



12 Hour EMT Skills Class

This study guide is assembled from the Maryland Medical protocols to assist the EMT students with refreshing their EMT knowledge. Information and protocols are specific to this course.

MIEMSS EMT Skills Class #: 22EMTS _____

MCFRS EMT Skills Class #: _____

Student Sign-In & Sign-Out Link



http://tiny.cc/emt_skills

[\(underscore between emt skills\)](#)

[1. Sign In start Day 1, sign out end of Day 1](#)

[2. Sign In start Day 2, sign out end of Day 2](#)

[Do not sign out at lunch or on breaks](#)

DAY 1 Morning Session

Review FR1A and MIEMSS Licensure System/Requirements (50min)

www.Miemsslicense.com www.firerescue1academy.com

- CRM and teamwork discussion, Stretcher handling, Patient movement, Patient positioning, unloading, Bariatric response equipment

Patient assessments with scenarios Round 1 (30-35 min rotations)

- Pt Assessments, Medical and Trauma
- Glucose, Narcan, Refusals: ETOH, Overdose & protocols
- Epinephrine auto and draw-up (2 Scenarios) & protocols

Day 1 Afternoon Session

Patient assessment scenarios Round 2 (30-35min rotation)

- Tourniquet, Wound Packing, Bleeding Control (Israeli Bandage)
- Chest injuries (Sucking Chest (DTC valves) / Flail Chest (New info)
- Abdominal injuries (Impaled object, Evisceration, AAA)

Patient assessment scenarios Round 3 (30-35 Min rotation)

- KED for pelvic/hip – not Spinal, Trauma Decision Tree
- Acetaminophen (pain management), Albuterol (MDI)O² & Protocols
- Chest pains scenario Nitro & Aspirin & protocols

PROTOCOL TEST: becomes available Day 1 of the course

www.firerescue1academy.com, On-Line EMT Protocol Test, 25 question; open book test, 70% (can miss 7 questions), maximum 3 attempts, 35 minute timed exam.

Must be successfully completed prior to:

- Start of Day 2 for shift classes or
- Weekend Classes: 1700 following Wednesday

Day 2 Morning Session (Complete day 1 last rotation if needed (1st 30-35 min)

- Splinting & traction within scenarios
- Spinal immobilization, Helmet removal (motorcycle & football) Pediatric spinal. Spinal Precautions and Spinal Immobilization protocols
- CPR–AED Review, integration to LP15 (4 lead, 12 lead), Stepped approach to Lucas application, TOR, MOLS, DNR Protocols and CPR IRP

Day 2 Afternoon Session: Patient assessments with scenarios Round 1(30-35 min.)

- OB station – normal delivery; complications emphasis protocols
- Airway maintenance, adjunct placement, Activated Charcoal with focus on consulting.
- Lifting & Moving pts, or skills to assist ALS providers

MCFRTA End of Class Survey



[Tiny.cc/mcfrta_eval](https://tiny.cc/mcfrta_eval)

WEB LINKS FOR ADDITIONAL TRAINING INFORMATION:

- Fracture Management Web Page
 - https://www.montgomerycountymd.gov/mcfrs-psta/Fracture_Management.html
- Monthly Basic Training
 - https://www.montgomerycountymd.gov/frs-ql/swsj/operations/basic_training.html
 - 2018 : Lucas Application
 - <https://www.youtube.com/watch?v=QIV4TWFzIzA>
 - 2019: Excited Delirium Management
 - <https://www.youtube.com/watch?v=vnWHxUfhqt0&feature=youtu.be>

Maryland EMT Renewal Requirements:

1. Register for 12 Hour EMT Skills Class via OTRS or LFRD Training Officer
 - a. Can be done anytime during your recertification period
 - b. Skills & On-Line can be done in any order
2. Register for 12 Hour EMT On-Line Course via OTRS or LFRD Training Officer
 - a. Can be done anytime during your recertification period
 - b. Course provided through Fire Rescue 1 Academy
 - i. www.firerescue1academy.com
3. Must have an in date Maryland EMT Card or MIEMSS Letter of Extension
 - a. Or valid National Registry EMT (no state), then must apply for reciprocity at:
 - i. www.miemsslicense.com

Registering for the 12-Hour EMT On-Line Course

1. Career: Register via OTRS
2. LFRD: Register via your Training Officer
3. Registration closes 15th of prior month
4. All courses must be completed the month enrolled in

MIEMSS Licensure

1. www.miemsslicense.com
2. Application for EMT Renewal
 - a. Application becomes available in your profile 90 days prior to renewal date.
 - b. 90 days from renewal you may apply for renewal even before you complete both classes. Once all 24 hours are documented in Licensure app then your application will show “pending” until approved by MIEMSS.
3. **Verify your Training Report**
 - a. www.miemsslicense.com
 - b. Click on “Training”
 - c. Select “Report”
 - i. The system will default to your provider level & current cycle date range. The courses taken during that cycle will be displayed by selecting the PDF icon.
 - d. Verify Date Range
4. **Verify and/or update your Personal Information (e-mail, etc)**
 - a. www.miemsslicense.com
 - b. Select Profile under “My Account”
 - c. Review all and update as necessary

PCAP (Career personnel only)

1. Your Station Officer is responsible to update PCAP

The General Patient Care section shall apply to all patient encounters unless otherwise noted in any specific treatment protocol.

A. RESPONSE

Review the dispatch information and select appropriate response.

B. SCENE ARRIVAL AND SIZE-UP

1. Consider Body Substance Isolation (BSI).
2. Consider Personal Protective Equipment (PPE).
3. Evaluate the scene safety.
4. Determine the number of patients.
5. Consider the need for additional resources.

C. PATIENT APPROACH

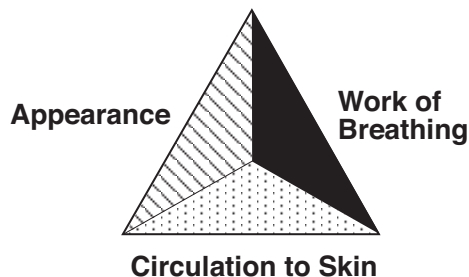
1. Determine the Mechanism of Injury (MOI)/Nature of Illness (NOI).
2. If appropriate, begin triage and initiate Mass Casualty Incident (MCI) procedures.

D. INITIAL ASSESSMENT

Correct life-threatening problems as identified.


Stabilize cervical spine when appropriate.

For pediatric patients, use the Pediatric Assessment Triangle.




1. Assess mental status
 - a) **A**lert
 - b) Responds to **V**erbal stimuli
 - c) Responds to **P**ainful stimuli
 - d) **U**nresponsive
2. Airway
 - a) Open and establish airway using appropriate adjunct.
 - b) Place patient in appropriate position.
 - c) Suction airway as needed, including tracheostomy tubes.
 - d) **If a patent airway cannot be established, the patient must be transported to the closest appropriate hospital-based emergency department or designated free-standing emergency medical facility.** EMS clinicians should remain available to assist with patient transfer, if the hospital determines such a transfer is appropriate.

General Patient Care (GPC) (continued)

- e)  In infants and young children, inspiratory stridor is an indication of upper airway foreign body or partial airway obstruction. Request ALS rendezvous. Transport the patient rapidly and with caution. Have foreign body airway removal equipment ready for immediate use in case the patient's airway becomes obstructed.

3. Breathing

- a) Determine if breathing is adequate and assess oxygen saturation (SpO₂) with pulse oximeter.
- (1) If patient's ventilations are not adequate, provide assistance with 100% oxygen using Bag-Valve-Mask (BVM).
 - (i) For all ages except neonates, deliver 1 breath every 5 seconds (8–12 breaths/min).
 - (ii) For a neonate, deliver 1 breath every 3 seconds; higher rates may be required.
 - (2) The decision to oxygenate will be based on the patient's clinical condition.
 - (i) If the patient has SpO₂ less than 94%, administer supplemental oxygen, titrated to SpO₂ level of 94%.
 - (ii) **Supplemental oxygen is not needed if SpO₂ greater than or equal to 94%** unless the patient is in respiratory distress, acutely dyspneic, or suffering from suspected CO poisoning. Patients in severe respiratory distress may benefit from high-flow oxygen from a nonrebreather (NRB).
 - (iii) Unless in respiratory distress, avoid administration of high-flow oxygen to patients presenting with the following conditions:
 - (a) STEMI / angina
 - (b) CVA / stroke
 - (c) Post-arrest
 - (iv) CO exposure: Apply 100% oxygen via NRB mask. Maintain SpO₂ at 100%.
 - (3) Utilize continuous ETCO₂ waveform monitoring in all intubated patients.
 - (4) Measure carbon monoxide level with a co-oximeter, if appropriate and available.

Percent O ₂ Saturation	Ranges	General Patient Care
94–100%	Normal	Give oxygen as necessary
91–93%	Mild Hypoxia	Give oxygen as necessary
86–90%	Moderate Hypoxia	Give 100% oxygen Assisting Ventilations if necessary
less than or equal to 85%	Severe Hypoxia	Give 100% oxygen Assist Ventilations If indicated, Intubate
 INACCURATE OR MISLEADING SpO₂ READINGS MAY OCCUR IN THE FOLLOWING PATIENTS: HYPOTHERMIC, HYPOPERFUSION (SHOCK), CO POISONING, HEMOGLOBIN ABNORMALITY, ANEMIA, AND VASOCONSTRICTION.		

b) Hyperventilate the head-injured patient only if signs/symptoms of herniation are present, including posturing, loss of pupillary light response, dilation of one or both pupils, vomiting, hypertension, bradycardia, and/or irregular respirations.

(1) If hyperventilating, use the following rates:

- (i) Adult (including adolescent 13 years of age or older): 20 breaths per minute
- (ii) Child (1-12 years of age): 30 breaths per minute
- (iii) Infant (less than 1 year of age): 35 breaths per minute

(2) Use ETCO₂ monitoring.


- (i) Maintain ETCO₂ between 35-40 mmHg for any patient with significant head injury
- (ii) For patients with significant head injury **and** signs of herniation, adjust ventilations to achieve ETCO₂ of 30-35 mmHg.

4. Circulation

a) Assess pulse.

- (1) Patients within the first hour after delivery, refer to *Newly Born* protocol.
- (2) Patients from one hour after birth up to those who have not reached their 13th birthday, refer to the *Universal Algorithm for Pediatric Emergency Cardiac Care for BLS*.
- (3) Patients 13 years of age or greater, refer to the *Universal Algorithm for Adult Emergency Cardiac Care for BLS*.
- (4) If pulseless, immediately initiate high-quality continuous CPR.
 - (i) Ensure frequent clinician rotations and minimal interruptions (less than 10 seconds).
 - (ii) Mechanical CPR devices may be used, if available, for patients 13 years of age and older only.
 - (iii) Perform CPR while preparing for rhythm analysis and defibrillation.

High Quality CPR Reference Chart for All Ages			
Component	Adults and Adolescents	Children (Age 1 Year to Puberty)	Infants (Age Less Than 1 Year, Excluding Newborns)
Compression-ventilation ratio without advanced airway	1 or 2 rescuers 30:2	1 rescuer 30:2 2 or more rescuers 15:2	
Compression-ventilation ratio WITH advanced airway	Continuous compressions at a rate of 100-120/min Give 1 breath every 6 seconds (10 breaths/min)		
Compression rate	100-120/min		
Compression depth	At least 2 inches (5 cm) Compression depth should be no more than 2.4 inches (6 cm)	At least one-third anterior-posterior diameter of chest About 2 inches (5 cm)	At least one-third anterior-posterior diameter of chest About 1½ inches (4 cm)
Hand placement	2 hands on the lower half of the breastbone (sternum)	2 hands or 1 hand (optional for very small child) on the lower half of the breastbone (sternum)	1 rescuer 2 fingers in the center of the chest, just below the nipple line 2 or more rescuers 2 thumb-encircling hands in the center of the chest, just below the nipple line

- b) Assess for and manage profuse bleeding, using a method appropriate for the patient's injuries:
- (1) Direct pressure
 - (2) Wound packing
 - (3) Hemostatic gauze
 - (4) Tourniquet or junctional tourniquet (with jurisdictional training)
- c) Assess skin color, temperature, and capillary refill.
5. Disability
- a) Assess for pulse, motor and sensory function in all extremities
 - b) Assess GCS for trauma patients
 - c) Determine the need for *Spinal Motion Restriction*.
 - (1) Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability **and** one or more the following should receive spinal motion restriction.
 - Midline spinal pain, tenderness, or deformity
 - Signs and symptoms of new paraplegia or quadriplegia
 - Focal neurological deficit
 - Altered mental status or disorientation
 - Distracting injury: Any injury (e.g., fracture, chest, or abdominal trauma) associated with significant discomfort that could potentially distract from a patient's ability to accurately discern or define spinal column pain or tenderness.
 - (2)  In addition to the above indicators for adults, the below apply to children who have not yet reached their 15th birthday.
 - Neck pain or torticollis
 - High-impact diving incident or high-risk motor vehicle crash (head on collision, rollover, ejected from the vehicle, death in the same crash, or speed greater than 55 mph)
 - Substantial torso injury
 - Conditions predisposing to spine injury
 - d) If NO to all of the above, transport as appropriate.
 - e) Infant or child car seats may **not** be used as a spinal immobilization device for the pediatric patient.
 - f) **If patient is unable to communicate or appropriately respond to the above questions, apply *Spinal Motion Restriction* protocol.**
6. Exposure
To assess patient's injuries, remove clothing as necessary, considering condition and environment.
7. Assign Clinical Priority
- a) Priority 1 — Critically ill or injured person requiring immediate attention; unstable patients with life-threatening injury or illness.
 - b) Priority 2 — Less serious condition yet potentially life-threatening injury or illness, requiring emergency medical attention but not immediately endangering the patient's life.

General Patient Care (GPC) (continued)

2.1

- c) Priority 3 — Non-emergent condition, requiring medical attention but not on an emergency basis.
- d) Priority 4 — Does not require medical attention.
- e) In the event of a multiple casualty incident, the Simple Triage and Rapid Treatment (*START* and/or *JumpSTART*) technique will be instituted for rapid tagging and sorting of patients into priority categories for both treatment and transport.

8. Normal Vital Signs Chart

AGE	ESTIMATED WEIGHT	HEART RATE	RESPIRATORY RATE	SYSTOLIC B/P
Premature	Less than 3 kg	160	Greater than 40	60
Newborn	3.5 kg	130	40	70
3 mo.	6 kg	130	30	90
6 mo.	8 kg	130	30	90
1 yr.	10 kg	120	26	90
2 yrs.	12 kg	115	26	90
3 yrs.	15 kg	110	24	90
4 yrs.	17 kg	100	24	90
6 yrs.	20 kg	100	20	95
8 yrs.	25 kg	90	20	95
10 yrs.	35 kg	85	20	100
12 yrs.	40 kg	85	20	100
14 yrs.	50 kg	80	18	110
ADULT	Greater than 50 kg	80	18	120

General Patient Care 2.1



4. For pediatric patients

- a) Pediatric section of the treatment protocol will be used for children who have **not** reached their 15th birthday (trauma) or their 18th birthday (medical), except as otherwise stated in the treatment protocol.
- b) Medication dosing
 - (1) Pediatric doses apply to patients weighing less than 50 kg.
 - (2) For pediatric patients equal to or greater than 50 kg, utilize adult dosing.
- c) The developmental age of the infant/child must be considered in the communication and evaluation for treatment.

Destination consideration:

For those patients who are 18 years of age or older who receive specialized care at a pediatric facility, consider medical consultation with a Pediatric Base Station for patient destination.

- d) Infants and children must be properly restrained prior to and during transport.
- e) A parent/guardian/care taker may remain with a pediatric patient during transport, but must be secured in a separate vehicle restraint system at all times during transport.

G. COMMUNICATIONS

1. Communications with and through EMRC/SYSCOM are recorded. In addition, as part of the quality assurance and quality improvement process, communications with hospitals are frequently recorded. Therefore, you should assume that all your communications among EMS clinicians, hospitals, public safety communications centers, and EMRC/SYSCOM are being recorded.



ANY PATIENT WHOM THE CLINICIAN IDENTIFIES AS MEETING ANY “SPECIALTY” ALERT (E.G., TRAUMA, STEMI ALERT, STROKE ALERT, SEPSIS ALERT) REQUIRES A HOSPITAL NOTIFICATION, AND WHEN INDICATED BY PRIORITY OR NEED FOR INTERVENTION WILL HAVE ONLINE MEDICAL CONSULTATION THROUGH EMRC ON A RECORDED LINE (RADIO OR PHONE).

2. All **Priority 1** patients require online medical consultation through EMRC on a recorded line (radio or phone).
3. All **Priority 2 patients who need further therapeutic intervention(s)** that require on-line medical consultation approval shall perform on-line medical consultation through EMRC on a recorded line (radio or phone).
4. For **Priority 2 patients who have persistent symptoms but who do not need therapeutic intervention(s)** requiring on-line medical consultation approval, clinicians shall notify the receiving facility with an “information only call” through EMRC on a recorded line (radio or phone).
5. For **Priority 2 patients whose symptoms have resolved** and **Priority 3 patients** whose vital signs are within normal limits, notification may be made through EMRC on a recorded line (radio or phone) or through an EOC/EMS communication system in accordance with the standard operating procedures of the local jurisdiction.



ONLINE MEDICAL CONSULTATION MAY BE OBTAINED AT ANY TIME FOR ANY PATIENT, IF DESIRED BY THE PREHOSPITAL EMS CLINICIAN. PEDIATRIC AND SPECIALTY CONSULTATION IS ENCOURAGED FOR TRAUMA AND MEDICAL PATIENTS. CONSULTATION WITH PEDIATRIC AND SPECIALTY CENTERS SHALL OCCUR SIMULTANEOUSLY WITH A BASE STATION CONSULT.

6. If medical consultation is genuinely unavailable, or if the time necessary to initiate consultation significantly compromises patient care, the clinician shall proceed with additional protocol directed care, so long as transport will not be significantly delayed. “Exceptional Call” must be indicated on the Patient Care Report (PCR).
7. Core essentials for communications:
 - a) Assigned patient priority (1 to 4)
 - b) Age
 - c) Chief complaint
 - d) Clinician impression
 - e) Pertinent patient signs and symptoms (e.g., HR, RR, BP, Pulse Ox, and GCS) (be specific—do not use within normal limits or stable in description)
 - f) Pertinent physical findings
 - g) ETA

In addition, for specialty center patients:

Trauma

- a) Patient Trauma Decision Tree Category (Alpha, Bravo, Charlie, Delta)
- b) Number of victims if more than one
- c) Describe mechanism

Stroke

- d) Last known well time
- e) Specific neurological findings (sensory, motor, cognitive)
- f) Upon positive assessment using the Cincinnati Stroke Scale, a STROKE alert shall be made and the LAMS score will be included in the consult.

STEMI

- g) 12-Lead interpretation
- h) Duration of symptoms



CONSIDER ACTIVATION OF THE GO-TEAM FOR SERIOUSLY INJURED PATIENTS WHO REQUIRE A PROLONGED EXTRICATION AND WHO MEET THE INDICATIONS FOR GO-TEAM ACTIVATION.

8. Mass Casualty Incident (MCI) Communications

- a) When a local jurisdiction declares an MCI, it is extremely important to maximize patient care resources and reserve EMS communications for emergent situations. Except for extraordinary care interventions, EMS clinicians may perform all skills and administer medications within protocol during a declared MCI. When the MCI condition is instituted, the Exceptional Call box must be checked on the PCR.
- b) During an MCI, the EMS Officer-in-Charge (OIC) shall designate an EMS Communicator who shall establish appropriate communications.
- c) Reference the Multiple Casualty Incident/Unusual Incident Protocol.

H. REASSESSMENT

1. Reassess unstable patients frequently (recommended every 5 minutes).
2. Reassess stable patients at a minimum of every 15 minutes.
3. Reassess patients being discharged to home or long-term care at the beginning and end of the transport or more frequently, at the clinician's discretion.

- c) If the time of arrival at the trauma or specialty referral center via ground unit is less than 30 minutes, there will generally be no benefit in using the helicopter, especially for Trauma Decision Tree categories Charlie and Delta.
- d) Refer to the *Trauma Decision Tree* when considering use of aeromedical transport. Provide SYSCOM with the patient's category (Alpha, Bravo, Charlie, or Delta).
- e) On-line medical direction should be obtained from the local trauma center and the specialty referral center when transport to the specialty center would require more than 10–15 minutes additional transport time.
 - (1) Pediatric Trauma Patients: Indications as per the pediatric section of the *Trauma* protocols.
 - (2) Spinal Trauma Patients: Indications as per *Spinal Motion Restriction* protocol.
 - (3) Burn Patients: Indications as per *Burn* protocol. Special note:
Isolated burn patients without airway injury or other associated trauma should normally be flown to a burn center, regardless of the location of the closest trauma center.
 - (4) Hand Injury Patients: Indications as per *Hand Trauma* protocol.
Special note: Medevac patients with appropriate indications for hand center referral should normally be flown to the hand center, regardless of the location of the closest trauma center.

3. Status

Evaluate the need for emergent versus non-emergent transportation.



DO NOT WAIT ON-SCENE FOR ADVANCED LIFE SUPPORT. ATTEMPT TO RENDEZVOUS EN ROUTE TO THE HOSPITAL.

J. TRANSFER OF CARE/RENDEZVOUS AND TRANSITION OF PATIENT CARE ALS TO BLS

The ALS clinician-patient relationship is established when the ALS clinician initiates patient assessment and

1. ALS medication(s)* is/are administered or
2. ALS procedure(s)* is/are performed or
3. Upon ALS clinician assessment of the patient there is potential risk of deterioration.

* Based on the medication or procedure as listed in protocol 9.2: *Procedures, Medical Devices, and Medications for EMS and Commercial Services*.

ALS clinicians may only terminate their EMS clinician-patient relationship when they are assured that the patient will continue to receive care at the same or greater levels, or when they have documented with on-line medical direction that the patient's condition has improved and that patient care may be transferred safely to an EMS clinician with a lower scope of practice.

BLS clinicians have the right to decline the transition of patient care. When consensus between the clinicians cannot be gained, ALS shall get on-line medical direction.

Clinicians will relay assessment findings and treatment provided to the individual(s) assuming responsibility for the patient(s). Should an ALS clinician perform an EKG (of any type), it shall be imported into the patient care report and a copy shall be sent with the BLS unit to the receiving facility.

K. DOCUMENTATION

A Patient Care Report (PCR) will be completed and delivered to the receiving facility as soon as possible, ideally upon transfer of care. If this is not immediately possible, clinicians must provide documentation of the patient's prehospital care on a template and in a format provided or approved by MIEMSS for inclusion in the patient care record before leaving the receiving facility, then deliver the completed PCR within 24 hours after dispatch, in compliance with COMAR 30.03.04.04.

Only the unit that pronounces death will select the "Dead on Scene" option in the PCR (eMEDS®) and thus all other units will report "Operational Support Only." If no interventions are performed, the highest level EMS clinician on scene will pronounce death and document "Dead on Scene." If BLS care was rendered by a BLS unit and then termination of resuscitation and pronouncement of death occurred, the BLS unit will select "Dead at Scene with BLS Intervention" option on the eMEDS® PCR. If ALS care was rendered by an ALS unit and then termination of resuscitation and pronouncement of death occurred, the ALS unit will select "Dead at Scene with ALS Intervention" option on the eMEDS® PCR.

L. CONFIDENTIALITY

Patient confidentiality must be maintained at all times.

M. PROFESSIONAL CONDUCT

All patients should be treated with dignity and respect in a calm and reassuring manner.

G. INABILITY TO CARRY OUT PHYSICIAN ORDER

Occasionally, a situation may arise in which a physician’s order cannot be carried out (e.g., the clinician feels the administration of an ordered medication would endanger the patient, a medication is not available, or a physician’s order is outside the protocol). If this occurs:

1. The EMS clinician must:
 - a) Immediately notify the consulting physician as to the reason the order cannot be carried out.
 - b) Document on the patient care report what was ordered, the time it was ordered, and the reason the order could not be carried out.
 - c) As soon as practical following the call, notify the local EMS jurisdiction of the incident.

2. Public Service EMS Operational Programs must:
 - a) Within **5 days** of being made aware of the incident, submit written notification of the incident through the local EMS jurisdiction and Program Medical Director to the Regional Medical Director with a copy to the State EMS Medical Director. The MIEMSS Regional EMS Administrator shall be notified at the discretion of the Regional Medical Director.
 - b) Within **14 days** of the written notification of the incident, initiate a QA investigation under the authority of the Medical Review Committee.
 - c) Within **30 days** of the written notification of the incident, forward to MIEMSS’ Compliance Office and State EMS Medical Director written results of the Medical Review Committee QA investigation and recommendations.

3. Licensed Commercial Programs must:
 - a) Within **5 days** of being made aware of the incident, submit written notification of the incident through the commercial Program Medical Director to the Director of the State Office of Commercial Ambulance Licensing and Regulation with a copy to the State EMS Medical Director.
 - b) Within **14 days** of the written notification of the incident, initiate a QA investigation under the authority of the Medical Review Committee.
 - c) Within **30 days** of the written notification of the incident, forward to the Program Medical Director and to the Director of the State Office of Commercial Ambulance Licensing and Regulation and State EMS Medical Director written results of the Medical Review Committee QA investigation and recommendations.

TRADE NAMES: Not Applicable**a) Pharmacology**

- (1) Increases oxygen content of the blood
- (2) Improves tissue oxygenation
- (3) Decreases energy expended for respirations

b) Pharmacokinetics

Changing the percentage of inspired oxygen results in an increased blood and tissue level equilibration within 5–20 minutes.

c) Indications

- (1) If evidence of hypoxia (Less than 94% SpO₂)
- (2) Respiratory distress
- (3) Cardiopulmonary arrest
- (4) Trauma
- (5) Suspected CO exposure
- (6) Dyspnea

d) Contraindications

Not clinically significant

e) Adverse Effects


High concentrations of oxygen will reduce the respiratory drive in some COPD patients; these patients should be carefully monitored.

f) Precautions

- (1) Never withhold oxygen from those who need it.
- (2) Oxygen should be given with caution to patients with COPD.
- (3) Simple or partial rebreather face masks must be supplied with a minimum 6 lpm.
- (4) Non-breather (NRB) face masks must be supplied with a minimum 12 lpm.

g) Dosage

- (1) Adult: Administer 12–15 lpm via NRB mask or 2–6 lpm via nasal cannula, as needed.
CO exposure: Administer 100% oxygen via NRB mask. Maintain SpO₂ at 100%
- (2) Pediatric: Administer 12–15 lpm via NRB mask or 2–6 lpm via nasal cannula, as needed.
CO exposure: Administer 100% oxygen via NRB mask. Maintain SpO₂ at 100%

Percent O ₂ Saturation	Ranges	General Patient Care
94–100%	Normal	Give oxygen as necessary
91–93%	Mild Hypoxia	Give oxygen as necessary
86–90%	Moderate Hypoxia	Give 100% oxygen Assisting Ventilations if necessary
less than or equal to 85%	Severe Hypoxia	Give 100% oxygen Assist Ventilations If indicated, Intubate
 INACCURATE OR MISLEADING SpO ₂ READINGS MAY OCCUR IN THE FOLLOWING PATIENTS: HYPOTHERMIC, HYPOPERFUSION (SHOCK), CO POISONING, HEMOGLOBIN ABNORMALITY, ANEMIA, AND VASOCONSTRICTION.		

Procedures – PATIENT-INITIATED REFUSAL OF EMS

- a) Initiate General Patient Care.

For the purposes of this protocol, a patient is defined as any person encountered by in-service rescue or emergency medical personnel with an actual or potential injury or medical problem. (The term “patient,” in this protocol only, refers both to patients and to persons who are potential patients. This protocol is not intended to determine the legal status of any person, the establishment of a clinician-patient relationship, or a legal standard of care.)



A minor patient is defined as a patient who has not reached their 18th birthday and is not

- (1) Married, **OR**
- (2) Parent of a child, **OR**
- (3) Requesting:
 - (a) Treatment for drug abuse or for alcoholism,
 - (b) Treatment for Sexual Transmitted Infection (STI) or for contraception,
 - (c) Treatment of injuries from alleged rape or sexual offense, **OR**
- (4) Living separate and apart from the minor’s parent, parents, or guardian, whether with or without consent of the minor’s parent, parents, or guardian, and is not self-supporting, regardless of the source of the minor’s income.

An authorized decision maker for minor patients is defined as an adult who identifies themselves as the parent or guardian, or has written authorization for medical decision making or states that they have written authorization for medical decision making. Clinicians may request the parent or guardian to present identification and will document the name of the individual who identifies themselves as the decision maker.



IN CASES OF ALLEGED RAPE OR SEXUAL OFFENSE, LAW ENFORCEMENT OR SOCIAL SERVICES SHALL BE NOTIFIED.

- b) These persons may have requested an EMS response or may have had an EMS response requested for them. Because of the hidden nature of some illnesses or injuries, an assessment must be offered and performed, to the extent permitted, on all patients. For patients initially refusing care, attempt to ask them, “Would you allow us to check you out and evaluate whether you are OK?”



IF THE AUTHORIZED DECISION MAKER REFUSES TO PERMIT THE EMS CLINICIAN TO EXAMINE A MINOR PATIENT TO DETERMINE THE SEVERITY OF THE ILLNESS OR INJURY, THEN CONSIDER CONTACTING LAW ENFORCEMENT FOR ASSISTANCE. CONSIDER CONSULTATION WITH PEDIATRIC BASE STATION.

- c) Each patient’s assessment shall include:
- (1) Visual assessment - injuries, responsiveness, level of consciousness, orientation, respiratory distress, gait, skin color, diaphoresis
 - (2) Primary survey - airway, breathing, circulation, and disability
 - (3) Vital signs - pulse, blood pressure, respiratory rate and effort, pulse oximeter when available

- (4) Secondary survey - directed by the chief complaint
 - (a) Medical calls - exam of lungs, heart, abdomen, and extremities. Blood glucose testing for patients with Diabetes Mellitus. Neurological exam for altered consciousness, syncope, or possible stroke.
 - (b) Trauma calls - for patients meeting criteria in the Maryland Medical Protocols Trauma Decision Tree recommending transport to a Trauma Center: exam of neck and spine, neurological exam, palpation and auscultation of affected body regions (chest, abdomen, pelvis, extremities).
- (5) Capability to make medical decisions (complete questions 1 through 4 on the Patient-Initiated Refusal of EMS form):
 - (a) Disorientation to person, place, time, situation
 - (b) Evidence of altered level of consciousness resulting from head trauma, medical illness, intoxication, or other cause
 - (c) Evidence of impaired judgment from alcohol or drug ingestion
 - (d) Language communication barriers were removed by assuring “language line” translation when indicated
 - (e) The patient understands the nature of the illness
- d) Following the assessment, complete items 5 through 9 on the Patient-Initiated Refusal of EMS Form, noting the presence of conditions that may place the patient at higher risk of hidden illness/injury or of worse potential outcome.

Management

- (1) Patients at the scene of an emergency who meet criteria to allow self-determination shall be allowed to make decisions regarding their medical care, including refusal of evaluation, treatment, or transport. These criteria include:
 - (a) Medical capacity to make decisions - the ability to understand and discuss and understanding of the nature and consequences of the medical care decision
 - (b) Adult (18 years of age or greater)
 - (c) Those patients who have not reached their 18th birthday and are:
 - (i) Married, **OR**
 - (ii) Parent of a child, **OR**
 - (iii) Requesting:
 - a. Treatment for drug abuse or for alcoholism,
 - b. Treatment for STI or for contraception,
 - c. Treatment of injuries from alleged rape or sexual offense, **OR**
 - (iv) Living separate and apart from the minor’s parent, parents, or guardian, whether with or without consent of the minor’s parent, parents, or guardian, and is self-supporting, regardless of the source of the minor’s income.
 - (d) A patient who has been evaluated by EMS clinicians as having ‘no’ answers to questions 1, 2, 3a, 3b, and 4 on the Patient-Initiated Refusal of EMS form shall be considered to be medically capable to make decisions regarding their own care.

- (e) Patients with ‘no’ answers to questions 1, 2, 3a, 3b, and 4 on the Patient-Initiated Refusal of EMS form but one or more ‘yes’ answers to questions 5 through 8 (medical conditions) have a higher risk of medical illness. The EMS clinician should consider consulting medical direction if the patient does not wish transport. The purpose of the consultation is to obtain a “second opinion” with the goal of helping the patient realize the seriousness of their condition and accept transportation.
 - (f) If the EMS clinician is unsure whether the patient has adequate ability to make medical decisions, they should seek medical consultation.
 - (g) At any time the EMS clinician identifies patient conditions that indicate that the patient should be transported to a hospital, and the patient is refusing transport, then the clinician should seek medical consultation.
- (2) Any person at the scene of an emergency requesting an EMS response, or for whom an EMS response was requested, and who is evaluated to have any one of the following conditions, shall be considered incapable of making medical decisions regarding care and shall be transported, with law enforcement involvement, to the closest appropriate medical facility for further evaluation:
- (a) Continued altered mental status from any cause including altered vital signs, influence of drugs and/or alcohol, metabolic causes (CNS or hypoglycemia), head trauma, or dementia
 - (b) Attempted suicide, danger to self or others, or verbalizing suicidal intent
 - (c) Acting in an irrational manner, to the extent that a reasonable person would believe that the medical capacity to make decisions is impaired
 - (d) Judgment impaired by severe illness or injury to the extent that a reasonable and medically capable person would seek further medical care
 - (e) On an Emergency Petition
- (3) Further care should be provided according to Maryland Medical Protocols, “III E. Behavioral Emergencies” or other protocol sections as appropriate, based on patient’s condition.
- e) Base Station Hospital Physician Consultation

Patient refusals are one of the highest risk encounters in clinical EMS. Careful assessment, patient counseling, and appropriate base hospital physician consultation can decrease non-transport of high-risk refusals. Patients who meet any of the following criteria require Base Station hospital physician consultation:

- (1) The clinician is unsure if the patient is medically capable of refusing transport.
- (2) The clinician disagrees with the patient’s decision to refuse transport due to unstable vital signs, clinical factors uncovered by the assessment, or the clinician’s judgment that the patient may have a poor outcome if not transported.
- (3) The patient was involved in any mechanism included in the Trauma Decision Tree of the Maryland Medical Protocols that would recommend transportation to a Trauma Center.

- (4) Minor patients: No parent, guardian, or authorized decision maker is available or the clinician disagrees with decision made by the parent, guardian, or authorized decision maker.

For patients with significant past medical history, consider consultation with the specialty center that follows the patient if possible.

Patients who do not meet the criteria above but have one or more positive answers to questions 6 through 10 on the Patient-Initiated Refusal of EMS form may have a higher risk of illness. In these situations, clinicians shall consult with the Base Station hospital physician.

- f) Documentation
 - (1) Complete Section One of the Patient-Initiated Refusal of EMS form, documenting the patient's medical decision-making capability and any "At-Risk" criteria.
 - (2) Complete Section Two, which documents clinician assessment and actions.
 - (3) Following patient counseling and Base Station hospital consultation, when indicated, complete Section Three: Initial Disposition, Interventions, and Final Disposition.
 - (4) Have the patient and witness sign the refusal statement as determined by your jurisdiction.
 - (5) Document your assessment, the care provided, elements of the refusal, medical decision-making capability, and "At-Risk" criteria on the jurisdiction's documentation (Medical Incident Report, MAIS form, or jurisdictional equivalent.)
 - (6) Submit copies of the Patient-Initiated Refusal of EMS form and the documentation form to the EMS Supervisor.
 - (7) If the patient/authorized decision maker refuses to sign the refusal statement:
 - (a) Contact a supervisor.
 - (b) Explain the need for a signature and again attempt to have the patient sign the refusal statement.
 - (c) If not already done, have a witness sign the refusal statement.
 - (d) Transmit the patient's unwillingness to sign the refusal statement on a recorded channel and document all steps taken to convince patient to sign.

Indications

- Blood glucose less than 70 mg/dL or greater than 300 mg/dL
- Patient-reported low or high blood glucose
- Diabetic patients with other medical symptoms (e.g., vomiting)
- Altered mental status
- Alcohol intoxication, suspected
- Seizure
- Stroke symptoms
- Unresponsive patients
- Cardiac arrest

BLS

- Check blood glucose level
- If blood glucose is less than 70 mg/dL, administer 10-15 grams of *oral glucose* between the patient's gum and cheek.
- Administer additional dose of 10-15 grams of *oral glucose* if not improved after 10 minutes.

ALS

- **HYPOglycemia:** If blood glucose is less than 70 mg/dL, administer *10% dextrose* in 50 mL (5 gram) boluses, 1 minute apart, to a maximum of 250 mL OR 25 grams of *50% dextrose IVP*, until:
 - the patient has a return to normal mental status, and
 - the patient's blood glucose is at least 90 mg/dL
- If patient has persistently altered mental status and blood glucose less than 90 mg/dL despite treatment, repeat dosing regimen above.
- If unable to initiate an IV and blood glucose is less than 70 mg/dL, administer *glucagon* 1 mg IM/IN.
 - If the patient has persistently altered mental status and blood glucose less than 90 mg/dL at 15 minutes, transport to the hospital should not be delayed.
- **HYPERglycemia:** If blood glucose is greater than 300 mg/dL, administer 10 mL/kg *Lactated Ringer's* bolus unless rales, wheezing, pedal edema, or history of renal failure or CHF is present.

MC

- Not applicable



Indications

- Blood glucose less than 70 mg/dL or greater than 300 mg/dL
- Patient-reported low or high blood glucose
- Diabetic patients with other medical symptoms (e.g., vomiting)
- Altered mental status
- Alcohol intoxication, suspected
- Seizure
- Stroke symptoms
- Unresponsive patients
- Cardiac arrest
- Pediatric bradycardia

BLS



- Check blood glucose level
- If blood glucose is less than 70 mg/dL, administer 10-15 grams of *oral glucose* between the patient's gum and cheek.
- Administer additional dose of 10-15 grams of *oral glucose* if not improved after 10 minutes.

ALS



- **Patient less than 28 days:** If blood glucose is less than 40 mg/dL, administer 2 mL/kg of 10% *dextrose* IV/IO. Recheck glucose after first dose.
- **Patient 28 days or greater until the 18th birthday:** If blood glucose is less than 70 mg/dL, administer 2–4 mL/kg of 10% *dextrose* IV/IO to a maximum of 25 grams. Recheck glucose after first dose.
- If unable to start IV and blood glucose is less than 70 mg/dL:
 - **28 days–4 years of age:** *Glucagon* 0.5 mg IM/IN.
 - **5 years of age until 18th birthday:** *Glucagon* 1 mg IM/IN. Recheck blood glucose. If the patient has persistently altered mental status and blood glucose less than 90 mg/dL at 15 minutes, transport to the hospital should not be delayed.

MC



- **Patient less than 28 days:** If blood glucose is less than 40 mg/dL, obtain medical consultation to administer second dose of 10% *dextrose* IV/IO.
- **Patient 28 days – 18 years of age:** If blood glucose is less than 70 mg/dL, obtain medical consultation to administer second dose of 10% *dextrose* IV/IO.

TRADE NAMES: Not Applicable

a) Indications

- (1) Altered mental status with known diabetic history
- (2) Unconscious for an unknown reason
- (3) Measured blood glucose less than 70 mg/dL

b) Adverse Effects

Not clinically significant

c) Precautions

Patient without gag reflex may aspirate.

d) Contraindications

Not clinically significant

e) Preparations

10–15 grams of glucose (contained in 24, 30, or 37.5 gram tube)

f) Dosage

- (1) Adult: Administer 10–15 grams of oral glucose between the gum and cheek. Consider single additional dose of oral glucose if not improved after 10 minutes.
- (2) Pediatric: Administer 10–15 grams of oral glucose between the gum and cheek; this may be accomplished through several small administrations. Consider single additional dose of oral glucose if not improved after 10 minutes.

TRADE NAMES: Narcan®

a) Pharmacology

Reverses all effects due to opioid (morphine-like) agents. This drug will reverse the respiratory depression and all central and peripheral nervous system effects.

b) Pharmacokinetics

- (1) Onset of action is within a few minutes with intranasal (IN) administration.
- (2) Patients responding to naloxone may require additional doses and transportation to the hospital since most opioids/narcotics last longer than naloxone.
- (3) Has no effect in the absence of opioid/narcotic.

c) Indications

To reverse respiratory depression induced by opioid/narcotic agent.

d) Contraindications

Patients under 28 days of age

e) Adverse Effects

Opioid withdrawal

f) Precautions

- (1) Naloxone may induce opiate withdrawal in patients who are physically dependent on opioids.
- (2) Certain drugs may require much higher doses of naloxone for reversal than are currently used.
- (3) Should be administered and titrated so respiratory efforts return, but not intended to restore full consciousness.
- (4) Intranasal naloxone must be administered via nasal atomizer.
- (5) Naloxone has a duration of action of 40 minutes; the effect of the opioid/narcotic may last longer than naloxone and patients should be encouraged to be transported.



CLINICIANS MUST CONTACT A BASE STATION PHYSICIAN FOR PATIENTS WISHING TO REFUSE TRANSPORT AFTER BLS ADMINISTRATION OF NALOXONE.

g) Dosage

- (1) Adult: Administer 2 mg IN, dividing administration of the dose equally between the nares to a maximum of 1 mL per nare, **OR** administer 4 mg/0.1 mL IN in one nare.
- (2) Pediatric (child aged 28 days to adult): Administer 2 mg IN, dividing administration of the dose equally between the nares to a maximum of 1 mL per nare, **OR** administer 4 mg/0.1 mL IN in one nare.
- (3) Repeat as necessary to maintain respiratory activity.

Indications

- Blurred vision (including intermittent loss of vision in one or both eyes, which may have resolved upon arrival of EMS)
- Difficulty speaking
- Numbness or weakness (often one side only)
- Sudden onset of dizziness or loss of balance
- Severe, unexplained headache


BLS



- Position patient with head elevated at 30 degrees.
- Check blood glucose level; if less than 70 mg/dL, treat per *Hypoglycemia* protocol.
 - Pediatrics: for patients who have not reached their 18th birthday, administer oxygen 2-6 lpm via nasal cannula, unless the patient is hypoxic or in respiratory distress.
- Perform Cincinnati Prehospital Stroke Scale (any abnormality is positive for stroke):
 - Facial droop – have patient smile or show teeth
 - ◆ Normal – both sides of face move equally
 - ◆ Abnormal – one side of the face does not move as well as the other side
 - Arm drift – patient closes eyes and holds both arms straight out for 10 seconds
 - ◆ Normal – both arms move the same or both arms do not move at all
 - ◆ Abnormal – one arm does not move or one arm drifts down compared with other
 - Speech abnormal – have the patient say “you can’t teach an old dog new tricks”
 - ◆ Normal – patient uses correct words with no slurring
 - ◆ Abnormal – patient slurs words, uses wrong words, or is unable to speak
- Perform Posterior Cerebellar Assessment (any abnormality is positive for stroke):
 - ◆ Balance: patient complains of sudden onset of loss of balance or dizziness
 - ◆ Eyes: patient has sudden vision loss (including intermittent loss of or blurred vision)
- If either the Cincinnati Prehospital Stroke Scale or Posterior Cerebellar Assessment is positive, then calculate the suspected stroke patient’s Los Angeles Motor Scale (LAMS) score:
 - Facial droop
 - ◆ Absent 0
 - ◆ Present 1
 - Arm drift
 - ◆ Absent 0
 - ◆ Drifts down 1
 - ◆ Falls rapidly 2
 - Grip strength
 - ◆ Normal 0
 - ◆ Weak grip 1
 - ◆ No grip 2
- Obtain and document a telephone number for one or more individuals who have knowledge of the patient’s presenting symptoms, last known well time, and medical history. Communicate this information to receiving hospital staff.

BLS



- Destination determination for a suspected stroke patient who can be delivered to the appropriate stroke center within **22 hours** from when patient was last known well:
 - **LAMS score 0-3:** transport the patient to the closest Designated Acute Stroke Ready, Primary, or Comprehensive Stroke Center.
 - **LAMS score of 4 or greater:** transport the patient to the closest Comprehensive Stroke Center or thrombectomy-capable Primary Stroke Center. If the patient cannot be delivered to an appropriate center within 30 minutes, go to the closest Designated Acute Stroke Ready or Primary Stroke Center.
 - **For suspected stroke patients greater than 30 minutes from any stroke center:** transport patient to the closest hospital or request aviation if there would be a time savings.
 -  **For pediatric suspected stroke patients (have not reached their 18th birthday):** consult with a local base station and pediatric base station to arrange transport to a Pediatric Trauma Center.

ALS



- Establish IV access, preferably on the unaffected side of the body
- Obtain blood sample using a closed system
- If blood glucose is less than 70 mg/dL, treat per *Hypoglycemia* protocol

MC




- For all suspected stroke patients within **22 hours** of last known well time, notify the receiving stroke center or hospital as soon as possible. During the consultation, the clinician shall use the verbiage, “Priority 1, Stroke Alert patient with a last known well time of XX:XX” as the universal method of notifying the facility that the patient meets the stroke inclusion criteria.
- If the patient is hypotensive, obtain medical consultation.
- Do not treat hypertension in the field.

Clinical Pearls

- While strokes during pregnancy or shortly after giving birth are rare, there has been a significant rise reported in the literature. Mothers-to-be and postpartum mothers have an increased risk.
- Strokes are less common in children than in adult patients. However, children with the following conditions have a higher risk of stroke: congenital heart defects, brain injury, sickle cell disease (blood disorders), and certain types of infections (meningitis, encephalitis).

TRADE NAMES: Not Applicable

- a) **Indications**
Poisoning by mouth
- b) **Adverse Effects**
May indirectly induce vomiting and cause nausea
- c) **Precautions**
Does not adsorb all drugs and toxic substances
- d) **Contraindications**
 - (1) Altered mental status
 - (2) Patients who have received an emetic
- e) **Preparations**
 - (1) 25 grams/125 mL bottle
 - (2) 50 grams/250 mL bottle
- f)  **Dosage**
 - (1) Adult: Administer 1 gram/kg PO
 - (2) Pediatric: Administer 1 gram/kg PO



POISON INFORMATION CENTER RECOMMENDATIONS SHOULD BE SOLICITED IN CONJUNCTION WITH MEDICAL CONSULTATION, BUT MEDICATION ORDERS CAN ONLY BE ACCEPTED FROM AN APPROVED BASE STATION OR CONSULTATION CENTER.

Indications

- Acute onset of severe illness after exposure to a known allergen with **two or more** of the following:
 - Urticaria (hives) or acute swelling of the mucosa (e.g., tongue, airway, stridor, lips)
 - Respiratory compromise
 - Hypotension
 - GI symptoms, such as persistent nausea/vomiting, abdominal pain, or diarrhea
- Acute onset of severe illness after exposure to a known allergen with hypotension

BLS

- *Epinephrine auto-injector (BLS)* 0.3 mg IM or *epinephrine (BLS)* (1 mg/mL) 0.5 mg IM in the lateral thigh
- *Albuterol (BLS)* inhaler (2 puffs inhaled) or *albuterol (BLS)* 2.5 mg nebulized. May repeat dose one time, as needed, within 30 minutes.

ALS

- Administer *epinephrine* (1 mg/mL) 0.5 mg IM. May repeat *epinephrine* IM every 5 minutes to a maximum of 3 doses for persistent severe reactions.
- Establish IV/IO access.
- For patients who are in extremis with severe hypotension or impending respiratory failure, initiate an *epinephrine* infusion (after having administered 3 doses of IM *epinephrine*) as follows:
 - Add 1 mg of *epinephrine* (either 1 mg/mL or 0.1 mg/mL) in a 100 mL bag of LR or NS
 - Use a Microdrip set (60 drops/mL) for infusion administration
 - Adult *epinephrine* infusion dosage:
 - ♦ Administer infusion through a free-flowing IV, ideally 20 gauge or larger, or by IO
 - ♦ Start infusion at 1 mL/min (60 drops/min) IV/IO
 - ♦ Check blood pressure every 5 minutes. If MAP is less than 65 mmHg or systolic blood pressure is less than 90 mmHg, increase to a maximum rate of 2 mL/min (120 drops/min).
- Additional treatments **after** administration of the initial dose of *epinephrine*:
 - *Albuterol* 2.5 mg nebulized and *ipratropium (Atrovent®)* 500 mcg nebulized; may repeat *albuterol* nebulized 2.5 mg one time.
 - *Diphenhydramine* 50 mg SLOW IVP or IM
 - Administer 20 mL/kg bolus IV/IO for hypotension (MAP less than 65 mmHg or systolic blood pressure less than 90 mmHg)
 - *Dexamethasone* 10 mg IV/IO

MC

- Additional doses of *epinephrine auto-injector*, *epinephrine*, *albuterol*, *ipratropium*, *diphenhydramine* beyond those listed above require medical consultation.
- If blood pressure goals are not met upon reaching *epinephrine* infusion rate of 2 mL/min (120 drops/min), obtain medical consultation.

Clinical Pearls

- Re-check dosing and concentration of *epinephrine* prior to administration.
- *Epinephrine* 1 mg/mL (previously known as 1:1,000) is appropriate for the IM route only.
- *Epinephrine* should never be given by IV route, except for an *epinephrine* infusion for patients in anaphylaxis or for patients in cardiac arrest.



Indications

- Acute onset of severe illness after exposure to a known allergen with **two or more** of the following:
 - Urticaria (hives) or acute swelling of the mucosa (e.g., tongue, airway, stridor, lips)
 - Respiratory compromise
 - Hypotension
 - GI symptoms, such as persistent nausea/vomiting, abdominal pain, or diarrhea
- Acute onset of severe illness after exposure to a known allergen with hypotension

BLS



- *Epinephrine (BLS)*
 - Less than 5 years of age: *epinephrine (BLS)* (1 mg/mL) 0.15 mg IM or *pediatric epinephrine auto-injector (BLS)* 0.15 mg IM in the lateral thigh
 - 5 years of age or greater: *epinephrine (BLS)* (1 mg/mL) 0.5 mg IM or *epinephrine auto-injector (BLS)* 0.3 mg IM in the lateral thigh
- *Albuterol (BLS)*
 - Less than 2 years of age: *albuterol (BLS)* inhaler (2 puffs) inhaled or *albuterol (BLS)* 1.25 mg nebulized. May repeat dose one time, as needed, within 30 minutes.
 - 2 years of age or greater: *albuterol (BLS)* inhaler (2 puffs) inhaled or *albuterol (BLS)* 2.5 mg nebulized. May repeat dose one time, as needed, within 30 minutes.

ALS



- Administer *epinephrine* IM. May repeat every 5 minutes for a total of 3 doses.
 - Less than 5 years of age: *epinephrine* (1 mg/mL) 0.15 mg IM in the lateral thigh.
 - 5 years of age or greater: *epinephrine* (1 mg/mL) 0.5 mg IM in the lateral thigh.
- Establish IV/IO access.
- Additional treatments to consider after administration of the initial dose of *epinephrine*:
 - *Albuterol* and *ipratropium (Atrovent®)* via nebulizer:
 - ◆ Less than 1 year of age: *albuterol* 1.25 mg; *ipratropium* is contraindicated.
 - ◆ Greater than 1 year of age but less than 2 years of age: *albuterol* 1.25 mg and *ipratropium* 250 mcg.
 - ◆ For a patient 2 years of age or greater: *albuterol* 2.5 mg and *ipratropium* 500 mcg.
 - ◆ For all age groups, one additional dose of *albuterol* only may be given via nebulizer.
 - *Diphenhydramine* 1 mg/kg SLOW IVP or IM to a maximum of 50 mg
 - Administer 20 mL/kg bolus for hypotension; systolic blood pressure less than 70 x 2 (age in years)
 - *Dexamethasone* 0.5 mg/kg to a maximum of 10 mg IV/IO

MC



- Additional doses of *pediatric epinephrine auto-injector*, *epinephrine*, *albuterol*, *ipratropium*, *diphenhydramine* beyond those listed above require medical consultation.
- Consider *pediatric epinephrine infusion* for refractory anaphylactic shock.

Clinical Pearls

- Re-check dosing and concentration of *epinephrine* prior to administration.
- *Epinephrine* 1 mg/mL (previously known as 1:1,000) is appropriate for the IM route only.
- *Epinephrine* should never be given by IV route, except for an *epinephrine* infusion for patients in anaphylaxis or for patients in cardiac arrest.

TRADE NAMES: Not Applicable

a) Indications

- (1) Moderate to severe allergic reaction with respiratory distress or mild allergic reaction with history of life-threatening allergic reaction
- (2) Patients with severe asthma

b) Adverse Effects

- (1) Tachycardia/palpitations
- (2) Angina
- (3) Headache
- (4) Nausea/vomiting
- (5) Dizziness
- (6) Hypertension
- (7) Nervousness/Anxiety
- (8) Tremors

c) Precautions



Medical consultation must be obtained before administering the EMS service's manual epinephrine or EMS service's auto-injector to cardiac (pediatric and adult), pregnant, and adult asthma patients. However, medical consultation is not required for severe allergic reactions with respiratory distress.

d) Contraindications

None in the presence of anaphylaxis

e) Preparations

Epinephrine

(Patient prescribed or EMS supplied)

- (1) Vial: 1 mg in 1 mL
- (2) Preloaded Syringe
 - (a) Adult: 0.5 mg in 0.5 mL
 - (b) Pediatric: 0.15 mg in 0.15 mL

f) Dosage

- (1) **Patients 5 years of age or greater:**

Adult: 0.5 mg in 0.5 mL IM

- (2) **Patients less than 5 years of age:**

Pediatric: 0.15 mg in 0.15 mL IM

- (3) Additional doses may be administered with medical consultation.

TRADE NAMES: Not Applicable**a) Indications**

- (1) Moderate to severe allergic reaction with respiratory distress or mild allergic reaction with history of life-threatening allergic reaction
- (2) Patients with severe asthma

b) Adverse Effects

- (1) Tachycardia/palpitations
- (2) Angina
- (3) Headache
- (4) Nausea/vomiting
- (5) Dizziness
- (6) Hypertension
- (7) Nervousness/anxiety
- (8) Tremors

c) Precautions

Medical consultation must be obtained before administering the EMS service's manual epinephrine or EMS service's auto-injector to cardiac (pediatric and adult), pregnant, and adult asthma patients. However, medical consultation is not required for severe allergic reactions with respiratory distress.

d) Contraindications

None in the presence of anaphylaxis

e) Preparations

- Epinephrine Auto-injector (single or multi-dose) only
(Patient prescribed or EMS supplied)
- (1) Adult: 0.3 mg
 - (2) Pediatric: 0.15 mg

f) Dosage



- (1) Less than 5 years of age: 0.15 mg IM in the lateral thigh via epinephrine auto-injector.
- (2) 5 years and greater: administer 0.3 mg IM in the lateral thigh via epinephrine auto-injector.
- (3) Additional doses may be administered with medical consultation.

Indications

- **UPPER EXTREMITY:** Patients should have stable vital signs with an isolated upper extremity injury, and no other major or multiple system traumatic injuries.
 - Stable patients with an isolated upper extremity injury at or below the mid-humerus
 - Complete or incomplete hand or finger amputation (except distal fingertip)
 - Degloving, high pressure injection, or crush injury
 - Compartment syndrome, suspected (excessive swelling and significant pain to extremity)
 - Complicated nerve or vascular injury of the forearm and hand
 - High-pressure injection injuries to hand or upper extremity
 - Complicated nerve, vessel, or compartment syndrome (excessive swelling and pain of extremity with possible evolving nerve deficit) injury of the forearm and hand
- **LOWER EXTREMITY:**
 - Complete or incomplete amputation of the lower extremity, ankle, foot
 - Degloving, high-pressure injection, or crush injury
 - Compartment syndrome, suspected (excessive swelling and significant pain to extremity)
 - Complicated nerve or vascular injury of the lower extremity

BLS



- Control bleeding.
 - Apply direct pressure to the area of bleeding.
 - Apply tourniquet early if hypovolemic shock is present and/or bleeding is difficult to control. If bleeding source is unclear, place tourniquet as proximal as possible on the limb.
 - If bleeding from a non-compressible injury (i.e., not able to place a tourniquet to stop bleeding), consider wound packing and/or hemostatic gauze.
- Splint suspected fracture or dislocated extremity or joint. If suspected fracture appears to have compromised perfusion or neurological function, apply gentle traction and splint in anatomic position.
- Package amputated extremity in sealed plastic bag (keep dry) and place on top of ice to keep cool. Do not freeze or submerge in water or freeze amputated part.
- **Upper Extremity Destination:**
 - Adult patients with isolated, qualifying upper extremity injuries should be referred to Curtis National Hand Center at MedStar Union Memorial Hospital.
 -  Pediatric patients who have not yet reached their 15th birthday with qualifying upper extremity injuries should be referred to the closest appropriate Pediatric Trauma Center.
- **Lower Extremity Destination:**
 - Adult patients with qualifying lower extremity injuries should be referred to the closest appropriate Adult Trauma Center.
 -  Pediatric patients with qualifying lower extremity injuries should be referred to the closest appropriate Pediatric Trauma Center.

ALS



- Establish IV access with *Lactated Ringer's*, if appropriate.
- If patient develops hypotension or signs of hemorrhagic shock:
 - Reassess the patient for other injuries. If multiple system trauma or neurotrauma, refer to *Multiple/Severe Trauma* protocol and transport to closest appropriate trauma center.
 - Treat per *Shock: Hypoperfusion* protocol.
- Provide pain management per *Pain Management* protocol.

MC

- Additional fluid beyond 2,000 mL requires medical consultation.
- Consultation and acceptance by the Curtis Hand Center (MedStar Union Memorial) is required prior to medevac authorization (before SYSCOM will dispatch the helicopter).

Clinical Pearls

- Toe injuries from lawn mower are not candidates for reimplantation and patients should be transported to the closest appropriate facility.
- Use time, distance, weather, and proximity to designated trauma center to determine mode of transport. If estimated ground transport time to designated hand center is less than 30 minutes, use ground transport.

Indications

- Multiple or severe traumatic injuries in patients **15 years of age and older**
- Suspected internal bleeding, external bleeding, fractures, or lacerations
- Patients may present with any of the following:
 - Shock or hypotension
 - Hypertension, particularly in head-injured patients
 - Shallow or absent respirations
 - Tachycardia or bradycardia
 - Decreased motor or sensory function in the extremities
- A patient who meets criteria for any category of the Maryland Trauma Decision Tree (Alpha, Bravo, Charlie, Delta)

BLS



- Airway with Cervical Spine Motion Restriction
 - Apply *Spinal Motion Restriction* protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilization performed.
 - Place an NPA/OPA early, as needed to establish or maintain a patient airway.
- Breathing and Ventilation
 - Provide ventilatory support and oxygen via appropriate method for the patient.
 - Maintain pulse oximetry (SpO₂) greater than or equal to 94%.
 - For a head-injured adult/adolescent (greater than 13 years of age), provide ventilation at a rate of 20 breaths per minute if:
 - ♦ Patient has signs of herniation such as unequal pupils, posturing or paralysis, or
 - ♦ Patient is manifesting a rapidly decreasing GCS, or
 - ♦ With on-line medical consultation
 - Seal open chest wounds with a vented chest seal.
- Circulation with Hemorrhage Control
 - Apply direct pressure to the area of bleeding.
 - If bleeding is life-threatening at any time OR continues despite direct pressure, then attempt wound packing, hemostatic bandages, and/or early tourniquet as appropriate.
 - Apply pelvic stabilization if indicated; use pelvic binder if available.

ALS



- Airway with Cervical Spine Motion Restriction as noted in BLS section above
- Breathing and Ventilation
 - Maintain ETCO₂ between 35-40 mmHg for any patient with significant head injury
 - For patients with suspected head injury AND signs of increased intracranial pressure (brainstem herniation), consider adjusting ventilations to achieve an ETCO₂ 30-35 mmHg.
 - If suspected **tension** pneumothorax, perform *needle decompression thoracostomy*; once catheters are placed, do not remove.
- Circulation with Hemorrhage Control
 - For patients with a systolic blood pressure greater than or equal to 90 mmHg (greater than or equal to 110 mmHg if injuries include a suspected head injury):
 - ♦ Establish IV/IO access.

ALS



- For patients with a systolic blood pressure less than 90 mmHg (less than 110 mmHg if injuries include a suspected head injury):
 - ◆ Establish IV/IO access.
 - ◆ Administer small boluses of *Lactated Ringer's* (maximum single bolus of 250 mL prior to additional blood pressure check) to achieve and maintain a systolic blood pressure of greater than or equal to 90 mmHg (110 mmHg if injuries include a suspected head injury).
- Initiate a second IV for category alpha and bravo patients ONLY if it does NOT delay transport.
- Treat per *Pain Management* protocol.

MC



- Additional fluid beyond 2,000 mL requires medical consultation

Clinical Pearls

- While, time, distance, and proximity are all factors to be considered in the triage decision, the trauma decision tree should be used to determine who should be transported to the nearest appropriate trauma center and when the transport should occur.
- For trauma patients who have not reached their 15th birthday, refer to *Trauma: Multiple/Severe (Pediatric)* protocol.



Indications

- Multiple or severe traumatic injuries in patients **less than 15 years of age**
- Suspected internal bleeding, external bleeding, fractures, or lacerations
- Patients may present with any of the following:
 - Shock or hypotension
 - Hypertension, particularly in head-injured patients
 - Shallow or absent respirations
 - Tachycardia or bradycardia
 - Decreased motor or sensory function in the extremities
- A pediatric patient who meets criteria for any category of the Maryland Trauma Decision Tree (Alpha, Bravo, Charlie, Delta)

BLS



- Airway with Cervical Spine Motion Restriction
 - Apply *Spinal Motion Restriction* protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilization performed.
 - Place an NPA/OPA early, as needed to establish or maintain a patient airway.
- Breathing and Ventilation
 - Provide ventilatory support and oxygen via appropriate method for the patient.
 - Maintain pulse oximetry (SpO₂) greater than or equal to 94%.
 - For a head-injured patient who meets any of the following criteria below, provide ventilation as follows:
 - ♦ Criteria:
 - Patients who have signs of herniation such as unequal pupils, posturing, or paralysis, or
 - Patient is manifesting a rapidly decreasing GCS, or
 - With on-line medical consultation
 - ♦ Ventilatory rate if any criteria above are met:
 - Adult/Adolescent (greater than 13 years of age): 20 breaths per minute
 - Child (1-12 years of age): 30 breaths per minute
 - Infant (less than 1 year of age): 35 breaths per minute
 - Seal open chest wounds with a vented chest seal.
- Circulation with Hemorrhage Control
 - Apply direct pressure to the area of bleeding.
 - If bleeding is life-threatening at any time OR continues despite direct pressure, then attempt wound packing, hemostatic bandages, and/or early tourniquet as appropriate.
 - Apply pelvic stabilization if indicated

ALS



- Airway with Cervical Spine Motion Restriction as noted in BLS section above
- Breathing and Ventilation
 - If suspected **tension** pneumothorax, perform *needle decompression thoracostomy*; once catheters are placed, do not remove.
- Circulation with Hemorrhage Control
- Establish IV/IO access
- If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR.
- Treat per *Pain Management* protocol



MC



- Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.

Clinical Pearls

- Pelvic fractures in pediatric patients are rare, pelvic binders/splints should be applied with caution

GLASGOW COMA SCALE

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	
5 SMILES/COOS/CRIS	APPROPRIATE WORDS	ORIENTED AND CONVERSES	5
4 CRIES	INAPPROPRIATE WORDS	DISORIENTED AND CONVERSES	4
3 INAPPROPRIATE CRIES/SCREAMS	CRIS/SCREAMS	INAPPROPRIATE WORDS	3
2 GRUNTS	GRUNTS	INCOMPREHENSIBLE SOUNDS	2
1 NO RESPONSE	NO RESPONSE	NO RESPONSE	1

Glasgow Coma Score


Total (3–15)

Indications

- Abrasions, contusions, and/or bleeding
- Signs of forcible restraint
- Petechiae of the face and conjunctiva, secondary to strangulation
- Facial injuries, including eye injuries, broken teeth, swollen jaw, or cheekbone
- Vaginal or rectal bleeding or pain
- Some patients may present without visible signs of trauma

BLS



- If practical, allow patient to speak with a clinician with whom they are most comfortable.
- Maintain a non-judgmental, caring attitude.
- Preserve the crime scene and clothing articles, if practical.
- Do not perform an examination of the genitals or rectum unless necessary to stabilize the patient.
- Dress wounds (do not attempt to clean).
- Discourage any self-treatment (shower, washing, changing clothes, brushing teeth).
- Treat injuries according to appropriate trauma protocol.
- Destination
 - Patients meeting specialty center criteria or in need of time-sensitive emergent care should be transported to the closest appropriate specialty center or emergency department, even if this is not a Maryland Coalition Against Sexual Assault (MCASA) recognized facility.
 -  Patients under 13 years of age should be transported to an MCASA-recognized pediatric facility for a Sexual Assault Forensic Exam (SAFE).
 - For patients 13 years of age and older, transport the patient to the appropriate MCASA-recognized facility for a SAFE exam. Use the term “safe patient” when notifying the receiving facility.
- Reporting
 - All EMS clinicians **must** report cases of suspected child or vulnerable adult abuse or neglect directly to the local police or adult/child protective services. This report is required by law. Do not initiate the report in the presence of the patient, parent, or caregiver.

ALS



- Treat with *ketorolac* or opioid, as needed, per *Pain Management* protocol.

MC



- Not applicable.

Clinical Pearls

- EMS clinicians are protected from liability if they make a report of child or vulnerable adult abuse or neglect in good faith.

Indications

- Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability **and** one or more the following should receive spinal motion restriction:
 - Midline cervical, thoracic, or lumbar spinal pain, tenderness, or deformity
 - Signs and symptoms of new paraplegia or quadriplegia
 - Focal neurological deficit (sensory or motor)
 - Altered mental status or disorientation
 - Distracting injury: Any injury (e.g., fracture, chest, or abdominal trauma) associated with significant discomfort that could potentially distract from a patient’s ability to accurately discern or define spinal column pain or tenderness.
- Indications for referral to an Adult Neurotrauma Center:
 - 15 years of age or older AND
 - Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma AND
 - Patent airway AND
 - Hemodynamically stable
 - ◆ If considering referral to Adult Neurotrauma Center, consult with both the nearest Trauma Center and the Adult Neurotrauma Center, when possible.

BLS

- Initiate manual in-line cervical spine stabilization and application of a correctly-sized cervical collar.
- Minimize flexion, extension, and rotation of the spinal column.
- **Cervical collar:** The following patients need application of a cervical collar and do **not** need full immobilization with a backboard. These patients should be assisted with minimal movement to the EMS stretcher and allowed to lie supine on their own accord with head elevated at 30 degrees:
 - Patients who are found by EMS clinicians to be standing or ambulatory,
 - Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, rotation) of the spinal column, and
 - Patients who do not have evidence of a neurological deficit.
- **Cervical collar and backboard:** Patients with neurological deficit or a GCS of less than 15 or who are not able to ambulate on their own accord shall be immobilized with cervical collar and a backboard.
- **Extrication:** Backboards may be used for patient extrication and transfer for patients not meeting the *Spinal Motion Restriction* protocol; however, other devices are preferred (e.g., Reeves™, scoop stretcher).
 - If the backboard is used only for extrication from scene to ambulance, remove the backboard as soon as possible and allow the patient to be supported on the EMS stretcher.
- **Interfacility transport:** Patients who have already been removed from the backboard should not be placed back on one for transport.
- **Found on backboard prior to EMS arrival:** If the patient was immobilized on a backboard prior to EMS arrival, EMS should assess continued need for the device using the criteria above.

BLS



• **Helmet Removal**

- If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
- If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
- If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

ALS



- If the patient presents with hypotension and concern for neurogenic shock, refer to the neurogenic shock section of the *Shock/Hypotension* protocol.

MC



- Not applicable.



Indications

- Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability **and** the presence of or inability to assess one or more of the following should receive spinal motion restriction:
 - Midline spinal pain, tenderness, or deformity
 - Signs and symptoms of new paraplegia or quadriplegia
 - Focal neurological deficit
 - Altered mental status or disorientation
 - Distracting injury
 - Neck pain or torticollis
 - High-impact diving incident or high-risk motor vehicle crash (i.e., head-on collision, rollover, ejected from the vehicle, death in the same crash, or speed greater than 55 mph)
 - Substantial torso injury
 - Conditions predisposing to spine injury
- Indications for referral to a Pediatric Trauma Center:
 - Patient is less than 15 years of age AND
 - Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma AND
 - Patent airway AND
 - Hemodynamically stable

BLS



- Initiate manual in-line cervical spine stabilization and application of a correctly-sized cervical collar.
- Minimize flexion, extension, and rotation of the spinal column
- **Cervical collar:** The following patients need application of a cervical collar and do not need full immobilization with a backboard. These patients should be assisted with minimal movement to the EMS stretcher and allowed to lie supine on their own accord with head elevated at 30 degrees:
 - Patients who are found by EMS clinicians to be standing or ambulatory,
 - Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, rotation) of the spinal column, and
 - Patients who do not have evidence of a neurological deficit.
- **Cervical collar and backboard:** Patients with neurological deficit or a GCS of less than 15 or who are not able to ambulate on their own accord, shall be immobilized with cervical collar and a backboard.
- **Extrication:** Backboards may be used for patient extrication and transfer for patients not meeting the *Spinal Motion Restriction* protocol; however, other devices are preferred (e.g., Reeves™, scoop stretcher).
 - If the backboard is used only for extrication from scene to ambulance, remove the backboard as soon as possible and allow the patient to be supported on the EMS stretcher.
- **Interfacility transport:** Patients who have already been removed from the backboard should not be placed back on one for transport.
- **Found on backboard prior to EMS arrival:** if the patient was immobilized on a backboard prior to EMS arrival, EMS should assess continued need for the device using the criteria above.



Trauma: Spinal Motion Restriction – Pediatric (continued)

8.6-P

BLS



- **Helmet Removal**

- If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
- If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
- If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

ALS



- If the patient presents with hypotension and concern for neurogenic shock, refer to the neurogenic shock section of the *Shock/Hypotension* protocol.

MC



- Not applicable.

Trauma: Spinal Motion Restriction – Pediatric 8.6-P

a) BACKGROUND

- (1) A review of past active assailant incidents has shown that the conventional prehospital practice of not entering the scene until it is deemed safe by law enforcement (LE) has been associated with additional loss of life.
- (2) This protocol is designed to be all-hazards in nature. It is meant to provide a clinical concept of operations that empowers trained and equipped, but not necessarily tactical, EMS prehospital clinicians, to access casualties and expedite life-sustaining interventions closer to the point and time of injury. For active assailant and other LE-related incidents, EMS clinicians shall be under LE escort. EMS clinicians shall use appropriate personal protective equipment as defined by local jurisdiction.
 - (a) Examples of such potentially volatile environments include, but are not limited to:
 - (i) Active assailant (active shooter/IED) situations
 - (ii) Post-blast detonations
 - (iii) Intentional release of a chemical agent
 - (iv) Industrial accident/explosion
 - (v) Hazardous materials incident
 - (vi) Structural collapse/urban search and rescue situations
 - (vii) Transportation mishaps with limited scene access
 - (viii) In the immediate aftermath of a natural disaster such as a tornado

b) INTRODUCTION

- (1) This protocol provides guidelines for the type of intervention and care that should be rendered at various proximities to a threat in a potentially volatile environment.
- (2) By definition, potentially volatile environments are dynamic in nature. Scene conditions may change and emergent evacuation of responders and patients may interfere with the delivery of interventions described in this protocol.

c) INDICATIONS

- (1) This protocol does not replace or supersede the general patient care practices in *The Maryland Medical Protocols for Emergency Medical Services*, which are still to be followed once the concern of active threat has been mitigated.
- (2) Use of this protocol is an acknowledgement by the EMS clinician that the situation is:
 - (a) Unique, austere, and different than the conventional environment of care in which EMS medicine is usually rendered AND
 - (b) The application of standard prehospital emergency practices could unnecessarily jeopardize the safety of the patient and/or medical clinician.
- (3) An active assailant incident or Potentially Volatile Environments with Life-Sustaining Interventions (PVE/LSI) protocol is declared.

d) CONTRAINDICATIONS

- (1) Absent the presence of perceived or actual threat, standard general patient care practices should be followed.

e) ZONES OF CARE/OPERATIONS

- (1) The zones described below are intended to standardize the terminology used by responding emergency medical clinicians in Maryland and to establish a common understanding of the interventions to be performed within each zone.
- (2) **Hot Zone (Direct Threat):** (Integrated Tactical EMS) Operational area with a direct and immediate threat to personal safety or health
 - (a) The overarching priority in the Hot Zone is mitigation of active threat. Medical care is a secondary function to threat mitigation.
 - (b) Medical clinicians must be an integrated tactical medic (i.e., TEMS) to operate in this environment. Medical priorities are to prevent casualties and responders from sustaining additional injuries and include prompt evacuation to a more secure zone.
 - (i) If at all possible, casualties should self-evacuate.
 - (ii) Goals of care include keeping the response team engaged in neutralizing the threat, minimizing public harm, and controlling life-threatening extremity hemorrhage.
 - a. Control of severe hemorrhage in the direct threat environment is best accomplished with commercially available tourniquets.
 - b. Tourniquet should be placed as high up on the limb as possible without taking the time to expose the area.
 - c. For full or partial amputation, immediately place a tourniquet if possible.
 - d. Cardiopulmonary resuscitation (CPR) is not indicated in this environment.
 - (iii) In circumstances of chemical agent exposure, administration of Nerve Agent Antidote Kits (NAAK/MARK-1) might be warranted if available.
- (3) **Warm Zone (Indirect Threat):** (Limited LSI) Area with a potential threat to personal safety or health
 - (a) **Evacuation of patients to a completely safe area is the primary objective of care in this area. The following care guidance is dependent on the availability of equipment, supplies, and the appropriate level clinicians. Extrication should NOT be delayed to provide advanced or involved treatment measures.**
 - (i) The Warm Zone typically exists between the Hot Zone and Cold Zone, but is not geographic and depends on the evolving situation.
 - (ii) Responders must remain cognizant that scene security can change instantly.
 - (iii) A focused and deliberate approach to providing patient care should occur.
 - (iv) The potential benefits of providing medical care in these zones must outweigh the risks of the ongoing tactical operation and/or delaying opportunity to evacuate the patient.
 - (v) Care in the Warm Zone typically occurs at or near the point of injury once scene stabilizing measures have occurred. Care may also take place at a casualty collection point (CCP).
 - (vi) A CCP is a location concealed and covered from immediate threat where victims can be assembled for movement from areas of risk to the triage/

- treatment area. Multiple CCPs may be required, which may be located in the Warm or Cold Zone. CCPs should be established and locations communicated as early as possible through operations to ALL responders.
- (vii) If possible, an abbreviated triage system should be set up to identify the priority for the extrication of patients. The use of ribbons or markers to clearly identify immediate and delayed (red and yellow, respectively) patients is highly recommended. Deceased individuals should also be labeled/tagged appropriately to prevent repeat assessments by multiple clinicians.
 - (viii) Medical care in the Warm Zone should be limited to essential interventions only and is guided by the mnemonic **“MARCHED”**
 - a. M – Massive Hemorrhage Control
 - i. Massive hemorrhage remains the greatest threat to life in most trauma patients. Attaining hemorrhage control is the top priority.
 - ii. Tourniquets remain the preferred means of hemorrhage control for life-threatening bleeding in this environment.
 1. If a tourniquet was applied in the Hot Zone, it should be reassessed.
 2. Tourniquets applied over clothing are not as effective and may need to be adjusted.
 3. Tourniquets should only be discontinued by an appropriately trained ALS clinician in consultation with medical control.
 4. Other methods of hemorrhage control include deep wound packing with either sterile gauze or hemostatic impregnated gauze.
 5. Vascular injuries in the neck, groin, and axilla (i.e., junctional zones) are not amenable to traditional extremity tourniquets. In addition, effective pressure dressings are often extremely difficult to apply. Hemostatic impregnated dressings with direct pressure (minimum 5 minutes with continuous pressure is preferred) have shown useful in such situations.
 - (b) A – Airway management
 - (i) Patients in the Warm Zone with airway issues are high priority for evacuation due to their often intense resource requirements.
 - (ii) Consider applying oxygen if available and indicated.
 - (iii) Unconscious casualty without airway obstruction:
 - a. Chin lift or jaw thrust maneuver
 - b. Nasopharyngeal airway
 - c. Place casualty in the recovery position
 - (iv) Casualty with airway obstruction or impending airway obstruction:
 - a. Chin lift or jaw thrust maneuver
 - b. Nasopharyngeal airway
 - c. Allow casualty to assume position that best protects the airway, including sitting up or leaning forward
 - d. Place unconscious casualty in the recovery position

- (v) If previous measures unsuccessful, if time and resources permit, consider per protocol:
 - a. Supraglottic Devices (e.g., King LT™, EASYTube®, or Combitube™).
 - b. Oro/nasotracheal intubation
 - c. Surgical cricothyroidotomy
- (c) R – Respirations
 - (i) The chest/upper abdomen should be assessed for any evidence of an open chest wound and an occlusive dressing should be applied accordingly.
 - (ii) Tension pneumothorax remains a significant cause of preventable death in trauma patients.
 - a. In suboptimal environments that interfere with complete physical assessment, any patient with significant blunt or penetrating chest trauma who displays dyspnea should be treated as a developing tension pneumothorax and receive needle decompression, if appropriate.
 - b. To be effective, needle decompression needs to be performed using at least a 3.25 inch, 14g needle/catheter or needle decompression thoracostomy kit.
- (d) C – Circulation
 - (i) In general, healthy adult trauma patients with a radial pulse and normal mentation do not need IV therapy in the Warm Zone.
 - (ii) Patients with evidence of hypotension:
 - a. If the patient displays signs of a closed head injury, IV fluid therapy is indicated to maintain at least a radial pulse or SBP of at least 90 mmHg.
 - b. Patients in hypovolemic shock should receive a one-time 500 mL bolus of IV fluid.
 - (iii) Patients in traumatic cardiac arrest should be considered deceased and no CPR should be performed in this zone.
- (e) H – Hypothermia
 - (i) Hypothermia in trauma patients has been associated with increased mortality. Hypothermia is easier to prevent than treat.
 - a. Patients should be moved to a warmed location if possible.
 - b. Efforts should be made to minimize heat loss.
- (f) E – Everything else
 - (i) Consider *Mark II/DuoDote*® for suspected organophosphate/nerve agent exposure.
 - (ii) Dependent upon resource availability, burns, eye injuries, and acute pain should be managed per *The Maryland Medical Protocols for Emergency Medical Services*.
- (g) D – Documentation
 - (i) Key findings and interventions should be conveyed to the next phase of care.

Procedures – POTENTIALLY VOLATILE ENVIRONMENT WITH LIFE-SUSTAINING INTERVENTIONS (continued)

- (4) **Cold Zone:** (Traditional Patient Care Protocols) Area surrounding the Warm Zone. Responders can operate without concern of danger or threat to personal safety or health.
- (a) Casualties are moved from the Warm Zone to the Cold Zone by way of an evacuation corridor(s).
 - (i) Evacuation Corridor: An area transitioning between the Warm and Cold Zone that is secured from immediate threat and allows for a mitigated risk in transporting victims from the CCP to the triage/treatment area beyond the outer perimeter.
 - (b) Once in the Cold Zone, casualties will require re-triage, particularly assessing for the development of a life-threatening condition and effects of Warm Zone therapy.
 - (i) If massive hemorrhage has not been addressed or has been ineffectively managed, it should be immediately readdressed with strategies mentioned above.
 - (c) Patients should be triaged and transported per standard practices.
 - (d) Medical care in the Cold Zone should be dictated by resource availability and, when possible, equate to the general patient care standards in *The Maryland Medical Protocols for Emergency Medical Services*.
 - (e) CPR may have a larger role during the evacuation phase especially for patients with electrocution, hypothermia, non-traumatic arrest, or near drowning; however, it is still casualty count/resource dependent.

Wound Packing

"Everything is compressible **JUST** not accessible"

You have seconds to act - It's the **pressure application** that saves lives - the product just helps the clotting!



Located in
Trauma Care & Casualty Support Bags



- Indications**
1. Massive hemorrhage of a junctional area
 2. Unable to apply a tourniquet

Primary wound packing sites

Use simple gauze
If a hemostatic product is not available

Impregnated Hemostatics

Old & Cold - CELOX
BEST for disrupted clotting factors makes blood viscous

Healthy & Warm - Quick Clot
Enhances functional clotting factors

STOP Do NOT pack the skull, chest or abdominal cavity STOP

Locate & expose bleeding site; apply direct pressure!!

Maintain pressure & pack from top to bottom

Hold pressure for 3-5 minutes

Apply compression bandage

Tourniquet (TQ)

Combat Tourniquet (CAT) first, if limb is too small attempt compression bandage.

Do NOT use training TQs for patient care use



- Location of Item:**
1. Trauma Care Bag
 2. Casualty Support Bag
 3. ALS red bag
 4. BLS green bag
 5. Transport Units
 6. MAB & MCSU



- Indications**
- Massive Hemorrhage
1. Gushing
 2. Pulsating
 3. Any traumatic amputation

Adult tourniquet application

Pass the red tip through the slit of the buckle

Pull the band tightly back on itself all the way around the limb

Tighten windlass rod until **NO** distal pulse is present **AND** **bleeding is stopped**

Secure the windlass rod

Secure with the time strap

Alternate TQ application (Pediatric)

Utilizing an **Emergency Bandage** cut and remove the pad

Apply tightly and add several twists

- Things to Consider:**
- Apply the TQ over clothing high & tight (don't waste time)
 - A second TQ will most likely be required on a leg
 - **When in doubt apply a TQ**
-

Place **SECOND** TQ next to the **FIRST**

Day 1 Afternoon

Trauma Care Bag

Single Patient to Multi/Mass Casualty Care

Trauma Categories
 1. Blunt
 2. Burn
 3. Penetrating
Treat ALL with this bag



2 Bags On Each:

- Engine
- Transport Unit
- Truck/Tower
- Rescue Squad

1 Bag On:

- BC701 - 705
- EMS703 & 704
- PCU (each)
- MIH700
- DC700
- SA700



E 2 - 28f NPA with KY
2 - HALO Vent Chest Seal

F 1 - ANSI Certified Safety Glasses

G 3 Sets - Gloves (Large)
1 - Hepa Mask

H & I 2 - CAT Tourniquet (Total 4)

1 - Medical Duct Tape Roll
1 - Quik Litter
1 - Sharpie
1 - Pen Light

A Outside



3 - Compression/Emergency Bandage
1 - Celox Gauze
1 - Combat Gauze (Quik-Clot)
2 - ARS Decompression Needle 10g
1 - SAM Splint

1 - Trauma Shears (Orange)
2 - Emergency Blanket
2 - Cravat
2 - Mechanical Pencils

B

C Use Emergency Blanket for Burns

D 5 - MCI Tags


Needle Decompression ALS ONLY

Order resupply from EMS logistics

Thoracic Injuries

Chest Seal & Needle Decompression

HALOs come with two chest seals; a vented and non-vented seal.
 Apply the **vented seal anterior side** of the chest (air rises)




Indications (Chest Seal)

- Sucking chest wound
- Penetrating wound to the torso

Locations:

- Trauma Care Bag
- ALS Red Bag
- Green BLS Bag
- Transport Units



Chest Seal Application Procedure

1. Expose
2. Wipe blood
3. **Apply chest seal (over wound)**
4. Continually assess (5 every minutes) oxygenation & ventilation
5. Burp chest seal if respiratory distress develops

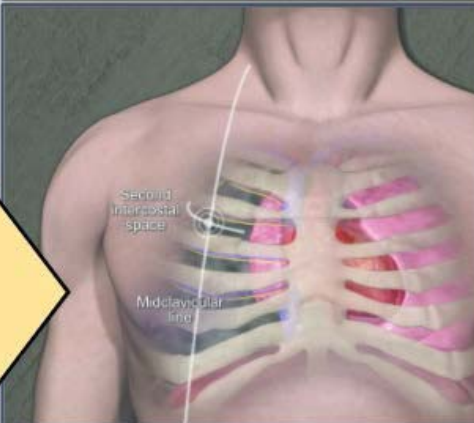
Indications (Needle Decompression)

Patients with a life-threatening tension pneumothorax:

- In extremis
- Diminished/absent lung sounds
- Hypotension
- and/or Traumatic Cardiac Arrest

Locations:

- Trauma Care Bag
- ALS Red Bag



Needle Decompression Procedure

1. **2nd intercostal space**
2. **Anterior midclavicular line**
3. **Insert above (superior) to 3rd rib**
4. Reassess breathing
5. Repeat as needed

3.25 length 10 gauge needle

Needle Decompression ALS ONLY SKILL

Indications


- Burns (electrical, thermal, chemical) as evidenced by any of the following: reddening of the skin, deep and intense pain, blisters, mottled appearance, or charred black or brown areas with severe or no pain.

BLS

- Extricate the patient from burning vehicles or buildings when safe.
- Stop the burning process; remove wet clothing and dry the patient to prevent hypothermia
- Administer high concentration of *oxygen* (if smoke inhalation, refer to *Carbon Monoxide* protocol).
- Treat associated trauma.
- Cover wounds appropriately with a clean sheet or Mylar® blanket.
- Remove all rings, bracelets, and other jewelry.
- Determine percentage of body surface area (BSA) burned and depth; use of the Palmar method is recommended for pediatrics.
- For burns greater than 10% BSA, follow *Cold Emergencies* protocol.
- For chemical burns, brush off dry chemical, remove clothing, and flush with water.
- Do not give anything by mouth.
- Do not place ice or ice packs on any patient with burns.
- **Destination Determination for Burn Patients:**
 - Transport patients who meet any of the following criteria to a burn center:
 - ◆ All third-degree burns (full thickness)
 - ◆ Second-degree burns (partial thickness) greater than 10% BSA
 - ◆ Burns of the face, hands, feet, major joints, genitalia, or perineum
 - ◆ Electrical burns, including lightning or contact with high voltage (greater than 120 volts)
 - ◆ Suspected smoke inhalation
 - ◆ Circumferential burns involving the extremities or torso
 - Consider aeromedical transport if the patient is more than 30 minutes by ground from a burn center or hyperbaric medicine specialty center.
 - Chemical burns should be transported to the closest appropriate hospital for decontamination prior to referral to a burn center.
 - Patients with burns and trauma should be transported to the nearest appropriate trauma center for initial care.
 - Children who have not reached 15th birthday who meet burn center criteria should be transported to a pediatric burn center.


ALS



- Assess and frequently re-assess the patient's airway.
 - If signs of respiratory failure are present (airway obstruction, shock, altered mental status, hypoxemia while receiving supplemental oxygen, or severe dyspnea), secure the patient's airway.
- Establish IV access, if appropriate.
 - Fluid resuscitation is not indicated for superficial burns or burns under 20% BSA.
 - For visibly large burns, predicted to be 20% or greater BSA, administer *Lactated Ringer's* as follows:
 - ♦ 15 years of age and above: 500 mL/hr *LR* (120 drops/min using 15 drop-set). Maximum dose 2,000 mL without medical consultation.
 - ♦ Children who have not reached 15th birthday: do not administer IV fluid unless the patient is in shock.
 - For patients in shock, administer small fluid boluses of *LR* (maximum single bolus of 250 mL prior to blood pressure check) to achieve and maintain a systolic blood pressure of 90 mmHg or greater (or mean arterial pressure of 65 mmHg). If a head injury is suspected, administer small boluses of *LR* to maintain a systolic blood pressure of 110 mmHg or greater.
 -  Establish IV access with *LR*, if appropriate. For patients in shock, administer small fluid boluses to achieve and maintain a systolic blood pressure of (70 + 2 x age in years) mmHg.
- Administer opioid per *Pain Management* protocol

MC

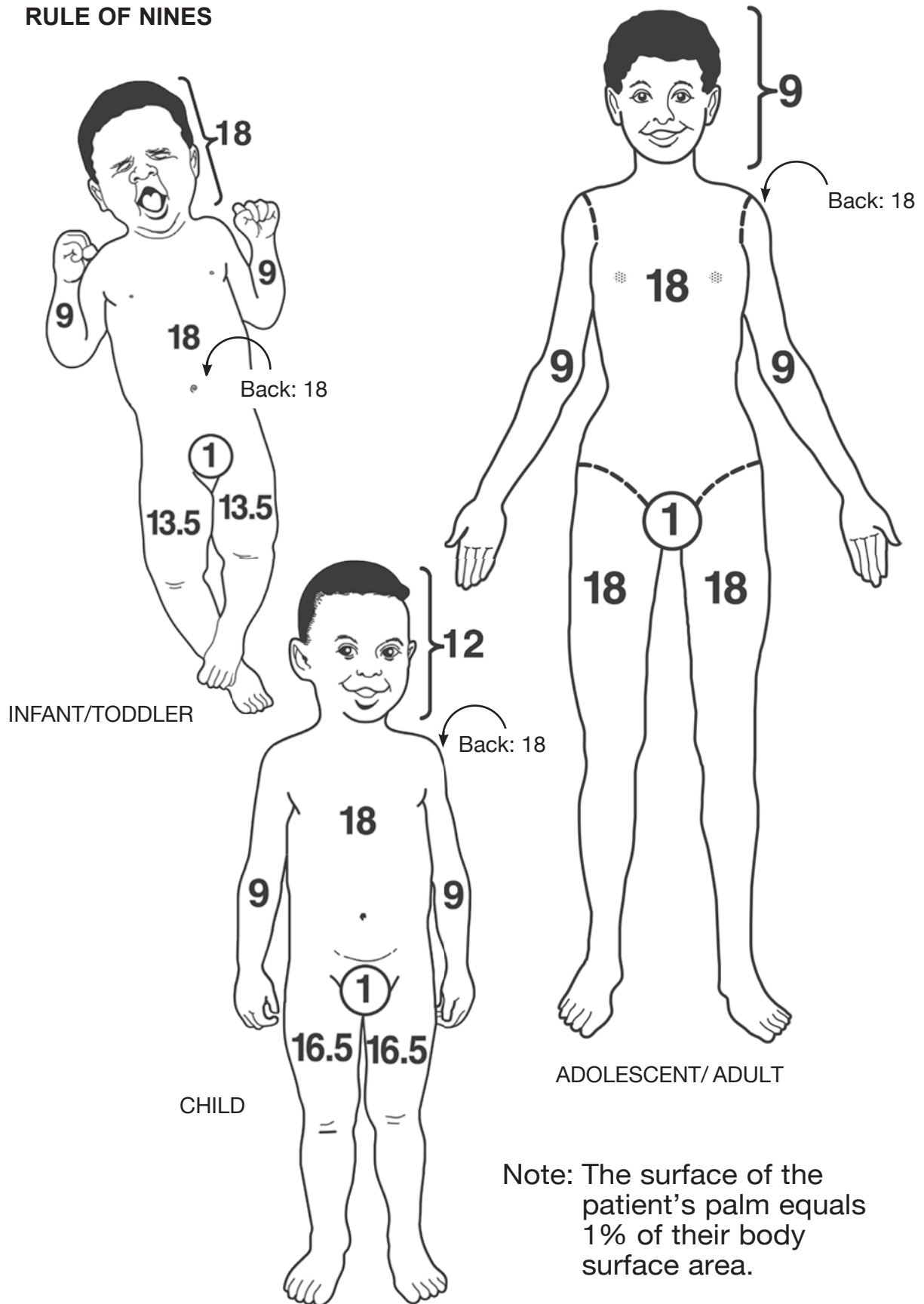


- For adults, *Lactated Ringer's* doses greater than 2,000 mL require medical consultation.
-  If transport time exceeds 30 minutes, obtain medical consultation for maintenance fluid recommendation.

Clinical Pearls

- Pulse oximetry is not reliable in presence of carbon monoxide or cyanide exposure.
- If suspected smoke inhalation, closely monitor the patient's airway for delayed airway obstruction, respiratory distress, or oxygen desaturation. The patient may need emergent airway management.

RULE OF NINES

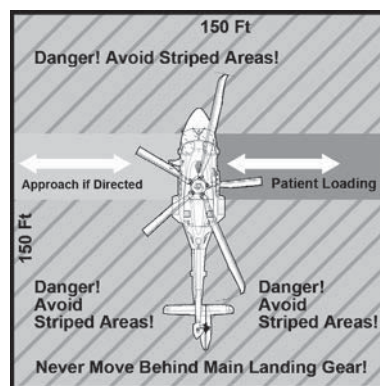


Note: The surface of the patient's palm equals 1% of their body surface area.

- (e) The LZ Officer will ensure that enough personnel is available to prevent any breach of LZ security by pedestrians while the helicopter is approaching, on the ground, or while departing. Failure to do so may cause injuries and/or delay patient transport.
- (f) Do not allow traffic to use the roadway until after the aircraft has departed. Traffic will be stopped at least 200 feet in both directions from the landing zone.
- (g) Do not use flares or cones to mark the landing zone: they will become airborne during the landing. (Weighted cones/lights that are designed for aircraft operations are generally acceptable.)
- (h) The flightcrew is the final authority when selecting an LZ. On some occasions, the flightcrew may not choose to utilize the ground personnel's suggested LZ and choose an alternate LZ. This decision is usually based on information that is unknown to the ground personnel (e.g., wind, aircraft performance limitations).

(3) APPROACHING THE AIRCRAFT

Personnel should only approach MSP aircraft under the following conditions:



AW-139

- (a) Hearing and eye protection shall be utilized at all times when approaching the aircraft.
- (b) Only when accompanied by an MSP flight crew member to the aircraft. Response personnel are usually limited to four when loading patients. The crew will provide additional guidance prior to these personnel approaching the aircraft.
- (c) In an emergency situation when it becomes necessary to render assistance or rescue occupants of the helicopter. In such cases: **DO NOT APPROACH THE AIRCRAFT UNLESS THE MAIN ROTOR HAS STOPPED!**
- (d) Only approach the aircraft from the Safe Zone (see diagram).
 - (i) Never approach the aircraft from the rear areas due to the hazards existing from the tail rotor.

REMAIN CLEAR OF THE REAR AND TAIL ROTOR AT ALL TIMES!

- (ii) If it becomes necessary to go from one side of the aircraft to the other, this will be done by walking around the front of the aircraft; however, do not walk under the rotor blades.
- (iii) Personnel shall not wear hats and loose clothing when approaching the aircraft. Do not lift anything above shoulder height (e.g., IV bags).
- (e) If the aircraft has landed on a slope or hill, care must be taken when approaching the aircraft from the downhill side. Uphill side approaches should be avoided, as the main rotor blade is spinning and is lower to the ground on one side of the aircraft. The Trooper/Flight Paramedic will provide additional guidance in this situation.
- (f) Never bring the patient to the aircraft prior to advising the Trooper/Flight Paramedic of the patient's information. Very high noise levels found in the general proximity of the aircraft make communication and patient turnover impossible.
- (g) If debris gets in the eyes and it impairs the vision, do not continue to approach or egress from the aircraft. Personnel will immediately "take a knee," and the Trooper/Flight Paramedic will provide assistance.

(4) MISCELLANEOUS SAFETY TIPS

(a) **Aircraft Doors**

Personnel should not attempt to open or close any aircraft doors. If a person is in the aircraft, they should remain inside until the flight crew member opens the door, thus preventing damage to the door and greatly reducing the risk of an aircraft door opening inadvertently in flight.

(b) **Vehicles**

- (i) No vehicles or personnel shall be permitted within 200 feet of the aircraft.
- (ii) Do not direct spotlights onto the landing area or at the aircraft, but keep vehicle's emergency lights displayed until the aircraft is overhead. Once the LZ has been confirmed and verified by the flight crew, vehicle lighting can be reduced to running lights or parking lights for night vision purposes.

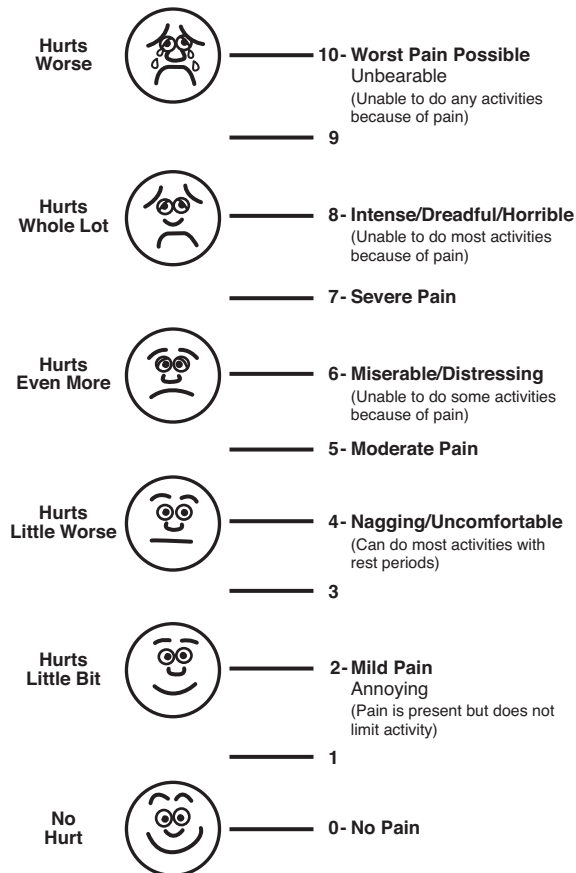
Indications

- Patient presents with a painful condition that would benefit from treatment with an analgesic. This includes DNR/MOLST patients and patients being pre-medicated for a painful procedure.
 - **Mild to moderate pain:** Pain rated in the 1-5 range on a scale of 1-10. Isolated musculoskeletal injuries such as sprains and strains.
 - **Moderate to severe pain:** Pain rated in the 5-10 range on a scale of 1-10.

BLS

- Measure level of pain. Ask patient to rate their pain on a scale from 0 (no pain) to 10 (worst pain imaginable). Patients who have a difficult time communicating their condition can be asked to rate their pain using the FACES scale.

Pain Rating Scale



- Allow patient to remain in position of comfort unless contraindicated by patient's condition.
- **Mild to Moderate Pain (1-5 on FACES scale):**
 - *Acetaminophen* for mild to moderate pain.
 - ◆ FOUR unit doses of 160 mg/5 mL each for a total of 640 mg/20 mL OR
 - ◆ 325 mg pill or tablet X 2 for a total of 650 mg with sips of water as tolerated by the patient. No repeat doses.

ALS



- **Moderate to Severe Pain (5-10 on FACES scale):**
 - *Fentanyl* IN preferred IV/IO/IM: 1 mcg/kg to a maximum initial dose of 200 mcg (For IN route, dosing may be limited due to volume limitations – administration of max 1 mL per nare).
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *fentanyl* 1 mcg/kg to a maximum dose of 200 mcg.
 - OR
 - *Morphine* IV/IO/IM: 0.1 mg/kg maximum single dose of 20 mg.
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *morphine* 0.05 mg/kg to a maximum additional dose of 10 mg.
 - OR
 - *Ketamine* IV/IO/IN/IM: 0.2 mg/kg IV/IO over 1–2 minutes. Maximum single dose 20 mg. If IV unavailable, administer 0.5 mg/kg IN/IM (If delivery device is available; divide administration of the dose equally between the nares to a maximum of 1 mL per nare).
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *ketamine* 0.2 mg/kg IV/IO over 1–2 minutes. Maximum single dose 20 mg. If IV unavailable, and pain remains moderate to severe, then administer a second dose of *ketamine* 0.5 mg/kg IN/IM.
 - OR
 - *Ketorolac* IV/IM: single dose of 15 mg IV only. No repeat doses. If IV unavailable, administer single dose of 30 mg IM. No repeat doses.

MC



- Obtain on-line medical direction for additional doses of *fentanyl*, *morphine*, or *ketamine*, based on the patient's level of pain following two doses of medication. *Ketorolac* and *acetaminophen* are single dose-only medications.

Clinical Pearls

- Administration of pain medication does not eliminate the need for transport of the patient to the hospital to receive a comprehensive evaluation of the cause of their pain and appropriate definitive treatment.
- *Ketamine* is indicated only for musculoskeletal and back pain. Do not administer for chest pain, abdominal/flank pain, or for headaches.



Indications







- Patient presents with a painful condition that would benefit from treatment with an analgesic. This includes DNR/MOLST patients and patients being pre-medicated for a painful procedure.
 - **Mild to moderate pain:** Pain rated in the 1-5 range on a scale of 1-10. Isolated musculoskeletal injuries such as sprains and strains. Pain related to childhood illnesses such as headache, ear infection, and pharyngitis.
 - **Moderate to severe pain:** Pain rated in the 5-10 range on a scale of 1-10.

BLS



- Measure level of pain. Ask older children to rate their pain on a scale from 0 (no pain) to 10 (worst pain imaginable). Young children can be asked to rate their pain using the FACES scale, which provides 5 levels of pain perception.

Pain Rating Scale

Hurts Worse		10- Worst Pain Possible Unbearable (Unable to do any activities because of pain)
	—————	9
Hurts Whole Lot		8- Intense/Dreadful/Horrible (Unable to do most activities because of pain)
	—————	7- Severe Pain
Hurts Even More		6- Miserable/Distressing (Unable to do some activities because of pain)
	—————	5- Moderate Pain
Hurts Little Worse		4- Nagging/Uncomfortable (Can do most activities with rest periods)
	—————	3
Hurts Little Bit		2- Mild Pain Annoying (Pain is present but does not limit activity)
	—————	1
No Hurt		0- No Pain

- Allow patient to remain in position of comfort unless contraindicated.
- **Mild to Moderate Pain (1-5 on FACES scale):**
 - *Acetaminophen* for mild to moderate pain per child or parent (1–5 on FACES scale)
 - ◆ Less than 2 years of age: Not indicated
 - ◆ 2–4 years: Unit dose 160 mg/5 mL
 - ◆ 5–12 years: TWO unit doses of 160 mg/5 mL each for a total of 320 mg/10 mL
 - ◆ 13 years and older: FOUR unit doses of 160 mg/5 mL each for a total of 640 mg/20 mL OR in a form of 325 mg pill or tablet X 2 for a total of 650 mg with sips of water as tolerated by the patient. No repeat doses.



ALS



- **Moderate to Severe Pain (5-10 on FACES scale):**
 - *Fentanyl* IN. If IN route not accessible, then use IV/IO/IM route.
 - ◆ Administer 1 **mcg/kg** to a maximum initial dose of 200 **mcg** (For IN route, dosing may be limited due to volume limitations - administration of max 1mL per nare).
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *fentanyl* 1 **mcg/kg** to a maximum dose of 200 **mcg**.
 - OR**
 - *Morphine* IV/IM 0.1 mg/kg maximum single dose of 20 mg.
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *morphine* 0.05 mg/kg to a maximum additional dose of 10 mg.
 - OR**
 - *Ketamine* IV/IO/IN/IM 0.2 mg/kg IV/IO over 1–2 minutes. Maximum single dose 20 mg.
 - ◆ Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of *ketamine* 0.2 mg/kg IV/IO over 1–2 minutes. Maximum single dose 20 mg.
 - ◆ If IV unavailable, administer 0.5 mg/kg IN/IM (If delivery device is available, divide administration of the dose equally between the nares to a maximum of 1 mL per nare). Reassess in 15 minutes. If pain remains moderate to severe, then administer a second dose of *ketamine* 0.5 mg/kg IN/IM.
 - OR**
 - *Ketorolac* IV/IM:
 - ◆ Patients who have not yet reached their 2nd birthday: Contraindicated.
 - ◆ Age 2 to patients who have not yet reached their 18th birthday: Administer 0.5 mg/kg IV to a maximum total dose of 15 mg. No repeat doses.
 - If IV is unavailable, administer 1 mg/kg IM to a maximum total dose of 30 mg. No repeat doses.

MC



- Obtain on-line medical direction for additional doses of *fentanyl*, *morphine*, or *ketamine*, based on the patient’s level of pain following two doses of medication. *Ketorolac* and *acetaminophen* are single dose-only medications.

Clinical Pearls

- Administration of pain medication does not eliminate the need for transport of the patient to the hospital to receive a comprehensive evaluation of the cause of their pain and appropriate definitive treatment.
- *Ketamine* is indicated only for musculoskeletal and back pain. Do not administer for chest pain, abdominal/flank pain or for headaches.

TRADE NAMES: Tylenol®

a) Indications

Patients ages 2 years and above judged to be in mild to moderate discomfort (e.g., 1–5 on FACES scale)

b) Adverse Effects

Not clinically significant

c) Precautions

Administration of acetaminophen for mild to moderate pain does not eliminate the need for transport of the patient to the hospital to receive a comprehensive evaluation of the cause of the pain and appropriate definitive treatment.

d) Contraindications

- (1) Head Injury
- (2) Hypotension
- (3) Administration of acetaminophen or medications containing acetaminophen within the previous four hours



MANY COMMON COLD PREPARATIONS CONTAIN ACETAMINOPHEN.

- (4) Inability to swallow or take medications by mouth
- (5) Respiratory distress
- (6) Persistent vomiting
- (7) Known or suspected liver disease (including patients suspected of current alcohol ingestion)
- (8) Allergy to acetaminophen
- (9) Patients less than 2 years of age

e) Preparations Use Unit Dose Only

(DO NOT USE MULTIDOSE BOTTLE OF LIQUID)

Unit dose 160 mg/5 mL liquid

Unit dose 325 mg pill or tablet

f) Dosage

- (1) Less than 2 years of age: Not indicated
- (2) 2–4 years: Unit dose 160 mg/5 mL
- (3) 5–12 years: TWO unit doses of 160 mg/5 mL each for a total of 320 mg/10 mL
- (4) 13 years and above: FOUR unit doses of 160 mg/5 mL each for a total of 640 mg/20 mL OR in a form of 325 mg pill or tablet x2 for a total of 650 mg with sips of water as tolerated by the patient.

TRADE NAMES: PROVENTIL[®], VENTOLIN[®]

a) Indications

- (1) Signs and symptoms of respiratory distress
- (2) Bronchospasm/wheezing associated with:
 - (a) Asthma
 - (b) Chronic bronchitis
 - (c) Emphysema
 - (d) Allergic reactions (anaphylaxis)

b) Adverse Effects

- (1) Tachycardia/palpitations
- (2) Hypertension
- (3) Angina
- (4) Nervousness/anxiety
- (5) Tremors
- (6) Dizziness
- (7) Headache
- (8) Sweating
- (9) Nausea/vomiting
- (10) Sore throat

c) Precautions

May cause severe bronchospasm from repeated excessive use.

d) Contraindications

Known hypersensitivity

e) Preparations


- (1) Hand-held (unit dose) aerosol inhaler
- (2) Ampule for nebulizer

f) Dosage

Inhaler

- (1) Adult: Patient may receive a maximum of 2 doses (4 puffs) over a 30-minute period
- (2) Pediatric: Patient may receive a maximum of 2 doses (4 puffs) over a 30-minute period

Nebulizer

- (1) Adult: 2.5 mg by nebulized aerosol connected to 6–8 lpm of oxygen; may repeat one time
- (2) Pediatric: May repeat one time; connect to 6–8 lpm of oxygen
 - (a) **Age 2 or older:** 2.5 mg by nebulized aerosol
 - (b) **Age less than 2 years:** 1.25 mg by nebulized aerosol
- (3)  Additional doses may be administered with medical consultation.

Indications

- Shortness of breath with wheezing or decreased air entry, presumed to be due to bronchospasm from reactive airway disease, asthma, or COPD
- Signs of respiratory distress which may include:
 - Accessory muscle use and/or tripod positioning
 - Cyanosis, mottled skin
 - Nasal flaring, retractions

BLS



- *Albuterol (BLS)* inhaler (2 puffs inhaled) or *albuterol (BLS)* 2.5 mg nebulized. May repeat dose one time, as needed, within 30 minutes.
- For severe respiratory symptoms, administer *epinephrine auto-injector (BLS)* 0.3 mg IM or administer *epinephrine (BLS)* (1 mg/mL) 0.5 mg in the lateral thigh.

ALS



- *Albuterol* 2.5 mg nebulized and *ipratropium (Atrovent®)* 500 mcg nebulized; may repeat *albuterol* nebulized 2.5 mg one time.
- For severe respiratory symptoms, administer *epinephrine auto-injector* 0.3 mg IM via or *epinephrine* (1 mg/mL) 0.5 mg IM. May repeat every 5 minutes for a total of 3 doses, as needed.
- Establish IV/IO access for patients with moderate to severe symptoms.
- For moderate to severe exacerbations, administer *dexamethasone* 10 mg IV/PO.
- For severe exacerbations or patients whose condition deteriorates despite treatments above, administer nebulized treatments, along with high-flow oxygen, continuous positive airway pressure (CPAP), or bag-valve mask (BVM).

MC



- (BLS) For patients with a cardiac history, obtain medical consultation for *epinephrine* (1 mg/mL) or *epinephrine auto-injector*.
- (ALS/BLS) Additional doses of *albuterol*, *ipratropium*, *epinephrine* (1 mg/mL) or *epinephrine auto-injector* beyond those listed above require medical consultation.
- (ALS) For moderate to severe exacerbations, administer *magnesium sulfate* 1–2 grams, mixed in 50–100 mL of approved diluent, IV/IO over 10–20 minutes.

Clinical Pearls

- If respiratory distress is due to a suspected allergic reaction or anaphylaxis, refer to *Allergic Reaction* and *Anaphylaxis* protocols.



Indications

- Shortness of breath with wheezing or decreased air entry, presumed to be due to bronchospasm from reactive airway disease or asthma
- Signs of respiratory distress which may include:
 - Accessory muscle use and/or tripod positioning
 - Cyanosis, mottled skin
 - Nasal flaring, retractions

BLS



- *Albuterol (BLS)* inhaler (2 puffs inhaled) or *albuterol (BLS)* nebulizer. May repeat dose one time, as needed, within 30 minutes.
 - For infants and children less than 2 years of age, administer nebulized *albuterol (BLS)* 1.25 mg.
 - For patients 2 years of age or greater, administer nebulized *albuterol (BLS)* 2.5 mg.
- For severe respiratory symptoms:
 - Less than 5 years of age: *pediatric epinephrine auto-injector (BLS)* 0.15 mg IM or *epinephrine (BLS)* (1 mg/mL) 0.15 mg IM
 - 5 years of age or greater: *epinephrine auto-injector (BLS)* 0.3 mg IM or *epinephrine (BLS)* (1 mg/mL) 0.5 mg IM

ALS



- *Albuterol* and *Ipratropium (Atrovent®)* nebulized.
 - For an infant less than 1 year of age: *albuterol* 1.25 mg nebulized; *ipratropium* is contraindicated.
 - For a child 1 year of age or greater, but less than 2 years of age: *albuterol* 1.25 mg and *ipratropium* 250 mcg nebulized.
 - For a patient 2 years of age or greater: *albuterol* 2.5 mg and *ipratropium* 500 mcg nebulized.
- May repeat *albuterol* one time for recurrent or worsening symptoms
- *Epinephrine* (1 mg/mL)
 - Less than 5 years of age: *epinephrine* (1 mg/mL) 0.15 mg IM
 - 5 years of age or greater: *epinephrine* (1 mg/mL) 0.5 mg IM
- May repeat *epinephrine* (1 mg/mL) every 5 minutes for a total of 3 doses, as needed.
- For moderate to severe exacerbations, consider the administration of *dexamethasone* 0.5 mg/kg PO/IV, up to a maximum dose of 10 mg.

MC



- (BLS) For patients with congenital heart or lung disease, obtain medical consultation for *epinephrine* (1 mg/mL), *pediatric epinephrine auto-injector*, or *epinephrine auto-injector*.
- (ALS/BLS) Additional doses of *albuterol*, *ipratropium*, *epinephrine* (1 mg/mL) or *epinephrine auto-injector* beyond those listed above require medical consultation.
- (ALS) For moderate to severe exacerbations, administer *magnesium sulfate* 50 mg/kg IV/IO to a max of 2 grams given over 10–20 minutes (mixed in 50 - 100 mL of approved diluent). For children, administer 20 ml/kg fluid bolus of LR with magnesium to reduce risk of hypotension.

Clinical Pearls

- If respiratory distress is due to a suspected allergic reaction or anaphylaxis, refer to *Allergic Reaction* and *Anaphylaxis* protocols.

TRADE NAMES: Not Applicable**a) Pharmacology**

- (1) Platelet inhibitor
- (2) Anti-inflammatory

b) Pharmacokinetics

Blocks platelet aggregation

c) Indications

Suspected Acute Coronary Syndrome and/or ST Elevation MI (STEMI)

d) Contraindications

- (1) Known hypersensitivity.
- (2) Patients who receive a full dose (324 mg) of aspirin prior to EMS arrival.

e) Adverse Effects

- (1) Heartburn
- (2) Nausea and vomiting
- (3) Wheezing

f) Precautions

GI bleeding and upset

g) Dosage

- (1) Adult: 324 mg or 325 mg chewed
- (2) Pediatric: Not indicated

TRADE NAMES: Not Applicable*(Patient Prescribed, Patient Assisted)***a) Indications**


Chest pain

b) Adverse Effects

- (1) Hypotension
- (2) Headache
- (3) Dizziness
- (4) Tachycardia

c) Precautions

- (1) BLS clinician may only administer patient prescribed sublingual nitroglycerin.
- (2) Reassess blood pressure before and after administration.

- (3)  If systolic blood pressure drops more than 20 mmHg, obtain medical consultation before further administration.

d) Contraindications


- (1) Blood pressure below 90 mmHg systolic
- (2) Heart rate less than 60 or greater than 150 bpm
- (3) Medication not prescribed for the patient
- (4) Pediatric patient under age 13
- (5) Any patient having taken medication for Pulmonary Artery Hypertension (e.g., Adcirca® or Revatio®) or erectile dysfunction (e.g., Viagra®, Levitra®, or Cialis®) within the past 48 hours. Medical consultation is required to override this contraindication.


e) Preparations

Spray or tablet

f) Dosage

- (1) Adult: One tablet or one spray sublingually
 - (a) Repeat in 3 to 5 minutes if chest pain persists.
 - (b) Maximum of three doses (a combination of patient-administered and EMT-administered) of nitroglycerin

- (2)  Pediatric: (nitroglycerin contraindicated for children under age 13)

- (3)  Additional doses may be administered with medical consultation.

Indications

- Adult patients (medical arrest: 18 years of age and older; trauma arrest: 15 years of age and older) who are unconscious, apneic, and pulseless

BLS

- Perform high-quality uninterrupted chest compressions (manual or mechanical) as soon as possible and until defibrillator available.
- Apply AED as soon as available.
- Follow machine prompts regarding rhythm analyses and shocks.
- Limit breaks in compressions to 10 seconds or less for rhythm analysis periods and during shocks; perform compressions while defibrillator is charging.
- **On-scene resuscitation:** Patients who are found in arrest or who arrest prior to transport and are attended to by BLS clinicians must only be resuscitated in place (with minimal movement, no attempts at patient loading, and no attempts at transport) until the following have been accomplished:
 - **Medical etiology:** the patient has received a minimum of five two-minute cycles of chest compressions and rhythm interpretation
 - **Traumatic etiology:** patient has received treatments for reversible causes per *Trauma Protocol: Trauma Arrest* protocol
- **Exemptions** from on-scene resuscitation:
 - Physical barriers prevent resuscitation
 - Clinicians are in danger
 - Pregnant patients
 - Patients in cardiac arrest thought to be secondary to hypothermia or submersion
- Following the initial on-scene resuscitation above, clinicians may continue on-scene resuscitation until termination of resuscitation or transport the patient at any time. Clinicians should ensure that a mechanical CPR device is in place (if available) prior to transport.

ALS

- Assess for shockable rhythm at next appropriate interval and treat appropriately.
- **On-scene resuscitation:** Patients who are found in arrest or who arrest prior to transport and are attended to by ALS clinicians must remain in place (with minimal movement, no attempts at patient loading, and no attempts at transport) until the following have been accomplished:
 - The patient has received three doses of *epinephrine*, regardless of algorithm being followed
- Following the initial on-scene resuscitation above, clinicians may choose to continue the on-scene resuscitation until termination of resuscitation or to transport the patient at any time. Clinicians should ensure the following prior to transport:
 - Mechanical CPR (mCPR) in place (if available)
 - Placement of an airway that facilitates ventilation during transport by a restrained clinician
- If ROSC, refer to *ROSC* protocol.
- Consider *Termination of Resuscitation* when appropriate.

MC

- Not applicable.



Indications

- Pediatric patients (medical arrest: less than 18 years of age; trauma arrest: less than 15 years of age) who are unconscious, apneic, and pulseless

BLS



- Perform high-quality uninterrupted chest compressions (manual or mechanical) as soon as possible and until defibrillator available.
- Apply AED as soon as available.
- Follow machine prompts regarding rhythm analyses and shocks.
- Limit breaks in compressions to 10 seconds or less for rhythm analysis periods and during shocks; perform compressions while defibrillator is charging.
- **On-scene resuscitation:** Patients who are found in arrest or who arrest prior to transport and are attended to by BLS clinicians must only be resuscitated in place (with minimal movement, no attempts at patient loading, and no attempts at transport) until the following have been accomplished:
 - **Medical etiology:** the patient has received a minimum of five two-minute cycles of chest compressions and rhythm interpretation
 - **Traumatic etiology:** patient has received treatments for reversible causes per *Trauma Protocol: Trauma Arrest* protocol
- **Exemptions** from on-scene resuscitation:
 - Physical barriers prevent resuscitation
 - Clinicians are in danger
 - Pregnant patients
 - Patients in cardiac arrest thought to be secondary to hypothermia or submersion
- Following the initial on-scene resuscitation above, clinicians may continue on-scene resuscitation until termination of resuscitation or transport the patient at any time. Clinicians should ensure that a mechanical CPR device is in place (if available) for patients 13 years of age and older prior to transport.

ALS



- Assess for shockable rhythm at next appropriate interval and treat appropriately.
- Only in a pediatric or neonatal arrest situation, *naloxone*, *atropine sulfate*, and *epinephrine*, can be administered via the ET route. Medications administered for pediatric patients via the endotracheal tube route shall be 2–2.5 times the IV dose for *naloxone* and *atropine sulfate*, and 10 times the IV dose for *epinephrine* (1 mg/mL). All ET medications shall be diluted in 5 mL of *Lactated Ringer's* for pediatric patients.
- Following initial on-scene resuscitation, clinicians may choose to continue the on-scene resuscitation until termination of resuscitation or to transport the patient at any time. Clinicians should ensure the following prior to transport:
 - Mechanical CPR (mCPR) in place for patients 13 years of age and older (if available)
 - Placement of an airway that facilitates ventilation during transport by a restrained clinician
- If ROSC, perform 12-lead EKG and transport the patient to Children's National Medical Center or Johns Hopkins Children's Center by ground or medevac. If arrival time is greater than 30 minutes to either of these destinations, transport to the closest appropriate facility.
- If no ROSC, transport to the closest appropriate facility or consider *Termination of Resuscitation* protocol, as appropriate.

MC



- Not applicable.

a) PURPOSE

To improve survival of sudden out-of-hospital cardiac arrest patients in Maryland. High Performance Cardio-Pulmonary Resuscitation (HPCPR) employed with Code Resource Management (CRM) is a proven concept based on a team approach that ensures effective and efficient use of EMS resources. This systematic change in treatment and management of cardiac arrest patients has demonstrated effectiveness in Maryland, and provides an example for systems embarking on measuring and improving care that is based upon proven research and practices.

b) INDICATIONS

Patients in cardiac arrest who are greater than 24 hours old.

c) CONTRAINDICATIONS

- (1) Patients meeting the criteria for *Pronouncement of Death in the Field* protocol
- (2) Patients who are less than 24 hours old

d) POTENTIAL ADVERSE EFFECTS/COMPLICATIONS

None

e) PRECAUTIONS

None

f) IMPORTANT ROLE OF DISPATCHER TELEPHONE CPR (T-CPR)

- (1) Immediate recognition of unresponsiveness, activation of EMS system response via 9-1-1, and initiation of CPR by the lay rescuer is essential to maximize survival.
- (2) In an unresponsive patient, rapid recognition of agonal (gaspings) respirations, or no respirations should prompt dispatcher-directed compressions to the caller (Dispatch-directed T-CPR).
- (3) Dispatch-directed T-CPR delivers CPR prior to EMS system arrival and presents a patient more responsive to EMS interventions, thus providing the ability to improve survival.


g) PROCEDURE FOR HIGH PERFORMANCE CPR

- (1) The first clinician at the patient's side will assess and initiate compressions.
- (2) **Effective Compressions** - Manual chest compressions should be initiated immediately upon identification of cardiac arrest, as long as the scene is safe. When compressions are done manually, compressors should be rotated **every 2 minutes** in order to maintain high-quality compressions. Ideally, one compressor is on each side of the patient's chest: one person compressing the chest and the other person ready to start. Chest compressions will be performed at a depth of at least 2 inches allowing for complete recoil of the chest after each compression.



For patients **less than one year of age**, compressions will be performed at a depth of 1½ inches. For patients **greater than one year old up to age 13**, compressions will be at a depth of 2 inches.

- (3) Compressions should be accomplished with equal time given for the down and up motion and achieve a rate of 100–120 per minute.

- (4) **Continuous Compressions** - Chest compressions will be performed at a rate of 100–120 per minute and will NOT be interrupted during the two-minute cycle for any reason. Other treatments such as ventilations, IV access, or intubation attempts will be done while compressions are ongoing. After completion of a two-minute cycle, a brief pause to assess pulses and/or defibrillate will be limited to less than 10 seconds.
- (5) **Defibrillation** – placement of the defibrillator pads will not interrupt chest compressions
- (a) **Automatic External Defibrillation**
 The AED will be powered on as soon as the cardiac arrest is confirmed. Do not interrupt chest compressions to remove clothing or place defibrillation pads. If the AED charges after analyzing, chest compressions will be performed while the device charges, then the patient will be “cleared” and defibrillated. Compressors will hover over the patient with hands ready during defibrillation so compressions can start immediately after a shock. Another two-minute cycle of compressions will be immediately performed. Pulse checks will not occur after a shock, but only after the AED prompts “no shock advised.” If no pulse is palpated, or if unsure, immediately perform another two minutes of CPR.
- (b) **Cardiac Monitor/Defibrillator**
 When a manual defibrillator is in use, it will be charged to the appropriate energy level as the end of the compression cycle nears (approximately 1 minute and 45 seconds into a two-minute cycle). At the end of the two-minute cycle, the patient will be cleared, the rhythm will then be interpreted rapidly, and the patient will either be defibrillated or the defibrillator energy charge will be cancelled. This sequence must be performed within 10 seconds. During this sequence, the compressors will hover over the patient with hands ready. If a shock is delivered, the compressor will immediately resume CPR. Rhythm interpretation will not occur after a shock, but only occur after the two-minute cycle of CPR is performed. If a shock is not indicated, check for a pulse. If patient remains pulseless, immediately resume HPCPR.
- (6) **Ventilations** - Ventilations will be performed without stopping chest compressions. Ventilations are important but can impede the cardiac output from compressions. Thus, rescuers should not provide too many breaths or use excessive force. One ventilation will be given every 10th compression during recoil (upstroke). Once an advanced airway is in place, ventilations will be interposed asynchronously with uninterrupted compressions (1 ventilation every 6 seconds, for all ages). Ventilation volume should be low volume (approximately 500 cc), best approximated by a three finger or end of bag squeeze. High performance, continuous compressions remain the priority. Ensure ventilations are adequate with bag-valve-mask attached to 100% oxygen. Clinicians will not interrupt compressions to obtain an advanced airway.
-  For children **up to age 13**, maintain a ratio of 2 ventilations every 30th compression for single rescuer CPR or 2 ventilations every 15th compression for two or more rescuer CPR (one ventilation on the recoil of the 14th compression and one ventilation on the recoil of the 15th compression).

Procedures – HIGH PERFORMANCE CPR (continued)

12.20

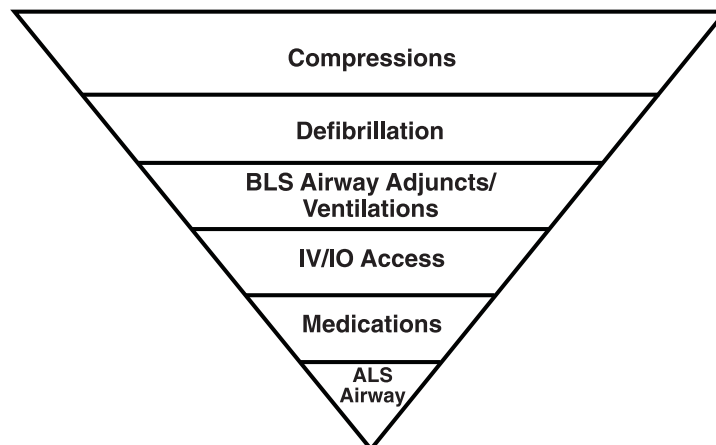
Procedures: High Performance CPR 12.20

Rescuers Should	Rescuers Should Not
Perform chest compressions at a rate of 100-120/min	Compress at a rate slower than 100/min or faster than 120/min
Compress to a depth of at least 2 inches (5 cm)	Compress to a depth of less than 2 inches (5 cm) or greater than 2.4 inches (6 cm)
Allow full recoil after each compression	Lean on the chest between compressions
Minimize pauses in compressions	Interrupt compressions for greater than 10 seconds
Ventilate adequately (2 breaths after 30 compressions, each breath delivered over 1 second, each causing chest rise)	Provide excessive ventilation (ie, too many breaths or breaths with excessive force)

- (7) **Advanced Life Support** - ALS clinicians will address defibrillation, IV/IO access, medication administration, and advanced airway placement, as indicated within these protocols; however, the placement of an advanced airway is no longer an early focus of cardiac arrest management and will not interrupt chest compressions. Nasal capnography may be utilized to optimize CPR performance and evaluation of ROSC, with use of bag-valve-mask ventilation.
- (8) **Return of Spontaneous Circulation (ROSC)** – Refer to *ROSC* protocol.
- (9) **Quality Improvement/Performance Metrics** – Time to CPR, time to defibrillation, and quality of CPR are all factors that have been shown to have a positive impact on survival. One metric that field crews can use to evaluate performance is CPR Fraction.
 - (a) CPR Fraction – The time CPR is being performed divided by the total time of the cardiac arrest. This fraction is typically reported as a percentage.
 - (i) A target goal for crews, that has been associated with improvements in survival, is a CPR fraction of equal to or greater than 80%.
 - (ii) Minimizing pre-shock pauses (e.g., charging defibrillator while clinicians performing chest compressions)
 - (iii) Feedback is best provided in real time or as close to the provision of care as possible.
 - (b) CPR compression rates should be between 100 and 120 per minute.
 - (c) Compression pauses should always be less than 10 seconds.

h) PROCEDURE: CODE RESOURCE MANAGEMENT (CRM)

Crews should coordinate their duties keeping the call priorities in mind. Intervention priorities are (in order of highest to lowest):



Procedures – HIGH PERFORMANCE CPR (continued)

The number of personnel on a given incident and the qualifications of those personnel can vary; however, the priorities remain the same. Appropriate crew roles are outlined below:

2 clinician crew:

Clinician 1 – Chest compressions

Clinician 2 – Ventilate, attach/operate AED/defibrillator, assume crew leader responsibilities (clinicians rotate positions every two minutes)

Roles remain the same even if clinicians are ALS equipped

3 clinician crew:

Clinician 1 – Chest compressions

Clinician 2 – Ventilate

Clinician 3 – Crew Leader, attach/operate AED/defibrillator
(Clinicians 1 and 2 rotate every two minutes)

Roles remain the same even if clinicians are ALS equipped

4 clinician crew:

Clinician 1 – Chest compressions

Clinician 2 – Ventilate

Clinician 3 – Attach/operate AED/defibrillator

Clinician 4 – Crew leader

(Clinicians 1, 2, and 3 rotate every two minutes)

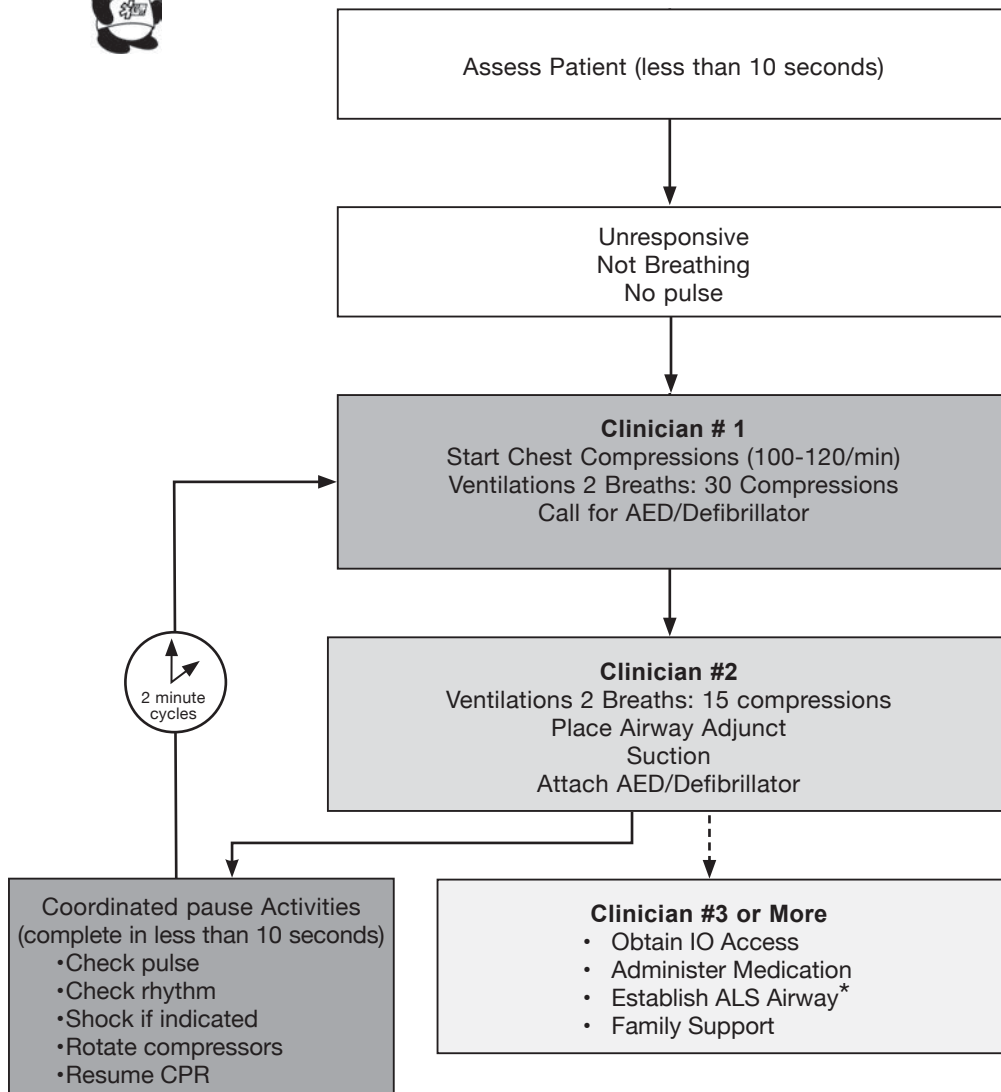
**** Once first two roles have begun treatment, ALS clinicians will establish IV/IO and administer medications.**

Greater than 4 clinicians - Utilize the same initial assignments as the four clinician crew. The crew leader will assign additional roles such as informing the family of patient status, gathering patient information, and documenting the medical interventions performed on the call. If resources allow, rotate additional clinicians to do chest compressions to achieve optimal performance.

Crew leader - The crew leader will keep time, record interventions performed during the arrest, give compression feedback and ensure rotation of personnel doing compressions every two minutes. Verbal announcements of time should occur at one minute, 30 seconds before reassessment, 15 seconds left, and countdown to reassessment at 10 seconds.



PEDIATRIC HIGH PERFORMANCE CPR (HPCPR)



Procedures: High Performance CPR 12.20

Pediatric HPCPR Team Member Initial Roles	
Clinician #1:	<ul style="list-style-type: none"> Chest compressions at 100-120 per minute Call for AED
Clinician #2:	<ul style="list-style-type: none"> Ventilate at 2 breaths:15 compressions Attach AED
Clinician #3 or MORE:	<ul style="list-style-type: none"> Assume timekeeper role Assume AED role IO Access Medications Establish ALS Airway Family Support

Essentials of High Performance CPR for Pediatrics
1. Ensure proper chest compression rate <ul style="list-style-type: none"> 100-120/min
2. Ensure proper compression depth <ul style="list-style-type: none"> Less than 1 year – 1 ½ inches (4 cm) Greater than or equal to 1 year – 2 inches (5 cm)
3. Minimize interruptions (less than 10 second pause)
4. Ensure full chest recoil
5. Coordinate 2 minute cycles
6. Rotate Compressor

* Once an advanced airway is in place, one ventilation every 6 seconds interposed asynchronously

1. PURPOSE

Mechanical CPR (mCPR) devices perform chest compressions at a consistent and reliable rate and depth, never fatigue, and are not susceptible to other human factors that degrade resuscitation quality. Additionally, the use of an mCPR device while transporting an in-progress resuscitation allows for effective CPR and increases safety by allowing clinicians to be restrained during transport.

2. PRESENTATION

Patients in cardiac arrest who have an established resuscitation in progress

3. INDICATIONS

- a) Active cardiac arrest resuscitation
- b) Applied in a standby mode for transport to any patient
 - (1) who achieves ROSC, OR
 - (2) who clinicians believe will progress to cardiac arrest

4. CONTRAINDICATIONS

Patients who have not yet reached their 13th birthday

5. PROCEDURE:

- a) Application of an mCPR device may not begin until after two 2-minute cycles of manual chest compressions.
- b) Any mCPR device must be applied in a manner that limits any break in compressions to less than 10 seconds.
- c) The 10-second breaks for device application must only occur around a normal 2-minute compression interval and simultaneously while performing rhythm interpretation and defibrillation.
- d) Apply the mCPR device according to manufacturer instructions, keeping in mind that minimizing breaks in compressions to less than 10 seconds may require that an mCPR device be applied over two or more 2-minute cycles of chest compressions.
- e) Once applied, devices must be used in accordance with manufacturer recommendations, but the goal should be to limit breaks in compressions as little as possible. This goal can be accomplished by:
 - (1) Only pausing the mCPR device for rhythm interpretation
 - (2) Pausing only long enough to identify the rhythm, and then starting again
 - (3) Delivering defibrillations while chest compressions are in progress
- f) An mCPR device (if available) should be applied in a standby mode for transport to any patient who achieves ROSC or patients who clinicians believe will progress to cardiac arrest.

6. PRECAUTIONS

Application of an mCPR device shall not cause delays in assessing for a shockable rhythm or the initiation of manual CPR.

7. INITIAL TRAINING

The jurisdictional medical director must certify that personnel have received a locally-approved training program prior to implementation.

8. ONGOING DEMONSTRATION OF PROFICIENCY

The jurisdictional medical director must reaffirm that EMSOP clinicians have received annual training with the mCPR device.

Indications

- A MOLST Form or Acceptable EMS DNR Order is presented to EMS by family/caregivers or found on scene, and
 - Patient is in cardiac or respiratory arrest, or
 - Patient is non-verbal or lacks medical decision-making capacity

BLS

- **Resuscitation status:**
 - **Attempt CPR** – if cardiac or respiratory arrest occurs: perform CPR, artificial ventilation, and all medical efforts that are indicated during arrest in order to restore or stabilize cardiopulmonary function
 - **MOLST A-1** – if cardiac or respiratory arrest occurs: do not attempt resuscitation (no CPR)
 - ♦ Prior to arrest: maximal restorative efforts including intubation
 - **MOLST A-2** – if cardiac or respiratory arrest occurs: do not attempt resuscitation (no CPR)
 - ♦ Prior to arrest: comprehensive efforts to prevent arrest excluding intubation
 - **MOLST B** – if cardiac or respiratory arrest occurs: do not attempt resuscitation (no CPR)
 - ♦ Prior to arrest: limited, palliative care only
- **Acceptable DNR Orders**
 - Maryland MOLST Form or Bracelet
 - ♦ May be an original, copy, or electronic format for patient care decisions, however, sending facility must provide paper copy to EMS prior to patient transport
 - Maryland EMS/DNR Form or Bracelet
 - ♦ There is no expiration on older versions of DNR forms.
 - Medic Alert DNR Bracelet or Necklace
 - Out-of-state EMS/DNR Form
 - Oral DNR Order from EMS System Medical Consultation
 - Oral DNR Order from other on-site physician, physician assistant, or nurse practitioner
- **Unacceptable DNR Orders**
 - Advanced directives (without a MOLST or DNR Order) or other oral or written requests shall not be honored by EMS without EMS System Medical Consultation
- **Revocation of DNR Orders**
 - An EMS/DNR Order may be revoked at any time by:
 - ♦ Physical cancellation or destruction of all EMS/DNR Order devices; or
 - ♦ A verbal statement by the patient made directly to EMS clinicians requesting resuscitation or palliative care only. In this case, EMS/DNR devices do not need to be destroyed. EMS clinicians must thoroughly document the revocation. A verbal revocation by the patient is only good for the current response for which it was issued.
 - An authorized decision-maker, other than the patient, cannot revoke an EMS/DNR Order verbally.
 - ♦ Decision-makers with the authority to revoke an EMS/DNR Order must either void or withhold all EMS/DNR Order devices if they wish resuscitation for the patient. If there is any confusion, the EMS clinician should consult a Base Station.

BLS



- **EMS DNR Medical Protocols**

- Perform limited patient assessment.
 - ◆ Check for a palpable pulse.
 - ◆ Check for respirations in an unresponsive patient.
 - ◆ Check for MOLST form or other acceptable EMS/DNR Order.
- Resuscitate/Do Not Resuscitate Criteria
 - ◆ If MOLST form or other acceptable EMS/DNR Order is present and the patient is in cardiac or respiratory arrest, no resuscitative measures shall be initiated.
 - ◆ If MOLST form or other acceptable EMS/DNR Order is not present, revoked, or otherwise void, EMS clinician shall treat and transport the patient, as appropriate.
 - If EMS clinicians believe that resuscitation or further resuscitative efforts are futile, they may initiate the *Termination of Resuscitation* protocol.
 - ◆ If the patient is conscious and able to communicate directly to EMS clinicians that they revoke the MOLST or other EMS/DNR Order verbally, then EMS clinicians shall treat and transport the patient, as appropriate.
 - ◆ If the EMS/DNR patient (Option A-1, A-2, B) experiences respiratory or cardiac arrest, EMS shall withhold or withdraw further resuscitation and provide support to the family and caregivers.
- **MOLST A-1** – Maximal Restorative Care, including intubation
 - ◆ Prior to respiratory or cardiac arrest: the Option A-1 patient shall receive the full scope of interventions permissible under *The Maryland Medical Protocols for Emergency Medical Services*, including: intubation, CPAP/BiPAP, cardiac monitoring, cardioversion, cardiac pacing, IVs, and medications in attempt to forestall cardiac or respiratory arrest.
 - ◆ If respiratory or cardiac arrest occurs: do not initiate CPR or any resuscitative efforts. Withhold or withdraw resuscitative efforts if they were already in progress prior to discovery of the MOLST or EMS/DNR Order.
- **MOLST A-2** – Comprehensive Efforts, excluding intubation
 - ◆ Prior to respiratory or cardiac arrest: same as option A-1, except no intubation is permitted
 - ◆ If respiratory or cardiac arrest occurs: no CPR, same as option A-1
- **MOLST B** – Palliative Care
 - ◆ Prior to respiratory or cardiac arrest, provide supportive treatment:
 - Respiratory
 - Open and maintain airway using chin lift, jaw thrust, finger sweep, nasopharyngeal or oropharyngeal airway, Heimlich maneuver, or laryngoscopy with Magill forceps for suspected airway obstruction, but no intubation, cricothyroidotomy, or tracheostomy
 - Oxygen: may provide passive oxygen via nasal cannula or non-rebreather mask, but no positive pressure oxygen via BVM, demand valve or ventilator. Pulse oximetry and capnography may be used.
 - Ventilator patients: if the patient is found on an outpatient ventilator and is not in cardiac arrest, maintain ventilator support during transport to the hospital
 - ◇ If the patient on an outpatient ventilator is found in cardiac arrest, contact online medical direction before disconnecting the ventilator.
 - Suction as necessary
 - Position for comfort

BLS



- External bleeding
 - Standard treatment; direct pressure, tourniquet
 - No IVs
- Immobilize fractures with devices to minimize pain
- Uncontrolled pain or other symptoms (e.g., severe nausea)
 - Allow patient, family or other health care clinicians to administer patient-prescribed medications. Document this on the PCR.
 - Patient controlled analgesia (PCA) systems shall be maintained and monitored.
 - For the patient with significant pain or pain with prolonged transport, initiate the *Pain Management* protocol.
- Existing IV lines shall be maintained in place.
- Transport: upon request of the patient, family or caregivers, EMS clinicians may transport Option B EMS/DNR patients to a specified inpatient hospice facility for pain control, symptom management or respite care (in lieu of transport to a hospital-based emergency department). EMS clinicians must notify the hospice facility prior to transport.
- Documentation
 - A copy of the MOLST or other acceptable EMS/DNR Order must be transported with the patient to the emergency department or inpatient hospice facility.
 - MOLST or EMS/DNR order status must be documented in the patient care report.
- Non-transported EMS/DNR Patients
 - Follow local operational procedures for handling deceased patients.
 - Do not remove DNR or Medical Alert Bracelets or Necklaces from the patient; leave the original MOLST or EMS/DNR Order with the patient.
 - Law enforcement or medical examiner's office need to be notified only in the case of sudden or unanticipated death that occurs:
 - By violence
 - By suicide
 - As the result of an accident
 - Suddenly, if the deceased was in apparent good health, or
 - In any suspicious or unusual manner

ALS



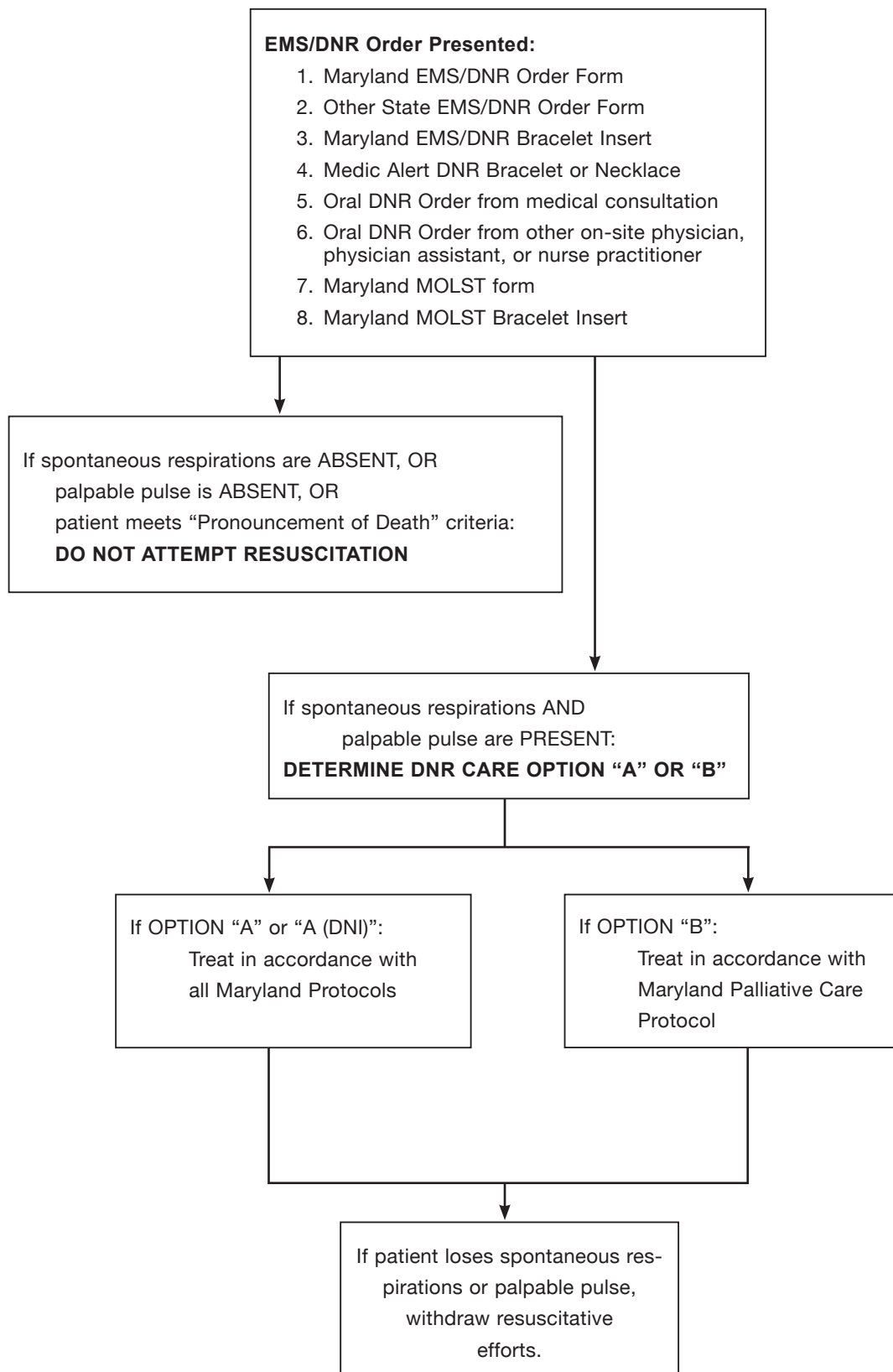
- Refer to BLS protocol

MC



- An oral DNR Order from EMS System Medical Consultation is acceptable if a MOLST or DNR form is not present.
- Obtain medical consultation if the MOLST or DNR form instructions are unclear or the form is unreadable.

EMS DNR Flowchart



Indications

- Patients who are in cardiac arrest due to medical or traumatic etiology

Exclusions

- The following patients should receive care according to appropriate protocol, without TOR, and transport to the closest appropriate facility:
 - Pregnant patients
 - Patients in cardiac arrest that is suspected to be due to hypothermia or submersion

BLS

- If the patient meets the criteria listed in the *Pronouncement of Death in the Field* protocol, EMS clinicians should terminate resuscitation efforts.
- BLS clinicians may terminate resuscitation for adult patients (age 18 or older) if:
 - ALS resources are genuinely unavailable, **and**
 - The patient has received a minimum of 15 two-minute cycles of HPCPR, **and**
 - During the five AED analyses immediately prior to TOR there was “no shock advised.”

ALS

- **Medical etiology:** may terminate resuscitation for adult patients (age 18 years or older) if:
 - Patient has received 15 two minute cycles of HPCPR, **and** the patient is:
 - ♦ in asystole, **or**
 - ♦ in VF, pulseless VT, or PEA with an ETCO₂ of less than 15 mmHg
- **Traumatic etiology:** may terminate resuscitation regardless of total resuscitation time for adult patients (15 years or older) if:
 - Patient presents in asystole, **or**
 - Patient’s cardiac rhythm changes to asystole during the resuscitation, **or**
 - Blunt trauma patient remains in PEA or VF after 5 two-minute cycles of HPCPR according to the *Trauma Protocol: Trauma Arrest* protocol

MC

- Not applicable.

Clinical Pearls

- If the patient does not meet TOR criteria, continue resuscitation and re-evaluate at the next rhythm check.
- For traumatic arrest patients, asystole and resuscitations lasting longer than 10 minutes are independent predictors of mortality. Treatment of the trauma arrest patient should focus on identifying and treating reversible causes during that narrow resuscitative window. TOR and transport decisions should only be made after administering time-sensitive therapies.



Indications

- Patients who are in cardiac arrest due to medical or traumatic etiology

Exclusions

- The following patients should receive care according to appropriate protocol, without TOR, and transport to the closest appropriate facility:
 - Pregnant patients
 - Patients in cardiac arrest that is suspected to be due to hypothermia or submersion

BLS



- If the patient meets the criteria listed in the *Pronouncement of Death in the Field* protocol, EMS clinicians should terminate resuscitation efforts.
- May not terminate resuscitation for pediatric **medical** arrest patients (under age 18 years).
- May terminate resuscitation for pediatric **traumatic** arrest patients (under age 15 years) if:
 - ALS resources are genuinely unavailable, **and**
 - The patient has received a minimum of 15 two-minute cycles of HPCPR, **and**
 - During the five AED analyses immediately prior to TOR there was “no shock advised.”

ALS



- **Medical etiology:** may terminate resuscitation of pediatric patients (less than 18 years of age) if:
 - Patient has received 15 two-minute cycles of HPCPR, **and** at least 1 dose of *epinephrine* **and**:
 - ♦ Patient is in asystole, **and**
 - ♦ Patient has a sustained ETCO₂ of less than 15 mmHg, **and**
 - ♦ In the judgment of EMS and law enforcement on scene, there is adequate social/emotional support and safety for civilians and professionals on scene, **and**
 - ♦ In the judgment of EMS and law enforcement, scene is amenable to leaving patient on scene.
- **Traumatic etiology:** may terminate resuscitation for pediatric patients (less than 15 years of age) if:
 - Patient has received 5 two-minute cycles of HPCPR without ROSC according to the *Trauma Protocol: Trauma Arrest* protocol **and**
 - Patient is in asystole, **and**
 - Patient has a sustained ETCO₂ of less than 15 mmHg, **and**
 - In the judgment of EMS and law enforcement on scene, there is adequate social/emotional support and safety for civilians and professionals on scene, **and**
 - In the judgment of EMS and law enforcement, scene is amenable to leaving patient on scene.

MC



- Not applicable.

Clinical Pearls

- If patient does not meet TOR criteria, continue resuscitation and reevaluate at the next rhythm check.

Indications

- Patients 18 years of age and older who have been revived from cardiac arrest (return of pulses) due to a medical etiology
- For patients resuscitated from traumatic arrest, refer to *Multiple/Severe Trauma* protocol.

BLS

- Verify presence of a carotid pulse. If any doubt exists as to whether a carotid pulse is present, initiate CPR and refer to appropriate *Cardiac Arrest* protocol.
- If apneic or inadequate respirations, continue to support ventilations.
- Frequently reassess vital signs. Treat any abnormalities in accordance with appropriate shock, respiratory, or cardiac protocols.
- If patient is 18 years of age or older and comatose (GCS less than 8), initiate *Neuroprotective Induced Hypothermia* protocol.
- Rendezvous with ALS or transport to the closest ED.
- If available and not already in place, apply mechanical CPR (mCPR) device in standby mode.

ALS

- Obtain 12-lead EKG; if STEMI, treat according to *STEMI* protocol.
- Establish IV/IO access, if not already obtained.
- Identify cardiac rhythm and treat according to appropriate algorithm.
 - If VF or VT was present during arrest and *amiodarone* not yet given, consider *amiodarone* 150 mg IV/IO over 10 minutes. (Presence of a perfusing sinus rhythm is necessary for the administration of *amiodarone*.)
- Treat hypotension with *Lactated Ringer's* fluid bolus, titrate to systolic blood pressure of 90 mmHg, or if ineffective, refer to the *Epinephrine Infusion* protocol. Refer to *Shock: Hypoperfusion* protocol.
- Reassess need for airway management or intubation, if not already addressed.
- Identify and treat underlying causes that contributed to the cardiac arrest.
- Initiate transport to a Cardiac Intervention Center, unless exceptions below apply.
 - Exceptions:
 - ♦ Obvious non-cardiac cause for arrest (e.g., drowning, asphyxiation, opiate overdose)
 - ♦ Transport time to Cardiac Interventional Center is more than 45 minutes greater than transport time to nearest ED

MC

- Obtain medical consultation if patient's clinical instability will not allow for safe transport to Cardiac Interventional Center due to extended transport time.
- All post-cardiac arrest patients are priority 1, and require medical consultation.

Clinical Pearls

- Consider use of helicopter transport if patient has sustained ROSC and it would provide a time-appropriate arrival at a cardiac intervention center.



Indications

- Pediatric patients less than 18 years of age who have been revived from cardiac arrest (return of pulses) due to a medical etiology
- For patients resuscitated from traumatic arrest, refer to *Multiple/Severe Trauma* protocol.

BLS



- Verify presence of a carotid pulse. If any doubt exists as to whether a carotid pulse is present, initiate CPR and refer to appropriate *Cardiac Arrest* protocol.
- If apneic or inadequate respirations, continue to support ventilations.
- Frequently reassess vital signs. Treat any abnormalities in accordance with appropriate shock, respiratory, or cardiac protocols.
- Rendezvous with ALS or transport to the closest ED.
- For patients 13 years of age and older, apply mechanical CPR (mCPR) device in standby mode, if available and not already in place.

ALS



- Establish IV/IO access, if not already obtained.
- Identify cardiac rhythm and treat according to appropriate algorithm.
- Reassess need for airway management or intubation, if not already addressed.
- If lungs are clear, treat hypotension with *Lactated Ringer's* 20 mL/kg IV fluid bolus per *Shock: Hypoperfusion* protocol, with the following blood pressure goals:
 - For patients 10 years and older (including adults), systolic blood pressure greater than 90 mmHg
 - For patients under 10 years of age, systolic blood pressure greater than 70 + 2x age in years mmHg; or
 - Systolic blood pressure ordered by the Pediatric Base Station. May repeat *Lactated Ringer's* 20 mL/kg fluid bolus one time.
- Transport to Children's National Medical Center or Johns Hopkins Children's Center with the following exceptions:
 - Transport time is 30 minutes greater than transport time to nearest ED, or
 - Patient's clinical instability will not allow for safe transport to one of the above centers due to transport time.

MC



- If patient's clinical instability will not allow for safe transport to a pediatric center, obtain a medical consult.
- All post-cardiac arrest patients are priority 1, and require medical consultation with a Pediatric Base Station, which may assist with destination determination.
- Third and subsequent fluid boluses, *Lactated Ringer's* 20 mL/kg IV/IO require medical consultation
- Pediatric *epinephrine* infusion dosage
 - The following dosing chart should be used for pediatric patients less than 50 kg, using approved *epinephrine* infusion and 60-drop set:

Weight range (kg)	Initial epinephrine dose	If goal blood pressure not achieved at 5 min, increase to
LESS than 10 kg	6 drops/min (0.1 mL/min)	12 drops/min (0.2 mL/min)
10-19 kg	12 drops/min (0.2 mL/min)	24 drops/min (0.4 mL/min)
20-29 kg	18 drops/min (0.3 mL/min)	36 drops/min (0.6 mL/min)
30-39 kg	24 drops/min (0.4 mL/min)	48 drops/min (0.8 mL/min)
40-49 kg	30 drops/min (0.5 mL/min)	60 drops/min (1.0 mL/min)

- If blood pressure goal in ALS section has not been met after 10 minutes, obtain medical consultation.

Obstetrics/Gynecological Emergencies: Childbirth Algorithm

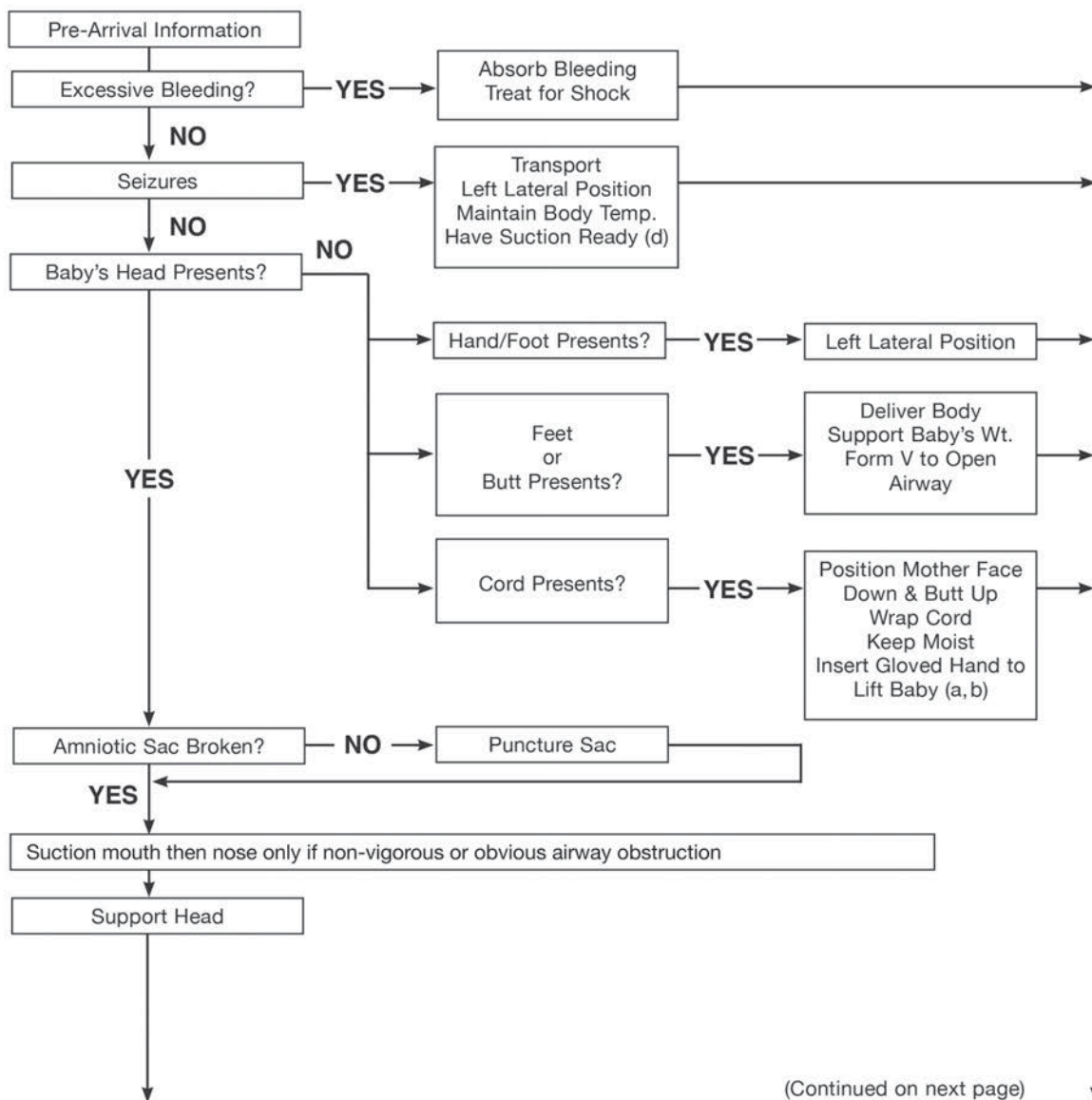
BLS



1. Indications

Patient presents pregnant, with contractions and/or pain, accompanied by bleeding or discharge, crowning during contraction, the feeling of an impending bowel movement, and/or a rock-hard abdomen.

2. Treatment

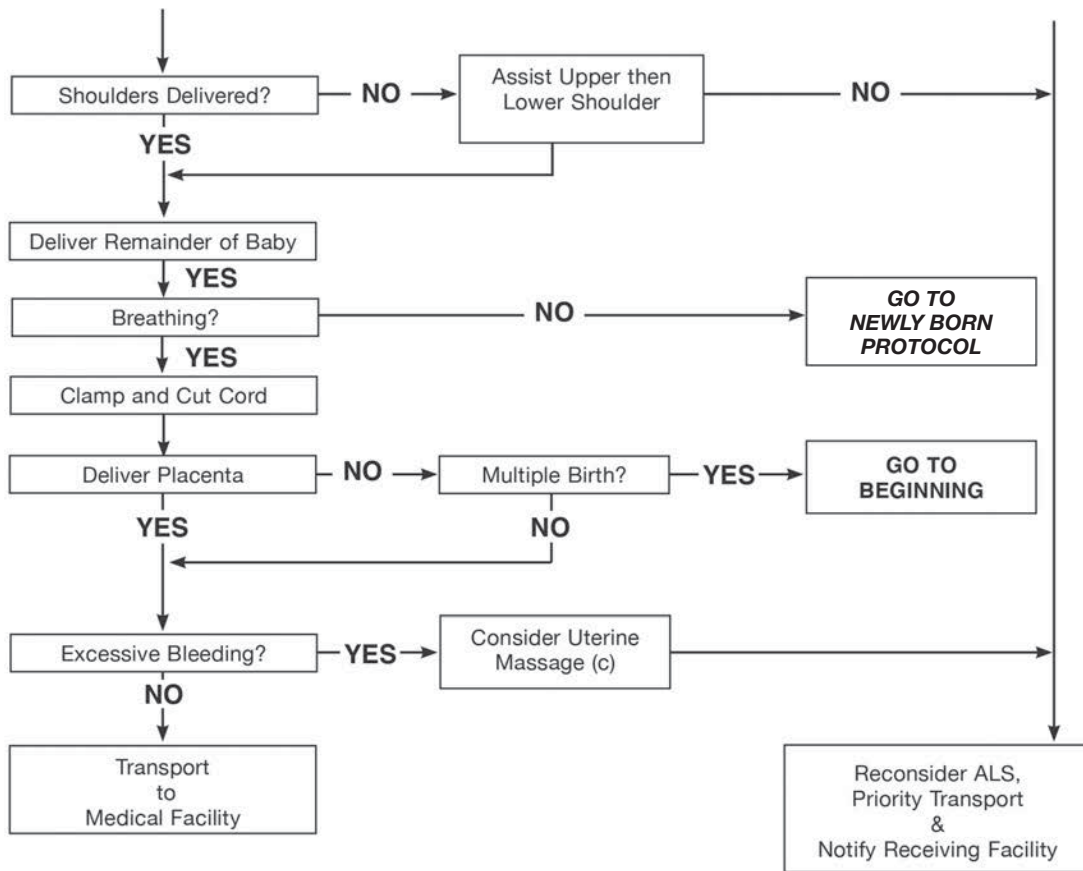


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Obstetrics/Gynecological Emergencies: Childbirth Algorithm (continued)

5.1

BLS



(a) - Keep presenting part of baby off the cord. Monitor and attempt to maintain the pulse in the cord.

(b) - Position of mother: 

(c) - Uterine massage is performed with the heel of the hand applying firm pressure from the pubis toward the umbilicus only. This massage is continued until bleeding diminishes. Transport rapidly.

(d) - Go to Seizure protocol: Consider *midazolam*.

OB/GYN: Childbirth Algorithm 5.1



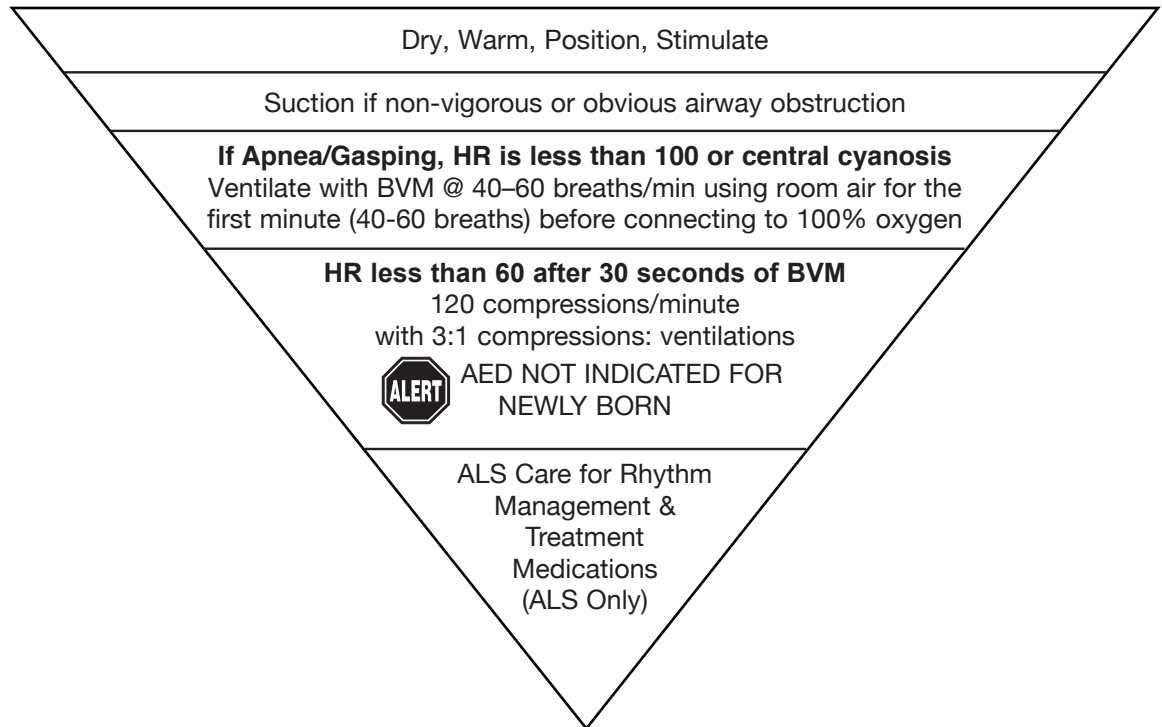
BLS



1. Indications

This protocol applies to the infant within the first hour after delivery.

UNIVERSAL ALGORITHM FOR THE NEWLY BORN FOR BLS



ALS



(a) - Acceptable Target SpO₂ after Birth

- 1 min – 60-65%
- 2 min – 65-70%
- 3 min – 70-75%
- 4 min – 75-80%
- 5 min – 80-85%
- 10 min – 85-95%

(b) - Consider possible causes of depressed newborn.

(Parenthesis = possible therapies and treatments)

Respiratory depression (Premature infants less than 32 weeks gestation will likely require ongoing BVM ventilations due to immature lungs.)

Hypoglycemia (Threshold for treatment = 30 mg/dL) (D10W 2–4 mL/kg IV/IO (D10W is prepared by mixing one part of D50W with four parts LR.))

Hypothermia (Warming)

Hypovolemia (Volume infusion – see “c”, below)

(c) - Volume infusion is 10 mL/kg.

APGAR Chart

SIGN	0	1	2
MUSCLE TONE (ACTIVITY)	LIMP	SOME FLEXION	ACTIVE, GOOD FLEXION
PULSE	ABSENT	LESS THAN 100/MIN	GREATER THAN 100/MIN
REFLEX IRRITABILITY* (GRIMACE)	NO RESPONSE	SOME GRIMACE OR AVOIDANCE	COUGH, CRY OR SNEEZE
COLOR (APPEARANCE)	BLUE, PALE	PINK BODY, BLUE HANDS/FEET	PINK
RESPIRATIONS	ABSENT	SLOW/IRREGULAR, INEFFECTIVE	CRYING, RHYTHMIC EFFECTIVE

**Nasal or Oral Suction Catheter Stimulus*



Apparent Life-Threatening Event/ Brief Resolved Unexplained Event (ALTE/BRUE)

4.6

Indications

- Infant or child less than 2 years of age
- Episode that is frightening to the observer that includes some combination of the following:
 - Apnea
 - Skin color change (cyanosis, pallor, erythema)
 - Marked change in muscle tone
 - Choking or gagging not associated with feeding or witnessing foreign body aspiration

BLS



- Perform assessment using the Pediatric Assessment Triangle
- Obtain a description of the event including nature, duration, and severity
- Assess the environment for possible causes
- When obtaining the medical history, include questions to identify any: current medications, chronic diseases, current or recent infections, evidence of seizure activity, gastroesophageal reflux, or recent trauma
- Apply oxygen and be prepared to support ventilation during transport

ALS



- Place patient on cardiac monitor
- Establish IV/IO access only if required by patient's clinical condition

MC



- If the parent or guardian refuses medical care or transport, clinician SHALL contact a Pediatric Base Station physician

Clinical Pearls

- Most patients will appear stable upon assessment. However, this episode may be a sign of serious underlying illness or injury. All suspected ALTE/BRUE patients should be transported for further medical evaluation.

Medical: Apparent Life-Threatening Event/Brief Resolved Unexplained Event (ALTE/BRUE) 4.6-P

Indications

- Injuries or burns in a pattern suggesting intentional infliction
- Injuries in various stages of healing or injuries scattered over multiple areas of the body
- Patient, parent, or caregiver responding in an inappropriate manner to the situation
- Malnutrition or extreme lack of cleanliness of the patient or environment
- Bulging of fontanel and altered mental status in infants

BLS



- Stabilize and treat injuries according to the appropriate protocol
- Discourage patient from washing if sexual abuse is suspected
- Document the following in the patient care report:
 - All statements made by the patient, parent, or caregiver; include verbatim statements in quotation marks
 - Any abnormal behavior on the part of the patient, parent, or caregiver
 - The condition of the environment and other residents present
 - Document the time the police or social service agency was notified along with the name and identifier, if possible
 - Document the name of the receiving health care clinician (RN, PA, or MD)
- Report all cases of suspected child or vulnerable adult abuse or neglect directly to either the local police or social service agency, as required by law. Do not initiate the report in front of the patient, parent, or caregiver.

ALS



- Refer to BLS protocol

MC



- Not applicable

Clinical Pearls

- Maryland EMS clinicians are protected from liability if they make a report of child or vulnerable adult abuse and neglect in good faith.

Indications

- Nausea
- Vomiting
- Active motion sickness
- Medication side effect/complication
- Prevention of nausea/vomiting (e.g., penetrating eye injury, high risk for aspiration, opioid administration)

BLS

- Place patient in position of comfort or in left lateral position, with consideration for *spinal motion restriction* if required.
- Allow patient to inhale vapor from an isopropyl alcohol wipe 3 times every 15 minutes, as needed and tolerated.

ALS

- Establish IV access, if appropriate.
- *Lactated Ringer's* fluid bolus, 20 mL/kg, if appropriate. Titrate to systolic blood pressure of 90 mmHg.
- *Ondansetron* 8 mg slow IV over 2-5 minutes OR 4-8 mg IM OR 8 mg orally disintegrating tablet (ODT). May repeat dose one time if needed.

MC

- A third dose of *ondansetron* may be administered, with medical consultation, to a maximum of 24 mg.

Clinical Pearls

- Higher doses of *ondansetron* may prolong the patient's QTc interval and lead to cardiac dysrhythmias. Initiate cardiac monitoring when repeat doses are administered.



Indications

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- Allow patient to inhale vapor from an isopropyl alcohol wipe 3 times every 15 minutes, as needed and tolerated.

ALS



- Establish IV access, if appropriate.
- *Lactated Ringer's* fluid bolus, 20 mL/kg, if age-related vital signs and patient's condition indicate hypoperfusion. Titrate to systolic blood pressure of (2 x patient's age in years) + 70 mmHg.
- *Ondansetron*
 - 28 days to 12-years-old: *Ondansetron* 0.1 mg/kg SLOW IV over 2–5 minutes
 - 13-18th birthday: *Ondansetron* 8 mg ODT OR 8 mg SLOW IV over 2–5 minutes OR *ondansetron* 0.1 mg/kg IM, if IV access is not available (with max single dose of 8 mg)
 - May repeat dose one time if needed.

MC



- A third dose of *ondansetron* may be administered, with medical consultation, to a maximum total dose of 0.3 mg/kg or 24 mg, whichever is lower.

Clinical Pearls

- Higher doses of *ondansetron* may prolong the patient's QTc interval and lead to cardiac dysrhythmias. Initiate cardiac monitoring when repeat doses are administered.



a) PURPOSE

Tracheostomy suctioning may be required to maintain a patent airway in patients who present with respiratory distress secondary to tracheostomy tube occlusion or obstruction.

b) INDICATIONS

- (1) Increased secretions from tracheostomy site or a mucous plug
- (2) Hypoxia, cyanosis, or decreased oxygen saturation levels
- (3) Increased work of breathing
- (4) Altered mental status secondary to hypoxia

c) CONTRAINDICATIONS

None

d) POTENTIAL ADVERSE EFFECTS/COMPLICATIONS

- (1) Bleeding at tracheal stoma site
- (2) Dislodgment of tracheostomy tube
- (3) Exaggerated cough reflex with introduction of saline
- (4) Increased hypoxia/respiratory distress
- (5) Infection

e) PROCEDURE

- (1) Two clinicians or clinician and trained family member
- (2) Use latex-safe sterile gloves and equipment.
- (3) Position patient with the head and neck hyperextended to expose the tracheostomy site.
- (4) Pre-oxygenate patient at the tracheostomy site:
 - (a) NRB mask if patient has adequate effective spontaneous respirations
 - (b) BVM if ventilator-dependent or there are ineffective spontaneous respirations
- (5) Select appropriately sized suction catheter (2 x internal diameter of tracheostomy tube).
- (6) Insert suction catheter:
 - (a) Measure from the tracheostomy site to the sternal notch.

OR

 - (b) Insert until there is a cough reflex.
- (7) Apply suction ONLY as the catheter is withdrawn, rotating the catheter in a twisting motion between thumb and finger.
- (8) Suction for maximum of 10 seconds.
- (9) Reoxygenate and reevaluate patient.
- (10) Repeat suction procedure as needed (for thick secretions instill 3–5 cc sterile saline/water prior to repeat suctioning).

1. INDICATIONS

An emerging infectious disease (EID) is an infectious disease for which incidence in humans has increased in the past two decades or threatens to increase in the near future. These diseases, which respect no national boundaries, include

- a) New infections resulting from changes or evolution of existing organisms
- b) Known infections spreading to new geographic areas or populations
- c) Previously unrecognized infections appearing in areas undergoing ecologic transformation
- d) Old infections reemerging as a result of antimicrobial resistance in known agents or breakdowns in public health measures.

The most recent example is Ebola Viral Disease (EVD). EIDs that meet this protocol will be posted on the MIEMSS website under the Infectious Disease Tab. Seasonal influenza is not considered an EID, but some of the same principles of infection control may apply to the more common infectious diseases.

- e) Signs and Symptoms of an EID are based on specific case definitions for the disease:
 - (1) EVD case definition includes:

Travel history or exposure **and** a set of signs and symptoms that are included in the case definition, which has evolved over time.
 - (2) Other future EID diseases may vary in their signs and symptoms, and could include:
 - (a) Respiratory congestion
 - (b) Sneezing/coughing
 - (c) Nausea/vomiting
 - (d) Skin rashes, hives, or “poxes”
 - (e) Swollen lymph nodes
 - (f) General malaise
 - (g) Loss of appetite
 - (h) Hemorrhage from mucosal membranes
 - (i) Descending neurological deficits
- f) Case Definition
As EIDs become more prevalent, the Centers for Disease Control and Prevention (CDC) typically publish a description of each disease, which is utilized to determine whether to include or exclude a Patient Under Investigation (PUI) for specific testing or treatment and specific isolation or quarantine measures. These case definitions will be posted on the MIEMSS website and include specific guidance on the identification, treatment, and appropriate transport of these patients and the appropriate use of PPE.
- g) Modes of transmission
 - (1) In direct transmission, an infectious agent is transferred from a reservoir to a susceptible host by direct contact or droplet spread.
 - (a) Direct contact occurs through skin-to-skin contact, kissing, and sexual intercourse. Direct contact also refers to contact with soil or vegetation harboring infectious organisms.
 - (b) Droplet spread refers to spray with relatively large, short-range aerosols produced by sneezing, coughing, or even talking. Droplet spread is classified as direct because transmission is by direct spray over a few feet, before the droplets fall to the ground.

- (2) Indirect transmission refers to the transfer of an infectious agent from a reservoir to a host by suspended air particles, inanimate objects (vehicles), or animate intermediaries (vectors).
 - (a) Airborne transmission occurs when infectious agents are carried by dust or droplet nuclei suspended in air. Airborne dust includes material that has settled on surfaces and become re-suspended by air currents as well as infectious particles blown from the soil by the wind. In contrast to droplets that fall to the ground within a few feet, droplet nuclei may remain suspended in the air for long periods of time and may be blown over great distances
 - (b) Vehicles that may indirectly transmit an infectious agent include food, water, biologic products (blood), and fomites (inanimate objects such as handkerchiefs, bedding, or surgical scalpels).
 - (c) Vectors such as mosquitoes, fleas, and ticks may carry an infectious agent through purely mechanical means or may support growth or changes in the agent.



2. TREATMENT

- a) If the presence of an EID at a scene is known prior to entering, don the appropriate PPE and limit entry into the scene to essential personnel only. If an EID is discovered during assessment, immediately don the appropriate PPE, clear the scene of non-essential personnel and initiate the recommended decontamination procedures.
- b) Initiate General Patient Care.
- c) Treat the patient according to the signs and symptoms presented and according to the MIEMSS guidance for the specific EID. Procedures that increase risk of distributing fluids or secretions should be limited to those absolutely necessary to maintain life and provide the patient with a reasonable level of comfort.
- d) Contain any bodily fluids or respiratory excretions prior to transporting the patient. A SURGICAL mask may be placed on the patient to limit respiratory droplet aerosolization.



N-95 SHOULD **NEVER** BE PLACED ON A PATIENT AS THEY RESTRICT THE EXCHANGE OF RESPIRATORY GASES AND TYPICALLY HAVE A ONE-WAY EXPIRATORY VALVE THAT ALLOWS DROPLETS TO BE AEROSOLIZED UPON EXPIRATION DEFEATING THE PURPOSE OF PLACING A MASK ON THE PATIENT.

- e) Transport the patient to the appropriate hospital.
Hospitals have been categorized into three levels based on their capabilities to assess and treat PUIs for designated EIDs. A list of designated EIDs will be published on the MIEMSS website.
 - (1) Frontline Hospitals (MDH designated) – All hospitals with emergency departments must have the capability to accept, identify, and isolate a PUI for a designated EID, then follow the approved procedures to notify the local health department to arrange for transfer to an Assessment Hospital. These patients will typically be transferred within 24 hours.
 - (2) Assessment Hospitals (MDH designated) – A facility that has the capability to receive, isolate, and provide care for a patient while testing is completed to confirm or deny the diagnosis of the suspected EID. The patient will remain at that hospital for 4 to 5 days until the patient is discharged or transfer to an designated Treatment Hospital

- (3) Treatment Hospitals (MDH designated) – A facility assessed by the CDC to have the capability to admit and provide comprehensive care for and manage a patient with a confirmed designated EID, until the patient is no longer ill or has died.
- f) Transport from the scene
PUIs at a residence should be transported directly to an Assessment Hospital unless total transport time is no longer than 45 minutes greater than transport to the nearest Frontline Hospital ED. If transport time is longer than 45 minutes greater than transport to the nearest Frontline Hospital ED, the patient must be transported to the closest appropriate Frontline Hospital. Priority 1 and Priority 2 patients with unresolved symptoms that cannot be managed outside the hospital should be taken to the closest Frontline Hospital. Receiving hospital notification of all suspected PUI patients should be done as early as possible to allow for hospital staff to prepare. Helicopter transport **NOT** indicated for the PUI patient
- g) Transport of a health department monitored patient
Individuals who were exposed and have some risk of contracting the disease may be monitored or even quarantined by the health department. MIEMSS will be notified by MDH if these patients become ill and require transportation by EMS to hospitals and will contact the local jurisdictional or waived commercial EMS Operational Program to arrange that transport. DHMH will determine the destination hospital.
- h) Interfacility Transfer
Transfers between hospitals will be completed by EMSOPs who have been granted a waiver from licensing to modify an ambulance specifically to transport an EID patient and have specific plans, training and quality assurance processes in place to do so. Public Safety EMSOPs may be called upon as a backup if the waived commercial services are not available. MDH will determine the destination hospital in these cases.
- i) Communication
EMS clinicians transporting PUIs for designated EIDs **MUST** contact the receiving hospital via EMRC **prior to beginning that transport** and enter the hospital through the entrance designated by the receiving hospital. The **term PUI must be used** to ensure the hospital understands and is prepared to receive the patient. Obtaining medical direction from the closest Frontline and Assessment Hospitals is always an option to determine the appropriate destination.
- j) Refusal of transport
If a PUI for a designated EID refuses care or transport, the EMS clinician should remove him/herself from the immediate presence of the patient and contact the local health department through their dispatch center or locally defined procedures and provide as much of the following information about the patient that is available.
- (1) Full name
 - (2) Age
 - (3) Gender
 - (4) Home address
 - (5) Contact phone numbers
 - (6) Current location
 - (7) Recent travel history
 - (8) Signs and symptoms being displayed
 - (9) Recent contact history with Ebola patients

Procedures – EMERGING INFECTIOUS DISEASE (EID) (continued)

The EMS clinician should expect to be involved in a discussion of the situation with health department and law enforcement officials, and if a quarantine/isolation order is issued, should be prepared to assist law enforcement in carrying out that order.



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- k) Treat the patient according to the signs and symptoms presented and according to the MIEMSS guidance for the specific EID. Limit invasive procedures and any that increase risk of distributing fluids or secretions to those absolutely necessary to maintain life and provide the patient with a reasonable level of comfort.



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- l) Pediatric patients under the age of 15 discovered at the home or in a non-health care environment should be transported to a Treatment Hospital that is also a Pediatric Trauma Center if transport times are not longer than 45 minutes greater than transport to the nearest Frontline Hospital ED. If transport times are longer than 45 minutes greater than transport to the nearest Frontline Hospital ED, the patient should be taken to an Assessment Hospital (if within 45 minute transport time) or the closest Frontline Hospital.

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