EMT-Basic
EMT-Advanced
EMT-Paramedic

Patient Care Protocols

Fall 2008

Hardin County EMS Patient Care Protocols are adapted from the Commonwealth of Kentucky EMS Patient Care Protocols and are the basic guidelines for medical care by the EMT's and Paramedic's of Hardin County EMS.

Table of Contents

Adult Medical Protocols 6
Routine Patient Care Guidelines 6
Acute Coronary Syndromes 8
Cardiac Arrest 11
Bradycardia 13
Tachycardia 15
Congestive Heart Failure/Pulmonary Edema 18
Allergic Reaction/Anaphylaxis 20
Asthma/COPD/RAD 23
Diabetic Emergencies 25
Fever 27
Nausea/Vomiting 28
Non-traumatic Abdominal Pain 29
Pain Management 30
Poisoning-Overdose 32
Poisoning: Activated Charcoal 34
Poisoning: Cyanide 36
Poisoning: Nerve Agents and Organophosphates 37
Poisoning: Radiation Injuries 42
Seizures 43
Suspected Stroke 44
Obstetrical Emergencies 47
Unresponsive/Altered Mental Status 55

Pediatric Medical Protocols 56
Routine Pediatric Care Guidelines 57
Pediatric Assessment 60
Apparent Life Threatening Event (ALTE) 62
Sudden Infant Death Syndrome (SIDS) 63
Neonatal Resuscitation 64
Cardiac Arrest 65
Bradycardia 68
Tachycardia 70
Shock 72
Allergic Reaction/Anaphylaxis 74
Asthma/RAD/Croup 78
Diabetic Emergencies 80

Non-traumatic Abdominal Pain 82
Poisoning/Overdose 83
Poisoning: Activated Charcoal 85
Poisoning: Cyanide 88
Poisoning: Nerve Agents and Organophosphates 89
Poisoning: Radiation Injuries 90
Seizures 91
Fever 92
Nausea/Vomiting 93
Dehydration 94
Unresponsive/Altered Mental Status 95
Children with Special Health Care Needs 96

Adult Trauma Protocols 104
Trauma Assessment and Management 105
Head Trauma 109
Chest Trauma 113
Abdominal Trauma 115
Pelvic Trauma 116
Extremity Trauma 117
Eye and Dental Trauma 119
Burns 120

Pediatric Trauma Protocols 124
Trauma Assessment and Management 125
Head Trauma 131
Chest Trauma 135
Abdominal Trauma 137
Pain Management 139
Pelvic Trauma 141
Extremity Trauma 142
Eye and Dental Injuries 144
Burns 145

Environmental Protocols 149
Electrical/Lightning Injuries 150
Snake Bites 151
Submersion Injuries 152
Heat Cramps/Heat Exhaustion 153

Hyperthermia 154
Hypothermia 155
Frostbite 161

Airway and Ventilation Management 162
Rapid Sequence Intubation (RSI) and Drug Assisted Intubation (DAI) 163
Airway Management - Pediatric 172
Post-Intubation Care 179
Mechanical Ventilation 184
CPAP/BIPAP Use 185

Medication List 186

Adult Medical Protocols

Routine Patient Care Guidelines - Adult

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

Initial Assessment

Scene Size-Up

► Review dispatch information.

- Assess the scene for safety, mechanism of injury, number and location of patients.
- General impression of patient.
- Assess need for body substance isolation.
- Notify the receiving facility as early as possible.
- Request additional resources as needed: e.g. EMS Supervisor, air medical transport, additional ambulances, rescue, hazardous materials team, etc.
- If you declare the incident to be a Multiple Casualty Incident – Go directly to the appropriate Hardin County Standard Operating Guideline.

Level of Consciousness

- Assess level of consciousness using the AVPU scale.
- Manually stabilize the patient's cervical spine if trauma is involved or suspected.
- Initiate cardiopulmonary resuscitation in accordance with current guidelines, as trained and credentialed, if indicated. This includes the use of the AED or cardiac monitory.

Airway

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

Breathing

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

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

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

Disability
- Movement of extremities.
- Defibrillation – VF/VT without pulse.

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

Secondary Assessment

Head-to-toe Survey

Neurological Assessment
- Glasgow Coma Score.

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

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

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

Acute Coronary Syndromes - Adult

Basic Standing Orders

B

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

Fibrinolytic Questionnaire

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

CHEST PAIN CHECKLIST FOR STEMI FIBRINOLYTIC THERAPY

Step One: **Has patient experienced chest discomfort for greater than 15 minutes and less than 12 hours?**

- YES → **Does ECG show STEMI or new or presumably new LBBB?**
  - YES → ***Step Two:***
  - NO → STOP
- NO → STOP

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

Systolic BP greater than 180 mm Hg	YES	NO
Diastolic BP greater than 110 mm Hg	YES	NO
Right vs. left arm systolic BP difference greater than 15 mm Hg	YES	NO
History of structural central nervous system disease	YES	NO
Significant closed head/facial trauma within the previous 3 months	YES	NO
Recent (within 6 wks) major trauma, surgery (including laser eye surgery), GI/GU bleed	YES	NO
Bleeding or clotting problem or on blood thinners	YES	NO
CPR greater than 10 minutes	YES	NO
Pregnant female	YES	NO
Serious systemic disease (eg, advanced/terminal cancer, severe liver or kidney disease)	YES	NO

Step Three: **Is patient at high risk?**
If ANY of the following is CHECKED YES, CONSIDER Transport/ Transfer to PCI Facility

Heart rate greater than or equal to 100 bpm **AND** systolic BP less than 100 mm Hg	YES	NO
Pulmonary edema (rales)	YES	NO
Signs of shock (cool, clammy)	YES	NO
Contraindications to fibrinolytic therapy	YES	NO

Acute Coronary Syndromes – Adult continued

Advanced Standing Orders

A

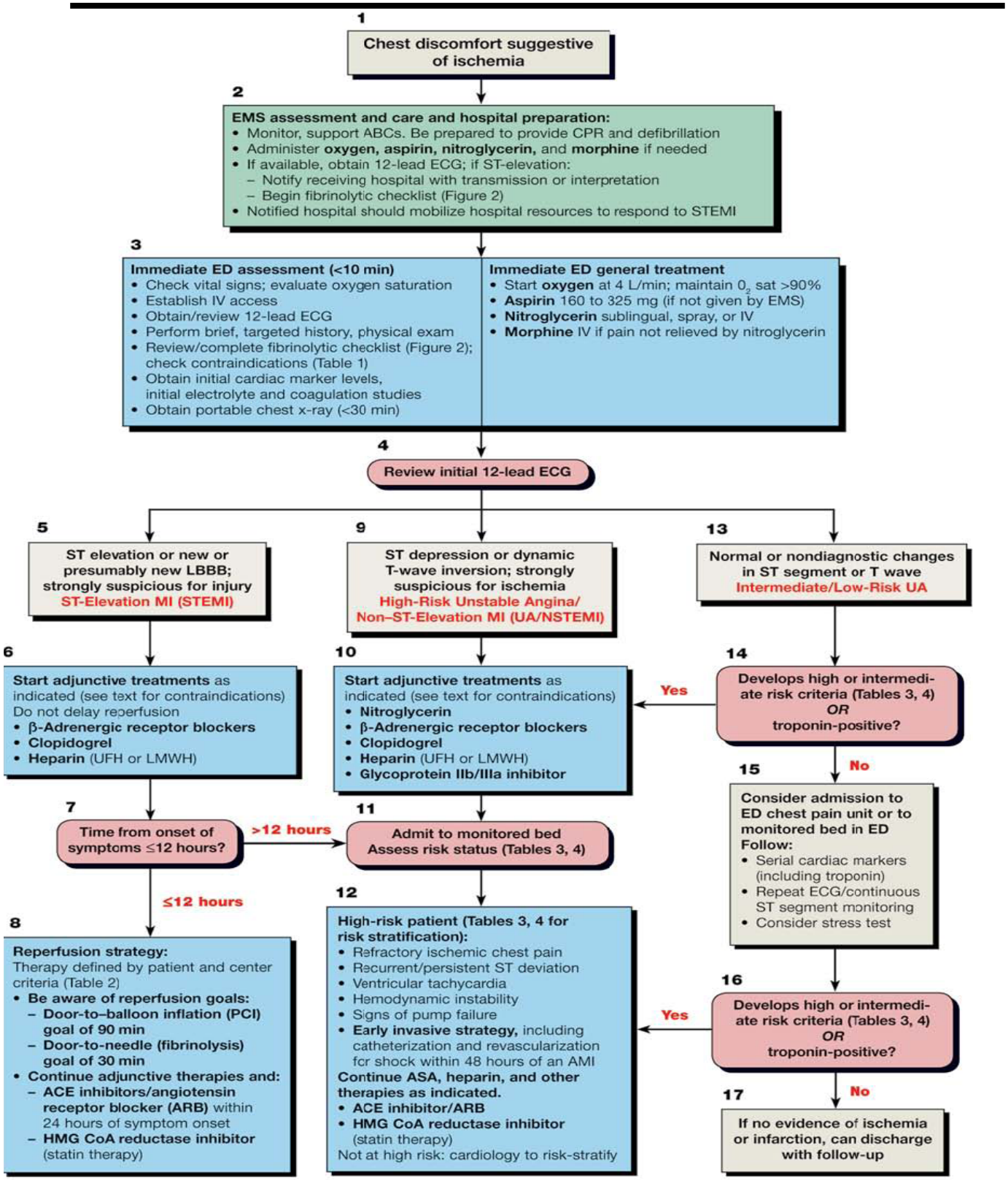
- IV access and administer fluids to maintain systolic blood pressure > 90 mmHg.
- Nitroglycerin 0.4mg SL every 5 minutes while symptoms persist if SBP > 90 mmHg.

Paramedic Standing Orders

P

- Place patient on monitor.
- Obtain a 12 lead EKG and transmit to the ED (if possible).
- If EKG suggests AMI, consider morphine, 2mg IVP every 5 minutes up to 10 mg if pain persists and SBP > 90.
- Consider Fentanyl 25-50 mcg for patients with a morphine allergy or known right ventricular infarction.
- Treat dysrhythmias PRN; refer to appropriate protocol.
- Contact Receiving Facility to possibly Activate Cath Lab Team.

Acute Coronary Syndromes Algorithm



© 2005 American Heart Association

Cardiac Arrest - Adult

Basic Standing Orders

B

- Routine Patient Care – with focus on CPR.
- Apply and use AED if available.
- For Trauma minimize on-scene time
- Consider ALS intercept.

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

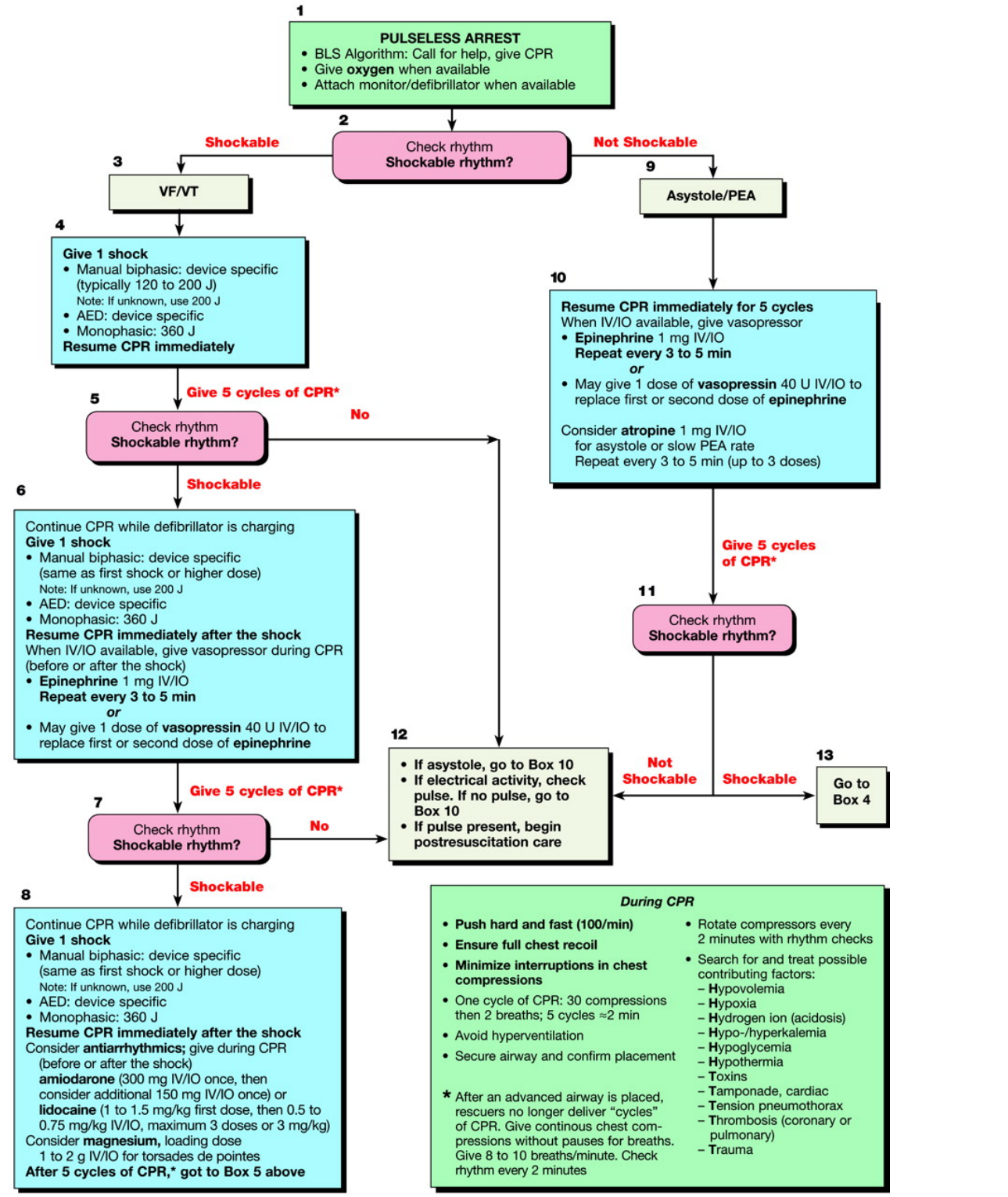
For Ventricular Fibrillation (VF)/Pulseless Ventricular Tachycardia (VT)

- If bystander CPR is not being performed, CPR for 5 cycles/2 min; then defibrillation (all energy levels are defibrillator and local protocol dependent) followed immediately by CPR for 5 cycles/2 min.; then rhythm check; repeat defibrillation attempts for VF/VT after each 5 cycles of CPR.
- Establish IV/IO access and advanced airway.
- Epinephrine (1:10,000) 1 mg IV; repeat every 3 -5 minutes. May give vasopressin 40 units in lieu of the first 1-2 doses of epinephrine.
- Consider Lidocaine, Amiodarone, or Magnesium.

For ASYSTOLE or Pulseless Electrical Activity (PEA)

- Continue CPR for 5 cycles/2 min.
- Epinephrine (1:10,000) 1 mg IV; repeat every 3 -5 minutes. May give vasopressin 40 units in lieu of the first 1-2 doses of epinephrine.
- Atropine 1 mg IV for asystole or slow PEA; repeat every 3 -5 minutes up to 3 doses.
- Continue CPR for 5 cycles/2 min. between interventions; stop only for rhythm check or return of circulation.
- Advanced airway management.
- NOTE: IV/IO administration of medications is preferred to administration via ETT.
- For Trauma Arrest– consider bilateral needle chest decompression.

Cardiac Arrest Algorithm



Bradycardia (Symptomatic) - Adult

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

Basic Standing Orders

B

- Routine Patient Care.
- Consider ALS intercept.

Advanced Standing Orders

A

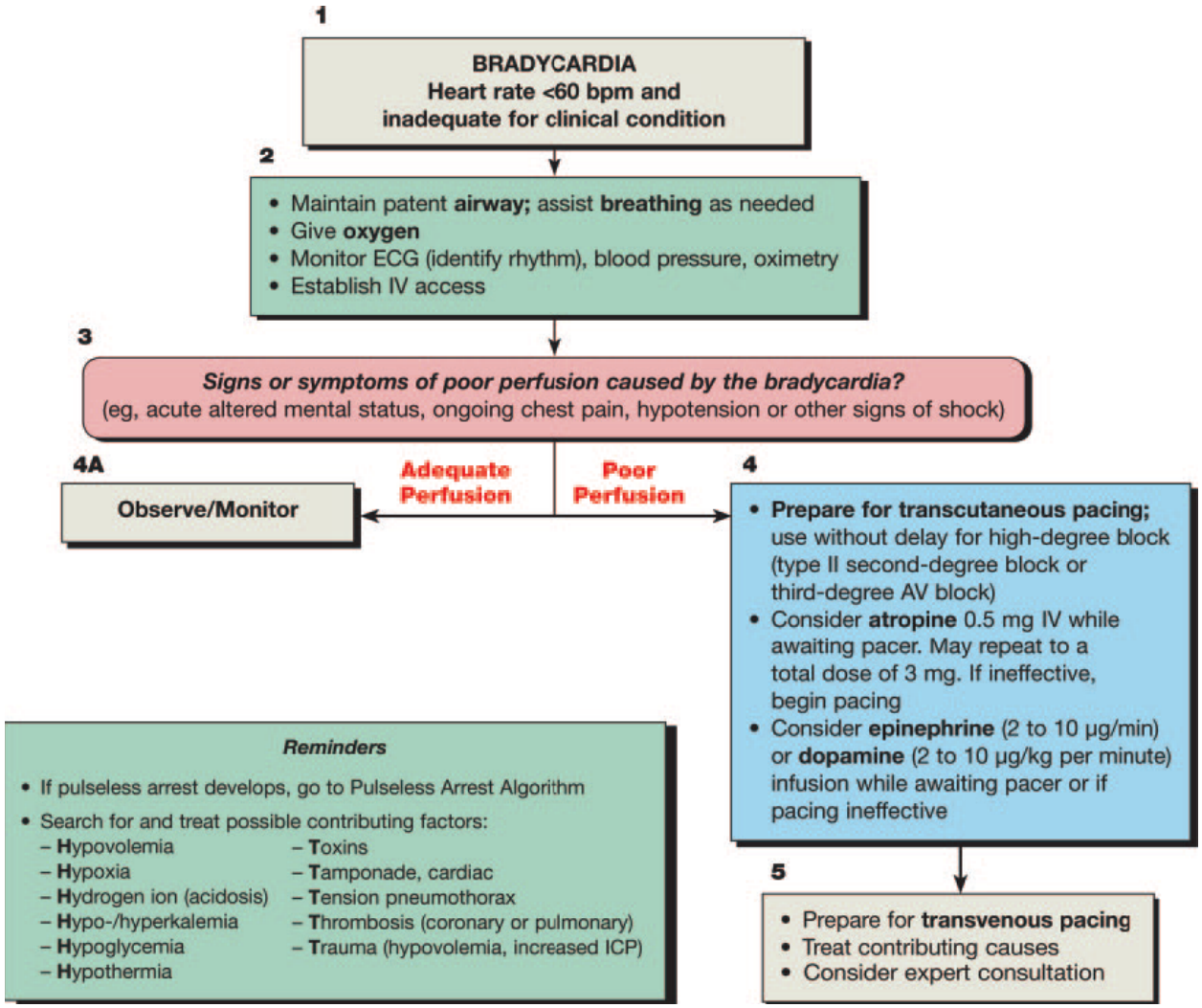
- Establish IV access.

Paramedic Standing Orders

P

- Perform 12-lead EKG.
- Consider atropine 0.5 mg IVP (1 mg via ETT) every 3-5 minutes to total of 3mg.
- Consider transcutaneous pacing if available. Attempt capture at 80 bpm at minimum output and increase until capture achieved. Use without delay for high degree block (Type II second degree block or third degree block).
- Consider procedural sedation prior to pacing:
  - Lorazepam 1 mg IV or 2 mg IM, may repeat once in 5 minutes, **or**
  - Midazolam 2.5 mg IV, may repeat once in 5 minutes
- Consider Epinephrine (2 to 10 ug/min) or Dopamine (2 to 10 ug/min) infusion while awaiting Pacer or if pacing ineffective.
- Consider Glucagon 2-5 mg IV, IM or SQ over 2-5 minutes in adults for suspected overdose of a beta-blocker or calcium channel blocker.

Bradycardia (Symptomatic) Algorithm - Adult



Tachycardia - Adult

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Identify rhythm using cardiac monitor and 12-lead ECG if available.
- **Unstable**
  (Hypotension, altered mental status, signs of poor perfusion)
  - Synchronized cardioversion
    - For V-Tach, A-fib, PSVT*: 100J, 200J, 300J, 360J
    - For A-flutter*: 50J, 100J, 200J, 300J, 360J
    - For Polymorphic V-Tach*: 200J, 300J, 360J*or biphasic equivalents, based on manufacturers recommendations
    - Consider procedural sedation if practicable (Midazolam 2.5 mg IV or Diazepam 5 mg IV)
- **Stable**
  PSVT or narrow complex tachycardia (with ventricular rate consistently greater than 140-150 BPM)
  - Consider vagal maneuvers (avoiding carotid sinus massage in the elderly).
  - If vagal maneuvers fail, give adenosine 6 mg rapid IVP, repeat dose of 12 mg X 2 as needed.

Tachycardia – Adult continued

Paramedic Standing Orders

P

► **Stable continued**

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

- Monitor and transport

For VT or uncertain wide complex tachycardia, consider

- Monitor and transport

For polymorphic VT / torsades, consider

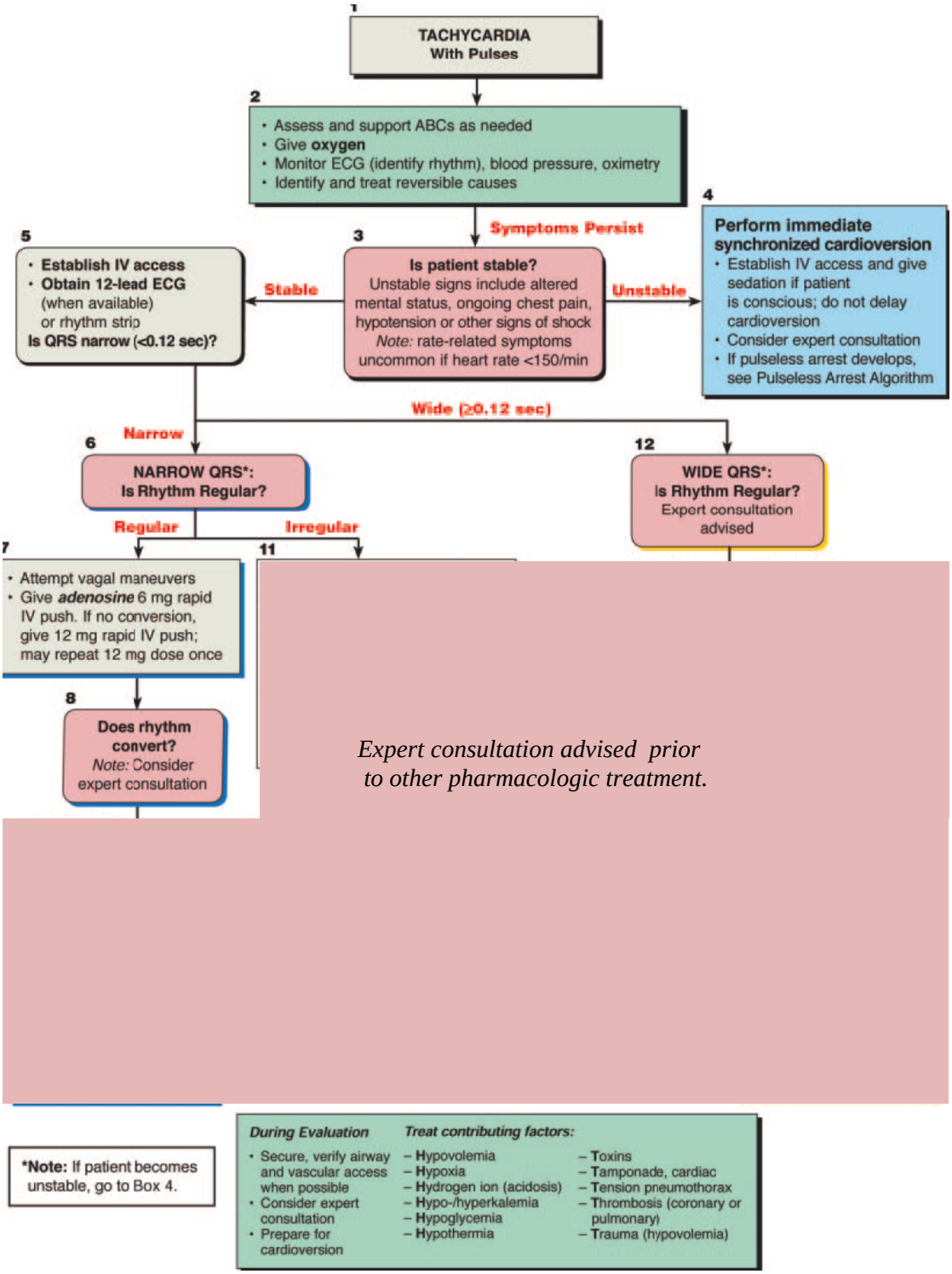
- Monitor and transport

For Known WPW

- Monitor and transport

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

Tachycardia Algorithm - Adult



Congestive Heart Failure/Pulmonary Edema - Adult

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Consider nitroglycerin 0.4 mg SL every 5 minutes prn if SBP> 90 mmHg.
- Consider furosemide 0.5 mg – 1 mg/kg IV or bumetanide 1 mg IV.
- Consider morphine sulfate 1 mg – 5 mg slow x 1. If not improving with above measures and systolic BP remains above 90 mm Hg,
  - Consider CPAP* if available and trained to use. Continuous Positive Airway Pressure (CPAP) with maximum 10 cm H2O pressure support
  - **Indications for CPAP**: Respiratory distress in the conscious patient suffering from presumed pulmonary edema who is non-responsive to simple oxygenation via non-rebreather mask.

Allergic Reaction/Anaphylaxis – Adult

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

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

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

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

Allergic Reaction/Anaphylaxis – Adult-Mild

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

Allergic Reaction/Anaphylaxis – Adult-Moderate

Edema, hives, difficulty swallowing, facial swelling, etc., with stable vital signs BP ≥ 90 mmHg.

Basic Standing Orders

B

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

Advanced Standing Orders

A

- Consider Albuterol 2.5 mg in 3 ml of NS via nebulizer every 5 minutes X 4 total doses.
- Establish an IV of 0.9% NaCl (Normal Saline) at KVO.

Paramedic Standing Orders

P

- Diphenhydramine 25-50 mg IM or IV.
- Consider Epinephrine (1:1000) 0.3 mg IM. Contact medical control if there is a history or risk factor for coronary artery disease.
- Establish an IV of 0.9% NaCl (Normal Saline) at KVO.

Allergic Reaction/Anaphylaxis – Adult-Severe

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

Basic Standing Orders

B

- Ensure adequate ABCs. Administer oxygen to keep SaO_2>90%.
- If patient was exposed to an allergen **and** exhibits severe respiratory distress or shock, Administer Epinephrine Autoinjector, or Epinephrine (1:1000) 0.3 mg (0.3 ml) IM.
- Begin Transport and request ALS intercept.
- Monitor ABCs and Vital Signs. Assist ventilations if necessary.

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

Advanced Standing Orders

A

- Consider Albuterol 2.5 mg in 3 ml of NS via nebulizer every 5 minutes X 4 total doses.
- Consider Epinephrine (1:1000) 0.3 mg (0.3 ml) IM.
- Establish an IV of 0.9% NaCl (Normal Saline) at KVO.

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

Paramedic Standing Orders

P

In addition to prior therapies, consider:

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

NOTE: Use Caution when administering Epinephrine with known Cardiovascular Disease

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mmHg.
- Consider albuterol 2.5mg in 3 ml normal saline via nebulizer prn every 5 minutes x 4 total doses.
- Consider combining ipratropium 0.5mg in 2.5 ml normal saline with albuterol 2.5mg in 3 ml normal saline as the first nebulizer treatment.
- Consider repeat albuterol 2.5mg, mixed in 3 ml normal saline, via nebulizer every 5 minutes.
- Consider levalbuterol 1.25 mg via nebulizer.

Paramedic Standing Orders

P

- For patients exhibiting signs/symptoms consistent with CHF, see Congestive Heart Failure/Pulmonary Edema Protocol.
- If available, measure peak flow pre-/post-treatment.

Asthma/RAD (Reactive Airway Disease) – Adult continued

Paramedic Standing Orders

P

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

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

Diabetic Emergencies: Hypoglycemia

Basic Standing Orders

B

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

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mmHg.
- If glucose level is <80mg/dl with associated signs and symptoms, administer dextrose (D50) 25 gm IV. Re-check glucose 5 minutes after administration of dextrose (D50). Repeat dextrose (D50) 25 gm IV if glucose level is less than 80mg/dL.
- In the presence of chronic alcoholism, alcohol intoxication, or malnourishment, administer thiamine 100 mg IV or IM.
- If unable to obtain IV access, administer glucagon 1mg IM or SQ.

Diabetic Emergencies: Hyperglycemia

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Airway management as needed.
- Transport.

Fever (>101.5°F/38.5°C) – Adult

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

- For temperatures of 101.5°F (38.5°C) or greater and no acetaminophen in last 4 hours, consider administering acetaminophen 500 - 1000mg PO in absence of signs/symptoms of nausea & vomiting.
- If acetaminophen has been administered within last 4 hours and temperature is still >101.5, then consider administering ibuprofen 400 – 800 mg PO if no contraindications (e.g. age > 65, known GI intolerance, known ulcer) and is without signs/symptoms of nausea & vomiting.

Nausea/Vomiting – Adult

Basic Standing Orders

B

- Routine Patient Care.

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Non-Traumatic Abdominal Pain - Adult

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

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

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

Abdominal history includes:

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

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

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

Basic Standing Order

B

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

Advanced Standing Orders

A

- Consider obtaining IV access with NS or RL.

Paramedic Standing Orders

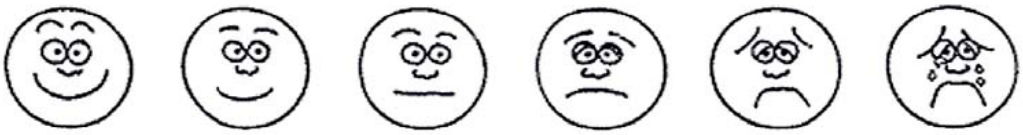
- Place patient on monitor.
- If signs of decreased perfusion or shock develop, initiate fluid resuscitation (See Trauma Assessment and Management Protocol).
- Be aware that ischemic cardiac pain can present as abdominal pain.

Pain Management - Adult

Basic Standing Orders

B

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



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

Paramedic Standing Orders

P

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

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

Poisoning: Overdose-Adult

Basic Standing Orders

B

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

Poisoning: Overdose-Adult continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

Suggested Antidotes

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

Poisoning: Activated Charcoal - Adult

Activated Charcoal is given to adsorb certain types of poisons after ingestion has occurred. The decision to administer should be made by on-line medical control with the type of poison and transport time being considered.

INDICATIONS:
- Poisoning by ingestion for the conscious patient
- Ingestion has occurred within 1 hour
- Ingested substance is known to be adsorbed by charcoal

POTENTIAL ADVERSE EFFECTS:
- Vomiting, aspiration, and airway obstruction
- Diarrhea, dehydration, shock, cramping (if sorbitol is included in charcoal)

CONTRAINDICATIONS:
- Altered mental status, decreased level of consciousness, or uncooperative patient
- Ingestion of hydrocarbon, corrosive or caustic substances
- Patient is unable to swallow

- PRECAUTIONS:
- Do not administer activated charcoal with sorbitol to infants under 1 year old

Basic Standing Orders

B

- ► Assess the patient, treat ABC problems, obtain baseline vitals and consider transport plan based on general impression.
- ► Remove any remaining pills, tablets, or fragments from patient's mouth, if necessary.
- ► Determine what the patient has ingested and read label regarding poisoning directions.
- ► Contact On-Line Medical Control.
- ► If unable to contact On-Line Medical Control contact Poison Control at-1-800-222-1222.
- ► If directed to administer Activated Charcoal, proceed with guideline
- ► Take full body substance isolation precautions; including gloves, mask, eye protection, and clothing cover.
- ► Use Aqueous Charcoal unless advised to use charcoal containing sorbitol.
- ► Check the expiration date and confirm that the medication is activated charcoal.
- ► Shake the container or massage the tube to thoroughly mix before using and as needed during use.
- ► Encourage the patient to drink one dose, a covered container and a straw may improve patient compliance. Be prepared for the patient to vomit.

Poisoning: Activated Charcoal – Adult continued

Basic Standing Orders continued

B

- Have suction ready and be ready to manage airway difficulties. If patient vomits, consider contacting medical control for permission to administer one more dose.
- If the patient does not drink the medication right away, the charcoal will need to be shaken again.
- Record the time of administration, dose given and the results.
- Be alert for vomiting. If child vomits, position on side and protect airway. Document stomach contents, (pill fragments, amount, etc.)
- Transport patient promptly, bringing label, or as much information about contaminant as possible with you.
- Perform ongoing assessment en route.

Poisoning: Cyanide - Adult

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

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

- Obtain IV access if situation permits.

Paramedic Standing Orders

P

- Hydroxocobalamin is the preferred treatment. If clinical suspicion of cyanide poisoning is high, hydroxocobalamin should be administered without delay.
- Hydroxocobalamin: 5 gm dose over 15 min. Using a Cyanokit**, prepare the full 5 gm dose in two equal portions: each portion = 2.5 gm in 100 ml of 0.9% NaCl (normal saline). Give each portion over 7.5 min. Depending upon the severity of the poisoning and the clinical response, a second dose of 5 gm may be administered by IV infusion for a total dose of 10 gm. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 120 minutes, as clinically indicated.

NOTE: ** Cyanokit ®: each kit contains two 250 ml glass vials, each containing 2.5 gm lyophilized hydroxocobalamin for injection, two sterile transfer spikes, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included.)

Poisoning: Nerve Agents and Organophosphates MCI

Basic Standing Orders

B

Assessment of the Scene:

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

General Patient Treatment

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

Basic Standing Orders

B

General Patient Treatment continued:

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

Procedure for Auto-Injector:

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

Poisoning: Nerve Agents and Organophosphates MCI

Basic Standing Orders

B

Procedure for Auto-Injector continued:

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

Patient Monitoring Following Administration

- Patients may have symptoms re-develop even after administration of the antidote kit.
- Atropine may only be repeated every 10 - 15 minutes as needed. (Note: multiple doses of atropine may be needed.)

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

Poisoning: Nerve Agents and Organophosphates MCI

Advanced Standing Orders

A

- Obtain IV access if situation permits.

Paramedic Standing Orders

P

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

  Instead of diazepam, may use either
  - Lorazepam 2-4 mg IM/IV, repeat every 5 to 10 minutes as needed, **or**
  - Midazolam 2.5-5.0 mg IM/IV, repeat every 5 to 10 minutes as needed.
- Albuterol 2.5 mg in 3 ml normal saline via nebulizer.

Poisoning: Nerve Agents and Organophosphates MCI Provider Protection

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

  Instead of diazepam, may use either
  - Lorazepam 2-4 mg IM/IV, repeat every 5 to 10 minutes as needed, **or**
  - Midazolam 2.5-5.0 mg IM/IV, repeat every 5 to 10 minutes as needed.
- Albuterol 2.5 mg in 3 ml normal saline via nebulizer.

Poisoning: Radiation Injuries MCI

Exposure to radioactive source or radioactive materials/debris.

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Consider anti-emetic.
- Consider pain control.

Seizures - Adult

Basic Standing Orders

B

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

Advanced Standing Orders

A

- IV access and administer fluids to maintain systolic blood pressure >90 mmHg.
- If blood glucose reading less than 80 mg/dl, see Diabetic Emergencies.

Paramedic Standing Orders

P

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

Suspected Stroke Protocol

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

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

Basic Standing Orders

B

- Routine Patient Care.
- Obtain glucose reading via glucometer.
- Administer high concentration oxygen, suction as necessary, and be prepared to assist ventilation.
- Perform Cincinnati Prehospital Stroke Scale.
- If positive, determine time of onset of symptoms. Time of onset of stroke is critical:
  - To patient- "When was the last time you were normal?"
  - To family or bystander- "When was the last time you saw the patient normal?"
- Encourage transportation of a family member.
- Maintain normal body temperature.
- Protect any paralyzed or partially paralyzed extremity.
- Early notification of the emergency department is critical.
- Closest hospital may not be the best destination hospital:
  - Consider JCAHO-approved stroke center if onset of symptoms to definitive treatment can be within 3 hours (Generally within two hours of symptoms to arrival at facility).
  - Consider air medical transport from the scene in lieu of closest hospital if the patient would otherwise not have access to definitive care at a JCAHO-approved stroke center within 3 hours (Generally within two hours of arrival at facility).
- Transport the patient to the closest appropriate hospital emergency department if:
  - The patient is in cardiac arrest, or
  - The patient has an unmanageable airway, or
  - The patient has another medical condition that warrants transport to the closest appropriate hospital emergency department as per protocol.
- Initiate fibrinolytic screening and document findings on Stroke Checklist.
- Consider ALS intercept/air medical transport.

Suspected Stroke Protocol continued

Advanced Standing Orders

A

Do not delay transport for ALS procedures

- IV access with 0.9% Normal Saline TKO. Avoid dextrose.

Paramedic Standing Orders

P

Do not delay transport for ALS procedures

- Obtain 12-lead EKG during transport.
- Avoid treating blood pressure elevation without online medical control authorization.
- Manage compromised airway.
- Continuously reassess.

Stroke Checklist: IV t-PA Inclusion/Exclusion Criteria

Note: The decision to transport to a JACHO stroke center is NOT based on the following criteria. The decision to administer t-PA is a PHYSICIAN decision that will be based, in part, on the following criteria:

Inclusion Criteria

- Age 18 or older
- Stroke Symptom onset < 3 hours
- Clinical Diagnosis of ischemic stroke causing a measurable neurologic deficit

Exclusion Criteria

- Onset to treatment > 3 hours or time of onset unknown
- Evidence of active bleeding or acute trauma
- Seizure at onset with postictal neurologic impairments
- History of Intracranial Hemorrhage
- Arterial puncture at a noncom-pressible site in the previous 7 days
- Major Surgery in last 14 days
- GI or Urinary tract hemorrhage previous 21 days
- Previous head trauma or stroke in last 3 months
- MI within the last 3 months
- Blood Pressure > 185/110 mm Hg requiring aggressive treatment
- INR > 1.7
- Platelet count <100,000 mm3
- Blood glucose < 50 mg/dL
- Heparin within previous 24 hours, PTT must be within normal range
- > 1/3 hypodensity on CT
- Evidence of ICH on CT
- Symptoms Minor or isolated
- Symptoms clearing spontaneously
- Symptoms of SAH
- Symptoms causing severe deficits

The Cincinnati Pre-Hospital Stroke Scale - Suspected Stroke Protocol

Left: normal.
Right: stroke patient with facial droop (right side of face.

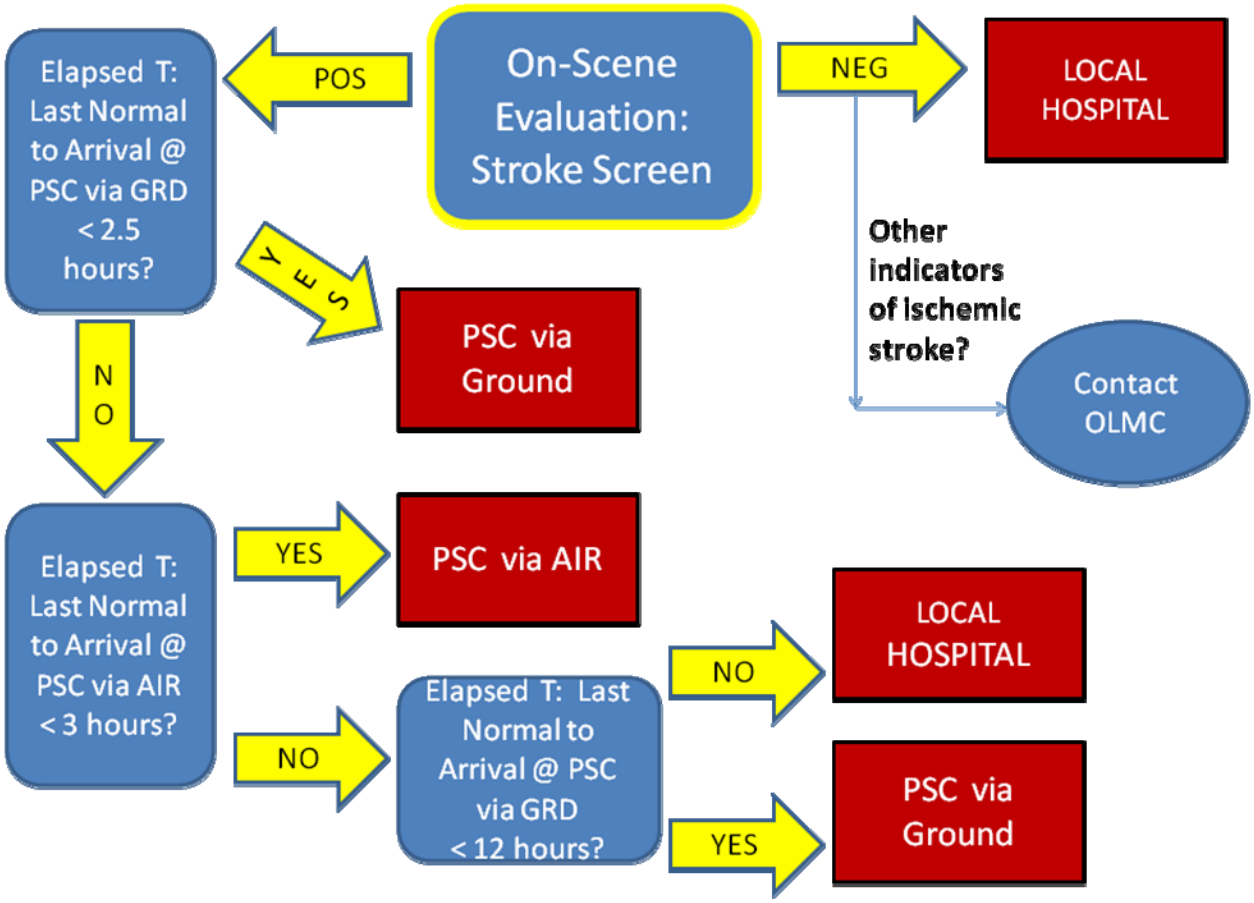
	Normal	**Abnormal**
Facial Droop (have patient show teeth or smile)	Both sides of face move equally	One side of face does not move as well as the other side
Arm Drift (patient closes eyes and holds both arms straight out for 10 seconds)	Both arms move the same or both arms do not move at all (other findings, such as pronator drift, may be helpful)	One arm does not move or one arm drifts down compared with the other
Abnormal Speech (have the patient say "you can’t teach an old dog new tricks")	Patient uses correct words with no slurring	Patient slurs words, uses the wrong words, or is unable to speak

Suspected Stroke Protocol – Transport & Destination Decision Making Guideline

Definitions:

PSC: JACHO Stroke Center

OLMC: Hardin Memorial Hospital ED



Obstetrical Emergencies

Basic Standing Orders

B

- Routine Patient Care.
- Gather specific information:
  - Length of pregnancy, number of previous pregnancies, number of previous live births, last menstrual period, due date, pre-natal care, number of expected babies, drug use.
  - Signs of near delivery: membrane rupture ("water broke") or bloody show, contractions, urge to move bowels, urge to push, etc.
  - Signs of pre-eclampsia: hypertension, swelling of face and/or extremities.
- Oxygen at high concentration to benefit mother and fetus.
- If the mother is having contractions, perform a visual inspection of the external genitalia and perineum for bulging or crowning. Have your partner be present during the exam. **IF THERE IS CROWNING, PREPARE FOR IMMEDIATE DELIVERY.**
  - Update responding ALS unit if available.
  - Inform the mother of the need for immediate delivery.
  - Ensure a private, clean delivery area and sanitary equipment.
  - Elevate mothers buttocks 6-8". Do not "Table" the infant.
  - Position and drape the mother.
  - Get several towels, warm if possible.
- Do not digitally examine or insert anything into vagina. Exceptions: to manage baby's airway in breech presentation or to treat prolapsed cord as below, you may insert a hand.
- Contact medical control if:
  - Active labor and delivery is imminent.
  - Post-partum hemorrhage.
  - Breech presentation.
  - Prolapsed cord.
- Place mother in left-lateral recumbent position except as noted.
- Never delay or restrain delivery under normal circumstances.
- Prolapsed cord: knee-chest position or Trendelenberg position; immediately and continuously support & elevate infant head or body with your hand to permit blood flow through cord. Transport at once to closest hospital with obstetrical capabilities.

Obstetrical Emergencies – Normal Delivery Procedure

Basic Standing Orders

B

Delivery Procedures:

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

Basic Standing Orders

B

Delivery Procedures continued:

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

Obstetrical Emergencies – Normal Delivery Procedure continued

Basic Standing Orders

B

Delivery Procedures continued:

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

Obstetrical Emergencies – Normal Delivery Procedure continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Routine Patient Care.
- Follow Neonatal Resuscitation Protocol.
- Monitor the patient.
- After all infants have delivered - administer Oxytocin via IV piggyback
  - Add 20 units of Oxytocin into 1,000 ml RL and infuse at 150 – 200 ml / hour. Ensure that IV is properly labeled.

NOTE: Oxytocin may only be administered after delivery of all infants. Use of this substance to facilitate delivery is strictly prohibitied.

Obstetrical Emergencies – Complicated Childbirth

Basic Standing Orders

B

Breech Birth

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

- **If the buttocks presents first:**
  - Administer high concentration oxygen to the mother.
  - Attempt to establish an open path in the birth canal to the infant's mouth with sterile-gloved fingers. If possible, turn the infant so that the back is toward you.
  - **Transport the mother immediately** in a face-up position with her hips elevated 6-8 " (Do not "Table" the infant, while maintaining an open path in the birth canal to the infant's mouth. Allow mother to push baby out. DO NOT PULL.
- **If a limb presents first:**
  - Administer high concentration oxygen to the mother.
  - Place the mother in a face-up position with her hips elevated and **transport immediately!**

Prolapsed Umbilical Cord

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

Multiple Births

- Obtain additional help as needed.
- Deliver each multiple birth according to the above protocol for **Uncomplicated Childbirth**, making sure to clamp and cut each umbilical cord between births.
- **If the anticipated second birth does not occur after 10 minutes, transport immediately!**

▪ If multiple birth (twins, triplet's – Place 2 clamps on umbilical cord of 2nd infant, place 3 clamps on third infant. This will allow for identification match of placenta to infant.

Obstetrical Emergencies – Complicated Childbirth continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Unresponsive/Altered Mental Status (AMS) Patient - Adult

Basic Standing Orders

B

- Routine Patient Care.
- Scene and patient management per General Guidelines.
- Administer 100% oxygen by face-mask.
- Immobilize if evidence of trauma.
- Determine level of consciousness (AVPU).
- Perform focused history and physical examination.
- Determine blood glucose level.
- Transport.

Advanced Standing Orders

A

- Establish intravenous access.
- Administer naloxone 2 mg IVP.
- If hypoglycemia is suspected, go to Hypoglycemia Protocol.

Paramedic Standing Orders

P

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

Medical Pediatric Protocols

Routine Patient Care Guidelines - Pediatric

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

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

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

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

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

Initial Assessment

Scene Size-Up

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

Level of Consciousness

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

Routine Patient Care Guidelines – Pediatric continued

Airway

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

Breathing

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

Circulation

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

Disability

- ► Movement of extremities.
- ► Defibrillation – VF/VT without pulse.

Expose

- ► Expose and examine head, neck, chest, abdomen, pelvis and back.
- ► Measure child utilizing the Braslow Resuscitation Tape.

Secondary Assessment

Head-to-toe Survey

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

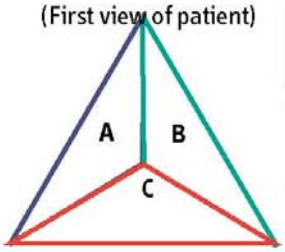
Assess Vital Signs
- Respiration.
- Pulse.
- Blood pressure.
- Capillary refill.
- Skin condition.
  - Color.
  - Temperature.
  - Moisture.

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

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

PEDIATRIC ASSESSMENT

General Impression
(First view of patient)



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

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

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

Work of Breathing
(Visible movement / Respiratory Effort)

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

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

Circulation to Skin
(Color / Obvious Bleeding)

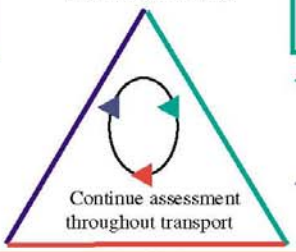
Abnormal: Cyanosis, mottling, paleness/ pallor or obvious significant bleeding.

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

Decision/Action Points:

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

Initial Assessment
(Primary Survey)



Airway & Appearance
(Open/Clear – Mental Status)

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

Normal: Clear and maintainable. Alert on AVPU scale.

Breathing
(Effort / Sounds / Rate / Central Color)

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

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

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

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

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

Decision/ Action Points:

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

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

Developed by New York State EMSC

(Estimate valid ≤ 10 years.)

Pediatric CUPS (with examples)

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

Glasgow Coma Score

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

Neonatal Resuscitation

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

Apnea/Gasping, HR <100 or central cyanosis

Ventilate with BVM @ 40-60/min

HR<60 after 30 sec BVM

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

ALS available & HR <60

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

For Epinephrine the IV route is strongly preferred over ET.

Respiratory / Cardiac Arrest Treatment

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

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

ALS Guidelines

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

Developed by New York State EMSC

Apparent Life Threatening Event (ALTE) – Pediatric

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

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

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

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

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

- Check cardiac rhythm.
- Consider possible overdose.
- ***Transport all infants with an ALTE. If transport is being refused contact the EMS Shift Supervisor.***

Sudden Infant Death Syndrome (SIDS)

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

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

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

- ► Refer to Pediatric Cardiac Arrest Protocol.

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

Neonatal Resuscitation

Definition: Neonatal resuscitation refers to the series of interventions used to stimulate spontaneous respiratory effort. The typical newborn response to hypoxia is apnea and bradycardia

Basic Standing Orders

B

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

Paramedic Standing Orders

P

Pulse

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

Cardiac Arrest - Pediatric

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

For ASYSTOLE or PEA

- Give Epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV **or** 0.1 mg/kg (1:1000; 0.1 ml/kg) via ETT, repeat every 3 - 5 minutes.
- Give 5 cycles of CPR, then check rhythm.

Paramedic Standing Orders continued

P

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

For VF/Pulseless VT

- ► Defibrillate at 2 J/kg; deliver 5 cycles of CPR and recheck rhythm; if still a shockable rhythm, defibrillate at 4 J/kg; deliver 5 cycles of CPR; give Epinephrine (1:10,000) 0.01 mg/kg (0.1 ml/kg) IV/IO **or** 0.1 mg/kg (1:1000; 0.1 ml/kg) via ETT.
  - repeat every 3 - 5 minutes
- ► If still a shockable rhythm, defibrillate at 4 J/kg; deliver 5 cycles of CPR; consider:
  - Amiodarone 5 mg/kg (maximum 300 mg) IV **or**
  - Lidocaine 1 mg/kg (maximum 100 mg) IV.
  - Magnesium sulfate 25 – 50 mg/kg (max. 2 grams) IV/IO over 1 – 2 minutes for torsades de pointes.
- ► If pulse obtained, begin post-resuscitation care.

Consider treatable causes

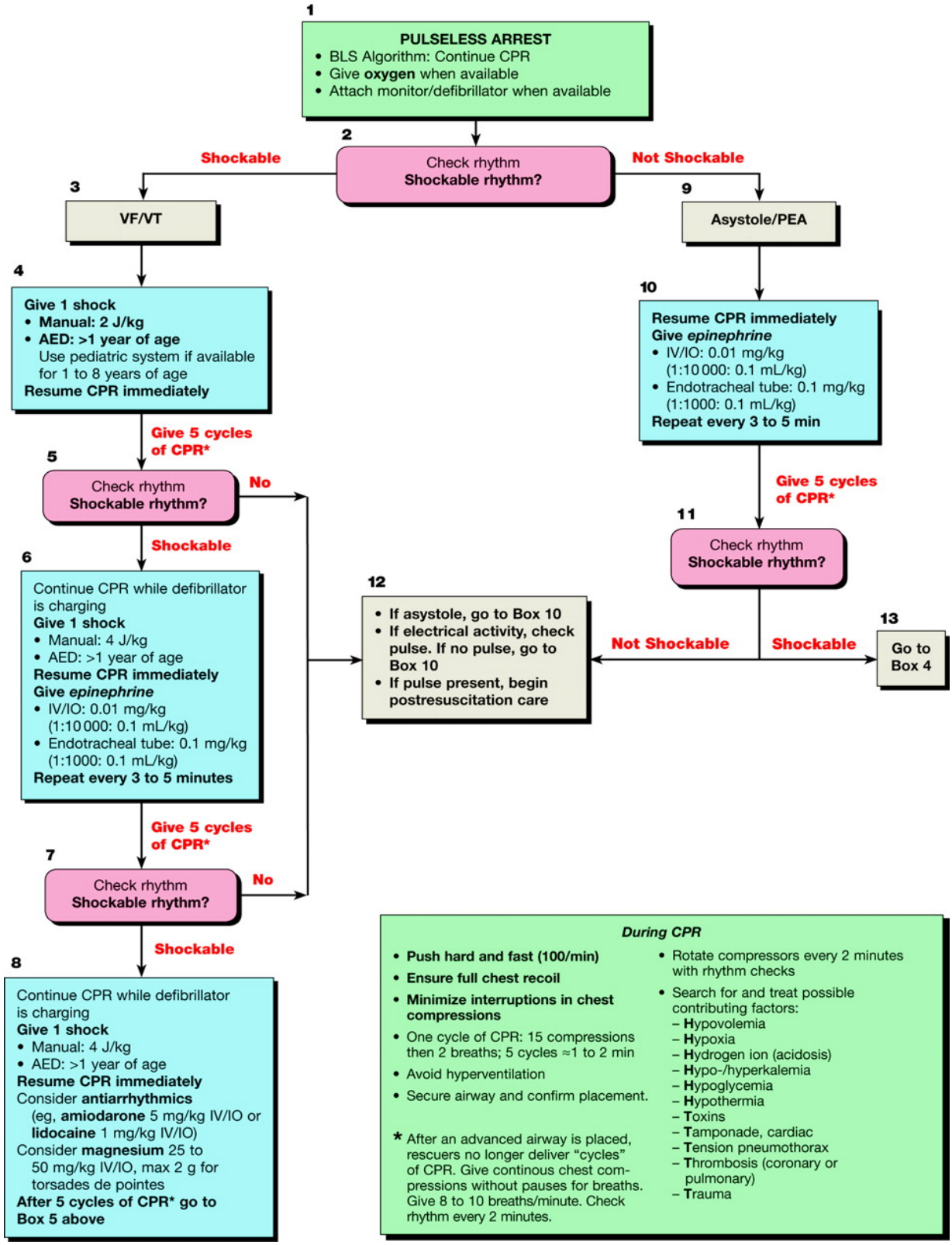
- ► For trauma consider bilateral needle chest decompressions.
- ► For suspected or known hyperkalemia (dialysis patient), or known tricyclic antidepressant overdose, consider sodium bicarbonate 1 mEq/kg IVP.

For Post-resuscitation hypotension

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

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

Cardiac Arrest Algorithm



Bradycardia (Symptomatic) - Pediatric

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

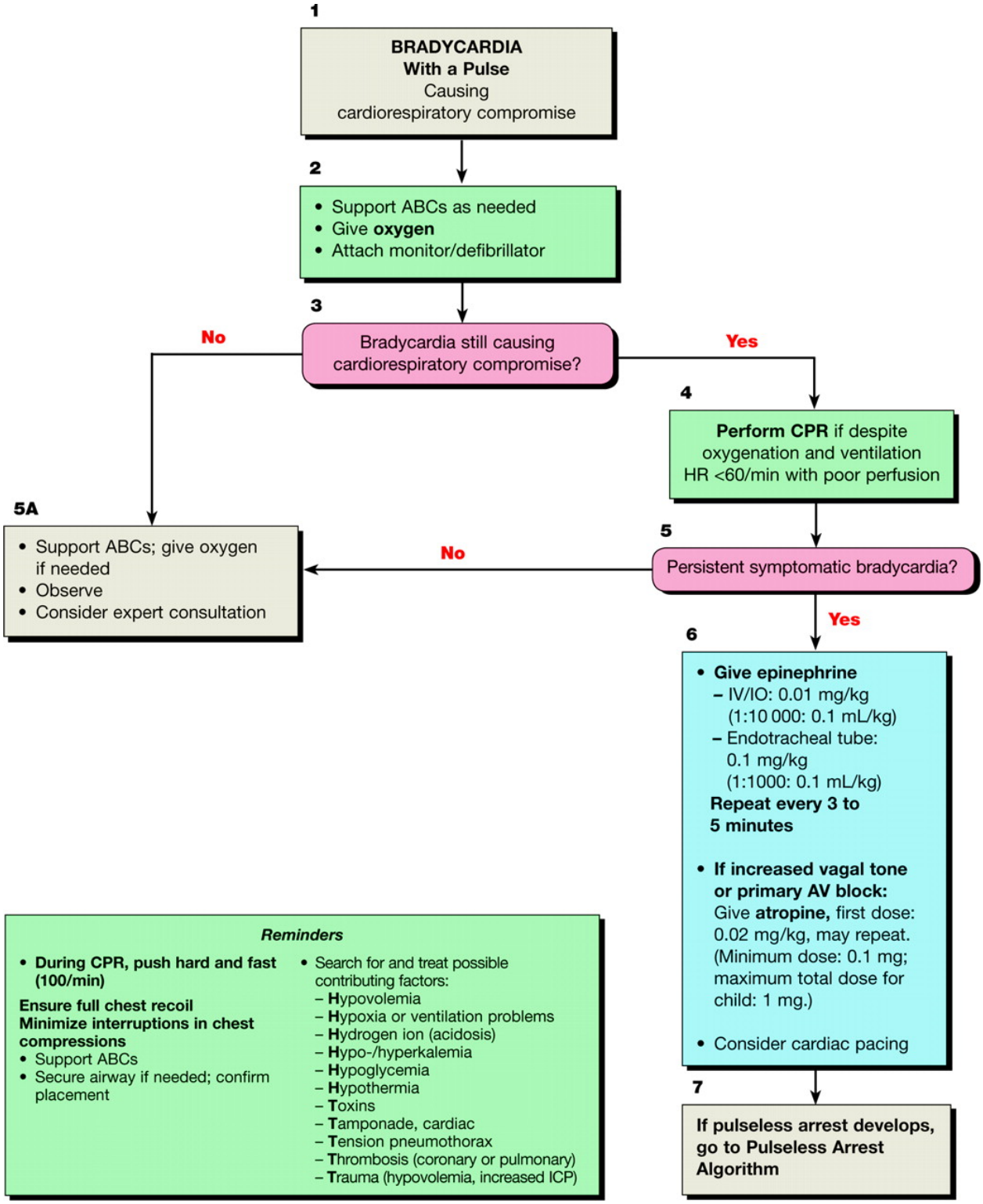
- IV access and administer fluids to maintain hemodynamic status.

Paramedic Standing Orders

P

- Epinephrine 0.01 mg/kg IV (0.1 ml/kg of **1:10,000**) every 3-5 minutes, **or**
- Epinephrine 0.1 mg/kg ETT (0.1 ml/kg of **1:1000**) every 3-5 minutes.
- Consider atropine 0.02mg/kg (min single dose 0.1mg, - total max dose is 1 mg).
- Consider transcutaneous pacing at minimum output and increase until capture achieved for rate appropriate to age.
- Consider procedural sedation prior to pacing
  - Midazolam 0.05 mg/kg IV, **or**
  - Diazepam 0.05 mg/kg IV
- Consider glucose if hypoglycemia suspected.

Bradycardia (Symptomatic) Algorithm – Pediatric



Tachycardia - Pediatric

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Consider procedural sedation prior to cardioversion

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

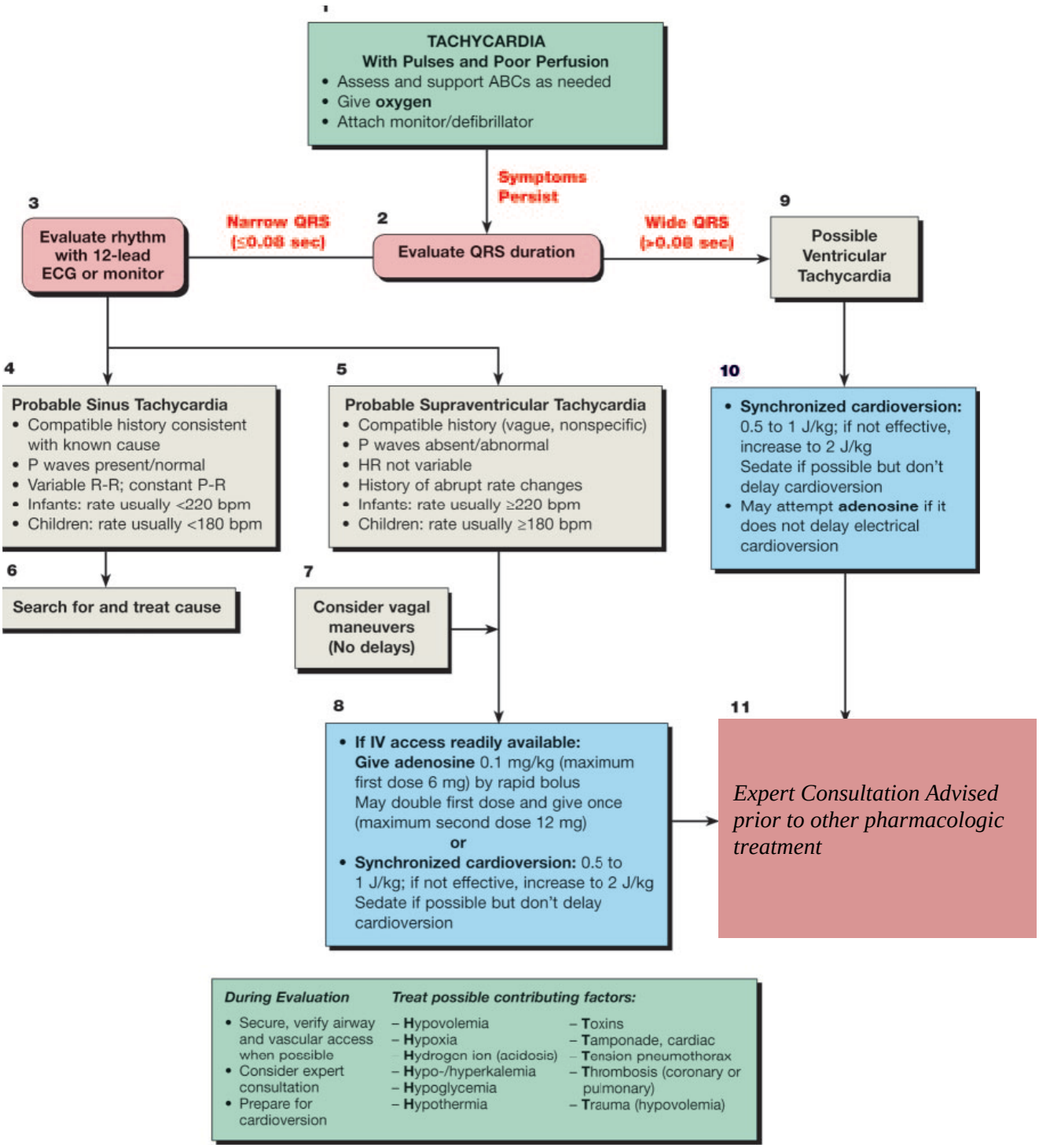
PSVT or narrow complex tachycardia

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

For suspected VT (wide complex >0.08 sec)

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

Tachycardia Algorithm- Pediatric



Shock - Pediatric

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

HYPOVOLEMIA

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

Paramedic Standing Orders

P

CARDIOGENIC

- Consider rhythm disturbance. If supraventricular tachycardia or ventricular tachycardia with a pulse and evidence of low cardiac output, follow protocol for Pediatric Tachycardia.
- Fluid bolus, 10 ml/kg NS or LR IV or IO.
- Consider dopamine.

Shock – Pediatric continued

Paramedic Standing Orders continued

P

DISTRIBUTIVE (Septic)

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

Key Points/Considerations

- Use appropriate barrier precautions.

Allergic Reaction/Anaphylaxis – Pediatric

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

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

Allergic Reaction/Anaphylaxis – Pediatric: Minor

Symptoms such as rash, itching or hives evident; normal perfusion, no dyspnea.

Basic Standing Orders

B

- Routine Patient Care
- Maintain airway and administer high flow oxygen:
  - Infants via infant mask @ 2-4 L/min.
  - Small child (1-8 yrs) via pediatric mask @ 6-8L/min.
  - Older child (9-15 years) via non-rebreather mask @ 10-15 L/min.
  - If mask not tolerated, administer via blow-by method.
  - Remove allergen.
  - Check vital signs frequently.
  - Begin transport, consider ALS intercept.
  - Consider patient assisted medication.

Advanced Standing Orders

A

- Consider Albuterol 2.5mg in 3 ml of normal saline via Nebulizer. May repeat x 2 PRN.
- IV access.
- If hypotensive, infuse 0.9% NaCl (Normal Saline) 20 ml/kg to maintain hemodynamic status.

Paramedic Standing Orders

P

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

Allergic Reaction/Anaphylaxis – Pediatric: Moderate

Edema, hives, wheezing, normal perfusion

Basic Standing Orders

B

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

Advanced Standing Orders

A

- Consider:
  - Albuterol 1 nebulizer treatment:
    - < 1 year or < 10 kg mix 1.25 mg in 1.5 ml NS (Normal Saline) 0.083%).
    - > 1 year or > 10 kg mix 2.5 mg in 3 ml NS (Normal Saline) 0.083%. May repeat twice PRN.

Paramedic Standing Orders

P

- Diphenhydramine 1 mg/kg (maximum 25 mg) IM/IV.
- Consider Epinephrine (1:1,000 strength) 0.01 mg/kg (0.01 ml/kg) IM every 5 minutes to a maximum dose of 0.3 mg (0.3 ml).
- .

Allergic Reaction/Anaphylaxis – Pediatric: Severe

Edema, hives, severe dyspnea, wheezing, poor perfusion, possible cyanosis and laryngeal edema.

Basic Standing Orders

B

- Ensure adequate ABCs. Administer oxygen to keep SaO_2>90%.
- If patient was exposed to an allergen **and** exhibits severe respiratory distress or shock administer ONE of the following:
  - Epipen Autoinjector (8 years of age or older) **or**
  - Epipen Jr. Autoinjector (less than 8 years/55 lbs) **or**
  - Epinephrine 1:1000, 0.3 mg (0.3ml) IM (8 years of age or older) **or**
  - Epinephrine 1:1000, 0.15 mg (0.15ml) IM (less than 8 years/55 lbs).
- Begin Transport and request ALS intercept.
- Monitor ABCs and Vital Signs. Assist ventilations if necessary.

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

.

Advanced Standing Orders

A

- Consider:
  - Albuterol 1 nebulizer treatment:
    - < 1 year or < 10 kg mix 1.25 mg in 1.5 ml NS (Normal Saline) 0.083%)
    - > 1 year or > 10 kg mix 2.5 mg in 3 ml NS (Normal Saline) 0.083%. May repeat twice PRN

Paramedic Standing Orders

P

In addition to prior therapies, consider:

- Methylprednisolone (Solu-Medrol®) 2 mg/kg, max dose 125 mg).
- Diphenhydramine 1 mg/kg (maximum 25 mg) IM/IV.
- May repeat Epinephrine (1:1000) 0.1 mg/kg (maximum 0.3 mg) IM.
- Consider early intubation.

Asthma/RAD/Croup - Pediatric

BRONCHOSPASM

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

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

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

Basic Standing Orders

B

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

Asthma/RAD/Croup – Pediatric continued

Advanced Standing Orders

A

- If croup suspected, consider nebulized epinephrine.
  - Less than 1 year of age: 2.5 mg (2.5 ml of 1:1000) in 3 ml normal saline; may repeat in 15 minutes x 1.
  - Greater than 1 year of age: 5 mg (5 ml of 1:1000) in 3 ml normal saline; may repeat in 15 minutes x 1.
- Assess circulation, perfusion and mental status.
- Consider ipratropium 0.25mg (1.25 ml of 0.02% solution) with albuterol 2.5mg (0.5 ml of 0.5% solution), mixed in 3 ml normal saline, via nebulizer x 1.
- Consider albuterol 2.5mg (0.5 ml of 0.5% solution) in 3 ml normal saline solution via nebulizer every 5 minutes x 4 total doses.
- Consider epinephrine (**1:1,000**) 0.01mg/kg IM (maximum 0.3mg = 0.3 ml) for patients unable to inhale nebulized albuterol.
- IV access and administer fluids to maintain hemodynamic status.

Paramedic Standing Orders

P

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

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

Diabetic Emergencies: Hypoglycemia - Pediatric

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Diabetic Emergencies: Hyperglycemia - Pediatric

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Airway management as needed.
- Transport.

Non-Traumatic Abdominal Pain - Pediatric

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

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

Abdominal history includes:

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

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

Basic Standing Order

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Consider monitoring patient IF signs of decreased perfusion.
- Refer to Shock-Pediatric Protocol.

Poisoning: Overdose - Pediatric

Basic Standing Orders

B

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

Poisoning: Overdose - Pediatric continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

Suggested Antidotes

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

Note: If clinical suspicion of cyanide poisoning is high, hydroxocobalamin should be administered without delay.

*Cyanokit®: each kit contains two 250 ml glass vials, each containing 2.5 gm lyophilized hydroxocobalamin for injection, two sterile transfer spikes, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included).

Poisoning: Activated Charcoal - Pediatric

Activated Charcoal is given to adsorb certain types of poisons after ingestion has occurred. The decision to administer should be made by on-line medical control with the type of poison and transport time being considered.

INDICATIONS:

- Poisoning by ingestion for the conscious patient
- Ingestion has occurred within 1 hour
- Ingested substance is known to be adsorbed by charcoal

POTENTIAL ADVERSE EFFECTS:

- Vomiting, aspiration, and airway obstruction
- Diarrhea, dehydration, shock, cramping (if sorbitol is included in charcoal)

CONTRAINDICATIONS:

- Altered mental status, decreased level of consciousness, or uncooperative patient
- Ingestion of hydrocarbon, corrosive or caustic substances
- Patient is unable to swallow

- PRECAUTIONS:
- Do not administer activated charcoal with sorbitol to infants under 1 year old

- ***Poisoning: Activated Charcoal – Pediatric continued***

Basic Standing Orders

B

- Assess the patient, treat ABC problems, obtain baseline vitals and consider transport plan based on general impression.
- Remove any remaining pills, tablets, or fragments from patient's mouth, if necessary.
- Determine what the patient has ingested and read label regarding poisoning directions.
- Contact On-Line Medical Control.
- If unable to contact On-Line Medical Control contact Poison Control at-1-800-222-1222.
- If directed to administer Activated Charcoal, proceed with guideline.
- Take full body substance isolation precautions; including gloves, mask, eye protection, and clothing cover.
- Use Aqueous Charcoal unless advised to use charcoal containing sorbitol.
- Check the expiration date and confirm that the medication is activated charcoal.
- Shake the container or massage the tube to thoroughly mix before using and as needed during use.
- Encourage the patient to drink one dose, a covered container and a straw may improve patient compliance. Be prepared for the patient to vomit.

Poisoning: Activated Charcoal – Pediatric continued

Usual infant/child dose: 1gm/kg to a maximum of 50 grams
Pounds ÷ 2.2 = Kilograms= Grams of Charcoal

Pounds	Kilograms	Grams of Charcoal
10	4.5	5
20	9	10
30	13.6	15
40	18	20
50	22.7	25
60	27.3	27
70	31.8	32
80	36.3	36
90	40.9	41
100	45	45
Over 100	50	50

- ► Have suction ready and be ready to manage airway difficulties. If patient vomits, consider contacting medical control for permission to administer one more dose.
- ► If the patient does not drink the medication right away, the charcoal will need to be shaken again.
- ► Record the time of administration, dose given and the results.
- ► Be alert for vomiting. If child vomits, position on side and protect airway. Document stomach contents, (pill fragments, amount, etc).
- ► Transport patient promptly, bringing label, or as much information about contaminant as possible with you.
- ► Perform ongoing assessment en route

Poisoning: Cyanide Poisoning - Pediatric

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

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

- ► Obtain IV access if situation permits.

Paramedic Standing Orders

P

- ► Hydroxocobalamin is the preferred treatment. If clinical suspicion of cyanide poisoning is high, hydroxocobalamin should be administered without delay.
- ► Hydroxocobalamin: 70 mg/kg dose over 15 min. Using a Cyanokit**,prepare 2.5 gm in 100 ml of 0.9% NaCl (normal saline) to yield a 25 mg/ml solution. Depending upon the severity of the poisoning and the clinical response, a second dose of 70 mg/kg may be administered by IV infusion for a total dose of 140 mg/kg. The rate of infusion for the second dose may range from 15 minutes (for patients in extremis) to 120 minutes, as clinically indicated, **or** an alternative therapy is to administer.

Note: ** Cyanokit ®: each kit contains two 250 ml glass vials, each containing 2.5 gm lyophilized hydroxocobalamin for injection, two sterile transfer spikes, one sterile IV infusion set, and one quick use reference guide. (Diluent is not included.)

Poisoning: Nerve Agents and Organophosphates MCI – Pediatric

Basic Standing Orders

B

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

Triage	Symptoms	Triage Level: Disposition	Atropine Correct hypoxia before IV (risk of torsades, V-fib)	Pralidoxime	Diazepam May use other benzodiazepines (e.g. Midazolam)
RED	Apnea, Convulsions, Cardiopulmonary Arrest	Immediate – Severe: Admit intensive care status	0.05-0.1 mg/kg IV, IM per ETT ⇨No maximum ⇨Repeat q5-10 minutes as above	25-50 mg/kg IV or IM as above	
YELLOW	Miosis and any other symptom	Immediate – Moderate: Admit	0.5 mg/kg IV or IM Repeat as needed q5-10 minutes until respiratory status improves	25-50 mg/kg IV or IM May repeat q 1 hour. Watch for: ⇨Muscle rigidity ⇨Laryngospasm ⇨Tachycardia	For any neurologic effect: ⇨30 days to 5 years-0.05 to 0.3 mg/kg/IV to a maximum dose of 5mg/dose. ⇨5 years and older-0.05 to 0.3 mg/kg IV to a maximum dose of 10/mg/dose. May repeat q15-30 minutes
GREEN	Asymptomatic: Miosis, mild rhinnorhea	Admit or observe PRN	None	None	None

Poisoning: Radiation Injuries MCI

Exposure to radioactive source or radioactive materials/debris.

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Consider anti-emetic.
- Consider pain control.

Seizures - Pediatric

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

FEVER (>101.5°F/38.5°C) – Pediatric

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

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

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

Nausea/Vomiting –Pediatric

Basic Standing Orders

B

- Routine Patient Care.

Advanced Standing Orders

A

- IV access and administer fluids to maintain hemodynamic status.

Paramedic Standing Orders

P

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

Dehydration – Pediatric

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

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

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

Unresponsive/Altered Mental Status (AMS) Patient - Pediatric

Basic Standing Orders

B

- Routine Patient Care.
- Scene and patient management per General Guidelines.
- Administer 100% oxygen by bag-valve-mask.
- Thorough medical history including recent illness, medication, accidental ingestion.
- Determine blood glucose level.
- Consider ALS intercept.

Advanced Standing Orders

A

- Continuously monitor ECG and Sp02.
- Establish intravenous access (intraosseous may be appropriate if cardiorespiratory compromise exists).
- Determine blood glucose level:
  - If BG < 80 mg/dl, or cannot be determined, administer dextrose via IV or IO.
  - Follow Diabetic Emergencies: Hypoglycemia Protocol.
- Administer narcan 0.1 mg/kg (maximum dose of 2 mg) IV or IO.
- If evidence of shock (hypotension, tachycardia, poor capillary refill), administer NS bolus of 20 ml/kg. If evidence of shock persists, you may repeat the 20 ml/kg bolus 2 times.

Paramedic Standing Orders

P

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

Children with Special Health Care Needs

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

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

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

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

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

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

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

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

Children with Special Health Care Needs - Central Intravenous Catheters

Indwelling intravenous access.

Uses

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

Types

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

Assessment Issues

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

Children with Special Health Care Needs - Colostomy

Drainage of fecal material.

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

Types
- Open stomas draining into plastic pouches.

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

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

Uses

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

Types

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

Assessment Issues

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

Basic and Paramedic Standing Orders

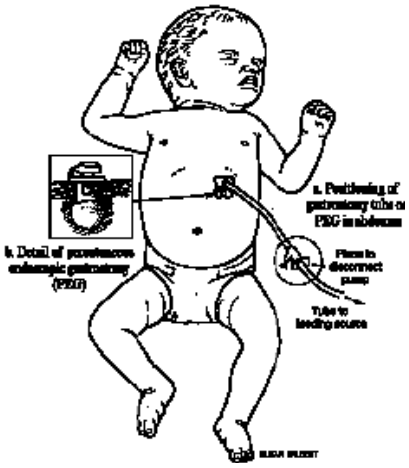
B
- Administer oxygen as needed.
- Hyperventilate if signs of brain herniation such as unresponsiveness with unequal pupils, fixed dilated or unresponsive pupils, or increased BP and decreased heart rate.

Children with Special Health Care Needs – Enteral Tubes

Feeding tube

Uses

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



Types

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

Assessment Issues

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

Children with Special Health Care Needs - Tracheostomy

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

Tracheostomy – breathing tube into trachea through opening in neck.

Uses

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

Types

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

Assessment Issues

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

Children with Special Health Care Needs - Tracheostomy continued

Basic Standing Orders

B

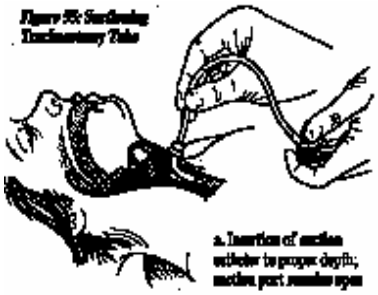
- **If on ventilator**, disconnect and attempt to oxygenate with BVM using tracheostomy adaptor (if needed). **Call ALS** if available, especially if respiratory distress present.
- **If not on ventilator,** administer oxygen with mask or BVM over trach as needed.

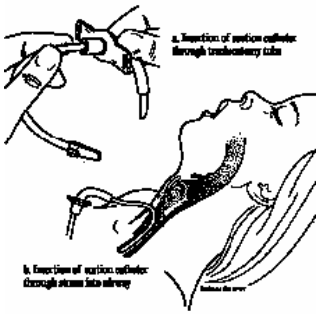
Paramedic Standing Orders

P

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

.





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

Drainage of urine.

Uses

- Temporary or permanent malfunction or obstruction of urinary system.

Types

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

Assessment Issues

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

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

Adult Trauma Protocols

Trauma Assessment and Management - Adult

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

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

Basic Standing Orders

B

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

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

Basic Standing Orders

B

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

Trauma Assessment and Management – Adult continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Head Trauma - Adult

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

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

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

Basic Standing Order

B

- ► Follow Trauma Assessment and Management Protocol.
- ► If pulse oximetry is available, monitor and maintain oxygen saturation (SpO_2) greater than 90%. Note that even a single instance of SpO_2 less than 90% can significantly affect patient outcome.
- ► Ventilation and hyperventilation in the patient with TBI
  - ♦ If breathing is inadequate, assist ventilation using a bag-valve-mask device with high flow, 100% concentration oxygen. Consider advanced airway device. Monitor for gastric distention.
    - o Adult, 10 breaths/minute.
- ► If breathing is adequate, administer high flow, 100% concentration oxygen using a non-rebreather mask or blow-by, as tolerated.
- ► **If a TBI is suspected, hyperventilate the patient only if one or more of the following signs of brain herniation exists:**
  - o Fixed or asymmetric pupils.
  - o Abnormal extension (decerebrate posturing).
  - o Glasgow coma scale (GCS) of less than 9 with a further decrease of 2 or more points.

Head Trauma – Adult continued

Basic Standing Order

B

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

Advanced Standing Orders

A

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

Head Trauma – Adult continued

Paramedic Standing Orders

P:

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

Glasgow Coma Scale - Head Trauma

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

Chest Trauma - Adult

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

Basic Standing Order

B

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

Chest Trauma – Adult continued

Paramedic Standing Orders

P

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

Abdominal Trauma - Adult

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

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

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

Basic Standing Order

B

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

Paramedic Standing Orders

P

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

Pelvic Trauma - Adult

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

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

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

Basic Standing Order

B

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

Extremity Trauma - Adult

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

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

Basic Standing Order

B

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

Extremity Trauma – Adult continued

Basic Standing Order

B

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

Paramedic Standing Orders

P

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

Eye and Dental Injuries-Adult

Basic Standing Orders

B

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

Dental Avulsions

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

- Proparacaine 2 drops to affected eye, repeat every 5 minutes as needed.
- Refer to the Pain Management Protocol.
- Refer to the Nausea Protocol.

Burns (Thermal) - Adult

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

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

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

Basic Standing Orders

B

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

Burns (Thermal) – Adult continued

Basic Standing Orders continued

B

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

Burns (Thermal) – Adult continued

Advanced Standing Orders

A

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

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

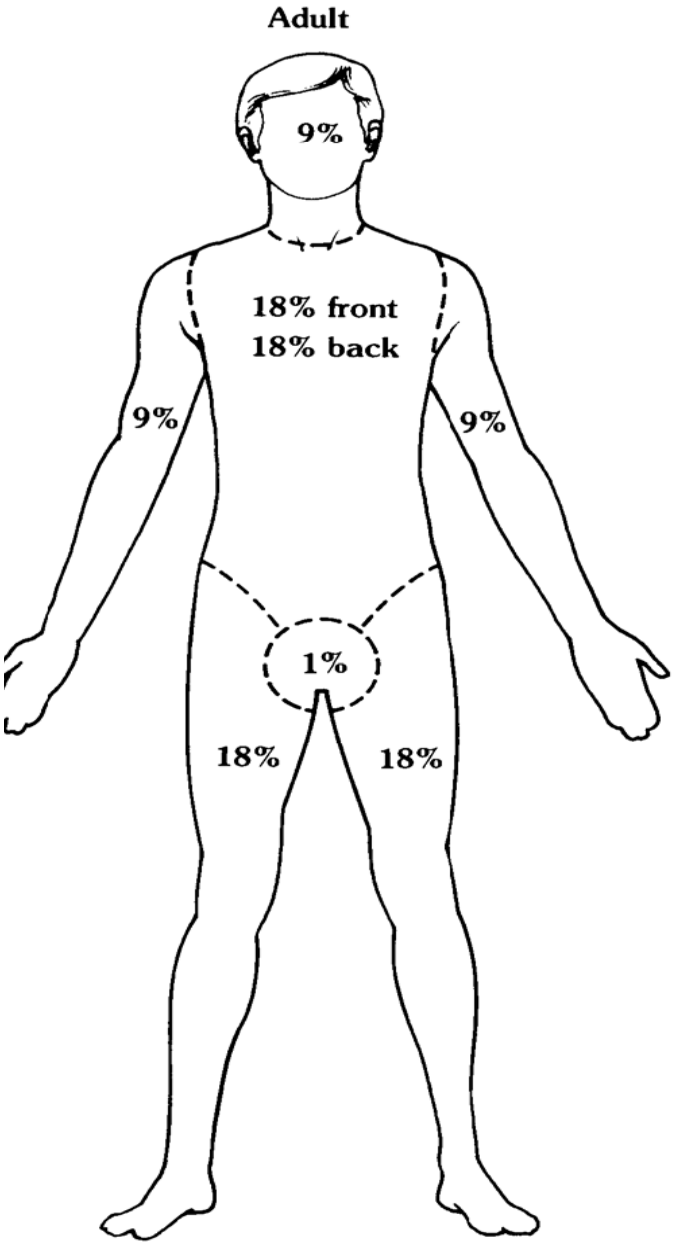
Paramedic Standing Orders

P

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

Rule of Nines Chart – Burns (Thermal)

Burn Chart – Rule of Nines



Pediatric Trauma Protocols

Trauma Assessment and Management - Pediatric

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

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

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

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

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

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

Trauma Assessment and Management – Pediatric continued

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

Basic Standing Orders

B

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

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

Basic Standing Orders continued

B

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

Trauma Assessment and Management – Pediatric continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Trauma Assessment and Management – Pediatric continued

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

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

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

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

Head Trauma - Pediatric

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

Suspect a TBI in the child who:

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

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

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

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

Head Trauma – Pediatric continued

Basic Standing Order

B

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

Basic Standing Order continued

B

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

Head Trauma – Pediatric continued

Advanced Standing Order

A

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

Paramedic Standing Orders

P

- If end-tidal CO_2 is available, ventilate to maintain an end-tidal CO_2 of 30-35 mmHg only if signs of herniation present.
- If intubation required, consider administration of lidocaine 1 mg/kg IV (maximum dose 100 mg) prior to intubation.

Chest Trauma - Pediatric

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

Basic Standing Order

B

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

Chest Trauma – Pediatric continued

Paramedic Standing Orders

P

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

Abdominal Trauma - Pediatric

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

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

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

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

Basic Standing Order

B

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

Abdominal Trauma – Pediatric continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

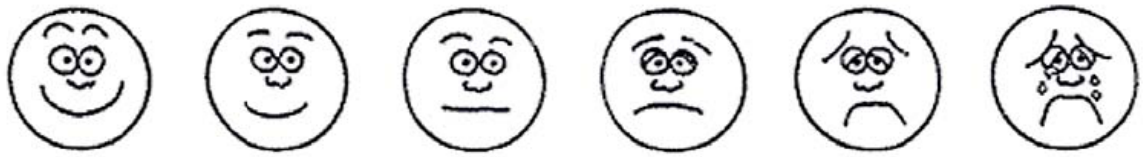
- Abdominal distention decreases lung capacity and makes the pediatric patient more difficult to ventilate.
- ALS providers should consider placement of a gastric tube.

Pain Management - Pediatric

Basic Standing Orders

B

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



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

Pain Management – Pediatric continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

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

Pelvic Trauma - Pediatric

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

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

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

Basic Standing Order

B

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

Extremity Trauma - Pediatric

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

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

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

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

Extremity Trauma – Pediatric continued

Basic Standing Order

B

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

Paramedic Standing Orders

P

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

Eye and Dental Injuries-Pediatric

Basic Standing Orders

B

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

Dental Avulsions

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Burns (Thermal) Pediatric

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

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

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

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

Basic Standing Orders

B

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

Basic Standing Orders

B

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

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

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

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

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

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

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

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

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

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

► Apply dressings to burns as tolerated.

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

Burns (Thermal) – Pediatric continued

Advanced Standing Orders

A

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

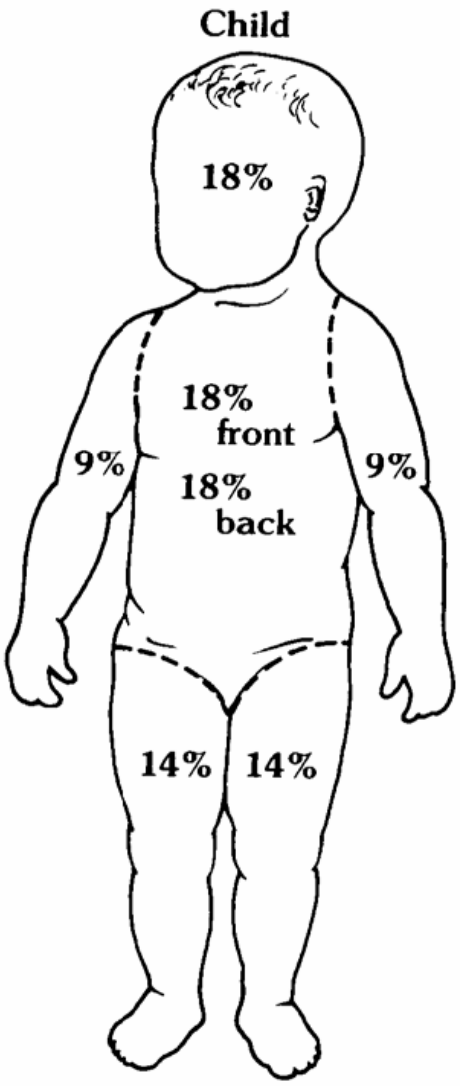
Paramedic Standing Orders

P

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

Rule of Nines - Burn Chart - Pediatric

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



Environmental Protocols

Electrical/Lightning Injury

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

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

- Establish IV access

Paramedic Standing Orders

P

- Assess airway status.
- Assess need for advanced airway skills.
- Monitor patient.
- Consider 12-lead EKG.
- Consider pain management protocol.
- If injury suggest risk of rhabdomyolysis, consider 1 amp Sodium Bicarbonate in 1000 ml NS wide open.
- Consider Trauma Center if available.

Snake Bites

General Considerations

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

Basic Standing Order

B

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

Advanced Standing Orders

A

- Establish IV access.

Paramedic Standing Orders

P

- Consider pain management – see Pain Management Protocol.

Submersion Injuries – Adult and Pediatric

Key points:

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

Basic Standing Orders

B

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

Paramedic Standing Orders

P

- Initiate IV access.
- Follow appropriate ACLS algorithm.
- Consider CPAP if no contraindications.

Heat Cramps/Heat Exhaustion – Adult and Pediatric

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

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Hyperthermia (Environmental) – Adult and Pediatric

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

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

Hypothermia (Environmental) – Adult and Pediatric

Basic Standing Orders

B

All Cold Patients

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

Hypothermia (Environmental) – Adult and Pediatric continued

Advanced Standing Orders

A

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

Paramedic Standing Orders

P

If core temperature <30°C (86°F)

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

If core temperature >30°C (86°F)

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

Hypothermia (Environmental) – Adult and Pediatric (continued)

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

Hypothermia (Environmental) – Adult and Pediatric- Mild

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

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

Hypothermia (Environmental) – Adult and Pediatric - Moderate

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

IV THERAPY

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

Paramedic Standing Orders

P

MEDICATIONS:

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

Hypothermia (Environmental) – Adult and Pediatric- Severe

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

Basic Standing Orders

B

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

Advanced Standing Orders

A

- Consider Advanced Airway Management
- Avoid hyperventilation
- Use heated humidified oxygen if possible (42°C – 46°C or 108°F – 115°F)
- Rewarming is key to arrest survival in hypothermia. Field techniques are ineffective. The goal is to deliver a viable patient to a facility that can perform effective rewarming (most clinics and hospitals).
- An AED or monitor may help determine cardiac activity. If any organized (other than VT) electrical rhythm is shown, do not start CPR.
- If no pulse (after checking for up to 60 seconds) and no respirations and no contraindications, start CPR. Be careful to not hyperventilate.

Paramedic Standing Orders

P

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

Frostbite – Adult and Pediatric

Management

► **Concerns:**

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

Basic Standing Orders

B

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

Airway and Ventilation Management

Rapid Sequence Intubation (RSI) and Drug Assisted Intubation (DAI)

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

Definition

RSI: The administration of pharmacologic agents, including paralytic agents, to facilitate endotracheal intubation.

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

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

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

Contraindications

- Ability to oxygenate and ventilate with a less invasive approach.
- Anatomic findings on clinical exam that predict a difficult intubation or cause sufficient doubt about the ability to successfully intubate. Examples:
  - Morbid obesity
  - Obese "bull" neck
  - Obvious malignancy
  - Ankylosis
  - Direct laryngeal trauma
- Succinylcholine is contraindicated in:
  - Burns greater than 24 hours old.
  - Spinal cord injury greater than 24 hours old.
  - Known neuromuscular disease (Guillain-Barré Syndrome), myasthenia gravis, amyotrophic lateral sclerosis, muscular dystrophy.
  - Chronic failure in hemodialysis presence of hemodialysis.
  - History of malignant hyperthermia.
- Non- arrested croup or epiglottis

Rapid Sequence Intubation (RSI) and Drug Assisted Intubation (DAI) *continued*

Procedure

- ► Maintain manual, in-line spine motion restriction by a second provider and remove the anterior portion of the cervical collar during intubation.
- ► Assemble and check all necessary equipment: suction, laryngoscopes, BVM, Eschmann stylet, LMA or Combitube.
- ► Calculate drug dosages and prepare and label syringes.
- ► Assure IV is patent, secure and free flowing.
- ► Monitor EKG, B/P, and Sp02. Prepare ETC02 monitoring and EID.
- ► Attempt to raise Sp02 to > 94 % with 100% oxygen by either NRB oxygen mask or BVM ventilation if necessary.
- ► Prior to drug administration, ensure that a neurologic assessment with GCS has been performed and documented.
- ► Premedication: (3 min. required for pre-treatment effects)
    - o Pediatric patients (newborn to age 7): Atropine 0.01 mg/kg IVP, minimum dose 0.1 mg and maximum dose 0.5 mg
    - o Lidocaine 1.5 mg/kg IVP in patients with head injury, CVA, and hypertensive crisis.
    - o For patients who are going to receive RSI with Succinylcholine, a defasiculating dose of Vecuronium (Norcuron) 0.01 mg/kg is optional to decrease muscle fasciculations.
- ► RSI / DAI drug administration
    - o RSI:
        - ▪ Sedate the awake patient with Etomidate (Amidate) 0.1-0.3 mg/kg IVP (maximum 20 mg) or Midazolam (Versed) 0.1 mg/kg IVP (maximum 5 mg). Use lower doses in the hypotensive or elderly patient. Sedation drugs can be omitted in the unconscious patient.
        - ▪ Paralyze with Succinylcholine (Anectine) 1.5 mg/kg IVP in adults and 2 mg/kg IVP (maximum 100 mg) in children.
        - ▪ Flush the IV line with 10 cc of IV fluids following drug administration.
    - o DAI:
        - ▪ Sedate the awake patient with Etomidate (Amidate) 0.1 -0.3 mg/kg IVP, maximum 20 mg, or Midazolam (Versed) 0.1 mg/kg IVP.
        - ▪ Flush the IV line with 10 cc of IV fluids following drug administration.

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

- Secure the successfully placed oral ETT with a commercial device or with circumferential tape and an oral airway. In CVA or head injured patients be careful not to occlude the jugular veins and obstruct blood flow from the head. Place a C-collar and cervical immobilization device for the purpose of ETT stabilization.
- Ventilatory management should consist of a tidal volume of about 7 cc/kg or just enough to see the chest rise and a ventilatory rate of 12-15 breaths per minute. Avoid hyperventilation except in the case of head injury and signs of herniation syndrome and even then, avoid extremes of hyperventilation.
- Consider placing an oral or nasogastric tube to decompress the stomach. This is especially important in the pediatric patient and can be accomplished with a straight suction catheter.
- Frequently assess ETT positioning. Continuous capnography with data storage and download capability is the best tool for ETT monitoring. Reassess ETT position after every patient move and on change of providers.
- Bradycardia developing during intubation is usually due to hypoxia and is best treated by improving oxygenation by halting the intubation attempt and ventilating with 100% oxygen by BVM with oral and/or nasal airways. Bradycardia in the adult that is not responsive to improved oxygenation can be treated with Atropine 0.5 mg IVP.
- Maintenance of sedation and paralysis
    - To maintain paralysis administer Vecuronium (Norcuron) 0.1 mg/kg IVP immediately after the ETT is secured and repeat with 0.05-0.1 mg/kg as needed. Continuous ETCO2 capnography must be used.
    - If the patient was conscious, sedation can be maintained with Midazolam (Versed) 0.05-0.1 mg/kg IVP as needed.
    - If pain control is required in the hemodynamically stable trauma patient, Fentanyl 1-2 mcg/kg IVP may be administered as needed.
- During transport, monitoring should include EKG, B/P, SpO2, ETCO2, breath sounds.

Rapid Sequence Intubation Algorithm-Pediatric

Rapid Sequence Intubation: Pediatric

- ABC's
- Pre-Oxygenation 100% Oxygen
- Assist Ventilations, prn
- Monitor SpO2

UTILIZATION OF THIS PROTOCOL REQUIRES DOCUMENTATION OF SPECIFIC TRAINING IN PEDIATRIC INTUBATION AND PEDIATRIC RSI DRUG ADMINISTRATION

Preparation: secure IV access, suction, bag-valve-device, endotracheal tube, peds LMA (1)

Atropine 0.01 mg/kg IV

Lidocaine 1-1.5 mg/kg IV

Vecuronium (Norcuron) 0.01 mg/kg (2)

Midazolam Versed 0.1 mg/kg IV

Apply Cricoid Pressure

Succinycholine (Anectine) 2 mg/kg IV (3)

Intubate

Secure ETT: Consider C-collar and CSID

Verify ETT placement. Auscultate breath sounds and listen over epigastrium. Monitor SpO2 and ETCO2.

Continued Paralysis/Sedation: Midazolam 0.1 mg/kgIV and Vecuronium 0.1 mg/kg IV: may repeat as needed

Consider Need for Pain Control: Sublimaze (Fentanyl) 1-2 mcg/kg IV; may repeat in 15-20 min as needed (4)

Monitor: SpO2, ETCO2, cardiac rhythm, lung sounds, ventilatory status. (5)

Succinylcholine Contraindicated:

Vecuronium (Norcuron) 0.15 mg/Kg IV
or
Rocuronium (Zemuron) 1 mg/Kg IV

Full RSI pre-treatment requires 3 min for onset of drug effects

The unconscious, moribund child needing immediate intubation needs a "CRASH INTUBATION" using only Atropine and Succinlycholine

Document:
- Airway
- Respiratory Status
- Lung Sounds
- Chest Rise/Excursion
- SpO2, ETCO2
- Cardiac Rhythm
- Skin Color
- Glasgow Coma Scale
- Conformation of ETT Placement
- ETT size
- ETT length (cm at teeth)

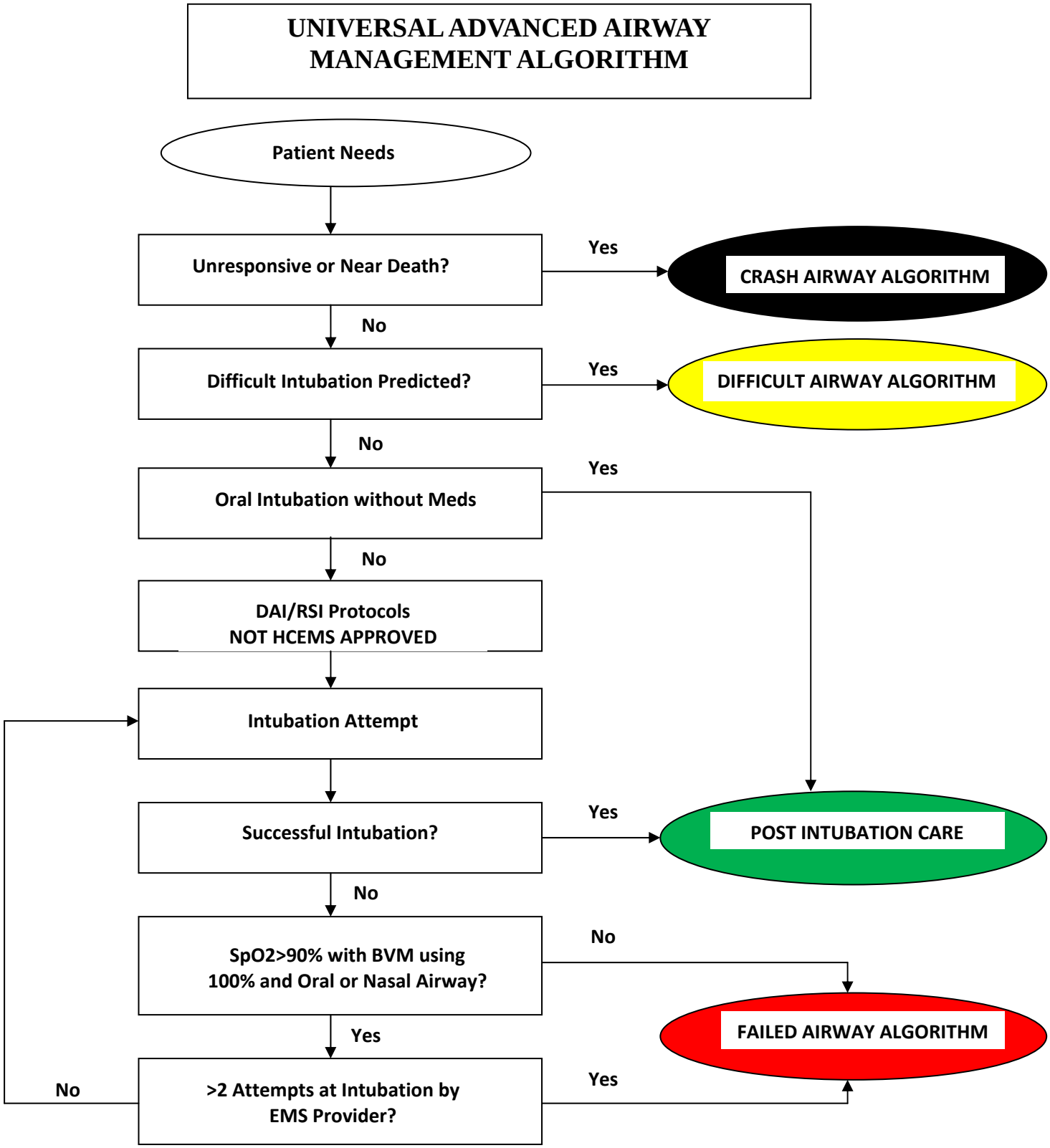
In addition to the EMS-PCR, complete the NAEMSP airway form and submit to medical direction for review

1 ETT: have on hand, one size smaller and one size larger as you prepare to intubate. A cuffed ETT may be used but do not inflate the cuff.
2 A defasciculating dose is helpful and should be used prior to Anectine
3 Anectine is contraindicated if family history of Malignant Hyperthermia exists; in cases of penetrating eye injury, severe burns, crush injury or in the presence of hyperkalemia. The onset of Anectine is 30-60 seconds, duration is 8-10 minutes.
4 Consider pain control measures. Neither paralytics nor sedatives control pain.
5 Keep the patient warm. Paralyzed patients loose much of their ability to generate body heat.

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

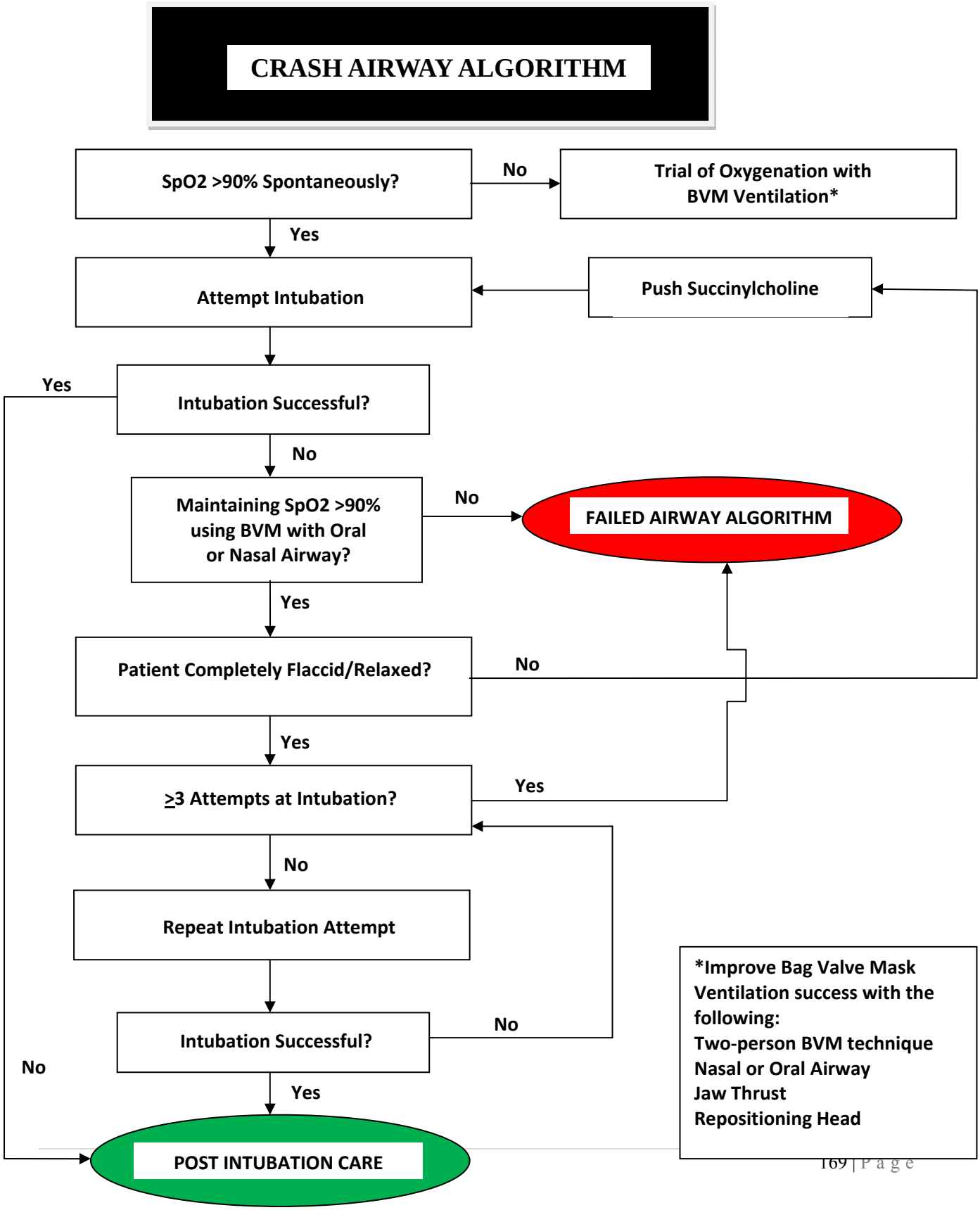
NOTE: This is a restricted procedure. A service and paramedic will require specific authorization from the Board prior to utilizing this procedure and skill.

Universal Advanced Airway Management Algorithm

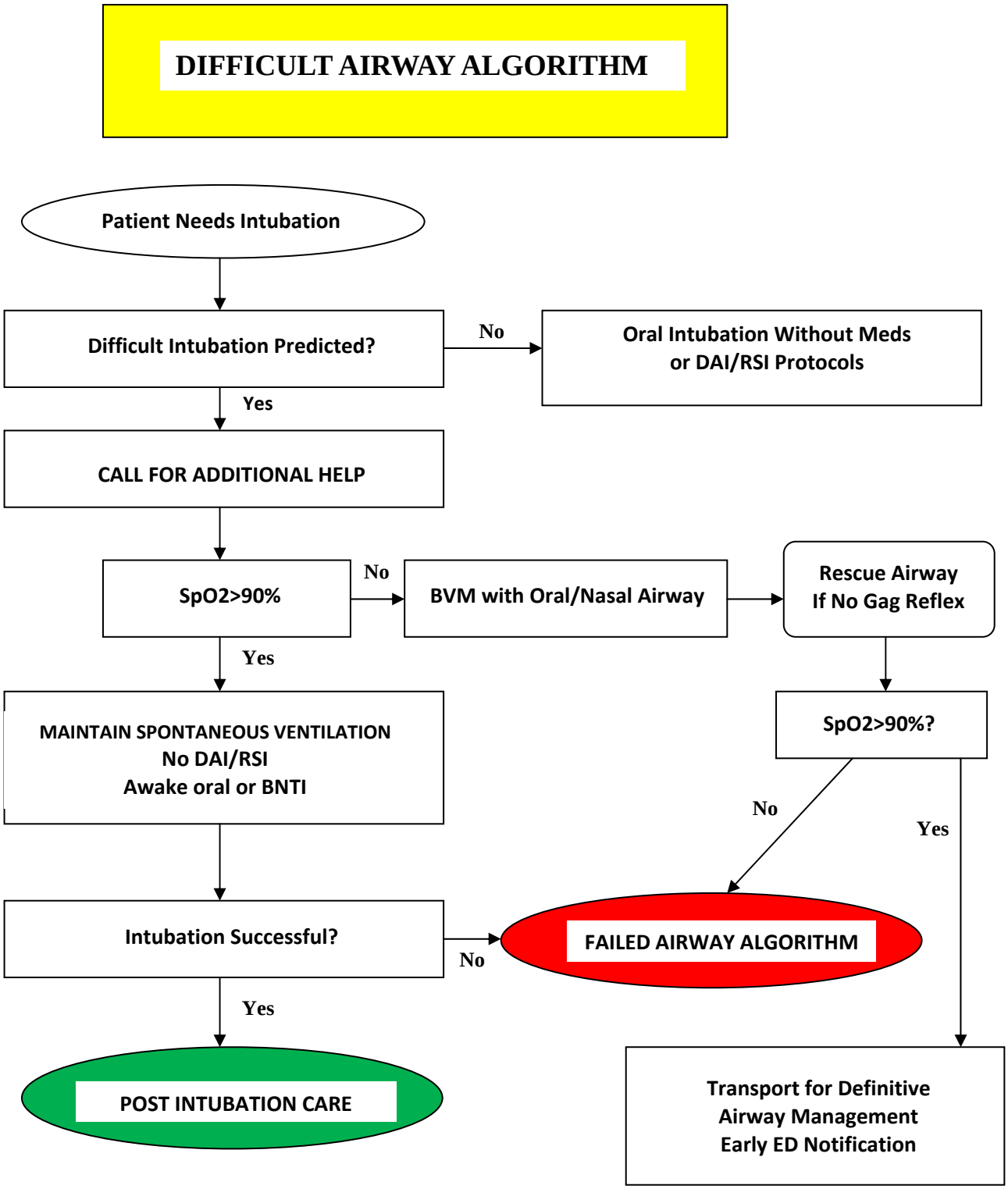


NOTE: Paralytic agents will not be used by HCEMS.

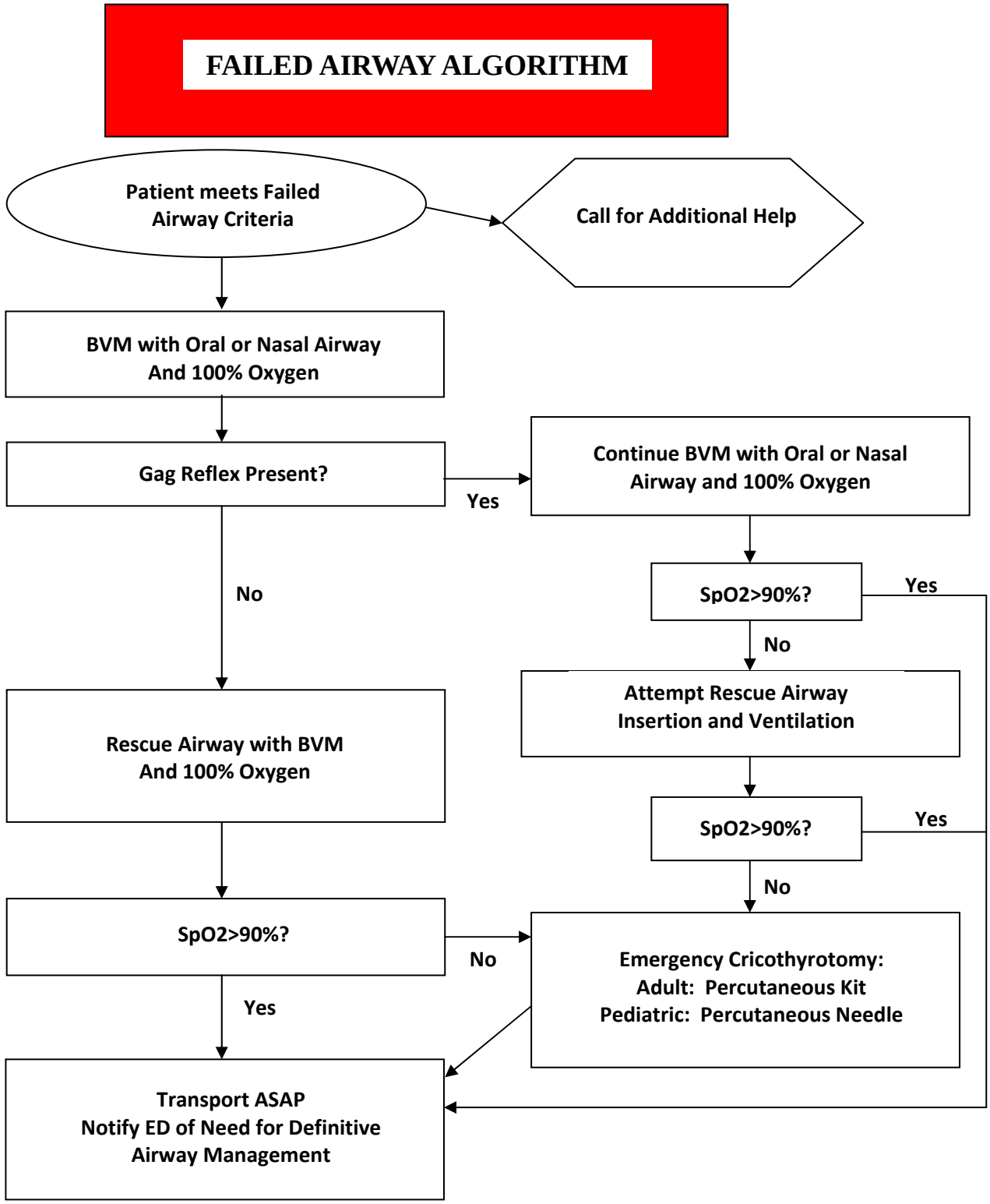
Crash Airway Algorithm



Difficult Airway Algorithm



Failed Airway Algorithm



Airway Management - Pediatric

PEDIATRIC AIRWAY MANAGEMENT

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

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

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

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

II. Initial Assessment Indicates Spontaneous Breathing Without Compromise.

A. Monitor breathing during transport.
B. Administer oxygen
1. Infants via infant mask @ 2-4 L/min.
2. Small child (1-8 y/o) via pediatric mask @ 6-8 L/min.
3. If mask is not tolerated, administer by blow-by method.

III. Initial Assessment Indicates Spontaneous Breathing With Respiratory Distress

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

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

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

V. Continued BVM Ventilation vs. Endotracheal Intubation

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

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

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

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

C. Contraindications: None

D. Adverse Effects / Complications

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

E. Procedure:
   1. Have suction available since vomiting may occur.
   2. Use an appropriately sized oral or nasal airway adjunct with BVM ventilation.
   3. Use an appropriate sized mask for best fit and to avoid pressure over the eyes.
   4. For the single provider, use the "E-C clamp" technique of holding the mask.
   5. Monitor EKG, pulse oximetry and capnography if available.
   6. Ventilate with 100% oxygen with a tidal volume of approximately 6-10 cc/kg or with just enough volume to see the chest rise.
   7. Rate of ventilation should be approximately 20/ min for a child and 30/ min for an infant. If capnography is available, ventilate to maintain the end tidal CO_2 at 35-40 mmHg. If head injury and signs of herniation are present, increase ventilation to maintain an end tidal CO_2 of 30 mmHg.
   8. If the patient does not have an adequate chest rise with BVM ventilations:

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

VII. Pediatric Orotracheal Intubation

A. Purpose:

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

B. Indications:

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

C. Contraindications:

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

D. Adverse Effects / Complications:

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

E. Procedure:

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

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

10. Remove the laryngoscope and hold the ETT in place.
11. Attach the BVM and ventilate with 100% oxygen.
12. Confirmation of correct ETT placement: No single method of ETT confirmation is 100% reliable, the position of the ETT must be assessed to be properly in the trachea by all means available to the pre-hospital EMS provider. The following methods may be used to confirm the correct placement of the ETT.
    a. Visualization of the ETT passing through the cords and into the trachea
    b. Auscultation of all lung fields to confirm adequate air exchange
    c. Auscultation of the epigastrium to confirm the absence of disturbance of the gastric fluids during ventilation
    d. Observation of bilateral expansion of the thorax
    e. End tidal CO2 detection device:
        i. At a minimum the colorimetric devices assessed initially and after six breaths.
        ii. Capnometry devices that give a numeric end tidal CO2 reading.
        iii. The preferred device is continuous capnography that is downloadable and printable.
    f. Esophageal intubation detector device.
        i. Useful if child > 8 y/o
    g. Other clinical signs of improved perfusion and ventilation/oxygenation
        i. Stable heart rate.
        ii. Pupillary response.
        iii. Stable and rising oxygen saturation.
        iv. Improved skin color.
13. Once correct ETT placement is confirmed, the ETT must be secured.
    a. Commercial device with built in bite block.
    b. Oral airway with tape. Tape ETT to the maxilla, not the mandible.
    c. Minimize head and neck movement with the use of a cervical collar, cervical spine immobilization device and spine board.
    d. Note and document depth of ETT placement.
        i. 3-5 cm of ETT movement may occur with neck flexion or extension.

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

Post Intubation Care

- Confirmation of correct ETT position
  - No single technique is 100% reliable for ETT confirmation.
  - Pre-hospital EMS providers should use all available means to determine correct ETT position.
  - A minimum of two clinical and one instrumental method of determination is recommended.
  - The following methods may be used to confirm correct ETT placement.
    - Direct visualization of the ETT passing through the vocal cords into the trachea.
    - Auscultation of all lung fields to confirm adequate air exchange.
    - Auscultation of the epigastrium to confirm the absence of disturbance of the gastric fluids during ventilation.
    - Observation of bilateral expansion of the thorax during ventilation.
    - Use of end tidal CO_2 detection
      - Colorimetric devices (pediatric size for child < 15 kg)
        - Patient with a pulse
          - YELLOW: ETT is in trachea
          - TAN: Consider possible causes of poor perfusion or poor CO_2 production. Give 6 breaths and monitor color of detector. If color changes to yellow or remains tan, ETT is in the trachea. If color changes to purple, apply cricoid pressure, remove the ETT, oxygenate with BVM and re-intubate.
          - PURPLE: ETT not in trachea. Apply cricoid pressure, remove ETT, oxygenate with BVM and re-intubate.
        - Patient without a pulse: Lack of color change is common even with proper placement in cardiac arrest.
          - YELLOW: ETT is in the trachea
          - TAN: Consider possible causes of poor perfusion and evaluate quality of CPR. Give 6 breaths and monitor color of detector. If color changes to yellow or remains tan, ETT is in the trachea. If color changes to purple,
            CO_2 is not being detected because the ETT is not in the trachea or no CO_2 is being delivered to the lungs in the arrest state. Confirm placement via other means.
      - Capnometry device that provides a numeric value for end tidal CO_2.
      - Capnography device that provides a continuous waveform and digital readout of end tidal CO_2.
      - Capnography that is continuous and has the capability to electronically download and print data is the preferred device.
        - Normal values for end tidal CO_2 is 5% to 6% which is equivalent to 35-45 mmHg.

Post Intubation Care continued

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

► Depth of ETT placement
- Correct depth avoids right mainstem bronchus intubation and inadvertent extubation.
- General depths of placement at the teeth or gums:
  - Adult male: 21-23 cm
  - Adult female: 19-21 cm
  - Infant: 10-11 cm
  - Child over 1 y/o: (12cm + Age/2) or (ETT size X 3)
- Direct visualization of cuff of ETT below the vocal cords.
- Inflated cuff of the ETT can be palpated in the sternal notch when the pilot balloon is compressed.

► Securing the ETT
- Initially manually secure ETT in place with your thumb and forefinger.
- A commercial ETT securing device with an incorporated bite block is recommended.
- At a minimum, place an oral airway and tape the ETT in place.
  - If circumferential taping is utilized, use care not to occlude venous blood flow from the head.
  - To avoid excess motion, tape the ETT to the maxilla, not the mandible.
- To further minimize head movement, place a cervical collar, immobilize with a cervical spine immobilization device.

► Following the securing of the ETT, note and document the depth of ETT placement.

Post Intubation Care continued

- Ventilation
  - With an ETT and 100% oxygen, large tidal volumes and hyperventilation are not necessary and have been shown in recent studies to be detrimental to patient outcome.
  - Use care to avoid hyperventilation. The exception is the head injured patient with signs of herniation and then only modest hyperventilation is necessary (see below).
  - Ventilate with a tidal volume of approximately 6-10 cc/kg or clinically, just enough ventilation to see the chest rise with each administered breath.
  - Rate of ventilation:
    - Adult: 10-12 / min
    - Child: 20 / min
    - Infant / Toddler: 30 / min
  - If continuous ETCO2 monitoring is available, maintain an ETCO2 of 35-40 mmHg.
    - If the patient has a head injury and signs of herniation, modestly hyperventilate to an ETCO2 of approximately 30 mmHg.
- Maintenance of Sedation, Analgesia, Neuromuscular Blockade
  - Purpose: To provide additional sedation, analgesia, and/or neuromuscular blockade in order to maintain ETT placement to facilitate continued oxygenation and ventilation in an intubated patient.
  - Indications
    - Patients awakening from medications used for drug assisted intubation.
    - Comatose patients recovering from paralytic drugs used for rapid sequence intubation.
    - Patients initially intubated without pharmacologic assistance but are now recovering due to improved oxygenation and ventilation.
  - Medications: All should be administered IV or IO and in smaller, titrated doses in the elderly, debilitated or unstable patient.
    - Sedation
      - Benzodiazepines are the most commonly used medications for continued sedation.
      - Single dose of Etomidate (Amidate) for initial intubation is safe. Repeat doses should be avoided due to inhibition of endogenous steroid synthesis.

- Midazolam (Versed): Adult and Peds dose: 0.05-0.1 mg/Kg IV (maximum 5 mg) repeat every 5 min PRN.
- Diazepam (Valium)
  - Adult: 1-5 mg IV, repeat every 5 min PRN
  - Peds: 0.1-0.5 mg/kg IV, repeat every 5 min PRN to a total dose of 5 mg in child < 5 y/o or 10 mg in child > 5 y/o.
- Lorazepam (Ativan)
  - Adult: 1-2 mg IV, repeat X 1 PRN
  - Peds: 0.05 mg/kg IV (max 4 mg), repeat X 1 PRN

- Analgesia
  - Appropriate pain control will facilitate ventilation and oxygenation and allow the use of smaller doses of sedatives and may avoid the need for pharmacologic paralysis with neuromuscular blockers.
  - Narcotics are the primary medications used for analgesia in intubated patients.
  - Fentanyl
    - Potent analgesic and respiratory depressant.
    - No histamine release as compared to morphine.
    - Large doses can rarely cause chest wall rigidity requiring neuromuscular blockade.
    - Rapid onset (5 min) and short duration (15 min).
    - Dosage: Adult and Peds: 1-2 mcg/kg IV, may repeat every 15-20 min PRN
      - Administer over 1-2 min
      - Concentration: 50 mcg/ml
      - Fentanyl 100 mcg = 10 mg Morphine
  - Morphine
    - Classic narcotic used for analgesia.
    - Histamine release causes vasodilation resulting in decreased venous return, decreased B/P, and relief of pulmonary congestion.
      - Valuable for the cardiac patient but a dangerous side effect for the debilitated patient or unstable trauma patient.
      - More of a sedation effect than Fentanyl.
    - Dosage:
      - Adults: 2-5 mg IV every 10-15 min PRN
      - Peds: 0.1 mg/kg IV every 10-15 min PRN

Post Intubation Care continued

- Neuromuscular Blocking Drugs (NMB's) (Paralytics)
  - The non-depolarizing class of NMB's are preferred for maintenance of paralysis in the RSI patient or for the initial paralysis of the successfully intubated patient with DAI meds or in patients intubated without pharmacologic assistance. In the RSI patient, additional NMB will have to be administered quickly as the effects of the initial succinylcholine will begin to wear off in approximately 5 minutes.
  - Vecuronium (Norcuron) is the preferred NMB of choice although any non-depolarizing NMB in appropriate dose may be successfully utilized.
    - Dosage: 0.1 mg/kg IV initially and 0.05 mg/kg IV PRN for repeat dosing.
  - **CAUTION**
    - MAINTAIN ADEQUATE SEDATION AND ANALGESIA WHEN ADMINISTERING PARALYTICS.
    - CONTINUOUSLY MONITOR OXYGENATION, VENTILATION, AND ETT POSITION WHEN ADMINISTERING PARALYTICS, SEDATION, AND ANALGESIA.

► Re-Confirming ETT Position
- Anytime patient is moved.
- Anytime dislodgement is suspected.
- Anytime care is transferred to another provider.
- Perform the initial ETT confirmation steps.
- Repeat laryngoscopy and directly confirm ETT position in the trachea if there is any question of correct position or any of the other confirmatory tests are equivocal.

► Documentation
- Full report to the receiving physician or designated staff.
  - Specifically report any difficulties or complications related to airway management.
  - Include times and dosages of all medications given.
- Complete the run report.
- Complete the NAEMSP airway form and forward to the Medical Director.

Mechanical Ventilation

NOTE: This is a procedure is restricted to HCEMS CCTP's that are trained and competent on the use of the specific hospital based ventilator. It is not intended to address the ATV's currently used by HCEMS

- ► Maintain oxygen saturation of greater than or equal to 92%.
- ► Attach cardiac monitor, end-tidal CO2 monitor.
- ► Assess and record vital signs, to include temperature, prior to transfer and every 5 to 10 minutes en-route.
- ► Reassess patient frequently during transport and document findings.
- ► Collect all transfer documentation: transfer sheet, EKG's, lab, other pertinent information.
- ► Contact the online medical director (medical control), document indication and order for the mechanical ventilation during transport.
- ► Consider arterial blood gas prior to transport.
- ► Document ventilator settings and patient response.
- ► Document correct tracheal tube placement and secure appropriately.
- ► Maintain chemical paralysis if utilized pre-transport.
    - o Monitor for motor activity.
    - o Norcuron (Vecuronium) 0.1-0.15 milligram per kilogram slow IV push; duration of action is 20-30 minutes.
    - o Alternative paralytics include atracurium (Tracrium) and rocuronium (Zemuron).
- ► Maintain adequate sedation
    - o Inadequate sedation may present as an unexplained increase in heart rate or blood pressure; the non-paralyzed patient may also demonstrate agitation, anxiety and/or restlessness.
    - o Midazolam (Versed) 0.035 milligram per kilogram IV over 2-3 minutes.
- ► Maintain adequate analgesia.
    - o Fentanyl (Sublimase) 1.0-3.0 micrograms per kilogram slow IV push; duration of action 30-60 minutes.

CPAP/BIPAP USE

Indications:

- Adult Patient.
- Conscious patient in severe respiratory distress due to suspected pulmonary edema, COPD or burn inhalation injuries.
- Shortness of breath with pulse oximetry < 92% on high-flow oxygen via NRB mask.

Contraindications:

- Suspected Pneumothorax.
- Inability to maintain own airway.
- Altered mental status.
- Agitated or Combative behavior.
- Facial trauma or burns.

System Requirements:

- Prehospital CPAP/ BiPAP equipment that meets DOH requirements.

Procedure:

- Assess patient and initiate high flow oxygen as indicated.
- Monitor pulse oximetry.[1]
- Apply CPAP/ BiPAP if oxygen saturation < 92% on high flow oxygen via NRB mask.
    - Connect CPAP/BiPAP device to suitable oxygen supply.
    - Attach breathing circuit to CPAP/BiPAP device and ensure device is functioning properly.
    - Apply and secure appropriate size breathing circuit mask to patient.
    - Titrate positive airway pressure up until improvement in patient pulse oximetry and symptoms.
        - WARNING: Do not exceed pressures of 10 cm H2O.
- Reassess the patient.
- Follow CHF or Asthma protocols if appropriate.[2,3]
- Transport
- Contact Medical control. [4]

[1]Pulse oximetry should be monitored continuously during use of CPAP/BiPAP
[2]If appropriate, nebulized bronchodilators may be administered during PAP ventilation via a side port.
[3]When appropriate, nitroglycerine should be administered by tablets rather than spray when a patient is receiving PAP ventilation.
[4]Advise the receiving ED of CPAP use as soon as possible. Many EDs do not have CPAP within the ED and may need to obtain it from within the hospital.

Medication List

ACTIVATED CHARCOAL

Class

Adsorbent

Mechanism of Action

Adsorbs toxic substances from the GI Tract; onset of action is immediate.

Indications

Most oral poisonings and medication overdoses; can be used after evacuation of poisons.

Contraindications

Oral administration to comatose patient; after ingestion of corrosives, caustics or petroleum distillates (ineffective and may induce vomiting); simultaneous administration with other oral drugs.

Adverse Reactions

May induce nausea and vomiting; may cause constipation; may cause black stools.

Drug Interactions

Bonds with and generally inactivates whatever it is mixed with, e.g., syrup of ipecac.

How supplied

25 gm (black powder) / 125 ml bottle (200 mg/ml)
50 gm (black powder) / 250 ml bottle (200 mg/ml)

Dosage and Administration

Note, if not in Pre-mixed slurry, dilute with 1-part charcoal/ 4 parts water.

Adult:	1-2 gm/kg PO or via NGT
Pediatric:	1-2 gm/kg PO or via NGT

Duration of action

depends upon GI function; will act until excreted.

Special Considerations

Often used in conjunction with magnesium citrate
Must be stored in a closed container
Does **not** adsorb cyanide, lithium, iron, lead and arsenic.

ADENOSINE

Class

Endogenous Nucleotide

Mechanism of action

Slows conduction time through the AV Node; can interrupt re-entrant pathways; slows heart rate; acts directly on sinus pacemaker cells. Drug of choice for PSVT.

Indications Conversion of PSVT to sinus rhythm. May convert PSVT due to Wolff-Parkinson-White syndrome. Not effective m converting atrial fibrillation / flutter.

Contraindications

Second or third-degree " block or Sick Sinus Syndrome
Atrial flutter / atrial fibrillation
Ventricular Tachycardia
Hypersensitivity to adenosine

Adverse Reactions

Facial flushing, shortness of breath, chest pain, headache, paresthesia, diaphoresis, palpitations, hypotension, nausea, metallic taste.

Drug Interactions

Methylxanthines (theophylline-like drugs) antagonize the effects of adenosine.
Dipyridamole (Persantine) potentiates the effects of adenosine
Carbamazepine (Tegretol) may potentiate the AV Node blocking effects of adenosine.
May cause bronchoconstriction in asthmatic patients.

How Supplied

Three mg/ml in 2-ml flip-top vials for IV injection

Dosage and Administration

Adult: 6 mg over 1-3 seconds; If no response after 1-2 minutes, administer 12 mg over 1-3 seconds, Maximum total dose = 30 mgs.
Pediatric: 0.1 - 0.2 mg/kg rapid IV; maximum single dose = 12 mgs.

Duration of action

Onset and peak effects in seconds; duration 12 seconds.

Special Considerations

Short half-life limits side effects in most patients.
Pregnancy safety: Category C.

ALBUTEROL

Class

Sympathomimetic, bronchodilator.

Mechanism of Action

Selective β-2 agonist which stimulates adrenergic receptors of the sympathomimetic nervous system resulting in smooth muscle relaxation in the bronchial tree and peripheral vasculature.

Indications

Treatment of bronchospasm in patients with reversible obstructive airway disease (COPD/asthma). Prevention of exercise-induced bronchospasm.

Contraindications

Known prior hypersensitivity reactions to Albuterol.
Tachycardia dysrhythmias, especially those caused by digitalis.

Adverse Reactions

Often dose-related and include restlessness, tremors, dizziness, palpitations, tachycardia, nervousness, peripheral vasodilatation, nausea, vomiting, hyperglycemia, increased blood pressure and paradoxical bronchospasm.

Drug Interactions

Tricyclic antidepressants may potentiate vasculature effects.
Beta-blockers are antagonistic.
May potentiate hypokalemia caused by diuretics.

How Supplied

Solution for aerosolization: 0.5% (5 mg/ml)
Metered Dose Inhaler: 90 mcg/metered spray (17 gm canister with 200 inhalations)
Syrup: 2 mg/5 ml

Dosage and Administration

Adult:	Administer 2.5 mg. Dilute 0.5 ml of 0.5% solution for inhalation with 2.5 ml normal saline in nebulizer and administer over 10-15 minutes. MDI: 1-2 inhalations (90-180 mcg). Five minutes between inhalations
Pediatric:	Administer solution of 0.01 - 0.03 ml (0.05 - 0.15 mg/kg/ dose diluted in 2 ml of 0.9% Normal Saline. May repeat every 20 minutes three times.

Duration of Action

Onset in 5-15 minutes with peak effect in 30-minutes - two hours and duration of 3-4 hours.

Special Considerations

Pregnancy Safety: Category C.
Antagonized by beta-blockers.
May precipitate angina pectoris and dysrhythmias.
Should only be administered by inhalation methodology in pre-hospital management.

AMIODARONE *(Non Inventory Item)*

Class

Antidysrhythmic.

Mechanism of Action

Prolongation of Action Potential; non-competitive alpha and beta sympathetic blocking effects; Calcium channel blocking effects.

Indications

Suppression of Ventricular Fibrillation refractory to defibrillation and Lidocaine. Suppression of Ventricular Tachycardia refractory to cardioversion and Lidocaine.

Contraindications

Second or Third Degree heart block.. Medication-induced Ventricular dysrhythmias. Hypotension, Bradycardia, Torsades de Pointes. Profound Sinus Bradycardia.

Adverse Reactions

Hypotension, Bradycardia, Pulseless Electrical Activity, Congestive Heart Failure, Nausea, fever, abnormal Liver Function Tests, Thrombocytopenia.

Drug Interactions

Will precipitate with Sodium Bicarbonate: incompatible. Compatible with: Dopamine, Dobutamine, Isoproterenol, Lidocaine, NTG, Norepinephrine, Phenylephrine, KCL, Procainamide.

How Supplied:

150 mg in 3 ml vials.

Dosage and Administration

Adult: 300 mg slow IV Push over 1-2 minutes in 10 ml Normal Saline, (For ACLS VF/ Pulseless VT) IV Drip 0.5-1mg per minute. (For malignant ventricular arrhythmias) per ordering physician.

Duration of Action: Onset: 5-15 minutes. Peak Effect: Variable. Duration: Variable

Special Considerations Pregnancy safety: Category C Maintain at room temperature and protect from light in storage (light protection not required during administration). Hypotension usually responsive to slowing infusion rate, IV Normal Saline. Administer cautiously in patients with Heart Failure or poor systolic function. May be especially effective in high-risk patients with recent acute MI.

ASPIRIN

Class

Platelet inhibitor, anti-inflammatory agent.

Mechanism of Action

Prostaglandin inhibition.

Indications

New onset chest pain suggestive of Acute Myocardial Infarction. Signs and symptoms suggestive of recent cerebrovascular accident.

Contraindications

Hypersensitivity.
Gastrointestinal bleeding.

Adverse Reactions

Heartburn.
GI bleeding.
Nausea, vomiting.
Wheezing in allergic patients.
Prolonged bleeding.

Drug Interactions

Use with caution in patients allergic to NSAIDS.

How Supplied

81 mg or 325 mg tablets (chewable and standard).

Dosage and Administration

81 mg - 325 mg PO.

Duration of Action

Onset: 30-45 minutes.
Peak effect: variable.
Duration: Variable.

Special Considerations

Pregnancy Safety: Category D.
Not recommended in pediatric population.

ATROPINE SULFATE

Class

Anticholinergic agent.

Mechanism of Action

Parasympatholytic: inhibits action of acetylcholine at postganglionic parasympathetic neuroeffector sites.

Increases heart rate in life-threatening bradydysrhythmias.

Indications

Hemodynamically significant bradycardia.

Asystole.

Drug of choice for organophosphate poisoning.

Bronchospastic pulmonary disorders.

Contraindications

Tachycardia.

Hypersensitivity.

Unstable cardiovascular status in acute hemorrhage and myocardial ischemia.

Narrow-angle glaucoma.

Adverse Reactions

Headache, dizziness, palpitations, nausea and vomiting.

Tachycardia, dysrhythmias, anticholinergic effects (blurred vision, dry mouth, urinary retention).

Paradoxical bradycardia when pushed slowly or at low doses.

Flushed, hot dry skin.

Drug Interactions

Potential adverse effects when administered with digoxin, cholinergics, physostigmine.

Effects enhanced by antihistamines, procainamide, quinidine, antipsychotics, benzodiazepines and antidepressants.

How Supplied

Prefilled syringes: 1.0 mg in 10 ml of solution.

Nebulizer: 0.2% (1 mg in 0.5 ml) and 0.5% (2.5 mg in 0.5 ml).

Injection Solution as Sulfate: 0.5mg/ml (1ml); 1mg/ml (1ml); 0.1mg/ml (5ml,10ml); 0.4mg/ml (1ml, 20ml)

Autoinjectors: (See Nerve Agent Antidote)

Dosage and Administration

Adult:

- Bradydysrhythymias: 0.5 - 1.0 mg IV every 3-5 minutes as needed to maximum total dose of 0.04 mg. (may be given Endotracheally if IV not established: 2.0 mg followed by 2.0 ml of Normal Saline Solution).
- Asystole: 1.0 mg IV push every 3-5 minutes as needed to maximum total dose of 3 mg / kg (may be given Endotracheally if IV not yet established: 2.0 mg followed by 2.0 ml Normal Saline Solution).

Pediatric:

- Bradydysrhythmias: 0.2 mg / kg IV / ET / IO (minimum single dose 0.1 mg, maximum single dose 1.0 mg). If administered via ET, follow with 2.0 ml sterile Normal Saline Solution.
- Asystole: Same as for Bradydysrhythmias: minimum dose 0.1 mg; maximum dose 0.5 mg for a child and 1.0 mg for adolescent.

Duration of Action

Onset: Immediate.
Peak Effect: Rapid to 1-2 minutes.
Duration: 2-6 hours.

Special Considerations

Pregnancy Safety: Category C.
Moderate doses dilate pupils.

CALCIUM CHLORIDE

Class

Electrolyte.

Mechanism of Action

Increases cardiac contractile state (positive inotropic effect).
May enhance ventricular automaticity.

Indications

Hypocalcemia, magnesium sulfate overdose, hyperkalemia, calcium channel blocker toxicity.
Adjunctive therapy in treatment of insect bites and stings.

Contraindications

Hypercalcemia, VF during cardiac resuscitation; digitalis toxicity.

Adverse Reactions

Bradycardia, asystole, hypotension, peripheral vasodilation, metallic taste, local necrosis, coronary and cerebral artery spasm, nausea, vomiting.

Drug Interactions

May worsen dysrhythmias secondary to digitalis.
May antagonize effects of Verapamil.
Flush line before and after administration of sodium bicarbonate.

How Supplied

10% solution in 10 ml ampules, vials and prefilled syringes (100 mg/ ml).

Dosage and Administration

Adult:	2-4 mg/kg of 10% solution slowly IV over 5 minutes; may repeat in 10 minutes. (maximum: 1 gm dose)
Pediatric:	20 mg/kg/dose of 10% solution slow IV/ IO (Maximum: 1 gm dose); May repeat in 10 minutes.

Duration of Action

Onset: 5-15 minutes.
Peak effects: 3-5 minutes.
Duration: 15-30 minutes but may persist for 4 hours (dose dependent).

Special Considerations

Pregnancy safety: Category C.
For pediatrics: if calcium gluconate is unavailable, 1-2 ml of 10% calcium chloride solution, diluted with IV fluid, may be substituted.

DEXAMETHASONE SODIUM PHOSPHATE **(Decadron –** ***Non Inventory Item*****)**

Class

Corticosteroid.

Mechanism of Action

Suppresses acute and chronic inflammation; immunosuppressive effects.

Indications

Anaphylaxis, asthma, spinal cord injury, croup, elevated intracranial pressure (prevention and treatment), as an adjunct to treatment of shock.

Contraindications

Hypersensitivity to product.

Adverse Reactions

Hypertension, sodium and water retention, GI bleeding.

None from single dose.

Drug Interactions

Calcium

Metaraminol.

How Supplied

100 mg/ 5 ml vials or 20 mg/1 ml vials.

Dosage and Administration

Adult: 10-100 mg IV (1 mg/kg slow IV bolus). (considerable variance through Medical Control).

Pediatric: 0.25-1.0 mg/kg/dose IV, IO, IM.

Duration of Action

Onset: Hours.

Peak effects: 8-12 hours.

Duration of action: 24-72 hours.

Special Consideration

Pregnancy safety: unknown.

Protect medication form heat.

Toxicity and side effects with long-term use.

DEXTROSE

Class

Carbohydrate, hypertonic solution.

Mechanism of Action

Rapidly increases serum glucose levels.
Short-term osmotic diuresis.

Indications

Hypoglycemia, altered level of consciousness, coma of unknown etiology, seizure of unknown etiology, status epilepticus (controversial).

Contraindications

Intracranial hemorrhage, delirium tremens, ineffective without thiamine,

Adverse Reactions

Extravasation leads to tissue necrosis.
Warmth, pain, burning, thrombophlebitis, rhabdomyositis.

Drug Interactions

Sodium bicarbonate, coumadin.

How Supplied

25 gm/ 50 ml pre-filled syringes (500 mg/ml).

Dosage and Administration

Adult: 12.5-25 gram slow IV; may be repeated as necessary.
Pediatric: 0.5-1 gm/kg/dose slow IV; may be repeated as necessary.

Duration of Action

Onset: less than 1 minute.
Peak effects: variable.
Duration: Variable.

Special Considerations

Administer thiamine prior to D50 in known alcoholic patients.
Draw blood sugar before administering.
Do not administer to patients with known CVA unless hypoglycemia documented.

DIAZEPAM

Class

Benzodiazepine, sedative-hypnotic, anticonvulsant.

Mechanism of Action

Potentiates effects of inhibitory neurotransmitters.
Raises seizure threshold.
Induces amnesia and sedation.

Indications

Acute anxiety states, acute alcohol withdrawal, muscle relaxant, seizure activity, agitation.
Analgesia for medical procedures (fracture reduction, cardioversion).
Delirium tremens.

Contraindications

Hypersensitivity, glaucoma. coma, shock, substance abuse, head injury.

Adverse Reactions

Respiratory depression, hypotension, drowsiness, ataxia, reflex tachycardia, nausea, confusion, thrombosis and phlebitis.

Drug Interactions

Incompatible with most drugs, fluids.

How Supplied

10 mg/5 ml prefilled syringes, ampules, vials and Tubex.

Dosage and Administration Seizure activity:

Adult: 5-10 mg IV q 10-15 minutes prn (5 mg over 5 min.)(maximum dose = 30 mgs.) Seizure activity:

Pediatric: 0.2-0.3 mg/kg/dose IV every 15-30 minutes (no faster than 3 mg over 5 minutes) (max. = 10 mg/kg). Rectal diazepam: 0.5 mg/kg via 2” rectal catheter and flush with 2-3 ml air after administration. Sedation for cardioversion: 5- 15 mg IV over 5-10 minutes prior to cardioversion.

Duration of Action

Onset: 1-5 minutes.
Peak effect: minutes.
Duration: 20-50 minutes.

Special Considerations

Pregnancy safety: Category D
Short duration of anticonvulsant effect.
Reduce dose 50% in elderly patient.

DIAZOXIDE *(Non Inventory Item)*

Class

Vasodilator.

Mechanism of Action

Non-diuretic antihypertensive; arteriolar vasodilatation.

Indications

Hypertensive crisis, especially in pre-eclampsia.

Contraindications

Hypotension, dissecting aortic aneurysm, labor.

Adverse Reactions

Reflex tachycardia, angina, cerebral ischemia, CVA, dysrhythmia, hyperglycemia, nausea, vomiting.

Drug Interactions

Incompatible with heat, light or acid solutions.

How Supplied

5 mg/ml 20 ml ampules.

Dosage and Administration

Adult: 5 mg/kg IV push over 10-30 seconds.

Pediatric: 5 mg/kg IV push over 10-30 seconds. **Duration of Action**

Onset: Immediate.

Peak effects: 5 minutes.

Duration of action: 3-12 hours.

Special Considerations

Administer only to patient in supine position.

Extravasation can cause tissue necrosis.

DILTIAZEM HCL *(Non Inventory Item)*

Class

Calcium channel blocker.

Mechanism of Action

Block influx of calcium ions into cardiac muscle: prevents spasm of coronary arteries. Arterial and venous vasodilator. Reduces preload and afterload. Reduces myocardial oxygen demand.

Indications

Control of rapid ventricular rates due to atrial flutter, atrial fibrillation, PSVT. Angina pectoris.

Contraindications

Hypotension, sick sinus syndrome, second or third degree AV block,
cardiogenic shock.
Wide-complex tachycardias.

Adverse Reactions

Bradycardia, second or third-degree AV blocks, chest pain, CHF, syncope.
V-Fib, V-tach, nausea, vomiting, dizziness, dry mouth, dyspnea, headache.

Drug Interactions

Caution in patients using medications that affect cardiac contractility. In general, should not be used in patients on Beta-blockers.

How Supplied

25 mg / 5 ml vial; 50 mg / 10 ml vial.
Non - refrigerated: LYO-JECT syringe.

Dosage and Administration

Adult: Initial bolus: 0.25 mg/ kg (average dose 20 mg) IV over two (2) minutes. If inadequate response, may re-bolus in 15 minutes: 0.35 mg/kg IV over two minutes. Maintenance infusion: 5-15 mg/hour.

Pediatric: Not recommended.

Duration of Action

Onset: 2-5 minutes.
Peak effect: Variable.
Duration: 1-3 hours.

Special Considerations

Pregnancy safety: category C.
Use in caution in patients with renal or hepatic dysfunction.
PVCs may be noted at time of conversion of PSVT to sinus rhythm.

DIPHENHYDRAMINE

Class

Antihistamine; anticholinergic.

Mechanism of Action

Blocks cellular histamine receptors; decreases vasodilation; decreases motion sickness.
Reverses extrapyramidal reactions.

Indications

Symptomatic relief of allergies, allergic reactions, anaphylaxis, acute dystonic reactions (phenothiazines).
Blood administration reactions; used for motion sickness, hay fever.

Contraindications

Asthma, glaucoma, pregnancy, hypertension, narrow angle glaucoma, infants, patients taking monoamine oxidase inhibitors (MOAIs).

Adverse Reactions

Sedation, hypotension, seizures, visual disturbances, vomiting, urinary retention, palpitations, dysrhythmias, dry mouth and throat, paradoxical CNS excitation in children.

Drug Interactions

Potentiates effects of alcohol and other anticholinergics, may inhibit corticosteroid activity, MAOIs prolong anticholinergic effects of diphenhydramine.

How Supplied

Tablet: 25, 50 mg; Capsules: 25, 50 mg.
50 or 100 mg prefilled syringes, vials (IV or IM); elixir 12.5 mg/5 ml.

Dosage and Administration

Adult: 25 - 50 mg IM or IV or P.O.
Pediatric: 1-2 mg/kg IV, IO slowly or IM. If given PO: 5 mg./ kg./ 24 hours.

Duration of Action

Onset: 15-30 minutes.
Peak effect: 1 hour.
Duration: 3-12 hours.

Special Considerations

Not used in infants or in pregnancy: Category B.
If used in anaphylaxis, will be in conjunction with epinephrine, steroids.

DOPAMINE

Class

Sympathomimetic, inotropic agent.

Mechanism of Action

Immediate metabolic precursor to Norepinephrine. Increases systemic vascular resistance, dilate renal and splanchnic vasculature. Increases myocardial contractility and stroke volume.

Indications

Cardiogenic, septic or spinal shock, hypotension with low cardiac output states. Distributive shock.

Contraindications

Hypovolemic shock, pheochromocytoma, tachydysrhythmias, VF.

Adverse Reactions

Cardiac dysrhythmias, hypertension, increased myocardial oxygen demand, extravasation may cause tissue necrosis.

Drug Interactions

Incompatible in alkaline solutions.
MAOIs will enhance effects of dopamine.
Beta blockers may antagonize effects of dopamine.
When administered with Phenytoin: may cause hypotension, bradycardia and seizures.

How Supplied

200 mg / 5 ml - for IV infusion. Add 200 mg to 250 ml of D5W for a concentration of 800 mcg/ml. Label Bag.

Dosage and Administration

Adult: 2- 20 mcg / kg / min. Start at 5 mcg/kg/min. and titrate to effect.
Pediatric: 2 - 20 mcg / kg / min. Start at 5 mcg/kg/min. and titrate to effect.

Duration of Action

Onset: 1-4 minutes.
Peak Effect: 5-10 minutes.
Duration: Effects cease almost immediately after infusion shut off.

Special Considerations

Pregnancy safety not established.
Effects are dose-dependent
Dopaminergic response: 2-4 mcg / kg / min.: dilates vessels in kidneys; inc. urine output.
Beta-adrenergic response: 4- 10 mcg / kg / min.: Increased chronotropy and inotropy
Adrenergic response: 10-20 mcg / kg / min.: Primarily alpha stimulant / vasoconstriction.
Greater than 20 mcg / kg / min.: reversal of renal effects / override alpha effects.
Always monitor drip rate.
Avoid extravasation injury.

EPINEPHRINE

Class

Sympathomimetic.

Mechanism of Action

Direct acting alpha and beta agonist.
Alpha: bronchial, cutaneous, renal and visceral arteriolar vasoconstriction.
Beta 1: positive inotropic and chronotropic actions, increases automaticity.
Beta 2: bronchial smooth muscle relaxation and dilation of skeletal vasculature
Blocks histamine release.

Indications

Cardiac arrest, asystole, PEA, VF unresponsive to initial defib.
Severe bronchospasm, asthma, bronchiolitis.
Anaphylaxis, acute allergic reactions.

Contraindications

Hypertension, hypothermia, pulmonary edema, coronary insufficiency, hypovolemic shock.

Adverse Reactions

Hypertension, dysrhythmias, pulmonary edema, anxiety, psychomotor agitation, nausea, angina, headache, restlessness.

Drug Interactions

Potentiates other sympathomimetics.
Deactivated by alkaline solutions.
MAOIs may potentiate effects of epinephrine.

How Supplied

1 mg / ml (1:1,000) ampules and 0.1 mg / ml (1:10,000) prefilled syringes. Auto-injectors: EPI-Pen: 0. 3 mg / ml EPI-Pen Jr.: 0.15mg/ml

Dosage and Administration

<u>Adult</u>
Anaphylaxis/asthma: 0.3 - 0.5 mg (0.3 - 0.5 ml 1:1000) SC
Anaphylaxis: 0.3 - 0.5 mg (3- 5 ml 1:10,000) IV
Cardiac Arrest: 1 mg IV push (1:10,000) every 3- 5 minutes.
Endotracheal: 2.0- 2.5 mg (1:1,000) every 3- 5 minutes in 10ml NS
<u>Pediatric</u>
Anaphylaxis/asthma: 0.01 mg/kg (0.01 mL/kg 1:1000) SC to maximum of 0.5 mg.
Cardiac Arrest:
Standard initial dose: IV, IO: 0.01 mg/kg (1:10,000, 0.1mL/kg)
ET: 0.1 mg/kg (1:1,000, 0.1mL/kg)
Second and subsequent doses: 0.1 mg/kg (1:1000, 0.1mL/kg)
<u>IV Infusion</u>: Add 1 mg of 1:1000 Epi to 250 ml of D_5W. This gives a concentration of 4 mcg/ml. Infuse at 2-10 mcg/min. (30 – 150 gtt / min with a microdrip set.

Duration of Action

Onset: Immediate.
Peak Effects: Minutes.
Duration: Several minutes.

Special Considerations

Pregnancy safety: category C.
Syncope in asthmatic children.

FENTANYL CITRATE *(Non Inventory Item)*

Class

Opioid analgesic (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions.
Depresses respiration.
Suppresses anxiety.
Less histamine release than morphine.

Indications

Analgesia for moderate to severe pain.

Contraindications

Allergic to Fentanyl.
Undiagnosed abdominal pain, depressed respiratory drive, head injury.

Adverse Reactions

Respiratory depression, hypotension, decreased levels of consciousness, nausea, vomiting.

Drug Interactions

Potentiates sedation with phenothiazines and other opiates and other sedative agents.

How Supplied

Injection solution: 0.05 mg/ml (500 mcg/ml)

Dosage and Administration

Adult: 25-50 mcg slow IV over 5 minutes to a maximum dose of 150 mcg (microgram).
Pediatric: 0.5 mcg/kg IV over five minutes.

Duration of Action

Onset: immediate.
Peak Effect: minutes.
Duration: 1-2 hours.

Special Considerations

Pregnancy safety: Category C.
Use with caution in geriatric population, patient with respiratory depression or hypovolemia.

FUROSEMIDE

Class

Loop diuretic.

Mechanism of Action

Inhibits electrolyte reabsorption and promotes excretion of sodium, potassium, chloride.

Indications

CHF; Pulmonary edema, hypertensive crisis.

Contraindications

Hypovolemia, anuria, hypotension (relative contraindication); hypersensitivity, hepatic coma.

Adverse Reactions

May exacerbate Hypovolemia, hypokalemia, ECG changes, dry mouth, hypochloremia, hyponatremia, hyperglycemia (due to hemoconcentration).

Drug Interactions

Lithium toxicity may be potentiated by sodium depletion.

Digitalis toxicity may be potentiated by potassium depletion.

How Supplied

100 mg / 5 ml, 20 mg / 2 ml, 40 mg / 4 ml vials.

Dosage and Administration

Adult: 0.5-1.0 mg / kg injected slowly IV.

Pediatric: 1 mg / kg / dose IV, IO.

Duration of Action

Onset: 5 minutes.

Peak Effects: 20-60 minutes.

Duration: 4-6 hours.

Special Considerations

Pregnancy safety: Category C.

Ototoxicity and deafness can occur with rapid administration.

Should be protected from light.

GLUCAGON

Class

Hyperglycemic agent, pancreatic hormone, insulin antagonist.

Mechanism of Action

Increases blood glucose by stimulating glycogenesis.
Unknown mechanism of stabilizing cardiac rhythm in beta-blocker overdose.
Minimal positive inotrope and chronotrope.
Decreases GI motility and secretions.

Indications

Altered level of consciousness when hypoglycemia is suspected. May be used as inotropic agent in beta-blocker overdose.

Contraindications

Hyperglycemia, hypersensitivity.

Adverse Reactions

Nausea, vomiting.
Tachycardia, hypertension.

Drug Interactions

Incompatible in solution with most other substances.
No significant drug interactions with other emergency medications.

How Supplied

1 mg ampules (requires reconstitution with diluent provided).

Dosage and Administration

Adult: 0.5 - 1 mg IM, SC, or slow IV; may repeat q 20 minutes PRN.
Pediatric: 0.03 -0.1 mg / kg / dose (maximum dose 1 mg) q 20 min. IM, IO, SC, slow IV.

Duration of Action

Onset: 1 minute.

Special Considerations

Pregnancy safety: Category C.
Ineffective if glycogen stores depleted.
Should be used in conjunction with 50% dextrose whenever possible.
If patient does not respond to second dose glucagon, 50% dextrose must be administered.

GLUCOSE - ORAL

Class

Hyperglycemic.

Mechanism of Action

Provides quickly absorbed glucose to increase blood glucose levels.

Indications

Conscious patients with suspected hypoglycemia.

Contraindications

Decreased level of consciousness, nausea, vomiting.

Adverse Reactions

Nausea, vomiting.

Drug Interactions

None.

How Supplied

Glucola: 300 ml bottles.

Glucose pastes and gels in various forms.

Dosage and Administration

Adult: Should be sipped slowly by patient until clinical improvement noted. Pediatric: Same as adult.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: Variable.

Special Considerations

As noted in indications section.

GLYCOPROTEIN IIb / IIIa INHIBITORS *(Non Inventory Item)*

Class

Chimeric monoclonal antibody fragment specific for platelet glycoprotein IIb/IIIa receptors.

Mechanism of Action

Blocks Platelet aggregation and thrombus formation.

Indications

Adjunct to percutaneous transluminal angioplasty..
Adjunct to thrombolytic agents.
Unstable angina not responsive to conventional medical therapy when percutaneous angioplasty is planned within 24 hours.

Contraindications

Active internal hemorrhage.
Clinically significant hemorrhage (GI, GU) within last 6 weeks.
Cerebrovascular accident within past 2 years.
Bleeding disorders.
Thrombocytopenia (low platelets / < 100,000).
Major surgery or trauma within last 6 weeks.
Intracranial tumor, A/V malformation or aneurysm.
Severe Hypertension, Vasculitis.
Use of Dextran before PTCA or intent to use Dextran during PTCA.
Hypersensitivity.

Adverse Reactions

Major bleeding.
Intracranial bleeding.
Thrombocytopenia.

Drug Interactions

Oral anticoagulants contraindicated.
Concurrent Dextran contraindicated.
Concurrent Heparin will increase risk of bleeding.

How Supplied

Intravenous doses (bolus / infusion), variable depending upon brand utilized.

Dosage and Administration

Variable depending upon Brand utilized.

Duration of Action

Onset: Variable: 1.5 -2.5 Hours.
Peak Effect: Variable: 2 - 3 Hours.
Duration: 2 Hours - 2 Days.

Special Considerations

Major bleeding in 14% of coronary angioplasty patients.
Bleeding from open areas may occur (catheter site).
Pregnancy Category: C.

HEPARIN SODIUM *(None Inventory Item)*

Class

Anticoagulant.

Mechanism of Action

Prevents conversion of fibrinogen to fibrin and affect clotting factors: IX, XI, XII, plasmin.

Does not lyse existing clots.

Indications

Prophylaxis and treatment of : venous thrombosis, pulmonary embolus, coronary occlusion, disseminated intravascular coagulation (DIC), post-operative thrombosis.

To maintain patency of IV injection devices and indwelling catheters.

Contraindication

Hypersensitivity.

Patients on antiplatelet drugs (relative contraindication).

Adverse Reactions

Hemorrhage, thrombocytopenia, allergic reactions (chills, fever, back pain).

Drug Interactions

Salicylates, some antibiotics and quinidine may increase risk of bleeding.

How Supplied

Heparin lock flush solutions in 10 and 100-unit / ml ampules and prefilled syringes.

1,000 - 40,000 units / ml ampules.

Dosage and Administration

Adult: Loading dose: 80 units/kg IV; maintenance dose: 18 units/kg/hour IV.

Pediatric: Loading dose: 50 u / kg IV; maintenance dose: 7.5 units/kg/ hour IV.

Duration of Action

Onset: Immediate.

Peak Effect: Variable.

Duration: 4 hours after continuous infusion discontinued.

Special Considerations

May be neutralized with protamine sulfate at 1 mg protamine / 100 u Heparin: give slowly IV over 1-3 minutes.

HYDROXOCOBALAMIN *(Non Inventory Item)*

Class

Cyanide antidote

Mechanism of Action

Hydroxylated active forms of vitamin B12. One molecule binds with one cyanide to form cyanocobalamin (Vitamin B12) which is then excreted renally.

Indications

Known or suspected cyanide poisoning.

Contraindication

No specific contraindications known.

Adverse Reactions

Transient elevation in blood pressure.
Erythema in nearly 100% of patients.
Pruritis and rash.

Drug Interactions

Incompatible with any other medications.
Compatible with D5W, NS and Lactated Ringers.

How Supplied

Single kit with two 2.5 gm vials.

Dosage and Administration

Adult:	5 grams given IV over 15 minutes. If clinically indicated, an additional 5 grams may be repeated over 15 minutes to 2 hours for a maximum dose of 10 grams.
Pediatric:	In non-US marketing experience, 70 mg/kg given IV over 15 minutes. May repeat once over 15 minutes.

Duration of Action

Mean half-life is 26 to 31 hours with 60-70% excreted in they urine.

Special Considerations

Contact Poison Control 1(800) 222-1222 to assist in diagnosis or management of cyanide poisoning.
Blood pressure changes can be significant but transient.

INSULIN *(Non Inventory Item)*

Class

Antidiabetic.

Mechanism of Action

Allows glucose transport into cells of all tissues; converts glycogen to fat; produces intracellular shift of potassium and magnesium to reduce elevated serum levels of these electrolytes.

Indications

Not used in emergency pre-hospital setting.

Diabetic ketoacidosis or other hyperglycemic state.

Hyperkalemia. (Insulin and D50 used together to lower hyperkalemic state).

Non-ketotic hyperosmolar coma.

Contraindications

Hypoglycemia, hypokalemia.

Adverse Reactions

Hypokalemia, hypoglycemia,, weakness, fatigue, confusion, headache, tachycardia, nausea, diaphoresis.

Drug Interactions

Incompatible in solution with all other drugs..

Corticosteroids, dobutamine, epinephrine and thiazide diuretics decrease the hypoglycemic effects of insulin.

Alcohol and salicylates may potentiate the effects of insulin.

How Supplied

10 ml Vials of 100 Units / ml.

Dosage and Administration

Dosage adjusted relative to blood sugar levels. May be given SC, IM or IV. Standard doses for diabetic coma.

Adult:	10-25 units Regular insulin IV, followed by infusion of 0.1 units / kg /hour.
Pediatric:	0.1 - 0.2 units / kg / hour IV or IM followed by infusion: 50 units of regular insulin mixed in 250 ml of NS (0.2 units / ml), at a rate of 0.1 - 0.2 units / kg / hour.

Duration of Action

Onset: Minutes

Peak Effect: Approximately 1 hour (short-acting); 3-6 hours (intermediate acting); 5-8 hours (long-acting).

Duration: Approximately 6-8 hours (short-acting); 24 hour (intermediate-acting); 36 hour (long-acting).

Special Considerations

Insulin is drug of choice for control of diabetes in pregnancy.

Usually require refrigeration.

Most rapid absorption if injected in abdominal wall; next most rapid absorption: arm; slowest absorption if injected into the thigh.

IPRATROPRIUM BROMIDE (Atrovent)

Class

Bronchodilator

Mechanism of Action

Blocks the action of acetycholine at the parasympathetic sites in bronchial smooth muscle causing bronchodilitation.

Indications

Used in bronchospasm especially associated with COPD, and emphysema.

Contraindications

Hypersensitivity to atropine or its derivatives**.**

Adverse Reactions

Poorly absorbed from the lung, so systemic effects are rare.
>10% CNS: Dizziness, Headache, Nervousness.
Respiratory: Cough
1-10% Cardiac: Hypotension, palpitations.

How Supplied

Nebulizing Ampule: 0.02% (2.5ml)
Inhaler: 18mcg/actuation

Dosage and Administration

Adult:	2-3 puffs via metered dose inhaler (MDI) tid-qid; maximum 12 puffs/day. ALT: 500mcg NEB q 6-8hrs (may mix neb solution with Albuterol if used within 1 hour)
Pediatric:	< 12 yo: 1-2 puffs(MDI) tid-qid; max: 8 puffs. ALT: 250mcg NEB q 6-8hrs (may mix solution with Albuterol if used within 1 hour).

Kinetics

Onset: 1-3 minutes after
administration Peak effects: Within
1.5- 2 hours Duration of Action: Up to
4-6 hours T1/2: 2 hrs after inhalation

Special Considerations

Pregnancy Safety: Category B.

KETOROLAC TROMETHAMINE (Tordal)

Class

Non-steroidal anti-inflammatory drug.
Analgesic

Mechanism of Action

NSAID, blocks prostaglandin complex formation and production.
It is a potent analgesic that does not possess any sedative or anxiolytic activities.

Indications

Pain relief, short-term.

Contraindications

Pain relief prior to major surgery.
Allergy, bleeding risk, stroke suspected or confirmed, aspirin allergy.

Adverse Reactions

Allergic reaction, bleeding, rash.

Drug Interactions

Avoid other non-steroidal drugs, Furosimide.

How Supplied

Oral: tablet 10mg
Injection solution: 15 mg/ml, 30 mg/ml
Intravenous solution: 15 mg/ml, 30mg/ml

Dosage and Administration

Adult: 15-30 mg IVP or 30-60 mg IM

Duration of Action

Onset: Minutes.
Peak Effects: 30 minutes. .

Special Considerations

Pregnancy safety: Category C.
Avoid with history of aspirin or NSAID drug.
Increases risk of bleeding, therefore do not use in a patient that may need to go to surgery.

LIDOCAINE HCL (2%)

Class

Antidysrhythmic.

Mechanism of Action

Decreases automaticity by slowing the rate of spontaneous Phase 4 depolarization.

Indications

Suppression of ventricular dysrhythmias (V-tach, VF, PVCs).
Prophylaxis against recurrence after conversion from V-tach, VF.

Contraindications

Second degree and third degree blocks in absence of artificial pacemaker).
Hypotension.
Stokes Adams Syndrome.

Adverse Reactions

Slurred speech, seizures, altered mental status, confusion, lightheadedness, blurred vision, bradycardia.

Drug Interactions

Apnea induced with succinylcholine may be prolonged with high doses of Lidocaine.
Cardiac depression may occur in conjunction with IV Dilantin.
Procainamide may exacerbate the CNS effects.
Metabolic clearance decreased in patients with liver disease or those patients taking beta-blockers.

How Supplied

100 mg in 5 ml solution prefilled syringes.
1 and 2 gram additive syringes.
100 mg in 5 ml solution ampules.
1 and 2 gram vials in 30 ml of solution.

Dosage and Administration

Adult: Cardiac arrest VT/ VF: 1.5 mg / kg IV push; repeat q 3-5 minutes to maximum dose of 3 mg/kg. After conversion to NSR, begin drip at 2-4 mg / min.
Pediatric: VF or Pulseless V-tach: 1 mg/kg IV / IO per dose. Infusion: 20-50 mcg/kg/min.

Duration of Action

Onset: 1-5 minutes.
Peak Effect: 5-10 minutes.
Duration: Variable (15 minutes-2 hours)

Special Considerations

Pregnancy safety: Category B.
Reduce maintenance infusions by 50% if patient is over 70 years of age, has liver disease, or is in CHF or shock.
A 75-100 mg bolus maintains levels for only 20 minutes.
Exceedingly high doses of Lidocaine can result in coma or death.
Avoid Lidocaine for reperfusion dysrhythmias after thrombolytic therapy.
Cross-reactivity with other forms of local anesthetics.

LORAZEPAM (Ativan)

Class

Benzodiazepine; sedative; anticonvulsant.

Mechanism of Action

Anxiolytic, anticonvulsant and sedative effects, suppresses propagation of seizure activity produced by foci in cortex, thalamus and limbic areas.

Indications

Initial control of status epilepticus or severe recurrent seizures.
Severe anxiety.
Sedation.

Contraindications

Acute narrow-angle glaucoma.
Coma, shock or suspected drug abuse.

Adverse Reactions

Respiratory depression, apnea, drowsiness, sedation, ataxia, psychomotor impairment, confusion.
Restlessness, delirium.
Hypotension, bradycardia.

Drug Interactions

May precipitate CNS depression if patient is already taking CNS depressant medications.

How Supplied

2 and 4 mg / ml concentrations in 1 ml vials.

Dosage and Administration

Note: When given IV or IO must dilute with equal volume of sterile water or sterile saline.

Adult: 2-4 mg slow IV at 2 mg / min; may repeat in 15-20 minutes to maximum dose of 8 mg. For sedation: 0.05 mg / kg up to 4 mg IV.

Pediatric: 0.05 - 0.20 mg / kg slow IV, IO slowly over 2 minutes; may repeat in 15-20 minutes to maximum dose of 0.2 mg / kg.

Duration

Onset of action: 1-5 minutes.
Peak effect: variable.
Duration of action: 6-8 hours.

Special Considerations

Pregnancy safety: Category D.
Monitor BP and respiratory rate during administration.
Have advanced airway equipment readily available.
Inadvertent arterial injection may result in vasospasm and gangrene.
Lorazepam expires in 6 weeks if not refrigerated.

MAGNESIUM SULFATE

Class

Electrolyte.

Mechanism of Action

Reduces striated muscle contractions and blocks peripheral neuromuscular transmission by reducing acetylcholinesterase release at the myoneural junction; manages seizures in toxemia of pregnancy; induces uterine relaxation; can cause bronchodilation after beta-agonists and anticholinergics have been used.

Indications

Seizures of eclampsia (Toxemia of pregnancy).
Torsades de Pointes.
Hypomagnesemia.
TCA overdose-induced dysrhythmias.
Digitalis-induced dysrhythmias.
Class IIa agent for refractory VF and VT after administration of Lidocaine doses.

Contraindications

Heart blocks.
Renal diseases.

Adverse Reactions

Respiratory and CNS depression.
Hypotension, cardiac arrest and asystole may occur.
Facial flushing, diaphoresis, depressed reflexes.
Circulatory collapse.

Drug Interactions

May enhance effects of other CNS depressants.
Serious changes in overall cardiac function may occur with cardiac glycosides.

How Supplied

2 ml and 20 ml vials of a 50% solution.

Dosage and Administration

Adult: Seizure activity associated with pregnancy: 1-4 gm IV push over 3 minutes. For Torsades de Pointes or Refractory VF/VT: 1-2 grams IV push over 1-2 minutes.
Pediatric: Not recommended.

Duration of Action

Onset: Immediate.
Peak effect: variable.
Duration: 3-4 hours.

Special Considerations

Pregnancy safety: Recommended that drug not be given in the 2 hours before delivery, if possible.
IV calcium gluconate or calcium chloride should be available as antagonist if needed.
The “cure” for toxemia is delivery of the baby.
Use with caution in patients with renal failure.
Magnesium sulfate is being used for acute MI patients in some systems under Medical Direction.

MANNITOL 20%

Class

Osmotic diuretic.

Mechanism of Action

Promotes the movement of fluid form the intracellular space to the extracellular space.

Decreases cerebral edema and intracranial pressure.

Promotes urinary excretion of toxins.

Indications

Cerebral edema.

Reduce intracranial pressure for certain cause (space-occupying lesions).

Rhabdomyolysis (myoglobinuria).

Blood transfusion reactions.

Contraindications

Hypotension, renal failure, electrolyte depletion, dehydration, intracranial bleeding.

Severe CHF with pulmonary edema.

Hyponatremia.

Adverse Reactions

CHF, pulmonary edema, hypertension, nausea, vomiting, headache, seizures, chest pain, tachycardia. Electrolyte depletion, dehydration, hypotension, sodium depletion.

Drug Interactions

May precipitate digitalis toxicity in when given concurrently.

How Supplied

250 ml and 500 ml of a 20% solution for IV infusion (200 mg / ml).

25% solution in 50 ml for slow IV push.

Dosage and Administration

Adult:	0.5 g -2 g / kg IV infusion over 15-30 minutes; may repeat after 5 minutes if no effect.
Pediatric:	0.5 - 1g / kg / dose IV, IO infusion over 30-60 minutes; may repeat after 30 minutes if no effect.

Duration of Action

Onset: 1-3 hours for diuretic effect; 15 minutes for reduction of intracranial pressure.

Peak effect: variable.

Duration: 4-6 hours for diuretic effect; 3-8 hours for reduction of ICP.

Special Considerations

Pregnancy safety: Category C.

May crystallize at temperatures below 7.8 degrees Centigrade.

In-line filter should always be used.

Effectiveness depends upon large doses and an intact blood-brain barrier.

Usage and dosages in emergency care are controversial.

METOPROLOL *(Non Inventory Item)*

Class

Antianginal; Antihypertensive Agent; Beta Blocker

Mechanism of Action

Selective inhibitor of beta1-adrenergic receptors; completely blocks beta1 receptors, with little or no effect on beta 2 receptors at doses <100 mg.

Indications

Treatment of hypertension and angina pectoris; prevention of myocardial infarction, atrial fibrillation, flutter, symptomatic treatment of hypertrophic subaortic stenosis; to reduce increased sympathetic stimuli in acute MI.

Contraindications

Hypersensitivity to metoprolol or any component of the formulation; sinus bradycardia; heart block greater than first degree (except in patients with a functioning artificial pacemaker); cardiogenic shock; uncompensated cardiac failure; pregnancy (2nd and 3rd trimesters).

Adverse Reactions

Respiratory: Bronchospasm

Cardiovascular: Bradycardia, palpitations, edema, congestive heart failure, reduced peripheral circulation.

Central nervous system: Drowsiness, insomnia.

Drug Interactions

Drugs which slow AV conduction (**digoxin**): effects may be additive with beta-blockers. **Glucagon**: Metoprolol may blunt the hyperglycemic action of glucagon. **Verapamil or diltiazem** may have synergistic or additive pharmacological effects when taken concurrently with beta-blockers; avoid concurrent I.V. use.

How Supplied

Metoprolol tartrate, is a selective beta1-adrenoreceptor blocking agent, available as 50- and 100-mg tablets for **oral** administration and in 5-ml (1mg/ml) ampules for **intravenous** administration.

Dosage and Administration

Adults: I.V.: Hypertension: Has been given in dosages 1.25-5 mg every 6-12 hours in patients unable to take oral medications

Myocardial infarction (acute): I.V.: 5 mg every 5-10 minutes up to 3 doses in early treatment of myocardial infarction.

Duration of Action

Peak antihypertensive effect: Oral: Within 1.5-4 hours

Duration: 10-20 hours

Half-life: 3-4 hours; End-stage renal disease: 2.5-4.5 hours

Special Considerations

Pregnancy Safety: Category C (manufacturer); D (2nd & 3rd trimesters - expert analysis). Not recommended in pediatric population. The safety and effectiveness of Metoprolol have not been established in children.

MIDAZOLAM *(Non Inventory Item)*

Class

Short-acting benzodiazepine CNS depressant.

Mechanism of Action

Anxiolytic and sedative properties similar to other benzodiazepines. Memory impairment.

Indications

Sedation, Anxiolytic prior to endotracheal or nasotracheal intubation.

Contraindications

Glaucoma, shock, coma, alcohol intoxication, overdose patient.
Depressed vital signs.
Concomitant use with other CNS depressants, barbiturates, alcohol, narcotics.

Adverse Reactions

Hiccough, cough, over-sedation, nausea, vomiting, injection site pain, headache, blurred vision.
Hypotension, respiratory depression and arrest.

Drug Interactions

Should not be used in patients who have taken CNS depressant.

How Supplied

2, 5, 10 ml vials (1 mg / ml).
1, 2 , 5, 10 ml vials (5 mg/ ml).

<u>Dosage and Administration</u>

Adult:	0.5 - 2.5 mg slow IV push; (may be repeated to total maximum: 0.1 mg / kg).
Pediatric:	To facilitate intubation: Medical control may order: (6 months- 5 years) Midazolam 0.05-0.1 mg/kg IV maximum dose of 5 mg. (6-12 year old) Midazolam 0.1 mg/kg IV maximum dose of 8 mg.

<u>WMD: (See APPENDIX Dosing Table)</u>

Duration of Action

Onset: 1-3 minutes IV and dose dependent.
Peak effect: variable.
Duration: 2-6 hours and dose dependent.

Special Considerations

Pregnancy safety: category D.
Administer immediately prior to intubation procedure.
Requires continuous monitoring of respiratory and cardiac function.
Never administer as IV bolus.

MORPHINE SULFATE (Schedule II Narcotic)

Class

Opioid analgesic. (Schedule II drug).

Mechanism of Action

Alleviates pain through CNS actions.
Suppresses fear and anxiety centers in brain.
Depresses brain stem respiratory centers.
Increases peripheral venous capacitance and decreases venous return.
Decreases preload and afterload, decreasing myocardial oxygen demand.

Indications

Analgesia for moderate to severe acute and chronic pain (use with caution).
Severe CHF, pulmonary edema.
Chest pain associated with acute MI.

Contraindications

Head injury, exacerbated COPD, depressed respiratory drive, hypotension.
Undiagnosed abdominal pain, decreased level of consciousness.
Suspected hypovolemia.
Patients who have taken MAOIs within past 14 days.

Adverse Reactions

Respiratory depression, hypotension, decreased level of consciousness, nausea, vomiting.
Bradycardia, tachycardia, syncope, facial flushing, euphoria, bronchospasm, dry mouth.

Drug Interactions

Potentiates sedative effects of phenothiazines.
MAOIs may cause paradoxical excitation.

How Supplied

10 mg in 1 ml of solution, ampules and Tubex syringes.

Dosage and Administration

Adult: 1-3 mg IV, IM, SC every 5 minutes titrated to maximum of 10 mg.
Pediatric: 0.1 - 0.2 mg / kg / dose IV, IO, IM, SC every 5 minutes titrated to maximum of 5 mg.

Duration of Action

Onset: Immediate.
Peak effect: 20 minutes.
Duration: 2 - 7 hours.

Special Considerations

Pregnancy safety: Category C.
Morphine rapidly crosses the placenta.
Safety in neonate not established.
Use with caution in geriatric population and those with COPD, asthma.
Vagotonic effect in patient with acute inferior MI (bradycardia, heart block).
Naloxone should be readily available as antidote.

NALOXONE

Class

Narcotic antagonist.

Mechanism of Action

Competitive inhibition at narcotic receptor sites.
Reverse respiratory depression secondary to depressant drugs.
Completely inhibits t effect of morphine.

Indications

Opiate overdose, coma. Complete or partial reversal of CNS and respiratory depression induced by opioids.
Decreased level of consciousness.
Coma of unknown origin.

Contraindications

Use with caution in narcotic-dependent patients.
Use with caution in neonates of narcotic-addicted mothers.

Adverse Reactions

Withdrawal symptoms in the addicted patient.
Tachycardia, hypertension, dysrhythmias, nausea, vomiting, diaphoresis.

Drug Interactions

Incompatible with bisulfite and alkaline solutions.

How Supplied

0.02 mg / ml (neonate); 0.4 mg/ml, 1 mg/ml ; 2.0 mg / 5 ml ampules; 2 mg/5 ml prefilled syringe.

Dosage and Administration

Adult: 0.4 - 2.0 mg IV, IM, SC, Nasal via atomizer or ET (diluted); min. recommended = 2.0 mg.; repeat at 5 minute intervals to 10 mg maximum dose. (Medical Control may request higher amounts). Infusion: 2 mg in 500 ml of D5W (4 mcg/ml), infuse at 0.4 mg / hr (100 ml/hour).

Pediatric: 0.1 mg / kg / dose IV, IM, SC, ET (diluted); maximum of 0.8 mg; if no response in 10 minutes, administer an additional 0.1 mg / kg /dose.

Duration of Action

Onset: within 2 minutes.
Peak effect: variable.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: category B. Seizures without causal relationship have been reported. May not reverse hypotension. Use caution when administering to narcotic addicts (violent behavior, etc).

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) *(Non Inventory Item)*

DuoDote: Nerve Agent Antidote Kit
Each **DuoDote** contains Atropine (2.1 mg/0.7 ml)
and Pralidoxime Chloride (600-mg/2 **ml**).

(ATNAA):Antodote Treatment Nerve Agent Auto-Injector Each Dual Chamber (ATNAA) auto-Injector delivers 2.1 mg Atropine in 0.7 ml and 600 mg Pralidoxime Chloride in 2 ml sequentially using a single needle.

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

<u>ATOX ComboPen: Delivers 220 mg Obidoxime Chloride and 2 mg Atropine in 2 ml. (Available outside the U.S.,pending FDA approval later this year.)</u>

Meridian Medical Technologies, Inc

Pralidoxime Chloride Injector (2-Pam) 600mg Pralidoxime Chloride in 2 ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

DIAZEPAM AUTO-INJECTOR: CONVULSANT ANTIDOTE NERVE AGENT (CANA): Each **CANA Autoinjector** contains 10mg diazepam in 2ml.

Meridian Medical Technologies, Inc

NERVE AGENT ANTIDOTES (AUTO-INJECTORS) continued

Pediatric AtroPen® Autoinjector: Four strengths of ATROPEN are available in color coded containers: 0.25mg (black, in 0.3ml), 0.5mg (blue); 1.0mg (Dark Red) **<u>or</u>** 2.0 mg (Green) Each ATROPEN delivers atropine in 0.7 ml. of sterile solution.

NITROGLYCERIN

Class

Vasodilators.

Mechanism of Action

Smooth muscle relaxant acting on vascular, bronchial, uterine and intestinal smooth muscle.

Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the myocardial work load and oxygen demand.

Indications

Acute angina pectoris.

Ischemic chest pain.

Hypertension.

CHF, pulmonary edema.

Contraindications

Hypotension, hypovolemia.

Intracranial bleeding or head injury.

Adverse Reactions

Headache, hypotension, syncope, reflex tachycardia, flushing.

Nausea, vomiting, diaphoresis, muscle twitching.

Drug Interactions

Additive effects with other vasodilators.

Incompatible with other drugs IV.

How Supplied

Tablets: 0.15 mg (1/400 grain); 0.3 mg (1/200 grain); 0.4 mg (1/150 grain); 0.6 mg (1/100 grain).

NTG spray: 0.4 mg - 0.8 mg under the tongue.

NTG IV (TRIDIL).

Dosage and Administration

Adult: Tablets: 0.3 - 0.4 mg SL; may repeat in 3-5 minutes to maximum of 3 doses. NTG spray: 0.4 mg under the tongue; 1-2 sprays. NTG IV infusion: 5 ug / min.; increase by 5-10 ug / min. every 5 minutes until desired effect.

Pediatric: not recommended.

Duration of Action

Onset: 1-3 minutes.

Peak effect: 5-10 minutes.

Duration: 20-30 minutes or. if IV, 1-10 minutes after discontinuation of infusion.

Special Considerations

Pregnancy safety: category C.

Hypotension more common in geriatric population.

NTG decomposes if exposed to light or heat.

Must be kept in airtight containers.

Active ingredient may have a stinging effect when administered SL..

NITROPASTE *(Non Inventory Item)*

Class
Vasodilator
Mechanism of Action
Smooth muscle relaxant acting on vascular, bronchial
uterine and intestinal smooth muscle. Dilation of arterioles and veins in the periphery, reduces preload and afterload, decreases the myocardial work load and oxygen demand.
Indications
Angina pectoris and chest pain associated with acute MI, CHF/PE; Hypertension (HTN).
Contraindications
Hypotension, hypovolemia, Intracranial bleeding or head injury.
Adverse Reactions
Headache, hypotension, syncope, reflex tachycardia, flushing. Nausea, vomiting, diaphoresis, muscle twitching.
How Supplied
Topical Ointment: (Nitrol ®) 2% [20 mg/g] (30g, 60g)
Dosage and Administration

Adult:	For CHF/PE; HTN
	Ointment: Apply 1 inch, cover with plastic wrap and secure with tape.
Pediatric:	not recommended.

Duration of Action
Onset: 30 minutes.
Peak effect: Variable.
Duration: 18-24 hours.
Special Considerations
Pregnancy safety: Category C.
Apply in thin uniform layer on non-hairy area.
1 inch equals approximately 15 mg nitroglycerin.
Avoid using fingers to spread paste.
Store past in cool place with tube tightly capped.
Erratic absorption rates quite common.

ONDANSETRON (Zofran)

Class

Anti-emetic.

Mechanism of Action

Zofran is an anti-emetic that acts by selective antagonism of the 5HT3 receptors.

Indications

Nausea and vomiting.

Contraindications

Avoid if history of known hypersensitivity

Avoid repeat dosing in patients with known abnormal liver function.

Adverse Reactions

Headache

Dizziness

Drowsiness

How Supplied

8 mg/ml and 2 mg/ml parenteral

8 mg and 4 mg oral

Dosage

Adult – 4 mg IV, may repeat X 1 in 30 minutes if needed

Peds – 0.1 mg/kg IV up to a maximum of 4 mg

OXYGEN

Class

Naturally occurring atmospheric gas.

Mechanism of Action

Reverses hypoxemia.

Indications

Confirmed or expected hypoxemia.
Ischemic chest pain.
Respiratory insufficiency.
Prophylactically during air transport.
Confirmed or suspected carbon monoxide poisoning.
All other causes of decreased tissue oxygenation.
Decreased level of consciousness.

Contraindications

Certain patients with COPD, emphysema who will not tolerate Oxygen concentrations over 35%.
Hyperventilation.

Adverse Reactions

Decreased level of consciousness and respiratory depression in patients with chronic CO2 retention.
Retrolental fibroplasia if given in high concentrations to premature infants. (maintain 30-40% 02)

Drug Interactions

None.

How Supplied

Oxygen cylinders (usually green and white) of 100% compressed oxygen gas.

Dosage and Administration

Adult: Cardiac arrest and Carbon Monoxide poisoning: 100%. Hypoxemia: 10-15 L/ min. via non-rebreather. COPD: 0-2 L/ min. via nasal cannula or 28-35% venturi mask. Be prepared to provide ventilatory support if higher concentrations of oxygen needed.

Pediatric: Same as for adult with exception of premature infant.

Duration of Action

Onset: Immediate.
Peak effect: not applicable.
Duration: Less than 2 minutes.

Special Considerations

Be familiar with liter flow and each type of delivery device used.
Supports possibility of combustion.

Oxytocin (Pitocin)

Class
Hormone

Description
Oxytocin meand "rapid birth". It is a synthetic hormone named for the natural posterior pituitary hormone.

Mechanism of Action
Stimulates uterine smooth muscle contractions indirectly and expedites the contractions of spontaneous labor.
Reduces uterine blood flow.
Stimulates mammary glands to increase lactation without increasing milk production.

Indications
EMS – Control of postpartum bleeding.

Contraindications
Presence of a second fetus.

Adverse Reactions
Hypotension, Hypertension, Tachycardia, Angina Pectoris, Anxiety, Seizure, Nausea, Vomiting, Allergic Reaction, Uterine Rupture, Death of Second Fetus.

Drug Interactions
Vasopressors may potentiate hypertension.

How Supplied
10 USP units / 1 ml ampule (10 U/ml)

Dosage and Administration
Via IV Infusion: Add 20 U to 1 L of RL. Administer at 150-200 ml/hour.

Onset of Action
IV - Immediately

Special Considerations
Do not administer if uterine is gravid.
Monitor Vital Signs & Uterine tone closely

PRALIDOXIME CHLORIDE *(Non Inventory Item)*

Class

Cholinesterase reactivator.

Mechanism of Action

Reactivation of cholinesterase to effectively act as an antidote to organophosphate pesticide poisoning. This action allows for destruction of accumulated acetylcholine at the neuromuscular junction.

Indications

As an antidote in the treatment of poisoning by organophosphate pesticides and chemicals.

In the pre-hospital arena, is used when atropine is or has become ineffective in management of organophosphate poisoning.

Contraindications

Use with caution in patients with reduced renal function.

Patients with myasthenia gravis and organophosphate poisoning.

Adverse Reactions

Dizziness, blurred vision, diplopia, headache, drowsiness, nausea, tachycardia, hyperventilation, muscular weakness, excitement and manic behavior.

Drug Interactions

No direct drug interactions, however, patients with organophosphate poisoning should not be given barbiturates, morphine, theophylline, aminophylline, succinylcholine, reserpine and phenothiazines.

How Supplied

Emergency Single Dose Kit containing:

- One 20 ml vial of 1 gram sterile Protopam Chloride.
- One 20 ml ampule of sterile diluent.
- Sterile, disposable 20 ml syringe.
- Needle and alcohol swab.

Dosage and Administration

NOTE: If Protopam is to be used, it should be administered almost simultaneously with atropine.

Adult:	Initial dose of 1-2 grams as an IV infusion with 100 ml saline over 15-30 minutes.
Pediatric:	20-40 mg / kg as IV infusion over 15-30 minutes. Doses may be repeated every 1 (one) hour if muscle weakness persists. If IV administration is not feasible, IM or SC injection may be utilized.

Duration of Action

Onset: Minutes.

Peak Effects: Variable.

Duration: Variable.

Special Considerations

Pregnancy safety unknown. Most effective if given within a few hours of poisoning. Cardiac monitoring should be considered in severe cases of organophosphate poisoning.

PROCAINAMIDE *(Non Inventory Item)*

Class

Antidysrhythmic Class Ia.

Mechanism of Action

Suppresses phase IV depolarization in normal ventricular muscle and Purkinje fibers, reducing automaticity of ectopic pacemakers; suppresses reentry dysrhythmias by slowing intraventricular conduction.

Indications

Suppress PVCs refractory to Lidocaine.
Suppress VT with a pulse refractory to Lidocaine.
PSVTs with wide-complex tachycardia of unknown origin (drug of choice when associated with WP).

Contraindications

Second and Third Degree block.
Torsades de Pointes.
Lupus.
Digitalis toxicity.
Myasthenia gravis.

Adverse Reactions

PR, QRS, and QT widening, AV Block, cardiac arrest, hypotension, seizures.
nausea, vomiting, reflex tachycardia, PVCs, VT, VF, CNS depression, confusion.

Drug Interaction

None with other emergency drugs.

How Supplied

1 gram in 10 ml vial (100 mg / ml).
1 gram in 2 ml vials (500 mg / ml) for infusion.

Dosage and Administration

Adult:	20-30 mg / min.; maximum total dose is 17 mg / kg. Maintenance infusion: 1-4 mg / min.
Pediatric:	2-6 mg / kg IV, IO at less than 20 mg / min.; maximum dose is 17 mg/kg. Maintenance infusion: 20-80 micrograms/kg/min**.**

Duration of Action

Onset: 10-30 minutes.
Peak effect: Variable.
Duration: 3-6 hours.

Special Considerations

Discontinue infusion if hypotension develops, the QRS complex widens by 50% of its original width or a total of 17 mg / kg has been administered or if the dysrhythmia is suppressed.
Pregnancy safety: Category C.
Potent vasodilating and inotropic effects.
Hypotension with too rapid an infusion.
Carefully monitor vital signs and ECG.
Administer cautiously to patients with renal, hepatic or cardiac insufficiency. Administer cautiously to patients with asthma or digitalis-induced dysrhythmias.

SODIUM BICARBONATE 8.4%

Class

Buffer, alkalinizer

Mechanism of Action

Reacts with hydrogen ions to form water and carbon dioxide thereby acting as a buffer for metabolic acidosis.

Indications

Known pre-existing bicarbonate-responsive acidosis.
Upon return of spontaneous circulation after long arrest interval.
TCA overdose.
Hyperkalemia.
Phenobarbital overdose.
Alkalinization for treatment of specific intoxications.

Contraindications

Metabolic and respiratory alkalosis.
Hypocalcemia and hypokalemia.
Hypocloremia secondary to GI loss and vomiting.

Adverse Reactions

Metabolic alkalosis, hypokalemia, hyperosmolarity, fluid overload.
Increase in tissue acidosis.
Electrolyte imbalance and tetany, seizures.
Tissue sloughing at injection site.

Drug Interactions

May precipitate in calcium solutions.
Half-lives of certain drugs may increase through alkalinization of the urine.
Vasopressors may be deactivated.

How Supplied

50 mEq in 50 ml of solvent.

Dosage and Administration

Bolus:	1 mEq / kg IV; may repeat with 0.5 mEq / kg every 10 minutes.
Infusion:	1 – 4 amps in 1 liter D5W or NS, rate determined by sending physician.

Duration of Action

Onset: 2-10 minutes.
Peak effect: 15-20 minutes.
Duration: 30-60 minutes.

Special Considerations

Pregnancy safety: Category C.
Must ventilate patient after administration.
Whenever possible, blood gas analysis should guide use of bicarbonate.
Intracellular acidosis may be worsened by production of carbon dioxide.
May increase edematous states. May worsen CHF.

STREPTOKINASE *(Non Inventory Item)*

Class

Thrombolytic agent.

Mechanism of Action

Combines with plasminogen to produce an activator complex that converts free plasminogen to the proteolytic enzyme plasmin. Plasmin degrades fibrin threads as well as fibrinogen, causing clot lysis.

Indications

Acute evolving MI.
Massive pulmonary emboli.
Arterial thrombosis and embolism.

Contraindications

Hypersensitivity.
Active bleeding, recent surgery (within 2-4 weeks), recent CVA.
Prolonged CPR.
Intracranial or intraspinal neoplasm, arteriovenous malformation or surgery.
Recent significant trauma (particularly head trauma).
Uncontrolled hypertension.

Adverse Reactions

Bleeding (GU, GI, intracranial, other sites).
Allergic reactions, hypotension, chest pain.
Reperfusion Dysrhythmias.
Abdominal pain.

Drug Interactions

Aspirin may increase risk of bleeding as well as improve outcome. Heparin and other anticoagulants may increase risk of bleeding as well as improve outcome.

How Supplied

250,000, 750,000, 1.5 Million IU vials.

Dosage and Administration

NOTE: **Reconstitute by slowly adding 5 ml sodium chloride or D5W, directing stream to side of vial instead of into powder. Gently roll and tilt vial for reconstitution. Dilute slowly to 45 ml total.**

Adult: 500,000 - 1,500,000 IU diluted to 45 ml IV over one (1) hour.
Pediatric: safety not established.

Duration of Action

Onset: 10 - 20 minutes. (fibrinolysis 10-20 minutes; clot lysis: 60 - 90 minutes).
Peak effects: Variable.
Duration: 3-4 hours (prolonged bleeding times up to 24 hours).

Special Considerations

Pregnancy safety: Category A.
Do not administer IM injections to patients receiving thrombolytics.
Obtain blood sample for coagulation studies prior to administration.
Carefully monitor vital signs.
Observe patient for bleeding.

TERBUTALINE

Class

Sympathomimetic bronchodilator.

Mechanism of Action

Selective beta-2 adrenergic receptor activity resulting in relaxation of smooth muscles of the bronchial tree and peripheral vasculature. Minimal cardiac effects.

Indications

Bronchial asthma.

Reversible bronchospasm associated with exercise, chronic bronchitis, and emphysema.

Contraindications

Hypersensitivity.

Tachydysrhythmias.

Adverse Reactions

Usually transient and dose-related, restlessness, apprehension, palpitations, tachycardia.

Chest pain, coughing, bronchospasm, nausea, facial flushing.

Drug Interactions

Cardiovascular effects exacerbated by other sympathomimetics.

MAOIs may potentiate dysrhythmias.

Beta blockers may antagonize terbutaline.

How Supplied

MDI: 200 mcg / metered spray.

Parenteral: 1 mg / ml ampule.

Dosage and Administration

Adult:	0.25 mg SC; may repeat in 15-30 minutes to maximum dose of 0.5 mg in 4 hours period. 400 mcg (two inhalations by MDI) every 4-6 hours; allow 1-2 minutes between inhalations.
Pediatric:	Not recommended for children under 12 years of age. 0.01 mg / kg / dose SC every 15-20 minutes PRN to maximum 0.25 mg dose. 0.03 -0.05 mg / kg in 1.25 ml saline for aerosolization every 4 hours.

Duration of Action

Onset: SC: 15-30 minutes; MDI: 5-30 minutes.

Peak effect: Variable.

Duration: SC: 1.5-4 hours; MDI: 3-6 hours.

Special Considerations

Pregnancy safety: Category B.

Carefully monitor vital signs.

Use with caution in patients with cardiovascular disease or hypertension.

Patient should receive oxygen before and during bronchodilator administration.

THIAMINE

Class

Vitamin (B1)

Mechanism of Action

Combines with ATP to form thiamine pyrophosphate coenzyme, a necessary component for carbohydrate metabolism. The brain is extremely sensitive to thiamine deficiency.

Indications

Coma of unknown origin.
Delirium tremens.
Beriberi.
Wernicke's encephalopathy.

Contraindications

None

Adverse Reactions

Hypotension from too rapid injection or too high a dose.
Anxiety, diaphoresis, nausea, vomiting.
Rare allergic reaction.

Drug Interactions

Give thiamine before glucose under all circumstances.

How Supplied

1,000 mg in 10 ml vial (100 mg / ml).

Dosage and Administration

Adult: 100 slow IV or IM.
Pediatric: 10-25 mg slow IV or IM.

Duration of Action

Onset: Rapid.
Peak effects: variable.
Duration: Dependent upon degree of deficiency.

Special Considerations

Pregnancy safety: Category A.
Large IV doses may cause respiratory difficulties.
Anaphylaxis reactions reported.

TISSUE PLASMINOGEN ACTIVATOR (T-PA) *(Non Inventory Item)*

Class

Thrombolytic agent.

Mechanism of Action

Binds to fibrin-bound plasminogen at the clot site, converting plasminogen to plasmin.
Plasmin digests the fibrin strands of the clot restoring perfusion.

Indications

Acute evolving myocardial infarction.
Massive pulmonary emboli.
Arterial thrombosis and embolism.

Contraindications

Recent surgery (within three weeks).
Active bleeding, recent CVA, prolonged CPR, intracranial or intraspinal surgery.
Recent significant trauma, especially head trauma.
Uncontrolled hypertension (generally BP over 200 mm Hg).

Adverse Reactions

GI, GU intracranial and other site bleeding.
Hypotension, allergic reactions, chest pain, abdominal pain, CVA.
Reperfusion dysrhythmias.

Drug Interactions

Acetylsalicylic acid may increase risk of hemorrhage.
Heparin and other anticoagulants may increase risk of hemorrhage.

How Supplied

20 mg with 20 ml diluent vial.
50 mg with 50 ml diluent vial.

Dosage and Administration

Adult: 10 mg bolus IV over 2 minutes; then 50 mg over one hour, then 20 mg over the second hour and 20 mg over the third hour for a total dose of 100 mg. (other doses may be prescribed through Medical Direction.)

Pediatric: safety not established.

Duration of Action

Onset: clot lysis most often within 60-90 minutes.
Peak effect: variable.
Duration: 30 minutes with 80% cleared within 10 minutes.

Special Considerations

Pregnancy safety: contraindicated.
Closely monitor vital signs.
Observe for bleeding.
Do not give IM injection to patient receiving T-PA.

VASOPRESSIN *(Non Inventory Item)*

Class

Endocrine-metabolic agent.

Mechanism of Action

Pressor effect due to vasoconstriction.

Indications

Cardiac arrest.

Contraindications

History of allergy or anaphylaxis.

Adverse Reactions

Anaphylaxis.

Drug Interactions

Increased risk of cardiotoxicity with amiodarone and lidocaine.

How Supplied

Injection solution 20 U/ml.

Dosage and Administration

40 U/IV to replace first dose of epinephrine.

Duration of Action

Duration: 10-20 minutes.

Special Considerations

One time dosing.

Pregnancy Category C.