Maryland Medical Protocols For EMS Providers

Protocol Update

Effective July 1, 2005
Additional Information

For additional information regarding the content of this presentation or the Maryland Medical Protocols for EMS Providers contact:

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Office of the State EMS Medical Director
653 West Pratt Street
Baltimore, MD 21201
Phone: (410) 706-0880
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The 2-hour 2005 Protocol Rollout is approved for the following:

- Program # 25191
- ALS Category 2 2 hours
- BLS Category L 2 hours
Pocket Protocols

A new pocket protocol version will be available June 1st.

To obtain pocket protocols, contact the Office of Licensure and Certification:
(410) 706-3666
Edits

- The effective date throughout the protocols was changed to July 1, 2005.

- Page iii
  - A new letter to the EMS providers was inserted.

- Pages v-x
  - The Table of Contents was reformatted to include the new material and reflect the change in page numbers.
Edits

- The acronym for subcutaneous was changed from SQ to SC.

- All “trailing zeros” were eliminated from medication doses in an effort to reduce medication errors.
  - For example 1.0 mg/kg now reads 1 mg/kg.
For an infant and child (less than 1 year of age):

Heart rate criteria for when to begin CPR has been changed from 80 bpm to 60 bpm.
The reference has been changed to match American Heart Association guidelines

- Symptomatic infant with poor perfusion with pulse less than 60 bpm, Ventilate for 30 seconds:
  - Pulse remains less than 60 bpm – begin CPR
  - Pulse greater than 60 bpm – continue assessment
The American Heart Association defines CPR for infants and children as follows:

- **Infants:** Less than 1 year
- **Children:** 1–8 years of age
The reference to the age for AED use was lowered. An AED may be used on a patient greater than 1 year of age if it is a pediatric AED or has the appropriate pads for the pediatric patient.

The order of text was changed. If an AED is available, it should be used prior to initiating CPR.
A reference was added to prompt the provider to seek and collect emergency information forms.

Examples include:

- DNR Forms, Medic Alert Forms, form developed by jurisdiction, or Emergency Information Form.
Page 33 ALERT

- “All requests For Scene Helicopter Transports Shall Be Made Through SYSCOM” was added.

Page 33 Line (3)

- The reference to head injury was removed since no specific head injury protocol was developed.
In 2004, 1.2.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)”

- Provide the Trauma Decision Tree category (A, B, C, or D) This category determination will influence the use of commercial aeromedical assets in the event a MSP medevac unit is not readily available.
Physiologic Abnormalities and Several Significant Anatomical Injuries Require Emergent Transport: Category A

- GCS less than 8 or
- Systolic BP
  - Less than 90 (Adult),
  - Less than 60 (Peds) or
- Respiratory rate
  - Less than 10 or greater than 29

- Flail chest
- Penetrating injuries to head, neck, or torso
- Pelvic fracture
- Two or more proximal long-bone fractures
- Rapidly declining GCS
Anatomic Injuries -- Urgent Category B

- Amputation proximal to wrist and ankle
- Limb paralysis
- Combination trauma with burns
- Penetrating injuries to extremities proximal to elbow and knee
- GCS 8-14
Page 33 I.2.c) “If 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.”

- This does not mean take the patient to the local ED. The patient still meets criteria to be transported to a Trauma or Specialty Center.

- If the helicopters are not flying, it is reasonable to transport the patient by ground up to an hour to get him/her to a Trauma Center or Specialty Center.
Mechanism of Injury & High-Energy Impact
Category C

- Ejection from automobile
- Falls greater than 3 times patient’s height
- Death in same passenger compartment
- Vehicle rollover
- Extrication time greater than 20 minutes
- High-speed auto crash
  - Initial speed greater than 40 mph
  - Major auto deformity greater than 20 inches
  - Intrusion into passenger compartment greater than 12 inches
Mechanism of Injury & High-Energy Impact Category C

- Auto-pedestrian/auto-bicycle injury with significant (greater than 5 mph) impact
- Pedestrian thrown or run over
- Motorcycle crash greater than 20 mph or with separation of rider from motorcycle
- Exposure to blast or explosion
Co-Morbid Factors
Category D

- Probably the most misunderstood section of the protocols
- These are processes, medications, or diseases that lead to patients having minimal injury or mechanisms; yet due to these factors the patients go on to have serious complications from their “minor” trauma.
- This means that patients with a cause of injury that does not met Category C but who have a Category D Co-Morbid factor should be transported to a trauma center for evaluation because they have higher complications from minor injury, are harder to assess, and may need surgical intervention to manage their injuries.
Co-Morbid Factors
Category D

- Age less than 5 or greater 55
- Pregnancy
- Cardiac disease, respiratory disease
- Immunosuppressed patients
- Insulin-dependent diabetes, cirrhosis, or morbid obesity
- Patient with bleeding disorder or patient on anticoagulants
Example:

A 72-year-old male falls from a step ladder that is only 6 feet high (less than 3 times his height). Patient is complaining of an ache across his mid-back. Vs HR 90 BP 130/80 and RR 18, clear lung sounds. ECG NSR

Should this patient go to Trauma Center and what Category?
Age Is a Destination Influence

- It is important to understand the reason for this inclusion of the Senior or Elderly patient.
  - Cardiac and vascular compensation mechanisms are diminished.
  - Is more stoic and does not complain as much as a younger patient with the same injury.
  - Often is on medications that blunt vital sign changes, so may not manifest physiologic signs until he/she crashes.
  - Organs are more susceptible to traumatic injury (bones more brittle, vessels more rigid, etc.).
This patient is clearly a Category D

- Think of this patient as “almost a Category C” but since he/she has a Category D risk factor, he/she should go to a Trauma Center.

- This patient was left at home by EMS and later started urinating frank blood and became shocky 6 hours later. Family drove the patient to the local ED and the patient was later transferred to a Trauma Center.
A reference to allow the IM administration of Valium was added.

IM administration requires medical direction.

A reference for severe nerve agent exposure has also been added.

If severe nerve agent exposure is suspected, providers may administer diazepam without medical consultation.
The rectal dose of valium for a child has been lowered. The new dose is:
- Up to 0.2 mg/kg rectal, Maximum total dose 10 mg.
Altered Mental Status: Unresponsive Person

Pages 39 & 40; Lines e) & m)

- Intranasal was added to the list of possible administration routes for Narcan.

Page 40 Line k)(1)

- The term “fluid challenge” was changed to “fluid bolus” and a reference was added for Volume Sensitive Children.
Volume Sensitive Children

Definition: children that need smaller fluid bolus volumes due to special needs including:
- neonates (birth to 28 days)
- congenital heart diseases
- chronic lung disease
- chronic renal failure

Fluid bolus for volume sensitive children is 10 ml/kg of LR.
Volume Sensitive Children

- **Volume sensitive fluid bolus included in:**
  - Altered mental status protocol
  - Cardiac emergency protocols
  - Hypoperfusion protocol
- **All trauma patients regardless of past medical history receive**
  20 ml/kg.
Apparent Life Threatening Event (ALTE)

Pages 41 & 42

- This is a new protocol specific to the pediatric patient.
Apparent Life Threatening Event: “What It’s Not…. ”

- *It’s not* a new term (it was defined in 1986)!
- *It’s not* a diagnosis, but a symptom complex.
- *It’s not* to be confused with SIDS (see definition).
- *It’s not* ever to be “blown-off” or underestimated; an ALTE must always result in a transport. Utilize your pediatric base station physician if necessary.
An episode that is frightening to the observer and that is characterized by some combination of apnea (central or occasionally obstructive), color change (usually cyanotic or pallid but occasionally erythematous or plethoric), marked change in muscle tone (usually marked limpness), choking, or gagging. In some cases, the observer fears that the infant has died. Previously used terminology such as “aborted crib death” or “near-miss SIDS” should be abandoned because it implies a possibly misleading association between this type of spell and SIDS.
### ALTE - A Symptom Complex: Etiologies

- Gastroesophageal reflux
- Pertussis
- Respiratory Syncytial Virus
- Urinary Tract Infection
- Metabolic Disorders
- Cerebral Lesions
- Cardiac Dysrhythmias
- Anemia
- Primary Prolonged Apnea

- Obstructive Sleep Apnea
- Medication or Drug Effects
- Sepsis
- Dehydration
- Small Airway Patency issues
- Tracheal/Pharyngeal problems
- Facial Dysmorphia
- Child Abuse
- Factitious Caregiver Complaints
ALTE and EMS: Recent Evidence

(In Case You Still Need Convincing)

- The incidence of ALTE was found to be 7.5% in an out-of-hospital infant population.
- The overwhelming majority of ALTE patients (83%) appeared to be in no apparent distress by EMS assessment.
- Nearly half of the patients assessed by EMS to be in no apparent distress (48%) were later found to have significant illnesses upon ED evaluation.

ALTE Protocol: Application of the Pediatric Assessment Triangle

PAT

- **No distress** – well appearing without signs or symptoms of illness
- **Mild** – ill appearing but without signs or symptoms of life-threatening illness
- **Moderate** – signs or symptoms of possible life-threatening illness but with stable vital signs
- **Severe** – Definite life-threatening symptoms, injuries, or abnormal vital signs
The history of an apparent life-threatening event (ALTE) must always result in transport to an emergency department regardless of the infant’s appearance at the time of EMS assessment.
The order of text was changed. If an AED is available, it should be used prior to initiating CPR.

“Arrhythmia” was changed to “Dysrhythmia.”
An algorithm for BLS Emergency Cardiac Care of pediatric patients was developed.
• A universal BLS algorithm for pediatric patients less than 8 years of age was added.

• If patient is a newborn, go to Newly Born Protocol.
An algorithm for ALS Emergency Cardiac Care of pediatric patients was developed.
• A universal ALS algorithm for pediatric patients less than 8 years of age was added.

• If patient is a newborn, go to Newly Born Protocol.
Two Thumb–Encircling Hands Technique Preferred for Infant 2-Rescuer CPR by HCP
Universal Algorithm for Pediatric Emergency Cardiac Care for ALS

Assess Responsiveness

Not Responsive
> 1 year: Assess Breathing
Call for Defibrillator

Responsive:
Observe
Treat as Indicated

Breathing

NO
Give 2 Slow Breaths
Assess Circulation

YES
If unconscious with adequate respiratory rate and effort and no trauma, place in recovery position
Universal Algorithm for Pediatric Emergency Cardiac Care for ALS

- Pulse
  - NO
    - Attach AED or Begin CPR
    - 100 compressions/minute with 5:1
    - GO TO PEDIATRIC ASYSTOLE & PULESLESS ARREST ALGORITHM
  - YES
    - 100% Oxygen
    - BVM ventilations at 20-30 breaths/min, if appropriate
    - Cardiac monitor, Vital signs
    - IV LR KVO, H&P, Detailed Assessment
    - Suspected Cause
    - Altered Mental Status: See Protocol
    - Respiratory Distress
    - Allergic Reaction/Anaphylaxis: See Protocol
    - Asthma/COPD: See Protocol
    - Pulmonary Edema/CHF: See Protocol
    - Dysrhythmia
      - Too Slow
        - GO TO PEDIATRIC BRADYCARDIA ALGORITHM
      - Too Fast:: Narrow Complex
        - GO TO PEDIATRIC SUPRAVENTRICULAR ALGORITHM
      - Too Fast: Wide Complex (>0.08 seconds)
        - GO TO PEDIATRIC VENTRICULAR TACHYCARDIA ALGORITHM
• A specific rate was added to the ventilation box: “BVM ventilations at 20-30 breaths/min”.

• The pulse rate for the infant and child was standardized to “60 bpm”.

• Possible causes of Bradycardia were added to the algorithm.
Pediatric Bradycardia Algorithm

1. Assess ABCs
2. Secure Airway
3. Ventilate
   - BVM ventilations at 20-30 breaths/ min
   - Oxygen 90 - 100%
4. IV/IO LR KVO
5. Assess Vital Signs
Pediatric Bradycardia Algorithm

Hemodynamically Unstable?

NO

Observe

Support ABCs

Transport

YES

Perform chest compressions if despite Oxygenation and Ventilation:
Pulse less than 60 bpm in infant or child

Epinephrine (b)
IV/IO 0.01 mg/kg (1:10,000)
ET 0.1 mg/kg (1:1,000), dilute 3-5 mL
Repeat every 3-5 minutes

Atropine
IV/IO 0.02 mg/kg; ET 0.05 mg/kg
Min dose 0.1 mg; Max dose: Child 0.5 mg, Adolescent 1 mg
Repeat Once

Consider possible causes of Bradycardia

Consider Trascutaneous Pacing

If asystole develops, refer to appropriate algorithm

(b) Neonatal (0-28 days)

Epinephrine ET 0.01 mg/kg (1:10,000) dilute with 1 ml
Pediatric Bradycardia Algorithm

Possible causes of bradycardia (Parenthesis) = Possible Therapies and Treatments

Hypovolemia

Volume infusion for Neonate and volume sensitive children = 10 mL/kg
For infant and child = 20 mL/kg

Drug Overdose

Sodium Bicarbonate: 1 mEq/kg with medical consultation
Calcium Chloride: 20 mg/kg (0.2 mL/kg) slow IVP/IO (50 mg/min)
Max dose 1 gram

Hypoxia

Ventilation

Hypothermia

Warming

Heart Block

Consider Transcutaneous Pacing
For CRT-(I) & EMT-P only
Medical consultation required
Revised epinephrine dose

- All doses IV/IO
  - 0.01 mg/kg 1:10,000 (0.1 ml/kg)
- ET administration
  - 0.1 mg/kg 1:1,000 (0.1 ml/kg)
  - Dilute in 3-5 ml of LR
- Neonates (0-28 days) 0.01 mg/kg 1:10,000 dilute with 1 ml

Repeat every 3-5 minutes
Pediatric Asystole and Pulseless Arrest Algorithm

Assess ABCs

Begin CPR

Confirm Cardiac Rhythm in more than one lead

VF/Pulseless VT  Asystole  PEA
Atropine is not indicated for the pediatric patient in asystole.

The footnotes were modified to include the appropriate dosing and volume for neonates.
Potentially Reversible Causes of Arrest: 4 H’s

- Hypovolemia
- Hypoxia
- Hypothermia
- Hyper/hypokalemia and metabolic causes (e.g., hypoglycemia)
Potentially Reversible Causes of Arrest: 4 T’s

- Tamponade (cardiac tamponade)
- Tension pneumothorax
- Thromboembolism (pulmonary)
- Toxins/poisons/drugs
The ALERT has been revised.

- Nitroglycerin is contraindicated for any patient who has taken a medication for erectile dysfunction (Viagra, Cialis, or Levitra) in the past 48 hours. Previously it was only contraindicated for 24 hours.
Page 59 Line 1)

- “Paramedic may perform without consult” was removed from the administration of morphine sulfate.
- For patients complaining of chest pain, a provider must consult prior to administering morphine.
- This was an error in the 2004 edition.
A maximum dose for calcium chloride was added.

“Maximum dose 1 gram or 10 ml.”
The following (BLS & ALS) protocols have been replaced by the Newly Born Protocol:

- Newborn Resuscitation Birth to 28 Days Old
- Newborn Resuscitation: Bradycardia Protocols

**Newly Born** is defined as the “infant who is just delivered.”

**Neonate** is defined as infant up to 28 days and guidelines have been incorporated into Pediatric protocols.
The Newly Born Protocol is based on the Inverted Pyramid developed by the American Academy of Pediatrics.

Universal Algorithm for the Newly Born for BLS

- **Dry, Warm, Position, Stimulate**
  - Suction mouth then nose (a)

- **If cyanotic**
  - Oxygen

- **If Apnea/Gasping, HR is less than 100 or central cyanosis**
  - Ventilate with BVM @ 40-60 breaths/min

- **HR less than 60 after 30 seconds of BVM**
  - Chest compressions @ 120/min with 3:1

- **MEDICATIONS (ALS ONLY) (b)**
Universal Algorithm for the Newly Born - ALS

Deliver head
- Suction mouth then nose
- Deliver body
- Clamp cord, cut when possible

Meconium Absent
- Dry, Warm, Position, Stimulate

Meconium Present (a)
- Visualize and suction hypopharynx, Intubate
- Perform deep suction
- Repeat until returns are free of meconium
- Ventilate between suctioning attempts as indicated to stabilize

Assess respirations

Respirations Spontaneous with Good Effort
- Evaluate Heart Rate

Respiratory Rate
- Slow/Gasping, Absent

Position airway
- Ventilate with BVM 100% O₂
- Give 20-30 breaths in 30 seconds
Universal Algorithm for the Newly Born - ALS (cont’)

Heart Rate <60
- Perform CPR
  - 120 compressions/min with 3:1
  - Intubate
- IV/IO LR KVO
  - Epinephrine IV/IO 0.01 mg/kg (1:10,000)
  - Neonates (0-28 days), Epinephrine ET 0.01 mg/kg (1:10,000) (f)
  - Repeat every 3-5 minutes

Heart Rate 60-100
- Support ventilations with BVM at a rate of 40-60 breaths/min
- Blue
  - Monitor
  - IV/IO LR KVO

Heart Rate >100
- Reassess respiratory rate and effort
- Evaluate color
- APGAR at 1 min, repeat at 5 mins
- Pink
  - Monitor and maintain body temperature
  - Transport

Reassess
Universal Algorithm for the Newly Born for ALS (cont’)

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

<table>
<thead>
<tr>
<th>Cause</th>
<th>Therapies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory depression</td>
<td>(b,c)</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>(d)</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>(Warming)</td>
</tr>
<tr>
<td>Hypovolemia</td>
<td>Volume Infusion (e)</td>
</tr>
</tbody>
</table>

(a) - Deep tracheal suctioning with meconium aspirator is only indicated for infants with thick (pea soup-like) meconium or respiratory depression after initial resuscitation.

(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 10ml/kg.

(f) - Neonates (0-28 days), Epinephrine ET 0.01 mg/kg (1:10,000) dilute with 1 ml.
Page 68

- An ALERT was added.
  - “Rigor Mortis May Be Present (See Presumed Dead on Arrival Protocol)”.
- “Dependent lividity” was removed as a criteria from the Presumed Dead on Arrival Protocol.
- “If indicated” was added to the treatments section (line a) section.
The dosage and routes for the administration of morphine to pediatric patients have been standardized.

**Pediatric Dose of Morphine Sulfate**
- Consider Morphine Sulfate
  - 0.1 mg/kg slow IV/IM/IO
  - Administer 1-2 mg/min
  - Maximum dose 5 mg
Specific signs and symptoms were added.

A patient should be considered for hyperbaric therapy if he/she had a loss of consciousness, nausea, vomiting, diarrhea, altered mental status, abnormal skin color, dyspnea, or seizures secondary to suspected carbon monoxide exposure and may or may not have minor burns.
The reference to airway thermal injuries was removed.
Hypertensive Crisis

- This protocol has been deleted.
- A patient experiencing hypertension should be treated according to General Patient Care Guidelines.
Non-Traumatic Shock: Hypoperfusion

Page 88

- Criteria for Hypotension revised
  - Systolic blood pressure less than 60 in neonates
  - Less than 70 in infants
  - Less than [70 + (2 x years)] for children
- Fluid bolus is 20 ml/kg LR IV/IO
  - Reassess and repeat second bolus if condition does not improve.
- Volume sensitive children receive an initial fluid bolus of 10 ml/kg LR IV/IO
  - Reassess and repeat second bolus of 10 mL/kg if condition does not improve.

Volume sensitive children include: neonates (birth to 28 days), congenital heart diseases, chronic lung disease, chronic renal failure
The reference was changed to “GO TO NEWLY BORN PROTOCOL” since this protocol replaces Newborn Resuscitation.
Pages 94-95

- The administration of syrup of ipecac was deleted from this protocol.
- Activated charcoal should only be administered without Sorbitol.
Overdose / Poisoning: Ingestion

The Demise of Ipecac

Syrup of Ipecac has been eliminated from both the EMS protocols and the PEMAC recommendations for the VAIP standards

- Research studies have demonstrated no improvement in outcome when Ipecac is used.
- Charcoal *without* *Sorbitol* has been found to be effective in treating specific overdoses.
Demise of Ipecac: The Bottom Line Evidence

- Inefficacious in preventing gastrointestinal absorption
- May interfere with more effective gastric-emptying therapies, i.e. activated charcoal
- Routinely improperly administered by caregivers
Overdose / Poisoning: Ingestion

Demise of Ipecac:
The Bottom Line Evidence

- Small, but not insignificant, incidence of abuse:
  - Eating disorders
  - Munchausen’s by proxy
- Primary Prevention: The elimination of potentially harmful products from the marketplace has been the key effective strategy.
Use of Ipecac Syrup by US Poison Centers

Year

Number of Cases

Maryland Poison Center
University of Maryland School of Pharmacy
Prehospital use of ipecac is not recommended

Activated charcoal without sorbitol should be given by EMS if:
- Patient is awake and alert;
- Significant toxicity is likely;
- The substance binds to Activated Charcoal;
- Recent time of ingestion;
- There are no contraindications;
- Medical Direction has been contacted;
- Poison Center has been consulted.
Overdose / Poisoning: Ingestion

Activated Charcoal without Sorbitol

Dose – 1 gram /kg PO
Route – Oral
Orders – from online medical control
Information – Maryland Poison Center
1-800-222-1212 or EMRC
A reference was added to the ALERT for toxic exposure. It now reads:

- Patients With Suspected Carbon Monoxide Or Toxic Inhalation Without Major Burns Should Be Considered For Transport To The Hyperbaric Specialty Center. Patients In Closed Space Incidents Are More Likely To Experience Carbon Monoxide With Altered Mental Status.
PASG – deleted for children

PASG have been deleted for all indications in the pediatric sections of the protocols.

- *In children, PASG may cause respiratory compromise and they are not associated with improved outcomes*
- *Pediatric trauma centers have not given medical direction for use of PASG in past three years.*
The entire Pain Management Protocol is new. It was designed to:

- Reduce suffering
- Make transport easier (for patients and providers)
- Is based on patient rating of pain
- Must be used judiciously
  - Consult medical control when necessary
- Can be offered to patients of almost any age
First, measure the level of pain
- 0 – 10 scale for adults and older children
- FACES scale for younger children

Allow patient to remain in position of comfort (unless contraindicated)

Monitor airway and vital signs every 5 minutes for unstable patients
Pain Management –
Treatment Indications

- Acute myocardial infarction
- Acute pulmonary edema
- Burns
- Isolated injuries
- Acute sickle cell pain crisis
- Abdominal pain (with consult)
- EMS/DNR Palliative Care Protocol
Pain Management - Contraindications

- Head injury
- Hypotension
- Allergy or sensitivity to morphine, codeine, or percodan (or other opiates)
- Allergy to morphine
- **Morphine can be given IV, IO, IM, SC**
  - **Adult:** Dosages varies according to protocol.
    - **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.
    - **Pulmonary Edema:** Administer 2-10 mg slow IVP depending on age and weight of patient.
    - **Isolated Injury (Burns, Frostbite, Eye Trauma):** Administer 2-10 mg slow IVP at 1-2 mg/min increments to 10 mg or until pain is relieved.
Morphine can be given IV, IO, IM, SC.

Pediatric (Frostbite, Burns, Eye and Extremity Injury, Sickle Cell Crisis)

Dose: 0.1 mg/kg IVP/IO/IM/SC
Administer slowly 1-2 mg/min
Maximum dose of 5 mg

Repeat pain measurement after administration, especially during transport.
Common Myths about Pain

- Pain management will slow diagnosis.
  - Not true; may even make it go more rapidly.
- Don’t give morphine for abdominal pain – may mask symptoms.
  - Not true; several studies have shown that diagnosis can be made just as easily if patient has had pain managed.
More Common Myths about Pain

- **Kids don’t feel pain like adults.**
  - Not true – they feel it just as much but may not be able to tell you.

- **Patients call 911 just to get drugs.**
  - Primary responsibility of all health care professionals is to treat the patient and to provide pain relief.
  - Referrals can be made after arrival at ED.
  - Consult when in doubt.
“Additional doses of epinephrine require medical consultation” was added to the Epinephrine dose on each page.
The dose of diphenhydramine was standardized and “slow” was added to the route of administration. It now reads:

- Administer diphenhydramine
  1 mg/kg slow IVP/IO or IM 
  Maximum single dose 25 mg
  Additional doses of diphenhydramine require medical consultation.
Respiratory Distress: Albuterol & Atrovent

- For Infants less than 1 year of age
  Albuterol 1.25 mg via nebulizer only
- For Children 1-2 years
  Albuterol 1.25 mg and Atrovent 250 mcg
- For patients greater than 2 years of age
  Albuterol 2.5 mg and Atrovent 500 mcg
The section “Medical consultation is required if the child has a cardiac history.” was removed from line (I) and made a separate ALERT.
Respiratory Distress: Albuterol & Atrovent

- For Infants less than 1 year of age
  Albuterol 1.25 mg via nebulizer only
- For Children 1-2 years
  Albuterol 1.25 mg and Atrovent 250 mcg
- For patients greater than 2 years of age
  Albuterol 2.5 mg and Atrovent 500 mcg
Page 109 Line e)

“(Note: if inhaled normal saline decreases the patient’s level of distress and symptoms, continue this therapy en route to the appropriate receiving facility.” was moved to line d) of this protocol.
Page 110 Line b)

- The medical consultation symbol was removed.
- Medical direction is not required.
- Reminder: Continuous Positive Airway Pressure (CPAP) is an Optional Supplemental Program.
• The criteria was revised for transport to a Designated Stroke Center.

• “If the patient is a candidate for fibrinolytic therapy AND can be delivered to the hospital within 2 hours of sign/symptom onset, transport the patient to the closest Designated Stroke Center. If there is not one within 30 minutes go to the nearest hospital.”
The checklist criteria was revised.

The new criteria is: “The patient can be delivered to a Stroke Center within 2 hours of sign/symptom onset.”
The definition of electrical burn was expanded to include lightening or contact with high voltage (200 volts or greater).

A reference was added for patients with suspected toxic exposure.
A reference was added for toxic exposure. It now reads:

- Patients With Suspected Carbon Monoxide Or Toxic Inhalation Without Major Burns Should Be Considered For Transport To The Hyperbaric Specialty Center. Patients In Closed Space Incidents Are More Likely To Experience Carbon Monoxide Or Toxic Inhalation And May Manifest Toxicity With Altered Mental Status”
The ALERT regarding the placement of ice on a burn was revised. Ice should not be placed on a burn if the patient has a TOTAL of 5% or greater burned body surface area.

The new section reads: “Do Not Place Ice On Any Patient With Burns Greater Than 5% Total Body Surface Area.”
The dosage of morphine for isolated trauma was revised. A maximum dose was added. The revised dosage is:

- Consider morphine sulfate 0.1 mg/kg slow IV/IO/IM
- Administer 1-2 mg/min
- Maximum dose 5 mg
The dosage of morphine for eye trauma was revised. A maximum dose was added. The revised dosage is:

- Consider morphine sulfate 0.1 mg/kg slow IV/IO/IM
- Administer 1-2 mg/min
- Maximum dose 5 mg
The dosage of morphine for hand/extremity was revised. A maximum dose was added. The revised dosage is:

- Consider morphine sulfate 0.1 mg/kg slow IV/IO/IM
- Administer 1-2 mg/min
- Maximum dose 5 mg
Page 120 Line d)

- The Hyperventilation rates were adjusted to match the General Patient Care Protocol.

- “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.”
The use of PASG was removed from this protocol for pediatric patients.
A reference for Volume Sensitive Children has been added:

“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.”
The use of PASG was removed from this protocol for pediatric patients.
A reference for Volume Sensitive Children has been added:

“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.”
Page 127 Lines o) & s)

- The use of PASG was removed from this protocol for pediatric patients.
The following terms were added to the Glossary:
- Apnea
- Children With Special Healthcare Needs
- Emergency Information Form
- Erythema
- Fluid Bolus
- Fluid Challenge
- Neonatal
- Newly Born
- Optional Supplemental Program
- Pallor
- Pilot Program
- Volume Sensitive Children
Page 140

- SQ was changed to SC.

Page 141

- Peak Expiratory Flow Meter was added to the chart and is a Standing Order (SO) for all ALS providers.

Page 142

- Activated charcoal shall only be administered without sorbitol.
- Etomidate was added for jurisdictions participating in RSI Pilot Program.
- Ipecac was deleted.
The symptomatic bradycardia rate for an infant and child was revised. The new section reads:

- **Symptomatic Bradycardia**
  - (a) Infant heart rate less than 100
  - (b) Child heart rate less than 80
Airway Management:
Tracheostomy Change and Suction

Pages 172-174 New Procedure
Description for both BLS and ALS
Tracheostomy:

A surgical opening in the trachea into which a special tube is placed.
Removing a Tracheostomy Tube: Step 1

- ALWAYS have at least one additional provider to assist
- Proper patient positioning
Removing a Tracheostomy Tube:

Step 2

Remove old trach tube

1st person: holds patient
2nd person: removes trach tube
Removing a Cuffed Tracheostomy Tube: Step 1

Empty Syringe Attached, Balloon Full

Syringe Full, Balloon Empty
Removing a Cuffed Tracheostomy Tube: Step 2

Cutting the Ties

Removing the Trach, Ties Dangling
RULES for Inserting a Tracheostomy Tube

Preparation:

- Proper positioning of the patient
- “Ready to go” trach set includes
  - Trach with obturator and ties attached (ideal)
- Suction equipment
- Normal saline/sterile water
RULES for Inserting a Tracheostomy Tube

- When possible, lubricate the new tube before insertion
- If lubricant not available, use saline or water

Prepare the trach tube with lubricant
Insertion of a Tracheostomy Tube

(Always a two person job)

If you meet resistance: **STOP**!
Insertion of a Tracheostomy Tube

Obturator Being Removed
Insertion of a Tracheostomy Tube

Inserting Inner Cannula

Inner Cannula In Place
Insertion of a Tracheostomy Tube

Trach Held in Place, Connect Bag Valve to Tracheostomy and Ventilate While Listening to Breath Sounds
Securing the Tracheostomy Tube

Syringe Full, No Air In Cuff

Cuff Inflated, Syringe Empty
Securing the Tracheostomy Tube

One Fingertip Fits Under the Adult Ties

Baby with One Fingertip
Summary:
Steps to Change a Tracheostomy Tube

- Gather equipment
- Lay the person flat and midline
- Hyperextend the neck (towel roll)
- Lubricate new trach tube
- Deflate old cuff, if appropriate, WITH syringe
- Untie/cut old ties, pull out old trach
- Put in new trach, remove obturator
- Attempt to ventilate
- Secure the new tracheostomy tube
<table>
<thead>
<tr>
<th>Trach Size</th>
<th>Catheter Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>00 – 3.5 trach tube</td>
<td>5-6 French catheter</td>
</tr>
<tr>
<td>4.0 – 4.5 trach tube</td>
<td>8-10 French catheter</td>
</tr>
<tr>
<td>5.0 – 5.5 Trach tube</td>
<td>10-12 French catheter</td>
</tr>
<tr>
<td>6.0 – 7.0 Trach Tube</td>
<td>14 French catheter</td>
</tr>
<tr>
<td>7.0 – 8.0 Trach Tube</td>
<td>16 French catheter</td>
</tr>
<tr>
<td>8.0 – 9.0 Trach Tube</td>
<td>18 French catheter</td>
</tr>
</tbody>
</table>
Suction Is Available:

Step 1

Instilling Saline into Adult Trach

Instilling Saline into Baby Trach
Suction Is Available: Supplemental Oxygen

Step 2

BV to trach
pre-suction

BV to trach
pre-suction
Suction: Inserting Suction Catheter

**Step 3**

- Keep fingers at the measured depth to insert the catheter
- Insert suction catheter without applying suction
Suction:  
Step 4

Apply suction:
- Cover the opening on catheter
- For NO MORE than 5-10 seconds (hold your breath comfortably)
Suction:
Step 5

Twisting Twisting the Catheter Between Fingers as Withdraw
Re-oxygenate the patient between suctioning attempts.
Obstructed Trach Algorithm

OBSTRUCTION (a)

SUCTION (b)(*)

OBSTRUCTION RELIEVED?

YES

O2 / POSITION

NO

SUCTION

CHANGE TRACH TUBE (c)
The use of PASG was removed from this protocol for pediatric patients.

- **Line c)(6) Contraindications**
  - “Children less than 15 years of age” was added as a contraindication.
Page 192 b)(7) “The ALS provider may establish a peripheral IV in a patient whose vasoactive medication has been interrupted due to malfunctioning long-term access device that cannot be repaired by the home health caregiver. The ALS provider can assist in reestablishment of an existing vasoactive infusion at the same dose or setting. Patient shall be transported to the nearest appropriate facility to access patient’s long-term device. When in doubt, obtain medical consultation.”
IV for Interrupted Vasoactive Infusions

- Vasoactive drugs can have profound positive effects when infusion is working correctly and catastrophic effects when they are suddenly interrupted.
- The half life of some of these medications can be extremely short (eg 3-5 min.) which means their effect will disappear rapidly within 3-30 min. This can lead to decreased cardiac output with sudden loss of blood pressure and cardiac arrest in some instances.
- Continuation of leaky infusion is better than no infusion. Leave it running.
IV for Interrupted Vasoactive Infusions

- Have family member check to assure that pump is turned on and make sure the line is not clamped.
- Does this correct problem?
- EMS provider shall NOT turn off pump.
- The discharge planners for these patients do not teach families to restart IV.
- Reestablisment of the infusion through peripheral IV access is essential.
- Patients and family members will have a back-up pump and medication. Once the peripheral vasoactive infusion is established, have family stop the occluded or leaking infusion through the central or PICC line.
Hub to Hub Connection

- The IV catheter should be flushed with sterile water, saline or LR then the infusion should be connected directly between the IV catheter hub and infusion pump tubing hub (do NOT use your IV tubing or Saline lock cap/tubing).

- The family or patient will set the pump and establish the rate which may be as low as 2cc an hour.
Precautions

- Do NOT flush or bolus the vasoactive medication. Too much can also be bad.
- EMS provider shall NOT turn off pump.
- Do NOT put anything else through the vasoactive medication line.
- If EMS medications are indicated, start a second IV with LR for medication administration.
Activated Charcoal

Pages 199 & 205
- Activated Charcoal
  - Only administered without Sorbitol
Cardiac patients have been added to the list of patients that require medical consultation prior to administration.

The new text reads:

“Unless in severe allergic reaction or severe asthma, medical consultation should be obtained before administering to a pregnant or cardiac patient.”
Ipecac

- Ipecac was deleted from the Maryland Medical Protocols for EMS Providers.
Nitroglycerin

Page 202 Line d)(5)

- The contraindication has been revised.
  - Nitroglycerin is contraindicated for any patient who has taken a medication for erectile dysfunction (Viagra, Cialis, or Levitra) in the past 48 hours. Previously it was only contraindicated for 24 hours.
Aspirin

Page 208 Line g)(1)

- The dose of aspirin was changed.
- Aspirin should be administered to a patient meeting the indications at a dose of 325 mg chewed.
Nerve agents were added to the list of indications.

A reference for nerve agent exposure was added.

A maximum single dose of atropine for pediatric patients has been established:
- Child (10-25 kg) 0.5 mg
- Adolescent (25-40 kg) 1 mg

The dose may be repeated one time.
The dosage section was reformatted. Atrovent is contraindicated for an infant less than 1 year of age.
Page 216 Lines g)(1) & (2)

- A reference to allow the IM administration of Valium was added.
- IM administration requires medical direction.
The rectal dose of valium for a child has been lowered. The new dose is:
- Up to 0.2 mg/kg rectal, Maximum total dose 10 mg.
- A reference for severe nerve agent exposure has also been added.
- If severe nerve agent exposure is suspected, providers may administer diazepam without medical consultation.
A maximum dose has been added for Diltiazem:

“0.25 mg/kg (maximum dose 20 mg) by IV bolus administered slow IV over 2 minutes; if response was not adequate, repeat in 15 minutes with a dosage of 0.35 mg/kg (maximum dose 25 mg) over 2 minutes.”
A requirement for medical consultation was added.

- If a patient is experiencing a “mild allergic reaction,” medical consultation is required.
- Medical consultation has always been required for doses greater than 25 mg.
Epinephrine

Pages 222-224

- Revised epinephrine dose
  - All doses IV/IO
    - 0.01 mg/kg (0.1 mL/kg) of the 1:10,000
    - Repeat every 3-5 minutes
  - ETT administration
    - 0.1 mg/kg 1:1,000 (0.1 mL/kg)
    - Dilute in 3-5 mL of LR
    - Repeat every 3-5 minutes
  - Neonates (0-28 days)
    - 0.01 mg/kg (0.1 mL/kg) of 1:10,000 IVP/IO
    - Repeat every 3-5 minutes
    - ET: 0.01 mg/kg of 1:10,000 diluted with 1 mL of LR
“Hypertension” was deleted as an indication for the administration of furosemide.

“Except in hypertensive crisis” has been eliminated from the paramedic may administer without consult.
Ipecac

- Ipecac has been removed from the Maryland Medical Protocols for EMS Providers.
Definition: children that need smaller fluid bolus volumes due to special needs including:

- neonates (birth to 28 days)
- congenital heart diseases
- chronic lung disease
- chronic renal failure

- Fluid bolus for volume sensitive children is 10 mL/kg of LR.
- Fluid bolus for other infants and children is 20 mL/kg.
Morphine Sulfate dosing was standardized.
- Pediatric: 0.1 mg/kg IVP/IO/IM
  Administer slow 1-2 mg/min
  Maximum dose 5 mg
- A maximum pediatric dose of 5 mg has been added to all the protocols:
  - Cold Emergencies
  - Burns
  - Eye Trauma
  - Hand/Extremity Trauma

Morphine may be administered for pacing.
Administer 1-2 mg/min IVP
The text has been revised.

- Nitroglycerin is contraindicated for any patient who has taken a medication for erectile dysfunction (Viagra, Cialis, or Levitra) in the past 48 hours. Previously it was only contraindicated for 24 hours.
Etomidate was added throughout the Rapid Sequence Intubation protocol.

A protocol approved in July of 2004 allowing RSI to be performed on children less than 10 years of age was also added.

Both the adult and pediatric RSI programs remain Pilot Programs and require the permission of the State EMS Medical Director to participate.
This line was changed to point out that CPAP does not guarantee the elimination of infection but is a less invasive procedure with a lesser risk of infection.
Page 264 Line 7.a)

- INITIAL BOLUS: The text was revised to insure the provider understands the initial bolus of the medication must be administered in the hospital setting by a physician or RN.

Page 264 Line 7.b)

- MAINTENANCE IV DRIP: The text was revised to include maintaining appropriate rate based on physician’s orders.
Page 269 Line 5.b) & Page 270 Line e)(4)

- Administration of MARK I Kits
  - An EMT-B may administer MARK I Kits (up to a total of 3) as buddy care to public safety personnel only OR
  - When directed by an ALS provider based on signs and symptoms in an MCI OR
  - On-site chemical testing, confirming nerve or organophosphate agent presence in an MCI
Page 269 Line 5.b) & Page 270 Line e)(4)

- Administration of the 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.
The repeat dose of Atropine has been revised:
- The 2 mg dose of Atropine may be repeated in 10 minutes if the patient remains symptomatic.

Line e)(4)
- For patients with “Severe nerve agent exposure, Providers may administer diazepam without medical consultation.”
Pages 272 & 275 Lines 6.(b) & 6.(a)

- The requirement of reporting each individual use of a ventilator to the Office of the State EMS Medical Director was removed.

- This protocol applies only to those jurisdictions participating in the Optional Ventilator Program.
Page 17 Line 3.a.(1)
- The dosing of atropine and pralidoxime was revised.

Page 24
- The chart was revised to match the new dosing.