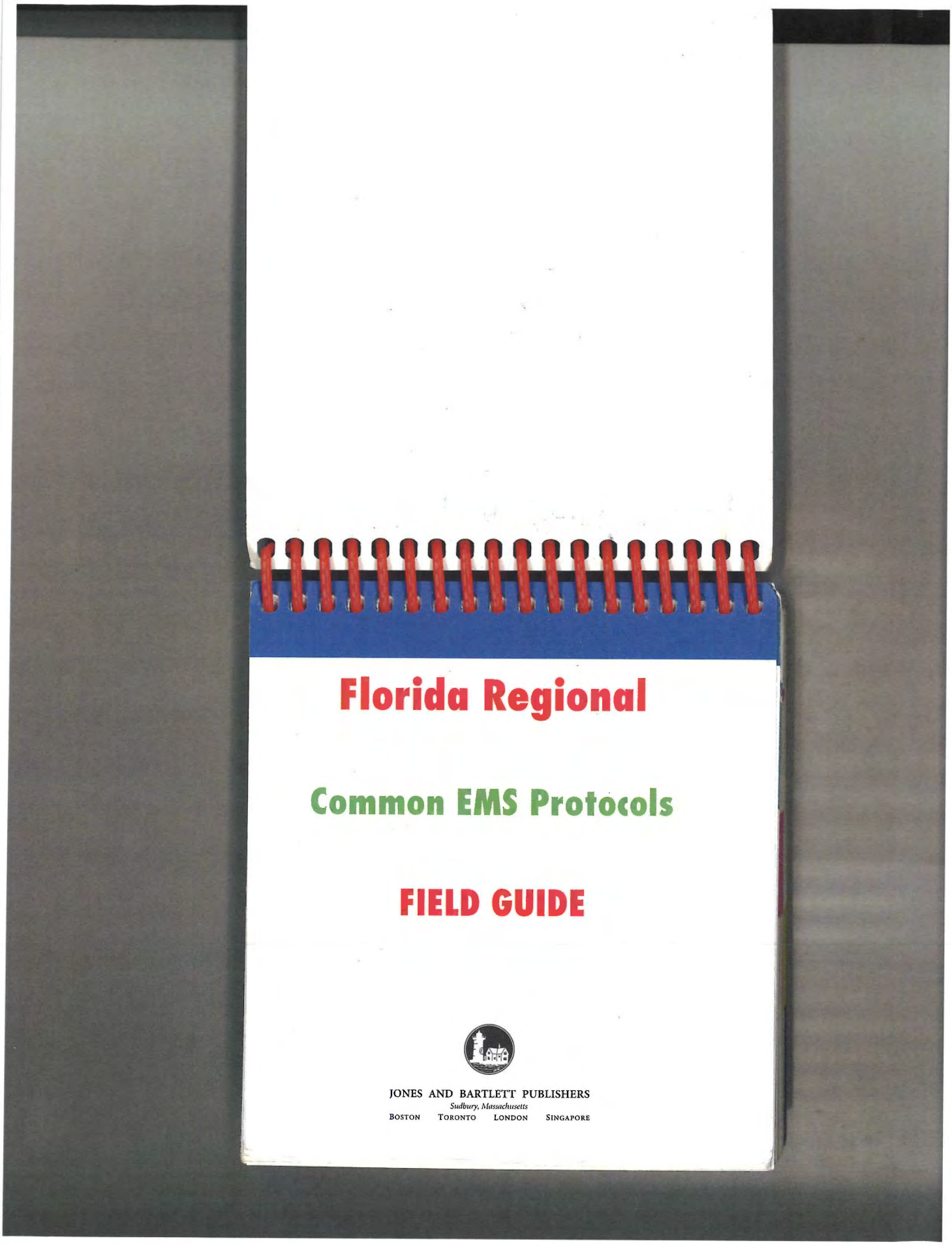
Florida Regional
Common
EMS Protocols
FIELD GUIDE
Florida Regional Common EMS Protocols Field Guide
This field guide was designed with the special needs of the EMT in mind! Durable, water-resistant, and compact, this field guide is made for your convenience.
The field guide is designed to be a one-stop source of information for on-scene patient care. It includes protocols for both medical emergencies as well as hazardous materials incidents. The medical emergencies protocols outline care for a typical case and follow the case, step-by-step. The protocols are divided into adult and pediatric sections, each with three parts:
Supportive Care Actions authorized for the EMT or paramedic that are supportive in nature.
ALS Level 1 Actions authorized only for the paramedic prior to physician contact.
ALS Level 2 Actions authorized only for the paramedic that require a physician consult.
Jones and Bartlett Publishers
40 Tall Pine Drive
Sudbury, MA 01776
978-443-5000
info@jbpub.com
www.jbpub.com
ISBN 0-7637-3039-4
90000
9 780763 730390



Florida Regional

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JONES AND BARTLETT PUBLISHERS
Sudbury, Massachusetts
BOSTON TORONTO LONDON SINGAPORE

World Headquarters
Jones and Bartlett Publishers
40 Tall Pine Drive
Sudbury, MA 01776
978-443-5000
info@jbpub.com
www.jbpub.com

Jones and Bartlett Publishers Canada
2406 Nikanna Road
Mississauga, ON L5C 2W6
Canada

Jones and Bartlett Publishers International
Barb House, Barb Mews
London W6 7PA
United Kingdom

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ISBN: 0-7637-3039-4

Wong-Baker FACES Pain Rating Scale from Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: *Wong's Essentials of Pediatric Nursing*, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

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Production Credits
Publisher, EMS & Aquatics: Lawrence D. Newell
V.P., Manufacturing and Inventory Control: Therese Bräuer
Associate Managing Editor: Jennifer Reed
Associate Production Editor: Karen C. Ferreira
Photo Researcher: Kimberly Potvin
Director of Marketing: Alisha Weisman
Composition, Text Design, and Art: Shepherd, Inc.
Printing and Binding: Transcontinental Printing

Printed in Canada
08 07 06 05 04 10 9 8 7 6 5 4 3 2 1

Section I
Adult Protocols

2.1 Adult Initial Assessment & Management

Protocols in Section 2.1 are designed to guide the EMT or paramedic in his or her initial approach to assessment and management of adult patients. Supportive Care is specified as ***EMT and Paramedic*** (BLS) and ***Paramedic Only*** (ALS).

Protocol 2.1.1 should be used on all adult patients for initial assessment. During this assessment, if the EMT or paramedic determines that there is a need for airway management, Protocol 2.1.2 should be used for the management of the adult airway. These protocols are frequently referred to by other protocols, which may or may not override them in recommending more specific therapy.

Protocol 2.1.3 presents the basic components of preparation for transport of medical patients. Due to the significant differences in priorities and packaging in the pre-hospital care of trauma and hypovolemia cases, a separate Trauma Supportive Care protocol has been developed. After following Protocol 2.1.1, this Medical Supportive Care protocol may be the only protocol used in medical emergency situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 2.1.4 presents the basic components of preparation for transport of trauma patients. Due to the significant differences in priorities and packaging in the pre-hospital care of medical cases, a separate Medical Supportive

Care protocol has been developed. After following Protocol 2.1.1, this Trauma Supportive Care protocol may be the only protocol used in trauma or hypovolemia situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 2.1.5 should be used by paramedics only for pain management.

2.1.1 Initial Assessment

EMT and Paramedic

I. **Scene Size-up.**
   - A. Review of Dispatch Information.
   - B. Assess Need for Body Substance Isolation.
   - C. Assessment of Scene Safety.
   - D. Determine Mechanism of Injury.
   - E. Determine Number and Location of Patients.
   - F. Determine Need for Additional Resources.

II. **Initial Assessment.**
   - A. General Impression of Patient.
   - B. Assess Mental Status (AVPU)—Maintain Spinal Immobilization PRN.
   - C. Assess Airway.
   - D. Assess Breathing.
   - E. Assess Circulation—Pulse, Major Bleeding, Skin Color and Temperature.
   - F. Assess Disability—Movement of Extremities/Defibrillation—VF/VT without pulse.
   - G. Expose and Examine Head, Neck, Chest, Abdomen, and Pelvis (check back when patient is rolled on side).
   - H. Identify Priority Patients.

III. **Initial Management** (see Adult Protocol 2.1.3 - Medical Supportive Care or 2.1.4 - Trauma Supportive Care).

IV. **Secondary Assessment.**
   - A. Conduct a Head-to-Toe Survey.
   - B. Neurological Assessment.
     1. Pupillary Response.
     2. Glasgow Coma Score.

C. Assess Vital Signs.
   1. Respirations.
   2. Pulse.
   3. Blood Pressure.
   4. Capillary Refill.
   5. Skin Condition.
      a. Color.
      b. Temperature.
      c. Moisture.
   6. Lung sounds.

D. **Obtain a Medical History.**
   1. **S** - Symptoms - Assessment of Chief Complaint.
      a. O—Onset and Location.
      b. P—Provocation.
      c. Q—Quality.
      d. R—Radiation.
      e. R—Referred.
      f. R—Relief.
      g. S—Severity.
      h. T—Time.
   2. **A** - Allergies.
   3. **M** - Medications.
   4. **P** - Past Medical History.
   5. **L** - Last Oral Intake.
   6. **E** - Events Leading to Illness or Injury.

V. **Other Assessment Techniques.**
   A. Cardiac Monitoring.
   B. Pulse Oximetry.
   C. Glucose Determination.
   D. Monitor Core Temperature.
   E. Capnography.

2.1.2 Airway Management

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 2.1.1.

If spontaneous breathing is present without compromise:

- Monitor breathing during transport.
- Administer oxygen via nasal cannula (2–6 L/min) PRN.

If spontaneous breathing is present with compromise:

- Maintain airway (e.g. modified jaw thrust).
- Administer oxygen via non-rebreather mask (10–15 L/min).
- If unconscious, insert oropharyngeal or nasopharyngeal airway PRN.
- Assist ventilations with BVM PRN.
- Suction PRN.
- Monitor pulse oximetry and capnography, as soon as possible.

Paramedic Only

- If patient accepts oropharyngeal airway, consider need for intubation (see below: ALS Level 1—Advanced Airway Management).

EMT and Paramedic

If spontaneous breathing is absent or markedly compromised:

- Maintain airway (e.g. modified jaw thrust).
- If unconscious, insert oropharyngeal or nasopharyngeal airway.
- Assist ventilations with BVM.
- Suction PRN.
- If unconscious and intubation is not available, insert LMA or Combitube (a).
- Monitor pulse oximetry and capnography or $ETCO_2$ monitoring device, as soon as possible.

ALS Level 1

Paramedic Only

- Perform endotracheal intubation and document the following(a).
  1. Confirm ETT placement.
     a. Negative epigastric sounds.
     b. Positive bilateral breath sounds.
  2. Secure ETT with commercial device.
     a. Full spinal immobilization is recommended.
  3. Attach end-tidal CO_2 monitoring device.
  4. Monitor SpO_2 with pulse oximeter.
- If unable to intubate and patient cannot be adequately ventilated by other means, perform cricothyroidotomy and transport rapidly to the hospital (b).

ALS Level 2

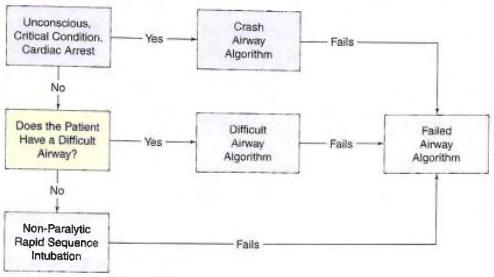
None

NOTE

(a) Other airway devices may be authorized for use by an individual medical director (e.g. COBRA Airway).

(b) Follow Universal Airway Algorithm on all intubations.

Universal Airway Algorithm



2.1.3 Medical Supportive Care

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 2.1.1.
- Airway Management Protocol 2.1.2.
- Establish hospital contact for notification of incoming patient and for the Paramedic to obtain consultation for level 2 orders.

ALS Level 1

Paramedic Only

- Monitor ECG PRN.

Paramedic and Authorized EMT

- Establish IV with Saline Lock (a)(b)(c)(d).

or

- Establish IV of Normal Saline with regular infusion set (a)(b)(c)(d), unless overridden by other specific protocol.

ALS Level 2

None

NOTE

(a) Authorized IV routes include all peripheral venous sites. External jugular veins may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. A large bore intracath should be used for unstable patients, avoid sites below the diaphragm.

(b) An IV lock or medication access point (MAP) may be used in lieu of an IV bag in some patients, when appropriate.

(c) When unable to establish an IV in the adult patient that needs to be resuscitated, an intraosseous line may be used by the **Paramedic only**.

(d) An EMT that has been authorized by their individual Medical Director may establish an IV.

2.1.4 Trauma Supportive Care

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 2.1.1. Initiate trauma alert, if applicable.
- Airway Management Protocol 2.1.2. (manually stabilize c-spine PRN).
- Correct any open wound/sucking chest wound (occlusive dressing).

Paramedic Only

- Correct any massive flail segment that causes respiratory compromise (intubate).
- Correct any tension pneumothorax.

EMT and Paramedic

- Control hemorrhage.
- Immobilize c-spine and secure patient to backboard PRN.
- Expedite transport.

NOTES

THE FOLLOWING STEPS SHOULD NOT DELAY TRANSPORT

- Complete bandaging, splinting and packaging PRN.
- Establish hospital contact for notification of incoming patient and for the Paramedic to obtain consultation for level 2 orders.

ALS Level 1

Paramedic and Authorized EMT

- Establish IV of Normal Saline with regular infusion set (a)(b)(c), unless overridden by other specific protocol.

Paramedic Only

- Monitor ECG PRN.

ALS Level 2

None

NOTE

(a) Authorized IV routes include all peripheral venous sites. External jugular veins may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. Two IVs using large bore intracaths, should be used for unstable patients, avoid sites below the diaphragm. Consider using trauma tubing or blood infusion tubing PRN.

(b) When unable to establish an IV in the adult patient that needs to be resuscitated, an intraosseous line may be used by the **Paramedic only**.

(c) An EMT that has been authorized by their individual Medical Director may establish an IV.

2.1.5 Pain Management

Paramedic Only

This entire protocol is ALS / Paramedic Only.

Isolated Extremity Fracture

The purpose of this procedure is to manage pain associated with isolated extremity fractures not associated with multi-system trauma or hemodynamic instability.

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe). This number should be documented and used to measure the effectiveness of analgesia.
- Distal circulation, sensation and movement should be noted and recorded in the injured extremity.
- The extremity should be immobilized as described in Adult Protocol 2.10.6 - Extremity Injuries. Nitrous Oxide **self-administered** analgesia should be given special consideration for pain management during this procedure, if available.
- Extremity fractures should be elevated, if possible, and cold applied.
- If pain persists and systolic BP ≥90 mmHg, choose one of the following:
  - Morphine Sulfate may be given slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg (a).

  or
  - Hydromorphone Hydrochloride (Dilaudid®) 1 mg slow IV, may repeat once PRN (maximum total dose 2 mg), if available (a).

  or
  - Nalbuphine Hydrochloride (Nubain®) 10 mg slow IV, if available (a).

  or

  - Fentanyl (Sublimaze®) 250 mcg slow IV, if available (a).

  or
  - Butorphanol (Stadol®) 2 mg slow IV, if available (a).

ALS Level 2

None

Acute Back Strain

This procedure should be used in the isolated back strain where an **acute abdominal process is not suspected.**

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe). This number should be documented and used to measure the effectiveness of analgesia.
- Nitrous Oxide **self-administered,** if available.
- Secure patient to back board PRN.
- If pain persists and systolic BP ≥90 mmHg, choose one of the following:
  - Morphine Sulfate may be given slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg (a).

  or
  - Hydromorphone Hydrochloride (Dilaudid®) 1 mg slow IV, may repeat once PRN (maximum total dose 2 mg), if available (a).

  or
  - Nalbuphine Hydrochloride (Nubain®) 10 mg slow IV, if available (a).

  or
  - Fentanyl (Sublimaze®) 250 mcg slow IV, if available (a).

  or
  - Butorphanol (Stadol®) 2 mg slow IV, if available (a).

ALS Level 2

- If pain persists and systolic BP ≥90 mmHg, Ketorolac Tromethamine (Toradol®) may be given 30 mg IV or 60 mg IM (if patient is >65 y/o limit dosage to 15 mg IV or 30 mg IM), if available (b).

Renal Colic

This procedure is used for flank pain associated with kidney stones where an acute abdominal process can be ruled out.

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe). This number should be documented and used to measure the effectiveness of analgesia.
- Nitrous Oxide **self-administered,** if available.
- If pain persists and systolic BP ≥90 mmHg, choose one of the following:
  - Morphine Sulfate may be given slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg (a).

  or
  - Hydromorphone Hydrochloride (Dilaudid®) 1 mg slow IV, may repeat once PRN (maximum total dose 2 mg), if available (a).

  or
  - Nalbuphine Hydrochloride (Nubain®) 10 mg slow IV, if available (a).

  or
  - Fentanyl (Sublimaze®) 250 mcg slow IV, if available (a).

  or
  - Butorphanol (Stadol®) 2 mg slow IV, if available (a).

ALS Level 2

- If pain persists and systolic BP ≥90 mmHg, Ketorolac Tromethamine (Toradol®) may be given 30 mg IV or 60 mg IM (if patient is >65 y/o limit dosage to 15 mg IV or 30 mg IM), if available (b).

Soft Tissue Injuries, Burns, Bites and Stings

This procedure is used for pain associated with soft tissue injuries, burns, bites and stings **not associated with multi-system trauma or hemodynamic instability.**

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe). This number should be documented and used to measure the effectiveness of analgesia.
- Nitrous Oxide **self-administered,** if available.
- If pain persists and systolic BP ≥90 mmHg, choose one of the following:
  - Morphine Sulfate may be given slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg (a).

  or
  - Hydromorphone Hydrochloride (Dilaudid®) 1 mg slow IV, may repeat once PRN (maximum total dose 2 mg), if available (a).

  or
  - Nalbuphine Hydrochloride (Nubain®) 10 mg slow IV, if available (a).

  or
  - Fentanyl (Sublimaze®) 250 mcg slow IV, if available (a).

  or
  - Butorphanol (Stadol®) 2 mg slow IV, if available (a).

ALS Level 2

- If pain persists and systolic BP ≥90 mmHg, Ketorolac Tromethamine (Toradol®) may be given 30 mg IV or 60 mg IM (if patient is >65 y/o limit dosage to 15 mg IV or 30 mg IM), if available (b).

NOTE

(a) Extreme caution should be used with administering narcotic analgesics to a patient with an SpO_2 <95.

(b) **Toradol is contraindicated in the following patients:**
  (1) Potential surgical candidate (e.g. Trauma patient)
  (2) Known allergies to nonsteroidal anti-inflammatory drugs (e.g. aspirin, ibuprophen)
  (3) History of nasal polyps
  (4) Angioedema
  (5) Bronchospastic reactivity (e.g. asthma)
  (6) Bleeding disorders (e.g. ulcers)
  (7) Kidney dysfunction
  (8) Older than 65 years of age

2.2 Adult Respiratory Emergencies

Assessment of the adult patient in respiratory distress requires specific attention to the function of the respiratory system. The EMT's and paramedic's assessment should be more concentrated in this area to include the following:

1. Assessment of chest wall movement to include rate and depth of ventilation, as well as a symmetrical rise and fall.
2. Assessment of accessory muscle use.
3. Auscultation of bilateral lung sounds.
4. Use of pulse oximetry.

The EMT and paramedic must be able to determine the adequacy of ventilation and understand its relationship to respiration. If signs of hypoxia and respiratory distress are present, immediate airway and ventilatory management should be initiated. These signs include: altered mental status, tachypnea, use of accessory muscles, nasal flaring, pursed lips, abnormal lung sounds, tachycardia, and cyanosis. In addition, the general signs of shock may also be seen. Other signs of respiratory insufficiency that should alert the paramedic to the need for immediate airway and ventilatory management, including intubation, are: respiratory rate <10 or >36 per minute, and SpO_2 <95.

In patients with chronic respiratory disease, the paramedic must be able to differentiate between what is chronic and what is acute, as it pertains to the respiratory assessment. Specific questions about the chief complaint and accompanying symptoms may prove to be invaluable in this setting. Assessment of lung sounds should be combined with patient history. For example, **a patient with a history of CHF that has wheezing on auscultation of lung sounds should *not* be automatically classified as an "asthma patient".** The paramedic must remember that patients with CHF may also present with wheezing. **If this patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF.**

Specific treatments for the different causes of respiratory distress are outlined in the following protocols. When the paramedic is unsure as to which protocol to follow, he or she should follow the protocols in Section 2.1 and contact medical control for further direction.

2.2.1 Airway Obstruction

Causes of upper airway obstruction include the tongue, foreign bodies, swelling of the upper airway due to angio-neurotic edema (see Adult Protocol 2.8.1 - Allergic Reactions/Anaphylaxis) and trauma to the airway. Differentiation of the cause of upper airway obstruction is essential to determining the proper treatment.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- If air exchange is inadequate and there is a reasonable suspicion of foreign body airway obstruction (FBAO), apply abdominal thrusts (a).

ALS Level 1

- If unable to relieve FBAO, visualize with laryngoscope and extract foreign body with Magill forceps.
- If obstruction is due to trauma and/or edema, or if uncontrollable bleeding into the airway causes life-threatening ventilatory impairment, perform endotracheal intubation.
- If unable to intubate and patient cannot be adequately ventilated by other means, perform cricothyroidotomy.

ALS Level 2

None

NOTE

(a) If air exchange is adequate with a partial airway obstruction, do not interfere and encourage patient to cough up obstruction. Continue to monitor for adequacy of air exchange. If air exchange becomes inadequate continue with protocol.

2.2.2 Asthma/Bronchospasm

This protocol is used for patients who are complaining of dypsnea and having wheezing. **A patient with a history of CHF that has wheezing on auscultation of lung sounds should *not* be automatically classified as an "asthma patient". If the CHF patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF (cardiac asthma) (see Adult Protocol 2.2.4 - Pulmonary Edema—CHF).**

Supportive Care

- Medical Supportive Care Protocol 2.1.3, including pulse oximeter and capnography.

ALS Level 1

- Choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- May give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- Consider need for intubation.
- If patient has respiratory distress, choose one of the following steroids:
  - Prednisone 60 mg PO, if available.

  or
  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 125 mg IV, if available.

or

- Dexamethasone (Decadron®) 10 mg IV, if available.

- For severe dyspnea, Epinephrine (1:1000) 0.3 mg SQ (b)(c).
- For severe dyspnea, Magnesium Sulfate 2 gm IV (mixed in 50 ml of D5W given over 5–10 minutes), PRN.

ALS Level 2

- Repeat Epinephrine (1:1000) 0.3 mg SQ (b)(c).

NOTE

(a) **Do not give Albuterol or Ipratropium Bromide if heart rate is ≥140.**
(b) **Caution should be used when the patient is older than 40 years of age or has a history of hypertension or heart disease.**
(c) If hypotensive with delay in capillary refill, consider Epinephrine (1:10,000) 0.5 mg **SLOW** IV (over 3–4 minutes) or Epinephrine (1:10,000) 1mg ET.

2.2.3 Chronic Obstructive Pulmonary Disease (COPD)

This protocol is used for patients with a history of emphysema and/or chronic bronchitis that complain of dyspnea. If, at any point, the patient's respiratory status deteriorates, consider intubation and administration of Albuterol via the ET tube as a mist, and transport immediately.

Supportive Care

- Medical Supportive Care Protocol 2.1.3, including pulse oximeter and capnography.

ALS Level 1

- Choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or

  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- May give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- Consider need for intubation.
- If patient has respiratory distress, choose one of the following steroids:
  - Prednisone 60 mg PO, if available.

  or

  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 125 mg IV, if available.

  or

  - Dexamethasone (Decadron®) 10 mg IV, if available.

ALS Level 2

None

NOTE

(a) **Do not give Albuterol or Ipratropium Bromide if heart rate is ≥140.**

2.2.4 Pulmonary Edema - CHF

This protocol is used for patients who are exhibiting signs of pulmonary - CHF including: dyspnea with rales and/or wheezing (cardiac asthma). The patient may also have diminished air exchange. Other treatment for the causes of pulmonary edema - CHF should be considered (e.g. supraventricular tachycardia, myocardial infarction and cardiogenic shock). **A patient with a history of CHF that has wheezing on auscultation of lung sounds should not be automatically classified as an "asthma patient". The paramedic must remember that patients with CHF may also present with wheezing. If the CHF patient does not have a history of asthma or allergic reaction, the more prudent assessment would be that of CHF (cardiac asthma).**

Supportive Care

- Medical Supportive Care Protocol 2.1.3, including pulse oximeter and capnography.
- Place patient in Fowler's position, if tolerated and assist ventilations PRN.
- Administer CPAP with 10 cmH_20 PEEP, if available (a).
- If patient is hypotensive (systolic BP <90 mmHg), see Adult Protocol 2.4.1 (b).

ALS Level 1

- If no improvement in patient's pulse oximeter, capnography and mental status consider intubation.
- If systolic BP ≥90 mmHg, Nitroglycerin (Nitrostat® or Nitrolingual® Spray) 0.4mg SL, repeat every 3 minutes (maximum dose 1.2 mg) (b)(c).
- If systolic BP ≥90 mmHg, Nitropaste (Nitro-Bid® Ointment) 1-2 inch on chest wall (spread Nitropaste on chest to size of patient's palm) (b).
- If systolic BP ≥90 mmHg, Furosemide (Lasix®) 1 mg/kg (or 80mg) IV (b).

- Re-evaluate need for intubation. If no improvement in patient's pulse oximeter, capnography and mental status consider intubation.
- If patient is stable, see Adult Protocol 2.4.2.
- If systolic BP ≥90 mmHg, Morphine Sulfate may be given slow IV in 2 mg increments, may repeat every 3–5 minutes, titrated to BP ≥90 mmHg, up to a maximum of 10 mg PRN (b)(d).

ALS Level 2

- Repeat Furosemide (Lasix®) 1 mg/kg (or 80mg) IV (b).
- Nitroglycerin (Tridil®) infusion @ 5–20 mcg/min., if available.

NOTE

(a) Mask must be tight fitting. Some patients may not tolerate CPAP at 10 cmH_2O PEEP initially. In this instance, 7.5 cmH_2O PEEP should be used to obtain tolerance and then increased to 10 cmH_2O PEEP for therapeutic effects.

(b) Consider clinical presentation of patient for signs of adequate perfusion.

(c) It is preferred to have an IV in place prior to NTG administration. However, if unable to establish IV, NTG may be administered with caution.

(d) If Morphine administration causes severe respiratory depression, consult with physician for possible reversal with Naloxone (Narcan®) 2mg IV (ALS Level 2 only).

2.2.5 Suspected Pneumonia

Patients complaining of dyspnea should be suspected of having pneumonia when they present with fever, productive cough, possible pleuritic chest pain, history of being bedridden, known immuno-compromise, diabetes, elderly and lung sounds indicative of consolidation (rales and/or rhonchi with egophony over area of consolidation).

Supportive Care

- Medical Supportive Care Protocol 2.1.3, including pulse oximeter and capnography; also check temperature.

ALS Level 1

- Choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- May give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- Avoid use of diuretics.

ALS Level 2

None

NOTE

(a) Do not give Albuterol or Ipratropium Bromide if heart rate is ≥140.

2.3 Adult Cardiac Dysrhythmias

Protocols in Section 2.3 follow the ACLS guidelines. The EMT and paramedic should use these protocols to guide him/her through the treatment of cardiac patients with specific dysrhythmias and accompanying signs and symptoms. After stabilization of the patient, the paramedic may need to refer to additional protocols for continued treatment (e.g. other cardiac protocols).

2.3.1 Asystole

Supportive Care

- Medical Supportive Care Protocol 2.1.3, if applicable.
- CPR (check other leads to confirm asystole).
- Hyperventilate.

ALS Level 1

- External pacemaker.
- Epinephrine (1:10,000) 1 mg IV (a), repeat every 3–5 minutes for duration of pulselessness.
- Atropine 1 mg IV (b), repeat every 3–5 minutes (maximum total dose 0.04 mg/kg or 3 mg).
- After maximum Atropine dose or known pre-existing metabolic acidosis, Sodium Bicarbonate (8.4%) 1 mEq/kg IV.
- Perform glucose test with finger stick as soon as possible. If glucose is below 60 mg/dL, administer Dextrose 50% 25 gm (50 ml) slow IV.
- If patient is taking a calcium channel blocker or has known renal failure, Calcium Chloride 10% 1000 mg (1 g) or 10 ml IV.

ALS Level 2

None

NOTE

(a) If IV is not established, administer Epinephrine via ETT at twice the IV dose (maximum 0.1 mg/kg).

(b) If IV is not established, administer Atropine via ETT at twice the IV dose.

2.3.2 Bradycardia

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- Perform 12 Lead ECG. Transmit 12 Lead ECG to destination hospital, if available. If inferior wall MI is identified, perform additional 12 lead ECG with V4R to confirm/rule out concurrent right ventricular MI (a).
- If symptomatic (b), Atropine 0.5–1 mg IV, repeat every 3–5 minutes (c) (maximum total dose 0.04 mg/kg or 3 mg) (d).
- External pacemaker.
- If patient is conscious and aware of situation during pacing, administer ***one*** of the following benzodiazepines:
  - Diazepam (Valium®) 5 mg IV, may repeat once PRN (up to max. 10 mg).

  or
  - Midazolam (Versed®) 2 mg IV, may repeat once PRN (up to max. 4 mg).

  or
  - Lorazepam (Ativan®) 2 mg IV, may repeat once PRN (up to max. 4 mg).
- If pacemaker is unavailable or ineffective, Dopamine infusion @ 5–20mcg/kg/min (1600 mcg/ml infusion concentration = 15–60 gtt/min). Titrate to maintain a minimum systolic BP of 90 mmHg with good capillary refill—maximum BP 120 mmHg (maximum dose 20 mcg/kg/min).

ALS Level 2

- If patient displays severe symptoms refractory to ALS Level 1 care, Epinephrine infusion @ 2–10 mcg/min.

NOTE

(a) Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular MI (confirmed on 12 lead ECG V4R ST elevation). When an inferior wall MI is associated with right ventricular MI, avoid use of nitrates (Nitroglycerin). If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status. **Consider pacing and IV fluids prior to the use of Atropine. Also refer to Adult Protocol 2.4.2 - Chest Pain Suspected AMI.**

(b) Symptomatic criteria include: hypotension (systolic BP <90 mmHg), ventricular escape beats, altered mental status, chest pain, dyspnea, or acute ischemia on 12 lead ECG.

(c) Consider pacing before maximum dose of Atropine.

(d) For 2nd degree AV block type II and 3rd degree AV block, omit Atropine and go to external pacer.

2.3.3 Narrow Complex Tachycardia

Patients suffering from tachycardia may or may not exhibit symptoms. It is important to note that narrow complex tachycardia has many origins. The atrial rate may be helpful in the differential interpretation of these types of tachycardia. The following rates should be considered:

Sinus tachycardia ranges from 100 to 160 per minute.
Junctional tachycardia ranges from 100 to 180 per minute.
Atrial tachycardia ranges from 150 to 250 per minute (atrial rate).
Atrial flutter ranges from 250 to 350 per minute (atrial rate).
Atrial fibrillation starts at 350 per minute (atrial rate).

In addition, wide complex tachycardia (QRS ≥ 0.12 seconds) should initially be considered as ventricular in origin, unless proven otherwise (e.g. documented QRS morphology consistent with pre-existing BBB).

All Stable Narrow Complex Tachycardias

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

Stable PSVT (Junctional or Atrial Tachycardia) and HR ≥ 150/minute

ALS Level 1

- Vagal maneuvers.
- Place patient in supine position and administer Adenosine Triphosphate (Adenocard®) 6 mg rapid IVP followed by 20 ml NS flush (a).
- Place patient in supine position and repeat Adenosine Triphosphate (Adenocard®) 12 mg rapid IVP followed by 20 ml NS flush in 2 minutes. May repeat a third time @ 12 mg in 2 minutes (a).

ALS Level 2

- Administer one of the following antiarrhythmics:
  - Diltiazem (Cardizem®) 0.25 mg/kg IV (over 2 minutes) (20 mg for average patient) for narrow complex supraventricular tachycardias (b)(c).
  - Repeat Diltiazem (Cardizem®) 0.35 mg/kg IV (over 2 minutes)(25 mg for average patient) in 15 minutes (b)(c).

  or

  - Amiodarone 150 mg in 50 ml of D5W over 10 minutes IV (b)(c), if available.
  - Repeat Amiodarone 150 mg in 50 ml of D5W over 10 minutes IV (b)(c), if available.

Stable Atrial Fibrillation or Atrial Flutter and HR ≥ 150/minute

ALS Level 1

- Administer Diltiazem (Cardizem®) 0.25 mg/kg IV (over 2 minutes) (20 mg for average patient) for narrow complex supraventricular tachycardias (b)(c).
- Repeat Diltiazem (Cardizem®) 0.35 mg/kg IV (over 2 minutes) (25 mg for average patient) in 15 minutes (b)(c).

ALS Level 2

- Administer Amiodarone 150 mg in 50 ml of D5W over 10 minutes IV (b)(c), if available.
- Repeat Amiodarone 150 mg in 50 ml of D5W over 10 minutes IV (b)(c), if available.

All Unstable Narrow Complex Tachycardias

(If antiarrhythmic therapy fails (Amiodarone or Diltiazem) or patient has diaphoresis, crushing chest pain, heart rate ≥ 150/minute and systolic BP < 90 mmHg)

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- If patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
  - Diazepam (Valium®) 5 mg IV, may repeat once PRN (up to max. 10 mg).

  or
  - Midazolam (Versed®) 2 mg IV, may repeat once PRN (up to max. 4 mg).

  or
  - Lorazepam (Ativan®) 2 mg IV, may repeat once PRN (up to max. 4 mg).
- Synchronized cardioversion @ 100, 200, 300, 360 joules (or equivalent biphasic energy level).

ALS Level 2

- Overdrive pacing.

NOTE

(a) Adenosine Triphosphate should not be given with known atrial flutter or atrial fibrillation.

(b) **DO NOT GIVE Amiodarone or Diltiazem to patients with a known history of WPW syndrome.**

(c) The decision to use **Amiodarone** or **Diltiazem** should be made with the idea that only one drug will be used. **BOTH DRUGS SHOULD NOT BE USED** on the same patient.

2.3.4 Premature Ventricular Ectopy (PVC'S)

Treatment of ventricular arrhythmias after MI has been a controversial topic for two decades. Similarly, management of ventricular arrhythmias during the acute phase of MI continues to evolve as treatment strategies are reviewed in the context of new information and changing epidemiological data during the era of adjunctive medical and reperfusion therapy. **At present, the treatment of asymptomatic premature ventricular ectopy (PVC's) is not recommended.** Current ACLS protocols recommend lidocaine for the treatment of hemodynamically stable VT and prevention of recurrent VF.

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Administer 100% oxygen via non-rebreather mask @ 10-15 LPM.

ALS Level 1

None

ALS Level 2

- **If the patient is symptomatic, contact physician for further orders.**

2.3.5 Pulseless Electrical Activity (PEA)

This protocol is used for: electromechanical dissociation (EMD), pseudo-EMD, idioventricular rhythms, bradyasystolic rhythms, post-defibrillation idioventricular rhythms.

The most frequent causes of PEA include:

Hypovolemia	Tablets (drug OD, accidents)
Hypoxia	Tamponade, cardiac
Hydrogen ion—acidosis	Tension pneumothorax
Hyper-/hypokalemia	Thrombosis, coronary (ACS)
Hypothermia	Thrombosis, pulmonary (embolism)

TREATMENT SHOULD BE GIVEN WITH RESPECT TO THE IDENTIFIABLE CAUSE AND, THEREFORE, MAY NOT REFLECT THE SEQUENCE SUGGESTED BELOW.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- CPR, hyperventilate.

ALS Level 1

- Epinephrine (1:10,000) 1 mg IV (a), repeat every 3–5 minutes for duration of pulselessness.
- Consider cause and possible treatment options (see specific protocols).
- Fluid challenge normal saline 500 ml IV.
- If bradycardic, Atropine 1 mg IV (b), repeat every 3–5 minutes (maximum total dose 0.04 mg/kg or 3 mg).
- If bradycardic, External pacemaker.
- After maximum Atropine dose or known pre-existing metabolic acidosis, Sodium Bicarbonate (8.4%) 1 mEq/kg IV.

- If patient is taking a calcium channel blocker, Calcium Chloride 10% 1000 mg (1 g) or 10 ml IV.
- Perform glucose test with finger stick as soon as possible. If glucose is below 60 mg/dL, administer Dextrose 50% 25 gm (50 ml) slow IV.

ALS Level 2

None

NOTE

(a) If IV is not established, administer Epinephrine via ETT at twice the IV dose (maximum 0.1 mg/kg).

(b) If IV is not established, administer Atropine via ETT at twice the IV dose (maximum total dose 0.04 mg/kg or 3 mg).

2.3.6 Wide Complex Tachycardia with a Pulse (Ventricular Tachycardia)

STABLE

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- Administer one of the following antiarrhythmics:
  - Lidocaine 1–1.5 mg/kg IV. Repeat every 3 minutes at half initial dose (0.5–0.75 mg/kg) to a maximum total dose of 3 mg/kg PRN (a). If Lidocaine converts rhythm, start Lidocaine maintenance infusion @ 2–4 mg/min (b).

  or

  - Amiodarone 150 mg in 50 ml of D5W over 10 minutes IV, if available. Repeat every 10 minutes PRN.

  or

  - Procainamide 30 mg/min., to a maximum dose of 17 mg/kg (c). If Procainamide converts rhythm, start Procainamide maintenance infusion @ 1–4 mg/min. (c)(d).

  or

  - If Torsades de Pointes, administer Magnesium Sulfate 2 g in 50 ml of D5W infused over 1–2 minutes IV. If Magnesium Sulfate coverts rhythm, start Magnesium Sulfate maintenance infusion (1 g in 250 ml of D5W) @ 30–60 gtts/min.

Use only one antiarrhythmic medication. If patient does not convert with maximum dose, treat as unstable (synchronize cardiovert).

ALS Level 2

None

UNSTABLE

(Heart rate >150 per minute, systolic BP <90 mmHg, chest pain, dyspnea, CHF, altered mental status.)

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- If patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
  - Diazepam (Valium®) 5 mg IV, may repeat once PRN (up to max. 10 mg).

  or
  - Midazolam (Versed®) 2 mg IV, may repeat once PRN (up to max. 4 mg).

  or
  - Lorazepam (Ativan®) 2 mg IV, may repeat once PRN (up to max. 4 mg).
- Synchronized cardioversion @ 100, 200, 300, 360 joules (e)(f).

ALS Level 2

None

NOTE

(a) If IV is not established, administer Lidocaine 3 mg/kg via ETT.

(b) Start Lidocaine maintenance infusion based on total bolus dose as follows:
1 mg/kg = 2 mg/min.
1.5–2 mg/kg = 3 mg/min.
2.5–3 mg/kg = 4 mg/min.
Reduce infusion by 50% for patients over 70 years of age, with CHF or liver disease.

(c) Ending points for Procainamide administration include:
1. Dysrhythmia is suppressed.
2. 17 mg/kg total loading dose.
3. QRS widens by 50% of original width.
4. Systolic BP drops 10 mmHg or more.

(d) Reduce Procainamide maintenance infusion by 50% for patients with kidney disease.

(e) If patient converts rhythm, give Lidocaine 1–1.5 mg/kg IV, refer to (a).

(f) Use equivalent biphasic energy setting if applicable.

2.3.7 Wide Complex Tachycardia Without a Pulse and Ventricular Fibrillation

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- When defibrillator is not immediately available, start CPR, if witnessed administer a precordial thump (a).
- Defibrillate @ 200, 300, 360 joules (or equivalent biphasic energy level) (EMT should apply AED) (a).
- CPR.

ALS Level 1

- Administer one of the following:
  - Epinephrine (1:10,000) 1 mg IV (b), repeat every 3–5 minutes for duration of pulselessness.

  or
  - Vasopressin 40 units IV or IO. After 10 minutes (following administration of Vasopressin), administer Epinephrine as above (c).
- Defibrillate @ 360 joules (or equivalent biphasic energy level), repeat defibrillation @ 360 joules (or equivalent biphasic energy level) after each medication is administered for duration of VF or VT without a pulse.
- Amiodarone 300 mg IV, if available (administer concurrently with Epinephrine for maximum effect).
- Lidocaine 1.5 mg/kg IV, repeat in 3–5 minutes to a maximum dose of 3 mg/kg (d)(e).
- Sodium Bicarbonate (8.4%) 1 mEq/kg IV.
- If hypomagnesemic state (f), consider Magnesium Sulfate 2 g in 50 ml of D5W infused over 1–2 minutes IV (g).
- Procainamide 30 mg/min. to a maximum dose of 17 mg/kg IV (h).

ALS Level 2

None

NOTE

(a) If patient converts to a supraventricular rhythm with a minimum rate of 60 per minute and without 2nd degree type II AV block or 3rd degree AV block, give Lidocaine 1–1.5 mg/kg IV (d).

(b) If IV is not established, administer Epinephrine via ETT at twice the IV dose (maximum 0.1 mg/kg).

(c) When Vasopressin is administered, Amiodarone, Lidocaine, Procainamide, or Magnesium Sulfate may be administered without delay. However, Epinephrine should not be administered for 10 minutes following the administration of Vasopressin.

(d) If IV is not established, administer Lidocaine 3 mg/kg via ETT.

(e) If Lidocaine converts rhythm, start Lidocaine maintenance infusion based on total bolus dose as follows:
1 mg/kg = 2 mg/min.
1.5–2 mg/kg = 3 mg/min.
2.5–3 mg/kg = 4 mg/min.
Reduce infusion by 50% for patients over 70 years of age, with CHF or liver disease.

(f) Hypomagnesemia should be suspected with malnutrition and alcoholism.

(g) If Magnesium converts rhythm, start Magnesium maintenance infusion (1 g in 250 ml D5W) @ 30–60 gtt/min.

(h) If Procainamide converts rhythm, start Procainamide maintenance infusion @ 1–4 mg/min. Reduce Procainamide maintenance infusion by 50% for patients with kidney disease.

2.4 Other Adult Cardiac Emergencies

The EMT and paramedic should use these protocols to guide him/her through the treatment of patients with other cardiac related emergencies that are exhibiting signs and symptoms. In addition to these protocols, the paramedic may need to refer to additional protocols for continued treatment (e.g. adult cardiac dysrhythmias protocols).

2.4.1 Cardiogenic Shock

This protocol is used for the patient that is hypotensive (Systolic BP <90 mmHg) with signs and/or symptoms that are cardiac in origin (see Adult Protocol 2.2.4 - Pulmonary Edema - CHF, Adult Protocol 2.3 - Adult Cardiac Dysrhythmias, and Adult Protocol 2.4.2 - Chest Pain - Suspected AMI).

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- If patient is not in pulmonary edema, administer fluid challenge of Normal Saline 500 ml IV.
- Dopamine infusion @ 5–20mcg/kg/min (1600 mcg/ml infusion concentration = 15–60 gtt/min). Titrate to maintain a minimum systolic BP of 90 mmHg with good capillary refill—maximum BP 120 mmHg (maximum dose 20 mcg/kg/min).
- If rate is slow (<60/min.), see Adult Protocol 2.3.2—Bradycardia.
- If rate is fast (≥150/min.), see Adult Protocol 2.3.3—Narrow Complex Tachycardia or Adult Protocol 2.3.6—Wide Complex Tachycardia as appropriate.

ALS Level 2

None

2.4.2 Suspected AMI/Acute Coronary Syndrome

This protocol is used for the patient that is experiencing **chest pain or discomfort** and/or other signs and symptoms associated with acute coronary syndrome, which include: dyspnea, diaphoresis, nausea/vomiting, weakness/fatigue, etc. If these additional signs and symptoms are present in the absence of chest pain or discomfort, AMI may still be present. This protocol should be followed when an AMI is suspected.

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Administer oxygen via nasal cannula @ 4 LPM (use non-rebreather @ 15 LPM if SpO_2 <90%).

ALS Level 1

- Treat dysrhythmias (see Adult Protocols 2.3) (a).
- Aspirin 162 up to 325 mg PO (chewable), unless contraindicated (b). If patient is allergic to ASA, administer Clopidogrel Bisulfate (Plavix®) 75 mg PO.
- If patient is experiencing chest pain or discomfort and systolic BP ≥90 mmHg, administer Nitroglycerin (Nitrostat® or Nitrolingual® Spray) 0.4 mg SL, repeat every 3–5 minutes (maximum dose 1.2 mg) (If hypotensive, see Adult Protocol 2.4.1 - Cardiogenic Shock) (c).
- If pain is reduced or relieved with Nitroglycerin SL, apply 1–2 inches of Nitropaste (Nitro-Bid® Ointment) to chest (spread Nitropaste on chest to size of patient's palm), if available.
- If pain continues and patient is not hypotensive (systolic BP <90 mmHg), administer Morphine Sulfate slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg.
- Perform 12 Lead ECG. Transmit 12 Lead ECG to destination hospital, if available. If inferior wall MI is identified, perform additional 12 lead ECG with V4R to confirm/rule out concurrent right ventricular MI (a).

- Perform fibrinolytic screening.
- **If AMI is probable (d), initiate Cardiac Alert and transport to appropriate cardiac interventional facility.**

ALS Level 2

- If patient is a candidate for fibrinolytics (e), reconstitute Retaplase (Retavase®) and administer 10 units IV **over 2 minutes,** if available. Do not delay transport.
- At 30 minutes from first bolus, reconstitute and administer second bolus of Retaplase (Retavase®) 10 units IV **over 2 minutes.**
- Nitroglycerin (Tridil®) infusion @ 5–20 mcg/min., if available.

NOTE

(a) Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular MI (confirmed on 12 lead ECG V4R ST elevation)—see Adult Protocol 2.3.2—Bradycardia. When an inferior wall MI is associated with right ventricular MI, avoid use of nitrates (Nitroglycerin). If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status.

(b) Allergies to ASA should be suspected in patients with anaphylaxis type signs and symptoms (e.g. Flushed, itchy skin, increased heart rate, dyspnea, and urticaria).

(c) Avoid Nitroglycerin with hypotension (systolic BP <90 mmHg), severe bradycardia (<50/min.), severe tachycardia (>150/min.)—treat tachycardia first, or use of Viagra® or Levitra® or Cialis®, etc. in past 24 hours.

(d) AMI is probable when there is:
  (1) A minimum of 1 mm of ST elevation in two or more related leads on the 12 lead ECG with history suggestive of AMI.
  (2) A left bundle branch block (LBBB) on the ECG with signs/symptoms and history suggestive of AMI.

(e) Patient is candidate for fibrinolytics if AMI is probable and inclusion criteria is met and exclusion criteria are absent on fibrinolytic screening.

2.4.3 Hypertensive Emergencies

This protocol should be applied to patients with a systolic BP >220 mmHg and/or a diastolic BP >120 mmHg and are experiencing symptoms (headache and/or neck pain, epistaxis). Do not delay transport. Eclampsia should be considered with female patients in their third trimester or postpartum who are hypertensive and/or seizing (see Adult Protocol 2.7.4).

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Administer oxygen via nasal cannula @ 4 LPM (use non-rebreather @ 15 LPM if SpO_2 <90%). If patient is asymptomatic, contact medical control.

ALS Level 1

- If patient has pulmonary edema, see Adult Protocol 2.2.4.
- If patient has signs of CVA (altered mental status or focal deficit), see Adult Protocol 2.5.4.
- If patient is experiencing pain or is agitated, treat underlying cause (e.g. alcohol withdrawal, musculoskeletal injury, amphetamine or cocaine use, etc.).

ALS Level 2

- Labetolol (Normodyne® or Trandate®) 20 mg IV over 2 minutes for hypertension not associated with CVA (a). May repeat in 20 minutes.
- Nitroglycerin (Tridil®) infusion @ 5–20 mcg/min., for hypertension not associated with CVA (a) (b), if available.

NOTE

(a) **In the presence of acute stroke (CVA), hypertension may be lowered in special circumstances only with a physician order (Level 2).**

(b) Nitrostat® or Nitrolingual® Spray 0.4 mg SL (may repeat x 2) may be considered when Tridil® is not available.

2.5 Adult Neurologic Emergencies

The paramedic and EMT should use these protocols to guide him/her through the treatment of atraumatic patients with signs and symptoms that are suggestive of neurological impairment or the cause of the patient's altered mental status is unknown. In addition to these protocols, the paramedic may need to refer to additional protocols for continued treatment (e.g. adult cardiac dysrhythmias protocols).

2.5.1 Altered Mental Status–Unknown Etiology

This protocol is used for patients with altered mental status where the etiology is unknown (e.g. Hx of diabetes - see Adult Protocol 2.8.2).

Supportive Care

- Medical Supportive Care 2.1.3, consider need for cervical spine immobilization.

ALS Level 1

- Consider need for intubation (a).
- Perform glucose test with finger stick.
- If blood glucose is below 60 mg/dL, administer Dextrose 50% 25 gm (50 ml) slow IV (b)(c). If unable to start IV, administer Glucagon 1 unit IM, if available.
- If Dextrose 50% is administered, also give Thiamine 100 mg IV, if available. If unable to start IV, administer Thiamine 100 mg IM.
- If blood glucose is greater than 300 mg/dL with signs of dehydration, administer Normal Saline 500 ml IV, if not contraindicated.
- Naloxone (Narcan®) 2 mg IV (d). If unable to start IV, administer Naloxone 2 mg IM, Intranasal or ET (d)(e).
- Re-evaluate need for intubation.
- **Contact Poison Information Center (1-800-222-1222).**
- Repeat glucose test with finger stick. If glucose is below 60 mg/dL, repeat Dextrose 50% 25 gm (50 ml) slow IV (b).
- Repeat Naloxone (Narcan®) 2 mg IV PRN.

ALS Level 2

None

NOTE

(a) Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness, such as hypoglycemics after D50 or opiate overdose cases after Narcan.

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

(c) If patient is conscious with control of airway, Oral Glucose may be given.

(d) IV Narcan should be administered slowly (e.g. 0.4 mg/minute) when the history is unknown or there is a possibility of chronic use of narcotics. Administration of Narcan to patients with chronic use of narcotics may induce withdrawal, seizures, and/or violent behavior. In these instances, the therapeutic goal is to restore adequate ventilatory effort. Consider restraining patient.

(e) Intranasal administration of Narcan requires the use of a mucosal atomization device.

2.5.2 Violent and/or Impaired Patient

This treatment protocol is used in conjunction with General Protocol 2.1 Behavioral Emergencies. If patient is violent and an immediate threat to the patient, EMS crew or bystander safety exists, restraint should be used to prevent patient from harming him or herself or others. If patient is not violent, be observant for possibility of violence and avoid provoking patient. **Particular caution should be exercised when any "non-lethal" law enforcement device (e.g. pepper spray, tazer, etc.) has been employed.**

Supportive Care

- Have patient placed under Baker Act via PD when appropriate and refer to Impaired/Incapacitated Persons Act (see General Protocol 2.1).
- Medical Supportive Care 2.1.3 (a).
- Rule out causes other than psychiatric (e.g.. drug overdose, CVA, ETOH, hypoxia, hypoglycemia).
- Physically restrain patient **only** when appropriate. **Avoid positional asphyxia.**

ALS Level 1

- Administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5 mg IV or Intranasal, may repeat once PRN (up to max. 10 mg)(b).

  or
  - Midazolam (Versed®) 2 mg IV or Intranasal, may repeat once PRN (up to max. 4 mg)(b).

  or
  - Lorazepam (Ativan®) 2 mg IV, IM or Intranasal may repeat once PRN (up to max. 4 mg)(a)(b).
- Diphenhydramine HCL (Benadryl®) 50 mg IM or IV (a).

ALS Level 2

- Haloperidol (Haldol®) 5 mg IM or IV. If not already given, administer Diphenhydramine HCL (Benadryl®) 50 mg IM or 25 mg IV (a)(c)(d).
- Repeat Haloperidol (Haldol®) 5 mg IM or IV (a)(c)(d).

NOTE

(a) In some instances, IV administration may present a safety concern; therefore IM administration of sedatives may be the more desirable route.

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Haloperidol administration may result in a dystonic reaction if administered alone. This can be avoided or reversed with Diphenhydramine HCL.

(d) **Haloperidol should be used with caution in cases of suspected overdose, especially cocaine, and should be preceded by benzodiazepine administration.**

2.5.3 Seizure Disorders

This protocol should be used when the patient has witnessed continuous convulsions (generalized tonic-clonic seizure or Grand Mal) or repeating episodes without regaining consciousness or sufficient respiratory decompensation. Consider underlying etiology, such as: hypoglycemia, drug overdose, head injury, or fever. Other types of seizures include: absence (Petit Mal), simple partial (focal motor and Jacksonian), complex partial (Psychomotor or Temporal Lobe), atonic (drop attacks), and myoclonic. When the patient is continuously showing signs of these other types of seizures, Medical Supportive Care should be initiated and the paramedic should contact medical control for further direction.

Supportive Care

- Medical Supportive Care 2.1.3.

ALS Level 1

- If Eclamptic female, administer Magnesium Sulfate 4 gm IV (mixed in 50 ml of D5W given over 5–10 minutes) (see Adult Protocol 2.7.4 - Eclampsia/ Preeclampsia) (d).
- Administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (a)(b).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(a).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(a).

- Perform glucose test with finger stick.
- If glucose is below 60 mg/dL, administer Dextrose 50% 25 gm (50 ml) slow IV (c). If unable to start IV, administer Glucagon 1 unit IM, if available.
- If Dextrose 50% is administered, also give Thiamine 100 mg IV, if available. If unable to start IV, administer Thiamine 100 mg IM.

ALS Level 2

None

NOTE

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(b) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 35 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

(c) To avoid infiltration and resultant tissue necrosis, Dextrose 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

(d) Females in their second or third trimester of pregnancy (≤ 20 weeks gestation) that are seizing should be assumed to have eclampsia. It should also be noted that eclampsia can occur postpartum (≤ 1 week).

2.5.4 Suspected Stroke ("Brain Attack")

This protocol is used for those patients exhibiting signs consistent with acute Stroke/CVA/"Brain Attack" (altered mental status, slurred speech, loss of function of any body part, hemiplegia, loss of vision, weakness of facial muscles, loss of sensation, drooling, etc.). Other causes should be ruled out (hypoglycemia, drug overdose, hypoxia, etc.).

Supportive Care

- Medical Supportive Care 2.1.3, Semi-Fowler's position with 30 degree elevation.
- Do not administer oxygen when SpO_2 ≥95%. If SpO_2 is 90–94% administer oxygen via nasal cannula @ 2 LPM (if unable to maintain SpO_2 ≥90%, administer high-flow O_2).
- When CVA is suspected, transport to the hospital should not be delayed.
- Determine time of onset of Stroke symptoms.

ALS Level 1

- If patient does not have an intact gag reflex, intubate. Hyperventilate only with clinical signs of brain herniation (unresponsive with unequal pupils).
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, see Adult Protocol 2.8.2 - Diabetic Emergencies.
- If drug overdose is suspected, refer to Adult Protocol 2.6 - Adult Toxicologic Emergencies.
- If CVA is suspected, complete the Stroke Alert check list. If positive, initiate **Stroke Alert** (a)(b).
- If Stroke Alert is initiated, perform fibrinolytic screening.
- **If *Stroke Alert* is initiated, transport to appropriate Stroke facility (c).**

ALS Level 2

None

NOTE

(a) Appropriate facility should be notified with consideration for emergency CT scan capabilities and fibrinolytic screening.

(b) **In the presence of acute stroke (CVA), hypertension may be lowered in special circumstances only with a physician order (ALS Level 2).**

(c) Those patients who meet stroke criteria and whose onset of symptoms is within three (3) hours should be transported to a Stroke Center.

2.5.5 Syncopal Episode

This protocol should be used for patients with a chief complaint of syncopal episode. **Consider history and possibility of dysrhythmia, medication side effects, glucose imbalance, inner ear disorders, CVA, TIA, and MI.**

Supportive Care

- Medical Supportive Care 2.1.3 (refer to other protocols as appropriate). Treat underlying cause, if it can be determined (see above).
- All patients with a known syncopal episode or witnessed by a reliable source, should be transported to the hospital via ambulance.

ALS Level 1

- Perform 12 Lead ECG. Transmit 12 Lead ECG to destination hospital, if available. If inferior wall MI is identified, perform additional 12 lead ECG with V4R to confirm/rule out concurrent right ventricular MI (a). If acute coronary syndrome is suspected, see Adult Protocol 2.4.2.

ALS Level 2

None

NOTE

(a) Bradycardia with hypotension may be due to inferior wall MI associated with right ventricular MI (confirmed on 12 lead ECG V4R ST elevation)—see Adult Protocol 2.3.2 - Bradycardia. When an inferior wall MI is associated with right ventricular MI, avoid use of nitrates (Nitroglycerin). If bradycardia and hypotension exists, pacing and IV fluids may improve the patient's hemodynamic status.

2.6 Adult Toxicologic Emergencies

This protocol is to be used for those patients suspected of exposure to toxic substances via any route of exposure (e.g. drug overdose, snake bite, etc.). The protocols will give specific considerations for each type of exposure, as well as general treatment guidelines. Additional assistance may be necessary in certain cases (e.g. hazardous materials team for toxic exposure, police for scene control, including violent and/or impaired patient - see Adult Protocol 2.5.2). **If the toxic substance is unknown or cannot be readily determined see Adult Protocol 2.6.7 - Unknown Toxicity.**

A history of the events leading to the illness or injury should be obtained from the patient and bystanders to include:

1. What drugs, poisons, or other substance(s) was the patient exposed? Consider multiple substances, especially on overdoses.
2. Route of exposure?
3. When and how much?
4. Duration of symptoms?
5. Is patient depressed, suicidal? History of previous overdose? (if applicable).
6. Accidental? Nature of accident?
7. Duration of exposure (if applicable).

Collect all pill bottles, empty or full, and check for "suicide notes" (if applicable). Transport any/all information or items that may assist in the treatment of the patient to the emergency department.

Contact the Poison Information Center (1-800-222-1222) for consultation regarding specific therapy.

2.6.1 Bites and Stings

This protocol includes the treatment for snake bites, dog and cat bites, insect stings, marine animal envenomations and stings. **Contact Poison Information Center (1-800-222-1222) for all bites and stings for treatment and transport decision and consultation.**

Snake Bites

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Consider need for Adult Protocol 2.8.1 - Allergic Reactions/Anaphylaxis.
- **Contact Poison Information Center (1-800-222-1222).**
- Splint affected area, place patient supine with extremities at a neutral level, keep patient quiet, remove and secure all jewelry.
- Wash area of bite with copious amounts of water.
- Attempt to identify snake, if safe to do so.
- Check temperature and pulse distal to bite on extremity and mark level of swelling and time with pen every 15 minutes.

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

Dog, Cat and Wild Animal Bites

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat). Clean area with soap and water.
- Advise dispatch to contact animal control and PD for identification and quarantine of animal.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

Insect Stings (including: Centipedes, Scorpions and Spiders)

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Consider need for Adult Protocol 2.8.1 - Allergic Reactions/ Anaphylaxis.
- Remove stinger by scraping skin with edge of flat surface (e.g. credit card). Do not attempt to pull stinger out, as this may release more venom.
- Clean area with soap and water.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

Marine Animal Envenomations - Stingray, Scorpionfish (Lionfish, Zebrafish, Stonefish), Catfish, Weeverfish, Starfish, and Sea Urchin

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Consider need for Adult Protocol 2.8.1 - Allergic Reactions/Anaphylaxis.
- Immerse the punctures in nonscalding hot water to tolerance (110–113 degrees F) to achieve pain relief (30–90 minutes). Transport should not be delayed, immersion in nonscalding hot water may be continued during transport.
- Remove any visible pieces of the spine(s) or sheath. Gently wash wound with soap and water, then irrigate vigorously with fresh water (avoid scrubbing).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

Marine Animal Stings - Jellyfish, Man-of-War, Sea Nettle, Irukandji, Anemone, Hydroid, Fire Coral

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Consider need for Adult Protocol 2.8.1 - Allergic Reactions/Anaphylaxis.
- Rinse the skin with sea water (Do not use fresh water, do not apply ice, do not rub the skin).
- Apply soaks of acetic acid 5% (vinegar) until pain is relieved. If vinegar is not available, use a paste of baking soda or unseasoned meat tenderizer.
- Remove large tentacle fragments using forceps (use gloves to avoid contact with bare hands).
- Apply a lather of shaving cream or a paste of baking soda and shave the affected area with edge of flat surface (e.g. credit card).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

Human Bites

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat). Clean area with soap and water.
- Advise dispatch to contact PD for possible domestic.

ALS Level 1

- Refer to Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

2.6.2 CNS Depressant Overdose

Signs and symptoms of CNS depressant overdose include: altered mental status, respiratory depression, hypotension, bradycardia, pulmonary edema, coma, and constricted pupils (opioids only). **Following is a partial list of CNS depressants.**

Benzodiazepines - generic name (trade name):

alprazolam (Xanax)
chlordiazepoxide (Librium)
clonazepam (Klonopin)
clorazepate (Tranxene)
diazepam (Valium)
flunitrazepam (Rohypnol)
flurazepam (Dalmane)
halazepam (Paxipam)
lorazepam (Ativan)
midazolam (Versed)
oxazepam (Serax)
prazepam (Centrax)
quazepam (Doral)
temazepam (Restoril)
triazolam (Halcion)

Barbiturates - generic name (trade name):

butabarbital sodium (Butisol Sodium)
mephobarbital (Mebaral)
pentobarbital sodium (Nembutal Sodium)
Phenobarbital
secobarbital sodium (Seconal Sodium)

Designer Drugs

Blue Nitro, GHB

Opioids, Narcotics, Synthetics and Combinations - generic name (trade name):

acetaminophen & codeine phosphate (Tylenol #3, Tylenol #4)
alfentanil HCl (Alfenta)
alfentanyl (Alfenta)
alphaprodine (Nisentil)
aspirin & codeine phosphate (Empirin with Codeine #3 and #4)
belladonna and opium (B & O Supprettes)
buprenorphine HCl (Buprenex)
butalbital, aspirin, caffeine, codeine phosphate (Fiorinol or Fioricet with Codeine)
butorphanol (Stadol)

Opioids, Narcotics, Synthetics and Combinations - generic name (trade name):

codeine
dextromethorphan
diamorphine (Heroin)
diacetylmorphine (Heroin)
dihydrocodeine bitartrate, acetaminophen, caffeine (DHCplus)
diphenoxylate HCl, atropine sulfate (Lomotil) - no miosis
difenoxin HCl with atropine sulfate (Motofin)
fentanyl citrate (Sublimaze)
fentanyl transdermal (Duragesic)
fentanyl citrate & droperidol (Innovar)
hydromorphone HCl (Dilaudid, Hydrostat)
hydrocodone bitartrate (Loratab, Hycodan, Anexsia)

hydrocodone bitartrate & acetaminophen (Hydrocet, Loracet, Vicodin)hydromorphone
loperamide HCl (Imodium, Imodium A-D)
levorphanol tartrate (Levo-Dromoran)
meperidine HCl (Demerol)—no miosis
meperidine HCl & promethazine HCl (Mepergan)—no miosis
methodone HCl (Dolophine)
morphine sulfate (Astramorph/PF, Duramorph, Infumorph 200, Infumorph 500, MS Contin, MSIR, Oramorph, Rescudose, Roxanol)
nalbuphine HCl (Nubain)
napsylate (Darvocet-N)
oxymorphone HCl (Numorphan)
oxycodone (Percodan, Percocet, Tylox, Roxicodone)
pentazocine HCl (Talwin, Talacen)
propoxyphene HCl (Darvon-N)
propoxyphene HCl & acetaminophen (Wygesic)
sufentanil (Sufenta)

Sedative Hypnotics - generic name (trade name):

Compoz
estazolam (Prosom)
etomidate (Amidate)
ethchlorvynol (Placidyl)
propofol (Diprivan)
Sleep-Eze
Sominex
zolpidem tartrate (Ambien)

SSRI—Selective Sereotonine Reuptake Inhibitors - generic name (trade name):

fluoxetine (Prozac)
paroxetine (Paxil)
sertraline (Zoloft)
fluvoxamine (Luvox)
citalopram (Celexa)

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level I

- Consider need for intubation (a).
- Draw blood sample prior to drug administration.
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, see Adult Protocol 2.8.2 - Diabetic Emergencies.
- If ECG QRS complex is wide (>0.10 seconds), administer Sodium Bicarbonate 1 mEq/kg IV (see Adult Protocol 2.6.6).
- If respiration is depressed, administer Naloxone (Narcan®) 2 mg IV (b).
- If no response, repeat Naloxone (Narcan®) 2 mg IV PRN.
- **Contact Poison Information Center (1-800-222-1222).**
- If patient is experiencing chest pain, see Adult Protocol 2.4.2 - Chest Pain - Suspected AMI.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (c)(d).

  or

  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(c).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(c).

- If hypotensive (systolic BP <90 mmHg), administer fluid challenge 500 ml.
- If patient is combative, consider need for physical and chemical restraints (see Adult Protocol 2.5.2).
- Treat tachydysrhythmias as per physician order.

ALS Level 2

None

NOTE

(a) Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness, such as hypoglycemics after D50 or opiate overdose after Naloxone.

(b) If patient is a suspected opioid addict, the administration of Naloxone should be titrated (e.g. 0.4 mg/minute) to increase respirations to normal levels without fully awakening patient to prevent hostile and confrontational episodes. Consider restraining patient. Naloxone may need to be repeated in 20-30 minutes to maintain effect.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject Valium, remove syringe and tape buttocks closed.

2.6.3 CNS Stimulant Overdose

Signs and symptoms include: dilated pupils, agitation, paranoia, bizarre behavior, PVCs, tachycardia, hypertension, hyperthermia, seizures, etc. **Following is a partial list of CNS stimulants.**

Cocaine

Cocaine, Crack

Amphetamines

Amphetamine variants (DMA, PMA, PMMA, STP, MDA, MDMA, TMA, DOM, DOB)

Designer Drugs

Ecstasy

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Run IV @ 250 ml/hr.

ALS Level 1

- If patient is experiencing chest pain, see Adult Protocol 2.4.2 - Chest Pain - Suspected AMI.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg Intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (a)(b).

  or

  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM or Intranasal. May repeat once PRN (4 mg maximum dose)(a).

  or

  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg Intranasal. May repeat once PRN (4 mg maximum dose)(a).

- If patient is hyperthermic (hot to touch), aggressively cool patient.
- **Contact Poison Information Center (1-800-222-1222).**
- If patient is combative, consider need for physical and chemical restraints (see Adult Protocol 2.5.2).

ALS Level 2

- Treat tachydysrhythmias as per physician order (c).

NOTE

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(b) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 35 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject Valium, remove syringe and tape buttocks closed.

(c) Beta blockers are contraindicated in cocaine overdose.

2.6.4 Digitalis Toxicity

Digitalis toxicity should be suspected in patients who are taking digitalis and have a dysrhythmia associated with digitalis toxicity (e.g. bradycardia, AV blocks with rapid ventricular response, supraventricular tachycardias, ventricular ectopy, and other ECG changes: wide PR interval >0.20, short QT interval—rate dependent, spoon-shaped ST segment, peaked T wave). The oleander tree can also cause a digitalis type toxicity, which will cause the same type of dysrhythmias and requires the same treatment.

DIGITALIS - generic name (trade name):
digoxin (Lanoxicaps, Lanoxin, Digoxin)
digitoxin (Crystodigin)

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- Treat tachydysrhythmias with medication per specific protocol (see Adult Protocol 2.3)(a).
- **Contact Poison Information Center (1-800-222-1222).**
- If unstable tachycardia >150/minute, synchronize cardiovert (b).
- If unstable bradycardia with wide QRS (>0.10 seconds), Sodium Bicarbonate 1 mEq/kg IV.

ALS Level 2

None

NOTE

(a) Avoid the use of Calcium Chloride.

(b) Energy settings for synchronized cardioversion should be 5–20 joules.

2.6.5 Hallucinogen Overdose

This protocol includes the hallucinogen drugs: LSD (acid, microdot), Mescaline and Peyote (mesc, buttons, cactus), and others (DET, EMT, psilocybin, etc.). Signs and Symptoms include: illusions and hallucinations, poor perception of time and distance, possible paranoia, anxiety, panic, unpredictable behavior, emotional instability, possible flashbacks, dilated pupils, and rambling speech.

Supportive Care

- Medical Supportive Care. "Talk down" patient.

ALS Level 1

- Consider need for intubation (a).
- Draw blood sample prior to drug administration.
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, see Adult Protocol 2.8.2 - Diabetic Emergencies.
- If respiration is depressed, Naloxone (Narcan®) 2 mg IV (b). If no response, repeat Naloxone (Narcan®) 2 mg IV PRN.
- **Contact Poison Information Center (1-800-222-1222).**
- If patient is experiencing chest pain, see Adult Protocol 2.4.2 - Chest Pain - Suspected AMI.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (c)(d).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(c).

  or

  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(c).
- If patient is combative, consider need for physical and chemical restraints.
- Treat tachydysrhythmias as per physician order.

ALS Level 2

None

NOTE

(a) Use appropriate discretion regarding immediate intubation of patients who may quickly regain consciousness, such as hypoglycemics after D50 or opiate overdose after Naloxone.

(b) If patient is a suspected opioid addict, the administration of Naloxone should be titrated (e.g. 0.4 mg/minute) to increase respirations to normal levels without fully awakening patient to prevent hostile and confrontational episodes. Consider restraining patient. Naloxone may need to be repeated in 20–30 minutes to maintain effect.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject Valium, remove syringe and tape buttocks closed.

2.6.6 Tricyclic Antidepressant Overdose

Signs and symptoms include: CNS depression, tachycardia, dilated pupils, respiratory depression, slurred speech, twitching and jerking, seizures, ST and T wave changes, wide QRS complex, R waves in lead avR, S waves in lead avL and lead I, and shock.

TRICYCLIC ANTIDEPRESSANTS - generic name (trade name):
- doxepin HCl (Adapin, Sinequan)
- amitriptyline HCl (Elavil, Endep)
- protriptyline HCl (Vivactil)
- chlordiazepoxide & amitriptyline HCl (Limbitrol)
- trimipramine maleate (Surmontil)
- perphenazine & amitriptyline HCl (Etrafon, Triavil)
- clomipramin HCl (Anafranil)
- amoxapine (Asendin)
- desipramine HCl (Norpramin)
- nortriptyline HCl (Pamelor)
- imipramine pamoate (Tofranil)

CYCLIC ANTIDEPRESSANT - generic name (trade name):
- venlafaxine (Effexor)

Supportive Care

- Medical Supportive Care Protocol 2.1.3 (a).

ALS Level 1

- Consider need for intubation.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (b)(c).

or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(b).

or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(b).
- Perform 12 lead ECG.
- If QRS is >0.10 seconds, Sodium Bicarbonate 1 mEq/kg IV.
- Treat dysrhythmias per specific protocol (see Adult Protocol 2.3).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 2

None

NOTE

(a) Romazicon, Procainamide, and Labetalol (all beta blockers) are contraindicated in Tricyclic Antidepressant overdose.

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 35 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject Valium, remove syringe and tape buttocks closed.

2.6.7 Unknown Toxicity

This protocol is to be used for those patients suspected of exposure to toxic substances via any route of exposure where the substance is unknown or cannot be readily determined.

Supportive Care

- Medical Supportive Care Protocol 2.1.3. If altered mental status, dyspnea, or SpO_2 <90: administer high-flow oxygen.

ALS Level 1

- If altered mental status, see Adult Protocol 2.5.1.
- **Contact Poison Information Center (1-800-222-1222).**
- If bronchospasm is present, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If bronchospasm is present, may give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- Treat dysrhythmias with medication per specific protocol (see Adult Protocol 2.3).
- If unstable bradycardia with wide QRS (>0.10 seconds), Sodium Bicarbonate 1 mEq/kg IV (see Adult Protocol 2.6.6).
- If patient is hypotensive and not in pulmonary edema, administer fluid challenge of Normal Saline 500 ml IV (see Adult Protocol 2.4.1).

- If ingestion is suspected without altered mental status and caustic ingestion can ruled out, if patient is willing: place patient in Fowler's position and administer Activated Charcoal.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (b)(c).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(b).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(b).

ALS Level 2

None

NOTE

(a) **Do not give Albuterol or Ipratropium Bromide if heart rate is ≥140.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 35 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject Valium, remove syringe and tape buttocks closed.

2.7 Adult OB/GYN Emergencies

The paramedic and EMT should use these protocols to guide him/her through the treatment of patients that are pregnant. These protocols cover complications of pregnancy and normal and abnormal labor delivery. In addition to these protocols, the paramedic may need to refer to additional protocols (e.g. seizures, etc.). The assessment of these patients should follow the normal approach to patient assessment as well as specific questions related to the history of the pregnancy. Questions for pregnancy history include:

1. Number of previous pregnancies (termed Gravida).
2. Number of previous live births (termed Para).
3. Expected date of delivery or due date (termed EDC "estimated date of confinement").
4. When did contractions begin?
5. Any history of labor complications?
   a. Premature births?
   b. C-section?
   c. Multiple births?
6. What is the duration and frequency of contractions?
   a. *Duration* is timed from the time the contraction starts to the time the contraction stops (e.g. 45 seconds, 1 minute, etc.).
   b. *Frequency* is timed from the beginning of one contraction to the beginning of the next contraction (e.g. 2 minutes apart, 4 minutes apart, etc.).
7. Evidence of blood show or spotting?
8. Did the water break?
   a. When?
   b. What was the color? (e.g. clear, greenish, brownish).
   c. Did it have an unusual odor?

9. Does the patient have an urge to push?
10. Does the patient feel like she has to move her bowels?

If the patient is complaining of uterine contractions, an external visual examination for crowning should be done to determine if the delivery is imminent.

2.7.1 Complications of Labor and Delivery

This protocol outlines the specific treatment for complications to labor and delivery. All care outlined is Supportive Care with each specific problem starting with Trauma Supportive Care Protocol 2.1.4.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4. Notify closest OB capable hospital early and prepare for transport to an OB capable hospital.

Prolapsed Cord

- Place mother in a knee-chest position or supine position with pillows under the buttocks.
- Do not attempt to push cord back. Wrap cord in warm sterile saline soaked dressing.
- With a gloved hand, palpate the cord for a pulse.
- If pulse is absent in umbilical cord, and positioning of mother does not restore pulse, insert a gloved hand into the vagina and lift the fetal head, or other presenting part, off of the umbilical cord while gently pushing the fetus into the uterus. With the other hand, press on the lower abdomen in an upward or cephalic direction. Push the fetus back only far enough to regain a pulse in the umbilical cord.
- Transport immediately, while maintaining fetal position to maintain umbilical pulse.

Breech Birth

- **Do not pull on the newborn.** Allow the delivery to proceed normally, supporting the newborn with the palm of your hand and arm, and allowing the head to deliver.

- If the head is not delivered within 3 minutes, place gloved hand in the vagina with your palm towards the newborn's face. Form a "V" with your index and middle finger on either side of the newborn's nose and push the vaginal wall away from the newborn's face to create an airspace for the newborn until delivery of the head. Suction may be provided PRN.
- Transport immediately, while maintaining the airspace for the newborn.

Limb Presentation

- Place mother in either the knee-chest position or supine position with pillows under the buttocks.
- Transport immediately.

Shoulder Dystocia

- Determine presence of shoulder dystocia as follows: head will deliver normally and then it will retract back into the perineum because the shoulders are trapped between the symphysis pubis and the sacrum (this is called "turtle sign").
- If this occurs, **do not pull on head.**
- Have mother drop her buttocks off the end of the bed and flex her thighs upward to facilitate delivery.
- Apply firm pressure with an open hand immediately above the symphysis pubis.
- If delivery does not occur, transport immediately.

ALS Level 1

None

ALS Level 2

None

2.7.2 Normal Labor and Delivery

This protocol should be used when the paramedic encounters an imminent delivery prior to arrival at the hospital. Imminent delivery is evidenced by crowning at the vaginal opening.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4. Notify closest OB capable hospital early and prepare for transport to an OB capable hospital.
- Place mother in a comfortable, supine position.
- Prepare OB kit (Also, have pediatric kit on standby).
- Gently and carefully assist expulsion of the newborn from the birth canal in its natural descent. **Do not pull or push the newborn.**
- Upon complete presentation of newborn's head:
  - Instruct mother to stop pushing.
  - Clear the airway by gentle suction of mouth, then nose with bulb syringe.
  - Inspect and palpate the newborn's neck for the umbilical cord. If present, carefully unwrap the cord from the neck. If unable to remove the cord, apply 2 umbilical clamps and cut between the clamps to release the cord.
  - Once airway is clear and cord is free from around neck, instruct mother to push on her next contraction to complete delivery.
- Upon complete delivery of the newborn:
  - Keep the newborn at the level of the vagina to prevent over or under transfusion of blood from the cord.
  - Never "milk" the cord. Apply 2 umbilical cord clamps (2 inches apart and at least 8 inches from the navel) then cut the cord between the clamps.
  - Avoid holding newborn by legs, allowing head to hang below body, as this may cause cerebral hemorrhage to occur.
  - Gently suction the mouth and nose with the bulb syringe.

  - If meconium is noted in the airway, see Pediatric Protocol 3.4.1 - Newborn Resuscitation.
  - Dry and wrap the newborn in a blanket to preserve body heat. Be sure to cover the newborn's head, as this is a major area of heat loss.
- Evaluate newborn:
  - If newborn is not breathing, see Pediatric Protocol 3.4.1 - Newborn Resuscitation.
  - Evaluate APGAR score at 1 and 5 minutes.
  - If APGAR is <7, see Pediatric Protocol 3.4.1 - Newborn Resuscitation.
- Following delivery of the newborn, the mother's vagina should continue to ooze blood. **Do not pull on the umbilical cord.**
- If active hemorrhage is noted from the vagina, apply firm continuous massage manually to the uterine fundus. If the mother wants to breast feed, encourage her to do so, as this will aide in the contraction of the uterus, which will help stop the bleeding and facilitate delivery of the placenta. (Do not attempt to examine the patient internally. Never pack the vagina to stop bleeding). Apply a sanitary napkin to vagina opening.
- If the placenta does deliver, preserve it in a plastic bag and transport it with the mother. It is not necessary to delay transport to wait for the placenta to deliver.
- After delivery of the placenta, clean perineal area and remove soiled drop sheets from under mother's buttocks. Visually inspect perineal area for tears. If active bleeding is present, apply direct pressure with sterile gauze. Apply sanitary napkin to vaginal opening.

ALS Level 1

None

ALS Level 2

- Nitronox for pain control of normal, uncomplicated delivery.
- Consider Oxytocin (Pitocin®) 10 units (1 ml) in 1000 ml of Normal Saline, IV infusion @ 1–2 ml/min. titrated to effect, according to uterine response.

2.7.3 Non-traumatic Vaginal Bleeding

This protocol should be used for female patients who may or may not be pregnant that present with non-traumatic vaginal bleeding. Examples of causes include: ante-partum hemorrhage (abruptio placenta, placenta previa and uterine rupture), post-partum hemorrhage, ruptured ectopic pregnancy, ruptured ovarian cyst, spontaneous abortion, etc.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Place all products of delivery (undeveloped fetus, placenta, etc.) in a plastic bag and transport with patient to the hospital.

ALS Level 1

- If hypotensive (systolic BP <90 mmHg), administer fluid challenge 500 ml.

ALS Level 2

- Consider Oxytocin (Pitocin®) 10 units (1 ml) in 1000 ml of Normal Saline, IV infusion @ 1–2 ml/min. titrated to effect, according to uterine response.

2.7.4 Toxemia of Pregnancy

This protocol should be used for the patient in her second or third trimester of pregnancy (≥20 weeks gestation) that is exhibiting signs of pre-eclampsia or eclampsia. The signs of toxemia include proteinuria (dark colored urine), excessive weight gain, and hypertension. The presence of two of these signs constitutes pre-eclampsia and all three constitutes eclampsia. The seizing patient in her third trimester of pregnancy (≥20 weeks gestation) should be assumed to be eclamptic and treated as specified below. However, consideration of another underlying etiology, such as: hypoglycemia, drug overdose, head injury, or fever should also be considered. **Eclamptic seizures can also occur postpartum** (≤1 week). Witnessed continuous convulsions (generalized tonic-clonic seizure or Grand Mal) or repeating episodes without regaining consciousness or sufficient respiratory decompensation demonstrates a need for immediate treatment.

Supportive Care

- Trauma Supportive Care 2.1.4. If patient is seizing, continue with treatment as specified below.

ALS Level 1

- If patient is seizing, administer Magnesium Sulfate 4 gm IV (mixed in 50 ml of D5W given over 5–10 minutes). May repeat once at 2 gm IV (mixed in 50 ml of D5W given over 5–10 minutes) PRN.
- If patient is still seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (a)(b).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(a).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(a).

- Perform glucose test with finger stick.
- If glucose is below 60 mg/dL, administer Dextrose 50% 25 gm (50 ml) slow IV (c).
- If glucose is given, administer Thiamine 100mg IV.
- If patient seized and transport time is >20 minutes, administer Magnesium Sulfate maintenance infusion.

ALS Level 2

None

NOTE

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(b) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Valium, remove syringe and tape buttocks closed.

(c) To avoid infiltration and resultant tissue necrosis, Dextrose 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

2.8 Other Adult Medical Emergencies

The paramedic and EMT should use these protocols to guide him/her through the treatment of patients with other medical emergencies that are exhibiting signs and symptoms. In addition to these protocols, the paramedic may need to refer to additional protocols for continued treatment.

2.8.1 Allergic Reactions / Anaphylaxis

This protocol should be used for patients exhibiting signs and symptoms consistent with allergic reaction; as follows:

Skin - flushing, itching, hives, swelling, cyanosis.
Respiratory - dyspnea, sneezing, coughing, wheezing, stridor, laryngeal edema, laryngospasm, bronchospasm.
Cardiovascular - vasodilation, increased heart rate, decreased blood pressure.
Gastrointestinal - nausea/vomiting, abdominal cramping, diarrhea.
CNS - dizziness, headache, convulsions, tearing.

Treatment is outlined according to the severity of the allergic reaction (mild, moderate, and severe or anaphylaxis).

Mild Reactions - (redness and/or itching, hives, stable vital signs with a systolic BP > 110 mmHg without dyspnea)

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.

ALS Level 1

- Diphenhydramine HCL (Benadryl®) 50 mg IM or IV.

ALS Level 2

None

Moderate Reactions - (edema, hives, dyspnea, wheezing, "lump in throat" feeling, difficulty swallowing, facial swelling and stable vital signs with a systolic BP ≥90 mmHg)

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.

ALS Level 1

- Diphenhydramine HCL (Benadryl®) 50 mg IM or IV.
- Epinephrine (1:1000) 0.3 mg SQ (a)(b).
- If patient remains in respiratory distress, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If patient remains in respiratory distress, may give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- If patient has respiratory distress, choose one of the following steroids:
  - Prednisone 60 mg PO, if available.

  or
  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 125 mg IV, if available.

  or
  - Dexamethasone (Decadron®) 10 mg IV, if available.
- May repeat Epinephrine (1:1000) 0.3 mg SQ (a)(b).

ALS Level 2

None

Severe Reactions - (edema, hives, severe dyspnea and wheezing, unstable vital signs with a systolic BP <90 mmHg, and possible cyanosis and laryngeal edema)

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.

ALS Level 1

- Diphenhydramine HCL (Benadryl®) 50 mg IV.
- Epinephrine (1:1000) 0.3 mg SQ (a)(b).
- If patient remains in respiratory distress, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If patient remains in respiratory distress, may give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- Consider need for intubation.
- If patient has respiratory distress, choose one of the following steroids:
  - Prednisone 60 mg PO, if available.

  or
  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 125 mg IV, if available.

or
- Dexamethasone (Decadron®) 10 mg IV, if available.
- May repeat Epinephrine (1:1000) 0.3 mg SQ (a)(b).

ALS Level 2

- Epinephrine (1:10,000) 0.3 mg SLOW IV in 0.1 mg increments over 2 minutes (a)(b).

Notes

(a) Caution should be used with administration of Epinephrine when the patient has a history of hypertension or heart disease.

(b) The EPI-Pen® may be used if other means of Epinephrine administration are not available.

2.8.2 Diabetic Emergencies

This protocol is to be used for those patients whose blood glucose is below 60 mg/dL or above 300 mg/dL.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- Perform glucose test with finger stick.

If glucose is below 60 mg/dL:

- If patient is conscious with an intact gag reflex, assist with self-administration of oral glucose, if possible.
- Thiamine 100 mg. IV, if available. If unable to start IV, administer Thiamine 100 mg IM, if available.
- If patient is stuporous or unconscious, administer D50 50 ml slow IV (a).
- If unable to start IV, administer Glucagon 1 unit dose IM, if available.
- Perform second glucose test with finger stick. If glucose is below 60 mg/dL, administer D50 50 ml IV (a).

If glucose is above 300 mg/dL with signs of dehydration:

- Administer Normal Saline 500 ml IV, unless contraindicated.

ALS Level 2

None

NOTE

(a) To avoid infiltration and resultant tissue necrosis, Dextrose 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

2.8.3 Non-Traumatic Abdominal Pain

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

Additional questions should be asked of the female patient regarding OB/GYN history (see Adult Protocol 2.7 - Adult OB/GYN Emergencies). **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 (female), pancreatitis.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.

ALS Level 1

- If hypotensive (systolic BP <90 mmHg), administer fluid challenge of Normal Saline 500 ml.

ALS Level 2

None

2.8.4 Non-Traumatic Chest Pain—Undifferentiated

Non-traumatic chest pain should first be assessed as a possible AMI (see Adult Protocol 2.4.2 - Chest Pain - Suspected AMI). Other causes of non-traumatic chest pain include: angina pectoris, dissecting aortic aneurysm, pericarditis, spontaneous pneumothorax, pulmonary embolism, pneumonia, pleurisy, costochondritis, hiatal hernia, esophageal spasm, peptic ulcer, cholecystitis, pancreatitis, and cervical disk problem.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.

ALS Level 1

- Consider following Adult Protocol 2.4.2 - Chest Pain - Suspected AMI.

ALS Level 2

None

2.8.5 Sickle Cell Anemia

Sickle cell anemia is a chronic hemolytic anemia occurring almost exclusively in blacks and is characterized by sickle-shaped red blood cells. Sickle cell crisis results from the occlusion of a blood vessel by masses of sickle-shaped red blood cells. Pain is the principle manifestation, and this represents the most common type of crisis. Typical pain occurs in the joints and back. Hepatic, pulmonary, or central nervous system involvement can occur, each with its own group of symptoms. Keep in mind that patients with sickle cell disorder have a high incidence of life-threatening disorders at a very young age.

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Administer 100% oxygen via non-rebreather @ 15 LPM.
- Administer fluid challenge of Normal Saline 500 ml IV.
- Provide emotional support.

ALS Level 1

- If pain persists and systolic BP ≥90 mmHg, choose one of the following:
  - Morphine Sulfate may be given slow IV in 2 mg increments every 3–5 minutes, titrated to pain and BP ≥90 mmHg, up to a maximum of 10 mg (a).

  or
  - Hydromorphone Hydrochloride (Dilaudid®) 1 mg slow IV, may repeat once PRN (maximum total dose 2 mg), if available (a).

  or
  - Nalbuphine Hydrochloride (Nubain®) 10 mg slow IV, if available (a).

  or
  - Fentanyl (Sublimaze®) 250 mcg slow IV, if available (a).

  or
  - Butorphanol (Stadol®) 2 mg slow IV, if available (a).

ALS Level 2

None

NOTE

(a) Extreme caution should be used with administering narcotic analgesics to a patient with an SpO_2 <95.

2.9 Adult Environmental Emergencies

The following protocols cover a range of problems due to the environment, including: trauma due to changes in atmospheric pressure, exposure to heat and cold extremes, water submersion, and exposure to electricity. Initial efforts should focus on removing the patient from the harmful environment.

2.9.1 Barotrauma / Decompression Illness - Dive Injuries

Barotrauma and decompression illness is caused by changes in the surrounding atmospheric pressure beyond the body's capacity to compensate for excess gas load. These injuries are most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA diving emergencies can occur at any depth with the most serious injuries manifesting symptoms after a dive. It should be understood that if a patient took a breath underwater, from any source of compressed gas (e.g. submerged vehicle, SCUBA, etc) while greater than three (3) feet in depth, the patient may be a victim of barotrauma. Barotrauma may cause several injuries to occur including: arterial gas embolism (AGE), pneumothorax, pneumomediastinum, subcutaneous emphysema, and the "squeeze". Decompression illnesses may also include decompression sickness ("Bends").

Supportive Care

- Medical Supportive Care Protocol 2.1.3. Administer 100% oxygen via non-rebreather @ 15 LPM.
- Place patient supine.
- Complete the Dive Accident Signs and Symptoms Checklist (see Appendix 7.6).
- Start Dive History Profile, if possible (the patient's dive buddy may be helpful in answering many of these questions).
- Whenever possible, have the legal authority in charge (e.g. police, Florida Marine Patrol, U.S. Coast Guard, etc.) secure all of the victim's dive gear with proper chain of custody for testing, analysis, etc.
- Manage patient according to appropriate protocol(s).
- Transport to closest Emergency Department or Trauma Center with helipad (Air transport of diving accident victim must be below 1000 feet).

- Contact Diver's Alert Network (DAN) at Duke University Medical Center collect at (919) 684-4326 for further assistance (a).
- Bring Dive Computer to the hospital, if available.

ALS Level 1
None

ALS Level 2
None

NOTE

(a) DAN may be contacted while on scene or after arrival at the hospital. If at hospital, give name of ED physician and ED phone number.

2.9.2 Cold Related Emergencies

Factors that predispose and/or cause a patient to develop hypothermia include: geriatric and pediatric patients, poor nutrition, diabetes, hypothyroidism, brain tumors or head trauma, sepsis, use of alcohol and certain drugs, and prolonged exposure to water or low atmospheric temperature. Hypothermia patients can be divided into three categories: Mild (temperature 94–97 degrees F) Moderate (temperature 86–94 degrees F), and Severe (temperature <86 degrees F). It should be noted that most oral thermometers will not register below 96 degrees F. However, some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68–108 degrees F.

Mild to Moderate hypothermia	patients will generally present with shivering, lethargy, and stiff, uncoordinated muscles.
Severe hypothermia	patients may be disoriented and confused to stupor and coma. Shivering will usually stop and physical activity will be uncoordinated. In addition, severe hypothermia will frequently produce an Osborn wave or J wave on the ECG, as well as dysrhythmias (bradycardia, ventricular fibrillation).

Supportive Care

- Trauma Supportive Care Protocol 2.1.4 (a).
- Remove all wet clothes and dry patient.
- Protect from heat loss and wind chill.

- Maintain horizontal position.
- Avoid rough movement and excess activity.
- Monitor temperature.
- Add heat to patient's head, neck, chest, and groin.
- For severe hypothermia, warm IV fluids.

For Severe Hypothermic Cardiac Arrest:

- Start CPR.
- For VF or pulseless VT, defibrillate @ 200J, 300J, 360J (b) (EMT should apply AED).

ALS Level 1

- Intubate and hyperventilate with warm humidified oxygen, if possible.
- Establish IV with warm Normal Saline.

If temperature is above 86 degrees F:

- Follow appropriate dysrhythmia treatment (see Adult Protocol 2.3).

If temperature is below 86 degrees F:

- Continue CPR and transport immediately. Do not treat dysrhythmias in severe hypothermia (warm patient prior to treatment).

ALS Level 2

None

NOTE

(a) Cases of frostbite should be bandaged with dry sterile dressings and transported without attempting rewarming in the prehospital setting.

(b) Use equivalent biphasic energy setting if applicable.

2.9.3 Heat Related Emergencies

Hyperthermia occurs when the patient is exposed to increased environmental temperature and can manifest as heat cramps, heat exhaustion, or heat stroke. Certain drugs may cause an increase in temperature (e.g. cocaine, ecstacy, etc.).

Some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68–108 degrees F.

Heat Cramps	signs and symptoms include: muscle cramps of the fingers, arms, legs, or abdomen, hot sweaty skin, weakness, dizziness, tachycardia, normal BP, and normal temperature.
Heat Exhaustion	signs and symptoms include: cold and clammy skin, profuse sweating, nausea/vomiting, diarrhea, tachycardia, weakness, dizziness, transient syncope, muscle cramps, headache, positive orthostatic vital signs, normal or slightly elevated temperature.
Heat Stroke	signs and symptoms include: hot dry skin (sweating may be present), confusion and disorientation, rapid bounding pulse followed by slow weak pulse, hypotension with low or absent diastolic reading, rapid and shallow respirations (which may later slow), seizures, coma, elevated temperature above 105 degrees F.

Heat Cramps and Heat Exhaustion

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Remove from warm environment and cool patient.

- Monitor temperature.
- For mild to moderate heat cramps and heat exhaustion, **if patient is conscious and alert,** encourage patient to drink water, followed by salt containing fluids (e.g. half-strength Gatorade® or 10K®).

ALS Level 1

- If heat cramps are severe or patient's level of consciousness is diminished, administer fluid challenge of Normal Saline 500 ml IV.

ALS Level 2

None

Heat Stroke

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Remove from warm environment and aggressively cool patient. Remove patient's clothing and wet patient directly with ice water. Also, turn A/C and fans on high and apply ice packs to head, neck, chest and groin.
- Monitor temperature. Cool patient to 102 degrees F, then dry patient, remove ice packs, and turn off fans (avoid lowering temperature too much).

ALS Level 1

- Treat hypotension (systolic BP <90mmHg) with IV fluids. Avoid using vasopressors and anticholinergic drugs (may potentiate heat stroke by inhibiting sweating). Administer fluid challenge of Normal Saline 500 ml IV.

ALS Level 2

None

2.9.4. Near Drowning

Near drowning patients are those who have been submerged in fresh or salt water and may or may not be conscious. If the patient is still in the water on arrival of EMS, a Dive Rescue Team should be utilized to remove the patient from the water whenever possible. Additional protocols may be needed for treatment decisions (e.g. Adult Protocol 2.9.1 - Barotrauma).

Supportive Care

- Trauma Supportive Care Protocol 2.1.4 (protect C-spine).
- Determine pertinent history (duration of submersion, depth, water temperature, possible seizure, drug and/or alcohol use).
- Maintain body temperature, dry and warm patient.
- **All near drowning patients MUST be transported to the hospital,** regardless of how well they may seem to have recovered. Delayed death or complications due to pulmonary edema or aspiration pneumonia may occur.

ALS Level 1

- Treat dysrhythmias per specific protocol (see Adult Protocol 2.3).

ALS Level 2

None

2.9.5 Electrical Emergencies

A wide range of injuries can be caused from a lightning strike or contact with electricity. Electrical injury can occur from direct contact, an arc, or a flash of the electricity and a direct hit or a splash from lightning. The movement of electrical current through the body can cause violent muscle contractions that can lead to fractures, and therefore, the C-spine should be protected. The thermal energy can cause external burns, but in many cases the majority of thermal damage is internal, with few external signs of injury. Dysrhythmias are also common (e.g. ventricular fibrillation). **The rescuer should be sure that the patient is no longer in contact with the electrical current before initiating treatment.**

Supportive Care

- Trauma Supportive Care Protocol 2.1.4 (protect C-spine)(a).
- Treat burns per Adult Protocol 2.10.8.
- Try to determine amps, volts and duration of contact, if possible.
- Consider need to transport to a trauma center.

ALS Level 1

- Treat dysrhythmias per specific protocol (see Adult Protocol 2.3).

ALS Level 2

None

NOTE

(a) Asystole is a common presentation with lightning strike. These patients should be aggressively resuscitated unless injuries are incompatible with life.

2.10 Adult Trauma Emergencies

These protocols cover specific types of injuries and their treatment. The initial assessment of the trauma patient should include determination of trauma alert criteria. When the situation demands (e.g. trauma alert criteria is met), scene time should be limited as much as possible (e.g. 10 minutes) and the patient should be expeditiously transported to a trauma center. Do not delay transport to establish vascular access or bandage and splint every injury. Priority should be given to airway management and rapid preparation for transport (eg. full immobilization on a backboard) and control of gross hemorrhage.

If a vascular access is obtained and hypovolemia is suspected (e.g. signs and symptoms of shock—systolic BP <90mmHg), a fluid challenge of 1–2 liters (20 ml/kg) may be administered until a systolic BP of 90mmHg is maintained. If the patient is still in shock after 2 liters of fluid, an additional liter of fluid may be administered (maximum total fluid administration of 3 liters). However, administration of large volumes of IV fluids has been found to be deleterious to the survival of patients with uncontrolled hemorrhage, internally or externally. In recent studies (NEJM, 1994), it has been shown that maximal fluid resuscitation may increase the bleeding, preventing the formation of a protective thrombus or dislodging it once the intraluminal pressure exceeds the tamponading pressure of the thrombus. Therefore, **consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).**

Avoid the use of vasopressor agents (e.g. Dopamine) in trauma patients that are hypotensive (systolic BP <90mmHg).

The pregnant female in her third trimester should be placed on her left side for transport. If the injuries require the use of a backboard, following full immobilization to the backboard, said board should be tilted to the left. Failure to follow this practice may cause hypotension due to decreased venous return.

2.10.1 Head and Spine Injuries

If history, symptoms, or signs of head or spinal injuries are present, manually immobilize the head and neck while maintaining a patent airway using a modified jaw-thrust method. Immobilization of the entire spine is indicated following initial stabilization. **Hangings without Trauma Alert Criteria are not Trauma Alert Patients (e.g. "suffocation type" patient without c-spine deformity).**

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- If not hypotensive (systolic BP ≥90 mmHg), elevate head of backboard 30 degrees (12–18 inches).

ALS Level 1

- If signs of brainstem herniation exist (e.g. pupillary dilation, asymmetric pupillary reactivity, or motor posturing), consider intubation and hyperventilate patient to achieve optimal $ETCO_2$ of 35–40 mmHg.
- If patient is seizing, see Adult Protocol 2.5.3 (avoid glucose containing solutions and medications).

ALS Level 2

None

2.10.2 Eye Injuries

This protocol covers a variety of injuries to the eye. If other injuries to the body exist, priority of care should be given as appropriate.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4 (establish IV PRN).
- Remove or ask to the patient to remove contact lenses, if still in the affected eye(s).
- For penetrating object, stabilize object and cover affected eye with an ocular shield or similar rigid device. Cover both eyes to minimize eye movement. Avoid direct pressure on eye or penetrating object.
- If eyeball has been forced out of the socket, cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid contact with the exposed globe. If bleeding, control by direct pressure with a sterile dry dressing.
- If there are signs and symptoms or suspicion of ocular exposure to chemicals or foreign body, without obvious or suspected penetrating injury or laceration of the cornea or globe, irrigate with Normal Saline IV solution.

ALS Level 1

- If patient is experiencing eye pain, administer Tetracaine 1 drop in each affected eye. Tetracaine is contraindicated in penetrating eye injuries or allergies to Lidocaine.

ALS Level 2

None

2.10.3 Chest Injuries

This protocol covers both blunt and penetrating chest trauma and should be part of initial resuscitation if breathing is compromised.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Penetrating injuries to the chest or upper back should be covered immediately with an occlusive dressing (e.g. Vaseline gauze).
- Do not attempt to remove an impaled object (stabilize with bulky dressing, etc.). If impaled object is very large or unwieldy, attempt to cut object to no less than six inches from chest.

ALS Level 1

- For tension-pneumothorax, decompress chest **on affected side.**
- For massive flail chest with severe respiratory compromise, intubate and assist ventilations. If flail chest does not cause severe respiratory compromise, stabilize externally using ipsilateral arm in sling and swathe.
- For traumatic asphyxia, establish two large bore IVs. If crushing object is still on patient, infuse a minimum of 1 liter of fluid before attempting to lift object off of patient.
- For traumatic asphyxia, Sodium Bicarbonate (8.4%) 1 mEq/kg IV.

ALS Level 2

None

2.10.4 Traumatic Chest Pain

Chest pain due to blunt trauma may be an indication of underlying injury. Blunt injuries such as pulmonary contusion and cardiac contusion may cause respiratory insufficiency and/or myocardial infarction.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.

ALS Level 1

- Treat dysrhythmias per specific protocol (see Adult Protocol 2.3).
- Consider need for other protocols (see Adult Protocol 2.4.2).

ALS Level 2

None

2.10.5 Abdomino-Pelvic Injuries

This protocol covers blunt and penetrating abdomino-pelvic trauma. Penetrating injuries may also include the chest (see Adult Protocol 2.10.3 - Chest Injuries).

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- For penetrating injuries cover with an occlusive dressing (e.g. Vaseline gauze).
- For evisceration, cover organs with saline soaked sterile dressing and then cover with an occlusive dressing (e.g. foil). Do not attempt to put organs back into abdomen.
- Do not log roll patient with suspected pelvic fracture (may use scoop stretcher).
- If pelvic fracture is suspected, apply PASG, if available.

ALS Level 1

None

ALS Level 2

None

2.10.6 Extremity Injuries

This protocol covers open and closed injuries to the extremities, including amputation.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4 (establish IV PRN).
- Any fracture or suspected fracture should be splinted appropriately with ice to area. Remove and secure all jewelry. Check pulse, sensation, and movement before and after splinting.
- Closed angulated fractures without distal pulse should be aligned using proximal and distal traction during splinting, except in fractures that involve a joint, which should be splinted in the position found.
- Traction splints should be used in cases of closed femur fractures, unless a pelvic fracture is suspected. PASG may be used for splinting lower extremities where a traction splint is not applicable, if available.
- Amputations should be dressed with bulky dressings and amputated part should be placed in plastic bag and then the bag placed on ice for transportation to the hospital.

ALS Level 1

- See Adult Protocol 2.1.5 for Pain Management.

ALS Level 2

None

2.10.7 Traumatic Arrest

The decision to attempt resuscitation of a traumatic arrest should be based on the paramedic's judgement as to the possibility of survival and/or the possibility of organ harvest. There are instances where resuscitation of a traumatic arrest is not warranted.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Rapidly prepare patient for transport and then expeditiously transport patient to the trauma center.

ALS Level 1

- If IV(s) can be established, infuse up to 3 liters of Normal Saline IV.
- Avoid use of vasopressors in cases of suspected hypovolemia.

ALS Level 2

None

2.10.8 Burn Injuries

Burns can be caused by thermal, chemical, and electrical sources. If an electrical burn is suspected, also see Adult Protocol 2.9.5 - Electrical Emergencies. Remember that burn patients are volume depleted. However, burns do not bleed; therefore, look for other sources of bleeding. Many burn injuries are associated with inhalation injury. The signs and symptoms of inhalation injury include: nasal and oropharyngeal burns, charring of the tongue or teeth, sooty (blackened), sputum, singed nasal and facial hair, abnormal breath sounds (e.g. stridor, rhonchi, wheezing, etc.), and respiratory distress. In cases of inhalation injury, attention should be given to the patency of the airway. Acute swelling can cause an airway obstruction. The Paramedic should consider the need for early intubation to avoid a complete airway obstruction that requires a cricothyroidotomy.

Supportive Care

- Trauma Supportive Care Protocol 2.1.4.
- Stop the burning process:
  - Thermal Burns: Lavage the burned area with tepid water (sterile, if possible) to cool skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc.).
  - Dry Chemical Burns: Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 15 minutes.
  - Liquid Chemical Burns: Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 15 minutes. (When *Phenol* has caused the burn, also see HAZMAT Protocol 8.1.20 - Phenol.)

- Remove clothing from around burned area, but do not remove/peel off skin or tissue.
- Remove and secure all jewelry and tight fitting clothing.
- Assess the extent of the burn using the Rule of Nines and the degree of burn severity.
- Apply dressing to burned area as follows:
  - If there is **greater than or equal to** 20% 2nd degree or 5% 3rd degree burns, cover burned areas with dry sterile dressings or Water Gel™ wraps.
  - If there is **less than** 20% 2nd degree or 5% 3rd degree burns, apply wet sterile dressings to burned areas for 15 minutes to aid in pain control. Alternatively, Burn Free™ gel pads or Water Gel™ wraps may be applied continuously to aid in pain control.
- Prevent hypothermia, keep patient warm and insure that all outer layers of dressings are dry.

ALS Level 1

- Pain Management Protocol (see Adult Protocol 2.1.5).

ALS Level 2

None

2.11 Adults with Special Healthcare Needs

These protocols cover specific types of special healthcare needs in adult patients. Adults 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 typical adults.

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

1. Priority is given to the ABCs.
2. Do not be overwhelmed by the machines.
3. Listen to the caregiver.
4. If a nurse is present, rely on their judgment.
5. Remember . . . the patient's cognitive level of function may be altered.
6. Assume that the patient can understand exactly what you say.
7. Bring all medications and equipment to the hospital.

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

1. Patient's normal vital signs.
2. Patient's actual weight.
3. Developmental level of the patient.
4. Patient's allergies—include latex.
5. Pertinent medications/therapies.

2.11.1 Home Mechanical Ventilators

Home mechanical ventilators may be indicated for chronically ill adult with abnormal respiratory drive, severe chronic lung disease, or severe neuromuscular weakness. Some patients require continuous mechanical ventilation, while others only require intermittent support during sleep or acute illness. Home ventilators may either be volume limited or pressure limited. All are equipped with alarms.

Types of ventilator alarms:

1. Low pressure or apnea—may be caused by a loose or disconnected circuit or an air leak in the circuit or at the tracheostoma, resulting in inadequate ventilation.
2. Low power—caused by a depleted battery.
3. High pressure—can be caused by a plugged or obstructed airway or circuit tubing, by coughing, or by bronchospasm.
4. Setting error—is caused by ventilator settings outside the capacity of the equipment.
5. Power switchover—occurs when the unit switches from alternating-current power to the internal battery.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- If ventilator-dependant patient is in respiratory distress and the cause is not easily ascertained and corrected, remove the ventilator and provide assisted manual ventilations with a bag-valve device. Suction PRN.
- Consider need for other protocols (e.g. Adult Protocol 2.2 - Adult Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

2.11.2 Tracheostomy

Tracheostomies are indicated for long-term ventilatory support, to bypass an upper airway obstruction, and to aid in the removal of secretions. Tracheostomies come in a variety of sizes and can be either single lumen or double lumen. Special attachments include: tracheostomy nose (filtration device), tracheostomy collar (for oxygen or humidification), and Passymuir valve (speaker valve).

Signs of tracheostomy tube obstruction:

1. Excess secretions.
2. No chest wall movement.
3. Cyanosis.
4. Accessory muscle use.
5. No chest wall rise with bag-valve ventilations.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- If obstruction is present, inject 1–3 ml of Normal Saline into the tracheostomy tube and suction PRN.
- If unable to clear obstruction by suctioning, remove tracheostomy tube and insert new tube (same size or one size smaller). **DO NOT FORCE TUBE.**
- If unable to insert new tracheostomy tube or if unavailable, insert endotracheal tube of similar size into stoma and ventilate with bag-valve-device PRN.
- If unable to insert endotracheal tube, ventilate with bag-valve-mask over stoma or over patient's mouth while covering stoma PRN.
- Consider need for other protocols (e.g. Adult Protocol 2.2 - Adult Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

2.11.3 Central Venous Lines

Central venous lines are indicated for administration of medications, delivery of chemotherapy, nutritional support, infusion of blood products, and blood draws. Types of central venous lines include: Broviac/Hickman, Port-a-cath/Med-a-port, and percutaneous intravenous catheters (PIC). Central venous line emergencies include: catheter coming completely out, bleeding at the site, catheter broken in half, blood embolus, thrombus, air embolus, and internal bleeding. **Use of SQ ports require special training and should not be used for IV access.**

Signs of blood embolus, thrombus, air embolus, and internal bleeding:

1. Chest pain.
2. Cyanosis.
3. Dyspnea.
4. Shock.

Supportive Care

- Medical Supportive Care Protocol 2.1.3. (CVP and PIC lines may be used for emergency IV access under sterile conditions.)
- If catheter is completely out, apply direct pressure to site.
- If there is bleeding at the site, apply direct pressure.
- If catheter is broken in half, clamp end of remaining tube.
- If suspected blood embolus, thrombus, or internal bleeding: clamp line.
- If suspected air embolism, clamp line and place patient on left side.
- Consider need for other protocols (e.g. Adult Protocol 2.2 - Adult Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

2.11.4 Feeding Tubes

Feeding tubes are indicated for administration of nutritional supplements and in patients that have an inability to swallow. Types of feeding tubes include: nasogastric tube (temporary) and gastrostomy tubes (G tube). Types of G tubes include those that are surgically placed, percutaneous endoscopic gastrostomy tubes, PEG tubes, and jejunal tubes (J-tube). Complications include: leaks, bleeding around the site, and displacement of the tube.

Supportive Care

- Medical Supportive Care Protocol 2.1.3.
- If catheter is completely out, cover site with Vaseline gauze and apply direct pressure to site.
- If there is bleeding at the site, apply direct pressure.

ALS Level 1

None

ALS Level 2

None

Section 2

Pediatric Protocols

3.1 Pediatric Initial Assessment & Management

Protocols in Section 3.1 are designed to guide the EMT or paramedic in his or her initial approach to assessment and management of pediatric patients. The Level 1 care is specified as ***EMT and Paramedic*** (BLS) and ***Paramedic Only*** (ALS).

Protocol 3.1.1 should be used on all pediatric patients for initial assessment. During this assessment, if the paramedic determines that there is a need for airway management, Protocol 3.1.2 should be used for the management of the pediatric airway. These protocols are frequently referred to by other protocols, which may or may not override them in recommending more specific therapy.

Protocol 3.1.3 presents the basic components of preparation for transport of medical patients. Due to the significant differences in priorities and packaging in the pre-hospital care of trauma cases, a separate Trauma Supportive Care protocol has been developed. After following Protocol 3.1.1, this Medical Supportive Care protocol may be the only protocol used in medical emergency situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Protocol 3.1.4 presents the basic components of preparation for transport of trauma patients. Due to the significant differences in priorities and packaging in the pre-hospital care of medical cases, a separate Medical Supportive Care protocol has been developed. After following Protocol 3.1.1, this Trauma Supportive Care protocol may be the only protocol used in trauma or hypovolemia situations where a specific diagnostic impression and choice of additional protocol(s) cannot be made. Judgment must be used in determining whether patients require ALS or BLS level care. This protocol is frequently referred to by other protocols, which may or may not override it in recommending more specific therapy.

Paramedics only should use protocol 3.1.5 for pain management.

3.1.1 Initial Assessment

The initial assessment of the pediatric patient will vary with the age of the patient. However, there are some initial components of assessment that are consistent with all patients, regardless of age. The paramedic or EMT should follow the appropriate approach to patient assessment with respect to the patient's age. In addition to the patient, the parents or caregiver may be needed to gain information needed for a complete assessment of the patient.

EMT and Paramedic

I. **Scene Size-up.**
   A. Review of Dispatch Information.
   B. Assess Need for Body Substance Isolation.
   C. Assessment of Scene Safety.
   D. Determine Mechanism of Injury.
   E. Determine Number and Location of Patients.
   F. Determine Need for Additional Resources.
   G. Observe Environment of Pediatric Patient.
   H. Obtain Information From Caregivers.

II. **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 (as above).
      2. Use of accessory muscles.
         a. Intercostal and/or supraclavicular retractions.
         b. Diaphragmatic breathing (see-saw type breathing).
      3. Respiratory rate.
      4. Tidal volume (chest expansion).
      5. Other signs of respiratory distress.
         a. Nasal flaring.
         b. Grunting.
         c. Cyanosis.
   C. Circulation to Skin.
      1. Strength of pulses (central vs peripheral).
      2. Color and temperature of extremities (central vs peripheral).
      3. Capillary refill time.
      4. Pulse rate.
      5. Blood pressure (may be difficult to assess in infants).

Pediatric Protocols

III. **Initial Assessment.**
   A. Assess Airway, C-Spine and Initial Level of Consciousness (AVPU: Alert, responds to Verbal, responds to Pain, Unresponsive).
   B. Assess Breathing.
   C. Assess Circulation and Presence of Hemorrhage.
   D. Assess Disability - Movement of Extremities.
   E. Expose and Examine Head, Neck, Chest, Abdomen, and Pelvis (check back when patient is rolled on side).
   F. Identify Priority Patients.

IV. **Initial Management** (see Pediatric Protocol 3.1.3 - Medical Supportive Care or 3.1.4 -Trauma Supportive Care).

V. **Secondary Assessment.**
   A. Conduct a Toe-to-Head Survey.
   B. Neurological Assessment.
      1. Pupillary Response.
      2. Pediatric Glasgow Coma Score.
   C. Repeat Assessment Triangle - Rapid Cardiopulmonary Assessment (as above).
   D. Obtain a Medical History.
      1. **S** - Symptoms - Assessment of Chief Complaint.
      2. **A** - Allergies.
      3. **M** - Medications.
      4. **P** - Past Medical History.
      5. **L** - Last Oral Intake.
      6. **E** - Events Leading to Illness or Injury.

VI. **Other Assessment Techniques.**
   A. Cardiac Monitoring.
   B. Pulse Oximetry.
   C. Glucose Determination.
   D. Monitor Core Temperature.
   E. Capnography.

3.1.2 Airway Management

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 3.1.1.

If spontaneous breathing is present without compromise:

- Monitor breathing during transport.
- Administer oxygen PRN(a).
  - Infants via infant mask @ 2–4 L/min.
  - Small child (1–8 years) via pediatric mask @ 6–8 L/min.
  - Older child (9–15 years) via non-rebreather mask @ 10–15 L/min.
  - If mask is not tolerated, administer via blow-by method.

If spontaneous breathing is present with compromise:

- Maintain airway (e.g. modified jaw thrust).
- Suction PRN.
- Administer oxygen.
  - Infants via infant mask @ 2–4 L/min.
  - Small child (1–8 years) via pediatric mask @ 6–8 L/min.
  - Older child (9–15 years) via non-rebreather mask @ 10–15 L/min.
  - If mask is not tolerated, administer via blow-by method.
- If unable to maintain airway, insert oropharyngeal or nasopharyngeal airway PRN.
- Assist ventilations with BVM PRN.
- Monitor pulse oximetry and capnography, as soon as possible.

If spontaneous breathing is absent or markedly compromised:

- Maintain airway (e.g. modified jaw thrust).
- Suction PRN.
- If unable to maintain airway, insert oropharyngeal or nasopharyngeal airway.
- Ventilate with BVM @ 20/minute for the child and 30/minute for the infant.

- Monitor pulse oximetry and capnography or $ETCO_2$ monitoring device, as soon as possible.

ALS Level 1

Paramedic Only

- Perform endotracheal intubation PRN and document the following (b)(c).
  1. Confirm ETT placement (EDD if ≥8 years of age, if available).
     a. Negative epigastric sounds.
     b. Positive bilateral breath sounds.
  2. Secure ETT with tape and bite block or commercial device.
     a. Full spinal immobilization is recommended.
  3. Attach end-tidal CO_2 monitoring device.
  4. Monitor SpO_2 with pulse oximeter.
- Insert Nasogastric tube and decompress stomach PRN (d).
- *If unable to intubate and patient cannot be adequately ventilated by other means* (see above), perform needle cricothyroidotomy if <12 years of age and transport rapidly to the hospital.

ALS Level 2

None

NOTE

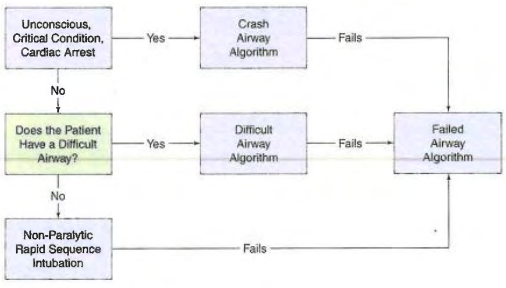
(a) Oxygen should only be administered to the patient that shows signs of respiratory compromise and/or is unable to maintain a SpO_2 ≥95.

(b) **The BVM should initially be used for ventilatory support.** Endotracheal intubation should only be used when the BVM is ineffective or prolonged ventilatory support is necessary.

(c) Follow Universal Airway Algorithm on all intubations.

(d) When gross gastric distension is noted, an NG tube should be inserted to relieve gastric distension that may be compromising ventilatory effort.

Universal Airway Algorithm



3.1.3 Medical Supportive Care

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 3.1.1.
- Airway Management Protocol 3.1.2.
- Keep patient warm.
- Establish hospital contact for notification of incoming patient and for the Paramedic to obtain consultation for ALS Level 2 orders.

ALS Level 1

Paramedic and Authorized EMT

- Establish IV of Normal Saline with regular infusion set PRN (a)(b)(c)(d)(e), unless overridden by other specific protocol.

Paramedic Only

- Monitor ECG PRN.

ALS Level 2

None

NOTE

(a) Authorized IV routes include all peripheral venous sites. External jugular veins may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. A large bore intracath should be used for unstable patients; avoid sites below the diaphragm.

(b) A Buretrol, Volutrol, or Soluset should be used in lieu of a regular infusion set when starting an IV on patients that are eight years old or less.

(c) An IV lock or medication access point (MAP) may be used in lieu of an IV bag in some patients with intravenous lines, when appropriate.

(d) An EMT that has been authorized by their Medical Director may establish an IV.

(e) When unable to establish an IV in the pediatric patient that needs to be resuscitated, an intraosseous line may be used by the **Paramedic Only.**

3.1.4 Trauma Supportive Care

Supportive Care

EMT and Paramedic

- Initial Assessment Protocol 3.1.1. Initiate trauma alert, if applicable.
- Airway Management Protocol 3.1.2. (manually stabilize c-spine PRN).
- Correct any open wound/sucking chest wound (occlusive dressing).

Paramedic Only

- Correct any massive flail segment that causes respiratory compromise (intubate).
- Correct any tension pneumothorax.

EMT and Paramedic

- Control hemorrhage.
- Immobilize c-spine and secure patient to backboard or Pediatric Immobilizer PRN (a).
- Keep patient warm.
- Expedite transport.

THE FOLLOWING STEPS SHOULD NOT DELAY TRANSPORT.

- Complete bandaging, splinting and packaging PRN.
- Contact on-line medical control for notification of incoming patient and for the Paramedic to obtain consultation for ALS Level 2 orders.

ALS Level 1

Paramedic and Authorized EMT

- Establish IV of Normal Saline with regular infusion set PRN (b)(c)(d), unless overridden by other specific protocol.

Paramedic Only

- Monitor ECG PRN.

ALS Level 2

None

NOTE

(a) Infants and small children in car seats may be immobilized without removing them from the car seat, as long as it will not interfere with patient assessment and other needed procedures and car seat is intact. If patient is not in car seat on arrival, do not put patient back into car seat to immobilize; use backboard or pediatric immobilizer.

(b) Authorized IV routes include all peripheral venous sites. External jugular vein may be utilized when other peripheral site attempts have been unsuccessful or would be inappropriate. Two IVs using large bore intracaths, should be used for unstable patients, avoid sites below the diaphragm. **Rapid transport should not be delayed to establish an IV.**

(c) A Buretrol, Volutrol, or Soluset should be used in lieu of a regular infusion set when starting an IV on patients that are less than eight years old.

(d) When unable to establish an IV in the pediatric patient that needs to be resuscitated, an intraosseous line may be used by the **Paramedic Only**.

3.1.5 Pain Management

Paramedic Only

This entire protocol is ALS/Paramedic Only.

ISOLATED EXTREMITY FRACTURE

The purpose of this procedure is to manage pain associated with isolated extremity fractures not associated with multisystem trauma or hemodynamic instability.

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe) or Wong-Baker Faces Scale or Infant Behavior Score (a)(b). This should be documented and used to measure the effectiveness of analgesia.
- Distal circulation, sensation and movement should be noted and recorded in the injured extremity.
- The extremity should be immobilized as described in Adult Protocol 3.9.5. - Extremity Injuries. Nitrous Oxide **self-administered** analgesia should be given special consideration for pain management during this procedure, if available.
- Extremity fractures should be elevated, if possible, and cold applied.

ALS Level 2

- If pain persists and systolic BP is adequate, choose one of the following:
  - Morphine Sulfate may be given intravenously in increments every 3–5 minutes, titrated to pain to a maximum of 10 mg. Administer at a rate not to exceed 1 mg/min. *Pediatric dose:* 0.1 mg/kg IV. *Infant dose:* 0.05 mg/kg IV (c).

or

- Nalbuphine Hydrochloride (Nubain®) 0.1 mg/kg (maximum 10 mg) slow IV, if available.

Acute Back Strain

This procedure should be used in the isolated back strain **where an acute abdominal process is not suspected.**

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0 = least severe to 10 = most severe) or Wong-Baker Faces Scale or Infant Behavior Score (a)(b). This should be documented and used to measure the effectiveness of analgesia.
- Nitrous Oxide **self-administered**, if available.
- Secure patient to back board PRN.

ALS Level 2

- If pain persists and systolic BP is adequate, choose one of the following:
  - Morphine Sulfate may be given intravenously in increments every 3–5 minutes, titrated to pain to a maximum of 10 mg. Administer at a rate not to exceed 1 mg/min. *Pediatric dose:* 0.1 mg/kg IV. *Infant dose:* 0.05 mg/kg IV (c).

  or

  - Nalbuphine Hydrochloride (Nubain®) 0.1 mg/kg (maximum 10 mg) slow IV, if available.
- For *patients >2 years of age:* if pain persists and systolic BP is adequate (see Appendix 7.10 - Pediatric Vital Signs), Ketorolac Tromethamine (Toradol®) may be given 0.5 mg/kg (maximum 15 mg) IV or 1 mg/kg (maximum 30 mg) IM, if available (d).

Soft Tissue Injuries, Burns, Bites and Stings

This procedure is used for pain associated with soft tissue injuries, burns, bites and stings not associated with multisystem trauma or hemodynamic instability.

ALS Level 1

- Patients should be asked to quantify their pain on an analog pain scale (0=least severe to 10=most severe) or Wong-Baker Faces Scale or Infant Behavior Score (a)(b). This should be documented and used to measure the effectiveness of analgesia.
- Nitrous Oxide **self-administered**, if available.

ALS Level 2

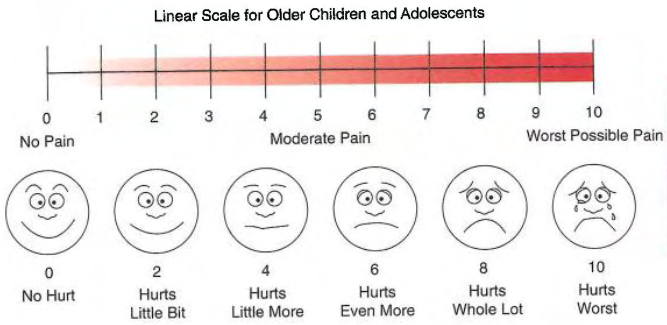
- If pain persists and systolic BP is adequate, choose one of the following:
  - Morphine Sulfate may be given intravenously in increments every 3–5 minutes, titrated to pain to a maximum of 10 mg. Administer at a rate not to exceed 1 mg/min. Pediatric dose: 0.1 mg/kg IV. Infant dose: 0.05 mg/kg IV (c).

  or

  - Nalbuphine Hydrochloride (Nubain®) 0.1 mg/kg (maximum 10 mg) slow IV, if available.
- For patients >2 years of age: if pain persists and systolic BP is adequate (see Appendix 7.10 - Pediatric Vital Signs), Ketorolac Tromethamine (Toradol®) may be given 0.5 mg/kg (maximum 15 mg) IV or 1 mg/kg (maximum 30 mg) IM, if available (d).

NOTE

(a) Wong-Baker FACES Scale.



(b) Infant Behavior Score.

From Wong D.L., Hockenberry-Eaton M., Wilson D., Winkelstein M.L., Schwartz P.: *Wong's Essentials of Pediatric Nursing*, ed. 6, St. Louis, 2001, p. 1301. Copyrighted by Mosby, Inc. Reprinted by permission.

Assessment of Behavior Score **(see next page)**

0	"Relaxed"—infant comfortable, not distressed.
1–2	Some transitory distress caused; returns immediately to "relaxed."
3–4	Transitory distress, likely to respond to consolation.
5	Infant experiences pain; if no response to consolation, **may require analgesia.**
6	"Anguished" and "exaggerated"—infant experiencing acute pain; is unlikely to respond to consolation, **will probably benefit from analgesia.**
6–8	"Inert"—(no response to traumatic procedure) infant is habituated to pain; will not respond to consolation; **systematic pain control by analgesia should be considered.**

Infant Behavior Score

Facial Expression

0	"relaxed"	Smooth muscled; relaxed expression; either in deep sleep or quietly alert
1	"anxious"	Anxious expression; frown; REM behind closed lids; wandering gaze; eyes narrowed; lips parted; pursed lips as if "oo" is pronounced
2	"anguished"	Anguished expression/crumpled face; brow bulge; eye-squeeze; nasolabial furrow pronounced; square-stretched mouth; cupped tongue; "silent cry"
3	"inert"	(Only during or immediately after traumatic procedure) no response to trauma; no crying; rigidity; gaze avoidance; fixed/staring gaze; apathy; diminished alertness

Body Movement

0	"relaxed"	Relaxed trunk and limbs; body in tucked position; hands in cupped position or willing to grasp a finger
1	"restless"	Moro reflex; startles; jerky or uncoordinated movement of limbs; flexion/extension of limbs; attempt to withdraw limb from site of injury
2	"exaggerated"	Abnormal position of limbs; limb/neck extension; splaying of fingers and/or toes; flailing or thrashing of limbs; arching of back; side swiping/guarding site of injury
3	"inert"	(Only during or immediately after traumatic procedure) no response to trauma; inertia; limpness/rigidity; immobility

Color

0	Normal skin color (depending on skin type)
1	Redness; congestion
2	Pallor; mottling; grey

(c) Extreme caution should be used with administering Morphine to a patient with an $SpO_2 < 95$.

(d) **Toradol is contraindicated in the following patients:**

(1) Potential surgical candidate (e.g. Trauma patient)
(2) Known allergies to nonsteroidal anti-inflammatory drugs (e.g. aspirin, ibuprophen)
(3) History of nasal polyps
(4) Angioedema
(5) Bronchospastic reactivity (e.g. asthma)
(6) Bleeding disorders (e.g. ulcers)
(7) Kidney dysfunction

3.2 Pediatric Respiratory Emergencies

Most children requiring urgent intervention have primary respiratory problems. 80–90% of all pediatric cardiac arrests originate in the respiratory system. When the child in respiratory distress can no longer compensate, respiratory failure will be followed by cardiac failure. It is crucial to recognize respiratory distress and dysfunction early, so that cardiopulmonary failure may be prevented. Note that the respiratory system is also used to compensate for the hypoxia and acidosis found in primary circulatory failure. Assessment of the pediatric respiratory system should focus on clinical status, as reflected by general appearance (adequacy of cerebral oxygenation and ventilation) and work of breathing.

Components of Appearance

1. **Alertness**	How responsive and interactive is the child with a stranger or other changes in the environment? Is the patient restless, agitated or lethargic?
2. **Distractibility**	How readily does a person, object, or sound draw the child's interest or attention? Will the patient play with a toy or new object?
3. **Consolability**	Can the patient be comforted by the caregiver or by the paramedic?
4. **Eye Contact**	Does the child maintain eye contact with objects or people? Will the patient fix his/her gaze on a face?
5. **Speech/Cry**	Is the speech/cry strong and spontaneous? Weak and muffled? Hoarse?

6. **Spontaneous Motor Activity**	Is the patient moving and resisting vigorously and spontaneously? Is there good muscle tone and responsiveness?
7. **Color**	Is the patient pink? Or is the patient pale, ashen, blue or mottled? Does the skin coloring of the trunk differ from that of the extremities?

Signs of Work of Breathing

1. **Use of Accessory Muscles**	Pediatric patients will use accessory muscles early to compensate for deficiencies in perfusion. Intercostal and supraclavicular retractions, as well as diaphragmatic breathing (see-saw) may be very apparent.
2. **Respiratory Rate**	Significant finding if >60/min. or <10–20/min.
3. **Tidal Volume**	Inspection of chest wall movement may not be adequate for assessment of tidal volume. It is imperative to auscultate bilateral lung sounds to determine adequacy of tidal volume.
4. **Nasal Flaring**	Flaring of the external nares indicates respiratory distress.
5. **Grunting**	Grunting is an ominous sign associated with severe distress. It is caused by a premature closure of the glottis on exhalation in an effort to compensate for atelectasis. The patient is attempting to maintain a positive end expiratory pressure (PEEP) to allow for better lung inflation.
6. **Cyanosis**	Cyanosis is usually a late finding and will initially be visible around the mouth and gums (perioral) and nail beds.

7. **Pulse Oximeter**	SpO_2 <95% is suggestive of respiratory insufficiency.
8. **Lung Sounds**	Auscultation of bilateral lungs sounds not only assesses tidal volume, but also may uncover abnormal sounds (e.g. wheezing, stridor, rales).

Specific treatments for the different causes of respiratory distress are outlined in the following protocols. When the paramedic is unsure as to which protocol to follow, he or she should follow the protocols in Section 3.1 and contact medical control for further direction.

References:

American Academy of Pediatrics: *Pediatric Education for Prehospital Professionals*, Boston, 2003.

American Heart Association/American Academy of Pediatrics: *Textbook of Pediatric Advanced Life Support*, Dallas, 2002.

American Heart Association: Guidelines 2000 for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care: *Supplement to Circulation* 102: 8, 2000.

3.2.1 Airway Obstruction

Causes of upper airway obstruction include the tongue, foreign bodies, swelling of the upper airway due to angio-neurotic edema (see Pediatric Protocol 3.7.1 - Allergic Reactions/Anaphylaxis), trauma to the airway, and infections {see Pediatric Protocol 3.2.2 - Upper Airway (Stridor - Croup/Epiglottitis)}. Differentiation of the cause of upper airway obstruction is essential to determining the proper treatment.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- If air exchange is inadequate and there is a reasonable suspicion of foreign body airway obstruction (FBAO), apply abdominal thrusts (back blows and chest thrusts for infants only) (a).

ALS Level 1

- If unable to relieve FBAO, visualize with laryngoscope and extract foreign body with Magill forceps.
- If obstruction is due to trauma and/or edema, or if uncontrollable bleeding into the airway causes life-threatening ventilatory impairment, perform endotracheal intubation.
- If unable to intubate and patient cannot be adequately ventilated by other means, perform needle cricothyroidotomy.

ALS Level 2

None

NOTE

(a) If air exchange is adequate with a partial airway obstruction, do not interfere and encourage patient to cough up obstruction. Continue to monitor for adequacy of air exchange. If air exchange becomes inadequate continue with protocol.

3.2.2 Upper Airway (Stridor - Croup/Epiglottitis)

Stridor is a high pitched "crowing" sound caused by restriction of the upper airway (usually heard on inspiration). In addition to FBAO (see Pediatric Protocol 3.2.1), stridor can be caused by croup and epiglottitis.

Croup (laryngotracheobronchitis) is a viral infection of the upper airway, which causes edema/inflammation below the larynx and glottis with a resultant narrowing of the lumen of the airway. Croup most often occurs in children 6 months to 4 years of age. The child with croup will have stridor, as well as, a distinctive barking cough and cold symptoms (low-grade fever (100–101 degrees F), with a gradual onset of respiratory distress.

Epiglottitis is an acute infection and inflammation of the epiglottis that potentially is life-threatening. Since the availability of *Hemophilus influenza, type B* (Hib) vaccine, epiglottitis has markedly decreased, yet it may still occur from other bacterial pathogens. Epiglottitis usually occurs in children 4 years of age and older. The child with epiglottitis will present with stridor, as well as, acute respiratory distress, sore throat, pain upon swallowing which causes the distinctive drooling, high grade fever (102–104 degrees F), and may assume the classic tripod position.

Supportive Care

- Medical Supportive Care Protocol 3.1.3, including pulse oximeter (avoid IVs in these patients) (a).
- Avoid agitating the child with suspected epiglottitis. Keep patient in position of comfort (may be held by parent to avoid agitation). Never examine the epiglottis (a).
- Administer humidified oxygen. If humidified oxygen is unavailable, use nebulized saline (do not force oxygen mask on pediatric patient - use blow-by technique if necessary) (a).

ALS Level 1
None

ALS Level 2
None

NOTE

(a) **Avoid *any* procedure that will agitate patient.**

3.2.3 Lower Airway (Wheezing - Asthma/Bronchiolitis)

Wheezing is a whistling type breath sound associated with narrowing or spasm of the smaller airways (usually heard on expiration, but may also be heard on inspiration).

Wheezing in the child under one year of age is usually the result of **bronchiolitis,** a viral infection of the bronchioles which causes prominent expiratory wheezing, clinically resembling asthma.

Asthma is a chronic inflammatory disease that is triggered by many different factors (e.g. environmental allergens, cold air, exercise, foods, irritants, and certain medications). Asthma has a two-phase response. The first phase is associated with a histamine release, which causes bronchoconstriction and bronchial edema. Early treatment with bronchodilators may reverse the bronchospasm. The second phase consists of inflammation of the bronchioles and additional edema. The second phase will usually not respond to bronchodilators. An anti-inflammatory medication (e.g. corticosteroid) is typically required. Assessment of the asthma patient usually includes a history of asthma with associated medications. The patient will be tachypneic and may have an unproductive cough. Use of accessory muscles is evident and wheezing may be heard, most commonly on expiration. In a severe asthma attack, the patient may not wheeze at all due to a lack of air flow.

Supportive Care

- Medical Supportive Care Protocol 3.1.3, including pulse oximeter.

ALS Level 1

- Choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment (if <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%}; if >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline {0.083%}). May repeat twice PRN (a).

or

- Levalbuterol (Xopenex®) 1 nebulizer treatment (if 6–11 years: 0.13 mg {3 ml}; if ≥12 years: 0.63 mg {3 ml}) of Levalbuterol. May repeat twice PRN.

- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- Consider need for assisted ventilation and intubation.
- If respiratory distress is severe, Epinephrine (1:1000) 0.01 mg/kg SQ (if <8 years, 0.15 mg up to maximum dose is 0.3 mg; if >8 years, maximum dose is 0.3–0.5 mg).
- If respiratory distress is severe, administer one of the following steroids:

  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 2 mg/kg IV (maximum dose 125 mg), if available.

  or

  - Dexamethasone (Decadron®) 0.5 mg/kg IV (maximum dose 10 mg), if available.
- For severe dyspnea, Magnesium Sulfate 25–50 mg/kg (maximum 2 gm) IV (mixed in 50 ml of D_5W given over 10–20 minutes), PRN.

ALS Level 2

- Repeat Epinephrine (1:1000) 0.01 mg/kg SQ (if <8 years, 0.15 mg up to maximum dose is 0.3 mg; if >8 years, maximum dose is 0.3–0.5 mg).

3.3 Pediatric Cardiac Dysrhythmias

Cardiac dysrhythmias in pediatric patients are uncommon and are usually due to non-cardiac problems, unless the patient is known to have congenital or acquired cardiac disease. Cardiac arrest is usually the end result of hypoxemia and acidosis resulting from respiratory insufficiency or shock. Therefore, attention should be given initially to support of the respiratory system. Pediatric dysrhythmias can be divided into three categories: slow rhythms, fast rhythms, or no rhythm. The most common dysrhythmia is bradycardia, which is the result of hypoxia or acidosis. Tachycardias can be a compensatory mechanism or a result of a reentry mechanism. Ventricular fibrillation, although rare in pediatrics, is usually the result of hypoxia. Asystole is a terminal event, following prolonged, untreated bradycardia.

"On the basis of the published evidence to date, the Pediatric Advanced Life Support (PALS) Task Force of the International Liaison Committee on Resuscitation (ILCOR) has made the following recommendation (July 2003):

Automated external defibrillators (AEDs) may be used for children 1 to 8 years of age who have no signs of circulation. Ideally the device should deliver a pediatric dose. The arrhythmia detection algorithm used in the device should demonstrate high specificity for pediatric shockable rhythms, i.e., it will not recommend delivery of a shock for nonshockable rhythms (Class IIb)."[1]

[1] *American Heart Association, National ECC Training Memo, August 15, 2003.*

3.3.1 Asystole

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- CPR.

ALS Level 1

- Check other leads to confirm asystole.
- Intubate and ventilate @ 20/minute for the child and 30/minute for the infant.
- Epinephrine (1:10,000) 0.01 mg/kg IV/IO (maximum 1 mg). If unable to establish an IV/IO, administer Epinephrine (1:1000) 0.1 mg/kg ET (maximum ET is 2 mg). Repeat every 3–5 minutes for duration of pulselessness.
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 1 ml/kg IV/IO (a).
- Consider Sodium Bicarbonate (8.4%) 1 mEq/kg IV/IO (b).

ALS Level 2

None

NOTE

(a) To avoid infiltration and resultant tissue necrosis, Dextrose 25% and 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

(b) Sodium Bicarbonate (4.2%) 1 mEq/kg IV/IO should be administered to infants (dilute 8.4% 1:1 with Normal Saline to make 4.2%).

3.3.2 Bradycardia

Causes of symptomatic bradycardia include hypoxemia, hypothermia, head injury, heart block, heart transplant (special situation), and toxin/poison/drug overdose.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- Assure adequate ventilation and oxygenation.
- If heart rate is <60/min. in infant or child (<8 years) associated with poor systemic perfusion, start chest compressions.

ALS Level 1

- Epinephrine (1:10,000) 0.01 mg/kg IV/IO (maximum 1 mg). If unable to establish IV/IO, administer Epinephrine (1:1000) 0.1 mg/kg ET (maximum ET is 2 mg). Repeat every 3–5 minutes at same dose (a).
- Atropine 0.02 mg/kg IV/IO (minimum single dose 0.1 mg, maximum single dose 0.5 mg for child and 1 mg for adolescent). If unable to establish IV/IO, administer Atropine 0.04 mg/kg ET (same minimum dose as IV/IO). May repeat Atropine once (a).
- Identify and treat possible causes.
- If patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
  - Diazepam (Valium®) 0.1 mg/kg IV.

  or
  - Midazolam (Versed®) 0.05 mg/kg IV.

  or
  - Lorazepam (Ativan®) 0.05 mg/kg IV.
- External pacemaker.

ALS Level 2

None

NOTES

(a) Administer Atropine before Epinephrine for bradycardia due to suspected increased vagal tone or primary AV block.

3.3.3 Narrow Complex Tachycardia

Pediatric patients suffering from tachycardia may or may not exhibit symptoms. Narrow complex tachycardia (QRS < 0.08 seconds) is either sinus tachycardia or supraventricular tachycardia. The following rates should be considered:

Sinus tachycardia is greater than normal and usually for a *child:* <180/minute and *infant:* <220/minute. Rate may vary with sinus tachycardia.

Supraventricular tachycardia is usually >220/minute for infants. If >2 years of age, SVT may be slower (e.g. 180–220/minute). Rate will not vary with SVT.

Wide complex SVTs are rare in children and, therefore, should initially be considered as ventricular in origin, unless proven otherwise (e.g. documented QRS morphology consistent with pre-existing BBB or WPW).

Possible causes of pediatric tachycardia include:

4 H's	4 T's
Hypoxemia	Tamponade
Hypovolemia	Tension pneumothorax
Hyperthermia	Toxins/poisons/drugs
Hyper/hypokalemia and metabolic disorders	Thromboembolism

Unstable Sinus Tachycardia (diminished perfusion)

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- If suspected hypovolemia, fluid challenge Normal Saline 20 ml/kg IV.
- Consider other cause (e.g. 4 **H**'s, 4 **T**'s).

ALS Level 2

None

Stable SVT (normal perfusion)

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- Perform 12 lead ECG.
- Consider cause (e.g. 4 **H**'s, 4 **T**'s).

ALS Level 2

- Vagal maneuvers, begin with ice water.
- Adenosine Triphosphate (Adenocard®) 0.1 mg/kg (6 mg max.) rapid IVP followed by 6 ml NS flush.
- Repeat in 2 minutes, Adenosine 0.2 mg/kg (12 mg max.) rapid IVP followed by 6 ml NS flush.
- Repeat in 2 minutes, Adenosine 0.2 mg/kg (12 mg max.) rapid IVP followed by 6 ml NS flush.

Unstable SVT (diminished perfusion)

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- Consider cause (e.g. 4 **H**'s, 4 **T**'s).
- Consider sinus tachycardia as the underlying rhythm, not SVT.

- If patient is responsive, Adenosine Triphosphate (Adenocard®) 0.1 mg/kg (6 mg max.) rapid IVP or IOP followed by 6 ml NS flush.
- If patient is responsive, repeat in 2 minutes, Adenosine 0.2 mg/kg (12 mg max.) rapid IVP followed by 6 ml NS flush. May repeat once in 2 minutes PRN.

ALS Level 2

- If patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
  - Diazepam (Valium®) 0.1 mg/kg IV.

  or
  - Midazolam (Versed®) 0.05 mg/kg IV.

  or
  - Lorazepam (Ativan®) 0.05 mg/kg IV.
- If patient is poorly responsive, synchronized cardioversion @ 0.5 joule/kg (or equivalent biphasic energy level).
- If patient is poorly responsive, synchronized cardioversion @ 1 joule/kg (or equivalent biphasic energy level).
- If patient is poorly responsive, synchronized cardioversion @ 2 joules/kg (or equivalent biphasic energy level).
- Amiodarone 5 mg/kg IV over 20 minutes.

3.3.4 Pulseless Electrical Activity (PEA)

This protocol is used for: electromechanical dissociation (EMD), pseudo-EMD, idioventricular rhythms, bradyasystolic rhythms, post-defibrillation idioventricular rhythms.

Possible causes of pediatric PEA include:

4 H's	4 T's
Hypoxemia	Tamponade
Hypovolemia	Tension pneumothorax
Hypothermia	Toxins/poisons/drugs
Hyper/hypokalemia and metabolic disorders	Thromboembolism

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- CPR.

ALS Level 1

- Intubate and hyperventilate.
- Epinephrine (1:10,000) 0.01 mg/kg IV/IO (maximum 1 mg). If unable to establish IV/IO, administer Epinephrine (1:1000) 0.1 mg/kg ET (maximum ET is 2 mg). Repeat every 3–5 minutes for duration of pulselessness.
- Consider cause (e.g. 4 H's, 4 T's) and possible treatment options (e.g. glucose) (see specific protocols).
- Fluid challenge of Normal Saline 20 ml/kg IV/IO.
- Consider Sodium Bicarbonate (8.4%) 1 mEq/kg IV/IO (a).

ALS Level 2

None

NOTE

(a) Sodium Bicarbonate (4.2%) 1 mEq/kg IV/IO should be administered to infants (dilute 8.4% 1:1 with Normal Saline to make 4.2%).

3.3.5 Wide Complex Tachycardia with a Pulse (Ventricular Tachycardia)

This protocol is used in wide complex tachycardia (QRS > 0.08 seconds) with a rate > 150/minute.

Possible causes of pediatric tachycardia include:

4 H's	4 T's
Hypoxemia	Tamponade
Hypovolemia	Tension pneumothorax
Hyperthermia	Toxins/poisons/drugs
Hyper/hypokalemia and metabolic disorders	Thromboembolism

Stable (normal perfusion)

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- Consider cause (e.g. 4 H's, 4 T's).
- Administer one of the following antiarrhythmics:
  - Lidocaine 1% 1 mg/kg IV. Repeat every 5 minutes to a maximum total dose of 3 mg/kg (a)(c).

  or
  - Amiodarone 5 mg/kg IV over 20 minutes.

  or
  - Procainamide 15 mg/kg over 30 minutes.

ALS Level 2

Use only one antiarrhythmic medication. If rhythm does not convert with maximum dose, treat as unstable (synchronize cardiovert).

Unstable (diminished perfusion)

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- Consider cause (e.g. 4 H's, 4 T's).

ALS Level 2

- If patient is conscious and aware of situation, consider sedation with one of the following benzodiazepines:
  - Diazepam (Valium®) 0.1 mg/kg IV.

  or
  - Midazolam (Versed®) 0.05 mg/kg IV.

  or
  - Lorazepam (Ativan®) 0.05 mg/kg IV.
- Synchronized cardioversion @ 0.5 joule/kg (or equivalent biphasic energy level)(d).
- Synchronized cardioversion @ 1 joules/kg (or equivalent biphasic energy level)(d).
- Administer one of the following antiarrhythmics:
  - Lidocaine 1% 1 mg/kg IV. Repeat every 5 minutes to a maximum total dose of 3 mg/kg (a)(c).

  or
  - Amiodarone 5 mg/kg IV over 20 minutes.

  or
  - Procainamide 15 mg/kg over 30 minutes.
- Synchronized cardioversion @ 2 joules/kg (or equivalent biphasic energy level).
- Synchronized cardioversion @ 4 joules/kg (or equivalent biphasic energy level).

Pediatric Protocols

NOTES

(a) Dilute Lidocaine 2% 1:1 with Normal Saline to make 1%.
(b) If unable to establish IV/IO, administer Lidocaine 3 mg/kg ET. May repeat every 5 minutes up to 6 mg/kg ET or 3 mg/kg IV/IO.
(c) If Lidocaine suppresses ectopy, start Lidocaine maintenance infusion @ 20–50 mcg/kg/min.
(d) If patient converts rhythm, give Lidocaine 1% 1 mg/kg IV or IO, refer to (a)(b)(c).

3.3.6 Wide Complex Tachycardia Without a Pulse and Ventricular Fibrillation

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- CPR.

ALS Level 1

- Defibrillate @ 2 joules/kg, then @ 4 joules/kg × 2 (or equivalent biphasic energy level)(EMT should apply AED).
- Epinephrine (1:10,000) 0.01 mg/kg IV/IO (maximum 1 mg). If unable to establish IV/IO, administer Epinephrine (1:1000) 0.1 mg/kg ET (maximum 2 mg), repeat every 3–5 minutes for duration of pulselessness (a).
- Administer one of the following antiarrhythmics:
  - Amiodarone 5 mg/kg IV/IO (a).

  or
  - Lidocaine 1% 1 mg/kg IV/IO. Repeat Lidocaine 1 mg/kg IV/IO every 3–5 minutes (max. 3 mg/kg) (a)(b)(c)(d).

  or
  - If Torsades de Pointes, Magnesium Sulfate 25–50 mg/kg IV/IO (a).
- Sodium Bicarbonate 1 mEq/kg IV (a)(e).

ALS Level 2

None

NOTES

(a) **Defibrillate @ 4 joules/kg after every drug is circulated for 30 seconds.**
(b) Dilute Lidocaine 2% 1:1 with Normal Saline to make 1%.
(c) If unable to establish IV/IO, administer Lidocaine 3 mg/kg ET. May repeat every 5 minutes up to 9 mg/kg.
(d) If Lidocaine converts rhythm, start Lidocaine maintenance infusion @ 20–50 mcg/kg/min.
(e) Sodium Bicarbonate (4.2%) 1 mEq/kg IV/IO should be administered to **infants** (dilute 8.4% 1:1 with Normal Saline to make 4.2%).

3.4 Newborn/Infant Cardiopulmonary Arrest

Infant and newborn cardiopulmonary arrest is usually a result of prolonged poor oxygenation and/or severe circulatory collapse. *Newborns* should be resuscitated using Pediatric Protocol 3.4.1.Unless there are obvious signs of death, the *infant* in cardiopulmonary arrest should be resuscitated using the protocols in Pediatric Protocol 3.3. Some infants may not appear to be salvageable, where the Paramedic determines a resuscitation attempt is warranted for psychological reasons (e.g. parent's peace of mind). Consideration should also be given to SIDS (see Pediatric Protocol 3.4.2).

3.4.1 Newborn Resuscitation

This protocol is to be used for newborns (immediately following delivery) that are in need of resuscitation (all other neonates should be treated as infants, with the exception of Atropine).

Supportive Care

- Dry and keep baby warm (cover with thermal blanket or dry towel and cover scalp with stocking cap).
- Position patient to open airway (a).
- Clear airway - suction mouth and nose with bulb syringe PRN. **Paramedic Only:** If newborn has signs of thick meconium, after suctioning with bulb syringe, intubate and suction trachea (b).
- Stimulate baby (rub baby's back).
- Clamp and cut cord, if not already done. Apply 2 umbilical clamps, 2 inches apart and at least 8 inches from the navel and cut between clamps.
- Assess skin color, respirations, and heart rate.
- Ventilate @ 40–60 breaths/minute with 100% oxygen under the following conditions:
  - Apnea.
  - Heart rate <100 beats/minute.
  - Persistent central cyanosis after high-flow oxygen.
- **Paramedic Only:** Intubate under the following conditions:
  - Bag-valve-mask ventilation is ineffective (>2 minutes).
  - Tracheal suctioning is required, especially for thick meconium (b).
  - Prolonged positive pressure ventilation is needed.
- Perform chest compressions at 120/minute (3:1 ratio, one third of the anterior-posterior diameter of chest in depth), using two thumbs side by side (or superimposed one on top of the other) over the mid-sternum just below the nipple line with the fingers encircling the chest and supporting the back, under the following conditions:

  - Heart rate <60 beats/minute and not rapidly increasing despite adequate ventilation with 100% oxygen for approximately 30 seconds.

ALS Level 1

- Epinephrine (1:10,000) 0.01–0.03 mg/kg IV/IO/ET under the following conditions:
  - Asystole.
  - Heart rate <60 beats/minute despite adequate ventilation with 100% oxygen and chest compressions.
- Repeat every 3–5 minutes, PRN.
- Fluid challenge Normal Saline 10 ml/kg IV under the following conditions:
  - Pallor that persists after adequate oxygenation.
  - Faint pulses with a good heart rate.
  - Poor response to resuscitation with adequate ventilations.
- Check blood glucose level on all resuscitations that do not respond to initial therapy. Use heel stick.
  - If blood glucose is <40 mg/dL, administer D10 5ml/kg IV/IO (dilute D50 1:4 with Normal Saline = D10).
- Perform Pediatric Assessment Triangle - Rapid Cardiopulmonary Assessment (see Pediatric Protocol 3.1.1 - Initial Assessment) frequently.

ALS Level 2

- If neonate continues to have altered mental status with depressed respirations, consider Naloxone (Narcan®) 0.1 mg/kg (1 mg/ml concentration) IV/IO/IM/ET (c).

NOTES

(a) The neonate should be placed on his or her back or side with the neck in a neutral position. To help maintain correct position, a rolled blanket or towel may be placed under the back and shoulders of the supine neonate, to elevate the torso 3/4 or 1 inch off the mattress to extend the neck slightly. If copious secretions are present, the neonate should be placed on his or her side with the neck slightly extended to allow secretions to collect in the mouth rather than in the posterior pharynx.

(b) Tracheal suctioning for thick meconium should be done via the endotracheal tube using a meconium aspirator attached to the 15 mm adaptor of the ETT. The suction unit is then attached and placed on low (no more than 100 mmHg). Suctioning should be performed until the ETT is clear (maximum 5 seconds). It may be necessary to repeat the intubation and continue suctioning until clear (maximum 3 times).

(c) Avoid the use of Naloxone if the mother has a history of drug use/abuse, as Naloxone may precipitate seizures in the newborn due to acute withdrawal.

3.4.2 Sudden Infant Death Syndrome (SIDS)

Sudden Infant Death Syndrome, or "crib death," is the sudden and unexpected death of an apparently healthy infant, usually under one year of age, which remains unexplained after a complete medical history, death scene investigation and postmortem examination. SIDS almost always occurs when the infant is asleep or thought to be asleep.

Although there may be obvious signs of death, the Paramedic may attempt resuscitation of the infant for psychological reasons (e.g. parents' peace of mind). There may also be some infants in which the Paramedic determines that a resuscitation attempt is not warranted. In either event, **the Paramedic or EMT should be prepared for a myriad of grief reactions from the parents and/or caregiver.**

It should also be noted, that some SIDS deaths are mistaken for child abuse. If there are possible signs of abuse, the Paramedic should continue as if it were a SIDS death, to avoid any unnecessary grief on the part of the parents and/or caregiver. The Paramedic should not attempt to determine whether or not child abuse has taken place. The scene should be treated as any other death scene, with attention to preservation of potential evidence. Remember, it is more common for an unexpected death of an infant to be SIDS.

Supportive Care

- **In most instances, resuscitation should be attempted** (see appropriate Pediatric Protocols).
- Assign a crewmember to assist the parents and/or caregiver and to explain the procedures.
- If time permits, elicit a brief history and perform an environmental check. Document all findings on the EMS run report.

- Once resuscitation is started, do not stop until directed to do so in the hospital by a physician.

ALS Level 1

None

ALS Level 2

None

3.5 Pediatric Neurologic Emergencies

This section covers the most common pediatric neurologic emergencies, altered mental status and seizures. It is important for the paramedic to understand appropriate behavior for the child/infant's age in order to properly assess level of consciousness. Attention should be given to how the child interacts with parents and the environment and whether or not the patient can make good eye contact. Parents may be invaluable for a baseline comparison of level of consciousness. The parents may simply state that the patient is not acting right. Causes of pediatric altered mental status include: hypoxia, head trauma, intoxication, infection, and hypoglycemia.

Approximately 4–6% of all children will have at least one seizure. Seizures may be due to an underlying disease (e.g. epilepsy) or may simply be a result of fever. Other causes of pediatric seizures include: hypoxia, brain hemorrhage, infection of brain and spinal cord (e.g. meningitis), hypoglycemia, and intoxication.

3.5.1 Altered Level of Consciousness (Altered Mental Status)

Common signs of altered mental status in pediatric patients include: combative behavior, decreased responsiveness, lethargy, weak cry, moaning, hypotonia, ataxia, and changes in personality. Initial approach should be based on the assumption that the patient is suffering from hypoxia, ischemia, hypoglycemia or dehydration. Secondary considerations should include medications, illicit drugs, plants, trauma, etc.

Supportive Care

- Medical Supportive Care Protocol 3.1.3, consider need for spinal immobilization.
- Consider need for ventilatory assistance.

ALS Level 1

- If child remains unresponsive and prolonged ventilatory assistance is needed, consider need for intubation (a).
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 1 ml/kg IV/IO (b).
- If mental status is depressed and signs of dehydration exist, administer fluid challenge of Normal Saline @ 20 ml/kg IV.
- If mental status and respiratory effort is depressed, administer Naloxone (Narcan®) 0.1 mg/kg (maximum 2 mg) IV/IO/IM/Intranasal (c). May repeat every 5 minutes PRN.
- **If toxicology (poisoning) is suspected, Contact Poison Information Center (1-800-222-1222).**

ALS Level 2

None

NOTES

(a) Use appropriate discretion regarding immediate intubation of pediatric patients who may quickly regain consciousness, such as hypoglycemics after D25 or opiate overdose cases after Naloxone.

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 25% should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

(c) Intranasal administration of Narcan requires the use of a mucosal atomization device.

3.5.2 Seizure Disorders

This protocol should be used when the patient has witnessed continuous convulsions or repeating episodes without regaining consciousness or sufficient respiratory compensation. Consider underlying etiology, such as: fever, hypoxia, head trauma, infection of brain and spinal cord (e.g. meningitis), hypoglycemia, and intoxication.

Supportive Care

- Medical Supportive Care Protocol 3.1.3. Apply gentle support of the patient's head to avoid trauma and loosen tight fitting clothing.

ALS Level 1

- Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 1 ml/kg IV/IO (a)(b). If unable to start IV/IO, and patient is >8 years: administer Glucagon 1 mg IM.
- If seizure continues, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally or 0.2 mg/kg intranasal. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (c)(d)(e).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum 2 mg) IM or intranasal. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum 2 mg) IV (c).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV or intranasal(c).

ALS Level 2

- If seizure continues for 5 minutes, administer one of the following benzodiazepines:

  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (c)(d)(e).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (c).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (c).

NOTES

(a) For newborns and infants, perform heel stick. In newborns, if blood glucose is <40 mg/dL, administer D10 5 ml/kg IV/IO (dilute D50 1:4 with Normal Saline = D10).

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 10%, 25%, and 50% should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device (same as IV dose).

(d) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(e) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

3.6 Pediatric Toxicologic Emergencies

This protocol is to be used for those patients suspected of exposure to toxic substances via any route of exposure (e.g. drug overdose, snake bite, etc.). The protocols will give specific considerations for each type of exposure, as well as general treatment guidelines. Additional assistance may be necessary in certain cases (e.g. hazardous materials team for toxic exposure, police for scene control, including violent and/or impaired patient - see Pediatric Protocol 3.7.5). Also, refer to Hazardous Materials Exposure 8.1 - Pediatric Chemical Treatment Guidelines PRN.

A history of the events leading to the illness or injury should be obtained from the patient and bystanders to include:

1. What drugs, poisons, or other substances was the patient exposed to? Consider multiple substances, especially on overdoses. Also consider plants and herbal remedies.
2. When and how much?
3. Duration of symptoms?
4. Is patient depressed, suicidal? History of previous overdose? (if applicable).
5. Accidental? Nature of accident?
6. Duration of exposure (if applicable).

Collect all pill bottles, empty or full, and check for "suicide notes" (if applicable). Transport any/all information or items that may assist in the treatment of the patient to the emergency department.

Contact the Poison Information Center (1-800-222-1222) for consultation regarding specific therapy.

3.6.1 Pediatric Ingestion (Overdose)

This protocol should be used on most types of ingestion (e.g. acetaminophen, benzodiazepines, narcotics, tricyclic antidepressants, vitamins with iron, etc.). See Adult Protocol 2.6 for lists of different types of medications. Symptoms vary with the substance involved (also refer to Hazardous Materials Exposure 8.1—Pediatric Chemical Treatment Guidelines PRN).

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- Consider need for ventilatory support.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Consider need for intubation.
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 1 ml/kg IV/IO (see Medical Procedure 4.14)(a)(b). If unable to start IV/IO, and patient is >8 years: administer Glucagon 1 mg IM.
- If suspected narcotic overdose in non-neonate, administer Naloxone (Narcan®) 0.1 mg/kg (maximum 2 mg) IV/IO/IM/Intranasal. May repeat every 5 minutes PRN (c).
- If suspected tricyclic antidepressant overdose (QRS >0.10), administer Sodium Bicarbonate 1 mEq/kg IV/IO (d).

ALS Level 2

None

NOTES

(a) For newborns and infants, perform heel stick. In newborn, if blood glucose is <40 mg/dL, administer D10 5 ml/kg IV/IO (dilute D50 1:4 with Normal Saline = D10).

(b) To avoid infiltration and resultant tissue necrosis, Dextrose 10%, 25%, and 50% should be given slow IV with intermittent aspiration of IV/IO line to confirm IV/IO patency followed by saline flush.

(c) Intranasal administration of Naloxone requires the use of a mucosal atomization device (same as IV dose).

(d) If patient is seizing, also see Pediatric Protocol 3.5.2.

3.6.2 Bites and Stings

This protocol includes the treatment for snake and spider bites, dog and cat bites, insect stings, marine animal envenomations and stings. All bites should be transported to the hospital.

Snake Bites

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/Anaphylaxis.
- **Contact Poison Information Center (1-800-222-1222).**
- Splint affected area, place patient supine with extremities at a neutral level, keep patient quiet, remove and secure all jewelry.
- Wash area of bite with copious amounts of water.
- Attempt to identify snake, if safe to do so.
- Check temperature and pulse distal to bite on extremity and mark level of swelling and time with pen every 15 minutes.

ALS Level 1

- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2

None

Dog and Cat and Wild Animal Bites

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat).

- Advise dispatch to contact animal control and PD for identification and quarantine of animal.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1
- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2
None

Insect Stings (including: Centipedes, Scorpions and Spiders)

Supportive Care
- Trauma Supportive Care Protocol 3.1.4.
- Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/Anaphylaxis.
- Remove stinger by scraping skin with edge of flat surface (e.g. credit card). Do not attempt to pull stinger out, as this may release more venom.
- Clean area with soap and water.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1
- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2
None

Marine Animal Envenomations - Stingray, Scorpionfish (Lionfish, Zebrafish, Stonefish), Catfish, Weeverfish, Starfish, and Sea Urchin

Supportive Care
- Trauma Supportive Care Protocol 3.1.4.
- Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/Anaphylaxis.

- Immerse the punctures in nonscalding hot water to tolerance (110–113 degrees F) to achieve pain relief (30–90 minutes). Transport should not be delayed, immersion in nonscalding hot water may be continued during transport.
- Remove any visible pieces of the spine(s) or sheath. Gently wash wound with soap and water, then irrigate vigorously with fresh water (avoid scrubbing).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1
- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2
None

Marine Animal Stings - Jellyfish, Man-of-War, Sea Nettle, Irukandji, Anemone, Hydroid, Fire Coral

Supportive Care
- Trauma Supportive Care Protocol 3.1.4.
- Consider need for Pediatric Protocol 3.7.1 - Allergic Reactions/Anaphylaxis.
- Rinse the skin with seawater (Do not use fresh water, do not apply ice, do not rub the skin).
- Apply soaks of acetic acid 5% (vinegar) until pain is relieved. If vinegar is not available, use a paste of baking soda or unseasoned meat tenderizer.
- Remove large tentacle fragments using forceps (use gloves to avoid contact with bare hands).
- Apply a lather of shaving cream or a paste of baking soda and shave the affected area with edge of flat surface (e.g. credit card).
- Apply heat pack to area.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2

None

Human Bites

Supportive Care

- Trauma Supportive Care Protocol 3.1.4 (see General Protocol 1.12 - Personal Exposure to Infectious Diseases).
- Wound care - BLS (do not use hydrogen peroxide on deep puncture wounds or wounds exposing fat). Clean area with soap and water.
- Advise dispatch to contact PD for possible domestic.

ALS Level 1

- Refer to Pediatric Protocol 3.1.5 for Pain Management.

ALS Level 2

None

3.7 Other Pediatric Medical Emergencies

The paramedic should use these protocols to guide him/her through the treatment of patients with other medical emergencies that are exhibiting signs and symptoms. In addition to these protocols, the paramedic may need to refer to additional protocols for continued treatment.

3.7.1 Allergic Reactions/Anaphylaxis

This protocol should be used for patients exhibiting signs and symptoms consistent with allergic reaction; as follows:

Skin - flushing, itching, hives, swelling, cyanosis.
Respiratory - dyspnea, sneezing, coughing, wheezing, stridor, laryngeal edema, laryngospasm, bronchospasm.
Cardiovascular - vasodilation, increased heart rate, decreased blood pressure.
Gastrointestinal - nausea/vomiting, abdominal cramping, diarrhea.
CNS - dizziness, headache, convulsions, tearing.

Treatment is outlined according to the severity of the allergic reaction (mild, moderate, and severe or anaphylaxis).

Mild Reactions - (redness and/or itching, hives, normal perfusion without dyspnea)

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.

ALS Level 1

- For severe itching, administer Diphenhydramine (Benadryl®) 1 mg/kg IM or IV (maximum 50 mg IM or 25 mg IV).

ALS Level 2

None

Moderate Reactions - (edema, hives, dyspnea, wheezing, and normal perfusion)

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.

ALS Level 1

- Diphenhydramine (Benadryl®) 1 mg/kg (maximum 50 mg IM or 25 mg IV) IM/IV.
- Epinephrine (1:1000) 0.01 mg/kg (maximum 0.15 mg) SQ (a).
- If patient remains in respiratory distress, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment (if <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%}; if >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline {0.083%}). May repeat twice PRN (a).

  or

  - Levalbuterol (Xopenex®) 1 nebulizer treatment (if 6–11 years: 0.13 mg {3 ml}; if ≥12 years: 0.63 mg {3 ml}) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If respiratory distress is severe, administer one of the following steroids:
  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 2 mg/kg IV (maximum dose 125 mg), if available.

  or

  - Dexamethasone (Decadron®) 0.5 mg/kg IV (maximum dose 10 mg), if available.
- May repeat Epinephrine (1:1000) 0.01 mg/kg (max. 0.15 mg) SQ (a).

ALS Level 2

None

Severe Reactions- (edema, hives, severe dyspnea and wheezing, poor perfusion, and possible cyanosis and laryngeal edema)

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.

ALS Level 1

- Diphenhydramine (Benadryl®) 1 mg/kg (maximum 50 mg IM or 25 mg IV) IM or IV.
- Epinephrine (1:1000) 0.01 mg/kg (maximum 0.15 mg) SQ (a).
- If patient remains in respiratory distress, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment (if <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%}; if >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline {0.083%}). May repeat twice PRN (a).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment (if 6–11 years: 0.13 mg {3 ml}; if ≥12 years: 0.63 mg {3 ml}) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If respiratory distress is severe, administer one of the following steroids:
  - Methylprednisolone Sodium Succinate (Solu-Medrol®) 2 mg/kg IV (maximum dose 125 mg), if available.

  or
  - Dexamethasone (Decadron®) 0.5 mg/kg IV (maximum dose 10 mg), if available.
- May repeat Epinephrine (1:1000) 0.01 mg/kg (max. 0.15 mg) SQ (a).

ALS Level 2

None

NOTE

(a) The EPI-Pen Jr.® may be used if other means of Epinephrine administration are not available.

3.7.2 Diabetic Emergencies

This protocol is to be used for those patients whose blood glucose is below 60 mg/dL (see Pediatric Protocol 3.4.1 for newborn).

Supportive Care

- Medical Supportive Care Protocol 3.1.3.

ALS Level 1

- If patient is conscious with an intact gag reflex, assist with self-administration of oral glucose, if possible.
- Perform glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 1 ml/kg IV/IO (a). If unable to start IV/IO, and patient is >8 years: administer Glucagon 1 mg IM.
- Repeat glucose test with finger stick. If glucose is below 60 mg/dL, administer: if <8 years: D25 2 ml/kg IV/IO; if >8 years: D50 0.5 ml/kg IV/IO (a).
- If blood glucose is >300 mg/dL with signs of dehydration, administer Normal Saline 20 ml/kg IV, unless contraindicated.

ALS Level 2

None

NOTE

(a) To avoid infiltration and resultant tissue necrosis, Dextrose 25% and 50% should be given slow IV with intermittent aspiration of IV line to confirm IV patency followed by saline flush.

3.7.3 Non-Traumatic Abdominal Pain

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 (costovertebral angle) tenderness.

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

Additional questions should be asked of the female adolescent patient regarding OB/GYN history (see Adult Protocol 2.7 - Adult OB/GYN Emergencies).

An acute abdomen can be caused by: appendicitis, diabetic ketoacidosis, incarcerated hernia, intussuception, cholecystitis, cystitis - UTI (bladder inflammation), duodenal ulcer, diverticulitis, abdominal aortic aneurysm, kidney infection - UTI (urinary tract infection), kidney stone, pelvic inflammatory disease - PID (female), pancreatitis.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.

ALS Level 1

- If decreased perfusion, administer fluid challenge of Normal Saline 20 ml/kg IV.

ALS Level 2

- Consider pain control (see Pediatric Protocol 3.1.5 for pain scale and medication dosage—same as isolated extremity facture pain protocol).

3.7.4 Non-Traumatic Chest Pain - Undifferentiated

Causes of non-traumatic chest pain in the pediatric patient include: wheezing associated illness, spontaneous pneumothorax, pleurisy, costochondritis, pulmonary embolism, pneumonia, peptic ulcer, drug usage (e.g. stimulants - cocaine), dissecting aortic aneurysm, pericarditis, hiatal hernia, esophageal spasm, cholecystitis, pancreatitis, cervical disk problem, and rarely cardiac problems.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

- Consider pain control (see Pediatric Protocol 3.1.5 for pain scale and medication dosage—same as isolated extremity facture pain protocol).

3.7.5 Violent and/or Impaired Patient

This treatment protocol is used in conjunction with General Protocol 2.1 Behavioral Emergencies. If patient is violent and an immediate threat to the patient, EMS crew or bystander safety exists, restraint should be used to prevent patient from harming him or herself or others. If patient is not violent, be observant for possibility of violence and avoid provoking patient. **Particular caution should be exercised when any "non-lethal" law enforcement device (e.g. pepper spray, tazer, etc.) has been employed.**

Supportive Care

- Have patient placed under Baker Act when appropriate and refer to Impaired/Incapacitated Persons Act (see General Protocol 2.1).
- Medical Supportive Care 3.1.3.
- Rule out causes other than psychiatric (e.g. drug overdose, ETOH, head trauma, hypoxia, hypoglycemia).
- Physically restrain patient **only** when appropriate.

ALS Level 1

- Administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.2 mg/kg (maximum 5 mg) IV or Intranasal, may repeat once PRN (up to max. 10 mg)(b).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV or Intranasal, may repeat once PRN (up to max. 4 mg)(b).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum 2 mg) IV, IM or Intranasal, may repeat once PRN (up to max. 4 mg)(a)(b).
- Diphenhydramine HCL (Benadryl®) 1 mg/kg (maximum 50 mg IM or 25 mg IV) IM or IV (a).

ALS Level 2

None

NOTES

(a) In some instances, IV administration may present a safety concern; therefore IM or intranasal administration of sedatives may be the more desirable route.

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device (same as IV dose).

3.7.6 Suspected Child Abuse

This protocol should be used when the paramedic suspects that child abuse may have occurred. Child abuse is when a person intentionally inflicts, or allows to be inflicted, physical or psychological injury to a child, which causes or results in risk of death, disfigurement, or distress. Child neglect is when a child's physical, mental, or emotional condition is impaired or in danger because of failure of the legal guardian to supply basic necessities, including: adequate food, clothing, shelter, education, or medical care.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Advise Police that child abuse is suspected.
- Protect child from further abuse.
- Obtain information in a non-judgmental manner.
- Do not confront caregiver and/or parent.
- Transport patient to the hospital for evaluation and possible treatment (a).
- Report suspected child abuse (Florida Child Abuse Hotline: 1-800-342-9152) (b).

ALS Level 1

None

ALS Level 2

None

NOTE

(a) If parents refuse to have patient transported to hospital, request police assistance.

(b) Reporting of suspected child abuse is required by law.

3.7.7 Sickle Cell Anemia

Sickle cell anemia is a chronic hemolytic anemia occurring almost exclusively in blacks and is characterized by sickle-shaped red blood cells. Sickle cell crisis results from the occlusion of a blood vessel by masses of sickle-shaped red blood cells. Pain is the principle manifestation, and this represents the most common type of crisis. Typical pain occurs in the joints and back. Hepatic, pulmonary, or central nervous system involvement can occur, each with its own group of symptoms. Keep in mind that patients with sickle cell disorder have a high incidence of life-threatening disorders at a very young age.

Supportive Care

- Medical Supportive Care Protocol 3.1.3. Administer 100% oxygen.
- Administer fluid challenge of Normal Saline 20 ml/kg IV.
- Provide emotional support.

ALS Level 1

- If pain persists and systolic BP is adequate, choose one of the following:
  - Morphine Sulfate may be given intravenously in increments every 3–5 minutes, titrated to pain to a maximum of 10 mg. Administer at a rate not to exceed 1 mg/min. Pediatric dose: 0.1 mg/kg IV. Infant dose: 0.05 mg/kg IV (c).

  or
  - Nalbuphine Hydrochloride (Nubain®) 0.1 mg/kg (maximum 10 mg) slow IV, if available.

ALS Level 2

None

NOTE

(a) Extreme caution should be used with administering narcotic analgesics to a patient with an SpO_2 <95.

3.8 Pediatric Environmental Emergencies

The following protocols cover a range of problems due to the environment, including: trauma due to changes in atmospheric pressure, exposure to heat and cold extremes, water submersion, and exposure to electricity. Initial efforts should focus on removing the patient from the harmful environment.

Pediatric Protocols

3.8.1 Near Drowning

Near drowning patients are those that have been submerged in fresh or salt water and may or may not be conscious. If the patient is still in open water on arrival of EMS, a Dive Rescue Team should be utilized to remove the patient from the water whenever possible. Additional protocols may be needed for treatment decisions (e.g. Pediatric Protocol 3.8.1 - Barotrauma).

Supportive Care

- Trauma Supportive Care Protocol 3.1.4 (protect C-spine) (a).
- Determine pertinent history (duration of submersion, depth, water temperature, possible seizure, drug and/or alcohol use, possible trauma).
- Maintain body temperature, dry and warm patient.
- **All near drowning patients MUST be transported to the hospital,** regardless of how well they may seem to have recovered. Delayed death or complications due to pulmonary edema or aspiration pneumonia are not uncommon. The most devastating injury is due to asphyxia.

ALS Level 1

- Treat dysrhythmias per specific protocol (see Pediatric Protocol 3.3).
- Consider Nasogastric Tube (b).

ALS Level 2

None

NOTES

(a) The routine use of abdominal thrusts for near-drowning victims is not recommended. This maneuver should only be used in cases of FBAO.

(b) Any near-drowning patient with a decreased ability to protect their airway, with gross abdominal distension, or who requires ventilatory assistance needs an NG tube.

3.8.2 Heat Related Emergencies

Hyperthermia occurs when the patient is exposed to increased enviromental temperature and can manifest as heat cramps, heat exhaustion, or heat stroke. Certain drugs may cause an increase in temperature (e.g. cocaine, ecstacy, etc.).

Some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68–108 degrees F (tympanic thermometers should not be used in infants (<1 yr).

Heat Cramps	signs and symptoms include: muscle cramps of the fingers, arms, legs, or abdomen, hot sweaty skin, weakness, dizziness, tachycardia, normal BP, and normal temperature.
Heat Exhaustion	signs and symptoms include: cold and clammy skin, profuse sweating, nausea/vomiting, diarrhea, tachycardia, weakness, dizziness, transient syncope, muscle cramps, headache, positive orthostatic vital signs, normal or slightly elevated temperature.
Heat Stroke	signs and symptoms include: hot dry skin (sweating may be present), confusion and disorientation, rapid bounding pulse followed by slow weak pulse, hypotension with low or absent diastolic reading, rapid and shallow respirations (which may later slow), seizures, coma, elevated temperature above 105 degrees F.

Heat Cramps and Heat Exhaustion

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Remove from warm environment and cool patient.

- Monitor temperature.
- For mild to moderate heat cramps and heat exhaustion, **if patient is conscious and alert,** encourage patient to drink water, followed by salt containing fluids (e.g. half-strength Gatorade® or 10K®).

ALS Level 1

- If heat cramps are severe or patient's level of consciousness is diminished, administer fluid challenge of Normal Saline 20 ml/kg IV.

ALS Level 2

None

HEAT STROKE

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Remove from warm environment and aggressively cool patient. Remove patient's clothing and cover patient with sheets soaked in ice water. Also, turn A/C and fans on high and apply ice packs to head, neck, chest and groin.
- Monitor temperature. Cool patient to 102 degrees F, then remove wet sheets, ice packs, and turn off fans (avoid lowering temperature too much).

ALS Level 1

- Treat hypotension with IV fluids. Avoid using vasopressors and anticholinergic drugs (may potentiate heat stroke by inhibiting sweating). Administer fluid challenge of Normal Saline 20 ml/kg IV.

ALS Level 2

None

3.8.3 Cold Related Emergencies

Factors that predispose and/or cause a patient to develop hypothermia include: geriatric and pediatric patients, poor nutrition, diabetes, hypothyroidism, brain tumors or head trauma, sepsis, use of alcohol and certain drugs, and prolonged exposure to water or low atmospheric temperature. Hypothermia patients can be divided into three categories: Mild (temperature 94–97 degrees F) Moderate (temperature 86–94 degrees F), and Severe (temperature <86 degrees F).

It should be noted that most oral thermometers will not register below 96 degrees F. However, some tympanic thermometers (Braun Thermoscan™ Pro-1 and Pro 3000) will register from 68–108 degrees F (tympanic thermometers should not be used in infants).

Mild to Moderate hypothermia	patients will generally present with shivering, lethargy, and stiff, uncoordinated muscles.
Severe hypothermia	patients may have altered mental status, ranging from confusion to lethargy or coma. Shivering will usually stop and physical activity will be uncoordinated. In addition, severe hypothermia will frequently produce an Osborn wave or J wave on the ECG, as well as dysrhythmias (bradycardia, ventricular fibrillation).

Supportive Care

- Trauma Supportive Care Protocol 3.1.4 (a).
- Remove all wet clothes and dry patient.
- Protect from heat loss and wind chill.
- Maintain horizontal position.

- Avoid rough movement and excess activity.
- Monitor temperature.
- Add heat to patient's head, neck, chest, and groin.
- For severe hypothermia, warm IV fluids, if possible.

For Severe Hypothermic Cardiac Arrest:

- Start CPR.

ALS Level 1

- For VF or pulseless VT, defibrillate @ 2 J/kg, 4 J/kg, 4 J/kg (or equivalent biphasic energy level).
- Intubate and hyperventilate with warm humidified oxygen, if possible (see Medical Procedure 4.20).
- Establish IV with warm Normal Saline.

If temperature is above 86 degrees F:

- Follow appropriate dysrhythmia treatment (see Pediatric Protocol 3.3).

If temperature is below 86 degrees F:

- Continue CPR and transport immediately. Do not treat dysrhythmias in severe hypothermia (warm patient prior to treatment).

ALS Level 2

None

NOTE

(a) Cases of frostbite should be bandaged with dry sterile dressings and transported without attempting rewarming in the prehospital setting.

3.8.4 Barotrauma/Decompression Illness - Dive Injuries

Barotrauma and decompression illness is caused by changes in the surrounding atmospheric pressure beyond the body's capacity to compensate for excess gas load. These injuries are most commonly associated with the use of SCUBA (Self-Contained Underwater Breathing Apparatus). SCUBA diving emergencies can occur at any depth with the most serious injuries manifesting symptoms after a dive. It should be understood that if a patient took a breath underwater, from any source of compressed gas (e.g. submerged vehicle, SCUBA, etc.) while greater than three (3) feet in depth, the patient may be a victim of barotrauma. Barotrauma may cause several injuries to occur including: arterial gas embolism (AGE), pneumothorax, pneumomediastinum, subcutaneous emphysema, and the "squeeze". Decompression illnesses may also include decompression sickness ("Bends").

Supportive Care

- Trauma Supportive Care Protocol 3.1.4, high-flow O_2.
- Place patient supine.
- Complete the Dive Accident Signs and Symptoms Checklist.
- Start Dive History Profile, if possible (the patient's dive buddy may be helpful in answering many of these questions).
- Whenever possible, have the legal authority in charge (e.g. police, Florida Marine Patrol, U.S. Coast Guard, etc.) secure all of the victims dive gear with proper chain of custody for testing, analysis, etc.
- Manage patient according to appropriate protocol(s).
- Transport to closest Emergency Department or Trauma Center with helipad (Air transport of diving accident victim must be below 1000 feet).
- Contact Diver's Alert Network (DAN) at Duke University Medical Center collect at (919) 684-4326 for further assistance (a).

ALS Level 1
None

ALS Level 2
None

NOTE

(a) DAN may be contacted while on scene or after arrival at the hospital. If at hospital, give name of ED physician and ED phone number.

3.8.5 Electrical Emergencies

A wide range of injuries can be caused from a lightning strike or contact with electricity. Electrical injury can occur from direct contact, an arc, or a flash of the electricity and a direct hit or a splash from lightning. The movement of electrical current through the body can cause violent muscle contractions that can lead to fractures, and therefore, the C-spine should be protected. The thermal energy can cause external burns, but in many cases the majority of thermal damage is internal, with few external signs of injury. Dysrhythmias are also common (e.g. ventricular fibrillation). The rescuer should be sure that the patient is no longer in contact with the electrical current before initiating treatment.

Supportive Care
- Trauma Supportive Care Protocol 3.1.4 (protect C-spine).
- Treat burns per Pediatric Protocol 3.9.7.
- Consider need to transport to a trauma center.

ALS Level 1
- Treat dysrhythmias per specific protocol (see Pediatric Protocol 3.3).

ALS Level 2
None

3.9 Pediatric Trauma Emergencies

These protocols cover specific types of injuries and their treatment. The initial assessment of the trauma patient should include determination of trauma alert criteria. When the situation demands (e.g. trauma alert criteria is met), scene time should be limited as much as possible (e.g. 10 minutes) and the patient should be expeditiously transported to a trauma center. Do not delay transport to establish vascular access or bandage and splint every injury. Priority should be given to airway management, rapid preparation for transport (e.g. full immobilization on a backboard) and control of gross hemorrhage.

If a vascular access is obtained and hypovolemia is suspected (e.g. signs and symptoms of shock), a fluid challenge of 20 ml/kg should be administered. If the patient is still in shock, repeat fluid challenge at 20 ml/kg until a maximum of 60 ml/kg is administered. However, administration of large volumes of IV fluids has been found to be deleterious to the survival of patients with uncontrolled hemorrhage, internally or externally. In recent studies (NEJM, 1994), it has been shown that maximal fluid resuscitation may increase the bleeding, preventing the formation of a protective thrombus or dislodging it once the intraluminal pressure exceeds the tamponading pressure of the thrombus. Therefore, **consult with the physician should be made prior to the administration of large volumes of IV fluids when the transport time is relatively short (e.g. < 20 minutes).**

Avoid the use of vasopressor agents (e.g. Dopamine) in trauma patients that are hypotensive.

The pregnant adolescent female in her third trimester should be placed on her left side for transport. If the injuries require the use of a backboard, following full immobilization to the backboard, said board should be tilted to the left. Failure to follow this practice may cause hypotension due to decreased venous return.

3.9.1 Head and Spine Injuries

If history, symptoms, or signs of head or spinal injuries are present, manually immobilize the head and neck while maintaining a patent airway using a modified jaw-thrust method. Immobilization of the entire spine is indicated following initial stabilization.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- If not hypotensive, elevate head of backboard 30 degrees (12–18 inches).

ALS Level 1

- If signs of brainstem herniation exist (e.g. pupillary dilation, asymmetric pupillary reactivity, or motor posturing), consider intubation and ventilate @ 20/minute for child and 30/minute for infant.

ALS Level 2

- If patient is seizing, see Pediatric Protocol 3.5.2 (avoid glucose containing solutions and medications).

3.9.2 Eye Injuries

This protocol covers a variety of injuries to the eye. If other injuries to the body exist, priority of care should be given as appropriate.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4 (establish IV PRN).
- Remove or ask the patient to remove contact lenses, if still in the affected eye(s).
- For penetrating object, stabilize object and cover affected eye with an ocular shield or similar rigid device. Cover both eyes to minimize eye movement. Avoid direct pressure on eye or penetrating object.
- If eyeball has been forced out of the socket, cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid contact with the exposed globe. If bleeding, control by direct pressure with a sterile dry dressing.
- If there are signs and symptoms or suspicion of ocular exposure to chemicals or foreign body, without obvious or suspected penetrating injury or laceration of the cornea or globe, irrigate with Normal Saline IV solution.

ALS Level 1

- If patient is experiencing eye pain, administer Tetracaine 1 drop in each affected eye. Tetracaine is contraindicated in penetrating eye injuries or allergies to Lidocaine.

ALS Level 2

None

3.9.3 Chest Injuries

This protocol covers both blunt and penetrating chest trauma and should be part of initial resuscitation if breathing is compromised.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Penetrating injuries to the chest or upper back should be covered immediately with an occlusive dressing (e.g. Vaseline gauze).
- Do not attempt to remove an impaled object (stabilize with bulky dressing, etc.). If impaled object is very large or unwieldy, attempt to cut object to no less than six inches from chest.

ALS Level 1

- For tension-pneumothorax, with evidence of respiratory and circulatory compromise, decompress chest **on affected side.**
- For massive flail chest with severe respiratory compromise, intubate and ventilate @ 20/minute for child and 30/minute for infant. If flail chest does not cause severe respiratory compromise, stabilize externally using ipsilateral arm in sling and swathe.
- For crush injury, establish two large bore IVs. If crushing object is still on patient, infuse a minimum of 20 ml/kg of fluid before attempting to lift object off of patient.
- For traumatic asphyxia, Sodium Bicarbonate (8.4%) 1 mEq/kg IV (a).

ALS Level 2

None

NOTE

(a) Sodium Bicarbonate (4.2%) 1 mEq/kg IV/IO should be administered to **infants** (dilute 8.4% 1:1 with Normal Saline to make 4.2%).

3.9.4 Abdomino-Pelvic Injuries

This protocol covers blunt and penetrating abdomino-pelvic trauma. Penetrating injuries may also include the chest (see Pediatric Protocol 3.9.3 - Chest Injuries).

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- For penetrating injuries, cover with an occlusive dressing (e.g. Vaseline gauze).
- For evisceration, cover organs with saline soaked sterile dressing and then cover with an occlusive dressing (e.g. foil). Do not attempt to put organs back into abdomen.
- Do not log roll patient with suspected pelvic fracture (may use scoop stretcher if appropriate to patient size).

ALS Level 1

None

ALS Level 2

None

3.9.5. Extremity Injuries

This protocol covers open and closed injuries to the extremities, including amputation.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4 (establish IV PRN).
- Any fracture or suspected fracture should be splinted appropriately with ice to area. Remove and secure all jewelry. Check pulse, sensation, and movement before and after splinting.
- Angulated fractures should be aligned using proximal and distal traction during splinting, except in fractures that involve a joint, which should be splinted in the position found.
- Traction splints should be used in cases of femur fractures, unless a pelvic fracture is suspected. PASG may be used for splinting lower extremities where a traction splint is not applicable, if available.
- Amputations should be dressed with bulky dressings and amputated part should be wrapped in moistened sterile gauze and placed in plastic bag and then the bag placed on ice for transportation to the hospital.

ALS Level 1

- See Pediatric Protocol 3.1.5 - Pain Management.

ALS Level 2

None

3.9.6 Traumatic Arrest

The decision to attempt resuscitation of a traumatic arrest should be based on the paramedic's judgment as to the possibility of survival and/or the possibility of organ harvest. There are instances where resuscitation of a traumatic arrest is not warranted.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Rapidly prepare patient for transport and then expeditiously transport patient to the trauma center.

ALS Level 1

- If IV(s) can be established, infuse Normal Saline 20 ml/kg up to 60 ml/kg IV.
- Avoid use of vasopressors in cases of suspected hypovolemia.

ALS Level 2

None

3.9.7 Burn Injuries

Burns can be caused by thermal, chemical, and electrical sources. If an electrical burn is suspected, also see Pediatric Protocol 3.8.5 - Electrical Emergencies. Remember that burn patients are volume depleted. However, burns do not bleed; therefore, look for other sources of bleeding. Assume that any patient with compromised perfusion has other injuries and treat accordingly. Many burn injuries are associated with inhalation injury. The signs and symptoms of inhalation injury include: nasal and oropharyngeal burns, charring of the tongue or teeth, sooty (blackened) sputum, singed nasal and facial hair, abnormal breath sounds (e.g. stridor, rhonchi, wheezing, etc.), and respiratory distress. In cases of inhalation injury, attention should be given to the patency of the airway. Acute swelling can cause an airway obstruction. The Paramedic should consider the need for early intubation to avoid a complete airway obstruction that requires a cricothyroidotomy.

Supportive Care

- Trauma Supportive Care Protocol 3.1.4.
- Stop the burning process, if necessary (do not cause hypothermia):

Thermal Burns:	Lavage the burned area with tepid water (sterile, if possible) to cool skin. Do not attempt to wipe off semisolids (grease, tar, wax, etc.).
Dry Chemical Burns:	Brush off dry powder, then lavage with copious amounts of tepid water (sterile, if possible) for 15 minutes.
Liquid Chemical Burns:	Lavage the burned area with copious amounts of tepid water (sterile, if possible) for 15 minutes. (When *Phenol* has caused the burn, also see HAZMAT Protocol 8.1.21 - Phenol.)

- Remove clothing from around burned area, but do not remove/peel off skin or tissue.
- Remove and secure all jewelry and tight fitting clothing.
- Assess the extent of the burn using the Modified Rule of Nines and the degree of burn severity. An additional method is to use the palmar surface of the patient as 1% BSA.
- Apply dressing to burned area as follows:
  - If there is greater than or equal to 20% 2nd degree or 5% 3rd degree burns, cover burned areas with dry sterile dressings or Water Gel™ wraps.
  - If there is less than 20% 2nd degree or 5% 3rd degree burns, apply wet sterile dressings to burned areas for 15 minutes to aid in pain control. Alternatively, Burn Free™ gel pads or Water Gel™ wraps may be applied continuously to aid in pain control.
- Prevent hypothermia, keep patient warm and insure that all outer layers of dressings are dry.

ALS Level 1

- Pain Management Protocol (see Pediatric Protocol 3.1.5).

ALS Level 2

None

3.10 Children with Special Healthcare 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."[2]

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

1. Priority is given to the ABCs.
2. Do not be overwhelmed by the machines.
3. Listen to the caregiver.
4. If a nurse is present, rely on their judgment.
5. Remember . . . the child's cognitive level of function may be altered.
6. Assume that the child can understand exactly what you say.
7. Bring all medications and equipment to the hospital.

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

1. Child's normal vital signs.
2. Child's actual weight.
3. Developmental level of the child.
4. Child's allergies—include latex.
5. Pertinent medications/therapies.

[2] *American Heart Associantion: PALS Provider Manual, 2002: p. 287*

3.10.1 Home Mechanical Ventilators

Home mechanical ventilators may be indicated for chronically ill children with abnormal respiratory drive, severe chronic lung disease, or severe neuromuscular weakness. Some children require continuous mechanical ventilation, while others only require intermittent support during sleep or acute illness. Home ventilators may either be volume limited or pressure limited. All are equipped with alarms.

Types of ventilator alarms:

1. Low pressure or apnea—may be caused by a loose or disconnected circuit or an air leak in the circuit or at the tracheostoma, resulting in inadequate ventilation.
2. Low power—caused by a depleted battery.
3. High pressure—can be caused by a plugged or obstructed airway or circuit tubing, by coughing, or by bronchospasm.
4. Setting error—is caused by ventilator settings outside the capacity of the equipment.
5. Power switchover—occurs when the unit switches from alternating-current power to the internal battery.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- If ventilator-dependant child is in respiratory distress and the cause is not easily ascertained and corrected, remove the ventilator and provide assisted manual ventilations with a bag-valve device. Suction PRN.
- Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

3.10.2 Tracheostomy

Tracheostomies are indicated for long-term ventilatory support, to bypass an upper airway obstruction, and to aid in the removal of secretions. Tracheostomies come in neonatal, pediatric, and adult sizes and can be either single lumen or double lumen. Special attachments include: tracheostomy nose (filtration device), tracheostomy collar (for oxygen or humidification), and Passymuir valve (speaker valve).

Signs of tracheostomy tube obstruction:

1. Excess secretions.
2. No chest wall movement.
3. Cyanosis.
4. Accessory muscle use.
5. No chest wall rise with bag-valve ventilations.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- If obstruction is present, inject 1–3 ml of Normal Saline into the tracheostomy tube and suction PRN (set suction at 100 mmHg or less).
- If unable to clear obstruction by suctioning, remove tracheostomy tube and insert new tube (same size or one size smaller). **DO NOT FORCE TUBE.**
- If unable to insert new tracheostomy tube or if unavailable, insert endotracheal tube of similar size into stoma and ventilate with bag-valve-device PRN.
- If unable to insert endotracheal tube, ventilate with bag-valve-mask over stoma or over patient's mouth while covering stoma PRN.
- Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

3.10.3 Central Venous Lines

Central venous lines are indicated for administration of medications, delivery of chemotherapy, nutritional support, infusion of blood products, and blood draws. Types of central venous lines include: Broviac/Hickman, Port-a-cath/Med-a-port, and percutaneous intravenous catheters (PIC). Central venous line emergencies include: catheter coming completely out, bleeding at the site, catheter broken in half, blood embolus, thrombus, air embolus, and internal bleeding. **Use of SQ ports require special training and should not be used for IV access.**

Signs of blood embolus, thrombus, air embolus, and internal bleeding:

1. Chest pain.
2. Cyanosis.
3. Dyspnea.
4. Shock.

Supportive Care

- Medical Supportive Care Protocol 3.1.3 (CVP and PIC lines may be used for emergency IV access under sterile conditions).
- If catheter is completely out, apply direct pressure to site.
- If there is bleeding at the site, apply direct pressure.
- If catheter is broken in half, clamp end of remaining tube.
- If suspected blood embolus, thrombus, or internal bleeding: clamp line.
- If suspected air embolism, clamp line and place patient on left side.
- Consider need for other protocols (e.g. Pediatric Protocol 3.2 - Pediatric Respiratory Emergencies).

ALS Level 1

None

ALS Level 2

None

3.10.4 Feeding Tubes

Feeding tubes are indicated for administration of nutritional supplements and in patients that have an inability to swallow. Types of feeding tubes include: nasogastric tube (temporary) and gastrostomy tubes (G-tube). Types of G tubes include those that are surgically placed, percutaneous endoscopic gastrostomy tubes, PEG tubes, and jejunal tubes (J-tube). Complications include: leaks, bleeding around the site, and displacement of the tube.

Supportive Care

- Medical Supportive Care Protocol 3.1.3.
- If catheter is completely out, cover site with Vaseline gauze and apply direct pressure to site.
- If there is bleeding at the site, apply direct pressure.

ALS Level 1

None

ALS Level 2

None

Section 3

HAZARDOUS MATERIALS EXPOSURE

(Chemical Treatment Guidelines)

Chemical Treatment Guide Index

Chemical Name or Group Name	Treatment Guide
ACIDS & ACID MISTS	Guide 1 - YELLOW
ALKALINE COMPOUNDS	Guide 1 - YELLOW
AMMONIA (Liquid & Gas)	Guide 1 - YELLOW
AROMATIC HYDROCARBONS (Benzene, Toluene, Xylene)	Guide 2 - BLUE
ARSENIC COMPOUNDS (or Heavy Metal Poisoning)	Guide 2 - BLUE
BLISTER AGENTS (H, HD, HS)	Guide 1 - YELLOW
CARBAMATE - INSECTICIDE POISONING	Guide 4 - GREEN
CARBON MONOXIDE POISONING	Guide 2 - BLUE
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CHLORINE GAS	Guide 1 - YELLOW
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METHYLENE BIPHENYL ISOCYANATE	Guide 1 - YELLOW
DINITROBENZENE (D.N.B.)	Guide 3 - GRAY
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ETHYL ISOCYANATE	Guide 1 - YELLOW
HYDROCYANIC ACID (AC)	Guide 5 - RED
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HYDROGEN SULFIDE, SULFIDES	Guide 5 - RED
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METHYLENE BIPHENYL ISOCYANATE	Guide 1 - YELLOW
METHYLENE DILSOCYANATE (MDI)	Guide 1 - YELLOW
MUSTARD (SULFUR MUSTARD)	Guide 1 - YELLOW
NERVE AGENTS (GA, GB, GD, GF, VX)	Guide 4 - GREEN
NITROGEN PRODUCTS AND OTHER PRODUCTS CAUSING METHEMOGLOBINEMIA	Guide 3 GRAY
ORGANOPHOSPHATE INSECTICIDE POISONING	Guide 4 - GREEN
PHENOL (Carbolic Acid)	Guide 9- WHITE
PHOSGENE (CG)	Guide 1 - YELLOW
PHOSPHINE	Guide 8- PURPLE
POTASSIUM CYANIDE	Guide 5 - RED
SODIUM CYANIDE	Guide 5 - RED
SULFUR MUSTARD (MUSTARD)	Guide 1 - YELLOW

Adult Chemical Treatment Guide 1A: *YELLOW* ☐

- ACIDS & ACID MISTS
- ALKALINE COMPOUNDS
- AMMONIA (Liquid & Gas)
- CHLORINE GAS AND PHOSGENE (CG)
- METHYLENE BIPHENYL ISOCYANATE, ETHYL ISOCYANATE, AND METHYLENE DILSOCYANATE (MDI)
- MUSTARD (SULFUR MUSTARD)—LEWISITE, BLISTER AGENTS (H, HD, HS)

Signs and symptoms: Low concentrations of airborne acids and alkalis can produce rapid onset of eye, nose, and throat irritation. Higher concentrations (low concentrations of ammonia) can produce cough, stridor, wheezing, chemical pneumonia (non-cardiogenic pulmonary edema). Ingestion of acids and alkalis can result in severe injury to the upper airway, esophagus, and stomach. In addition, there may be circulatory collapse as well as partial or full thickness burns.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Supportive Care

- Remove patient from hazardous area (a).
- If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water. Provide ocular irrigation with normal saline (do not attempt to neutralize with another solution).
- If patient has external burns, see Adult Protocol 2.10.8 (Burn injuries).
- Medical Supportive Care Protocol 2.1.3 (Ipecac, charcoal, and NG tube are contraindicated; avoid oral airways).

- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Noncardiogenic pulmonary edema should not be treated with Lasix, but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If patient has bronchospasm, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment containing 2.5 mg of Albuterol pre-mixed with 2.5 ml normal saline. May repeat twice PRN (b)(c).

  or
  - Levalbuterol (Xopenex®) 1 nebulizer treatment containing 0.63 mg (3 ml) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only** (b)(c).
- If patient has bronchospasm, may give Terbutaline (Brethine®) 0.25 mg SQ, if available.
- If patient has inhaled chlorine or hydrochloric acid (HCl) and has significant respiratory distress, administer Sodium Bicarbonate via nebulizer (8.4% 3ml mixed with Normal Saline 3ml or 4.2% 6ml).
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (d)(e).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(d).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(d).

◆ If hypotension persists, treat PRN (see Adult Protocol 2.4.1).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) **Do not give Albuterol or Ipratropium Bromide if heart rate is ≥140.**

(c) **Caution should be used when the patient is older than 40 years of age or has a history of hypertension or heart disease.**

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(e) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 2A: *BLUE* ■

- AROMATIC HYDROCARBONS (Benzene, Toluene, Xylene)
- ARSENIC COMPOUNDS (or Heavy Metal Poisoning)
- CARBON MONOXIDE POISONING
- CHLORINATED HYDROCARBONS (Methylene Chloride)
- KETONES

Mild exposure signs and symptoms include: cough, hoarseness, headache, poor concentration, irritability, agitation, anxiety, drowsiness, dizziness, weakness, tremors, transient euphoria, vision and hearing disturbances, nausea/vomiting, salivation, diarrhea, stomach pain and chemical burns with chlorinated hydrocarbons **(for Arsenic signs and symptoms see below).**

Moderate to severe exposure signs and symptoms include: cardiovascular collapse, tachy-dysrhythmias (especially ventricular fibrillation), chest pain, pulmonary edema, dyspnea, tachypnea, respiratory failure, paralysis, altered mental status, seizures, excessive salivation, pale skin, cyanosis, rarely cherry red skin with carbon monoxide, and delayed carcinogenic effects **(for Arsenic signs and symptoms see below).**

Signs and symptoms of Arsenic exposure include: severe gastrointestinal fluid loss, burning abdominal pain, watery or bloody diarrhea, muscle spasm, seizures, cardiovascular collapse, tachycardia, hypotension, ventricular dysrhythmias, shock, and coma. There may be respiratory or cardiac arrest and acute renal failure may occur with bronze urine within a few minutes.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Products may be *FLAMMABLE*.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 2.1.3 (Ipecac & NG tube are contraindicated. Avoid oral airways).
- If patient was exposed externally, remove clothing and decontaminate as appropriate. Provide ocular irrigation with normal saline.
- Administer high-flow oxygen (100%) (b).
- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Non-cardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3)(c).
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (d)(e).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(d).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(d).
- If hypotension persists, treat PRN (see Adult Protocol 2.4.1)(c).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Document duration of exposure to CO and when oxygen therapy was started (This information is needed to assist in making HBO decisions).

(c) Administration of Epinephrine to patients in a pre-code status may not be desirable for this group of patients. A physician and or Poison Information Center should guide the administration of Epinephrine in these cases.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(e) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 3A: *GRAY*

- DINITROBENZENE (D.N.B.)
- NITROGEN PRODUCTS AND OTHER PRODUCTS CAUSING METHEMOGLOBINEMIA

Signs and symptoms include: methemoglobinemia characterized by chocolate-brown-colored blood, CNS depression, headache, dizziness, ataxia, vertigo, tinnitus, dyspnea, tachypnea, violent coughing, choking, possible upper airway obstruction spasm or edema of the glottis, abdominal pain, hypotension, heart blocks, ventricular dysrhythmias, seizures (rare), pallor, cyanosis, and cardiovascular collapse.

Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 2.1.3.
- If patient was exposed externally, remove clothing and decontaminate as appropriate.
- Administer high-flow oxygen (100%).
- **Contact Poison Information Center (1-800-222-1222).**
- If Nitrogen Product ingestion, administer Activated Charcoal 50 gm PO.

ALS Level 1

- If the patient is dyspneic, cyanotic, normal SpO_2 and has chocolate-brown-colored blood, administer Methylene Blue (1%) 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.
- If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3).
- If patient is seizing, administer one of the following benzodiazepines:

- Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (b)(c).

or

- Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(b).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(b).

- If hypotension persists, treat PRN (see Adult Protocol 2.4.1).
- Do not induce vomiting.

ALS Level 2

- If cyanosis persists, administer Methylene Blue (1%) 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 4A: *GREEN*

- CARBAMATE - INSECTICIDE POISONING
- ORGANOPHOSPHATE - INSECTICIDE POISONING AND NERVE AGENTS (GA, GB, GD, GF, VX)

Signs and symptoms The muscarinic effects are described as the classic **SLUDGE** syndrome (excessive Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal distress, and Emesis). Additional muscarinic effects include: bronchorrhea, bronchospasm, and bradycardia. The patient will have **constricted pupils** (miosis, which may last up to two months—despite appropriate treatment) with inhalation or skin exposure. Ingestion may or may not cause myosis. However, stimulation of nicotinic receptors will produce tachycardia, muscle paralysis (apnea), muscle twitching/fasciculations, and seizures.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to patient's sweat, vomit, stool, and vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 2.1.3, administer high-flow O_2.
- If patient was exposed externally, remove clothing and decontaminate as appropriate (place clothes in sealed bag).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level I

If treating 1 to 4 patients:

- If patient is bradycardic (patient is usually tachycardic) or has excessive pulmonary secretions, administer Atropine 0.03 mg/kg IV (2 mg/70 kg). Repeat every 5 minutes until secretions are inhibited (b)(c).

- If Organophosphate, Consider Pralidoxime (Protopam®, 2-PAM®) 1–2 gm mixed in 100 ml NS IV drip over 30 minutes. In severe cases, 2-PAM® may be given IV at a maximum rate of 200 mg/minute or 1 gm/5 minutes (used when nicotinic effects are present as evidenced by fasciculation of large muscles). Observe patient for hypertension. (May be needed with high exposure to Carbamates) (c).
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (d)(e).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(d).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(d).

If treating 5 or more patients or self-exposure (with PINPOINT PUPILS):

- Administer **Mark I kit(s)** (two autoinjectors containing Atropine 2mg in one and Pralidoxime 600mg in the other) as follows:
  - *For early symptoms (severe rhinorrhea or mild to moderate dyspnea),* administer one (1) Mark I autoinjector kit. If no improvement in patient's status in 10 minutes, administer another Mark I autoinjector kit (c)(f).
  - *For severe respiratory distress, coma, or seizures,* administer three (3) Mark I autoinjectors and one (1) CANA autoinjector (Diazepam 10mg IM) (c)(f).

For all patients meeting above criteria:

- Alert emergency department to prepare for contaminated patient.
- Do *not* induce vomiting or give Furosemide (Lasix®) or Morphine.

- If patient is experiencing eye pain and/or blepharospasm, administer Scopalomine 1 drop in each eye.

ALS Level 2

None

NOTE

(a) **Risk of exposure from fumes is high, call HAZMAT team. PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.**

(b) If advised by Poison Information Center, every other dose of Atropine can be increased to 0.06 mg/kg IV.

(c) End point for treatment is manifested by patient improvement with clear lung sounds.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(e) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

(f) When possible, establish IV and administer Atropine, Diazepam, Lorazepam, and Midazolam IV and Pralidoxime IV drip.

Adult Chemical Treatment Guide 5A: *RED*

- CYANIDE—HYDROGEN CYANIDE, HYDROCYANIC ACID (AC), CYANOGEN CHLORIDE (CK)
- HYDROGEN SULFIDE, SULFIDES & MERCAPTANS
- AZIDES

Signs and symptoms include: Cardiovascular - initially, pulse decreases and BP rises, in later stages, possible tachycardia, dysrhythmias and cardiovascular collapse can occur, there may also be palpitations and/or chest tightness. Respiratory—can cause immediate respiratory arrest, although initially there is usually an increase in the rate and depth of respirations, and later becoming slow and gasping, possible irritation of the respiratory tract, cough, dyspnea, tachypnea, and pulmonary edema. CNS—can cause immediate coma, although initially there is usually weakness, headache, and confusion; seizures are common. GI—nausea/vomiting, salivation may be profuse, possible garlic taste in mouth. Skin—pale, cyanotic or reddish color, dermatitis, sweating.

Good Medical Supportive Care, including airway management, is paramount and should precede the use of the Cyanide Antidote Kit. However, the rapid administration of the Cyanide Antidote Kit will be the only therapy that will reverse the life-threatening symptoms.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 2.1.3, administer high-flow O_2.
- If patient was exposed externally, remove clothing quickly and decontaminate.
- **Contact Poison Information Center (1-800-222-1222).**
- If conscious, administer Activated Charcoal 50 gm PO for oral ingestion.

- **Only a physician or the Poison Information Center can authorize treatment beyond Supportive Care for exposure to azides.**

ALS Level 1

- If unconscious, administer Sodium Bicarbonate 1 mEq/kg IV.
- If patient is exhibiting life-threatening symptoms (severe respiratory compromise or arrest, shock, seizures, coma), administer Cyanide Antidote Kit (3 parts) in the following order (to induce methemoglobinemia). **If symptoms are not severe, or if diagnosis is not certain, omit steps 1 & 2 and only give Sodium Thiosulfate (step 3). Non-HAZMAT Paramedics and Non-Rescue Supervisors can only give Sodium Thiosulfate.**

Rescue Supervisor and HAZMAT Paramedic:

(1) Amyl Nitrite (break pearls into gauze sponge and hold under patient's nose or BVD intake valve) for 15 to 30 seconds of each minute, until sodium nitrite solution is ready (b).

(2) Sodium Nitrite 3% *(300 mg/10 ml)* 10 ml (or 0.35 ml/kg) at 2.5 to 5 ml/minute IV.

All Paramedics:

(3) Sodium Thiosulfate 25% 12.5 gm (50 ml) IV. **(Contraindicated for Hydrogen Sulfide exposure)**

- If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3).
- If hypotension persists, treat PRN (see Adult Protocol 2.4.1).
- Alert emergency department to prepare for contaminated patient.
- Do not induce vomiting.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (c)(d).

or

- Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(c).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(c).

ALS Level 2

- If symptoms persist after 20 minutes, repeat Cyanide Antidote Kit at 50% of initial dose.
- If patient becomes cyanotic after the cyanide antidote kit, contact Poison Information Center (1-800-222-1222) for further instructions.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) If patient has IV access and received supportive care, step 1 may be by-passed for step 2.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 6A: *PINK*

- ETHYLENE GLYCOL
- METHANOL

The clinical manifestations of ethylene glycol poisoning are described in three phases: Phase I (30 minutes to 12 hours)—ethanol-like inebriation, metabolic acidosis, seizures, and coma. Phase 2 (12 to 36 hours)—tachycardia, tachypnea, hypertension, pulmonary edema. Phase 3 (36 to 48 hours)—crystalluria, acute tubular necrosis with oliguria—renal failure.

Signs and symptoms of methanol exposure include: Cardiovascular—dysrhythmias and hypotension. Respiratory—respiratory insufficiency or arrest, pulmonary edema, chemical pneumonitis, and bronchitis. CNS—CNS depression and coma, seizures, headache, muscle weakness, and delirium. GI—GI bleeding, nausea/vomiting, and diarrhea. Eye—chemical conjunctivitis. Skin—irritation to full thickness burns.

Supportive Care

- Remove patient from hazardous area.
- Medical Supportive Care Protocol 2.1.3.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (a)(b).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(a).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(a).
- If lungs are clear, administer Normal Saline @ 100 ml/hr IV.
- If respiratory rate is twice normal rate, administer Sodium Bicarbonate 8.4% 1-2 mEq/kg IV.
- If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3).
- Administer Thiamine 100 mg IV, if available.

ALS Level 2

None

NOTE

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(b) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3-5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 7A: ORANGE

- HYDROFLUORIC ACID (HF)
- VICANE

Signs and symptoms of exposure include: hypovolemic shock and collapse, tachycardia with weak pulse, acute pulmonary edema, asphyxia, chemical pneumonitits, upper airway obstruction with stridor, pain and cough, decreased LOC, nausea/vomiting, diarrhea, possible GI bleeding, and possible blindness. HF also causes severe skin burns. The damage may be severe with no outward signs, except that the patient will complain of severe pain.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 2.1.3 (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water.
- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Noncardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- **If patient has burns to eye(s):**
  - Immediately flush with copious amounts of water or normal saline.
  - Prepare an eye wash solution by mixing Calcium Gluconate (10%) 50 ml in NS 500 ml (b).

  - Apply Calcium Gluconate eye wash using the Morgan Therapeutic Lens and continue until arrival at receiving facility (b).
- **If patient has burns to the skin:**
  - Immediately flush with copious amounts of water.
  - Prepare skin gel by mixing Calcium Gluconate (10%) 10 ml into a 2 oz tube of KY jelly (making a 2.5% gel)(b).
  - Apply a 2.5% Calcium Gluconate Gel on burned area. For burns to hand(s) place hand in glove filled with this gel (b).
- **For inhalation injury:**
  - Immediately support ventilations.
  - Administer Calcium Gluconate (10%) 1 ml mixed with 3 ml NS via nebulizer (b).
  - For severe respiratory depression/arrest and/or cardiac toxicity (dysrhythmia—prolonged QT interval, hypotension), administer Calcium Gluconate (10%) 1-2 g slow IV over 5 minutes (b).
- If patient has dysrhythmias, provide additional treatment PRN (see Adult Protocol 2.3).
- If hypotension persists, treat PRN (see Adult Protocol 2.4.1).

ALS Level 2

- If systemic symptoms persist, repeat Calcium Gluconate (10%) 1-2 g slow IV over 5 minutes (b).

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) **DO NOT USE Calcium Carbonate as the outcome can be disastrous.**

Adult Chemical Treatment Guide 8A: *PURPLE*

- PHOSPHINE

Signs and symptoms of ketone exposure include: Cardiovascular—cardiac dysrhythmias and tachycardia. Respiratory—upper respiratory tract irritation, dyspnea, tachypnea, a burning sensation in the chest and pulmonary edema. CNS—CNS depression to coma, confusion, tinnitus, disorientation, headache, drowsiness, weakness, and seizures. GI—pain and irritation of the mucous membranes, nausea/vomiting, and diarrhea. Eye—chemical conjunctivitis. Skin—irritation and dermatitis, cyanosis of extremities.

Signs and symptoms of phosphine exposure include: Cardiovascular—cardiovascular collapse with weak and rapid pulse. It can show a reflex bradycardia. Respiratory—a mild and transient cough is the only symptom at the time of exposure to most agents. A delayed onset of dyspnea, tachypnea, violent coughing and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and possible upper airway obstruction spasm or edema of the glottis. CNS—fatigue, restlessness, and decreased LOC are usually delayed signs. GI—burning of the mucous membranes, nausea/vomiting, and abdominal pain. Eye—chemical conjunctivitis. Skin—irritation of moist skin areas, pallor and cyanosis. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.

- Medical Supportive Care Protocol 2.1.3, administer 100% high-flow oxygen (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and decontaminate as appropriate (do not use water as an initial irrigating solution for *Phosphine exposure* due to possible reactivity). Provide ocular irrigation with normal saline.
- **Contact Poison Information Center (1-800-222-1222).**
- For Phosphine ingestion, administer Activated Charcoal 50 gm PO.
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Noncardiogenic pulmonary edema should *not* be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (b)(c).

  or
  - Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(b).

  or
  - Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(b).
- If patient has dysrhythmias, treat PRN (see Adult Protocol 2.3).
- If hypotension persists, treat PRN (see Adult Protocol 2.4.1).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Adult Chemical Treatment Guide 9A: *WHITE* ☐

- PHENOL (CARBOLIC ACID)

Signs and symptoms of exposure include: nausea/vomiting, diarrhea, excessive sweating, headache, dizziness, ringing in the ears, seizures, loss of consciousness, coma, respiratory depression, inflammation of the respiratory tract, shock, and death. Exposure to skin can result in severe burns, which will cause the skin to have a white, red or brown appearance. Failure to decontaminate the skin may allow the Phenol to absorb into the system and result in death.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 2.1.3 (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and decontaminate with copious amounts of water.
  - After thoroughly rinsing skin, apply vegetable oil or mineral oil or Polyethylene glycol (PEG) to exposed areas. (Isopropyl alcohol may be used for *very* small skin burns only.)
  - Provide ocular irrigation with normal saline.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level I

- Assess need for intubation.
- If patient is seizing, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 5mg IV. If unable to start IV, administer Diazepam 5 mg intranasal or 10 mg per rectum. May repeat PRN up to 20 mg maximum dose (b)(c).

or

- Lorazepam (Ativan®) 2 mg IV. If unable to start IV, administer Lorazepam 2 mg IM. May repeat once PRN (4 mg maximum dose)(b).

or

- Midazolam (Versed®) 2 mg IV. If unable to start IV, administer Midazolam 2 mg intranasal. May repeat once PRN (4 mg maximum dose)(b).

◆ If hypotension persists, treat PRN (see Adult Protocol 2.4.1).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use Diastat® (commercial preparation of rectal diazepam), if available. If Diastat® is not available, use a lubricated tuberculin or 3–5 ml syringe **without the needle** to administer diazepam (Valium®). Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm (approx. 2 in) into the rectum. Inject diazepam, remove syringe and tape buttocks closed.

Pediatric Chemical Treatment Guide 1P: *YELLOW* ☐

- ACIDS & ACID MISTS
- ALKALINE COMPOUNDS
- AMMONIA (Liquid & Gas)
- CHLORINE GAS AND PHOSGENE (CG)
- METHYLENE BIPHENYL ISOCYANATE, ETHYL ISOCYANATE, AND METHYLENE DILSOCYANATE (MDI)
- MUSTARD (SULFUR MUSTARD)—LEWISITE, BLISTER AGENTS (H, HD, HS)

Signs and symptoms: Low concentrations of airborne acids and alkalis can produce rapid onset of eye, nose, and throat irritation. Higher concentrations (low concentrations of ammonia) can produce cough, stridor, wheezing, chemical pneumonia (non-cardiogenic pulmonary edema). Ingestion of acids and alkalis can result in severe injury to the upper airway, esophagus, and stomach. In addition, there may be circulatory collapse as well as partial or full thickness burns.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Supportive Care

◆ Remove patient from hazardous area (a).

◆ If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water. Provide ocular irrigation with normal saline (do not attempt to neutralize with another solution).

◆ If patient has external burns, see Adult Protocol 3.9.7 (Burn injuries).

- Medical Supportive Care Protocol 3.1.3 (Ipecac, charcoal, and NG tube are contraindicated; avoid oral airways).
- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Noncardiogenic pulmonary edema should not be treated with Lasix, but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If patient has bronchospasm, choose one of the following bronchodilators:
  - Albuterol (Ventolin®) 1 nebulizer treatment (if <1 year or <10 kg, mix 1.25 mg in 1.5 ml of Normal Saline {0.083%}; if >1 year or >10 kg, mix 2.5 mg in 3 ml of Normal Saline {0.083%}). May repeat twice PRN (a).

  or

  - Levalbuterol (Xopenex®) 1 nebulizer treatment (if 6-11 years: 0.13 mg {3 ml}; if ≥ 12 years: 0.63 mg {3 ml}) of Levalbuterol. May repeat twice PRN.
- If bronchodilators are administered, may add Ipratropium Bromide (Atrovent®) 0.5 mg (0.5 ml) to either Albuterol or Levalbuterol nebulizer treatment **on first nebulizer treatment only.**
- If patient has inhaled chlorine or hydrochloric acid (HCl) and has significant respiratory distress, administer Sodium Bicarbonate via nebulizer (8.4% 3ml mixed with Normal Saline 3ml or 4.2% 6ml).
- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (c)(d)(e).

  or

  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (c).

or

- Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (c).

- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) **Do not give Albuterol if heart rate is ≥200.**

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(e) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Pediatric Chemical Treatment Guide 2P: *BLUE*

- AROMATIC HYDROCARBONS (Benzene, Toluene, Xylene)
- ARSENIC COMPOUNDS (or Heavy Metal Poisoning)
- CARBON MONOXIDE POISONING
- CHLORINATED HYDROCARBONS (Methylene Chloride)
- KETONES

Mild exposure signs and symptoms include: cough, hoarseness, headache, poor concentration, irritability, agitation, anxiety, drowsiness, dizziness, weakness, tremors, transient euphoria, vision and hearing disturbances, nausea/vomiting, salivation, diarrhea, stomach pain and chemical burns with chlorinated hydrocarbons **(for Arsenic signs and symptoms see below).**

Moderate to severe exposure signs and symptoms include: cardiovascular collapse, tachy-dysrhythmias (especially ventricular fibrillation), chest pain, pulmonary edema, dyspnea, tachypnea, respiratory failure, paralysis, altered mental status, seizures, excessive salivation, pale skin, cyanosis, rarely cherry red skin with carbon monoxide, and delayed carcinogenic effects **(for Arsenic signs and symptoms see below).**

Signs and symptoms of Arsenic exposure include: severe gastrointestinal fluid loss, burning abdominal pain, watery or bloody diarrhea, muscle spasm, seizures, cardiovascular collapse, tachycardia, hypotension, ventricular dysrhythmias, shock, and coma. There may be respiratory or cardiac arrest and acute renal failure may occur with bronze urine within a few minutes.

End-stage symptoms may resemble organophosphate poisoning. However, patients will have NORMAL OR DILATED PUPILS (patient will not have pinpoint pupils). These patients should not be given Atropine or 2-PAM.

Products may be *FLAMMABLE*.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 3.1.3 (Ipecac & NG tube are contraindicated. Avoid oral airways).
- If patient was exposed externally, remove clothing and decontaminate as appropriate. Provide ocular irrigation with normal saline.
- Administer high-flow oxygen (100%) (b).
- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Non-cardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If patient has dysrhythmias, treat PRN (see Pediatric Protocol 3.3)(c).
- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (d)(e)(f).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (d).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (d).
- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Document duration of exposure to CO and when oxygen therapy was started (This information is needed to assist in making HBO decisions).

(c) Administration of Epinephrine to patients in a pre-code status may not be desirable for this group of patients. A physician and or Poison Information Center should guide the administration of Epinephrine in these cases.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(f) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Pediatric Chemical Treatment Guide 3P: *GRAY*

- DINITROBENZENE (D.N.B.)
- NITROGEN PRODUCTS AND OTHER PRODUCTS CAUSING METHEMOGLOBINEMIA

Signs and symptoms include: methemoglobinemia characterized by chocolate-brown-colored blood, CNS depression, headache, dizziness, ataxia, vertigo, tinnitus, dyspnea, tachypnea, violent coughing, choking, possible upper airway obstruction spasm or edema of the glottis, abdominal pain, hypotension, heart blocks, ventricular dysrhythmias, seizures (rare), pallor, cyanosis, and cardiovascular collapse.

Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 3.1.3.
- If patient was exposed externally, remove clothing and decontaminate as appropriate.
- Administer high-flow oxygen (100%).
- **Contact Poison Information Center (1-800-222-1222).**
- If Nitrogen Product ingestion, administer Activated Charcoal 1g/kg (maximum 50 gm) PO.

ALS Level 1

- If the patient is dyspneic, cyanotic, normal SpO_2 and has chocolate-brown-colored blood, administer Methylene Blue (1%) 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.
- If patient has dysrhythmias, treat PRN (see Pediatric Protocol 3.3).

- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (b)(c)(d).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (b).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (b).
- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).
- Do *not* induce vomiting.

ALS Level 2

- If cyanosis persists, administer Methylene Blue (1%) 1-2 mg/kg slow IV over 5 minutes, followed by a NS 30 ml flush to decrease pain at site.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(d) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Pediatric Chemical Treatment Guide 4P: *GREEN*

- CARBAMATE—INSECTICIDE POISONING
- ORGANOPHOSPHATE—INSECTICIDE POISONING AND NERVE AGENTS (GA, GB, GD, GF, VX)

Signs and symptoms The muscarinic effects are described as the classic **SLUDGE** syndrome (excessive Salivation, Lacrimation, Urination, Diarrhea, Gastrointestinal distress, and Emesis). Additional muscarinic effects include: bronchorrhea, bronchospasm, and bradycardia. The patient will have **constricted pupils** (miosis, which may last up to two months—despite appropriate treatment) with inhalation or skin exposure. Ingestion may or may not cause myosis. However, stimulation of nicotinic receptors will produce tachycardia, muscle paralysis (apnea), muscle twitching/fasciculations, and seizures.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to patient's sweat, vomit, stool, and vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 3.1.3, administer high-flow O_2.
- If patient was exposed externally, remove clothing and decontaminate as appropriate (place clothes in sealed bag).
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

If treating 1 to 4 patients:

- If patient is bradycardic (patient is usually tachycardic) or has excessive pulmonary secretions, administer Atropine 0.05 mg/kg IV (maximum 3 mg). Repeat every 5 minutes until secretions are inhibited (b)(c).

- If Organophosphate, Consider Pralidoxime (Protopam®, 2-PAM®) 1–2 gm mixed in 100 ml NS IV drip over 30 minutes. In severe cases, 2-PAM® may be given IV at a maximum rate of 200 mg/minute or 1 gm/5 minutes (used when nicotinic effects are present as evidenced by fasciculation of large muscles). Observe patient for hypertension. (May be needed with high exposure to Carbamates) (c).
- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (d)(e)(f).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (d).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (d).

If treating 5 or more patients OVER 8 YEARS OF AGE or self-exposure (with PINPOINT PUPILS):

- Administer **Mark I kit(s)** (two autoinjectors containing Atropine 2mg in one and Pralidoxime 600mg in the other) (see Medical Procedure 4.17) as follows:
  - For *early symptoms* (severe rhinorrhea or mild to moderate dyspnea), administer one (1) Mark I autoinjector kit. If no improvement in patient's status in 10 minutes, administer another Mark I autoinjector kit (c)(g).
  - For severe respiratory distress, coma, or seizures, administer three (3) Mark I autoinjectors and one (1) CANA autoinjector (Diazepam 10mg IM) (c)(g).

For all patients meeting above criteria:

- Alert emergency department to prepare for contaminated patient.
- Do not induce vomiting or give Furosemide (Lasix®) or Morphine.
- If patient is experiencing eye pain and/or blepharospasm, administer Scopalomine 1 drop in each eye.

ALS Level 2

None

NOTE

(a) **Risk of exposure from fumes is high, call HAZMAT team. PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.**

(b) If advised by Poison Information Center, every other dose of Atropine can be increased to 0.06 mg/kg IV.

(c) End point for treatment is manifested by patient improvement with clear lung sounds.

(d) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(e) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(f) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

(g) When possible, establish IV and administer Atropine, Diazepam, Lorazepam, and Midazolam IV and Pralidoxime IV drip.

Pediatric Chemical Treatment Guide 5P: *RED*

- CYANIDE—HYDROGEN CYANIDE, HYDROCYANIC ACID (AC), CYANOGEN CHLORIDE (CK)
- HYDROGEN SULFIDE, SULFIDES & MERCAPTANS
- AZIDES

Signs and symptoms include: Cardiovascular—initially, pulse decreases and BP rises, in later stages, possible tachycardia, dysrhythmias and cardiovascular collapse can occur, there may also be palpitations and/or chest tightness. Respiratory—can cause immediate respiratory arrest, although initially there is usually an increase in the rate and depth of respirations, and later becoming slow and gasping, possible irritation of the respiratory tract, cough, dyspnea, tachypnea, and pulmonary edema. CNS—can cause immediate coma, although initially there is usually weakness, headache, and confusion; seizures are common. GI—nausea/vomiting, salivation may be profuse, possible garlic taste in mouth. Skin—pale, cyanotic or reddish color, dermatitis, sweating.

Good Medical Supportive Care, including airway management, is paramount and should precede the use of the Cyanide Antidote Kit. However, the rapid administration of the Cyanide Antidote Kit will be the only therapy that will reverse the life-threatening symptoms.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 3.1.3, administer high-flow O_2.
- If patient was exposed externally, remove clothing quickly and decontaminate.
- **Contact Poison Information Center (1-800-222-1222).**

- If conscious, administer Activated Charcoal 1gm/kg (maximum 50 gm) PO for oral ingestion.
- **Only a physician or the Poison Information Center can authorize treatment beyond Supportive Care for exposure to azides.**

ALS Level 1

- If unconscious, administer Sodium Bicarbonate 1 mEq/kg IV.
- If patient is exhibiting life-threatening symptoms (severe respiratory compromise or arrest, shock, seizures, coma), administer Cyanide Antidote Kit (3 parts) in the following order (to induce methemoglobinemia). **If symptoms are not severe, or if diagnosis is not certain, omit steps 1 & 2 and only give Sodium Thiosulfate (step 3). Non-HAZMAT Paramedics and Non-Rescue Supervisors can only give Sodium Thiosulfate.**

  Rescue Supervisor and HAZMAT Paramedic:

  (1) Amyl Nitrite (break pearls into gauze sponge and hold under patient's nose or BVD intake valve) for 15 to 30 seconds of each minute, until sodium nitrite solution is ready (b).

  (2) Sodium Nitrite 3% *(300 mg/10 ml)* 0.33 ml/kg slow IV over 5 minutes.

  All Paramedics:

  (3) Sodium Thiosulfate 25% 1.65 ml/kg IV. **(Contraindicated for Hydrogen Sulfide exposure)**
- If patient has dysrhythmias, treat PRN (see Adult Protocol 3.3).
- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).
- Alert emergency department to prepare for contaminated patient.
- Do not induce vomiting.

- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (c)(d)(e).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (c).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (c).

ALS Level 2

- If symptoms persist after 20 minutes, repeat Cyanide Antidote Kit at 50% of initial dose.
- If patient becomes cyanotic after the cyanide antidote kit, contact Poison Information Center (1-800-222-1222) for further instructions.

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) If patient has IV access and received supportive care, step 1 may be by-passed for step 2.

(c) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(d) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(e) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Pediatric Chemical Treatment Guide 6P: *PINK*

- ETHYLENE GLYCOL
- METHANOL

The clinical manifestations of ethylene glycol poisoning are described in three phases: Phase 1 (30 minutes to 12 hours)—ethanol-like inebriation, metabolic acidosis, seizures, and coma. Phase 2 (12 to 36 hours)—tachycardia, tachypnea, hypertension, pulmonary edema. Phase 3 (36 to 48 hours)—crystalluria, acute tubular necrosis with oliguria—renal failure.

Signs and symptoms of methanol exposure include: Cardiovascular—dysrhythmias and hypotension. Respiratory—respiratory insufficiency or arrest, pulmonary edema, chemical pneumonitis, and bronchitis. CNS—CNS depression and coma, seizures, headache, muscle weakness, and delirium. GI—GI bleeding, nausea/vomiting, and diarrhea. Eye—chemical conjunctivitis. Skin—irritation to full thickness burns.

Supportive Care

- Remove patient from hazardous area.
- Medical Supportive Care Protocol 3.1.3.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (a)(b)(c).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (a).

or

- Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (a).

- If lungs are clear, administer Normal Saline & 2 ml/kg/hr IV.
- If respiratory rate is twice normal rate, administer Sodium Bicarbonate 8.4% 1-2 mEq/kg IV.
- If patient has dysrhythmias, treat PRN (see Pediatric Protocol 3.3).
- Administer Thiamine 100 mg IV, if available.

ALS Level 2

None

NOTE

(a) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(b) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(c) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Pediatric Chemical Treatment Guide 7P: *ORANGE*

- HYDROFLUORIC ACID (HF)
- VICANE

Signs and symptoms of exposure include: hypovolemic shock and collapse, tachycardia with weak pulse, acute pulmonary edema, asphyxia, chemical pneumonitis, upper airway obstruction with stridor, pain and cough, decreased LOC, nausea/vomiting, diarrhea, possible GI bleeding, and possible blindness. HF also causes severe skin burns. The damage may be severe with no outward signs, except that the patient will complain of severe pain.

Supportive Care

- Remove patient from hazardous area (a).
- Medical Supportive Care Protocol 3.1.3 (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and jewelry and decontaminate with copious amounts of water.
- **Contact Poison Information Center (1-800-222-1222).**
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Non-cardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- **If patient has burns to eye(s):**
  - Immediately flush with copious amounts of water or normal saline.
  - Prepare an eye wash solution by mixing Calcium Gluconate (10%) 50 ml in NS 500 ml (b).

- Apply Calcium Gluconate eye wash using the Morgan Therapeutic Lens and continue until arrival at receiving facility (b).

- **If patient has burns to the skin:**
  - Immediately flush with copious amounts of water.
  - Prepare skin gel by mixing Calcium Gluconate (10%) 10 ml into a 2 oz tube of KY jelly (making a 2.5% gel)(b).
  - Apply a 2.5% Calcium Gluconate Gel on burned area. For burns to hand(s) place hand in glove filled with this gel (b).
- **For inhalation injury:**
  - Immediately support ventilations.
  - Administer Calcium Gluconate (10%) 1 ml mixed with 3 ml NS via nebulizer (b).
  - For severe respiratory depression/arrest and/or cardiac toxicity (dysrhythmia—prolonged QT interval, hypotension), administer Calcium Gluconate (10%) 100 mg/kg (maximum 1 gm) slow IV over 5 minutes (b).
- If patient has dysrhythmias, provide additional treatment PRN (see Pediatric Protocol 3.3).
- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS Level 2

- If systemic symptoms persist, repeat Calcium Gluconate (10%) 100 mg/kg (maximum 1 gm) slow IV over 5 minutes (b).

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) **DO NOT USE Calcium Carbonate as the outcome can be disastrous.**

Pediatric Chemical Treatment Guide 8P: *PURPLE*

- PHOSPHINE

Signs and symptoms of ketone exposure include: Cardiovascular—cardiac dysrhythmias and tachycardia. Respiratory—upper respiratory tract irritation, dyspnea, tachypnea, a burning sensation in the chest and pulmonary edema. CNS—CNS depression to coma, confusion, tinnitus, disorientation, headache, drowsiness, weakness, and seizures. GI—pain and irritation of the mucous membranes, nausea/vomiting, and diarrhea. Eye—chemical conjunctivitis. Skin—irritation and dermatitis, cyanosis of extremities.

Signs and symptoms of phosphine exposure include: Cardiovascular—cardiovascular collapse with weak and rapid pulse. It can show a reflex bradycardia. Respiratory—a mild and transient cough is the only symptom at the time of exposure to most agents. A delayed onset of dyspnea, tachypnea, violent coughing and pulmonary edema follows. Some agents work immediately on the upper airway, resulting in pain and choking, spasm of the glottis, temporary reflex arrest of breathing and possible upper airway obstruction spasm or edema of the glottis. CNS—fatigue, restlessness, and decreased LOC are usually delayed signs. GI—burning of the mucous membranes, nausea/vomiting, and abdominal pain. Eye—chemical conjunctivitis. Skin—irritation of moist skin areas, pallor and cyanosis. Note: symptoms may be immediate or may be delayed for 5 to 72 hours.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.

- Medical Supportive Care Protocol 3.1.3, administer 100% high-flow oxygen (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and decontaminate as appropriate (do not use water as an initial irrigating solution for Phosphine exposure due to possible reactivity). Provide ocular irrigation with normal saline.
- **Contact Poison Information Center (1-800-222-1222).**
- For Phosphine ingestion, administer Activated Charcoal 1 gm/kg (maximum 50 gm) PO.
- If patient has pulmonary edema, maintain adequate ventilation and oxygenation, as well as providing pulmonary suction to remove fluid. **Non-cardiogenic pulmonary edema should not be treated with Furosemide (Lasix®), but with positive end expiratory pressure (PEEP) or CPAP mask.**

ALS Level 1

- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (b)(c)(d).

  or
  - Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (b).

  or
  - Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (b).
- If patient has dysrhythmias, treat PRN (see Pediatric Protocol 3.3).
- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **PPE (usually Level A) with SCBA must be worn in hazardous area. PPE with minimum of Level C protection must be worn for treatment outside of the hazardous areas.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(d) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.

Hazmat Exposure
Pediatric Chemical Treatment Guide 8P

Pediatric Chemical Treatment Guide 9P: *WHITE* ☐

- PHENOL (CARBOLIC ACID)

Signs and symptoms of exposure include: nausea/vomiting, diarrhea, excessive sweating, headache, dizziness, ringing in the ears, seizures, loss of consciousness, coma, respiratory depression, inflammation of the respiratory tract, shock, and death. Exposure to skin can result in severe burns, which will cause the skin to have a white, red or brown appearance. Failure to decontaminate the skin may allow the Phenol to absorb into the system and result in death.

Supportive Care

- Remove patient from hazardous area (a).
- Avoid exposure to vapor emitting from soaked clothes.
- Medical Supportive Care Protocol 3.1.3 (Ipecac is contraindicated).
- If patient was exposed externally, remove clothing and decontaminate with copious amounts of water.
  - After thoroughly rinsing skin, apply vegetable oil or mineral oil or Polyethylene glycol (PEG) to exposed areas. (Isopropyl alcohol may be used for very small skin burns only.)
  - Provide ocular irrigation with normal saline.
- **Contact Poison Information Center (1-800-222-1222).**

ALS Level 1

- Assess need for intubation.
- If seizure continues for 5 minutes, administer one of the following benzodiazepines:
  - Diazepam (Valium®) 0.5 mg/kg (maximum 10 mg) rectally. If IV is available prior to seizure, administer Diazepam (Valium®) 0.2 mg/kg IV (b)(c)(d).

or

- Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IM. If IV is available prior to seizure, administer Lorazepam (Ativan®) 0.1 mg/kg (maximum total dose 4 mg) IV (b).

or

- Midazolam (Versed®) 0.1 mg/kg (maximum 2 mg) IV (b).

- If hypotension persists, administer 20 ml/kg Normal Saline IV PRN (maximum 60 ml/kg total).

ALS Level 2

None

NOTE

(a) If risk of exposure from fumes is high, call HAZMAT team. **Refer to appropriate Hazmat PPE protocol, as the risk of secondary contamination is very high.**

(b) Intranasal administration of benzodiazepines requires the use of a mucosal atomization device.

(c) Use a lubricated tuberculin or 3–5 ml syringe **without the needle.** Position patient in a decubitus knee position or supine with legs held apart and insert lubricated syringe approximately 5 cm into the rectum. Inject Diazepam, remove syringe and tape buttocks closed.

(d) If Diastat® (rectal diazepam preparation) is used, administer 2.5 mg.