

**The Maryland**  
**Medical Protocols**  
**for Emergency Medical Services Providers**

Effective July 1, 2009

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**Maryland Institute for  
Emergency Medical Services Systems**



The complete “Maryland Medical Protocols for  
Emergency Medical Services Providers” is also avail-  
able on the Internet. Check out the MIEMSS website  
**[www.MIEMSS.org](http://www.MIEMSS.org)**.

## To All Health Care Providers in the State of Maryland:

Re: 2009 Revisions, updates, and additions to *Maryland Medical Protocols for EMS Providers*

EMS providers will be able to download the replacement pages from the MIEMSS website at [www.miemss.org](http://www.miemss.org). They will also be receiving a single copy of the 2009 pocket protocols which will have the core protocol changes for quick reference and review. The EMS Board has approved the following: Protocol Changes, Optional Supplemental Protocols, and Pilot Protocol for implementation on July 1, 2009. This update includes all the "February 14, 2008 Protocol Clarifications," the "September 9, 2008 Changes and Additions," and the "October 7, 2008 Trauma Decision Tree" modifications. Multiple minor grammatical or nomenclature modifications have been made to ensure internal consistency of the document and accuracy with changes such as converting "ml" to "mL" and the removal of the round patch "CRT" references or minor adjustments in dosage or clarification of existing dosages or joule settings. Prior to July 1, 2009 all EMS providers (BLS and ALS) must complete a protocol rollout session that will cover the new material. The following highlight some of the 2009 additions, deletions, and major revisions of the protocols.

### Protocol Changes

1. New "Nausea and Vomiting" Protocol
2. New medication "Ondansetron" (Zofran)
3. Replacement of Diazepam with new medication "Midazolam" for all indications except nerve agent / organophosphate exposure where either medication may be of benefit as Diazepam is part of the CHEM PAC inventory.
4. The purchase of a circular magnet for use in the event of the failure of an Implantable Cardioverter Device (ICD)
5. General Patient Care (GPC) "Transition of Patient Care ALS to BLS" guidance
6. GPC modification of "priority definitions"
  - a) Priority 1 – Critically ill or injured person requiring immediate attention; unstable patients with (~~deleted potentially~~) 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.
7. Removal of endotracheal medication administration only for adults
8. Allowing "Nurse Practitioners" to sign for EMS/DNR forms and providing verbal EMS/DNR orders if on scene
9. Allowing new site (proximal humerus) for mechanical IO insertion when other sites not available
10. CPAP moved from Optional Supplemental Protocol to Procedure Section
11. Consultation required for category "C" or "D" patients when considering whether helicopter transport is of clinical benefit.

### Optional Supplemental Protocols (require application and approval by MIEMSS)

1. Impedance threshold device (prevents air from entering the chest during chest recoil: doubles blood flow back to the heart during CPR)
2. Laryngeal Tube Airway Device (King LTS-D™) as adjunct to or alternative to Combitube or EASY tube)
3. Allowing Certified First Responders to administer MARK I kits (Optional Supplemental Protocol) as "buddy aid"

### Pilot Protocol (requires application and approval by MIEMSS)

1. Pelvic Stabilization/ Binder Technique for Suspected Pelvic Fracture Procedure

Remember, it is the responsibility of each provider to review the 2009 material to ensure he/she is familiar with the revisions. If you have any questions regarding the update, please contact the Office of the State EMS Medical Director at 410-706-0880. Thank you for your hard work and dedication.

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## I. GENERAL INFORMATION

### A. GENERAL PROVISIONS

The goal of prehospital emergency medical services is to deliver a viable patient to appropriate definitive care as soon as possible. Optimal prehospital care results from a combination of careful patient assessment, essential prehospital emergency medical services, and appropriate medical consultation.

The Maryland Medical Protocols were developed to standardize the emergency patient care that EMS providers, through medical consultation, deliver at the scene of illness or injury and while transporting the patient to the closest appropriate hospital. These protocols will help EMS providers anticipate and be better prepared to give the emergency patient care ordered during the medical consultation.

Maryland has highly trained and dedicated basic and advanced life support personnel who may need on-line medical consultation only for complicated or extended resuscitative patient care. These protocols are a form of “standing orders” for emergency patient care intervention in a patient who has a life-threatening illness or injury. It remains the responsibility of the EMT-B, CRT-(I), or EMT-P to obtain on-line medical consultation when appropriate. If it is genuinely impossible or inappropriate (i.e., when rendering emergency care to a patient who has a life-threatening injury or medical condition) to obtain on-line medical consultation, the EMT-B/CRT-(I)/EMT-P may render emergency patient care in accordance with these protocols in an effort to save a patient’s life or limb. Whenever such emergency life-saving patient care is rendered, the EMT-B/CRT-(I)/EMT-P must document the treatment rendered and the reason on-line medical consultation could not be obtained on the Patient Care Report (PCR), the equivalent of the MAIS runsheet, and on an additional narrative. In addition, the “exceptional call” area on the PCR must be marked, and the provider must immediately notify the EMS Jurisdiction. The EMS Jurisdiction must notify the State EMS Medical Director within 5 days of the incident. This general provision applies throughout these protocols. **(NEW '09)**

Requests for additions, deletions, or exceptions must be submitted through the State EMS Medical Director’s Office of the Maryland Institute for Emergency Medical Services Systems.



THE GENERAL PATIENT CARE SECTION AND THE ALGORITHMS MUST BE FOLLOWED IN THE SPECIFIC SEQUENCE NOTED.

FOR ALL OTHER TREATMENT PROTOCOLS, THE LETTER AND NUMERICAL OUTLINE FORMAT IS STRICTLY FOR RAPID AND UNIFORM REFERENCE AND DOES NOT IMPLY OR DIRECT A MANDATORY SEQUENCE FOR PATIENT CARE.



IF A FIRST RESPONDER IS DISPATCHED AS AN EMS UNIT, OR FOR PURPOSES RELATED TO MEDICAL ASSISTANCE, OXYGEN AND AED TREATMENT MAY BE UTILIZED, WHEN APPROPRIATE AND APPLICABLE, PROVIDED THE FIRST RESPONDER IS JURISDICTIONALLY AUTHORIZED TO USE AN AED AND/OR THE FIRST RESPONDER HAS BEEN EDUCATED AND TRAINED TO PROVIDE OXYGEN AND/OR AED THERAPY.

THE FIRST RESPONDER SHALL DOCUMENT ALL PATIENT CARE.

- (3) With on-line medical consultation.
- c) Administer oxygen as appropriate.
  - (1) Administer oxygen at 12-15 lpm NRB mask to all priority 1 patients (including COPD).
  - (2) Administer oxygen at 12-15 lpm NRB to all priority 2 patients (including COPD) experiencing cardiovascular, respiratory, or neurological compromise.
  - (3) Administer oxygen at 2-6 lpm by nasal cannula or 6-15 lpm mask delivery device to ALL other priority 2 patients and priority 3 patients with no history of COPD.
  - (4) Priority 3 patients, with a history of COPD or patients with chronic conditions, should receive their prescribed home dosage of oxygen. If patients are not on home oxygen, they should receive oxygen at 2-6 lpm nasal cannula or 6 lpm mask delivery device, if indicated.



NEVER WITHHOLD OXYGEN FROM A PATIENT IN RESPIRATORY DISTRESS!

DEVICE	FLOW RATE	CONCENTRATION
Nasal Cannula	2-6 lpm	28-44%
Venturi Mask	Variable	24-50%
Partial Rebreather Mask	6-10 lpm	35-60%
Simple Face Mask	6-10 lpm	35-60%
Pocket Mask	12-15 lpm	50-60%
Non-Rebreather Mask	12-15 lpm	80-100%
Bag-Valve-Mask	12-15 lpm	90-100%

4. Circulation

- a) Assess pulse.
  - (1) Patients less than 1 year of age:
    - (a) If pulse is absent, begin CPR and use manual defibrillator.
    - (b) If patient is symptomatic with poor perfusion (unresponsive or only responds to painful stimuli) and pulse is less than 60 bpm:
      - (i) Ventilate for 30 seconds.
      - (ii) If after 30 seconds, the pulse is less than 60 bpm, begin CPR.
    - (c) If pulse greater than 60 bpm, continue assessment.
  - (2) Patients greater than 1 year but who have not reached their 12<sup>th</sup> **(NEW '09)** birthday.
    - (a) If pulse is absent, use AED/manual defibrillator or begin CPR.
    - (b) If patient is symptomatic with poor perfusion (unresponsive or responds only to painful stimuli) and pulse is greater than 60 bpm:

- (i) Ventilate for 30 seconds.
- (ii) If after 30 seconds, the pulse is less than 60 bpm, begin CPR.
- (c) If pulse greater than 60 bpm, continue assessment.
- (3) Patients 12 year of age or older:
  - (a) If pulse is absent, use AED/manual defibrillator or begin CPR.
  - (b) If pulse is present, continue assessment.
- b) Assess for and manage profuse bleeding.
- c) Assess skin color, temperature, and capillary refill.

5. Disability

- a) Perform Mini-Neurologic Assessment (Pulse/Motor/Sensory).
- b) Cervical Spine Immobilization
  - (1) The provider shall determine the appropriate device for use in spinal immobilizing the patient. Infant or child car seats may NOT be used as a spine immobilization device for the pediatric patient.
  - (2) If patient presents with a traumatic mechanism which could cause cervical spine injury and meets ANY of the following criteria, complete Spinal Immobilization (C-spine and back maintaining neutral alignment and padding when appropriate) should occur.
    - (a) History of Loss of Consciousness (LOC) or Unconscious?
    - (b) Disoriented or altered LOC?
    - (c) Suspected use of Drugs or Alcohol?
    - (d) Midline Cervical Tenderness or Pain?
    - (e) Focal Neurologic Deficit?
    - (f) Has a painful distracting injury that could mask cervical pain or injury?
    - (g) Child less than 8 years of age
  - (3) If NO to all of the above, transport as appropriate.



IF PATIENT IS UNABLE TO COMMUNICATE OR APPROPRIATELY RESPOND TO THE ABOVE QUESTIONS, PERFORM A COMPLETE SPINAL IMMOBILIZATION.

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. **(NEW '09)**
- 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. **(NEW '09)**
- 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.

- b) Priority 2 patients shall be triaged according to the Maryland Medical Protocols to the closest appropriate hospital-based emergency department, designated trauma or designated specialty referral center unless otherwise directed by EMS System medical consultation.
  - c) Stable priority 3 or 4 patients who do not need a time critical intervention may also be transported to the local emergency department or freestanding medical facility.
2. Mode of transport (air, land, water, etc.)
- a) Medevac patients with indications for specialty referral center should be flown to the appropriate type of specialty center if not more than 10-15 minutes further than the closest trauma center. (Patients with an airway, breathing, or circulatory status who would be jeopardized by going an additional 10-15 minutes should go to the closest trauma center.)
  - b) Consider utilization of a helicopter when the patient's condition warrants transport to a trauma or specialty referral center and the use of a helicopter would result in a clinically significant reduction in time compared with driving to a trauma/specialty center.

ALL REQUESTS FOR SCENE HELICOPTER TRANSPORTS SHALL BE MADE THROUGH SYSCOM. FOR TRAUMA DECISION TREE CATEGORY "C" OR "D", RECEIVING TRAUMA CENTER MEDICAL CONSULTATION REQUIRED WHEN CONSIDERING WHETHER HELICOPTER TRANSPORT IS OF CLINICAL BENEFIT. **(NEW '09)**

- c) If the time of arrival at the trauma or specialty referral center via ground unit is less than 30 minutes, there will generally not be a benefit in using the helicopter, especially for Trauma Decision Tree classes "C" and "D".
- d) Refer to the trauma decision tree when considering use of aeromedical transport. Provide SYSCOM with the patient's Category (A, B, C, or D).
- 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 trauma 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 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 (NEW '09)**

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

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

\* Based on the medication or procedure as listed in the protocol pages 144-147

ALS providers may only terminate their EMS provider-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 Provider with a lower scope of practice.

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

Providers will relay assessment findings and treatment provided to the individual(s) assuming responsibility for the patient(s).

**K. DOCUMENTATION**

A Patient Care Report (PCR) will be completed for each incident/patient as per local jurisdictional and State requirements.

**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.



## B. ALTERED MENTAL STATUS: SEIZURES

1. Initiate General Patient Care.

2. Presentation

Seizures are a neuromuscular response to an underlying cause such as: epilepsy, hypoxia, hypoglycemia, hypoperfusion, head injury, CVA, alcohol or drug abuse. Consider recent history of possible illness, infection, fever, or stiff neck.



DO NOT ATTEMPT TO FORCE ANY DEVICE INTO THE PATIENT'S MOUTH IF THE PATIENT IS STILL SEIZING.

3. Treatment



a) If the patient is still seizing:

- (1) DO NOT RESTRAIN.
- (2) Protect patient from further injury.
- (3) Consider cause of seizure activity.

b) When seizure activity has stopped:


- (1) Identify and treat injuries.
- (2) If patient is a known diabetic, glucose paste (10-15 grams) should be administered between the gum and cheek.



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c) Initiate IV LR KVO.

d) Use glucometer and treat accordingly.

e)  Consider midazolam (Paramedic may perform without consult for patients with active seizures.)  
0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg  
(Reduce by 50% for patients 69 years or older)  
If IV unavailable, 5 mg IM may be administered  
Additional doses up to a maximum total dose 10 mg require medical consultation for all providers  
If patient is in status, consider IO administration of midazolam  
If suspected severe nerve agent exposure, providers may administer midazolam 5 mg IM or diazepam (CANA) without medical consultation. **(NEW '09)**

## ALTERED MENTAL STATUS: SEIZURES (Continued)




- f) If the patient is still seizing:
  - (1) DO NOT RESTRAIN.
  - (2) Protect from further injury.
  - (3) Consider underlying cause of seizure.
- g) When seizure activity has stopped:
  - (1) Identify and treat any injuries.
  - (2) If patient is a known diabetic, glucose paste (10-15 grams) should be administered between the gum and cheek.



- 
- h) Initiate IV/IO.
  - i) Use glucometer and treat accordingly.
  - j) Administer fluid bolus, if appropriate  
20 mL/kg of LR IV/IO



FOR A CHILD ACTIVELY SEIZING, ADMINISTER MIDAZOLAM IM AND RESERVE IO FOR LIFE -THREATENING ILLNESS. **(NEW '09)**

- k) The paramedic may assist patients with the administration of their prescribed benzodiazepine.
- l)  Consider midazolam for seizures lasting greater than 10 minutes (Paramedic may perform without consult for patients with active seizures.)
  - 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes
  - Maximum total dose 5 mg
  - If IV unavailable, administer 0.2 mg/kg IM
  - Maximum single dose 5 mg
  - Additional doses up to a maximum total dose 5 mg require medical consultation for all providers.
  - If patient is in status, consider IO administration of midazolam.
  - If suspected severe nerve agent exposure, providers may administer midazolam as above or diazepam (CANA) without medical consultation. **(NEW '09)**

4. Continue General Patient Care.

## C. ALTERED MENTAL STATUS: UNRESPONSIVE PERSON

1. Initiate General Patient Care.

2. Presentation

Patients may exhibit confusion, focal motor sensory deficit, unusual behavior, unresponsiveness to verbal or painful stimulus.



ALCOHOL CAN CAUSE ALTERED MENTAL STATUS BUT IS NOT COMMONLY A CAUSE OF TOTAL UNRESPONSIVENESS TO PAIN.



3. Treatment

a) Obtain pulse oximetry, if available.

b) Administer glucose paste (10-15 grams) between the gum and cheek.



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c) Initiate IV LR fluid therapy 20 mL/kg bolus.  
Titrate to a systolic pressure of 100 mm Hg.

d) Consider obtaining blood sample using closed system.


e) **If patient has constricted pupils and respiratory depression or is unresponsive and the provider strongly suspects a narcotic overdose,**


Administer naloxone

0.4 - 2 mg SLOW IVP/IO/IM/Intranasal (If delivery device is available)

Titrate to adequate respiratory effort.

f) Use glucometer and treat accordingly.

g)  Consider an additional dose of naloxone.

h)  Consider additional fluid administration  
Maximum 2,000 mL without medical consultation.

## ALTERED MENTAL STATUS: UNRESPONSIVE PERSON (Continued)





- i) Obtain pulse oximetry if available.
- j) Administer glucose paste (10-15 grams) between the gum and cheek.



- 
- k) Initiate IV/IO KVO.
    - (1) 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 IV/IO.  
**OR**  
For volume-sensitive children administer initial fluid bolus of 10 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 10 mL/kg LR IV/IO.

Volume-sensitive children include: neonates (0-28 days), children with congenital heart disease, chronic lung disease, or chronic renal failure.

- (2) Consider obtaining blood sample using closed system.
- l) Use glucometer and treat accordingly.
- m) **If patient has constricted pupils and respiratory depression or is unresponsive and the provider strongly suspects a narcotic overdose,**  
Administer Naloxone  
0.1 mg/kg SLOW IVP/IO/IM/Intranasal (If delivery device is available)  
Maximum dose 0.4-2 mg
- n)  Consider repeating Naloxone.
- o)  Third and subsequent fluid boluses at 20 mL/kg IV/IO except in volume-sensitive children, then bolus at 10 mL /kg.

4. Continue General Patient Care.

## BEHAVIORAL EMERGENCIES (Continued)



- 
- d) Initiate IV LR KVO, if appropriate.
  - e) Consider Chemical Restraint
4. Continue General Patient Care.

## F. CARDIAC EMERGENCIES: CARDIAC GUIDELINES



1. The following algorithmic and standard formatted sections pertain to cardiac emergencies. Several guidelines apply to all algorithms when assessing and treating cardiac patients. These guidelines are:
  - a) When the patient's condition changes, indicating the transition to a new treatment algorithm, the new treatment shall take into account prior therapy (e.g., previously administered medications).
  - b) As BLS/ALS guidelines indicate, definitive airway control is preferable, and if this can be achieved, along with other initial interventions, then the earlier the better. However, defibrillation is more important initially if the patient can be ventilated without intubation.
  - c) Cardiac Arrest Modifications:
    - (1) For **witnessed** cardiac arrest by EMS provider, immediately start CPR and apply AED or manual defibrillator as soon as possible; shock if indicated.

The goal is to defibrillate as soon after stopping CPR as possible (ideally for manual defibrillator in less than 5 seconds).  
After single shock, immediately restart CPR (do not perform pulse or ECG rhythm check) for 5 cycles, then assess for pulse and rhythm and apply single shock if indicated. Repeat this sequence of single shocks and 5 cycles of CPR.



SOME AEDs MAY NOT CURRENTLY DELIVER THE REFERENCED JOULE SETTING NOR ALLOW FOR SINGLE SHOCK DELIVERY. THE AED INDUSTRY WILL BE IMPLEMENTING THESE CHANGES OVER TIME WHICH WILL BE A MULTI-YEAR PROCESS. WHEN IN DOUBT FOLLOW THE AED PROMPT.

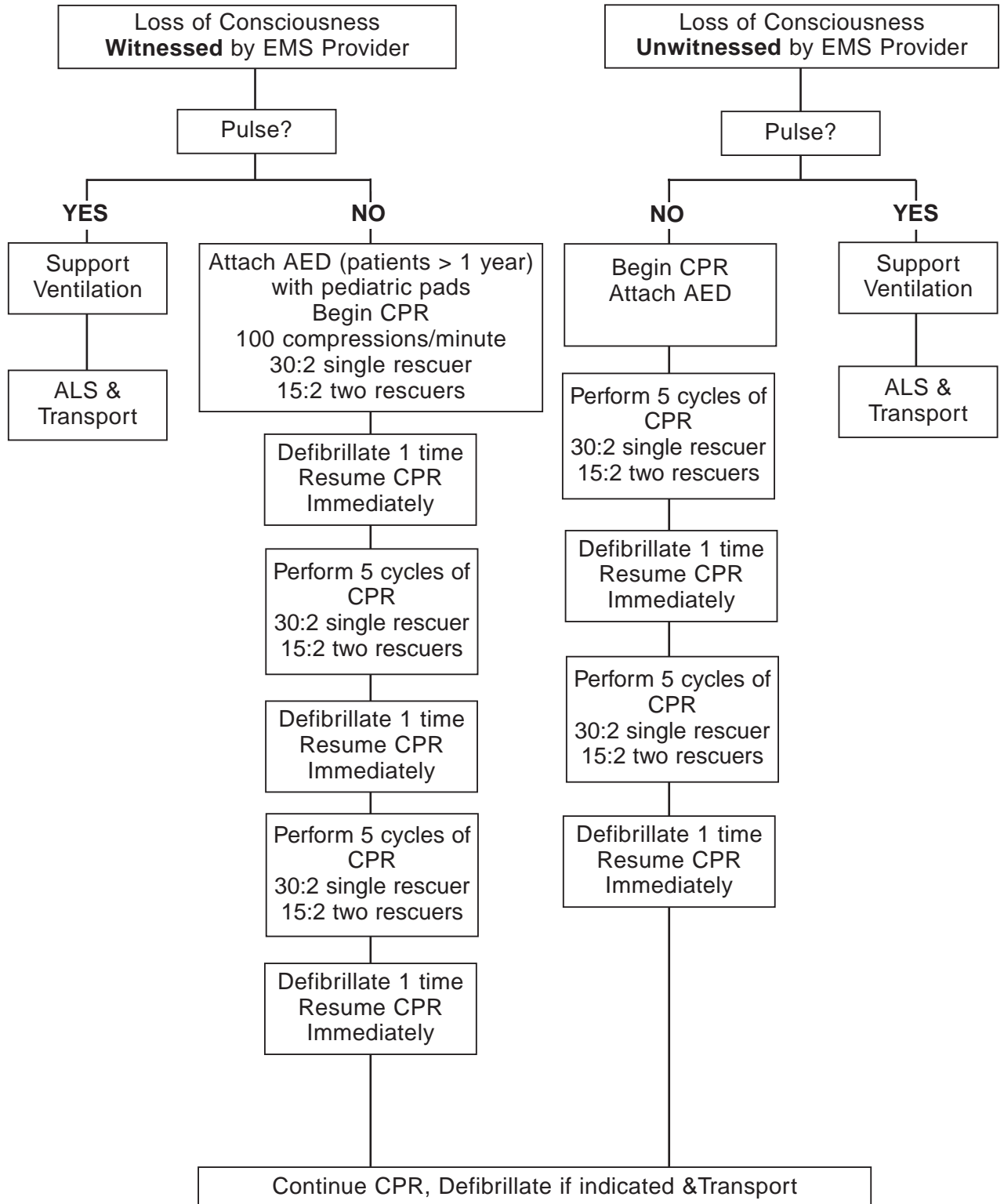
- (2) For all **unwitnessed** cardiac arrest without CPR in progress, EMS should first perform 5 cycles of CPR, then apply AED or manual defibrillator while performing CPR. Then perform as in c) (1) above.



- 
- d) If unable to initiate an IV or perform endotracheal intubation within 5 minutes, continue with appropriate care and transport the patient as soon as possible to the appropriate hospital. Further attempts to initiate IV therapy or endotracheal intubation should be accomplished while en route to the receiving hospital.
    - e) Only in the pediatric or neonatal arrest situation, naloxone, atropine, epinephrine, and lidocaine 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, atropine, and lidocaine and ten times the IV dose for epinephrine (1:1,000). All ET medications shall be diluted in 5 mL of Lactated Ringer's for pediatric patients. **(NEW '09)**

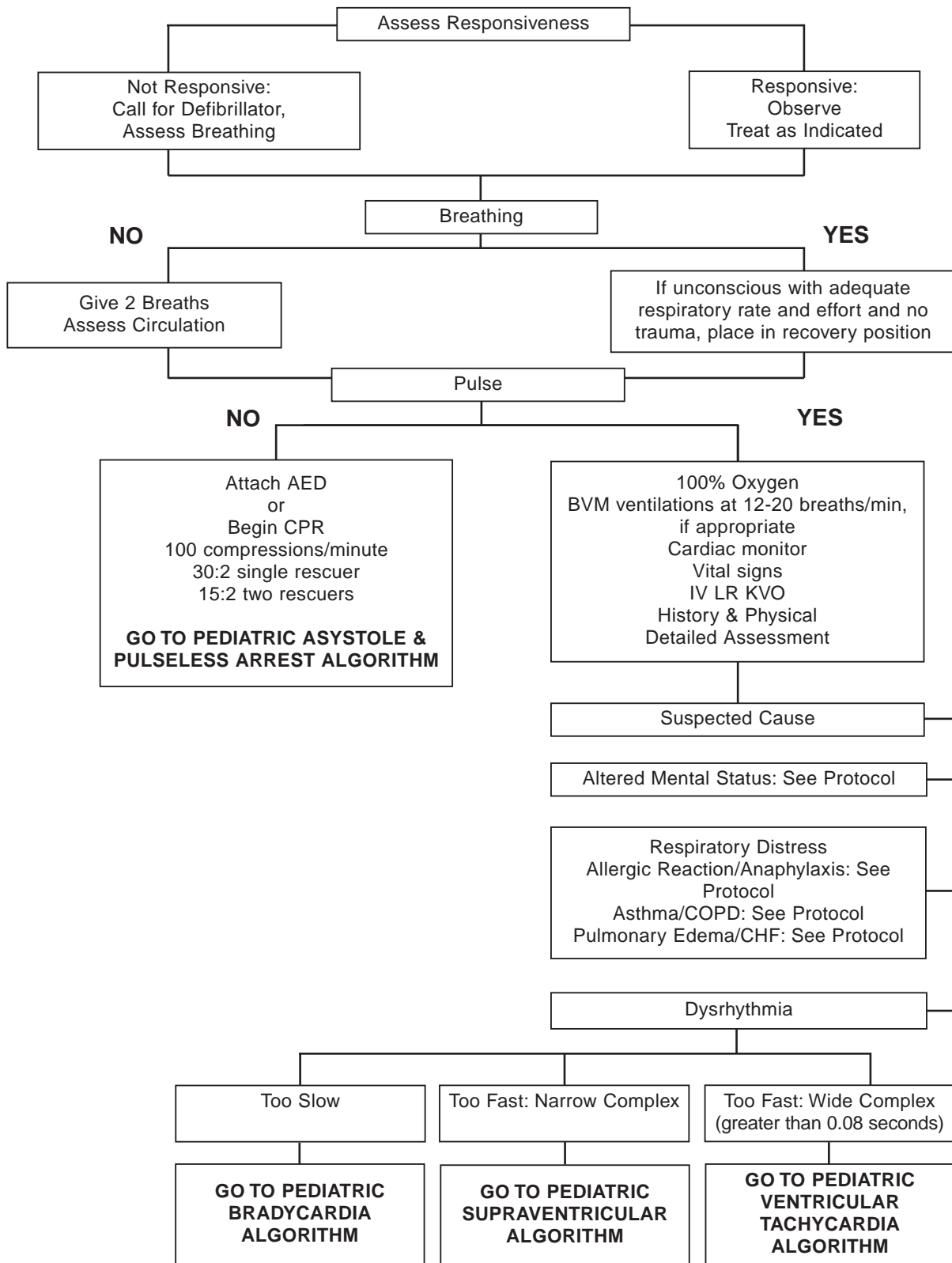


4. **UNIVERSAL ALGORITHM FOR PEDIATRIC (LESS THAN 12 YEARS OF AGE) (NEW '09)  
EMERGENCY CARDIAC CARE FOR BLS  
(If newborn, refer to Newly Born Protocol)**





5. **UNIVERSAL ALGORITHM FOR PEDIATRIC (LESS THAN 12 YEARS OF AGE) (NEW '09)**  
**EMERGENCY CARDIAC CARE FOR ALS**  
(If newborn, refer to Newly Born Protocol)





## G. CARDIAC EMERGENCIES: BRADYCARDIA

1. Initiate General Patient Care.

2. Presentation

Patient may present with a slow heart rate and chest pain, shortness of breath, decreased level of consciousness, hypotension, hypoperfusion, pulmonary congestion, congestive heart failure, and/or acute myocardial infarction.



3. Treatment

a) Place patient in position of comfort.

b) Assess and treat for shock, if indicated.

c) Constantly monitor airway and reassess vital signs every 5 minutes.





---

d) Initiate IV LR KVO.

e) If patient is hemodynamically unstable: Initiate Transcutaneous Pacing. (CRT-(I) & EMT-P only)

f) If transcutaneous pacing is unsuccessful or not available, administer atropine:  
0.5 - 1 mg IVP  
Atropine should be given in repeat doses in 3–5 minute intervals up to a total of 0.04 mg/kg

g)  Consider dopamine  
2-20 mcg/kg/minute.

h)  If patient is hemodynamically stable and in Type II, second-degree AV Block or third-degree AV Block:

(1) Consider/Prepare for Transcutaneous Pacing. (CRT-(I) & EMT-P only)

(2) If patient develops discomfort with TCP  
Consider morphine 1-2 mg/min IVP. (Paramedic may perform without consult.)

**OR**

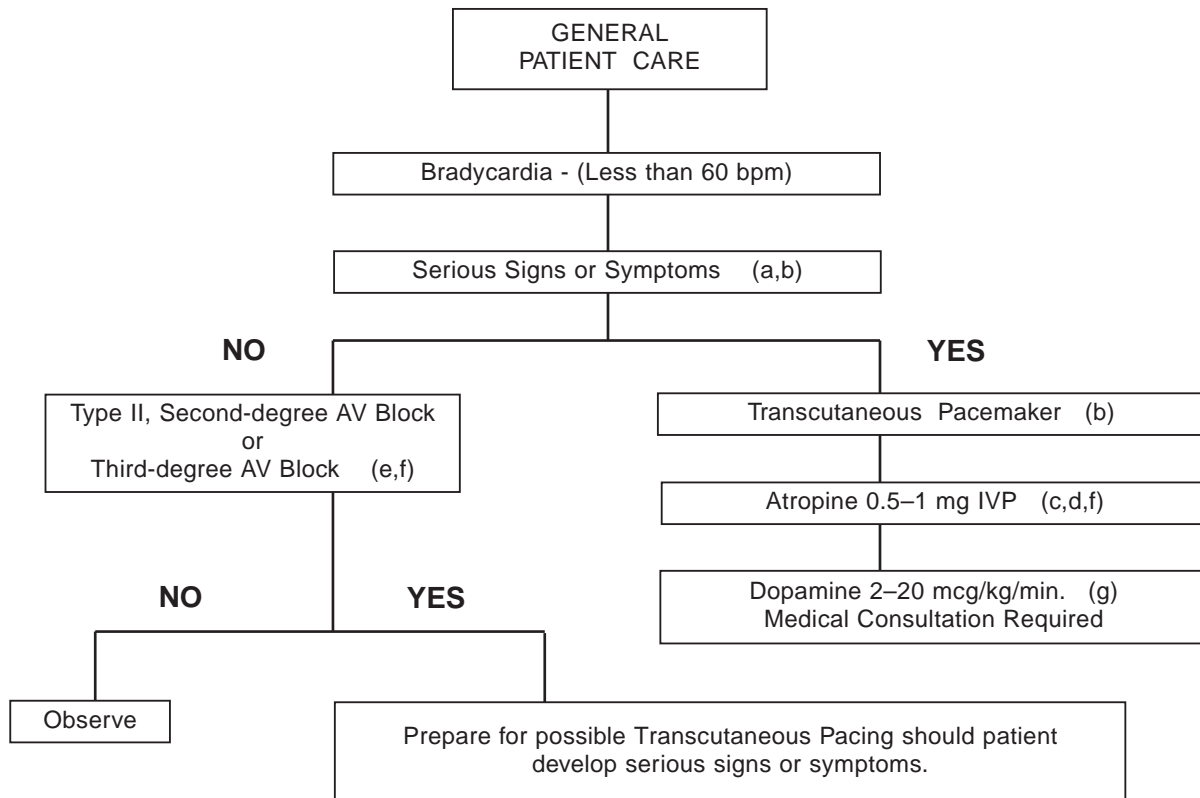
Consider midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg. (Reduce by 50% for patients 69 years or older.) **(NEW '09)**

i) Refer to appropriate algorithm.



4.

### ADULT BRADYCARDIA ALGORITHM

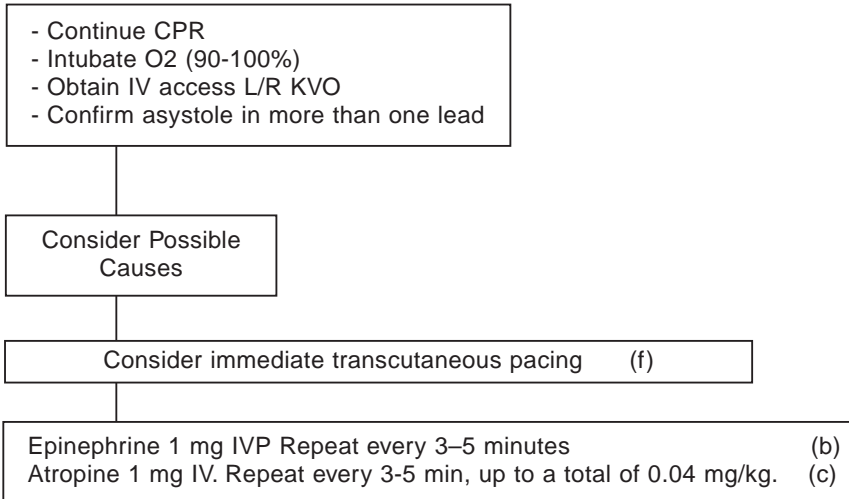


- (a) - Serious signs and symptoms must be related to the slow rate. Signs and symptoms may include chest pain, shortness of breath, decreased level of consciousness, hypotension, hypoperfusion, pulmonary congestion, CHF, and/or AMI.
- (b) - Do not delay TCP (CRT-I) & EMT-P only) while awaiting IV or atropine to take effect if the patient is symptomatic, or if patient is provider-witnessed asystole.
- (c) - Denervated transplanted hearts will not respond to atropine. Go at once to TCP. (CRT-I) & EMT-P only).
- (d) - Atropine shall be given in repeat doses in 3-5 minute intervals up to a total of 0.04 mg/kg. Medical consultation required. Consider shorter intervals in severe clinical conditions. Atropine shall be used with caution in AV block at the His-Purkinje level (Type II AV block and new third-degree block with wide QRS complexes).
- (e) - **Never** treat third-degree AV block or ventricular escape beats with lidocaine.
- (f) - In the presence of Mobitz II and third-degree AV block, medical consultation is required for atropine administration.
- (g) - Requires medical consultation for administration of dopamine. Adults: titrate to systolic BP 100 mm Hg or medical consultation directed BP. IV infusion pump is preferred.



4.

## ADULT ASYSTOLE ALGORITHM



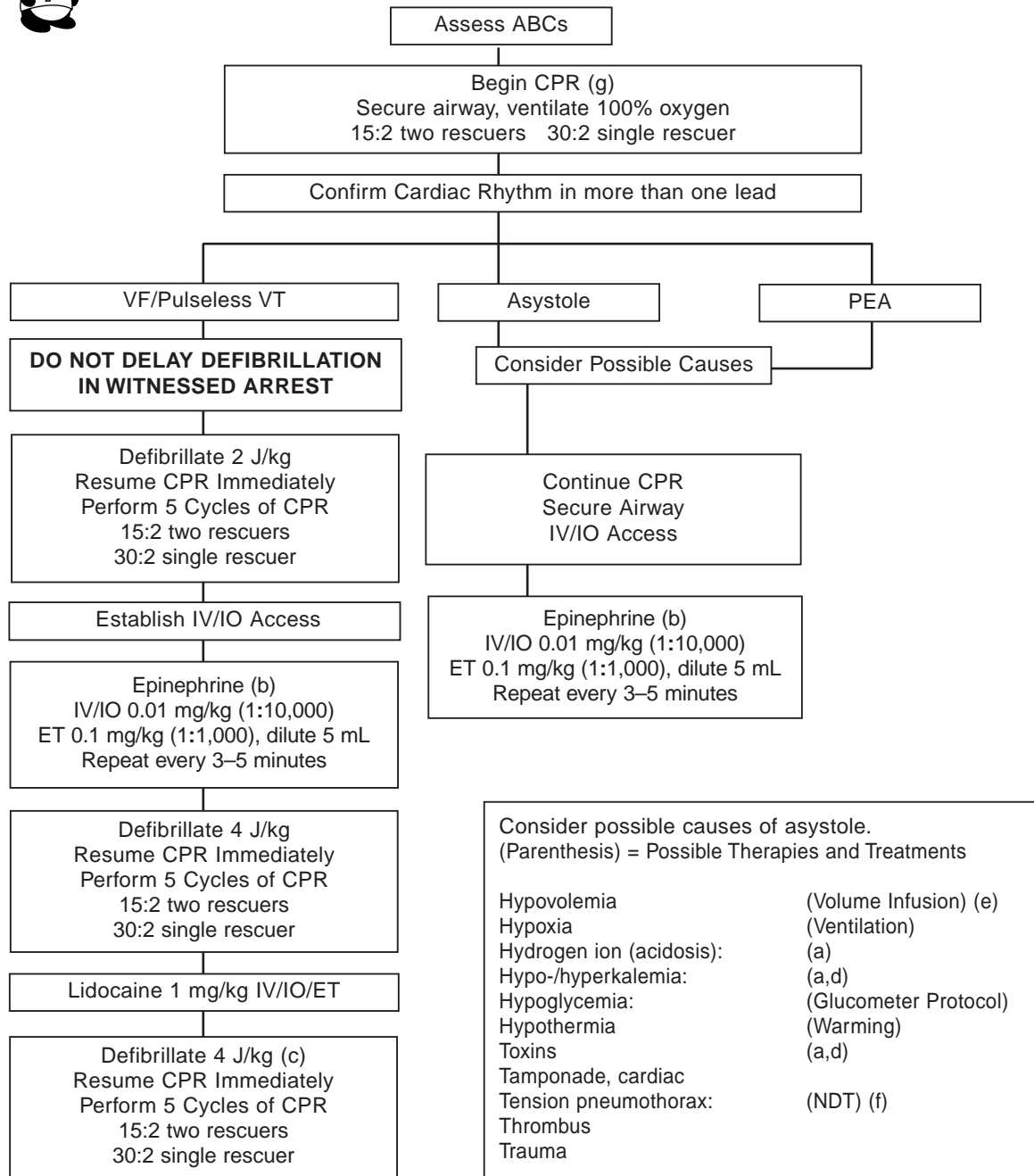
Consider possible causes of asystole.  
(Parenthesis) = Possible Therapies and Treatments

Hypovolemia	(Volume Infusion) (e)
Cardiac Tamponade	(Volume Infusion) (e)
Tension Pneumothorax	(Needle Decompression Thorocostomy–NDT) (g)
Massive Pulmonary Embolism	
Massive AMI	
Drug Overdose	(a,d)
Hypoxia	(Ventilation)
Hypothermia	(Warming)
Acidosis	(a)
Hyperkalemia	(a,d)

- (a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.
- (b) - The recommended dose for epinephrine is 1 mg IVP every 3-5 minutes. **(NEW '09)**
- (c) - Shorter atropine dosing intervals are acceptable, possibly helpful in asystolic arrest.
- (d) - Calcium Chloride, 0.5-1 gram IVP, with medical consultation. See calcium chloride.
- (e) - Volume infusion is 20 mL/kg.
- (f) - Do not delay TCP if patient is provider-witnessed asystole. (CRT-(I) & EMT-P only)
- (g) - NDT for CRT-(I) and EMT-P only.



## 5. PEDIATRIC ASYSTOLE & PULSELESS ARREST ALGORITHM



- (a) - Sodium bicarbonate, 1 mEq/kg, with medical consultation. See sodium bicarbonate.
- (b) - Neonates (0-28 days), epinephrine ET 0.03 mg/kg (1:10,000) dilute with 1 mL.
- (c) - Alternate: lidocaine, defibrillate, then epinephrine, defibrillate.
- (d) - Calcium Chloride, 20 mg/kg (0.2 mL/kg) slow IVP/IO (50 mg/min). Max dose 1 gram.
- (e) - Volume infusion for neonates and volume sensitive children, 10 mL/kg; for infant and child 20 mL/kg.
- (f) - NDT for CRT-(I) and EMT-P only.
- (g) - For patients in unwitnessed cardiac arrest 5 cycles of CPR should be completed prior to defibrillation.

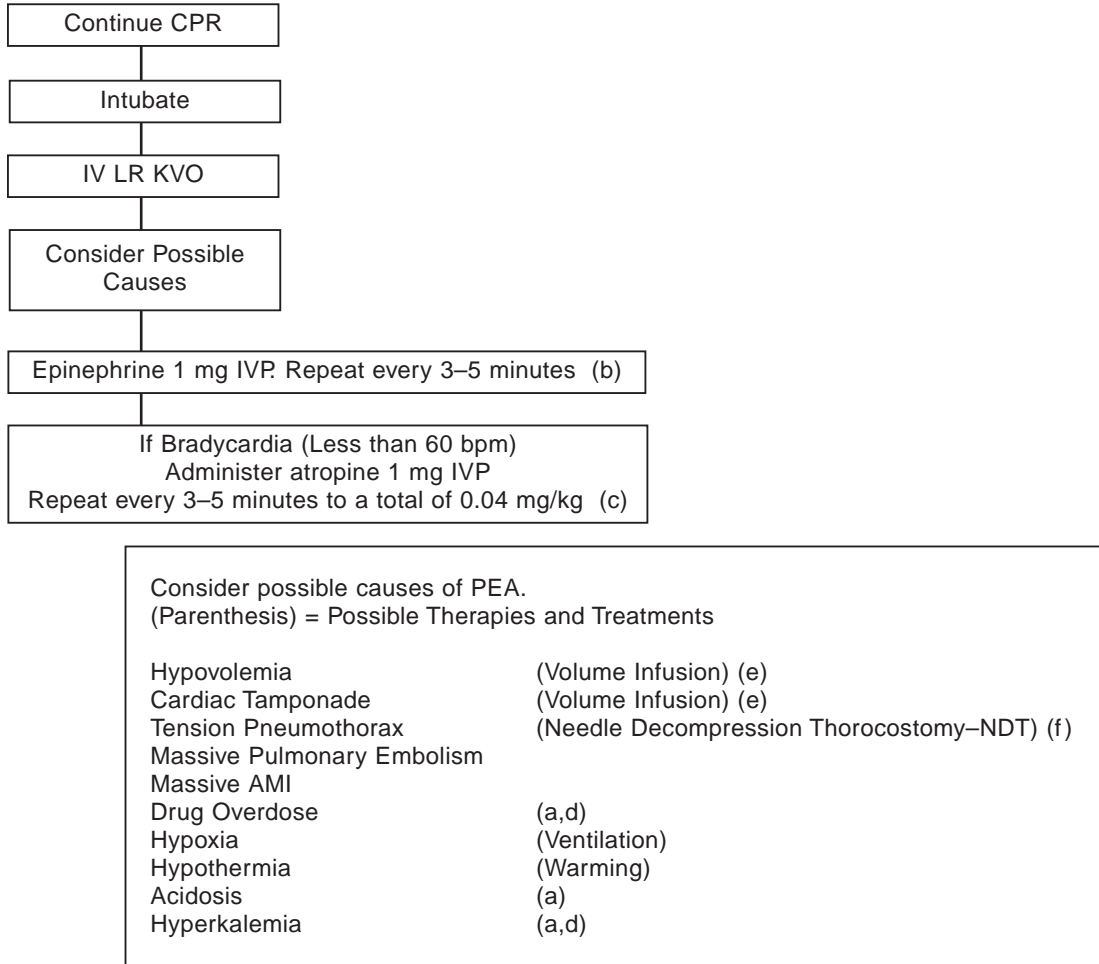


6.

## PULSELESS ELECTRICAL ACTIVITY (PEA) ALGORITHM

Includes:

- EMD
- Pseudo EMD
- Brady-asystolic Rhythms
- Idioventricular Rhythms
- Ventricular Escape Rhythms
- Post-defibrillation Idioventricular Rhythms

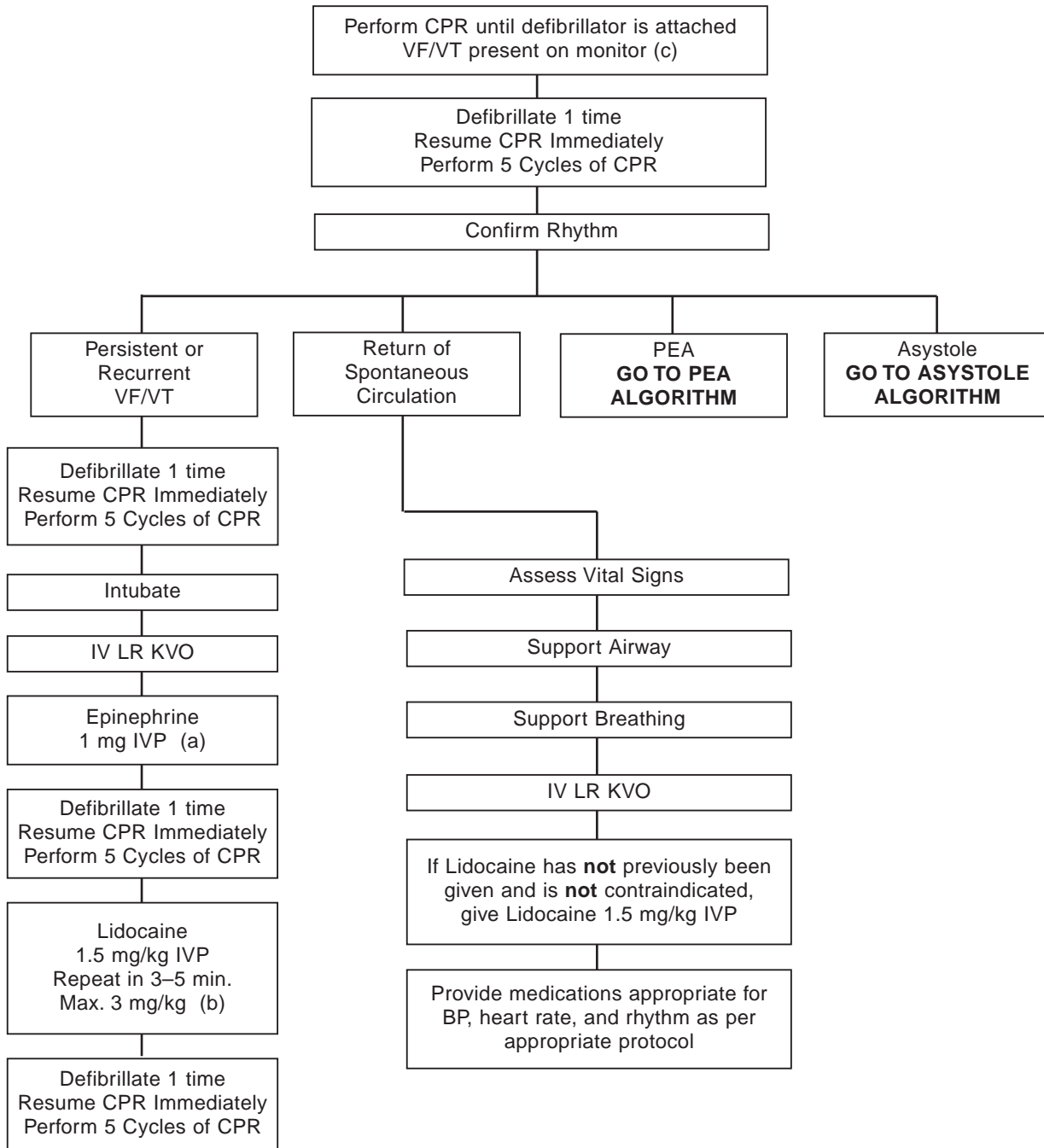


- (a) - Sodium bicarbonate 1 mEq/kg, with medical consultation. See sodium bicarbonate.
- (b) - Administer epinephrine 1 mg IVP every 3-5 minutes. **(NEW '09)**
- (c) - Shorter atropine dosing intervals are acceptable, possibly helpful in asystolic arrest.
- (d) - Calcium Chloride, 0.5-1 gram IVP, with medical consultation. See calcium chloride.
- (e) - Volume infusion is 20 mL/kg.
- (f) - NDT for CRT-(I) and EMT-P only.



7.

# VENTRICULAR FIBRILLATION PULSELESS VENTRICULAR TACHYCARDIA



(a) - The recommended dose of epinephrine is 1 mg IVP every 3-5 minutes. **(NEW '09)**

(b) - Sodium bicarbonate 1 mEq/kg, if medical consult directed. See sodium bicarbonate.

(c) - For patients in unwitnessed cardiac arrest 5 cycles of CPR should be completed prior to defibrillation.

## I. CARDIAC EMERGENCIES: CHEST PAIN/ACUTE CORONARY SYNDROME

1. Initiate General Patient Care.

2. Presentation

Chest discomfort that may radiate to the arm, shoulders, jaw, or back. Generally described as a crushing pain or toothache. May be accompanied by shortness of breath, sweating, nausea, or vomiting.



ACUTE CORONARY SYNDROME (ACS) IS DEFINED AS PATIENTS PRESENTING WITH ANGINA OR ANGINAL EQUIVALENTS SUCH AS CHEST, EPIGASTRIC, ARM, OR JAW PAIN OR DISCOMFORT AND MAY BE ASSOCIATED WITH DIAPHORESIS, NAUSEA, SHORTNESS OF BREATH OR DIFFICULTY BREATHING.

3. Treatment




- a) Place patient in position of comfort.
- b) Assist patient with administration of patient's own prescribed nitroglycerin. May be repeated in 3-5 minutes if chest pain persists, blood pressure is greater than 90 mm Hg, and pulse is greater than 60 bpm. Maximum three doses total (patient and EMT-B assisted).
- c) Assess and treat for shock if indicated.
- d) Constantly monitor airway and reassess vital signs every 5 minutes.



NITROGLYCERIN IS CONTRAINDICATED FOR ANY PATIENT HAVING TAKEN MEDICATION FOR ERECTILE DYSFUNCTION (eg, VIAGRA™, LEVITRA™, OR CIALIS™) WITHIN THE PAST 48 HOURS. MEDICAL CONSULTATION IS REQUIRED TO OVERRIDE THIS CONTRAINDICATION.



IF THE PATIENT'S BLOOD PRESSURE DROPS MORE THAN 20 mm Hg AFTER ADMINISTRATION OF NITROGLYCERIN, OBTAIN MEDICAL CONSULTATION BEFORE FURTHER ADMINISTRATION.

- e)  Additional doses of nitroglycerin require medical consultation.



- 
- f) Initiate IV LR KVO.
  - g) Shall perform a 12 lead ECG for patients with ACS. (If trained, providers may perform a 15 lead ECG.)
  - h) If patient has a prescription or previous history of nitroglycerin use, administer nitroglycerin: 0.4 mg SL. May be repeated if symptoms persist, and BP is greater than 90 mm Hg, and pulse is greater than 60 bpm, to a maximum dose of 1.2 mg.

## CARDIAC EMERGENCIES: CHEST PAIN/ACUTE CORONARY SYNDROME (Continued)

- i) If patient does **not** have a prescription or previous history of nitroglycerin use, an IV must be established prior to administration; then administer nitroglycerin as above.
- j) If IV cannot be established, nitroglycerin may be administered with medical consultation.
- k) Identify rhythm and treat according to appropriate algorithm.
- l)  Administer additional doses of nitroglycerin.
- m)  Consider morphine sulfate.  
2-10 mg slow IV/IM/IO  
Administer 1-2 mg/min
- n) Consider aspirin 324 mg or 325 mg chewed, if acute myocardial infarction is suspected.



CONSULT A PEDIATRIC BASE STATION FOR CHILDREN (WHO HAVE NOT REACHED THEIR 15<sup>TH</sup> BIRTHDAY) WITH CHEST PAIN WITH ASSOCIATED DYSRHYTHMIAS, CARDIAC DISEASE, OR BLUNT CHEST TRAUMA.  
**(NEW '09)**

- 4. Continue General Patient Care.



## J-1. CARDIAC EMERGENCIES: IMPLANTABLE CARDIOVERTER DEFIBRILLATOR (ICD) MALFUNCTION (NEW '09)

1. Initiate General Patient Care.

2. Presentation

An implantable cardioverter defibrillator (ICD) is a device that delivers an internal defibrillation (shock) whenever the patient's heart rhythm/rate exceeds defined limits. EMS providers may encounter ICD devices which are appropriately or inappropriately delivering shock therapy. Internal shocks cause patient discomfort but **DO NOT** pose a danger to EMS personnel even when in direct contact with patient receiving an internal shock.



3. Treatment

- a) Place patient in position of comfort.
- b) Assess and treat for shock if indicated.
- c) Constantly monitor airway and reassess vitals every 5 minutes.



IF PATIENT IS IN CARDIAC ARREST, PERFORM CPR AND USE AED AS APPROPRIATE DESPITE THE PATIENT'S ICD WHICH MAY OR MAY NOT BE DELIVERING SHOCKS.



- 
- d) Initiate IV LR KVO.
  - e) Monitor cardiac rhythm and treat according to appropriate algorithm(s).
  - f) ICD deactivation: Patient must meet the following criteria:
    - (1) Three or more distinct shocks and
    - (2) Obvious device malfunction with an EMS provider-witnessed inappropriate shock  
(e.g., alert patient in atrial fibrillation with rapid ventricular rate or SVT)
  - g) Place an EMS donut magnet directly over device. Magnet placed directly over will deactivate device and shocks will not be delivered. After defibrillator is deactivated, tape magnet firmly in place and treat according to the appropriate algorithm(s).




IF THE PATIENT HAS A COMBINATION ICD AND PACEMAKER, DEACTIVATING THE ICD MAY OR MAY NOT DEACTIVATE THE PACEMAKER.

- h) Regardless of the decision to deactivate the ICD device, be prepared to manage the underlying rhythm (e.g., treat wide complex tachycardia with cardioversion or lidocaine per protocol as appropriate).




IF PATIENT BECOMES UNSTABLE OR IN THE EVENT OF A RHYTHM CHANGE WHERE A SHOCK IS DESIRED, REMOVE THE MAGNET TO REACTIVATE THE ICD. IF REACTIVATION DOES NOT OCCUR, USE MANUAL DEFIBRILLATOR IN ACCORDANCE WITH TACHYCARDIA PROTOCOL.

CONTINUE CHEST COMPRESSIONS FOR PEDIATRIC PATIENTS WHO REMAIN POORLY PERFUSED DESPITE PACEMAKER CAPTURE.

- i)  If ICD deactivation indications are questionable or deactivation is unsuccessful (or a donut magnet is not available) and undesired shocks continue, medications may be administered for patient comfort.
  - (1) Consider morphine sulfate. (Paramedics may administer without consultation.)  
Rate of administration 1-2 mg/min  
**OR**
  - (2) Midazolam 0.1 mg/kg (2-5 mg) slow IVP/IM/IO (Paramedics may administer without consultation.)  
IM administration requires all providers to obtain consultation.
- j) Transport to the closest appropriate facility.
- k) Continue general patient care.



Consult a pediatric base station for children (who have not reached their 15<sup>th</sup> birthday) with an ICD device delivering shock therapy or malfunctioning.

- l)  If ICD deactivation indications are questionable or deactivation is unsuccessful (or a donut magnet is not available) and undesired shocks continue, medications may be administered for patient comfort.
  - (1) Morphine sulfate 0.1 mg/kg IV/IO/IM  
**OR**
  - (2) Midazolam 0.1 mg/kg slow IV/IO over 1-2 minutes. Maximum single IV/IO dose 2 mg. Maximum total dose 5 mg. If IV cannot be established, administer 0.2 mg/kg IM. Max single IM dose is 5 mg. (IM requires all providers to obtain medical consultation.)  
Maximum total dose 5 mg.
- m) Transport to the closest appropriate facility.
- n) Continue general patient care.

## NEWLY BORN PROTOCOL (Continued)

Consider possible causes of depressed newborn.  
(Parenthesis) = Possible Therapies and Treatments

Respiratory depression	(b,c)
Hypoglycemia	(d)
Hypothermia	(Warming)
Hypovolemia	Volume Infusion (e)

- (a) - Deep tracheal suctioning before many spontaneous respirations have occurred is only indicated when the newborn is not vigorous after delivery.
- (b) - Premature infants less than 32 weeks gestation will likely require ongoing BVM ventilations due to immature lungs.
- (c) - Naloxone 0.1 mg/kg ET/IV/IO.
- (d) - D10W 5 -10 mL/kg IV/IO (D10W is prepared by mixing one part of D50W with four parts LR).
- (e) - Volume infusion is 10 mL/kg.
- (f) - Neonates (0-28 days), epinephrine ET 0.03 mg/kg (1:10,000) dilute with 1 mL.

## L. CARDIAC EMERGENCIES: PREMATURE VENTRICULAR CONTRACTIONS (PVCs)

1. Initiate General Patient Care.
2. Presentation  
Irregular heart beat of ventricular origin.
3. Treatment indications:
  - a) PVCs in the presence of cardiac symptoms that are:
    - (1) Near the "T" wave.
    - (2) Multifocal (different shape)
    - (3) Sequential or closely coupled or
  - b) Runs of Ventricular Tachycardia (5 or more consecutive beats) or ventricular tachycardia with a pulse or
  - c) Once successful electrical conversion from ventricular tachycardia or ventricular fibrillation to a supraventricular rhythm




- d) Place patient in position of comfort.
- e) Assess and treat for shock, if indicated.
- f) Constantly monitor airway and reassess vital signs every 5 minutes.



- 
- g) Initiate IV LR KVO.
  - h) Patients meeting the above criteria:
    - (1) Initial Dose: lidocaine 1-1.5 mg/kg IVP
    - (2) Follow-up Doses: lidocaine 0.5-0.75 mg/kg IVP every 5-10 minutes
    - (3) Maximum dose: 3 mg/kg IVP (**NEW '09**)



MAY BE MODIFIED BY MEDICAL CONSULTATION.

- i)  Medical consultation must be obtained for treatment of asymptomatic patients.

4. Continue General Patient Care.

## M. CARDIAC EMERGENCIES: ST ELEVATION MYOCARDIAL INFARCTION [STEMI]

1. Initiate General Patient Care.
2. Presentation



ACUTE CORONARY SYNDROME (ACS) IS DEFINED AS PATIENTS PRESENTING WITH ANGINA OR ANGINAL EQUIVALENTS SUCH AS CHEST, EPIGASTRIC, ARM, OR JAW PAIN OR DISCOMFORT AND MAY BE ASSOCIATED WITH DIAPHORESIS, NAUSEA, SHORTNESS OF BREATH OR DIFFICULTY BREATHING.

### Inclusion Criteria:

Patient presents with Acute Coronary Syndrome (ACS) symptoms and has one of the following in a diagnostic quality ECG:

- a) Anterior, Inferior, or Lateral MI: ST elevation greater than 1 mm in two or more contiguous leads **and** QRS complex is narrower than 0.12 (3 small boxes) seconds; (if wider than 0.12, you are unable to diagnose as STEMI)

### OR

- b) Posterior MI: ST depression greater than 1mm in V1 and V2 with an R/S ratio of greater than or equal to one **and** QRS complex is narrower than 0.12 (3 small boxes) seconds; (if wider than 0.12, you are unable to diagnose as STEMI)

### OR

- c) **New Left Bundle Branch Block:** If patient has in his/her possession a previous ECG with narrow QRS to demonstrate that the wide complex is a new change



DETECTION OF RIGHT VENTRICULAR AND POSTERIOR WALL INFARCTION IS IMPORTANT, AS APPROXIMATELY 40% OF PATIENTS WITH INFERIOR WALL INFARCTIONS HAVE RIGHT VENTRICULAR AND/OR POSTERIOR WALL INVOLVEMENT, WHICH PREDISPOSES THEM TO MORE COMPLICATIONS AND INCREASED MORTALITY. **(NEW '09)**

3. Treatment



- 
- a) Follow Chest Pain Protocol for nitrate, aspirin and pain management.
  - b) If patient meets above STEMI criteria, this patient is a priority I patient and requires a medical consult.
  - c) If patient meets one of the above condition sets for STEMI inclusion criteria, the patient shall be transported to closest Primary STEMI Center unless the transport time is more than 30 minutes greater than the transport time to the closest STEMI Transfer Center or Emergency Department. **(NEW '09)**
  - d) When indicated and based on the EMS provider's report, the Base Station physician at the receiving Primary STEMI Center will activate its Cardiac Intervention Team. **(NEW '09)**

## CARDIAC EMERGENCIES: ST ELEVATION MYOCARDIAL INFARCTION [STEMI] (Continued)

- e) The receiving Emergency Department physician will determine if the patient can bypass the Emergency Department and go directly to the cardiac catheterization lab to meet the cardiac interventional team.
- f) If patient does not have ECG ST elevations greater than 1mm in two contiguous leads, the patient shall be transported to the closest appropriate facility.
- g) Patient who presents with inferior wall MI, clear lung sounds, and hypotension (90 systolic) (40% of inferior wall MI have right ventricular infarction) should be given a fluid bolus of 250-500 mL of Lactated Ringers. For additional bolus, perform medical consult. **(NEW '09)**



CONSULT A PEDIATRIC BASE STATION FOR CHILDREN WHO HAVE **NOT** REACHED THEIR 15<sup>TH</sup> BIRTHDAY WITH ST ELEVATIONS.

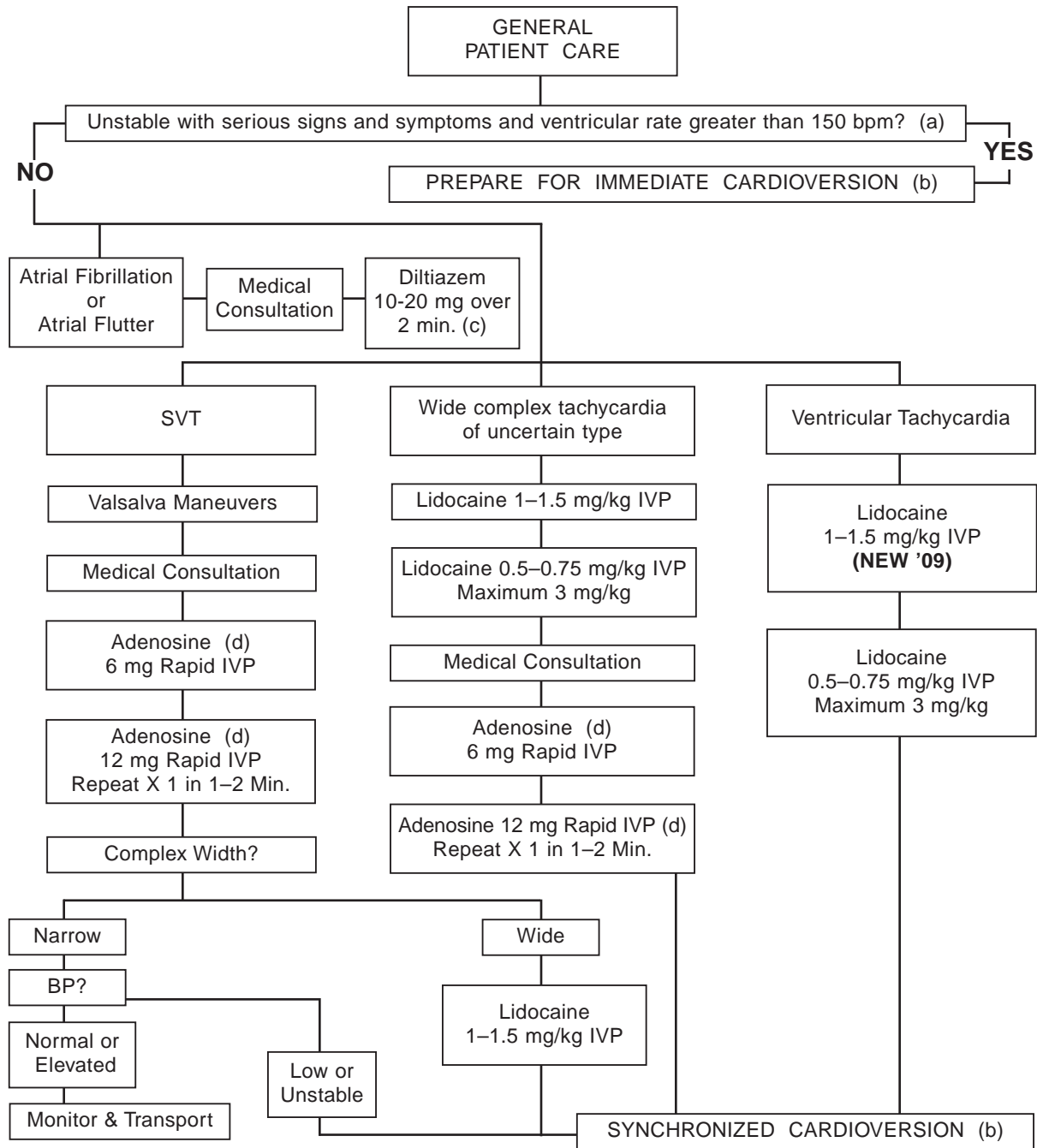
## **CARDIAC EMERGENCIES: TACHYCARDIA (Continued)**

- o) If patient is hemodynamically unstable with a ventricular rate greater than 220 for an infant or 180 for a child, prepare for immediate cardioversion.
  - p) If patient is hemodynamically stable, identify rhythm and proceed to appropriate algorithm.
4. Continue General Patient Care.



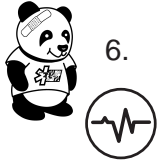
5.

### ADULT TACHYCARDIA ALGORITHM



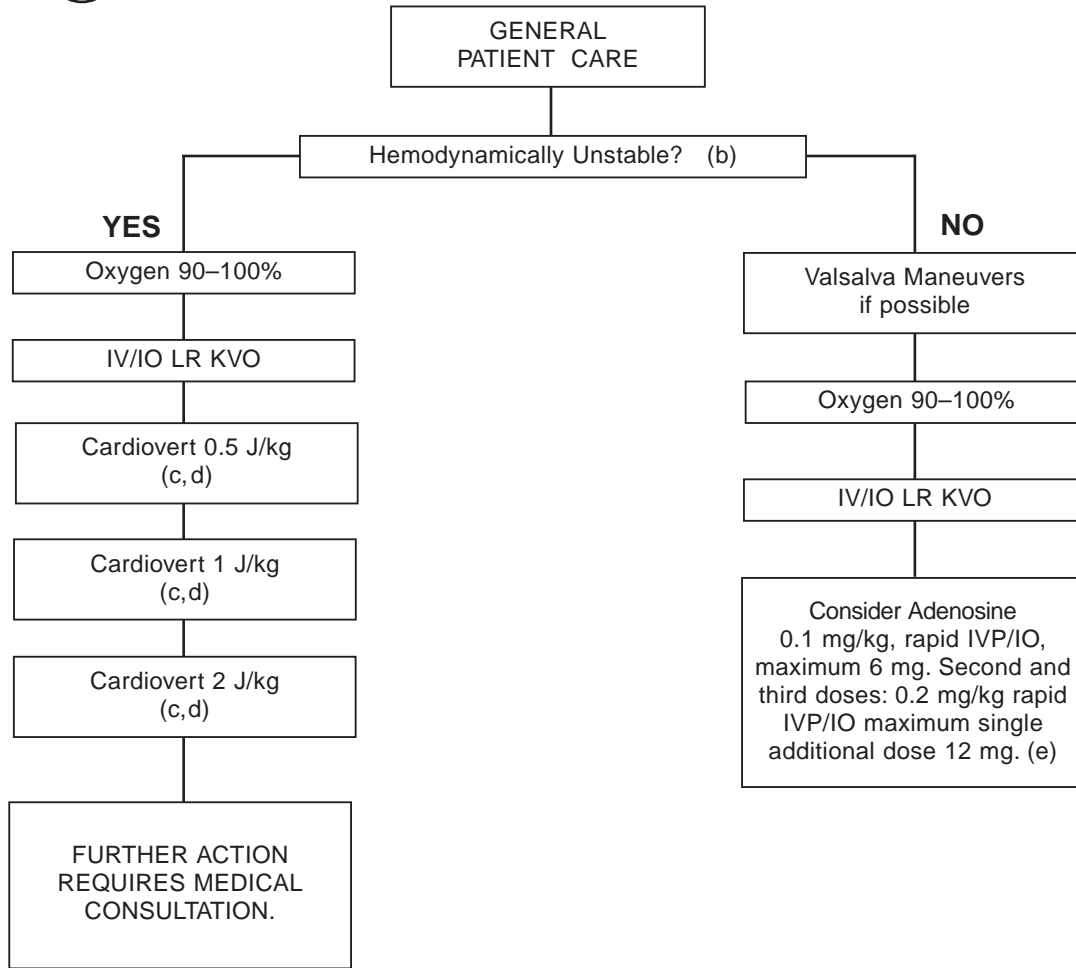
- (a) - Unstable condition must be related to the tachycardia. Signs and symptoms may include chest pain, shortness of breath, decreased level of consciousness, hypotension, hypoperfusion, pulmonary congestion, CHF, and/or AMI.
- (b) - Consider sedation (midazolam with medical consultation). However, overall patient status, including BP, may affect ability to administer sedative. **(NEW '09)**
- (c) - Consider calcium chloride 250 mg IVP for hypotension induced by diltiazem. Medical consultation required. If rate does not slow in 15 minutes, administer a second dose of diltiazem (15-25 mg over 2 minutes.) Medical consultation required.
- (d) - Be prepared for up to 40 seconds of asystole. Adenosine available for CRT-(I) & EMT-P only. (Paramedic may administer without consult.)





6.

## PEDIATRIC SUPRAVENTRICULAR TACHYCARDIA ALGORITHM (a)



(a) - Ventricular Heart Rates in excess of: Infant 220 bpm or Children 180 bpm

(b) - Hemodynamically unstable is defined as a systolic blood pressure less than 60 in neonates (patients less than 28 days old), less than 70 in infants (patients less than 1 year of age), less than  $[70 + (2 \times \text{years}) = \text{systolic BP}]$  for patients greater than 1 year of age; altered mental status with hypoperfusion evidenced by delayed capillary refill; pallor; or peripheral cyanosis.

(c) - If calculated joules setting is lower than cardioversion device is able to deliver, use the lowest joules setting possible or obtain medical consultation.

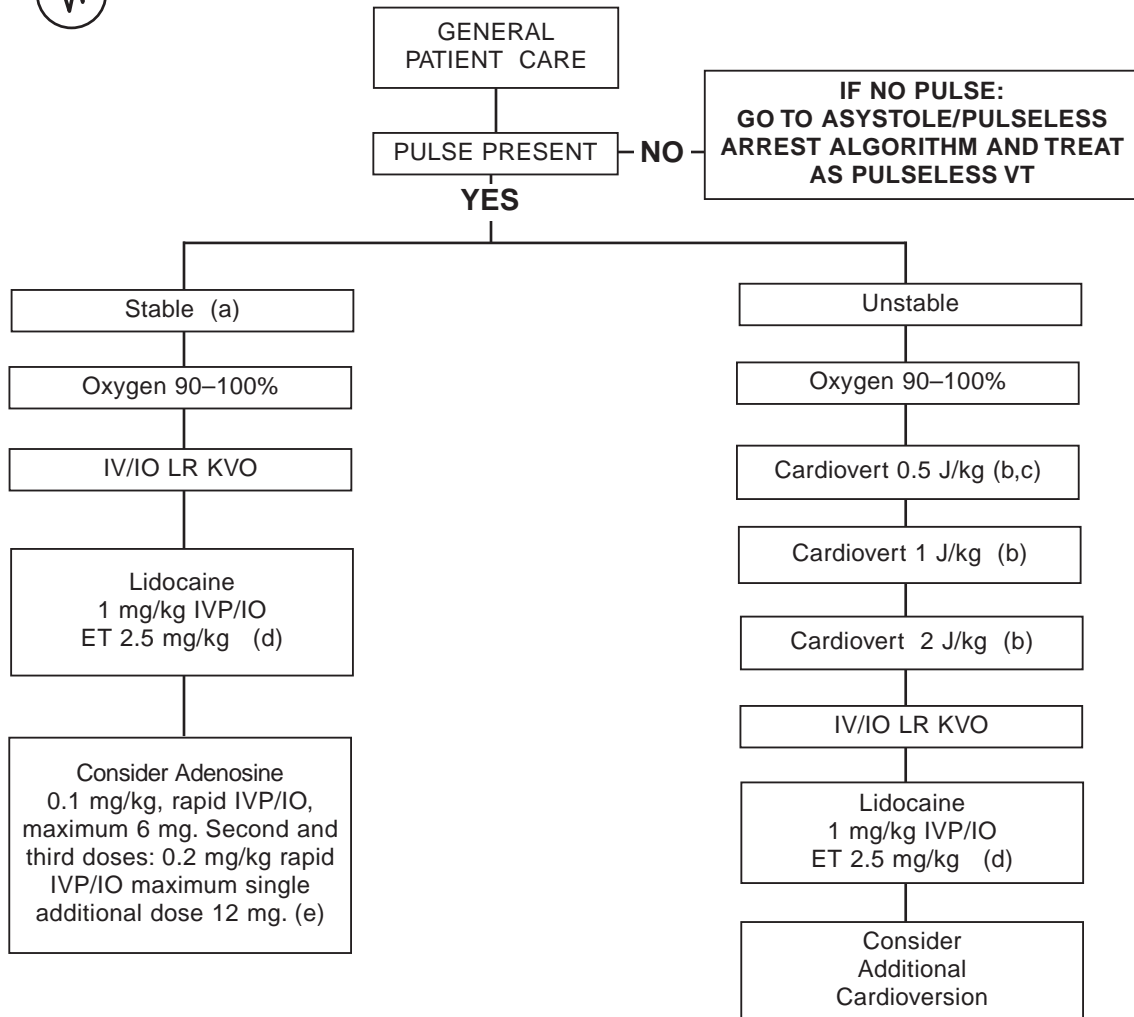
(d) - Consider sedation (midazolam with medical consultation). However, overall patient status, including BP, may affect ability to administer sedative. **(NEW '09)**

(e) - Be prepared for up to 40 seconds of asystole. Adenosine available for CRT-(I) & EMT-P only. (Paramedic may administer without consult.)



7.

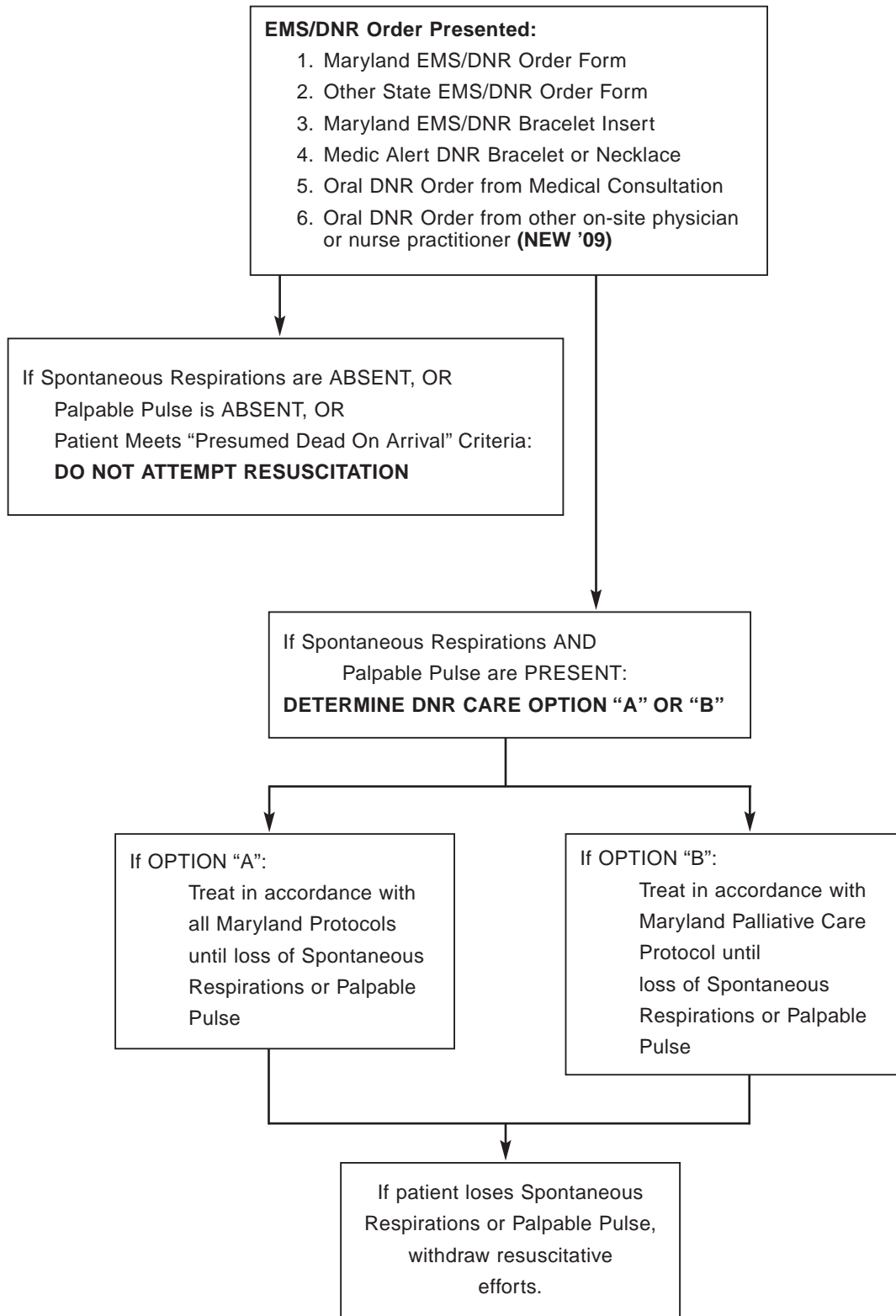
## PEDIATRIC VENTRICULAR TACHYCARDIA ALGORITHM



- (a) - If patient decompensates, move directly to unstable path and cardioversion
- (b) - Cardioversion. If calculated joules setting is lower than cardioversion device is able to deliver, use the lowest joules setting possible or obtain medical consultation.
- (c) - Consider sedation (midazolam with medical consultation). However, overall patient status, including BP, may affect ability to administer sedative. **(NEW '09)**
- (d) - Lidocaine administration: 1 mg/kg IV/IO bolus, followed by 0.5 mg/kg at 8-minute intervals until a maximum dose of 3 mg/kg has been administered or rhythm conversion has occurred. A paper tracing must be obtained prior to each administration. ET Dose is 2-2.5 times the above dose.
- (e) - Be prepared for up to 40 seconds of asystole. Adenosine available for CRT-(I) & EMT-P only. (Paramedic may administer without consult.)

**P. EMS DNR Flowchart Effective 07/01/98**

(Reference DNR Appendix in this document for a thorough explanation.)



## Q. ENVIRONMENTAL EMERGENCIES: COLD EMERGENCIES (FROSTBITE)

1. Initiate General Patient Care.

2. Presentation

Exposure to cold environment (not necessarily outdoors). Frostbite usually affects the feet first followed by the hands, face, and/or ears. The skin initially appears reddened, then turns mottled, bluish, white and/or gray with continued freezing of the flesh. Pain persists during initial stages followed by numbness.




3. Treatment

- a) Remove patient from cold environment.
- b) Handle potential frostbitten areas gently.
- c) Cover lightly with gauze.
- d) Protect from further heat loss.



DO NOT RUB THE AFFECTED AREAS, AS THIS WILL CAUSE MORE DAMAGE TO THE FROZEN TISSUE.



- 
- e) Initiate IV LR KVO, if appropriate.
  - f)  Consider morphine sulfate (Paramedic may perform without consult.)  
2-10 mg slow IV/IM/IO  
Administer 1-2 mg/min.



**PEDIATRIC SECTION ON NEXT PAGE**

## HYPERBARIC THERAPY PROTOCOL (Continued)



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c) Initiate IV LR

- (1) If hypoperfusion exists, initiate IV LR fluid therapy 20 mL/kg bolus in unburned area, if possible.  
Titrate to a systolic pressure of 100 mm Hg.
- (2)  Obtain medical consultation to initiate an IV in an area of burn, if unable to obtain an IV in unburned area.
- (3)  Consider additional fluid administration (Max 2,000 cc without medical consultation)



---

d) Initiate IV/IO LR.

- (1) If age-related vital signs and patient's condition indicates hypoperfusion, administer initial fluid challenge of 20 mL/kg LR IV/IO in unburned area, if possible. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
- (2)  Obtain medical consultation to initiate an IV in an area of burn, if unable to obtain an IV in unburned area.

6. Transportation

a) Priority I Patients (immediate threat to life)

- (1) Consider air transportation if the patient will **ARRIVE** at the appropriate receiving facility more quickly than could be accomplished by ground transportation.
- (2) The provider should consider all of the following:
  - (a) Time for helicopter response
  - (b) Patient turnover (loading time)
  - (c) Flight time to appropriate facility
  - (d) Weather conditions

b) Priority II Patients (no immediate threat to life)

Consider air transport if drive time is greater than 30 minutes.

7. Continue General Patient Care.

## X1. Nausea and Vomiting (NEW '09) (CRT-I and EMT-P)

1. Initiate General Patient Care.

2. Presentation

Patients presenting with nausea and/or vomiting due to underlying injury, medical condition, active motion sickness, or medication side effect/ complication.



Under certain injury or medical conditions, vomiting or intense nausea can complicate the existing injury or medical condition. Preventative administration of an anti-nausea/anti-emetic should be considered and approved with medical consultation (e.g., penetrating eye injury, high risk for aspiration, side effects of narcotic administration).



3. Treatment

a) Place patient either in position of comfort or in left lateral position if not prevented by spinal immobilization or packaging.



---

b) Consider initiating IV LR KVO or with 20 mL/kg fluid challenge if indicated

c) Administer Ondansetron

Adult: 4 mg slow IV over 2-5 minutes or 4 mg IM;

May repeat once with medical consultation.



Preventative administration of an anti-nausea/anti-emetic



---

d) Consider initiating IV LR KVO.

e) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid challenge of 20 mL/kg LR IV/IO.

f) Administer Ondansetron:



For patients who weigh less than 40 kg: 0.1 mg/kg slow IV over 2-5 minutes,

For patients who weigh 40 kg or greater: 4 mg slow IV over 2-5 minutes

**OR**

If no IV: 0.1 mg/kg IM (with max single dose of 4 mg);

May repeat once with medical consultation.



Preventative administration of an anti-nausea/anti-emetic

## NON-TRAUMATIC SHOCK: HYPOPERFUSION (Continued)



- e) The pediatric patient may present hemodynamically unstable or with hypoperfusion evidenced by altered mental status, delayed capillary refill greater than 2 seconds, pallor, peripheral cyanosis, hypotension. Hypotension is defined as a systolic blood pressure less than 60 in neonates (patients less than 28 days old), less than 70 in infants (patients less than 1 year of age), less than  $[70 + (2 \times \text{years}) = \text{systolic BP}]$  for patients greater than 1 year of age.



- f) Continue General Patient Care.




- 
- g) Initiate IV/IO LR.


If age-related vital signs and patient's condition indicates 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 IV/IO.

**OR**

For volume sensitive children administer initial fluid bolus of 10 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 10 mL/kg LR IV/IO.

Volume sensitive children include: neonates (0-28 days), children with congenital heart disease, chronic lung disease, or chronic renal failure.

- h)  Third and subsequent fluid boluses at 20 mL/kg IV/IO. **(NEW '09)**

- i)  Consider dopamine.  
2-20 mcg/kg/min IVP/IO  
Titrate to age-specific vital signs.

4. Continue General Patient Care.

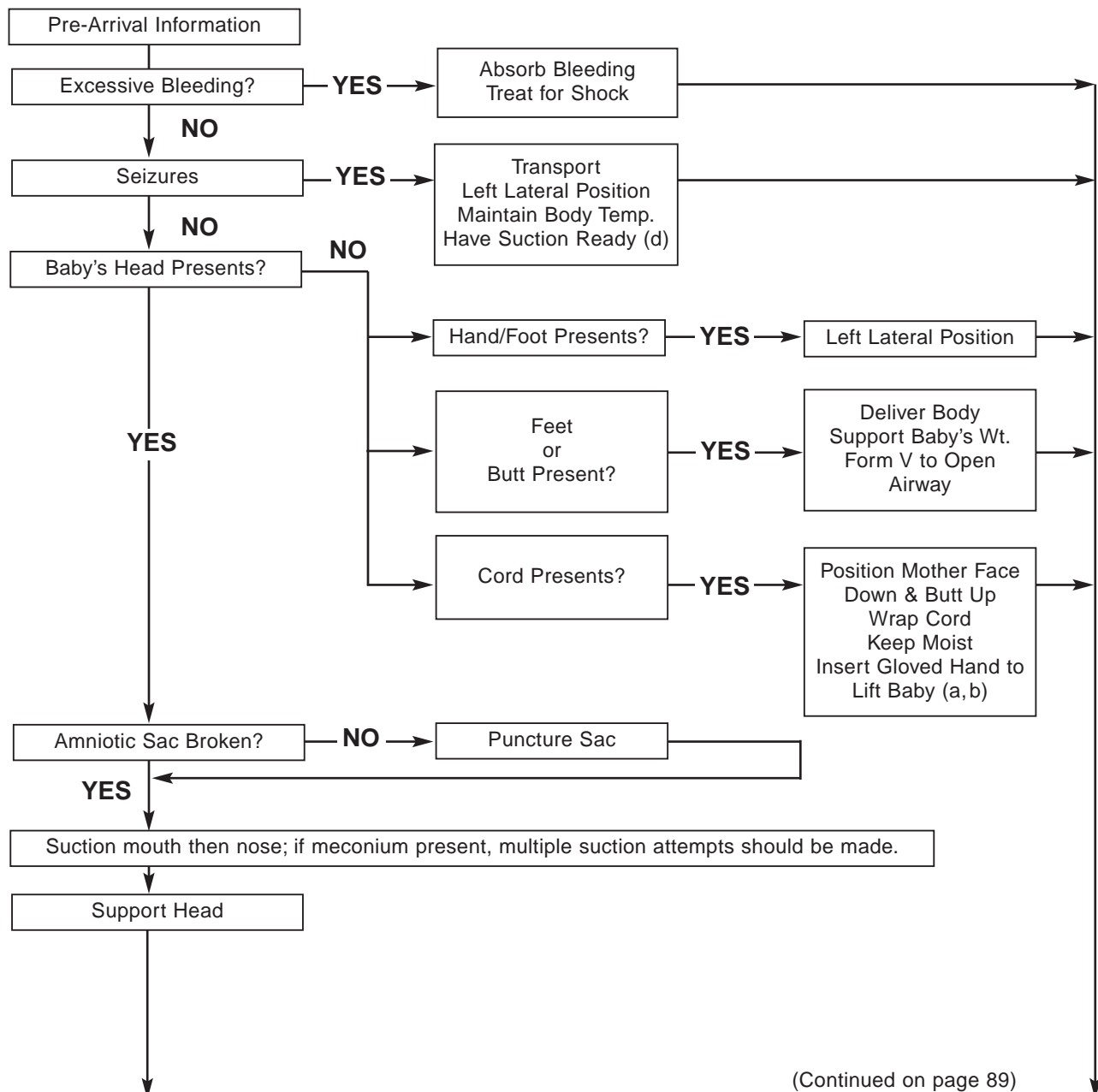
## Z. OBSTETRICAL/ GYNECOLOGICAL EMERGENCIES: CHILDBIRTH ALGORITHM

1. Initiate General Patient Care.

2. Presentation

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.

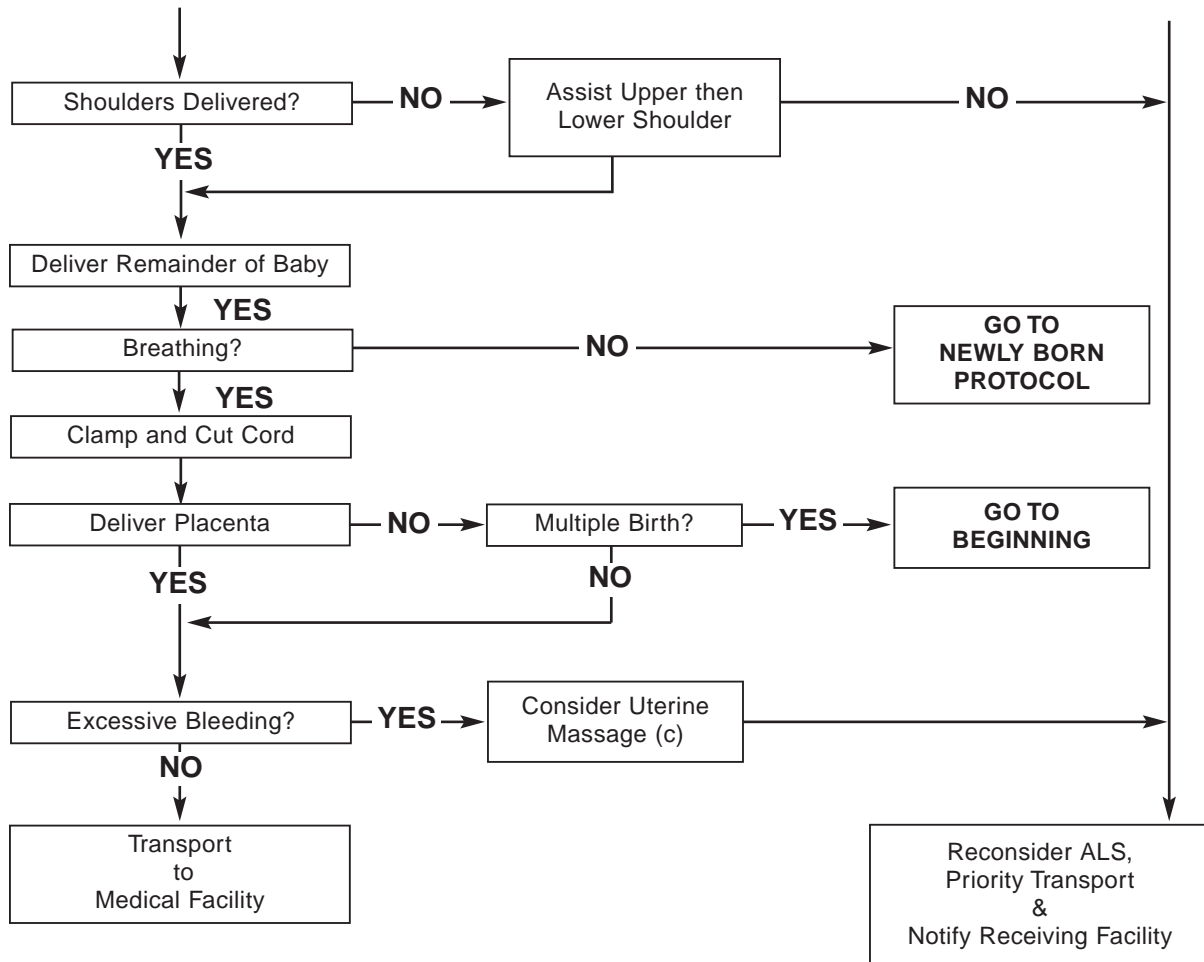
3. Treatment




(Continued on page 89)



## OBSTETRICAL/ GYNECOLOGICAL EMERGENCIES (Continued)



(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 from the pubis toward the umbilicus only.

(d) - Go to Seizure Protocol: Consider midazolam. **(NEW '09)**



4. Continue General Patient Care.

## AA. FUTURE PROTOCOL DEVELOPMENT

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## RESPIRATORY DISTRESS: ALLERGIC REACTION /ANAPHYLAXIS (Continued)

- (3) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid challenge 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 IV/IO.
  - (4) Administer diphenhydramine  
1 mg/kg slow IVP/IO or IM  
Maximum single dose 25 mg  
Additional doses of diphenhydramine require medical consultation.
  - (5) Administer a combination of albuterol/atrovent via nebulizer:
    - **For an infant less than 1 year of age**, administer albuterol 1.25 mg via nebulizer; atrovent is contraindicated.
    - **For a child 1 year of age or greater, but less than 2 years of age**, administer albuterol 1.25 mg and atrovent 250 mcg.
    - **For a patient 2 years of age or greater**, administer albuterol 2.5 mg and atrovent 500 mcg.
  - (6) If further treatments are indicated, an additional albuterol-only nebulizer may be given.
- k)  For anaphylactic shock only (hypotension or severe airway/respiratory distress), consider epinephrine 1:10,000 (concentration is 0.1 mg per mL) with medical consultation 0.01 mg/kg slow IVP/IO (give 1 mL increments)  
Maximum dose 1 mg
- l)  Mild Allergic Reaction
- Consider diphenhydramine  
1 mg/kg slow IVP or IM  
Maximum single dose 25 mg  
**OR**  
Consider epinephrine 1:1,000  
0.01 mg/kg IM  
Maximum single dose 0.5 mg

4. Continue General Patient Care.

## II. RESPIRATORY DISTRESS: ASTHMA/COPD

1. Initiate General Patient Care.

2. Presentation

Patient may exhibit any of the following: wheezing and/or crackles, abnormal respiratory rate, rapid heart rate, stridor, grunting, cyanosis, mottled skin, altered mental status, nasal flaring, retractions, accessory muscle use, dyspnea, diminished or absent breath sounds, and/or tripod positioning.




3. Treatment




CONSIDER MEDICAL CONSULTATION FOR PATIENTS GREATER THAN 45 YEARS OF AGE OR PATIENTS WITH A CARDIAC HISTORY.

a) Assist the patient experiencing moderate to severe symptoms or mild symptoms with a history of life-threatening allergic reaction with the patient's prescribed albuterol or prescribed Epinephrine auto-injector.

b)  Use of the EMS services epinephrine auto-injector requires medical consultation.

c) Albuterol inhaler (2 puffs) may be repeated once within 30 minutes.

d)  Consider additional doses of patient's prescribed albuterol or epinephrine auto-injector.



e) Initiate IV LR KVO (on all Priority 1 or 2 patients and all patients with a history of cardiac disease).

f) Administer a combination of albuterol/atrovent via nebulizer  
Albuterol 2.5 mg and Atrovent 500 **mcg**

g) If further treatments are indicated, an additional albuterol-only nebulizer may be given.

h) Consider continuous positive airway pressure (CPAP) if patients continue to deteriorate in spite of above nebulized treatments. If available, continue inline nebulizations. **(NEW '09)**

i) Consider the administration of epinephrine 1:1,000  
0.01 mg/kg IM  
Maximum single dose 0.5 mg  
May repeat every 5 minutes for a total of 3 doses for severe reactions.  
**OR**

j) Consider the administration of terbutaline  
0.25 mg IM

## RESPIRATORY DISTRESS: PULMONARY EDEMA /CONGESTIVE HEART FAILURE (Continued)

- (1) Asymptomatic – dyspnea on exertion but no symptoms at rest
- (2) Mild – mild dyspnea at rest, despite O<sub>2</sub> treatment. Able to speak in full sentences.
- (3) Moderate – moderate dyspnea. O<sub>2</sub> sat less than 93% on oxygen. Systolic BP usually greater than 150. Unable to speak in full sentences. Normal mental status.
- (4) Severe – severe dyspnea, respiratory failure, hypoxia (O<sub>2</sub> sat < 90% on oxygen), diaphoresis, Systolic BP commonly greater than 180. One word sentences, altered consciousness.



3. Treatment – The goals of treatment are to reduce the pressure of blood returning to the heart (preload) and the resistance that the left ventricle must pump against (after load). The most effective and safe medication for these goals is nitroglycerin (NTG). When Captopril (an Angiotensin Converting Enzyme Inhibitor (ACEI) is administered along with NTG the benefit is in addition to the benefit realized with nitroglycerin.



- a) Position patient in high Fowler's position.
- 
- b) Rate the patient's difficulty breathing on a scale where 0 is 'no trouble breathing' and 10 is 'the worst trouble breathing.'
  - c) Continuous positive airway pressure (CPAP) should be considered for moderate dyspnea and must be implemented in severe dyspnea. (Use early; administer 3 doses of NTG while setting up, acclimatizing the patient and applying CPAP). **(NEW '09)**



PERFORM 12-LEAD ECG (IF AVAILABLE) AND IN THE FACE OF INFERIOR WALL WITH POSTERIOR WALL EXTENSION MI, CONSIDER LOWERING THE SECOND DOSING OF NTG.

- d) If patient **has** a prescription or previous history of nitroglycerin use, administer nitroglycerin per dosing below. May be repeated if symptoms persist, and BP is greater than 90 mm Hg, and pulse is greater than 60 bpm, to a maximum dose of 4 mg. If BP drops below 90 mm Hg, treat with medical fluid bolus(es) [initial bolus 250 – 500 cc; may repeat x 1].
- e) If patient does **not have** a prescription or previous history of nitroglycerin use, an IV must be established prior to administration; then administer nitroglycerin as below.
- f) Initiate IV LR KVO.
- g) If IV cannot be established, nitroglycerin may be administered with medical consultation.

## RESPIRATORY DISTRESS: PULMONARY EDEMA /CONGESTIVE HEART FAILURE (Continued)

- h) Identify rhythm and treat according to appropriate algorithm.
- i) Nitroglycerin
- (1) **Asymptomatic (dyspnea on exertion, not at rest)** – apply oxygen per GPC to maintain O<sub>2</sub> saturation greater than 93%
  - (2) **Mild symptoms (mild dyspnea at rest, despite O<sub>2</sub> treatment; able to speak full sentences)** – administer low dose NTG 0.4 mg SL at 3 – 5 minute intervals.
  - (3) **Moderate symptoms (moderate dyspnea; O<sub>2</sub> saturation less than 93% on O<sub>2</sub>; unable to speak full sentences; normal mental status; SBP will generally be greater than 150 mm Hg) –High Dose NTG (Assess BP before each administration)**

### High Dose NTG (Assess BP before each administration) (NEW '09)

#### CPAP Nitroglycerin Dose (Dose at 3-5 minute intervals.)

- (i) give 1 dose of 0.4 mg NTG (Preparing CPAP)
- (i) give 1 dose of 0.8 mg NTG (Patient education CPAP)
- (iii) give 1 dose of 0.8 mg NTG (CPAP acclimatized patient)
- (iv) complete dose=2.0 mg
- (v) Then follow with captopril (SBP is equal to or greater than 110); then attach CPAP; and then apply nitroglycerin paste.

#### CPAP Not Tolerated - Nitroglycerin Dose

##### (Dose at 3-5 minute intervals.)

- (i) give 1 dose of 0.4 mg NTG
- (ii) give 1 dose of 0.8 mg NTG
- (iii) give 1 dose of 0.8 mg NTG
- (iv) give 1 dose of 0.8 mg NTG
- (v) give 1 dose of 0.8 mg NTG
- (vi) give 1 dose of 0.8 mg NTG
- (vii) complete dose = 4.4 mg
- (viii) Then follow with captopril (SBP is equal to or greater than 110); administer albuterol (medical consult if there is cardiac history); and apply Nitroglycerin paste.

- (4) **Severe symptoms (O<sub>2</sub> saturation less than 90% [hypoxia]; one word sentences, altered sensorium, diaphoresis; SBP will generally be greater than 180 mm Hg) –**  
Treat with High Dose NTG as in i)(3) above.

- j) Consider additional nitroglycerin  
low or high dose based upon symptoms of shortness of breath (rating scale) and blood pressure (goal reduce Mean Arterial Pressure by 15 – 20%)

## STROKE: NEUROLOGICAL EMERGENCIES (Continued)



STROKES ARE UNCOMMON IN CHILDREN. WHEN THEY OCCUR, IT IS LIKELY THAT THE CHILD WILL HAVE SICKLE CELL DISEASE. TRY TO DETERMINE WHICH PEDIATRIC SPECIALTY CENTER FOLLOWS THE CHILD AND INFORM LOCAL BASE STATION AND THE PEDIATRIC BASE STATION.



- j) Administer oxygen at 2-6 liters via nasal cannula (unless hypoxic or in respiratory distress).
- k) Position patient lying flat or slightly elevated.



- l) If a child presents with a SUSPECTED Stroke (e.g. sickle cell patient), consult with the nearest pediatric base station and local base station.



- 
- m) Use Glucometer and treat accordingly.  
(See Section IV, Glucometer Protocol.)
  - n) Initiate an IV LR KVO.
  - o) If the patient is hypotensive, obtain medical consultation.
  - p) Consider obtaining blood sample using closed system.
  - q) Do not treat hypertension in the field.

### 4. Continue General Patient Care.

### Fibrinolytic Therapy Checklist for Ischemic Stroke

All of the "YES" boxes and all of the "NO" boxes must be checked before a patient should be transported to a "Designated Stroke Center".

#### INCLUSION CRITERIA

(All of the "YES" boxes must be checked)

#### YES

- 15 years of age or older
- Signs and symptoms of stroke with neurologic deficit (abnormal Cincinnati Stroke Scale)
- Patient can be delivered to a Stroke Center within 2 hours of sign/symptom onset

#### EXCLUSION CRITERIA

(All of the "NO" boxes must be checked)

#### NO

- Active internal bleeding (eg, gastrointestinal bleeding or urinary bleeding within the last 21 days)
- Known bleeding disorder
- Within 3 months of intracranial surgery, serious head trauma, or previous stroke
- Within 14 days of major surgery or serious trauma
- History of intracranial hemorrhage
- Witnessed seizure at stroke onset
- History of cancer of the brain

## MM. TRAUMA PROTOCOL: BURNS

1. Initiate General Patient Care.
2. Presentation
  - a) Burns are the body's response to injuries to the skin, muscles, bone, nerves, and blood vessels caused by thermal, chemical, electrical, radiation, or light source. Patients may exhibit any of the following: reddening of the skin, deep and intense pain, blisters, mottled appearance, and/or charred black or brown areas with severe or no pain.
  - b) Indications for Referral to a Burn Center
    - (1) Second and third degree burns
      - (a) Burns greater than 10% body surface area (BSA) in patients under 10 or over 50 years of age
      - (b) Burns greater than 20% body surface area (BSA) in any patient
      - (c) Burns of the face, hands, feet, or perineum
    - (2) Electrical burns, including lightning or contact with high voltage (200 volts or greater)
    - (3) Chemical burns
    - (4) Suspected inhalation injury when carbon monoxide is not suspected. (Assess airway for direct thermal injury as noted by singed nasal hairs, facial burns, and soot in mouth.) Patients with suspected inhalation injury may need emergent airway management.
    - (5) Circumferential burns



PATIENTS WITH BURNS AND TRAUMA SHOULD BE REFERRED TO THE NEAREST APPROPRIATE TRAUMA CENTER, NOT A BURN CENTER.

CHILDREN WHO MEET BURN INCLUSIVE CRITERIA WHO HAVE NOT REACHED THEIR 15<sup>TH</sup> BIRTHDAY SHOULD BE TRANSPORTED TO A PEDIATRIC BURN CENTER. **(NEW '09)**

PATIENTS PRESENTING WITH ALTERED MENTAL STATUS OR NAUSEA WITH VOMITING, SEIZURES, LOSS OF CONSCIOUSNESS OR MARKED DYSPNEA IN THE FACE OF SUSPECTED CARBON MONOXIDE OR TOXIC INHALATION WITH OR WITHOUT MINOR BURNS SHOULD BE CONSIDERED FOR TRANSPORT TO THE HYPERBARIC SPECIALTY CENTER. PATIENTS IN CLOSED SPACE INCIDENTS ARE MORE LIKELY TO MANIFEST THESE SYMPTOMS.

3. Treatment
  - a) Eliminate source of burn.
  - b) Determine percent of body surface area (BSA) and depth.
  - c) Treat associated trauma.
  - d) Dress wounds appropriately:
    - (1) Dry, sterile dressings
    - (2) Moist dressings for burns less than 9% BSA





## TRAUMA PROTOCOL: BURNS (Continued)






DO NOT GIVE ANYTHING BY MOUTH.




DO NOT PLACE ICE OR ICE PACKS ON ANY PATIENT WITH BURNS GREATER THAN 5% TOTAL BODY SURFACE AREA.

CONSIDER UTILIZING AEROMEDICAL RESOURCE IF PATIENT IS MORE THAN 30 MINUTES FROM A BURN CENTER /HYPERBARIC MEDICINE SPECIALTY CENTER BY GROUND.



- 
- e) Initiate IV LR fluid therapy 20 mL/kg bolus in unburned area, if possible. Titrate to a systolic pressure of 100 mm Hg.
  - f)  Obtain medical consultation to initiate an IV in an area of burn, if unable to obtain an IV in unburned area.
  - g)  Consider morphine sulfate. (Paramedic may administer without consult.)  
2-10 mg slow IV/IM/IO  
Administer 1-2 mg/min
  - h)  Consider additional fluid administration  
Maximum dose 2,000 mL without medical consultation



- 
- i) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO in unburned area, if possible. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
  - j)  Obtain medical consultation to initiate an IV in an area of burn, if unable to obtain an IV in unburned area.
  - k)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO. **(NEW '09)**
  - l)  Consider morphine sulfate  
0.1 mg/kg slow IV/IO/IM  
Administer 1-2 mg/min  
Maximum dose 5 mg

4. Continue General Patient Care.

## NN. TRAUMA PROTOCOL: EYE TRAUMA

1. Initiate General Patient Care.
2. Presentation  
The patient may present with profuse bleeding, avulsions, lacerations, foreign objects, impaled objects, and/or soft tissue damage to the eye(s) and/or surrounding facial areas.
3. Treatment



NEVER APPLY PRESSURE TO THE EYEBALL OR GLOBE!


IF THE PATIENT HAS OTHER ASSOCIATED TRAUMA OR BURNS, TRANSPORT THE PATIENT TO THE APPROPRIATE TRAUMA OR BURN CENTER; OTHERWISE, TRANSPORT THE PATIENT TO THE NEAREST EYE TRAUMA CENTER, IF APPROPRIATE.

DO NOT USE CHEMICAL COLD PACKS ON THE FACE.



- a) **Foreign objects NOT embedded in the eye(s):** Flush with copious amounts of water (preferably sterile), normal saline, or LR from the bridge of the nose outward.
- b) **Injury to orbits (area around the eye):** Stabilize and immobilize the patient's head and spine; apply cold packs if the eyeball is NOT injured.
- c) **Lacerations/injuries to the eyeball or globe:** Shield affected eyeball and dress other eye to reduce movement; protect loss of fluids; immobilize the patient's head and spine and elevate the head of the backboard to decrease intraocular pressure.
- d) **Impaled objects:** Stabilize object; shield affected eyeball; and dress other eye to reduce movement.



- 
- e) Initiate IV LR KVO.
  - f)  Consider morphine sulfate. (Paramedic may administer without consult.)  
2-10 mg slow IV/IM/IO  
Administer 1-2 mg/min

## TRAUMA PROTOCOL: HAND/UPPER/LOWER EXTREMITY TRAUMA (Continued)



### 3. Treatment



- a) Package amputated extremity in sealed plastic bag (keep dry) and place **on top** of ice to keep cool. **DO NOT FREEZE.**





DO NOT SUBMERGE IN WATER OR FREEZE AMPUTATED PART.

USE TIME, DISTANCE, WEATHER, AND PROXIMITY TO DESIGNATED TRAUMA CENTER, TO DETERMINE MODE OF TRANSPORT. IF ESTIMATED TRANSPORT TIME TO DESIGNATED HAND CENTER IS LESS THAN 30 MINUTES, USE GROUND TRANSPORT.



- 
- b) Initiate IV LR fluid therapy 20 mL/kg bolus.  
Titrate to a systolic pressure of 100 mm Hg.
- c)  Consider morphine sulfate. (Paramedic may administer without consult).  
2-10 mg slow IV/IM/IO  
Administer 1-2 mg/min
- d)  Consider additional fluid administration  
Maximum dose 2,000 mL without medical consultation



- 
- e) Initiate IV/IO LR.
- f) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid challenge 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 IV/IO.
- g)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.
- h)  Consider morphine sulfate  
0.1 mg/kg slow IV/IO/IM  
Administer 1-2 mg/min  
Maximum dose 5 mg

### 4. Continue General Patient Care.

## PP. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA

1. Initiate General Patient Care.

2. Presentation

The patient may present with hypovolemic or neurogenic shock, hypotension, hypertension, rapid or slow heart rate, unequal pupils, shallow or absent respirations, decreased distal pulses, decreased motor and sensory function in extremities, internal or external bleeding, fractures, or lacerations.



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.


CHILDREN WHO MEET INCLUSION BASED ON THE TRAUMA DECISION TREE AND WHO HAVE **NOT** REACHED THEIR 15<sup>TH</sup> BIRTHDAY, SHOULD BE TRANSPORTED TO A PEDIATRIC TRAUMA CENTER.



3. Treatment

- a) Maintain spine stabilization.
- b) Control bleeding and immobilize patient, if indicated.
- c) Hyperventilate the head-injured patient as follows:  
Adult 20 breaths per minute  
Child 30 breaths per minute  
Infant 35 breaths per minute
  - (1) Who has signs of herniation such as unequal pupils, posturing, or paralysis
  - (2) Who is manifesting a rapidly decreasing GCS **or**,
  - (3) With on-line medical consultation.
- d) Consider pelvic stabilization technique if indicated (**NEW '09**)



- 
- e) Initiate IV LR fluid therapy 20 mL/kg bolus.  
Titrate to a systolic pressure of 100 mm Hg.
  - f)  Consider additional fluid administration  
Maximum dose 2,000 mL without medical consultation

## TRAUMA PROTOCOL: TRAUMA ARREST (Continued)



- h ) Rapid assessment and extrication
- i) Protect cervical spine.
- j) CPR
- k) Consider AED if arrest is believed to be medical in nature.  
(See Section IV, AED.)



A PATIENT IN CARDIOPULMONARY ARREST SECONDARY TO TRAUMA SHOULD BE TAKEN TO THE NEAREST APPROPRIATE PEDIATRIC TRAUMA CENTER. CONSIDERATION SHOULD BE GIVEN TO TRANSPORTING THE PATIENT TO THE NEAREST EMERGENCY DEPARTMENT OR ADULT TRAUMA CENTER, IF THE PEDIATRIC TRAUMA CENTER IS MORE THAN 10 MINUTES ADDITIONAL TRANSPORT TIME!



- 
- l) Initiate IV/IO LR.
  - m) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid challenge 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 IV/IO.
  - n) If traumatic arrest is suspected due to multi-system blunt trauma, or due to penetrating neck, chest, or abdominal trauma, bilateral needle decompressions should be performed. Once catheters are placed **do not remove**.

4. Continue General Patient Care.

## TT. TRAUMA DECISION TREE

### Measure vital signs and level of consciousness and assess for major injury

#### Category A

<input type="checkbox"/> GCS less than or equal to 8 or Systolic BP less than 90 (Adult) less than 60 (Peds) or Respiratory rate less than 10 or greater than 29		
<input type="checkbox"/> Flail chest	<input type="checkbox"/> Pelvic fracture	<input type="checkbox"/> Penetrating injuries to head, neck, or torso
<input type="checkbox"/> Rapidly declining GCS	<input type="checkbox"/> Paralysis (spine)	<input type="checkbox"/> Open or depressed skull fracture
<input type="checkbox"/> 2 or more proximal long-bone fractures		

**YES**

Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (Refer to II GPC I).

**NO**

Assess for other injuries.

#### Category B

<input type="checkbox"/> GCS 9 - 14	<input type="checkbox"/> Crushed, degloved, or mangled extremity
<input type="checkbox"/> Paralysis or vascular compromise of limb	<input type="checkbox"/> Penetrating injuries to extremities proximal to elbow or knee
<input type="checkbox"/> Amputation proximal to wrist or ankle	<input type="checkbox"/> Combination trauma with burns

**YES**

Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to II GPC I).

**NO**

Evaluate for evidence of mechanism of injury and high-energy impact.

#### Category C

<input type="checkbox"/> High Risk Auto Crash		
<ul style="list-style-type: none"> <li>• Intrusion greater than 12 in. occupant site; greater than 18 in. any site</li> <li>• Ejection (partial or complete) from vehicle</li> <li>• Death in same passenger compartment</li> <li>• Vehicle telemetry data consistent with high risk of injury</li> </ul>	<ul style="list-style-type: none"> <li>• Rollover without restraint</li> <li>• Auto v. pedestrian/bicyclist thrown, run over, or with significant (20 mph) impact</li> <li>• Motorcycle crash greater than 20 mph</li> </ul>	
<input type="checkbox"/> Falls greater than 3 times patient's height	<input type="checkbox"/> Exposure to blast or explosion	

**YES**

Transport to Trauma Center; alert trauma team. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center Medical Consultation required when considering whether helicopter transport is of clinical benefit (refer to II GPC I). (Effective 10/14/08)

**NO**

Evaluate for other considerations.

#### Category D

<input type="checkbox"/> Age less than 5 or greater than 55	<input type="checkbox"/> Burns without trauma mechanism go to burn center
<input type="checkbox"/> Patient with bleeding disorder or patient on anticoagulants	<input type="checkbox"/> Pregnancy greater than 20 weeks
<input type="checkbox"/> Dialysis patient	<input type="checkbox"/> EMS provider judgment

**YES**

Consider medical direction and transport to trauma center. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center Medical Consultation required when considering whether helicopter transport is of clinical benefit (refer to II GPC I). (Effective 10/14/08)

**NO**

Transport according to protocol.

## IV. APPENDICES

### A. GLOSSARY

**AED:** Automated External Defibrillation.

**AMI:** Acute Myocardial Infarction.

**APGAR score:** An acronym and method of scoring to determine the condition of a newborn (see APGAR chart on page 149).

**Apnea:** An absence of spontaneous respirations.

**Aspiration:** The act of taking fluid (e.g., vomitus, mucus, or blood) from the body via a suction device. The act of taking foreign material or vomit into the lungs.

**Asymptomatic:** The lack of any evidence or indication of illness, disease, or physical disturbance of patient's condition.

**AVPU:** A method of determining and recording a patient's mental status or level of consciousness where "A" stands for Alert; "V" stands for responsive to Verbal stimuli; "P" stands for responsive to Painful stimuli; and "U" stands for Unresponsive.

**Barotrauma:** Injury sustained as a result of exposure to excessive environmental pressure changes (e.g., blast injury or underwater pressure injury).

**Basic:** Emergency Medical Technician-Basic.

**BSI:** Body Substance Isolation.

**BVM:** Bag-Valve-Mask.

**Carte Blanche:** Full discretionary power.

**Children with Special Healthcare Needs (CSHN):** Children with chronic illness or conditions requiring specialized assessment, treatment, technology, or transport destination.

**CISM:** Critical Incident Stress Management.

**Commercial ambulance:** Ambulance licensed by the State Office of Commercial Ambulance Licensing and Regulation.

**COPD:** Chronic Obstructive Pulmonary Disease (i.e., asthma, emphysema, bronchitis).

**Critical:** Approaching death or having the nature of a crisis (e.g., time-critical, critical injury).

**CRT-(I):** Cardiac Rescue Technician-Intermediate.

**Cyanotic:** Bluish color of the skin or mucus membranes caused by lack of oxygen to the tissue.

**DCAP BTLS:** Acronym for signs of injuries to assess during a physical examination of patients. D = Deformity, C = Contusions, A = Abrasions, P = Punctures/penetrations, B = Burns, T = Tenderness, L = Lacerations, S = Swelling.

**Defibrillation:** Administration of electrical current(s) to the heart in an effort to normalize rhythm.

**Defibrillation set (stacked shocks):** Includes a set of three successive shocks either biphasic or monophasic standard 200 J, 300 J, 360 J, or peds 2-4 J/kg.

**DNR:** Do Not Resuscitate.

**Dystonic:** Any impairment of muscle tone, which may be manifested by prolonged muscle contractions that may cause twisting and repetitive movements or abnormal posture. These movements may be in the form of rhythmic jerks. Symptoms that “appear” to be of a focal seizure-like nature with an awake and alert person and no history of seizures but who probably has a recent history of anticholinergic medication use (e.g., anti-psychotic, anti-vomiting).

**EJ:** External Jugular vein of the neck peripheral IV access site.

**Emergency Information Form:** A two-page form, designed by the American Academy of Pediatrics and American College of Emergency Physicians (AAP & ACEP), that provides a brief summary of special health care needs including: diagnosis, usual pattern of disease, emergency action plan, primary and specialty doctors and hospitals. Can be downloaded and data entered at <http://www.aap.org/advocacy/eif.doc>.

**Emetic:** Referring to a substance that causes vomiting.

**EMS:** Emergency Medical Services.

**EMT-B:** Emergency Medical Technician - Basic.

**EMT-P:** Emergency Medical Technician - Paramedic.



**NOI:** Nature of Illness.

**Notification:** Is an “information only call” directly to the receiving hospital through the jurisdictional EOC or EMS communication system not requiring medical consultation and may follow local standing operational procedures.

**NRB:** Non-rebreather mask.

**NTG:** Nitroglycerin.

**Nurse Practitioner:** A nurse practitioner is an individual who has been licensed as a Registered Nurse and certified as a Nurse Practitioner by the Maryland Board of Nursing. This does not include individuals who are only Registered Nurses or Licensed Practical Nurses. **(NEW’09)**

**OIC:** Officer in Charge.

**On-Line Medical Direction:** Is the direct voice/data communication between a provider and an EMS base station physician or a jurisdictionally affiliated physician, or with an “on-scene physician.” This communication is bi-directional and provides the provider with medical direction while providing the physician or receiving hospital with valuable information on the patient. This exchange can take place on-scene, over a telecommunications device, or in the hospital setting.

**On-Scene Physician:** On-Scene physician may be the patient’s identified private physician or a bystander physician who is physically on location. Care rendered or orders given by the on-scene physician should be documented, including the identification of the physician. All on-scene medical direction shall be consistent with the Maryland Medical Protocols for EMS Providers. Any medical procedure which is not consistent with the protocols shall only be rendered by the on-scene physician who shall accompany the patient to the hospital. Any extraordinary care by EMS providers pursuant to the protocols may be approved only by the EMS base station physician or a system medical director. (based on COMAR 30.02.03.02A)

**OPQRST:** Used to recall pertinent questions (**O**nset, **P**rovocation, **Q**uality, **R**adiation, **S**everity, **T**ime) to ask when obtaining a patient history for medical emergencies.

**Optional Supplemental Program (OSP):** A voluntary jurisdictional program which requires MIEMSS approval.

**Pallor:** An unnatural paleness or absence of color in the skin.

**PASG:** Pneumatic Anti-Shock Garments (a.k.a. Medical Anti-Shock Trousers).

**PCM:** Patient Controlled Medications. A medication delivery system under a patient’s control.

**PCR:** Patient Care Report (equivalent to MAIS) document used to record pertinent patient information regarding assessment, treatment, and transport. This is a confidential medical record.

**PDOA:** Presumed dead on arrival.

**Pilot Program (PP):** A program designed to test a new project or procedure in order to determine its effect on EMS. Requires MIEMSS approval and reporting all uses to MIEMSS.

**Plethora:** A term applied to the beefy red coloration of a newborn.

**PMD:** Program Medical Director.

**PO:** By mouth.

**PPE:** Personal Protective Equipment.

**Provider:** Includes EMT-Basic, CRT-(I), and EMT-Paramedic. **(NEW'09)**

**Pulse Oximetry:** A non-invasive measurement of arterial oxygen saturation using infrared absorption frequencies.

**PVC:** Premature ventricular contraction.

**Recovery Position:** The position (patient flat on left lateral side) or placement of patients to reduce risk of aspiration.

**RMD:** Regional Medical Director.

**SAFER:** **S**tabilize, **A**ssess and acknowledge, **F**acilitate, **E**ncourage, and **R**ecovery OR Referral.

**SAMPLE:** Used to aid in obtaining pertinent patient history. S = Symptoms and signs patient is exhibiting, A = patient Allergies, M = patient Medications (prescription & non-prescription), P = Past medical history, L = what and when was the patient's Last oral intake, E = Events prior to arrival, or simply, the history of the current emergency.

**SC:** Subcutaneously.

**Sign:** Any objective evidence or indication of illness, disease, or physical disturbance of patient's condition.

**SL:** Sublingual. Under the tongue.

**SMOI:** Significant Mechanism Of Injury.

**SOP:** Standard Operational Procedure. Defined by local jurisdiction or region.

**Standing Orders:** Orders, rules, regulations, or procedures prepared as guidelines in the preparation and carrying out of medical and surgical procedures.

**Sublingually:** Under the tongue.

**Symptom:** Any subjective evidence of disease or of a patient's condition (such as evidence perceived by the patient).

**Symptomatic:** The subjective evidence or indication of illness, disease, or physical disturbance of patient's condition.

**Syncope:** A fainting spell. It usually follows a feeling of lightheadedness and may often be prevented by lying down. Syncope may also result from any number of heart, neurologic, or lung disorders.

**System Medical Director:** Means any of the following: Executive Director of MIEMSS, State EMS Medical Director, Associate State Medical Director for Pediatrics, Regional Medical Directors, Associate Regional Pediatric Medical Directors, EMS Operational Program Medical Directors, and Assistant EMS Operational Program Medical Directors.

**TOI: Type Of Incident** to which EMTs may be called upon to respond (for example: ill and/or injured patients, hazardous materials incidents, fires, mass casualty incidents, etc.)

**Vagal:** Pertaining to the vagus nerve (the tenth cranial nerve which is essential for speech, swallowing, and slowing of the heart rate).

**VF:** Ventricular Fibrillation.

**Volume Sensitive Children:** Children that need smaller fluid bolus volumes due to special needs including: neonates (birth to 28 days), congenital heart diseases, chronic lung disease, or chronic renal failure.

**VT:** Ventricular Tachycardia.

**Vulnerable Adult:** An adult who lacks the physical or mental capacity to provide for the adult's daily needs (Digest of Criminal Law).

**B. PROCEDURES, MEDICAL DEVICES, AND MEDICATIONS FOR  
EMS AND COMMERCIAL SERVICES (NEW '09)**

<b>PROCEDURE</b>	<b>EMT-B</b>	<b>CRT-(I)</b>	<b>EMT-P</b>
<b>ADMINISTRATION OF MEDICATIONS</b>			
Oral, Sublingual, IM (auto-injector)	SO	SO	SO
SC, IM, IV, Rectal, Nebulizer, Intranasal	-	SO	SO
Intraosseous	-	SO	SO
Intradermal PPD (Public Safety Personnel only)	-	-	OSP
<b>AIRWAY MANAGEMENT</b>			
Carbon Dioxide Detector (ALS required)	SO	SO	SO
Capnograph (not required)	-	SO	SO
Combitube - to be replaced by EASY Tube or King LTS-D (latex free) by 2010	-	SO	SO
CPAP	-	SO	SO
Cricothyroidotomy	-	-	PP
Direct Laryngoscopy	-	SO	SO
Gastric Tube (BLS "Burp," ALS insert)	-	SO	SO
Impedance Threshold Device (ITD) (NEW '09)	OSP	OSP	OSP
Laryngeal Tube Airway (King LTS-D) (NEW '09)	-	OSP	OSP
Nasotracheal Intubation	-	-	SO
Oropharyngeal/Nasopharyngeal Airway	SO	SO	SO
Orotacheal Intubation	-	SO	SO
Needle Decompression Thoracostomy (NDT)	-	SO/MC	SO/MC
Pulse Oximeter (ALS required)	SO	SO	SO
Suction	SO	SO	SO
Ventilator	-	-	OSP
<b>CHEMICAL RESTRAINT</b>	-	-	MC
<b>ELECTROCARDIOGRAM</b>			
Standard Limb Leads	-	SO	SO
12 Lead	PP	SO	SO
<b>ELECTRICAL THERAPY</b>			
Automated External Defibrillator	SO	SO	SO
Cardioversion	-	SO	SO
Defibrillation	-	SO	SO
Transcutaneous Cardiac Pacing	-	SO	SO
<b>GLUCOMETER</b>	OSP	SO	SO
<b>INTRAVENOUS THERAPY</b>			
External Jugular Access & Maintenance	-	SO	SO
Intraosseous Infusion & Maintenance	-	SO	SO
Peripheral IV Access/Saline Lock/Blood Drawn	OSP	SO	SO
Peripheral IV Maintenance	SO	SO	SO
<b>SKELETAL STABILIZATION/IMMOBILIZATION</b>	SO	SO	SO
<b>SOFT TISSUE INJURY &amp; BLEEDING MANAGEMENT</b>	SO	SO	SO
<b>VASOVAGAL MANEUVER</b>			
Valsalva maneuver	-	SO	SO

**SO** Standing Order

**OSP** Optional Supplemental Program

**MC** Medical Consultation Required

**PP** Pilot Program

**B. PROCEDURES, MEDICAL DEVICES, AND MEDICATIONS FOR  
EMS AND COMMERCIAL SERVICES (Continued)**

<b>DEVICE</b>	<b>EMT-B</b>	<b>CRT-(I)</b>	<b>EMT-P</b>
Apnea Monitors	SO	SO	SO
Arterial Lines and Cardiac Sheaths	-	-	-
Chemotherapy Administration/Drip	-	-	-
Chest tubes with Chest Drainage System	-	-	-
Chest tubes with Heimlick Valve	-	SO	SO
Colostomy bag	SO	SO	SO
External Orthopedic Fixators	SO	SO	SO
Foley catheter	SO	SO	SO
Foley catheter with irrigation	SO	SO	SO
Gastrostomy and jejunum feeding tubes (Non-infusing)	SO	SO	SO
HALO Cervical Immobilization	SO	SO	SO
IABP InterAortic Balloon Pump	-	-	-
Ileostomy tube (Non-infusing)	SO	SO	SO
<b>PICC</b> —peripherally inserted central line (venous) or <b>CVA</b> —central venous access line, capped only.	SO	SO	SO
<b>PICC</b> —peripherally inserted central line (venous) or <b>CVA</b> —central venous access line, subclavian/femoral or internal jugular may be monitored if fluid/medication being administered meets protocol. The ALS provider may access the line in a life-threatening emergency.	-	SO	SO
Intraventricular/Intracranial Monitor	-	-	-
Left Ventricular Assist Device (LVAD) Scene (BLS & ALS)	SO	SO	SO
Left Ventricular Assist Device (LVAD) Interfacility	-	-	-
Nasogastric and Orogastric tubes (Existing, Non-infusing or Capped)	SO	SO	SO
Nephrostomy Tubes	SO	SO	SO
Peak Expiratory Flow Meter	-	SO	SO
Pelvic Binder Device ( <b>NEW '09</b> )	PP	PP	PP
Portable Outpatient Fixed Medication Pump/PCA Pump	SO	SO	SO
Peritoneal Dialysis (Non-active, Capped)	SO	SO	SO
Physical Restraint	SO	SO	SO
Sengstaken-Blakemore tube	-	-	-
Suprapubic catheter	SO	SO	SO
Surgical drains	SO	SO	SO
Swan-Ganz	-	-	-
Tracheostomy (Existing)	SO	SO	SO
Transtracheal O <sub>2</sub> (Out Patient/Existing)	SO	SO	SO
Transvenous Pacemaker (Temporary Transvenous)	-	-	-
Ventilators (Acute, Chronic, Scene)	-	-	OSP
Ventricular Peritoneal Shunt	SO	SO	SO
Wound vacuum device	SO	SO	SO

**SO** Standing Order  
**OSP** Optional Supplemental Program

**MC** Medical Consultation Required  
**PP** Pilot Program

**B. PROCEDURES, MEDICAL DEVICES, AND MEDICATIONS FOR EMS AND COMMERCIAL SERVICES (Continued)**

MEDICATIONS	EMT-B CRT-(I)		EMT-P
	MC	MC	
Activated Charcoal (Without Sorbitol)	MC	MC	MC
Adenosine	-	MC	SO
Albuterol Unit Dose Inhaler (Patient's Prescribed)	SO/MC	SO/MC	SO/MC
Albuterol Sulfate Nebulizer	-	SO/MC	SO/MC
Aspirin	-	SO	SO
Atropine Sulfate	-	SO/MC	SO/MC
Atrovent	-	SO	SO
Benzocaine	-	-	SO
Calcium Chloride (10% Solution)	-	MC	MC
Captopril (Capoten)	-	SO	SO
Dextrose 50%	-	SO	SO
Diazepam	-	MC	SO/MC
Diltiazem	-	MC	MC
Diphenhydramine Hydrochloride	-	SO/MC	SO/MC
Dopamine Hydrochloride	-	MC	MC
Epinephrine Auto-Injector	SO/MC	SO	SO
Epinephrine Nebulizer	-	MC	MC
Epinephrine 1:10,000/1:1,000	-	SO	SO
Etomidate (Amidate)	-	-	PP
Furosemide	-	MC	MC
Glucagon	-	SO/MC	SO/MC
Glycoprotein IIb/IIIa	-	-	OSP
Haldol	-	-	MC
Hemophilia Blood Factor (VIII or IX)	-	SO	SO
Heparin (Inter-facility transport only)	-	-	OSP
Lidocaine	-	SO	SO
MARK I/Duodote (Atropine & 2 PAM)	OSP	OSP	OSP
Midazolam (Versed) <b>(NEW '09)</b>	-	MC	SO/MC
Morphine Sulfate	-	MC	SO/MC
Morphine Sulfate (Infusion)	-	-	MC
Naloxone (IV and intranasal)	-	SO	SO
Nitroglycerin Paste	-	SO	SO
Nitroglycerin (tablet /spray) (Patient's Prescribed)	SO	SO	SO
Nitroglycerin (tablet/spray)	-	SO	SO
Ondansetron <b>(NEW '09)</b>	-	SO/MC	SO/MC
Oral Glucose	SO	SO	SO
Oxygen	SO	SO	SO
Purified Protein Derivative (Public Safety Personnel only)	-	-	OSP
Saline (Nebulized)	-	SO	SO

**SO** Standing Order

**OSP** Optional Supplemental Program

**MC** Medical Consultation Required

**PP** Pilot Program

**B. PROCEDURES, MEDICAL DEVICES, AND MEDICATIONS FOR  
EMS AND COMMERCIAL SERVICES (Continued)**

<b>MEDICATIONS</b>	<b>EMT-B CRT-(I) EMT-P</b>		
Sodium Bicarbonate	–	<b>MC</b>	<b>MC</b>
Succinylcholine (Anectine)	–	–	<b>PP</b>
Terbutaline Sulfate	–	<b>SO</b>	<b>SO</b>
Vaccines (Hepatitis and Influenza) (Public Safety Personnel only)	–	–	<b>OSP</b>
Vecuronium (Norcuron)	–	–	<b>PP</b>

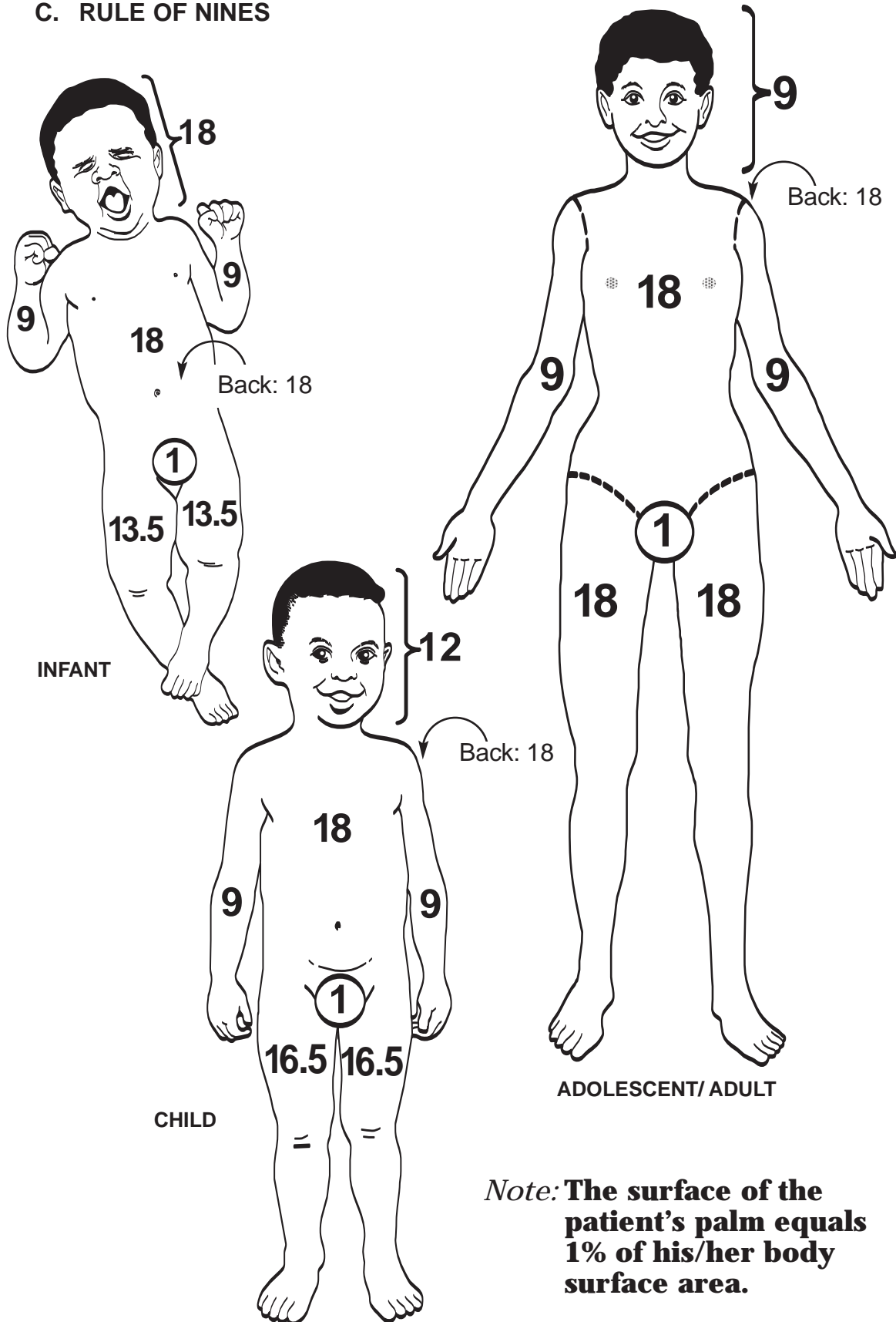
**SO** Standing Order

**OSP** Optional Supplemental Program

**MC** Medical Consultation Required

**PP** Pilot Program

C. RULE OF NINES



*Note: The surface of the patient's palm equals 1% of his/her body surface area.*



## D. NORMAL VITAL SIGNS AND APGAR CHART

### Normal Vital Signs

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

### 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*

## E. EMS/DNR



THE FOLLOWING SECTION IS ABSTRACTED FROM THE ORIGINAL MARYLAND EMERGENCY MEDICAL SERVICES DO NOT RESUSCITATE PROGRAM 2ND REVISION (07/01/98). THE PAGE (pg.) AND THE CHAPTER (ch.) NUMBER HAVE BEEN APPENDED TO THE FOLLOWING CHAPTER TITLES FOR EASY REFERENCE. BECAUSE THIS ABSTRACT IS CONDENSED FROM THE ORIGINAL DOCUMENT, SOME CHAPTER NUMBERS OR LETTERS WERE INTENTIONALLY LEFT OUT. PLEASE REFER TO THE ORIGINAL MARYLAND EMS/DNR DOCUMENT FOR FURTHER INFORMATION.

AS OF JANUARY 1, 2002, A COPY OF THE MARYLAND EMS DNR ORDER FORM CAN BE ACCEPTED IN LIEU OF THE ORIGINAL.

1. PREFACE As of 7/1/98, EMS/DNR Order forms, bracelets, and necklaces will recognize two patient options for care prior to arrest: (pg. 15 ch. A)
  - a) **Option A** (ALS)—Maximal (Restorative) Care Before Arrest, Then DNR, **or**
  - b) **Option B** (BLS)—Limited (Palliative) Care Only Before Arrest, Then DNR
  
2. VALID EMS/DNR BRACELET WITH INSERT or AUTHORIZED METAL EMBLEM HAS THE SAME EFFECT AS THE FORM. (pg. 17 ch. D)
  - a) Typically only one EMS/DNR device is needed to initiate the EMS/DNR protocol.
  - b) EMS providers should only request a second instrument (i.e., a bracelet when a form has already been presented) if there is reason to question the validity of the first produced notification device.
  
3. RECIPROCITY (pg. 19 ch. E)
  - a) A standardized EMS/DNR Order from another state may be honored.
  - b) Treat out-of-state EMS/DNR Orders as Option “B” EMS/DNR patients.
  - c) See chart in “EMS/DNR Program” booklet for how other states will treat Maryland devices.
  
4. ORAL EMS/DNR ORDERS (pg. 19 ch. G)
  - a) EMS providers may follow an oral EMS/DNR Order directly from a Maryland- licensed physician (MD or DO) or nurse practitioner that is physically present “on-site.” EMS shall not accept orders from private physician attendings or nurse practitioner by telephone. **(NEW '09)**
  - b) **EMS providers may follow an oral EMS/DNR Order from a Maryland- licensed physician “on-line” via the EMS Communications System (i.e. radio or telephone consult that is routed through a public service access point [PSAP] for audio recording).**
  
5. ACCEPTABLE AND UNACCEPTABLE EMS/DNR ORDERS (pg. 19 ch. H)
  - a) The following **are** acceptable for implementing the EMS/DNR protocol:
    - (1) Original Maryland EMS/DNR Order Form

## EMS/DNR (Continued)

- (2) Copy of the Maryland EMS/DNR Order Form
  - (3) Other State EMS/DNR Order Form
  - (4) Maryland EMS/DNR Bracelet Insert
  - (5) Medic Alert DNR Bracelet or Necklace
  - (6) Oral DNR Order from EMS System Medical Consultation
  - (7) Oral DNR Order from other on-site physician or nurse practitioner  
**(NEW '09)**
- b) The following **are not** acceptable for implementing the EMS/DNR protocol:
- (1) Advance directives without an EMS/DNR Order
  - (2) Facility specific DNR orders
  - (3) Notes in medical records
  - (4) Prescription pad orders
  - (5) DNR stickers
  - (6) An oral request from someone other than a physician or nurse practitioner **(NEW '09)**
  - (7) An oral order from an attending physician or nurse practitioner who is not on site **(NEW '09)**
  - (8) Any other device or instrument not listed above as acceptable.
6. VALIDITY OF EARLIER VERSIONS OF EMS/DNR ORDERS (pg. 22 ch. K)
- a) Older versions of EMS/DNR Orders — i.e. initial version (1995 and first revision, 4/1/96) — **continue to be valid and need not be updated** unless the patient or authorized decision maker wishes to take advantage of new features available in the newer forms.
  - b) EMS providers should treat older versions of EMS/DNR order (pre 7/1/98) as “Option B (BLS) - Limited (Palliative) Care Only Before Arrest, Then DNR.”
7. REVOCATION OF AN EMS/DNR ORDER (pg. 24 ch. M)
- a) An EMS/DNR Order may be revoked at any time by:
    - (1) Physical cancellation or destruction of all EMS/DNR Order devices; or
    - (2) An oral statement by the patient made directly to emergency medical services personnel requesting only palliative care or resuscitation. If the patient revokes an EMS/DNR order orally, the EMS/DNR Order notification devices do not need to be destroyed. EMS providers should document thoroughly the circumstances of the revocation. An oral revocation by a patient is only good for the single response or transport for which it was issued.
  - b) An authorized decision-maker, other than the patient, cannot revoke an EMS/DNR Order **orally**. Because of the difficulty in identifying authorized decision makers in emergent situations, it is incumbent upon an authorized decision maker who has authority to revoke an EMS/DNR Order to either destroy or withhold all EMS/DNR Order devices, if they wish resuscitation for the patient.

## EMS/DNR (Continued)

- c) Section 5-610 of the Health Care Decision Act (Health General Article, Annotated Code of Maryland) makes willful concealment, cancellation, defacement, obliteration, or damage of an advance directive (including EMS/DNR Orders), without the patient's or authorized decision maker's consent, a misdemeanor subject to a fine not exceeding \$10,000, imprisonment not exceeding one year, or both.
8. ANTICIPATED LOCATIONS FOR EMS/DNR ORDER FORMS: (pg. 25 ch. N)  
EMS personnel shall be directed to look for an EMS/DNR Order in the following places:
- a) About a patient's wrist, hung from a necklace, or safety-pinned to a patient's clothing.
  - b) At medical facilities, in the patient's chart.
  - c) In residences and domicile facilities, by the bedside, behind the patient's bedroom door or on the refrigerator door.
  - d) In schools and educational institutions, in the nurse's office, health room, or with the student's attendant caregiver/aide.
  - e) Family or caregivers will be expected to retrieve the original EMS/DNR Order prior to the ambulance's arrival.
9. IDENTIFICATION OF PATIENT (pg. 25 ch. O)
- a) If the patient is able, the patient can self-identify during the initial assessment.
  - b) If the patient is unable to communicate, then family, caregivers, or bystanders can identify the patient for EMS providers.
  - c) If an EMS/DNR vinyl bracelet with insert or metal emblem (bracelet or necklace) is attached to a patient (on wrist, pendant from neck, pinned to clothing, etc.) the patient's identity can be reasonably assumed by EMS providers.
  - d) If an EMS/DNR vinyl bracelet insert or metal emblem (bracelet or necklace) is found detached from the patient, EMS personnel must treat it as an EMS/DNR Order form and identify the subject of the EMS/DNR Order as the patient. A valid bracelet insert alone, without the vinyl bracelet, is a valid EMS/DNR Order so long as EMS providers confirm the patient's identity (pg. 17 ch. D).
  - e) If EMS personnel are unable to ascertain with reasonable certainty, when required to do so, that the subject of the EMS/DNR Order is the patient, they may resuscitate the patient.
10. HEALTH PROVIDER/EMS PERSONNEL IMMUNITY (pg. 26 ch. R)
- a) General immunity provisions, such as Good Samaritan immunity for volunteers and sovereign immunity for government employees, may apply under specific circumstances.

## EMS/DNR (Continued)

- (3) The State EMS Board may authorize additional facilities under 6.2.2 or 6.2.4 (pp. 35-36), if recognized in the future by DHMH in accordance with 42 CFR 418.98 and 42 CFR 418.100. EMS jurisdictions and commercial ambulance services will be notified by MIEMSS of any facilities that become eligible and elect to receive patients by ambulance, become ineligible, or elect to discontinue their participation.
  - (4) Take a copy of EMS/DNR Order, vinyl bracelet with insert, or metal emblem (bracelet or necklace) to the hospital with the patient. If returning the patient from a previous transport, be sure to request a copy of the EMS/DNR Order form, vinyl bracelet with insert, or metal emblem (bracelet or necklace) from the staff (see pg. 20 ch H2 and the "EMS/DNR Order Retrieval Strategies" on pg. 58 of the EMS/DNR program booklet).
- g) COMMUNICATIONS
- (1) Consultation requirements for Option A EMS/DNR patients shall be dictated by the Maryland EMS Medical Protocols in accordance with the patient's medical needs. EMS providers shall notify the hospital of the patient's EMS/DNR status (i.e., Option A) and the identity of patient's physician or nurse practitioner. **(NEW '09)**
  - (2) No consultation is required for the Option B EMS/DNR patients. The receiving hospital or inpatient hospice facility should be notified to expect the patient and prepare accordingly. Also make the hospital or inpatient facility aware of the patient's EMS/DNR status (i.e., Option B) and the identity of the patient's physician or nurse practitioner. **(NEW '09)**
  - (3) If there is misunderstanding with family members or others present at the scene or if there are other concerns about following the EMS/DNR Order and the patient's condition permits, contact the physician or nurse practitioner signing the order, or the patient's hospice program, or on-line medical direction for assistance. **(NEW '09)**
- h) DOCUMENTATION
- (1) If possible, make or retain a copy of the EMS/DNR Order and attach it to the official copy of the call runsheet that is kept by the EMS service. **Having a copy of the EMS/DNR Order can significantly reduce documentation requirements.** Encourage sending facilities to provide you with a copy of the EMS/DNR order, in addition to an original of the order, with the patient's transfer documents.

## EMS/DNR (Continued)

- (2) If the EMS/DNR protocol is initiated:
  - (a) On the 7/94 MAIS runsheet, until the supply of those runsheets is exhausted, complete the "Hospice" dot in the "Conditions" section under "Assessment." On the 7/95 and subsequent MAIS runsheets, complete the DNR dot. On runsheets shipping 7/1/98 you will be able to select DNR-A or DNR-B to match the patient care options on the 7/1/98 revision of the EMS/DNR Orders;
  - (b) Document, in the narrative section:
    - (i) Who gave you the EMS/DNR Order (as an applicable person physically providing the written order, name of on-site physician or nurse practitioner, or name of on-line medical direction physician) **(NEW '09)** or
    - (ii) Where the EMS/DNR Order was found;
  - (c) Document the EMS/DNR order number, the effective date of the order, the name of the patient, the patient's date of birth, and the name of the physician or nurse practitioner signing the order **(NEW '09)**;
  - (d) Document the time the EMS/DNR protocol was initiated;
  - (e) Document any care rendered;
  - (f) If the patient arrests while under your care, document the time the patient lost spontaneous respirations or palpable pulse, if able to determine, and
  - (g) If the patient arrests while under your care, document the chain of custody until the body is out of custody of EMS.
- (3) If resuscitation protocols are initiated, document:
  - (a) Care rendered as per normal practice;
  - (b) The reason the EMS/DNR protocol was not initiated, if relevant (e.g., unable to find EMS/DNR Order, EMS/DNR is not or does not appear to be valid, patient request, etc.);
  - (c) If resuscitation was started because there was reasonable doubt as to the validity of an EMS/DNR Order;
    - (i) The EMS/DNR Order number, the effective date of the order, the name of the patient, the patient's date of birth, and the name of the physician or nurse practitioner signing the order **(NEW '09)**; and
    - (ii) Who gave you the EMS/DNR or where the EMS/DNR Order was found.
- (4) Transfer any EMS/DNR Order to the appropriate authorities (e.g., to hospital or in-patient hospice personnel of the facility where the patient was transferred or, if the patient is deceased, to the physician/police/medical examiner). If possible at the receiving facility, and if not already done, make a copy of the EMS/DNR Order. **DO NOT RETAIN** an original EMS/DNR Order.

**3A. AIRWAY MANAGEMENT: CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)**



**CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)  
(REQUIRED AS OF JULY 1, 2008) (NEW '09)**

**1. INDICATIONS**

- a) Respiratory distress or failure, due to cardiogenic pulmonary edema or COPD/Asthma in which the patient demonstrates spontaneous respirations and a patent, self-maintained airway.
- b) Patients who are 15 years of age or older.

**2. CONTRAINDICATIONS**

- a) Circumstances in which endotracheal intubation or a surgical airway is preferred or necessary to secure a patent airway
- b) Circumstances in which the patient does not improve or continues to deteriorate despite CPAP administration

**3. PROCEDURE**

- a) Assure patent airway.
- b) Administer 100% O<sub>2</sub> via appropriate delivery system.
- c) Perform appropriate patient assessment, including obtaining vital signs, pulse oximeter (SpO<sub>2</sub>) reading, and cardiac rhythm.
- d) Apply CPAP device per manufacturer's instructions.
- e) Continuously reassess the patient.
- f) Monitor continuous pulse oximetry.
- g) Monitor continuous ETCO<sub>2</sub> monitoring with nasal prongs (if available).
- h) Follow the appropriate set of standing orders for continued treatment.
- i) Contact the medical control as soon as possible to allow for prompt availability of hospital CPAP equipment and respiratory personnel.



FOR CIRCUMSTANCES IN WHICH THE PATIENT DOES NOT IMPROVE OR CONTINUES TO DETERIORATE DESPITE CPAP AND/OR MEDICATIVE THERAPY, TERMINATE CPAP ADMINISTRATION AND PERFORM BVM VENTILATION AND ENDOTRACHEAL INTUBATION IF NECESSARY.

CPAP MAY BE CONSIDERED FOR NON-CARDIOGENIC PULMONARY EDEMA.

#### **4. JUSTIFICATION**

- a) The use of CPAP has long been recognized as an effective treatment for patients suffering from exacerbation of congestive heart failure and COPD. CPAP has recently shown promise in the out-of-hospital setting as well, by demonstrating favorable results in the treatment of acute congestive heart failure.
- b) The use of CPAP for the treatment of patients who might otherwise receive endotracheal intubation holds several benefits:
  - (1) CPAP is a less invasive procedure with a lesser risk of infection.
  - (2) CPAP eliminates the necessity of weaning a patient off an ET tube and ventilator.
  - (3) CPAP eliminates the necessity of sedating or paralyzing an alert patient by ALS or the emergency department staff in order to perform laryngoscopy.
  - (4) CPAP allows the alert patient to have a continued dialogue with his/her caregivers. This allows for the exchange of additional medical history. It also allows for the patient to be involved in the decision-making process for his/her care.

#### **5. SPECIFIC METHODS**


Maryland will be using a full facemask, with the approval of the Jurisdictional Medical Director. CPAP will be initiated for the treatment of pulmonary edema and asthma/COPD.





- (7) Pneumothorax/tension pneumothorax from high pressure ventilation or underlying pre-existing trauma
- (8) Intracranial tube placement through basal skull fracture

**e) PRECAUTIONS**

- (1) Topical anesthesia (Benzocaine spray) should be applied to both nares to minimize discomfort.
- (2) Confirmation of ET placement
  - (a) Utilization of the back airway airflow monitor [BAAM] device when available
  - (b) Auscultation of all lung fields to confirm air exchange
  - (c) Auscultation of the epigastrium to deny disturbance of gastric fluids upon ventilation
  - (d) Observation of bilateral expansion of the thorax
  - (e) End tidal CO<sub>2</sub> detection device required. At a minimum, use colorimetric devices.
  - (f) The esophageal detection device
  - (g) Documentation of tube depth at the nares
  - (h) Other clinical signs of improved perfusion and ventilation (i.e. pupillary response, skin color, etc.)
- (3)  Nasal intubation may require facilitation with sedation. When hypovolemia is unlikely, morphine or midazolam, or a combination of both may be given by direct medical consultation to achieve mild sedation. **(NEW '09)**



## **CRT-(I) & EMT-P ONLY**

### **6. AIRWAY MANAGEMENT: NEEDLE DECOMPRESSION THORACOSTOMY (NDT)**

#### **a) PURPOSE**

Needle Decompression Thoracostomy is a procedure of introducing a needle/catheter (with flutter valve attached) into the pleural space of the chest to provide temporary relief for the patient suffering from a tension pneumothorax.

#### **b) INDICATIONS**



MEDICAL CONSULTATION REQUIRED UNLESS THE DELAY WOULD COMPROMISE PATIENT CARE

- (1) Patients who are assessed to have a life-threatening tension pneumothorax in extremis with diminished/absent lung sounds, hypotension, and/or arrest.
- (2) Patients in traumatic arrest shall receive bilateral NDT. (May be performed without medical consultaion.)
- (3) Allowable Site: Second intercostal space anterior midclavicular line

#### **c) CONTRAINDICATIONS**

- (1) Patients with suspected simple pneumothorax
- (2) Patients whose tension pneumothorax can be relieved by the removal of an occlusive dressing from an open chest wound

#### **d) POTENTIAL ADVERSE EFFECTS / COMPLICATIONS**

- (1) Intercostal vascular or nerve injury
- (2) Pneumo/hemothorax
- (3) Direct damage to the lung
- (4) Pericardial/cardiac injury
- (5) Infection

#### **e) PRECAUTIONS**

- (1) Reassessment of catheter patency
- (2) Second decompression may need to be performed if evidence of reaccumulation, catheter occlusion, or dislocation is evident.



## 7. **OBSTRUCTED AIRWAY FOREIGN BODY REMOVAL: DIRECT LARYNGOSCOPY**

### a) **PURPOSE**

The attempted correction of a foreign-body airway obstruction through direct laryngoscopy should be accomplished only by a Maryland licensed CRT-(I) or EMT-P. This is accomplished after the ALS provider has determined (by noting repeated unsuccessful attempts at dislodging the object by applying the standard basic method of foreign body removal by BLS providers or the ALS provider) that the object cannot be dislodged by these means. The patient must be unconscious and supine before this method is attempted. **(NEW '09)**

### b) **INDICATIONS (NEW '09)**

Patient must be unconscious due to foreign body upper airway obstruction that has not resolved with standard basic methods for foreign body removal.

### c) **CONTRAINDICATIONS**

None

### d) **POTENTIAL ADVERSE EFFECTS/COMPLICATIONS**

Trauma to the oral pharynx, vocal cords, esophagus, or trachea

### e) **PRECAUTIONS**

It is important to distinguish the foreign body from portions of the patient's anatomy.



## **8. AIRWAY MANAGEMENT: OROTRACHEAL INTUBATION**

### **a) PURPOSE**

- (1) Endotracheal intubation involves the passage of an endotracheal tube with direct visualization or digital manipulation through the larynx and into the trachea to provide direct maximum ventilatory support for a patient.
- (2) Blind digital intubation is accomplished without the laryngoscope.

### **b) INDICATION**

- (1) Cardiac arrest
- (2) Respiratory arrest, patient without gag reflex
- (3) Deep coma, patient without gag reflex
- (4) Patient in extremis, in severe respiratory distress with extremely poor air exchange, or agonal respirations (gag reflex may be present)

### **c) CONTRAINDICATIONS**

Upper airway obstruction due to foreign objects

### **d) POTENTIAL ADVERSE EFFECTS/COMPLICATIONS**

- (1) Intubation of the esophagus
- (2) Trauma to the oral pharynx, vocal cords, esophagus, or trachea
- (3) Right mainstem bronchus intubation
- (4) Vomiting
- (5) Increased intracranial pressure as a result of increased vagal stimulation
- (6) Pneumothorax/tension pneumothorax from high pressure ventilation or underlying pre-existing trauma

### **e) PRECAUTIONS**

- (1) When the patient cannot be intubated (following no more than two tracheal intubation attempts), avoid future intubation attempts until the patient reaches the hospital, unless otherwise directed by the physician.

**d) CONTRAINDICATIONS**


Tachydysrhythmias due to digitalis toxicity

**e) POTENTIAL ADVERSE EFFECTS/ COMPLICATIONS**



An unsynchronized shock can result in ventricular fibrillation.

**f) PRECAUTIONS**

(1) If the calculated joules setting is lower than the cardioversion device is able to deliver, use the lowest joules setting possible or obtain medical consultation.

(2)  Administer midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg.

(Reduce by 50% for patients 69 years or older) **(NEW '09)**

(3)   Administer midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 2 mg. **(NEW '09)**



### 13. ELECTRICAL THERAPY: DEFIBRILLATION

#### a) PURPOSE

Defibrillation involves the delivery of non-synchronized direct electric current (mono or biphasic) to the myocardium of a patient exhibiting ventricular fibrillation or ventricular tachycardia without palpable pulses/blood pressure. The objective of defibrillation is to depolarize the entire myocardium, which, it is hoped, will result in allowing a single reliable pacemaker site to assume pacemaker control at a rate capable of producing an adequate cardiac output.

#### b) INDICATIONS FOR TREATMENT

- (1) Ventricular fibrillation
- (2) Ventricular tachycardia without palpable pulse or BP

#### c) DOSAGE

- (1) Adult
  - (a) Initial delivered energy monophasic 360 J or biphasic 200 J
  - (b) Subsequent delivered energy monophasic 360 J or biphasic increasing joules setting if device allows **(NEW '09)**
- (2) Pediatric
  - (a) Initial delivered energy 2 J/kg (monophasic or biphasic)
  - (b) Subsequent delivered energy 4 J/kg (monophasic or biphasic)

#### d) CONTRAINDICATIONS

None

#### e) POTENTIAL ADVERSE EFFECTS / COMPLICATIONS

- (1) Burns to the skin
- (2) Deactivation of patient's implanted pacemaker

#### f) PRECAUTIONS

- (1) Patients who are fully digitalized may require less than the normal recommended delivered energy.
- (2) If the calculated joules setting is lower than the defibrillation device is able to deliver, use the lowest joules setting possible or obtain medical consultation.





## CRT-(I) & EMT-P ONLY

### 14. ELECTRICAL THERAPY: EXTERNAL TRANSCUTANEOUS CARDIAC PACING

#### a) PURPOSE

Non-invasive cardiac pacing, also referred to as external or transcutaneous pacing, involves the temporary application of externally applied electrodes to deliver an adjustable electrical impulse directly across an intact chest wall for the purpose of rhythmically stimulating the myocardium to increase the mechanical heart rate.

#### b) INDICATIONS

- (1) It is indicated for the treatment of hemodynamically compromised patients in settings where cardiac output is compromised due either to the complete failure of cardiac rhythm or to an insufficient rate of the patient's intrinsic pacemaker.
- (2) Bradycardia. (ECG other than second-degree Mobitz Type II or third-degree AV Block.)
- (3) Second-degree Mobitz Type II and third-degree AV block with a systolic BP of less than 80 mmHg, or 80-100 mm Hg with shock-like signs or symptoms.
  -  In the presence of Mobitz II and third-degree AV block, medical consultation is required for atropine administration.
- (4)  Pacing may be indicated in certain instances in which the heart rate is 60-75 BPM and shock-like symptoms persist. Pacing in these instances requires medical consultation from a physician.
- (5) Patients who experience provider-witnessed cardiopulmonary arrest and who present with asystole, or patients whose ECG converts to asystole while the ECG is being monitored.
- (6) Prompt application of the transcutaneous cardiac pacemaker is appropriate prior to the administration of epinephrine and atropine when a patient converts to asystole as a primary rhythm during ECG monitoring by a CRT-(I) or EMT-P.



- (7) Pediatric patients with profound symptomatic bradycardia unresponsive to optimal airway management, oxygenation, epinephrine, and atropine. **(NEW '09)**

**c) DOSAGE (NEW '09)**

Start pacemaker at age appropriate heart rate:  
 Infant (less than 1 year): 120 beats per minute  
 Child (1 year to 12 years): 100 beats per minute  
 Adult (greater than 12 years): 80 beats per minute

Start milliamperes (m.a.) as low as possible and gradually increase m.a. until palpable pulse confirm capture or 200 m.a.



CONTINUE CHEST COMPRESSIONS FOR PEDIATRIC PATIENTS WHO REMAIN POORLY PERFUSED DESPITE PACEMAKER CAPTURE. (NEW '09)

**d) CONTRAINDICATIONS**

- (1) Non-witnessed cardiopulmonary arrest with asystole
- (2) Patient not meeting blood pressure criteria

**e) POTENTIAL ADVERSE EFFECTS/COMPLICATIONS**

- (1) Patient may experience mild to moderate discomfort.

If patient is conscious and has adequate blood pressure consider:



Morphine 1-2 mg/min IVP (Paramedic may administer without consult).

**OR**

Midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg

(Reduce by 50% for patients 69 years or older) **(NEW '09)**




Administer midazolam 0.1 mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 2 mg. **(NEW '09)**

- (2) Musculoskeletal twitching in upper torso may occur during pacing.

**f) PRECAUTIONS**

When properly applied, chest compressions can be performed directly over the insulated electrodes while the pacer is operating.



- (d) If blood glucose is greater than 300 mg/dl, administer 10 mL/kg LR bolus unless rales, wheezing, pedal edema, or history of renal failure or CHF is present.
- (e)  If blood glucose is less than 40 mg/dl, obtain medical consultation for authorization to administer second dose of D25W or D10W.



## CRT-(I) & EMT-P ONLY (NEW '09)

### 18. INTRAOSSEOUS INFUSION (IO)

#### a) PURPOSE

The administration of fluids and medications via intraosseous infusion has long been known to be a relatively safe and effective procedure in the treatment of critically ill patients.

#### b) INDICATIONS

Patients in which the following conditions are present:

- (a) Cardiac arrest, **OR**
- (b) Profound hypovolemia, **OR**
- (c) No available vascular access, or following two unsuccessful peripheral IV attempts for patients with any other life-threatening illness or injury requiring immediate pharmacological or volume intervention **OR**
- (d) In pediatric patients in cardiac arrest, go directly to IO if no peripheral sites are obvious and without having to attempt peripheral access.



#### c) PROCEDURES

Allowable sites for IO:

- (a) Sites for manual placement of IO needle:
  - (i) Patients 6 years of age or less, use the proximal tibial site: locate the preferred site 1-3 cm distal to the tibial tuberosity on the anteromedial surface of the tibia.
  - (ii) Patients greater than 6 years of age, use the distal tibial site: locate the medial surface of the distal tibia just proximal to the medial malleolus.
- (b) Sites for mechanical placement of IO needle:
  - (i) Patients 3-39 kg, use a pediatric needle (15 ga, 15 mm length) in the proximal tibial site as in manual placement above.
  - (ii) Patients 40 kg and greater, use an adult needle (15 ga, 25 mm length) in the proximal tibial site as in manual placement above.
  - (iii) Patients 40 kg and greater where the adult needle is not long enough (less than 5 mm of the needle is visible when the tip of the needle touches the bone), use the distal tibial site as in manual placement above or longer adult needle (15 ga, 35 mm length).
  - (iv) Patients 40 kg and greater where a lower extremity site is not available, use the proximal humerus site: adduct the humerus, position the elbow posteriorly to the back of the stretcher or floor, and place the patient's hand on his/her

abdomen near the umbilicus. Go two finger breaths below the tip of the acromium to locate the tuberosity. Insert at 90 degree angle to lateral surface of the tuberosity.



TWO ATTEMPTS WITHIN FIVE MINUTES ARE PERMITTED. MEDICAL CONSULTATION SHOULD BE OBTAINED FOR FURTHER ATTEMPTS.



- (2) Pain due to infusion via IO
  - (a) To prevent or treat pain during an IO infusion for adults, administer 20-40 mg of 2% (only 1-2 mL preservative free/cardiac) Lidocaine IO.
  - (b) To prevent or treat pain during an IO infusion for pediatric patients equal to or greater than 40 kg, administer 20-40 mg of 2% (only 1-2 mL preservative free/cardiac) Lidocaine IO.
  - (c) Medical consultation required for pediatric patients under 40 kg.

**d) CONTRAINDICATIONS**

- (1) Conscious patient with stable vital signs
- (2) Peripheral vascular access readily available
- (3) Suspected or known fractures in the extremity targeted for IO infusion
- (4) Previous attempt in the same bone
- (5) Cellulitis at the intended site of the procedure
- (6) Patient with known bone disorder
- (7) Prior knee or shoulder joint replacement

**e) POTENTIAL ADVERSE EFFECTS/COMPLICATIONS**

- (1) Extravasation of fluid
- (2) Infection
- (3) Fat emboli
- (4) Compartment syndrome

**f) PRECAUTIONS**

- (1) Humeral site: Stabilize the needle prior to any attempt at removing the driver. The humeral cortex can be considerably “less dense” and failure to stabilize the needle may cause inadvertent dislodgement. Also, as patients advance in age, bone density continues to decrease and the proximal humeral needle’s stability must be routinely assessed.



## 19. INTRAVENOUS MAINTENANCE THERAPY FOR EMT-B

### a) Provider-controlled IV solutions

(1) The EMT-Basic is authorized to be the primary caregiver for patients with established intravenous (IV) therapy **ONLY** when the reason for transport is not related to complications associated with the IV line, and:

(a) The IV Solution **DOES NOT** contain:

(i) **MEDICATIONS,**

(ii) **WHOLE BLOOD,** or

(iii) **BLOOD PRODUCTS** (such as plasma, platelets, or packed red blood cells)

(b) The IV catheter is placed in a **PERIPHERAL LIMB VEIN,** or

(c) The IV catheter is a capped (i.e., heparin-locked) peripheral or central line, and

(d) No other ALS interventions are required.

### (2) IV fluids

The EMT-Basic is authorized to perform IV maintenance of **NON-MEDICATED** IV solutions that contain only:

(a) Lactated Ringer's solution

(b) 2.5%-10.0% dextrose in water

(c) 0.25%-0.9% saline solution

(d) Potassium chloride (KCL) added to the solution. The amount of KCL in solution shall not exceed 20 milliequivalents (mEq)/liter **OR**

(e) Total Parenteral Nutrition (TPN)



IF IV FLUIDS OR TPN ARE BEING ADMINISTERED VIA INFUSION PUMP AND NOT PATIENT-CONTROLLED, THE PATIENT MUST BE ACCOMPANIED BY A NURSE OR APPROPRIATELY TRAINED ALS PROVIDER.

### b) Patient-controlled medications or IV solutions

The EMT-Basic is authorized to be the primary caregiver for patients with established intravenous (IV) therapy **ONLY** when the reason for transport is not related to complications associated with the IV line or the medications being infused and the patient has been caring for the line, IV fluids, and/or IV medications at home without the assistance of a health care provider.

## 21. PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) or dermal protective ensembles are used in combination with respirators to protect first responders from vapor, solid, or liquid chemical agent environments. The OSHA levels of protection are defined in Title 29 of the Code of Federal Regulations, Part 1910.120. (29 CFR 1910.120)

- a) Level A: An SCBA or supplied-air with escape cylinder, in combination with a fully encapsulating chemical protective suit, capable of maintaining a positive air pressure inside the suit. Level A ensembles include both outer and inner chemical-resistant gloves, chemical-resistant steel-toed boots, and two-way radio communications. Additional items, such as long underwear or coveralls, may also be included. This ensemble is required for the highest level of protection for skin, eyes, and the respiratory system.
- b) Level B: Same respiratory protection as Level A, along with hooded chemical-resistant clothing, outer and inner chemical-resistant gloves, chemical-resistant steel-toed boots, and other optional items, such as face shields, hard hats, boot covers, and coveralls. OSHA Level B does not include a positive-pressure suit. Level B PPE is used when the type and atmospheric concentrations of substances have been identified and require a high level of respiratory protection, but a lesser level of skin protection.
- c) Level C: Full face piece or half face piece air-purifying respirators with hooded, chemical-resistant clothing, inner and outer chemical-resistant gloves, and chemical-resistant boots. Level C PPE should be used when the atmospheric contaminants have been identified, concentrations measured, and an air-purifying respirator is appropriate and available to remove the contaminants of interest.
- d) Level D: A work uniform affording minimal protection, used for nuisance contamination only.

## 22. PHYSICAL AND CHEMICAL RESTRAINTS

### a) PURPOSE

To prevent harm to patient and/or others

### b) INDICATIONS

- (1) Patient restraints (physical and/or chemical) should be utilized only when necessary and only in situations where the patient is exhibiting behavior that the EMS Provider believes will present a danger to the patient or others.
- (2) The procedure does apply to patients treated under implied consent.

### c) PROCEDURE

- (1) The physical restraint procedure applies to patients greater than 1 year of age.
  - (a) Ensure that the scene is safe.
  - (b) Ensure sufficient personnel are present to control the patient while restraining. **USE POLICE ASSISTANCE WHENEVER AVAILABLE.**
  - (c) Position the patient for safe transport:



PATIENT POSITIONING SHOULD BE MODIFIED WHEN RESTRAINING PATIENTS WITH LIMITED MOBILITY (E.G. CONFINED TO BED OR WHEELCHAIR). USE PASSIVE RESTRAINT AND PLACE PATIENTS WITH PREVIOUS INJURY OR PRE-EXISTING CONDITIONS, SUCH AS OSTEOPOROSIS OR CONTRACTURE, IN A NEUTRAL POSITION.

PATIENTS ARE NOT TO BE RESTRAINED IN A PRONE, HOBbled, OR HOG-TIED POSITION. WHENEVER POSSIBLE, ALL PATIENTS THAT ARE PHYSICALLY RESTRAINED AND CONTINUE TO FIGHT THE RESTRAINTS SHOULD BE CONSIDERED FOR CHEMICAL RESTRAINT. **(NEW '09)**

Method. (Be prepared to logroll immediately in the event of vomiting.)

1. Place patient face up or on his/her side, if at all possible.
2. Secure extremities:  
For adults, use 4-point restraints (ideally with one arm up and the opposite arm down) or use a sheet to carefully wrap the patient before applying a Reeves-type stretcher.  
For patients 12 years and under, use 3-point restraints (two arms, one leg) or use a sheet to carefully wrap the patient before applying a Reeves-type stretcher.



IF POLICE HANDCUFFED THE PATIENT, JOINTLY WITH POLICE, REPOSITION THE PATIENT IN FACE-UP POSITION AND WITH HANDS ANTERIOR AND SECURED TO STRETCHER.

3. If necessary, utilize cervical-spine precautions to control violent head or body movements.

4. Place padding under patient's head. Pad any other area needed to prevent the patient from further harming him or herself or restricting circulation.
  5. Secure the patient onto the stretcher for transport, using additional straps if necessary. Be prepared at all times to logroll, suction, and maintain airway.
- (d) Monitor airway status continuously, utilize pulse oximetry when available, vital signs, and neurocirculatory status distal to restraints. Document findings every 15 minutes, along with reason for restraint.
  - (e) For interfacility transfers, obtain a written physician's order for use of restraints.




(2) Chemical Restraint Procedure



BE SURE TO ASSESS FOR EVIDENCE OF TRAUMATIC OR MEDICAL CAUSES FOR PATIENT'S AGITATION.

- (a) Prepare airway equipment, including suction, BVM, and intubation equipment
- (b) Adults (**NEW '09**)
  - (1) Administer combined medications of haloperidol and midazolam which can be mixed in the same syringe. (If patient has head injury consider administration of only midazolam.)
    - a. **Patient 15-69 years of age:**
      - (i) Haloperidol 5 mg IM/IV **and**
      - (ii) Midazolam 5 mg IM/IV
    - b. **Patient greater than 69 years of age:**
      - (i) Haloperidol 2.5 mg IM/IV **and**
      - (ii) Midazolam 2.5 mg IM/IV
  - (2) Repeat doses may be given with medical direction.
- (c) Pediatric (**NEW '09**)
  - (1) Administer haloperidol only.
    - a. **Less than 6 years of age is contraindicated.**
    - b. **6-11 years of age**
      - (i) Haloperidol 0.05 mg/kg IM/IV
      - (ii) Max dose 2.5 mg
    - c. **12-14 years of age**
      - (i) Haloperidol 2.5-5 mg IM/IV
  - (2) Repeat doses may be given with medical direction.
- (d) Start IV LR KVO, if possible.
- (e) Use Glucometer and treat accordingly.
- (f) Monitor vital signs, ECG, and pulse oximetry.
- (g) Be prepared to treat hypotension with fluid challenge.



- (h)  Treat acute dystonic or extrapyramidal reactions with Diphenhydramine adult: 25-50 mg IV/IM; pediatrics 1 mg/kg slow IV/IO/IM; Maximum single dose 25 mg. Additional doses of diphenhydramine require medical consultation.
- (i) Monitor airway status continuously, utilize pulse oximetry when available, vital signs, and neurocirculatory status distal to restraints. Document findings every 15 minutes, along with reason for restraint.

**d) ADDITIONAL INFORMATION**

- (1) Physical-restraint guidelines:
  - (a) Use the minimum restraint necessary to accomplish necessary patient care and ensure safe transportation (soft restraints may be sufficient in some cases). If law-enforcement or additional personnel are needed, call for assistance prior to attempting restraint procedures. Do not endanger yourself or your crew.
  - (b) Avoid placing restraints in such a way as to preclude evaluation of the patient's medical status (airway, breathing, and circulation). Consider whether placement of restraints will interfere with necessary patient-care activities or will cause further harm.
  - (c) Once restraints are placed, do not remove them until you arrive at the hospital unless there is a complication from their use. If at all possible, take extra personnel during transport to hospital to deal with potential complications.
- (2) Chemical-restraint guidelines:

Sedative agents may be used to provide a safe method of restraining violently combative patients who present a danger to themselves or others, and to prevent violently combative patients from further injury while secured with physical restraints.





## 5. ATROPINE SULFATE

### a) Pharmacology

- (1) Parasympatholytic (vagolytic action)
- (2) Anticholinergic (accelerates the heart rate)
- (3) May restore cardiac rhythm in asystole


### b) Pharmacokinetics

- (1) Accelerated heart rate within minutes of IV injection
- (2) Peak effect is seen within the first 15 minutes.
- (3) Atropine disappears rapidly from the blood.
- (4) Excreted in the urine within the first 12 hours

### c) Indications

- (1) Symptomatic bradycardia
- (2) Asystole, idioventricular rhythm
- (3) Organophosphate poisoning
- (4) Nerve agents

### d) Contraindications

- (1) Known hypersensitivity
- (2) Dysrhythmias in which enhancement of conduction may accelerate the ventricular rate and cause decreased cardiac output (e.g. atrial fibrillation, atrial flutter, or PAT with block)
- (3) Relative Contraindications (Weigh risk/benefits.):
  - (a)  AV block at His-Purkinje level (second-degree Type II AV Block and third-degree AV Block)
  - (b) Suspected acute myocardial infarction or ischemia
  - (c) Glaucoma

### e) Adverse Effects

- (1) Excessive doses of atropine can cause delirium, restlessness, disorientation, tachycardia, coma, flushed and hot skin, ataxia, blurred vision, dry mucous membranes.
- (2) Ventricular fibrillation and tachycardia have occurred following IV administration of atropine.

### f) Precautions

Not clinically significant




**g) Dosage**

(1) Adult **(NEW '09)**:

- (a) Asystole: Administer 1 mg IVP repeated every 3-5 minutes to a total of 0.04 mg/kg; maximum dose not to exceed 3 mg
- (b) Bradycardia: Administer 0.5-1 mg IVP repeated every 3-5 minutes to a total dose of 0.04 mg/kg

(2) Pediatric:

- (a) Bradycardia: Administer 0.02 mg/kg IV/IO; minimum dose 0.1 mg; maximum single dose Child (10 kg-25 kg), 0.5 mg; Adolescent (25-40 kg), 1 mg; ET 0.03 mg/kg, dilute 5 mL; repeat once

(3)  Organophosphate poisoning

- (a) Adult: Administer 2-4 mg IVP or IM every 5-10 minutes
- (b) Pediatric: Administer 0.02 mg/kg IVP/IO or IM every 5-10 minutes

(4) Nerve agent exposure

See MARK I in WMD Protocols.



## 11. DIAZEPAM (VALIUM) (NEW '09)

### a) Pharmacology

- (1) Sedation, hypnosis, alleviation of anxiety, muscle relaxation, anticonvulsant activity
- (2) Little cardiovascular effect

### b) Pharmacokinetics

- (1) Onset of action is extremely rapid following IV administration.
- (2) Half-life ranges from 20 to 90 minutes.

### c) Indications

- (1) Sustained and/or recurrent seizures due only to nerve agent or organophosphate exposure

### d) Contraindications

- (1) Known hypersensitivity, head injury
- (2) Should be used with caution in patients with altered mental status, hypotension, or acute narrow angle glaucoma

### e) Adverse Effects

- (1) Lightheadedness, motor impairment, ataxia, impairment of mental and psychomotor function, confusion, slurred speech, amnesia
- (2) Additive effect with ethanol
- (3) Irritability and excitation may be seen paradoxically.

### f) Precautions

- (1) Respiratory depression may occur with IV administration, especially if given too rapidly.
- (2) Respiratory support may be required.
- (3) Use with caution in pregnant patients, persons ingesting alcohol, or persons ingesting sedatives.

### g) Dosage (Paramedic consultation NOT required for above indication)

- (1) Adult: Administer 10 mg with autoinjector (CANA) or reconstituted vial.
- (2) Pediatric: greater than 30 kg/66 lbs: Administer 10 mg with autoinjector (CANA) or 0.1 mg/kg from reconstituted vial.



## 12. DILTIAZEM (Cardizem)

(CRT-I) & EMT-P only

### a) Class

Calcium channel blocker

### b) Actions

- (1) Inhibits the movement of calcium ions across cardiac muscle cells
- (2) Decreases conduction velocity and ventricular rate

### c) Indications

Symptomatic atrial fibrillation and atrial flutter

### d) Contraindications

- (1) Hypotension below 90 mm Hg, second or third degree heart block, hypersensitivity to the drug
- (2) Patients less than 12 years of age

### e) Precautions

Use cautiously in patients with renal failure or congestive heart failure.

### f) Side effects

- (1) Headache
- (2) Nausea
- (3) Vomiting
- (4) Bradycardia
- (5) Hypotension

### g) Significant interactions

Congestive heart failure may result if used along with beta blockers.

### h) Dosage

- (1) Adult:
  - (a) 0.25 mg/kg (maximum dose 20 mg) by IV bolus administered slow IV over 2 minutes; if response is not adequate, repeat in 15 minutes with a dosage of 0.35 mg/kg (maximum dose 25 mg) over 2 minutes.
  - (b) For patients older than 50 years of age or borderline blood pressure, consider initial bolus 5-10 mg administered IV over 2 minutes.
- (2) Pediatric:

Contraindicated for patients less than 12 years of age.



## 15. EPINEPHRINE 1:10,000/1:1,000

### a) Pharmacology

- (1) The administration of epinephrine causes increases in:
  - (a) Systemic vascular resistance
  - (b) Systemic arterial pressure
  - (c) Heart rate (positive chronotropic effect)
  - (d) Contractile state (positive inotropic effect)
  - (e) Myocardial oxygen requirement
  - (f) Cardiac automaticity
  - (g) AV conduction (positive dromotropic effect)
- (2) Causes a reduction with bronchodilation by relaxing smooth muscles in the bronchial tree (bronchial dilation)

### b) Pharmacokinetics

- (1) IV administered epinephrine has an extremely rapid onset of action.
- (2) Is rapidly inactivated by the liver
- (3) Subcutaneous administration of epinephrine results in slower absorption due to local vasoconstriction.
- (4) Local massage will hasten absorption.
- (5) Topically applied nebulizer within the respiratory tract, epinephrine has vasoconstrictor properties which result in reduction of mucosal and submucosal edema. It also has bronchodilator properties which reduce airway smooth muscle spasms.

### c) Indications

- (1) Cardiac arrest
- (2) Moderate to severe allergic reaction/anaphylaxis
- (3) IV epinephrine should be reserved for cardiac arrest patients and for impending cardiac arrest due to anaphylactic shock.
- (4) Bronchial asthma
- (5) Respiratory Stridor (Suspected Croup)

### d) Contraindications

- (1) Hypertension
- (2) Pre-existing tachydysrhythmias with a pulse (ventricular and supraventricular)
- (3) Use with pregnant women should be avoided whenever possible.

### e) Adverse Effects

- (1) Tachydysrhythmias (supraventricular and ventricular)
- (2) Hypertension
- (3) May induce early labor in pregnant women



- (4) Headache
- (5) Nervousness
- (6) Decreased level of consciousness
- (7) Rebound edema may occur 20-30 minutes after administration to croup patients

**f) Precautions**

- (1) Do not mix with sodium bicarbonate as this deactivates epinephrine.
- (2) Epinephrine causes a dramatic increase in myocardial oxygen consumption.
- (3) Its use in the setting of an acute MI should be restricted to cardiac arrest.
- (4) IVP epinephrine (1:1,000) should not be administered to any patient with a pulse.

**g) Dosage**

- (1) Cardiac Arrest
  - (a) Adult (**NEW '09**):
    - (i) Administer 1 mg (1:10,000) IVP every 3-5 minutes;
  - (b) Pediatric:
    - (i) Administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO; repeat every 3-5 minutes
    - (ii) ET: 0.1 mg/kg of 1:1,000, diluted with 5 mL of Lactated Ringer's; repeat every 3-5 minutes
  - (c) Neonate:
    - (i) Administer 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO; repeat every 5 minutes
    - (ii) ET: 0.03 mg/kg of 1:10,000, diluted with 1 mL of Lactated Ringer's
- (2) Bradycardia
  - (a) Adult: not indicated
  - (b) Pediatric:
    - (i) Administer 0.01 mg/kg (0.1 mL/kg) of the 1:10,000 IVP/IO; repeat every 3-5 minutes
    - (ii) ET: 0.1 mg/kg of 1:1,000, diluted with 5 mL of Lactated Ringer's solution; repeat every 3-5 minutes



## 17. GLUCAGON (CRT-(I) & EMT-P only)

### a) Pharmacology

- (1) Hormone synthesized by the pancreas
- (2) Increases blood glucose concentration
- (3) Inhibits gastric and pancreatic secretions
- (4) May increase heart rate and cardiac output
- (5) May decrease blood pressure
- (6) Increases metabolic rate

### b) Pharmacokinetics

- (1) Destroyed by the GI tract and is not effective orally
- (2) Maximum hyperglycemic activity occurs within 30 minutes and disappears after 1-2 hours.
- (3) Relaxation of smooth muscle occurs within 8-10 minutes and persists for 12-27 minutes.
- (4) The half-life is 3-10 minutes.
- (5) Degraded in liver and kidneys

### c) Indications

- (1) Unconscious patients who are highly suspected of being hypoglycemic where IV access is unobtainable
- (2) Unconscious combative patients where IV access is unobtainable due to venous collapse or altered mental status

### d) Contraindications

Known hypersensitivity


### e) Adverse Effects

Nausea and vomiting

### f) Precautions

Glucagon only works if liver has significant glycogen stores.

### g) Dosage

- (1) For suspected hypoglycemia without IV access:
  - (a) Adult: Administer 1 mg IM
  - (b) Pediatric:
    - (i) 1 mg IM (25-40 kg); maximum total dose 3 mg
    - (ii) 0.5 mg IM (less than 25 kg); maximum total dose 3 mg
- (2)  For suspected beta blocker overdose:
  - (a) Adult: Administer 1 mg IVP every 5 minutes
  - (b) Pediatric: Administer every 5 minutes
    - (i) 1 mg IVP (25-40 kg); maximum total dose 3 mg
    - (ii) 0.5 mg IVP (less than 25 kg); maximum total dose 3 mg



**18. HALOPERIDOL (HALDOL) (NEW '09)**  
(EMT-P Only)

**a) Pharmacology**

- (1) An effective anxiolytic agent. Very effective in the management of aggressive and violent patients.
- (2) Also has antiemetic properties. Useful in the management of severe nausea and vomiting.
- (3) Weak anticholinergic (atropine-like) and alpha-blocking agent (vasodilation).

**b) Pharmacokinetics**

Onset of action is within 10 minutes of the IM administration.

**c) Indications**

Chemical restraint for violent, agitated, and aggressive patients who present a danger to themselves or to others and who cannot be safely managed otherwise. Most violent/agitated patients can be handled with verbal or physical restraint alone. This is a joint paramedic–base station physician decision that relies heavily on paramedic judgment.

**d) Contraindication**

- (1) Children under 6 years of age
- (2) Parkinson's disease
- (3) CNS depression
- (4) Acute CNS injury

**e) Adverse Effects**

- (1) Extrapyramidal symptoms (dystonic reaction) are the most common side effects. These are generally not encountered with short-term use. In the event that they should develop, a single dose of diphenhydramine 25-50 mg (1 mg/kg for pediatrics to a max of 25 mg) will generally relieve symptoms (medical consult required).
- (2) Hypotension and tachycardia are common (20-25%) but usually self-limiting side effects. Fluid challenge is indicated with a significant drop blood pressure or hypotension.
- (3) Haloperidol has been known to cause torsades de pointes ventricular tachycardia. Once the patient has been medicated place the patient on a cardiac monitor and monitor for dysrhythmias. **(NEW '09)**



**f) Precautions**

- (1) Violent patients should be physically restrained while the medication is administered.
- (2) May mask subsequent evaluation.

**g)  Dosage (NEW '09) (May combine with midazolam in same syringe)**

- (1) Adult
  - a. **Patient 15-69 years of age:**  
5 mg IM or IV
  - b. **Patient greater than 69 years of age:**  
2.5 mg IM or IV
- (2) Pediatric
  - a. **Child less than 6 years of age:**  
Contraindicated
  - b. **Child 6-11 years of age:**  
0.05 mg/kg IM or IV, max of 2.5 mg
  - c. **Patient 12-14 years of age:**  
2.5 - 5 mg IM or IV



## 19. LACTATED RINGER'S



### a) Pharmacology

- (1) Isotonic crystalloid solution
- (2) Lacted Ringer's contains:

(a) Sodium (Na <sup>+</sup> )	130 mEq/liter
(b) Potassium (K <sup>+</sup> )	4 mEq/liter
(c) Calcium (Ca <sup>++</sup> )	3 mEq/liter
(d) Chloride (Cl <sup>-</sup> )	109 mEq/liter
(e) Lactate	28 mEq/liter

### b) Pharmacokinetics

Lactated Ringer's is a water and electrolyte replacement.

### c) Indications

- (1) Hypovolemia
- (2) Keep vein open
- (3) Fluid boluses

### d) Contraindications

Fluid overload states



### e) Adverse Effects

Rare in therapeutic doses

### f) Precautions

- (1) Patients receiving lactated Ringer's should be monitored to prevent circulatory overload.
- (2) Lactated Ringer's should be used with caution in patients with congestive heart failure or renal failure.

### g) Dosage

- (1)  Maximum dose 2,000 mL without medical consultation
- (2) Adult:
  - (a) KVO
  - (b) Initiate IV LR fluid therapy (20 mL/kg bolus).
  - (c) Titrate to a systolic pressure of 100 mm Hg.
- (3) Pediatric:
  - (a) KVO
  - (b) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO.
  - (c) If patient's condition does not improve, administer the second fluid bolus of 20 mL/kg LR IV/IO.
  - (d) Volume infusion for neonates and volume sensitive children 10 mL/kg; for infant and child 20 mL/kg. Fluid boluses for neonates and volume sensitive children are 10 mL/kg; for infants and children 20 mL/kg.
  - (e)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO



## 20. LIDOCAINE (XYLOCAINE)

### a) Pharmacology

- (1) Suppresses ventricular ectopy
- (2) Elevates VT and VF threshold
- (3) Nasal anesthesia

### b) Pharmacokinetics

- (1) Extremely rapid (within minutes) onset following IV administration and lasts approximately 10-20 minutes
- (2) Mucosal anesthesia with onset in 1-5 minutes

### c) Indications

- (1) Prevent recurrence of ventricular fibrillation/tachycardia after defibrillation and conversion to supraventricular rhythm
- (2) Ventricular tachycardia (VT)
- (3) Ventricular fibrillation (VF)
- (4) Reduce or eradicate ventricular ectopy, especially closely coupled, multifocal, or short bursts of five or more PVCs in succession
- (5) Decrease intracranial pressure with Rapid Sequence Intubation
- (6) Nasal tracheal intubation

### d) Contraindications

- (1) AV blocks
- (2) Sensitivity to lidocaine
- (3) Idioventricular escape rhythms
- (4) Accelerated idioventricular rhythm
- (5) Sinus bradycardia or arrest or block
- (6) Hypotension
- (7) Shock
- (8) Ventricular conduction defects

### e) Adverse Effects

- (1) Lidocaine may cause clinical evidence of toxicity usually related to the central nervous system.
- (2) Toxicity:
  - (a) Early: muscle twitching, slurred speech, altered mental status, decreased hearing, paresthesia (pins and needles), anxiety, apprehension, visual disturbances, nausea, numbness, difficulty breathing or swallowing, decreased heart rate
  - (b) Late: convulsions, hypotension, coma, widening of QRS complex, prolongation of the P-R interval, hearing loss, hallucinations



**f) Precautions**

- (1) Reduce the dosage in patients with decreased cardiac output, liver dysfunction, and the elderly (age over 70)
- (2) Bolus doses should be administered over a 1-minute period, except in ventricular fibrillation/ventricular tachycardia, when they are administered IVP.

**g) Dosage**

- (1) Adult with pulse: Administer 1 -1.5 mg/kg IVP bolus followed by 0.5-0.75 mg/kg every 8-10 minutes as needed, up to 3 mg/kg.  
**(NEW '09)**
- (2) Adult without pulse: Administer 1.5 mg/kg IVP bolus initially followed by additional 1.5 mg/kg IVP bolus in 3-5 minutes to maximum of 3 mg/kg.
- (3) Pediatric with pulse: Administer 1 mg/kg initial bolus and 0.5 mg/kg IVP/IO bolus every 8-10 minutes, as needed, to maximum of 3 mg/kg.  
ET dose: 2-2.5 times the above dose
- (4) Pediatric without pulse: Administer 1 mg/kg initial bolus IVP/IO bolus followed by 1 mg/kg IVP boluses in 3-5 minutes to a maximum of 3 mg/kg.  
ET dose: 2-2.5 times the above dose

**h) Inter-Facility Transport Only**

- (1) IV Infusion
- (2) Maintain the IV Infusion of lidocaine at the rate established by the sending physician and record vital signs every 15 minutes. (See Lidocaine Infusion for Inter-Facility Transport.)



**21. MIDAZOLAM (VERSED) (Non-RSI) (NEW '09)  
(CRT-I and EMT-P)**

**a) Pharmacology**

- (1) Sedative
- (2) Hypnotic
- (3) Anticonvulsant

**b) Pharmacokinetics**

- (1) A short-acting benzodiazepine with strong hypnotic, anticonvulsant activity and amnestic properties
- (2) Onset of action is extremely rapid following IV administration approximately 1<sup>1</sup>/<sub>2</sub> minutes and for IM approximately 15 minutes.
- (3) Duration of effect 1-4 hours with half life of 1<sup>1</sup>/<sub>2</sub> to 3 hours in healthy adult.

**c) Indications**

- (1) Sustained and/or recurrent seizures
- (2) Precardioversion to reduce anxiety
- (3) Awake patient requiring transcutaneous pacing (TCP)
- (4) Nasal Tracheal Intubation
- (5) Implanted Cardioverter Defibrillator (ICD) Malfunction
- (6) Nerve/ organophosphate exposure
- (7) Bucking Endotracheal Intubated patient (for RSI jurisdictions)
- (8) Chemical Restraint

**d) Contraindications**


- (1) Hypotension (See below for ET bucking)
- (2) Known hypersensitivity to midazolam

**e) Adverse Effects**

- (1) Respiratory depression, or apnea
- (2) Hypotension

**f) Precautions**

- (1) The effects of midazolam can be accentuated and significantly potentiated by CNS depressants, such as narcotics or alcohol
- (2) Midazolam is five times as potent per milligram as diazepam and there is an increased risk of respiratory depression

- g)**  **Dosage** (Paramedic may perform without consult for patients with active seizures.)

All Indications in c) above except for Bucking Endotracheal Intubated patient and Chemical Restraint

- (1) Adult: (Reduce the below IV/IO/IM by 50% for patients 69 years or older.)

0.1mg/kg in 2 mg increments slow IV push over one to two minutes per increment with maximum single dose 5 mg  
If IV unavailable, 5 mg IM may be administered

Additional doses up to a maximum total dose 10 mg requires medical consultation for all providers  
For seizures lasting greater than 10 minutes (status), consider IO administration of midazolam.

If suspected severe nerve agent exposure, providers may administer Midazolam 5 mg IM without medical consultation

- (2) Pediatric:  
0.1mg/kg slow IV push over one to two minutes,  
Maximum single dose 2 mg  
If IV unavailable, 0.2 mg/kg IM  
Maximum single dose 5 mg

Additional doses up to a maximum total dose 5 mg requires medical consultation for all providers  
For life threatening conditions, consider IO administration of midazolam.

If suspected severe nerve agent exposure, providers may administer midazolam as above without medical consultation

#### Chemical Restraint

Adult: Patient 15-69 years: midazolam 5 mg IM/IV



Patient greater than 69 years: midazolam 2.5 mg  
IM/IV

Repeat doses may be given with medical direction

Pediatrics: Not indicated

#### Bucking Endotracheal Intubated patient (RSI PILOT ONLY)

- (1) Adult: Administer 0.05 mg/kg (2-5 mg) slow IVP over 1-2 minutes, while maintaining BP systolic greater than 80 mmHg. STOP ONCE BUCKING HAS RESOLVED AND VENTILATION IS RELAXED  
Additional doses require medical consultation





**f) Precautions**

- (1) Narcan reverses all effects.
- (2) Administration masks pain, making hospital diagnosis difficult.
- (3) Should be administered slowly and titrated to effect.
- (4) Vital signs should be monitored frequently.
- (5) Hypotension is a greater possibility in volume-depleted patients.



**Dosage**

- (1) Adult:
  - (a) AMI: Administer 2-5 mg slow IVP, followed by 1 mg every 5 minutes to a maximum of 10 mg or until pain is relieved
  - (b) Isolated injury (including burns, frostbite, eye trauma): Administer 2-10 mg slow IVP at 1-2 mg/min increments to 10 mg or until pain is relieved (Paramedic may perform without consult.) For doses above 10 mg, requires medical consultation.
  - (c) May also be administered IM dose 5-15 mg based on patient weight
  - (d) Pacing: Administer 1-2 mg/min IVP. (Paramedic may perform without consult.)
- (2) Pediatric: 0.1 mg/kg slow IVP/IO/IM (1-2 mg/min)  
Maximum dose 5 mg.



## 23. NALOXONE (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 if administered IVP.
- (2) Intramuscular and pediatric/neonatal endotracheal administration results in a slower onset of action. **(NEW '09)**
- (3) Patients responding to naloxone may require additional doses and transportation to the hospital since most opioids last longer than naloxone.
- (4) Has no effect in the absence of narcotics

### c) Indications

To reverse respiratory and central nervous system depression induced by opiates

### d) Contraindications

Not clinically significant

### e) Adverse Effects


Not clinically significant

### f) Precautions

- (1) Naloxone may induce opiate withdrawal in patients who are physically dependent.
- (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

### g) Dosage

- (1) Adult: Administer 0.4-2 mg IVP/IM/Intranasal (if delivery device is available); repeat as necessary to maintain respiratory activity.  
**(NEW '09)**
- (2) Pediatric: Administer 0.1 mg/kg IVP/IM/Intranasal (if delivery device is available) , up to maximum initial dose of 2 mg; may be repeated as necessary to maintain respiratory activity.  
ET dose: 0.2 - 0.25 mg/kg

- (3)  Greater than 2 mg IV may be administered with medical consultation





## 24. NITROGLYCERIN

### a) Pharmacology

- (1) Vasodilator-effect on veins more than arteries
- (2) Decreases right heart return (preload) by venous pooling, thereby decreasing myocardial workload and oxygen consumption

### b) Pharmacokinetics

- (1) Absorbed through oral mucosa
- (2) Antianginal and vasodilation effects within 1-2 minutes after administration. Half-life is 1-4 minutes.
- (3) Duration of action is less than 5 minutes.

### c) Indications

- (1) For treatment of angina
- (2) Congestive heart failure, acute pulmonary edema

### d) Contraindications

- (1) Known hypersensitivity
- (2) Pediatric patient under the age of 12
- (3) Any patient having taken medication for erectile dysfunction (eg, Viagra™, Levitra™, or Cialis™) within the past 48 hours. Medical consultation is required to override this contraindication.
- (4) Asymptomatic hypertension
- (5) Blood pressure below 90 mmHg systolic
- (6) Heart rate less than 60

### e) Adverse Effects

Headache, hypotension, nausea, vomiting, and dizziness, decreased level of consciousness

### f) Precautions

May cause hypotension


### g) Dosage

#### (1) Adult

- (a) If patient has a prescription or previous history of nitroglycerin use, administer nitroglycerin: 0.4 mg SL (may repeat dose 2 times at 3-5 minute intervals)

May be repeated if symptoms persist, and BP is greater than 90 mm Hg, and pulse is greater than 60 bpm, to a maximum dose of 1.2 mg

- (b) If patient does **not** have a prescription or previous history of nitroglycerin use, establish IV prior to the administration of nitroglycerin, then administer nitroglycerin as above.

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

**(2) High Dose NTG (Assess BP before each administration) (NEW '09)**

**CPAP Nitroglycerin Dose (Dose at 3-5 minute intervals.)**

- (i) give 1 dose of 0.4 mg NTG (Preparing CPAP)
- (i) give 1 dose of 0.8 mg NTG (Patient education CPAP)
- (iii) give 1 dose of 0.8 mg NTG (CPAP acclimatized patient)
- (iv) complete dose=2.0 mg
- (v) Then follow with captopril (SBP is equal to or greater than 110); then attach CPAP; and then apply nitroglycerin paste.

**CPAP Not Tolerated - Nitroglycerin Dose**

**(Dose at 3-5 minute intervals.)**

- (i) give 1 dose of 0.4 mg NTG
- (ii) give 1 dose of 0.8 mg NTG
- (iii) give 1 dose of 0.8 mg NTG
- (iv) give 1 dose of 0.8 mg NTG
- (v) give 1 dose of 0.8 mg NTG
- (vi) give 1 dose of 0.8 mg NTG
- (vii) complete dose = 4.4 mg
- (viii) Then follow with captopril (SBP is equal to or greater than 110); administer albuterol (medical consult if there is cardiac history); and apply Nitroglycerin paste.

**(3) Pediatric: Not indicated**



**25A. Ondansetron (Zofran) (NEW '09)  
(CRT-I and EMT-P)**


**a) Pharmacology**

- (1) A selective blocking agent of the serotonin 5-HT<sub>3</sub> receptor type.

**b) Pharmacokinetics**

- (1) Anti-nausea and anti-emetic with onset of action within 5-15 minutes IV and 30 minutes IM.

**c) Indications**

- (1) Control of nausea and vomiting  
(2)  Ondansetron can be administered in an effort to reduce the nausea or vomiting complications associated with certain existing injuries, medical illness, or medication side effects (e.g., penetrating eye injury, high risk for aspiration, or following narcotic administration)

**d) Contraindications**

- (1) Known hypersensitivity to Ondansetron.

**e) Adverse Effects**

- (1) Hypotension  
(2) Tachycardia  
(3) Extrapyramidal reactions  
(4) Seizures  
(5) QT interval prolongation

**f) Precautions**

- (1) Monitor ECG, pulse oxymetry, and blood pressure.  
(2) Have emesis basin and suction ready.

**g) Dosage**

- (1) Adult: 4 mg slow IV over 2-5 minutes OR  
4 mg IM;



May repeat once with medical consultation.

Preventative administration of an anti-nausea/anti-emetic

- (2)  Pediatric:

For patients who weigh 40 kg or less: 0.1 mg/kg slow IV over 2-5 minutes,

For patients who weigh more than 40 kg: 4 mg slow IV over 2-5 minutes

OR

If no IV: 0.1 mg/kg IM (with max single dose of 4 mg);

May repeat once with medical consultation.



Preventative administration of an anti-nausea/anti-emetic

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**PILOT PROGRAM  
EMT-B ACQUISITION OF 12-LEAD ELECTROCARDIOGRAPHY**

- (iii) Remove electrodes from a sealed package immediately before use. Using previously unpacked electrodes or electrodes with expired date codes may impair ECG signal quality.
- (iv) When placing electrodes on female patients, always place the leads V3-V6 under the breast rather than on the breast.
- (v) Acquisition of a 12-lead ECG should take no more than 5 minutes.
- (vi) Transmission of the 12-lead ECG to the receiving facility should be done en route to the receiving facility. There is no need to delay transport to transmit a 12-lead ECG.

**6. INDIVIDUAL EMT-B APPROVAL FOR PARTICIPATION**

- a) The EMT-B 12-Lead ECG Program is open to all Maryland EMT-Bs that have been providing direct patient care for a minimum of one year.
- b) Providers must be members of an ALS company that currently owns a local system compatible 12-lead device.

**7. ONGOING DEMONSTRATION OF PROFICIENCY**

After the initial training program is completed, the EMT-B will participate in an annual refresher training program.

**8. REVIEW OF EACH CALL**

- a) Providers will submit copies of each 12-lead ECG and EMAIS report to their jurisdictional Quality Review Committee.
- b) The Quality Review Committee will review all 12-lead transmissions on a quarterly basis and submit a report to the Jurisdictional and Regional Medical Directors.

**PILOT PROGRAM  
PELVIC STABILIZATION BINDER DEVICE FOR  
SUSPECTED PELVIC FRACTURE PROCEDURE (NEW '09)**

**N3. Pelvic Stabilization Binder Device**

All levels of EMS providers if appropriately trained in the device

**1. INDICATIONS**

All of the following blunt trauma patients with physical findings indicative of pelvic fracture should have an application of a Pelvic Stabilization Binder Device.

- a) Evidence of pelvic instability on examination of the pelvis
- b) Patients complaining of pelvic pain on examination of the pelvis
- c) Pain on iliac compression
- d) Pain on compression of the pubic symphysis
- e) Blood at the urethral meatus
- f) Vaginal bleeding
- g) Perineal or scrotal hematoma
- h) All blunt trauma patients with an unreliable physical exam and significant mechanism of injury may be considered for application of a Pelvic Stabilization Binder Device.



PREGNANCY IS NOT A CONTRAINDICATION TO THE APPLICATION OF THE PELVIC STABILIZATION BINDER DEVICE WHEN INDICATED.

**2. CONTRAINDICATIONS**

Children who have not reached their 15<sup>th</sup> birthday

**3. PROCEDURE**

- a) Assess for pelvic instability.  
In order to not increase bleeding, only one exam should be performed to evaluate for pelvic fracture. Multiple exams will disrupt clot formation.
- b) Identify the greater trochanter of each femur.  
The greater trochanter is the bony prominence of the lateral upper thigh.
- c) The patient should be placed in a supine position prior to application of the pelvic stabilization binder device.
- d) Place pelvic binder around the patient, centered at the level of the greater trochanter.
- e) It may be advisable to place the binder on the backboard prior to placing the patient onto the backboard so that it is already prepared for placement.
- f) Ensure patient has been undressed and provides adequate exposure.
- g) Tighten the binder as directed by the manufacturer's instructions for the specific stabilization binder.
- h) Once pelvic stabilization binder device is applied, do not remove until directed to do so by physician.

OPTIONAL SUPPLEMENTAL PROGRAM  
CYANIDE POISONING PROTOCOL

## V. JURISDICTIONAL OPTIONAL PROTOCOLS



### O. CYANIDE POISONING

1. Initiate General Patient Care.

2. Presentation

Depending on its form, Cyanide can enter the body through inhalation, ingestion, or absorption through the skin. Cyanide should be suspected in occupational or smoke exposures (i.e. firefighting), industrial accidents, natural catastrophes, suicide and murder attempts, chemical warfare and terrorism (whenever there are multiple casualties of an unclear etiology).

Non-specific and early signs of cyanide exposure (inhalation, ingestion, or absorption) include the following signs and symptoms: anxiety, vertigo, weakness, headache, tachypnea, nausea, dyspnea, vomiting, and tachycardia.

**“High Concentrations of cyanide” will produce:**

1. Markedly altered level of consciousness
2. Seizure
3. Respiratory depression or respiratory arrest or
4. Cardiac dysrhythmia (other than sinus tachycardia)

The rapidity of onset is related to the severity of exposure (inhalation or ingestion) and may have dramatic, immediate effects causing early hypertension with subsequent hypotension, sudden cardiovascular collapse or seizure/coma.



PATIENTS WHO HAVE SUSTAINED A BURN AND/OR TRAUMATIC INJURY SHOULD BE GIVEN TREATMENT SPECIFIC TO THOSE INJURIES, INCLUDING SPINAL IMMOBILIZATION, IF INDICATED. THE SMELL OF (BITTER) ALMONDS IS NOT A RELIABLE SIGN AND THE PROVIDER SHOULD NOT ATTEMPT TO INHALE LOCAL AIR NOR PATIENT BREATH TO DETERMINE IF THE ALMOND SMELL IS PRESENT.

BE SURE TO ASSESS FOR EVIDENCE OF TRAUMATIC OR MEDICAL CAUSES FOR PATIENT'S ALTERED MENTAL STATUS.



3. BLS Treatment:

- a) Remove the patient from the source of exposure. (In the smoke inhalation victim, maintain appropriate provider respiratory protection, SCBA).
- b) Restore or maintain airway patency.
- c) Administer 100% oxygen via non-rebreather mask or bag valve mask.
- d) Provide aggressive advanced airway management.

**OPTIONAL SUPPLEMENTAL PROGRAM  
CYANIDE POISONING PROTOCOL**

**CYANIDE POISONING (CONTINUED)**

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4. ALS Treatment:
  - 1) Initiate IV LR KVO.
  - 2) Use Glucometer and treat patient accordingly.
  - 3) There is no widely available, rapid, confirmatory cyanide blood test. Treatment decisions must be made on the basis of clinical history and signs and symptoms of cyanide intoxication. For the patient with an appropriate history and manifesting one or more of “high concentrations of cyanide” signs or symptoms:
    - a) Collect a pre-treatment blood sample in the appropriate tube for Lactate and Cyanide levels.
    - b) ADULT: Administer Hydroxocobalamin. Initial dose is 5 g administered over 15 minutes slow IV. Each 2.5 g vial of hydroxocobalamin for injection is to be reconstituted with 100 mL of LR and administered at 10 - 15 mL/minute. An additional 5 g dose may be administered with medical consultation.
    - c) PEDIATRIC: Administer Hydroxocobalimin 70 mg/kg (reconstitute concentration is 25 mg/mL). Each 2.5 g vial of hydroxocobalamin for injection is to be reconstituted with 100 mL of LR and administered at 10 - 15 mL/minute. Maximum single dose is 5 grams.
    - d) If patient (adult or pediatric) has a reported oral cyanide ingestion and does not manifest signs and symptoms meeting administration criteria, medical consultation is required for administration of hydroxocobalamin (consider simultaneous consultation with poison control and medical consultation).
    - e) If patient history is suggestive of CO inhalation, consider transport to hyperbaric medicine treatment facility.



HYDROXOCOBALAMIN MAY CAUSE TEMPORARY RED DISCOLORATION OF THE SKIN, URINE, AND MUCOUS MEMBRANES (WHICH IS NOT TO BE CONFUSED WITH THE RARE SIGN OF CARBON MONOXIDE POISONING). THE DEVICES THAT RELY ON COLORIMETRY (EG PULSE OXYMETER, AND CO LEVEL) WILL BE INTERFERED WITH BY THE COLOR CHANGE AND ARE NOT RELIABLE FOR PATIENT ASSESSMENT.

NOTIFY HOSPITAL OF ADMINISTRATION OF HYDROXOCOBALAMIN AND DO NOT ADMINISTER SODIUM THIOSULFATE THROUGH THE SAME IV SINCE THIS MAY CAUSE CRYSTALLINE PRECIPITATION.

5. Continue General Patient Care.



**OPTIONAL SUPPLEMENTAL PROGRAM  
IMPEDANCE THRESHOLD DEVICE (ITD)  
ALL PROVIDER LEVELS**



**Q1. IMPEDANCE THRESHOLD DEVICE (ITD) (single use device) (NEW '09)**

**1. PURPOSE**

While CPR is being performed, the impedance threshold device prevents air from entering the chest during chest recoil, thereby increasing negative pressure. This enhanced vacuum pulls more blood back to the heart, doubling blood flow during CPR. Studies have shown that this mechanism increases cardiac output, blood pressure, and survival rates.

**2. INDICATIONS**

The impedance threshold device is indicated for patients 12 years of age and greater with cardiac arrest.

**3. CONTRAINDICATIONS**

- a) Children less than 12 years of age
- b) Patients with a pulse



**4. PROCEDURE**

- a) Use with a facemask.
  - (1) Connect ITD to facemask.
  - (2) Open airway. Establish and maintain tight face seal with mask throughout chest compressions; a head strap or 2-handed technique is recommended.
  - (3) Connect ventilation source to ITD.
  - (4) Perform CPR at the recommended compression to ventilation ratio.
- b) Use with an ET Tube.
  - (1) Confirm ET tube placement and firmly secure ET tube as there is additional weight.
  - (2) Connect ITD to ET tube.
  - (3) Connect ventilation source to ITD.
  - (4) Perform continuous chest compressions at recommended rate.
  - (5) Remove clear tab and turn on timing assist lights. Ventilate asynchronously at timing light flash rate of 10/min.
  - (6) Place exhaled CO<sub>2</sub> detector between ITD and ventilation source.

## OPTIONAL SUPPLEMENTAL PROGRAM IMPEDANCE THRESHOLD DEVICE (ITD)



ONCE THE PATIENT HAS A RETURN OF SPONTANEOUS CIRCULATION (A PULSE) THE ITD MUST BE REMOVED. THE SAME ITD MAY BE PLACED BACK INTO THE VENTILATION CIRCUIT IF THE PATIENT GOES BACK INTO CARDIAC ARREST REQUIRING ADDITIONAL CPR.

### 5. SPECIAL CONSIDERATIONS

Remove secretions from the ITD by shaking or blowing out with the ventilation source.

**OPTIONAL SUPPLEMENTAL PROGRAM  
AIRWAY MANAGEMENT  
ALS ONLY**



**Q2. AIRWAY MANAGEMENT: Laryngeal Tube Airway Device (King LTS-D™)**

**1. PURPOSE**

To provide an alternative to the Combitube (latex) or Easy Tube (latex free); it is a latex-free means of ventilating patients who cannot be intubated via direct laryngoscopy.

**2. INDICATIONS**

Inability to place an endotracheal tube in a patient who has no gag reflex (including patients who cannot be intubated following the administration of succinylcholine)

**3. CONTRAINDICATIONS**

- (1) Responsive patients with an intact gag reflex
- (2) Patients under 35 inches (2 and 2.5 LT not to be used)
- (3) Known esophageal disease or ingestion of caustic substances

**4. POTENTIAL ADVERSE EFFECTS / COMPLICATIONS**

- (1) The LTS-D airway does not protect against the effects of regurgitation and aspiration.
- (2) High airway pressures may divert gas either to the stomach or to the atmosphere.
- (3) Intubation of the trachea cannot be ruled out as a potential complication of the insertion of the LTS-D airway. After placement, perform standard checks for breath sounds and utilize an appropriate carbon dioxide monitor.

**5. PROCEDURE**

- (1) Inspect all components of the LTS-D for visible damage.
- (2) Select appropriate size LTS-D airway:
  - (a) Size 3: Patients 35 inches to 5 ft tall (BVM connector tip is yellow)
  - (b) Size 4: Patients 5-6 ft tall (BVM connector tip is red)
  - (c) Size 5: Patients greater than 6 ft tall (BVM connector tip is purple)
- (3) Test cuffs by injecting the maximum volume of air (by size) and lubricate with water soluble jelly.
  - (a) Size 3: 60ml Air
  - (b) Size 4: 80ml Air
  - (c) Size 5: 90ml Air

**OPTIONAL SUPPLEMENTAL PROGRAM  
AIRWAY MANAGEMENT**

- (4) Maintain cervical immobilization (if indicated) and lift tongue and jaw upward with one hand. Ideal position of the head is in the “sniffing position”; however, the LTS-D airway can be inserted with the head in neutral position.
- (5) Insert LTS-D airway to the indicated depth until the proximal cuff is slightly visible in the posterior pharynx under the base of the tongue; **DO NOT USE EXCESSIVE FORCE.**
- (6) With the free hand, hold the mouth open and make sure that the tongue is not folded back during insertion of the LTS-D airway.
- (7) Inflate cuff. When the airway is properly seated, the patient's teeth should be located within the black lines on the lumen of the LTS-D airway.
- (8) Ventilate and evaluate lung ventilation (breath sounds, absence of gastric sounds, chest rise, end tidal carbon dioxide, oxygen saturation).
- (9) If no lung ventilation, then deflate the cuff, withdraw LTS-D airway 2 cm at a time, re-inflate cuff, and reevaluate ventilation.
- (10) Once effective ventilation is confirmed, continue to monitor oxygen saturation and ventilate to desired end tidal carbon dioxide level.
- (11) If unable to achieve adequate ventilation using LTS-D airway, remove device, reinsert, and attempt again. If unable to ventilate, re-attempt bag valve mask ventilation and consider obstructed airway maneuvers.

**OPTIONAL SUPPLEMENTAL PROGRAM  
MARK I KITS**

**R. MARK I Kits Atropine and 2-PAM Auto-Injectors**

**1. Initiate General Patient Care.**

**2. General Information**

- a) Nerve agents are a group of highly toxic chemicals that may potentially be released in a WMD event. These agents act to inhibit cholinesterase and therefore prolong the effects of acetylcholine. These agents are potent, long acting, and all bind to acetylcholine irreversibly unless an oxime is given.
- b) Nerve agents include Tabun (GA), Sarin (GB), Soman (GD) and GF. There are also V agents such as VX.
- c) The G-type agents evaporate and become vapor or may be dispersed in the air by weapons. When a person inhales this vapor, effects begin within seconds to minutes.
- d) The V-type agents are oily and evaporate very slowly. They persist on the ground, foliage, etc., for long periods of time. Exposure to this liquid on the skin causes effects to start as soon as 10 minutes or as long as 18 hours after contact. The vapor hazard from these is not as great as from the G-type agents.
- e) Many insecticides currently in use are organophosphates and are chemically related to nerve agents. The organophosphate insecticides may have a slower onset and a longer lasting effect compared with nerve agents.

**3. Presentation**

- a) Characteristic signs and symptoms may identify nerve agent poisoning. After vapor exposure, early manifestations of poisoning occur in the eyes, nose, and airway. With liquid/dermal contact exposure, early manifestations occur in the skin and the GI tract. Thus, when looking at the chart below, consider the mechanism of release and the associated signs and symptoms. (Refer to the chart below with the mnemonic P-SLUDGE-MC for symptoms and signs. NOTE: This mnemonic is used for all

<b>Nerve Agents</b>			
Signs & Symptoms of Chemical Agents			
		<u>Vapor Exposure</u>	<u>Liquid Exposure</u>
<b>Mild</b>	P - Pinpointing pupils	x	Not Seen
	S - Salivation	x	Not Seen
	L - Lacrimation (tearing)	x	Not Seen
<b>Severe</b>	U - Urination	x	x
	D - Defecation	x	x
	G - Gastrointestinal; pain/gas	x	x
	E - Emesis (vomiting)	x	x
	M - Muscle twitching	x	x
	C - Convulsions	x	x

*From SBCCOM's EMS Technician Course and Toxic Chemical Training Course for Medical Support Personnel.*

## OPTIONAL SUPPLEMENTAL PROGRAM ADMINISTRATION OF MARK I KITS

organophosphate toxicity. Pupillary response occurs only with vapor exposure and will not be seen unless there is direct liquid contact with the eye. Urinary incontinence is also very rare.)

- b) EMS providers must know the following MILD, MODERATE, and SEVERE signs and symptoms of nerve agent poisoning. When providers recognize most or all of the symptoms listed below they must IMMEDIATELY receive treatment (first aid or buddy aid).
  - (1) MILD poisoning (self-aid). Casualties with mild symptoms may experience most or all of the following:
    - (a) Unexplained runny nose
    - (b) Unexplained sudden headache
    - (c) Sudden drooling
    - (d) Difficulty in seeing (dimness of vision, constricted pupil)
    - (e) Tightness in the chest or difficulty in breathing
    - (f) Wheezing and coughing
    - (g) Localized sweating and muscular twitching in the area of the contaminated skin
    - (h) Stomach cramps
    - (i) Nausea without vomiting
  - (2) MODERATE effects would be the above, but also include more severe effects such as diarrhea, moderate to severe difficulty breathing, and some skeletal-muscular twitching /fasciculations. The progression of symptoms from mild to moderate indicates either inadequate treatment or continuing exposure to the nerve agent.
  - (3) SEVERE symptoms. Providers with severe symptoms will not be able to treat themselves and must receive prompt buddy aid and medical treatment. Casualties with severe symptoms may experience most or all of the MILD symptoms plus most or all of the following:
    - (a) Impaired thinking
    - (b) Increasing wheezing and increased difficulty breathing
    - (c) Severe pinpoint pupils
    - (d) Red eyes with tearing
    - (e) Vomiting
    - (f) Severe muscular twitching and general weakness
    - (g) Involuntary defecation
    - (h) Convulsions
    - (i) Unconsciousness
    - (j) Respiratory Failure
    - (k) Bradycardia

#### 4. Prevention of Poisoning

- a) In the setting of an exposure to a nerve agent, the most rapid absorption occurs through the respiratory tract. When it is suddenly determined that providers are in the Hot Zone, do **not** look for the **invisible** vapor cloud. Providers should hold their breath until they don and clear their breathing

## OPTIONAL SUPPLEMENTAL PROGRAM MARK I KITS

apparatus or protective masks. Once masked, a provider will then give the alarm to other providers. This may be done with hand signals or through the mask. If a fellow provider is severely poisoned with altered consciousness in the hot zone, the initial, less poisoned masked provider should mask the casualty.

- b) When the masked casualty is severely poisoned after exposure to vapor and liquid, he/she should be decontaminated by removing clothing, blotting the agent (if a liquid exposure), and diluting the agent by using a flush with large amounts of water. Decontamination should be done as soon as possible, but it will usually occur in the warm zone or a safe area.
- c) When treating a severely poisoned casualty, the treating provider should take care to avoid exposure to the liquid agent (which could occur when kneeling next to the casualty). Squatting next to the casualty while masking or treating him/her will help the caregiver to avoid exposure to liquid nerve agent.
- d) Do not administer nerve agent antidotes before actual exposure to nerve agents or development of clinical symptoms occurs. Nerve agent antidotes may degrade performance in the hot zone (creating a heat-stressed provider) and should be administered only when symptoms and signs of nerve agent poisoning are present.

### 5. Treatment

- a) The ABC priorities of prehospital treatment require modification to AABCs standing for “Antidote then ABCs.” The antidote (Atropine and 2-PAM) should be given as soon as possible, because toxic exposure to the nerve agent will make ventilation difficult. If the antidote is not immediately available, prevent further exposure to the nerve agent, provide ABC support, and evacuate the patient to an area where the antidote is available.
- b) Certified First Responder or EMT-B may administer MARK I kits (up to total of three kits) as buddy care to public safety personnel or when directed to do so by an ALS provider based on signs and symptoms in a mass casualty incident (MCI) or on-site chemical testing, confirming nerve or organophosphate agent presence in a mass casualty incident. The midazolam 5 mg or diazepam 10 mg auto-injector (CANA) can only be administered when three MARK I kits are administered in a severe exposure by an ALS provider. Medical Consultation is not required in these situations. **(NEW '09)**
- c) Dosage scheme for Mark I auto-injector administration
  - (1) Vapor (small exposure)
    - (a) Symptoms may include pinpoint pupils, runny nose, and/or mild shortness of breath.
    - (b) Onset of symptoms: within seconds
    - (c) If only symptoms are pinpoint pupils and/or runny nose, DO NOT TREAT; otherwise, treatment should begin with one dose of the Mark I antidote kit initially. This dosage may be repeated in 10 minutes if the patient remains symptomatic.

**OPTIONAL SUPPLEMENTAL PROGRAM  
MARK I KITS**

- (2) Liquid (small exposure)
  - (a) Symptoms may include sweating, twitching, vomiting, weakness
  - (b) Onset: minutes to hours
  - (c) Treatment should begin with one dose of Mark I antidote kit initially. The dosage may be repeated in 10 minutes if the patient remains symptomatic.
- (3) Vapor or liquid (moderate exposure)
  - (a) Symptoms may include more severe respiratory distress, muscular weakness, and/or vomiting and diarrhea.
  - (b) Treatment should begin with 2 doses of Mark I antidote kit initially. The dose of 2 mg of atropine may be repeated in 10 minutes if the patient remains symptomatic.
- (4) Vapor or liquid (large exposure)
  - (a) Symptoms may include copious secretions, unconsciousness, convulsions, and/or apnea.
  - (b) Onset: seconds to hours
  - (c) Treatment should begin with 3 doses of Mark I antidote kit initially. The dose of 2 mg of atropine may be repeated until symptoms decrease or cease.
- d) Monitoring effectiveness of treatment
  - (1) Mark I antidote treatment is initiated when symptoms are present in a WMD potential nerve agent setting.
  - (2) Evidence of response to treatment includes improvement in initial symptoms and **drying of secretions**. If neither occurs after initial Mark I administration, then administer additional atropine until these endpoints are reached. In this setting the pulse will generally be above 90 beats per minute (bpm) as an additional sign of atropinization. Pupillary constriction (pinpoint/miosis) usually occurs from direct exposure, will not respond to systemic atropine, and should not be used as a sign of the effect of treatment.
  - (3) The duration of effect of each 2 mg Atropine Auto-Injector is approximately 5 to 15 minutes. If secretions return and the pulse drops below 90 bpm, then additional atropine treatment should be given.
- e) Advanced Life Support care should be initiated once the patient is adequately decontaminated.
  - (1) Once an IV is established, a patient may be treated with atropine 2–4 mg IVP or IM every 5–10 minutes for symptoms listed above. Treatment should be titrated to the endpoints listed above.
  - (2) If 2-PAM has not previously been administered, 1–2 grams may be administered IM.
  - (3) Seizures should be treated with midazolam as indicated in protocol. If only diazepam (CANA) available administer 10 mg IM. **(NEW '09)**
  - (4) Severe nerve agent exposure: The midazolam 5 mg or diazepam 10 mg auto-injector (CANA) can only be administered when three MARK I kits are administered in a severe exposure by an ALS provider. Medical Consultation is not required in these situations. **(NEW '09)**



**OPTIONAL SUPPLEMENTAL PROGRAM  
WILDERNESS EMERGENCY MEDICAL  
SERVICES PROTOCOLS**

**POVIDONE-IODINE (Betadine)**

AVAILABILITY. . . . . Supplied in a 10% solution  
ACTION. . . . . A topical antimicrobial solution  
INDICATIONS. . . . . Superficial trauma  
CONTRAINDICATIONS. . . A patient with a known hypersensitivity  
PRECAUTIONS. . . . . For external use only  
SIDE EFFECTS. . . . . None  
INTERACTIONS. . . . . None  
DOSE . . . . . Clean the affected area with the solution and apply to the dressing as necessary.  
PEDIATRIC DOSE. . . . . Clean the affected area with the solution and apply to the dressing as necessary.

**TETRACAINE**

AVAILABILITY. . . . . Bottled solution (0.5%)  
ACTION. . . . . Topical anesthetic for use on the eye  
INDICATIONS. . . . . Foreign body in the eye  
CONTRAINDICATIONS. . . Hypersensitivity  
PRECAUTIONS. . . . . Tolerance varies with the status of the patient.  
INTERACTIONS. . . . . None  
DOSE . . . . . Place 2 drops in affected eye.  
PEDIATRIC DOSE. . . . . Not indicated

**OPTIONAL SUPPLEMENTAL PROGRAM  
MARYLAND VACCINATION & TESTING PROGRAM  
FOR EMT-P PROVIDERS (NEW '09)**

**Y. MARYLAND VACCINATION & TESTING PROGRAM**

Scope of practice for EMT-Paramedic personnel has been expanded to allow select immunization and PPD testing by paramedic personnel. The immunizations that are allowed to be performed include Hepatitis B, Influenza, and PPD. This program is a jurisdictional option requiring the jurisdictional medical director and the jurisdiction to authorize select trained paramedic personnel to perform these functions. There are program requirements which are attached for your review. Please note that you must have a written memorandum of understanding between your EMS service and the local health department before this program can be instituted.

In order to become recognized and authorized to implement the immunization and testing program for EMT-Paramedics, you must complete the application and submit a copy of the health department memorandum of understanding to the Office of the State EMS Medical Director. At that time you will receive a copy of the CD-ROM that has all of the pertinent documents and instructional material, along with a CDC videotape on PPD placement and interpretation. Your jurisdiction will then be recognized as an authorized optional immunization and testing jurisdiction.

When you are implementing this program, we strongly encourage you to advise EMS personnel at risk to seek vaccination where possible.

**REQUIREMENTS:**

- 1) Medical Director: Must have a jurisdictional medical director who is willing to take responsibility for the program.
- 2) Must be under the Infection Control Program for the Jurisdiction.
- 3) Immunization record form with documentation of all pertinent information about vaccination or test, including the patient's primary care practitioner.
- 4) Direct linkage with occupational medicine/employee health and a memorandum of understanding (MOU) with local public health service/department.
- 5) Statewide protocol approved by the EMS Board.
- 6) ALS resuscitation equipment (refer to "Maryland Medical Protocols for EMS Providers") must be available on-site during vaccinations.
- 7) Must use the comprehensive training curriculum developed by MIEMSS Infection Control Committee and becomes an "optional supplemental protocol."
- 8) Physician does not have to be physically present for the administration of vaccinations or tests by the trained paramedic called the Vaccination and Testing Officer (VTO).
- 9) Program instruction must be directed by and have participation by the jurisdictional medical director to select paramedics (EMT-Ps) who will become the VTOs.
- 10) This is not for post-exposure prophylaxis (patient must be seen by occupational medicine/physician for consent and treatment).
- 11) Only Public Safety Personnel (any career or volunteer member of a fire, rescue, or EMS department, company, squad, or auxiliary; any law enforcement

officer; or the State Fire Marshal or sworn member of the State Fire Marshal's office) are eligible to receive immunizations or testing from VTOs.

- 12) Mechanism for meeting FDA storage and refrigeration standards for vaccines and test Maryland Inventory Control Sheet.
- 13) Mechanism for follow-up
  - a) For additional vaccinations for completion of series
  - b) For potential complications of vaccinations or symptoms noted on adverse event form (meeting federal reporting requirements)
  - c) Patient contact phone number for complications (e.g., bad vaccine "lot")
- 14) Must have a standardized informed consent form and standardized vaccine pre-screening questionnaire form.
- 15) Vaccinations allowable are:
  - a) Influenza
  - b) Hepatitis B
- 16) Testing
  - a) PPD Screening (Intradermal)
- 17) Recommend 30-minute observation period (to be determined by the jurisdictional medical director) post-immunization administration with ALS personnel and equipment available.

**MARYLAND VACCINATION & TESTING PROGRAM  
FOR EMT-P PROVIDERS  
REFERENCE SHEET**

## **HEPATITIS B VACCINATION**

**Indications:**

Pre-exposure: preventive

**Contraindications:**

History of anaphylactic reaction to baker's yeast

**Adverse effects:**

Not clinically significant

**Precautions:**

- (1) Recipients must read and sign consent form.
- (2) CDC recommends antibody testing 1-2 months after the third dose to determine immunity.

**Dose:** (three total, using a 3 mL syringe with 1" 25 gauge needle)

Initial 1 mL IM (deltoid)

2nd dose 4 weeks after initial; 1 mL IM (deltoid)

3rd dose 5-6 months after 2nd dose; 1 mL IM (deltoid)

## **INFLUENZA VACCINATION**

**Indications:**

- (1) Persons who attend to patients at high risk for complications (e.g., the elderly)
- (2) Persons with chronic medical conditions
- (3) Pregnant women who will be in the second or third trimester of pregnancy during influenza season
- (4) Providers of essential community services

**Contraindications:**

History of anaphylactic hypersensitivity to eggs

**Adverse effects:**

- (1) More common: soreness at the injection site that lasts up to 2 days
- (2) Less common: fever, malaise, myalgia beginning 6-12 hours after vaccination and persisting for 1 to 2 days.

**Precautions:**

- (1) Vaccine should be delayed in the presence of acute febrile illness; administer after symptoms have abated.
- (2) Takes two weeks to develop adequate antibodies against the vaccine virus strain.
- (3) Optimal time for organized vaccination campaigns is usually the period from October through mid-November.

**MARYLAND VACCINATION & TESTING PROGRAM  
FOR EMT-P PROVIDERS  
REFERENCE SHEET**

- (4) Because influenza vaccine contains only noninfectious viruses, it cannot cause influenza.
- (5) Recipients must read and sign consent or refusal form.

**Dose:** (using a 3 mL syringe with 1" 25 gauge needle)  
0.5 - 1 mL IM (deltoid)

**PURIFIED PROTEIN DERIVATIVE (PPD) TEST**

**Indications:**

Yearly administration for healthcare providers

**Contraindications:**

- (1) Previous positive reaction to PPD
- (2) History of TB

**Adverse effects:**

Not clinically significant

**Precautions:**

Recipients must read and sign consent form.

**Procedure:**

- (1) Feel the induration with your finger tips
- (2) Measure with approved device in millimeters (mm)
  - a. Less than 5 mm is negative
  - b. Equal to or Greater than 5 mm requires clinical correlation and evaluation by jurisdictional medical director or other appropriate physician

**Note:**

Do not use erythema as margins, measure only the induration.

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