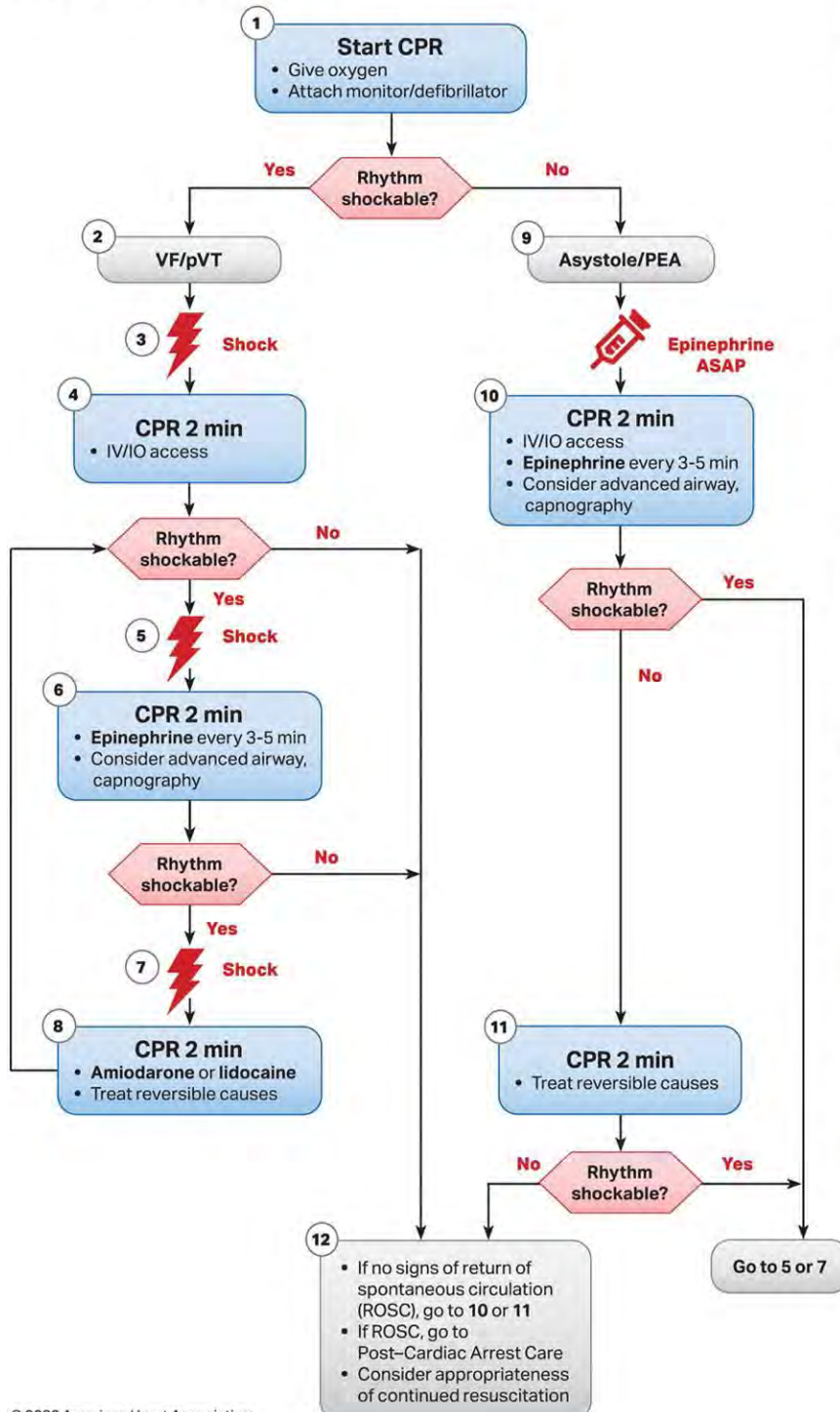
DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Ventricular Fibrillation / Pulseless Ventricular Tachycardia

4.3

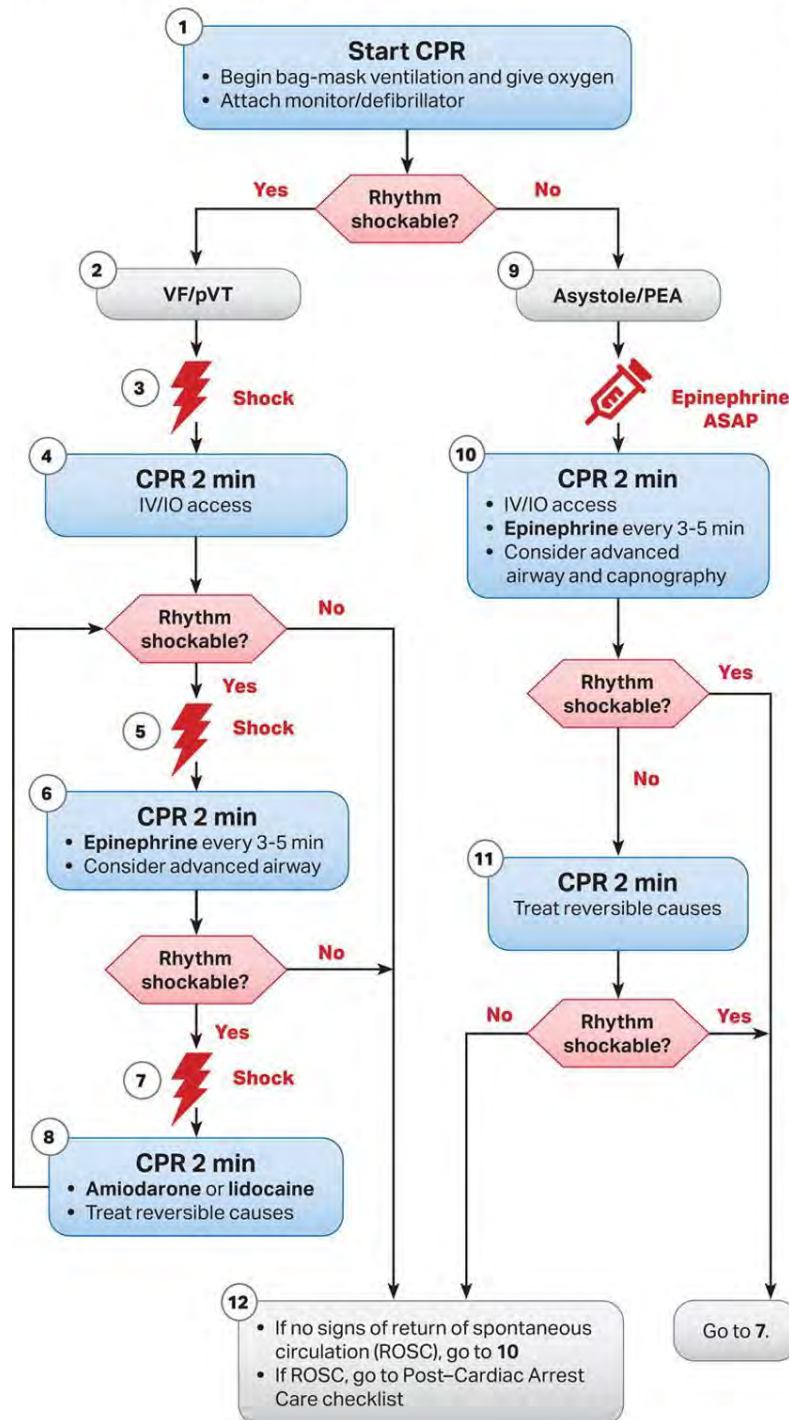
Adult Cardiac Arrest Algorithm



CPR Quality
<ul style="list-style-type: none"> • Push hard (at least 2 inches [5 cm]) and fast (100-120/min) and allow complete chest recoil. • Minimize interruptions in compressions. • Avoid excessive ventilation. • Change compressor every 2 minutes, or sooner if fatigued. • If no advanced airway, 30:2 compression-ventilation ratio. • Quantitative waveform capnography <ul style="list-style-type: none"> – If PETCO₂ is low or decreasing, reassess CPR quality.
Shock Energy for Defibrillation
<ul style="list-style-type: none"> • Biphasic: Manufacturer recommendation (eg, initial dose of 120-200 J); if unknown, use maximum available. Second and subsequent doses should be equivalent, and higher doses may be considered. • Monophasic: 360 J
Drug Therapy
<ul style="list-style-type: none"> • Epinephrine IV/IO dose: 1 mg every 3-5 minutes • Amiodarone IV/IO dose: First dose: 300 mg bolus. Second dose: 150 mg. or • Lidocaine IV/IO dose: First dose: 1-1.5 mg/kg. Second dose: 0.5-0.75 mg/kg.
Advanced Airway
<ul style="list-style-type: none"> • 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)
<ul style="list-style-type: none"> • Pulse and blood pressure • Abrupt sustained increase in PETCO₂ (typically ≥40 mm Hg) • Spontaneous arterial pressure waves with intra-arterial monitoring
Reversible Causes
<ul style="list-style-type: none"> • Hypovolemia • Hypoxia • Hydrogen ion (acidosis) • Hypo-/hyperkalemia • Hypothermia • Tension pneumothorax • Tamponade, cardiac • Toxins • Thrombosis, pulmonary • Thrombosis, coronary

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Pediatric Cardiac Arrest Algorithm



CPR Quality

- Push hard ($\geq \frac{1}{3}$ of anteroposterior diameter of chest) and fast (100-120/min) and allow complete chest recoil
- Minimize interruptions in compressions
- Change compressor every 2 minutes, or sooner if fatigued
- If no advanced airway, 15:2 compression-ventilation ratio
- If advanced airway, provide continuous compressions and give a breath every 2-3 seconds

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 IV/IO dose:**
0.01 mg/kg (0.1 mL/kg of the 0.1 mg/mL concentration).
Max dose 1 mg.
Repeat every 3-5 minutes.
If no IV/IO access, may give endotracheal dose: 0.1 mg/kg (0.1 mL/kg of the 1 mg/mL concentration).
- **Amiodarone IV/IO dose:**
5 mg/kg bolus during cardiac arrest. May repeat up to 3 total doses for refractory VF/pulseless VT
or
Lidocaine IV/IO dose:
Initial: 1 mg/kg loading dose

Advanced Airway

- Endotracheal intubation or supraglottic advanced airway
- Waveform capnography or capnometry to confirm and monitor ET tube placement

Reversible Causes

- Hypovolemia
- Hypoxia
- Hydrogen ion (acidosis)
- Hypoglycemia
- Hypo-/hyperkalemia
- Hypothermia
- Tension pneumothorax
- Tamponade, cardiac
- Toxins
- Thrombosis, pulmonary
- Thrombosis, coronary

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This protocol applies to all adult patients experiencing a non-traumatic cardiac arrest who are found to be in refractory ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT). Approximately 1/3 of patients who suffer out-of-hospital cardiac arrest present to EMS with a shockable rhythm. Despite being the minority of all cardiac arrests, > 80% of survivors come from this group of patients, making it the presenting cardiac arrest rhythm to be targeted for improvement in treatment and outcome.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult patient (age \geq 18 years old) in cardiac arrest per [Cardiac Arrest protocol](#).
- Patient has been defibrillated 3 times (AED and or monitor/defibrillator).
- Patient has received first dose of an antiarrhythmic medication (e.g., amiodarone)
- Patient is still in VF or pVT despite the above treatment.

Exclusion Criteria:

- Pediatric patient (age < 18 years old)
- Patient is not in cardiac arrest per [Cardiac Arrest Protocol](#).
- Patient is NOT in refractory VF or pVT.
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) Protocol](#).
- Patient meets PDOA criteria. [See Person Dead on Arrival Protocol](#).

Definition:

- **Refractory VF or pVT:** the failure to achieve sustained return of spontaneous circulation (ROSC) after treatment with 3 defibrillations and administration of an antiarrhythmic medication IV/IO. (e.g., amiodarone).

Pediatrics

- Refractory VF/pVT is extremely rare in children. Continue treatment per [VF/pVT protocol](#) and contact medical control during transport for further guidance.

Treatment and Interventions:

- 1 Continue patient care as described in the [Cardiac Arrest protocol](#).
- 2 Ensure high-quality uninterrupted CPR is performed throughout the entire cardiac arrest.
- 3 Ensure patient has received the treatment and interventions outlined in the [Ventricular Fibrillation and Pulseless Ventricular Tachycardia Protocol](#). This includes:



- Three defibrillations (AED or monitor/defibrillator).
- First dose of antiarrhythmic medication IV/IO.
- At least one but no more than three doses of epinephrine IV/IO.

ADVANCED LIFE SUPPORT PROVIDERS

1. Continue every 2-minute pulse and rhythm checks.
 - If rhythm is PEA/Asystole, [refer to PEA/Asystole protocol](#).
2. If rhythm continues as VF/pVT after three previous defibrillations:
 - Defibrillate again at monitor maximum 200 J
 - OR
 - If a second monitor/defibrillator is available on scene, perform [double sequential defibrillation \(DSD\)](#).
3. After defibrillation immediately resume CPR for 2 minutes before another pulse or rhythm check is done.
4. Recheck rhythm after each 2-minute cycle of CPR is complete and repeat defibrillation at maximum joules or perform [double sequential defibrillation](#) if indicated.
5. Once patient is identified as refractory VF/pVT the patient shall NOT receive any additional epinephrine.
6. Administer esmolol bolus IV/IO

Adult

Esmolol

Dose: **0.5 mg/kg bolus IV/IO over 1 minute**

7. If not already completed, administer a second dose of antiarrhythmic medication IV/IO.

Adult

Amiodarone

Initial dose: **300 mg IV/IO**

Second dose: **150 mg IV/IO in 5 minutes**



8. Administer Magnesium Sulfate IV/IO for suspected polymorphic Ventricular Tachycardia (Torsades de Pointes). Routine use of magnesium for treatment of cardiac arrest is NOT recommended.

Adult

Magnesium Sulfate

Dose: **2 gm slow IV/IO**

Mix 2 gm in 10 ml of NS and administer over 2 minutes

9. Routine use of sodium bicarbonate for treatment of cardiac arrest is NOT recommended. **Sodium bicarbonate should NOT be administered for “prolonged down time.”** Administer Sodium Bicarbonate 1mEq/kg IV/IO push only if the patient is believed to have suffered cardiac arrest from:
- Hyperkalemia
 - Tricyclic Anti-Depressant Overdose
 - Excited Delirium
10. Routine use of calcium for treatment of cardiac arrest is NOT recommended. However, calcium should be considered in dialysis patients and those known to be hyperkalemic.
11. Routine use of Narcan for treatment of cardiac arrest is NOT recommended.
- Once an opioid overdose has deteriorated to cardiac arrest, standard ACLS management should be initiated with a focus on high quality CPR and effective airway management.
12. Termination of Resuscitation for patients in refractory VF/pVT shall not occur in the prehospital setting.
13. **All patients with refractory VF/pVT shall be transported to the closest emergency ECMO center as indicated on the Hospital Capability Chart.** The goal is to have the patient arrive in the emergency department within 30 minutes of collapse.
- Preparation for transport shall occur after the second defibrillation.
 - Transport shall occur after the third defibrillation.
 - CPR via LUCAS device shall continue during transport.



14. Contact receiving hospital immediately after third defibrillation.
 - Provide estimated time of arrival.
 - Perform ECMO Candidate Checklist and notify Attending Physician as soon as possible if patient is an ECMO candidate.
 - If transporting a refractory VF patient, who meets the ECMO Candidate Checklist, to Washington Hospital Center (H13) call report directly to the Blue Team Attending at [202-877-5560](tel:202-877-5560)

MEDICAL CONTROL OPTIONS

1. Notify hospital based ECMO team prior to patient arrival in the emergency department.

General Notes:

- During prolonged resuscitation from a shockable rhythm cardiac arrest there is an increase in sympathetic tone through administration of multiple rounds of epinephrine. Epinephrine's mechanism of action increases myocardial oxygen demand, can worsen myocardial ischemia, and lowers the VF threshold thus potentially contributing to the occurrence of recurrent VF.
- Esmolol is an ultra-short acting, cardiac-selective beta blocker that decreases adrenergic stimulation of the heart, raises the VF threshold, and thus potentially facilitates conversion to sinus rhythm.
- Extracorporeal CPR (ECPR) refers to the initiation of cardiopulmonary bypass during the resuscitation of a patient in cardiac arrest. This involves the cannulation of a large vein and artery and initiation of venoarterial extracorporeal circulation and membrane oxygenation (ECMO). The goal of ECPR is to support vital organ perfusion while potentially reversible causes of cardiac arrest are addressed. (e.g., coronary artery occlusion, pulmonary embolism)
- ECMO is a complex hospital intervention that requires a highly trained team, specialized equipment, and multidisciplinary support. To be successful, the ECMO team needs to be notified of a possible ECMO candidate as soon as possible. Not every hospital in DC can provide this potentially life-saving treatment to patients. Refer to the Hospital Capability Chart for ECPR/ECMO capable facilities.

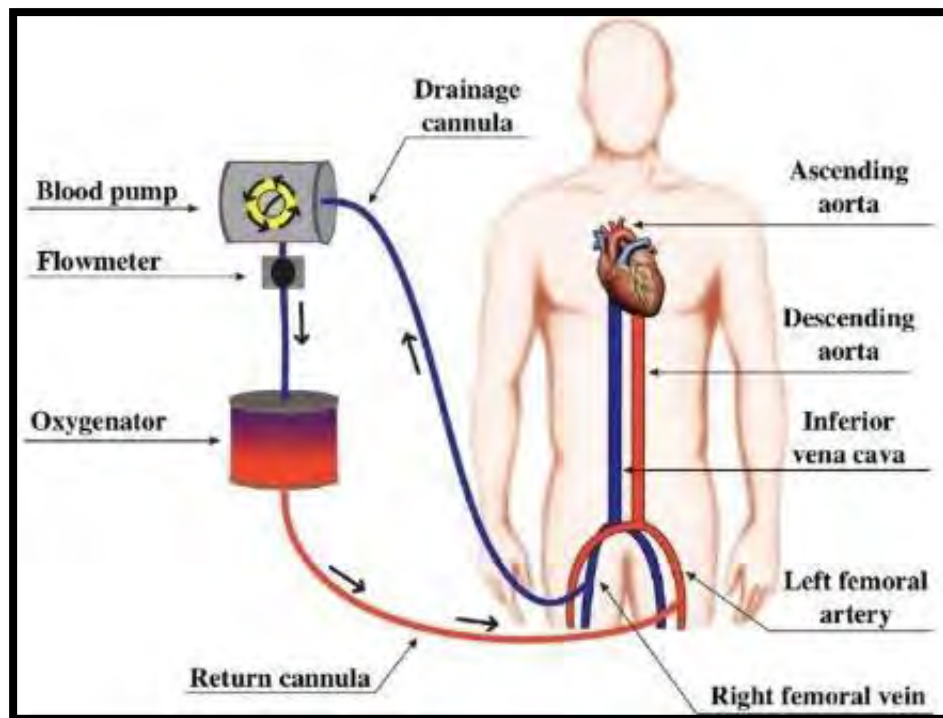


Figure 1: ECMO



DC Fire and EMS ECPR / ECMO Candidate Checklist	
Goal: < 15 min on scene. Arrive in ED within 30 min of patient collapse	
Criteria	Yes?
Witnessed Cardiac Arrest	
Rapid Bystander CPR (within 5 minutes of collapse)	
Initial shockable rhythm (includes shock by AED prior to ALS arrival)	
Refractory VF/pVT unresponsive to at least 3 defibrillations and amiodarone or lidocaine	
No evidence of trauma as the cause for cardiac arrest.	
Not hemorrhaging (e.g., GI bleeding, significant trauma)	
Age 18-70 years old	
Good baseline functional status (living independently- not a long-term care facility resident)	
No prior neurocognitive dysfunction (e.g., dementia)	
No signs of end stage disease <ul style="list-style-type: none"> • Renal failure with dialysis • Liver Failure • Terminal cancer 	
Mechanical CPR device is available on scene for transport	
LUCAS device fits on patient	
ETCO ₂ > 10 mm/Hg with CPR	
Estimated arrival at ECMO capable ED within 30 minutes of collapse	
<p>If all above criteria are met, patient is a <u>potential</u> ECMO candidate. Notify ECMO capable receiving facility as soon as possible.</p> <p>*** H8 has ECMO /ECPR capability weekdays (M-F) during business hours (0800-1700)</p> <p>*** H13 has ECMO /ECPR capability 24 hours per day 7 days per week</p> <p>*** If transporting to H13 call report directly to the Blue Team Attending Physician as soon as possible at 202-877-5560</p>	



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Special Circumstances 4.5

This information will be released at a future date.



This protocol applies to patients who have a return of spontaneous circulation (ROSC) after a medical cardiac arrest. All adult patients that are successfully resuscitated from a medical cardiac arrest, regardless of initial cardiac arrest rhythm and 12-lead EKG findings, MUST be transported directly to a STEMI/ROSC receiving facility. All pediatric patients that are successfully resuscitated from cardiac arrest shall be transported to Children's National Hospital. (H2)

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient recently suffered a cardiac arrest.
- ROSC has been achieved (i.e., patient has a palpable pulse).
- Patient's mental status may range from awake/alert to unresponsive.
- Patient's breathing may range from normal to apneic.
- EKG findings: variable from bradycardia to ST-segment elevation or depression.

Exclusion Criteria:

- Patient does not have a palpable pulse and is still in cardiac arrest
- Patient is status post cardiac arrest due to traumatic etiology. [See Traumatic Cardiac Arrest Protocol.](#)

Treatment and Interventions:

- 1 Continue [General Assessment and Universal Patient Care Protocol.](#)
- 2 Immediately obtain and document a full set of post-ROSC vital signs.
- 3 Monitor closely for reoccurrence of cardiac arrest. If this occurs proceed back to [Cardiac Arrest Protocol](#) and initiate rhythm specific treatment.
 - Keep defibrillator pads on patient
- 4 Continue treatment protocol for the presumed cause of cardiac arrest.
- 5 If an advanced airway was already placed, reconfirm correct placement with continuous waveform capnography (ETCO₂), presence of bilateral breath sounds and absent gastric sounds with ventilation.
- 6 Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen Protocol](#) with a target of achieving 94-98% O₂ saturation.
- 7 Ensure ventilation rate and tidal volume is appropriate for the specific clinical scenario and patient age. Utilize Zoll X Series Real BVM feedback.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Return of Spontaneous Circulation (ROSC) 4.6

- Tidal Volume: ventilate with the minimum volume necessary to see chest rise. Excessive tidal volumes and over-inflation of the lungs can result in lung injury and increase mortality and morbidity in some patient populations.
 - Ventilation Rate: maintain normal ventilation rates based on patient age. Routine and or accidental hyperventilation should be strictly avoided. **Goal is to maintain an ET_{CO}₂ of 35-45 mmHg.**
 - Adult: 10 breaths per minute
 - Child: 20 breaths per minute
 - Infant: 30 breaths per minute
- 8 Titrate PEEP as necessary to maintain target O₂ saturation of 94-98%. [See PEEP Procedure.](#)
 - 9 Never let the BVM “drop” while connected to an endotracheal tube (ETT) as this may dislodge the tube. This can occur even when a commercial tube holder is being utilized.
 - Recommend briefly disconnecting the BVM from the ETT when moving the patient in or out of the medic unit, transferring from the cot to the hospital stretcher, or whenever you must take your hands off the BVM.
 - 0 Keep the head of stretcher elevated 35-45° during transport to improve pulmonary function and decrease risk of micro aspiration.
 - 1 If available and time allows, place a NG or OG tube to decompress the stomach, decrease the risk of vomiting and aspiration, and to improve oxygenation and ventilation.
 - 2 Repeat your primary survey and obtain serial vital signs every 3-5 minutes. Treat any newly identified life-threats accordingly.

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide continuous EKG monitoring.
2. Perform [12-lead EKG](#) as soon as possible after ROSC.
 - If a STEMI is identified, contact the STEMI/ROSC facility immediately and transmit the EKG as soon as possible.
 - ❖ Important Note: a 12-lead EKG is NOT typically indicated after ROSC from a traumatic cardiac arrest.
3. Establish an IV/IO if not previously performed.
 - A second venous access site is beneficial if possible but not required.



4. Hypotension is common in the immediate post ROSC period. Consider causes for post ROSC hypotension and treat accordingly:
 - Decreased venous return to the heart from increase intrathoracic pressure created by positive pressure bag valve ventilation
 - Hyperventilation
 - Hypovolemia/hemorrhage
 - Sedative medications
 - Tension Pneumothorax
 - Metabolic acidosis
 - Cardiac ischemia or dysfunction
5. Hypotension in the immediate post ROSC period should be both anticipated and treated aggressively as it is a common precursor to reoccurrence of cardiac arrest. Treat post ROSC hypoperfusion/shock per [Hypoperfusion / Non-Traumatic Shock protocol](#).
6. If clinically significant bradycardia occurs, treat per [Bradycardia protocol](#).
7. Check blood glucose level.
 - If hypoglycemic, treat per [Hypoglycemia protocol](#).
 - If hyperglycemic, treat per [Hyperglycemic protocol](#).
8. If patient seizes, treat per [Seizure protocol](#).
9. Assess and frequently reassess patient for signs of pain, discomfort, or agitation post advanced airway placement:
 - Combative or aggressive behavior
 - Purposeful or non-purposeful movement of the arms or legs
 - Eye opening, tears or watery eyes
 - “Bucking the tube” or asynchrony with bag valve ventilation
 - New or worsening hypertension or tachycardia after airway placement
10. If patient shows signs of pain, discomfort, or agitation after advanced airway placement: Provide post advanced airway management pain control AND sedation:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
<u>Ketamine</u> 0.5 mg/kg IV/IO may repeat every 5 minutes as needed for pain or agitation	<u>Ketamine</u> 0.5 mg/kg IV/IO may repeat every 5 minutes as needed for pain or agitation
Ketamine may be used for any patient but is specifically preferred for patients who are hypotensive or in shock, are wheezing or who were intubated for severe asthma.	



OR

<u>Adult</u>	<u>Pediatric</u>
<p><u>Fentanyl</u> 25-100 mcg IV/IO may repeat every 5 minutes as needed for pain</p>	<p><u>Fentanyl</u> 0.5 mcg/kg IV/IO up to a maximum single dose of 25 mcg. May repeat every 5 minutes as needed for pain</p>
<p><u>AND</u></p>	<p><u>AND</u></p>
<p><u>Versed</u> 2-5 mg IV/IO may repeat every 5 minutes as needed for agitation</p>	<p><u>Versed</u> 0.1 mg/kg IV/IO, up to a maximum single dose of 2 mg. May repeat every 5 minutes as needed for agitation</p>

MEDICAL CONTROL OPTIONS

1. Contact medical control with any questions regarding management options.

General Notes:

- Post-cardiac arrest care is a critical component of the chain of survival. Successful resuscitation from cardiac arrest results in a post-cardiac arrest syndrome that can evolve in the days after ROSC. Post-cardiac arrest brain injury remains a leading cause of morbidity and mortality in adults and children because the brain has limited tolerance of ischemia, hyperemia, or edema.
- Prehospital initiation of therapeutic hypothermia (i.e., chilled saline or ice packs) is not recommended post ROSC.
- Hyperventilation is a significant cause of hypotension and recurrence of cardiac arrest in the post resuscitation phase and must be avoided. Hyperventilation also reduces cerebral perfusion and may worsen neurologic outcomes after cardiac arrest.
- The clinical condition of post-ROSC patients is dynamic and changes rapidly. They require close monitoring, as a significant percentage of post-ROSC patients will re-arrest.
- Hypotension may worsen brain and other organ injury after cardiac arrest by decreasing oxygen delivery to tissues. Post-ROSC hypotension should be aggressively treated.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Resuscitation

Return of Spontaneous Circulation (ROSC)

4.6

DC Fire and EMS Post Medical Cardiac Arrest ROSC Checklist	
2 sets of vital signs at least 3 minutes apart with HR greater than 60 bpm and MAP greater than 65 mmHg (or age appropriate for pediatric ROSC) required before moving patient.	
AIRWAY	Yes?
Optimize ventilation - Advanced Airway with NG tube in place.	
Reconfirm airway placement with continuous ET _{CO} ₂ monitoring.	
Consider intubation if any complication/difficulty with iGel, otherwise may defer.	
Suction airway as needed.	
Avoid BVM "drop" - disconnect BVM as needed.	
BREATHING	Yes?
Optimize oxygenation. Titrate O ₂ administration to SPO ₂ of 94% to 98%. Provide PEEP as needed.	
Avoid hyperventilation. Goal is ET _{CO} ₂ 35-45 mmHg.	
Avoid excessive ventilatory volumes, use ZOLL Real BVM Help.	
Elevate head of stretcher 35° to 45° to improve pulmonary function.	
Ensure BVM mask available in case of iGel/ET tube displacement.	
CIRCULATION	Yes?
12 Lead EKG obtained.	
Continuous EKG monitoring in place.	
Establish IV/IO access, 2nd line is ideal but not required.	
Anticipate and prepare to treat hypoperfusion and or bradycardia.	
IVF bolus ready.	
Push dose epinephrine or epinephrine infusion prepared and labeled immediately after ROSC, and accessible during patient movement.	
If not already in place, position LUCAS device in case of re-arrest.	
DISABILITY	Yes?
Check blood glucose if not already done.	
If pain or agitation, provide post airway management pain control and sedation	
MANAGEMENT	Yes?
Stretcher, moving devices, and ambulance pre-positioned for efficient departure	
Family support is being provided	
Repeat primary survey immediately after ROSC and once situated in ambulance	
Full O ₂ cylinder with regulator affixed ready in ambulance for transport	



This protocol describes the process of stopping resuscitation efforts on patients who have suffered a presumed medical cardiac arrest and in whom Return of Spontaneous Circulation (ROSC) has not been achieved despite prehospital treatments as directed by the cardiac arrest rhythm specific protocols.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is in cardiac arrest (adult or pediatric) from a presumed medical etiology
- Patient has received BLS and ALS resuscitation interventions
- Return of Spontaneous Circulation (ROSC) has not been achieved despite prehospital treatments as directed by the cardiac arrest rhythm specific protocols

Exclusion Criteria:

- ROSC has been achieved. [See ROSC Protocol.](#)
- Patient is in refractory ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT). [See Refractory VF/pVT Protocol.](#)
- Patient is in cardiac arrest due to accidental hypothermia. [See Special Circumstances in Cardiac Arrest Protocol.](#)
- Patient is known or suspected to be pregnant > 20 weeks gestational age. (fundal height at or above the level of the belly button) [See Special Circumstances in Cardiac Arrest Protocol.](#)
- Patient is in cardiac arrest due to traumatic etiology. [See Traumatic Cardiac Arrest Protocol.](#)

Procedure:

1. BLS and ALS care must be started on all patients who are found apneic and pulseless unless:
 - A patient has a valid MOST Form or other actionable end-of-life medical order (e.g., POLST Form, DNR order, or Advanced Directive). [See DNR / Medical Orders for Scope of Treatment \(MOST\) protocol.](#)
 - Patient meets PDOA criteria. [See Person Dead on Arrival Protocol.](#)
 - During a mass casualty incident, (MCI) the patient is designated as deceased (black tag) or expectant (grey tag) in accordance with the MCI Protocol. Such patients should be reevaluated as resources allow.
2. If the patient is in cardiac arrest due to a blunt or penetrating injury [see Traumatic Cardiac Arrest Protocol.](#)
3. At a suspected crime scene, disturb as little potential evidence as possible.



4. Resuscitation efforts in presumed medical cardiac arrests shall occur for at least 30 minutes of ALS care EXCEPT in the following circumstances when termination may occur immediately:
 - If resuscitation was started prior to the discovery of a valid MOST form or other valid actionable end-of-life medical order
 - If resuscitation was started and upon further examination, PDOA Criteria is met

ADVANCED LIFE SUPPORT PROVIDERS

1. Resuscitation efforts shall occur for at least 30 minutes of ALS care. ALS care starts when the monitor/defibrillator is both turned on and attached to the patient in cardiac arrest.
2. ALS providers may contact a medical control physician for termination of resuscitation efforts if all criteria in the attached termination checklist are met. Termination of resuscitation may still be appropriate even if all the criteria in the checklist are not met. Discuss with Medical Control Physician. **The Medical Control Physician must authorize termination before resuscitation efforts are stopped.**

If termination of resuscitation is granted:

1. Stop resuscitation efforts
2. Pronouncement of Death: confirm the facility and name of the Medical Control Physician issuing the order to terminate resuscitation efforts. Confirm the correct spelling of the physician's first and last name and hospital facility.
 - Wording in the following format must be entered into the EPCR narrative: "The patient was pronounced dead on **date** at **time** by **Dr. first and last name** from **hospital name**."
3. Make every effort to not disturb the scene any further. Do not remove any personal property (e.g., jewelry) or medical devices from the body. This includes any devices from procedures you have performed, e.g., endotracheal tube, IV/IO.
 - EXCEPTION: On occasion, a patient may be terminated in the prehospital setting and the presence of medical devices used for resuscitation (e.g., endotracheal tube) are extremely upsetting to grieving family members. In these rare situations, it is permissible to remove such devices after discussing with the EMS Supervisor or OIC. Document clearly in the EPCR what device(s) were removed and by whom.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Resuscitation

Termination of Resuscitation - Medical Cardiac Arrest 4.7

4. If termination of resuscitation occurs at a licensed health care facility (i.e., nursing home) the facility staff shall handle the legal death notification and law enforcement should not be contacted by EMS unless the death is traumatic or the result of possible criminal activity.
5. If termination of resuscitation occurs outside of a licensed health care facility, immediately notify law enforcement, and remain on scene until they arrive to take custody of the body. Document the badge number of the responsible law enforcement officer.

If termination of resuscitation is NOT granted:

1. Obtain any additional patient care orders from the medical control physician. Unless medical control recommends immediate transport, remain on scene to continue high quality CPR and ALS care for an additional 10 minutes.
2. After the additional resuscitation efforts, if the patient is still in cardiac arrest, re-contact the same medical control hospital to request termination.
3. If medical control refuses termination a second time, transport patient to an appropriate receiving facility while continuing resuscitation efforts.
4. Document all conversations with medical control in the EPCR narrative.

MEDICAL CONTROL OPTIONS

1. Termination of resuscitation at the direction of the attending medical control physician

General Notes:

- In patients with cardiac arrest, prehospital resuscitation is initiated with the goal of returning spontaneous circulation before permanent neurologic damage occurs. In most situations, ALS providers can perform an initial resuscitation that is equivalent to an in-hospital resuscitation attempt, and there is usually no additional benefit to emergency department resuscitation in most cases.
- When there is no response to prehospital cardiac arrest treatment, it is acceptable and often preferable to cease futile resuscitation efforts in the field. This is true for both adult and pediatric patients. Children should NOT be transported with CPR in progress simply because of their age.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Resuscitation

Termination of Resuscitation - Medical Cardiac Arrest 4.7

- Recent evidence has shown that, to capture over 99% of potential survivors from medical cardiac arrest (especially VF and pulseless VT arrest), resuscitation should be continued for approximately 40 minutes. However, this does not imply that all resuscitations should continue this long. (e.g., unwitnessed arrests, asystolic rhythm, $\text{ETCO}_2 < 20 \text{ mmHg}$)
- Survival and functional neurologic outcomes are unlikely if ROSC is not obtained by EMS. It is dangerous to providers, pedestrians, and other motorists to attempt to resuscitate a patient during ambulance transport.
- ETCO_2 measurements of less than 10 mmHg or falling greater than 25% during the resuscitation despite ALS care indicates a poor prognosis and provides additional support for termination.
- When cardiac arrest resuscitation becomes futile, the patient's family should become the focus of the EMS providers. The medical literature consistently indicates that families of the deceased patient would like to hear the news from a *caring* and *empathetic* member of the patient care team. Most families understand the futility of the situation and are accepting of stopping resuscitation efforts in the prehospital environment.



Family Member Death Notification Best Practices

- All EMT's and Paramedics are expected to act in accordance with the departments core values: Bravery, Accountability, Safety, Integrity, Compassion, Service.
- If possible, find a place to talk with family members that is quiet and free of distraction.
- Use language interpreter services as needed.
- Identify yourself by name and rank. Sit or stand at eye level with the family. Make eye contact when speaking to family members.
- Establish who you are talking to and their relationship to the patient. Use courtesy titles for family members (e.g., Mr. Ms.) Nod in understanding when family is speaking.
- If you know the patient's name, use it when talking about the deceased. If you do not know the patient's name, ask the family members.
- Listen to what the family already knows about the situation. Lean forward to demonstrate active listening.
- Briefly describe the circumstances leading to the death in clear understandable language that avoids medical jargon.
- Foreshadow the bad news, *"I am sorry, but I'm afraid that I have bad news"*
- Break the bad news directly but compassionately using direct and clear language. Avoid euphemisms such as "passed on" or "no longer with us." Instead use the terms "death", "dying" or "dead." (e.g., *"When we arrived, John's heart had stopped beating. We did CPR, used a breathing tube, and gave him medications to restart his heart. Despite everything we did, his heart still wasn't beating, and he has died"*)
- Whenever possible, family members should be given the option to be present during the termination of resuscitation.
- If family was not present during the resuscitation, allow the family to see the patient if they wish. Prior to the viewing, remember to prepare them for any visible injuries and the medical equipment that is still attached.
- Watch for verbal and non-verbal cues from family members about the amount of information they want and whether they understand what you are telling them.
- Acknowledge feelings of family members, demonstrate empathy, and offer support. (e.g. *"I cannot imagine what you have been through today. How can I help you?"*)
- Allay family member's guilt by calling attention to something the family has done right. (e.g. *"I know it was scary. You were doing excellent CPR when we arrived. You were right to call 911."*)
- After the death notification is made and or the family is viewing the patient, silence in the room may feel uncomfortable. Do not feel pressure to fill this silence with continued talking. Compassionate body language and an expression of empathy such as *"I'm so sorry for your loss"* is appropriate and recommended.
- After the initial grief response has subsided, offer to answer any questions. You may need to repeat or clarify some facts, however, avoid providing excessive information that may only increase confusion for families.



DC Fire and EMS Termination of Resuscitation Medical Cardiac Arrest Checklist

Criteria	Yes?
Clear radio/telephone contact between paramedic and medical control physician.	
Successful airway management per Cardiac Arrest Protocol.	
High-quality CPR per Cardiac Arrest Protocol.	
At least 30 minutes of ALS care has been performed.	
Appropriate medication administration per rhythm specific protocols.	
No sustained ROSC (> 3 minutes) at any time.	
No spontaneous respiration, eye opening, motor response, or other neurologic activity at the time terminating resuscitation is contemplated.	
Cardiac rhythm is asystole or PEA < 40 bpm.	
The cardiac rhythm is NOT persistent or recurrent VF/pVT.	
ETCO ₂ is less than 20 mmHg.	
The suspected cause of the cardiac arrest is NOT hypothermia.	
The patient is NOT pregnant > 20 weeks gestational age.	
All paramedics and the medical control physician agree with termination.	
If all above criteria are met after 30 minutes of ALS care, termination of resuscitation in the prehospital environment is appropriate. Contact Medical Control Physician.	
If all above criteria are not met, termination of resuscitation in the prehospital environment may still be appropriate. Discuss with Medical Control Physician.	



This protocol applies to all patients in cardiac arrest because of a penetrating or blunt traumatic injury. Historically, prehospital traumatic cardiac arrest (TCA) has had very poor survival rates, which resulted in resuscitative efforts being deemed futile by many. However, newer literature has shown that survival is still possible depending on multiple factors including timeliness of EMS intervention and proximity to a trauma center. Depending on the EMS system examined, rates of survival from TCA can approach that of all-cause medical cardiac arrest at 0-17%. Thus, through a consistent and systematic approach to patient assessment, this protocol aims to delineate patients who may benefit from prehospital treatment and rapid transport to a trauma center from those in whom further resuscitative efforts are truly futile. In comparison to primary medical cardiac arrests, the causes of TCA are very different, and some are potentially reversible in the prehospital setting. As such, efforts to resuscitate TCA should be aimed at rapid identification and reversal of the underlying cause.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient is unconscious/unresponsive.
- Patient is apneic.
- Patient has no pulse.
 - Pulse check shall occur at the carotid or femoral artery.
 - Pulse should only be checked for a maximum of 10 seconds, if no definite pulse is felt, assume the patient is in cardiac arrest and start CPR.
- Patient is in cardiac arrest due to an obvious traumatic etiology (blunt or penetrating).

Exclusion Criteria:

- Patient is responsive.
- Patient has a palpable pulse.
- Patient meets PDOA criteria. See Person Dead on Arrival Protocol.
- Cardiac arrest due to a suspected medical etiology. See rhythm specific protocols.

Treatment and Interventions:

1. See treatment flowchart at the end of the protocol for a visual representation of this protocol.
2. BLS and ALS care must be started on all patients who are found apneic and pulseless unless their initial presentation is immediately deemed incompatible with life as defined below OR the patient is in asystole on ALS arrival.

Do NOT initiate resuscitative efforts in the following situations:

- Decapitation or transection of the torso
- Burned beyond recognition
- Massive whole-body crush injury

- Obvious displacement of brain matter
 - Obvious signs of prolonged death: rigor mortis, dependent lividity, or decomposition
 - During a mass casualty incident, (MCI) the patient is designated as deceased (black tag) or expectant (grey tag) in accordance with the MCI Protocol. Such patients should be reevaluated as resources allow.
- ❖ Important Note: recent penetrating trauma (e.g., GSW or stabbing) is NOT considered an injury immediately incompatible with life unless the initial presentation meets the above criteria. These patients should be managed per this protocol.
3. If resuscitation was started (e.g., CPR by BLS providers) and upon further examination the patient has obvious signs of prolonged death or an injury incompatible with life as defined above, resuscitation efforts may be terminated immediately.
 4. If resuscitation was started (e.g., CPR by BLS providers) and upon arrival of ALS resources, the patient is found to be in asystole, resuscitation efforts may be terminated immediately.
 5. Initiate and continue patient care as described in the Cardiac Arrest Protocol.
 6. At a suspected crime scene, disturb as little potential evidence as possible.
 7. Immediate Transport Criteria: initiate immediate transport to nearest trauma center (expedite scene time and provide all treatment enroute) for the following patients:
 - Traumatic cardiac arrest witnessed by FEMS personnel
 - Traumatic cardiac arrest in a female patient with known pregnancy > 20 weeks gestational age or fundal height at or above the level of the belly button
 8. If patient is in traumatic cardiac arrest AND does not have a presentation immediately incompatible with life AND is not in asystole on ALS arrival, AND does not meet immediate transport criteria, begin/continue scene resuscitation efforts:
 - Place patient in position where resuscitative efforts can be initiated.
 - Apply c-spine stabilization if blunt trauma.
 - Start chest compressions (LUCAS® device may be utilized in TCA).
 - Control obvious external hemorrhage by application of tourniquets, pressure dressings, and hemostatic agents as needed.
 - Manage airway. Maximize effective oxygenation and ventilation.
 - BLS or ALS techniques may be used as the situation and resources allow.
 - Reduce/realign long bone fractures as needed and stabilize pelvis in cases of severe blunt trauma (e.g., fall from significant height, high-speed MVC).

ADVANCED LIFE SUPPORT PROVIDERS

- If the mechanism of injury (blunt or penetrating) was to the torso, perform bilateral needle thoracostomy for decompression of potential tension pneumothorax.
 - Chest decompression at the 4th intercostal space anterior axillary or mid axillary line is preferred over the 2nd intercostal space mid-clavicular line. See Needle Thoracostomy Procedure.
- Obtain IV or IO access and initiate fluid resuscitation with crystalloid fluid bolus.
- After performing the interventions noted above, treat/transport based on the displayed rhythm as follows:

Cardiac Rhythm on Monitor after initial resuscitation efforts		
Asystole or PEA \leq 40 bpm	ROSC or PEA $>$ 40 bpm	Ventricular Fibrillation or Ventricular Tachycardia
Stop resuscitation. Terminate on scene per FEMS Medical Director.	Transport rapidly to nearest trauma center. Continue to identify and treat immediate life threats.	Transport rapidly to nearest trauma center. See VF/VT protocol. Continue to identify and treat immediate life threats.

9. An online Medical Control Physician does NOT need to be contacted for termination of a traumatic cardiac arrest if all the criteria for termination of resuscitation are met. See Traumatic Cardiac Arrest Checklist (below).
 - The current DC Fire and EMS Medical Director shall be listed on the EPCR as the pronouncing physician. The time the resuscitation efforts were stopped shall be listed as the time of death. Wording in the following format must be entered into the EPCR: “The patient was pronounced dead on **date** at **time** by **Dr. first and last name of DC Fire and EMS Medical Director** by standing order.”
10. If termination of resuscitation occurs, immediately notify law enforcement, and remain on scene until they arrive to take custody of the body. Document badge number of the responsible law enforcement officer.
11. If return of spontaneous circulation is achieved, continue to reassess, and manage immediate life threats. Manage per ROSC Protocol as applicable.
 - Exception to ROSC Protocol: vasopressors (i.e., epinephrine) should NOT be used during or after a traumatic cardiac arrest. Continue resuscitation with IV/IO whole blood or crystalloid fluids.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control with any questions regarding management options.

General notes:

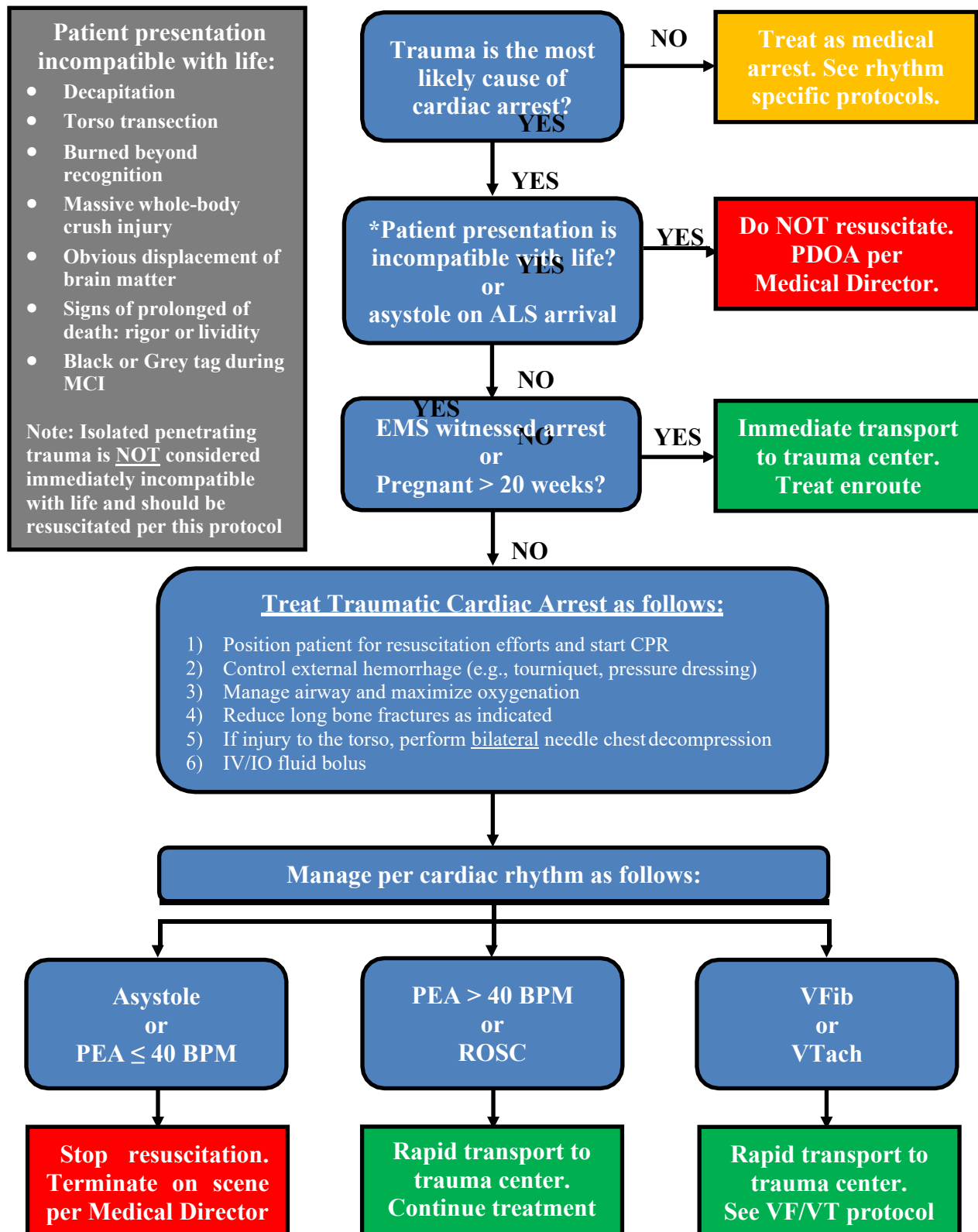
- The decision-making process regarding patients in TCA is complex and stressful and is therefore prone to error unless a reproducible approach is used to facilitate management. Every traumatic arrest is different, but all can benefit from utilizing the common management principles outlined above.
- Unlike medical causes of cardiac arrest, TCA typically results from a brief list of causes: severe head trauma, hypovolemia (i.e., blood loss), tension pneumothorax, pericardial tamponade, and upper airway obstruction. Given the reversible nature of several potential causes of TCA, intervention in the prehospital setting in a standard, protocol driven fashion can potentially result in increased survival among this patient population.
- In the case of TCA, the presenting rhythm is most commonly PEA followed by asystole.
- Most of the available evidence suggests that an initial rhythm of asystole is associated with an extremely low probability of survival (< 1%) for both blunt and penetrating TCA.
- In addition to asystole, PEA with a rate less than 40 per minute has also been shown to be correlated with extremely low odds of survival in TCA. Whereas a rate greater than 100 per minute is associated with a very high survival rate.
- Pulseless patients with an initial organized electrical activity on ECG (PEA) warrant the initiation of resuscitation (i.e., treatment of reversible causes of TCA) but not necessarily transport. See treatment algorithm.
- The best outcomes in TCA occur when the patient is identified in the peri-arrest phase and action is taken either to prevent cardiac arrest all together or rapidly reverse it.
- Currently there is significant controversy concerning the use of ACLS/PALS- type medications including epinephrine and or atropine in the setting of traumatic, hypovolemic arrest. **At present time, we DO NOT recommend the use of these medications in the treatment approach described above.**

- As opposed to medical cardiac arrests, no length of time for on scene resuscitation efforts is mandated in this protocol. Providers should focus efforts on rapidly treating reversible causes of traumatic cardiac arrest. When these have been addressed as described in this protocol, disposition patient per cardiac rhythm on the monitor.
- In a situation where the mechanism of injury appears inconsistent with the patient's condition and not severe enough to induce traumatic arrest, consider a primary medical cause for the patient's cardiac arrest and treat per rhythm specific ACLS/PALS protocols.



DC Fire and EMS Termination of Resuscitation Traumatic Cardiac Arrest Checklist

Criteria	Yes?
The most likely cause of cardiac arrest was a traumatic injury	
The cardiac arrest was NOT witnessed by FEMS personnel	
The patient is NOT pregnant > 20 weeks gestational age	
Successful airway management per Cardiac Arrest Protocol	
High-quality CPR per Cardiac Arrest Protocol	
IV/IO fluid bolus has been administered	
No continued external source of hemorrhage	
If torso trauma, bilateral needle chest decompression has been performed	
No ROSC at any time during the resuscitation	
No spontaneous respiration, eye opening, motor response, or other neurologic activity at the time terminating resuscitation is contemplated	
Cardiac rhythm is asystole or PEA \leq 40 bpm	
All paramedics agree with termination	
If all above criteria are met, termination of resuscitation in the prehospital environment is indicated.	
The current DC Fire and EMS Medical Director shall be listed on the EPCR as the pronouncing physician. The time the resuscitation efforts were stopped shall be listed as the time of death. Wording in the following format must be entered into the ECPR: “The patient was pronounced dead on date at time by Dr. first and last name of DC Fire and EMS Medical Director by standing order.”	





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Resuscitation

Newborn Resuscitation 4.9

This protocol applies to newborn patients who do not respond to initial stimulation and resuscitative efforts. Prompt initiation of resuscitative steps is critical to the successful outcome of a neonatal resuscitation.

ALL PROVIDER LEVELS

1. Position the newborn on his/her back, with the neck in a neutral position.
2. Ensure a patent airway by gentle suctioning of the mouth then the nose utilizing a bulb syringe. If Meconium stained fluid is present, suction the patient's hypopharynx.
 - ALS providers should utilize a **Meconium Aspirator** attached to an endotracheal tube. With the assistance of a laryngoscope and blade, insert the endotracheal tube into the trachea and suction while removing the tube. **Do not perform procedure in a newborn with a vigorous cry.**
3. Dry the infant, place on a dry blanket, cover the head and keep the infant warm.
4. Provide tactile stimulation if the newborn is not responding to drying.
5. If the infant is ventilating adequately, administer free flow (blow-by) 100% oxygen at a minimum of 6 liters per minute close to the face. If ventilations are inadequate or if the chest fails to rise, reposition the head and neck, suction, and initiate bag-valve-mask ventilations with high flow oxygen at 40-60 breaths per minute.
6. If heart rate 60-80 and rapidly rising:
 - Continue manual ventilation and supplemental oxygen.
7. If heart rate less than 60, or 60-80 and not rapidly rising:
 - Initiate CPR with bag-valve-mask ventilations with high flow oxygen.
8. Determine the 1-minute **APGAR score**. Repeat at the 5 minute interval.

Test	0 Points	1 Point	2 Points
Activity (Muscle Tone)	Absent	Arms & legs extended	Active movement with flexed arms & legs
Pulse (Heart Rate)	Absent	Below 100 bpm	Above 100 bpm
Grimace (Response Stimulation or Reflex Irritability)	No Response	Facial grimace	Sneeze, cough, pulls away
Appearance (Skin Color)	Blue-gray, pale all over	Pink body and blue extremities	Normal over entire body – Completely pink
Respiration (Breathing)	Absent	Slow, irregular	Good, crying



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Resuscitation

Newborn Resuscitation 4.9

ADVANCED LIFE SUPPORT PROVIDERS

1. Establish an **IV/IO** of **Normal Saline** and administer 10 ml/kg if ventilation and heart rate are not improving after 3 minutes.
2. Provide **continuous EKG monitoring** and treat life threatening dysrhythmias as indicated.
3. Perform **ET Intubation** if the patient does not respond to assisted ventilations and/or CPR after 3 minutes.
4. Administer **Epinephrine 1:10,000 0.01 mg/kg IV/IO**, if the heart rate remains <80 beats per minute after assisted ventilations and/or CPR for 3 minutes.
5. For suspected narcotic (opiate) overdose, administer **Narcan 0.1 mg/kg IV/IO/ET**.

MEDICAL CONTROL OPTION

1. Medical Control may request that providers obtain a blood sugar. If the result is low, and transport time is still lengthy, Medical Control may request that Dextrose 10% be administered to the newborn.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Wide Complex Tachycardia 5.1

This protocol applies to adult and pediatric patients with a pulse, experiencing a wide complex tachycardia with or without signs and symptoms of hemodynamic instability.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Heart rate greater than 100 BPM in adults or relative tachycardia in pediatric patients.
- Patient has a palpable pulse.
- EKG QRS complex is greater than or equal to 120 ms.
- EKG Rhythm:
 - Ventricular tachycardia (VT)
 - Supraventricular tachycardia (SVT) with aberrancy
 - Accelerated idioventricular rhythms
 - Pre-excited tachycardias with accessory pathways (i.e., WPW)
 - Rapid ventricular paced rhythm in patients with a pacemaker

Exclusion Criteria:

- Narrow complex tachycardia (i.e., QRS complex is less than 120 ms). See [Narrow Complex Tachycardia protocol](#).
- Patient is in cardiac arrest. [Treat per Cardiac Arrest protocol](#).
- Sinus tachycardia with aberrancy.

Definitions:

- **Wide complex tachycardia:** cardiac rhythm with a rate greater than 100 BPM and a QRS width greater than or equal to 120 ms. The wide complex is a result of the electrical impulses originating in the ventricle or abnormal conduction due to structural or metabolic causes (e.g., bundle branch block, hyperkalemia, acidosis, etc.).
- **Stable wide complex tachycardia:** wide complex tachycardia without evidence of hemodynamic instability and/or hypoperfusion despite a sustained rapid heart rate.
- **Unstable wide complex tachycardia:** wide complex tachycardia resulting in hemodynamic instability and/or hypoperfusion. Heart rate is typically greater than 150 BPM to cause hemodynamic instability. Signs and symptoms include:
 - Acutely altered mental status
 - Ischemic chest pain
 - Hypotension with signs of hypoperfusion
 - Shortness of breath due to pulmonary vascular congestion
 - Near syncope or syncope.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Wide Complex Tachycardia 5.1

Treatment and Intervention:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Consider causes of wide complex tachycardia:
 - Most wide complex regular tachycardias are due to classic ventricular tachycardia
 - History of cardiac dysrhythmia (e.g., SVT with aberrancy)
 - Ischemic heart disease (e.g., STEMI)
 - Hypoxia
 - Dehydration
 - Pulmonary embolism
 - Hyperkalemia
 - Toxins / overdose (e.g., Tricyclic antidepressants, Benadryl)
 - Endocrinopathies (e.g., hyperthyroidism)
 - Medication (e.g., caffeine, diet pills, thyroid supplements, decongestants)
 - ❖ Important Note: in the absence of hyperkalemia or other toxicologic/metabolic causes of QRS widening, it is safest to assume the cause of a regular wide complex tachycardia is VT until proven otherwise.
4. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
5. All patients with wide complex tachycardia should be transported ALS with cardiac monitoring throughout treatment and transport.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring.
2. Obtain [12 lead EKG](#). Identify specific tachydysrhythmia and evaluate for ischemia.
3. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Wide Complex Tachycardia 5.1

4. Consider hyperkalemia in any patient with a wide complex tachycardia and a history of renal disease or missed dialysis. Treat with calcium chloride per [Hyperkalemia protocol](#). This treatment is safe even if the diagnosis of hyperkalemia is not confirmed.

Management of unstable wide complex tachycardia

1. Consider [procedural dissociation](#) as needed.
2. Proceed immediately to synchronized cardioversion. [See Synchronized Cardioversion protocol](#). The following escalating energy sequence shall be used:

<u>Adult</u>	<u>Pediatric</u>
70J, 120J, 150J, 200J	0.5J/kg, 1J/kg, 2J/kg

3. Sustained polymorphic ventricular tachycardia (Torsade de Pointes) is almost always unstable. Treatment may require [unsynchronized defibrillation](#) if synchronized cardioversion is not possible due to the monitor being unable to sync with the very rapid rates.
4. Once the rhythm converts to a non-lethal rhythm, monitor the patient's EKG and vital signs.

Management of stable wide complex tachycardia

1. The most common cause of stable regular wide complex tachycardia is VT. Administer Amiodarone.
2. The most common cause of stable irregular wide complex tachycardia is atrial fibrillation with conduction aberrancy. Administer Amiodarone.

<u>Adult</u>	<u>Pediatric</u>
<p>Amiodarone 1st dose: 150 mg IV/IO Mix in 100 ml of normal saline. Infuse over 10 minutes.</p> <p>If rhythm fails to convert after 1st dose may administer 2nd dose in 5 minutes.</p> <p>2nd dose: 150 mg IV/IO Mix in 100 ml of normal saline. Infuse over 10 minutes.</p>	<p>Amiodarone 5 mg/kg IV/IO (max dose 150 mg) Infuse over 20 minutes</p>



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Wide Complex Tachycardia 5.1

- ❖ Important Note: adenosine and other AV node blocking medications such as diltiazem or esmolol should NOT be used in irregular wide-complex rhythms. Blocking the AV node in some of these patients may lead to electrical impulses that are transmitted exclusively down an accessory pathway which can result in ventricular fibrillation.
3. If the wide complex tachycardia is Torsades de Pointes administer Magnesium Sulfate:

<u>Adult</u>	<u>Pediatric</u>
Magnesium Sulfate 2 gm IV/IO Mix in 100 ml of normal saline. Infuse over 10 minutes	Magnesium Sulfate 50 mg/kg (up to a max dose of 2 gm) Infuse over 10 minutes.

4. If at any time during the assessment or treatment of a stable wide complex tachycardia, the patient begins to deteriorate or exhibit signs of tachycardia induced hemodynamic compromise, proceed immediately to [synchronized cardioversion](#).

Pregnancy Considerations:

- Synchronized cardioversion, defibrillation, and magnesium sulfate are considered safe and acceptable in pregnancy.
- Amiodarone is NOT considered safe in pregnancy due to multiple possible fetal effects and is NOT recommended unless the dysrhythmia is life-threatening (i.e., cardiac arrest) and other therapies are ineffective.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- The likelihood of VT increases with increasing age, presence of cardiac history, and QRS duration.
- The wider the QRS, the more likely it is to be VT. A QRS duration greater than 140 ms is very likely to be VT. By 200 ms, the rhythm is almost always due to either classic VT or a toxicologic/metabolic condition (e.g., hyperkalemia)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Wide Complex Tachycardia 5.1

- A wide complex irregular rhythm should be considered pre-excited atrial fibrillation (i.e., AFib with WPW). Extreme care must be taken in these patients. Avoid AV nodal blocking agents such as adenosine, calcium channel blockers or beta blockers because these medications may cause a paradoxical increase in ventricular response such as ventricular fibrillation.
- Torsades de pointes is a specific type of polymorphic VT. To be correctly diagnosed, Torsades requires evidence of QT prolongation on a baseline ECG between episodes of VT. Polymorphic VT without a history of QT prolongation should be considered ischemic in etiology until proven otherwise.
- Most episodes of torsades de pointes are self-terminating but recurrent.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Narrow Complex Tachycardia 5.2

This protocol applies to adult and pediatric patients with a pulse, experiencing a narrow complex tachycardia with or without signs and symptoms of hemodynamic instability

ALL PROVIDER LEVELS

Inclusion Criteria:

- Heart rate greater than 100 BPM in adults or relative tachycardia in pediatric patients.
- Patient has a palpable pulse.
- EKG QRS complex is less than 120 ms.
- EKG Rhythm:
 - Supraventricular tachycardia (AV nodal reentrant tachycardia)
 - Atrial fibrillation/atrial flutter
 - Junctional tachycardia
 - Multifocal atrial tachycardia

Exclusion Criteria:

- Wide complex tachycardia (i.e., QRS complex is greater than or equal to 120 ms). [See Wide Complex Tachycardia protocol.](#)
- Patient is in cardiac arrest. [Treat per Cardiac Arrest protocol.](#)
- Sinus tachycardia.

Definitions:

- **Narrow complex tachycardia:** cardiac rhythm with a rate greater than 100 BPM and a QRS width less than 120 ms.
- **Stable narrow complex tachycardia:** narrow complex tachycardia without evidence of hemodynamic instability and/or hypoperfusion despite a sustained rapid heart rate.
- **Unstable narrow complex tachycardia:** narrow complex tachycardia resulting in hemodynamic instability and/or hypoperfusion. Heart rate is typically greater than 150 BPM in adults, greater than 180 BPM in children, and greater than 220 BPM in infants to cause hemodynamic instability. Signs and symptoms include:
 - Acutely altered mental status
 - Ischemic chest pain
 - Hypotension with signs of hypoperfusion
 - Shortness of breath due to pulmonary vascular congestion
 - Near syncope or syncope

Treatment and Intervention:

1. Initiate [General Assessment and Universal Patient Care protocol.](#)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Narrow Complex Tachycardia 5.2

2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Consider causes of narrow complex tachycardia:
 - History of cardiac dysrhythmia such as atrial fibrillation
 - Ischemic heart disease (e.g., STEMI)
 - Hypoxia
 - Dehydration
 - Pulmonary embolism
 - Toxins / overdose (e.g., cocaine, amphetamines, stimulants)
 - Medications (e.g., caffeine, diet pills, thyroid supplements, decongestants)
 - Endocrinopathies (e.g., hyperthyroidism)
4. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
5. All patients with symptomatic or unstable narrow complex tachycardia should be transported ALS with cardiac monitoring throughout treatment and transport.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring.
2. Obtain [12 lead EKG](#). Identify specific tachydysrhythmia and evaluate for ischemia.
3. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.

Management of unstable narrow complex tachycardia

1. Consider [procedural dissociation](#) as needed.
2. Proceed immediately to synchronized cardioversion. [See Synchronized Cardioversion protocol](#). The following escalating energy sequence shall be used:

<i>Adult</i>	<i>Pediatric</i>
70J, 120J, 150J, 200J	0.5J/kg, 1J/kg, 2J/kg

3. Once the rhythm converts to a non-lethal rhythm, monitor the patient's EKG and vital signs.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

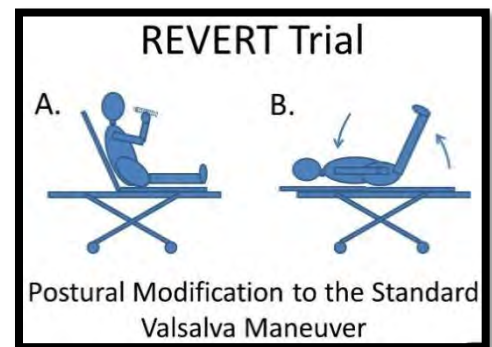
Narrow Complex Tachycardia 5.2

Management of the stable patient

1. If the narrow complex tachycardia is regular in appearance perform Valsalva maneuvers.

- For a pediatric patient unable to voluntarily perform a Valsalva maneuver:
 - Apply an ice pack to the face or forehead for 30-45 seconds.

- For an adult patient:
 - Ask them to blow through the barrel of an empty 10 ml syringe for 15-30 seconds.
 - If logistically feasible, perform the Valsalva maneuver while sitting at a 45° angle as seen in figure A.
 - After 15-30 seconds of Valsalva, immediately lie the patient supine with a passive leg raise for 15 seconds as seen in figure B.
 - Repeat this technique one time if initially unsuccessful.
 - [Training Video 1](#) or [Training Video 2](#).



2. If vagal maneuvers are unsuccessful in converting the regular narrow complex tachycardia administer Adenosine:

<u>Adult</u>	<u>Pediatric</u>
<p>Adenosine</p> <p>1st dose: 6 mg rapid IV push</p> <p>Use single 20-mL syringe containing adenosine added to normal saline</p> <p>If rhythm fails to convert after 1st dose may administer 2nd dose.</p> <p>2nd dose: 12 mg rapid IV push</p> <p>Use single 20-mL syringe containing adenosine added to normal saline</p>	<p>Adenosine</p> <p>1st dose: 0.1 mg/kg rapid IV push (max dose 6 mg)</p> <p>Use single 20-mL syringe containing adenosine added to normal saline</p> <p>If rhythm fails to convert after 1st dose may administer 2nd dose.</p> <p>2nd dose: 0.2 mg/kg rapid IV push (max dose 12 mg)</p> <p>Use single 20-mL syringe containing adenosine added to normal saline</p>

- ❖ Important Note: the “single 20-mL syringe” method of administering adenosine has been shown to be more effective at converting SVT than the classic use of a 3-way stopcock with a rapid flush. Adenosine is stable in, and compatible with normal saline.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Narrow Complex Tachycardia 5.2

- ❖ Important Note: do NOT administer adenosine if the patient has a history of Wolff Parkinson White Syndrome (WPW) or if delta waves are present on EKG.
- 3. If Adenosine fails to convert the regular narrow complex tachycardia, continue cardiac monitoring while transporting patient to the closest appropriate emergency department.
- 4. If the narrow complex tachycardia is irregular, consider administering Esmolol for rate control of presumed atrial fibrillation or atrial flutter with rapid ventricular response:

<i>Adult</i>	<i>Pediatric</i>
Esmolol 0.50 mg/kg IV/IO Administer over 1 minute May repeat dose one time in 5 minutes as needed to control rapid heart rate.	Not Indicated

- ❖ Important note: do NOT administer esmolol for atrial fibrillation or flutter if the rapid rate is potentially compensating for an underlying secondary cause that needs to be treated (e.g., sepsis, GI bleed, PE, cardiac ischemia, alcohol withdrawal etc.) Treat the underlying cause of tachycardia first. Decreasing the heart rate with esmolol before treating the underlying cause can result in rapid cardiovascular collapse and cardiac arrest.
- ❖ Important Note: do NOT administer esmolol if the patient has a history of Wolff Parkinson White Syndrome (WPW) or if delta waves are present on EKG.
- 6. If at any time during the assessment or treatment of a stable narrow complex tachycardia, the patient begins to deteriorate or exhibit signs of tachycardia induced hemodynamic compromise, proceed immediately to synchronized cardioversion.

Pregnancy Considerations:

- Vagal maneuvers, adenosine, and synchronized cardioversion are considered safe and acceptable in pregnancy.
- Esmolol is NOT considered safe in pregnancy due to the risk of causing fetal bradycardia.



MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- The term “SVT” refers to a group of tachydysrhythmias that originate in the atrium, AV node or bundle of His. This includes sinus tachycardia, atrial tachycardia, AV reentrant tachycardia (AVNRT), and AV reentrant tachycardia (AVRT) among others.
- Paroxysmal SVT refers to a clinical syndrome of tachycardia with abrupt onset and termination. The most common cause of paroxysmal SVT is AVNRT and AVRT.
- Paroxysmal SVT is the most common dysrhythmia in children. It should be suspected in a child with a heart rate over 180 BPM or an infant with a heart rate over 220 BPM. Young infants may tolerate rates up to 300 BPM without significant symptoms.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Bradycardia 5.3

This protocol applies to adult and pediatric patients experiencing age-specific bradycardia with signs and symptoms of hemodynamic instability and/or hypoperfusion. Most bradycardic patients will be stable/asymptomatic. Stable patients with bradycardia may require evaluation in an emergency department but do not require specific prehospital treatment.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Heart rate less than 50-60 BPM in adults who are NOT well conditioned athletes.
 - Patient has palpable pulse.
 - Signs and symptoms of hemodynamic instability and/or low cardiac output that are presumed to be due to the bradycardia.
 - Acutely altered mental status
 - Ischemic chest pain
 - Hypotension with signs of hypoperfusion
 - Shortness of breath due to pulmonary vascular congestion
 - Near syncope or syncope.
 - EKG rhythm:
 - Sinus bradycardia
 - Second-degree AV blocks (Mobitz type 1 and 2)
 - Third degree AV block i.e., complete heart block
 - Ventricular escape rhythms
 - See below for pediatric considerations.
- ❖ Important Note: it is critically important to treat the patient based on overall clinical presentation, NOT just the number (i.e., a low heart rate).
- ❖ Important Note: bradycardia causing hemodynamic instability in an adult patient is typically less than 50 BPM.

Exclusion Criteria:

- Hemodynamically stable or asymptomatic bradycardia.
- Patient is in cardiac arrest. [Treat per Cardiac Arrest protocol.](#)

Treatment and Intervention:

1. Initiate [General Assessment and Universal Patient Care protocol.](#)
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol.](#)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Bradycardia 5.3

3. Bradycardia is a symptom of an underlying problem/condition and not a diagnosis. Consider the multiple potential causes of bradycardia:
 - Ischemic heart disease (e.g., STEMI)
 - Hypoxia
 - Hyperkalemia
 - Hypothermia
 - Sinus bradycardia or sick sinus syndrome
 - Head injury (elevated ICP) or stroke
 - Toxins / overdose
 - Endocrinopathies (e.g., hypothyroidism)
 - Medication effects (e.g., beta-blockers, calcium channel blockers, digoxin)
 - Pacemaker malfunction/failure
4. Check blood glucose level. Treat per [Hypoglycemia](#) or [Hyperglycemia protocol](#) as clinically indicated.
5. Rule out head trauma as a suspected etiology. [See Traumatic Brain Injury protocol.](#)
6. If beta-blocker or calcium channel blocker overdose is suspected, treat per [Overdose-Poisoning protocol.](#)
7. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol.](#)
8. All patients with symptomatic bradycardia should be transported ALS with cardiac monitoring throughout treatment and transport.

Pediatric Considerations:

1. Treatment is only indicated for patients who are severely symptomatic.
2. For newborns or infant children less than 12 months of age with a heart rate less than 60 BPM and signs and/or symptoms of hypoperfusion (i.e., altered mental status, hypoxia, hypotension, weak pulse, delayed cap refill, cyanosis)
 - Manage airway and assist breathing with positive pressure ventilation (BVM) and oxygen as necessary.
 - Initiate chest compressions if HR less than 60 BPM despite oxygenation and ventilation. Perform minimally interrupted chest compressions using a compression-to-ventilation ratio of 15:2 if two or more providers are present and 30:2 if a single provider is present.

ADVANCED LIFE SUPPORT PROVIDERS



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Bradycardia 5.3

1. Place patient on continuous EKG monitoring.
2. Obtain [12 lead EKG](#). Identify specific bradycardic dysrhythmia and evaluate for ischemia.
 - If patient has an acute STEMI on EKG, contact medical control before administering medications or pacing.
3. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
4. Bradycardia should be managed via the least invasive manner possible, escalating care as needed (i.e., attempt treatment with medications before initiating pacing).
5. Administer IV fluid bolus unless patient has acute decompensated CHF:

<i>Adult</i>	<i>Pediatric</i>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses
❖ Important Note: reassess for signs of fluid overload. Stop fluids if signs of respiratory distress due to cardiogenic pulmonary edema develop.	

6. Consider hyperkalemia in any patient with a wide complex bradycardia and a history of renal disease or missed dialysis. Treat with calcium chloride per [Hyperkalemia protocol](#). This treatment is safe even if the diagnosis of hyperkalemia is not confirmed.
7. If bradycardia and symptoms of hemodynamic instability continue, initiate the following therapies as indicated:
 - For unstable sinus bradycardia or Mobitz type I, administer atropine:

Adult	Pediatric
Atropine 1 mg IV/IO. Repeat every 3-5 minutes if the patient remains symptomatic. Max total dose is 3 mg.	Atropine 0.02 mg/kg IV/IO Repeat once in 3-5 minutes if the patient remains symptomatic. Minimum dose is 0.1 mg Maximum dose is 0.5 mg



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Bradycardia 5.3

- ❖ Important Note: high degree blocks (Mobitz type II or 3rd degree AV block) or heart transplants may not respond to atropine. In these cases, proceed immediately to administration of IV/IO epinephrine.
- If atropine is ineffective or in cases of high degree blocks (Mobitz type II or 3rd degree AV block) or heart transplant administer epinephrine:
 - [Push dose epi \(See Push Dose Epi Procedure\).](#)

<i>Adult</i>	<i>Pediatric</i>
Push Dose Epinephrine 1 ml (10 mcg) IV/IO every 1 minute as needed Titrate to desired blood pressure	Push Dose Epinephrine 1 mcg/kg IV/IO (max single dose 1 ml or 10 mcg) every 1 minute as needed Titrate to desired blood pressure

OR

- [Epinephrine infusion \(See Epinephrine Infusion Chart\).](#)

<i>Adult</i>	<i>Pediatric</i>
Epinephrine infusion 2-10 mcg/min	Epinephrine infusion 0.1-1 mcg/kg/min

- ❖ Important Note: when using vasopressors target age-appropriate goal blood pressure (e.g., adult goal SBP greater than 90 mmHg or MAP greater than 65 mmHg)
8. If there is no response to atropine and/or epinephrine, initiate transcutaneous pacing per [Transcutaneous Pacing protocol](#).
- Consider [procedural dissociation](#) as needed.
 - Ensure the pacer is in Demand mode.
 - Set the pacer rate to 80 BPM for an adult patient and 100 BPM for a pediatric patient.
 - Ensure both electrical and mechanical capture is achieved.
- ❖ Important Note: may proceed immediately to transcutaneous pacing ONLY if the patient is severely symptomatic with a high degree block (2nd degree type II or 3rd degree) and IV/IO access is not yet available. If IV/IO access is already available, trial push-dose epinephrine or epinephrine infusion before initiating pacing.



MEDICAL CONTROL OPTIONS

1. If patient has an acute STEMI on EKG, contact medical control before administering medications or pacing bradycardia.
2. Contact Medical Control for further orders when necessary.

General Notes:

- It is critically important to treat the patient's presentation and not just the heart rate number. Remember that conditioned athletes may have resting heart rates of 40-60 BPM.
- In unstable patients with bradycardia, the goal of treatment is to increase the heart rate to achieve an adequate cardiac output to perfuse vital organs.
- Atropine is a vagolytic and will only affect the SA node and proximal AV node. Bradyarrhythmias below the AV node will not respond well to atropine (wide QRS).
- Patients who have undergone cardiac transplant have a denervated heart and will not respond to atropine.
- Epinephrine works on the entire myocardium and will increase the rate and contractility of the heart. It is often more useful than atropine.
- Bradycardia caused by metabolic/toxic causes (e.g., hypothermia, hyperkalemia, hypothyroidism) will not respond to standard therapy (i.e., atropine, pacing, etc.). The underlying disease must be treated first.
- Narrow QRS bradycardias usually have a better prognosis and frequently do NOT require pacing. These bradycardias are frequently vagally induced or occur because of a reversible cause (e.g., beta blocker overdose).
- Wide QRS bradycardias are concerning for infranodal block or disease. These patients will likely need resuscitation and may potentially require permanent pacemaker placement.
- Hyperkalemia can present with profound bradycardia and can mimic heart blocks (especially 3rd degree).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Coronary Syndrome – Chest Pain 5.4

This protocol applies to adult patients with non-traumatic chest pain that is suspected cardiac in etiology. The overall goal is to provide therapy in an effort to reduce ischemia, provide pain relief and rapidly identify and treat a patient suffering from a suspected cardiac event.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen if Oxygen Saturation by pulse oximetry is less than 94%.
3. Place the patient in a position of comfort.
4. Administer **Aspirin 324 mg PO** (chewed and swallowed) if not taken during the previous 24 hours or has no known allergy. (**Contact Medical Control for pediatric patients**).
5. BLS providers should assist patients in taking their own previously prescribed **Nitroglycerin SL 0.4 mg** or may use EMS stock medications if the patient's prescribed Nitroglycerin is not available. **BLS providers can only assist the patient with one dose of 0.4 mg Nitroglycerin SL.**

Caution: Withhold Nitroglycerin and consult Medical Control if:

- **The patient meets pediatric criteria.**
 - **The patient has a systolic blood pressure ≤ 110 mmHg or HR < 60 .**
 - **The patient has taken erectile dysfunction medications within the past 24 hours (i.e. Viagra, Cialis, or Levitra)**
6. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring**. Treat life threatening dysrhythmias as indicated.
2. Obtain a **12 lead EKG** pre-treatment and post-treatment. If myocardial injury is suspected because of ST elevation which is evident in two or more contiguous leads, the patient shall be transported to the nearest cardiac interventional facility (STEMI Facility). The EKG indicating a STEMI should be transmitted to the receiving facility and the hospital should be notified as soon as practicable. Note: **A 12-lead EKG must be done prior to administering nitroglycerin in order to rule out right-sided or posterior AMIs.**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Coronary Syndrome – Chest Pain 5.4

3. If the EKG shows S-T elevation in leads II, III, and AVF and is suggestive of an acute inferior MI or lead V4R indicates a right sided MI or posterior MI withhold Nitroglycerin and provide a fluid bolus of 1 liter of Normal Saline. In cases of suspected right sided or posterior MI, narcotic analgesia may only be used with Medical Control orders.
4. Continuously assess lung sounds and monitor vital signs before and after administration. Administer additional **Normal Saline Boluses of 250 ml** as needed to maintain or restore perfusion in cases of hypoperfusion with or without right ventricular involvement (RVI). **Maximum total of 2000 ml.**
5. Administer **Nitroglycerin 0.4 mg SL** every 3-5 minutes as long as the patients symptoms persist and the systolic blood pressure is ≥ 110 mmHg.
6. Apply **Nitroglycerin paste 1"** for persistent symptoms after two (2) SL doses of Nitroglycerin have been previously administered. Ensure that the systolic blood pressure is ≥ 110 mmHg prior to application.
7. Administer **Fentanyl** or **Morphine Sulfate** for chest pain that is not relieved by Nitroglycerin. Titrate for relief of discomfort with repeat dosing as needed every 5-10 minutes as long as SBP ≥ 110 mmHg.
 - If the EKG shows Inferior, RVI, or Posterior MI or if the patient exhibits signs / symptoms of hypoperfusion Contact Medical Control for Fentanyl / Morphine Sulfate.
 - Withhold from patients suffering from suspected or actual cocaine induced chest pain with agitation.
 - In patients 65 years old and greater consider an initial dose of half your normal adult dose when administering opiates (Fentanyl / Morphine).

<u>Adult</u>	<u>Pediatric</u>
Fentanyl 25-50 mcg IV per dose every 5 minutes to a maximum of 200 mcg. Use 25 mcg for the elderly or a weight under 70 kg	Contact Medical Control



or



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Coronary Syndrome – Chest Pain 5.4

<u>Adult</u>	<u>Pediatric</u>
Morphine Sulfate 2 mg IV titrated to cessation of pain. Maximum total dose of 10 mg	Contact Medical Control



8. For nausea / vomiting consider **Ondansetron (Zofran)** or **Prochlorperazine (Compazine)**. May repeat once in 10 minutes if nausea/vomiting is not relieved:

<u>Adult</u>	<u>Pediatric (ALS Only)</u>
Ondansetron (Zofran) 4 mg IV over 30 seconds	Ondansetron (Zofran) 0.15 mg/kg IV over 30 seconds. Maximum single dose 4 mg

or

<u>Adult</u>	<u>Pediatric</u>
Diphenhydramine 25 mg IV/IM followed by Prochlorperazine (Compazine) 10 mg IV/IM	Not Indicated

MEDICAL CONTROL OPTIONS

1. **Midazolam (Versed) 2-5 mg IV/IN, up to a maximum 7 mg or Pediatric Patients: 0.1 mg/kg, up to a maximum single dose of 5 mg in lieu of Morphine Sulfate or Fentanyl, if chest pain is suspected due to CNS stimulants (i.e. cocaine, methamphetamine, etc.)**
2. **Additional doses of Fentanyl or Morphine Sulfate**
3. **Dopamine infusion 5-20 mcg/kg/min for persistent hypoperfusion.**
4. **Pediatric Patients: Morphine Sulfate 0.1 mg/kg slow IVP**
5. **Pediatric Patients: Fentanyl 1 mcg/kg IVP**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Coronary Syndrome – Chest Pain 5.4

Wall affected	Leads	Artery(s) involved	Reciprocal changes
Anterior	V ₂ – V ₄	Left coronary artery, Left anterior descending (LAD)	II, III, AVF
Anterolateral	I, AVL, V ₃ – V ₆	Left anterior descending (LAD) and diagonal branches, circumflex and marginal branches	II, III, AVF
Anteroseptal	V ₁ – V ₄	Left anterior descending (LAD)	
Inferior	II, III, AVF	Right coronary artery (RCA)	I, AVL
Lateral	I, AVL, V ₅ , V ₆	Circumflex branch or left coronary artery	II, III, AVF
Posterior	V ₈ , V ₉	Right coronary artery (RCA) or circumflex artery	V ₁ – V ₄ ST segment depression (R > S in V ₁ and V ₂).
Right ventricular	V ₄ R	Right coronary artery (RCA)	-----



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Pulmonary Edema - CHF 5.5

This protocol applies to patients experiencing pulmonary edema secondary to congestive heart failure (CHF). The goal is to ultimately reduce the preload and afterload pressures of the myocardium. In pediatric patients, congenital heart defects are generally the culprit of CHF. Contact medical control before any medication therapy is rendered to pediatric patients.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. If the patient is conscious and in moderate to severe respiratory distress with adequate respiratory effort, apply **Continuous Positive Airway Pressure Device (CPAP)** and titrate to a pressure of:

<u>Adult</u>	<u>Pediatric</u>
10 cmH ₂ O	Not Indicated

- Before applying the CPAP face piece place the nasal cannula ETCO₂ device on the patient. This will allow for the introduction of additional Oxygen and eventual monitoring via continuous quantitative waveform capnography (ETCO₂) without having to remove the face piece.
4. Place the patient in a position of comfort.
 5. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*

ADVANCED LIFE SUPPORT PROVIDERS

1. Administer **Nitroglycerin**. ALS providers may administer 1st dose even before IV access is established.

Caution - Withhold Nitroglycerin or consult Medical Control if:

- The patient has a systolic blood pressure ≤ 110 mm/Hg.
- The patient has taken erectile dysfunction medications within the past 24 hours (i.e. Viagra, Cialis, or Levitra).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Pulmonary Edema - CHF 5.5

<u>Adult</u>	<u>Pediatric</u>
Nitroglycerin 0.4 mg SL every 5 minutes as long as the patients symptoms persist and the systolic BP is ≥ 110 mmHg. <u>No limit to the number of doses</u>	Not indicated

2. Provide **continuous EKG and quantitative waveform capnography monitoring** (ETCO₂) via nasal cannula device.
3. Apply **Nitroglycerin paste**:

<u>Adult</u>	<u>Pediatric</u>
Nitroglycerin Paste 1" for persistent symptoms. Ensure that the systolic blood pressure is ≥ 110 mmHg prior to application.	Not indicated

4. Administer **Enalaprilat IV** if SBP ≥ 110 mmHg and no known sensitivity to ACE inhibitors (i.e. Lisinopril, Captopril, and Monopril):

<u>Adult</u>	<u>Pediatric</u>
Enalaprilat 1.25 mg IV	Not Indicated

5. In instances where bronchospasm is present with wheezing, **Albuterol 2.5 mg** via nebulizer in line circuit with CPAP.
6. Obtain a **12 lead EKG** if time and patient condition permits. If myocardial injury is suspected because of ST elevation which is evident in two or more contiguous leads or chest pain is present, administer **Aspirin 324 mg PO** and transport to the nearest cardiac interventional facility (STEMI Facility).

MEDICAL CONTROL OPTIONS

1. Consider **Lasix 20-40 mg IV** if signs of fluid overload present.
2. Consider **Lasix for Pediatric Patients: 0.5 mg/kg IV**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Cardiac Emergencies

Acute Pulmonary Edema - CHF 5.5

3. Consider **Midazolam (Versed) 2-5 mg IV/IN, up to a maximum of 7 mg** or ***Pediatric Patients: 0.1 mg/kg IV up to a maximum single dose of 5 mg*** for severe anxiety titrated to anxiety reduction with a noted decrease in anxiety related tachycardia.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

This protocol provides management guidelines for any adult patient with an implantable ventricular assist device (VAD), including a left ventricular assist device (LVAD), right ventricular assist device (RVAD), or biventricular-assist device (BiVAD).

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult patient with a VAD that presents with
 - Symptoms of cardiovascular compromise
 - Cardiac arrest
 - Medical or injury-related event NOT involving the cardiovascular system or VAD malfunction

Exclusion Criteria:

- Patients who do NOT have a VAD in place

Washington Metropolitan VAD Centers:

- George Washington University Hospital (H8)
- MedStar Washington Hospital Center (H13)
- Inova Fairfax Hospital (H29)

Basics of a VAD

1. Indication for placement: nearly all patients who have a VAD have severe, end-stage systolic heart failure. VAD's are typically placed in patients whose heart failure has progressed despite maximal medical therapy. Some of these patients are waiting for a heart transplant.
2. See General Notes section below for a review of the important components of a VAD.
3. Continuous-flow (as opposed to older and now rarely used pulsatile-flow) devices account for the majority of VADs implanted today. Due to the continuous-flow, patients may not have a palpable pulse, and their normal heart sounds will be replaced with an audible "VAD hum."
4. Due to the continuous-flow, vital signs such as noninvasive blood pressure or oxygen saturation may be difficult or impossible to obtain.
5. BP can be obtained with a manual cuff and a doppler ultrasound probe if available.
 - In the absence of a pulse, the doppler return to flow number is considered a mean arterial pressure (MAP). Goal MAP is 60-80 mmHg
 - In the presence of a palpable pulse, the doppler return to flow number is a systolic BP



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

6. Lack of palpable pulse in a patient with a continuous-flow VAD is common and alone cannot be used to determine whether a patient is in cardiac arrest.
7. The two most common causes of VAD pump failure are disconnection of the power source and failure of the driveline.

Treatment and Interventions:

1. In accordance with AHA consensus recommendations, OUC call takers have been instructed to start telephone CPR in patients with a VAD if there are no signs of life at the time of 911 activation.
2. Initiate General Assessment and Universal Patient Care Protocol
3. Manage airway as indicated per Airway Management and Oxygen Therapy Protocol
4. Assess VAD for pump malfunction or failure:
 - Look and listen for VAD alarms
 - Auscultate over the left chest/upper abdomen for the pump sound i.e., “VAD hum.” A continuous humming sound means the pump IS working
 - Assess for clinical signs of inadequate/poor perfusion
 - Altered mental status
 - Skin color and temperature such as pallor or diaphoresis
 - Delayed capillary refill
 - Work of breathing
5. If patient has a normal functioning VAD and is experiencing a non-cardiovascular related problem requiring hospital evaluation, treat patient per applicable FEMS protocol and transport to the patient’s regional VAD center without manipulating the device.
6. If the VAD pump has malfunctioned or there are clinical signs of inadequate perfusion:
 - Utilize available resources to troubleshoot potential VAD malfunction and to determine appropriate corrective actions to restore normal VAD function
 - Contact the patient’s VAD-trained companion, if available
 - Contact the patient’s VAD coordinator as soon as possible, using the phone number on the device
 - Ensure secure connections to the system controller
 - Ensure an adequate power source is connected
 - Have patient stop all physical activity and assess for patient tolerance
 - If the VAD is still not functioning after checking the above, a system controller change-out should be considered if there is a trained provider or family member available. Family members are trained to make this controller change.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

- If the VAD is still not functioning, especially if the ETCO₂ is < 20 mmHg in a correctly intubated patient, external manual chest compressions should be initiated, and standard ACLS protocols followed.
7. If the VAD appears to be functioning, noted by a mechanical hum on auscultation of the left chest/upper abdomen, BP should be checked
- If available, a doppler BP (MAP) should be obtained
 - If unavailable, a noninvasive BP may be attempted; however, as noted above this may not be obtainable in a continuous-flow device.
 - If an obtained MAP is < 50 mmHg, start manual chest compressions
 - If an obtained MAP is > 50 mmHg, do NOT start chest compressions because the VAD is likely providing adequate forward blood flow
 - If there is no detectable BP in a correctly intubated patient, ETCO₂ can be measured. If ETCO₂ > 20 mmHg, like a patient with a MAP > 50 mmHg, do NOT start chest compressions
 - If the ETCO₂ < 20 mmHg start manual chest compressions
- ❖ Important Note: **DO NOT USE THE LUCAS DEVICE, when CPR is indicated, perform only manual chest compressions**
8. If patient is experiencing a VAD-related complication or cardiovascular problem, expedite transport to the patient's regional VAD center, while providing ALS care outlined below.
- **EXCEPTION:** If the patient's regional VAD center is Inova Fairfax Hospital (H29) and the patient's clinical condition (e.g., CPR in progress) does not allow for this length of transport, the patient may be diverted to a closer VAD center in DC.
9. Any patient requiring transport to the hospital who typically receives their VAD care at a facility located outside of the Washington Metropolitan area shall be transported to the closest regional VAD center. (i.e., Hospital 8, 13, or 29)
10. When transporting, for any reason, a patient with a VAD, always transport the patient with their backup/spare VAD equipment (e.g., controller and batteries).
11. Many family members of patients with a VAD are trained in device emergency procedures. If feasible, transport these family members in the same vehicle as the patient.
12. Some patients with a VAD will have a valid MOST Form or other valid actionable end-of-life medical order. (e.g. POLST Form, DNR order, or Advanced Directive)
- Check Section A of the MOST Form for DNR status.
 - If Do Not Attempt Resuscitation is selected, the patient should be treated as any other patient with this medical order. See DNR MOST Protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

ADVANCED LIFE SUPPORT PROVIDERS

1. Apply continuous cardiac monitor and acquire 12-lead EKG as soon as possible.
 - VADs do NOT create irrelevant or erroneous EKG tracings but may create interference. Tachyarrhythmias (e.g., atrial fibrillation, ventricular tachycardia, etc.) are common in these patients.
 - Ventricular tachycardia (VT) or ventricular fibrillation (VF) can be accompanied by a range of hemodynamic presentations. Not all patients with a LVAD who are in VT or VF will be unconscious. The VAD may provide enough forward blood flow despite the arrhythmia to maintain consciousness and, in some cases, even adequate perfusion.
 - **The decision to cardiovert/defibrillate a patient with an LVAD is based on the adequacy of mental status and perfusion. (Assess perfusion as noted above, remember that perfusion in these patients does not equate to a palpable pulse)**
 - **Symptomatic arrhythmias should be cardioverted/defibrillated per standard ACLS rhythm specific protocols.**
 - Do NOT place pads over driveline.
 - Do NOT turn off or disconnect the LVAD for cardioversion/defibrillation.
2. Establish large gauge IV access as the preferred route for medication and fluid administration.
 - If peripheral IV access is unsuccessful than obtain IO access
 - IO placement in the humerus (preferred in adults) or tibia can be the first venous access procedure during cardiac arrest if insertion of an IV would disrupt CPR.
3. If patient has a functioning VAD and has signs of inadequate perfusion and MAP < 80 mmHg or BP is not obtainable:
 - Administer IV/IO fluid bolus

Adult

250 ml as needed to maintain or restore perfusion.
Maximum total of **2000 ml**

4. Treat per rhythm specific ACLS Protocols as indicated.

MEDICAL CONTROL OPTIONS



DC Fire and EMS Pre-Hospital Treatment Protocols

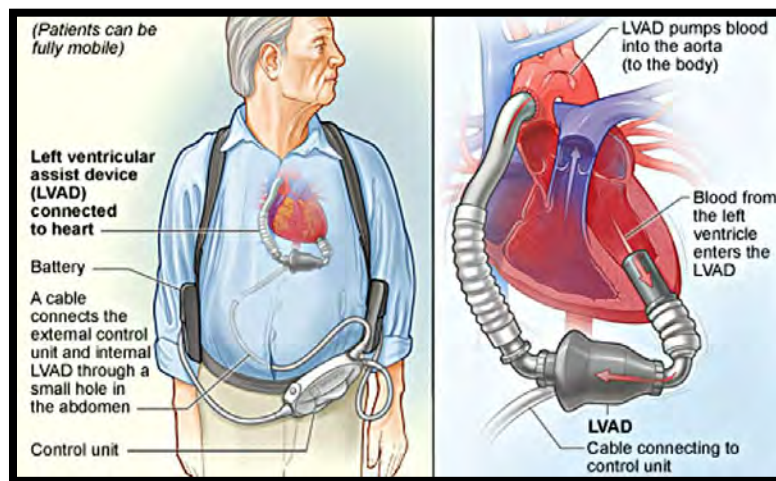
Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

1. Contact Medical Control with any questions regarding management options.
2. VAD coordinators are often the first line of communication for EMS and family members when caring for patients with a VAD emergency. Providers may follow the direction of the VAD coordinator so long as the instruction is within the providers scope of practice (EMT or Paramedic) and is reasonable given the patient's presentation and on-scene resources.

General Notes:

- These guidelines are based on the 2017 AHA Scientific Statement on Cardiopulmonary Resuscitation in Adults and Children with Mechanical Circulatory Support. [Cardiopulmonary Resuscitation in Adults and Children with Mechanical Circulatory Support: A Scientific Statement from the American Heart Association \(ahajournals.org\)](https://www.ahajournals.org/doi/full/10.1161/ATL.0000000000000123)
- Most patients who are discharged home with a VAD have a LVAD. These devices use a pump implanted inside the thoracic/abdominal cavity, which pump blood from the weakened left ventricle into the central aortic circulation, thus "assisting" the heart.



- The internal pump is connected to a controller that controls and powers the pump via a driveline that exits the skin, typically in the abdomen. The controller houses the electronics that run the device and monitor its function. The controller is connected to two rechargeable batteries which can provide anywhere from 8 to 12 hours of power. The VAD can also receive power from a base unit, typically located at the patient's home, or via adapters to other power sources such as a grounded electrical outlet or car battery.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6

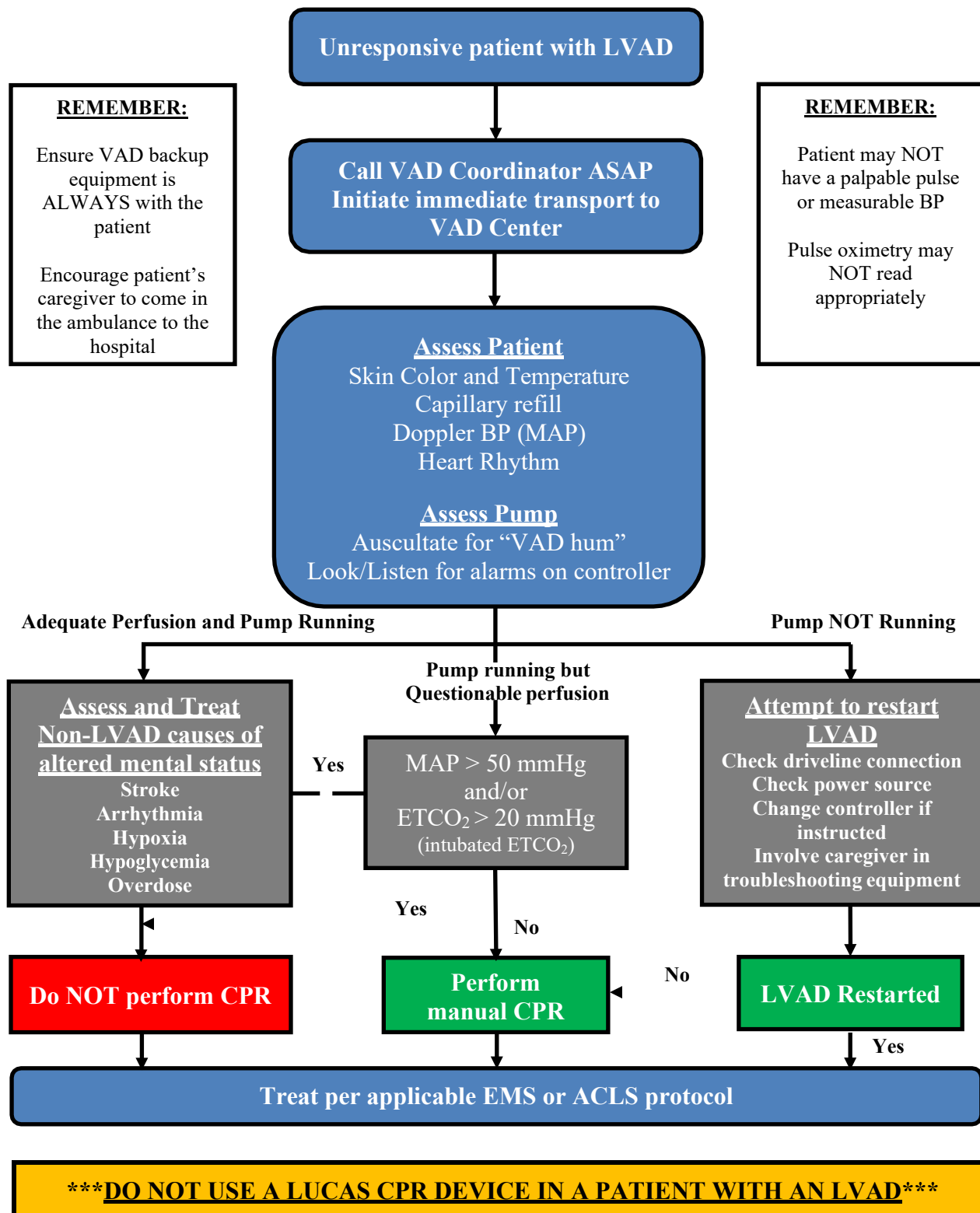
- Automated BP monitors are accurate, but their success rate in obtaining a BP is only approximately 50% because of reduced pulse pressure in patients with a continuous-flow VAD. Similarly, pulse oximetry may be inaccurate as well.
- Current generation of continuous-flow LVADS are quite reliable and the incidence of pump dysfunction/failure is low. An interruption of power from the batteries or through the controller or a driveline malfunction may lead to pump failure.
- The most common cause of VAD alarms are low batteries or battery failures. There will often be alarms preceding or accompanying the pump failure, but alarms will stop once the batteries are drained.
- Although LVADs provide near-complete support of the cardiac output, most patients still have residual native heart function. With LVAD pump dysfunction/failure, the heart may still provide some forward blood flow to support perfusion for a period of time, the duration of which differs from patient to patient, depending on the severity of underlying cardiac dysfunction.
- All patients with a VAD are on anticoagulant medications and are at increased risk of bleeding.
- The most common complications during long-term VAD support are driveline infections, gastrointestinal bleeding and stroke.
- Patients with a VAD can develop non-pump related medical issues (e.g., hypoglycemia, drug-overdose, hypoxemia) similar to patients without a VAD, resulting in alterations in mental status and hemodynamics. These situations can mimic a cardiac arrest in a nonpulsatile VAD patient. They can also be the inciting factor for hemodynamic collapse or altered mental status/coma. Thus, these conditions should be considered, identified, and treated promptly in altered or hemodynamically compromised patients.
- You do not need to disconnect the controller or batteries to defibrillate, cardiovert, or acquire a 12-lead EKG
- The patient's travel bag with back-up controller and spare batteries, should always accompany them. If feasible, bring the patient's power module, cable, and display module to the hospital as well.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - Cardiac Emergencies

Ventricular Assist Device (VAD) 5.6





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Airway Obstruction 6.1

This protocol applies to patients with a suspected or actual foreign body airway obstruction or airway obstructions due to trauma, burns, or severe anaphylactic reactions. Do not delay transport for patients that are unconscious with a complete airway obstruction. Perform BLS and/or ALS skills en route to the medical facility.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. If the patient is experiencing an incomplete / partial airway obstruction, encourage the patient to cough in an attempt to relieve the obstruction.
3. If the patient is conscious and the airway is completely obstructed due to a foreign body, perform **BLS obstructed airway techniques** until the obstruction is relieved or the patient goes unconscious.
4. If the patient is unconscious, perform BLS obstructed airway techniques Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
5. Provide immediate transportation to the nearest appropriate medical facility if the foreign body obstruction is not relieved or closed due to trauma or severe anaphylaxis. Monitor the patient for cardiac arrest.

ADVANCED LIFE SUPPORT PROVIDERS

1. If the patients airway is still obstructed due to a foreign body and is unconscious, perform the following advanced airway techniques in order:
 - Perform **Direct Laryngoscopy** and remove any foreign body obstruction seen with Magill forceps if possible.
 - Perform an emergent **Needle Cricothyroidotomy**. *This is the last resort when a foreign body airway obstruction is present.*
2. If the patients airway is completely obstructed due to trauma, burns, or severe anaphylaxis:
 - Perform an emergent **Needle Cricothyroidotomy**.

MEDICAL CONTROL OPTION

1. Contact Medical Control for further orders when necessary



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Bronchospasm – Asthma - COPD 6.2

This protocol applies to patients experiencing respiratory distress associated with Asthma or COPD.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
 - For patients with a history of COPD, administer the patients prescribed dose of **Oxygen**. If severe distress is present, administer 100% supplemental Oxygen and monitor respiratory effort and rate.
3. Place the patient in a position of comfort.
4. If the patient presents with respiratory distress with suspected bronchospasm /wheezing, administer **Albuterol**:

<u>Adult</u>	<u>Pediatric</u>
Albuterol 2.5 mg via nebulizer	Albuterol 2.5 mg via nebulizer

5. If the patient continues to exhibit or report respiratory distress with bronchospasm/wheezing administer a combination of **Albuterol** and **Ipratropium Bromide (Atrovent)** via nebulizer one time only for pre-hospital care.

<u>Adult</u>	<u>Pediatric</u>
Albuterol 2.5 mg nebulized and Atrovent 500 mcg nebulized	Albuterol 2.5 mg nebulized and Atrovent 500 mcg nebulized

- If the patient is in extremis or does not clear after the first nebulized Albuterol treatment ALS care shall be immediately initiated.
- BLS providers should contact medial control for orders for additional Albuterol 2.5 mg via nebulizer if the patient's symptoms persist and ALS care is not immediately available.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Bronchospasm – Asthma - COPD 6.2

6. For COPD patients experiencing significant respiratory distress, consider **Continuous Positive Airway Pressure Device (CPAP)** and start at a pressure of **5 cmH₂O** with an in-line nebulizer.
 - Before applying the CPAP face piece place the nasal cannula ETCO₂ device on the patient. This will allow for the introduction of additional Oxygen and eventual monitoring via continuous quantitative waveform capnography (ETCO₂) without having to remove the face piece.
 - **Some COPD patients have lung problems that may be worsened by CPAP. If the patient worsens on CPAP, remove the device immediately.**
7. If the patient still presents with respiratory distress and is in extremis, administer **Epinephrine IM** in the lateral aspect of the patient's thigh:

<u>Adult</u>	<u>Pediatric</u>
Epinephrine 1:1,000 <u>BLS</u> or <u>ALS</u>: 0.3 mg via Auv-Q <u>ALS</u>: 0.3-0.5 mg IM (ALS)	Epinephrine 1:1,000 <u>BLS</u> or <u>ALS</u>: ≤3 y.o. 0.15 mg IM via Auv-Q <u>ALS</u>: 0.01 mg/kg IM up to a maximum single dose 0.5 mg

8. Establish an **IV** of Normal Saline KVO or Saline Lock for patients that are experiencing significant respiratory distress and those with a significant cardiac history. **Advanced EMTs may initiate IV access.**

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG and continuous quantitative waveform capnography (ETCO₂)**.
2. For patients who appear dehydrated and are without signs of pulmonary edema consider a single **Normal Saline Bolus**:

<u>Adult</u>	<u>Pediatric</u>
250 ml	20 ml/kg



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Bronchospasm – Asthma - COPD 6.2

Patients should be treated based on the level of distress exhibited and their response to therapies.

Providers should immediately proceed with treatments as indicated by the categories:

For patients experiencing **MILD DISTRESS**

1. Providers may repeat **Albuterol 2.5 mg via nebulizer** to a total of 3 doses or 7.5 mg.
2. Administer **Prednisone PO**:

<u>Adult</u>	<u>Pediatric</u>
Prednisone 60 mg PO	Contact Medical Control



For patients experiencing **SEVERE DISTRESS**:

1. Administer nebulized **Racemic Epinephrine**:

<u>Adult</u>	<u>Pediatric</u>
Racemic Epinephrine 0.5 ml unit dose mixed in 3 ml of Normal Saline	Racemic Epinephrine Less than 5 kg: 0.25 ml mixed in 3 ml Normal Saline 5 kg or greater: 0.5 ml Unit dose mixed in 3 ml of Normal Saline

2. Administer **Methylprednisolone (Solu-Medrol)**:

<u>Adult</u>	<u>Pediatric</u>
Solu-Medrol 125 mg IV/IM	Solu-Medrol 2 mg/kg IV/IM, up to a maximum single dose of 125 mg

3. If IV access is not available or patient can tolerate PO delivery then administer **Prednisone PO**:

<u>Adult</u>	<u>Pediatric</u>
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DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Bronchospasm – Asthma - COPD 6.2

Prednisone 60 mg PO	Contact Medical Control
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4. If no or minimal improvement with other therapies consider administering **Magnesium Sulfate**:

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Magnesium Sulfate 2 gm slow IV Infusion. Mix 2 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min over 20 minutes.	Contact Medical Control



5. Once air movement has improved, continue with **Albuterol 2.5 mg via nebulizer as needed.**

For patients with **IMPENDING RESPIRATORY FAILURE**

1. For adult patients, mix **Racemic Epinephrine** (0.5 ml), **Albuterol** (2.5 mg) and **Ipratropium Bromide** (500 mcg if not previously administered) in a “*super neb*” and deliver via an in-line nebulizer device. *Consider use of CPAP for COPD patients in extremis with inline nebulizer system.*
2. Continue to deliver nebulized treatments (**Albuterol**) via the CPAP circuit until the patient improves or need for ventilatory support and intubation arises.
3. If after previous therapies the SpO₂ cannot be maintained above 90% with ventilatory assistance or CPAP then refer to the **Medication Facilitated Intubation** protocol as applicable.

MEDICAL CONTROL OPTIONS

1. Consider additional doses of **Epinephrine 1:1,000 IM.**
2. **Pediatric Patients:** **Magnesium Sulfate 25-50 mg/kg IV** over 20 minutes, up to a maximum single dose of **2 gm.**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Croup – Upper Airway Compromise 6.3

This protocol applies to patients that present with a loud cough that mimics the “bark of a seal”, respiratory distress, grunting, wheezing or stridor on inspiration. The major concern of this illness is the possibility of airway obstruction.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Move the patient to a cool environment.
4. If the patient presents with respiratory distress with clinical evidence of croup, administer **Normal Saline 3 ml** via Nebulizer. Repeat 2 additional times as necessary if the patient improves with the initial administration.
5. Consider establishing an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG and continuous quantitative waveform capnography (ETCO₂)**.
2. If stridor is present administer nebulized **Racemic Epinephrine**:

<u>Adult</u>	<u>Pediatric</u>
Racemic Epinephrine 0.5 ml unit dose mixed in 3 ml of Normal Saline	Racemic Epinephrine Less than 5 kg: 0.25 ml mixed in 3 ml Normal Saline 5 kg or greater: 0.5 ml unit dose mixed in 3 ml of Normal Saline

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Respiratory Failure and Arrest 6.4

This protocol applies to patients who exhibit signs and symptoms of respiratory failure with impending or actual respiratory arrest.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. If a narcotic (opiate) overdose is suspected, administer **Naloxone (Narcan)**:
 - Respiratory arrest or insufficient ventilation
 - Pinpoint Pupils
 - GCS less than 13

(If a definitive airway (King or ET Tube) is already in place and ventilation is adequate **DO NOT** administer Narcan)

<u>Adult</u>	<u>Pediatric</u>
<p>Naloxone (Narcan):</p> <p><u>BLS</u>: 2 mg IN only, may repeat twice at the same dose</p> <p><u>AEMT or ALS</u>: 2 mg IV/IN or IM. If no response from the initial dose within 5 minutes, repeat 4 mg IV/IN and titrate to effect thereafter if indicated</p>	<p>Naloxone (Narcan):</p> <p><u>ALS</u> only: 0.1 mg/kg IV/IN or IM, up to a maximum single dose of 2 mg</p>

- Patients receiving Narcan should receive care at the ALS level and should be transported to the hospital for further evaluation and treatment.
4. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG and continuous quantitative waveform capnography (ETCO₂)**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Respiratory Failure and Arrest 6.4

2. Initiate advanced airway management if the airway cannot be managed properly utilizing BLS airway maintenance.
 - If the patient is intubated via ET intubation, withhold further treatments of Narcan and transport the patient with supported ventilations.
3. If the patient has an intact gag reflex and muscle tone that will inhibit oral intubation immediately refer to the **Medication Facilitated Intubation Protocol**.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Post Invasive Advanced Airway Management 6.5

ALS

Purpose:

Provide continued and supportive patient care after placement of an invasive advanced airway (endotracheal tube or supraglottic airway) in the prehospital setting.

Clinical Indications:

Any patient who has an invasive advanced airway device in place.

Contraindications:

None

Procedure:

1. Confirm correct placement of advanced airway with continuous waveform capnography (ETCO₂), presence of bilateral breath sounds and absent gastric sounds with ventilation.
2. Secure device manually by hand until it is secured with tape, twill, or a commercial device. Note measurement of tube at incisors or gum line and monitor frequently for tube movement/displacement.
3. Never let the BVM simply “drop” while connected to an endotracheal tube (ETT) as this may dislodge the tube. This can occur even when a commercial tube holder is being utilized. Recommend briefly disconnecting the BVM from the ETT when moving the patient in or out of the medic unit, transferring from the cot to the hospital stretcher, or whenever you must take your hands off the BVM.
4. Keep the head of stretcher elevated 35-45° during transport to improve pulmonary function and decrease risk of micro aspiration. This can be performed in trauma patients per the spinal motion restriction protocol.
5. Ensure post invasive advanced airway ventilation rate and tidal volume is appropriate for the specific clinical scenario and patient age.
 - Tidal Volume: ventilate with the minimum volume necessary to see chest rise. Excessive tidal volumes and over-inflation of the lungs can result in lung injury and increase mortality and morbidity in some patient populations.
 - Ventilation Rate: maintain normal ventilation rates based on patient age. Routine and or accidental hyperventilation should be strictly avoided. Goal is to maintain an ETCO₂ of 35-45 mmHg.
 - Adult: 10-12 breaths per minute
 - Child: 20 breaths per minute
 - Infant: 30 breaths per minute



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Post Invasive Advanced Airway Management 6.5

- EXCEPTION: See TBI protocol for ETCO₂ guided ventilation management during active brain herniation.
- 6. If available and time allows, place a NG or OG tube to decompress the stomach, decrease the risk of vomiting and aspiration and to improve oxygenation and ventilation.
- 7. Continue active treatment and resuscitation of the injury or illness that required advanced airway placement.
- 8. Repeat your primary survey and obtain serial vital signs every 3-5 minutes. Treat accordingly any newly identified life-threats.
- 9. Continuously monitor placement of advanced airway device with waveform capnography (ETCO₂) throughout treatment, transport, and patient care handoff at the receiving facility.
- 10. Assess and frequently reassess patient for signs of pain, discomfort, or agitation post advanced airway placement:
 - Combative or aggressive behavior
 - Purposeful or non-purposeful movement of the arms or legs
 - Eye opening, tears or watery eyes
 - “Bucking the tube” or asynchrony with bag valve ventilation
 - New or worsening hypertension or tachycardia after airway placement
- 11. If patient shows signs of pain, discomfort, or agitation after advanced airway placement: Provide post advanced airway management pain control AND sedation:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
<u>Ketamine</u> 0.5 mg/kg IV/IO may repeat every 5 minutes as needed for pain or agitation	<u>Ketamine</u> 0.5 mg/kg IV/IO may repeat every 5 minutes as needed for pain or agitation
Ketamine may be used for any patient but is specifically preferred for patients who are hypotensive or in shock, are wheezing or who were intubated for severe asthma.	

OR



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Post Invasive Advanced Airway Management 6.5

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
<u>Fentanyl</u> 25-100 mcg IV/IO may repeat every 5 minutes as needed for pain <u>AND</u> <u>Versed</u> 2-5 mg IV/IO may repeat every 5 minutes as needed for agitation	<u>Fentanyl</u> 0.5 mcg/kg IV/IO up to a maximum single dose of 25 mcg. May repeat every 5 minutes as needed for pain <u>AND</u> <u>Versed</u> 0.1 mg/kg IV/IO, up to a maximum single dose of 2 mg. May repeat every 5 minutes as needed for agitation

12. Consult Medical Control for additional medication orders as needed.
13. Hypotension is common in the immediate post intubation period (particularly if performing Medication Facilitated Intubation) and should be both anticipated and treated aggressively as it is a common precursor to post-intubation cardiac arrest. It is commonly caused by:
 - Decreased venous return to the heart from increased intrathoracic pressure created by positive pressure bag valve ventilation.
 - Hyperventilation
 - Sedative medications
 - Tension Pneumothorax
 - Hypovolemia
 - Metabolic acidosis
 - Cardiac ischemia or dysfunction
14. For sudden deterioration of a patient with an invasive advanced airway in place, immediately consider the following potential causes and treat accordingly:
 - Dislodgement of the invasive advanced airway
 - Obstruction of the invasive advanced airway
 - Pneumothorax
 - Equipment failure

Notes:

- The cornerstone of post invasive advanced airway patient comfort is pain control first followed by sedation as needed. A combination of fentanyl **AND** versed provides both analgesia and sedation that can be titrated as necessary. Alternatively, ketamine provides both analgesia and sedation at the same time.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Respiratory Emergencies

Post Invasive Advanced Airway Management 6.5

- Initial and continuous ETT confirmation with waveform capnography (ETCO₂) is mandatory. Reliance on only clinical methods of tube confirmation (visualizing cords, lung sounds, absence of gastric sounds) is NOT reliable and results in unacceptably high rates of missed esophageal intubations.
- At least 5-6 ventilations resulting in a normal appearing ETCO₂ waveform and a consistent ETCO₂ level must be seen before the endotracheal tube can be declared correctly placed in the trachea.
- The waveform capnography tracing of an esophageal intubation is most frequently a zero ETCO₂ flatline. However, because the esophagus can possess small amounts of CO₂ from swallowed respiratory gases or from BVM ventilations, an esophageal intubation can produce a tracing of a few misshaped waves of ETCO₂. The key feature to recognize is that the small amount of ETCO₂ potentially detected during an esophageal intubation rapidly decreases to a zero flatline tracing, typically within 5-6 ventilations.
- A colorimetric CO₂ detection device should be considered a back-up confirmatory device and used only if waveform capnography is not available.
- When ALS resources are on scene, waveform capnography ETCO₂ shall be used on all supraglottic airway devices and BVM's to ensure effective and adequate gas exchange as well as to monitor ventilation rate.
- In small pediatric patients, uncontrolled head flexion and extension can move an ETT a centimeter or more within the trachea resulting in accidental extubation. All providers should be mindful of this risk and take precautions to minimize unnecessary or uncontrolled head movement.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Abdominal Pain – Non-Traumatic 7.1

This protocol applies to all adult and pediatric patients who are experiencing non-traumatic abdominal pain. There are many causes of abdominal pain, some of which are life threatening. See [Abdominal Pain Differential](#). It is critically important to obtain a thorough history to identify the suspected cause and thus provide patients with the most appropriate level of care.

XXX

ALL PROVIDER LEVELS

Inclusion Criteria:

- Abdominal pain or discomfort related to a non-traumatic cause.

Exclusion Criteria:

- Abdominal pain due to trauma. See trauma protocols.
- Abdominal pain due to or related to pregnancy. See OB/GYN protocols.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Assess for life-threatening causes of abdominal pain:
 - Ischemic, necrotic, or perforated bowel
 - Intestinal obstruction
 - Gastrointestinal bleeding
 - Dissecting or ruptured abdominal aortic aneurysm (AAA)
 - Ruptured ectopic pregnancy
4. Consider extra-abdominal disease that can mimic intra-abdominal pathology and cause abdominal pain:
 - Referred cardiac pain (i.e., acute MI)
 - Diabetic Ketoacidosis
5. Assess for urgent causes of abdominal pain
 - Biliary tract disorders (e.g., Gallbladder infection or stone)
 - Appendicitis
 - Diverticulitis
 - Ovarian torsion in females and testicular torsion in males
 - Pancreatitis
 - Kidney stone or infection
6. Place the patient in a position of comfort.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Abdominal Pain – Non-Traumatic 7.1

7. If patient is nauseated or vomiting, treat per [Nausea and Vomiting protocol](#).
 8. If not already dispatched or on scene, request ALS evaluation and transport for any patient who meets one or more of the following criteria:
 - Unstable vital signs
 - Signs or symptoms of hypoperfusion or shock
 - Rigid abdomen
 - Pulsatile abdominal mass
 - Grossly distended or “inflated” abdomen that is new for the patient
 - Abdominal pain associated with
 - Chest pain or chest discomfort of any kind
 - Shortness of breath
 - Syncope or pre-syncope
 - Stroke like symptoms (e.g., extremity weakness, numbness, or tingling, etc.)
- ❖ Important Note: a 12 lead EKG is required in all patients > 30 yo with epigastric (upper abdominal) pain to evaluate for myocardial ischemia. (e.g., ST elevation MI)

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Obtain a [12 lead EKG](#) in all patients > 30 yo with epigastric (upper abdominal) pain to evaluate for myocardial ischemia. (e.g., ST elevation MI)
 - Suspect referred cardiac pain in patients with cardiovascular risk factors who complain of epigastric abdominal pain and who are not tender on examination.
3. Establish IV/IO access as indicated by the patient’s clinical presentation.
4. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
5. Provide analgesia as indicated by the patient’s clinical presentation. See [Pain Management protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Abdominal Pain – Non-Traumatic 7.1

General Notes:

- Be cautious in patients with abdominal pain who have had prior abdominal surgery. They are at high risk for complications such as bowel obstructions or early (within 30 days of surgery) post-operative complications.
- Be extremely cautious in elderly patients (> 65 yo) with abdominal pain as they are at significant risk of morbidity and mortality and often present with vague or unimpressive complaints. Elderly patients have a high rate of life-threatening surgical emergencies causing their abdominal pain.
- Abdominal pain is perceived in three ways:
 - Visceral: pain is vague, colicky (intermittent) and poorly localized. It is usually the first type of pain felt. It arises from inside the organs.
 - Somatic: pain is a more specific, localized, and constant pain that arises from outside the organs due to inflammation of the peritoneum. (e.g., appendicitis = Right lower quadrant pain or diverticulitis = left lower quadrant pain)
 - Referred: pain associated with a structure distant from the actual source. (e.g., epigastric pain from an acute MI or abdominal pain from pneumonia)
- In 50% of ectopic pregnancy cases, patients may have no risk factors and may be asymptomatic before presentation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Altered Mental Status

7.2

This protocol applies to all adult and pediatric patients who present with a decreased level of consciousness or altered mental status that is non-traumatic in etiology.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has a decreased or altered level of consciousness from baseline.
- Patient has an altered mental status.
 - Altered mental status is a state where a patient is not alert and oriented to person, place, time, and situation within the context of their expected developmental level.

Exclusion Criteria:

- [Syncope or Near Syncope](#)
- [Traumatic brain injury](#)
- [Cardiac arrest](#)
- [Seizure](#)

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
 - Particularly in the older adult, identify the patient's baseline mental status by speaking with family, friends, or caregivers if available.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Rule out trauma as a suspected etiology. [See Traumatic Brain Injury protocol](#).
4. Place the patient in a position of comfort if possible.
5. Check blood glucose level. Treat per [hypoglycemia](#) or [hyperglycemia protocol](#) as clinically indicated.
6. If narcotic (opioid) overdose is suspected, administer naloxone (Narcan) per [Overdose-Poisoning protocol](#).
7. If patient exhibits aggressive or violent behavior that presents a danger to self and or others, treat per [Behavioral Psychological Emergencies protocol](#).
8. If patient is nauseated or vomiting or at risk for aspiration, treat per [Nausea and Vomiting protocol](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Altered Mental Status

7.2

9. Identify and treat the following potential causes:

Treatable Causes of Altered Mental Status (AEIOU-TIPS)	
Causes	Treatment
A Alcohol (intox or withdrawal) Acidosis Arrhythmias	Supportive Care Fluid Boluses and Oxygen Refer to cardiac rhythm specific protocols
E Endocrine Electrolytes Encephalopathy	Refer to Adrenal Crisis protocol if applicable
I Insulin (too much or too little) Hypoglycemia Hyperglycemia	Refer to Hypoglycemia protocol Refer to Hyperglycemia protocol
O O ₂ (hypoxia) Opioid overdose	Refer to Airway Maintenance and Supplemental Oxygen protocol and or Overdose-Poisoning protocol
U Uremia	Refer to Renal Failure and Dialysis Emergencies protocol Fluid Boluses as clinical indicated
T Trauma (blood loss) Intracranial Pressure Temperature (low or high)	Refer to trauma protocols Refer to Traumatic Brain Injury protocol Refer to Hypothermia and Hyperthermia protocols
I Infection (sepsis) Ischemia (heart attack)	Refer to Sepsis protocol Refer to Acute Coronary Syndrome protocol
P Poisoning Psychiatric	Refer to Overdose-Poisoning, CO, or Cyanide protocol Refer to Behavioral / Psychological Emergencies protocol
S Seizure Stroke Shock	Refer to Seizure protocol Refer to Stroke protocol Refer to Shock protocol
*** Causes of altered level of consciousness or altered mental status may be from conditions not listed. Proper assessment and supportive care should not be limited to the above***	



ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Obtain [12 lead EKG](#) and evaluate for cardiac causes of altered mental status. Treat per appropriate protocol.
 - Dysrhythmia (e.g., bradycardia, heart block, ventricular tachycardia, etc.)
 - Myocardial ischemia (e.g., ST elevation MI)
3. Establish IV/IO access as indicated by the patient's clinical presentation.
4. Place patient on continuous ETCO₂ monitoring.
5. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Although alcohol use is a common cause of an altered level of consciousness, it is rarely the cause of complete unresponsiveness. Do NOT let the patient's alcohol intoxication cloud your clinical judgement or interfere with performing a complete assessment. It is always safer to assume that the intoxicated patient has a serious medical illness or traumatic injury (e.g., head bleed) and treat accordingly than it is to conclude that the patient is "just drunk."
- Altered mental status due to primary psychiatric disease is a diagnosis made only after ruling out all other potential medical causes. Particularly in patients without a confirmed prior history of psychiatric disease, a thorough evaluation, history and physical exam is required.
- Infections may cause altered mental status without fever in older adults, infants, and immunocompromised patients.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Altered Mental Status

7.2

- Altered level of consciousness or altered mental status may be a symptom of an acute cardiac event (such as a myocardial infarction- STEMI or NSTEMI) even if the patient does not present with “chest pain.” Patients that may present with atypical acute myocardial infarction presentations include the elderly, females, and diabetics.
- Hypoglycemia and hypoxia can cause patients to be irritable and violent. Identify and treat accordingly.
- The postictal state after a seizure does not typically last longer than 20-30 minutes. Consider non-convulsive status epilepticus (persistent brain seizure without extremity movement) in patients with prolonged altered mental status after a seizure.
- In assessing a patient with an altered level of consciousness, a thorough history, when able to be obtained, is the most important step in identifying the cause. The history should include:
 - History from bystanders
 - Age of the patient
 - Environment where patient was found
 - Recent complaints (e.g., headache, chest pain vomiting, fever)
 - Pill bottles/medications (e.g., opioids, diabetes, or seizure medication, etc.)
 - Medical alert tags and accessory medical devices
 - Evaluate for potential dehydration as a cause of altered mental status in the pediatric and geriatric population. Assess for reduced oral intake, vomiting, diarrhea, etc.
- Medications a child may have accidental access to that can cause altered mental status include but are not limited to:
 - Antihypertensives
 - Oral hypoglycemic
 - Opioids
 - Benzodiazepines
 - Antiepileptics



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Anaphylaxis and Allergic Reactions 7.3

The protocol applies to all adult and pediatric patients suffering from suspected anaphylaxis and or allergic reaction.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Suspected anaphylaxis and or allergic reaction.

Exclusion Criteria:

- Signs and symptoms not related to known or suspected allergen exposure.
- Shock or inadequate perfusion due to an etiology not related to an allergic reaction.

Definitions:

- **Allergic Reaction:** when the body has a hypersensitivity reaction to a foreign protein or allergen (e.g., food, medicine, pollen, insect sting or any ingested, inhaled, or injected substance). Symptoms involve only one organ system and are typically mild to moderate in severity and may include any of the following: hives, skin itching, scratchy throat, watery or itchy eyes, sneezing, dry cough.
- **Anaphylaxis:** a severe, immediate, systemic hypersensitivity reaction that can lead to cardiopulmonary collapse, shock, or arrest. Anaphylaxis is diagnosed when any one of the following three presentations occur:
 - Acute onset of hives, itching, flushing, swollen lips-tongue-uvula and at least one of the following:
 - Respiratory distress
 - Hypotension
 - Two or more of the following occur rapidly (within minutes to hours) after exposure to a known or likely allergen:
 - Skin-Mucosal reaction (e.g., hives, swollen lips-tongue-uvula)
 - Respiratory distress (shortness of breath, stridor, wheezing, hypoxia)
 - Hypotension or associated symptoms (e.g., syncope)
 - Persistent GI symptoms (e.g., crampy abdominal pain, nausea/vomiting)
 - Hypotension within minutes to hours after exposure to a known allergen for that patient.
- ❖ **Important Note:** up to 20% of patients with anaphylaxis do NOT present with hives or skin manifestations. This contributes to providers failing to diagnose anaphylaxis.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Anaphylaxis and Allergic Reactions 7.3

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
 2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
 3. Remove rings and any constrictive jewelry.
 4. Remove allergen if possible (i.e., stinger from skin)
 5. Place the patient in a position of comfort.
 6. If not already dispatched or on scene, request ALS for any patient who presents with signs or symptoms consistent with anaphylaxis and or has received IM epinephrine.
 7. Epinephrine is the first-line treatment for anaphylaxis and should be administered as soon as possible. (i.e., BLS providers shall not wait for ALS arrival to administer IM epinephrine)
 8. Administer IM Epinephrine in the anterolateral thigh if the patient presents with any two of the following signs or symptoms:
 - Hives or itching
 - Stridor
 - Hypotension
 - Abdominal Pain
 - Diarrhea
 - Sensation of swelling in mouth, tongue, or throat
 - Bronchospasm (wheezing)
 - Delayed capillary refill time
 - Respiratory distress
 - Nausea or Vomiting
 - Angioedema
- ❖ BLS providers shall use an epinephrine auto-injector. ALS providers may use an epinephrine auto-injector or epinephrine drawn from a 1 mg/ml vial.
- ❖ Important Note: there are no contraindications to epinephrine use in anaphylaxis.



DC Fire and EMS Pre-Hospital Treatment Protocols
Treatment Protocols – General Medical Emergencies
Anaphylaxis and Allergic Reactions

7.3

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Epinephrine 1 mg/ml <u>BLS</u> or <u>ALS</u>: 0.3 mg IM via adult auto-injector in the anterolateral thigh <u>ALS</u>: 0.5 mg IM (drawn from 1 mg/ml epinephrine vial) in the anterolateral thigh	Epinephrine 1 mg/ml Age ≤ 9 yo <u>BLS</u> or <u>ALS</u>: 0.15 mg IM via pediatric auto-injector in the anterolateral thigh Age > 9 yo <u>BLS</u> or <u>ALS</u>: 0.3 mg IM via adult auto-injector in the anterolateral thigh <u>ALS</u>: 0.01 mg/kg IM up to a maximum single dose of 0.3 mg in the anterolateral thigh
*** If signs of anaphylaxis persist following the first dose of epinephrine, additional IM epinephrine can be repeated by all providers every 5-15 min as needed***	

9. If respiratory symptoms/distress is present, administer Albuterol via nebulizer.

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Albuterol 2.5 mg nebulized	Albuterol 2.5 mg nebulized
All providers may repeat as needed until respiratory distress resolves	

10. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
11. Transport as soon as possible and perform ongoing assessment and treatment as indicated.
All patients with suspected or confirmed anaphylaxis should be transported ALS.

ADVANCED LIFE SUPPORT PROVIDERS

- Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
 - ❖ Anaphylaxis and epinephrine administration can both cause significant tachycardia. Maintain patient on cardiac monitoring throughout treatment and transport.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Anaphylaxis and Allergic Reactions 7.3

2. Establish IV/IO access as indicated by the patient's clinical presentation.
3. Place patient on continuous ETCO₂ monitoring.
4. For hives or itching, administer diphenhydramine (Benadryl):

<i>Adult</i>	<i>Pediatric</i>
Diphenhydramine (Benadryl) 50 mg IV/IO/IM	Diphenhydramine (Benadryl) 1 mg/kg IV/IO/IM, up to a maximum single dose of 50 mg
IV route is preferred, especially for the patient in severe shock.	

- ❖ Important Note: Diphenhydramine may be administered without preceding epinephrine in patients with symptoms of mild allergic reaction such as isolated hives and no other symptoms of anaphylaxis.
5. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
 6. Administer IV epinephrine per [Hypoperfusion / Non-Traumatic Shock protocol](#) when anaphylactic shock is persistent (hypotension with altered mental status, pallor, diaphoresis, etc.) despite 2-3 doses of IM epinephrine in conjunction with fluid boluses.
 7. For persistent anaphylaxis symptoms in a patient taking a beta blocker, administer glucagon:

Glucagon		
<i>Adult</i>	<i>Pediatric ≥ 5 yo</i>	<i>Pediatric < 5 yo</i>
1 mg IV/IO/IM/IN	1 mg IV/IO/IM/IN	0.5 mg IV/IO/IM/IN

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Anaphylaxis and Allergic Reactions 7.3

General Notes:

- Under-recognition and under treatment of anaphylaxis is extremely common and life-threatening. Rapid identification and treatment are of the utmost importance. Delayed administration of epinephrine is a major risk factor for death.
- Contrary to common belief that all cases of anaphylaxis present with hives or other skin manifestations, a significant portion of anaphylactic episodes may not involve these signs and symptoms on initial presentation. Moreover, most fatal reactions to food-induced anaphylaxis in children were not associated with cutaneous manifestations.
- GI symptoms (e.g., abdominal cramping, nausea, vomiting, diarrhea) occur most commonly in food-induced anaphylaxis but can occur with other causes.
- Patients with asthma are at high risk for a severe allergic reaction
- Anaphylaxis can be triggered by various allergens. The most common cause in adults are medications and in children it is food allergens.
- 30-60% of patients presenting with anaphylaxis will have no specific trigger identified.
- Anaphylaxis symptoms usually begin within 5-20 minutes after exposure to the offending agent. Symptom onset from food allergies can be more prolonged, up to a few hours.
- There is no proven mortality benefit to using steroids in the management of allergic reactions and or anaphylaxis.
- Anterolateral aspect of the middle third of the thigh is the preferred administration site for IM epinephrine due to faster absorption and higher peak concentrations of epinephrine in comparison to subcutaneous or IM deltoid route.
- Epinephrine is the only medication that shows a mortality benefit in the management of anaphylaxis. The most common cause of death in anaphylaxis is not giving epinephrine at the right time and at the correct dose.
- Epinephrine is NOT contraindicated in patients with ischemic heart disease, as the risks of untreated anaphylaxis outweigh the risk of epinephrine administration.



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Remove the EpiPen® Auto-Injector from the carrier tube and follow these 2 simple steps:

1. Blue to the sky.



- Grasp with orange tip pointing downward
- Remove blue safety cap by pulling straight up – do not bend or twist

2. Orange to the thigh.



- Place the orange tip against the middle of the outer thigh
- Swing and push the auto-injector firmly into the thigh until it “clicks”
- Hold in place for 3 full seconds



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After using EpiPen®, you must seek immediate medical attention or go to the emergency room. For the next 48 hours, you must stay close to a healthcare facility or be able to call 911.



This protocol is specific to patients who have ingested antipsychotic medications. Side effects of these medications may include extrapyramidal symptoms, orthostatic hypotension, and sedation. Extrapyramidal symptoms may include involuntary muscle movements, tremors, rigidity, and muscle contractions. These symptoms are side effects of medications commonly used in therapy for managing psychotic and schizophrenic mental health conditions. A history of psychotic mental health issues and any combination of these side effects should be indicators for treatment under this protocol.

Common Antipsychotics include: Prolixin, Thorazine, Mellaril, Haldol, Risperidol, Geodon, Seroquel, and Zyrxexa

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care and determine a suspected cause of the reaction.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. **Advanced EMTs and ALS providers** administer **Diphenhydramine (Benadryl)** to relieve the patient's discomfort:

<u>Adult</u>	<u>Pediatric</u>
Diphenhydramine (Benadryl) 50 mg IV/IM	Contact Medical Control



4. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
5. If the patient presents with signs and symptoms of hypoperfusion administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses



ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring**.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Medical Emergencies

Stroke / CVA / Brain Attack 7.5

This protocol applies to patients exhibiting signs and symptoms of a stroke, i.e., Cerebral Vascular Accident (CVA). Treatment for a CVA is time dependent and based on when the stroke is believed to have started. Transporting providers must clearly communicate with hospital staff and document in the ePCR any information they have regarding the time that the patient was last known well (LKW) and when symptoms were discovered. All providers (BLS and ALS) shall use this protocol to determine what type of stroke center to which the patient should be safely and rapidly transported.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Suspected Ischemic Stroke
 - Patient has new, acute neurological deficits such as facial droop, weakness, gait disturbance or imbalance, numbness, slurred speech, altered mentation, or vision changes.
 - Symptoms started within the last 24 hours.

OR

- Suspected Hemorrhagic Stroke (intracerebral or subarachnoid hemorrhage)
 - Patient has sudden onset severe headache (sometimes described as the worst headache of their life) with associated elevated blood pressure, nausea and or vomiting and or altered mental status.
 - Symptoms started within the last 24 hours.

Exclusion Criteria:

- If glucose < 70 mg/dl, treat per [Hypoglycemia protocol](#) and reassess symptoms.
- If traumatic mechanism of injury exists and GCS < 13, treat per [Traumatic Brain Injury protocol](#).

Definitions:

- **Last known well (LKW) time** is the date and time that the patient, or bystanders, confirm the patient was last known to be without the current signs and symptoms of a stroke or at their prior baseline. This is NOT always the time that the patient or bystanders first discovered symptoms. Example: if a patient woke up from sleep with symptoms present, then establish the last time the patient was noted to be at their baseline prior to going to sleep.
- **Time of Symptom Discovery** refers to the date and time at which the symptoms were first noticed by a reliable witness. This term is often mistakenly used interchangeably with LKW time, and so explicit capture of both times ensures accuracy. Time of



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Stroke / CVA / Brain Attack 7.5

symptom discovery will be the same as LKW time only in patients with a witnessed stroke onset.

- **Primary Stroke Center (PSC)** refers to a hospital capable of providing care for most cases of ischemic (blood vessel blockage) strokes. These hospitals have dedicated stroke programs, can treat with tPA (clot buster medication), and admit most patients to the hospital for continued care. Some strokes such as those that are hemorrhagic (brain bleeding) or large vessel occlusions will require transfer to a Comprehensive Stroke Center. Refer to the hospital capability chart for a list of local PSCs.
- **Comprehensive Stroke Center (CSC)** refers to a hospital capable of providing the highest level of care for all types of strokes. These hospitals have 24/7 access to advanced brain imaging, minimally invasive catheter procedures used to treat large vessel occlusions, dedicated neuroscience ICUs, and on-site neurosurgery availability. Refer to the hospital capability chart for a list of local CSCs
- **Large Vessel Occlusions (LVOs)** are ischemic (blood vessel blockage) strokes that occur in one of the major arteries of the brain. Occlusion of these large vessels, such as the middle cerebral artery, results in loss of blood flow to large regions of the brain. These strokes tend to be more severe and result in less favorable outcomes for patients compared to strokes that occur in small vessels. LVOs are ideally treated with endovascular therapy which is only available at CSCs.
- **Endovascular Therapy (EVT)** refers to a procedure where stroke specialists at a CSC use advanced real-time imaging, guide wires and stent retrievers to physically remove the occluding clot from the large vessel (i.e., thrombectomy), thereby immediately restoring blood flow to the brain.

Pediatrics:

- A CVA in children is typically considered to be a rare event.
- All children suspected of having a stroke should be transported to Children's National Hospital (H2).
- Stroke scales are not validated for pediatric patients, but the following treatment principles remain the same as in adults.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
 - Determine the "last known well" time
 - Determine the time of symptom discovery
 - Obtain a reliable phone number for a family member or bystander that can verify the above times. Give this name and phone number to stroke center staff



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Stroke / CVA / Brain Attack 7.5

2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Check blood glucose level. If blood glucose level < 70 mg/dl, treat per [Hypoglycemia protocol](#).
 - Hypoglycemia is a common mimic of stroke-like symptoms and should be ruled out as soon as possible during patient assessment.
4. Perform FAST exam.
 - It is the responsibility of all providers (BLS and ALS) to promptly perform an accurate FAST exam.
 - If the FAST exam is positive, transport should be immediately expedited. Limit scene time to < 15 minutes.
 - BLS ambulances should not request a medic unit for transport if not included in the original dispatch or wait for a delayed (> 5 minutes away) medic unit. BLS ambulances should transport directly to the correct type of stroke center based on the results of their FAST Exam.
 - ❖ Exception: if the patient requires other time-sensitive ALS interventions (e.g., advanced airway management) the BLS ambulance may request ALS resources as needed.

Cincinnati Pre-hospital Stroke Screen (FAST Exam)

FAST Exam is positive (+) if the patient has one or more of the following **new** clinical abnormalities:

- **F**acial droop or weakness on either side.
 - Ask patient to smile and show their teeth.
- **A**rm and/or Leg weakness.
 - Ask patient to extend arms, palms up, with eyes closed. Watch to see if one arm drifts down. If only one arm drifts, the test is positive. If both arms drift down, the results are unclear.
- **S**peech is slurred or impaired.
 - Ask patient to say, “You can’t teach an old dog new tricks.”
- **T**ime: Determine the “last known well” time and transport immediately to a stroke center as outlined below



DC Fire and EMS Pre-Hospital Treatment Protocols

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Stroke / CVA / Brain Attack 7.5

5. If FAST exam is positive (+) for any one or two of the above FAST criteria:
 - Transport to the closest stroke center (primary or comprehensive) with pre-notification.
6. If FAST exam is positive (+) for all three of the above FAST criteria:
 - Transport to the closest comprehensive stroke center with pre-notification that a Large Vessel Occlusion (LVO) is suspected.
7. A properly performed FAST exam misses approximately 15% of strokes, so even if the FAST exam is negative, if the patient has signs/symptoms concerning for a stroke (e.g., vision loss, dizziness, imbalance, etc.) the patient should still be transported to a stroke center.
8. If seizure activity is witnessed, treat per [Seizure protocol](#).
9. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
10. Transport patient with head in the midline and neutral position.
 - Transport patient supine if tolerated as this has been shown to increase blood flow to the brain. If supine is not tolerated by the patient, elevate head of stretcher 15-30 degrees.
 - Place the patient's affected or paralyzed extremity in a secure and safe position during patient movement and transport.
 - If speech is impaired, mental status is altered, or there is concern for aspiration do NOT give the patient anything to eat or drink
11. Pre-notify the receiving stroke center as soon as possible, ideally while at the patient's side, prior to moving to the ambulance. Include the following information in your notification to allow prompt activation of the stroke team:
 - Last known well time
 - Time of symptom discovery
 - Results of the FAST exam, i.e., how many parts (1, 2, or 3) of the exam were positive
 - If all three parts of the FAST exam are positive, relay suspicion for LVO
 - Vital signs
 - Blood glucose level
- ❖ Important Note: patients with hemorrhagic strokes such as intracerebral and subarachnoid hemorrhages frequently do not have a positive (+) FAST exam. Rather they present with sudden onset severe headache (sometimes described as the worst headache of their life) with associated elevated blood pressure, nausea and or vomiting and or altered mental status.
 - All patients with suspected hemorrhagic stroke should be transported immediately to the closest comprehensive stroke center.



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Treatment Protocols – Medical Emergencies

Stroke / CVA / Brain Attack 7.5

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol. Do NOT delay transport.
2. Obtain [12-lead EKG](#). Do NOT delay transport.
3. Establish an IV of Normal Saline KVO or Saline Lock
 - Avoid multiple IV attempts.
 - Do NOT delay transport
4. If the patient's SBP is less than 90 mm/Hg administer **Normal Saline Bolus**:

<i>Adult</i>	<i>Pediatric</i>
250 ml as needed to maintain or restore perfusion. (Goal SBP > 110 mm/Hg) Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

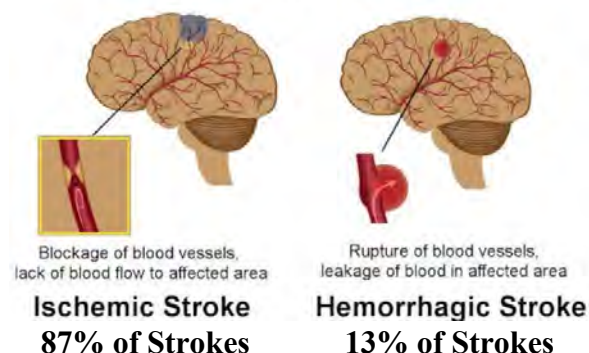
5. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).

MEDICAL CONTROL OPTIONS

1. Activate in-hospital stroke team.

General Notes:

Types of Stroke



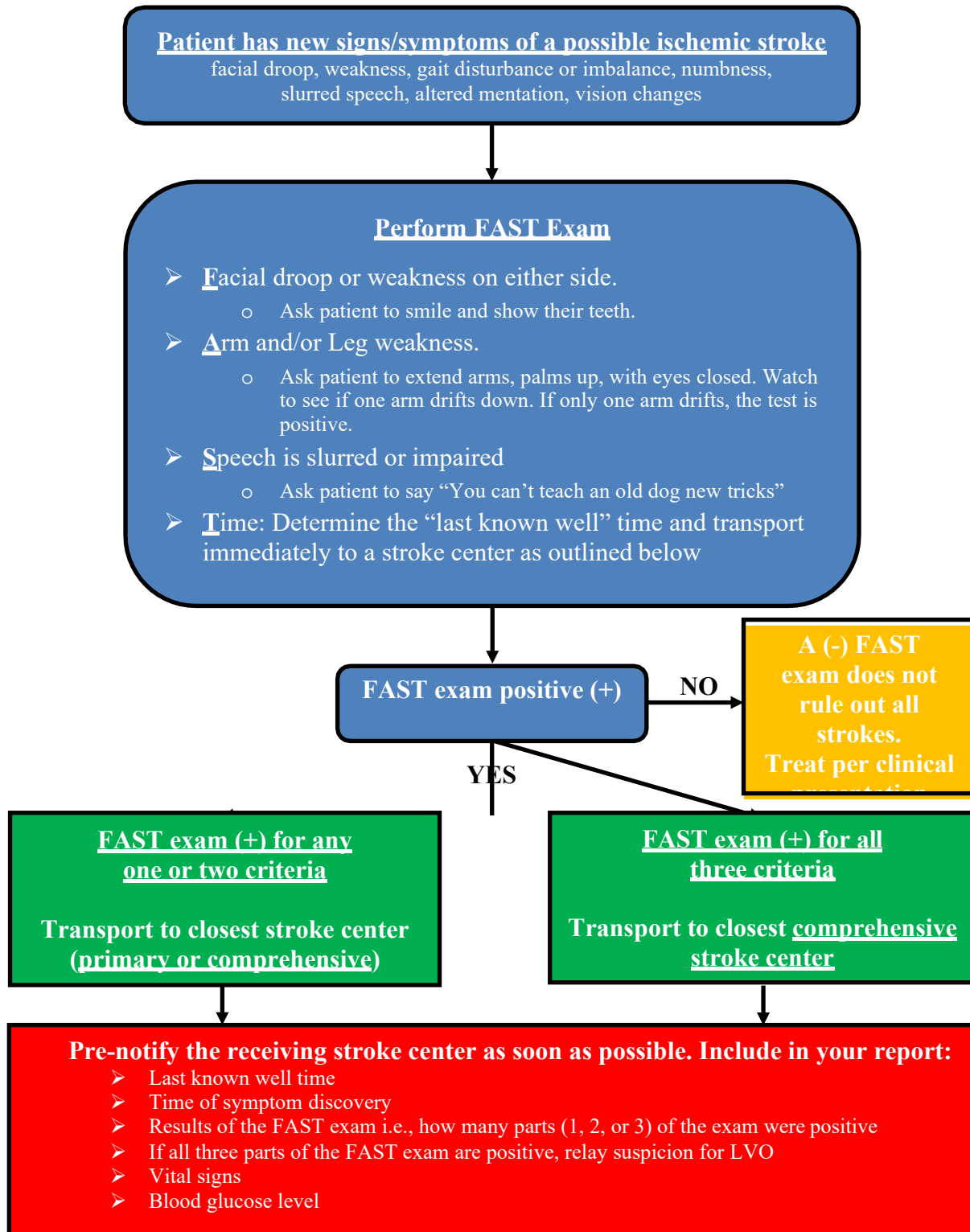


DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Medical Emergencies

Stroke / CVA / Brain Attack 7.5

- Stroke is the 5th leading cause of death in the United States and a leading cause of long-term disability.
- “Time is brain” refers to the time-dependent treatment effect of reperfusion therapies (tPA and endovascular therapy) in ischemic strokes and the fact that, with each passing minute, a stroke progresses from ischemia to infarction, additional neurons are lost, and functional outcomes worsen.
- Some patients who have had a stroke may be unable to verbally communicate but can still understand what is being said around them. Be sure to clearly communicate and explain what is happening to the patient even if they are unable to speak.
- In general, hypertension in stroke patients should not be treated in the prehospital setting. Treatment should be deferred to the stroke center once additional clinical information is available.
- Common stroke mimics include hypoglycemia, seizure, complex migraine headaches, and intoxication.
- For appropriate patients with LVOs, endovascular therapy with thrombectomy has the potential to result in significant, life-changing improvement in functional outcome after a stroke. It is imperative that potential LVO’s (FAST exam (+) for 3 criteria) be triaged to CSCs as quickly as possible.
- Recent studies support the efficacy of endovascular treatment for LVO’s up to 24 hours after time last known well in appropriately selected patients.
- Patients who experience a transient ischemic attack (TIA) develop the same signs and symptoms as those who are experiencing a CVA. However, the symptoms may resolve after a few minutes to hours. Despite symptoms resolving during a TIA, this is a serious warning sign that a future CVA is likely in near future. Thus, patients with a TIA shall be treated as if they are having an acute CVA and should be transported to a stroke center for further evaluation.





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypertension 7.6

This protocol applies to adult patients experiencing a severely elevated blood pressure (BP). Hypertension is a common finding in an emergency setting but is usually a transient response to other factors (e.g., anxiety or pain) and does not require emergent treatment. Aggressive prehospital treatment of hypertension can result in significant harm and most patients, even with very high blood pressures, only need supportive EMS care. Specific presentations such as CHF/pulmonary edema, chest pain, stroke, eclampsia or altered mental status should be treated based on these specific protocols.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has a severely elevated BP as defined below.

Exclusion Criteria:

- Patient has suffered an acute head injury. Treat per [Traumatic Brain Injury protocol](#).

Definitions:

- **Normal blood pressure:** systolic pressure < 120 mmHg and diastolic pressure < 80 mmHg.
- **Severe hypertension:** systolic pressure \geq 180 mmHg and/or diastolic blood pressure \geq 120 mmHg.
 - **Severe asymptomatic hypertension (hypertensive urgency):** patient presents with severe hypertension but is relatively asymptomatic (i.e., only mild headache) or completely asymptomatic. The patient does NOT have any other signs or symptoms of acute end-organ damage. The patient needs better BP control but not emergently. Unnecessary aggressive treatment of the BP is associated with a greater risk of acute harm than benefit.
 - **Hypertensive emergency:** patient presents with severe hypertension and signs or symptoms of acute end-organ damage. This can be life-threatening and requires immediate assessment and treatment in a monitored hospital setting. Signs and symptoms of acute end-organ damage include:
 - Severe headache or altered mental status
 - Numbness or weakness
 - Change in vision or difficulty speaking
 - Seizure
 - Chest pain or shortness of breath
 - New severe nontraumatic abdominal or back pain
 - Currently pregnant



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypertension 7.6

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Place the patient in a position of comfort.
4. If patient has signs or symptoms of acute end-organ damage, treat per applicable protocol.
 - Signs or symptoms of acute stroke treat per [Stroke protocol](#).
 - Witnessed seizure activity treat per [Seizure protocol](#).
 - Signs or symptoms of an acute myocardial infarction treat per [Acute Coronary Syndrome protocol](#).
 - Signs or symptoms of acute decompensated heart failure treat per [CHF protocol](#).
 - Patient is pregnant, treat per [Pre-Eclampsia and Eclampsia protocol](#).
5. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
6. Severe asymptomatic hypertension does NOT by itself mandate ALS treatment or transport to an emergency department.
 - If the patient otherwise meets Nurse Triage Line (NTL) criteria as outlined in EMS Operations Bulletin No 13., the patient shall be referred to the NTL for final disposition (e.g., self-care, clinic appointment, etc.).
 - Patients who meet BLS transport criteria and present with incidental severe asymptomatic hypertension shall be transported by a BLS transport unit (AMR or DC BLS).
7. All patients with suspected or confirmed hypertensive emergency as defined above shall be assessed, treated, and transported ALS.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Obtain [12 lead EKG](#) and evaluate for myocardial ischemia (e.g., ST elevation MI, ST depressions etc.) Treat per [Acute Coronary Syndrome protocol](#).
3. Establish IV/IO access as indicated by the patient's clinical presentation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypertension 7.6

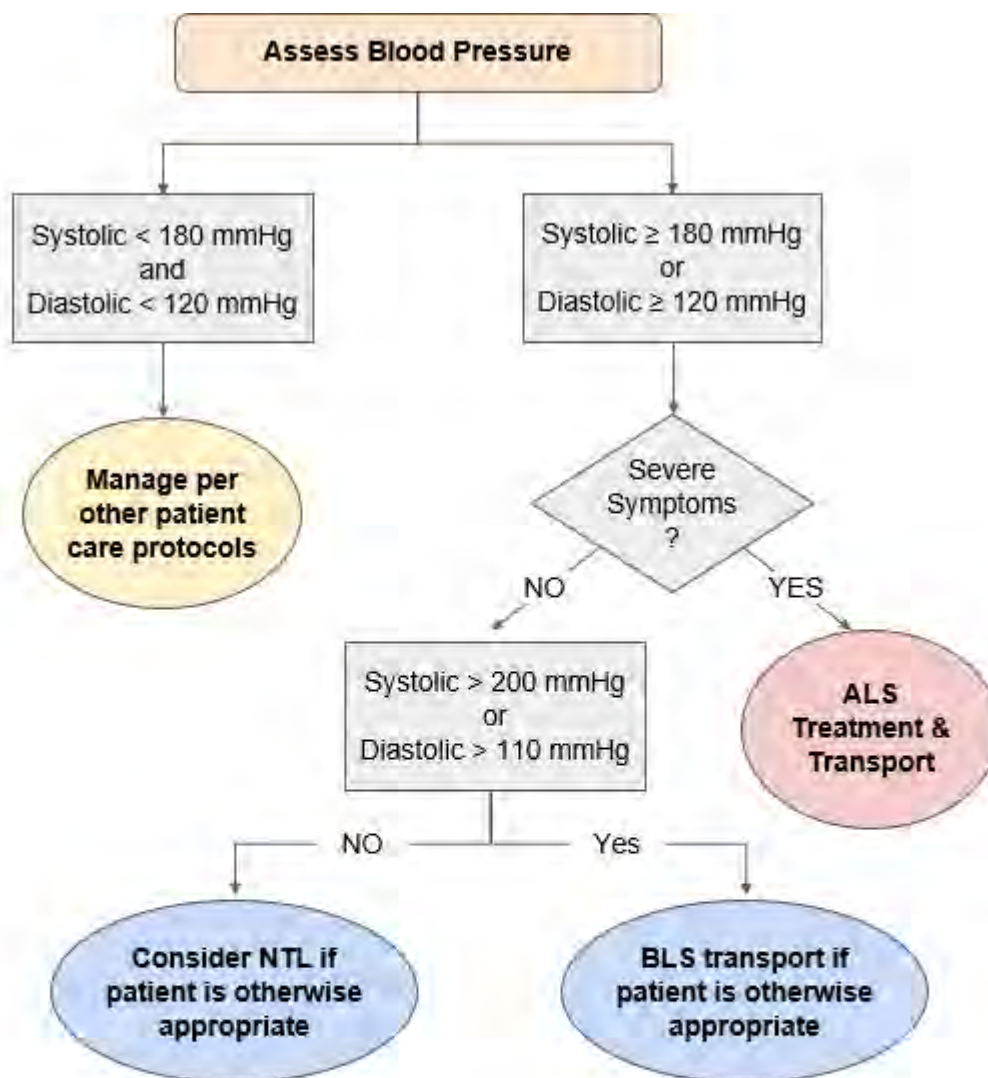
4. If patient has experienced an acute traumatic injury that may be contributing to a severely elevated blood pressure, treat per [Pain Management protocol](#) as clinically indicated.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- The significance of elevated systemic pressure depends on the clinical context of the presentation. Patients presenting with markedly elevated BP (often >160-180 systolic or > 100-120 mmHg diastolic) should be differentiated into those with or without signs and symptoms of acute end-organ dysfunction due to elevated BP.
- The degree of BP elevation does not correlate with the severity of organ damage; however, the rate of BP change strongly correlates with the likelihood of end-organ dysfunction. Individuals with longstanding hypertension develop vascular changes that protect target organs, whereas normotensive patients may develop hypertensive emergencies at markedly lower BPs.
- Severe asymptomatic hypertension is common, especially among patients with known hypertension who are not fully compliant with their medications. Most cases of asymptomatic blood pressure elevation can be addressed in an outpatient clinic or primary care setting.
- EMS administration of anti-hypertensive medications is not recommended at this time. Optimal therapy, including the choice of medication and the blood pressure goal, varies according to the specific hypertensive emergency and is best provided in a monitored hospital setting.



Severe Symptoms

Signs and symptoms of acute hypertensive end-organ damage include severe headache or altered mental status, numbness or weakness, change in vision or difficulty speaking, seizure, chest pain or shortness of breath, new severe nontraumatic abdominal or back pain, or the patient is currently pregnant.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypoperfusion / Non-Traumatic Shock 7.7

This protocol applies to all adult and pediatric patients exhibiting signs and symptoms of non-traumatic hypoperfusion or shock. Life-saving management in patients experiencing shock is centered on rapid recognition, aggressive resuscitation, and timely transport.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Signs of poor perfusion as demonstrated by one or more of the following:
 - Altered mental status
 - Tachypnea See [Normal Vital Signs](#).
 - Hypoxia (pulse oximetry < 94%)
 - Low ETCO₂ (< 30 mmHg)
 - Hypotension for age. See [Normal Vital Signs](#).
 - Tachycardia for age or rapid, weak pulse.
 - Pale/cool/mottled or flushed skin
 - Delayed or absent capillary refill

Exclusion Criteria:

- Shock due to suspected trauma.

Definitions:

- **Shock** is a life-threatening condition defined by persistent, inadequate delivery of oxygen and nutrients to meet cellular demands. This most often results from poor blood flow/perfusion of tissues. Importantly, shock is NOT defined by hypotension. Patients can be in shock without hypotension, this is called cryptic shock.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Place patient supine unless respiratory distress requires head of bed elevation. If the patient is pregnant, place the patient in the left lateral position.
4. Consider potential causes of shock and treat accordingly:
 - Hypovolemia (e.g., bleeding, vomiting, or diarrhea)
 - Cardiogenic (e.g., acute MI or cardiac dysrhythmia)
 - Distributive (i.e., neurogenic, septic, anaphylactic, drug overdose/toxicity)
 - Obstructive (e.g., pulmonary embolism, cardiac tamponade, tension pneumothorax)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypoperfusion / Non-Traumatic Shock 7.7

5. Treat shock from traumatic injury per trauma protocols.
6. Keep the patient warm and prevent heat loss unless the patient has a fever.
7. Check blood glucose level. Treat per [Hypoglycemia](#) or [Hyperglycemia protocol](#) as clinically indicated.
8. If there is a history of adrenal insufficiency, treat in conjunction with [Adrenal Crisis protocol](#).
9. If patient has a Ventricular Assist Device (VAD), treat in conjunction with [VAD protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Obtain [12 lead EKG](#) and evaluate for cardiac causes of shock. Treat per appropriate protocol.
 - Dysrhythmia (e.g., bradycardia, heart block, ventricular tachycardia, etc.)
 - Myocardial ischemia (e.g., ST elevation MI)
3. Place patient on continuous ETCO₂.
 - Depending on the cause of shock, a reading < 30 mmHg indicates poor perfusion and ≤ 25 mmHg suggests worsening acidosis and increased likelihood of death.
4. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
5. Administer IV fluid bolus:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses
❖ Important Note: use caution when administering fluids in cardiogenic shock. Frequently reassess lungs sounds and for signs of fluid overload. Stop fluids if signs of respiratory distress due to cardiogenic pulmonary edema develop.	



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypoperfusion / Non-Traumatic Shock 7.7

6. Initiate vasopressor therapy if any of the following occurs:
- Signs of hypoperfusion or hypotension still exist despite initial fluid bolus of at least 1-2 liters in adults or two 20 cc/kg boluses in pediatrics.

OR

- Cardiogenic shock is suspected, and fluid resuscitation is felt to be contraindicated (i.e., symptoms of pulmonary edema or fluid overload causing respiratory distress.)
- ❖ Important Note: vasopressor therapy may be initiated immediately in conjunction with an IV fluid bolus for patients who are severely hypotensive (systolic BP < 70 mmHg) and or in a peri-cardiac arrest state.
- [Push dose epi \(See Push Dose Epi Procedure\).](#)

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Push Dose Epinephrine 1 ml (10 mcg) IV/IO every 1 minute as needed Titrate to desired blood pressure	Push Dose Epinephrine 1 mcg/kg IV/IO (max single dose 1 ml or 10 mcg) every 1 minute as needed Titrate to desired blood pressure

OR

- [Epinephrine infusion \(See Epinephrine Infusion Chart\).](#)

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Epinephrine infusion 2-10 mcg/min	Epinephrine infusion 0.1-1 mcg/kg/min

- ❖ Important Note: when using vasopressors target age-appropriate goal blood pressure (e.g., adult goal SBP > 90 mmHg or MAP > 65 mmHg)
7. Use improvement in mental status and blood pressure (systolic pressure and or MAP) as indicators of effective treatment.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hypoperfusion / Non-Traumatic Shock 7.7

General Notes:

- Inadequate or delayed resuscitation increases the risk of multiple organ dysfunction syndrome and death. Early detection and intervention are critical for improving outcomes.
- Mortality rates for patients in shock vary widely based on the cause, but the common causes of shock, including sepsis, trauma, and cardiac failure, have mortality rates of 20-50%.
- Patients with persistent hypotension incur the highest mortality, but mortality is also substantial in those with cryptic shock (shock without overt hypotension). The misconception that hypotension is necessary to define shock persists today and results in dangerous delays in treatment.
- Even patients with end-stage renal disease and severe congestive heart failure need adequate volume resuscitation with frequent reassessments, especially if the etiology of shock is hypovolemic or distributive (e.g., sepsis). Stop fluids when signs of pulmonary edema are found on exam.
- Ongoing reassessments of tissue perfusion, pulmonary congestion, and fluid responsiveness should be used to guide fluid resuscitation. Both under-resuscitation and over-resuscitation are harmful to the patient.
- The most common cause of shock of unclear cause is septic shock.
- ETCO₂ directly measures ventilation (i.e., elimination of CO₂ from the body) but also indirectly measures changes in tissue level production of CO₂ (i.e., metabolism) and delivery of CO₂ to the lungs via blood circulation (i.e., perfusion) In shock states there is typically worsening metabolic acidosis and reduced cardiac output/reduced perfusion which results in decreased ETCO₂ readings.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

This protocol applies to adult and pediatric patients experiencing pain. It includes pharmacological and non-pharmacological techniques to be used by both BLS and ALS providers. Patients that will likely require pain management may include but are not limited to those experiencing a traumatic injury, thermal or chemical burns, sickle cell crisis, acute coronary syndrome, and abdominal pain including unilateral flank pain (i.e., kidney stones).

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient experiencing acute medical or traumatic pain that would benefit from treatment with a pharmacological and or non-pharmacological therapy.

Exclusion Criteria:

- Pregnancy with active labor.

Definitions

- **Mild to Moderate pain:** pain rated in the 1-5 range on a scale of 1-10. Examples may include isolated soft tissue or musculoskeletal injuries such as sprains and strains.
- **Moderate to Severe pain:** pain rated in the 5-10 range on a scale of 1-10. Examples may include obvious fractures or dislocations, gunshot wounds, burns, etc.
- **Non-steroidal anti-inflammatory drugs (NSAID):** a class of medication that reduces the production of certain chemicals in the body that cause inflammation, pain, and fever. Examples of NSAIDs include aspirin, ibuprofen, naproxen, ketorolac.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#) for medical patient or General Trauma Management protocol for injured patient.
 - Unless the patient is unable to communicate, identify the patient's allergies to medications prior to administration of pain medication.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Continue injury or illness specific treatment per applicable protocol.
4. Measure and document the patient's level of pain during initial assessment, before, and after any intervention. Ask the patient to rate their pain on a scale from 0 (no pain) to 10 (worst pain imaginable).



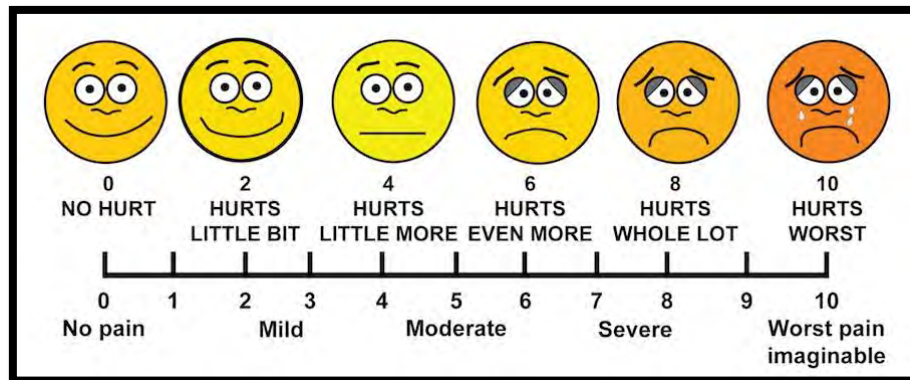
DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

- Patients who are unable to self-report level of pain or have a difficult time communicating their condition can be asked to rate their pain using the FACES scale.

Wong-Baker FACES Pain Rating Scale



- ❖ Important Note: documenting an injured patient's pain level (on a scale of 1-10) and any improvement or worsening during treatment/transport in the ePCR is both a national and department key performance indicator. Documenting initial and reassessment pain level(s) is mandatory for all injured patients who are alert and awake.
 - ❖ Important Note: pain level (using scales noted above) should be documented before and regularly (i.e., every 15 minutes) after analgesic medication administration and upon arrival at the receiving hospital.
5. Initiate use of non-pharmaceutical pain management techniques:
 - Verbal reassurance or distraction to minimize anxiety.
 - For children, facilitate caregiver presence to the extent allowed by required clinical care and caregiver comfort.
 - Allow the patient to remain in a position of comfort unless contraindicated by the patient's condition.
 - Apply ice/cold packs to limit swelling in suspected fractures or soft tissue injury, but do NOT apply ice directly to bare skin.
 - Splint traumatic extremity injuries.
 - ❖ Important Note: administration of pain medication may be required prior to splinting certain extremity injuries.
 6. If non-pharmaceutical techniques are not sufficient to relieve mild to moderate pain (pain scale of 1-5), then consider use of oral analgesics:



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Treatment Protocols – General Medical Emergencies

Pain Management 7.8

- ❖ Important Note: depending on the clinical situation and the level of pain, a paramedic may skip administering an oral analgesic and proceed immediately to administering IN/IV/IO/IM analgesic medication.

Adult Acetaminophen (Tylenol®)

Acetaminophen: 160 mg chewable tablet x 4 for a total of 640 mg by mouth

No repeat dosing allowed

Special Notes:

- Contraindications: do NOT use in patients with:
 - Inability to swallow or take medications by mouth.
 - Recent ingestion (within the past 6 hours) of acetaminophen or acetaminophen-containing products (e.g., Vicodin, Percocet, Norco, or certain cold/flu remedies).
 - Severe active liver disease.
 - A known allergy to acetaminophen.

Pediatric Acetaminophen (Tylenol®)

Age	< 3 months	3 months	4-11 months	12-23 months	2-4 yo	5-12 yo	≥ 13 yo
Acetaminophen liquid 160 mg / 5 ml	Not indicated	1.25 ml (40 mg)	2.5 ml (80 mg)	3.75 ml (120 mg)	5 ml (160 mg) or One 160 mg chewable tablet	10 ml (320 mg) or Two 160 mg chewable tablets	20 ml (640 mg) or Four 160 mg chewable tablets

No repeat dosing allowed

Special Notes:

- Contraindications: do NOT use in patients with:
 - Inability to swallow or take medications by mouth.
 - Recent ingestion (within the past 6 hours) of acetaminophen or acetaminophen-containing products (e.g., Vicodin, Percocet, Norco, or certain cold/flu remedies).
 - Severe active liver disease.
 - A known allergy to acetaminophen.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

7. Oral administration of acetaminophen for treatment of mild to moderate pain does NOT by itself mandate an ALS transport to an emergency department:
 - If the patient otherwise meets BLS transport criteria as outlined in [Section 2.2 Transfer of Care Policy](#), oral pain medication may be administered, and patient care continued by or transferred to BLS providers for transport.
 - If the patient otherwise meets Nurse Triage Line (NTL) criteria as outlined in EMS Ops Bulletin No. 13, oral pain medication may be administered, and patient care transferred to the NTL for final disposition. (e.g., self-care, clinic appointment, etc.)
9. If patient is nauseated or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. If non-pharmaceutical techniques and or oral analgesics are not sufficient to relieve pain, then consider use of IN/IV/IO/IM analgesia.
 - ❖ Important Note: Any patient receiving IN/IV/IO/IM fentanyl or ketamine shall be transported ALS to an appropriate emergency department.
 - If the patient otherwise meets BLS transport criteria as outlined in [Section 2.2 Transfer of Care Policy](#), ketorolac may be administered IM by a paramedic, and patient care transferred to BLS providers for transport to an appropriate emergency department.
2. When administering fentanyl or ketamine, place patient on continuous cardiac, pulse oximetry, and ETCO₂ monitoring.
 - ❖ Exception: during a confined space/technical rescue or extrication, clinical monitoring may not be logistically possible. In such cases, ketamine is the preferred analgesic medication due to its minimal negative hemodynamic or respiratory side effects.
3. Establish IV/IO access as indicated by the patient's clinical presentation.
 - Consider intranasal (IN) analgesia for initial dosing, particularly in children, to initiate pain relief prior to, or in the absence of, IV access. IN administration may obviate the need to obtain IV access for pain medication in some situations.
 - For [IN medication administration](#) the maximum volume per nare is 1 mL.
 - Please note: the mucosal atomizer device has a 0.1 mL dead space. Thus, to prevent underdosing, an extra 0.1 mL of medication may be drawn up to account for this dead space within the atomizer. This is particularly important in small volume pediatric dosing.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

- Consider intramuscular (IM) analgesia for initial dosing to initiate pain relief prior to, or in the absence of, IV access. IM administration may obviate the need to obtain IV access for pain medication in some situations.
 - For IM medication administration the maximum volume per injection is 3 ml.
- 4. If patient has moderate to severe pain (pain scale of 5-10) administer any of the following medications based on patient presentation and clinical scenario:
 - ❖ Important Note: Paramedics shall NOT delay or defer pain medication administration to patients with moderate to severe pain due to “close proximity” to the hospital. Due to patient volumes and logistical factors, patients do NOT immediately receive analgesic medications upon arrival in the emergency department.

<u>Fentanyl</u>				
	Intranasal	Intramuscular	IV/IO	Repeat Dose
Adult	1 mcg/kg IN Max single dose 100 mcg	1 mcg/kg IM Max single dose 100 mcg	1 mcg/kg IV/IO slow push over 1-2 min. Max single dose 100 mcg	May repeat every 5-10 min as needed to a max total dose of 300 mcg
Pediatric	Same as adult	Same as adult	Same as adult	Same as adult
Special Notes: <ul style="list-style-type: none">• <u>Contraindications:</u> do NOT use in patients with:<ul style="list-style-type: none">○ Hypotension (e.g., Adult SBP < 90 mmHg). Instead use ketamine in these situations.○ Hypoxia despite supplemental oxygen or any signs of hypoventilation. Instead use ketamine in these situations.○ A known allergy to opioids.• <u>Consider using fentanyl for treatment of:</u><ul style="list-style-type: none">○ Traumatic injuries with no contraindications listed above.○ Medical chest pain that is refractory to nitroglycerin.○ Medical abdominal pain.				

- ❖ Important Note: If patient experiences persistent respiratory depression after receiving fentanyl, administer naloxone per [Overdose – Poisoning protocol](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

<u>Ketamine</u>				
	Intranasal	Intramuscular	IV/IO	Repeat Dose
Adult	0.5 mg/kg IN Max single dose 50 mg	0.5 mg/kg IM Max single dose 50 mg	0.25 mg/kg IV/IO slow push over 1-2 min. Max single dose 30 mg	May repeat every 5-10 min as needed to a max total dose of 100 mg
Pediatric ≥ 3 mo	Same as adult	Same as adult	Same as adult	Same as adult
Special Notes: <ul style="list-style-type: none"> • <u>Contraindications:</u> do NOT use in patients with: <ul style="list-style-type: none"> ○ Children < 3 months old. ○ Medical chest pain, abdominal/flank pain, or headaches. Instead use fentanyl or ketorolac in these situations. ○ A known allergy to ketamine. • <u>Consider using ketamine for treatment of:</u> <ul style="list-style-type: none"> ○ Traumatic injury with no contraindications listed above. ○ Traumatic injury with signs of hypotension or circulatory shock. ○ During technical rescues that limit the ability to apply patient monitoring devices (e.g., pulse oximetry, ETCO₂). ○ There is a concern for or history of opioid addiction or if the patient is already on high doses of opioids for pre-existing medical conditions. 				



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

<u>Ketorolac (Toradol®)</u>				
	Intranasal	Intramuscular	IV only	Repeat Dose
Adult	Not indicated	30 mg IM	15 mg IV	No repeat doses
Pediatric ≥ 2 yo	Not indicated	1 mg/kg IM Max dose 30 mg	0.5 mg/kg IV Max dose 15 mg	No repeat doses
Special Notes: <ul style="list-style-type: none">• <u>Contraindications:</u> do NOT use in patients with:<ul style="list-style-type: none">○ Children < 2 years old.○ NSAID use in the past 6 hours.○ Hypotension (Adult SBP < 90 mmHg).○ Bleeding traumatic injury.○ Chronic kidney disease.○ Current pregnancy.○ History of intestinal bleeding.○ Currently taking anticoagulants (e.g., Xarelto, Coumadin, Eliquis).○ Cardiac chest pain.○ A known allergy to NSAIDs.• <u>Consider using ketorolac for treatment of:</u><ul style="list-style-type: none">○ Suspected kidney stones/renal colic.○ Nontraumatic headache i.e., migraine headache.○ Isolated minor extremity injuries (e.g., ankle sprain)○ Non-traumatic neuromuscular pain (e.g., low back pain, joint pain, arthritis etc.)				

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for additional doses of fentanyl or ketamine as needed based on the patient's level of pain. Ketorolac and acetaminophen are single dose-only medications.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Pain Management 7.8

General Notes:

- In the case of a suspected fracture, the use of appropriate splinting techniques and application of ice can relieve a significant amount of pain and should be used in combination with analgesic medication.
- Onset of action is dependent on the pharmacokinetics of the drug class as well as route of administration; oral analgesics are effective for pain control but have a slower onset of action.
- If opioid analgesic medications are administered, the use of non-invasive capnography identifies hypoventilation faster and earlier than desaturation on pulse oximetry.
- Patients with acute abdominal pain may safely receive analgesic medications as needed for comfort. Use of analgesia for acute abdominal pain does NOT mask clinical findings or delay diagnosis in the emergency department.
- Intranasal medication administration (fentanyl/ketamine) is preferred over IV/IM for pediatrics to potentially avoid the need for IV access for pain medication administration.
- Research on the safety of low dose ketamine for pain dates to the 1970s and reveals a strong safety profile. Low dose ketamine does not cause respiratory depression, hypoxemia, or hypotension as do many other similar analgesic agents.
- Low dose ketamine is contraindicated in infants < 3 months of age due to the risk of laryngospasm (due to airway physiology, not ketamine itself).
- When given as a stand-alone analgesic or in combination with other pain medications including opioids, low dose ketamine lowers pain scores and has functionally equivalent efficacy to morphine for short-term analgesia in the emergency setting.
- While some believe the use of ketamine is contraindicated in patients with mental illness due to potential exacerbation of underlying psychosis, there is little evidence of adverse reactions or exacerbation of psychosis when ketamine is used in a low dose analgesic manner.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Adrenal Crisis

7.9

This protocol applies to patients that have a known medical history of adrenal insufficiency who present with signs and or symptoms of acute adrenal crisis. Evidence of an adrenal insufficiency diagnosis may include medical alert tags, patient or family statement, notes or care description letter from a healthcare provider, possession of corticosteroids for self or family administration.

ALL PROVIDER LEVELS

Inclusion Criteria:

- All patients with known medical history of adrenal insufficiency who exhibit signs and or symptoms of adrenal crisis.

Exclusion Criteria:

- Patient does not have a known history of adrenal insufficiency.
- Patient with known history of adrenal insufficiency but is NOT in adrenal crisis.

Definitions:

- **Adrenal Insufficiency** is a potentially life-threatening condition in which the adrenal glands do not produce enough of the hormone's cortisol and aldosterone. Adrenal insufficiency can be caused by several medical conditions:
 - Congenital or acquired disorders of the adrenal gland.
 - Congenital or acquired disorders of the pituitary gland or hypothalamus.
 - Long term use of high dose steroids (e.g., COPD, asthma, rheumatoid arthritis, and organ transplant recipients).
- **Acute Adrenal Crisis** is a life-threatening condition in which someone with adrenal insufficiency fails to mount an adequate response to acute physiologic stress. (e.g., infection, trauma, etc.) Refractory shock or death can occur in patients on a daily maintenance dose of steroids (hydrocortisone sodium succinate or prednisone) that experience illness or injury and are not given supplemental "booster" doses of hydrocortisone.
 - Early symptoms: non-specific, may resemble viral illness or hypoglycemia
 - Late symptoms: altered mental status, hypotension, hypoglycemia, seizures, cardiac dysrhythmia, cardiopulmonary arrest

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Adrenal Crisis

7.9

3. Identify and treat the underlying condition causing acute adrenal crisis per the appropriate protocol.
4. Check blood glucose level. Treat per [Hypoglycemia](#) or [Hyperglycemia protocol](#) as clinically indicated.
5. All patients with suspected or confirmed acute adrenal crisis shall be treated and transported ALS.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Obtain [12 lead EKG](#) and evaluate for cardiac causes of acute adrenal crisis. Treat per appropriate protocol.
 - Dysrhythmia (e.g., bradycardia, heart block, ventricular tachycardia, etc.)
 - Myocardial ischemia (e.g., ST elevation MI), treat per [Acute Coronary Syndrome protocol](#).
 - Assess for findings of hyperkalemia, treat per [Hyperkalemia protocol](#).
3. Establish IV/IO access as indicated by the patient's clinical presentation.
4. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
5. ALS providers are directed to administer a “booster” dose of steroids to patients with adrenal insufficiency with the following illnesses or injuries:
 - Shock/hypoperfusion (any cause)
 - Severe traumatic injury
 - Hyperthermia or hypothermia
 - Fever > 100.4°F and ill appearing
 - Respiratory distress (any cause)
 - Myocardial infarction
 - Partial or full thickness burns > 5% BSA
 - Vomiting and diarrhea with signs/symptoms of dehydration
 - Medication facilitated intubation
6. If available, the patient's personal Hydrocortisone Sodium Succinate (Solu-Cortef®) emergency kit may be administered.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Adrenal Crisis

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<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Hydrocortisone Sodium Succinate (Solu-Cortef®) 100 mg IV/IO/IM	Hydrocortisone Sodium Succinate (Solu-Cortef®) 2 mg/kg IV/IO/IM Maximum dose of 100mg

- ❖ Important Note: if the patient/family want to self-administer the patient's personal Hydrocortisone Sodium Succinate (Solu-Cortef®) emergency kit, this is allowed. ALS providers should assist and supervise immediate administration.

7. If the patient's personal Hydrocortisone Sodium Succinate (Solu-Cortef®) emergency kit is NOT readily available, immediately given methylprednisolone (Solu-Medrol®)

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Methylprednisolone (Solu-Medrol®) 125 mg IV/IO/IM	Methylprednisolone (Solu-Medrol®) 2 mg/kg IV/IO/IM Maximum dose of 125 mg

8. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
9. If findings of hyperkalemia are present on EKG, treat per [Hyperkalemia protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary

General Notes:

- Adrenal crisis is a life-threatening emergency, and treatment should not be delayed for laboratory testing. The treatment is emergency steroid replacement.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Adrenal Crisis

7.9

Your Emergency Solu-Cortef™ (hydrocortisone) Injection Kit



Your Emergency Injection Kit needs to contain:

- 1 x 2 mL Solu-Cortef™ ACT-O-VIAL®
- 2 x Alcohol Swabs
- 1 x 3 mL Single Use Syringe
- 1 x Vial Access Cannula or Drawing Up Needle
- 1 x Injection Needle
- 1 x Cotton Swab

Preparation:

- Wash your hands thoroughly before preparing the injection.
- Check the label to ensure you have Solu-Cortef™.
- Check the expiry date on the ACT-O-VIAL®.



STEP 1



STEP 2

- Tap to ensure that powder is at base of vial and away from the central stopper.
- Put the ACT-O-VIAL® on a hard surface.
- Place the palm of your hand on the lid of the ACT-O-VIAL®.
- Press down firmly on the lid to force the liquid into the bottom chamber.



STEP 3

- Gently mix the solution without shaking it.
- Rotate the ACT-O-VIAL® turning it upside down a number of times.
- **DO NOT SHAKE.**
- The solution is initially cloudy but will become clear.



STEP 4

- Remove the plastic tab that covers the rubber stopper with your thumbnail.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Adrenal Crisis

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- Wipe the top of the ACT-O-VIAL® with an alcohol swab.



- Connect the 3 mL syringe and the vial access cannula or drawing-up needle firmly together.



- Place the ACT-O-VIAL® on a firm surface, and insert the access cannula or drawing-up needle through the centre of the rubber stopper.



- With the access cannula or drawing up needle in the ACT-O-VIAL®, invert the bottle and withdraw the correct dose ordered by your doctor.

NOTE: If using a drawing up needle, keep the needle tip below the fluid level.



- Withdraw the syringe from the ACT-O-VIAL®.
- Remove the access cannula or drawing up needle and replace it with the injection needle. Use the needle size recommended by your clinic nurse.
- Flick the syringe to remove any bubbles.
- Expel any excess air.



- Divide the thigh into 3 sections.
- Clean the leg area with an alcohol swab **BEFORE** injection.
- Give the injection in the outer middle third of the thigh.





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

This protocol applies to any adult or pediatric patient who presents with suspected or confirmed seizure activity or has recently reported seizure activity.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Seizure activity upon arrival of EMS.
- Recent seizure with continued postictal state.
- Persistent unexplained altered mental status in a patient with a history of seizures.

Exclusion Criteria:

- [Syncope or Near Syncope.](#)
- [Cardiac Arrest.](#)
- [Dystonic Reaction.](#)

Definitions:

- **Seizure:** a sudden change in behavior caused by an episode of disordered electrical activity in the brain. A seizure can present with a variety of abnormal neurologic findings depending on the part of the brain that is involved.
- **Focal Seizure:** a seizure involving a small (focal) part of the brain that may or may not affect consciousness/awareness. The symptoms vary depending entirely on the part of the brain that is involved at the start of the seizure.
- **Generalized Seizure:** a seizure involving both halves (hemispheres) of the brain. Loss of consciousness always occurs and may be accompanied by spasms, stiffening, shaking, muscle contractions or loss of muscle tone.
- **Febrile Seizure:** a seizure occurring between 6 months and 5 years of age, associated with fever but without evidence of intracranial infection (i.e., meningitis) or other defined cause. Febrile seizures are divided into two categories, simple or complex, based on clinical features.
 - **Simple Febrile Seizure:** most common type, characterized by a generalized seizure that lasts less than 5 minutes and does not recur in a 24-hour period.
 - **Complex Febrile Seizure:** characterized by a seizure that has a focal onset (e.g., shaking limited to one limb or one side of the body), lasts longer than 5 minutes, or occurs more than once in 24 hours.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

- **Postictal period:** the period of transition from a seizing state back to the patient's pre-seizure baseline level of awareness and function. Although there is a broad range, this period usually lasts less than 1 hour and presents with sleepiness/decreased alertness and or confusion. It may last longer in the elderly and those patients with other comorbid conditions.
- **Status Epilepticus:** a seizure lasting ≥ 5 minutes or two or more successive seizures without a return to baseline mental status in between. This is a true emergency requiring rapid treatment and transport.
- **Non-convulsive status epilepticus:** a state of ongoing seizure activity in the brain causing altered mental status but with minimal or no motor movements. This diagnosis should be considered in any patient with altered mental status and a history of a seizure disorder or in any person with recent seizure and a prolonged postictal period.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Rule out trauma as a suspected etiology. [See Traumatic Brain Injury protocol](#).
4. Assess for spinal injury and treat accordingly. [See Spinal Motion Restriction protocol](#). If spinal injury is not suspected, place patient in a position of comfort.
5. Do not restrain the patient or place any device into the patient's mouth while actively seizing. Protect the patient from injury.
6. Check blood glucose level. Treat per [Hypoglycemia](#) or [Hyperglycemia protocol](#) as clinically indicated.
7. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
8. Consider multiple potential causes of seizure:
 - Head injury
 - Hypoxia
 - Cardiac Dysrhythmia (e.g., ventricular tachycardia, ventricular fibrillation)
 - Hypoglycemia or hyperglycemia
 - Fever or infection
 - Stroke



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

- Pregnancy with eclampsia
 - Hyperthermia
 - Electrolyte abnormalities (e.g., hyponatremia)
 - Alcohol or drug intoxication or withdrawal
 - History of seizure disorder with or without medication noncompliance.
9. If patient is postictal but not actively seizing, provide supportive care and transport to an emergency department.
10. Patients with a prolonged postictal period, persistent altered mental status after a seizure, or unusual repetitive movements (e.g., forced eye deviation to one side, lip smacking, or subtle body twitching) should be suspected of having non-convulsive status epilepticus. This is a medical emergency and should be transported immediately.
11. If febrile seizure, remove excessive layers of clothing to facilitate cooling.
12. All children presenting with a febrile seizure should be transported to an appropriate emergency department for evaluation and observation.
- If the child experienced a simple febrile seizure with complete return to normal neurologic baseline at time of EMS assessment, BLS transport may be considered.
 - If the child experienced a complex febrile seizure or has persistent altered mental status at time of EMS assessment, ALS transport shall occur.
13. If not already dispatched or on scene, request ALS transport for any patient who meets one or more of the following criteria:
- Actively seizing
 - Has been seizing for ≥ 5 minutes (e.g., has been seizing since the 911 call was made)
 - Two or more seizures without regaining normal consciousness.
 - Hypoglycemia
 - Is pregnant and has had a seizure or is currently seizing
 - Recent head trauma.
 - Concern for non-convulsive status epilepticus
 - Complex febrile seizure
 - Any possible seizure activity in a child ≤ 6 months old

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access when clinically and logistically feasible.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

- If patient is actively seizing and does not yet have IV/IO access. Proceed immediately with IM midazolam. Do NOT delay midazolam administration to obtain IV access.
- 3. Place patient on continuous ETCO₂ monitoring.
- 4. If the patient is unconscious and experiencing active seizure activity, administer Midazolam (utilize the appropriate concentration/vial of midazolam as indicated below):

<u>Adult</u>	<u>Pediatric</u>
Midazolam <u>Intramuscular:</u> 5 mg IM Concentration: 10 mg/2 mL (1 mL) OR <u>Intravenous dose:</u> 5 mg IV/IO Concentration: 10 mg/10 mL (5 mL) May repeat once at a dose 2 mg IV/IO in 5 minutes if patient continues to seize. Maximum total dose is 7 mg. If IM or IV dosing is not an option, intranasal administration may occur: <u>Intranasal dose:</u> 5 mg IN Concentration: 10 mg/2 mL (1 mL may be administered into one nostril)	Midazolam <u>Intramuscular:</u> 0.2 mg/kg IM to a maximum single dose of 5 mg. Concentration: 10 mg/2 mL (5 mg/mL) OR <u>Intravenous dose:</u> 0.1 mg/kg IV/IO, to a maximum single dose of 5 mg. Concentration: 10 mg/2 mL (5 mg/mL) Repeat once in 5 minutes if patient continues to seize. If IM or IV dosing is not an option, intranasal administration may occur: <u>Intranasal dose:</u> 0.2 mg/kg IN to a maximum single dose of 5 mg. Concentration: 10 mg/2 mL
If patient is actively seizing and does not yet have IV/IO access. Proceed immediately with IM midazolam. <u>Do NOT delay midazolam administration to obtain IV access.</u> Intramuscular (IM) administration of midazolam is preferred over intranasal (IN) when IV/IO access has not yet been obtained.	

- 5. If patient is > 20 weeks pregnant or delivered a baby in the past 6 weeks, eclampsia is suspected. Treat per [Pre-eclampsia and Eclampsia protocol](#). Administer **Magnesium Sulfate:**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

<u>Adult</u>	<u>Pediatric</u>
<p>Magnesium Sulfate</p> <p><u>Dose:</u> 4 gm IV/IO over 10 minutes. Mix 4 gm in 100 ml of NS. Utilize a 10 gtts set and infuse at 50 gtts/min</p> <p>May be repeated once. Infuse until visible seizure activity stops.</p>	<p>Not indicated</p>

6. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
7. If patient presents with or develops respiratory depression or a compromised airway that is an immediate threat to life AND is unable to be corrected using less invasive airway management techniques (e.g., proper airway positioning, suctioning, OPA/NPA and BVM) consider advanced airway placement. [See Medication Facilitated Intubation protocol](#).
8. Acquire a 12-lead EKG following cessation of seizure activity in patients without a history of seizure to determine possible cardiac cause (e.g., Ventricular tachycardia)

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Most seizures are self-limited lasting 1-3 minutes and will need only supportive care (e.g., suctioning, oxygen, and attention to airway management). Most seizures will not need treatment with midazolam.
- Hypoglycemic patients who are treated in the field for seizure should be transported to the hospital, regardless of whether they return to baseline mental status after treatment.
- Involuntary muscle movements, often referred to as myoclonic jerks, may accompany syncope due to cardiac causes or hypoxia. However, syncope is differentiated from seizure by its brief loss of consciousness as opposed to seizures which typically have a more prolonged postictal phase.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Seizures 7.10

- Suspect a possible cardiac cause if a patient over the age of 50 experiences a new onset seizure.
- More than two doses of benzodiazepines are associated with high risk of airway compromise. Use caution. Consult with Medical Control when more than two doses are required to control seizure activity.
- Be aware that rectal Valium (Diastat) may have been administered to some patients with known seizure disorders prior to EMS arrival. Adding midazolam on top of rectal Valium may be required but can also exacerbate respiratory depression. Be prepared to provide airway management.
- Midazolam by the intramuscular (IM) route affords the fastest route to terminating a seizure. Decreased time to medication administration increases the likelihood of successfully terminating a seizure.
- Continued seizure activity causes molecular changes in the brain that make medications less effective over time. Thus, do NOT delay treatment in patients who are actively seizing.
- Febrile seizures occur in 2-4% of children younger than 5 years of age with peak occurrence between 12 and 18 months old. Most children have their febrile seizure on the first day of illness and, in some cases, it is the first symptom that the child is ill.
- Most febrile seizures have ended spontaneously by the time the child is first evaluated, and the child is rapidly returning to normal baseline. In such cases, active treatment with Midazolam is not necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Care Protocols – General Medical Emergencies

Behavioral Psychological Emergencies 7.11

This protocol applies to patients exhibiting behavior that presents a danger to self and others. Careful assessment is required to determine the cause of the mental disturbance. In all cases, substance induced disorders (alcohol intoxication or drugs) organic causes (cerebral lesions), endocrine emergencies (hypoglycemia or hyperglycemia), hypoxia or trauma must be ruled out to determine if the condition is truly psychological. Excited Delirium is a condition in which a person is in a psychotic state or extremely agitated. The person's inability to process rational thought precludes normal de-escalation procedures alone. High body temperatures and instant tranquility (this is when a previously combative patient becomes quiet and docile) in these patients are key findings in predicting a high risk of sudden death in excited delirium. Ensure that law enforcement is summoned to all responses involving potentially combative patients.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Attempt to de-escalate verbally aggressive behavior with a calm and reassuring approach and manner. Utilize family members or friends known to the patient if it is safe to do so.
3. Do not leave the patient alone unless there is a risk or harm to pre-hospital personnel or others.
4. Support airway and provide supplemental oxygen per the Airway Maintenance and Supplemental Oxygen protocol.
5. Place the patient in a position of comfort unless combative.
6. If patient restraint is necessary to prevent harm to the patient and others, provide soft four-point restraints or handcuffs (law enforcement) and transport the patient in a supine position. **Do not transport the patient in a prone position or restrict the patient in taking full tidal volume breaths.** Circulation and motor sensory function shall be checked every 5 minutes while in physical restraints.
7. Ensure that a blood glucose reading is obtained.
8. Consider use of Comprehensive Psychiatric Emergency Program (CPEP) if:
 - Age 18 or greater and less than age 65.
 - Vital signs and blood glucose level within normal ranges.
 - There is an isolated behavioral problem.
 - Transport should be completed by law enforcement.
 - No medical problems or injuries that need to be evaluated at the hospital.

ADVANCED LIFE SUPPORT PROVIDERS



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Care Protocols – General Medical Emergencies

Behavioral Psychological Emergencies

7.11

1. If the patient continues to present a danger to self or others on scene due to combativeness, consider chemical sedation:

<u>Adult</u>	<u>Pediatric</u>
Midazolam <u>Intranasal dose: 10 mg IN (5 mg each nostril). Contact Medical Control</u> for additional doses OR <u>Intramuscular: 5 or 10 mg IM</u> OR <u>Intravenous dose: 2-5 mg IV/IO</u> every 2 minutes to a maximum of 10 mg until cessation of visible seizure activity	Contact Medical Control

or

<u>Adult</u>	<u>Pediatric</u>
Haloperidol (Haldol) 5 mg IM Patients over the age of 65 years 2.5 mg	Haloperidol (Haldol) Medical Control Required <u>Greater than 12 y.o.: 5 mg IM</u> <u>Ages 6 – 12 years: 2 mg IM</u>



2. Provide **continuous EKG monitoring** and **pulse oximetry**.
3. Any patients receiving medications for sedation shall be transported to the hospital by ALS resources for further medical evaluation.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Nausea and Vomiting

7.12

This protocol applies to adult and pediatric patients with nausea and or vomiting. The goal of this protocol is to supplement the care described in other disease specific protocols by decreasing the discomfort caused by nausea and vomiting.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has mild, moderate, or severe nausea and or vomiting due to underlying injury, medical condition, active motion sickness, or medication side effect.
- Preventative administration of an anti-nausea/anti-emetic should be considered when intense nausea or vomiting could complicate an existing injury or medical condition (e.g., penetrating eye injury, traumatic brain injury, high risk for aspiration, side effects of opioid administration, etc.)

Exclusion Criteria:

- None
- See specific contraindications to ondansetron (Zofran)

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Place patient either in position of comfort or in left lateral position if not prevented by spinal motion restriction or logistical considerations.
3. Continue injury or illness specific treatment per applicable protocol.
4. BLS and ALS providers may assist an adult patient with inhaling vapor from an isopropyl alcohol wipe (i.e., an alcohol prep) for treatment of nausea and or vomiting. This is particularly useful when an ALS provider is not on scene, IV access is not indicated, or additional relief is required with or after ondansetron administration.
 - Open a single isopropyl alcohol wipe and place 1-2 cm from the patient's nose.
 - Instruct the patient to inhale deeply through their nose and exhale out their mouth.
 - Inhale 3 times through the nose every 15 minutes, as tolerated.

Adult

**Isopropyl alcohol wipe
(i.e., an alcohol prep)**
Inhale 3 times through the nose
every 15 minutes, as tolerated.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Nausea and Vomiting

7.12

ADVANCED LIFE SUPPORT PROVIDERS

1. Establish IV/IO access as indicated by patient's clinical presentation.
2. Administer ondansetron (Zofran):
 - IV/IO administration is via slow push (i.e., over at least 30 seconds, preferably over 2-5 minutes).
 - IV form of ondansetron may be given orally at same dose.

<u>Adult</u>	<u>Pediatric (> 6 months old)</u>
Ondansetron (Zofran) 4 mg IV/IO/IM/PO May repeat IV/IO dose one time in 10 minutes as needed. Do NOT repeat IM/PO dose	Ondansetron (Zofran) 0.15 mg/kg IV/IO/IM/PO (Maximum single dose 4 mg) May repeat IV/IO dose one time in 10 minutes as needed. Do NOT repeat IM/PO dose

3. Contraindications for administration of ondansetron (Zofran) include:
 - Known allergy to ondansetron (Zofran) or another 5-HT₃ receptor antagonist such as Kytril (granisetron) and Aloxi (palonosetron)
 - Suspected or known diagnosis of prolonged QTc interval on ECG
 - History of prolonged QTc at baseline
 - Electrolyte abnormalities such as severe hypokalemia or hypomagnesemia (which can lead to prolonged QTc)
 - Currently taking other medications that prolong the QTc interval (e.g., methadone, antipsychotics such as haloperidol, heart medications such as amiodarone or sotalol, etc.)

❖ Important Note: Routine ECG and electrolyte screening before administration of ondansetron is NOT required unless patient has the specific risk factors noted above.
4. Oral administration of ondansetron (Zofran) for treatment of mild to moderate nausea and or vomiting does NOT by itself mandate an ALS transport to an emergency department:
 - If the patient otherwise meets BLS transport criteria as outlined in Section 2.2 Transfer of Care Policy oral ondansetron (Zofran) may be administered and patient care transferred to BLS providers for transport.
 - If the patient otherwise meets Nurse Triage Line (NTL) criteria as outlined in EMS Operations Bulletin No. 13, oral ondansetron (Zofran) may be administered, and patient care transferred to the NTL for final disposition. (e.g., self-care, clinic appointment, etc.)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Nausea and Vomiting

7.12

5. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary

General Notes:

- Nausea and vomiting are symptoms of an underlying illness. In addition to treating the nausea and vomiting, performing a thorough history and physical exam is critical to identifying what may be an underlying disease in need of emergency treatment (e.g., bowel obstruction, acute heart attack, elevated intracranial pressure, infection, etc.)
- Several studies demonstrate that inhaling vapor from an isopropyl alcohol wipe is as effective, and in some cases faster and more effective, than ondansetron administration.
- Studies show that inhaling vapor from an isopropyl alcohol wipe provides significant reduction in nausea within 10 minutes of initiating aromatherapy.
- The side effect profile of ondansetron is extremely mild favoring the use of this medication over other IV anti-emetic medications.
- Ondansetron may be used safely in pregnant females with nausea and vomiting.
- For very young pediatric patients, ondansetron can be sedating. Regardless, ondansetron is the preferred anti-emetic in children.
- Ondansetron can increase the QT interval and should be used with caution in patients who have a history of long QT syndrome or are on other medications that can increase the QT interval.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

7.13

This protocol applies to all adult and pediatric patients who present with signs and symptoms consistent with hypoglycemia.

ALL PROVIDER LEVELS

Inclusion Criteria:

Check blood glucose level when an adult or pediatric patient meet any of the following criteria:

- Altered level of consciousness or altered mental status
- Alcohol intoxication or history of alcohol use disorder
- Stroke symptoms (facial asymmetry, extremity weakness, slurred speech)
- Seizure activity
- Severe infection or possible sepsis
- Hypothermia
- Symptoms of potential hypoglycemia (e.g., weakness, nausea, vomiting, irritability, dizziness, diaphoresis, fatigue, lightheadedness)

Exclusion Criteria:

- None

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Check blood glucose level when indicated as noted above. If hypoglycemic, consider possible causes and treat per this protocol.

Hypoglycemia Requiring Treatment		
Adult < 70 mg/dL or Glucometer reads "LO"	Pediatric ≥ 1 month old < 70 mg/dL or Glucometer reads "LO"	Neonate < 1 month old < 45 mg/dL or Glucometer reads "LO"
❖ Important note: when the glucometer reads "LO" the blood glucose level is < 20 mg/dL.		

4. If patient has hypoglycemia in addition to other co-existing traumatic injuries or medical symptoms, (e.g., stroke, seizure, infection, etc.) treat hypoglycemia per this protocol and refer to the applicable protocol for additional management direction.
5. ALS providers may proceed directly to IV/IO interventions as needed.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

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6. Administer oral glucose in the form of glucose gel or other appropriate high glucose content fluid (such as orange juice) if the patient is:
 - At least 4 years old AND
 - Has a blood glucose level of < 70 mg/dL AND
 - Displays signs and symptoms of hypoglycemia AND
 - Is conscious enough to adequately swallow secretions, follow commands, and maintain their own airway

Oral Glucose Gel	
<i>Adult</i>	<i>Pediatric</i>
One single dose tube in the buccal space (space in the cheek) May repeat once in 10 minutes if needed to correct blood glucose level	One single dose tube in the buccal space (space in the cheek) May repeat once in 10 minutes if needed to correct blood glucose level

7. Dispense oral glucose in small amounts and ensure the patient is adequately swallowing and not aspirating.
8. For patients with an insulin pump who are hypoglycemic with associated altered mental status (GCS < 15):
 - If patient cannot ingest oral glucose or ALS is not available: stop the pump, disconnect, or remove at insertion site.
 - If patient can ingest oral glucose or is receiving ALS interventions: leave the pump connected and running.
9. Reassess vital signs and mental status frequently after dextrose treatment.
10. Repeat check of blood glucose level 5 minutes after dextrose treatment if mental status has not returned to normal.
11. If treatment of hypoglycemia with prehospital dextrose does not achieve normal blood glucose levels and mental status:
 - Initiate transport to closest appropriate receiving facility for further treatment of refractory hypoglycemia.
 - Evaluate for alternative causes of altered mental status.
 - Continue treatment of hypoglycemia using dextrose solutions per this protocol.
 - Consult medical control for further direction as needed.
12. All hypoglycemic patients who have had a seizure should be treated and transported ALS to an emergency department for evaluation regardless of their mental status and response to prehospital therapy.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

7.13

Non-Transport of Hypoglycemic Patients: Treat and Release Criteria

1. After successful treatment of a hypoglycemic diabetic emergency, the patient or legal guardian may refuse further treatment or transport if **all** the following criteria are met:
 - Repeat blood glucose level is > 100 mg/dL.
 - Repeat vital signs are normal for patient age.
 - A clear cause of the hypoglycemia is identified (e.g., missed meal).
 - Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose/dextrose.
 - Patient has no other signs and symptoms of illness (e.g., chest pain, fever, seizures).
 - Patient can promptly obtain and eat a carbohydrate meal without vomiting.
 - Patient is not driving a vehicle or operating machinery.
 - Patient or legal guardian refuses transport and providers agree transport not indicated.
2. **CAUTION:** It is strongly recommended that patients taking long-acting insulin (e.g., Lantus, Levemir) or a sulfonylurea (e.g., glipizide, glyburide, glimepiride, chlorpropamide) be transported to the hospital for observation due to the long half-life of these medications and frequent reoccurrence of hypoglycemia. If the patient refuses transport, they must be advised of the serious risks/complications of these specific medications prior to completing the refusal procedure.
3. **CAUTION:** It is strongly recommended that the patient be released to the care of a responsible individual (e.g., friend or family member) who will remain with the patient as an observer for a reasonable period of time and can request assistance (i.e., call 911) should symptoms reoccur. If this is not possible, the patient should contact a friend or family member by phone that will agree to check in on them, ideally within 1-2 hours.
4. The patient should be given instructions for follow-up care prior to being released. They should be able to repeat back the following instructions:
 - If possible, remain in the care of a responsible individual.
 - Consume a meal immediately.
 - Monitor their blood glucose frequently.
 - Advise their personal physician of this episode.
 - Watch for signs and symptoms of another episode (e.g., anxiousness, confusion, dizziness, sweating, hunger, irritability, blurry vision, trembling, faintness, weakness, and fatigue)
 - If another episode occurs, call 911 immediately.
5. To complete a refusal of care after a hypoglycemic diabetic emergency, follow the [Refusal Procedure](#) outlined in the medical protocols including obtaining patient and witness signatures as well as contacting the EMS Liaison Officer or Battalion EMS Supervisor.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

7.13

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - Treatment with dextrose via IO device should be a last resort unless an IO is emergently required for other medical reasons. All patients requiring IO placement should be transported to an appropriate receiving facility.
3. If the patient is hypoglycemic, **administer 10% Dextrose (D10W) IV/IO:**

Adult

100 ml bolus of D10W IV/IO over 2-5 minutes

Recheck blood glucose 5 minutes after bolus is complete.
If blood glucose level is still < 70 mg/dL, repeat dose once.

Pediatric ≥ 1 month old

**5 ml/kg bolus of D10W IV/IO over 2-5 minutes
(Maximum single dose 100 ml)**

Recheck blood glucose 5 minutes after bolus is complete.
If blood glucose level is still < 70 mg/dL, repeat dose once.

Neonate < 1 month old

5 ml/kg bolus of D10W IV/IO over 2-5 minutes

Recheck blood glucose 5 minutes after bolus is complete.
If blood glucose level is still < 45 mg/dL, repeat dose once.

4. Glucagon may be administered only if IV access has been attempted and was unobtainable.

Glucagon

Adult

Pediatric ≥ 5 yo

Pediatric < 5 yo

1 mg IM/IN

1 mg IM/IN

0.5 mg IM/IN



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

7.13

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- 10% dextrose (D10W) should be used for all patients. The use of 50% dextrose (D50W) has been discontinued.
- Oral medications for diabetes such as sulfonylureas (e.g., glipizide, glyburide, glimepiride, chlorpropamide) have long half-lives ranging from 12-60 hours. Patients with corrected hypoglycemia who are taking these agents or long-acting insulin (e.g., Lantus, Levemir) are at particular risk for recurrent symptoms and frequently require hospital admission.
- Avoid overshoot hyperglycemia when correcting hypoglycemia. Administer dextrose containing IV fluids in small doses until either mental status improves or a maximum prehospital dose is achieved.
- A normal adult's circulating blood volume contains less than 5g of glucose, thus big doses of glucose such as an "amp of D50" (25g) provides no additional clinical benefit over smaller doses of glucose such as 100 ml of D10W (10g). Furthermore, studies show nearly identical times to recovery (around eight minutes) when comparing these two approaches.
- Nausea and or vomiting after administration of Glucagon is very common. This should be anticipated and treated accordingly per [Nausea and Vomiting protocol](#).
- Glucagon does not work reliably in younger children, so after Glucagon administration continue to attempt IV/IO access.
- Glucagon should improve the patient's level of consciousness within about 10 minutes of administration.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols - General Medical Emergencies

Hypoglycemia

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DC Fire and EMS	
<u>Non-Transport of Hypoglycemic Patients</u>	
<u>Treat and Release Checklist</u>	
After successful treatment of a hypoglycemic diabetic emergency, the patient or legal guardian may refuse further treatment or transport if <u>all</u> the following criteria are met:	
Criteria	Yes?
Repeat blood glucose level is > 100 mg/dL	
Repeat vital signs are normal for patient age	
A clear cause of the hypoglycemia is identified (e.g., missed meal)	
Patient returns to normal mental status, with no focal neurologic signs/symptoms after receiving glucose/dextrose	
Patient has no other signs and symptoms of illness (e.g., chest pain, fever, seizures)	
Patient can promptly obtain and eat a carbohydrate meal without vomiting	
Patient can be supervised by a responsible adult or one has been contacted by phone and agrees to check on the patient within a reasonable amount of time, ideally 1-2 hours.	
Patient is not driving a vehicle or operating machinery	
Patient or legal guardian refuses transport and providers agree transport not indicated	
If the patient is on long-acting insulin (e.g., Lantus, Levemir) or a sulfonylurea (e.g., glipizide, glyburide, glimepiride, chlorpropamide) and they are refusing transport, they must be advised of the risks/complications of these specific medications prior to completing the refusal procedure.	
ELO or a Battalion EMS Supervisor authorizes the refusal of care	
To complete a refusal of care after a hypoglycemic diabetic emergency, follow the Refusal Procedure outlined in the medical protocols including obtaining patient and witness signatures as well as contacting the EMS Liaison Officer (ELO) or a Battalion EMS Supervisor.	



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperglycemia

7.14

This protocol applies to all adult and pediatric patients who present with signs and symptoms that are a result of or complicated by hyperglycemia. Hyperglycemia is defined as a blood glucose level (BGL) ≥ 100 mg/dL, but specific prehospital treatment is reserved for patients who present with extremely elevated glucose and or with severe concomitant symptoms. Patients with severe hyperglycemia may have diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemic syndrome (HHS) which can be life-threatening if not treated appropriately.

ALL PROVIDER LEVELS

Inclusion Criteria:

Check blood glucose level when an adult or pediatric patient meet any of the following criteria:

- Altered level of consciousness or altered mental status
- Alcohol intoxication or history of alcohol use disorder
- Stroke symptoms (facial asymmetry, extremity weakness, slurred speech)
- Seizure activity
- Severe infection or possible sepsis
- Hypothermia
- History of diabetes with symptoms of hyperglycemia:
 - Frequent urination
 - Increased thirst
 - Hypotension or other signs of dehydration (e.g., tachycardia)
 - Tachypnea
 - Blurry vision
 - Weakness or dizziness
 - Nausea, vomiting or abdominal pain

Exclusion Criteria:

- None

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Check blood glucose level when indicated as noted above. If hyperglycemic, treat per this protocol.
4. Consider potential causes of hyperglycemia. Consider the 3 I's:
 - Infection – an underlying infection is the most common trigger of hyperglycemic emergencies.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperglycemia

7.14

- Insulin - refers to any medication changes to insulin or oral medications including poor compliance with taking prescribed medications or malfunctioning insulin pump.
 - Ischemia - refers to hyperglycemia sometimes being an indication of physiologic stress in a patient and thus it can be a clue to myocardial (i.e., heart) ischemia.
5. If patient has hyperglycemia in addition to other co-existing traumatic injuries or medical symptoms, (e.g., stroke, seizure, infection, MI etc.) treat hyperglycemia per this protocol and refer to the applicable protocol for additional management direction.
 6. Asymptomatic hyperglycemia does NOT by itself mandate ALS treatment or transport to an emergency department.
 - If the patient otherwise meets Nurse Triage Line (NTL) criteria as outlined in EMS Operations Bulletin No 13., the patient shall be referred to the NTL for final disposition (e.g., self-care, clinic appointment, etc.).
 - Patients who meet BLS transport criteria and present with incidental asymptomatic hyperglycemia shall be transported by a BLS transport unit (AMR or DC BLS).
 7. Symptomatic or severe hyperglycemia as described in this protocol should be transported ALS to an emergency department while receiving the indicated treatment.

Hyperglycemia Requiring ALS Treatment and Transport

BGL \geq 250 mg/dL with severe symptoms

or

BGL $>$ 400 mg/dL

❖ Important note: when the glucometer reads “HI” the blood glucose level is $>$ 500 mg/dL.

Severe symptoms: age adjusted hypotension, tachycardia, or tachypnea, ketones detected on glucometer, low ETCO₂, signs of dehydration, blurry vision, weakness, dizziness, altered mental status, nausea, vomiting, or abdominal pain

8. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperglycemia

7.14

2. Obtain [12 lead EKG](#) and evaluate for cardiac causes of hyperglycemia (e.g., acute MI) Treat per appropriate protocol.
 - Assess for findings of hyperkalemia (i.e., peaked T waves, loss of P wave, widening of the QRS complex, etc.)
3. Monitor ETCO₂.
 - A reading ≤ 25 mmHg in a patient with hyperglycemia may indicate Diabetic Ketoacidosis (DKA).
4. Establish IV/IO access.
5. If patient is severely hyperglycemic and or is exhibiting symptoms related to high blood glucose levels, administer fluid bolus:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
500-1000 ml IV/IO may repeat as needed Maximum total of 2000 ml	20 ml/kg IV/IO may repeat as needed Maximum of 3 boluses

6. If findings of hyperkalemia are present on EKG, treat per [Hyperkalemia protocol](#).
7. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
8. Reassess vital signs and mental status frequently.
 - If mental status declines, reassess blood glucose level and provide appropriate treatment if hypoglycemia has developed.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Asymptomatic hyperglycemia poses no immediate risk to the patient in the prehospital setting while inappropriately aggressive interventions to manage blood sugar can be harmful. For example, overly aggressive administration of fluid in hyperglycemic patients can cause cerebral edema or dangerous hyponatremia. Thus, treatment of



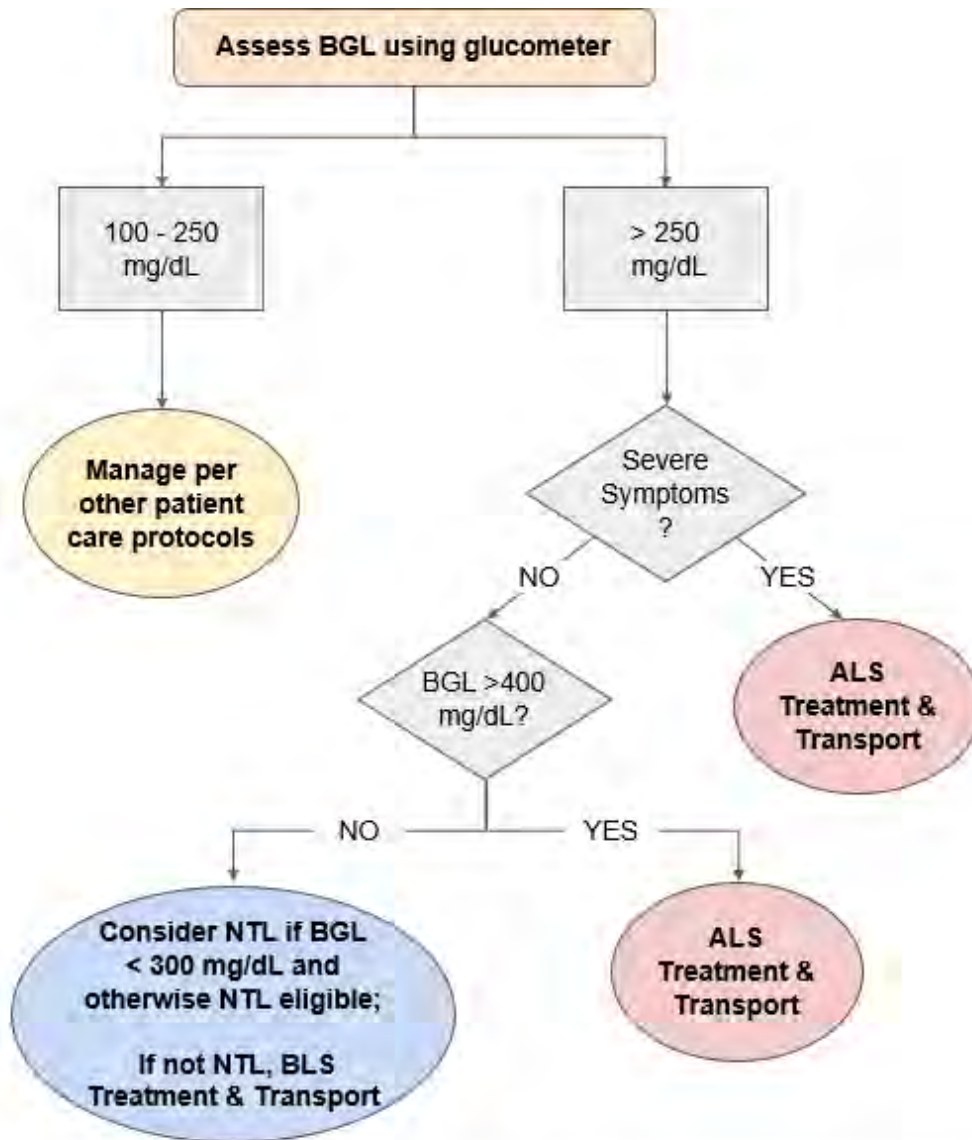
DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperglycemia

7.14

hyperglycemia in the prehospital setting should occur only when the patient is symptomatic or severely hyperglycemic.



Severe Symptoms

age adjusted hypotension, tachycardia, or tachypnea, ketones detected on glucometer, low ETCO₂, signs of dehydration, blurry vision, weakness, dizziness, altered mental status, nausea, vomiting, or abdominal pain



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperglycemia

7.14

- Symptoms are often non-specific in early diabetic emergencies and may include abdominal pain, nausea, vomiting, and or malaise. DKA usually develops rapidly, over hours to days.
- Gastrointestinal complaints are common in patients in DKA. In one study, abdominal pain was found to be present in 46% of patients in DKA and it appeared to correlate with the amount of acidosis present. Nausea and vomiting are also common and correlate with the amount of acidosis.
- New onset diabetic ketoacidosis (DKA) in pediatric patients commonly presents with nausea, vomiting, abdominal pain, and or increased urination.
- Patients in DKA in the setting of infection often do not mount a fever.
- Patients in DKA typically present with a compensatory respiratory alkalosis to counteract a profound metabolic acidosis. In other words, they attempt to compensate for their metabolic acidosis by breathing off CO₂ by increasing the rate and volume of respiration. (i.e., Kussmaul's respirations)
 - Medication facilitated intubation should be avoided if possible, in a patient with suspected DKA, because these patients are at high risk for cardiovascular collapse with intubation and mechanically matching the patient's own compensatory respiratory drive is very difficult post-intubation.
- There is no role for routine use of sodium bicarbonate in DKA



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Renal Failure and Dialysis Emergencies

7.15

This protocol applies to all adult and pediatric patients, not in cardiac arrest, who present with complications related to a history of chronic renal failure or suspected new acute renal failure or who are on chronic dialysis.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has a history of chronic renal failure.
- Patient with new onset/acute renal failure.
- Patient who undergoes routine hemodialysis.
- Patient who undergoes routine peritoneal dialysis.
- Patient with dialysis fistula or port/catheter.

Exclusion Criteria:

- Patient with no history of renal failure or dialysis.
- [Cardiac arrest](#)

Definitions:

- **Hemodialysis:** a treatment for kidney failure that removes toxins from the body by directly filtering the patient's blood using a machine that functions like an electric kidney. Hemodialysis typically occurs at a dialysis center and usually needs to be performed every 2-3 days for a period of 3-5 hours per session.
- **Peritoneal dialysis:** a treatment for kidney failure that uses the internal lining of the abdomen (peritoneum) as a filter to remove toxins and waste products from the blood. During peritoneal dialysis a cleansing solution is infused into the abdominal cavity via a permanent catheter through the abdominal wall. After several hours, the fluid with the filtered waste product is removed from the abdomen. Treatments can be done anywhere including at home, work, or while traveling. This process must be done frequently, usually four times per day.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#).
 - In addition to performing a standard history and physical exam, obtain and document the following dialysis specific information for relay to hospital staff if patient is transported:
 - Date of last dialysis session? Current schedule for dialysis?
 - Was the last dialysis session stopped before the normal end of treatment?
 - How much fluid was removed during the last dialysis session?
 - Did any problems occur during the last dialysis session?



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Renal Failure and Dialysis Emergencies

7.15

2. Do NOT take blood pressures on the arm with a dialysis shunt/fistula.
3. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
4. Place the patient in a position of comfort if possible.
5. Check blood glucose level. Treat per [hypoglycemia](#) or [hyperglycemia protocol](#) as clinically indicated.
6. Bleeding dialysis shunt/fistula:
 - Fistula bleeding after dialysis will often be from a small punctate needle access site.
 - Apply firm, direct pressure to the bleeding site.
 - Placing pressure with only “gauze and tape” will NOT stop the bleeding. The pressure needs to be applied with gloved fingers directly over the bleeding site for 15-30 minutes using a firm two-hand technique.
 - If patient has significant life-threatening bleeding and direct pressure does not control the hemorrhage, apply a tourniquet to the affected extremity at least 3 inches proximal to the bleeding shunt/fistula. Do NOT apply a tourniquet directly over the shunt/fistula.
7. Patients with chronic renal failure on dialysis typically have numerous medical problems. They are at high risk for acute MI, fluid overload or congestive heart failure, stroke, bleeding, and sepsis. Treat accordingly:
 - Symptoms of pulmonary edema or CHF, treat per [Acute Pulmonary Edema-CHF protocol](#).
 - Symptoms of chest pain treat per [Acute Coronary Syndrome protocol](#).
 - Symptoms of possible stroke, treat per [Stroke/CVA protocol](#).
 - Elevated blood pressure, treat per [Hypertensive Crisis protocol](#).
 - Signs of infection, treat per [Sepsis protocol](#).
 - Suspected or confirmed hyperkalemia, treat per [Hyperkalemia protocol](#).
 - Symptoms of syncope or near syncope, treat per [Syncope / Near-Syncope protocol](#).
8. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Renal Failure and Dialysis Emergencies

7.15

2. Obtain [12 lead EKG](#) and evaluate for acute ischemia or dysrhythmia. Treat per appropriate protocol.
 - Evaluate EKG for findings of hyperkalemia and treat per [Hyperkalemia protocol](#).
 - Diffuse hyperacute T-waves
 - QRS greater than 120 ms or QTc greater than 480 ms
 - Bradycardia, especially wide complex bradycardia
 - Heart block
 - Sine Wave
3. Establish IV/IO access, in a non-shunt/fistula extremity, as indicated by the patient's clinical presentation.
4. Place patient on continuous ETCO₂ monitoring.
5. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).
 - Hypotension during or immediately following dialysis is commonly a result of too much fluid being dialyzed off the patient. Symptoms typically improve with a small fluid bolus of 250-500 ml.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Patients with post-hemodialysis site hemorrhage typically present with persistent bleeding from the access site on the AV fistula after their hemodialysis run. Fistulas are accessed using a 16-gauge or larger needles and blood thinners are used to prevent clotting in the dialysis circuit during the procedure. It is this combination of a relatively large puncture site, semi-arterial pressure in the vessel and the coagulopathy related to the patient (uremia, platelet dysfunction) and the dialysis circuit blood thinners that can cause significant bleeding.
- Do NOT take a patient's blood pressure or start an IV in an extremity which has a shunt or fistula in place.
- Accessing a patient's dialysis catheter is only indicated in the setting of cardiac arrest or near-cardiac arrest when no IV or IO access can be obtained. Attempt and utilize IO access if available.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Renal Failure and Dialysis Emergencies

7.15

- Possible Complications of Dialysis Treatment:
 - Hypotension: may result in chest pain, dysrhythmia, altered mental status, and seizure. Treat with small IV fluid boluses.
 - Removal of therapeutic medications such as anti-seizure medications.
 - Disequilibrium syndrome: occurs due to a shift of urea and or electrolytes resulting in nausea and or vomiting, altered mental status, or seizure.
 - Bleeding: dialysis patients are often treated with blood thinners and they may also have a low platelet count. Bleeding can occur at any site including in the brain, GI tract, or at the fistula/catheter site.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperkalemia 7.16

This protocol applies to all adult and pediatric patients who present with suspected or confirmed hyperkalemia. Hyperkalemia is defined as a blood potassium level > 5.5 mmol/L. If left untreated, it can lead to severe cardiac, hemodynamic, and metabolic dysfunction up to and including cardiac arrest and death.

ALL PROVIDER LEVELS

Inclusion Criteria

- Clinical scenario highly suggestive of potentially life-threatening hyperkalemia.
 - Patient on dialysis or with a history of renal failure presenting in cardiac arrest.
 - Patient on dialysis or with a history of renal failure presenting with hemodynamic instability or arrhythmia due to known or suspected hyperkalemia.
 - Large crush injury with prolonged entrapment.
 - Patient found down on the ground, immobile, for a prolonged length of time.
 - Suspected diabetic ketoacidosis.
- EKG changes consistent with hyperkalemia. See General Notes below.
- Laboratory confirmed hyperkalemia.

Exclusion Criteria:

- Signs and or symptoms not due to suspected or confirmed hyperkalemia.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
 - Collect information from patient, family, or facility that could suggest or confirm diagnosis of hyperkalemia.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Continue injury or illness specific treatment per applicable protocol.
4. Patients with suspected or confirmed hyperkalemia (blood potassium level > 5.5 mmol/L) shall be transported ALS with continuous cardiac monitoring in place.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring and evaluate for signs of hyperkalemia. If cardiac dysrhythmia is present, proceed to the appropriate protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperkalemia 7.16

- Obtain [12 lead EKG](#) and evaluate for signs of hyperkalemia. See General Notes below.
 - Diffuse hyperacute T-waves
 - QRS greater than 120 ms
 - QTc greater than 480 ms
 - Bradycardia, especially wide complex bradycardia
 - Heart block
 - Sine Wave
- Establish IV/IO access.
- If patient has suspected or confirmed hyperkalemia with EKG changes, initiate fluid bolus:

<u>Fluid Bolus</u>	
<u>Adult</u>	<u>Pediatric</u>
500-1000 ml IV/IO may repeat as needed Maximum total of 2000 ml	20 ml/kg IV/IO may repeat as needed Maximum of 3 boluses
❖ Important Note: use caution when administering fluids to patients who are on dialysis or those with CHF. Frequently reassess lungs sounds and for signs of fluid overload. Stop fluids if signs of respiratory distress due to pulmonary edema develop.	

- If patient has suspected or confirmed hyperkalemia with EKG changes, treat with the following medications:

<u>Calcium Chloride 10%</u>	
<u>Adult</u>	<u>Pediatric</u>
1 g (10 ml) IV/IO over 5 minutes Use large gauge IV and ensure patency before administration. EXCEPTION: calcium may be given as a rapid push in the setting of cardiac arrest If QRS > 120 milliseconds, repeat Calcium every 5-10 minutes until QRS duration is < 120 milliseconds	20 mg/kg IV/IO over 5 minutes Max dose 1 g (10 ml) Use large gauge IV and ensure patency before administration. EXCEPTION: calcium may be given as a rapid push in the setting of cardiac arrest If QRS > 120 milliseconds, repeat Calcium every 5-10 minutes until QRS duration is < 120 milliseconds



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperkalemia 7.16

<u>Sodium Bicarbonate</u>	
<u>Adult</u>	<u>Pediatric</u>
1 mEq/kg IV/IO Max dose 50 mEq	1 mEq/kg IV/IO Max dose 50 mEq

- ❖ Important Note: Calcium and Sodium Bicarbonate can particulate (form a solid) when administered in the same IV/IO line, therefore, adequate flushing of the line in between medication administration is required or administer in separate IV/IO lines.

<u>Albuterol</u>	
<u>Adult</u>	<u>Pediatric</u>
Nebulized continuously throughout patient care	Nebulized continuously throughout patient care
May discontinue with EKG improvement.	May discontinue with EKG improvement.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

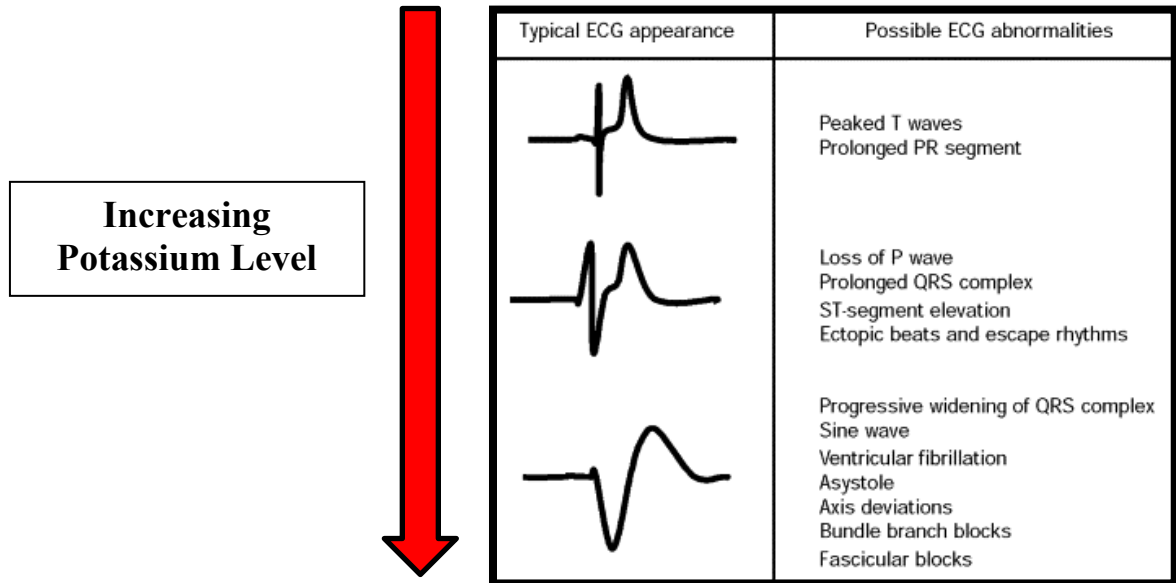
- The rate at which hyperkalemia develops affects the severity of disease. A patient with severe hyperkalemia who has developed hyperkalemia chronically will likely tolerate their symptoms significantly better than a patient who develops moderate hyperkalemia acutely.
- In cases of suspected or confirmed severe hyperkalemia, calcium should be the first-line treatment for patients with signs/symptoms of hyperkalemia, especially in cases of hemodynamic instability and or cardiac arrhythmias/EKG changes.
- The most critical test for hyperkalemia is an ECG. An ECG should be performed immediately and acted upon if the clinical suspicion for hyperkalemia is high.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Hyperkalemia 7.16



- The EKG is neither sensitive nor specific as a tool for determining the serum potassium concentration, especially in patients with end stage renal failure.
- Peaked T waves are not always seen in severe hyperkalemia
- Bradycardia or heart block in the setting of suspected hyperkalemia is extremely dangerous and should be treated aggressively.
- All cardiac conduction derangements predispose the hyperkalemic patient to life threatening dysrhythmias. Classically, the ECG deteriorates into a wide bradycardic “sine wave” pattern before ventricular fibrillation and asystole.
- Calcium Chloride is corrosive to peripheral vessels and may cause tissue necrosis if extravasation occurs; thus, it should be administered slowly thorough a large gauge IV in patients with a present pulse. In the setting of a cardiac arrest, calcium chloride may be administered as a rapid IV push.
- Consider administration of calcium chloride early in the treatment of patients on dialysis who present in cardiac arrest.
- Onset of albuterol’s effectiveness for hyperkalemia is 20-30 minutes.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Syncope / Near-Syncope 7.17

This protocol applies to all adult and pediatric patients who present with syncope or near syncope.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient has experienced syncope.
- Patient has experienced near-syncope.

Exclusion Criteria:

- Persistent altered mental status (i.e., lasting longer than a few minutes). See [Altered Mental Status protocol](#).
- Loss of consciousness due to traumatic injury. See [Traumatic Brain Injury protocol](#).
- Loss of consciousness in the setting of seizure activity. See [Seizure protocol](#).
- Loss of consciousness in the setting of cardiac arrest. See [Cardiac Arrest protocol](#).

Definitions:

- **Syncope** is a brief episode of non-traumatic loss of consciousness and postural tone that resolves spontaneously with a return to baseline mental status and neurologic function within seconds to a few minutes. It is typically resolved prior to EMS arrival.
- **Near-syncope** is an early sign/symptom of potential impending syncope. It usually lasts for seconds to minutes and may be described by the patient as dizziness, lightheadedness, “nearly blacking out” or “almost fainting.” It is typically resolved prior to arrival of EMS.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care protocol](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Consider multiple potential causes of syncope and or near-syncope:
 - Vasovagal
 - Hypotension / Hypoperfusion
 - Cardiac dysrhythmias (e.g., bradycardia or tachycardia)
 - Cardiac ischemia (e.g., ST depressions or ST elevation MI)
 - Pulmonary embolism
 - Hypoglycemia
 - Stroke
 - Toxins or Medication effects (e.g., beta-blockers)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Syncope / Near-Syncope 7.17

- Abdominal aortic aneurysm rupture
 - Hypocapnia caused by tachypnea/anxiety
 - Psychiatric
- ❖ Important Note: cardiac disease is a common and potentially lethal cause of syncope and near-syncope. Thus, all patients with syncope or near-syncope shall receive an ALS assessment and a 12 lead EKG.
4. Check blood glucose level. Treat per [Hypoglycemia](#) or [Hyperglycemia protocol](#) as clinically indicated.
 5. Rule out trauma as a suspected etiology. [See Traumatic Brain Injury protocol.](#)
 6. Assess for signs and symptoms of traumatic injury if the syncopal or near-syncopal event was associated with a fall. Treat injuries per trauma protocols.
 7. Place the patient in a position of comfort if possible.
 8. Perform FAST exam / stroke assessment. If a stroke is suspected, initiate care per [Stroke protocol.](#)
 9. If narcotic (opiate) overdose is suspected, administer naloxone (Narcan) per [Overdose-Poisoning protocol.](#)
- ❖ CAUTION: syncope is presumed to be the result of a serious and potentially life-threatening medical condition until proven otherwise after a thorough hospital evaluation. Thus, all patients should be transported to an emergency department even in the absence of symptoms during EMS evaluation. If the patient refuses transport, they must be advised of these serious risks/complications, prior to completing the refusal procedure.
10. Patients with syncope or near-syncope and any one or more of the following criteria shall be transported ALS with continuous cardiac monitoring in place:
 - Age > 35 years old
 - Age adjusted hypotension (SBP \leq 100 mmHg in older adults) or tachycardia
 - Cardiac ischemia or any dysrhythmia on EKG including atrial fibrillation or flutter
 - QRS duration > 120 ms or QTc > 480 ms
 - Palpitations, chest pain or shortness of breath
 - Reported cyanosis during the syncopal event
 - History of coronary artery disease or congestive heart failure
 - Syncope during exercise or exertion
 11. Patients who do not meet the above criteria for ALS transport may be transported BLS.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Syncope / Near-Syncope 7.17

12. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
 - Early application of a cardiac monitor has a higher likelihood of catching any cardiac disease. Thus, EKG monitoring and a 12-Lead EKG should be conducted as soon as possible.
2. Obtain [12 lead EKG](#) and evaluate for high-risk cardiac causes of syncope or near-syncope. Treat per appropriate protocol.
 - Dysrhythmia (e.g., bradycardia, heart block, prolonged QT, WPW, Brugada, ventricular tachycardia, etc.)
 - Myocardial ischemia (e.g., ST elevation MI)
3. Establish IV/IO access as indicated by the patient's clinical presentation.
4. If the patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock, treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- By being most proximate to the scene and to the patient's presentation, EMS providers are commonly in a unique position to identify the cause of syncope. Consideration of potential causes, ongoing monitoring of vitals and cardiac rhythm as well as detailed exam and history are essential pieces of information to pass onto hospital providers.
- Most commonly, syncope is caused by an inciting event causing a drop in cardiac output resulting in at least 10 seconds of interrupted blood flow to both cerebral cortices or the brainstem reticular activating system.
- Involuntary muscle movements, often referred to as myoclonic jerks, may accompany syncope due to cardiac causes or hypoxia. However, syncope is differentiated from



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Syncope / Near-Syncope 7.17

seizure by its brief loss of consciousness as opposed to seizures which typically have a more prolonged postictal phase, or from other neurologic conditions, which often have persistent deficits.

- All patients suffering from syncope should receive hospital level evaluation, even if they appear normal with few complaints on scene.
- More than 25% of geriatric syncope is a result of cardiac dysrhythmia.
- Identifying patients with cardiac syncope is one of the most important diagnostic considerations, since such patients have a 6-month all-cause mortality rate that exceeds 10%. The most concerning etiology is syncope due to dysrhythmias, which is typically sudden without warning symptoms.
- Near-syncope has the same basic pathophysiologic causes as syncope and has similar outcomes and risks.
- Be aware of patients with wearable heart rate monitors on watches and smartphones, which can be explored for heart rate and rhythm information surrounding the event.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Brief Resolved Unexplained Event (BRUE) 7.18

This information will be released at a future date.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Sepsis 7.19

This information will be released at a future date.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Hyperthermia 8.1

This protocol applies to patients suffering from a suspected heat related emergency. Hyperthermic reactions generally relate to heat cramps, heat exhaustion or in severe cases, heat stroke.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. If heat exhaustion or cramps are suspected, move the patient to a cool environment and obtain a temperature.
3. Place the patient in a position of comfort. If signs of hypoperfusion exist, place the patient in the shock position if possible.
4. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
5. If heat stroke is suspected, initiate immediate aggressive cooling techniques such as removing as much clothing as possible, cold packs at the groin, under the axilla and around the neck; covering the patient with a cool wet sheet and set windows and ventilation system in the EMS unit to provide mechanical cooling.
6. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
7. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring**. Treat life threatening dysrhythmias as indicated.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Hyperthermia 8.1

2. Administer **Ondansetron (Zofran)** or **Prochlorperazine (Compazine)** for nausea/vomiting. Repeat one time in 10 minutes if nausea or vomiting is not relieved:

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Ondansetron (Zofran) 4 mg IV over 30 seconds	Ondansetron (Zofran) 0.15 mg/kg IV over 30 seconds. Maximum single dose 4 mg

or

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Diphenhydramine (Benadryl) 25 mg IV followed by Prochlorperazine (Compazine) 10 mg	Not Indicated

3. If seizure activity is witnessed refer to the **Seizure protocol**.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Hypothermia 8.2

This protocol applies to patients suffering from cold-related emergencies such as mild frostbite to severe hypothermia. Hypothermia is defined as a core temperature below 95°F. Moderate to severe hypothermia often presents with altered mental status and occasionally a decreased pulse, respiratory rate and blood pressure. Patients in cardiac arrest with suspected severe hypothermia shall not be considered dead until re-warming has been completed at a medical facility.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care and handle the patient gently.
2. Remove any wet clothing and cover the patient in blankets to prevent heat loss.
3. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
4. If the patient is in cardiac arrest, attach **AED/Monitor Defibrillator** and analyze the rhythm. If the AED advises “shock advised” ensure that all providers are clear of the patient and depress the shock button. If no response from the first defibrillation, defer from further attempts until the patient’s core temperature is increased.
 - ALS providers should utilize their manual cardiac monitor / defibrillator and **defibrillate** if the patient is in a “shockable” rhythm. Immediately continue CPR post defibrillation:

<u>Adult</u>	<u>Pediatric</u>
360 J	AED or 2 J/kg (manual)

5. If the patient:
 - Is greater than 8 years of age with a blood glucose level of <70 mg/dl.
 - Displays signs and symptoms of hypoglycemia
 - Is conscious enough to swallow and can maintain their own airway.
 - ❖ Administer **Oral Glucose 24-50 gm SL** *or* one single dose tube. Advanced-EMTs and ALS providers may proceed directly to intravenous interventions.
5. Establish an **IV** of Normal Saline KVO and infuse warm IV fluids if possible. **Advanced EMTs may initiate IV access.**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Hypothermia 8.2

6. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

ADVANCED LIFE SUPPORT PROVIDERS

1. If the patient's blood glucose level is <70 mg/dl, administer **Dextrose**:

<u>Adult</u> (>12 yrs) <70 mg/dl	<u>Pediatric (ALS Only)</u> (1 mo.-12 yrs) <60 mg/dl	<u>Neonate (ALS Only)</u> (<1 mo.) <45 mg/dl
50% 25 gm IV	25% 2 ml/kg IV	10% 5 ml/kg IV

Dextrose Dilution Procedures

D₂₅W - Waste 25 ml D₅₀W. Use pre-filled syringe (with remaining 25 ml) to withdraw 25 ml of NS from IV bag. Gently agitate syringe to mix solution.

D₁₀W - Waste 40 ml D₅₀W. Use pre-filled syringe (with remaining 10 ml) to withdraw 40 mL of NS from IV bag. Gently agitate syringe to mix solution.

1. Provide **continuous EKG monitoring**.
2. If the patient is suffering from severe hypothermia (at the hospital, this patient will likely be found to have a temperature of <86°F or 30°C) and in cardiac arrest, withhold medication delivery until the patient is re-warmed in the medical facility.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Drowning and Near-Drowning 8.3

This protocol applies to patients suffering from an accidental or intentional submersion in any liquid. Pre-hospital management of these patients shall be directed toward correcting the hypoxia associated with drowning. All patients suffering from a drowning or near drowning episode should be transported to a medical facility. In the event of cold water drowning, the patient shall not be considered deceased until re-warming has been completed at a medical facility.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Consider manual stabilization and spinal immobilization if the possibility of suspected head or c-spine injury exists.
3. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
4. If the patient is conscious and presents with rales and adequate respiratory effort, apply **Continuous Positive Airway Pressure Device (CPAP)** and titrate to a pressure of:

<u>Adult</u>	<u>Pediatric</u>
10 cmH ₂ O	Medical Control required



5. If hypothermia is suspected, refer to the **Hypothermia** protocol.
6. If the patient is in cardiac arrest, follow the appropriate **Cardiac Arrest** protocol.
6. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
7. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Environmental Emergencies

Drowning and Near-Drowning 8.3

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring**.
2. If the patient is experiencing **severe respiratory distress** or presents with impending respiratory failure refer to the **Medication Facilitated Intubation protocol**.

MEDICAL CONTROL OPTIONS

1. Additional dose of **Midazolam (Versed)** for sedation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Overdose - Poisoning 9.1

This protocol applies to patients that have been exposed to a poison, overdosed on a medication or exhibits signs and symptoms related to the effects of drug abuse. This protocol establishes therapeutic pathways for patients with suspected overdose of medicinal agents. If possible, transport any medication bottles or pills, tablets, or capsules with the patient.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care and attempt to identify any medications or products taken or exposed to. Save samples and /or bottles if possible.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Ensure that a blood glucose reading is obtained.
4. Contact **Poison Control** on channel **H-11** or call 1-800-222-1222 for assistance in managing specific overdoses. Any medication interventions recommended by Poison Control must first be approved by Medical Control.
5. Administer **Naloxone (Narcan)** if a narcotic (opiate) overdose is suspected and the patient has any two of the following:
 - Pinpoint pupils
 - GCS <13
 - Respiratory depression

(If a definitive airway (King or ET Tube) is already in place and ventilation is adequate **DO NOT** administer Narcan)

<u>Adult</u>	<u>Pediatric</u>
<p>Naloxone (Narcan):</p> <p><u>BLS:</u> 2 mg IN only, may repeat twice at the same dose</p> <p><u>AEMT or ALS:</u> 2 mg IV/IN or IM. If no response from the initial dose within 5 minutes, repeat 4 mg IV/IN and titrate to effect thereafter if indicated</p>	<p>Naloxone (Narcan):</p> <p><u>ALS</u> only: 0.1 mg/kg IV/IN or IM, up to a maximum single dose of 2 mg</p>

- Patients receiving Narcan should receive care at the ALS level and should be transported to the hospital for further evaluation and treatment.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Overdose - Poisoning 9.1

6. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*
7. If the patient presents with signs and symptoms of hypoperfusion administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring and continuous quantitative waveform capnography (ETCO₂)**.
2. If organophosphate poisoning is suspected refer to the **Organophosphate/Carbamate/Nerve Agent poisoning protocol**.
3. If seizure activity is witnessed refer to the **Seizure protocol**.
4. Consider specific toxicology antidotes when the patient displays critical signs and symptoms:
 - **Sodium Bicarbonate** for tricyclic antidepressant (TCA) overdose:

<u>Adult</u>	<u>Pediatric</u>
Sodium Bicarbonate 1 mEq/kg IV	Sodium Bicarbonate 1 mEq/kg IV

- **Calcium Chloride** for calcium channel blocker overdose:

<u>Adult</u>	<u>Pediatric</u>
Calcium Chloride 1 gram slow IV	Calcium Chloride 20 mg/kg slow IV

- **Glucagon IV** for beta blocker overdose:

<u>Adult</u>	<u>Pediatric</u>
Glucagon 1 mg IV every 5 minutes up to a maximum total dose of 3 mg	Glucagon 1 mg IV every 5 minutes maximum total dose of 3 mg



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Overdose - Poisoning 9.1

5. If bradycardia is present, immediately refer to the **Bradycardia protocol**.

MEDICAL CONTROL OPTIONS

1. If the patient is hypotensive and does not respond to fluid resuscitation, consider a **Dopamine infusion** in the range of **5-20 mcg/kg/min**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Excited Delirium 9.2

Patients presenting with Excited Delirium often present with mental status changes, severe agitation, and violent bizarre behavior with symptoms of extreme sympathetic nervous system activation. This is a potentially fatal condition with rapid onset. In most Excited Delirium cases there is an abnormality with the regulation of the dopamine neurotransmitter in the brain. The failure to up-regulate the dopamine transporter with chronic cocaine/drug abuse or psychosis treatment leads to a hyper-dopaminergic state and this in turn, leads to the psychotic symptoms and malignant hyperthermia. This protocol is meant to aggressively treat those patients who are extremely hard to manage due to extreme sympathetic nervous system activation and hyperthermia and not patients with mild to moderate behavioral issues due to intoxication or psychosis.

Common causes of excited delirium include:

- Stimulant Drug Abuse (Cocaine, PCP, Methamphetamine)
- Underlying psychiatric disease
- Non-compliance with medications to control psychosis or bipolar disorder
- Alcohol withdrawal

ALL PROVIDER LEVELS

1. Assist law enforcement officials with rapid capture and physical restraint as required.
2. Restrain per Physical Restraint Protocol. These patients are to remain supine on the backboard at all times unless the airway needs to be cleared. **Patients that are restrained should never be placed in the prone or face down position nor have external pressure on the Chest that may impede respiration.**
3. Administer supplemental **Oxygen** via NRB mask at 15 lpm.
4. Initiate rapid cooling if Hyperthermic by:
 - Removing clothing
 - Douse skin with water
 - Apply Ice Packs to neck groin, axilla, and core trunk area.
 - Move the patient to a cool climate controlled environment
5. Ensure that Blood Glucose Level is obtained.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Excited Delirium 9.2

6. Establish an **IV** of Normal Saline and run Wide Open. *Advanced EMTs may initiate IV access.*

<u>Adult</u>	<u>Pediatric</u>
1000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

7. Initiate rapid transport. Do not delay transport waiting on the arrival of an ALS resource.

ADVANCED LIFE SUPPORT PROVIDERS

1. Administer **Midazolam (Versed)** for sedation. May be administered immediately after restraint:

<u>Adult</u>	<u>Pediatric</u>
Midazolam <u>Intranasal dose: 10 mg IN (5 mg each nostril). Contact Medical Control</u> for additional doses OR <u>Intramuscular: 5 mg IM</u> OR <u>Intravenous dose: 2-5 mg IV/IO</u> every 2 minutes to a maximum of 7 mg until cessation of visible seizure activity	Midazolam <u>Intranasal dose: 0.2 mg/kg IN</u> to a maximum dose of 5 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses OR <u>Intravenous dose: 0.1 mg/kg IV/IO</u> , up to a maximum single dose of 2 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses



2. Provide **continuous EKG monitoring, pulse oximetry, and ETCO₂ monitoring.**



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Excited Delirium 9.2

3. Administer **Sodium Bicarbonate**:

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Sodium Bicarbonate 50 mEq IV/IO, slow push	Sodium Bicarbonate 1 mEq/kg IV/IO, slow push Medical Control Required



4. If EKG anomalies such as a widening QRS, tall peaked T-Waves, or sudden cardiac death are noted, immediately administer the medications listed below before instituting the appropriate cardiac treatment algorithm.

- Repeat **Sodium Bicarbonate 50 mEq IV/IO**.
- **Calcium Chloride 1 Gram IV/IO**.
- Additional Fluid Bolus.

MEDICAL CONTROL OPTIONS

1. Additional doses of **Midazolam (Versed) 2-5 mg IV/IO or Versed 5 mg IN**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Envenomations - Bites/Stings 9.3

This protocol applies to patients experiencing venomous or non-venomous, bites or stings from animals, snakes, or spiders.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Attempt to identify the insect, reptile or animal that caused the injury, if safe to do so. **DO NOT** transport a living snake/animal/spider to the hospital. Determine if the patient has access to anti-venom that can be transported to the hospital with them.
3. If an anaphylactic reaction occurs as a result of a bite or sting, refer to the **Allergic reaction / Anaphylaxis protocol**.
4. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
5. Remove any rings, bracelets, jewelry and constricting clothing from the affected extremity.
6. Have the patient remain calm and immobilize the effected extremity.
7. Do not apply tourniquets, cold packs, or make incisions around the affected area.
8. Contact **Poison Control** on channel **H-11** or call 1-800-222-1222 for assistance in managing specific envenomations. Any medication recommendations from Poison Control must first be approved by Medical Control.
9. Provide rapid transport to the appropriate medical facility if the patient is symptomatic. Notification to the receiving facility is required.
10. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
11. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Envenomations - Bites/Stings 9.3

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG monitoring**.
2. Administer **Midazolam (Versed)** for patients experiencing severe muscle spasms:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Midazolam 2-5 mg IV/IN, up to a maximum dose of 7 mg	Contact Medical Control



MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.
2. To reduce localized pain, the following materials may be used to soothe the stings from Exotic Pets and Fish:

Dragon Fish	Soak in hot water
Jellyfish	Douse area with vinegar
Portuguese Man o' War	Douse with salt water (from the aquarium tank), then soak in hot water

- These animals are commonly found in many private salt-water aquariums. Contact **Poison Control** on channel **H-11** or call 1-800-222-1222 for assistance in managing specific envenomations. Any medication interventions recommended by Poison Control must first be approved by Medical Control.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Carbon Monoxide (CO) Exposure 9.4

I. General Indicators of Carbon Monoxide Exposure:

- Victims who have been rescued from or had a prolonged exposure to smoke at a fire ground.
- Victims who have been exposed to carbon monoxide due to other sources of incomplete combustion.
- Exposure or overdose to Methylene Chloride (commercial paint remover)

II. Clinical Indicators of Carbon Monoxide Exposure:

1. After a patient has been exposed to carbon monoxide, his/her symptoms may range from minimal to life threatening and may include:
 - Headaches
 - Errors in judgment
 - Confusion
 - Loss of coordination
 - Loss of consciousness
 - Chest pain
 - Cyanosis
 - Seizures
 - Irritability
 - Vomiting

III. Treatment and Transport Decision

1. The following percentages refer to the saturation percentage of CO (SpCO) in the hemoglobin. If the SpCO reading indicated a weak signal, the probe should be adjusted and readings should be confirmed on multiple separate fingers with the probe properly shielded.

SpCo Level		Management
0 - 3%		No treatment required
<6%	smokers or during fire ground rehab operations	No treatment required
4 - 12%	without s/sx and no history of exposure	Observe and treat
12 - 25%	with s/sx or history of exposure	Treat and transport
25% or greater	regardless of s/sx	Treat and transport

2. If the patient meets any of the following criteria after a CO exposure consider transport to a hyperbaric facility as referenced in the hospital capability list regardless of measured CO level on the meter:
 - History of unconsciousness.
 - Objective neurologic deficit or altered mental status.
 - Chest pain or ischemic EKG changes.
 - Pregnant patient with CO level of >15% regardless of symptoms.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Carbon Monoxide (CO) Exposure 9.4

- Pediatric patient with CO level of >15% regardless of symptoms.
- Any patient with CO level of >25% regardless of symptoms.

ALL PROVIDER LEVELS

1. Remove the patient from the contaminated environment if safe to do so.
2. Initiate General Assessment and Universal Patient Care.
3. Monitor SpCO with a RAD-57 or other device. Provide frequent SpCO monitoring. Readings should be confirmed on two separate fingers with the probe properly shielded. If fingers are cold it may help to warm the hand prior to taking the reading.
Note: Pulse oximetry monitors may give false SpO₂ readings in patients exposed to cyanide and/or carbon monoxide.
4. Administer supplemental **Oxygen** via NRB face mask with flow rate at 15 lpm or greater. Support airway per Airway Maintenance and Supplemental Oxygen protocol.
5. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*
6. If the patient is unresponsive, the patient shall be transported to the closest hospital for their respective age category.
7. **Pediatric Patients:** Contact Medical Control to determine appropriate destination.

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG, SpCO, and continuous quantitative waveform capnography (ETCO₂)**.
2. If the elevated SpCO reading is the result of smoke exposure refer to the **Smoke Inhalation/Cyanide Exposure protocol**.
3. Should the need for advanced airway management or ventilatory assistance maintain an **ETCO₂** level of 30-35 mmHg.
4. Refer to the **Medication Facilitated Intubation protocol** as required.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Smoke Inhalation and Cyanide Exposure 9.5

Cyanide is a cellular toxin; it halts respiration at the cellular level. Cyanide may also be found in university laboratory facilities. This may be a common method of suicide attempt in those who have access to the substance, such as laboratory workers and chemists. Cyanide also has a significant role in causing death and incapacitation in fires. The speed of onset is related to the severity of exposure (inhalation or ingestion) and may have dramatic, immediate effects causing early hypertension with subsequent hypotension, sudden cardiovascular collapse or seizure/coma.

I. Non-specific and early signs of cyanide exposure:

1. The following are early signs and symptoms of cyanide exposure: anxiety, vertigo, weakness, headache, tachypnea, nausea, dyspnea, vomiting, and tachycardia.

II. Signs of Exposure to Higher Levels of Cyanide:

1. Any of the following signs and symptoms may indicate exposure to higher levels of cyanide:
 - Markedly altered level of consciousness.
 - Seizures.
 - Respiratory depression or respiratory arrest.
 - Hypotension.
 - Cardiac dysrhythmia (other than sinus tachycardia).
 - History of recent smoke inhalation.

III. Known Exposure to Cyanide:

1. If patient has reported oral cyanide ingestion or has a history of known exposure immediately progress to the administration of **Hydroxocobalamin (Cyanokit)** without delay. Do not wait for signs or symptoms to manifest or worsen.

ALL PROVIDER LEVELS

1. Remove the patient from the contaminated environment if safe to do so.
2. Initiate General Assessment and Universal Patient Care.
3. Administer supplemental **Oxygen** via NRB face mask with flow rate at 15 lpm or greater. Support airway per Airway Maintenance and Supplemental Oxygen protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Smoke Inhalation and Cyanide Exposure 9.5

4. Monitor SpO₂ and SpCO when a RAD-57 or other device becomes available. Pulse oximetry monitors may give false SpO₂ readings in patients exposed to carbon monoxide (CO). If the patient's fingers are cold then the hand should be warmed prior to taking the reading.
5. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*
6. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG, SpCO, and continuous quantitative waveform capnography (ETCO₂)**.
2. Administer **Hydroxocobalamin (Cyanokit)** if the patient:
 - Has a known exposure to cyanide
 - Suffered smoke inhalation with mental status changes
 - Suffered smoke inhalation with signs and symptoms of cyanide exposure
 - Requires intubation or artificial ventilation as a result of smoke inhalation
 - Is a burn patient that has mental status changes or requires artificial ventilation

<u>Adult</u>	<u>Pediatric</u>
Hydroxocobalamin Initial dose is 5 gm IV over 15 minutes. Each 2.5 gm vial of Hydroxocobalamin is to be reconstituted with 100 ml of NS and administered at 12-14 ml/minute Administer first dose over 7-8 minutes and repeat the second dose	Hydroxocobalamin 70 mg/kg IV , up to a maximum of 5 gm. Each 2.5 gm vial of Hydroxocobalamin is to be reconstituted with 100 ml of NS and administered at 12-14 ml/minute Administer partial or full dose as needed over 7-8 minutes. Repeat the second full or partial dose as needed



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Toxicology Emergencies

Smoke Inhalation and Cyanide Exposure 9.5

3. Refer to the **Medication Facilitated Intubation protocol** as required.
4. Should the need for advanced airway management or ventilatory assistance arise maintain an **ETCO₂** level of 30-35 mmHg.
5. Refer to the **Burn Management protocol** as required.

MEDICAL CONTROL OPTIONS

1. **Dopamine infusion 5-20 mcg/kg/min** for persistent hypoperfusion.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Management of the Uncomplicated Delivery 10.1

This protocol applies to female patients that are in labor, with delivery of a newborn being imminent. The most important decision to make with a patient in labor is whether to attempt delivery in the field or transport the patient to the hospital. Factors that effect that decision include; number of previous deliveries, frequent contractions that are less than 2 minutes apart and lasting 30-45 seconds, crowning or bulging, or mother has the urge to push or move her bowels (Do not allow the patient to utilize the toilet).

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Administer supplemental **Oxygen** per Airway Management and Oxygen Therapy protocol.
3. Place the patient supine with knees widely separated. Elevate the patient's buttocks if needed.
4. Carefully assist expulsion of the newborn from the birth canal in its natural progression. Do not push or pull the newborn.
5. As the head emerges, encourage the mother not to push so that the delivery process can continue slowly and with minimal trauma to the perineal area.
6. Once the head emerges, suction the newborns mouth then nose to clear secretions.
 - If the cord is wrapped around the newborns neck, attempt to unwrap it from the neck. If unable to remove the cord, attach the 2 umbilical clamps and cut the cord between the clamps.
7. Gently guide the head downward until the upper shoulder delivers.
8. Gently guide the head upwards until the lower shoulder delivers.
9. Once delivery is accomplished, clamp the cord at 6" and 8" from the navel and cut between the clamps.
10. Dry and wrap the newborn in a blanket to preserve body temperature.
11. Record the delivery time and gender of the newborn.
12. Proceed immediately to **Newborn Resuscitation Protocol** if resuscitation is necessary.
13. Record **APGAR score** at 1 minute and at 5 minutes.
14. Ensure that the placenta is transported to the hospital with the mother and newborn if delivered prior to arrival at the hospital.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Pre-Eclampsia and Eclampsia 10.2

Generalized edema is usually the presenting sign and can be often noted in the patients face, hands, sacral area, lower extremities, and abdominal wall. Patient may also complain of a frontal lobe headache, blurred vision or any other visual disturbances, nausea, vomiting, irritability, difficulty breathing and hypertension.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Administer supplemental **Oxygen** per Airway Management and Oxygen Therapy protocol.
3. Place the patient in the left lateral recumbent position if possible.
4. During transport, dim the lights in the transport unit because bright lighting and loud noises can produce seizures in the pre-eclamptic patient.
5. Provide immediate transport to the closest appropriate facility.
6. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*

ADVANCED LIFE SUPPORT PROVIDERS

1. If the patient is experiencing active seizure activity, administer **Midazolam (Versed)**:

<u>Adult</u>	<u>Pediatric</u>
Midazolam <u>Intranasal dose: 10 mg IN (5 mg each nostril). Contact Medical Control</u> for additional doses OR <u>Intramuscular: 5 mg IM</u> OR <u>Intravenous dose: 2-5 mg IV/IO</u> every 2 minutes to a maximum of 7 mg until cessation of visible seizure activity	Midazolam <u>Intranasal dose: 0.2 mg/kg IN</u> to a maximum dose of 5 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses OR <u>Intravenous dose: 0.1 mg/kg IV/IO</u> , up to a maximum single dose of 2 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Pre-Eclampsia and Eclampsia 10.2

2. If eclampsia is suspected, administer **Magnesium Sulfate Infusion**:

	<u>Adult</u>	<u>Pediatric</u>
3. If	<p>Magnesium Sulfate 4 gm infusion. Mix 4 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min</p> <p>May be repeated one time and infused until cessation of visible seizure activity</p>	<p>Not indicated</p>

equipment is available, obtain and document fetal heart tones.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Prolapsed Cord 10.3

A prolapsed cord occurs when the umbilical cord presents itself outside of the uterus while the fetus is still inside. It can happen when the water breaks – with the gush of water the cord comes along. Usually, thereafter the fetus will engage and squash the cord, cutting off oxygen supplies and leading to brain damage of the fetus.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Place the patient in the knee-chest position.
4. **Do not attempt to push the cord back into the vagina.** Wrap the cord in a saline soaked dressing.
5. Palpate the cord for a pulse. If no pulse is obtained, push the newborn's head or presenting part back into mother only far enough to regain a pulse in the umbilical cord.
6. Provide immediate transport to the closest appropriate facility while maintaining pressure on the newborn.
7. Establish an **IV** of Normal Saline KVO or Saline Lock. *Advanced EMTs may initiate IV access.*



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Limb Presentation 10.4

When faced with a newborn's limb as the presenting part, **DO NOT** attempt delivery and transport the patient immediately to the closest appropriate facility.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Place the patient supine with hips elevated.
4. Do not attempt to deliver the newborn in the pre-hospital setting.
5. Keep the patient calm and encourage her not to push during contractions.
6. Provide immediate transport to the closest appropriate facility.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Breech Presentation 10.5

When faced with a newborn patient buttock as the presenting part, let the delivery occur naturally and make certain that an open airway is accomplished until delivery is completed.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Place the patient supine with knees widely separated. Elevate the patient's buttocks if needed.
4. Allow the delivery to proceed normally while supporting the newborn with the palm or your hand and arm.
5. If the head is not delivered within 3 minutes, place a gloved hand in the vagina, with your palm toward the newborn's face utilizing a "V" technique with your fingers. Push the vaginal wall away from the newborn's face to create a space until delivery of the head.
6. Check the cord to ensure that it is not wrapped around the newborn's neck.
7. Provide immediate transport to the closest appropriate facility if there is a delay in delivery of the head.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Uterine Inversion 10.6

Uterine inversion is a condition when the uterus protrudes through the vagina with the placenta still attached. This condition can produce severe hemorrhage and hypoperfusion.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Place the patient supine.
4. If the placenta is still attached, do not remove it.
5. Cover any protruding tissue lightly with moist sterile dressings.
6. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
7. Administer **Normal Saline Boluses at 250 ml** as needed to maintain or restore perfusion. Maximum total of **2000 ml**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – OBGYN Emergencies

Management of Vaginal Hemorrhage 10.7

This protocol applies to female patients with unusually heavy vaginal bleeding as a result of pregnancy (abruptio placenta, placenta previa and uterine rupture), miscarriage or post-partum hemorrhage.

ALL PROVIDER LEVELS

1. Initiate General Assessment and Universal Patient Care.
2. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
3. Place the patient in the left lateral recumbent position if the patient is in the third trimester of pregnancy. If the patient is not in the third trimester and is exhibiting signs / symptoms of hypoperfusion, place the patient in the shock position.
4. In the event of active post-partum hemorrhage from the vagina, apply a firm uterine massage starting from the pubis toward the umbilicus clockwise.
5. In the event that the patient has experienced a miscarriage and the fetus is ≤ 20 weeks in gestation:
 - Ensure that the fetus is pulseless and apneic. If so, do not attempt resuscitative measures.
 - If there is any question as to the approximate gestation of the fetus, provide resuscitative measures.
 - If the fetus presents with spontaneous respirations and/or pulses, provide newborn resuscitative measures and transport to the closest appropriate hospital. If there is a question as to whether the fetus is viable or not; contact Medical Control for direction.
6. In the event that the patient has experienced a miscarriage and the fetus is > 20 weeks in gestation:
 - Provide newborn resuscitative measures and transport to the closest appropriate hospital.
7. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
8. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses at 250 ml** as needed to maintain or restore perfusion. Maximum total of **2000 ml**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

This protocol applies to adult and pediatric patients who have sustained a traumatic injury. The goals of trauma care include rapid assessment and management of life-threatening injuries, safe patient movement to prevent worsening injury severity, and rapid transport to the appropriate level trauma center.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients who have sustained an injury due to mechanical trauma, including:
 - Blunt injury
 - Penetrating injury
 - Blast injury
 - Burns

Exclusion Criteria:

- Adult or pediatric patient who has no acute traumatic injury.
- Adult or pediatric patient in cardiac arrest due to an obvious traumatic etiology. [See Traumatic Cardiac Arrest protocol.](#)

Treatment and Interventions:

1. Survey the scene for possible hazards and maintain situational awareness. Ensure the scene is safe to initiate patient care.
2. Determine the number of patients and request additional resources as necessary to manage the incident. Refer to [MCI protocol](#) if greater than 9 patients.
3. If patient is part of an [active shooter / hostile event \(ASHE\)](#), refer to [Active Shooter protocol](#).
4. Consider potential spinal cord injury and perform [spinal motion restriction](#) as indicated.
 - ❖ Important Note: Spinal motion restriction shall NOT be performed following penetrating trauma to the head, neck, or torso. Such procedures delay rapid transport and have been associated with increased patient mortality.
5. Initiate primary assessment utilizing “MARCH” algorithm.
 - Remove as much clothing as necessary to determine the presence or absence of a life-threatening injury.
 - Make every effort to keep exposed only those body parts you are examining and keep the remainder of the patient covered to prevent heat loss.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

- **Massive Hemorrhage**
 - Perform visual and physical full body sweep to assess for penetrating wounds and or severe life-threatening hemorrhage.
 - Be sure to roll patient and examine the back as well as inspect the axilla and groin regions for sources of hemorrhage.
- **Airway**
 - Assess airway patency by asking the patient basic questions (e.g., name, what happened? etc.)
 - Look for injuries that may lead to airway obstruction including:
 - Unstable facial fractures
 - Expanding neck hematoma
 - Blood or vomitus in the airway
 - Facial burns or inhalation injury
 - Evaluate mental status for ability to protect and maintain airway.
- **Respiratory / Breathing**
 - Assess respiratory rate and pattern.
 - Assess work of breathing.
 - Assess for tracheal deviation.
 - Assess symmetry of chest wall movement.
 - Listen bilaterally on lateral chest wall for breath sounds.
 - Place patient on continuous pulse oximetry (SpO₂) and ETCO₂ monitoring if available.
- **Circulation**
 - Assess blood pressure and heart rate.
 - Assess for presence and quality of central pulses (e.g., femoral or carotid)
 - Assess for presence and quality of peripheral pulses
 - Evaluate skin color, temperature, and moisture
- **Head Injury / Hypothermia Prevention**
 - Perform initial neurologic status assessment. Utilize [GCS](#) or AVPU (Alert, Verbal, Painful, Unresponsive)
 - If patient is altered, check blood glucose level.
 - Assess pupillary size and responsiveness.
 - Assess for gross motor movement of extremities.
 - Evaluate for clinical signs of [traumatic brain injury with herniation](#).
 - Assume all patients that are moderately or severely injured or burned are or will rapidly become hypothermic regardless of outside ambient temperature.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

6. Treat all immediate life threats identified in the primary assessment “**MARCH**” algorithm as soon as possible, ideally as soon as identified in the primary assessment.
 - **Massive Hemorrhage**
 - Stop severe external and extremity hemorrhage. Use direct pressure, [extremity tourniquets](#) or [wound packing with hemostatic gauze](#) as indicated. See Extremity Trauma / External Hemorrhage Management protocol.
 - **Airway**
 - If impending airway obstruction or altered mental status resulting in inability to maintain airway patency, immediately support airway per [Airway Maintenance and Supplemental Oxygen protocol](#).
 - Utilize jaw thrust as needed to open airway.
 - Suction as needed to remove foreign objects, vomitus, or blood from the mouth.
 - Use NPA x 2 and or OPA as indicated/tolerated.
 - Avoid nasal airway adjuncts in patients with maxillofacial injuries.
 - **Respiratory / Breathing**
 - Provide supplemental oxygen as indicated per [Airway Maintenance and Supplemental Oxygen protocol](#). Maintain SpO₂ > 94%.
 - If absent or diminished breath sounds in a hypotensive trauma patient, especially those with chest trauma, consider tension pneumothorax.
 - ALS providers see below for [needle thoracostomy](#).
 - For treatment of a potential open and/or sucking chest wound, immediately place a vented chest seal to penetrating injuries between the belly button and clavicles.
 - If a vented chest seal is not available, use a non-vented chest seal or improvised chest seal.
 - Monitor for the potential development of a subsequent tension pneumothorax. If the patient develops increasing hypoxia, respiratory distress or hypotension after chest seal placement and a tension pneumothorax is suspected, BLS providers shall burp or remove the chest seal as needed. ALS provider shall perform [needle thoracostomy](#).
 - For treatment of a potential flail chest, assist ventilations as needed, provide pain relief, and monitor for deterioration.
 - Do NOT attempt to stabilize the flail segment with sandbags or heavy bulky dressings as they may further compromise chest wall motion and ventilation.
 - **Circulation**
 - ALS providers see below for IV/IO access.
 - Do not delay transport to obtain IV access.
 - If pelvis is unstable or a pelvic ring injury is suspected based on mechanism of injury and signs of shock, [place pelvic binder or sheet to stabilize pelvis](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

- **Head Injury / Hypothermia Prevention**
 - If clinical signs of traumatic brain injury, treat per [Traumatic Brain Injury protocol](#).
 - Promptly remove wet or bloody clothing and cover patient with an available warm body cover (e.g., cloth blanket, mylar blanket etc.) to prevent further heat loss.
 - Ensure temperature setting in the patient compartment of the ambulance is warm to prevent further heat loss.
- 7. Minimize scene time (goal < 10 minutes for all patients) and initiate rapid transport to an appropriate receiving trauma center. [See Trauma Triage Algorithm](#).
 - Achieve control of any massive hemorrhage and treat airway and respiratory compromise then prioritize transport.
 - Do NOT delay transport for non-essential procedures such as:
 - 12-lead EKG
 - Fingertick glucose in conscious/awake patient
 - Minor splinting or wound bandaging
 - IV/IO access or fluid bolus
 - BLS ambulances shall NOT wait for a prolonged or delayed ALS resource (i.e., paramedic engine or medic transport unit) when caring for a Red Criteria trauma patient. BLS ambulances shall initiate transport to the closest level 1 trauma center and request ALS intercept if logistically and geographically feasible.
 - If a paramedic engine and BLS ambulance are on scene with a Red Criteria trauma patient, providers shall NOT delay transport by requesting a medic transport unit. The engine company paramedic shall upgrade the BLS ambulance to minimize scene time (goal < 10 minutes) in Red Criteria trauma patients.
 - Air medical transport may be utilized to reduce transport time for certain Red Criteria trauma patients when operational and logistical conditions are favorable. [See Air Transportation Utilization protocol](#).
- 8. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports regardless of clinical priority.
- 9. Repeat primary assessment or perform secondary assessment, if patient condition allows, while enroute to the trauma center.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

- Obtain medical history from patient or family.
 - Allergies
 - Medications: very important in trauma patients is whether the patient is taking anticoagulant or antiplatelet medications as these can increase the severity of bleeding after injury.
 - Coumadin
 - Pradaxa
 - Xarelto
 - Eliquis
 - Plavix
 - Aspirin
 - Past medical and surgical history
 - Last meal
 - Events leading up to the injury
- Perform complete head to toe physical exam including re-assessment of interventions from primary survey. Treat life threatening condition as they are recognized. Inspect and palpate each of the major body systems for “DCAP-BTLS-IC.”
 - Head / Face
 - Palpate head and scalp and face and evaluate for soft tissue injury or bony crepitus indicating injury to skull or facial bones.
 - Assess for globe injury and subjective change in vision. Treat per Eye Injury Protocol.
 - Neck
 - Check for contusions, abrasions, hematomas, JVD, tracheal deviation.
 - Palpate for crepitus.
 - Maintain [spinal motion restriction](#) as indicated.
 - Chest
 - Palpate for instability / crepitus.
 - Listen to breath sounds.
 - Inspect for penetrating or soft tissue injuries.
 - Abdomen
 - Palpate for tenderness.
 - Inspect for penetrating or soft tissue injuries.
 - Cover eviscerated abdominal contents with a clean or sterile dressing that has been moistened with saline. Wet dressings may be covered with a large, dry, or occlusive dressing to keep the patient warm. Do not attempt to replace the protruding tissue back into the abdominal cavity.
 - Pelvis
 - Inspect for penetrating or soft tissue injuries.
 - Gently palpate pelvis once for instability by applying medial pressure on the iliac crests bilaterally. Do NOT repeatedly or aggressively “rock the pelvis.”



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

- Assess for abnormal positioning of lower extremities (e.g., external rotation or limb-length discrepancy). This may be a sign of a hip dislocation or fracture.
 - Assess for genital or perineal bruising, swelling or laceration which may be a sign of a serious pelvic injury.
 - Back
 - Inspect for penetrating or soft tissue injuries.
 - Maintain [spinal motion restriction](#) as indicated.
 - Neurologic status
 - Perform frequent repeat assessments of GCS.
 - Assess gross exam of motor strength and sensation in all four extremities.
 - Extremities
 - Assess for fracture/deformity. Splint obvious extremity fractures per Extremity Trauma / External Hemorrhage Management protocol.
 - Assess peripheral pulses/capillary refill
10. If seizure activity is witnessed, treat per [Seizure protocol](#).
11. If patient experiences pain, treat per [Pain Management protocol](#).
12. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
13. When transferring care to trauma center staff use structured handoff format (“AT-MIST”) to ensure all critical information is communicated:
- A – age
 - T – time of incident
 - M – mechanism
 - I – injuries noted
 - S – symptoms/signs
 - T – treatments provided

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Place patient on continuous ETCO₂ monitoring.
3. As part of the primary assessment and treatment of respirations in the MARCH algorithm, evaluate for signs and symptoms of tension pneumothorax.
 - If tension pneumothorax is suspected, perform needle thoracostomy per [Needle Thoracostomy Protocol](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

General Trauma Management 11.1

4. Establish IV/IO access as indicated by the patient's clinical presentation.
5. If patient presents with signs and symptoms of hypovolemia or hypoperfusion/shock after traumatic injury, treat per Traumatic Shock protocol.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Patients with major hemorrhage, hemodynamic instability, penetrating torso trauma, or signs of traumatic brain injury often require rapid surgical intervention. Transport should not be delayed. Scene time should NOT exceed 10 minutes.
- DCAP-BTLS-IC is mnemonic acronym to remember specific soft tissue injuries to look for during a person's assessment after traumatic injury.
 - D – Deformities
 - C – Contusions
 - A – Abrasions
 - P – Penetrations/punctures
 - B – Burns
 - T – Tenderness
 - L – Lacerations
 - S – Swelling/edema
 - I – Instability
 - C – Crepitus



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Amputation 11.2

This protocol applies to adult and pediatric patients with a partial or complete amputation of a body part.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients who have sustained an injury resulting in partial or complete amputation of a body part.

Exclusion Criteria

- None

Treatment and Interventions:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Resuscitate [per Hypoperfusion / Traumatic Shock protocol](#).
4. Control hemorrhage utilizing a tourniquet per [Tourniquet procedure](#).
5. Perform extremity splinting as required.
6. Care of the partially amputated body part shall include:
 - Hemorrhage control via tourniquet placement as required.
 - Stabilization of the body part via splinting when clinically and logistically feasible.
 - Rapid transport of the patient to the closest appropriate level 1 trauma center.
7. Care of the completely amputated body part if recovered shall include:
 - Remove gross contamination by gently rinsing with normal saline.
 - Wrap the body part in moist sterile dressings and place in a plastic bag or container.
 - If possible, place the bag or container with the amputated body part into a second bag or container with ice packs to keep the amputated body part cool.
 - ❖ Important Note: Do NOT freeze the body part by placing it directly on ice or by adding another coolant such as dry ice.
8. Transport the amputated body part along with the patient to the closest appropriate level 1 trauma center. [See Trauma Triage Algorithm](#).
 - Important Note: Do NOT delay transport of the patient to locate a missing amputated body part. If the amputated part is not readily found, additional responders should



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Amputation 11.2

remain at the scene to search for it. Once the amputated part is found, it can be transported to the same trauma center as the patient.

9. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports regardless of clinical priority.
10. If patient experiences pain, treat per [Pain Management protocol.](#)
11. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol.](#)

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
3. Place patient on continuous ETCO₂ monitoring.
4. Continue resuscitation per [Hypoperfusion / Traumatic Shock protocol.](#)

MEDICAL CONTROL OPTION

1. Contact Medical Control for further orders when necessary.

General Notes:

- The appearance of an amputation may be horrifying and distracting; however, the primary trauma assessment (e.g., MARCH assessment) should still be performed before looking for a missing extremity, unless adequate numbers of responders are present to assist.
- The longer the amputated body part is without blood flow and thus oxygen, the less likely that it can be reimplanted successfully. Cooling the amputated body part, without freezing it, will reduce the metabolic rate and prolong this critical reimplantation time.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Blast Injuries 11.3

This protocol applies to adult and pediatric patients exposed to an explosive force or blast.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients exposed to an explosive force. Injuries may include any or all the following:
 - Blunt trauma
 - Penetrating trauma
 - Burns
 - Pressure-related injuries (barotrauma)
 - Toxic chemical contamination
 - Chemical, biological, radiological, nuclear agent exposure.

Exclusion Criteria

- None

Treatment and Interventions:

1. Ensuring scene safety is critically important at the scene of an explosion.
 - Maintain situational awareness throughout all aspects of assessing and treating patients.
 - Always consider the possibility of subsequent explosions.
2. Determine the number of patients and request additional resources as necessary to manage the incident. Refer to [MCI protocol](#) if greater than 9 patients.
3. Remove patient from the scene as soon as is logistically practical and safe.
 - ❖ Important Note: patients suffering a blast injury may have a perforated eardrum resulting in deafness which may complicate the evaluation of their mental status and their ability to follow commands.
4. Initiate assessment and patient care per [General Trauma Management protocol](#).
 - Be sure to assess for and stop severe hemorrhage.
 - Assess airway patency and consider possible thermal or chemical burns to the airway.
 - Consider possible pneumothorax or tension pneumothorax due to the penetrating/blunt trauma or barotrauma.
 - Continually reassess for symptoms of blast lung injury.
5. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Blast Injuries 11.3

6. Resuscitate per [Hypoperfusion / Traumatic Shock protocol](#).
7. Control hemorrhage per [Extremity Trauma / External Hemorrhage Management protocol](#).
8. If clinical signs of traumatic brain injury, treat per [Traumatic Brain Injury protocol](#).
9. If the patient has burns (thermal, chemical or airway) transport adult patients to the burn center at Medstar (Hospital 4) and pediatric patients to Children's National (Hospital 2).
10. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports regardless of clinical priority.
11. If patient experiences pain, treat per [Pain Management protocol](#).
12. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
3. Place patient on continuous ETCO₂ monitoring.
4. If thermal or chemical burn to the airway is suspected, early airway management is vital.
 - Secure airway. Utilize airway adjuncts, i-gel or intubation as indicated. [See i-gel protocol](#), or [See Medication Facilitated Intubation protocol](#).
5. Continue resuscitation per [Hypoperfusion / Traumatic Shock protocol](#).

MEDICAL CONTROL OPTION

1. Contact Medical Control for further orders when necessary.



General Notes:

- Blast injury patients may sustain complex, multisystem injuries, including blunt and penetrating trauma, shrapnel injury, barotrauma, burns, and toxic chemical exposure.
- How severely a person is injured in a blast will be determined by:
 - Type of blast: high vs low order explosive
 - Environment: enclosed spaced vs open space
 - Presence of projectiles
 - Distance from the explosion
 - Presence or absence of shielding
- There are 4 types of blast injury
 - Primary injury: occurs due to the over pressurized blast wave. Most severe injury occurs at air-fluid interface in the brain, lungs, eardrums, and bowel.
 - Secondary injury: due to projectiles propelled by the blast. Any body part may be affected.
 - Tertiary injury: due to person being thrown by the blast wind into a solid object. Can result in crush injury.
 - Quaternary: all other explosion related injuries, illness or disease not described above including exacerbation or complications of existing conditions (e.g., COPD exacerbation)

Tertiary

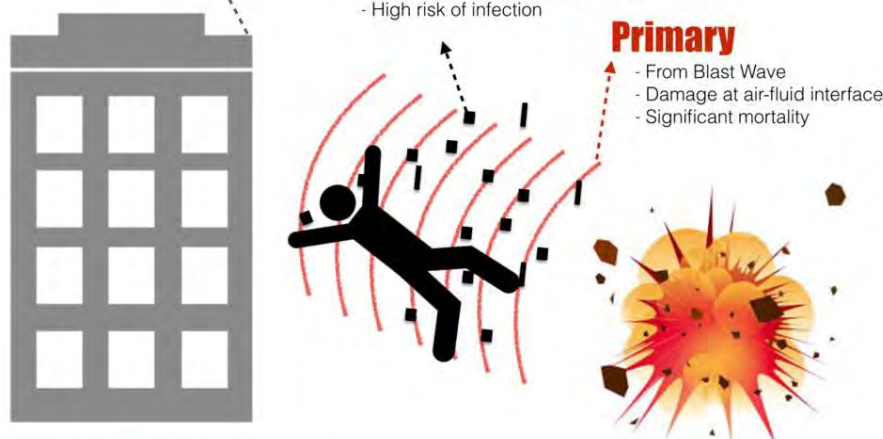
- Person propelled into solid object
- Crush injuries common

Secondary

- From objects propelled by the blast
- Significant source of casualties
- High risk of infection

Primary

- From Blast Wave
- Damage at air-fluid interfaces
- Significant mortality



Building graphic by Benoit Douvroux. Falling stick figure by Andrea Novoa from the Noun Project.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Thermal and Chemical 11.4

This protocol applies to patients sustaining burns as a result of thermal chemical or electrical components. Indications for referral to a burn center applies to patients with 2nd degree burns >10%, 3rd degree burns >1% in any patient, electrical injury (greater than 200 volts), suspected inhalation injury, or significant burns to the face/head, hands, feet major flexion joints or perineum. In the event that there is associated trauma to the burned patient, transport to the closest burn center for immediate care if unstable.

ALL PROVIDER LEVELS

1. Remove the patient from the source of injury. Decontaminate if the injury occurred as a result of a hazardous material or chemical if safe to do so.
2. Initiate General Assessment and Universal Patient Care.
3. Support airway and provide supplemental Oxygen per Airway Maintenance and Supplemental Oxygen protocol.
4. If smoke inhalation is suspected, provide humidified Oxygen.
5. Remove items that may constrict swelling tissue.
6. Determine the degree and body surface area percentage burned.
7. If the burns are **≤10% body surface area**, cover with Waterjel Emergency Burn Dressing or if not available sterile dressings soaked in a saline solution.
8. If the burns are **>10% body surface area**, cover with Waterjel Emergency Burn Dressing or if not available sterile dry dressings. Ensure that the patient is kept covered and warm to prevent the loss of body heat with mylar blanket.
9. Initiate advanced airway management if the airway cannot be managed properly utilizing BLS airway maintenance.
 - ALS providers should utilize advanced airway management with **ET intubation** and attach continuous **quantitative waveform capnography (ETCO₂)**, maintaining a level of 35-45 mmHg. If ET intubation cannot be accomplished due to a completely obstructed airway, perform an emergent **Needle Cricothyroidotomy**.
 - Patients with Evidence of upper Airway Burn, changes in Voice, or stridor should be intubated early. Consider medication Facilitated intubation protocol.
10. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Thermal and Chemical 11.4

11. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
500 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

ADVANCED LIFE SUPPORT PROVIDERS

1. Consider **continuous EKG monitoring** and **quantitative waveform capnography (ETCO₂)**.
2. Waterjel emergency burn dressings provide pain relief by efficient and effective cooling of the burn injury.
3. For further pain management consider **Fentanyl** or **Morphine Sulfate**.
 - **If the patient exhibits signs / symptoms of hypoperfusion Contact Medical Control for Fentanyl / Morphine Sulfate:**

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Fentanyl 50-100 mcg IV per dose every 5 minutes to a maximum of 200 mcg Use 25 mcg for the elderly or a weight under 70 kg	Fentanyl 1 mcg/kg IV/IO/IN up to a maximum single dose of 50 mcg Contact Medical Control for additional doses



or

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Morphine 2 mg IV . Repeat as needed until pain is relieved or a maximum of 10 mg is reached An additional dose of 2 mg up to a maximum single dose of 10 mg may be repeated one time after 10 minutes	Morphine 0.1 mg/kg IV until pain is relieved or a maximum single dose of 10 mg is reached



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Thermal and Chemical 11.4

- In patients 65 years old and greater consider an initial dose of half your normal adult dose when administering opiates (Fentanyl / Morphine).

4. Consider administration of **Ketamine** for pain if **Fentanyl** or **Morphine** is unavailable:

<u>Adult</u>	<u>Pediatric</u>
Ketamine 0.2 mg/kg IV/IO/IM administered over 1 minute. May repeat once in 5 minutes as needed	Contact Medical Control for orders and anticipate 0.1-0.2 mg/kg IV/IM/IO



5. For nausea / vomiting consider **Ondansetron (Zofran) IV** or **Prochlorperazine (Compazine)**:

<u>Adult</u>	<u>Pediatric</u>
Ondansetron (Zofran) 4 mg IV over 30 seconds. May repeat in 10 minutes	Ondansetron (Zofran) 0.15 mg/kg IV over 30 seconds. Maximum single dose 4 mg

or

<u>Adult</u>	<u>Pediatric</u>
Diphenhydramine (Benadryl) 25 mg IV followed by Prochlorperazine (Compazine) 10 mg IV	Not Indicated

6. If the injury is associated with smoke inhalation and a decreased level of consciousness refer to the **Smoke Inhalation/Cyanide Exposure** protocol.



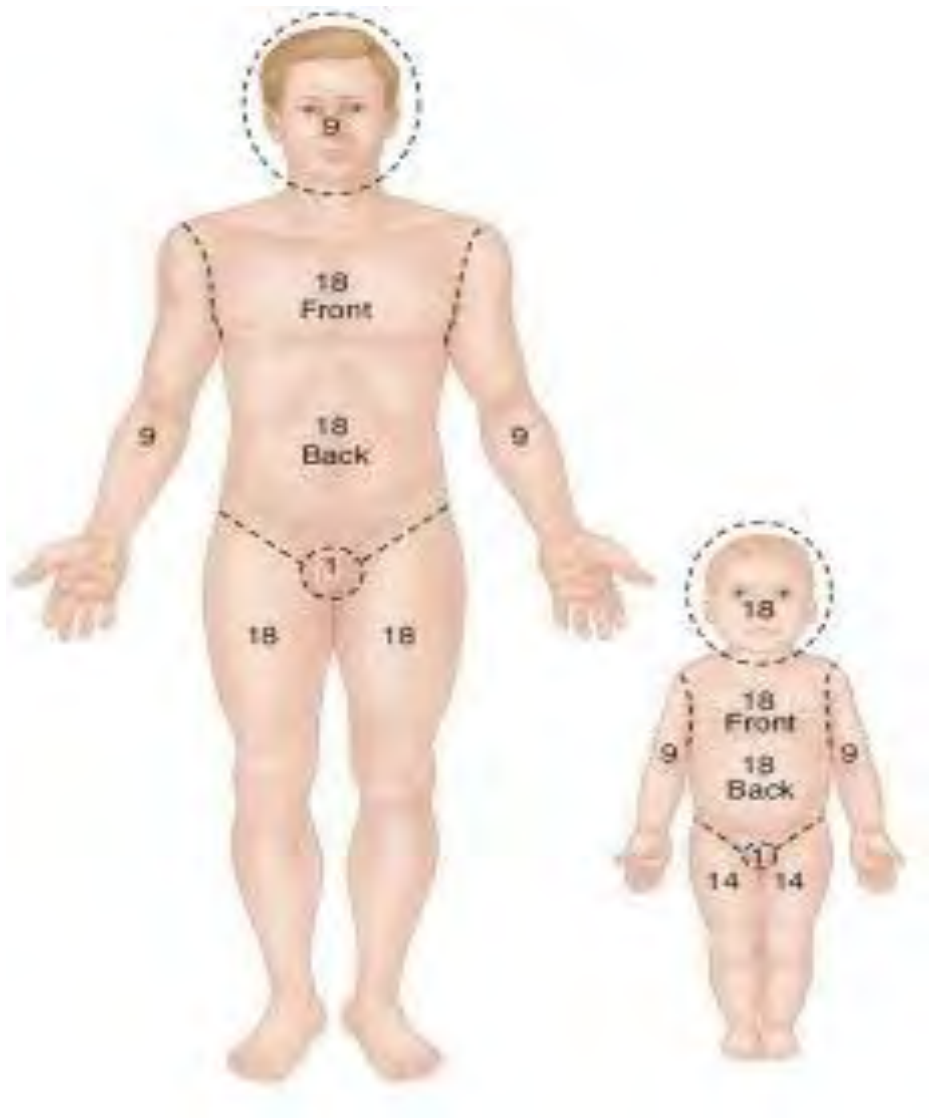
DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Thermal and Chemical 11.4

MEDICAL CONTROL OPTION

1. Contact Medical Control for further orders when necessary.





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Electrocution and Lightning 11.5

This protocol applies to patients sustaining injury as a result of high voltage electricity (>200 volts) or lightning strikes. In addition to burns, these patients have a high probability of cardiac rhythm disturbances and penetrating trauma as a result of the electrical injury.

ALL PROVIDER LEVELS

1. Remove the patient from the source of injury, if safe to do so.
2. Initiate General Assessment and Universal Patient Care.
3. Consider spinal immobilization if the mechanism of injury exists.
4. If the patient is in respiratory arrest, initiate **ventilatory support** per the Airway Maintenance and Oxygen Therapy protocol.
5. If the patient is in cardiac arrest, initiate **CPR** and attached an **AED** as appropriate. Refer to the **appropriate Cardiac Arrest protocol**.
6. Administer supplemental **Oxygen** per the Airway Management and Oxygen Therapy protocol.
7. Establish an **IV** of Normal Saline KVO. *Advanced EMTs may initiate IV access.*
8. If the patient presents with signs and symptoms of hypoperfusion, administer **Normal Saline Boluses**:

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain or restore perfusion. Maximum total of 2000 ml	20 ml/kg as needed to maintain or restore perfusion. Maximum of 3 boluses

9. All electrical injuries or burns should be transported to a specialty burn center.

ADVANCED LIFE SUPPORT PROVIDERS

1. Provide **continuous EKG and continuous quantitative waveform capnography (ETCO₂)**.
2. Apply **appropriate Cardiac Arrest protocol** as applicable.
3. If the patient is hemodynamically stable refer to the **Pain Management protocol**.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Burns: Electrocution and Lightning 11.5

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Crush Injuries / Compartment Syndrome 11.6

This protocol applies to adult and pediatric patients in whom a part of their body (typically large muscle groups such as a leg) is subject to crushing forces for extended periods of time, usually several hours, and are thus at risk for developing crush syndrome and or compartment syndrome.

ALL PROVIDER LEVELS

Inclusion Criteria:

- A sustained (> 30 minutes) traumatic crush mechanism of injury.
- Non-traumatic injuries that may cause compartment syndrome include:
 - Prolonged immobilization (e.g., an intoxicated patient lying unconscious on their arm for hours)
 - Prolonged compression of the torso/limbs
 - Exertional rhabdomyolysis
 - Electrical injury
 - Burns

Exclusion Criteria:

- None

Definitions:

- **Crush Injury:** a description of a mechanism of injury. Any body part that suffers any traumatic crushing force has sustained a “crush injury.” The injury to the soft tissues, muscles, and nerves can be due to the primary direct effect of the trauma and or ischemia related to prolonged compression.
- **Crush Syndrome:** systemic manifestations resulting from crush injury, which can result in organ dysfunction (predominantly acute kidney injury) and or death. Crush syndrome is the consequence of muscle injury resulting in the spilling of intracellular contents into the blood stream. The most concerning is the release of potassium and myoglobin.
 - When the crushing/compressive force is relieved (reperfusion syndrome):
 - The patient may become rapidly acidotic and hyperkalemic.
 - Myoglobin can obstruct the kidneys resulting in acute kidney injury.
 - Any bleeding (internal or external) previously controlled by the crushing force may now be uncontrolled.
 - Arrhythmias and sudden death can result.
- **Compartment Syndrome:** occurs when increased pressure within a fascial bound muscle compartment compromises the circulation and function of the tissues within



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Crush Injuries / Compartment Syndrome 11.6

that compartment. May occur acutely after trauma or with a crush injury but also can occur from exertional rhabdomyolysis and burns.

- Muscles are covered with a non-stretchable fascia—a thin connective tissue. Injuries causing bleeding and swelling within that fascial compartment create increased pressure, resulting in decreased blood flow and perfusion.
- Most commonly occurs in the legs and forearms.
- Traditionally presents with pain disproportionate to appearance of the injury, pallor (grey/purple skin), paresthesia (numbness, tingling, pins and needles sensation), paralysis, cool to touch, absent to weak distal pulse, and tight skin.

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care for medical patient or General Trauma Management protocol](#) for injured patient.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Evaluate for possible concomitant injury (e.g., fractures, spinal injury, traumatic brain injury) and continue injury specific treatment per applicable protocol.
4. Remove constrictive clothing and jewelry.
5. Determine if the patient is severely entrapped and or suffering from a crush injury that is unlikely to be amenable to traditional extrication techniques.
 - Consider early activation of the George Washington University Hospital Surgical Strike Team if a field amputation may be required.
6. Tourniquets should be staged (in position but not tightened) on any entrapped limbs to rapidly control any bleeding following removal of crushing/compressive forces.
 - Placement of tourniquets to isolate a crushed limb with the intent of preventing the release of potassium and other cellular contents from entering central circulation is NOT supported by evidence and is NOT recommended.
7. If patient experiences pain, treat per [Pain Management protocol](#).
8. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
9. Once extricated, rapid hemodynamic/cardiovascular decompensation should be anticipated. The patient should be transported rapidly to a level 1 trauma center.
10. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports regardless of clinical priority.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Crush Injuries / Compartment Syndrome 11.6

11. Repeat primary assessment or perform secondary assessment, if patient condition allows, while enroute to the trauma center.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
3. Place patient on continuous ETCO₂ monitoring.
4. Resuscitate per [Hypoperfusion / Traumatic Shock protocol](#).
5. IV fluids should be administered prior to releasing the crushed body part. Crush injury without adequate fluid resuscitation is likely to develop into crush syndrome.
6. Obtain and if possible, continuously monitor a 12 lead EKG. If signs of hyperkalemia are present, treat per [Hyperkalemia protocol](#).
7. Any rapid decompensation or progression to cardiac arrest should be presumptively treated for hyperkalemia in addition to hypovolemia.
8. Post extrication:
 - Continue resuscitation with IV fluids.
 - Continue to monitor for signs and symptoms of hyperkalemia on EKG. Treat per [Hyperkalemia protocol](#).

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – General Medical Emergencies

Crush Injuries / Compartment Syndrome 11.6

General Notes:

- Causes of mortality in untreated crush injury:
 - Immediate
 - Severe head injury
 - Traumatic asphyxia
 - Torso injury with damage to intrathoracic or intra-abdominal organs
 - Early
 - Sudden release of a crushed extremity may result in reperfusion syndrome (acute hypovolemia, electrolyte abnormalities, and subsequent lethal arrhythmia)
 - Hyperkalemia
 - Hypovolemia/shock
 - Late
 - Acute kidney injury
 - Coagulopathy and hemorrhage
 - Sepsis
- Nontraumatic presentations of crush syndrome may occur in patients with prolonged immobilization, such as might be found with profound intoxication, stroke, coma, or a person that has fallen and is unable to right themselves. In such cases, the persons body weight on the isolated body part (e.g., arm, thigh, buttocks) alone without relief may produce a compartment syndrome and rhabdomyolysis. Clinicians should be alert to this phenomenon, especially on calls for lift assist and similar incidents involving prolonged immobilization.
- The prehospital treatment for acute compartment syndrome is recognition and transport to a trauma receiving facility. In rare circumstances, such as a prolonged entrapment, acute compartment syndrome may benefit from field fasciotomy performed by the George Washington University Hospital Surgical Strike Team or Department Medical Director.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Extremity Trauma / External Hemorrhage Management 11.7

This protocol applies to adult and pediatric patients with extremity trauma and or external hemorrhage.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients with traumatic extremity injury and or extremity hemorrhage (external hemorrhage).
- Adult and pediatric patients with known or suspected extremity fracture or dislocation.

Exclusion Criteria

- None

Treatment and Interventions:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
 - Assess degree of extremity/external bleeding.
 - Assess vascular status of extremity.
 - Pulse
 - Pallor
 - Capillary refill
 - Skin temperature
 - Assess neurologic status of extremity.
 - Distal movement of extremity
 - Sensation to touch
 - Evaluate extremity for deformity, abnormal shortening, rotation, or instability.
2. Manage extremity/external bleeding:
 - Expose the wound and apply direct pressure to bleeding site, followed by a pressure dressing.
 - If direct pressure/pressure dressing is ineffective or not feasible due to logistical or clinical constraints:
 - For moderate to severe bleeding at a site amenable to tourniquet placement: apply a commercial tourniquet to the extremity. [See Tourniquet protocol](#).
 - For moderate to severe bleeding at a site NOT amenable to tourniquet placement (i.e., junctional sites such as the groin or axilla, torso, neck, etc.): perform wound packing. [See Wound Packing protocol](#).
 - Be sure to pack the entire depth of the wound tightly and fully until bleeding stops, then apply firm and continuous direct pressure for three minutes. Once bleeding is controlled, apply a pressure dressing over the wound packing.



➤ Pediatric considerations:

- Hemorrhage control strategies and indications for placing a tourniquet on a pediatric patient are the same as for adults.
- In general, the CAT tourniquet is expected to be effective on the thigh of pediatric patients as young as 6 to 12 months and arms beginning around 5 years of age.
- Direct pressure and wound packing may be more effective for infants and young children.
- Stretch-wrap-tuck elastic type bandages (e.g., H, Israeli bandage, or ETD) can be used on any age patient.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Extremity Trauma / External Hemorrhage Management 11.7

3. Treat pain per [Pain Management protocol](#).
 - A properly applied tourniquet in a conscious patient is very painful. Treat with ALS pain medication. Do NOT loosen a tourniquet to relieve pain.
 - ❖ Important Note: ALS pain management is indicated for patients requiring tourniquet application and those with suspected fractures or dislocations.
4. Stabilize suspected fractures/dislocations:
 - Strongly consider administering pain medication before attempting to move or splint a suspected fracture or dislocation.
 - If distal vascular function is compromised, gently attempt to restore normal anatomic position /alignment of the extremity, then reassess perfusion status.
 - Perform extremity splinting as appropriate to limit movement of suspected fracture.
 - Elevate extremity fractures whenever possible to limit swelling.
 - Apply ice/cold packs to limit swelling in suspected fractures or soft tissue injury, but do not apply ice directly to bare skin.
 - Reassess distal neurovascular status after any manipulation or splinting of fractures/dislocations.
 - Dress open wounds associated with fractures with saline-moistened gauze.
5. Remove jewelry and potentially constricting clothing from the injured limb.
6. Do NOT remove impaled foreign bodies.
 - Stabilize impaled object to prevent movement.
 - Control bleeding around the stabilized impaled object.
7. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
3. Place patient on continuous ET_{CO}₂ monitoring.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Extremity Trauma / External Hemorrhage Management 11.7

4. Resuscitate per [Hypoperfusion / Traumatic Shock protocol](#).

MEDICAL CONTROL OPTION

1. Contact Medical Control for further orders when necessary.
-

General Notes:

- Survival is markedly increased when a tourniquet is placed BEFORE shock develops. Do not wait for hypotension or other signs of shock to place a tourniquet to control hemorrhage.
- External hemorrhage control to prevent shock is particularly critical in infants and young children, due to their relatively small blood volume.
- Use of a tourniquet for extremity hemorrhage is strongly recommended if sustained direct pressure is ineffective or impractical for the given situation. Use a commercially produced tourniquet. Utilize improvised tourniquets only if no commercial device is available. Do NOT release a properly applied commercial tourniquet until the patient reaches definitive care.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Eye Emergencies 11.8

This protocol applies to adult and pediatric patients with eye injuries due to trauma, chemical, or thermal burns.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients with suspected or confirmed eye injury due to trauma, chemical, or thermal burns.

Exclusion Criteria:

- None

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#) for medical patient or [General Trauma Management protocol](#) for injured patient.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Continue injury or illness specific treatment per applicable protocol.
4. Management of exposure to chemical agents:
 - Ensure all providers utilize proper PPE.
 - Remove patient from exposure source as soon as possible.
 - Remove patient's contact lens, if possible, keep the lenses moist with normal saline, and transport them with the patient.
 - Identify the chemical involved. If available transport the MSDS for the chemical with the patient.
 - Irrigate the eye(s) immediately with normal saline for a minimum of 20 minutes utilizing IV tubing, a nasal cannula, or Morgan lens. Eye irrigation should commence on scene as soon as possible and be continued throughout transport.
5. Management of non-penetrating ocular foreign body:
 - Irrigate the eye(s) immediately with normal saline utilizing IV tubing, a nasal cannula, or Morgan Lens until the object is cleared from the eye.
 - The patient may report continued eye irritation even after the object is no longer present on the surface of the eye. This may be due to a corneal abrasion on the surface of the eye.
6. Management of penetrating eye injury:
 - Do NOT irrigate penetrating eye injury.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Eye Emergencies 11.8

- Stabilize any penetrating object(s)
 - Cover both the injured and non-injured eye. Do not apply pressure or use an absorbent dressing on an eye that may have ruptured or has a penetrating injury.
 - If the globe is avulsed or enucleated, do NOT put back into the eye socket. Cover eye socket with moist saline dressings and protect from further injury.
 - Transport the patient with head elevated.
7. If patient experiences pain, treat per [Pain Management protocol](#).
 8. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol](#).
 9. All patients with eye injuries should be transported to a trauma center.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma in Pregnancy 11.9

This protocol applies to the female patient with known pregnancy greater than 20 weeks gestational age or fundal height at or above the level of the belly button.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Female patient with known pregnancy > 20 weeks gestational age or fundal height at or above the level of the belly button.

Exclusion Criteria:

- Female patient is not pregnant.
- Female patient is pregnant < 20 weeks gestational age.

Definitions:

- **Viable fetus:** gestational age \geq 20 weeks (i.e., fundal height at or above the belly button).
- **Pre-viable fetus:** gestational age < 20 weeks (i.e., fundal height below the belly button).

Treatment and Interventions:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
 - Treat all life-threatening injuries as soon as possible.
 - Minimize scene time. Perform treatments enroute to trauma center.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Control hemorrhage per [Extremity Trauma / External Hemorrhage Management protocol](#).
4. If clinical signs of traumatic brain injury, treat per [Traumatic Brain Injury protocol](#).
5. All pregnant trauma patients should be transported to a trauma center for evaluation and monitoring.
 - Even minor trauma (e.g., low-speed motor vehicle collisions or a ground level fall) in a pregnant woman can lead to serious consequences (e.g., placental abruption) for the mother and fetus.
6. Pregnant patients should be transported in the left lateral recumbent position if clinically and logistically feasible. If not, providers shall apply manual left uterine displacement during transport to minimize aortocaval compression by an enlarged gravid uterus.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma in Pregnancy 11.9

7. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports regardless of clinical priority.
8. If patient experiences pain, treat per [Pain Management protocol.](#)
9. If patient experiences nausea and or vomiting, treat per [Nausea and Vomiting protocol.](#)
10. In the event of a traumatic cardiac arrest, immediately initiate transport to the closest trauma center (expedite scene time and provide all treatment enroute) per the [Traumatic Cardiac Arrest protocol.](#)
 - Priorities for the pregnant woman in cardiac arrest include provision of high-quality CPR and relief of aortocaval compression through left lateral uterine displacement.
 - Pregnant women in cardiac arrest, with a gestational age > 20 weeks, may be candidates for a peri-mortem c-section upon arrival at the trauma center. Ideally, this procedure is performed within 5 minutes of maternal cardiac arrest. Notify receiving trauma center for preparation as soon as possible.

ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
3. Place patient on continuous ETCO₂ monitoring.
4. Resuscitate per [Hypoperfusion / Traumatic Shock protocol.](#)

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- The primary goal of caring for an injured pregnant patient is to stabilize the mother first, as fetal outcomes are directly correlated with maternal resuscitation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma in Pregnancy 11.9

- Manual displacement of the gravid uterus to the left during resuscitation can increase cardiac output by up to 20%.
- Peri-mortem cesarean delivery at or greater than 20 weeks uterine size appears to improve outcomes of maternal cardiac arrest when standard resuscitation does not rapidly result in ROSC. Further, shorter time intervals from arrest to delivery appear to lead to improved maternal and neonatal outcomes.

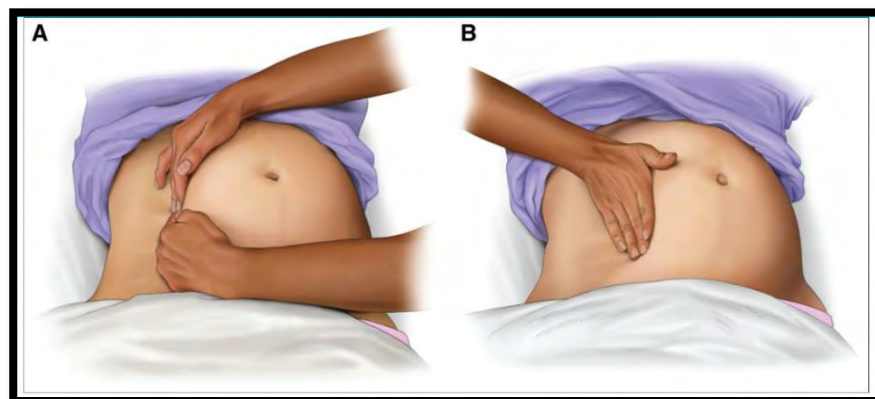
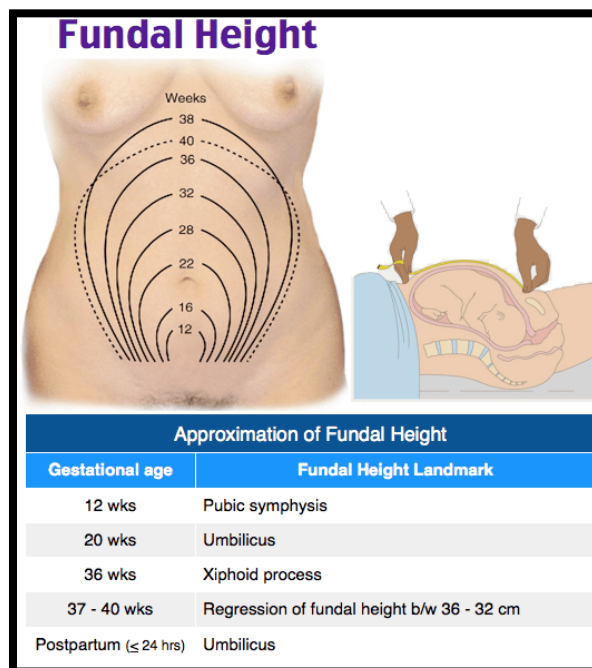


Figure A: Manual left lateral uterine displacement, performed with 2-handed technique.

Figure B: 1-handed technique.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Traumatic Brain Injury 11.10

This protocol applies to adult and pediatric patients with a suspected brain injury due to blunt or penetrating trauma. The goal of prehospital TBI management is limiting disability and mortality from head injury by promoting adequate oxygenation and cerebral perfusion while limiting the development of increased intracranial pressure and secondary brain injury.

ALL PROVIDER LEVELS

1. Initiate [General Assessment and Universal Patient Care Protocol](#).
 - Ensure continuous pulse oximetry monitoring.
 - Perform frequent (approximately every 5 minutes) systolic and diastolic blood pressure measurements.
 - Perform initial assessment of GCS and pupil size as soon as possible during the primary assessment.
 - Reassess GCS and pupil size frequently (approximately every 5 minutes) and with any change in mentation or before administering any sedative medications.
 - If available, apply continuous waveform ETCO₂ in moderate/severe head injury.
 - If signs of altered mental status are present, check blood glucose level and treat per hypoglycemia protocol.
2. Ensure that spinal motion restriction is performed. For moderate/severe TBI, elevate the head of the stretcher 30 degrees to reduce intracranial pressure.
3. If the patient has a patent airway and is breathing adequately, administer oxygen as appropriate with a target of achieving a SpO₂ of > 94%. Hypoxia significantly increases mortality in TBI and should be avoided.
4. If the patient does not have a patent airway, is not breathing adequately, or has altered mental status initiate airway management procedure per [Airway Management and Oxygen Therapy Protocol](#).
5. If a patient with suspected TBI is comatose (unconscious and unresponsive) **AND** one or more of the following signs of brain herniation is present, hyperventilate the patient at a rate of:

<u>Adult</u>	<u>Pediatric</u>
20 breaths per min.	25 breaths per min.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Traumatic Brain Injury 11.10

- ❖ Signs of brain herniation:
 - Seizure activity.
 - Unilateral or bilateral “blown” pupil (fixed, dilated, and unreactive to light).
 - Asymmetric pupils (unequal > 1mm difference).
 - Abnormal flexion or extension (posturing).
 - Hypertension and bradycardia (Cushing’s response).
 - Intermittent apnea (periodic breathing) or abnormal respiratory pattern.
- 6. Control scalp bleeding with direct pressure if no suspected open skull injury.
- 7. Apply a moist sterile dressing to any potential open skull wound.
- 8. Immediately transport to the closest open trauma center.
 - Transport patients < 15 years old to Children’s National Hospital (H2).

ADVANCED LIFE SUPPORT PROVIDERS

1. Place the patient on continuous EKG monitoring. If a dysrhythmia is present, proceed to the appropriate protocol.
2. Establish IV/IO access. Do not delay transport; perform en route to the trauma center.
3. Oral endotracheal intubation or supraglottic airway insertion may be performed if BVM ventilation is not effective in maintaining oxygenation or if it is needed to protect or maintain an open airway. See Medication Facilitated Intubation Protocol and Post Advanced Airway Management Protocol.
4. Apply continuous quantitative waveform capnography (ETCO₂). If the patient has no signs of brain herniation, then target a normal ETCO₂ of 35-45 mmHg.
5. If a patient with suspected TBI is comatose (unconscious and unresponsive) **AND** one or more of the above signs of brain herniation is present, hyperventilate to a target ETCO₂ of 30-35 mmHg.
6. Stop hyperventilation and resume normal age-appropriate ventilation rates if the pupils normalize.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Traumatic Brain Injury 11.10

7. Administer normal saline fluid bolus to maintain the following blood pressure goals. Hypotension significantly increases mortality in TBI and should be avoided.
 - Adult (age > 10 years old): maintain SBP greater than or equal to 110 mmHg
 - Pediatric: Maintain SBP:
 - Less than 1 month: greater than 60mmHg
 - 1-12 months: greater than 70mmHg
 - 1-10 years old: greater than $70 + 2X$ age in years

<u>Adult</u>	<u>Pediatric</u>
250 ml as needed to maintain blood pressure goal. Maximum total of 2000 ml	20 ml/kg as needed to maintain blood pressure goal. Maximum of 3 boluses

8. If the patient experiences active seizure activity, treat per seizure protocol.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General notes:

- The presence of hypoxia or hypotension has been associated with a 2- to 4-fold increase in death and or severe disability for patients with severe TBI. The presence of both hypoxia and hypotension together has a synergistic negative effect, increasing mortality by three or more times than either alone. Treat hypoxia and hypotension aggressively.
- Shock / hypotension is not usually due to isolated head injuries. If the patient is in shock, consider another cause for the hypotension such as blood loss.
- Restlessness and combativeness can be due to hypoxia and shock, not just head injury.
- Patients can suffer significant brain injury without losing consciousness or experiencing loss of memory on the scene.
- Always assume coexisting cervical spine injury in patients with moderate to severe head injury. Utilize the Spinal Motion Restriction protocol.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Traumatic Brain Injury 11.10

- Early signs of neurologic deterioration after head injury include:
 - Confusion
 - Agitation
 - Drowsiness
 - Vomiting
 - Severe headache
- Traumatic Brain Injury severity guideline:
 - Mild TBI: GCS 13-15 or AVPU = (A)
 - Moderate TBI: GCS 9-12 or AVPU = (V)
 - Severe TBI: GCS 3-8 or AVPU = (P) or (U)
- **Do NOT hyperventilate unless there are active signs of brain herniation.** In the past, aggressive hyperventilation was often performed to reduce ICP in patients with TBI. However, hyperventilation is known to cause cerebral vasoconstriction with an associated decrease in cerebral blood flow, resulting in worsened neurologic outcomes and greater likelihood of moderate to severe disability. Thus, hyperventilation should be avoided unless the patient is actively herniating.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Spinal Motion Restriction 11.11

Long backboards have historically been used to limit undesired motion of the spine after a traumatic mechanism of injury. However, numerous studies conclude that they do not provide true immobilization of the spine. For this reason, the term “spinal motion restriction” (SMR) has gained favor over “spinal immobilization.” SMR can be achieved by use of an ambulance cot, scoop stretcher, vacuum splint, or other similar device upon which a patient is safely secured during EMS transport. SMR without the use of a long backboard avoids the unintended but well documented patient injury and complications associated with use of this device during transport. The long backboard may still have a role in facilitating the extrication and rapid transfer of patients to the ambulance cot for transport.

ALL PROVIDER LEVELS

1. Assess the scene to determine the mechanism of injury.
 - Mechanism alone should NOT determine if a patient requires SMR; however, mechanisms that have been associated with a higher risk of spinal injury include moderate to high speed motor vehicle crashes, axial loading injuries to the spine (diving into shallow water) and falls greater than 10 feet.
2. Assess the patient in the position found for findings associated with a spine injury:
 - Abnormal mental status
 - Spinal pain or tenderness
 - Neurologic deficits
 - Evidence of alcohol or drug intoxication
 - Other severe injuries, particularly associated torso injuries
3. **Indications for SMR following blunt trauma include any of the following:**
 - Acutely altered level of consciousness (e.g., GCS < 15, evidence of intoxication)
 - Midline neck or back pain and/or tenderness to palpation
 - Anatomic deformity of the spine
 - Torticollis in children (i.e., involuntary neck muscle contractions that cause the head to tilt or turn sideways)
 - Focal neurologic signs and/or symptoms (e.g., numbness or motor weakness)
 - Distracting circumstances or injury that impairs the patient’s ability to contribute to a reliable examination (e.g., long bone fracture, crush injury, large burns, emotional distress, communication barrier, etc.)
4. **There is no indication for SMR following penetrating trauma to the head, neck or torso.** Such procedures delay rapid transport and have been associated with increased patient mortality.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Spinal Motion Restriction 11.11

5. SMR when indicated should be applied to the entire spine and consists of the following steps:

- a. Place an appropriately sized cervical collar to limit movement of the cervical spine.
 - i. If the patient does not fit into a cervical collar or cannot tolerate a cervical collar (e.g., elderly patient with severe curvature of the spine) they should be immobilized in a position of comfort using towel rolls or sandbags.
- b. Keep the head, neck, and torso in alignment as much as possible during extrication, transfer and transport.
- c. If the patient is ambulatory on scene or can safely self-extricate:
 - i. Assist the patient in moving to the ambulance cot with minimal spinal motion into a seated position.
 - ii. Once on the ambulance cot, lay the patient back gently into the supine position.
- d. If the patient is not ambulatory on scene or extrication is required:
 - i. Pay attention to minimizing spinal motion during patient transfer from one surface to another including, for example, ground to ambulance cot.
 - ii. Utilize a scoop stretcher or a long backboard to assist with patient extrication and transfer to the ambulance cot.
 - iii. If utilizing a long backboard for transfer from the ground to the ambulance cot, use the lift and slide technique, rather than a logroll, to place the patient on the long backboard.
- e. Once a patient is safely positioned on an ambulance cot, the rigid transfer device (e.g., long backboard, scoop stretcher, etc.) shall be removed. **Do not transport patients on rigid long backboards unless removal interferes with critical patient treatments or interventions.** An example of this may be facilitation of immobilization of multiple extremity injuries or an unstable patient where removal of a board will delay other treatment priorities. **Removal of the transfer device should occur in all but the rarest of situations.**
- f. After removal of the extrication or transfer device, maintain SMR by ensuring that the patient remains secured in the supine position, directly on the ambulance cot, with a cervical collar in place.
- g. The preferred position for SMR is flat and supine. However, there are three circumstances under which raising the head of the stretcher to 30 degrees should be considered:
 - i. Respiratory distress
 - ii. Suspected severe brain injury



DC Fire and EMS Pre-Hospital Treatment Protocols

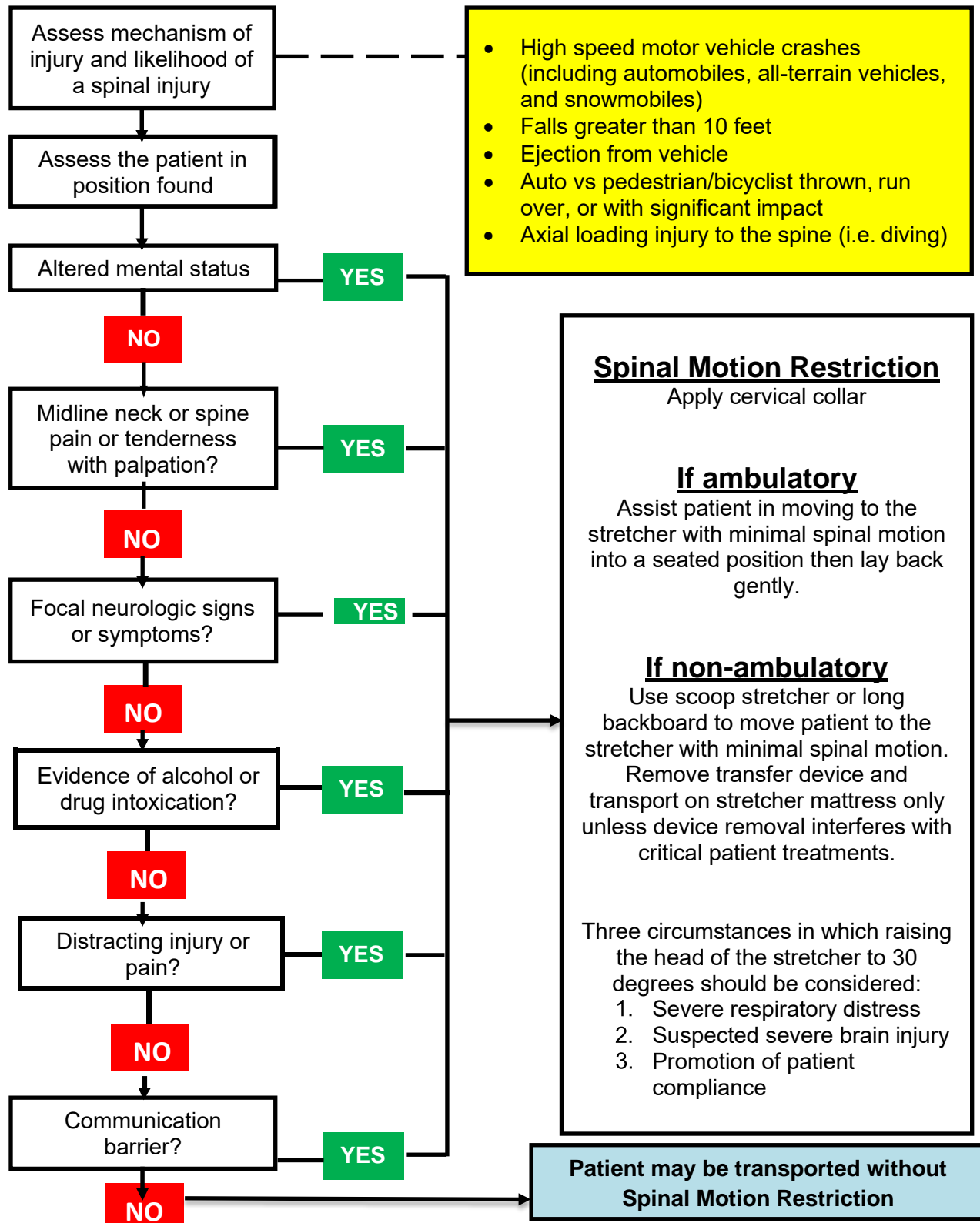
Treatment Protocols – Trauma Emergencies

Spinal Motion Restriction 11.11

- iii. Promotion of patient compliance
- h. In an uncooperative patient, avoid interventions that may promote increased spinal movement.
- i. As part of the patient care report to the receiving trauma facility, transporting personnel shall inform hospital staff that a patient is in SMR on the ambulance cot. The use of a slider board or similar device is necessary to safely transfer the patient from the ambulance cot to the hospital stretcher.

6. Pediatric considerations

- a. Young children pose communication barriers, but this should not mandate SMR purely based on age.
- b. When possible, infants and toddlers already strapped into a car seat with a built-in harness should be extricated while still strapped into the car seat and secured to the ambulance cot.
- c. Children are abdominal breathers, so when possible, immobilization straps should go across the chest and pelvis and not across the abdomen.
- d. Children have disproportionately larger heads than adults. Additional padding under the shoulders and body is often necessary to avoid excessive cervical spine flexion during SMR.





DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Hypoperfusion / Traumatic Shock 11.12

This protocol applies to all adult and pediatric patients exhibiting signs and symptoms of traumatic hypoperfusion or shock. Life-saving management in patients experiencing shock is centered on rapid recognition, aggressive resuscitation, and timely transport.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Signs of poor perfusion as demonstrated by one or more of the following:
 - Altered mental status
 - Tachypnea See [Normal Vital Signs](#).
 - Hypoxia (pulse oximetry < 94%)
 - Low ETCO₂ (< 30 mmHg)
 - Hypotension for age. See [Normal Vital Signs](#).
 - Tachycardia for age or rapid, weak pulse.
 - Pale/cool/mottled or flushed skin
 - Delayed or absent capillary refill

Exclusion Criteria:

- Shock due to suspected medical etiology. Treat per [Hypoperfusion / Non-Traumatic Shock protocol](#).

Definitions:

- **Shock** is a life-threatening condition defined by persistent, inadequate delivery of oxygen and nutrients to meet cellular demands. This most often results from poor blood flow/perfusion of tissues. Importantly, shock is NOT defined by hypotension. Patients can be in shock without hypotension, this is called cryptic shock.

Treatment and Interventions:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
2. Consider potential causes of traumatic shock and treat accordingly:
 - Hypovolemic: hemorrhage is the most common cause of shock in the injured patient
 - Cardiogenic: cardiac contusion, acute MI or cardiac dysrhythmia
 - Distributive: spinal cord injury
 - Obstructive: tension pneumothorax and cardiac tamponade
3. Keep the patient warm and prevent heat loss.
4. If there is a history of adrenal insufficiency, treat in conjunction with [Adrenal Crisis protocol](#).



ADVANCED LIFE SUPPORT PROVIDERS

1. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
2. As part of the primary assessment and treatment of respirations in the MARCH algorithm, evaluate for signs and symptoms of tension pneumothorax.
 - If tension pneumothorax is suspected, perform needle thoracostomy per [Needle Thoracostomy Protocol](#).
3. Place patient on continuous ETCO₂.
 - Depending on the cause of shock, a reading < 30 mmHg indicates poor perfusion and ≤ 25 mmHg suggests worsening acidosis and increased likelihood of death.
4. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required. Do NOT delay transport to obtain a second site of vascular access.
5. For adult patients:
 - If systolic BP > 100 mmHg and heart rate < 110 BPM, no IV fluids are required, maintain IV saline lock.
 - If systolic BP < 100 mmHg or heart rate > 110 BPM, initiate volume resuscitation:
 - Blood products are recommended as first line therapy if available.
 - If blood products are not available, administer fluid bolus.
 - Warmed fluids are recommended when available.

Adult

250 ml as needed to maintain or restore perfusion. Maximum total of **2000 ml**

- Discontinue fluid administration when one or more of the following end points has been achieved:
 - Systolic BP of 100 mmHg (unless traumatic brain injury is suspected, see below)
 - Palpable radial pulse
 - Improved mental status



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Hypoperfusion / Traumatic Shock 11.12

- ❖ Important Note: If severe traumatic brain injury is suspected maintain systolic BP greater than or equal to 110 mmHg. Treat per [Traumatic Brain Injury protocol](#).

6. For Pediatric Patients

- If [systolic BP and heart rate are normal for age](#), no IV fluids are required, maintain IV saline lock.
- If patient has [tachycardia for age](#) or signs of poor perfusion (low BP, greater than 2-second capillary refill, altered mental status, hypoxia, weak pulses, or mottled/cool skin) initiate volume resuscitation:
 - Blood products are recommended as first line therapy if available.
 - If blood products are not available, administer fluid bolus.
 - Warmed fluids are recommended when available.

Pediatric

20 ml/kg as needed to maintain or restore perfusion.
Maximum of **3 boluses**

- Discontinue fluid administration when one or more of the following end points has been achieved:
 - [Normal BP for age](#)
7. If patient in traumatic shock is not responding to fluid resuscitation, reconsider untreated tension pneumothorax as possible cause of refractory shock, particularly in a patient with thoracic trauma.
- If tension pneumothorax is suspected, perform needle thoracostomy per [Needle Thoracostomy Protocol](#).
8. For adults (age ≥ 15 yo) administer Tranexamic Acid (TXA) IV/IO when all the following criteria are met:
- Evidence of significant blunt or penetrating mechanism of injury (e.g., penetrating injury to torso, rollover MVC, pedestrian struck, ejection from automobile).
 - AND
 - Traumatic injury occurred within the last 3 hours.
 - AND
 - Evidence of or concern for severe internal or external hemorrhage.
 - AND
 - Patient has one of the following vital signs criteria:
 - SBP < 70 mmHg OR
 - SBP < 90 mmHg with HR ≥ 110 beats per minute OR
 - Age ≥ 65 yo and SBP ≤ 100 mmHg with HR ≥ 100 beats per minute



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Hypoperfusion / Traumatic Shock 11.12

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
Tranexamic Acid (TXA) 1 gm infusion. Mix 1 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 100 gtts/min over 10 minutes	Not Indicated
Do NOT administer in the same IV/IO line as blood products.	

- ❖ Important Note: it is preferable that TXA be administered as soon as possible after the initial traumatic injury. The greatest benefit to patients is seen when TXA is administered within 1 hour of injury.
- 9. If patient meets criteria for TXA administration, also administer 1 gm of Calcium Chloride IV/IO slow push over 2 minutes. See Calcium in Traumatic Shock protocol.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Calcium in Traumatic Shock 11.12.2

This protocol, approved by DC Health, in collaboration with the district's three adult level 1 trauma centers applies to **adult only trauma patients (age > 15 yo)** with suspected or confirmed hemorrhagic shock due to a traumatic injury.

ADVANCED LIFE SUPPORT PROVIDERS

Inclusion Criteria:

- Adult patient (age ≥ 15 yo)
- Suspected or confirmed hemorrhagic shock due to a traumatic injury.

Exclusion Criteria:

- Pediatric patients < 15 yo
- Patient not in shock
- Shock due to medical etiology. [See Hypoperfusion / Non-Traumatic Shock protocol.](#)
- Traumatic cardiac arrest. [See Traumatic Cardiac Arrest protocol.](#)

Definitions:

- **Calcium** is a divalent cation that plays several important physiologic roles in multiple organ systems. In bleeding trauma patients, calcium is a key component in platelet adhesion and the coagulation cascade as well as contractility of heart and smooth muscle cells. In other words, calcium not only plays a vital role in clot formation and thus helps stop bleeding, but it also acts similarly to a vasopressor and inotrope.

Treatment and Interventions:

1. Initiate assessment and patient care per [General Trauma Management protocol.](#)
2. Continue resuscitation per [Hypoperfusion / Traumatic Shock protocol.](#)
3. For adults (age ≥ 15 yo) administer Calcium Chloride IV/IO when all the following criteria are met:
 - Evidence of significant blunt or penetrating mechanism of injury (e.g., penetrating injury to torso, rollover MVC, pedestrian struck, ejection from automobile).
AND
 - Traumatic injury occurred within the last 3 hours.
AND
 - Evidence of or concern for severe internal or external hemorrhage.
AND
 - Patient has one of the following vital signs criteria:
 - SBP < 70 mmHg OR
 - SBP < 90 mmHg with HR ≥ 110 beats per minute OR
 - Age ≥ 65 yo and SBP ≤ 100 mmHg with HR ≥ 100 beats per minute



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Calcium in Traumatic Shock 11.12.2

Calcium Chloride 10%	
<u>Adult</u>	<u>Pediatric</u>
1 gm (10 ml) IV/IO slow push over 2 minutes. Use large gauge IV and ensure patency before administration	Not Indicated

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

- Trauma patients often present with hypocalcemia in the setting of severe hemorrhage due to trauma, which can then be worsened by necessary blood transfusions and resuscitation. The negative impacts of hypocalcemia in trauma are directly linked to worsening of each component of the lethal trauma triad: hypothermia, acidosis, and coagulopathy. Hypocalcemia in trauma patients has repeatedly been associated with increased morbidity and mortality as well as greater blood transfusion requirements and increased coagulopathy. This has led to a variety of in-hospital protocols for calcium administration to severely injured trauma patients, typically in conjunction with massive transfusion protocols. However, it remains unclear when exactly to administer calcium, current data suggests that earlier administration may be of benefit.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma Triage Algorithm 11.13

This protocol applies to adult and pediatric patients who have sustained a traumatic injury. The goal of this protocol is to maximize patient outcomes by ensuring injured patients are transported to the most appropriate hospital destination via the correct level of care i.e., ALS or BLS. It is based on the 2021 National Guideline for the Field Triage of Injured Patients: Recommendations of the National Expert Panel on Field Triage.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients who have sustained an injury due to mechanical trauma, including:
 - Blunt injury
 - Penetrating injury
 - Blast injury
 - Burns

Exclusion Criteria:

- Adult or pediatric patient who has no acute traumatic injury.
- Adult or pediatric patient in cardiac arrest due to an obvious traumatic etiology. [See Traumatic Cardiac Arrest protocol.](#)
- Adult or pediatric patients at a Mass Casualty Incident. Refer to [MCI protocol.](#)

Definition:

- **Level 1 Trauma Center:** provides the highest level of trauma care to injured patients. Has a full range of specialists and equipment available 24 hours per day and thus can provide total care for every aspect of injury. Level 1 trauma centers in the region include:
 - Hospital 2 (Children's National Hospital) ***PEDIATRIC ONLY***
 - Hospital 4 (Medstar) ***ALSO ADULT BURN CENTER***
 - Hospital 5 (Howard University Hospital)
 - Hospital 8 (George Washington University Hospital)
 - Hospital 29 (Inova Fairfax Hospital)
- **Level 2 Trauma Center:** provides comprehensive trauma care, regardless of the severity of injury. Provides 24-hour availability of all essential specialties, personnel, and equipment to care for most trauma patients. Level 2 trauma centers in the region include:
 - Hospital 16 (University of Maryland Capital Region Medical Center)
 - Hospital 22 (Suburban Hospital)
 - Hospital 23 (Walter Reed National Military Medical Center)
 - Hospital 26 (Virginia Hospital Center)



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma Triage Algorithm 11.13

- **Level 3 Trauma Center:** has the resources and capability to perform emergency resuscitation, surgery, and stabilization for many injured patients. Does not have the full availability of trauma specialists but has transfer agreements with a level 1 or level 2 trauma center that provide back-up specialty resources as needed.
 - Currently there are no level 3 trauma centers amongst our receiving hospitals.

Treatment and Interventions:

1. Initiate and continue patient care as described in the [General Trauma Management protocol](#).
2. Minimize scene time for all trauma patients to < 10 minutes.
3. Patients that meet any one or more of the 2021 National Guideline for Field Triage of Injured Patients Red Criteria shall be transported ALS to a Level 1 Trauma Center.

RED CRITERIA: High Risk for Serious Injury	
Injury Patterns	Mental Status and Vital Signs
<ul style="list-style-type: none">• Penetrating injuries to head, neck, torso, and proximal to the elbow or knee• Skull deformity, suspected skull fracture• Suspected spinal injury with new motor or sensory loss• Chest wall instability, deformity, or suspected flail chest• Suspected pelvic fracture• Suspected fracture of two or more proximal long bones• Crushed, degloved, mangled, or pulseless extremity• Amputation proximal to wrist or ankle• Active bleeding requiring a tourniquet or wound packing with continuous pressure	<p>All Patients</p> <ul style="list-style-type: none">• Unable to follow commands (GCS motor < 6)• RR < 10 or > 29 breaths/min• Respiratory distress or need for respiratory support• Room-air pulse oximetry < 90% <p>Age 0-9 years</p> <ul style="list-style-type: none">• SBP < 70 mmHg + (2 x age years) <p>Age 10-64 years</p> <ul style="list-style-type: none">• SBP < 90 mmHg or• HR > SBP <p>Age ≥ 65 years</p> <ul style="list-style-type: none">• SBP < 110 mmHg or• HR > SBP
Patients meeting one or more of the above RED criteria shall be transported ALS to a Level 1 Trauma Center	



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma Triage Algorithm 11.13

- Exception to ALS transport of Red Criteria trauma patients: BLS ambulances shall NOT wait for a prolonged or delayed ALS resource (i.e., paramedic engine or medic transport unit) when caring for a Red Criteria trauma patient. BLS ambulances shall initiate transport to the closest level 1 trauma center and request ALS intercept if logistically and geographically feasible.
 - If a paramedic engine and BLS ambulance are on scene with a Red Criteria trauma patient, providers shall NOT delay transport by requesting a medic transport unit. The engine company paramedic shall upgrade the BLS ambulance to minimize scene time (goal < 10 minutes) in Red Criteria trauma patients.
 - Air medical transport may be utilized to reduce transport time for Red Criteria trauma patients when operational and logistical conditions are favorable. [See Air Transportation Utilization protocol.](#)
4. Patients that meet any one of the 2021 National Guideline for Field Triage of Injured Patients, Yellow Criteria and do NOT meet any Red Criteria may be transported ALS or BLS, depending on patient presentation and suspicion for injury, to the closest regional trauma center.

YELLOW CRITERIA: Moderate Risk for Serious Injury	
Mechanism of Injury	EMS Judgment
<ul style="list-style-type: none">• High-Risk Auto Crash<ul style="list-style-type: none">➤ Partial or complete ejection➤ Significant intrusion (including roof)<ul style="list-style-type: none">○ > 12 inches occupant site OR○ > 18 inches any site OR○ Need for extrication due to entrapment➤ Death in passenger compartment➤ Child (age 0-9) unrestrained or in unsecured child safety seat➤ Vehicle telemetry data consistent with severe injury• Rider separated from transport vehicle with significant impact (e.g., motorcycle, ATV, horse, etc.)• Pedestrian/bicycle rider thrown, run over, or with significant impact• Fall from height > 10 feet (all ages)	<p>Consider risk factors, including:</p> <ul style="list-style-type: none">• Anticoagulant use• Suspicion of child abuse• Special, high-resource healthcare needs• Pregnancy > 20 weeks• Children should be triaged preferentially to pediatric capable centers



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma Triage Algorithm 11.13

Patients meeting one or more of the above YELLOW CRITERIA WHO DO NOT MEET ANY RED CRITERIA may be transported ALS or BLS, depending on patient presentation and suspicion for injury, to any available regional trauma center (Level 1, 2, or 3).

5. Patients not meeting Red or Yellow Criteria may be transported to any hospital emergency department as appropriate.
6. All patients with burn related injuries shall be transported to an appropriate adult or pediatric burn center based on age.
7. Notify receiving trauma center by radio/phone as soon as possible for all trauma transports, regardless of clinical priority.

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for further orders when necessary.

General Notes:

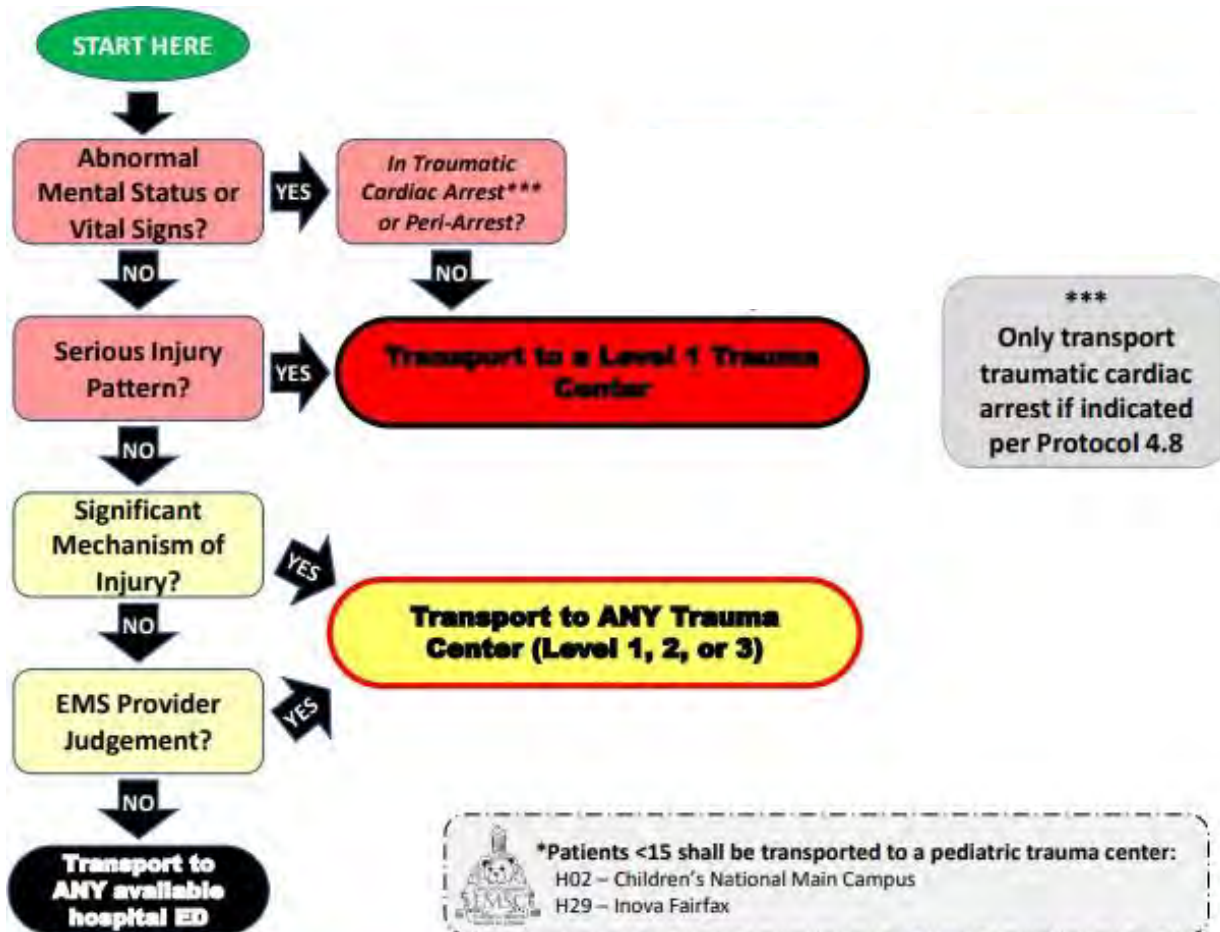
- Adult and pediatric studies show that patient outcomes are significantly improved when injured patients are cared for in trauma centers compared to non-trauma hospitals.
- Under triage is the percentage of seriously injured patients missed by EMS and transported to non-trauma hospitals, which is associated with increased mortality in adults and children. Under-triage is common in children and older adults.
- Trauma systems have prioritized the goal of minimizing under-triage and accepting a higher level of over-triage to avoid increased patient mortality, with targets set at < 5% and < 35% respectively.
- Multiple studies have compared total GCS score (eyes, verbal, motor) to motor GCS only in predicting serious injury. These studies have found that a motor GCS < 6 i.e., the patient does not follow commands, predicts serious injury as well as total GCS < 13. Given the ease of use, motor GCS < 6 has replaced total GCS < 13 for identifying high risk injury.



DC Fire and EMS Pre-Hospital Treatment Protocols

Treatment Protocols – Trauma Emergencies

Trauma Triage Algorithm 11.13



Mental Status / Vital Signs	Serious Injury Patterns	Significant Mechanism of Injury	EMS Provider Judgement
All Patients <ul style="list-style-type: none">Unable to follow commands (GCS motor score < 6)RR < 10 or > 29 breaths/minRespiratory distress or need for respiratory supportRoom-air pulse oximetry < 90% Age 0-9 years <ul style="list-style-type: none">SBP < 70 mmHg + (2 x age years) Age 10-64 years <ul style="list-style-type: none">SBP < 90 mmHg or HR > SBP Age ≥ 65 years <ul style="list-style-type: none">SBP < 110 mmHg or HR > SBP	<ul style="list-style-type: none">Penetrating injuries to head, neck, torso, and proximal to elbow or kneeSkull deformity, susp. skull fractureSusp. spinal injury with new motor or sensory lossChest wall instability, deformity, or suspected flail chestSusp. pelvic fractureSusp. fracture of ≥ 2 prox. long bonesCrushed, degloved, mangled, or pulseless extremityAmputation proximal to wrist or ankleActive bleeding requiring a tourniquet or wound packing with continuous pressure	High Risk Auto Crash <ul style="list-style-type: none">Partial or complete ejectionSignificant intrusion (including roof) > 12" occupant site OR > 18" any site OR need for extricationDeath in passenger compartmentChild (<10) unrestrained/unsecuredVehicle telemetry data consistent with severe injuryRider separated from transport vehicle with significant impact (e.g., motorcycle, ATV, horse, etc.)Pedestrian/bicycle rider thrown, run over, or with significant impactFall from height > 10 feet (all ages)	Consider risk factors, including: <ul style="list-style-type: none">Anticoagulant useSuspicion of child abuseSpecial, high-resource healthcare needsPregnancy > 20 weeksChildren should be triaged preferentially to pediatric capable centers



Children with special health care needs refers to children who have or are suspected of having a serious or chronic condition of: physical, developmental, behavioral, or emotional health that requires health-related services of a type or amount beyond that generally required by children. Technology-assisted children refer to those children who depend on medical devices to support bodily function. In all cases utilize the caregiver to assist or perform necessary troubleshooting measures because they are often trained in performing those functions.

Emergencies in Children with Ventilators

ALL PROVIDER LEVELS

1. Children on mechanical ventilation may exhibit sudden or gradual deterioration, cardiac arrest, increased oxygen demand, increased respiratory rate, retractions, and change in mental status.
2. Examine the child quickly for possible causes of distress which may be easily correctable (e.g. detached oxygen source) the caretakers will often have done this but double check.
3. Medications the child is presently taking may be the cause of deterioration.
4. Try to establish the child's baseline; the child may not look age appropriate.
5. If on a ventilator, remove the child from the ventilator and manually ventilate the child with a secure oxygen source; if the child improves there may be a problem with the ventilator or oxygen source.
6. Suction the child as accumulation of debris is a common cause of obstruction; if the tracheostomy tube has a cannula, remove it; if it is the cause of obstruction, there should be immediate improvement.
7. If still no improvement provide immediate transport to the closest appropriate facility.
8. Initiate appropriate resuscitation as needed.

ADVANCED LIFE SUPPORT PROVIDERS

1. If there is no improvement the tube should be removed; attempt bag-valve mask ventilation; if another tube is available insert into the stoma and resume ventilation (a standard endotracheal tube may be used or the used tracheostomy tube after being cleaned).
2. If there is no improvement, immediately transport to the nearest appropriate medical facility and initiate appropriate resuscitation as needed.



Emergencies in Children with In-Dwelling Catheters

ALL PROVIDER LEVELS

1. Children may have central lines in several locations and some complications are due to location; some central lines are located under the skin and can be felt but not seen.
2. The most common emergencies with central lines include blockage of the line, complete or partial accidental removal, or complete or partial laceration of the line.
3. Always evaluate a child for cardiovascular stability, as some complications may be life threatening.
4. Children may be experiencing complications from their underlying medical condition; ask caretakers about the child's condition.
5. If the line is blocked, do not attempt to force the catheter open. Transport to a facility capable of managing central lines.
6. For complete removal, do not attempt to reinsert; transport to the nearest emergency department.
7. Infections are a common complication; don't try to push a line back in, even if it is only slightly out.
8. For complete removal, maintain pressure on site until bleeding has stopped; transport child and catheter to nearest emergency department (part of the catheter may have broken off).
9. Always bring the line with you to the hospital.
10. For partial or complete laceration of the line, clamp proximally to laceration and transport child and catheter to the closest appropriate facility.
11. For children with sudden deterioration begin resuscitation and transport to the closest appropriate facility (child may have pneumothorax or internal bleeding).

Emergencies in Children with Gastrostomy Tubes

ALL PROVIDER LEVELS

1. Children with gastrostomy tubes may have complications of obstruction or dislodgment; obstruction is usually not an emergency but the child may require transport; dislodgment is not life threatening but the tube should be replaced as soon as possible. Both conditions are easily recognized.
2. The child should be examined for any other possible problems.



3. Children who have problems with their tubes may have problems with regurgitation or aspiration.
4. Be aware of and address any other possible problems from their underlying medical condition.
5. Transport the child and the tube to the nearest facility capable of replacing the tube; **this is not an emergency transport.**
 - Do not attempt to replace the tube; it is not as easy as it seems and there may be other complications.



All Fire/EMS personnel are required to report cases of suspected child / elder abuse or neglect to the Police agency responsible for the area in which the call occurred or the DC Child and Family Services Agency (24 hour hotline at 202-671-7233). Do not initiate the report in front of the patient, parent, or caregiver. **DO NOT CONFRONT OR BECOME HOSTILE TO THE PARENT OR CAREGIVER.**

ALL PROVIDER LEVELS

Physical Assessment Suggestive of Abuse:

1. Fractures in children under 2 years of age.
2. Repeated fractures not explained well.
3. Injuries in various stages of healing.
4. Frequent injuries.
5. Bruises or burns in patterns (e.g. iron or cigarette burns, cord marks, bite or pinch marks, and bruised to head, neck, back or buttocks).
6. Widespread injuries over the body.
7. Obvious physical neglect (malnutrition, lack of cleanliness).
8. Inappropriate dress (e.g. very little clothes in winter).

History Suggestive of Abuse:

1. The history does not match with the nature or severity of injury.
2. The parents' and/or caregivers' account is vague or changes.
3. The "accident" is beyond the capabilities of the patient (e.g. a 12 month old that burns self by turning on the hot water in the bath tub).
4. There is a delay in seeking help.
5. The parent and/or caregiver may be inappropriately unconcerned about the patient's injury.

Characteristics of the Abused:

1. If less than 5 years old, is likely to be passive.
2. If over 5 years of age, is likely to be aggressive.
3. Does not look to the abuser for support, comfort, or reassurance.
4. May cry without any expectation of receiving help.
5. May be quiet and withdrawn.
6. May be fearful of the abuser.

**Characteristics of the Abuser:**

1. Crosses all religious, ethnic, occupational, educational, and socioeconomic boundaries.
2. May resent or reject the child.
3. May have feelings of worthlessness about self or about the child.
4. May have unrealistic expectations of what the child is capable of doing.
5. May be very critical of the child.
6. Oftentimes the abuser is repeating what was learned as a child (the abuser was more than likely abused as a child).
7. May be overly defensive rather than concerned.

Presentation:

The patient may present with patterned burns or injuries suggesting intentional infliction, such as, injuries in varying stages of healing, injuries scattered over multiple areas of the body, fractures or injuries inconsistent with stated cause of injury. The patient, parent, or caregiver may respond inappropriately to the situation. Malnutrition or extreme lack of cleanliness of the patient or environment may indicate neglect. Signs of increased intracranial pressure (bulging fontanel and altered mental status in an infant may suggest Shaken Baby Syndrome) may also be seen.

Patient Management:

1. Treat and stabilize injuries according to the appropriate Patient Care Protocol(s).
2. If sexual abuse is suspected, document the reasons for concern.
3. Document the following information on the Patient Care Report (PCR):
 - All verbatim statements made by the patient, the parent or caregiver(s) shall be placed in quotation marks, including statements about how the injury may have occurred.
 - Any abnormal behavior of the patient, parent(s), or caregiver(s) must be documented.
 - Document the condition of the environment and other residents that are present.
 - Document the time law enforcement was notified and the name and badge number of the officer completing the report.
 - Document the name of the hospital personnel that received the patient and any statements made.
 - Document the level / type of interaction between the patient and the caregiver(s).



Type and Use of Personal Protective Equipment

- Gloves - For any patient contact, and when cleaning/disinfecting contaminated equipment. Puncture resistant gloves will be worn in situations where sharp or rough edges are likely to be encountered, i.e., auto extrication.
- Face Mask & Eye Protection - Facial protection will be used in any situation where splash contact with the face is possible. This protection may be afforded by using both a face mask and eye protection, or by using a full-face shield. When treating a patient with a suspected or known airborne transmissible disease, N95 Respirators should be used. For respiratory illnesses (TB, SARS) it is beneficial to mask the patient with a surgical mask
- Coverall/fluid resistant gowns - Designed to protect clothing from splashes, gowns may interfere with, or present a hazard to, the member in some circumstances. Structural firefighting gear also protects clothing from splashes and is preferable in fire, rescue, or vehicle extrication activities.
- Shoe/Head Coverings - Fluid barrier protection will be used if suspected contamination is possible.

General Precautions against disease

- If it's wet, it's infectious - use gloves
- If it could splash onto your face, use eye shields and mask or full face shield.
- If it's airborne, mask yourself with N95 Respirator and the patient with surgical mask.
- If it can splash on your clothes, use a gown or structural firefighting gear.
- If it could splash on your head or feet, use appropriate barrier protection.

Post Exposure Management

- Provide first aid.
- Secure area to prevent further contamination. (Stop bleeding with direct pressure).
- Remove contaminated clothing and flush.
- Wash the contaminated area well with soap and water, or waterless hand cleanser, and apply antiseptic.
- If the eyes, nose, or mouth are involved, flush them well with large amounts of water.



DC Fire and EMS Pre-Hospital Treatment Protocols

Special Care Protocols

Personal Protective Equipment Exposure Control 12.3

- Notification and relief of duty. The worker's supervisor should be immediately notified if a worker experiences an exposure involving potentially infectious source material. The supervisor should determine if the worker needs to be relieved of duty.
- Report the Exposure. The worker or immediate supervisor should promptly complete an Exposure Report appropriate for the agency, and submit it to the designated Infection Control Officer.
- Seek Medical Attention, Counseling, Consent and Testing per established policies and procedures.



DC Fire and EMS Pre-Hospital Treatment Protocols

Special Care Protocols

Electrical Control Device Removal 12.4

Local law enforcement agencies have implemented the use of an Electrical Control Device (ECD) into their response to control a violent, potentially violent, or actively resisting patient. The Electrical Control Device uses a compressed nitrogen gas canister to discharge from a distance two electrode-tipped barbs. This protocol addresses under which conditions DC FEMS providers should remove these ECD darts. FEMS providers should not ask police to remove these darts.

All Provider Levels

1. Consider scene safety and measures to protect oneself and other rescuers from a potentially violent patient in situations in which an ECD has been used.
2. The patient will continue to be in police custody during your assessment and this procedure. If indicated, ask the police to restrain or secure the patient.
3. Medically assess and treat the patient for any emergent condition (e.g., excited delirium) during this time.
4. Wear PPE with gloves and eye protection - consider mask and gown if obvious blood is present.
5. Have police remove TASER cartridge from gun before removing the dart. **Do not cut the wires.**
6. Grasp the dart itself firmly with one hand and pull to remove one dart at a time. Place the other hand on the patient's skin at least four inches away from the puncture. **Do not scrape yourself** with the dart's barb upon removal. Do not remove by pulling on the wire. Carefully observe the end of the dart to confirm that the barb is present. If barb is not visible, the dart has not been fully removed. (See below.) Return the dart, wires, etc., to the police.
7. **DO NOT REMOVE** darts and instead transport to the hospital for removal if any of the following apply:
 - o Patient is not under control.
 - o Head, eye, face, neck, breast, hands, feet, genitalia or groin is involved.

NOTE: Darts are a sharp hazard potentially contaminated with blood-borne pathogens. Treat darts as a contaminated needle and place in the ECD cartridge and return to the police.

8. Reassess the patient. Consider underlying causes of the patient's agitated behavior, e.g., drug or alcohol intoxication, trauma, psychiatric disease, or excited delirium.



9. Bandage wounds.
10. Fully document the care rendered even when the patient is not transported by FEMS. Note the location on the body of each dart removed in the EPCR.

Patient Disposition:

1. Transport to a hospital with law enforcement support if:
 - a. Patient requests hospital transport.
 - b. Dart was not fully removed.
 - c. Further medical care or evaluation is indicated including but not limited to the following situations:
 - Head, eye, face, neck, breast, hands, feet, genitalia, or groin were the site of dart puncture,
 - Uncontrolled bleeding,
 - Further wound care needed,
 - Diminished level of consciousness,
 - Patient is pregnant, and
 - Patient complains of palpitations or has an irregular heart rhythm.
2. If patient does not need transport to the hospital:
 - a. Advise the patient and law enforcement to follow-up on updating tetanus vaccination as needed.
 - b. Release the patient to law enforcement.



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Mass Casualty Incident – SALT triage 13.1

Purpose:

To provide structure to the triage and treatment of persons involved in a multiple or mass casualty incident or a multiple patient scene. This guideline works in conjunction with EMS Operations Bulletin 1, *Mass Casualty Incidents*, which defines the other processes at an MCI outside patient treatment and triage. Consider contacting the DC Hospital Coalition Notification Center early in the incident for MCI's at (877) 323-4262 or via TAC Channel 0H-3 NOTIFY.

Responsibility:

All personnel are responsible for the information set forth in the following procedures. During an MCI primary care givers will be overwhelmed and all additional personnel will be expected to assist in the triage and treatment of patients.

Definitions:

A multiple or mass casualty incident is an emergency scene that creates a number of patients sufficient to significantly overwhelm available resources.

Multiple Casualty Incident: <9 patients (does not need to be declared)

Mass Casualty Incident: 9 or more patients (needs to be declared)

Triage: The process of sorting and categorizing patients based on the severity of their symptoms. Patients will be categorized into the five following groups. Each group has a color designation to assist in the rapid sorting of triaged patients.

Procedure:

DCFEMS Immediate Lifesaving Interventions

- Control of major hemorrhage
- Opening the airway (for pediatric patient provide two rescue breaths)
- Application of occlusive dressings (i.e., chest seals)
- Chest decompression
- Auto-injector antidotes



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Mass Casualty Incident – SALT triage 13.1

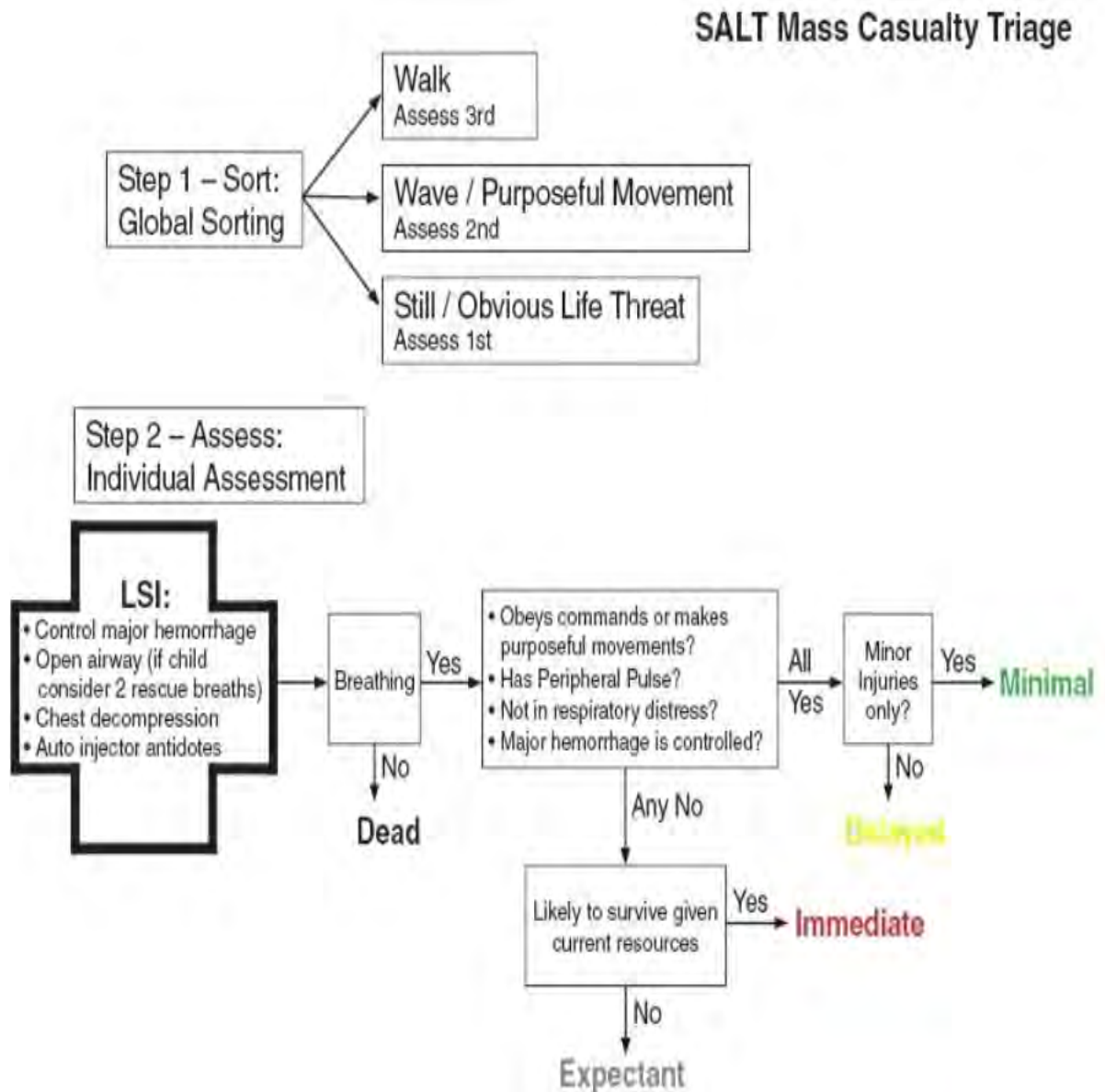
1. Patients will be categorized into one of the five categories.

RED (Immediate)	Critically injured patients who must be transported as soon as resources allow.
YELLOW (Delayed)	Injured patients who must be evaluated and treated quickly due to the risk of deterioration but may not need immediate transport.
GREEN (Minor)	Those patients with minor injuries who do not need immediate treatment or transport. “Walking wounded” should be encouraged to congregate in a designated location/ casualty collection point.
GRAY (Expectant)	Patients who not deceased but are unlikely to survive given the available resources. Reevaluated/re-categorized as resources become available.
BLACK (Deceased)	Patients who are not breathing. Life-saving interventions can be considered, e.g., patients with no respiratory effort should be triaged in the black (deceased) category following an attempt to open the airway. Patients who are categorized as black shall be left in place as found.

2. After initial triage and lifesaving interventions, attach a colored ribbon (if available) that correlates to the appropriate triage category of the patient.
3. Reevaluation of the patient and further interventions will take place after all patients have been triaged or more resources become available. The process of revaluation and re-categorization will be on-going.
4. The application of Disaster Tags to patients can be attempted but is secondary to the above actions.



SALT Mass Casualty Triage Algorithm (Sort, Assess, Lifesaving Interventions, and Treatment/Transport)





Organophosphate, Pesticide and Nerve Agent Poisoning

Organophosphate and Carbamate Poisoning: Organophosphates and carbamates are widely used commercially and by consumers as insecticides for pets, homes, and businesses. These chemicals are among the most toxic currently used in pesticides. Both classes of compounds have similar pharmacological actions, in that they both inhibit the effects of acetylcholinesterase, which is an enzyme that degrades acetylcholine at nerve terminals. When acetylcholinesterase is inhibited, acetylcholine accumulates at the synapses, resulting in the characteristic S/S of organophosphate and carbamate poisoning.

Examples of Organophosphates and Carbamates:

- Malathion / Parathion / TEPP / OMPA / Dipterex / Chlorthion / Di-Syston / Coral / Phosdrin/ Methylparathion / Systex / EPN / Diazinon / Guthion / Trithion.

The antidote kits are to be used in incidents of exposure to a nerve agent or organophosphate material. Auto-injectors contain Atropine Sulfate and Pralidoxime Chloride. Specific criteria will trigger this medical protocol.

- The decision to utilize the antidote should be based on clinical evaluation.
- Use of the antidote kit is to be based on signs and symptoms of the patient. Suspicion or the simple presence of a nerve agent is not sufficient reason to administer these medications.
- Use of antidotes will not protect responders from anticipated exposures.

Symptoms of a Nerve Agent, Organophosphate, and Carbamate Poisoning:

When a nerve agent is present, it interferes with the normal instructions of chemical transmitters that direct the muscle or gland to return to an unstimulated, relaxed state. The action of toxic nerve agents is to overstimulate the nerve endings and central nervous system. Overstimulation of the nervous system causes muscles and certain glands to overreact and cause predictable symptoms. The symptoms of the poisoned patient have been characterized by an acronym:

	M	miosis (pinpoint pupils)
	S	salivation (excessive drooling)
Mild	L	lacrimation (tearing)
Severe U		urination (lose control of urine)
	D	defecation / diarrhea
	G	GI upset (cramps)
	E	emesis (vomiting)
	M	muscle (twitching, spasm, "bag of worms")
	C	convulsion



plus

RESPIRATION - difficulty breathing / distress (short of breath, wheezing).

plus

AGITATION + CNS SIGNS - confusion, agitation, seizures, coma.

ALL PROVIDER LEVELS

1. Evacuation and decontamination procedures should be undertaken as soon as possible. Providers should be keenly aware of the possibility of cross-contamination and appropriate PPE should be employed.
2. Support the airway and provide supplemental Oxygen per the Airway Maintenance and Supplemental Oxygen protocol.
 - Providers should be prepared for the need to suction copious volumes of secretions.
 - If indicated, the King Airway may be utilized in the HAZ MAT “Hot Zone” for this particular clinical pathway and type of event.
3. Administer pre-packaged Nerve Agent Antidote Kits (NAAK) every 10-15 minutes, to a maximum of a total of three doses of auto-injectors. Repeat dosages will be administered until signs and symptoms show signs of improvement. Current products available for use include:
 - a. **DouDote™** Auto-injector via IM: the Doudote™ Auto-injector contains 2 mg of Atropine and 600 mg of Pralidoxime Chloride (2-PAM Chloride) combined in one auto-injector

<i>Adult</i>	<i>Pediatric</i>
One (1) DouDote™ Auto-injector IM	Patients weighing 12 kg or greater: Administer one (1) DouDote™ Auto-Injector IM every 20 minutes. See Special Pediatric Instructions noted below



- b. **Mark 1 NAAK** consisting of two components:
 - I. Atropine 2 mg auto-injectors IM
 - II. 2-PAM Chloride 600 mg I
- c. **CHEMPACK stores:**
 - I. Atropine 0.5 mg auto-injectors IM
 - II. Atropine 1 mg auto-injectors IM
 - III. Multidose vials of 2-PAM Chloride 1 gram Injectable
 - IV. Multidose vials of Atropine Injectable

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
<p>Atropine</p> <p>Administer one (1) dose IM via Auto-injector every 10 minutes</p> <p>or</p> <p>2 mg IV/IO every 10 minutes</p>	<p>Atropine (every 20 minutes)</p> <p><u>Ages less than 3 y.o.</u> Administer one (1) Atropine 0.5 mg IM via AtroPen Auto-injector</p> <p><u>Ages 3-7 y.o.</u> Administer one (1) Atropine 1 mg IM via AtroPen Auto-Injector</p> <p><u>Ages 8 y.o. or greater</u> Administer one (1) Atropine 2 mg IM via Auto-injector</p> <p>See Special Pediatric Instructions noted below</p>

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
<p>2-PAM Chloride 600 mg IM via Auto-injector</p> <p>Administer one (1) dose every 10 minutes</p>	<p>2-PAM Chloride 600 mg IM via Auto-injector</p> <p><u>Ages 3 y.o. or greater:</u></p> <p>Administer one (1) dose every 20 minutes</p> <p>See Special Pediatric Instructions noted below</p>



Special Pediatric Instructions:

If a WDM MCI event occurs and pediatric AtroPen auto-injectors are not readily available from the CHEMPACK cache then providers shall administer either **one (1) DouDote™ auto-injector** or **one (1) complete Mark 1 kit** to any pediatric patient who is displaying moderate/severe signs of nerve agent or organophosphate poisoning. Repeat dose every 20 minutes.

4. Seizure and fall precautions should be utilized.



ADVANCED LIFE SUPPORT PROVIDERS

1. Administer **Diazepam** or **Midazolam (Versed)** if the patient presents with any of the following:
 - seizure activity
 - unconsciousness
 - any form of visible muscle fasciculation
 - Any patient that has had a total of three DouDotes or Mark 1NAAKs administered.

<u>Adult</u>	<u>Pediatric</u>
Diazepam 10 mg IM via Auto-injector	Diazepam 0.3 mg/kg IV/IO or IM over 2-3 minutes Maximum single dose of 10 mg

or

<u>Adult</u>	<u>Pediatric</u>
Midazolam <u>Intranasal dose:</u> 10 mg IN (5 mg each nostril). Contact Medical Control for additional doses OR <u>Intramuscular:</u> 5 mg IM OR <u>Intravenous dose:</u> 2-5 mg IV/IO every 2 minutes to a maximum of 7 mg until cessation of visible seizure activity	Midazolam <u>Intranasal dose:</u> 0.2 mg/kg IN to a maximum dose of 5 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses OR <u>Intravenous dose:</u> 0.1 mg/kg IV/IO , up to a maximum single dose of 2 mg . Repeat once in 5 minutes until cessation of visible seizure activity Contact Medical Control for additional doses

Special: Mass Casualty Incident Exception

When working under the direct supervision of an ALS provider, BLS providers may administer **Diazepam 10 mg IM via auto-injector**.



2. Establish an **IV** of Normal Saline KVO or Saline Lock.
3. If auto-injectors are not utilized or all three auto-injector doses have been used, administer **Atropine 1-2 mg IV/IO every 10 minutes** as needed for the management of excessive secretions, pulmonary edema, hypotension, bradycardia, and ineffective ventilations.

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Atropine 1-2 mg IV/IO or IM if using an Atropine auto-injector	Atropine 0.05 mg/kg IV/IO every 20 minutes

4. **Ondansetron (Zofran)** may be used for the relief of nausea and vomiting. Repeat one time in 10 minutes if nausea or vomiting is not relieved.

<u><i>Adult</i></u>	<u><i>Pediatric</i></u>
Ondansetron (Zofran) 4 mg IV over 30 seconds	Ondansetron (Zofran) 0.15 mg/kg IV over 30 seconds. Maximum single dose 4 mg

MEDICAL CONTROL OPTIONS

1. Additional doses of **DouDote™ Auto-injectors** or the **2-Pam Auto-injectors** from the Mark 1 kit. (Use of additional Atropine is a standing order).
2. Additional administration of **Diazepam IM** or **Midazolam (Versed) IN/IO/IM/IN**.



Mild Exposure:

Signs/Symptoms	Mark 1 Kit (Atropine/2-Pam)	DuoDote	Diazepam or Midazolam
<ul style="list-style-type: none">• Blurred vision• Miosis• Teary eyed• Chest tightness• Unexplained Wheezing• Tremors• Acute onset of stomach cramps• Nausea• Tachycardia• Bradycardia	<ul style="list-style-type: none">• One (1) Auto-Injector set:<ul style="list-style-type: none">○ Atropine 2mg IM○ 2-Pam Chloride 600 mg IM• Monitor for signs/symptoms every 5 minutes. Repeat dose at 10 minute intervals if no noted improvement or s/sx worsen.• Atropine, as needed every 10-15 minutes.	<ul style="list-style-type: none">• 1 DuoDote™ injection into the mid-outer thigh if the patient experiences two or more MILD symptoms of nerve gas or insecticide exposure• Wait 10 to 15 minutes for DuoDote™ to take effect. If, after 10 to 15 minutes, the patient does not develop any SEVERE symptoms, no additional DuoDote™ injections are recommended.• Monitor for signs/symptoms every 5 minute. Repeat dose at 10 – 15 minute intervals if no noted improvement.	<ul style="list-style-type: none">• Not indicated with mild s/sx.

Moderate/Severe Exposure:

Signs/Symptoms	Mark 1 Kit (Atropine/2-Pam)	DuoDote	Diazepam or Midazolam
<ul style="list-style-type: none">• SLUDGEM• Severe respiratory distress• AMS• Respiratory arrest• Seizures	<ul style="list-style-type: none">• 3 Auto-Injectors Atropine (6 mg)/3 Auto-injectors 2-Pam (1.8 Grams)• Monitor every 5 minutes• Atropine IM every 3 - 5 minutes, as needed,	<ul style="list-style-type: none">• Three (3) DuoDote injections into the patient's mid-outer thigh in rapid succession.• No more than 3 doses of DuoDote should be administered.• Atropine 1 - 2 mg IV/IO for management of	<ul style="list-style-type: none">• One (1) Auto injector, Diazepam 10 mg IM or Midazolam 10 mg IM/IN or 2-5 mg IV/IO, max 10 mg to treat convulsions if suspected in the unconscious individual.



<ul style="list-style-type: none"> Copious airway secretions 		continued s/sx. <ul style="list-style-type: none"> Medical Control may order additional doses of NAAKS. 	<ul style="list-style-type: none"> The effects of nerve agents and some insecticides can mask the motor signs of a seizure.
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Nerve Agent Specific Triage:

for Nerve Agent Casualties	
Immediate (1)	<p><u>Effects</u> - Unconscious, talking but not walking, moderate to severe effects in two or systems more systems (e.g., respiratory, GI, cardiac arrest. muscular, CNS)</p> <p><u>Clinical Signs</u> - seizing or postictal, severe respiratory distress, recent cardiac arrest</p>
<u>Delayed (2)</u>	<p><u>Effects</u> - recovering from agent exposure or antidote</p> <p><u>Clinical Signs</u> - diminished secretions, improving respiration.</p>
Minor (3)	<p><u>Effects</u> - walking and talking</p> <p><u>Clinical Signs</u> - pinpoint pupils, runny nose, and mild to moderate difficulty breathing.</p>
Non-Salvageable (4)	<p><u>Effects</u> - Unconscious</p> <p><u>Clinical Signs</u> - Cardiac/respiratory arrest of long duration.</p>



Anthrax Poisoning

Anthrax is an acute infectious disease caused by the spore-forming bacterium *Bacillus Anthracis*. The serious forms of human anthrax are inhalation, cutaneous, and intestinal. Direct person-to-person spread of anthrax is extremely unlikely, if it occurs at all. There is no need to immunize or treat contacts of persons ill with anthrax.

- No treatment for household contacts
- No treatment for friends
- No treatment for coworkers, unless they also were exposed to the same source of infection

Provide supportive patient care and decontamination as needed.

Ricin Poisoning

Ricin is a very potent protein toxin made from mash left over after processing castor beans for oil. Ricin is considered a threat as a biological weapon primarily because it is widely available; it is a category B agent/disease with a high fatality. It is water-soluble, odorless, tasteless and not inactivated by heat. Ricin inhibits protein synthesis. It is very toxic to cells. The toxin may be inhaled, ingested, or in some instances directly introduced into the body by injection. It is not transmissible by person to person. Ricin should be particularly suspected when severe pulmonary distress occurs in previously healthy individuals. Signs, symptoms and pathology manifestations of ricin toxicity vary with dose and route of exposure. Symptoms may mimic pneumonia or food poisoning depending on the route of transmission:

- Fever
- Cough/congestion
- Wheezing/shortness of breath
- Nausea/vomiting/diarrhea
- Hypotension (severe cases)
- Pulmonary Edema/Failure (severe cases)

Provide supportive patient care and decontamination as needed.

Acute Radiation Syndrome

During victim prioritization, first responders can use available radiation detection equipment to determine the presence of significant amounts of contamination on an individual. The monitoring equipment may also be used to qualitatively compare the amount of contamination on one victim to the contamination on other victims. This may aid in prioritizing victims for decontamination.



At the post-decontamination monitoring point, first responders may use detection equipment to grossly assess the progress made in decontaminating victims. If operationally feasible, individuals who remain significantly contaminated following decontamination procedures should be subjected to additional decontamination. This will typically involve the victim returning to the contaminant removal/shower station for additional washing. Decontamination efforts should be reevaluated or suspended if contamination levels are not being significantly reduced.

The Environmental Protection Agency (EPA) recommends that no more than two additional decontamination attempts be performed for individuals with significant contamination remaining following the first decontamination attempt. An inability to reduce the measured radiation levels to near-background levels may suggest that the remaining contamination is internal.

Although lukewarm soapy water solution is considered ideal for most radiological decontamination scenarios, its use may not be practical or even recommended in certain cases. Unless soapy water is readily available or easy to make, it may not be practical to use it as a decontaminant. The incident commander should consider using alternative decontaminants or techniques in light of operational constraints.

Following decontamination, if practical, check each victim for remaining Contamination, using appropriate meter. If considerable contamination remains on a victim, the victim should return to the shower station for additional washing; however, decontamination efforts for that individual should be reevaluated or suspended if contamination levels are not being significantly reduced. Multiple decontamination attempts are not generally recommended, since they are usually neither practical nor warranted. After decontamination, victims can be released to the clean area for drying with clean towels, redressing with clean replacement clothing or blankets, and medical evaluation. If possible, privacy and modesty should be preserved throughout the decontamination process – from undressing to redressing.

Provide supportive patient care as needed.



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Pandemic Influenza 13.4

Pandemic Influenza

There is a continuous stream of information regarding the approaches to an outbreak of severe viral respiratory diseases, especially Pandemic Influenza. This disease outbreak would require significant operational changes in Fire and EMS operations, in conjunction with Public Health programs. There would be a variety of programs that would allow Fire and EMS providers to receive appropriate vaccination, prophylaxis, or treatment as the threat of the disease evolves. Discussion of this topic is beyond the scope of this handbook, and would be accomplished at the time of the event in conjunction with the District's public health leaders, the Department's leadership and medical control, and local infectious disease experts.



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Viral Pandemic Triage 13.5

Coronavirus disease 2019 (COVID-19) is a respiratory illness that can spread from person to person. On March 11, 2020 the World Health Organization characterized COVID-19 as a pandemic, and locally a State of Emergency and Public Health Emergency was declared in the District of Columbia. On March 13, 2020 the President of the United States declared the COVID-19 outbreak a national emergency.

With anticipated unprecedented patient volumes for DCFEMS and local emergency departments, it is necessary to implement a protocol that assists EMS clinicians in easily identifying NTL-eligible patients that may be appropriate to care for themselves safely at home, without transport to an emergency department.

ALL PROVIDER LEVELS

Does the patient have a suspected viral syndrome with at least two (2) of the following symptoms: fever higher than 100.0°F, cough, body aches, or sore throat?

If **YES**, proceed to the checklist below; if **NO**, use the appropriate DCFEMS protocol.

Yes	No	Criteria
		Patient age is between 18 and 60 years old.
		Patient is immunosuppressed (e.g., HIV), or is taking medications that suppress the immune system (chemotherapy, organ transplant medications, etc.)
		Uncontrolled Diabetes (glucose > 200)
		Heart disease
		COPD or lung disease excluding stable asthma
		Any respiratory distress
		Patient has a heart rate between 50-100 bpm
		Patient has a systolic blood pressure between 100-200 mmHg
		Respiratory rate between 12-20 breaths per minute
		Oxygen saturation (SpO2) > 93%
		Ambulatory oxygen saturation (SpO2) remains above 92% (see note 6)
		Clear lung sounds
		Patient can ambulate with only minimal assistance
		Nurse Triage Line agrees the patient is appropriate for home self-care



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Viral Pandemic Triage 13.5

ANY CHECKS in a **shaded box** indicate that patient transport should be initiated.

If ALL CHECKS are in non-shaded boxes, the patient should provide self-care at home. Call the Nurse Triage Line. The triage nurse will provide self-care instructions to the patient.

Any patient may be transported at the EMT or Paramedic or Nurse Triage Line's discretion.

This emergency protocol was issued by DCFEMS Office of the Medical Director, after approval by DC Health, in response to the COVID-19 pandemic and the declaration of a public health emergency in the District of Columbia.

Notes:

1. During the patient assessment, providers shall use the appropriate PPE according to Appendix F, *2019 novel Coronavirus (COVID-19)*, of the Infection Control Program Policy and Procedures (N-95 or higher-level respirator, eye protection, gloves, gown, head and shoe covers).
2. As soon as possible during the patient assessment, providers shall place a surgical mask on the patient unless otherwise not tolerated by the patient.
3. If possible, providers shall limit patient contact to only one provider.
4. All providers should attempt to maintain a distance of 6 feet or more from the patient when feasible and when it does not interfere with indicated patient care.
5. When leaving the patient at home, the patient should demonstrate normal mental status, meet all inclusion criteria in the above protocol, have access to food and other necessities, and be left with self-care instructions from the Triage Nurse.
6. Measure SpO₂ continuously while the patient walks 30 feet in the home or up 10 steps. May walk the patient in circles.



In the setting of a worldwide COVID-19 pandemic, it is necessary for EMS to make modifications to specific practices and standards of care to help prevent the spread of the virus to healthcare providers and bystanders. Because the coronavirus that causes COVID-19 is transmitted between people who are in close contact with one another through respiratory droplets produced when an infected person coughs or sneezes, providers shall make the following modifications when providing respiratory care to patients with suspected or confirmed COVID-19.

ALL PROVIDER LEVELS

1. Providers who will directly care for or who will be within 6 feet of a patient with possible COVID-19 shall utilize full PPE as outlined in appendix F, *2019 novel Coronavirus (COVID-19)*, of the Infection Control Program Policy and Procedures (N-95 or higher-level respirator, eye protection, gloves, gown, head and shoe covers).
2. Providers shall place a surgical mask on the patient as soon as possible and always before placing the patient in the transport unit unless it is not clinically feasible.
3. All providers shall avoid touching their head/face while working until after appropriate decontamination has occurred.
4. Minimize oropharyngeal suctioning as much as possible while maintaining a patent airway.
5. When providing oxygen therapy via a nasal cannula or non-rebreather mask, the lowest liter per minute flow necessary to maintain an O₂ saturation of $\geq 90\%$ shall be used.
6. When providing oxygen therapy via a nasal cannula or non-rebreather mask, place a surgical mask over the oxygen delivery device to further reduce the risk of spreading aerosolized infectious droplets.
7. Nebulized bronchodilators increase the risk of aerosolizing infectious droplets. **Thus, providers shall restrict the use of nebulized medications (Albuterol and Atrovent, etc.) to only patients with truly severe life-threatening respiratory distress.** Patients with only minimal to moderate respiratory distress shall not receive nebulized therapies in the prehospital setting. These treatments will be deferred to the hospital when the patient is in an appropriate isolation room.
 - If available, Metered Dose Inhaler Albuterol using a spacer can be used for a patient in respiratory distress with a history of asthma/COPD or who has wheezing on physical exam.



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Viral Pandemic Care Modifications 13.6

<u>Adult</u>	<u>Pediatric</u>
Metered Dose Inhaler Albuterol <u>BLS</u> or <u>ALS</u>: 8 “puffs” with a spacer. May repeat once in 5 minutes.	Metered Dose Inhaler Albuterol <u>BLS</u> or <u>ALS</u>: 4 “puffs” with a spacer. Contact medical control for a repeat dose.

- If the patient is in respiratory extremis with a history of asthma/COPD or has wheezing on physical exam, all providers shall consider early administration of epinephrine IM in the lateral aspect of the patient’s thigh (before resorting to nebulized medication).

<u>Adult</u>	<u>Pediatric</u>
Epinephrine 1:1,000 <u>BLS</u> or <u>ALS</u>: 0.3 mg via EpiPen <u>ALS</u>: 0.3-0.5 mg IM (ALS)	Epinephrine 1:1,000 <u>BLS</u> or <u>ALS</u>: ≤ 3y.o. 0.15 mg IM via EpiPen Jr. <u>ALS</u>: 0.01 mg/kg IM up to a maximum single dose 0.5 mg

- If the patient has a history of asthma/COPD or has wheezing on physical exam, ALS Providers shall consider early administration of Magnesium Sulfate IV (before resorting to nebulized medication).

<u>Adult</u>	<u>Pediatric</u>
Magnesium Sulfate 2 gm slow IV Infusion. Mix 2 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min over 20 minutes.	Contact Medical Control

8. CPAP increases the risk of aerosolizing infectious droplets. Thus, providers shall restrict the use of CPAP to only patients with truly severe life-threatening respiratory distress.



DC Fire and EMS Pre-Hospital Treatment Protocols

Major Incident Operations

Viral Pandemic Care Modifications 13.6

Patients with minimal to moderate respiratory distress shall be maintained in the prehospital setting on a non-rebreather mask or with a nasal cannula placed under a surgical mask.

9. If a nebulized bronchodilator and/or CPAP is required in the prehospital setting due to truly severe life-threatening respiratory distress:
 - **Providers shall notify the receiving facility** of this therapy as soon as possible before arrival. This allows the ED staff to make appropriate preparations.
 - Upon arrival at the hospital, stop the nebulized medication. **Do NOT enter the ED actively nebulizing medication.**
 - Upon arrival at the hospital, **if possible, also stop CPAP and place a non-rebreather mask on the patient.**
 - **If the patient's level of respiratory distress prevents the removal of CPAP, notify the receiving facility as soon as possible before entering the ED. This allows the ED staff to make appropriate arrangements and provide further patient and facility-specific direction.**
10. Providers shall use extreme caution when providing bag valve mask ventilation, placing a supraglottic airway, and when performing endotracheal intubation. These are aerosol-generating procedures, and full PPE for all providers is mandatory. These artificial ventilation procedures should be deferred to the hospital whenever possible. They shall only be performed in severe life-threatening situations.
11. Medication facilitated intubation shall not be performed in the prehospital setting on a patient with confirmed or suspected COVID-19. Medication facilitated intubation of these patients should be performed by hospital staff utilizing advanced infection control techniques and advanced airway procedures not available in the prehospital setting.
12. For patients in respiratory or cardiac arrest during a viral pandemic, all providers shall be in full PPE. (N-95 or higher-level respirator, eye protection, gloves, gown, head and shoe covers).
13. For patients in respiratory or cardiac arrest during a viral pandemic, placement of a supraglottic airway is associated with less droplet production and less provider droplet exposure than with BVM or intubation via direct laryngoscopy.
14. When using a BVM, CPAP, or nebulizing medication, providers shall use a viral filter when available.



15. Providers shall clearly document in the ePCR the decisions made as it pertains to withholding or utilizing specific respiratory care procedures during a viral pandemic.

MEDICAL CONTROL OPTIONS

1. Consider additional doses of **Epinephrine 1:1,000 IM**.
2. ***Pediatric Patients:* Magnesium Sulfate 25-50 mg/kg IV** over 20 minutes, up to a maximum single dose of **2 gm**.
3. ***Pediatric Patients:*** Repeat dose of Metered Dose Inhaler Albuterol



This information will be released at a later time.



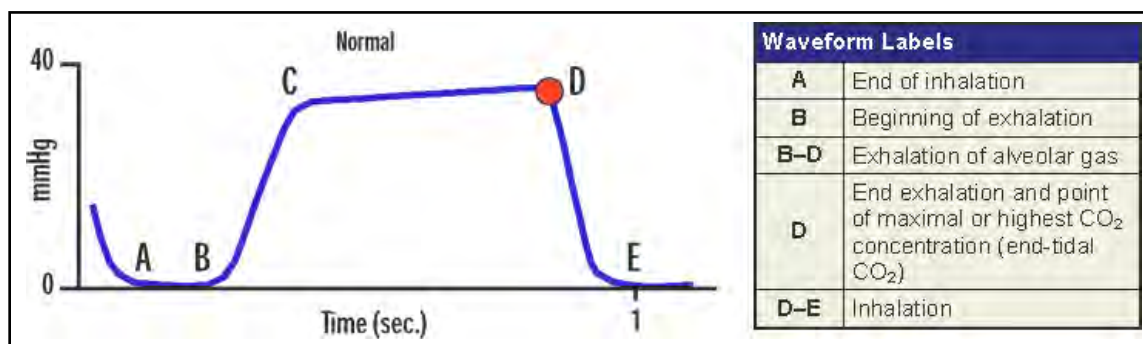
Clinical Indications:

- Continuous Quantitative Waveform Capnography (ETCO₂) should be used when available with all endotracheal and nasotracheal airways and those with respiratory distress or seizures.
- Continuous Quantitative Waveform Capnography (ETCO₂) should be considered for use on patients treated with CPAP, Epinephrine, Morphine and Midazolam.

Procedure:

1. Attach capnography sensor to a patient or endotracheal tube.
2. Note ETCO₂ level and waveform changes. These should be documented on each respiratory failure, cardiac arrest, or respiratory distress patient.
3. The capnometer should remain in place with the airway and be monitored throughout the pre-hospital care and transport.
4. Any loss of ETCO₂ detection or waveform indicates a potential airway problem and should be corrected.
5. The capnogram should be monitored as procedures are performed to verify or correct the airway problem.
6. In a perfusing patient, end-tidal ETCO₂ levels of 35-45 mmHg are considered normal.
7. The numerical value can aid in assessing hypoventilation (increased ETCO₂), or hyperventilation (decreased ETCO₂) in perfusing patients.
8. Hyperventilation shall be avoided in patients in cardiac arrest or those with head injuries without signs / symptoms of herniation.
9. Document the procedure and results on the patient care report (PCR).

Normal Capnogram:

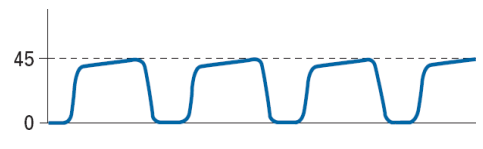
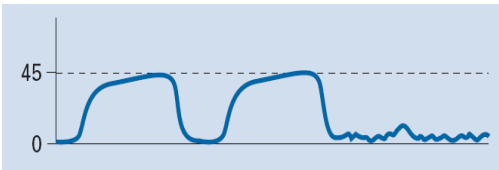
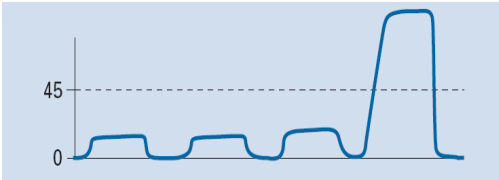
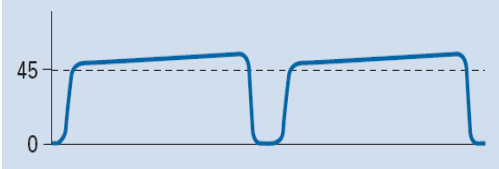
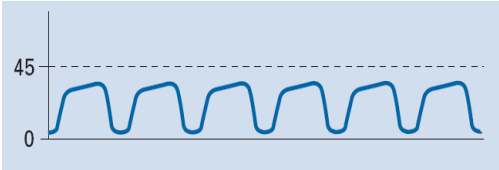
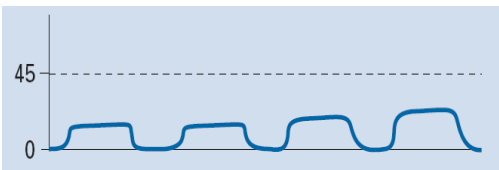
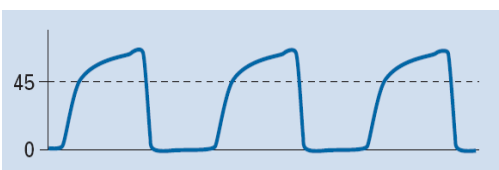




DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Continuous Quantitative Waveform Capnography 14.1.1

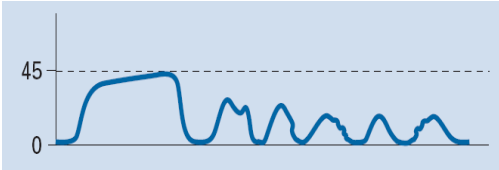
END-TIDAL CO ₂ WAVEFORM / CHANGES		
	Normal ETCO ₂	<ul style="list-style-type: none"> Normal perfusion
	Loss of previous waveform with ETCO ₂ near zero	<ul style="list-style-type: none"> Endotracheal tube disconnected, dislodged, kinked or obstructed Loss of circulatory function
	Sudden increase in ETCO ₂	<ul style="list-style-type: none"> Return of spontaneous circulation
	Slow rate with increased ETCO ₂	<ul style="list-style-type: none"> Hypoventilation If elevated above normal levels, need for increased ventilation Partial airway obstruction
	Rapid rate with decreased ETCO ₂	<ul style="list-style-type: none"> Effects of hyperventilation
	CPR Assessment	<ul style="list-style-type: none"> Cardiac arrest Attempt to maintain minimum of 10 mmHg
	"Sharkfin" waveform	<ul style="list-style-type: none"> Asthma COPD



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Continuous Quantitative Waveform Capnography 14.1.1

	<p>Decreasing ETCO2 with loss of plateau.</p>	<ul style="list-style-type: none">• ET tube cuff leak or deflated cuff• ET tube in the hypopharynx• Partial obstruction
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DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Carbon Monoxide Oximeter 14.1.2

Utilization of Carbon Monoxide Oximeter:

- This is a noninvasive instrument used for the detection of capillary carbon monoxyhemoglobin in a patient with a pulse.

Clinical Indications:

- Carbon Monoxide Oximeter should be used on patients with smoke inhalation or inhalation of other hydrocarbon exhaust. Consider use for firefighters during incident rehabilitation.

Procedure:

- Apply finger probe to patient's finger (preferably the non-dominant ring finger, or another finger with a large clean nail).
- A reading of >12% indicates mild carbon monoxide inhalation.
- A reading of >25% indicates severe carbon monoxide inhalation.



Special Considerations:

- Pediatrics: Not intended for use on patients weighing less than 30 kg.
- Pregnancy: Fetal SpCO may be 10-15% higher than the maternal reading.
- Smokers: Heavy smokers may have a baseline SpCO level up to 10%.
- A misapplied or dislodged sensor will cause inaccurate readings.
- Never use tape to secure the sensor.
- Do not place the sensor on the thumb.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Continuous Positive Airway Pressure 14.1.3

Clinical Indications:

- The CPAP device should be applied to patients when inadequate ventilation is suspected due to pulmonary edema (CHF), COPD, pneumonia or near drowning.
- Patient is ≥ 15 years of age.

Contraindications:

- Asthma.
- Respiratory Arrest / Apnea.
- Patient has a tracheotomy.
- Active vomiting or upper GI bleeding.
- Patient has a suspected pneumothorax or chest trauma.



Procedure:

1. Ensure adequate oxygen supply to ventilation device.
2. Explain the procedure to the patient.
3. Consider placement of a nasopharyngeal airway.
4. Place the delivery mask over the mouth and nose. Oxygen should be flowing at this point.
5. Secure the mask with provided straps starting with the lower straps until minimal air leak occurs.
6. Titrate device up to 10 cm H₂O in patient's ≥ 15 years of age (Consider lower settings for COPD patients at 5 cm H₂O).
7. Continuously evaluate the patient's response to therapy. Assess breath sounds, oxygen saturation, and general appearance of the patient.
8. Encourage the patient to allow forced ventilation to occur. Observe closely for signs of complication. The patient must be breathing for optimal use of the CPAP device.
9. Administer appropriate medications as required (nebulized albuterol for COPD or nitroglycerin for CHF).
10. If the patient begins to deteriorate due to respiratory failure, remove the CPAP device, provide BVM ventilations and assess the need for advanced airway management.
11. Document time and response on patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Needle Cricothyroidotomy QuickTrach 14.1.4

Clinical Indications:

- Adult (4.0 mm) QuickTrach: Any patient >100 pounds (45 kg).
- Pediatric (2.0mm) QuickTrach: Any patient <100 pounds (45 kg) and >2 years (24 months) in age.
- Acute upper airway obstruction, which cannot be relieved using basic airway maneuvers, finger sweep, or endotracheal visualization and Magill forceps removal.
- Respiratory arrest with facial or neck injury, or abnormal anatomy, which make endotracheal intubation impossible.
- Inability to ventilate patient with a bag valve mask.



Procedure:

1. Expose the neck.
2. Identify the cricoid membrane/ligament located between the cricoid cartilage and the thyroid cartilage.
3. Prep the skin.
4. Puncture the cricothyroid membrane at a 90-degree angle with the catheter/syringe assembly.
5. Aspirate for air upon introducing the catheter/syringe.
6. Upon aspiration of air, redirect the catheter/syringe in a 45-degree angle (toward feet), and advance until the stopper meets the skin.
7. Remove the stopper.
8. Advance the catheter (not the needle) until the flange rests on the skin.
9. Remove the needle-syringe assembly.
10. Apply the strap.
11. Attach the connecting tube to the 15 mm adaptor.
12. Attach a bag valve mask (BVM) to the other end of the connecting tube.
13. Ventilate the patient using the BVM.
14. Auscultate for bilaterally equal breath sounds.
15. Document the procedure and results on the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Medication Facilitated Intubation 14.1.5

ALS

Purpose:

Achieve rapid tracheal intubation of a patient not in cardiac arrest using pharmacological aids and procedural techniques that facilitate safe intubation and minimize potential complications.

Clinical Indications:

One or more of the following indications is present AND is an immediate threat to life AND is unable to be corrected in a rapid manner using less invasive airway management techniques:

1. Unable to protect or maintain an open airway
 - A decreased level of consciousness with risk for aspiration such as active vomiting or airway bleeding
2. Unable to adequately oxygenate or ventilate
 - Apnea
 - Clinically significant hypoxia for the patient, e.g., $SpO_2 < 90\%$ despite ventilatory assistance via BVM and supplemental O_2
 - Altered mental status with inadequate respiratory effort or elevated $ETCO_2 > 45\text{mmHg}$
3. Rapidly impending airway compromise in the prehospital setting
 - Inhalation burn injury with respiratory distress/symptoms such as stridor
 - Angioedema or anaphylaxis with upper airway involvement/obstruction
 - Penetrating trauma to the neck with rapidly expanding neck hematoma

Contraindications:

- You are not forced to intubate, i.e., patient may be safely maintained in the prehospital setting using less invasive techniques until arrival in the emergency department.
- The condition resulting in the potential need for intubation is easily or rapidly reversible, e.g., opiate overdose, hypoglycemia, or seizure.
- Valid Do Not Resuscitate/Do Not Intubate Order
- Newborn patients
- Patients with functioning tracheostomies
- Do not have at least two DCFEMS paramedics on scene, engaged in patient care throughout the procedure.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Medication Facilitated Intubation 14.1.5

Cautions:

- Airways predicted to be difficult intubations are not a firm contraindication to performing medication facilitated intubation (MFI); however, paramedics should anticipate and plan for the difficulty and use appropriate caution.
- Factors contributing to an anatomically difficult intubation:
 - Obesity
 - Short, thick neck
 - Limited neck extension or immobility (e.g., cervical spine precautions)
 - Receding mandible (chin)
 - Airway obstruction
 - Facial or neck trauma resulting in distorted anatomy
 - Small mouth opening or large tongue
 - Unique logistical or scene obstacles limiting patient access (e.g., special operations such as tactical environments or entrapment)
- Factors contributing to a physiologically difficult intubation i.e., high likelihood of hemodynamic collapse or cardiac arrest associated with medication facilitated intubation:
 - Hypotension (SBP < 90mmHg) prior to sedation and intubation
 - Hypoxia (SpO₂ < 90) prior to sedation and intubation
 - Presence of a severe metabolic acidosis (e.g., sepsis, DKA, severe trauma)

Pediatrics:

- MFI can be performed on children; however, patients less than 15 years of age require contact with Pediatric Medical Control prior to initiating the procedure.

Procedure:

1. Must have two DCFEMS paramedics on scene, engaged in patient care throughout the procedure, to perform MFI.
2. Determine the need for MFI based on clinical indications.
3. Ensure patient is on continuous cardiac and pulse oximetry monitoring.
4. Obtain IV/IO access (preferably 2 sites).
5. Prepare airway equipment and supplies: blades, tubes, suction, bougie etc.
6. Vocalize and prepare the back-up airway plan if intubation is unsuccessful.
 - Supraglottic airway
 - BVM with oral/nasal airways
 - Cricothyrotomy



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Medication Facilitated Intubation 14.1.5

7. Assign tasks to assistant(s) as needed (e.g., holding c-spine restriction, performing external laryngeal manipulation, monitoring SpO₂).
8. Initiate preoxygenation as soon possible. Pre-oxygenate for 3-5 minutes to an O₂ saturation as close to 100% as possible. Preoxygenate with the patient's head elevated 25° to 45° when clinically feasible.
 - For patients with a SpO₂ > 93% and adequate respiratory rate/effort - use NRM at “flush” flow rate O₂ L/Min or highest flow rate possible.

OR

 - For patients with a SpO₂ < 93% or those with inadequate respiratory rate/effort - use BVM with a PEEP valve at “flush” flow rate O₂ L/Min or highest flow rate possible.
9. In addition to the preoxygenation performed in step 8 with either a NRM or BVM, if available resources allow, also apply a nasal cannula at 15 L/Min. Continue nasal cannula oxygenation until the intubation is complete.
10. Position the patient to maximize the likelihood of successful intubation.
 - “Ear to sternal notch”- elevate the head using a folded sheet, blanket, or an assistant's hands such that the patient's ear is level with the patient's sternal line
 - “Sniffing position”- base of neck flexion and head on upper neck extension while maintaining the face parallel with the ceiling
11. Administer induction medication over 15-30 seconds

<i>Adult</i>	<i>Pediatric</i>
Ketamine 2mg/kg IV/IO	Ketamine 2mg/kg IV/IO *Contact Medical Control*

12. Suctioning soiled airways before the intubation attempt improves first pass success, particularly when using video laryngoscopy.
13. 45-60 seconds after administration of ketamine, perform orotracheal intubation utilizing video laryngoscopy.
14. If first attempt at intubation is unsuccessful and the patient is NOT desaturating, a second attempt may be made so long as logical and targeted changes to the approach are made between the first and second attempt.
 - Identify the most likely cause of failure and proceed with a second attempt only if it is felt that a specific change in technique or plan will result in success. (e.g., changing blades or the intubating provider, improving patient position etc).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Medication Facilitated Intubation 14.1.5

15. If intubation is unsuccessful, proceed immediately with the backup airway plan from step 6 if any of the following situations occur:
 - Unable to improve likelihood of success after the first intubation attempt
 - The patient is desaturating after the first attempt
 - A second intubation attempt is also unsuccessful
16. Confirm endotracheal tube placement with continuous quantitative waveform capnography (ETCO₂) and presence of lung sounds and symmetric chest rise.
17. Secure the endotracheal tube (ETT) at the appropriate depth.
18. See Post Advanced Airway Management Protocol for continued clinical care after intubation.
19. Clearly document the procedure in the electronic patient care report (PCR).
 - Clinical indication for MFI
 - Use of preoxygenation and apneic oxygenation
 - Position for intubation
 - Equipment used (blade and tube size, bougie, dose of medications etc.)
 - Number of attempts
 - If an attempt was unsuccessful, must document why
 - Waveform capnography confirmation

Notes:

- GCS < 8 is NOT a definitive indication for intubation. Paramedics must use their critical thinking skills to evaluate the patient's GCS, airway patency, cause of decreased GCS, and transport time to help guide the decision to intubate in the prehospital setting.
- Identification and treatment of physiologic abnormalities (e.g., hypotension, hypoxia etc.) prior to intubation, when possible, is critically important to improving patient outcomes by preventing peri-intubation hemodynamic collapse and cardiac arrest.
- An intubation attempt is defined as any time that any laryngoscopy blade is inserted into the patient's mouth.
- Each attempt at intubation significantly increases patient mortality and morbidity; thus, if the first intubation attempt fails, the paramedic must diagnose what went wrong in the first attempt before rushing to perform a second attempt. Always remember that the ultimate patient-centered goal is airway maintenance with adequate oxygenation and ventilation, not the specific placement of an endotracheal tube.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Medication Facilitated Intubation 14.1.5

- Ketamine is a dissociative anesthetic that provides analgesia, anesthesia, and amnesia with minimal to no effect on the patient's respiratory drive while also preserving airway reflexes. Thus ketamine shall be used for MFI instead of etomidate or midazolam.
- Initial and continuous ETT confirmation with waveform capnography (ETCO₂) is mandatory. Reliance on only clinical methods of tube confirmation (visualizing cords, lung sounds, absence of gastric sounds) is NOT reliable and results in unacceptably high rates of missed esophageal intubations.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

This procedure describes the indications for and procedural steps to place an i-gel[®] supraglottic airway in both adult and pediatric patients. The i-gel[®] is a latex free, single patient use device. It is designed to provide effective oxygenation and ventilation via a non-inflatable, anatomical seal of the pharyngeal, laryngeal and perilaryngeal structures. The i-gel[®] is approved for use by both BLS and ALS providers.

ALL PROVIDER LEVELS

Clinical Indications:

- Primary advanced airway management device:
 - The i-gel[®] may be placed as the initial airway device in certain cardiac arrest situations. (e.g., patient is difficult to BVM, limited number or only BLS personnel on-scene, special rescue operations, etc.)
- Alternative advanced airway management device: i.e., when intubation was unsuccessful
 - After any two unsuccessful intubation attempts.
 - After any one unsuccessful intubation attempt and it is felt that a second intubation attempt will also be unsuccessful.
 - After any one unsuccessful medication facilitated intubation attempt and the patient is experiencing critical oxygen desaturation.

Contraindications:

- Patient is conscious or semi-conscious or has an intact gag reflex.
- Patient has a valid MOST form or other actionable end-of-life medical order (e.g., POLST Form, DNR order, or Advanced Directive) that states the patient does not want advanced airway interventions.
- Unable to successfully place the device due to airway obstruction, trismus, or limited mouth opening, etc.

Cautions:

- Do not use excessive force to insert the device or nasogastric tube.
- Inadequate levels of pain control and sedation (e.g., post ROSC) may lead to coughing, bucking, excessive salivation, vomiting, or laryngospasm.
- The i-gel[®] is not a definitive airway and thus does not prevent aspiration. Use with caution in patients at high risk for vomiting and aspiration. (e.g., full stomach, morbid obesity, pregnancy, etc.)

Complications:

- Laryngospasm



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

- Sore throat
- Gastric insufflation, regurgitation, and aspiration of the gastric contents
- Tongue numbness and cyanosis

Size Chart:

Product	Patient Size	Patient Weight	Color	Size NG tube
Size 5	Large adult	90+ kg	Orange	14 F
Size 4	Medium adult	50-90 kg	Green	12 F
Size 3	Small adult / large pediatric	30-60 kg	Yellow	12 F
Size 2	Small pediatric	10-25 kg	Gray	12 F
Size 1.5	Infant	5-12 kg	Light blue	10 F
Size 1	Neonate	2-5 kg	Pink	N/A

- Most adult patients will be managed with a size 4 i-gel®.
- Refer to Handtevy for easy pediatric reference.

Important Note: While size selection on a weight basis should be applicable to most patients, individual anatomical variations mean the weight guidance provided should always be considered in conjunction with a clinical assessment of the patient's anatomy. Patients with cylindrical necks or wide thyroid/cricoid cartilages may require a larger size i-gel® than would normally be recommended on a weight basis. Equally, patients with a broad or stocky neck or smaller thyroid/cricoid cartilage may require a smaller size i-gel® than would normally be recommended on a weight basis. Patients with central obesity, where the main weight distribution is around the abdomen and hips, might in practice require an i-gel® of a size consistent with the ideal body weight for their height rather than their actual body weight.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

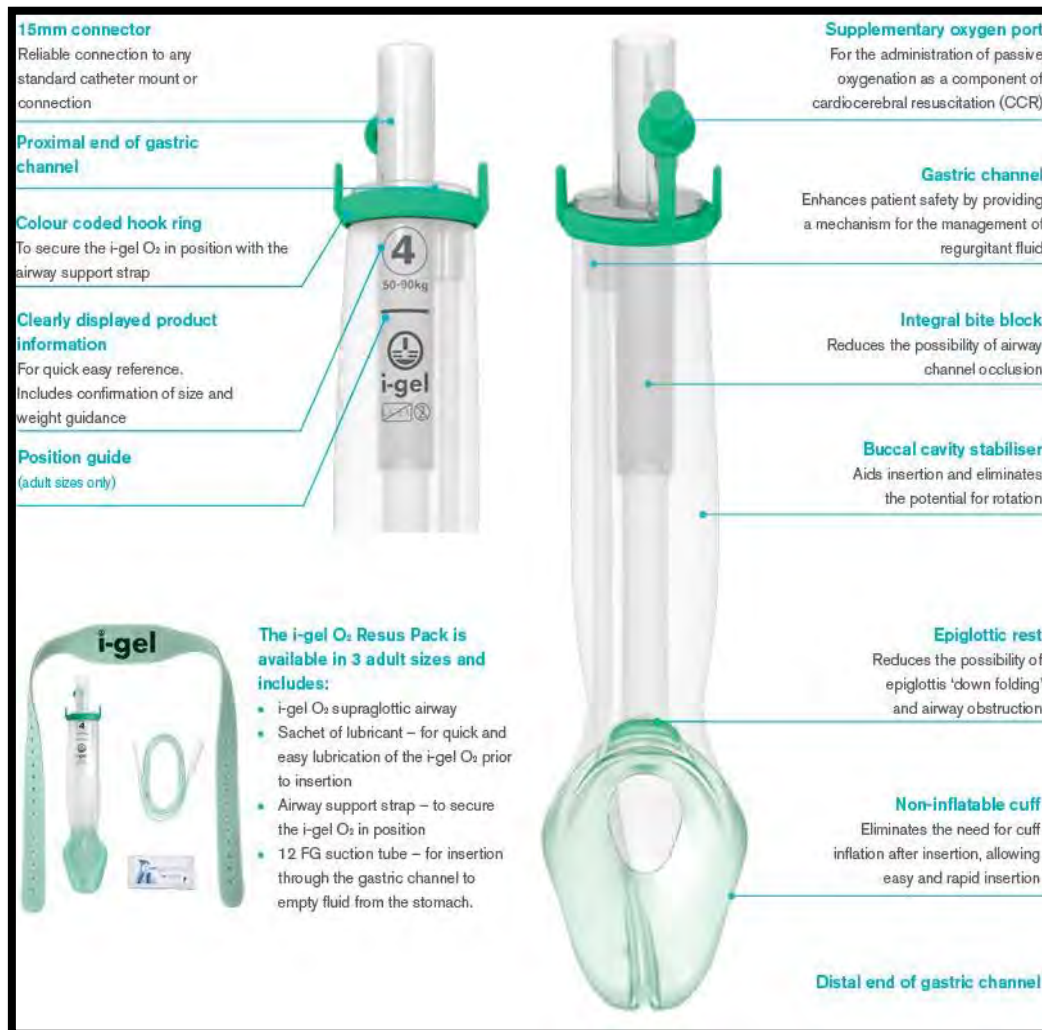


Figure 1: Key Components of the i-gel[®]

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.)
2. Support airway and provide supplemental oxygen per Airway Maintenance and Supplemental Oxygen Protocol.
3. Inspect packaging and the device to ensure it is not damaged. Discard the device if the airway tube or the body of the device looks abnormal, deformed, or damaged.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

4. Remove dentures or removable plates from the mouth before attempting i-gel[®] insertion.
5. Open the i-gel[®] package and take out the protective cradle containing the device. Remove the i-gel[®] and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.
6. Open the sachet of water-based lubricant and place a small bolus onto the middle of the smooth surface of the protective cradle in preparation for lubrication.
 - Do NOT use silicone-based lubricants.
7. Grasp the i-gel[®] with the opposite (free) hand along the integral bite block and lubricate the back, sides, and front of the cuff with a thin layer of lubricant.
8. If the patient is not ready for immediate i-gel[®] insertion, place the lubricated device back into the protective cradle until ready for insertion.
9. When ready for i-gel[®] insertion, remove the lubricated i-gel[®] from the protective cradle. Grasp the i-gel[®] firmly along the integral bite block. Position the device so that the i-gel[®] is facing towards the chin of the patient.
 - The patient should be in the “sniffing position” with head extended and neck flexed.
 - The chin should be gently pressed down before proceeding.
 - Introduce the leading soft tip of the i-gel[®] into the mouth of the patient in a direction towards the hard palate. The i-gel’s tip must follow the curvature of the patient’s hard palate upon insertion.
 - ❖ Important Note: it is not necessary to insert fingers or thumbs into the patient’s mouth during the process of inserting the device.
 - ❖ Important Note: if there is early resistance during insertion, a “jaw thrust” or “insertion with deep rotation” is recommended.
 - ❖ Important Note: the i-gel[®] is supplied in a protective cradle or cage pack to ensure the device is retained in the correct flexion prior to use. The i-gel[®] must always be separated from the cradle prior to insertion. The cradle is NOT an introducer and must never be inserted into the patient’s mouth.
10. Glide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

- When properly placed, the teeth should rest at a level on the i-gel[®] between the logo and the size number. A horizontal line (adult sizes 3, 4, and 5 only) at the middle of the integral bite-block represents the correct position of the teeth.
 - ❖ Important Note: sometimes a feel of “give-away” is felt before the end point resistance is met. This is due to the passage of the bowl of the i-gel[®] through the faucial pillars. It is important to continue to insert the device until a definitive resistance is felt.
11. As soon as insertion has been completed, hold the i-gel[®] in the correct position until and while the device is being secured in place.
 12. Attach BVM to the 15-mm connector and begin appropriate ventilation rate and volume per patient age and clinical condition.
 - Be sure to keep the passive oxygenation port capped when providing BVM ventilation through the 15-mm connector.
 13. Confirm proper position by auscultation, chest movement and verification of continuous quantitative waveform capnography (ETCO₂).
 14. Secure the i-gel[®].
 - For size 3,4, and 5 utilize the airway support strap provided in the Resus Pack. The wide central band of the strap should be located directly under the neck of the patient. Ensure there is sufficient tension to hold the i-gel[®] securely in place but not excessive tension that may cause trauma to the patient’s neck or face or that may cause unwanted downward pressure on the i-gel[®].
 - For sizes 1,1.5, and 2 the i-gel[®] should be taped in place “maxilla to maxilla” (upper jaw to upper jaw). See figure below.
 - ❖ Important Note: intubating through the i-gel[®] by blindly passing a gum-elastic bougie has been described. This technique is extremely challenging in the prehospital setting and results in unacceptably high rates of intubation failure and complication. Thus, blind intubation attempts through the i-gel[®] shall not be performed by FEMS personnel.
 13. If available, insert the appropriate size nasogastric tube down the gastric channel to decompress the stomach, decrease the risk of vomiting and aspiration, and to improve oxygenation and ventilation.
 - After insertion of the NG tube through the i-gel[®] gastric channel into the stomach, hook up the NG tube to portable or on-board suction.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

I-gel Supraglottic Airway 14.1.6

14. Document the procedure in the ePCR.

General notes:

- The i-gel[®] is a truly anatomical device, achieving a mirrored impression of the pharyngeal, laryngeal and perilaryngeal structures, without causing compression or displacement trauma to the tissues and structures in the vicinity.
- Do not reuse or attempt to reprocess the i-gel[®].
- The i-gel[®] is easy to use, insertion can normally be achieved in less than 5 seconds, by a proficient user.
- No attempt should be made to use i-gel[®] as a conduit for intubation in the prehospital setting. This shall only be performed with fiber optic guidance in the hospital setting.
- Excessive air leak, around the bowl or through the gastric channel, during manual ventilation is most likely due to the i-gel[®] not being placed deep enough against the laryngeal and pharyngeal tissues. In such instances, remove the device and reinsert with a gentle jaw thrust applied by an assistant or a deep rotation to achieve an optimum depth of insertion.
- The anatomical design and soft material of the i-gel[®] are less likely to cause adverse outcomes when compared with other supraglottic devices. The clinical evidence currently available suggests i-gel[®] may cause fewer secretions in the pharynx and hypopharynx than some other supraglottic airways.
- If there is failure to achieve complete insertion after utilizing the standard insertion technique and a jaw thrust or deep rotation maneuver, the device can be inserted under direct vision by laryngoscopy or one a size smaller i-gel[®] should be used.

The i-gel O₂ Resus Pack

Preparations for use

- 1.** Open the i-gel O₂ package and take out the protective cradle containing the device. Remove the accessory pack containing the sachet of lubricant and attach support strap from this protective cradle and place to one side.
- 2.** Remove the i-gel O₂ and transfer it to the palm of the same hand that is holding the protective cradle, supporting the device between the thumb and index finger.
- 3.** Open the sachet of supplied lubricant and place a small brush onto the middle of the smooth surface of the protective cradle in preparation for lubrication. Do not use silicone based lubricants.
- 4.** Place the i-gel O₂ back into the protective cradle in preparation for insertion.
- 5.** Grasp the i-gel O₂ with the opposite (free) hand along the integral bite block and lubricate the back, sides and front of the cuff with a thin layer of lubricant.

Insertion technique

- 6.** Remove the i-gel O₂ from the protective cradle. Grasp the lubricated i-gel O₂ firmly along the integral bite block. Position the device so that the i-gel O₂ cuff outlet is facing towards the chin of the patient. The patient should be in the 'sniffing the morning air' position with head extended and neck flexed. The pillow should be gently pressed down before proceeding. Introduce the leading soft tip into the mouth of the patient in a direction towards the hard palate.
- 7.** Guide the device downwards and backwards along the hard palate with a continuous but gentle push until a definitive resistance is felt.
The tip of the airway should be located into the upper oesophageal opening (a) and the cuff should be located against the laryngeal framework (b). The incisors should be resting on the integral bite-block (c).
- 8.** Taping
The i-gel O₂ should be taped down from 'mantis to mantles' or secured with the support strap provided.
- 9.** Airway support strap
The strap should be slid under the patient's neck until the wide central bend of the strap is located directly under the nape of the neck. One end of the strap should then be fitted over the patient's face and secured to the i-gel O₂ by placing an appropriate hole on the strap over the leg of the hook ring located at the top of the integral bite block. The other end of the strap should then be fixed over the other side of the patient's face and secured in the same manner, ensuring there is sufficient tension to hold the i-gel O₂ securely in place, but not an excessive tension that may cause trauma to the patient's neck or face or that may cause unwanted downward pressure of the i-gel O₂.

Important notes to the recommended insertion technique

Sometimes a feel of 'give-way' is felt before the end point resistance is met. This is due to the passage of the bowl of the i-gel O₂ through the faucial pillars. It is important to continue to insert the device until a definitive resistance is felt.

Once definitive resistance is met and the teeth are located on the integral bite block, do not repeatedly push the i-gel O₂ down or apply excessive force during insertion.

It is not necessary to insert fingers or thumbs into the patient's mouth during the process of inserting the device.

Patient Size	i-gel® Size	Patient Weight Guidance
Small adult	3	55-65kg (120-140lb)
Medium adult	4	65-90kg (140-200lb)
Large adult	5	>90kg (200+ lbs)

Visit the i-gel website www.i-gel.com

The patent-holder NCT secures a comprehensive guide to the preparation, insertion and removal of the i-gel O₂. The user should first familiarise themselves with the terminology for their supplied kit prior to attempting to use the i-gel O₂. The i-gel O₂ must always be separated from the protective cradle prior to insertion. The straps are not an intubator and must never be inserted into the patient's nostrils. The i-gel O₂ has been designed as a facilitative resuscitation device, such as where deep sedation, Mid-Congress Resuscitation Device (MCRD) and Endotracheal Intubation Assessor (EIA), however, the i-gel O₂ does not incorporate supplementary oxygen gas, nor can it be used for the delivery of positive ventilation. In the event of a respiratory emergency, please refer to the instruction for use or contact us.

INTERSURGICAL
MULTIPLE RESPIRATORY SYSTEMS

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DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Meconium Suctioning 14.1.7

Clinical Indications:

- Non-vigorous Neonatal patients with thick meconium stained amniotic fluid.

NOTE: If the newborn is vigorous, suction with a bulb syringe, do not intubate. If thick meconium stained amniotic fluid is present, do not stimulate the infant to breathe. Use appropriate aspiration adapter.

Procedure:

1. Intubate immediately with appropriate size endotracheal tube.
2. Connect endotracheal tube to meconium aspiration adapter to suction.
3. Withdraw endotracheal tube while suctioning.
4. If the endotracheal tube is filled with meconium, re-intubate with a new endotracheal tube and suction again until clear.
5. Resume Neonatal Resuscitation protocol.
6. If intubating and suctioning takes longer than 90 seconds or heart rate <80, initiate BVM with oxygen therapy.
7. Document the procedure and results on the patient care report (PCR).





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Needle Thoracostomy 14.1.8

This procedure describes the indications for and procedural steps to perform a needle thoracostomy for suspected tension pneumothorax.

ADVANCED LIFE SUPPORT PROVIDERS

Clinical Indications:

- Adult or pediatric patient with severe respiratory distress in whom tension pneumothorax is strongly suspected and whom presents with at least one or more of the following signs/symptoms:
 - Absent or markedly decreased breath sounds on affected side (bilateral pneumothorax may cause absent/decreased breaths sounds on both sides)
 - Hypotension or signs of circulatory shock
 - Asymmetric chest rise and fall
 - Jugular vein distension (JVD)
 - Tracheal deviation away from the affected side (often a late sign and difficult to appreciate on exam)
 - Increased resistance with manual ventilation, decreased tidal volumes
 - Hypoxia < 90% on pulse oximetry
 - Chest tube dislodgement/occlusion resulting in symptoms of tension pneumothorax
- Patient in traumatic cardiac arrest with mechanism of injury to the torso (blunt or penetrating) for whom resuscitation is indicated shall receive bilateral needle chest decompression.

Contraindications:

- Simple pneumothorax without signs of respiratory distress or tension physiology.

Complications:

- Misplaced needle decompression into the intraabdominal cavity
- Hemorrhage from vessel laceration
- Nerve injury
- Creation of a pneumothorax if one was not already present
- Laceration of the lung
- Infection

Definitions:

- **ThoraSite®** is an anatomical landmark guide used to identify the appropriate intercostal space for lateral chest decompression. It is designed to provide a safer approach to the pleural space by pinpointing the correct procedure site. ThoraSite is non-sterile and is for single patient use.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Needle Thoracostomy 14.1.8

Procedure:

1. Don personal protective equipment (gloves, eye protection, etc.)
2. Support airway and provide high flow supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
3. Fully expose the entire chest and identify the procedure area on the same side as the suspected pneumothorax:

Lateral approach:

- ❖ **Important Note:** this is the preferred site for needle decompression in adults due to increased likelihood of the catheter reaching the thoracic cavity.
- ❖ **Important Note:** when performing lateral chest needle decompression, the SAM Thorasite® shall be utilized to ensure correct needle placement and reduce the risk of accidental patient injury due to a misplaced needle into the intraabdominal cavity.
- **4th intercostal space (between ribs 4 and 5) at the anterior/mid axillary line.**
 - 4th intercostal space in men is located at the nipple line. See Figure 1.
 - 4th intercostal space in women is located at the inframammary line (where the inferior breast tissue connects to the chest wall)

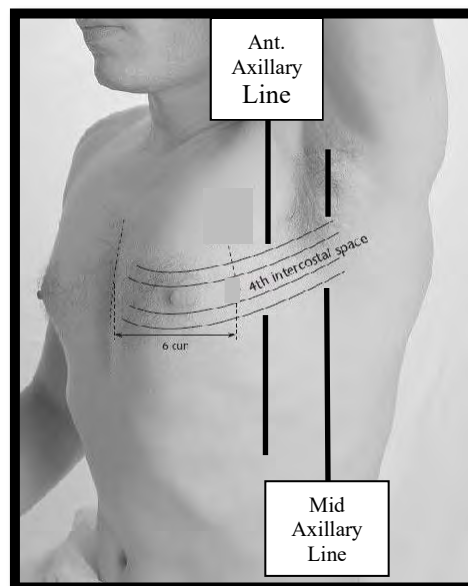
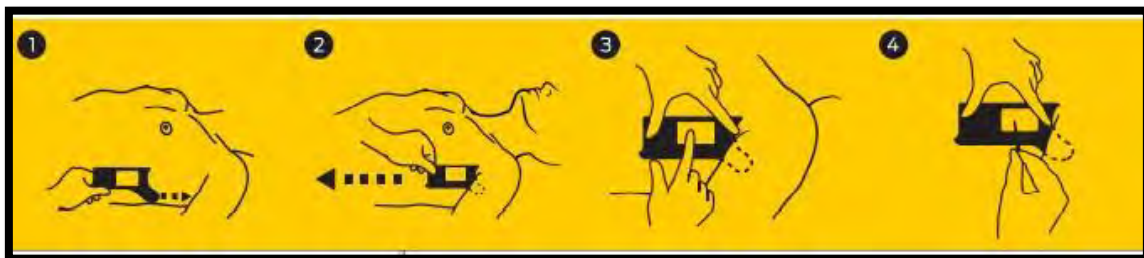
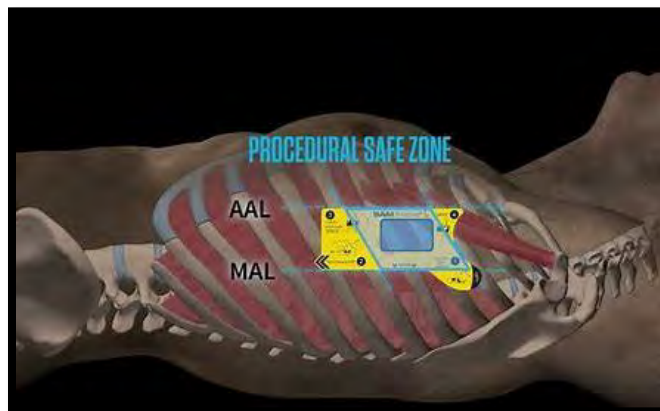


Figure 1: 4th intercostal space anterior/mid axillary line



Figure 2: SAM Thorasite®

- To utilize the SAM Thorasite® follow these steps:
 - Push axilla hook into the armpit until fully inserted into axillary fossa.
 - Keep patient's arm positioned $< 90^\circ$ from their side.
 - Point alignment arrow toward the hip.
 - The base of the Thorasite® should be parallel to the patient's spine.
 - Palpate within safe zone window to feel the intercostal space.
 - If two intercostal spaces are identified within the safe zone window, select the upper (towards the armpit) intercostal space.





Anterior Approach:

- ❖ **Important Note:** this is the preferred site for needle decompression in children.
- **2nd intercostal space (between ribs 2 and 3) at the mid clavicular line.**
 - If using this location, it is always safest to insert the needle more laterally, away from vital structures in the middle of the chest (e.g., heart, mediastinum). See Figure 2.

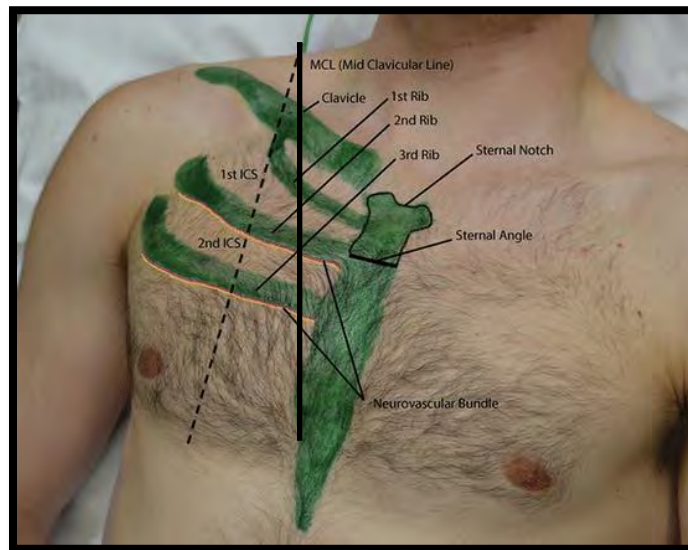


Figure 3: 2nd intercostal space mid clavicular line

4. Select the appropriately sized needle for chest decompression:
 - **Adult:** 3.25 inch 10-14-gauge IV catheter
 - **Pediatrics > 13 years old:** 3.25 inch 10-14-gauge IV catheter
 - **Pediatrics ≤ 13 years old:** standard length 1.25 inch 14-16-gauge IV catheter
5. Insert the needle with catheter into the skin between two ribs (the intercostal space) just over the top of the inferior rib.
 - When utilizing the SAM Thorasite®, if ribs cannot be palpated, vent in the center of the safe zone window. If rib is encountered, redirect above the rib.
 - The needle should be inserted perpendicular to the chest wall.
6. Advance the needle with catheter through the parietal pleura until a “pop” is felt and air or blood exits under pressure through the catheter.
7. Then advance the catheter only, off the needle, until it is hubbed against the chest wall. Do NOT advance the needle any deeper into the thoracic cavity.



DC Fire and EMS Pre-Hospital Treatment Protocols

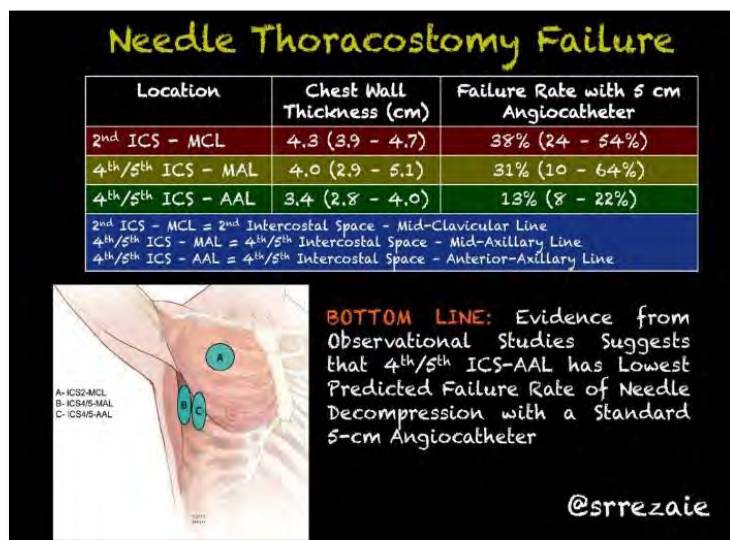
Medical Procedures/Airway Management

Needle Thoracostomy 14.1.8

8. Remove the needle, leaving the plastic catheter in place.
9. Occlusion of the catheter and re-expansion of the tension pneumothorax may occur.
 - Providers must frequently reassess for the need to repeat needle chest decompression.
 - Repeat needle chest decompression as indicated.
 - Leave the previous catheter(s) in place.

General notes:

- Non-tension (simple) pneumothorax is not immediately life threatening and should NOT be decompressed in the prehospital setting.
- Positive pressure ventilation (e.g., BVM, supraglottic airway, intubation) or a failed non-venting occlusive dressing may lead to the development of a pneumothorax and or rapid progression from simple pneumothorax to tension pneumothorax.
- Studies have shown improved success in reaching the thoracic cavity in adult patients when the 4th or 5th intercostal space in the anterior axillary or mid axillary line is used instead of the 2nd intercostal space in the mid clavicular line. The American College of Surgeons now recommends this location for needle decompression in adult patients. The location for chest decompression in children remains unchanged, and the 2nd intercostal space in the midclavicular line should still be used.



Laan DV et al. Chest Wall Thickness and Decompression Failure: A systematic Review and Meta-Analysis Comparing Anatomic Locations in Needle Thoracostomy. Injury 2015 [Epub Ahead of Print]. PMID: 26724173



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Orotracheal Intubation 14.1.9

Clinical Indications:

- Cardiac arrest.
- Respiratory arrest.
- Hypoxic or obtunded patients.
- Patients with possible increasing ICP.

Contraindications:

- Presence of gag reflex.
- Clinched teeth.



Procedure:

1. Prepare, position and oxygenate the patient with 100% Oxygen.
2. Place nasal cannula with high flow oxygen on patient and such is to remain in-place during intubation attempts for passive oxygenation.
3. Select proper endotracheal tube (and stylette, if used), have suction ready.
 - Pediatric - Refer to Broselow™ tape.
4. Using laryngoscope, visualize vocal cords. (Use Sellick maneuver to assist you).
5. Limit each intubation attempt to 30 seconds with BVM between attempts.
6. Visualize tube passing through vocal cords.
7. Inflate the cuff with 5-10 ml of air and secure the tube to the patient's face.
8. Auscultate for bilaterally equal breath sounds and absence of sounds over the epigastrium. If you are unsure of placement, remove tube and ventilate patient with bag valve mask.
9. Consider using an alternate airway device if endotracheal intubation efforts are unsuccessful.
10. Apply EtCO₂ monitor and record readings on scene, enroute to the hospital, and at the hospital.
11. Document endotracheal tube size, time, results, and placement location by the centimeter marks either at the patient's teeth or lips on the patient care report (PCR). Document all devices used to confirm initial tube placement.
12. Consider placing an orogastric tube to clear stomach contents after the airway is secured with an ET tube.
13. Document the procedure and results on the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Video Laryngoscopy 14.1.10

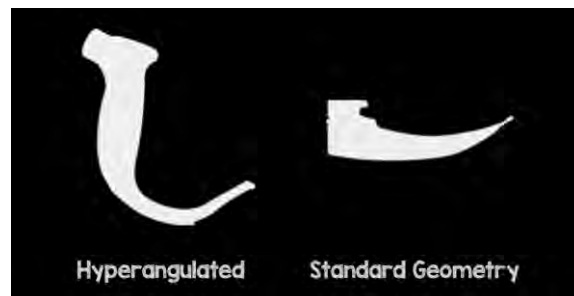
ALS

Background:

Current scientific literature on the use of video laryngoscopy (VL) in the prehospital setting is favorable. Multiple studies have shown that the use of VL by paramedics markedly increases both the overall likelihood of intubation success as well as the first attempt success rate compared to standard direct laryngoscopy. The use of Video Laryngoscopy is strongly preferred for all intubations by the DCFEMS Office of the Medical Director.



The VL device currently utilized by DCFEMS is the GlideScope® Go™. This device offers both a disposable standard geometry and hyperangulated laryngoscope blade. The standard geometry blade mirrors the shape and size of a traditional direct laryngoscope Macintosh blade. The hyperangulated blade has an extreme anterior curve. This difference is important as outlined in the procedure below.



Clinical Indications

The indications for performing VL are the same as for all techniques of oral intubation. See Orotracheal Intubation Protocol and Medication Facilitated Intubation Protocol.

Contraindications

The contraindications for performing VL are the same as for all techniques of oral intubation. See Orotracheal Intubation Protocol and Medication Facilitated Intubation Protocol.

Procedure for using Standard Geometry VL:

1. Follow the steps outlined in the Orotracheal Intubation Protocol.
2. Utilize the same insertion, blade manipulation, and tube passage techniques as traditional direct laryngoscopy.
3. Visually confirm successful placement of the endotracheal tube (ETT) through the vocal cords on the video screen in addition to verifying tube placement via continuous waveform capnography.



Procedure for using Hyperangulated Geometry VL:

1. Follow the steps outlined in the Orotracheal Intubation Protocol making the following adjustments for the extreme anterior curve of the hyperangulated blade:
 - Lead with suction. Suction the oropharynx and posterior pharynx prior to inserting the VL blade.
 - Insert the hyperangulated blade directly in the midline of the mouth slowly curling around the base of the tongue. Sweeping the tongue to the left is NOT necessary when using a hyperangulated VL device.
 - During blade insertion, keep the tip of the hyperangulated blade pressed close against the tongue to avoid contaminating the camera with pooled secretions in the posterior pharynx.
 - Tip of the hyperangulated blade should be inserted into the vallecula and a gentle rocking motion used to expose the larynx.
 - Over inserting the hyperangulated VL blade too deep resulting in a very up-close view of the glottic opening down into the trachea should be avoided. This up-close view of the glottic opening makes endotracheal tube delivery very difficult and sometimes impossible.
 - The ideal screen view for intubation is with the epiglottis and glottic opening only seen in the top half of the video screen thus maximizing the visual field for tube manipulation and decreasing the angle for tube delivery.
 - The stylet and ETT should be shaped to match the curvature of the hyperangulated blade.
 - Once the desired view of the glottic opening is obtained on the video screen, the ETT is inserted into the mouth under direct observation to avoid upper airway trauma. This means taking attention away from the video screen for a brief period to safely insert the tube into the mouth.
 - Once the tube passes the vocal cords and enters the trachea, the highly curved stylet may get caught on the anterior tracheal wall. If this occurs, the stylet should be partially withdrawn by the operator or assistant so the tip of the tube will straighten out and be more easily passed down the trachea.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

Video Laryngoscopy 14.1.10

2. Visually confirm successful placement of the endotracheal tube (ETT) through the vocal cords on the video screen in addition to verifying tube confirmation via continuous waveform capnography.
3. If blood or secretions obstruct the camera at any point during the intubation, you must remove the blade, deploy suction, wipe off the camera lens and initiate an additional attempt. You can NOT perform direct laryngoscopy with a hyperangulated blade.

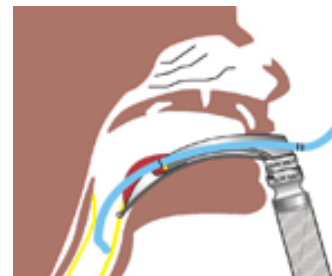
Notes:

- When using standard direct laryngoscopy, the goal is to compress and displace the upper airway tissues so that a direct line of sight can be achieved between the operator's eye and the glottic opening. In contrast, when using VL, an indirect view of the glottic opening is obtained, i.e., by placing a camera on the end of the laryngoscope blade an "eye" is placed down in the airway so that the operator can look around obstructing tissues rather than relying on their displacement.
- In comparison to direct laryngoscopy, the advantages of video laryngoscopy include:
 - No longer needing a direct line of sight to the glottic opening thus facilitating easier identification of the necessary airway anatomy
 - Magnifies the view of the airway
 - Requires less strength/force to intubate
 - Allows colleagues and assistants to visualize and help with the procedure
 - Allows instructors and preceptors to more easily supervise the procedure when performed by trainees
 - Allows for video recording of intubations which can be used for procedural documentation, provider education and training.
- All ETT's placed by VL must be confirmed as correctly placed in the trachea on the video screen AND with continuous waveform capnography (ETCO₂).
- It is up to the paramedic performing the intubation whether to use the standard geometry or hyperangulated blade. However, the following situations are frequently best managed utilizing the hyperangulated blade:
 - Failure of the standard geometry blade due to a high anterior airway
 - Limited neck mobility (e.g., due to age, surgery, or spinal motion restriction)
 - Inability to get in a standard intubating position
 - Very short neck
 - Limited mouth opening and or large tongue (e.g., anaphylaxis or angioedema)



Clinical Indications:

- Difficult intubation with a restricted view of the glottic opening. This may occur due to:
 - Short, thick (bull) neck.
 - Pregnancy.
 - Laryngeal edema (anaphylaxis, burns).
 - Normal anatomical variation.
 - Supra-glottic neoplasms (tumors above the glottic opening).
 - Inability to position patient appropriately (e.g. entrapment, confined space).



Contraindications:

- Pediatric patients under the age of 14.

Procedure:

- Hyperventilate the patient with 100% oxygen for at least one minute prior to each intubation attempt. Note, however, that this step should be omitted when ventilation (demonstrated by rise and fall of the chest) proves impossible.
- Prepare the ET tube and other intubation equipment (minimum 6.0 mm ET tube).
- Curve the bougie and ensure the distal tip is formed into a “J” shape;
- Perform a laryngoscopy, obtaining the best possible view of the glottic opening.
- Advance the bougie, continually observing its distal tip, with the concavity facing anteriorly;
- Visualize the tip of the bougie passing the vocal cords.
- Once the tip of the bougie has passed the epiglottis, continue to advance it in the mid-line so that it passes behind the epiglottis but in an anterior direction.



- As the tip of the bougie enters the glottic opening you will either feel 'clicks' as it passes over the tracheal rings or the tip will arrest against the wall of the airways ('hold-up'). This suggests correct insertion, although cannot be relied upon to indicate correct positioning with 100% accuracy. **HOWEVER, FAILURE TO ELICIT CLICKS OR HOLD-UP IS INDICATIVE OF ESOPHAGEAL PLACEMENT.** If hold-up is felt, the bougie should then be withdrawn approximately 5 cm to avoid the ET tube impacting against the carina.
- Hold the bougie firmly in place and **MAINTAIN LARYNGOSCOPY.**
 - Instruct your colleague to pass the endotracheal tube over the proximal end of the bougie.
 - As the proximal tip of the bougie is re-exposed, the assistant should carefully grasp it, assuming control of the bougie and passing control of the ET tube to the intubator.
 - The ET tube should then be carefully advanced ('rail-roaded') along the bougie and hence through the glottic opening, taking care to avoid movement of the bougie.
 - **SUCCESSFUL INTUBATION MAY BE CONSIDERABLY ENHANCED BY ROTATING THE ET TUBE 90°, SO THAT THE BEVEL FACES POSTERIORLY.** In so doing the bougie may also rotate along the same plane but should not be allowed to move up or down the trachea.
- Once the ET tube is fully in place hold it securely as your colleague withdraws the bougie.
- Withdraw the laryngoscope.
- Inflate the cuff. Then verify correct positioning of the ET tube using auscultation of the lung fields and epigastrium and observing for chest wall movement.
- Secure the ET tube. The tip of the ET tube can move up to 6.0 cm once placed and this is certainly sufficient to dislodge it from the trachea.
- Document the procedure and results on the patient care report (PCR).

**Background:**

Pulse Oximeters are noninvasive instruments used for the detection of arterial oxyhemoglobin. Each hemoglobin (Hgb) molecule can carry up to 4 oxygen molecules. Hgb molecules carrying 4 oxygen molecules is considered “fully saturated” and Hgb molecules carrying less than 4 oxygen molecules is considered “unsaturated”. Pulse oximetry measures the concentration of bound Hgb. It does not measure oxygen concentration.

Clinical Indications:

- Include SpO₂ as a vital sign.
- All patients who require oxygen.
- All patients requiring EKG monitoring.
- All patients with respiratory, cardiovascular or neurological complaints.
- All patients with abnormal vital signs.
- All patients who receive respiratory depressants (Morphine, Diazepam, Midazolam).
- Critical trauma patients.

Procedure:

1. Apply probe to index finger or thumb.
2. A normal SpO₂ on room air is 96-100%.
3. Moderate hypoxemia is characterized by values <90%.
4. Severe hypoxemia is characterized by values <80%.
5. Document the results on the patient care report (PCR).

Special Considerations:

The following circumstances may result in low/absent SpO₂ readings:

- Motion at the sensor site.
- Hypoperfusion
- Cold temperature.
- Edema.
- Anemia.
- Carbon monoxide poisoning.
- Methemoglobinemia.



Background:

Tracheostomy patients with an In-Dwelling Tube or Stoma.

- Most patients with a permanent tracheostomy (with tube or stoma) can adequately breathe through the opening.
- Some of these patients have complete surgical reconstruction of the airway and breathe only through the tube or stoma, while other patients may have the opening to the mouth and can breathe through the tracheostomy tube, stoma, nose, or mouth.
- If air escaping is felt or heard at the nose or mouth when ventilating a partial neck breather, the nose and mouth must be sealed (pinching the nose closed and closing the mouth using a jaw lift) prior to ventilating the patient.
- Tracheostomy patients requiring ventilatory assistance require specialized techniques be employed in order to be properly ventilated.
 - EMS personnel must identify the tracheostomy site and tube (if present).
 - Check the tracheostomy tube or stoma for any blockage.
 - Look, listen, and feel for breathing at the tube or stoma site.
 - Assess for breathing and adequacy of respirations.

Clinical Indications:

- Respiratory arrest.
- Cardiac arrest.
- Hypoventilation.
- Severe respiratory distress due to an obstructed tracheostomy tube.

Procedures:

If a tracheostomy tube has the standard 15 mm adapter and the patient can be ventilated through the tube:

1. Attach a BVM to the adapter.
2. Ventilate with a bag-valve mask and 100% oxygen.
3. Assess for adequacy of ventilations and check for leaks.
4. If the tube is cuffed, inflate the cuff until there is no air leak.



If the patient cannot be ventilated through the tube:

1. Visually inspect the tube and tracheostomy for any obstructing material and remove if possible.
2. Attempt to ventilate with 2 breaths.
3. If successful, continue to ventilate as required.

If there is no obvious obstructing material and the patient cannot be ventilated:

1. Suction the airway and attempt to ventilate with 2 breaths.
2. If successful, continue to ventilate as required.

If the patient still cannot be ventilated:

BLS Providers should:

1. Remove the tube carefully.
2. Suction the stoma.
3. Place a pediatric sized mask over the stoma site.
4. Ventilate with a bag-valve mask and 100% oxygen.
5. Load and go should be initiated as soon as possible.
6. On scene times should be kept to a minimum.
7. Treat other life-threatening conditions en route.
8. Transport the patient to the nearest appropriate health care facility.
9. Notify the receiving health care facility of the patient's status as soon as possible.
10. Monitor and treat the patient en route.

ALS Providers should:

1. Remove the tube carefully.
2. Place a pediatric mask over the stoma site.
3. Ventilate with a bag-valve mask and 100% oxygen.
4. Choose the appropriate sized endotracheal tube.
5. Insert the tube into the stoma until the cuff is just inside the stoma (cuffed tubes only).
6. Inflate the cuff and check for air leaks.
7. Ventilate the patient checking for chest rise and fall.
8. Auscultate lung sounds for equal bilateral breath sounds and no sounds over the epigastrium.



If a tracheostomy tube is not present (i.e. a stoma):

1. Place a pediatric mask over the stoma site.
2. Ventilate with an appropriately sized bag-valve mask and 100% oxygen.
3. Suctioning can be done through the tracheostomy tube or stoma.
4. Care must be taken to insert the suction catheter no more than 5 cm (2 inches) beyond the lower edge of the opening.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

PEEP Valve 14.1.14

This procedure describes the indications for and clinical use of a Positive End Expiratory Pressure (PEEP) Valve attached to a BVM.

ALL PROVIDER LEVELS

Clinical Indications:

- All patients receiving assisted positive pressure ventilation via BVM, supraglottic airway, or endotracheal tube should have the PEEP valve attached to the bag valve and utilized as clinical condition dictates.

Contraindications:

- None

Cautions:

- Cardiac Arrest
- Pneumothorax
- Age adjusted hypotension (SBP < 90 mmHg or MAP < 60 mmHg in adults)



Complications:

- PEEP increases intrathoracic pressure which can result in decreased venous blood return to the heart (decreased preload) and thus decreased cardiac output and hypotension.
- PEEP increases intrathoracic pressure which can contribute to a simple pneumothorax developing into a tension pneumothorax.

Procedure:

1. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen Protocol](#).
2. Remove the BVM exhalation port cover and attach the PEEP valve.
3. Set PEEP to 5 cm H₂O.
4. For patients NOT in cardiac arrest, increase PEEP by 5 cm H₂O every 3-5 minutes as needed to improve hypoxia and achieve the clinically indicated SpO₂.
 - Most patients will only require 5-10 cm H₂O of PEEP to maintain goal SpO₂.
 - PEEP of > 10 cm H₂O should rarely be required and increases the likelihood of the patient experiencing one of the complications listed above.
 - Consult with medical control if > 15 cm H₂O is required.
 - Maximum PEEP is 20 cm H₂O.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Airway Management

PEEP Valve 14.1.14

5. If the patient has increased difficulty breathing, worsening respiratory failure, or increased resistance to positive pressure ventilation, then assess for a tension pneumothorax and treat as indicated. [See Needle Thoracostomy Procedure.](#)
6. If the patient is hypotensive prior to or becomes hypotensive with the use of PEEP, treat the hypotension accordingly (e.g., IV fluids) and utilize the lowest amount of PEEP possible while still maintaining an appropriate SpO₂.
7. If clinically indicated, administer medications for treatment of asthma, COPD, or pulmonary edema per appropriate protocol concurrent with positive pressure ventilation with PEEP.
8. Special Circumstance: ***Use of PEEP valve during cardiac arrest***
 - Be sure to keep the PEEP valve set at 5 cm H₂O or less during cardiac arrest to maximize venous return and cardiac preload. Do NOT increase PEEP above 5 cm H₂O during chest compressions.
 - Once return of spontaneous circulation (ROSC) is achieved, titrate the PEEP as necessary to maintain desired SpO₂.

MEDICAL CONTROL OPTIONS

1. Consult with medical control if > 15 cm H₂O is required to maintain goal SpO₂.

General notes:

- PEEP refers to the application of additional pressure at the end of expiration to maintain pressure in the alveoli above that of atmospheric pressure.
- PEEP improves oxygenation in patients with pulmonary edema or other fluids in the lungs (such as pneumonia) by preventing collapse of the alveoli at end expiration and reopening already collapsed alveoli so they can participate in gas exchange. PEEP also helps prevent repeated opening and closing of the alveoli which is thought to cause lung injury.
- If transporting a patient from one medical facility to another (e.g., from a nursing home to an emergency department) and PEEP has already been established and the patient is tolerating it, continue the PEEP at the previously established level.
- PEEP decreases preload and in patients who are hypovolemic, hypotensive, or experiencing heart failure, PEEP can have significant negative effects on the patient's hemodynamic status.



ALL PROVIDER LEVELS

Clinical Indications:

- Patient is unconscious/unresponsive.
- Patient is apneic or has abnormal breathing (i.e., only gasping).
- Patient has no palpable pulse.

Contraindications:

- Patient is conscious/responsive.
- Patient has a palpable pulse.
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) protocol.](#)
- Patient meets PDOA criteria. [See Person Dead on Arrival protocol.](#)

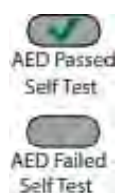


Pediatrics

- When using an AED on infants and children 8 years old or less or weighing less than 55 lbs (25 kg), use of reduced energy pediatric specific pads is recommended.
- However, if a manual defibrillator nor an AED equipped with reduced energy pediatric specific pads is available, an AED without the reduced energy pads (i.e., adult pads) shall be used.

Daily Check of Zoll AED 3 BLS

- Ensure the defibrillation pads cable is always connected to the defibrillator.
- Do NOT use or keep in service the Zoll AED 3 defibrillator if the green check (✓) is not displayed in the AED's status indicator window (located to the right of the On/Off Button). The green check displays when the AED is ready to use.



ZOLL AED 3™ Controls and Indicators

See "ZOLL AED 3 Control Functions" on the following page for a description of each of these controls.





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Defibrillation - Automated AED 14.2.1

- If the Zoll AED 3 defibrillator fails to pass its self-test after installing a new battery, make sure the defibrillation pads are plugged in properly.
- If the Zoll AED 3 defibrillator emits a beeping tone when it is off, check the battery and defibrillation pads connection. If this does not resolve the beeping, remove the AED from service.

Procedure:

1. If multiple rescuers are available, one rescuer shall provide uninterrupted chest compressions while the AED is being prepared for use. [See Cardiac Arrest protocol.](#)
2. Press the On/Off button in the upper left corner of the AED to turn it on.
3. Ensure pads are already connected to the AED.
4. Pad placement: anterior/posterior placement should be utilized as the first line approach for all cardiac arrests. Ensure that the patient's chest is clean and dry.
 - Remove all medication patches on the chest and wipe off any residue.
 - Dry patient's chest, if wet, before attaching defibrillation pads.
 - Do NOT place the defibrillation pads directly over any implanted medical device such as a pacemaker, LVAD, or port-a-cath.
 - Separate the compression sensor from the pads and place it in the center of the chest.
 - ❖ Important Note: poor adherence or air pockets under the defibrillation pads can lead to arcing, skin burns, or reduced energy delivery. Do not fold, wrinkle, or cut the defibrillation pads gel surface when applying defibrillation pads to the patient.

Anterior Posterior Pad Placement

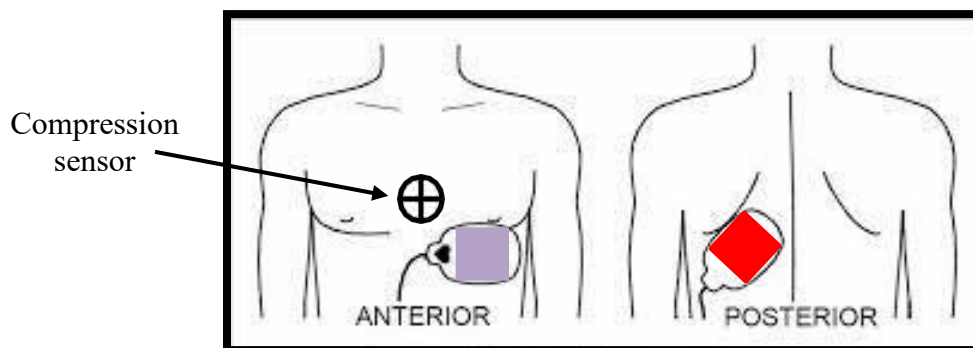


Figure 1: “Red to Bed” or “Red to Rear”: the red Zoll pad is placed to the left of the spine just below the scapula at the level of the heart.

The purple apex pad is placed over the anterior heart. Position under breast on a female.
The compression sensor is placed in the center of the chest.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Defibrillation - Automated AED 14.2.1

5. The AED will issue the voice and text prompt, “Don’t Touch Patient, Analyzing” and then begin ECG rhythm analysis.
6. Stop CPR and clear the patient for rhythm analysis. Minimize interruptions in chest compressions. All interruptions in CPR shall be as short as possible and no greater than 10 seconds.
7. If “Shock Advised” continue chest compressions while the AED is charging.
 - Once the AED is charged, you will hear the charge ready tone and the following voice prompt “Don’t Touch Patient. Press Flashing Shock Button.”
 - Hold compressions and assertively state “CLEAR” and visualize that no one, including yourself, is in contact with the patient.
 - Defibrillate by depressing the flashing “shock” button. The AED will announce “Shock Delivered.”
 - Immediately resume CPR (chest compressions and ventilations) for 2 minutes after the defibrillation.
8. If “No Shock Advised” resume CPR (chest compression and ventilations) for 2 minutes.
9. After 2 minutes of CPR, stop CPR, check for a pulse, and allow AED to analyze rhythm. If “Shock Advised” repeat step 7. If “No Shock Advised” resume CPR.
10. Continue treatment steps 5 through 9 until arrival of ALS providers or until arrival in the emergency department if applicable.
11. When performing CPR on an adult patient, utilize the CPR compression sensor. To maximize performance of manual CPR:
 - Follow the audio prompts that provide feedback on the depth and rate of chest compressions.
 - Utilize the ECG/CPR Dashboard on the Zoll AED 3 defibrillator.
 - Goal compression depth in adults is 2.0-2.4 inches.
 - Goal compression rate is 100-120 compressions per minute.
 - ❖ Important Note: the AED shall be placed in a position where the provider performing chest compressions can see the CPR feedback prompts.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Defibrillation - Automated AED 14.2.1



12. If a spontaneous pulse returns: See [Return of Spontaneous Circulation \(ROSC\) protocol](#).
13. Document the procedure, response, and time in the patient care report (PCR).



ADVANCED LIFE SUPPORT PROVIDERS

Clinical Indications:

- Patient is unconscious/unresponsive.
- Patient is apneic or has abnormal breathing (i.e., only gasping).
- Patient has no palpable pulse.
- EKG findings:
 - Ventricular fibrillation (VF)
 - Pulseless ventricular tachycardia (pVT)



Contraindications:

- Patient is conscious/responsive.
- Patient has a palpable pulse.
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) protocol.](#)
- Patient meets PDOA criteria. [See Person Dead on Arrival protocol.](#)

Procedure:

1. If multiple rescuers are available, one rescuer should provide uninterrupted chest compressions while the Zoll X series is being prepared for use. [See Cardiac Arrest protocol.](#)
2. Minimize interruptions in chest compressions. All interruptions in CPR shall be as short as possible and no greater than 10 seconds.
3. Press the green power button located on the top of the Zoll X Series to turn on the monitor/defibrillator.
4. Pad placement: anterior/posterior placement should be utilized as the first line approach for all cardiac arrests. Ensure that the patient's chest is clean and dry.
 - Remove all medication patches on the chest and wipe off any residue.
 - Dry patient's chest, if wet, before attaching defibrillation pads.
 - Do NOT place the defibrillation pads directly over any implanted medical device such as a pacemaker, LVAD, or port-a-cath.
 - Separate the compression sensor from the pads and place it in the center of the chest.
 - ❖ Important Note: poor adherence or air pockets under the defibrillation pads can lead to arcing, skin burns, or reduced energy delivery. Do not fold, wrinkle, or cut the defibrillation pads gel surface when applying defibrillation pads to the patient.



Anterior Posterior Pad Placement

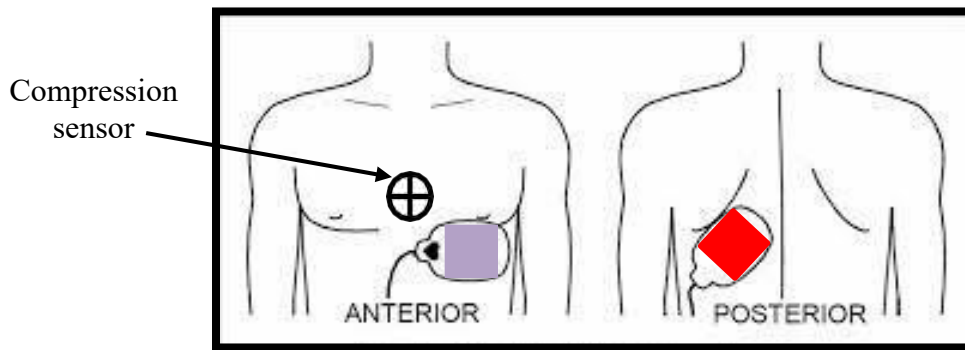


Figure 1: “Red to Bed” or “Red to Rear”: the red Zoll pad is placed to the left of the spine just below the scapula at the level of the heart.

The purple apex pad is placed over the anterior heart. Position under breast on a female.

The compression sensor is placed in the center of the chest.

5. Confirm the diagnosis of cardiac arrest and identify the need for defibrillation.
6. Operation of the Zoll X series may be conducted in either manual or AED mode. If operating in AED mode, follow prompts.
7. If operating in manual mode, set the appropriate energy level. [See Ventricular Fibrillation / Pulseless Ventricular Tachycardia protocol.](#)
 - The default energy selections for adult patients are:
 - Shock 1 – 120 joules
 - Shock 2 – 150 joules
 - Shock 3 – 200 joules
 - Pediatric energy selection shall be weight based per [Ventricular Fibrillation / Pulseless Ventricular Tachycardia protocol.](#) The default energy selections for pediatric patients are:
 - Shock 1 – 50 joules
 - Shock 2 – 70 joules
 - Shock 3 – 85 joules





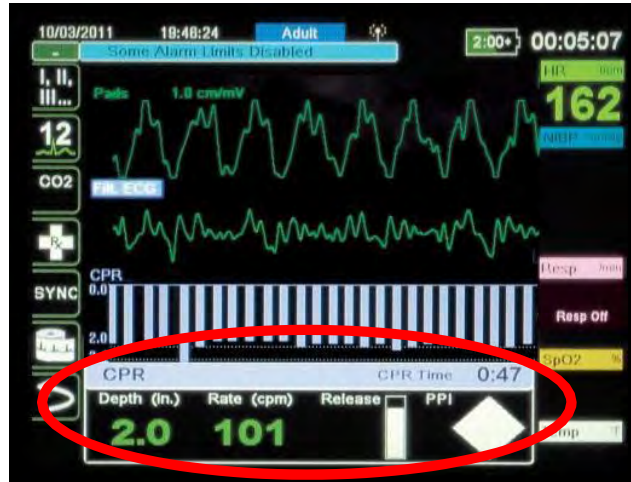
DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Defibrillation – Manual

14.2.2

8. If operating in manual mode, press the CHARGE button on the front panel. Continue chest compressions while the defibrillator is charging.
 - When charging the monitor/defibrillator displays a charging message at the bottom of the screen and a distinctive charging tone sounds indicating the unit is charging.
 - When fully charged, the tone changes to a continuous charge ready tone, the highlighted energy bar graph includes the selected energy, and the SHOCK button lights up.
 - ❖ Important Note: changing the selected energy while the unit is charging or charged causes the defibrillator to disarm itself. Press the CHARGE button again to charge the unit to the newly selected energy level.
 - ❖ Important Note: once the monitor is charged, the energy can be dumped by selecting the Disarm button or by pressing the energy select down button.
9. Once the monitor/defibrillator is charged, hold compressions and assertively state “CLEAR” and visualize that no one, including yourself, is in contact with the patient.
10. Press and hold the SHOCK button on the front panel until energy is delivered to the patient.
 - If at any time you want to cancel the defibrillation, press the disarm softkey.
 - If the defibrillator is not discharged within 60 seconds after reaching the selected energy level, the monitor/defibrillator automatically disarms itself.
11. Immediately resume CPR (chest compressions and ventilations) for 2 minutes after the defibrillation.
12. After 2 minutes of CPR, stop CPR, analyze rhythm, and check for a pulse only if appropriate for the rhythm.
13. Repeat steps 5 through 11 every 2 minutes as indicated by patient response and EKG rhythm or AED mode prompts.
14. When performing CPR on an adult or pediatric patient, utilize the compression sensor and CPR Dashboard to maximize the effectiveness of manual chest compressions.
 - Follow the audio prompts that provide feedback on the depth and rate of chest compressions.
 - Utilize the Real CPR Help Dashboard on the Zoll X Series.
 - Goal compression depth in adults is 2.0-2.4 inches.
 - Goal compression rate is 100-120 compressions per minute.
 - ❖ Important Note: the monitor/defibrillator shall be placed in a position where the provider performing chest compressions can see the CPR feedback prompts.



- ❖ Important Note: ideal compressions are “green-green-full-full” i.e., compression depth and rate are within recommended range and displayed in green. The chest recoil release bar and the perfusion performance indicator (PPI) diamond are full.

15. If a spontaneous pulse returns: See [Return of Spontaneous Circulation \(ROSC\) protocol](#).
16. Document the procedure, response, and time in the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Double Sequential Defibrillation 14.2.3

ADVANCED LIFE SUPPORT PROVIDERS

Clinical Indications:

- Patient is greater than or equal to 18 years old.
- Patient is unconscious/unresponsive.
- Patient has no palpable pulse.
- EKG findings: refractory ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT) despite three defibrillation attempts. (AED and or monitor/defibrillator). [See Refractory VF/VT protocol.](#)

Contraindications:

- Patient is less than 18 years old.
- Patient is conscious/responsive.
- Patient has a palpable pulse.
- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive) [See DNR / Medical Orders for Scope of Treatment \(MOST\) protocol.](#)
- Patient meets PDOA criteria. [See Person Dead on Arrival protocol.](#)

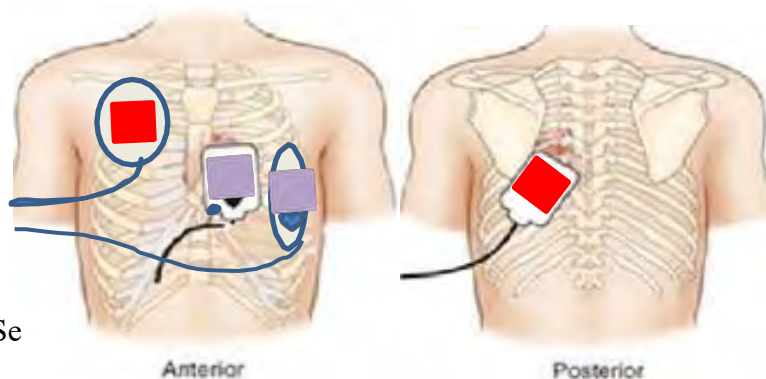
Pediatrics:

- Double Sequential Defibrillation is NOT indicated in pediatric patients.

Procedure:

1. Confirm the diagnosis of cardiac arrest with refractory VF or pVT.
2. Ensure chest compressions are adequate and continued throughout preparation for double sequential defibrillation. Minimize interruptions in chest compressions. All interruptions in CPR shall be as short as possible and no greater than 10 seconds.
3. Obtain a second monitor/defibrillator and apply pads.

**Apply the second defibrillator pads Anterior-Lateral
(ensure the two sets of pads are NOT touching)**





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Double Sequential Defibrillation 14.2.3

Adult

Monitor/Defib # 1: Anterior & Posterior Placement

Monitor/Defib # 2: Anterior & Lateral Placement

**Confirm VF/VT on both monitors
Charge both monitor/defibs to 200 J**

**The energy from both devices should be delivered
simultaneously allowing for ideal sequential
administration of the electricity.**

**PLEASE NOTE: Two different paramedics shall
operate and discharge the two monitor/defibs**

4. Set the energy level to 200 joules on each monitor/defibrillator.
5. Simultaneously charge each defibrillator.
6. Hold compressions, assertively state, “CLEAR” and visualize that no one, including yourself, is in contact with the patient.
7. Utilizing two different paramedics to operate the monitors, defibrillate the patient with the desired energy by depressing the shock button on both monitor/defibrillators. The energy from both devices should be delivered nearly simultaneously allowing for ideal sequential administration of the electricity.
8. After defibrillation, immediately resume chest compressions and ventilations for 2 minutes.
9. After 2 minutes of CPR, analyze the rhythm and check for a pulse only if appropriate for the rhythm.
10. If the patient remains in refractory VF or pVT, repeat this procedure every two minutes until arrival at an ECMO capable hospital.
11. If a spontaneous pulse returns: See [Return of Spontaneous Circulation \(ROSC\) protocol](#).
12. Document the procedure, response, and time in the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

LUCAS – Chest Compression Device 14.2.4

ALL PROVIDER LEVELS

Clinical Indications:

- Medical or traumatic cardiac arrest

Contraindications:

- Patient is too small: if LUCAS alerts with 3 fast signals when lowering the Suction Cup, and you cannot enter the PAUSE mode or ACTIVE mode.
- Patient is too large: if you cannot lock the upper part of LUCAS to the back plate without compressing the patient's chest.
- Situation where it is not possible to position LUCAS safely or correctly on the patient's chest.



Procedure:

1. Initiate and continue patient care as described in the [Cardiac Arrest protocol](#).
2. Perform manual chest compression for at least two, two-minute cycles prior to deploying the LUCAS chest compression system.
 - ❖ Important Note: the LUCAS device shall not be utilized until the CPR coach has organized the resuscitation, identified team roles, and verbalized a coordinated plan for transitioning from manual chest compressions to the LUCAS device.
3. Turn ON the device prior to placing on the patient.
 - Push ON/OFF on the user control panel for 1 second to power up the LUCAS and start the self-test.
 - The green LED adjacent to the ADJUST key illuminates when LUCAS is ready for use.
4. Placing the back plate:
 - Remove the LUCAS back plate from the carrying bag.
 - Coordinate with the CPR coach to pause manual compressions in a deliberate and organized fashion. All interruptions in CPR shall be as short as possible and no greater than 10 seconds.
 - Carefully place back plate under the patient, immediately below the armpits. Use one of the following procedures:
 - Hold the patient's shoulder and lift the patient's upper body a small distance.
 - OR
 - Roll the patient from side to side.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

LUCAS – Chest Compression Device 14.2.4

5. Once the back plate is in position, immediately resume manual CPR.
6. Pre-position the LUCAS stabilization strap under the patient's neck and around the shoulders.
 - Carefully lift the patient's head and put the cushion strap behind the patient's neck. Position the cushion as near the patient's shoulders as possible.
7. Attaching the upper part of the LUCAS to the back plate:
 - Remove the upper part of the LUCAS from the bag.
 - Pull release rings once to make sure that the claw locks are open.
 - Let go of the release rings.
 - While manual CPR is still in progress, attach the LUCAS support leg that is nearest to you to the back plate. Ensure you hear it "click" into place.
 - Thread the other LUCAS support leg through the arms of the person providing manual chest compressions. Attach the second support leg to the back plate. Ensure you hear it "click" into place. arms while CPR is still in progress ensuring the claws click into place.
 - ❖ Important Note: if the LUCAS upper part does not attach to the back plate, make sure that the claw locks are open and that you have released the release rings.
8. Position the Suction Cup
 - Center the suction cup over the chest. The compression point should be at the same spot as for manual CPR.
 - When the pressure pad in the suction cup is in the correct position, the lower edge of the suction is immediately above the end of the sternum.

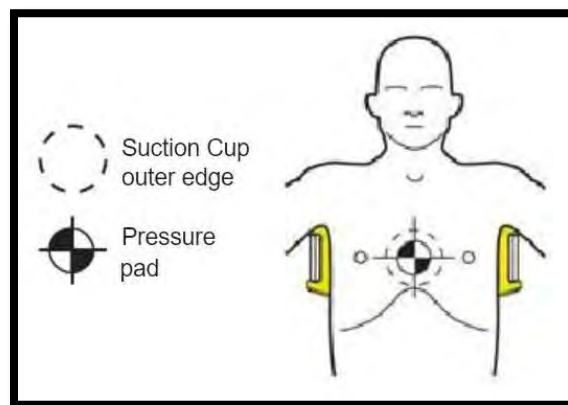


Figure 1: Correct placement of LUCAS back plate, pressure pad, and suction cup outer edge.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

LUCAS – Chest Compression Device 14.2.4

- ❖ Important Note: if the pressure pad is not in the correct position in relation to the sternum, there is an increased risk of damage to the rib cage and internal organs. In addition, the perfusion provided by the LUCAS will be significantly reduced.
- 9. Adjust the height of the suction cup to set the start position.
 - Ensure that the LUCAS is in the ADJUST mode.
 - Pause manual compressions.
 - Push the suction cup down with two fingers until the pressure pad touches the patient's chest or the monitor/AED chest compression sensor without compressing the chest.
 - Push the PAUSE button to lock in the start position.
- 10. Start compressions and secure neck strap fit.
 - Push the ACTIVE (30:2) or ACTIVE (Continuous) button to start the device as clinically indicated.
 - Utilize ACTIVE (30:2) mode until an advanced airway is placed. After an advanced airway is placed, switch the LUCAS to ACTIVE (Continuous)
 - Connect the buckles on the support leg straps with the buckles on the cushion stabilization strap. Ensure the straps are snug and are not twisted.
- 11. Monitor for LUCAS suction cup movement or displacement. If the position of the LUCAS suction cup changes at any time during operation, immediately completely the following steps:
 - Push the ADJUST button.
 - Release the cushion straps from the support leg straps.
 - Pull up the suction cup to readjust the central and/or height position for a new start position.
 - When the suction cup is in the correct position, repeat steps 7 and 8 above.
- 12. If the patient experiences CPR induced consciousness/awareness or exhibits signs of pain during chest compressions but ROSC has not been achieved, administer ketamine per [Procedural Dissociation protocol](#).
- 13. The LUCAS can be active while the patient is moved if:
 - The LUCAS and the patient are safely positioned on the transportation device.
 - The LUCAS stays in the correct position and angle on the patient's chest.
- 14. If transport to a local emergency department is indicated complete the following:
 - Secure the patient's arms with the straps on the LUCAS support legs. Do not apply the straps so tightly that IV(s) become occluded.
 - Re-verify the LUCAS suction cup placement following any patient lifting or movement. Reposition LUCAS as needed.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

LUCAS – Chest Compression Device 14.2.4

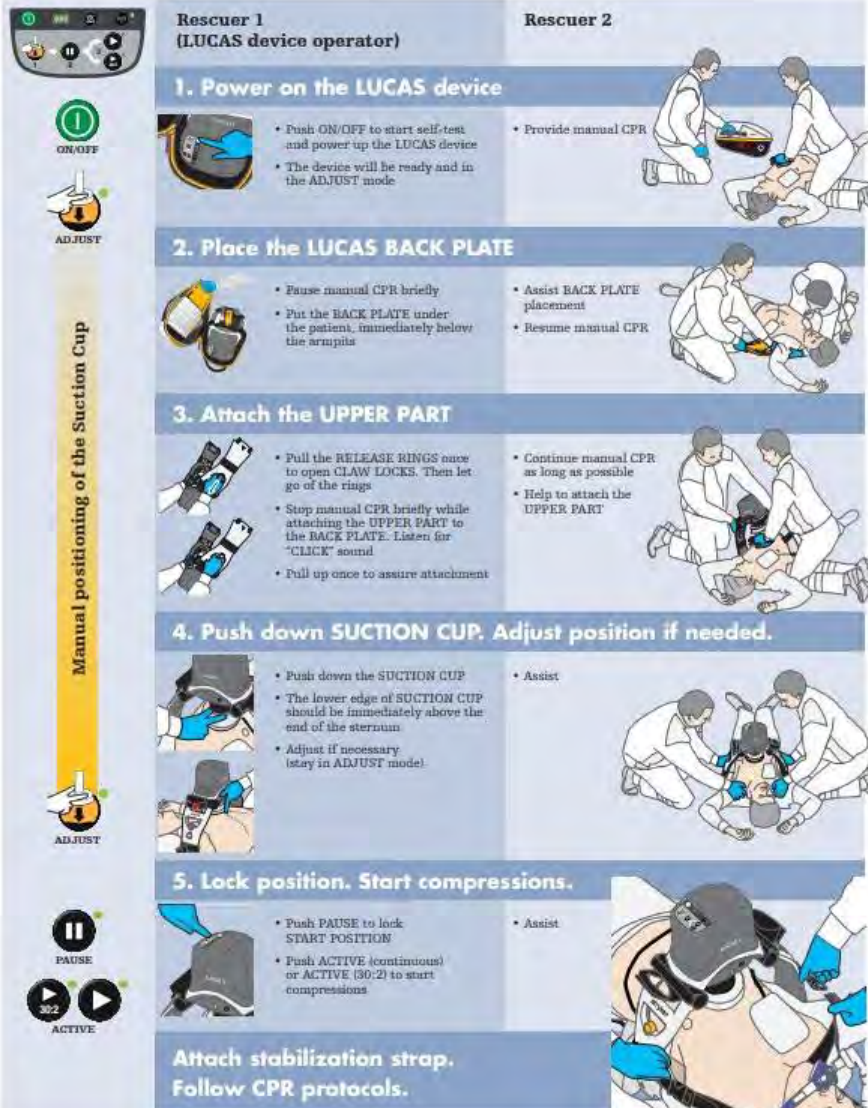
15. Once removal of the LUCAS is clinically indicated, complete the following steps:
 - Push ON/OFF for 1 second to power off the device.
 - Remove the stabilization strap.
 - Pull the release rings to remove the upper part of the LUCAS from the back plate.
 - Remove the back plate from under the patient.
16. After patient use, clean all surfaces and straps with a soft cloth and warm water with a mild cleaning agent or disinfectant agent.
 - Do NOT immerse in liquid. The LUCAS can be damaged if liquid enters the hood.
 - Allow the device to dry before re-packing.
 - Remove and install a new suction cup.
17. Document the procedure in the patient care report.



stryker

LUCAS[®] 3 Chest Compression System

Quick reference guide



The diagram illustrates the five-step process for using the LUCAS 3 Chest Compression System. It is divided into two columns: Rescuer 1 (LUCAS device operator) and Rescuer 2. A vertical sidebar on the left shows the manual positioning of the suction cup with icons for ON/OFF, ADJUST, and PAUSE/ACTIVE modes.

Rescuer 1 (LUCAS device operator)	Rescuer 2
1. Power on the LUCAS device <ul style="list-style-type: none">Push ON/OFF to start self-test and power up the LUCAS deviceThe device will be ready and in the ADJUST mode	<ul style="list-style-type: none">Provide manual CPR
2. Place the LUCAS BACK PLATE <ul style="list-style-type: none">Pause manual CPR brieflyPut the BACK PLATE under the patient, immediately below the armpits	<ul style="list-style-type: none">Assist BACK PLATE placementResume manual CPR
3. Attach the UPPER PART <ul style="list-style-type: none">Pull the RELEASE RINGS once to open CLAW LOCKS. Then let go of the ringsStop manual CPR briefly while attaching the UPPER PART to the BACK PLATE. Listen for "CLICK" soundPull up once to assure attachment	<ul style="list-style-type: none">Continue manual CPR as long as possibleHelp to attach the UPPER PART
4. Push down SUCTION CUP. Adjust position if needed. <ul style="list-style-type: none">Push down the SUCTION CUPThe lower edge of SUCTION CUP should be immediately above the end of the sternumAdjust if necessary (stay in ADJUST mode)	<ul style="list-style-type: none">Assist
5. Lock position. Start compressions. <ul style="list-style-type: none">Push PAUSE to lock START POSITIONPush ACTIVE (continuous) or ACTIVE (30:2) to start compressions	<ul style="list-style-type: none">Assist

Attach stabilization strap. Follow CPR protocols.

The LUCAS 3 device is for use as an adjunct to manual CPR when effective manual CPR is not possible (e.g., transport, extended CPR, fatigue, insufficient personnel). Refer to operating instructions for complete directions for use (indications, contraindications, warnings, cautions, and potential adverse events).

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LUCAS[®] 3

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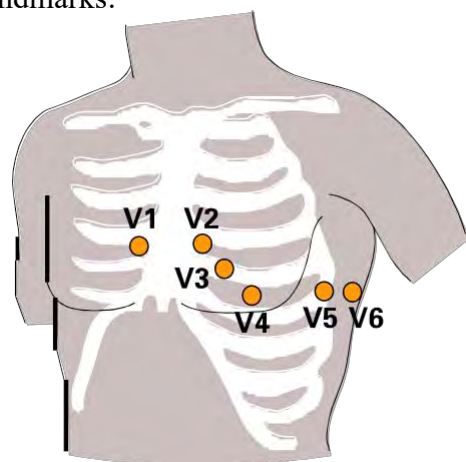


Clinical Indications:

- Suspected cardiac event.
- Suspected tricyclic overdose.
- Electrical injuries.
- Syncope.
- CHF.

Procedure:

1. Assess patient and monitor cardiac status.
2. If patient is unstable, definitive treatment is the priority. If patient is stable or stabilized after treatment, perform a 12 Lead EKG.
3. Prepare EKG monitor and connect patient cable with electrodes.
4. Expose chest and prep as necessary. Modesty of the patient should be respected.
5. Apply chest leads and extremity leads using the following landmarks:
 - RA -Right arm.
 - LA -Left arm.
 - RL -Right leg.
 - LL -Left leg.
 - V1 -4th intercostal space at right sternal border.
 - V2 -4th intercostal space at left sternal border.
 - V3 -Directly between V2 and V4.
 - V4 -5th intercostal space at left mid-clavicular line.
 - V5 -Level with V4 at left anterior axillary line.
 - V6 -Level with V5 at left mid-axillary line.
6. When performing a right sided EKG in patients with a suspected inferior wall MI with possible right ventricular involvement (RVI):
 - V4R - 5th intercostal space at right mid-clavicular line.
7. Instruct patient to remain still.
8. Press the appropriate button to acquire the 12 Lead EKG.
9. ALS Providers shall interpret the EKG and if STEMI is suspected, transmit the EKG to an interventional cardiology facility if possible.





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

EKG – 12 Lead 14.2.5

- When making a radio report to a STEMI center, providers will report their own interpretation of the 12-lead, then read the machine interpretation verbatim to the hospital staff.

10. Document the procedure, time, and interpretation on the patient care report (PCR).

Wall affected	Leads	Artery(s) involved	Reciprocal changes
Anterior	V ₂ – V ₄	Left coronary artery, Left anterior descending (LAD)	II, III, AVF
Anterolateral	I, AVL, V ₃ – V ₆	Left anterior descending (LAD) and diagonal branches, circumflex and marginal branches	II, III, AVF
Anteroseptal	V ₁ – V ₄	Left anterior descending (LAD)	
Inferior	II, III, AVF	Right coronary artery (RCA)	I, AVL
Lateral	I, AVL, V ₅ , V ₆	Circumflex branch or left coronary artery	II, III, AVF
Posterior	V ₈ , V ₉	Right coronary artery (RCA) or circumflex artery	V ₁ – V ₄ ST segment depression (R > S in V ₁ and V ₂).
Right ventricular	V ₄ R	Right coronary artery (RCA)	-----



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Synchronized Cardioversion 14.2.6

Certain tachydysrhythmias and clinical presentations require synchronizing the defibrillator discharge with the ECG R-wave to avoid the induction of ventricular fibrillation.

ADVANCED LIFE SUPPORT PROVIDERS

Clinical Indications:

- Patient has a palpable pulse.
- Unstable patient with a tachydysrhythmia.
 - Ventricular Tachycardia
 - Atrial Fibrillation with RVR
 - Supraventricular Tachycardia



Contraindications:

- Patient is pulseless. [See Cardiac Arrest protocol.](#)
- Sinus Tachycardia.

Procedure:

1. Press the green power button located on the top of the Zoll X Series to turn on the monitor/defibrillator.
2. Pad placement: anterior/posterior placement should be utilized as the first line approach for synchronized cardioversion. Ensure that the patient's chest is clean and dry.
 - Remove all medication patches on the chest and wipe off any residue.
 - Dry patient's chest, if wet, before attaching defibrillation pads.
 - Do NOT place the defibrillation pads directly over any implanted medical device such as pacemaker, LVAD, or port-a-cath.

Anterior Posterior Pad Placement

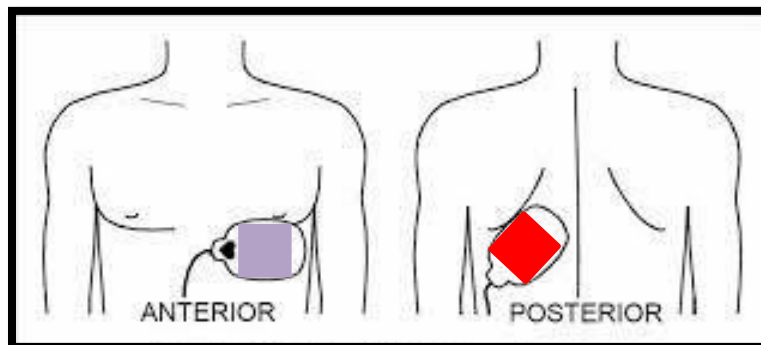


Figure 1: “Red to Bed” or “Red to Rear”: the red Zoll pad is placed to the left of the spine just below the scapula at the level of the heart.

The purple apex pad is placed over the anterior heart. Position under breast on a female.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Synchronized Cardioversion 14.2.6

- ❖ Important Note: poor adherence or air pockets under the defibrillation pads can lead to arcing, skin burns, or reduced energy delivery. Do not fold, wrinkle, or cut the defibrillation pads gel surface when applying defibrillation pads to the patient.
- 3. Confirm the need to perform synchronized cardioversion per [Wide Complex Tachycardia protocol](#) or [Narrow Complex Tachycardia protocol](#).
- 4. Consider the use of procedural dissociation per [Procedural Dissociation protocol](#).
- 5. Press the Sync quick access key on the front panel. The system will now be in SYNC mode.
 - A sync marker (s) appears on the monitor above each detected R-wave to indicate where discharge will occur.
 - A sync indicator appears at the top of the display screen, and a green light next to the indicator flashes with each Sync marker.
- 6. Press the Energy Select arrows up or down to select the desired energy level per [Wide Complex Tachycardia protocol](#) or [Narrow Complex Tachycardia protocol](#).



7. Press the CHARGE button on the front panel.
 - When charging the monitor/defibrillator displays a charging message at the bottom of the screen and a distinctive charging tone sounds indicating the unit is charging.
 - When fully charged, the tone changes to a continuous charge ready tone, the highlighted energy bar graph includes the selected energy, and the SHOCK button lights up.
- ❖ Important Note: Changing the selected energy while the unit is charging or charged causes the defibrillator to disarm itself. Press the CHARGE button again to charge the unit to the newly selected energy level.
8. Once the monitor/defibrillator is charged, assertively state “CLEAR” and visualize that no one, including yourself, is in contact with the patient.
9. Press and hold the SHOCK button on the front panel until energy is delivered to the patient. The defibrillator will discharge with the next detected R wave.
 - If at any time you want to cancel the defibrillation, press the disarm softkey.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Synchronized Cardioversion 14.2.6

- If the defibrillator is not discharged within 60 seconds after reaching the selected energy level, the monitor/defibrillator automatically disarms itself
- 10. If the patient's condition is unchanged after initial synchronized cardioversion, repeat steps 5 to 9, utilizing escalating energy settings per [Wide Complex Tachycardia protocol](#) or [Narrow Complex Tachycardia protocol](#).
 - ❖ Important Note: the Zoll X Series automatically exits Sync mode after each shock. To reactivate sync mode, press the SYNC quick access key on the front panel again.
- 11. If patient's rhythm deteriorates into ventricular fibrillation/pulseless ventricular tachycardia, perform immediate unsynchronized defibrillation per [Ventricular Fibrillation / Pulseless Ventricular Tachycardia protocol](#).
- 12. Document the procedure, response, and time in the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Transcutaneous Cardiac Pacing 14.2.7

ADVANCED LIFE SUPPORT PROVIDERS

Clinical Indications:

- Hemodynamically unstable bradycardia.
- See [Bradycardia protocol](#).

Contraindications:

- Aystole
- Profound hypothermia



Procedure:

1. Press the green power button located on the top of the Zoll X Series to turn on the monitor/defibrillator.
2. Apply standard ECG electrodes, attach lead wires, and connect the ECG cable to the monitor/defibrillator.
3. Attach defibrillator pads: anterior/posterior placement should be utilized as the first line approach for all patients requiring transcutaneous pacing. Ensure that the patient's chest is clean and dry.
 - Remove all medication patches on the chest and wipe off any residue.
 - Dry patient's chest, if wet, before attaching defibrillation pads.
 - Do NOT place the defibrillation pads directly over any implanted medical device such as a pacemaker, LVAD, or port-a-cath.

Anterior Posterior Pad Placement

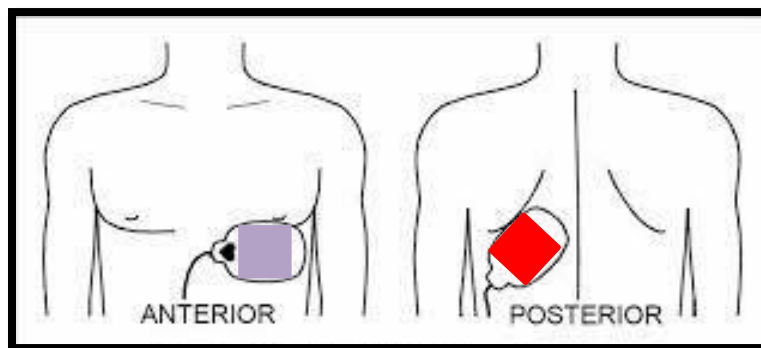


Figure 1: “Red to Bed” or “Red to Rear”: the red Zoll pad is placed to the left of the spine just below the scapula at the level of the heart.

The purple apex pad is placed over the anterior heart. Position under breast on a female.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

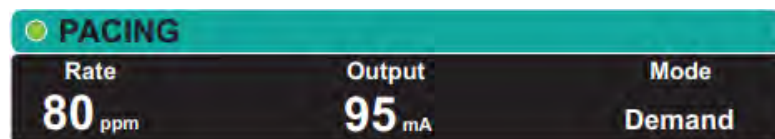
Transcutaneous Cardiac Pacing 14.2.7

- ❖ Important Note: poor adherence or air pockets under the defibrillation pads can lead to arcing, skin burns, or reduced energy delivery. Do not fold, wrinkle, or cut the defibrillation pads gel surface when applying defibrillation pads to the patient.

4. Confirm the need to perform transcutaneous pacing per [Bradycardia protocol](#).
5. Consider the use of procedural dissociation per [Procedural Dissociation protocol](#).
6. Press the PACER button on the front panel of the monitor. The Pacer Settings window displays:



7. Set Pacer Mode: ensure the pacer mode is set to Demand.
 - ❖ Important Note: if ECG electrodes are not available or become displaced from the patient, the X Series will deliver pacemaker pulses at a fixed rate instead of in Demand mode. Fixed pacing should only be performed in an emergency when no alternative is available.
8. Set Pacer Rate: use the arrow keys to navigate to Rate, press the Select button, and then use the arrow keys and the Select button to set the Pacer Rate:
 - 80 BPM for an adult patient
 - 100 BPM for a pediatric patient
9. Turn on Pacer: use the arrow keys to navigate to Start Pacer, then press the Select button to select it. The Pacing window displays behind the Pacer Settings window.



10. Set Pacer Output: in the pacer settings window, use the arrow keys and the Select button to adjust the pacer output.
 - The pacer output is adjustable in 10 mA increments when increasing the output, and in 5 mA increments when decreasing the output.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

Transcutaneous Cardiac Pacing 14.2.7

- Start at 30 mA. Increase output every 10 seconds until there is ECG evidence of electrical capture.
11. Once both electrical and mechanical capture is achieved, increase pacer output 10% above threshold to maintain capture.
- Electrical capture is determined by the presence of a pacing spike followed by a widened QRS complex, the loss of any underlying intrinsic rhythm, and the appearance of an extended, and sometimes enlarged T wave.
 - Mechanical capture is assessed by palpation of a peripheral pulse that corresponds to each electrically paced complex on the monitor.
 - ❖ Important Note: the ideal pacer current is the lowest value that maintains both electrical and mechanical capture – it is usually about 10% above threshold. Typical threshold currents range from 40-80 mA.
 - ❖ Important Note: to avoid mistaking muscular response to pacing stimuli for arterial pulsations, check for a pulse using ONLY a femoral artery or the right brachial or radial artery. Do NOT use the carotid pulse to assess for capture.
 - ❖ Important Note: changing the ECG lead being viewed on the monitor and increasing the size can sometimes be helpful in determining electrical capture.
12. After electrical and mechanical capture is obtained, reassess vital signs, skin color, and capillary refill for improved perfusion.
13. Document the response to external pacing in the patient care report (PCR).



The primary goal of Pit Crew CPR is utilizing a structured, team-based, approach to delivering efficient, high-performance CPR. The name “Pit Crew CPR” comes from the Formula One Racing pit crews that use a highly choreographed, well defined, and autonomous approach to maximize efficient task completion. In a cardiac arrest resuscitation, this approach assigns each prehospital provider, before arrival on scene, a specific therapeutic task and prespecified location in which to complete this task once at the patient’s side. As part of a bundle of best practices, Pit Crew CPR has been shown to improve CPR performance metrics, patient survival, and neurological outcome.

ALL PROVIDER LEVELS

Clinical Indications:

- Medical or traumatic cardiac arrest.

Contraindications:

- Patient has a valid MOST Form or other actionable end-of-life medical order. (e.g., POLST Form, DNR order, or Advanced Directive).
- Patient meets PDOA criteria.

Priorities of Care

- Minimize interruptions in chest compressions. All interruptions in CPR shall be as short as possible and no greater than 10 seconds.
- Provide chest compressions at the appropriate depth and rate.
- Ensure adequate chest recoil in between chest compressions.
- Avoid excessive ventilatory rate and volume.

Procedure

1. Pit Crew CPR roles shall be pre-planned prior to arriving at the patient’s side and include the following assignments:

- **CPR Leader Coach**

The CPR Leader/Coach position shall be the responsibility of the first arriving company officer. The CPR Leader/ Coach shall provide leadership to and organization of on-scene personnel to ensure the below positions (runner/compressor, ventilator) are filled and that performance meets the department’s standards of care. The CPR Leader/Coach is responsible for all aspects of the resuscitation related to CPR:

- Applies the AED if applicable
- Ensures that the performance of both the compressor and ventilator is adjusted based on the audio and visual prompts provided by the AED or



monitor/defibrillator.

- Coordinates deployment of the Lucas Chest Compression System.
- Monitors effectiveness of Lucas Device and coordinates repositioning as needed.
- Tracks two-minute pulse checks.
- Directs intentional pre-planning of pulse checks including:
 - Calling out “20 seconds to next pulse check, 10 seconds to next pulse check.”
 - Ensures that the ventilator, or other member has confirmed pulses with compressions (“fingers on the femoral”) prior to stopping CPR and performing the pulse check.
 - Ensures that if a paramedic is on-scene that the paramedic moves to a position to see the monitor/defibrillator and is ready to interpret the cardiac rhythm prior to initiation of a pulse check. (The monitor/defibrillator shall remain in a position where the compressor and ventilator can see the visual chest compression and ventilation performance feedback.)
 - Limits all pauses in chest compressions to less than ten seconds.

➤ **Runner/Compressor**

- First member to arrive at the patient's side.
- Immediately assesses responsiveness and checks for the presence of a carotid or femoral pulse.
- ❖ Important Note: pulse should only be checked for a maximum of 10 seconds, if no definite pulse is felt, assume the patient is in cardiac arrest and immediately start CPR.
- Initiates chest compressions if indicated.
- Delivers chest compressions at an adequate depth and at a rate of 100 to 120 per minute.
- When performing CPR 30:2, counts compressions out loud when approaching 30 compressions (this can be omitted, and continuous compressions initiated once an advanced airway is in place).
- When an AED or ALS Monitor with a CPR puck is in use, it is the responsibility of the runner/compressor to be mindful of audio feedback prompts and adjust compression performance accordingly. Emphasis shall be given to adequate compression depth, and appropriate rate.
- Alternates duty cycles with the ventilator, or other on-scene members to ensure ongoing high-quality chest compressions.
- "Hovers," no more than two inches over the patient's chest during any pause in chest compressions, including defibrillation attempts, in order to minimize the interruption in compressions or “hands off” time.



➤ **Ventilator**

- Opens and clears the airway.
- Appropriately utilizes BLS airway adjuncts.
- Delivers artificial ventilations via BVM at an appropriate ratio or rate depending on clinical scenario (15:2, 30:2, or continuous).
- If there is difficulty with BVM ventilations, an i-gel airway device can be placed.
- Once an advanced airway is in place (i-gel or endotracheal tube) ventilations shall occur at a rate of one breath every 6 seconds in adults and one breath every 2-3 seconds in children.
- Ventilatory volumes should be just enough to see chest rise. If an ALS monitor/defibrillator is in place members should be guided by the real BVM help ventilatory feedback device.

➤ **Paramedic**

- Primary clinical decision maker on all aspect of the resuscitation NOT related to chest compressions, management of the Lucas device, timing of two-minute pulse checks, and ventilation rate.
- Performs manual defibrillation when clinically indicated. May choose to run monitor/defibrillator in AED mode if desired.
- Evaluates effectiveness of current airway/ventilation performance. May perform intubation if indicated.
- Obtains IV/IO access.
- Administers medications and provides additional treatment as needed.
- Determines need for transport if indicated by protocol (e.g., refractory VF)
- Determines if and or when patient meets criteria for termination of resuscitation.
- Contacts medical control if needed.

➤ **EMS Supervisor**

- Provides overall supervision of the medical care provided during all phases of the cardiac arrest resuscitation.
- Supports the paramedic and CPR coach as needed.
- Maintains broad situational awareness of the resuscitation making mental notes of areas for post incident debrief.
- Pre-plans patient evacuation and ensures medical optimization of the patient prior to movement.
- Depending on the workload and task saturation of the paramedic, the EMS Supervisor may assist with providing family support, medical control communication, etc.



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DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Cardiac Management

PIT Crew CPR

14.2.8

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DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures – Cardiac Management

Push-Dose Epinephrine 14.2.9

Purpose:

Provide hemodynamic support to patients with severe hypoperfusion/hypotension not responsive to initial fluid resuscitation.

ALS

Inclusion Criteria:

Any patient who has fluid refractory hypotension from a suspected medical etiology (e.g., sepsis, cardiogenic shock, post cardiac arrest syndrome, etc.)

Push-dose epinephrine can be useful in the following situations:

- An anticipated transient drop in blood pressure (e.g. performing medication facilitated intubation on a dehydrated patient with severe sepsis).
- As a short-term bridge to the initiation of a vasopressor infusion by EMS or at the hospital.
- Temporizing perfusion of critical organs (heart, brain, kidneys) while aggressive fluid resuscitation and blood product replacement is taking time to effect

Exclusion Criteria:

- Patient is in cardiac arrest. See Cardiac Arrest Protocol.
- Hypotension is due to blood loss or trauma

Procedure:

1. Take a 10 ml syringe with 9 ml of normal saline
2. Into this syringe, draw up 1 ml of 0.1 mg/ml epinephrine from the “code epi”. (Cardiac arrest epinephrine amp contains 100 mcg/ml labeled as 0.1 mg/ml)
3. Shake well
4. Now you have 10 mls of push-dose epinephrine at a concentration of 10 mcg/ml





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures – Cardiac Management

Push-Dose Epinephrine 14.2.9

Dose:

<i><u>Adult</u></i>	<i><u>Pediatric</u></i>
1 ml (10 mcg) IV/IO every 1 minute as needed Titrate to desired blood pressure	1 mcg/kg IV/IO (max single dose 1 ml or 10 mcg) every 1 minute as needed Titrate to desired blood pressure

Onset of Action: 1 minute

Duration: 5-10 minutes

Caution:

Three mistakes can occur when mixing or using push-dose epinephrine. Providers shall pay specific attention to the following to avoid medication errors:

1. Be sure to use 0.1 mg/ml “code epi” and NOT 1 mg/ml “anaphylaxis epi”
2. Be sure to use 1 ml of epi with 9 ml of normal saline and NOT 9 ml of epi with 1 ml of normal saline
3. Once the push-dose epinephrine is mixed in a syringe, it looks identical to a regular normal saline flush. The push-dose epinephrine syringe shall be labeled to prevent confusion with a normal saline flush.

General Notes:

- Push-dose epinephrine is NOT a substitute for appropriate resuscitative efforts and thus is not appropriate for mild/borderline hypotension or those patients who have not yet received IV/IO fluid resuscitation.
- If the patient needs CPR then give the usual code dose of epinephrine. Push-dose epi can be used post resuscitation in the management of post-arrest severe hypotension
- Any patient older than 1 year old (10kg) can be managed using the max single dose of 1 ml (10 mcg) every 1 minute as needed.



QUICK REFERENCE

HOW TO MIX PUSH DOSE EPINEPHRINE



Then, draw up 1cc epinephrine into the flush to make 10cc



Dose: 1 ml (10 mcg) every 1 minute as needed



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures – Cardiac Management

Epinephrine 0.1 mg/ml (1:10,000) Shortage 14.2.10

This protocol applies to adult and pediatric patients when epinephrine 0.1 mg/ml (1:10,000) prefilled syringes aka “cardiac arrest epinephrine” is in low supply or unavailable. It provides instruction on how to use epinephrine 1 mg/ml (1:1,000) aka “anaphylaxis epinephrine” in cardiac arrest and how to make [push-dose epinephrine](#).

ADVANCED LIFE SUPPORT PROVIDERS

Inclusion Criteria:

- Patient is in cardiac arrest and resuscitation attempt is indicated per [Cardiac Arrest protocol](#).
- Any patient with fluid refractory hypotension from a suspected medical etiology (e.g., sepsis, cardiogenic shock, post cardiac arrest syndrome) who requires the use of push-dose epinephrine.
- Epinephrine 0.1 mg/ml (1:10,000) prefilled syringes aka “cardiac arrest epinephrine” is in low supply or not available due to national manufacturing shortages or other logistical constraints.
- Epinephrine 1 mg/ml (1:1,000) vial is available for administration.

Exclusion Criteria:

- None

Procedure

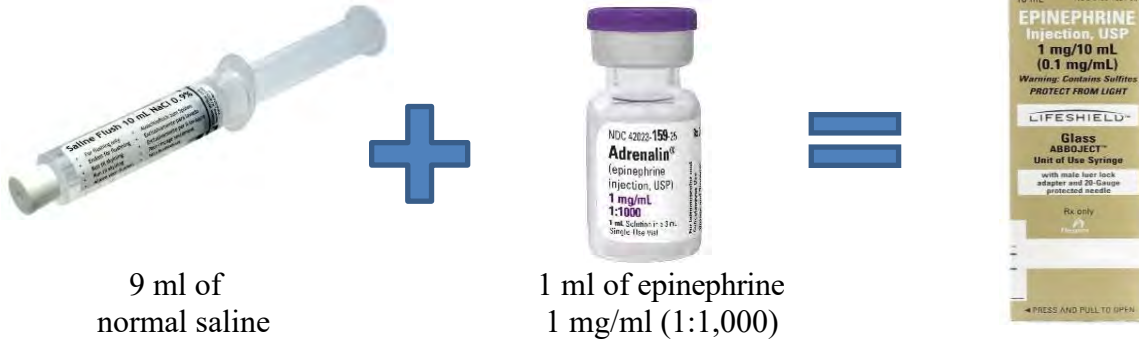
1. When 0.1 mg/ml epinephrine (1:10,000) prefilled syringes are in low supply, use remaining prefilled syringes sparingly.
 - It is preferable to limit prefilled syringe use in cardiac arrest to situations where there is only one paramedic on scene with multiple competing tasks to be performed.
 - When 2 or more paramedics are on scene or a single paramedic has sufficient logistical ability to draw up medications, make epinephrine 0.1 mg/ml (1:10,000) from 1 mg/ml (1:1,000) as described below.
2. To make epinephrine 0.1 mg/ml (1:10,000) from epinephrine 1 mg/ml (1:1,000) complete the following:
 - Take a 10 ml normal saline flush and waste 1 ml.
 - Draw up 1 ml of 1 mg/ml epinephrine (1:1,000) into this same saline flush to create a 10 ml syringe of 0.1 mg/ml epinephrine (1:10,000).
 - This syringe is now identical to your normal cardiac arrest prefilled epinephrine syringes and can be used as such for both adult and pediatric patients.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures – Cardiac Management

Epinephrine 0.1 mg/ml (1:10,000) Shortage 14.2.10



- ❖ **Safety Concern:** be sure the newly created 10 ml syringe of 0.1 mg/ml epinephrine (1:10,000) is labeled appropriately and not mistaken for a normal saline flush.
 - ❖ **Important Note:** this dilution process is similar to how we make [push-dose epinephrine](#) but the final concentrations are different. Remember for cardiac arrest we are making a 10 ml syringe of 0.1 mg/ml epinephrine (1:10,000). For push-dose epinephrine we are making a 10 ml syringe of 0.01 mg/ml epinephrine (1:100,000). See below for push-dose epinephrine.
3. To make push-dose epinephrine (0.01 mg/ml) from the 10 ml syringe of 0.1 mg/ml epinephrine (1:10,000) that you just mixed:
- Take a second 10 ml saline flush and waste 1 ml.
 - Utilizing a three-way stopcock, or Baxter Rapid-Fill Connector, transfer 1 ml of the 0.1 mg/ml epinephrine (1:10,000) made as above into the second saline flush.
 - The second saline flush is now a 10 ml syringe of 0.01 mg/ml epinephrine (1:100,000) i.e., push-dose epinephrine 10 mcg/ml.
 - Administer push-dose epinephrine based on patient condition per normal [push-dose epinephrine](#) procedure.

General Notes:

- Although diluted epinephrine has been shown to be chemically stable for some time after dilution, members shall not pre-mix epinephrine prior to its intended use. Creation of 0.1 mg/ml epinephrine (1:10,000) or push-dose epinephrine (1:100,000) shall occur at the time of its intended use and any excess prepared syringes not used shall be disposed of at the end of that specific incident.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Venous Access Management

Blood Glucose Analysis 14.3.1

Clinical Indications:

- Patients with suspected hypoglycemia (diabetic emergencies, change in mental status, bizarre behavior, etc.).

Procedure:

1. Gather and prepare equipment.
2. Blood samples for performing glucose analysis should be obtained simultaneously with intravenous access when possible.
3. Place correct amount of blood on reagent strip or site on glucometer per the manufacturer's instructions.
4. Time the analysis as instructed by the manufacturer.
5. Document the glucometer reading and treat the patient as indicated by the analysis and protocol.
6. Repeat glucose analysis as indicated for reassessment after treatment and as per protocol.
7. If after dextrose administration the glucose level is substantially low per a reading in a cool digit, utilize a more centrally located alternate site for testing.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Venous Access Management

Venous Access – Existing Catheters 14.3.2

Clinical Indications:

- Access of an existing venous catheter for medication or fluid administration in critical patient's only

Providers **MAY** Access:

- Peripherally Inserted Central Catheters (PICC lines)
- Tunneling catheters such as Broviac, Hickman, and Groshong
- Non-tunneled, dual lumen catheters used for temporary dialysis access, i.e., Quinton catheters.

Providers **MAY NOT** Access:

- Dialysis catheters: Arteriovenous shunts (synthetic bridges between the arterial and venous circulation located under the skin in the forearm).
- Subcutaneous internal access devices that require access through the skin, for example, Port-a-Cat, Medi-Port

Procedure:

1. Clean the port of the catheter with an alcohol wipe.
2. Remove the cap to the port and attach the empty 10 ml syringe to the catheter port.
3. Unlock the clamp on the access line, if applicable, and aspirate blood from the port. Blood should aspirate freely. If it does not, replace the cap and ***DO NOT*** use the access port.
4. Lock the clamp, if applicable, and remove the syringe with the aspirated blood. Dispose of the syringe in a biohazard container.
5. Connect a syringe containing 10 ml of normal saline to the port, unlock the clamp, and flush the device. The line should flush easily. Re-clamp the line.
6. Remove the syringe and connect the primed IV to the port. Unclamp the line and adjust flow rate as needed.
7. Begin administration of medications or IV fluids slowly and observe for any signs of infiltration. If difficulties are encountered, stop the infusion and reassess.
8. Record procedure, any complications, and fluids / medications administered on the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Venous Access Management

Venous Access – External Jugular 14.3.3

Clinical Indications:

- External jugular vein cannulation is indicated in a critically ill patient >8 years of age who requires intravenous access for fluid or medication administration and in whom an extremity vein is not obtainable.
- External jugular cannulation can be attempted initially in life threatening events where no obvious peripheral site is noted.

Procedure:

1. Place the patient in a supine head down position. This helps distend the vein and prevents air embolism.
2. Turn the patient's head toward the opposite side if no risk of cervical injury exists.
3. Prep the site with alcohol.
4. Apply pressure to the vein lightly with one finger above the clavicle to allow the vein to engorge.
5. Align the catheter with the vein and aim toward the same side shoulder.
6. Puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in the usual method.
7. Attach the IV tubing or saline lock and secure the catheter with taping and/or dressing.
8. Document the procedure, time, and result (success) on the patient care report (PCR).



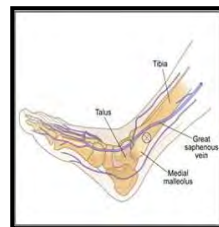
Clinical Indications:

- Patients where peripheral IV access is unobtainable with any of the following:
 - Cardiac arrest. **The right proximal humeral head is the preferred site.**
 - Single or Multi-system trauma with severe hypovolemia.
 - Any unconscious or seriously ill patient requiring immediate medication therapy or fluid replenishment.



Contraindications:

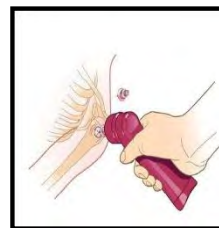
- Fracture proximal to proposed intraosseous site.
- History of Osteogenesis Imperfecta.
- Current or prior infection at proposed intraosseous site.
- Previous intraosseous insertion or joint replacement at the selected site.



Procedure:

1. Locate landmarks.

- Adult ≥ 40 kg (AD or LD Needle)
 - Proximal Tibia - The insertion point is two finger widths below the patella, 1-2 cm medial of the tibial tuberosity.
 - Distal Tibia - Identify the major structures of the lower leg, the distal tibia (anterior or most forward lower leg bone) and the medial malleolus (medial ankle bone or protrusion). The insertion point is two finger widths proximal to the medial malleolus and midline on the tibia.
 - Proximal Humeral - Palpate and identify the mid-shaft humerus and continue palpating toward the proximal aspect or humeral head. As you near the shoulder you will note a protrusion. This is the base of the greater tubercle insertion site.
- Pediatric 3-39 kg (PD Needle)
 - Proximal Tibia - 1 cm distal to tibial tuberosity and then medial along the flat aspect. Gently guide the driver, do not push. If **NO** tuberosity is present, the insertion is located two finger widths below the patella and then medial along the flat aspect of the tibia. Carefully feel for the “give” indicating penetration into the medullary space.





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Venous Access Management

Venous Access/EZ-IO 14.3.4

- Distal Tibia - Identify the major structures of the lower leg, the distal tibia (anterior or most forward lower leg bone) and the medial malleolus (medial ankle bone or protrusion). The insertion point is one finger width proximal to the medial malleolus for patients less than 12 kg. As the patient reaches the 39 kg mark, the insertions point is two finger widths from the medial malleolus.
 - Proximal Humeral - Palpate and identify the mid-shaft humerus and continue palpating toward the proximal aspect or humeral head. As you near the shoulder you will note a protrusion. This is the base of the greater tubercle insertion site. The greater tubercle may be difficult to palpate on patients weighing less than 25 kgs.
2. Prepare the skin with alcohol.
 3. Load the needle onto the driver.
 4. Firmly stabilize the leg near (not under) the insertion site
 5. Firmly press the needle against the site and operate the driver. Use firm, gentle pressure.
 6. As the needle reaches the bone, stop and be sure that the 5 mm marking on the needle is visible; if it is, continue to operate the driver.
 7. When a sudden decrease in resistance is felt and the flange of the needle rests against the skin, remove the driver and the stylette from the catheter.
For adult humerus site drive the needle so hub touches skin surface.
 8. Confirm placement by aspiration of bone marrow.
 9. Place EZ-IO™ immobilization device over hub.
 10. Attach primed extension set.
 11. Flush the EZ-IO™ needle rapidly with 10 ml of saline. Infuse 4 ml of 1% Cardiac Lidocaine for conscious patients and allow dwell time of 2-4 minutes.
 12. If no infiltration is seen, attach the IV line and infuse fluids and/or medications as normal.
 13. Secure the needle by securing tape on immobilization device.
 14. IV bag may need to be under pressure for infusion.
 15. Document the procedure, time, and results on the patient care report (PCR).



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Venous Access Management

Venous Access – IO - Jamshidi 14.3.5

Clinical Indications:

- Life threatening illness or injury in a child <8 years of age or <40 kg in weight.

Procedure:

1. Expose the lower leg.
2. Identify the tibial tuberosity (bony prominence below the knee cap) on the proximal tibia. The insertion location will be 1-2 cm (2 finger widths) below this and medially.
3. Prep the site with alcohol.
4. Hold the intraosseous needle perpendicular to the skin, twist the needle with a rotating grinding motion applying controlled downward force until a "pop" or "give" is felt indicating loss of resistance. Do not advance the needle any further.
5. Remove the stylette and attach a 10 ml syringe filled with 5 ml of Normal Saline.
6. Attempt to extract marrow into the syringe; then inject the saline while observing for infiltration.
7. Stabilize and secure the needle.
8. Document the procedure, time, and result (success) on the patient care report (PCR).

**Background:**

The Broselow™ Pediatric Emergency Tape is designed to be used as a quick reference to drug dosing and equipment sizing on pediatric patients. The Broselow™ tape is calibrated in different colors according to different lengths. The color that corresponds to the patient's length is used. If the Broselow™ bag is also used, the color on the tape can be matched with the color on the pouch that contains the appropriately sized equipment and drugs.

Procedure:

1. Place the patient in a supine position.
2. Remove tape from package and unfold.
3. Place tape next to patient, ensuring that the multicolored side is facing up.
4. Place red end of tape even with the top of the patient's head.
5. Place the edge on one hand on the red end of the tape.
6. Starting from the head, run the edge of your free hand down the tape.
7. Stop hand even with the heel of the patient's foot (if patient is larger than tape, stop here and use appropriate adult technique).
8. Verbalize the color block (on edge of tape) and weight range where your free hand has stopped. If patient falls on the line, go to the next higher section.
9. Use color block (on edge of tape) to identify the weight range of the patient.
10. Use weight range to determine appropriate size of equipment and approximate dosages for medications.



Background:

The helmet removal procedure is a guideline designed in two parts. Part I is for those patients wearing a motorcycle, bicycle, or other non-football type head protective device. Part II is designed for those patients wearing a football helmet.

Non-Football Helmets

1. Perform a Primary Survey if possible. Also, if the situation permits, ascertain if the victim has the ability to move their extremities. If unable to perform a primary survey, go to step 2.
2. The in-charge rescuer should designate a trained rescuer (Rescuer II) to manually control the cervical spine. The in-charge rescuer should kneel beside the patient and remove the chin strap device. A third rescuer should prepare padding for use to keep the spine in a neutral position.
3. The in-charge rescuer should then take control of the cervical spine from a side position to the patient. Rescuer II should then relinquish control of the cervical spine to the in-charge rescuer.
4. Rescuer II should remove the helmet by spreading the sides of the helmet and removing the helmet using caution not to manipulate the cervical spine. The in-charge rescuer should be prepared to hold the head, as when the helmet is removed there will be an increase in weight.
5. A pad may need to be inserted under the patient's head to maintain position of the c-spine. Cervical spine control should then be maintained by rescuer II.
6. The in-charge rescuer should then resume the primary survey, further assessment and interventions.

Football Helmets

1. Perform a Primary Survey. Also, if the situation permits, ascertain if the victim has the ability to move all extremities.
2. If the football helmet fits and the airway is maintainable with the helmet in place, do not remove the helmet. Immobilize manually and complete the primary survey. If transportation is necessary, the cervical spine should be immobilized with the helmet and shoulder pads in place. A CID, towels, or blanket rolls may be used to immobilize the head on a back board. The face mask may be removed.
3. If the football helmet does not fit correctly or the airway is not maintainable with the helmet in place, then the helmet needs to be removed.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/EMS Procedures

Helmet Removal 14.4.2

4. The in-charge rescuer should designate a trained rescuer (rescuer II) to manually control the cervical spine. The in-charge rescuer should kneel beside the patient and remove the chin strap, ear pads, and remove the face mask retainers. (If not already done) A third rescuer should prepare padding for use to keep the spine in a neutral position.
5. The in-charge rescuer should then take control of the cervical spine from a side position to the patient. Rescuer II should then relinquish control of the cervical spine to the in-charge rescuer.
6. Rescuer II should remove the helmet by spreading the sides of the helmet and removing it from the head without moving the cervical spine. The in-charge rescuer should be prepared to hold the head, as when the helmet is removed there will be an increase in weight. Padding may need to be inserted under the patient's head to maintain neutral position. Cervical spine control should then be maintained by rescuer II.
7. If shoulder pads need to be removed, the helmet should be removed prior to the shoulder pads. When removing shoulder pads remove the straps and lift on side of the pads prior to log-rolling. Then after rolling the patient on their side, finish removing the shoulder pads. A cervical immobilization device (CID) pad or a 1" pad may be sufficient to maintain neutral alignment of the cervical spine.
8. Immobilize on a long backboard using a cervical collar, straps, and a cervical immobilization device. Continue the assessment.



Combative Patient Restraint - Adult & Pediatric:

There are many reasons why a patient may be combative – mental illness, drug/alcohol ingestion, post-ictal state, hypoxia, traumatic head injuries or from an unknown etiology. The priority when caring for medical patients who present with combative behavior is to identify and treat the underlying cause.

Note: Prior to restraining a patient, the EMS provider must assess the patient's mental status and determine whether the patient presents a potential or definite life threat to themselves or others.

Patient Management:

If patient has an altered mental status:

- Ensure adequate assistance is available to restrain the patient.
- All personnel should be instructed as to how the patient will be restrained. This will ensure the safety of the patient as well as emergency personnel.
- Restrain the patient.
- Document.
- Assess the patient continuously to prevent complications until turned over to ED personnel.

Restraint procedure:

1. Soft medical restraints only are secured to each extremity.
2. Place patient supine on a long backboard (LBB).
3. Both lower extremities are secured to the LBB.
4. Left arm is secured to the LBB beside the patient's body.
5. Right arm is flexed above the patient's head and secured to the LBB by the wrist.
6. Patient's body is secured to the LBB using straps.
7. Perform a complete assessment on the patient and reassess every 5 minutes.
8. Notify the receiving facility of transport.
9. Consider the use of chemical restraint (See Behavioral / Psychological Emergencies Protocol).
10. The use of medication mandates continuous observation by the paramedic, to prevent respiratory arrest, insufficiency, or aspiration.



Suicidal patient who is alert and oriented as normal and refusing transport:

1. Attempt to convince the patient to allow transport, use family and/or friends to assist. However, family/friends may agitate the patient and need to be distanced.
2. Request the assistance of the Metropolitan Police Department (MPD).
3. All personnel should be instructed as to how the patient will be restrained. This will ensure the safety of the patient as well as emergency personnel.
4. Restrain the patient.
5. Perform a complete assessment on the patient and reassess every 5 minutes.
6. Notify the receiving facility of transport and ask for security personnel to be available upon arrival, if needed.

Documenting a Restraint Procedure:

1. Reason(s) why restraint was necessary.
2. Any assessment findings obtained through observation (injuries, behavior, mental status, etc.) prior to restraining.
3. Describe the position in which the patient was restrained.
4. Time the patient was restrained.
5. Assessment findings after the patient was restrained and during transport.
6. Once the patient is restrained, one EMS provider must remain with the patient at all times.

Note: Do not place or allow any restraint to impair circulation or respirations. The dignity of the patient must be considered during and after the restraining process.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/EMS Procedures

Tourniquet Use 14.4.4

ALS - BLS

Clinical Indications:

- A tourniquet may be used to control hemorrhage in extremities that is severe, potentially life or limb threatening, and unable to be controlled by direct pressure.
- For any traumatic total or partial amputation, a tourniquet should be applied as proximal – high on the limb – as possible above the amputation, regardless of current hemorrhage.

Contraindications:

- Non-extremity sites of hemorrhage such as the head, neck, or torso.

Precautions:

- A tourniquet applied incorrectly can increase blood loss and be generally ineffective.
- Tourniquets currently approved for use are meant for use on extremities but are not effective on axillary or groin vascular injuries. In axillary or groin vascular injuries move to direct pressure, wound packing, hemostatic agent, and compression bandage use.
- A commercially made tourniquet is the preferred tourniquet. If none is available, a blood pressure cuff inflated to a pressure sufficient to stop bleeding can be tried only until a commercially made tourniquet is available. If utilizing this type of improvised tourniquet, the EMS provider must ensure the effectiveness of the improvised device. Blood pressure cuffs will gradually lose pressure and need re-inflation, or the Velcro closure may come loose.
- Severe pain may occur with tourniquet application. Analgesics are usually needed.

Procedure:

- Use of our own department issued tourniquets is preferred if immediately available.
- Attempt to control hemorrhage via direct pressure (at the site of the bleeding as well as pulse points) while preparing tourniquet. Kneel on extremity at pulse points such as the brachial artery or femoral artery.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/EMS Procedures

Tourniquet Use 14.4.4

- Apply tourniquet according to manufacturer specifications and using the steps below:
 - If able to fully expose and evaluate wound, apply tourniquet directly over the skin and not over clothing. Always apply tourniquets as proximal – high on the limb as possible.
 - The following circumstances may create time or resource limitations that require applying the tourniquet over clothing:
 - (1) Hemorrhage is severe enough that loss of life or limb is imminent.
 - (2) An active threat environment restricts provider actions.
 - (3) Patient volume and acuity exceeds available resources.
 - **Do not apply a tourniquet over a joint.**
 - Tighten tourniquet until bleeding stops and pulses distal to tourniquet are no longer palpable.
 - Mark the time of each tourniquet application.
 - Ensure tourniquet is not obscured by dressings or clothing.
 - Reassess tourniquet efficacy after moving patient, and at least every 15 minutes thereafter. If it is noted at any time that a tourniquet has become ineffective as evidenced by continued bleeding or palpable distal pulses, identify cause of failure (e.g. tourniquet over clothing, improper application, faulty device, blood pressure cuff has lost pressure). Consider tightening tourniquet. DO NOT remove tourniquet.
 - If tourniquet is still ineffective, locate a suitable site for application of a second tourniquet, preferably proximal to the first tourniquet.
 - Keep tourniquet on throughout all care phases – a correctly applied tourniquet should only be removed by the receiving hospital.
 - Provide pain management as per our protocols.



This procedure describes the indications for and procedural steps to using a Morgan Lens for eye irrigation.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Foreign body or chemical in the eye (e.g., chemicals, non-embedded foreign bodies).
- Foreign body sensation in the eye without visible debris.

Exclusion Criteria:

- Penetrating eye injuries.
- Confirmed or suspected rupture of the globe.
- Confirmed or suspected eye infection.

Procedure:

1. Attach Morgan Lens to sterile IV tubing and normal saline bag.
2. Prime IV tubing with normal saline.
3. Have patient look down, retract upper lid and insert Morgan Lens under lid.
4. Have patient look up, retract lower lid and gently place lens.
5. Release lower lid over lens and ensure steady, copious flow.
6. Secure tubing to prevent accidental lens removal.
7. Absorb saline outflow with extra towels and sheets.
8. Irrigate with at least 1 Liter of fluid and DO NOT RUN DRY.
9. To remove the Morgan Lens:
 - Ensure flow of solution is continued.
 - Have patient look up and retract lower lid and upper lid if necessary.
 - Gently slide Morgan Lens out and off the eye.
 - Stop flow of solution only after removing lens completely from the eye.
10. Document procedure completely, including solution and volume used to irrigate.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Wound Packing 14.4.6

This procedure describes the indications and procedural steps for wound packing. It applies to adult and pediatric trauma patients. **Only gauze with an x-ray detectable strip may be packed into a wound cavity.**

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients with moderate to severe bleeding at sites not amenable to tourniquet placement (i.e., junctional sites such as the groin or axilla, torso, neck, etc.)

Exclusion Criteria:

- Minor bleeding is controlled or can be controlled with less invasive methods i.e., direct pressure.
- Moderate to severe bleeding at a site that can be controlled with application of a tourniquet.

Definitions:

- **Junctional Bleeding:** bleeding from a junction between the torso and an extremity.
 - Base of the neck
 - Shoulder
 - Armpit
 - Perineum
 - Buttocks
 - Gluteal area
 - Groin
- **Hemostatic Gauze:** a commercial gauze impregnated with a chemical agent or compound that aids in hemostasis or clot formation. The gauze is typically “Z-folded” to allow for easy, linear, insertion into a wound cavity and includes an x-ray detectable strip. Examples include Combat Gauze® and ChitoGauze®.

Procedure:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
2. Expose the patient and locate any injuries for which wound packing is indicated.
3. Immediately apply and maintain direct pressure to the site of bleeding. If possible, apply pressure by placing gloved fingers into the wound—with or without gauze—and apply direct pressure to the bleeding artery and/or vein. Apply compressive force against a bone if anatomically feasible.



4. If possible, remove excessive pooled blood from the wound while preserving any clots already formed in the wound.
5. While maintaining direct pressure, pack hemostatic gauze tightly and deeply into the wound – directly onto the source of bleeding if it has been located.
 - Pack around (do NOT remove) bone fragments or foreign objects.



6. Continue to tightly pack hemostatic gauze into the wound until it forms a small mound over the wound. The goal is to pack the entire wound cavity very tightly.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Wound Packing 14.4.6

7. After packing of the wound is complete, hold continuous, firm, direct pressure over the wound for a minimum of three minutes.
 - ❖ Important Note: This step is critical to the efficacy of hemostatic gauze and should not be overlooked



8. Reassess to ensure bleeding is controlled. Do NOT remove packing to assess bleeding.
9. If bleeding is controlled, bandage the site with a pressure dressing. If the wound continues to bleed, pack additional hemostatic gauze, and maintain continuous, firm, direct pressure.





DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Wound Packing 14.4.6

General Notes:

- Combat Gauze® is currently the hemostatic gauze of choice based on recommendations from the Committee on Tactical Combat Casualty Care (CoTCCC).
- None of the currently available hemostatic gauze products cause exothermic reactions or heat release.
- Celox® and ChitoGauze® both use chitosan, a purified, natural polymer extracted from shrimp shells, as their hemostatic agent. Both are safe for use in patients that have known or suspected shellfish allergies.
- Granulated and/or topical hemostatic agents are not currently recommended by the CoTCCC.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Chest Seal 14.4.7

This procedure describes the indications for and procedural steps to place a chest seal. It applies to adult and pediatric trauma patients.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Adult and pediatric patients with an open penetrating traumatic wound to the thorax from the level of the belly button to the clavicles, including the back and armpits.

Exclusion Criteria:

- No open penetrating traumatic injury to the thorax.

Definitions:

- **Vented Chest Seal:** an occlusive dressing that incorporates a valve(s), or channels into its design, which:
 - Prevents external air from entering the pleural cavity during inspiration.
 - Allows air and blood from underlying lung injury to be released during exhalation.
 - ❖ This design has been shown to reduce the likelihood of the development of tension pneumothorax. Examples of vented chest seals include HyFin® Vent, SAM® Chest Seal, Halo® Vent and the Asherman Chest Seal®.
- **Non-vented Chest Seal:** a simple occlusive dressing that fully seals a chest injury.
 - Examples of non-vented chest seals include the Halo® and Halo XL chest seal, H&H® Wound Seal and DualSeal, and improvised dressings (e.g., foil, plastic, etc.,) taped on all four sides.
- ❖ **Important Note:** The preferred sequence of chest seal selection is:
 1. Commercial vented chest seal
 2. Commercial non-vented chest seal
 3. Improvised chest seal, occlusive dressing sealed on three sides.

Procedure:

1. Initiate assessment and patient care per [General Trauma Management protocol](#).
2. Expose the patient and locate any penetrating injuries for which chest seal application is indicated.
3. Open the chest seal packaging using the red tear notches.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Chest Seal 14.4.7



4. Use the included gauze to wipe away blood, sweat, or other debris from the area of application.
5. Using the red tabs, separate the clear backing from the adhesive side of the chest seal.
6. Center the vent over the wound and firmly press the seal onto the skin, fully smoothing out all edges over the skin.



Figure 1: A properly placed chest seal



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

Chest Seal 14.4.7

7. Monitor for the potential development of a subsequent tension pneumothorax. If the patient develops increasing hypoxia, respiratory distress or hypotension after chest seal placement and a tension pneumothorax is suspected:
 - BLS providers shall burp or remove the chest seal as needed.
 - ALS providers shall perform [needle thoracostomy](#).

General Notes:

- The HyFin® Vent is used as the example in this protocol, but all chest seals are applied in a fundamentally similar fashion. Be sure to center any vent component of a chest seal over the injury you are sealing.
- Commercial chest seals are designed for use in a working environment and even in the presence of blood, contaminants, or body hair, they adhere reasonably well. However, providers should attempt to apply the seals to the cleanest and driest surface possible to maximize efficacy.
- Commercial chest seal adhesives are designed to maintain their effectiveness, even if temporarily removed (i.e., burped) or released several times.
- Chest seal packaging and the clear backing to the adhesive side of the seal may be retained for use as improvised occlusive dressings, if the number of patients or injuries exceeds the number of chest seals available on scene.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

SAM Pelvic Sling 14.4.8

This procedure describes the indications for and procedural steps to place a pelvic sling, also known as a “pelvic binder.” It applies to only adult trauma patients.

ALL PROVIDER LEVELS

Inclusion Criteria:

- Patient (15 years old or greater) who has sustained a high energy blunt mechanism of injury (e.g., high-speed motor vehicle collision or motorcycle crash, fall from significant height, pedestrian struck by automobile, or blast injury).
- AND**
- Any one of the following three criteria is present:
 - Obvious signs of pelvic injury/instability on physical exam.
 - Pain to the pelvis, lower back, groin, or hip.
 - Leg length discrepancy (one leg shorter than the other) or a rotational deformity or lower limb amputation.
 - Bruising over the flank, pelvis, perineum, or scrotum.
 - Wounds over the pelvis or bleeding from the rectum, vagina, or urethra.
 - Signs of hemorrhagic shock and reports pelvic or low back pain/tenderness even if the pelvis seems stable.
 - Signs of hemorrhagic shock and altered mental status regardless of the presence or absence of pelvic pain or instability.
- ❖ Important Note: potential risks of missing an occult pelvic injury outweigh the risks or complications associated with pelvic binding. Therefore, all patients with suspected pelvic trauma should be placed in a binder.

Exclusion Criteria:

- Patient is 14 years old or less.
- Penetrating mechanism of injury.
- Presence of an impaled object that would interfere with placement of a pelvic binder.
- ❖ Important Note: traction splints cannot be used with pelvic slings. Standard immobilization of the lower extremities (e.g., straighten to length, padded board etc.) should be used if a pelvic sling is indicated.

Definitions:

- **Open book pelvic fracture:** term used to describe any pelvic fracture that significantly disrupts the pelvic ring. These injuries combine an anterior pelvic injury causing widening (opening) of the pubic symphysis, and a posterior pelvic fracture or ligamentous injury. Open book pelvic injuries result in a risk of major hemorrhage and result in a high incidence of death or disability.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

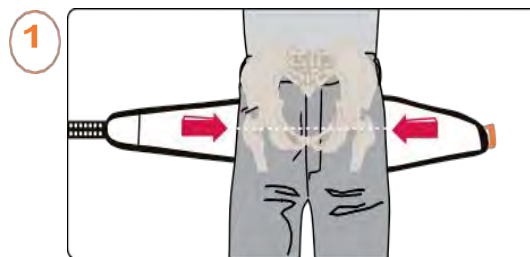
SAM Pelvic Sling 14.4.8

- **Pelvic binder:** a commercially available pelvic stabilization device. The SAM Pelvic Sling™ II is one such device. Application of a pelvic sling may benefit the patient by reducing:
- Pelvic volume: this can help tamponade bleeding.
 - Fracture movement and reinjury.
 - Further vascular damage.
 - Pain and discomfort.

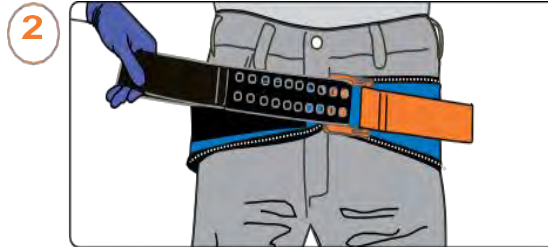
Procedure:

The pelvic sling deployed by DC Fire and EMS is the SAM Pelvic Sling™ II. The instructions for application of this device are as follows:

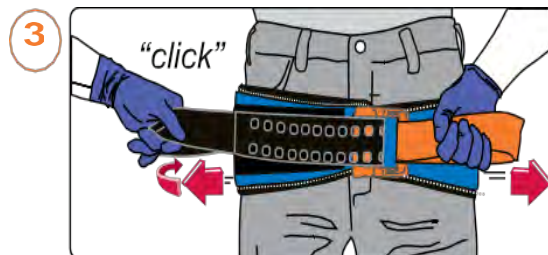
1. Initiate assessment and patient care per [General Trauma Management protocol](#).
 - ❖ Important Note: it is strongly recommended that providers avoid “rocking” the pelvis as this may further displace fracture fragments and dislodge already formed blood clots. Instead, gently palpate the bony structures of the pelvis and lower spine for tenderness.
2. Circumferentially expose the area around the pelvis. The pelvic sling should be placed next to the skin. If unable to remove clothing, be sure to remove objects from the patient’s pockets or pelvic area prior to applying the pelvic sling.
3. Place the SAM Pelvic Sling™ II, grey/black side up beneath the patient’s thighs. With assistance, gently elevate the pelvis and slide the SAM Pelvic Sling™ II superiorly into place. If possible, avoid log rolling the patient to place the device.
4. The proper alignment of the SAM Pelvic Sling™ II is at the level of the trochanters (hips), not on or by the iliac wings.



5. Place black strap through the buckle and pull completely through.



6. Hold the orange strap and pull the black strap in the opposite direction until you hear and feel the buckle “click.”
 - The buckle mechanism is designed to click when the proper amount of tension (33 lbs.) has been applied.
6. Maintain tension and immediately press the black strap onto the surface of SAM Pelvic Sling™ II to secure the Velcro closure.
 - Important note: do NOT be concerned if you hear a second “click” after SAM Pelvic Sling™ II is secured.



7. Once a pelvic binder is applied, it should remain in place until the patient reaches definitive care at an appropriate receiving trauma center.

General Notes:

- Pelvic fractures most frequently occur in patients 15-28 yo who sustain high-energy, side-impact mechanisms of injury such as high-level falls or MVC's. To disrupt the pelvic ring requires a significant force of injury, equivalent to instantly coming to a stop from 30 miles per hour.
- The most feared complication of a pelvic injury is rapid and uncontrolled hemorrhage into the retroperitoneal space. Pelvic fractures can be a contributing cause of uncontrolled hemorrhage and subsequent mortality in trauma patients. Depending on the anatomy of



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures / EMS Procedures

SAM Pelvic Sling 14.4.8

the fracture, bleeding from a pelvic fracture can range from several hundred milliliters to a patient's entire blood volume.

- The source of pelvic hemorrhage is found to be venous injury in 80-90% of cases. Up to 20% of pelvic fractures may result in hemodynamic instability.
- As a result of these high-energy impacts, pelvic fractures are frequently associated with potentially life-threatening, coexisting injuries to the head, chest, abdomen, or spinal column.
- Classic teaching encourages “rocking” or “springing” the pelvis to identify pelvic tenderness or instability and thus a possible source of internal hemorrhage. However, this technique has proved to be very unreliable, detecting only the most severe pelvic disruptions. Furthermore, this maneuver may be dangerous to the patient by further displacing fracture fragments and dislodging formed blood clots, resulting in worsening hemorrhage. Thus, it is strongly recommended that providers avoid rocking the pelvis. Instead, gently palpate the bony structures of the pelvis and lower spine for tenderness. Some clinicians also recommend a cautious, one-time only, inward compression maneuver of the iliac crests to assess for instability.
- Classic teaching on the management of pelvic fractures recommends circumferentially wrapping a bed sheet around the pelvis while taping the lower limbs in internal rotation to reduce the pelvic volume. Although successful reduction of open-book pelvic fractures with a circumferential sheet has been reported, this technique is often difficult to consistently reproduce, requires multiple providers to accomplish, and frequently doesn't achieve or maintain the necessary reduction force.
- [SAM® Pelvic Sling Training | Single Person Application | SAM Medical](#)
- [SAM® Pelvic Sling Training | Two Person Application | SAM Medical](#)



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Endotracheal Drug Administration 14.5.1

Clinical Indications:

- Cardiac arrest when an endotracheal tube has been placed and venous or IO access is unobtainable. IV/IN/IO are the preferred routes of administration of life saving medication.

Medications that can be administered by endotracheal route:

- Narcan
- Atropine
- Epinephrine
- Lidocaine
- Midazolam (Versed)

Procedure:

1. Ensure that the correct medication, patient, dosage, time is identified.
2. Hyperventilate the patient with 4-5 breaths and remove BVM.
3. If the BVM has a supplied medication port, administer medication through the medication port and ventilate the patient.
4. If the BVM does not have a supplied medication port:
 - Hyperventilate the patient.
 - Disconnect the BVM.
 - Administer medication via the endotracheal tube.
 - Re-attach the BVM and ventilate the patient to allow the medication to reach the bronchial tree so it can be absorbed into the bloodstream.
5. Medications administered via endotracheal route, should be administered at twice the IV dose and should be diluted with sterile normal saline to a volume of at least 10 ml for adults and 1-5 ml for pediatric patients.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Intranasal Medication Administration 14.5.2

Clinical Indications:

- Patient without IV access requiring urgent medication administration (e.g., active seizure, respiratory arrest secondary to opiate overdose, hypoglycemia or pain management).

Medications that can be administered by intranasal route:

- Narcan
- Glucagon
- Midazolam (Versed)
- Fentanyl



Procedure:

1. Determine appropriate medication dose per applicable protocol.
2. Draw medication into syringe and carefully dispose of sharps if the medication is drawn from a vial. If medication is needle-less, attach mucosal atomizer device directly to syringe.
3. Gently insert the atomizer into the nare and stop once resistance is met.
4. Rapidly administer the medication.
5. If the medication is ≥ 1 ml, administer half of the medication in one nare and the other half in the other nare.
6. Document the procedure and results on the patient care report (PCR).



Clinical Indications:

- Patient's condition warrants medication to improve or stabilize condition.

Precautions:

- Observe universal precautions and ensure body substance isolation (BSI).
- Be certain that the route you choose to use is appropriate for the drug; see specific protocols or medication formulary.
- Be certain the drug you want to administer is the one you use.
- Check expiration dates, dosages and routes before administration.
- Use sterile technique for drawing up medications and filling syringes.
- Rapid administration of drugs can cause untoward effects, avoid them by administering the drugs according to protocol.
- Always check for extravasation, especially when administering dextrose and dopamine.

Procedures:

IV Administration (ALS - AEMT)

1. Use appropriate needleless cannula or luer lock syringe for solution.
2. Cleanse injection port with alcohol.
3. Insert needleless cannula or syringe onto injection port.
4. Clamp Pinch IV tubing between port and IV bag; inject medication slow or rapid as required.
5. Release tubing and follow medication with a 10-20 ml fluid bolus.
6. Record medication given, concentration of dose, amount given and time.

IO Administration (ALS - AEMT)

1. Establish intraosseous line per protocol.
 2. Prepare medication.
 3. Cleanse injection port with alcohol, inject medication and flush with saline.
 4. Record medication given, concentration of dose, amount given and time.
- **Note: Any medication that can be administered via IV access may be administered via IO access in the same manner and at the same dose as indicated by the protocol for IV administration.**



IM Administration (ALS - AEMT)

1. Use 1.0 to 1.5 inch, 21-23 gauge needle.
2. Select site, usually deltoid or gluteal muscles.
3. Cleanse site with alcohol.
4. Eject air from syringe.
5. Insert needle at 90 degree angle.
6. Aspirate, if no blood return, inject medication.
7. Apply pressure to site, cover with sterile dressing.
8. Record medication given, concentration of dose, amount given and time.

SQ Administration (ALS - AEMT)

1. Use ¾ inch to 1 inch, 23-25 gauge needle.
2. Select site, usually lateral mid 1/3 arm.
3. Cleanse site with alcohol.
4. Eject air from syringe.
5. Insert needle at 45 degree angle, bevel up.
6. Aspirate, if no blood return, inject medication.
7. Cover with sterile dressing.
8. Record medication given, concentration of dose, amount given and time.

Nebulized Administration (ALS - BLS)

1. Medication is measured and introduced into nebulizer.
2. Attach oxygen tubing to the nebulizer and adjust flow rate to 10 lpm or as prescribed by the manufacturer's recommendations.
3. Patient is instructed to breathe deeply and to hold a deep inspiration every 4-5 breaths.
4. Patient is monitored throughout procedure per protocol.
5. Treatment is continued until all medication is administer or is discontinued due to complication in patient condition.
6. Record medication given, concentration of dose, amount given and time.



During the 2019-2020 influenza season, the Department could only document flu vaccine administration in approximately 25% of our employees. This low vaccination rate poses an immediate threat to our employees, their families, and the patients we care for. Flu vaccination prevents millions of illnesses, hospitalizations, and flu-related doctor's visits each year in the United States. The importance of obtaining a flu vaccine is even more amplified during the ongoing COVID-19 pandemic. As a result, the Department aims to document influenza vaccination in > 90% of our employees.

ADVANCED LIFE SUPPORT PROVIDERS

Inclusion Criteria:

- Any employee who has not yet received this year's influenza vaccine.

Exclusion Criteria:

- History of severe egg allergy.
- History of Guillain-Barré syndrome.
- Previous severe influenza vaccine reaction.

Procedure:

1. Complete the consent paperwork.
2. Identify the pre-filled influenza vaccine by checking the label.
3. Have the recipient uncover the shoulder area.
4. Apply a fresh alcohol pad over the deltoid muscle using a circular motion.
5. Empty any air in the syringe.
6. Remove the cap covering the vaccine needle.
7. Insert the needle quickly and firmly into the deltoid muscle and inject the syringe contents fully.
8. Remove the needle, cover the needle with the safety feature, and dispose of the needle and syringe in the sharps container.
9. Apply band-aid to the injection site.
10. Give the completed paperwork to the Infection Control Nurse or her designee.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

100 ml Normal Saline Mini-Bag Shortage 14.5.5

This protocol applies to adult and pediatric patients when 100 ml normal saline mini-bags are in low supply or unavailable due to national manufacturing shortages. It provides instruction on how to administer medications that would otherwise be infused using a 100 ml normal saline mini-bag.

ADVANCED LIFE SUPPORT PROVIDERS

Inclusion Criteria:

- Patient is to receive an infusion of tranexamic acid, magnesium sulfate, amiodarone, or epinephrine per an illness/injury specific protocol.
- 100 ml normal saline mini-bag is not available due to national manufacturing shortages or other logistical constraints.
- 50 ml luer lock syringe is available for use.

Exclusion Criteria:

- None

Procedure

1. If the patient is to receive tranexamic acid, magnesium sulfate, or amiodarone as an infusion per a specific protocol, complete the following:
 - Take a 50 ml syringe and draw up the medication to be administered.
 - Fill remainder of 50 ml syringe with normal saline.
 - Gently shake syringe to mix.
 - Slow push medication over approximately 10 minutes.
2. If the patient is to receive an epinephrine infusion in a 100 ml normal saline mini-bag, utilize push-dose epinephrine instead. [See Push-Dose Epinephrine procedure.](#)



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Procedural Dissociation 14.5.6

This protocol applies to adult and pediatric patients requiring dissociation/sedation for a severely painful and emergent procedure or condition in the prehospital setting. This protocol is for use during clinical or logistical situations that are unmanageable utilizing the typical pain management strategies described in the [Pain Management protocol](#).

ADVANCED LIFE SUPPORT PROVIDERS

Inclusion Criteria:

- Patient presents with a life or limb threatening condition that requires a prehospital procedure that will result in severe or otherwise unmanageable pain and or anxiety. Examples may include:
 - Field amputation by a trauma center surgical strike team.
 - Extrication or disentanglement from a traumatic incident.
 - CPR induced consciousness during cardiac arrest.
 - Percutaneous cricothyrotomy.
 - Transcutaneous pacing.
 - Synchronized cardioversion.

OR

- Patient presents with a life or limb threatening condition that is so severely painful, the patient requires dissociation to comply with treatment and transport. Examples may include:
 - Severe traumatic injury requiring movement and stabilization (e.g., partial extremity amputation, hip dislocation, major impaled object, etc.)
 - Severe large surface area burns without indication for endotracheal intubation.

Exclusion Criteria:

- Presenting condition can be managed utilizing the [Pain Management protocol](#).
- Patient has indications for medication facilitated intubation and it is logistically feasible to perform the intubation. See [Medication Facilitated Intubation protocol](#) and [Post Invasive Advanced Airway Management protocol](#).
- Behavioral emergencies such as hyperactive or excited delirium. See [Behavioral Psychological Emergencies protocol](#).
 - ❖ Important Note: ketamine shall NOT be used to control or sedate patients with acute behavioral emergencies.

Definitions

- **Procedural sedation:** the administration of medications to achieve a level of dissociation or sedation that relieves otherwise severe, unmanageable pain and or



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Procedural Dissociation 14.5.6

anxiety and improves patient compliance with and tolerance of a specific treatment or transport.

- **Dissociative sedation:** patients undergoing dissociative sedation with ketamine often have their eyes open throughout the procedure but do not feel pain, are unable to follow commands, and have inconsistent responses to touch and voice. Amnesia typically occurs during dissociative sedation.
- **Amnesia:** the inability to remember events from a period of time.
- **Surgical strike team:** a team of hospital-based clinicians, led by an attending trauma surgeon, that is on-call at a local trauma center to respond to entrapments and entanglements that require advanced surgical procedures to extricate or resuscitate a patient (e.g., field amputation, REBOA catheter placement, etc.)

Treatment and Interventions:

1. Initiate [General Assessment and Universal Patient Care](#) for medical patient or [General Trauma Management protocol](#) for injured patient.
 - Unless the patient is unable to communicate, identify the patient's allergies to medications prior to administration of any medication.
2. Support airway and provide supplemental oxygen per [Airway Maintenance and Supplemental Oxygen protocol](#).
 - If logistically feasible, place patient on supplemental oxygen (minimum 6 L via nasal cannula) prior to initiating procedural dissociation to help prevent the development of hypoxia.
3. If the clinical and logistical presentation allows, explain to the patient both the procedure to be performed and the need to perform procedural dissociation. Obtain verbal consent from the patient if clinically and logistically feasible.
4. Place patient on continuous EKG monitoring. If dysrhythmia is present, proceed to the appropriate protocol.
5. Place patient on continuous ETCO₂ and pulse oximetry monitoring.
 - Increases in ETCO₂ can be a subtle indicator of hypoventilation and over-sedation.
 - ❖ Important note: during a confined space/technical rescue, clinical monitoring may not be logistically possible while performing a procedural dissociation for extrication/disentanglement. These situations are rare, and every effort shall be made to place the patient on continuous monitoring equipment as soon as possible during the rescue operation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Procedural Dissociation 14.5.6

6. Establish IV/IO access.
 - For patients with hypotension and evidence of poor perfusion, promptly establish IO access if unable to obtain peripheral venous access.
 - Two sites of venous access may be beneficial but is not required.
7. Continue injury or illness specific treatment per applicable protocol.
8. Measure and document level of pain during initial assessment, before, and after any intervention per [Pain Management protocol](#).
9. If patient is nauseated or vomiting, treat per [Nausea and Vomiting protocol](#).
10. Administer ketamine for procedural dissociation as clinically and logistically indicated:

<u>Ketamine Procedural Dissociation/Sedation</u>				
	IM	Repeat IM Dose	IV/IO	Repeat IV/IO Dose
Adult	4 mg/kg IM	May repeat 2 mg/kg IM every 5-10 min as needed.	1 mg/kg IV/IO slow push over 1-2 min.	May repeat 0.5 mg/kg IV/IO every 5-10 min as needed.
Pediatric ≥ 3 mo	Same as adult	Same as adult	Same as adult	Same as adult
Special Notes: <ul style="list-style-type: none">• IV/IO procedural dissociation is always preferred. IM procedural dissociation shall only be performed if obtaining IV/IO access is clinically or logistically impossible.• Onset of dissociation with intramuscular administration is more unpredictable and will be delayed in comparison to IV/IO.• Duration of dissociation is approximately 20-30 minutes by IV/IO route and 30-45 minutes by IM route.• During confined space/technical rescue operations, obtaining IV/IO access may not be possible. IM procedural dissociation may be required. In these rare circumstances, the maximum volume per single IM injection is 5 ml (as opposed to 3 ml for all other IM injections).				



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Procedural Dissociation 14.5.6

- ❖ Important Note: in general, the safest approach is to choose the lowest level of sedation that is sufficient to perform the necessary procedure or treatment.
 - ❖ Important Note: use caution in elderly patients as they are at higher risk for complications during procedural dissociation. They often require smaller sedative doses and the duration of action of sedatives is often prolonged in the elderly.
 - ❖ Important Note: patients previously receiving fentanyl, versed, or ketamine are NOT excluded from receiving procedural dissociation with ketamine if clinically indicated. However, providers should be aware that these situations warrant additional caution in preventing airway and hemodynamic complications.
11. Frequently reassess and monitor the patient's airway, breathing and sedation status during and after procedural sedation.
 12. Be prepared to perform rescue airway interventions (e.g., jaw thrust, BVM ventilation, etc.) as needed to prevent and treat any complications or adverse events that occur during the procedural dissociation.
 13. All patients receiving procedural dissociation are priority 1 and shall be transported ALS with a minimum of two providers in the rear patient compartment of the transport unit. (The two providers may be two paramedics or 1 paramedic and 1 EMT.)
 - Notify the receiving emergency department by radio/phone as soon as possible of the patient's status, preferably prior to leaving the scene.
 14. If a patient recovering from ketamine procedural dissociation develops recovery agitation/emergence delirium:
 - Provide supportive care: initiate verbal de-escalation, provide reassurance, and attempt to limit environmental stimuli. This agitation is typically short lived and requires only supportive management.
 - In the rare instance that supportive care is not sufficient to calm a patient experiencing severe recovery agitation/emergence delirium, administer versed:



<u>Versed</u> (Emergence delirium after Procedural Dissociation)				
	Intranasal	Intramuscular	IV/IO	Repeat Dose
Adult	5 mg IN	5 mg IM	2-5 mg IV/IO	May repeat every 5-10 min as needed.
Pediatric	0.2 mg/kg IN Max single dose 5 mg	0.2 mg/kg IM Max single dose 5 mg	0.1 mg/kg IV/IO Max single dose 2 mg	Same as adult
Special Notes: <ul style="list-style-type: none">• Administration of versed for recovery agitation/emergence delirium should NOT be routine and is infrequently required.• Administration of versed for recovery agitation/emergence delirium should only occur after attempts at supportive management have been unsuccessful.• IV/IO administration of versed for recovery agitation/emergence delirium is always preferred.				

MEDICAL CONTROL OPTIONS

1. Contact Medical Control for additional dosing as needed based on the patient's level of pain and or anxiety.
2. If a surgical strike team from a local trauma center is on scene to assist with disentanglement of an entrapped patient, paramedics may utilize the attending trauma surgeon for on scene Medical Control orders for procedural dissociation.

General Notes:

- Untreated pain can lead to long-term increases in pain symptoms and other negative physiological effects.
- The need for pain control, compliance with a procedure, and lack of memory must be balanced against the patient's risk of an adverse event.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medical Procedures/Medication Administration

Procedural Dissociation 14.5.6

- The SNORES bundle of care should be initiated for all patients undergoing procedural dissociation unless logistically not possible due to confined space/technical rescue operations.
 - S - SpO₂ monitoring
 - N - Nasal ETCO₂ monitoring
 - O - Oxygen at a minimum of 6 L via nasal cannula
 - R - Reassess airway status and vital signs frequently
 - E - ECG 3 lead monitoring
 - S – Sugar/glucose check
- The longer the procedure requiring sedation, the higher the risk for an adverse event as there is more time for such events to occur.
- Children often require larger doses of sedatives than adults. This is due to a variety of factors including the fact that children usually have a lower amount of body fat than adults.
- Patients should be resuscitated to the best possible perfusion status before starting procedural sedation.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Approved Medication List 15.1

The following medications have been approved by the DC Fire and EMS Medical Director and DC Health to be utilized by EMS providers within the District of Columbia Fire and EMS Department:

Acetaminophen (Tylenol).....	ALS - BLS
Acetylsalicylic Acid (Aspirin)	ALS - BLS
Adenosine (Adenocard)	ALS
Albuterol Sulfate (Proventil).....	ALS - BLS
Amiodarone (Cardorone)	ALS
Atropine Sulfate	ALS
Calcium Chloride 10%.....	ALS
Dextrose 50%, 25%, 10%	ALS - AEMT
Diazepam (Valium) (ChemPack).....	ALS
Diphenhydramine HCL (Benadryl)	ALS - AEMT
Enalaprat (Vasotec).....	ALS
Epinephrine HCL 1:1,000 / 1:10,000 (Adrenalin)	ALS - BLS
Esmolol (Brevibloc).....	ALS
Fentanyl (Sublimaze) (Controlled Medication).....	ALS
Furosemide (Lasix)	ALS
Glucagon HCL	ALS - AEMT
Glucose (Oral).....	ALS - BLS
Haloperidol (Haldol)	ALS
Hydrocortisone (Solu-cortef)	ALS - AEMT
Hydroxocobalamin (Cyanokit)	ALS
Ipratropium Bromide (Atrovent).....	ALS - BLS
Ketamine (Ketalar) (Controlled Medication)	ALS
Ketorolac (Toradol)	ALS
Lidocaine HCL (Xylocaine).....	ALS
Magnesium Sulfate	ALS
Methylprednisolone Sodium Succinate (Solu-Medrol).....	ALS
Midazolam HCL (Versed) (Controlled Medication)	ALS
Morphine Sulfate (Controlled Medication)	ALS
Naloxone HCL (Narcan)	ALS - BLS
Nitroglycerin (Nitrostat)	ALS - BLS
Ondansetron (Zofran).....	ALS
Oxygen.....	ALS - BLS
Prednisone.....	ALS
Pralidoxime Chloride / 2-pam CL (WMD).....	ALS - BLS
Racemic Epinephrine	ALS
Sodium Bicarbonate.....	ALS
Sodium Chloride 0.9%.....	ALS - BLS
Tranexamic Acid (TXA, Cyklokapron)	ALS



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Acetaminophen 15.2

Class:

- Analgesic
- Antipyretic

Actions:

- Inhibits the enzyme cyclo-oxygenase, blocking prostaglandin production and interfering with pain impulse generation in the peripheral nervous system.
- Controls pain and fever but does not reduce inflammation as does nonsteroidal anti-inflammatory medications.

Indications:

- To relieve mild to moderate pain.

Contraindications:

- Inability to swallow or take medications by mouth.
- Severe active liver disease.
- A known allergy to acetaminophen.
- Previous administration of acetaminophen containing products within 6 hours.

Precautions:

- Acetaminophen should be used with caution in patients with liver disease/failure.
- The maximum **adult** daily dose of acetaminophen is 4,000 mg from all sources.

Adult Dosage / Route:

- 640 mg P.O.

Pediatric Dosage / Route:

<u>Pediatric Acetaminophen (Tylenol®)</u>							
Age	< 3 months	3 months	4-11 months	12-23 months	2-4 yo	5-12 yo	≥ 13 yo
Acetaminophen liquid 160 mg / 5 ml	Not indicated	1.25 ml (40 mg)	2.5 ml (80 mg)	3.75 ml (120 mg)	5 ml (160 mg) or One 160 mg chewable tablet	10 ml (320 mg) or Two 160 mg chewable tablets	20 ml (640 mg) or Four 160 mg chewable tablets
No repeat dosing allowed							

**Class:**

- Analgesic, anti-inflammatory, antipyretic, anti-platelet aggregator.

Actions:

- Irreversibly inactivates cyclooxygenase and blocks platelet aggregation, thus reducing propagation of clot in coronary vessels during MI. Blocks pain impulses in the CNS as a NSAID.

Indications:

- Chest pain or discomfort suggestive of MI or cardiac ischemia.

Contraindications:

- Hypersensitivity.
- Sign or symptoms of acute CVA (may be a intracerebral bleed)

Precautions:

- Any significant active bleeding.

Adverse Reactions:

- Gastritis, nausea and vomiting.

Adult Dosage / Route:

- 324 mg / 4-81 mg baby aspirin PO if not taken during the previous 24 hours.

Pediatric Dosage / Route:

- Not indicated.

**Class:**

- Antiarrhythmic.

Actions:

- Adenosine is a naturally occurring substance present in all cells that slows conduction through the AV node of the heart. Because of its rapid onset of action and short half-life, the administration of Adenosine is sometimes referred to as "chemical cardioversion".

Indications:

- Paroxysmal Supraventricular Tachycardia (PSVT) refractory to common vagal maneuvers.
- Stable Monomorphic Wide Complex Tachycardia.

Contraindications:

- 2nd and 3rd degree heart blocks.
- Sick sinus syndrome.
- Hypersensitivity.
- History of WPW or in the presence of "Delta waves".

Precautions:

- May cause transient dysrhythmias.
- Effects antagonized by theophylline.
- May cause bronchospasm in asthma patients.

Adverse Reactions:

- Dyspnea.
- Nausea.
- Headache.
- Dizziness.

Adult Dosage / Route:

- 6 mg rapid IV followed by a rapid 10-20 ml flush.
- If no response after initial dose in 2 minutes, administer 12 mg rapid IV push followed by a rapid 10-20 ml flush.

Pediatric Dosage / Route:

- Initial dose: 0.1 mg/kg rapid IV/IO. If required second dose: 0.2 mg/kg rapid IV/IO.
Medical Control Required.

**Class:**

- Sympathetic agonist.

Actions:

- A synthetic sympathomimetic that causes bronchodilation with reduced Beta 1 cardiac effects. Beta 2 adrenergic.

Indications:

- Bronchial asthma.
- Bronchospasm associated with chronic bronchitis, emphysema, allergic reaction, toxic inhalation, pulmonary edema and congestive heart failure.
- Crush injuries with prolonged extrication.

Contraindications:

- Hypersensitivity.
- Uncontrolled cardiac dysrhythmias.

Precautions:

- Caution should be exercised in patients with a cardiac history.

Adverse Reactions:

- Palpitations.
- Anxiety.
- Dizziness.
- Headache.
- Nervousness.
- Arrhythmias.
- Nausea / vomiting.

Adult Dosage / Route:

- 2.5 mg administered by nebulizer.
- BLS Providers may administer 5.0 mg without medical control.
- ALS Providers may administer 7.5 mg without medical control.
- ALS Providers may administer continuous Albuterol without medical control if patient is in moderate to severe distress or respiratory failure is impending (Asthma / COPD).



Pediatric Dosage / Route:

- 2.5 mg administered by nebulizer.
- BLS Providers may administer 5 mg without order.
- ALS Providers may administer 7.5 mg without order.

**Class:**

- Class III Antiarrhythmic.

Actions:

- Prolongs phase 3 of the action potential, duration, and refractory period in myocardial cells; acts as noncompetitive inhibitor of alpha- and beta-adrenergic receptors. It also has sodium and potassium channel blocker actions.

Indications:

- Ventricular Tachycardia with a Pulse.
- Pulseless Ventricular Tachycardia.
- Ventricular Fibrillation.

Contraindications:

- Known hypersensitivity to the drug.
- Marked sinus bradycardia.
- Second- and third-degree AV block.
- Cardiogenic shock.
- Hypokalemia, Hypomagnesemia (need to be corrected prior to Amiodarone use).

Precautions:

- May cause burning at site of administration.

Adverse Reactions:

- Cardiac: Hypotension, bradycardia, AV block, arrhythmias.
- Respiratory: Interstitial pneumonitis, ARDS.
- CNS: Malaise, muscle fatigue, ataxia, dizziness, and paresthesias.

Adult Dosage / Route:**Ventricular Tachycardia with a Pulse**

- 150 mg mixed in 100 ml Normal Saline infused over 10 minutes. May be repeated one time in 10 minutes.

Pulseless Ventricular Tachycardia and Ventricular Fibrillation

- Initial dose: 300 mg IV/IO.
- Second dose: 150 mg IV/IO.
- Third dose: 150 mg IV/IO.



Return of Spontaneous Circulation (ROSC)

- 150 mg mixed in 100 ml Normal Saline and infused over 10 minutes.

Pediatric Dosage / Route:

Ventricular Tachycardia with a Pulse

- Contact Medical Control.

Pulseless Ventricular Tachycardia and Ventricular Fibrillation

- Initial dose: 5 mg/kg IV/IO.
- Repeat doses: 5 mg/kg IV/IO.
- Maximum total dose: 15 mg/kg IV/IO.

Return of Spontaneous Circulation (ROSC)

- 5 mg/kg slow infusion. Mix dose in 100 ml NS. Utilize a 10 gtts set and infuse at 100 gtts/minute over 10 minutes.

**Class:**

- Anticholinergic / Parasympatholytic agent.

Actions:

- Blocks acetylcholine receptors in organophosphate poisonings.
- Reverses suspected vagal tone in bradycardia, asystole, and PEA.

Indications:

- Symptomatic bradycardia
- Organophosphate poisoning.
- WMD Nerve Agent poisoning.

Contraindications:

- Use with caution in high degree blocks (2nd degree Type II and 3rd degree).

Precautions:

- If given too slowly, can cause transient bradycardias.
- Use caution when administering to patients with glaucoma.

Adverse Reactions:

- Palpitations.
- Tachycardia.
- Dilated pupils.
- Dry mouth.
- Blurred vision.

Adult Dosage / Route:**Bradycardia (ALS Only)**

- 0.5 mg IV. Repeat once in 5 minutes if the patient remains symptomatic.

Organophosphate Poisoning / WMD (ALL PROVIDER LEVELS)**Auto-Injectors: DuoDote™**

- 2 mg IM via DuoDote™ auto-injector every 10-15 minutes to a maximum total dose of three DuoDote™ auto-injectors.

Auto-Injectors: Mark 1 NAAK

- 2 mg via auto-injector every 10 minutes.



Otherwise

- 1-2 mg IV/IO after exhausting auto-injector series repeat every 10 minutes as needed.

Pediatric Dosage / Route:

Bradycardia (ALS Only)

- 0.02 mg/kg IV/IO, minimum dose of 0.1 mg and a maximum of 0.5 mg.

Organophosphate Poisoning / WMD – ALL PROVIDER LEVELS

Auto-Injectors DuoDote™

- Patients weighing 12 kg or greater administer 2 mg atropine via DuoDote™ auto-injector every 20 minutes to a maximum total dose of three DuoDote™ auto-injectors.

Auto-Injectors Mark 1 NAAK

- Ages 8 or greater: 2 mg IM via AtroPen, repeat every 20 minutes as needed.

Auto-Injectors AtroPen (CHEMPACK)

- Ages 3 or less: 0.5 mg IM via AtroPen, repeat every 20 minutes as needed.
- Ages 3-7: 1 mg IM via AtroPen, repeat every 20 minutes as needed.

Otherwise

- 0.05 mg/kg IV/IO after exhausting auto-injector series (maximum single dose of 2 mg), repeat every 20 minutes as needed.

Special Pediatric Instructions

If a WDM MCI event occurs and pediatric AtroPen auto-injectors are not readily available from the CHEMPACK cache then providers shall administer either **one (1) DuoDote™ auto-injector** or **one (1) complete Mark 1 kit** to any pediatric patient who is displaying moderate/severe signs of nerve agent or organophosphate poisoning. Repeat dose every 20 minutes.

**Class:**

- Electrolyte, calcium supplement.

Actions:

- Increases myocardial contractile force and ventricular automaticity.
- Balances hyperkalemia.
- Aids in the re-entry of calcium into muscle when given for calcium channel blocker or magnesium sulfate toxicity.

Indications:

- Known or suspected hyperkalemic cardiac arrest (renal patient).
- Magnesium sulfate toxicity.
- Calcium channel blocker toxicity (toxicity may be caused by overdose of calcium channel blocker medications such as Nifedipine, Verapamil, etc).

Contraindications:

- Digitalis toxicity (Calcium chloride worsens arrhythmias secondary to digitalis toxicity).

Precautions:

- Sodium bicarbonate precipitates with Calcium chloride. Therefore, flush the IV line with 10 ml of Normal Saline between administrations of these two medications.

Adverse Reactions:

- Tissue necrosis if the IV infiltrates.
- Bradycardia, hypotension or asystole can occur with rapid injection.

Adult Dosage / Route:

- 1 gm IV. Slow administration for patients with a palpable pulse when treating crush syndrome or patients with profound hypotension after the administration of diltiazem.
- 1 gm IVP when treating patients in cardiac arrest.

Pediatric Dosage / Route:

- 20 mg/kg IV. Slow administration for patients with a palpable pulse.

**Class:**

- Carbohydrate.

Actions:

- Increases blood glucose levels.

Indications:

- Hypoglycemia.

Contraindications:

- Hyperglycemia
- Known or suspected CVA (ischemic or intracranial hemorrhage) in the absence of hypoglycemia.
- Glucose-galactose malabsorption syndrome
- Documented hypersensitivity or allergy

Precautions:

- Blood glucose measurement is preferred prior to the administration of glucose.

Adverse Reactions:

- Dextrose can cause local venous irritation and tissue necrosis if infiltration occurs.

Adult Dosage / Route (ALS):

- 100 ml bolus of D10W IV/IO over 2-5 minutes. Recheck blood glucose 5 minutes after bolus is complete. If blood glucose level is still < 70 mg/dL, repeat dose once.

Pediatric ≥ 1-month old Dosage / Route (ALS Only):

- 5 ml/kg bolus of D10W IV/IO over 2-5 minutes (Maximum single dose 100ml). Recheck blood glucose 5 minutes after bolus is complete. If blood glucose level is still < 70 mg/dL, repeat dose once.

Neonate < 1-month old Dosage / Route (ALS Only):

- 5 ml/kg bolus of D10W IV/IO over 2-5 minutes. Recheck blood glucose 5 minutes after bolus is complete. If blood glucose level is still < 45 mg/dL, repeat dose once.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Diazepam/Valium 15.10

Class:

- Benzodiazepine.

Actions:

- Increases the inhibitory processes in the cerebral cortex.

Indications:

- Sustained or recurrent seizure activity following nerve agent or organophosphate exposure.

Contraindications:

- Known hypersensitivity to the drug.

Precautions:

- Should be used with caution in patients with AMS, hypotension, or acute angle glaucoma.
- May cause respiratory depression.
- May cause CNS depression in patients that have consumed alcohol or other sedatives.

Adverse Reactions:

- Neuro: Motor impairment, ataxia, confusion, slurred speech, and lightheadedness.
- Cardio: Hypotension

Adult Dosage / Route:

- Auto-Injector: 10 mg IM repeated every 10 minutes until cessation of seizure activity.
- IV: 2-10 mg IV max 20 mg without medical Control (Secondary replacement medication for Midazolam).

Pediatric Dosage / Route:

- Auto-Injector: If greater than 33 kg (72 pounds): 10 mg IM.
- From medication vial: If less than 33 kg: 0.3 mg/kg IV/IO/IM over 2-3 minutes to a maximum single dose of 10 mg.

**Class:**

- Potent antihistamine.

Actions:

- Block histamine receptor sites in allergic reactions.
- Reverses side effects of dystonic reactions caused by phenothiazines.

Indications:

- Anaphylaxis.
- Allergic reactions.
- Dystonic reactions.
- Nausea when administered in combination with Prochlorperazine

Contraindication:

- Hypersensitivity.

Precautions:

- Use with caution in patients that are pregnant, history of asthma, or experiencing severe intoxication.

Adverse Reactions:

- Hypotension.
- Headache.
- Palpitations.
- Tachycardia.
- Sedation.
- Drowsiness.

Adult Dosage / Route (AEMT - ALS):

- 25-75 mg, slow IV/IM.

Pediatric Dosage / Route (ALS Only):

- 1 mg/kg, slow IV/IM up to a maximum dose 50 mg.

**Class:**

- Angiotensin Converting Enzyme (ACE) Inhibitor

Actions:

- Inhibits conversion of angiotensin I to angiotensin II. Resulting in decrease afterload and decreased aldosterone secretion.

Indications:

- CHF
- Hypertension with pulmonary edema

Contraindications:

- Hypotension (SBP 110 mmHg).
- Pregnancy.
- Known sensitivity to ACE inhibitors.

Precautions:

- Interactions: additive effects if used with beta Blockers.
- The elimination half-life of midazolam increases during co-administration with Diltiazem. This can result in prolonged sedation when co-administered with midazolam.

Adverse Reactions:

- Cardiac: Hypotension, Dizziness due to orthostatic hypotension.

Adult Dosage / Route:

➤ 1.25 mg IV.

Pediatric Dosage / Route:

- **Medical Control Required.**

**Class:**

- Sympathomimetic.

Actions:

- A potent alpha and beta stimulant that increases heart rate, cardiac contractile force, myocardial electrical activity, systemic vascular resistance, blood pressure and automaticity. Increases myocardial oxygen demand.

Indications:

- Cardiac arrest.
- Anaphylaxis.
- Severe acute asthma exacerbation.
- Hypoperfusion / Medical Shock

Contraindications:

- None

Precautions:

- Use with caution in elderly patients with a history of coronary artery disease.
- Use with caution in pregnant patients.
- Do not mix with Sodium Bicarbonate.

Adverse Reactions:

- Palpitations.
- Anxiety.
- Tremors.
- Headache.
- Dizziness.
- Nausea / vomiting.

Adult Dosage / Route:**Cardiac Arrest**

- 0.1 mg/ml: administer 1 mg IV/IO every 3-5 minutes for the duration of the arrest.

Anaphylaxis

- 1 mg/ml: administer 0.5 mg IM, repeat every 5-15 minutes as necessary. (ALS).
- Administer 0.3 mg IM via epinephrine auto-injector, repeat every 5-15 minutes as necessary (BLS or ALS).

Severe Asthma

- 1 mg/ml: administer 0.5 mg IM, repeat as necessary. (ALS).
- Administer 0.3 mg IM via epinephrine auto-injector, repeat as necessary (BLS or ALS).



Push Dose Epinephrine

- See Procedure for mixing instructions and dosing.

Pediatric Dosage / Route:

Cardiac Arrest

- 0.1 mg/ml: administer 0.01 mg/kg IV/IO every 3-5 minutes for the duration of the arrest.

Bradycardia

- 0.1 mg/ml: administer 0.01 mg/kg IV/IO.
- 0.1-1 mcg/kg/min infusion. If <10 kg mix 0.4 mg 1:1,000 in a 100 ml NS for a concentration of 4 mcg/ml. Infuse with a 60 gtts set for the desired dose. If >10 kg mix 0.8 mg 1:1,000 in a 100 ml NS for a concentration of 8 mcg/ml. Infuse with a 60 gtts set for the desired dose.

Severe Anaphylaxis

- 1 mg/ml: administer 0.01 mg/kg IM, up to a maximum single dose of 0.3 mg. May repeat every 5-15 minutes as necessary (**ALS**).
- Administer 0.15 mg IM via pediatric epinephrine auto-injector for patient's ≤ 9 years of age. May repeat every 5-15 minutes as necessary (**BLS** or **ALS**).
- Administer 0.3 mg IM via adult epinephrine auto-injector for patient's > 9 years of age. May repeat every 5-15 minutes as necessary (**BLS** or **ALS**).
- 0.1-1 mcg/kg/min infusion. If <10 kg mix 0.4 mg 1:1,000 in a 100 ml NS for a concentration of 4 mcg/ml. Infuse with a 60 gtts set for the desired dose. If >10 kg mix 0.8 mg 1:1,000 in a 100 ml NS for a concentration of 8 mcg/ml. Infuse with a 60 gtts set for the desired dose.

Push Dose Epinephrine

- See Procedure for mixing instructions and dosing.

**Class:**

- Beta Blocker (Class II antiarrhythmic)

Actions:

- Cardiosselective beta-1 receptor antagonist with rapid onset and a very short duration of action

Indications:

- Ventricular Fibrillation / pulseless Ventricular Tachycardia cardiac arrest refractory to three defibrillation attempts and one dose of amiodarone or lidocaine
- Rate control for atrial fibrillation or atrial flutter with rapid ventricular response

Contraindications:

- Patient is NOT in refractory Ventricular Fibrillation or pulseless Ventricular Tachycardia cardiac arrest
- Do NOT administer esmolol for atrial fibrillation or flutter if the rapid rate is potentially compensating for an underlying secondary cause that needs to be treated (e.g., sepsis, GI bleed, PE, cardiac ischemia, alcohol withdrawal etc.) Treat the underlying cause of tachycardia first. Decreasing the heart rate with esmolol before treating the underlying cause can result in rapid cardiovascular collapse and cardiac arrest.
- Do NOT administer esmolol for atrial fibrillation or atrial flutter if the patient has a history of Wolff Parkinson White Syndrome (WPW) or if delta waves are present on EKG.
- Not safe in pregnancy

Precautions:

- Should only be administered when the patient is still in refractory shockable rhythm cardiac arrest. Do NOT give during PEA/Asystole cardiac arrest or post ROSC

Adverse Reactions:

- No significant adverse reactions observed when administered during a refractory shockable rhythm cardiac arrest.
- May cause hypotension or bradycardia when administered for atrial fibrillation or atrial flutter with rapid ventricular response.

Adult Dosage / Route:

- 0.5 mg/kg IV/IO x 1 dose for refractory VF/VT cardiac arrest
- 0.5 mg/kg IV/IO may repeat dose one time in 5 minutes as needed to control rapid heart rate in atrial fibrillation or atrial flutter with rapid ventricular response

Pediatric Dosage / Route:

- No current protocol indication or dosing for pediatrics.

**Class:**

- Synthetic Narcotic Analgesic.

Actions:

- Binds to opioid receptors.

Indications:

- Acute Coronary Syndrome/Chest Pain.
- Pain Management.
- Burns Thermal/Chemical.

Contraindications:

- Hypotension.
- Respiratory depression.
- Traumatic brain injury.

Precautions:

- May cause respiratory depression.
- Onset is almost immediate when administered via IV.

Adult Dosage / Route:

- **If the patient exhibits signs / symptoms of hypoperfusion Contact Medical Control for Fentanyl**
- **In patients 65 years old and greater consider an initial dose of half your normal adult dose when administering opiates (Morphine / Fentanyl).**

Pain Management

- 25-50 mcg IV per dose every 5 minutes to a maximum of 200 mcg. Use 25 mcg for the elderly or a weight under 70 kg.

Burn Management

- 50-100 mcg IV per dose every 5 minutes to a maximum of 200 mcg. Use 25 mcg for the elderly or a weight under 70 kg.

Pediatric Dosage / Route:

- 1 mcg/kg IV/IO/IN up to a maximum single dose of 50 mcg. **Medical Control Required** for additional doses.

**Class:**

- Loop diuretic.

Actions:

- A potent diuretic that inhibits sodium re-absorption by the kidneys.
- Vasodilatation of the pulmonary veins.

Indications:

- Acute pulmonary edema.
- Congestive heart failure.
- Hypertension.

Contraindications:

- Hypersensitivity.
- Known allergy to sulfonamides.
- Dehydrated patients.
- Pregnancy.
- Hypotension.

Precautions:

- Severe dehydration and electrolyte depletion may occur from excess doses of Furosemide.

Adverse Reactions:

- Dehydration.
- Decreased circulatory blood volume.
- Decreased cardiac output.
- Loss of electrolytes.

Adult Dosage / Route:

- 20-40 mg slow IV. **Medical Control Required**

Pediatric Dosage / Route:

- 0.5 mg/kg IV. **Medical Control Required**

**Class:**

- Pancreatic hormone.
- Anti-hypoglycemic.

Actions:

- Converts stored glycogen to glucose, increasing blood glucose levels.
- Improves cardiac contractility and increases heart rate.
- Relaxes smooth muscles of GI tract.

Indications:

- Hypoglycemia when IV access has been attempted and is unobtainable (should not be a first line treatment for hypoglycemia).
- Antidote for beta-blocker and calcium channel blocker overdose with bradycardia.
- Allergic Reaction / Anaphylaxis in patients on beta-blockers that fail to respond to epinephrine.

Contraindications:

- Hypersensitivity.

Precautions:

- Administer cautiously to patients with kidney and liver dysfunctions.
- Effective only if sufficient stores of glycogen in the liver.

Adverse Reactions:

- Nausea and vomiting are common and should be anticipated and treated per appropriate protocol
- Tachycardia.

Adult Dosage / Route:**Hypoglycemia with no IV access for D10 administration**

- 1 mg IM/IN.

Calcium Channel / Beta Blocker Overdose

- 1 mg IV/IO/IM/IN every 5 minutes, up to a maximum of 3 mg.

Allergic Reaction / Anaphylaxis in patient on Beta Blockers not responding to Epinephrine

- 1 mg IV/IO/IM/IN



Pediatric Dosage / Route (ALS Only):

Hypoglycemia with no IV access for D10 administration

- Pediatric ≥ 5 yo: 1 mg IM/IN
- Pediatric < 5 yo: 0.5 mg IM/IN

Calcium Channel / Beta Blocker Overdose

- 1 mg IV/IO/IM/IN every 5 minutes, up to maximum of 3 mg.

Allergic Reaction / Anaphylaxis

- Pediatric ≥ 5 yo: 1 mg IV/IO/IM/IN
- Pediatric < 5 yo: 0.5 mg IV/IO/IM/IN

**Class:**

- Carbohydrate.

Actions:

- Increases blood glucose level.

Indications:

- Hypoglycemia

Contraindications:

- Patient unable to maintain their own airway.
- Patient unable to swallow secretions.
- < 4 yo.
- Hyperglycemia
- Known or suspected CVA (ischemic or intracranial hemorrhage) in the absence of hypoglycemia.
- Glucose-galactose malabsorption syndrome
- Documented hypersensitivity or allergy

Precautions:

- Assure that the patient has a gag reflex and can safely swallow.

Adverse Reactions:

- Aspiration.
- Nausea and vomiting.

Adult Dosage / Route:

- One single dose tube in the buccal space (space in the cheek). May repeat once in 10 minutes if needed to correct blood glucose level.

Pediatric Dosage \geq 4 yo Dosage / Route:

- One single dose tube in the buccal space (space in the cheek). May repeat once in 10 minutes if needed to correct blood glucose level.

**Class:**

- Tranquilizer.
- Anti-psychotic.

Actions:

- Strong anti-emetic effect and impairs central thermoregulation. Produces weak central anticholinergic effects and transient orthostatic hypotension due to blockade of dopamine activity.

Indications:

- Management of manifestations of psychotic disorders and for treatment of agitated states in acute and chronic psychoses.

Contraindications:

- Patients with known hypersensitivity.
- Coma.
- Parkinson's disease.
- Alcoholism.
- CNS depression.
- Cocaine overdose.

Precautions:

- Severe cardiovascular disorders (may cause transient hypotension or precipitate angina pectoris).
- Receiving anticonvulsant medication (may lower convulsive threshold).

Adverse Reactions:

- Extra-pyramidal Syndrome (EPS).
- Headache.
- Lethargy.
- Headache.
- Tachycardia.
- Hypotension.

Adult Dosage / Route:

- 5 mg IM. Patients over the age of 65 years, 2.5 mg IM.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Haloperidol 15.19

Pediatric Dosage / Route:

- Children >12 years of age: 5 mg IM. **Medical Control Required**
- Children 6-12 years of age: 2 mg IM. **Medical Control Required.**



Class:

- Corticosteroid

Actions:

- Acts as an anti-inflammatory glucocorticoid.

Indications:

- Adrenal crisis in a patient with known adrenal insufficiency.

Contraindications:

- None in the patients with adrenal insufficiency.

Precautions:

- None.

Adverse Reactions:

- Cardiac: Transient hypertension.

Adult Dosage / Route (ALS):

- 100 mg IV/IO/IM.

Pediatric Dosage / Route (ALS):

- 2 mg/kg IV/IO/IM to a maximum of 100 mg.

**Class:**

- Antidote.
- Precursor of vitamin B12.

Actions:

- Binds with cyanide ions to form cyanocobalamin, which is excreted in the urine.

Indications:

- Treatment of cyanide poisoning with altered mental status or symptoms of circulatory compromise.

Contraindications:

- Patients with known anaphylactic reactions to hydroxocobalamin or cyanocobalamin.

Precautions:

- Administer slowly over 15 minutes.
- Transient hypertension.

Adverse Reactions:

- Hypertension.
- Headache.
- Red-colored urine.
- Headache.
- Nausea.

Adult Dosage / Route:

- Initial dose is 5 grams infused over 15 minutes slow IV. (Each 2.5 g vial of hydroxocobalamin for injection is to be reconstituted with 100 ml of Normal Saline and administered at 10-15 ml/minute.) An additional 5 gram dose may be administered with **Medical Control** order.

Pediatric Dosage / Route:

- 70 mg/kg (reconstitute concentration is 25 mg/ml). Each 2.5 g vial of hydroxocobalamin for injection is to be reconstituted with 100 ml of Normal Saline and infused at 10-15 ml/minute. Maximum single dose 5 grams.

**Class:**

- Anticholinergic.
- Bronchodilator.

Actions:

- Bronchodilatation.
- Dries respiratory tract secretions.
- Most effective in combination with a beta-adrenergic bronchodilator.

Indications:

- Bronchospasm related to asthma, chronic bronchitis, and emphysema.

Contraindications:

- Sensitivity to Atropine.
- Tachydysrhythmias.
- ****The aerosol solution and all new inhalers **DO NOT** contain Soy Lecithin and as such **CAN** be used with patients **with sensitivity to soybeans or peanuts**.****

Precautions:

- Administer cautiously to patients with narrow-angle glaucoma.

Adverse Reactions:

- Tachycardia.
- Palpitations.
- Dizziness.
- Headache.
- Dry mouth.

Adult Dosage / Route:

- 2.5 ml (500 mcg) mixed with 2.5 mg Albuterol via nebulizer.

Pediatric Dosage / Route:

- 2.5 ml (500 mcg) mixed with 2.5 mg Albuterol via nebulizer.

**Class:**

- General Anesthetic.

Actions:

- N-Methyl d-aspartate (NMDA) receptor antagonist.

Indications:

- Analgesia if narcotic pain medication not available.
- Analgesia and sedation during crush injuries with prolonged extrication
- Medication Facilitated Intubation
- Post invasive advanced airway management pain control and sedation
- CPR induced consciousness/awareness during cardiac arrest

Contraindications:

- Previous allergic reaction or anaphylaxis to ketamine

Precautions:

- May have additive and/or synergistic effects when other sedatives are present.

Adverse Reactions:

- Cardiac: Hypertension, Flushing, Palpitations.
- GI: Increased oral secretions, Nausea & Vomiting.
- Respiratory: Increased secretions, bronchorrhea

Adult Dosage / Route:**Pain Management**

- 0.2 mg/kg IV/IO/IM administered over 1 minute. May repeat once in 5 minutes as needed.

Crush Injuries

- 0.2 mg/kg IV/IO/IM administered over 1 minute. May repeat every 5 minutes for a total of three (3) doses to ensure provider safety during extrication.

CPR induced consciousness/awareness during cardiac arrest

- 1 mg/kg IV/IO. May repeat once as needed.

Medication Facilitated Intubation

- 2 mg/kg IV/IO



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Ketamine 15.23

Post Invasive Advanced Airway Management Pain Control and Sedation

- 0.5 mg/kg IV/IO. May repeat every 5 minutes as needed for pain and agitation

Pediatric Dosage / Route:

- **Contact Medical Control.** Anticipate orders for 0.1-0.2 mg/kg IV/IM/IO for pain and 2 mg/kg IV/IO for Medication Facilitated Intubation.

**Class:**

- Nonsteroidal anti-inflammatory drug (NSAID)

Actions:

- Inhibits the bodies synthesis of hormones and chemicals that cause inflammation and pain.

Indications:

- Patients experiencing mild to moderate pain.
- Suspected kidney stones/renal colic.
- Nontraumatic headache i.e., migraine headache.
- Isolated minor extremity injuries (e.g., ankle sprain)
- Non-traumatic neuromuscular pain (e.g., low back pain, joint pain, arthritis etc.)

Contraindications:

- Children < 2 years old.
- Other NSAID use in the past 6 hours.
- Hypotension (Adult SBP < 90 mmHg).
- Bleeding traumatic injury.
- Chronic kidney disease.
- Current pregnancy.
- History of intestinal bleeding.
- Currently taking anticoagulants (e.g., Xarelto, Coumadin, Eliquis).
- Cardiac chest pain.
- A known allergy to NSAIDs.

Precautions:

- Ketorolac is not indicated for the treatment of abdominal or non-traumatic chest pain.

Adult Dosage / Route:

- 30mg IM.
- 15mg IV. (IV only Do NOT give IO)

Pediatric Dosage / Route:

- **Not indicated for patients under 2 years of age.**
- 1 mg/kg IM Max dose 30 mg
- 0.5mg/kg IV Max dose 15mg

**Class:**

- Antiarrhythmic.
- Local anesthetic.

Actions:

- Suppresses ventricular ectopy.
- Blocks conduction of pain impulses.

Indications:

- Ventricular fibrillation.
- Ventricular tachycardia.
- Multifocal or frequent PVC's (>6 per minute).
- Medication Facilitated Intubation with suspected head injury.
- ROSC following the use of Lidocaine as the primary antiarrhythmic medication.
- Intraosseous line anesthesia.

Contraindications:

- Ventricular escape rhythms with bradycardia.
- 2° type II and 3° heart blocks.
- Bradycardia.

Precautions:

- Use caution in patients over the age 65.
- History of liver disease or dysfunction.

Adverse Reactions:

- Muscle twitching.
- Slurred speech.
- Coma.
- Hypotension.
- Altered mental status.

Adult Dosage / Route:**Ventricular Fibrillation / Pulseless Ventricular Tachycardia**

- 1 mg/kg IV/IO may be repeated every 5 minutes up to a maximum of 3 mg/kg.



Ventricular Tachycardia with a pulse

- 1 mg/kg IV/IO may be followed by 0.5 mg/kg every 5 minutes, up to a maximum of 3 mg/kg.

Return of Spontaneous Circulation (ROSC)

- 0.5 mg/kg IV/IO repeated every 5 minutes to a maximum dose of 3 mg/kg.

Medication Facilitated Intubation

- 1.5 mg/kg IV/IO.

Intraosseous Line Anesthesia

- 20-40 mg IO (2-4 ml 1% Cardiac Lidocaine) and allow 1-2 minute settle time.

Pediatric Dosage / Route:

Ventricular Fibrillation / Pulseless Ventricular Tachycardia

- 1 mg/kg IV/IO may be repeated every 5 minutes up to a maximum of 3 mg/kg.

Ventricular Tachycardia with a pulse

- 1 mg/kg IV/IO may be followed by 0.5 mg/kg every 5 minutes, up to a maximum of 3 mg/kg.

Return of Spontaneous Circulation (ROSC)

- 0.5 mg/kg IV/IO repeated every 5 minutes.

**Class:**

- Electrolyte.
- Anticonvulsant.

Actions:

- Reverses magnesium deficiency.
- Calcium channel blocker.
- Increases intracellular potassium.
- Relaxes smooth muscle.

Indications:

- Torsades de pointes.
- Seizures due to eclampsia.
- Bronchospasm in asthma or COPD that does not respond to other therapy.

Contraindications:

- Hypotension.
- Heart block.
- Chronic kidney disease/dialysis.

Precautions:

- Continuously monitor blood pressure, respiratory effort, level of consciousness, and muscle strength before and after medication administration.

Adverse Reactions:

- Hypotension.
- Respiratory depression.
- Circulatory collapse.
- Muscle weakness/paralysis.
- Bradycardia.
- CNS depression.

Adult Dosage / Route:**Torsades de pointes (Pulseless)**

- 2 gm slow IV/IO. Mix 2 gm in 10 ml of Normal Saline and administer over 2 minutes.



Torsades de pointes (With a pulse)

- 2 gm slow infusion. Mix 2 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min.

Eclampsia

- 4 gm slow infusion. Mix 4 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min. May be repeated one time until cessation of visible seizure activity.

Asthma

- 2 gm slow infusion. Mix 2 gm in 100 ml of Normal Saline. Utilize a 10 gtts set and infuse at 50 gtts/min.

Pediatric Dosage / Route:

Torsades de pointes (Pulseless)

- 25-50 mg/kg slow IV/IO. Mix required dosage in 10 ml Normal Saline and administer over 2 minutes. Maximum dose of 2 gm.

Torsades de pointes (With a pulse)

- 25-50 mg/kg IV over 20 minutes, up to a maximum single dose of 2 gm.

Asthma

- 25-50 mg/kg IV over 20 minutes, up to a maximum single dose of 2 gm.

**Class:**

- Anti-inflammatory.
- Corticosteroid.

Actions:

- A synthetic steroid that is effective as an anti-inflammatory. Also controls severe or incapacitating allergic reactions.

Indications:

- Acute asthma.
- Acute COPD exacerbation.
- Adrenal crisis.

Contraindications:

- Known hypersensitivity.
- Untreated serious infections.

Precautions:

- Cardiac arrhythmias can occur with large rapidly administer dosages.

Adverse Reactions:

- Cardiac arrhythmias.
- Hypertension.

Adult Dosage / Route:

- 125 mg IV/IO/IM.

Pediatric Dosage / Route:

- 2 mg/kg IV/IO/IM, up to a maximum single dose of 125 mg.

**Class:**

- Benzodiazepine.

Actions:

- A short acting central nervous system depressant that causes amnesia, sedation, and muscle relaxation.

Indications:

- Active seizures / status epilepticus.
- Sedation prior to cardioversion or transcutaneous pacing in conscious patients.
- Chest pain or tachycardia due to overdose on ingestion of cocaine, amphetamine, ecstasy, LSD, PCP or ketamine.
- Chemical sedation for combative patients with mental disturbances or overdose.
- Seizures secondary to Organophosphate and Carbamate Poisoning.
- Seizures secondary to WMD Nerve Agent poisoning.
- Post invasive advanced airway management sedation.

Contraindications:

- Known hypersensitivity.
- Hypotension.

Precautions:

- Monitor respirations.
- Avoid mixing with other medications, flush IV line after administration.
- Titrate in small doses.

Adverse Reactions:

- Respiratory depression.
- Apnea.
- Hypotension.
- Amnesia.
- Nausea.



Adult Dosage / Route:

Seizures / Eclampsia / Excited Delirium / Nerve Agents, Organophosphate poisoning, or Carbamate Poisoning

- Intramuscular dose: 10 mg IM.
- Intravenous dose: 5 mg IV/IO repeat once in 5 minutes if patient continues to seize. Maximum total IV/IO dose is 10mg.
- Intranasal dose: 10 mg IN, 5 mg each nostril.

Cardioversion / Pacing / Envenomations / Bites and Stings

- 2-5 mg IV/IO/IN, up to a maximum dose of 10 mg.

Stimulant Induced Chest Pain / Acute Pulmonary Edema (CHF)

- 2-5 mg IV/IN, up to a maximum dose of 10 mg. **Medical Control Required**

Pediatric Dosage / Route:

Seizures

- Intramuscular dose: 0.2 mg/kg IM to a maximum single dose of 5 mg.
- Intravenous dose: 0.1 mg/kg IV/IO, up to a maximum single dose of 5 mg. Repeat once in 5 minutes until cessation of visible seizure activity.
- Intranasal dose: 0.2 mg/kg IN to a maximum dose of 5 mg.

Cardioversion / Pacing

- 0.1 mg/kg IV/IN, up to a maximum single dose of 5 mg.

Stimulant Induced Chest Pain / CHF

- 0.1 mg/kg IV/IN, up to a maximum single dose of 5 mg. **Medical Control Required**

Nerve Agents, Organophosphate poisoning, or Carbamate Poisoning

- 0.2 mg/kg IV/IO/IM/IN, up to a maximum single dose of 5 mg.

**Class:**

- Narcotic.
- Analgesic.

Actions:

- Potent analgesic.
- Decreases peripheral vascular resistance causing vasodilatation.
- Decreases cardiac workload and oxygen demand on the heart.

Indications:

- Chest pain not relieved by nitroglycerin (second line agent for Fentanyl).
- Pain management. (Second line agent for Fentanyl).

Contraindications:

- Known hypersensitivity.
- Head injury.
- Hypotension.
- Respiratory depression.

Precautions:

- Monitor respiratory status and blood pressure. Have Naloxone readily available.

Adverse Reactions:

- Hypotension.
- Respiratory depression.
- Syncope.
- Bronchospasm.

Adult Dosage / Route:

- **If the patient exhibits signs / symptoms of hypoperfusion Contact Medical Control for Morphine**
- **In patients 65 years old and greater consider an initial dose of half your normal adult dose when administering opiates (Morphine / Fentanyl).**



Pain Management / Burns

- 2 mg IV. Repeat as needed until pain is relieved or a maximum of 10 mg is reached. An additional dose of 2 mg up to a maximum single dose of 10 mg may be repeated one time after 10 minutes.

Cardiac Chest Pain

- 2 mg IV, up to a maximum of 10 mg.

Pediatric Dosage / Route:

Pain Management

- 0.1 mg/kg IV until pain is relieved or a maximum single dose of 10 mg is reached. An additional dose of 0.5 mg/kg up to a maximum single dose of 10 mg may be repeated one time after 10 minutes.

**Class:**

- Narcotic Antagonist.

Actions:

- Reverses narcotic effects.

Indications:

- Suspected narcotic / opiate overdose.
- Altered Mental Status of unknown origin.

Contraindications:

- Known hypersensitivity.

Precautions:

- Half-life is shorter than most narcotics and may allow the patient to re-develop a decreased level of consciousness and/or respiratory depression.
- May induce opiate withdrawal in patients that have a physical dependency to narcotics / opiates.

Adverse Reactions:

- Nausea / vomiting.
- Headache.
- Tachycardia.
- Acute withdrawal syndrome (violent behavior).

Adult Dosage / Route (BLS Only):

- 2 mg IN. May repeat twice at the same dose.

Adult Dosage / Route (AEMT- ALS):

- 2 mg IV/IN or IM. If no response from the initial dose within 5 minutes repeat 4 mg IV/IN and titrate to effect thereafter if indicated.

Pediatric Dosage / Route (ALS Only):

- 0.1 mg/kg IV/IM/IN, up to a maximum single dose of 2 mg.

**Class:**

- Nitrate.
- Vasodilator.

Actions:

- Coronary and systemic vasodilator that decrease peripheral vascular resistance and preload.
- Decreases cardiac workload and oxygen demand on the heart.

Indications:

- Chest pain of cardiac origin.
- Pulmonary edema associated with congestive heart failure.
- Hypertension.

Contraindications:

- Hypotension.
- Suspected intracranial pressure.
- Taken Viagra or similar medications (Sildenafil, Cialis, Tadalafil, Levitra, Vardenafil) in the previous 24 hours.

Precautions:

- Use extreme caution when right ventricular involvement (RVI) is suspected. Contact **Medical Control** prior to administration.
- Ensure that an IV is established prior to nitroglycerin in patients with a suspected inferior wall MI.

Adverse Reactions:

- Hypotension.
- Headache.
- Reflex tachycardia.
- Nausea / vomiting.

Adult Dosage / Route:**Cardiac Chest Pain**

- 0.4 mg SL every 5 minutes, up to a maximum of 3 doses. Nitro paste 1” after 2nd NTG dose.
- BLS providers may assist the patient with his/her own prescribed Nitroglycerin only after a thorough patient assessment.



Congestive Heart Failure

- 0.4 mg SL every 5 minutes, **no maximum dose**. Nitro paste 1”.

Pediatric Dosage / Route:

- Not indicated.

**Class:**

- Selective serotonin 5-HT₃ receptor antagonist

Actions:

- Blocks one type of receptor for serotonin, a natural substance in the brain that may contribute to nausea and vomiting.

Indications:

- Patient has nausea and or vomiting due to underlying injury, medical condition, active motion sickness, or medication side effect.
- Preventative administration of an anti-nausea/anti-emetic should be considered when vomiting or intense nausea could complicate an existing injury or medical condition (e.g., penetrating eye injury, traumatic brain injury, high risk for aspiration, side effects of opioid administration, etc.)

Contraindications:

- Known allergy to ondansetron (Zofran) or another 5-HT₃ receptor antagonist such as Kytril (granisetron) and Aloxi (palonosetron)
- Suspected or known diagnosis of prolonged QTc interval on ECG
 - History of prolonged QTc at baseline
 - Electrolyte abnormalities such as severe hypokalemia or hypomagnesemia (which can lead to prolonged QTc)
 - Currently taking other medications that prolong the QTc interval (e.g., methadone, antipsychotics such as haloperidol, heart medications such as amiodarone or sotalol, etc.)
- ❖ Routine ECG and electrolyte screening before administration of ondansetron is NOT required unless patient has risk factors noted above.

Precautions:

- None

Adverse Reactions:

- The frequency of significant side effects is extremely low, but may include headache and or dizziness, constipation, urinary retention, rash, agitation, mild sedation, and bronchospasm

**Adult Dosage / Route:**

- 4 mg IV/IO/IM/PO. Administer IV/IO over at least 30 seconds, preferably over 2-5 minutes. May repeat IV/IO dose one time in 10 minutes as needed. Do NOT repeat IM/PO dose.

Pediatric Dosage / Route:

- 0.15 mg/kg IV/IO/IM/PO. Maximum single dose 4 mg. Administer IV/IO over at least 30 seconds, preferably over 2-5 minutes. May repeat IV/IO dose one time in 10 minutes as needed. Do NOT repeat IM/PO dose.

**Class:**

- Gas.

Actions:

- Odorless, colorless, tasteless gas that is essential for life.

Indications:

- Cardiopulmonary arrest.
- Trauma.
- Dyspnea.
- Suspected hypoxemia.
- Cardiac related chest pain.

Contraindications:

- None.

Precautions:

- Utilize the prescribed dose of a COPD patient unless the patient is in severe respiratory distress then 100% is required.

Adverse Reactions:

- May induce respiratory drive in some COPD patients.

Adult Dosage / Route:

- ≥ 15 lpm for BVM, 12-15 lpm via NRB mask or 2-6 lpm via nasal cannula.
- Routine oxygen administration is **NOT REQUIRED** if pulse ox is greater than 94%

Pediatric Dosage / Route:

- ≥ 15 lpm for BVM, 12-15 lpm via NRB mask or blow-by, 2-6 lpm via nasal cannula. Routine oxygen administration is **NOT REQUIRED** if pulse ox is greater than 94%

**Class:**

- Cholinesterase reactivator.

Actions:

- Reactivates cholinesterase which has been deactivated by chemical nerve agents and organophosphate poisons.
- Relieves paralysis of the respiratory muscles following chemical nerve agent or organophosphate exposure.

Indications:

- Second drug given for the treatment of poisoning due to organophosphate pesticides and chemical nerve agents (First drug of choice is Atropine).
- Primary indication for Pralidoxime administration is muscle weakness or respiratory depression in these patients.

Contraindications:

- Known hypersensitivity.

Precautions:

- Not indicated for poisonings with carbonate pesticides.
- Effects during pregnancy are unknown.
- Safety and efficacy in children is unknown.
- Do not administer more than 3 auto-injectors due to its hypertensive effects.

Adverse Reactions:

- Tachycardia, laryngospasm, muscle rigidity if IV and infused too quickly.
- Mild to moderate pain at injection site.
- Blurred or double vision, dizziness, loss of coordination, headache drowsiness, hypertension, tachycardia.

Adult Dosage / Route:

- 600 mg IM, up to 1800 mg or 3 auto-injectors.

Pediatric Dosage / Route:

- Not indicated.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Prednisone 15.35

Class:

- Corticosteroids.

Actions:

- Reduces inflammation.

Indications:

- Bronchospasm with mild - moderate respiratory distress.
- Bronchospasm with moderate-severe respiratory distress if IV access is not available.

Contraindications:

- Known sensitivity.
- Liver disease.
- Pregnancy.

Precautions:

- None in the short term emergency setting.

Adult Dosage / Route:

60 mg P.O.

Pediatric Dosage / Route:

- 1-2 mg/kg, up to a maximum of 10 mg. Patient has to be >20 kg and able swallow.

**Class:**

- Direct acting beta agonist and anti-inflammatory.

Actions:

- Stimulates both alpha and beta receptors reducing edema and producing bronchodilation.

Indications:

- Croup with audible stridor.
- Bronchospasm with moderate-severe respiratory distress.

Contraindications:

- Hypertension.
- Tachydysrhythmias.

Precautions:

- Concurrent use with other adrenergic agents will have additive adrenergic side effects.
- Use with MAO inhibitors may lead to hypertensive crisis.
- Beta blockers may negate therapeutic effect.

Adult Dosage / Route:

- 0.5 ml (11.25 mg) mixed with 3 ml of Normal Saline via nebulizer.

Pediatric Dosage / Route:

- <5 kg, 0.25 ml (5.62 mg) mixed with 3 ml of Normal Saline via nebulizer.
- ≥5 kg, 0.5 ml (11.25 mg) mixed with 3 ml of Normal Saline via nebulizer.

**Class:**

- Electrolyte.
- Alkalizing agent.

Actions:

- Drives serum potassium back into the cell.
- Enhances urinary excretion of tricyclic antidepressants.
- Neutralizes acidosis.

Indications:

- Hyperkalemia.
- Tricyclic antidepressant (TCA) overdose or ingestion.
- Excited delirium

Contraindications:

- Routine use of sodium bicarbonate for treatment of cardiac arrest is NOT recommended. Sodium bicarbonate should not be administered for “prolonged down time.”

Precautions:

- Inactivates simultaneously administered catecholamine's (epinephrine or dopamine).
- Flush IV line between medication administrations, particularly when also administering Calcium Chloride.

Adverse Reactions:

- Alkalosis.
- Hypokalemia.
- Seizures.
- Tissue sloughing at injection site.

Adult Dosage / Route:

- 1 mEq/kg IV/IO to a maximum dose of 50 mEq.

Pediatric Dosage / Route:

- 1 mEq/kg IV/IO to a maximum dose of 50 mEq.



DC Fire and EMS Pre-Hospital Treatment Protocols

Medication Formulary

Sodium Chloride 0.9% Normal Saline 15.38

Class:

- Isotonic Crystalloid Solution.

Actions:

- Fluid and sodium replacement.

Indications:

- Anytime IV access and/or medication administration is obtained.

Contraindications:

- High doses in the presence of congestive heart failure can cause circulatory overload.

Precautions:

- Electrolyte depletion can occur following large amounts of normal saline.

Adverse Reactions:

- Thirst.

Adult Dosage / Route:

- IV/IO or saline lock.

Pediatric Dosage / Route:

- IV/IO or saline lock.



Class:

- Anti-Fibrinolytic.

Actions:

- Inhibits both plasminogen activation and plasmin activity, thus *preventing clot breakdown rather than promoting new clot formation*. With massive bleeding this may help stabilize clot formation and decrease extravascular bleeding. Onset of action within 4 hours after IV administration. Exact time of onset unclear and variable.

Indications:

Must meet all criteria below:

- Adults (Age 15 or greater) with hemorrhagic shock from trauma.
- Must have obvious bleeding external wounds **neck to mid-thigh or suspected severe internal injuries** from blunt or penetrating trauma.
- Trauma occurred within last 3 hours.
- Must have sustained tachycardia 110 beats per minute and/or sustained hypotension with systolic blood pressure 90 mmHg or less.

Contraindications:

- Non-hemorrhagic shock.
- Non-traumatic hemorrhagic shock.
- Hemorrhagic shock stabilized with other hemostatic agents/measures.

Precautions:

- Delayed effects up to 48 hours consistent with anti-inflammatory actions.

Adverse Reactions:

- While a theoretical concern, TXA has not been shown to cause significant increase in deep venous thrombosis, pulmonary embolism, myocardial infarction, or stroke in published trials to date.

Adult Dosage / Route:

- 1 gram mixed in 100 ml Normal Saline infused over 10 minutes.

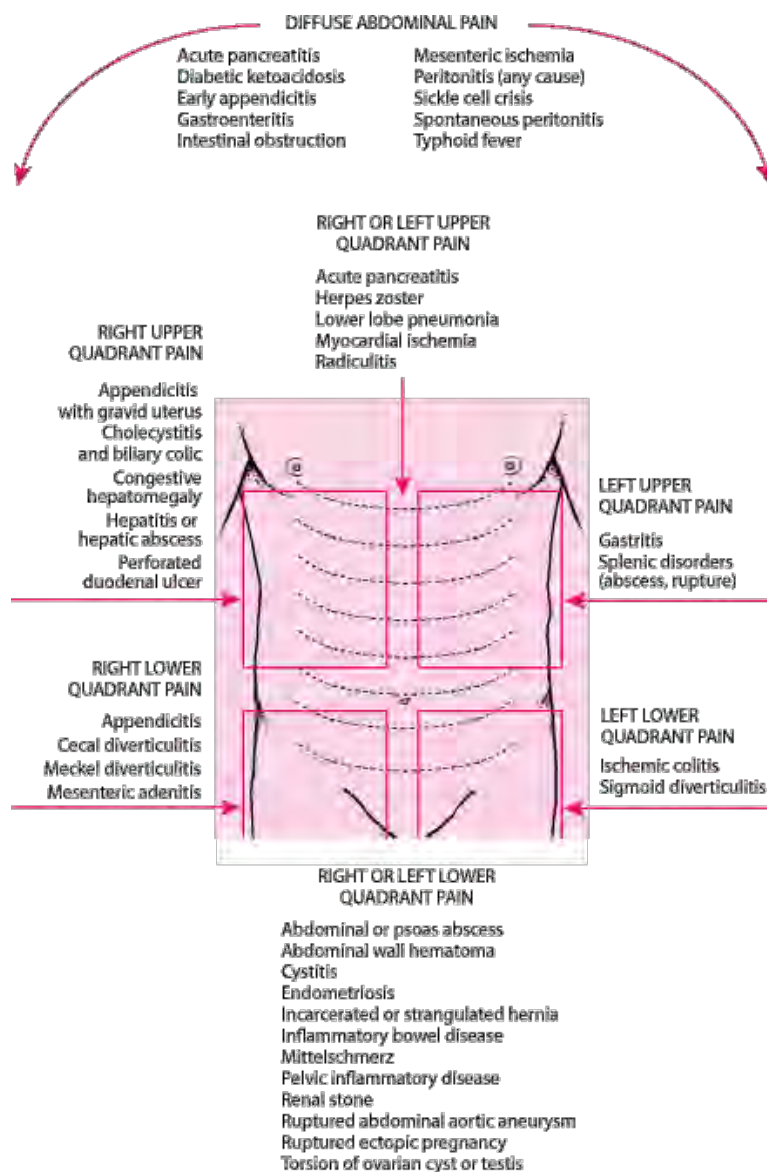
Pediatric Dosage / Route:

- Not Indicated.



There are many causes of abdominal pain of which some can be life threatening. When evaluating a patient experiencing abdominal pain, attempt to determine the cause of the complaint utilizing the following differential diagnosis and pertinent clues in the history and physical exam.

ALL PROVIDER LEVELS



[medical: Abdominal pain Quadrant wise \(all4medical.blogspot.com\)](http://all4medical.blogspot.com)



Life-threatening causes of abdominal pain

Ectopic Pregnancy

- Abdominal or pelvic pain plus a missed menstrual cycle or vaginal bleeding = ectopic pregnancy until proven otherwise.
- Be cautious: patient may present with normal vitals and only mild pain. Vaginal bleeding does NOT have to be present.
- If the ectopic ruptures, the patient can present with or rapidly develop hypotension / shock.
- Patient risk factors:
 - ✓ Prior ectopic pregnancy
 - ✓ Previous sexually transmitted diseases or pelvic inflammatory disease
 - ✓ Previous abdominal surgeries
 - ✓ Smoking

Acute Mesenteric Ischemia

- A “stroke” of the GI tract.
- Sudden onset, severe, colicky, diffuse pain with associated vomiting and diarrhea.
- Classic presentation “pain out of proportion” to exam i.e., intense severe pain with otherwise normal abdominal exam.
- Patient risk factors:
 - ✓ History of prior blood clot
 - ✓ Elderly female
 - ✓ CHF or diabetes
 - ✓ Atrial fibrillation



Life-threatening causes of abdominal pain

Intestinal Obstruction

- Crampy, diffuse abdominal pain with associated nausea and or vomiting.
- Worsening abdominal distension.
- Can still pass gas/stool up to 24 hours after an obstruction begins (bowel emptying).
- Normal vital signs unless dehydrated or bowel ischemia/perforation has occurred.
- Patient risk factors:
 - ✓ History of prior abdominal surgery
 - ✓ Intestinal cancer
 - ✓ Hernias
 - ✓ Previous bowel obstruction

Perforated Intestine

- Acute pain that quickly becomes generalized throughout the entire abdomen. Abdomen becomes rigid as intra-abdominal inflammation worsens.
- Pain may radiate to right shoulder or both shoulders.
- Accompanied by vomiting 50% of the time.
- Tachycardia with worsening fever.
- Patient risk factors:
 - ✓ Elderly
 - ✓ Trauma (e.g., GSW or stabbing)
 - ✓ Recent colonoscopy
 - ✓ Ingestion of sharp objects or caustic agents
 - ✓ Diverticulitis



Life-threatening causes of abdominal pain

GI Bleeding

- Can range from slow intermittent bleeding to massive hemorrhage.
- May cause black sticky “tarry” stools or bright red stools depending on where the bleeding is occurring in the GI tract.
- Patient risk factors:
 - ✓ Peptic ulcer disease
 - ✓ Esophageal varices (Hx of liver disease)
 - ✓ Aspirin or NSAID use
 - ✓ Excessive alcohol use
 - ✓ Ingestion of caustic substances
 - ✓ Blood thinner use
 - ✓ Diverticulitis
 - ✓ Cancer
 - ✓ Inflammatory Bowel Disease

Abdominal Aortic Aneurysm (AAA)

- Severe, sudden onset of diffuse abdominal pain classically described as tearing or ripping.
- Pain may radiate to back/flank/groin or thigh.
- Can present with syncope or signs of shock.
- Classic clinical triad: abdominal pain/flank pain, hypotension, and a pulsatile abdominal mass.
- Patient risk factors:
 - ✓ Known AAA > 3 cm
 - ✓ Men > 60 years old
 - ✓ Diabetes or hypertension
 - ✓ Smoking
 - ✓ Coronary artery disease
 - ✓ Family history of AAA



DC Fire and EMS Pre-Hospital Treatment Protocols

Appendices

Chest Pain Differential 16.2

There are many presentations that represent an acute coronary syndrome, especially in females, the elderly, in patients with diabetes, and those with underlying histories of heart disease. Consider acute coronary syndromes in patients with pain or discomfort from the jaw to the lower abdomen.

	Myocardial Infarction	Angina Pectoris	Dissecting Aneurysm	Pericarditis	Peptic Ulcer
Location	Substernal may vary	Substernal	Substernal	Substernal more left sided	Epigastric Substernal
Onset	Usually sudden	Exertional	Acute	Sub-acute	Acute or Sub-acute
Provocation	Usually none. See comments.	Exercise excitement stress, cold, meals	None	Worsened: lying down breathing, swallowing, coughing, twisting	Alcohol, lack of foods, acid foods
Quality	Crushing Heaviness, dull Pressure Band-like Constricting Squeezing	Discomfort Choking Pressure Squeezing, Strangling, Constricting	Deep tearing Shearing "Knife-like"	Sharp	Burning
Radiation	Across, mid-thorax anterior, arms shoulder, neck jaw, teeth, fingers	Same as MI	Back lumbar region	Usually none occasionally shoulder, neck, flank	Occasionally back
Alleviation	None	Rest, NTG	None	Tripod position shallow respirations	Antacids, food
Duration	Usually under 30 minutes. Can be longer.	5-15 min.	Hours	Hours	Hours
Comments	SOB, N&V, pallor, diaphoresis impending doom	May be nocturnal	Sudden onset may subside spontaneously or be associated with paralysis	May be associated with URI, flu pronestyl hydralazine lupus; MAY BE FEBRILE	ASA, NSAID's e.g. Motrin Advil, may trigger.



DC Fire and EMS Pre-Hospital Treatment Protocols

Appendices

Chest Pain Differential 16.2

	Pancreatitis	Esophageal Rupture	Pulmonary Embolism	Esophageal Spasm	Costo- Chondritis
Location	Epigastric	Retrosternal	Multiple	Substernal, Epigastric	Anterior / Lateral
Onset	Acute / Sub-acute	Acute	Sudden or Gradual	Sub-acute	Sudden or Gradual
Provocation	Alcohol, trauma, gall bladder disease	Swallowing	Respirations, cough	Spontaneous, cold liquids, recumbency	Movement, palpation, cough, respiration
Quality	Severe or dull	Severe	Sharp or dull	Dull, pressure, colicky	Sharp superficial
Radiation	Back	Lateral	None	Jaw, either arm	None
Alleviation	Time	None	None	Antacids, occasionally NTG	Time, heat, analgesia
Duration	Hours	Hours	Variable	5-60 minutes	Variable
Comments	May be viral e.g. Mumps	Alcoholics with forceful vomiting; associated with pleural effusion, shock and hydro-pneumothorax	Sudden onset may subside spontaneously or be associated with paralysis	May be associated with URI, flu pronestyl hydralazine lupus; MAY BE FEBRILE	ASA, NSAID's e.g. Motrin Advil, may trigger.



Eye Opening

Spontaneously **4**

To Voice **3**

To Pain **2**

No Response **1**

Motor Response

To Verbal Command - Obeys **6**

To Painful Stimulus - Localizes Pain **5**

Flexion - Withdraw **4**

Flexion - Abnormal **3**

Extension **2**

No Response **1**

Verbal Response

Less than 2 years old	2-5 years old	Greater than 5 years old	Score
Smiles/Coos/Cries	Appropriate Words	Oriented and Converses	5
Cries	Inappropriate Words	Disoriented and Converses	4
Inappropriate/Cries/Screams	Cries/Screams	Inappropriate Words	3
Grunts	Grunts	Incomprehensible Sounds	2
No Response	No Response	No Response	1

Glasgow Coma Score Total (3-15)



This reference applies to mixing 1 milligram of Epinephrine 1:1,000 in a 100 ml solution (concentration of 10 mcg/ml), infuse via 60 drop tubing at the following rates. Example: $(2 \text{ mcg/min} / (1000 \text{ mcg} / 100 \text{ cc})) \times 60 \text{ gtts/cc} = 12 \text{ gtts/min}$.

For patients <40 kg, refer to the Broselow™ tape for drip/min calculation.

1 mcg/min	2 mcg/min	3 mcg/min	4 mcg/min	5 mcg/min
6 gtts/min	12 gtts/min	18 gtts/min	24 gtts/min	30 gtts/min
6 mcg/min	7 mcg/min	8 mcg/min	9 mcg/min	10 mcg/min
36 gtts/min	42 gtts/min	48 gtts/min	54 gtts/min	60 gtts/min

This reference applies to mixing 1 milligram of Epinephrine 1:1,000 in a 250 ml solution (concentration of 4 mcg/ml), infuse via 60 drop tubing at the following rates. Example: $(2 \text{ mcg/min} / (1000 \text{ mcg} / 250 \text{ cc})) \times 60 \text{ gtts/cc} = 30 \text{ gtts/min}$.

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



DC Fire and EMS Pre-Hospital Treatment Protocols

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Normal Vital Signs 16.5

	Respirations	Pulse	Systolic BP*
Adult	12 - 20	60 -100	90 - 140
Adolescent	12 - 24	60 -100	>90
Children (1 to 10 years)	22 - 34	80 -140	>75
Infants (1 month to 1 year)	24 - 40	90 -150	>70
Neonate (0 to 28 days)	30 - 60	100 -160	>60

* For children 1 to 10 years of age, you can determine the lower limit of an acceptable blood pressure using the following formula:

$$\text{Minimal systolic blood pressure} = 70 + (2 \times \text{age in years})$$



DC Fire and EMS Pre-Hospital Treatment Protocols

Appendices

APGAR Scoring Chart 16.6

Determine the **APGAR** score at the first minute postpartum. Repeat at the 5-minute interval.

Test	0 Points	1 Point	2 Points
Activity (Muscle Tone)	Absent	Arms & legs extended	Active movement with flexed arms & legs
Pulse (Heart Rate)	Absent	Below 100 bpm	Above 100 bpm
Grimace (Response Stimulation or Reflex Irritability)	No Response	Facial grimace	Sneeze, cough, pulls away
Appearance (Skin Color)	Blue-gray, pale all over	Pink body and blue extremities	Normal over entire body – Completely pink
Respiration (Breathing)	Absent	Slow, irregular	Good, crying

Score of 7-10 is usually associated with coughing and crying within seconds of delivery. Newborns with this score typically do not require and further resuscitation.

Score of 4-6 the newborn is moderately depressed. Will typically appear pale or cyanotic and have respiratory complications and flaccid muscle tone. These newborns will require some type of resuscitative efforts.



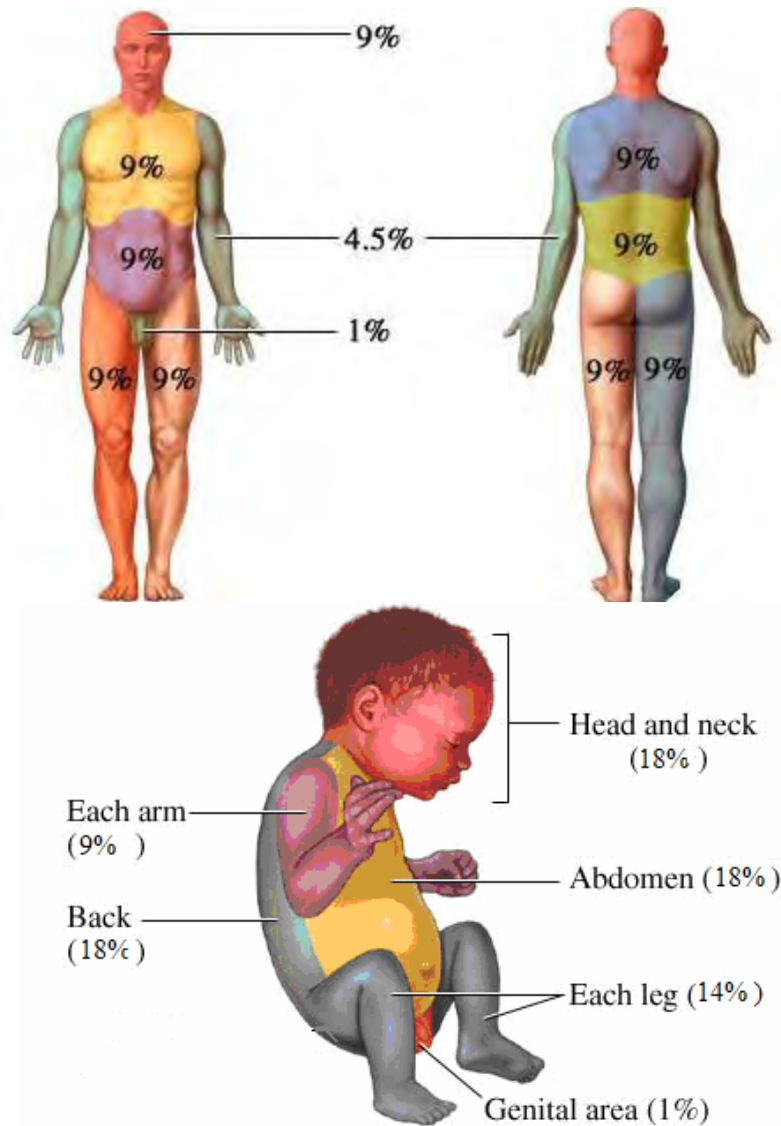
The following chart shows the average ET, suction and orogastric tube size that is compatible to the age of the patient.

Age	ET Size	Suction Catheter	Orogastric Tube
Pre-term	2.5 - 3.0 uncuffed	5	8
Term	3.0 - 3.5 uncuffed	6 - 8	8
6 Months	3.5 uncuffed	8	10
12 - 18 Months	4.0 uncuffed	8	10
3 Years	4.5 uncuffed	8	12
5 Years	5.0 uncuffed	10	12
6 Years	5.5 uncuffed	10	14
8 Years	6.0 uncuffed	10	14
12 Years	6.5 cuffed	10	16
16 Years	7.0 - 8.0 cuffed	12	16
Adult Female	7.5 - 8.0 cuffed	12	18
Adult Male	8.0 - 8.5 cuffed	14	18

1. This chart is meant as a guide only.
2. The size and weight of the child must be taken into consideration for sizing.
3. A quick formula to use when determining endotracheal tube size in pediatric patients is $\text{Size} = (\text{Age in Years}) / 4 + 4$.
4. The use of a BroselowTM tape or similar device is encouraged for pediatric patients.



Rule of Nines



Detailed calculation reference for pediatrics > 1 year of age:

For every year over one, add 0.5% to each leg and subtract 1% for the head

Age	Head	Each leg	Age	Head	Each leg
2	17%	14.5%	6	13%	16.5%
3	16%	15%	7	12%	17%
4	15%	15.5%	8	11%	17.5%
5	14%	16%	9	10%	18%



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Appendices

Infectious Disease 16.9

Disease	Transmission	Prevention	Post-Exposure	Other
Meningitis (Bacterial / Viral)	Droplets; Coughing, sneezing, intubation, suctioning	HEPA Mask	Antibiotic; Cipro, Rocephin, Rifampin	Seek medical care if symptoms of meningitis develop; fever, stiff neck, severe headache.
Influenza (FLU)	Close contact droplets; coughing, sneezing, intubation, suctioning. Also direct contact with vesicle fluid.	Flu shot (Vaccination)	Treatments; analgesics, Rimantadine, Tamiflu, Relenza.	As determined by medical professional.
Varicella Zoster (Chicken Pox)	Close contact droplets; coughing, sneezing, intubation, suctioning. Also direct contact with vesicle fluid.	Vaccine = 1 shot (Varivax). HEPA mask.	Treatment; Varicella Zoster Immune Globulin (VZIG) within 96 hrs. of exposure.	As determined by medical professional.
HIV	Blood to blood, to non-intact skin and mucous membranes.	No Vaccine	See post-exposure control protocol.	Periodic screening; 6, 12, 26 weeks after exposure.
Syphilis	Blood and/or open sores / lesions	No Vaccine	Source = RPR Employee = RPR Penicillin.	Repeat test at 3 and 6 months. If positive refer to medical professional.
Hepatitis-B (HBV)	Blood to blood, to non-intact skin and mucous membranes.	Vaccine = 3 shot series. Titer and re-immunize if necessary.	Source = Acute Hep. Panel Employee = Acute Hep. Panel. If source positive, employee not immune; administer immune globulin and consider HAV vaccine series.	Periodic screening; 6, 12, 26 weeks after exposure.



DC Fire and EMS Pre-Hospital Treatment Protocols

Appendices

Infectious Disease 16.9

Disease	Transmission	Prevention	Post-Exposure	Other
Hepatitis-A (HAV)	Fecal / oral	Vaccine = 2 shot series	Source = Acute Hep. Panel Employee = Acute Hep. Panel. If source positive, employee not immune; administer immune globulin and consider HAV vaccine series.	Periodic screening; 12 weeks after exposure or if symptoms occur.
Tetanus	Soiled object causing open wound.	Vaccine good for 10 years.	If no vaccine, administer at this time. If over 7 years from last vaccination and sustained open wound, booster dose.	Seek medical care if symptoms of tetanus develop; lockjaw, rigid muscles.
Lyme Disease	Tick-borne; tick attached 24 hours.	Avoid tick infested areas. Vaccine = 3 shot series for prone areas.	Antibiotics; Amoxicillin, Doxycycline.	As determine by medical professional.
Scabies	Direct contact; mite infested areas, bedding / clothing, nursing homes.	Avoid infested areas.	Lindane and Kwell applied to the entire body for 24 hours.	Close supervision of treatment including bathing.
Rabies	Virus-laden saliva of infected animal; animal bites.	Avoid animal bites.	Wash infected areas. Administer rabies anti-serum injection and first dose of rabies vaccine. Contact animal control, monitor for presence of infection.	If animal is positive, continue to treat employee with vaccine.
Tuberculosis (TB)	Droplets; Coughing, sneezing, intubation, suctioning	Initial 2-step, annual PPD. Wear HEPA Masks	Source = PPD Employee = PPD, unless PPD tested within prior 12 weeks or previously PPD reactive	PPD at week 12 post-exposure. If new positive; chest x-ray and Rx with isoniazid for 6 months



1st degree, primary	1°	calcium chloride	CaCl
2nd degree, secondary	2°	carcinoma, cancer	Ca
3rd degree	3°	cardiopulmonary resuscitation	CPR
about, approximately	≈	centigrade	C°
after	⌣	cerebrospinal fluid	CSF
before	⌢	cerebrovascular accident	CVA
abdomen	abd.	change	Δ
abortion	Ab	chest pain	CP
acetaminophen/Tylenol	APAP	chief complaint	CC
acute coronary syndrome	ACS	chronic obstructive pulmonary disease	COPD
acute myocardial infarction	AMI	circulation, motor, sensation	CMS
advanced cardiac life support	ACLS	clear to auscultation	CTA
against medical advice	AMA	complains of	c/o
airway, breathing, circulation	ABC	congestive heart failure	CHF
alcohol (ethanol)	ETOH	coronary artery bypass graft	CABG
alert and oriented	A&O	coronary artery disease	CAD
ambulate, ambulatory	Amb	cubic centimeter	cc
antecubital	AC	dead on arrival at hospital	DOA
anterior	ant.	dead on scene	DOS
arrived on scene to find	AOSTF	decreased, depressed	↓
aspirin	ASA	delirium tremens	DT's
atherosclerotic heart disease	ASHD	dextrose 25%	D25
atrial fibrillation	AFib	dextrose 5% in water	D5W
atrial flutter	Aflutter	dextrose 50%	D50
automatic internal cardiac defibrillator	AICD	diagnosis	Dx
automated external defibrillator	AED	diastolic blood pressure	DBP
awake, alert, oriented	AAO	discontinue	D/C
bag-valve-mask	BVM	drop	gtt.
beats per minute	BPM	drops	gtts.
bilateral breath sounds	BBS	ear, nose, and throat	ENT
blood glucose analysis	BGA	electrocardiogram	ECG, EKG
blood pressure	BP	emergency department	ED
blood sugar, breath sounds	BS	Epinephrine	Epi
bowel movement	BM	equals	=



erectile dysfunction medications	EDF	last menstrual period	LMP
estimated date of confinement	EDC	left, liter	L.
endotracheal tube	ETT	left	ⒻⒻ
every	q or Q	left lower quadrant of abdomen	LUQ
external jugular	EJ	left upper quadrant of abdomen	<
Fahrenheit	F°	less than	≤
female	f. or ♀	less than or equal to	LOC
format for capnography measurements	EtCO2=XX	level of consciousness	LOC
gastrointestinal	GI	loss of consciousness	LPM
gauge	ga.	liters per minute	m. or ♂
Glasgow Coma Scale	GCS	male	MICU
gram or grams	g or gm	medical intensive care unit (hospital)	mEq.
Gravida	G	milliequivalent	mcg
greater than	>	microgram	mg
greater than or equal to	≥	milligram	mg/dL
ground level fall	GLF	milligrams per deciliter	mL or ml
gunshot wound	GSW	milliliter	mm Hg
headache	HA	millimeters of Mercury	Min
head, eyes, ears, nose, throat	HEENT	minute	MICU
heart rate	HR	mobile intensive care unit	MVC
history	Hx	motor vehicle collision	MAE
increased, elevated	↑	moves all extremities	MAEW
inferior	inf.	moves all extremities well	MS
insulin dependent diabetes mellitus	IDDM	multiple sclerosis	MI
intensive care unit	ICU	myocardial infarction	NC
intramuscular	IM	nasal cannula	NG tube
intranasal	IN	nasogastric tube	N/V/D
intraosseous	IO	nausea/vomiting/diarrhea	Neb
intravenous	IV	nebulized	-
jugular venous distention	JVD	negative	NTG
keep vein open	KVO	Nitroglycerin	N/C
kilogram	kg	no complaint	Ø
laceration	LAC	none	NIDDM
lactated Ringer's	LR	non-insulin dependent diabetes mellitus	



DC Fire and EMS Pre-Hospital Treatment Protocols

Appendices

Abbreviations 16.10

no known drug allergies	NKDA	sublingual	SL
Non-rebreather	NRB	supraventricular tachycardia	SVT
normal saline	NS	systolic blood pressure	SBP
normal sinus rhythm	NSR	times 2, or times 3, or times ...	x2
overdose	OD	to keep open	TKO
oxygen	O ₂ or O2	transcutaneous pacing	TCP
para	P	treatment	Rx or Tx
patient	pt.	ventricular fibrillation	VF
patient care report	PCR	ventricular tachycardia	VT
per	/	vital signs	V.S.
person, place, time, event	PPTE	wheelchair	w/c
physical exam	P.E.	weight	wt.
positive	+	with	τ or w/
posterior	post.	without	s or w/out
privately owned vehicle	POV	year(s) old	y.o.
pulseless electrical activity	PEA		
pulse, motor, sensation	PMS		
pulse oximetry	SpO2		
pupils equal and reactive to light	PERL		
range of motion	ROM		
Revised Trauma Score	RTS		
right	R or R.		
right bundle branch block	RBBB		
right lower quadrant	RLQ		
right upper quadrant	RUQ		
Ringer's lactate	RL		
shortness of breath	S.O.B.		
signs/symptoms	S/S		
sodium bicarbonate	NaHCO ₃		
sodium chloride	NaCl		
ST elevation myocardial infarction	STEMI		
signs/symptoms, allergies, medications, past history, last oral, events leading to	SAMPLE		



CYANOKIT—PEDIATRIC DOSING

Dose: 70 mg/kg (maximum dose is 5g)

Drip Rate: 10-15 mL/min (about 5 gtt/sec when using 20gtt set)

(Adjust IV tubing roller clamp wheel between midway and wide open--NOT wide open!!)

BASED ON
1 VIAL
PACKAGING

BROSLOW COLOR/WEIGHT	INITIAL DOSE	VOLUME TO GIVE	INFUSION INSTRUCTIONS (after reconstituting 1 vial with 200 mL saline)
GRAY 3-4-5 kgs	280 mg	11 mL	Withdraw 11 mL from vial. Administer 11 mL via syringe SLOWLY over 1 minute.
PINK 6-7 kg	420mg	17 mL	Withdraw 17 mL from vial. Administer 17 mL via syringe SLOWLY over 1.5 minutes.
RED 8-9 kg	560 mg	23 mL	Withdraw 23 mL from vial. Administer 23 mL via syringe SLOWLY over 2 minutes.
PURPLE 10-11 kg	700 mg	28 mL	Withdraw 28 mL from vial. Administer 28 mL via syringe SLOWLY over 2 minutes.
YELLOW 12-14 kg	910 mg	36 mL	Withdraw 36 mL from vial. Administer 36 mL via syringe SLOWLY over 2.5 minutes.
WHITE 15-18 kg	1120 mg	45 mL	Withdraw 45 mL from vial. Administer 45 mL via syringe SLOWLY over 3 minutes.
BLUE 19-23 kg	1470 mg	60 mL	Withdraw and waste 140 mL from vial. Infuse remainder (60 mL).
ORANGE 24-29 kg	1890 mg	76 mL	Withdraw and waste 124 mL from vial. Infuse remainder (76 mL).
GREEN 30-36 kg	2310 mg	92 mL	Withdraw and waste 108 mL from vial. Infuse remainder (92 mL).
40 kg / 88 lbs	2800 mg	112 mL	Withdraw and waste 88 mL from vial. Infuse remainder (112 mL).
45 kg / 99 lbs	3150 mg	126 mL	Withdraw and waste 74 mL from vial. Infuse remainder (126 mL).
50 kg / 110 lbs	3500 mg	140 mL	Withdraw and waste 60 mL from vial. Infuse remainder (140 mL).
55 kg / 121 lbs	3850 mg	154 mL	Withdraw and waste 46 mL from vial. Infuse remainder (154 mL).
60 kg / 132 lbs	4200 mg	168 mL	Withdraw and waste 32 mL from vial. Infuse remainder (168 mL).
65 kg / 143 lbs	4550 mg	182 mL	Withdraw and waste 18 mL from vial. Infuse remainder (182 mL).
70 kg / 154 lbs (and above)	4900 mg	200 mL	Infuse entire vial.

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