Section I

Scope of Practice
Scope of Practice

A. Scope of practice for a First Responder

1. Patient assessment and triage
2. Basic wound management, including hemorrhage control
3. Bandaging and splinting of fractures
4. Basic life support including use of an SAED
5. Such other skills contained within the Department of Transportation National Standard First Responder Curriculum

Upon the approval of the Department, and recommendation of the council, additional skills may be authorized upon the written request of a local medical director, if such skills do not exceed the scope of practice for certification.

(O.A.C. 310:641-5-30. Standards of Practice)

A. A licensed emergency medical technician basic (EMT-B) may perform to the following level or standard of care;

(1) Patient assessment, including the determination of vital signs, diagnostic signs, and triage;
(2) Bandaging, splinting, and the control of hemorrhage;
(3) Treatment of shock, including the use of pneumatic anti-shock trousers (PASG);
(4) Cardiopulmonary resuscitation (CPR) and the use of only adjunctive airway devices and the use of a semi-automated external defibrillator (SAED);
(5) The maintenance of intravenous fluids, without medications and/or drugs added;
(6) Rescue and extrication procedures;
(7) Assistance of patient prescribed medications, including sublingual nitroglycerin, epinephrine auto injector and hand held aerosol inhalers;
(8) Administration of oral glucose, activated charcoal, aspirin, agency supplied epinephrine auto inject, and albuterol per local medical direction;
(9) All other emergency medical care skills and measures included in the standard United States Department of Transportation basic emergency medical technician training curriculum which are not specifically listed above, and;
(10) Upon the approval of the Department, and recommendation of the Council, additional skills may be authorized upon the written request of a local medical director. Authorized skills for the EMT-B may be reduced or limited by local medical direction.

B. A licensed emergency medical technician intermediate (EMT-I) may perform to the following level or standard of care;

(1) All skills listed in Subsection 310:641-5-30(a) for the EMT-B;
(2) Establishment of vascular access for the administration of intravenous fluids, without medications and/or drugs added;
(3) Administration of medications per local medical direction and approved by the Department;
(4) Venipuncture to obtain blood samples;
(5) The use and placement of definitive airway adjuncts for adults, children and infants;
(6) Upon the approval of the Department, and recommendation of the Council, additional skills may be authorized upon the written request of a local medical director.
Oklahoma State EMS Protocols

Scope of Practice (310:641-5-30. Standards of Practice)(Cont.)

C. A licensed emergency medical technician paramedic (EMT-P) may perform to the following level or standard of care;

1. All skills listed in Subsection 310:641-5-30(a), for the EMT-B and Subsection 310:641-5-30(b), for the EMT-I;
2. The recognition, interpretation, treatment of cardiac arrhythmias using a cardiac monitor/defibrillator/external pacemaker;
3. The advanced management of pediatric emergencies, including resuscitation, advanced airway placement, and administration of pediatric medication;
4. The advanced management of obstetric and gynecologic emergencies, including medication administration;
5. Advanced intervention of psychiatric patients, including medication administration;
6. All other emergency medical care skills and measures included in the standard United States Department of Transportation paramedic emergency medical technician training curriculum, which are not specifically listed above, and;
7. Upon the approval of the Department, and recommendation of the Council, additional skills may be authorized upon the written request of a local medical director.

Scope of Practice Additional Skills

The Medical Director may approve the following skills for EMT-B’s. A Department approved Quality Assurance Program Must be in place.

A. The use of definitive airways, which may include:

   1. Combi-Tube
   2. PTL
   3. LMA

A. Agency supplied epinephrine auto injectors
B. Oral Glucose
C. Activated Charcoal
D. Childrens Aspirin
E. Albuterol – Nebulizer breathing treatments
F. Use of Glucometers
G. Use of Three-Lead Monitoring Devices.
   1. The use of these will be limited lead connection and printing strips. EMT-B’s are not to interpret the rhythm nor base treatment on what is displayed on the monitor. The purpose is two-fold:
   2. Allows for the EMT-B with a FRA to have an initial rhythm strip ready for ALS transport
   3. Allows for the EMT-B to present the ER staff with the initial rhythm when the patient was contacted on scene
Section II

Treatment Protocols
Trauma Patient Assessment – Scene Size-up

Environmental Assessment: (scene size up)

A. Recognize environmental hazards to rescuers, and secure area for treatment.
B. Recognize hazard for patient, and protect from further injury.
C. Identify number of patients. Initiate a triage system if appropriate.
D. Observe position of patient, mechanism of injury, surroundings.
E. Initiate communications if hospital resources require mobilization; call for backup if needed.
F. Identify self, and establish patients Level of Consciousness.

Initial Assessment:

A. Airway:
   1. Protect cervical spine from movement in trauma victims. Use assistant to provide continuous in-line cervical immobilization.
   2. Observe the mouth and upper airway for air movement.
   3. Look for evidence of upper airway problems such as vomitus, bleeding, facial trauma.

B. Breathing:
   1. Look for jugular venous distention and tracheal deviation.
   2. Expose chest and observe chest wall movement.
   3. Note respiratory rate (qualitative), noise, and effort.
   4. Look for life-threatening respiratory problems and briefly stabilize:
      a. Open or sucking chest wound: seal.
      b. Large flail segment: stabilize.
      c. Tension pneumothorax: transport rapidly and consider decompression.
   5. Auscultate for crackles (wet sounds), wheezes, or decreased breath sounds.
   6. Palpate for tenderness, wounds, fractures, crepitus, unequal rise of chest.

C. Circulation:
   1. Palpate for radial and carotid pulses. Note pulse quality (strong, weak), and general rate (slow, fast, moderate).
      a. A radial pulse - systolic BP greater than > 80.
      b. A femoral pulse - systolic BP greater than > 70.
      c. A carotid pulse - systolic BP greater than > 60.
   2. Consider checking capillary refill time in fingertips: 2 sec is normal.
   3. Check skin color and condition.
   4. Control hemorrhage by direct pressure with clean dressing to wound.

Trauma Patient Assessment – Initial Survey (cont.)
D. Responsiveness:
   1. Note initial level (awake, responsive to voice or pain, no response).
   2. Briefly note body position and extremity movement.
   3. Check movement and sensation in all four extremities prior to moving patient.

Focused History and Physical Exam/Rapid Trauma Assessment

A. Select appropriate assessment.
   1. Focused = injury specific. DCAP-BTLS a specific injury or complaint
   2. Rapid = quick system survey to identify and treat life-threats not already assessed.
      a. head and neck
      b. chest and abdomen
      c. pelvis
      d. extremities as needed
B. Baseline vitals if already not obtained
C. Obtain SAMPLE hx from patient or bystanders if possible.

Trauma Patient Assessment – Detailed Physical Exam

Secondary survey is the systematic assessment of the entire patient. The purpose of the secondary survey is to uncover problems which are not life-threatening but which could be injurious or could become life-threatening to the patient. It should be performed after:

1. Primary survey.
2. Stabilization and initial treatment of life-threatening airway, breathing, or circulatory difficulties.

A. Initial Vital Signs

B. Additional History

C. Head and Face:
   1. Observe for deformities, asymmetry, bleeding.
   2. Palpate for deformities, tenderness, crepitus.
   3. Recheck airway for potential obstruction: dentures, bleeding, loose or avulsed teeth, vomitus, abnormal tooth position from mandibular fracture, absent gag reflex.
   4. Eyes: pupils (equal or unequal, responsiveness to light), foreign bodies, contact lenses, periorbital ecchymosis (raccoon eyes).
   5. Nose: deformity, bleeding, discharge.

D. Neck:
   1. Recheck for deformity or tenderness if not already immobilized.
   2. Observe for wounds, neck vein distention, use of neck muscles for respiration, altered voice, and medical alert tags.
   3. Palpate for crepitus, tracheal shift.

Trauma Patient Assessment – Detailed Physical Exam (cont.)
E. Chest:
1. Observe for wounds, symmetry of chest wall movement.
2. Have patient take deep breath: observe for pain, symmetry, air leak from wounds.
3. Auscultate for crackles (wet sounds), wheezes, or decreased breath sounds.
4. Palpate for tenderness, wounds, fractures, crepitus, unequal rise of chest.

F. Abdomen:
1. Observe for wounds, bruising, distention.
2. Palpate all 4 quadrants for tenderness, rigidity, or painful response

G. Pelvis:
1. Palpate and compress lateral pelvic rims, symphysis pubis, for tenderness or instability.

H. Shoulders/Upper Extremities:
1. Observe for angulation, protruding bone ends, symmetry.
2. Gently palpate for tenderness.
3. Note distal pulses, color, medical alert tags.
4. Check sensation.
5. Test for weakness if no obvious fracture present (have patient squeeze your hands).
6. If no obvious fracture, gently move arms to check overall function.

I. Lower Extremities:
1. Observe for angulation, protruding bone ends, symmetry.
2. Palpate for tenderness, crepitus.
3. Note, distal pulses, color.
4. Check sensation.
5. Test for weakness if no obvious fracture present (have patient push feet against your hands).

J. *Back:
1. If patient is stable, logroll; observe and palpate for wounds, fractures, tenderness, bruising.
2. Recheck motor and sensory function as appropriate.

* Examination of the back may take place after the primary survey and prior to placing patient on backboard if rapid transport is indicated (see Trauma and Hypovolemic Supportive Care Protocol).

Trauma Patient Assessment – Detailed Physical Exam (cont.)

Special Notes:
Be systematic. If you jump from one obvious injury to another, the subtle injury which may be most dangerous to the patient is easily missed.

Obtain and record two or more sets of vital signs and neurologic observations (if mental status abnormal) prior to transport or enroute. A patient cannot be called "stable" without at least two sets of vital signs giving similar normal readings. Serial vital signs are an important parameter of the patient's physiologic status. Vital signs should be repeated as necessary to document changes.
Oklahoma State EMS Protocols

A primary survey is done on all medical and trauma patients. In awake medical patients, this may consist only of identifying yourself and noting the patient's responsiveness and general appearance. The formal secondary survey may not need to be done on patients with a specific complaint, such as "chest pain". Assessment must be no less thorough, but it may be limited to the body systems that are pertinent to the presenting problem.

A. Vital signs: quantitative vital signs usually precede the rest of the exam.

B. Head/Face:
   1. Note airway patency, oral swelling, hydration.
   2. Eyes: note pupil symmetry, reaction to light, movement.
   3. Note symmetry of facial movements.

C. Neck:
   1. Observe for neck vein distention in the upright position, use of accessory muscles for breathing.

D. Chest:
   1. Observe chest wall for symmetry of air movement and evidence of respiratory effort.
   2. Auscultate:
      a. Breath sounds for symmetry, crackles (wet sounds), wheezing, or evidence of obstruction.
      b. Heart for regularity (if irregular, is it intermittently or consistently irregular?).

E. Abdomen:
   1. Observe for distention, bruising.
   2. Palpate for tenderness, rigidity, masses.

F. Extremities:
   1. Observe: presence of edema, color of skin.
   2. Palpate for warmth, tenderness, presence of pulses.

G. See Neurologic Assessment.

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**Pediatric Patient Assessment**
Children can be examined easily from head to toe, but lack of understanding by the patient, poor cooperation, and fright often limit the ability to assess completely in the field. Children often cannot verbalize what is bothering them, so it is important in trauma victims to do a systematic primary and secondary survey, which covers areas that the patient may not be able to tell you about. Any observations about spontaneous movements of the patient and areas that the child protects are very important. In the patient with a medical problem, the more limited set of observations listed below should pick up potentially serious problems.

A. General:
   1. Level of alertness, eye contact, attention to surroundings.
   2. Muscle tone: normal, increased, or weak and flaccid.
   3. Responsiveness to parents, caregivers; is the patient playful or irritable?

B. Head:
   1. Signs of trauma.
   2. Fontanelle, if open: abnormal depression or bulging.

C. Face:
   1. Pupils: size, symmetry, reaction to light.
   2. Hydration: brightness of eyes, is child making tears, is the mouth moist?


E. Chest:
   1. Note presence of stridor, retractions (depressions between ribs on inspiration) or increased respiratory effort.
   2. Breath sounds: symmetrical, wet, wheezing?
   3. Heart: rate, obvious murmur.

F. Abdomen: distention, rigidity, bruising, tenderness.

G. Extremities:
   1. Brachial pulse.
   2. Signs of trauma.
   4. Skin temperature and color, capillary refill.
   5. Areas of tenderness, guarding or limited movement.

H. See Neurologic Assessment.
### TABLE I - 1

**VITAL SIGNS FOR INFANTS & CHILDREN**

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight kg</th>
<th>Heart Rate</th>
<th>Resp Rate</th>
<th>BP (Sys)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>3</td>
<td>100-160</td>
<td>30-60</td>
<td>70-110</td>
</tr>
<tr>
<td>6 mo</td>
<td>7</td>
<td>90-150</td>
<td>24-36</td>
<td>70-110</td>
</tr>
<tr>
<td>1 yr</td>
<td>10</td>
<td>90-150</td>
<td>22-30</td>
<td>70-110</td>
</tr>
<tr>
<td>3 yr</td>
<td>15</td>
<td>80-120</td>
<td>20-26</td>
<td>80-120</td>
</tr>
<tr>
<td>5 yr</td>
<td>20</td>
<td>70-110</td>
<td>20-24</td>
<td>80-120</td>
</tr>
<tr>
<td>10 yr</td>
<td>30</td>
<td>60-90</td>
<td>16-20</td>
<td>90-120</td>
</tr>
<tr>
<td>12 yr</td>
<td>40</td>
<td>60-90</td>
<td>16-20</td>
<td>90-130</td>
</tr>
<tr>
<td>14 yr</td>
<td>50</td>
<td>60-90</td>
<td>14-20</td>
<td>90-140</td>
</tr>
</tbody>
</table>

### TABLE I - 2

**APGAR SCORING SYSTEM FOR NEWBORNS**

<table>
<thead>
<tr>
<th>Clinical Sign</th>
<th>0 Points</th>
<th>1 Point</th>
<th>2 Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Blue or Pale</td>
<td>Body Pink</td>
<td>Completely Pink</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Extremities Blue</td>
<td></td>
</tr>
<tr>
<td>Pulse</td>
<td>Absent</td>
<td>Below 100</td>
<td>100 or More</td>
</tr>
<tr>
<td>Grimace response to catheter in nares</td>
<td>No Response</td>
<td>Grimaces</td>
<td>Cries</td>
</tr>
<tr>
<td>Activity</td>
<td>Limp</td>
<td>Some Flexion</td>
<td>Active</td>
</tr>
<tr>
<td>Respiration</td>
<td>Absent</td>
<td>Slow or Irregular</td>
<td>Good, Strong Cry</td>
</tr>
</tbody>
</table>

### TABLE I - 3
### CPR GUIDELINES

<table>
<thead>
<tr>
<th>Age</th>
<th>Comp Rate</th>
<th>Vent. Rate</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB -1 yr (infant)</td>
<td>100</td>
<td>20</td>
<td>5:1</td>
</tr>
<tr>
<td>1 yr - 8 yr (child)</td>
<td>100</td>
<td>20</td>
<td>5:1</td>
</tr>
<tr>
<td>Over 8 yr (adult)</td>
<td>100</td>
<td>12</td>
<td>15:2</td>
</tr>
</tbody>
</table>

*Maintain “sniffing position”*

### TABLE I - 4

**PEDIATRIC EQUIPMENT GUIDELINES ACCORDING TO AGE & WEIGHT**

<table>
<thead>
<tr>
<th>Age</th>
<th>Weight kg (lbs)</th>
<th>Blade</th>
<th>ET Tube</th>
<th>IV Cath Ga</th>
</tr>
</thead>
<tbody>
<tr>
<td>NB</td>
<td>3 (7)</td>
<td>0-1</td>
<td>3.0-3.5</td>
<td>23-24</td>
</tr>
<tr>
<td>6 mo</td>
<td>7 (15)</td>
<td>1</td>
<td>3.5-4.0</td>
<td>23-24</td>
</tr>
<tr>
<td>1 yr</td>
<td>10 (22)</td>
<td>1-2</td>
<td>3.5-4.0</td>
<td>23</td>
</tr>
<tr>
<td>3 yr</td>
<td>15 (33)</td>
<td>1-2</td>
<td>4.5-5.0</td>
<td>20-23</td>
</tr>
<tr>
<td>5 yr</td>
<td>20 (44)</td>
<td>2</td>
<td>5.0-5.5</td>
<td>20-23</td>
</tr>
<tr>
<td>10 yr</td>
<td>30 (66)</td>
<td>2</td>
<td>6.0-7.0</td>
<td>18-20</td>
</tr>
<tr>
<td>12 yr</td>
<td>40 (88)</td>
<td>2</td>
<td>6.0-7.0</td>
<td>18-20</td>
</tr>
<tr>
<td>14 yr</td>
<td>50 (110)</td>
<td>3</td>
<td>7.0-8.0</td>
<td>18-20</td>
</tr>
</tbody>
</table>
ET TUBE FORMULA = (16 + AGE IN YEARS) DIVIDED BY 4

ONE SIZE LARGER & SMALLER SHOULD BE ALLOWED FOR INDIVIDUAL VARIATIONS

WEIGHT ESTIMATION: WT. (kg) = 2 X AGE (YRS) + 8

SYSTOLIC BLOOD PRESSURE FORMULA = 70+ (AGE X 2)

DEFIBRILLATION & CARDIOVERSION

Defibrillation: 2 J/kg
   If 1st shock unsuccessful, 4 J/kg thereafter

Cardioversion: 0.5 - 1 J/kg
   If 1st shock unsuccessful, increase as needed up to 2 J/kg

Neurologic Assessment

Management of patients with head injury or neurologic illness depends on careful assessment of neurologic function. Changes are particularly important. The first observations of neurologic status
in the field provide the basis for monitoring sequential changes. It is therefore important that the paramedic accurately observe and record neurologic assessment, using measures that will be followed throughout the patient’s hospital course.

A. Vital Signs:

Observe particularly for adequacy of ventilations; depth, frequency, and regularity of respirations.

B. Level of consciousness:

GLASGOW COMA SCALE  
(BEST RESPONSE)

<table>
<thead>
<tr>
<th>Activity</th>
<th>Score</th>
<th>Infants</th>
<th>Children/Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>EYE OPENING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Spontaneous</td>
<td>Spontaneous</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>To speech or sound</td>
<td>To speech</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>To painful stimuli</td>
<td>To pain</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>VERBAL</td>
<td>5</td>
<td>Appropriate words or</td>
<td>Oriented</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sounds; social smile;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>fixes and follows</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Cries but consolable</td>
<td>Confused</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Persistently irritable</td>
<td>Inappropriate words</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Restless/agitated</td>
<td>Incomprehensible words</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>MOTOR</td>
<td>6</td>
<td>Spontaneous movement</td>
<td>Obeys commands</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Localizes to pain</td>
<td>Localizes pain</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Withdraws to pain</td>
<td>Withdraws to pain</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Abnormal flexion</td>
<td>Abnormal flexion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(decorticate)</td>
<td>(decorticate)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Abnormal extension</td>
<td>Abnormal extension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(decerebrate)</td>
<td>(decerebrate)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>None (flaccid)</td>
<td>None (flaccid)</td>
</tr>
</tbody>
</table>

Neurologic Assessment (cont.)

C. Eyes:
1. **Direction of gaze.**
2. **Size and reactivity of pupils.**

**D. Movement:**

1. Observe whether all four extremities move equally well.

**E. Sensation (if patient awake):**

1. Observe for absent, abnormal, or normal sensation at different levels if cord injury is suspected.

**Special Notes:**

A. The Glasgow Coma Scale (GCS) used above has recently gained acceptance as one method of scoring and monitoring patients with head injury. It is readily learned, has little observer-to-observer variability, and accurately reflects cerebral function. Always record specific responses rather than just the score (sum of observations). Remember that a patient who is totally without response will have a score of 3, not 0.

B. Use a flow sheet to follow and identify changes rapidly.

C. Sensory and motor exam must be documented before moving patient with suspected spinal injury.

D. Note what stimulus is being used when recording responses. Applied noxious stimuli must be adequate to the task but not excessive. Initial mild stimuli can include light pinch, dull pinprick. If these are unsuccessful at eliciting a pain response, pressure with a dull object to base of nail bed, stronger pinch (particularly in axilla) may be necessary to demonstrate the patient's best motor response.

E. When responses are not symmetrical, use motor response of the best side for scoring GCS and note asymmetry as part of neurologic evaluation.

F. Use of restraints or intubation of patient will make some observations less accurate. Be sure to note on chart if circumstances do not permit full verbal or motor evaluation.

G. In small children, the GCS may be difficult or impossible to evaluate. Children who are alert and appropriate should focus their eyes and follow your actions, respond to parents or caregivers, and use language and behavior appropriate to their age level. In addition, they should have normal muscle tone and a normal cry. Several observers should attempt to elicit a “best verbal response”, to avoid over or underestimation of level of consciousness.

**Patient History**

**Medical: (SAMPLE Hx)**

A. **Chief complaint**: (S = Sign/symptoms)
Oklahoma EMS Protocols

1. When did it start? How long has it been going on? Is it changing?
2. How intense is the problem? Very severe, mild?
3. What caused or brought on the condition?
4. Does anything make it better or worse?
5. For pain: describe the location, type of pain, severity, radiation.
6. What caused the patient or family to seek help at this time?
7. Has the patient experienced or been treated before for this problem? When?

B. Associated complaints: Are any other symptoms bothering the patient at this time?

C. Allergies. (A)

D. Relevant Past Medical History. (P)

E. Medications and drugs. (M)

F. Last Oral Intake. (L)

G. Survey of surroundings for evidence of drug abuse, mental function, family problems. (Events Leading up to the incident) (E)

Trauma: The mnemonic DCAP-BTLS may serve as a reminder for injuries to be noted.

A. Chief complaints: areas of tenderness, pain.

B. Associated complaints.

C. Mechanism of injury:

1. What were the implements involved: weapons, autos, etc.
2. How did the injury happen: cause, precipitating factors?
3. What trajectories were involved: bullets, cars, people?
4. How forceful was the mechanism: speed of cars, force of blow, etc.?
5. With a vehicle: What is the condition of windshield, steering wheel, body? Were the passengers wearing seatbelts? Was the patient ejected from the vehicle? Was the patient wearing a helmet? Did the airbag(s) deploy? Was the child in a carseat? Deformity 20” or greater? Intrusion 12” or greater? Rollover? Ejection? Death same motor vehicle? Motorcycle 20 + mph? Pedestrian vs MV greater than > 5 mph?

D. Mental status and pertinent findings since accident according to witnesses or bystanders.

E. Treatment since accident: movement of patient by bystanders, etc.

Patient History (cont.)

F. Allergies.

G. Medications.

H. Past medical history.
I. Last eaten meal.

J. Events surrounding present complaint.

The mnemonic OPQRST may serve as a reminder for the assessment of both trauma and medical patients

Special Notes:

A. Do not let the gathering of information distract from management of life-threatening problems or create delays in delivering patients with life-threatening problems or time-sensitive issues (e.g., AMI, CVA or Acute Trauma) to receiving hospitals.

B. Appropriate questioning can provide valuable information while establishing authority, competence, and rapport with patient.

C. In medical situations, history is commonly obtained before or during physical assessment. In trauma cases it may be simultaneous or following the primary survey. An assistant is often used for gathering information from family or bystanders.

D. USE BYSTANDERS to confirm information obtained from the patient and to provide facts when the patient cannot. History from the scene is invaluable.

E. Over-the-counter medications (including aspirin and birth control pills) are frequently overlooked by patient and rescuer, but may be important to emergency problems.

F. Confidentiality is mandatory. Patients deserve respect, kindness, and discretion.

GENERAL SUPPORTIVE CARE

This protocol provides guidelines for the initial care and packaging of medical patients. Because patients with hypovolemia and/or traumatic complaints may require different treatment and transport priorities, a separate Trauma and Hypovolemic Supportive Care protocol has been created.
The General Supportive Care protocol is meant to be the foundation of care for all medical patients, and may be the only protocol invoked for any particular patient. It is recommended that all services build on this foundation with service specific protocols.

A reasonable effort must be made to protect the high-risk medical patient from sudden deterioration. No patient with chest pain or any patient at high risk for sudden clinical deterioration should be ambulated. Use whatever means is necessary to place the patient at rest and to have them carried from the residence, to include additional lifting assistance, stair-chair, etc.

Any medical patient requiring a "Life Net" - oxygen, monitor, intravenous access - should have these procedures done at the location the patient is found (e.g. inside house), prior to moving the patient to the ambulance, unless circumstances preclude this from occurring (e.g., unsafe scene or the patient is located outside, near the ambulance). If the patient has an immediate life-threatening condition requiring intubation, cardioversion and/or medications, this should be initiated prior to moving the patient to the ambulance.

Attention should be given to not inappropriately prolong scene time making multiple attempts at accomplishing invasive procedures in a medical patient. Therefore, it is recommended that individual services consider the implementing the following guidelines: TWO ATTEMPTS, TWO MINUTES FOR EACH INVASIVE PROCEDURE (not to exceed 5 minutes total). If the procedure is not accomplished after two attempts or two minutes have elapsed, then the paramedic must consider expediting transport to the hospital where these procedures can be accomplished. In this situation, if the patient does suddenly deteriorate, a reasonable attempt would have been made to prevent this occurrence. Additional attempts at invasive procedures may be attempted during transport to the hospital. Individual services are encouraged to establish service specific guidelines for ALS interventions.

It is understood that no two situations or patients are identical. These guidelines do not disregard nor eliminate the need for appropriate paramedic judgment for each patient encounter. These guidelines DO NOT pertain to the trauma patient where rapid transport is advised with invasive procedures performed enroute to the hospital.

General Supportive Care (cont.)

Adult Care

Patient assessment and history taking. Include charting of at least two sets of vital signs.

Airway Management:
A. Initial management includes patient positioning and manual maneuvers to assure a patent airway.

B. Patients with signs and symptoms of hypoxia (e.g. tachypnea, cyanosis, tachycardia, altered mental status, chest pain) should initially be treated with 10-15 L/min via non-rebreather mask (Exception: Patients with COPD may initially be started on 2 L/min via nasal cannula (Individual services are encouraged to develop service specific protocols regarding oxygen therapy) Respiratory suppression from oxygen administration should be closely monitored and managed by assisted ventilation. NOTE: Capnography should be used on all patients with potential or actual change in metabolism, circulation, respiration, airway, or breathing system function.

C. If the patient has continued difficulty with oxygenation and ventilation after simple airway maneuvers, airway adjuncts and advanced airway procedures may be used.

D. Endotracheal tube placement must be verified immediately following intubation, after tube taping, after moving the patient, and at any other time of concern or change in the patient's condition.

E. All intubated patients are recommended to have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (Individual services should develop agency specific protocols regarding the protection of the airway after definitive airways are placed.)

F. To assist with verification of the endotracheal tube, connect the appropriate microstream capnography filterline to the endotracheal tube and the breathing device, then interpret results. In cardiac arrest, reestablishment of cardiac output and pulmonary perfusion by adequate cardiopulmonary resuscitation (CPR) is necessary to increase End-Tidal CO2 levels that are detectable. End-Tidal CO2 results are not conclusive, if there is any question regarding the position of the endotracheal tube, direct visualization of the tube passing through the cords should be performed to confirm proper tube placement. If inadvertent esophageal intubation has occurred, proper placement should be reattempted before the previous ET tube is removed.

GENERAL SUPPORTIVE CARE - (cont.)

G. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique. In cases of vigorous mouth-to-mouth ventilation, bag-valve-mask ventilation, use of demand resuscitator ventilation, mask to autoventilation, or esophageal intubation, massive free air collection in the stomach may occur after only a few breaths. Gastric distention should be suspected in patients with an acutely distended abdomen after
difficult endotracheal intubation, especially if CPR was performed. If possible insert a nasogastric tube and apply low suction until distention is relieved.

H. When in the transport unit, the patient on O2 should be connected to the on-board oxygen supply and the portable O2 tank securely stowed. This is to avoid the possibility of the O2 tank becoming a potentially lethal missile during sudden stops. All patients receiving O2 during transport must continue to receive O2 from the vehicle to the ED.

ECG monitoring and pulse oximetry should be done in all patients with potential for or signs of instability. All patients monitored during transport must continue to be monitored during transfer from the vehicle to the receiving ED.

Venous access:

A. ALS personnel should determine which route of access, if any, should be established. General guidelines follow. In those patients requiring IV access, the upper extremities should be the sites of first choice. In those cases where peripheral access is unsuccessful and the patient’s condition is critical (i.e., unconscious, cardiac arrest), an external jugular venous site may be attempted.

Renal dialysis fistulas, central lines, and IV medication ports SHOULD NOT be used by ALS personnel for IV access. Individual services are encouraged to develop service specific protocols regarding use of permanent sites for IV access.

B. Establish intravenous access using, preferably, an 18G or larger catheter or a saline lock in any patient with grossly abnormal vital signs or in whom the possibility of development of instability exists. Examples include patients with hypertension, SOB, or chest pain. Exceptions to the initiation of a saline lock are covered under specific protocols. Intravenous maintenance with a saline lock intermittent infusion device is indicated in those patients requiring prophylactic IV access at a KVO rate or medication administration, excluding patients requiring fluid, constant drug infusion or cardiac arrests.

GENERAL SUPPORTIVE CARE - (cont.)

C. Medical patients with a systolic BP < 90 mm Hg associated with signs and symptoms of shock should have an IV of NS or LR established.

Follow additional protocols as needed, establishing Medical Control contact as dictated by protocol and availability. Contact the destination facility to give a patient report following local protocols and guidelines.
Transport red lights and sirens if patient's condition is critical. Critical is defined by a medical or traumatic condition requiring immediate medical intervention by physician and nursing personnel upon arrival at the Emergency Department. All other patients will be transported non-red lights and sirens. As per OAC 310:641-3-120 (2) states that transporting with lights only is prohibited.

D. Endotracheal tube placement must be verified immediately following intubation, after tube taping, after moving the patient, and at any other time of concern or change in the patient's condition. To assist with verification of the endotracheal tube, connect the appropriate microstream capnography filterline to the endotracheal tube and the breathing device, then interpret results. In cardiac arrest, reestablishment of cardiac output and pulmonary perfusion by adequate cardiopulmonary resuscitation (CPR) is necessary to increase End-Tidal CO2 levels that are detectable. End-Tidal CO2 results are not conclusive, if there is any question regarding the position of the endotracheal tube, direct visualization of the tube passing through the cords should be performed to confirm proper tube placement. If inadvertent esophageal intubation has occurred, proper placement should be reattempted before the previous ET tube is removed.

E. All intubated patients must have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures.

F. Once an endotracheal tube or other definitive airway adjunct has been inserted and successful placement has been determined, ventilate the patient using a bag-valve-mask or other ventilatory system. If placement of an endotracheal tube is unsuccessful, continue to use the ventilatory system in combination with a bag-mask and simple airway adjuncts. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique. In cases of vigorous mouth-to-mouth ventilation, bag-valve-mask ventilation, mask to autoventilation, or esophageal intubation, massive free air collection in the stomach may occur after only a few breaths. Gastric distention should be suspected in patients with an acutely distended abdomen after difficult endotracheal intubation, especially if CPR was performed. To relieve gastric distention insert nasogastric tube immediately and apply low suction until distention is relieved.

General Supportive Care (cont.)

G. When in the transport unit, the patient on O2 should be connected to the on-board oxygen supply and the portable O2 tank securely stowed. This is to avoid the possibility of the O2 tank becoming a potentially lethal missile during sudden stops. All patients receiving O2 during transport must continue to receive O2 from the vehicle to the ED.

ECG monitoring and pulse oximetry should be done in all patients with previous cardiac history potential for or signs of instability. All patients monitored during transport must continue to be monitored during transfer from the vehicle to the receiving ED.
TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE

NOTE:

This protocol presents the basic components of patient "packaging" for trauma patients. Due to the significant differences in priorities and packaging in the pre-hospital care of medical cases, a separate General Supportive Care protocol has been developed. This Trauma and Hypovolemic Supportive Care Protocol may be the only protocol used in trauma or hypovolemia situations where a specific diagnostic impression and choice of protocol(s) cannot be made. If there is a question as to whether a patient requires a particular intervention, contact with Medical Control is advised. This
protocol is frequently referred to by other protocols that may override it in recommending more specific therapy.

Although the following protocol is oriented toward the treatment of the trauma patient, the principles of rapid evaluation, treatment, and transport of patients with hypovolemia secondary to other problems parallel those listed below. Fluid resuscitation may be required in large volumes or in smaller incremental boluses. Careful monitoring for signs of volume overload is essential.

A. Adult Care

Initial Assessment.

Airway access with cervical spine control, initial management includes patient positioning and manual maneuvers to assure a patent airway. Patients with signs and symptoms of hypoxia should initially be treated with \( \text{O}_2 \) 10-15 L/min via non-rebreather mask. Assist ventilation (24 breaths/min) in patients with a respiratory rate < 12/min, shallow respirations with inadequate tidal volume, or decreased level of consciousness. NOTE: Capnography should be used on all patients with potential or actual change in metabolism, circulation, respiration, airway, or breathing system function.

Bag-valve-mask ventilation is usually very effective. If the patient has continued difficulty with oxygenation and ventilation after simple airway maneuvers, airway adjuncts and bag-valve mask ventilation, advanced airway procedures may be used. ET tube placement must be verified after intubation, after tube taping, after moving the patient, and at any other time of concern or change in patient condition. To assist with verification of the endotracheal tube, connect the appropriate microstream capnography filterline to the endotracheal tube and the breathing device, then interpret results. In cardiac arrest, reestablishment of cardiac output and pulmonary perfusion by adequate cardiopulmonary resuscitation (CPR) is necessary to increase End-Tidal CO2 levels that are detectable. End-Tidal CO2 results are not conclusive, if there is any question regarding the position of the endotracheal tube, direct visualization of the tube passing through the cords should be performed to confirm proper tube placement. If inadvertent esophageal intubation has occurred, proper placement should be reattempted before the previous ET tube is removed.

TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE (cont.)

All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (Agencies should develop specific protocols for the management of intubated patients)
Once an endotracheal tube or other definitive airway adjunct, has been inserted and successful placement has been determined, remove the bag-valve device and attach the autoventilator. Set the desired breaths per minute and observe chest rise during the ventilation cycles. If placement of an endotracheal tube or combitube is unsuccessful, continue to use the autoventilator in combination with a bag-mask and oral pharyngeal or nasopharyngeal airway. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique. In cases of vigorous mouth-to-mouth ventilation, bag-valve-mask ventilation, use of demand resuscitator ventilation, mask to autoventilation, or esophageal intubation, massive free air collection in the stomach may occur after only a few breaths. Gastric distention should be suspected in patients with an acutely distended abdomen after difficult endotracheal intubation, especially if CPR was performed. To relieve gastric distention insert nasogastric tube immediately and apply low suction until distention is relieved. (Agencies should develop agency specific protocols for relieving gastric distention)

Hemorrhage control.

Appropriate spinal immobilization if indicated.

“Load and go” and notification of receiving hospital. **(Each service is encouraged to develop agency specific guidelines regarding the transportation and destination of trauma patients. These guidelines should be based on the trauma and triage guidelines)**

If the patient is not in a “Load and Go” criteria, the attending EMT may elect to complete the secondary survey at the scene. **(This should be based on agency specific guidelines)**

Stabilize life threatening respiratory problems:

a) Sucking chest wound  
b) Flail chest

**NOTE:** The following steps should not delay transport:

Initiate IV NS using two large bore lines if possible. Patients with penetrating injuries to the torso should have fluid resuscitation titrated to a systolic blood pressure no higher than 90 mm/Hg.

**TRAUMA AND HYPOVOLEMIC SHOCK SUPPORTIVE CARE (cont.)**

**NOTE:** Recent studies have questioned the value of aggressive fluid resuscitation for penetrating chest trauma prior to surgery. Theoretically, aggressive fluid resuscitation, while elevating blood pressure, may increase bleeding from the wound, increasing the likelihood of death. **It is recommended to Bolus fluid, reevaluate the patient, then repeat bolus or titrate fluid to patient condition. Agencies should develop agency specific guidelines for volume replacement.**

ECG and pulse oximetry monitoring.

Complete bandaging, splinting and packaging.
Reconfirm fluid resuscitation with On-Line Medical Control.

Decompression of tension pneumothorax, if indicated.

All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (Agencies should develop specific protocols for intubated patients.)

Once an endotracheal tube has been inserted and successful placement has been determined, remove the bag-valve device and attach the autoventilator. Set the desired breaths per minute and observe chest rise during the ventilation cycles. If placement of an endotracheal tube is unsuccessful, continue to use the autoventilator in combination with a bag-mask and oral pharyngeal airway. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique. In cases of vigorous mouth-to-mouth ventilation, bag-valve-mask ventilation, mask to autoventilation, or esophageal intubation, massive free air collection in the stomach may occur after only a few breaths. Gastric distention should be suspected in patients with an acutely distended abdomen after difficult endotracheal intubation, especially if CPR was performed. To relieve gastric distention insert nasogastric tube immediately and apply low suction until distention is relieved. (Follow Local Protocols)

Hemorrhage control.

Appropriate spinal immobilization if indicated.

“Load and go” and notification of receiving hospital if the patient is an emergency trauma patient as defined by Protocol I.4: Destination.

If the patient is not an emergency trauma patient, the paramedic may elect to complete the secondary survey at the scene.

Stabilize life threatening respiratory problems; such as a sucking chest wound for flail chest.

ASYSTOLE

Adult Care

Identify asystole in two different leads.

CPR and AED protocol.

Intubate. Use an ET Tube or other definitive airway adjunct. Check End-Tidal CO2 readings using capnography. The presence of exhaled CO2 on the monitor screen indicates proper tracheal tube placement. The lack of CO2 generally means that the tube is in the esophagus therefore confirming ETT placement is indicated. Low CO2 readings in cardiac arrest patients may be caused by inadequate CPR, prolonged down time, or hypothermia. If there is a
sudden loss of ETCO2 to zero or near zero evaluate the patient for ETT tube dislodgement. Equipment malfunction, (i.e., ETT extubation,) is more likely to occur during out-of-hospital transportation of the patient. Reintubate if needed.

All patients that have definitive airways in place should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures.

When clinically convenient remove bag-valve device and attach a ventilatory system to the endotracheal tube, combitube, or other adjunct and ventilate the patient to correct rate and volume. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

If gastric distention is suspected in patients with acutely distended abdomen after difficult intubation, especially if CPR was performed, insert nasogastric tube immediately and apply low suction until distention relieved.

Consider treatable causes.

If the onset of asystole is witnessed by the paramedic (e.g. postdefibrillation appearance of asystole) initiate transcutaneous pacing. **If pacing is unsuccessful, after approximately 30 seconds, return to conventional therapy. Pacing maybe reattempted after 5 minutes of resuscitative efforts, not to exceed 3 attempts at obtaining effective mechanical capture. Limit CPR interruptions to 30 seconds.

**NOTE:** Mechanical capture is the contraction of the myocardium and is evidenced by presence of a pulse and signs of improved cardiac output. Both electrical and mechanical capture must occur to benefit the patient.

Epinephrine, 2 mg, ET*, and Atropine, 2 mg, ET if ET route is clear. Hyperventilate to promote drug distribution. Repeat Epinephrine every 3-5 minutes for duration of pulselessness.

**ASYSTOLE (cont.)**

IV, NS, TKO.

If Epinephrine and Atropine not yet given via ET tube and IV is established, give Epinephrine 1.0 mg IV and Atropine 1.0 mg IV.
Atropine 1.0 mg IV repeated in 3-5 minutes, total dose not to exceed 0.04 mg/kg.

Consider Sodium Bicarbonate, 1.0 mEq/kg, IV (Transport services are encouraged to establish service specific protocols regarding use of Sodium Bicarbonate.)

*Endotracheal medications should be administered at two times the recommended IV dose. The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.
ASYSTOLE (cont.)
Oklahoma State EMS Protocols

Asystole

Focused Primary ABCD
Identify Asystole in two different leads

CPR

Rapid Scene Survey: Is there any evidence that personnel should not attempt resuscitation

Adult ALS Care

General Supportive Care

Identify reversible causes

Consider TCP if EMS witnessed

Epinephrine
2 mg ET or 1 mg IV q. 3-5 min

Atropine
2 mg ET or 1 mg IV q. 3-5 min up to a total of 0.4 mg/kg

Consider NaHCO3
1 mEq./kg /IV

Pediatric ALS Care

General Supportive Care

Identify reversible causes

Epinephrine
ETT: 0.1 mg/kg (1:1000) q. 3-5 min.
IV/IO: 0.01 mg/kg 1:10000, if Epinephrine not yet given ET.
Epinephrine 2nd dose IV/IO: 0.1 mg/kg (1:1000) q. 3-5 min

Consider Pediatrics NaHCO3
1 mEq./kg /IV/IO

Consider Infants NaHCO3
0.5 mEq./kg /IV/IO

BRADYCARDIA
Adult Care

General Supportive Care.

If systolic BP < 90, PVC’s, altered mental status, signs or symptoms of ischemia:

Atropine 0.5 - 1.0 mg IV or 2.0 mg ET*, repeated every 3-5 min up to 0.04 mg/kg total.

Consider immediate pacing in the unconscious patient.

In the conscious patient, consider pacing if:

a) Patient does not respond to Atropine.
b) IV access unsuccessful.
c) Symptoms so severe that waiting for a maximal response to Atropine would be dangerous.

Prior to pacing the conscious patient, sedate with Valium 5-10 mg IV given slowly over 1-2 minutes or Versed (0.15 mg/kg). Slowly titrate Versed IV to desired effect, (i.e., drowsiness, slurred speech), not to exceed 5 mg.

If Atropine and pacing are unsuccessful, consider Dopamine infusion at 5 mcg/kg/min. IV.

NOTE: Atropine should be used cautiously in 2nd degree Type II and 3rd degree block with a wide QRS escape rhythm.

* The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.

BRADYCARDIA (cont.)
Bradycardia

Focused Primary ABCD
- Problem focused examination
- Problem focused physical examination
- Consider causes

Adult ALS Care

General Supportive Care

Pediatric ALS Care

General Supportive Care

Is bradycardia causing severe cardiopulmonary compromise? (poor perfusion, hypotension, respiratory difficulty altered LOC, frequent PVC’s)

No

Type II second-degree AV block? or 3rd degree AV block?

- No
  - Observe

- Yes
  - Prepare for TCP

Intervention sequence
- Atropine 0.5 - 1 mg/IV or 2 mg ET or TCP if indicated/sedate pt. if conscious
- Dopamine infusion 5 mcg/kg/min IV, if bradycardia Atropine/Pacing refractory

Observe
- Support ABCs
- Consider transport to specialized pediatric care facility

Yes

Perform chest compressions
- if despite oxygenation:
  - Heart Rate < 80 in infants
  - Heart Rate < 60 in children

Epinephrine
- IV/IO 0.01 mg/kg 1:10000
- ETT 0.1 mg/kg 1:1000
- Repeat q. 3 - 5 minutes at the same dose

Atropine
- 0.02 mg/kg/IV/O
  - (minimum dose: 0.1 mg, maximum dose: 0.5 mg - child, 1 mg - adolescent)
  - May be repeated once

Transport to specialized pediatric care facility

CARDIOGENIC SHOCK

Oklahoma EMS Protocols 30 Revised 10/02
Indications:

Patients with chest pain or dyspnea, who have not suffered trauma and have:

a) systolic BP <90 mm Hg.
b) signs and symptoms of shock.

**Adult Care**

General Supportive Care. IV NS. Patients requiring fluid bolus administration for any reason require contact with Medical Control, though not necessarily before the initiation of the volume infusion.

If lungs clear, IV NS 250 ml fluid bolus. If rales present, IV NS TKO.

Dopamine infusion at 5 mcg/kg/min IV. (400 mg in 250 ml D5W, concentration 1600 mcg/ml.)

If patient remains hypotensive, titrate infusion up to a maximum of 20 mcg/kg/min.

**CARDIOGENIC SHOCK (cont.)**
Cardiogenic Shock

Clinical Signs
Patients with chest pain or dyspnea who have not suffered trauma and have:

a) systolic BP < 90 mm Hg
b) signs and symptoms of shock

Adult ALS Care

General Supportive Care

IV/NS

Administer fluids
(250 cc) if not contra indicated, otherwise IV TKO

Dopamine
Start @ 5 mcg/kg/min/IV, titrate to a maximum of 20 mcg/kg/min

Pediatric ALS Care

General Supportive Care

IV/NS

Administer fluids
(20 ccs/kg) if not contra indicated, otherwise IV TKO

Transport to specialized pediatric care facility

Acute Coronary Syndromes

Introduction:
Acute Coronary Syndromes start with cholesterol plaque in a coronary artery. When that plaque ruptures, a clot forms on top of it causing either partial or complete occlusion of that coronary artery. If there is complete occlusion of the artery then an acute myocardial infarction occurs. These patients usually have ST-segment elevation on their ECG in more than one contiguous lead. When patients have this finding on the electrocardiogram, they benefit from clot busting medicines called, thrombolytic therapy, to help dissolve the clot, while other patients might benefit from prompt angioplasty in a catheter lab. The majority of patients do not have complete occlusion of their coronary artery and as a result, they have chest pain and either no findings or non-specific findings on their ECG. It is crucial to remember that even when myocardial infarction is present, the ECG does not always provide obvious evidence.

Unstable angina is suspected clinically when previous angina patients report an increase in the frequency and severity of chest pain, or when patients without a cardiac history experience new onset of angina. For example, a patient experiences chest pain walking up a hill, which goes away when the patient rests. Unstable angina occurs when a patient who has known coronary artery disease has an increase in frequency or their angina is easier to provoke or comes at rest. Any of these things are a warning sign that the disease has become unstable and the patient now has unstable angina. Unstable angina can be thought of as “preinfarct angina,” because the underlying conditions which produce the unstable angina are identical to those that produce myocardial infarction. Despite the fact that these patients do not meet the objective ECG criteria for infarct recognition, they should be classified as Code 3 (emergency) Medical Patients.

Prinzmetal’s Angina is unlike typical angina, which is the result of a narrowed coronary artery, Prinzmetal’s Angina is the result of coronary artery vasospasm. This variant angina may occur in otherwise healthy individuals, with little or no demonstrable coronary artery disease. The episode of coronary artery spasm usually last only a few minutes, but this may be long enough to produce a potentially lethal arrhythmia. If the spasm persists, infarct may result. These patients often complain of chest pain, which is relieved with Nitroglycerin.

The clinical suspicion of an Acute Coronary Syndrome is arrived at by considering multiple factors:

- Description of Pain or Discomfort
- Accompanying Signs and Symptoms
- Cardiac Risk Factors
- Past Medical History
- Family History

Acute Coronary Syndromes (cont.)

Introduction (cont):
Chest pain is one of the most frequent medical complaints prompting a call for emergency medical services. This patient presentation may be difficult to evaluate because of the varied medical problems involving the organs located in the chest and upper abdomen. Some patients with acute chest pain present with signs and symptoms that indicate they are in danger of developing a life-threatening process; others have ATYPICAL pain that is difficult to evaluate. Although the patient may not present in a typical fashion, the paramedic should always consider chest pain as representing a significant problem. The patient's description of his or her symptoms is one of the most critical evaluation components for paramedics. The patient with chest pain resulting from myocardial ischemia will typically complain of a retrosternal chest discomfort that is PRESSURE LIKE, CONSTRICTING, or SQUEEZING. A classical description is of a weight on the chest. ATYPICAL presentation of cardiac pain may be interpreted as burning or cramping in nature, especially if the patient has been involved in physical activity. Some patients may even hesitate to call it a “pain” but prefer to call it a “feeling” or “sensation in my chest.” The pain may radiate into the neck, arm, or abdomen or be noted only in the epigastrium, shoulder, mandible, back, or arm. These less typical presentations can cause the patient to delay seeking medical attention and make it difficult for paramedics to determine whether the complaint is significant and potentially dangerous. Even when the symptoms are not typical of cardiac pain, all adults with chest pain should be considered to have a cardiac problem until further evaluation is performed at the hospital.

Although myocardial ischemia may occur at rest, the pain of myocardial ischemia is typically exertional in nature, requiring several seconds to minutes to crescendo with exertion and ease with rest. Often a careful history reveals prior history of exertional-type symptoms. Associated symptoms typically are present, such as dyspnea, diaphoresis, nausea, emesis, pallor, weakness, near syncope, or syncope. Often patients have a sense of “impending doom”.

Approximately 15% of Acute Coronary Syndrome patients will present with atypical pain. FEMALES often present with atypical pain. (NOTE: While the “Q” wave is the most conclusive ECG evidence of infarction, some patients with confirmed infarct never develop a “Q” wave. This finding is of greater incidence among women). There should be a high index of suspicion for ALL patients with chest pain, especially in patients with a history of coronary artery disease or a number of risk factors. Females, diabetics and/or elderly patients are most likely to present with ATYPICAL presentation, e.g. (musculoskeletal, positional, pleuritic features, chest pain which is often unilateral, described as sharp or stabbing, this also includes epigastric discomfort) or anginal equivalents, e.g. (dyspnea, palpitations, near-syncope or syncope, or general weakness). Elderly patients may often complain of feeling tired, listless, and/or shortness of breath, while the complaint of chest pain may only be made by the elderly patient after specific questioning. When an elderly patient experiences a sudden onset of breathing difficulty, is tired, and/or admits to some chest pain, myocardial infarction should be considered a possibility.

Patients with a history of DIABETES can be particularly difficult because many diabetics who develop an acute myocardial infarction often present with minimal or ATYPICAL symptoms, (chest pain to a diabetic may, relatively, be a minor component). Medications the patient is taking will also provide information about underlying diseases. Above all, the use of Nitroglycerin indicates prior cardiac disease. Paramedics must remember to recognize these indicators as potential Acute Coronary Syndrome patients.

Acute Coronary Syndromes (cont.)

Introduction (cont.)

The presence of risk factors should be sought in the patient who is being evaluated for chest pain or any symptom suggestive of Acute Coronary Syndrome. A history of prolonged smoking,
uncontrolled or poorly controlled hypertension, hyperlipidemia, diabetes mellitus, or the presence of heart disease in family relatives (especially in those younger than 50 years of age) increases the likelihood of Acute Coronary Syndrome.

General Supportive Care - Semi-fowler’s position (15-30 degrees of elevation). Always use O₂. High flow oxygen via Non-rebreather mask is generally not necessary for uncomplicated acute coronary syndrome patients. If the patient is breathing normally and the SpO₂ readings are > 95% then oxygen by nasal cannula is adequate. A nonrebreather mask must be used if the O₂ saturation is less than < 95%. Remember that SpO₂ readings > 95% in the presence of tachypnea is a sign of compensation and may indicate severe impending decompensation and hypoxia. Be prepared with advanced airway devices. It is encouraged that each service develops service specific protocols regarding the use and application of oxygen.

Specific treatment for Acute Coronary Syndromes includes Morphine, Oxygen, Nitroglycerin and Aspirin. These medications should be administered according to protocol. The purpose of a 12-Lead ECG is to establish a baseline for each patient and identify potential candidates for thrombolytics or percutaneous coronary intervention with the earliest possible notification of the receiving hospital. 12-Lead ECG acquisition should not delay appropriate treatment or significantly prolong scene of transport time.

Place on cardiac monitor using standard (4) limb lead placement in anticipation of 12-lead acquisition. 12-Lead ECG acquisition should only be established in patients who are: 1) alert and oriented; 2) able to cooperate with prehospital treatment; 3) adequately perfusing, blood pressure >= 90 mm/Hg; 4) absent of ventricular tachycardia or fibrillation; 5) absent of high degree AV blocks; 5) complaining of non-traumatic chest pain or anginal equivalents. NOTE: If precordial electrodes are attached and 12-lead ECG is acquired while patients assessment is taking place, scene time is should not be adversely affected.

Acquire prehospital 12-lead ECG tracing WHILE administering Nitroglycerin, Aspirin, Lidocaine, Morphine or other medications. Obtain 12-lead ECG either in patient’s residence or incident location prior to moving patient to vehicle in preparation for transport or in vehicle just prior to beginning transport and treat according to assessment. The acquisition of 12-Lead ECG should not interfere with emergent and life-saving patient care.

Acute Coronary Syndromes (cont.)

An inferior infarction is suspected when there is ST elevation in two or more contiguous leads involving Lead II, III, and aVF. Establish IV and administer Nitroglycerin, One metered dose, intraoral spray, if systolic BP > 90 mm Hg. Nitroglycerin shall be repeated every five (5) minutes up to a maximum of three (3) dosages if systolic BP remains > 90 mm Hg as long as chest pain is persistent or if there is remnants of ST elevation. NOTE: While the potential
is recognized for serious adverse events after Nitroglycerin, the rarity of such events should not prevent administration of Nitroglycerin to patients in the prehospital setting in whom IV established is delayed or not possible. In addition, since nitrates have been shown to reduce the odds of death after acute myocardial infarction, withholding such therapy may be unfavorable. For these reasons, it is acceptable to administer the first dose of Nitroglycerin while obtaining IV access. Remember, you should always inquire if the patient has recently taken Viagra and avoid the use of Nitroglycerin if this is the case.

Administer TWO (2) chewable baby ASPIRINS (81 mg/tablet), equivalent to 162 mg. NOTE: Aspirin should be given to all patients suspected of having chest pain from acute ischemic coronary syndrome despite any relief of pain occurring spontaneously or from the use of Oxygen or Nitroglycerin. Do not administer this medication (Aspirin) if the patient is hypersensitive* to this drug or has active bleeding, i.e., blood in stools or melena.

*Hypersensitivity is an unexpected and exaggerated reaction to a particular antigen. It is used synonymously with the term allergy.

If patient is still experiencing pain administer Morphine, 2 mg incremental doses, IV, repeated at 5 minute intervals up to a total of 10 mg, titrated for pain relief. Do not administer Morphine if systolic BP < 90 mm Hg. In Morphine allergic patient, give Demerol 25-50 mg IV.

Benadryl as adjunct to Morphine or Demerol for nausea. 25 mg slow IV push

If a patient is already hypotensive or becomes hypotensive after initial treatment, a right ventricular infarction (RVI) should be suspected. INFERIOR INFARCTION with right ventricular infarction (RVI) there is a dilemma concerning the benefit of pain reduction versus hypotension risks. With RVI, the decision to administer vasodilators like Nitroglycerin and Morphine should be made with caution. Each service is encouraged to develop service specific protocols regarding vasodilators and RVI. Whenever inferior infarction is suspected, always obtain lead V4R to identify patients with right ventricular infarction. ST elevation in lead V4R is highly sensitive and specific for detecting RVI. NOTE: Evidence indicates that RVI complicates about 30% to 40% of all inferior-wall infarctions. In the presence of RVI, blood may “stall” in the right ventricle and begin to back up. For this reason, jugular venous distention is often noted in patients with RVI. Unlike left ventricular infarctions, RVI itself does not produce pulmonary congestion, so lung sounds remain dry. RVI can become clinically significant when vasodilators are administered because RVI patients are preload dependent. Vasodilators like Nitroglycerin and Morphine reduce preload and may produce marked hypotension with RVI. These drugs, which are routinely given to manage cardiac chest pain, should therefore be used with caution in RVI patients. Remember two points. First, it is not the inferior wall infarction that causes concern about the administration of Nitroglycerin or Morphine. The right ventricular infarction causes the concern. When there is no ECG or clinical evidence of RVI accompanying the inferior wall infarction, Nitroglycerin and Morphine are administered in their “usual” manner.

Acute Coronary Syndromes (cont.)

(cont.) Second, DO NOT withhold Nitroglycerin in situations in which it is not possible to quickly ascertain if an RVI is present. In other words, if you cannot quickly determine whether or not an RVI exists, then it is probably safer to administer the Nitroglycerin than it is to withhold. Each service is encouraged to develop service specific protocols for the administration of Morphine and Nitroglycerin.
If patient HYPOTENSIVE, give fluid bolus in 250 cc increments, up to 500 ccs. Reassess lung sounds after each 250 cc increment. Care must be given not to overload the circulatory system. Another important complication seen in right coronary occlusions is AV block. In 90% of the population, the AV node is supplied by the right coronary artery. With this knowledge, it is easy for paramedics to understand why AV block is a frequent complication of inferior wall infarcts, with or without an accompanying RVI. When RVI accompanies inferior wall infarct, the likelihood of an AV block is even greater. AV blocks with narrow QRS complexes that are frequently seen with inferior-wall infarction often occur at the level of the AV node, are generally well tolerated, and usually respond to both Atropine and pacing. As always, treat AV blocks only when they become hemodynamically unstable.

An ANTERIOR INFARCTION is suspected when there is ST elevation in two or more contiguous leads involving leads V1 thru V6, Lead 1, aVL. Establish IV and administer Nitroglycerin, One metered dose, intraoral spray, if systolic BP > 90 mm Hg. Nitroglycerin shall be repeated every five - (5) minutes up to a maximum of three – (3) dosages if systolic BP remains > 90 mm Hg as long as chest pain is persistent or if there is remnants of ST elevation. NOTE: While the potential is recognized for serious adverse events after Nitroglycerin, the rarity of such events should not prevent administration of Nitroglycerin to patients in the prehospital setting in whom IV established is delayed or not possible. In addition, since nitrates have been shown to reduce the odds of death after acute myocardial infarction, withholding such therapy may be unfavorable. For these reasons, it is acceptable to administer the first dose of Nitroglycerin while obtaining IV access. Remember, you should always inquire if the patient has recently taken Viagra and avoid the use of Nitroglycerin if this is the case.

Administer TWO (2) chewable baby ASPIRINS (81 mg/tablet), equivalent to 162 mg. NOTE: Aspirin should be given to all patients suspected of having chest pain from acute ischemic coronary syndrome despite any relief of pain occurring spontaneously or from the use of Oxygen or Nitroglycerin. Do not administer this medication (Aspirin) if the patient is hypersensitive to this drug or has active bleeding., i.e., blood in stools or melena.

If patient is still experiencing pain administer Morphine, 2 mg incremental doses, IV, repeated at 5 minute intervals up to a total of 10 mg, titrated for pain relief. Do not administer Morphine if systolic BP < 90 mm Hg. In Morphine allergic patient, give Demerol 25-50 mg IV.

Benadryl as adjunct to Morphine or Demerol for nausea. 25 mg slow IV push

Transport as soon as possible

Acute Coronary Syndromes (cont.)
Acute Coronary Syndrome
(Chest Pain suggestive of coronary ischemia)

Immediate medical patient assessment
Measure vitals, signs, and perform physical examination
Obtain history of present illness and pertinent past medical history

Adult ALS Care

Obtain 12-Lead ECG Tracing

Included in General Supportive Care
NTG 0.4 mg S/L spray
q. 5 min if SBP > 90 mmHg
ASA 162 mg / po

Evidence of CHF or cardiogenic shock
See pulmonary edema protocol
See cardiogenic shock protocol

MS 2mg IV if no relief w/ NTG X 3
(max. 10 mg if SBP > 90 mmHg)
Use Demerol if MS allergic, 25 - 50 mg IV

Transport ASAP

Pediatric ALS Care

General Supportive Care

Treatment of dysrhythmia / protocol

PULSELESS ELECTRICAL ACTIVITY (PEA)
Adult Care

CPR and AED protocol.

Intubate with an advanced airway adjunct. Check End-Tidal CO2 readings using capnography. The presence of exhaled CO2 on the monitor screen indicates proper tracheal tube placement. The lack of CO2 generally means that the tube is in the esophagus therefore confirming ET tube placement is indicated. Low CO2 readings in cardiac arrest patients may be caused by inadequate CPR, prolonged down time, or hypothermia. If there is a sudden loss of ETCO2 to zero or near zero evaluate the patient for ET tube dislodgement. Equipment malfunction, (i.e., ET extubation,) is more likely to occur during out-of-hospital transportation of the patient. Reintubate if needed.

All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (Develop and follow local protocols for securing patients intubation tubes)

Ventilate the patient using a bag-valve mask device or other ventilatory system. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

If gastric distention is suspected in patients with acutely distended abdomen after difficult intubation, especially if CPR was performed, insert nasogastric tube immediately and apply low suction until distention relieved.

Consider hypovolemia, acidosis, hypoxemia, tension pneumothorax, cardiac tamponade, pulmonary embolus as cause of PEA.

Epinephrine 2 mg, ET*, if ET route is clear. Repeat Epinephrine every 3-5 minutes for duration of pulselessness.

Atropine 2.0 mg ET may be given if heart rate < 60 bts/min.

IV, NS, TKO. Consider fluid bolus if hypovolemia suspected.

If Epinephrine not yet given via ET tube and IV is established, give Epinephrine 1.0 mg IV.

If Atropine required and not yet given via ET tube, and IV is established, give Atropine 1.0 mg IV. Repeat Atropine every 3-5 minutes to a total dose of 0.04 mg/kg.

PULSELESS ELECTRICAL ACTIVITY (PEA)(cont.)
Consider Sodium Bicarbonate 1.0 mEq/kg, IV. Each service is encouraged to develop agency specific protocols regarding use of Sodium Bicarbonate.

* The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.

PULSELESS ELECTRICAL ACTIVITY (PEA)(cont.)
Oklahoma State EMS Protocols

Pulseless Electrical Activity

Focused Primary ABCD
Basic CPR and Defibrillation

Adult ALS Care

Focused Primary ABCD
Basic CPR and Defibrillation

General Supportive Care

Review for most frequent causes:
- Hypovolemia
- Acidosis
- Hypoxemia
- Tension Pneumothorax
- Cardiac Tamponade
- Pulmonary Embolus

Epinephrine
2 mg ET or 1 mg IV q. 3-5 min

Atropine
(if rate is < 60)
2 mg ET or 1 mg IV q. 3-5 min up to a total of 0.4 mg/kg

NaHCO3
1 mEq./kg

Pediatric ALS Care

General Supportive Care

Review for most frequent causes:
- Hypovolemia
- Acidosis
- Hypoxemia
- Tension Pneumothorax
- Cardiac Tamponade
- Pulmonary Embolus

Epinephrine
ETT: 0.1 mg/kg (1:1000) q. 3-5 min.
IV/IO: 0.01 mg/kg 1:10000, if Epinephrine not yet given ET.
Epinephrine 2nd dose IV/IO: 0.1 mg/kg (1:1000) q. 3-5 min

Pediatrics NaHCO3
1 mEq./kg/IV/IO

Infants NaHCO3
0.5 mEq./kg/IV/IO

HYPERTENSIVE EMERGENCIES
NOTE: In the presence of focal neurologic signs or evidence of CVA, pre-hospital treatment of hypertension is contraindicated because a rapid or precipitous drop in BP may compromise cerebral blood flow and create further CNS injury. Focal neurologic findings are defined as unilateral motor or sensory deficits.

Adult Care

General Supportive Care. If unconscious, hyperventilate and keep NPO.

With chest pain (see also CHEST PAIN protocol)

With congestive failure (see also PULMONARY EDEMA protocol)

Nitroglycerin, one metered dose (oral puff).

a. Diastolic pressure > 120 or if systolic pressure > 220 with symptoms of chest pain, shortness of breath, or change in mental status.

NOTE:

1. Asystomatic hypertensive patients do not require treatment in the prehospital setting.

2. Blood pressure monitoring should be performed before each administration of Nitroglycerin.

3. Hypertension associated with COCAINE use may be difficult to control. Follow agency specific protocols for this medical condition.

HYPERTENSIVE EMERGENCIES
Hypertensive Emergencies

In the presence of focal neurologic signs or evidence of CVA pre-hospital treatment of hypertension is contraindicated

Adult ALS Care

**Interventional sequence, Level II**
Nitroglycerin one metered dose if:

- Diastolic pressure $> 120$
- Systolic pressure $> 220$
  with symptoms of chest pain, SOB, altered LOC

**With chest pain**

see also **ACS** protocol

**With congestive failure**

see also **Pulmonary Edema** protocol

**If unconscious:**
Hyperventilate and keep NPO

Pediatric ALS Care

**Asymptomatic Patients**
medication regimen not indicated

**If unconscious:**
Hyperventilate and keep NPO

**HTN**
COCAIN use
Valium or Versed / OLM C

**PREMATURE VENTRICULAR ECTOPY**
**Indications:**

Treatment of PVC’s should be limited to patients with probable cardiac complaints, e.g. chest pain, syncope, SOB, etc. Use this protocol if the ventricular complexes meet any of these criteria and the underlying heart rate is greater than > 60:

1. Six or more PVC’s per minute.
2. Multi-focal PVC’s at any frequency.
3. R on T pattern at any frequency.
4. Coupling at any frequency (This protocol is for isolated coupling and bursts - see Ventricular Tachycardia for rapid sustained patterns of ventricular complexes).

**Adult Care**

General Supportive Care.

Lidocaine 1 mg/kg IV.

Lidocaine 0.5 mg/kg IV after 5-10 minutes.

Additional boluses of Lidocaine 0.5 mg/kg IV, may be repeated as necessary every 5-10 minutes to suppress ventricular ectopy. Total dose not to exceed 3 mg/kg.

If Lidocaine appears to resolve ectopy, initiate Lidocaine infusion containing 1 gm Lidocaine in 250 mg D5W given at a rate of 2-4 mg/min. (30-60 microdrops/min.).

Once ectopy is resolved, maintain as follows:

1. After Lidocaine 1 mg/kg  Lidocaine Drip at 2 mg/minute
2. After Lidocaine 1 – 2 mg/kg  Lidocaine Drip at 3 mg/minute
3. After Lidocaine 2 – 3 mg/kg  Lidocaine Drip at 4 mg/minute

**NOTE:** The maintenance dose (drip infusion) should be reduced by 50% if age >70, presence of CHF, shock or liver disease. In these situations, the bolus dose remains the same.

None.
Oklahoma State EMS Protocols

**Premature Ventricular Ectopy**

- Treatment of PVC's should be limited to patients with probable cardiac complaints, six or more PVC's/min, Multifocal PVC's, R on T pattern, Couplets

**Adult ALS Care**

- General Supportive Care

- **Lidocaine**
  - 1 mg/kg/IV
  - 0.5 mg/kg repeated as necessary q.5 - 10 min. to suppress ectopy (max. 3 mg/kg)

- **Ectopy resolved?**

- **Lidocaine infusion**
  - 2 - 4 mg/min
  - (Infusion reduced by 50% if age > 70, hx of CHF or liver disease)

**Pediatric ALS Care**

- General Supportive Care

- **Lidocaine**
  - 1 mg/kg/IV bolus
  - 0.5 mg/kg/IV, repeated as necessary q. 5 - 10 min. to suppress ectopy (max. 3 mg/kg)

- Treat ectopy with drugs only if child is symptomatic

SUPRAVENTRICULAR TACHYCARDIA

Oklahoma EMS Protocols 45 Revised 10/02
NOTE: QRS duration must be < 120 milliseconds, rate > 150.

NOTE: The field treatment of this rhythm will depend upon whether the patient is hemodynamically stable or unstable. "Hemodynamically unstable" is defined as:

A. Systolic BP < 90 mm Hg OR
B. Decreased level of consciousness OR
C. Signs and symptoms of pulmonary edema.

**Adult Care**

**CONSCIOUS, STABLE**

General Supportive Care. Record rhythm strip before and after intervention.

Valsalva maneuver.

Adenosine 6 mg IVP as fast as possible, followed by a 20 ml saline flush.

If PSVT persists 2 min after initial dose, repeat Adenosine 12 mg IVP over 1-2 seconds followed by a 20 ml saline flush. (The 12 mg dose may be repeated a second time if required after consultation with Medical Control)

**UNSTABLE**

Consider sedation with Valium 5-10 mg IV or Versed (0.15 mg/kg). Slowly titrate Versed IV to desired effect, (i.e., drowsiness, slurred speech), not to exceed 5 mg.

Unsynchronized countershock, 50J*.

Unsynchronized countershock, 200J.

Unsynchronized countershock, 300J.

Unsynchronized countershock, 360J.

* Prior to cardioversion, pharmacologic cardioversion with Adenocard may be attempted at the discretion of Medical Control.

**SUPRAVENTRICULAR TACHYCARDIA (cont.)**
Supraventricular Tachycardia

Evaluate Patient
Is patient Stable or Unstable?

Adult ALS Care

Stable

Hemodynamically unstable
SBP < 90 mmHg or Altered LOC or S/S of pulmonary edema

Narrow complex tachycardia, QRS duration < 120 ms, rate > 150 w/o P waves

General Supportive Care

Valsalva maneuver

Yes

Successful

Transport

No

Adenosine
6 mgIV/fast as possible/20 cc saline flush, repeat with 12 mg in two minutes if indicated.

Unsyn. countershock 50 j*
Unsyn. countershock 200j
Unsyn. countershock 300j
Unsyn. countershock 360j

Pediatric ALS Care

Hemodynamically unstable
SBP < 70 torr, Pediatric SVT usually > 220 b/m

Narrow complex tachycardia, QRS duration < 120 ms, rate > 150 w/o P waves

General Supportive Care

Valsalva maneuver if practical/OLMC approval

Prepare patient for immediate cardioversion

Sedate patient if possible but it should not delay cardioversion

Valium 5 - 10 mg IV or Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg

Unsyn. countershock 0.5 j/kg
Unsyn. countershock 1 j/kg
Unsyn. countershock 2 j/kg

*Prior to cardioversion, Adenocard may be attempted at the discretion of OLMC
**Adult Care**

CPR and AED/Manual Defibrillation shock protocols. Power usage will depend on the use of biphasic vs. monophasic device. *(Follow AHA and Local recommendations)*

Intubate. Check End-Tidal CO2 readings using capnography. The presence of exhaled CO2 on the monitor screen indicates proper tracheal tube placement. The lack of CO2 generally means that the tube is in the esophagus therefore confirming ETT placement is indicated. Low CO2 readings in cardiac arrest patients may be caused by inadequate CPR, prolonged down time, or hypothermia. If there is a sudden loss of ETCO2 to zero or near zero evaluate the patient for ETT tube dislodgement. Equipment malfunction, (i.e., ETT extubation,) is more likely to occur during out-of-hospital transportation of the patient. Reintubate if needed.

All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. *(Follow local protocols for securing the intubated patient)*

When clinically convenient remove bag-valve device and attach the ventilator to the endotracheal tube, combitube, or appropriate adjunct. Set the desired breaths per minute and observe chest rise during ventilation cycles. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

If gastric distention is suspected in patients with acutely distended abdomen after difficult intubation, especially if CPR was performed, insert nasogastric tube immediately and apply low suction until distention relieved.

Epinephrine, 2 mg, if ET tube is clear. Repeat Epinephrine every 3-5 minutes for duration of pulselessness. *(Defibrillate 30-60 seconds after drug delivery)*

IV, NS, TKO.

If Epinephrine not yet given via ET tube, give Epinephrine 1.0 mg IV PLUS IV Amiodarone, 300 mg bolus. NOTE: The 300 mg IV Amiodarone bolus is expected to maintain a reasonable blood level for 20 to 30 minutes, long enough for the patient to be transported to the nearest emergency department.

• Countershock 360 J**.

**VENT. FIBRILLATION AND PULSELESS VENT. TACH. (cont.)**
Lidocaine, 1.5 mg/kg IV or 3.0 mg/kg ET*. Repeat Lidocaine 1.5 mg IV in 5 minutes to a total dose of 3.0 mg/kg.

Countershock, 360 J*.

Endotracheal medications should be administered at two times the recommended IV dose. The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.

Consideration for transport should be made at this time.

Magnesium Sulfate 1 gm IV.

Countershock, 360 J*.

Contact Medical Control at earliest opportunity for further orders.

Consider Sodium Bicarbonate 1.0 mEq/kg, IV.

If cardioversion restores a supraventricular rhythm with rate 60 and without 2nd or 3rd degree A-V block, administer a Lidocaine bolus (if not yet given earlier) 1 mg/kg, IV, and start Lidocaine drip at 2 mg/min. (adult).

* If cardioversion restores a supraventricular rhythm with rate 60 and without 2nd or 3rd degree A-V block, administer a Lidocaine bolus (if not yet given earlier) 1 mg/kg, IV, and start Lidocaine drip, 20-50 mcg/kg/min (pediatric).

** Defibrillations should be performed 30-60 seconds after drug delivery. The pattern should be drug-shock-drug-shock. If delays occur because of medication administration or the performance of procedures, go back to defibrillate before proceeding.

**EMT-D Transition to Advanced Life Support Care**

In accordance with the American Heart Association Advanced Cardiac Life Support Guidelines, paramedics arriving at the scene of a patient with a Semi-Automatic Defibrillator in place should attach a conventional defibrillator when clinically convenient. If a Semi-Automatic Defibrillator is in the process of analyzing, the paramedic should allow the analysis to be completed and a shock delivered, if advised. Once the shock has been delivered or “No Shock” is advised, the patient should then be switched to a conventional defibrillator in order to avoid time delays associated with semi-automatic analysis and defibrillation.

**VENT. FIBRILLATION AND PULSELESS VENT. TACH. (cont.)**
Ventricular Fibrillation and Pulseless Ventricular Tachycardia

Focused Primary ABCD
Basic CPR and Defibrillation

Defibrillation
Assess for and shock VF/pulseless VT up to 3 times 200 j, 300j, 360j

Rhythm after first 3 shocks?

Persistent or recurrent VF/VT

Intubate ASAP confirm ETT placement by exam plus ETCO2

Epinephrine
2mg ET q. 3-5 min
Defibrillate 1 X 360 j
30 - 60 sec. after drug administration

IV/NS/TKO

Epinephrine
1 mg IV q. 3-5 min. if not given ET PLUS IV Amiodarone 300 mg
Defibrillate 1 X 360 j 30 - 60 sec. after drug administration

Lidocaine
1.5 mg/kg/IV or 3.0 mg ET q. 5 min. (max. 3 mg/kg)
Defibrillate 1 X 360 j 30 - 60 sec. after drug administration

Magnesium Sulfate
1 gm IV Defibrillate 1 X 360 j 30 - 60 sec. after drug administration

Consider NaHCO3
1 mEq./kg/IV Defibrillate 1 X 360 j 30 - 60 sec. after drug administration

POST-RESUSCITATION OF PATIENTS IMMEDIATELY AFTER CARDIAC ARREST

Oklahoma EMS Protocols 50 Revised 10/02
Prehospital post-resuscitation care refers to the period between restoration of a spontaneous circulation and transfer of the patient to the emergency department. Patients may display a wide spectrum of responses to resuscitation varying from awake and alert with adequate spontaneous respirations and hemodynamic stability, to remaining comatose, apneic, and having an unstable circulation.

The prehospital goal of post-resuscitative care is to provide cardiorespiratory support in order to optimize tissue perfusion, especially to the brain. All patients require careful, repeat assessments to establish the status of their cardiovascular, respiratory, and neurological systems.

A. Adult Care

General Supportive Care. Maintain airway and adequate tidal volume as appropriate. Always administer 100% oxygen. If indicated, continue ventilatory assistance with appropriate system attached to the endotracheal tube, combitube, or appropriate adjunct. NOTE: Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique. Determine accurate vital signs and modify treatment as the patient's condition changes. Continuous cardiac monitoring and referral to appropriate treatment protocol.

Post-resuscitation-Hypotension without rate problem

Evaluate General Supportive Care.

Always determine whether blood pressure instability arises from volume, pump, or rate problem.

a) If lungs clear, administer 250 to 300 mL of normal saline, IV.

b) If hypotension persists after fluid bolus, Dopamine infusion at 5 mcg/kg/min IV (400 mg in 250 ml D5W, concentration 1600 mcg/ml).

c) If patient remains hypotensive, titrate infusion up to a maximum of 20 mcg/kg/min.

Post-resuscitation-Tachycardias

Evaluate General Supportive Care.

Supraventricular tachycardias observed in the immediate post-resuscitation phase are best treated by leaving them alone. The high catecholamine state of cardiac arrest may be causing the tachycardia, particularly if high doses of Epinephrine were administered. If the blood pressure drops or fails to increase soon after resuscitation, then refer to appropriate treatment protocol.

Post-resuscitation Bradycardias

Evaluate General Supportive Care.

If Bradycardia is associated with hypotension and hypoperfusion consider the use of Atropine, Pacing. (Use Dopamine if Atropine and Pacing are unsuccessful).
Post-resuscitation-Premature Ventricular Contractions

Evaluate General Supportive Care

Lidocaine bolus, 1 mg/kg up to the maximum of recommended dose especially if VF/VT originally precipitated the arrest or if Lidocaine has not been administered within the last fifteen minutes.

Lidocaine infusion 2 – 4 mg/min.

Once ectopy is resolved, maintain as follows:

a) After Lidocaine 1 mg/kg    Lidocaine Drip at 2 mg/minute
b) After Lidocaine 1 – 2 mg/kg  Lidocaine Drip at 3 mg/minute
c) After Lidocaine 2 – 3 mg/kg  Lidocaine Drip at 4 mg/minute

None for post-resuscitation care of patient immediately after cardiac arrest.
Determine whether blood pressure instability arises from volume, pump or rate problem.

If the blood pressure drops or fails to increase soon after resuscitation, refer to the appropriate treatment protocol.

Bradycardia associated with hypotension and hypoperfusion consider:
- Atropine 0.5-1 mg IV or 2 mg ET q 3-5 min (max 0.4 mg/kg)
- Pacing
- Use Dopamine if Atropine and pacing are unsuccessful.

If patient remains hypotensive, titrate infusion up to a max of 20 mcg/kg/min.

POST-RESUSCITATION OF PATIENTS IMMEDIATELY AFTER CARDIAC ARREST (cont)
Determine whether blood pressure instability arises from volume, pump or rate problem

If the patient's lung fields are dry, fluid bolus 20 cc/kg NS IV

If the blood pressure drops or fails to increase soon after resuscitation, refer to the appropriate treatment protocol

Bradycardia associated with hypotension and hypoperfusion refer to specific protocol

Lidocaine bolus 1 mg/kg (max 3 mg/kg)

Lidocaine infusion 20 mcg/kg/minute

VENTRICULAR OR WIDE QRS TACHYCARDIA WITH PULSE
NOTE: The field treatment of this rhythm will depend upon whether the patient is hemodynamically stable or unstable. "Hemodynamically unstable" is defined as:

A. Systolic BP < 90 mm Hg OR
B. Decreased level of consciousness OR
C. Signs and symptoms of pulmonary edema

Adult Care

STABLE

General Supportive Care.

**If Torsades is present Magnesium Sulfate 1 gm over 1 – 2 minutes. If torsades is refractory or reoccurs repeat dose in 3 minutes.

Lidocaine, 1 mg/kg IV.

Lidocaine, 0.5 mg/kg IV, every 5-10 minutes until dysrhythmia resolves or total bolus dose is 3 mg/kg.

Lidocaine infusion, 2 mg/min IV, only after resolution with boluses.

NOTE: If tachycardia is a hemodynamically stable wide QRS tachycardia of uncertain type, Adenocard 6 mg, rapid IV push over 1-2 seconds, may be given after Magnesium Sulfate or Lidocaine upon approval by Medical Control.

Amiodarone 150 mg over the FIRST 10 minutes (15 mg/min or 0.3 ml/min, to minimize the potential for hypotension) IV for monomorphic ventricular tachycardia in patients with AMI, if the VT is not accompanied by hypotension, altered mental status, or pulmonary edema.

Amiodarone infusion. Add 3 ml of Amiodarone (150 mg) to 50 ml of D5W. Infuse 50 ml over 10 minutes, only after resolution with bolus. (Combine 150 mg of Amiodarone in 50 ml of D5W using the Buretrol Infusion set to accurately measure the mixture. Then set the Dial – a – Flow at 250 gtts/minute. This will deliver the desired dosage in approximately 10 minutes.)

If patient conscious, sedation with Valium 5-10 mg IV given slowly over 1-2 minutes or Versed (0.15 mg/kg). Slowly titrate Versed IV to desired effect, (i.e., drowsiness, slurred speech), not to exceed 5 mg.

Synchronized cardioversion at 100 Joules.

Repeat synchronized cardioversion progressively at 200, 300, and then 360 Joules if required.

VENTRICULAR OR WIDE QRS TACHYCARDIA WITH PULSE (cont.)
**UNSTABLE***

If patient unconscious, immediate unsynchronized cardioversion at appropriate energy setting.

**If Torsades is present Magnesium Sulfate 1 gm over 1 – 2 minutes. If torsades is refractory or reoccurs repeat dose in 3 minutes.

Sedation, if needed, with Valium 5-10 mg IV or Versed (0.15 mg/kg). Slowly titrate Versed IV to desired effect, (i.e., drowsiness, slurred speech), not to exceed 5 mg.

Unsynchronized cardioversion, 100 joules.

Unsynchronized cardioversion, 200 joules.

Unsynchronized cardioversion, 300 joules.

Unsynchronized cardioversion, 360 joules.

***Lidocaine, 1 mg/kg IV or 2 mg/kg ET. Repeat Lidocaine 0.5 mg IV every 5-10 minutes until dysrhythmia resolves or total bolus dose of 3 mg/kg is given. Start Lidocaine drip at 2-4 mg/min IV if cardioversion successful.

Unsynchronized cardioversion, at level previously successful.

Unsynchronized cardioversion, at level previously successful.

* Unsynchronized cardioversion should be performed whenever the patient has signs of clinical instability or whenever synchronization seems delayed.

** Magnesium Sulfate is primary treatment for patients in torsades de pointes. Magnesium Sulfate should not be used in patients on dialysis or with renal insufficiency.

*** Endotracheal medications should be administered at two times the recommended IV dose. The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.
Oklahoma State EMS Protocols

Ventricular or Wide QRS Tachycardia with Pulse

- Adult ALS Care
  - Stable

### Monomorphic VT
- General Supportive Care
  - Lidocaine 1 mg/kg/IV
    - 0.5 mg/kg repeated as necessary q.5 - 10 min. to suppress ectopy (max. 3 mg/kg)
  - Lidocaine infusion 2 - 4 mg/min
    - (Infusion reduced by 50% if age > 70, hx of CHF or liver disease)
  - If stable polyformic VT refractory to Lidocaine
    - Sedation prior to cardioversion
      - Valium 5 - 10 mg IV or Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg
      - Syn. countershock 100 j
    - Repeat syn countershock if required
      - Syn. countershock 200 j
      - Syn. countershock 300 j
      - Syn. countershock 360 j

### Polymorphic VT Suggestive of Torsades
- General Supportive Care
  - Magnesium Sulfate 1 g/IV over 1 - 2 min
    - If refractory or recurrent after 1st dose repeat dose in 3 min
  - If stable polyformic VT refractory to Magnesium Sulfate, then use synchronized cardioversion
  - Sedation prior to cardioversion
    - Valium 5 - 10 mg IV or Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg
    - Syn. countershock 100 j
    - Repeat syn countershock if required
      - Syn. countershock 200 j
      - Syn. countershock 300 j
      - Syn. countershock 360 j

### Wide QRS uncertain type
- General Supportive Care
  - Adenosine 6 mg IVP over 1 - 2 seconds after Magnesium Sulfate or Lidocaine/OLMC
  - If stable wide QRS of uncertain type refractory to Adenosine, Magnesium Sulfate or Lidocaine
    - Sedation prior to cardioversion
      - Valium 5 - 10 mg IV or Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg
      - Syn. countershock 100 j
      - Repeat syn countershock if required
        - Syn. countershock 200 j
        - Syn. countershock 300 j
        - Syn. countershock 360 j

### Monomorphic or Polymorphic VT
- General Supportive Care
  - Amiodarone 150 mg/IV over 1st 10 minutes
  - Amiodarone infusion 150 mg infused over 10 minutes
  - If stable monomorphic or polymorphic VT refractory to Amiodarone
    - Sedation prior to cardioversion
      - Valium 5 - 10 mg IV or Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg
      - Syn. countershock 100 j
      - Repeat syn countershock if required
        - Syn. countershock 200 j
        - Syn. countershock 300 j
        - Syn. countershock 360 j

VENTRICULAR OR WIDE QRS TACHYCARDIA WITH PULSE (cont.)
Ventricular or Wide QRS Tachycardia with Pulse

General Supportive Care

Unstable

Hemodynamically unstable
SBP < 90 mmHg or
Altered LOC or
S/S of pulmonary edema

Unstable

Polymorphic VT

Magnesium Sulfate
1 g/IV over 1 - 2 min
If refractory or recurrent after 1st dose repeat dose in 3 min

Sedate patient if possible
but it should not delay cardioversion
Valium 5 - 10 mg IV or
Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg

Unsyn. countershock 100 j
Repeat unsyn countershock if required
Unsyn. countershock 200 j
Unsyn. countershock 300 j
Unsyn. countershock 360 j

Lidocaine
1 mg/kg/IV
0.5 mg/kg repeated as necessary q.5 - 10 min. to suppress ectopy (max. 3 mg/kg)

Lidocaine Infusion
2 - 4 mg/min
(Infusion reduced by 50% if age > 70, hx of CHF or liver disease)

Monomorphic VT

Sedate patient if possible
but it should not delay cardioversion
Valium 5 - 10 mg IV or
Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg

Unsyn. countershock 100 j
Repeat unsyn countershock if required
Unsyn. countershock 200 j
Unsyn. countershock 300 j
Unsyn. countershock 360 j

Sedate patient if possible
but it should not delay cardioversion
Valium 5 - 10 mg IV or
Versed 0.15 mg/kg/IV to desired effect do not exceed 5 mg

Unsyn. countershock 100 j
Repeat unsyn countershock if required
Unsyn. countershock 200 j
Unsyn. countershock 300 j
Unsyn. countershock 360 j

Lidocaine
1 mg/kg/IV
0.5 mg/kg repeated as necessary q.5 - 10 min. to suppress ectopy (max. 3 mg/kg)

Lidocaine Infusion
2 - 4 mg/min
(Infusion reduced by 50% if age > 70, hx of CHF or liver disease)
Oklahoma State EMS Protocols

Ventricular or Wide QRS Tachycardia with Pulse

Evaluate Patient
Is patient Stable or Unstable?
The majority of children who develop VT have underlying structural heart disease or prolonged QT syndrome

Pediatric ALS Care

Stable
Evaluate Tachycardia
General Supportive Care

Identify and treat possible causes
Potential causes
Acute hypoxemia
Acidosis
Electrolyte imbalance (Hyper/hypokalemia)
Tricyclic antidepressant OD

Lidocaine
1 mg/kg/IV/IO
2 mg/kg/ET

Lidocaine infusion
120 mg in 100 mg of D5W, infuse at rate of 20 - 50 mcg/kg/min
(1 - 2.5 gtts/kg/min)

Unstable
Evaluate Tachycardia
General Supportive Care

Identify and treat possible causes
Potential causes
Acute hypoxemia
Acidosis
Electrolyte imbalance (Hyper/hypokalemia)
Tricyclic antidepressant OD

Lidocaine
1 mg/kg/IV/IO
2 mg/kg/ET

Lidocaine should be administered before cardioversion, however cardioversion should not be delayed in the unstable child if the drug and access are not immediately available

Sedate patient if possible but sedation should not delay cardioversion
Valium 0.02 mg/kg/IV (max. 5 mg)
Rectal Valium 0.03 to 0.05 mg/kg
(max. 5 to 10 mg based upon pt. weight)
Versed 0.1 mg/kg (max. 5 mg)

Unsyn. countershock 0.5 j/kg
Unsyn. countershock 1 j/kg
Unsyn. countershock 2 j/kg

Lidocaine
0.5 mg/kg/IV, repeated as necessary q. 5 - 10 min. to suppress ectopy (max. 3 mg/kg)

Lidocaine infusion
120 mg in 100 mg of D5W, infuse at rate of 20 - 50 mcg/kg/min
(1 - 2.5 gtts/kg/min)

Hemodynamically unstable
SBP < 70 mmHg or Altered LOC or S/S of pulmonary edema

AIRWAY OBSTRUCTION
**Indications**

1. All patients who cannot phonate and are suspected of foreign body upper airway obstruction.
2. All patients in cardiac arrest that occurred in a restaurant or during a meal.

**Adult Care**

*General Supportive Care.*

If air exchange is adequate, do not provide specific treatment.

If air exchange is inadequate and there is a reasonable suspicion of foreign body obstruction, perform Heimlich maneuver, visualize with laryngoscope and extract foreign body with forceps.

If edema, obstruction or uncontrollable bleeding causes life-threatening ventilatory impairment, despite previous efforts of other procedures, consider surgical airway adjuncts.

If patient is partially obstructed and cannot be ventilated and obstruction is not relieved, perform cricothyroid puncture and initiate trans-tracheal ventilation.
AIRWAY OBSTRUCTION (cont.)

Foreign Body Obstruction
Partial/Complete

Assessment

Conscious talking (partial obstruction)

Conscious unable to talk (assume complete obstruction)

Unconscious (complete obstruction)

4 Abdominal thrusts (Heimlich Maneuver)

Direct Laryngoscopy, remove foreign body with Magill forceps

Successful

No

Chest thrust

Repeat until successful max. 3 cycles

Repeat until successful or patient becomes unconscious

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AIRWAY OBSTRUCTION (cont.)

Pediatric Foreign Body Obstruction

Assessment
Mechanism
stridor
LOC

O2 non-rebreather or
blow by

Talking
Yes
Encourage coughing

No

Head down back
blows x 5

Head down chest
compressions

Attempt ventilation, if still
obstructed repeat x 3

Patient > 1 year
old

Patient > 1 year
old

Abdominal thrusts
(Heimlich) until expelled
or x 5

Unconscious

Yes

Lie patient flat, chin lift,
jaw thrust, chest
compressions

Successful

NO

Attempt direct view, remove with
Magill forceps

NO

Yes (Child)

No

No (Infant)
ASTHMA

Indications:

Patients with respiratory distress and:

A. History of asthma AND
B. Wheezing on auscultation and/or prolonged expiration AND
C. No evidence of pulmonary edema.

Adult Care

General Supportive Care. IV NS.

Position of comfort.

Two unit doses of 2.5 mg equivalent to 5 mg of Albuterol combined with one unit dose vial .5 mg of Atrovent. Contents of vial is nebulized and administered until dose complete.* (Basic and Intermediate EMT's are able to administer nebulizer treatments if agency specific protocols are in place)

If age less than < 45 and unable to cooperate with nebulization, consider Epinephrine 1:1,000 0.3 ml SQ. However, if the patient is extremely hypoxic, consider intubation followed by nebulization of Albuterol through the endotracheal tube.

Methylprednisolone 125 mg IV.
Asthma

Treatment of Asthma should be limited to patients with respiratory distress AND a history of Asthma AND wheezing on auscultation and/or prolonged expiration AND no evidence of pulmonary edema.

Adult ALS Care

- General Supportive Care
  - 5 mgs of Albuterol combined with 0.5 mgs of Atrovent nebulized and administered until dose is complete.
  - Repeat the dose as required after consultation with On-Line Medical Control
  - If age < 45 and unable to cooperate with nebulization, consider Epinephrine (1:1000) 0.3 ml SQ.
  - Methylprednisolone 125 mgs IV, after consult with On-Line Medical Control.

Pediatric ALS Care

- General Supportive Care
  - If patient < 15 kg, 2.5 mgs Albuterol with 0.25 mgs of Atrovent. If patient =/> 15 kgs, 5 mgs Albuterol with 0.25 mgs Atrovent, administered until dose is complete.
  - Repeat the dose as required after consultation with On-Line Medical Control
  - If unable to cooperate with nebulization, consider Epinephrine 0.01 ml/kg (1:1000), not to exceed 0.3 ml, SQ.
  - Methylprednisolone 2 mg/kg IV, after consult with On-Line Medical Control.
**EMPHYSEMA**

**Indications:**

Patients with respiratory distress and:

A. History of COPD AND
B. Wheezing on auscultation, diminished breath sounds bilaterally and prolonged expiration AND
C. No evidence of pulmonary edema.

**Adult Care**

General Supportive Care, Fowler's position, \( O_2 \), 2 L/min. If signs and symptoms of hypoxia persist, then increase \( O_2 \) to 10 L/min by mask. Observe for changes in mental status or respiratory depression. Assist ventilation as necessary.

Unit dose vial of 5 mg Albuterol mixed with .5 mg of Atrovent, (1 unit dose vial). Contents of vial is nebulized and administered until dose complete. (Basic and Intermediate EMT's may use nebulizer treatments if agencies medical director agrees to the use of meds.

Repeat doses of Albuterol/Atrovent require On-Line Medical Control consultation.

Methylprednisolone 125 mg IV.

**NOTE:**

Endotracheally intubated patients may be given Albuterol/Atrovent by attaching the nebulizer in-line.

Subcutaneous Epinephrine is **NOT** an alternate drug for these patients.

**EMPHYSEMA (cont.)**
Emphysema

Patient with respiratory distress AND a history of COPD AND wheezing on auscultation, diminished breath sounds bilaterally and prolonged expiration AND no evidence of pulmonary edema.

General Supportive Care

Fowler's position, O2 2 L/min. If signs/symptoms of hypoxia persist, then increase O2 to 10 L/min by mask. Assist ventilations as necessary.

Unit dose 5 mgs Albuterol mixed with 0.5 mgs of Atrovent, nebulized and administered until the dose is complete.

Methylprednisolone 125 mgs IVP after consult with On-Line Medical Control

Repeat dose of Albuterol and Atrovent requires On-Line Medical Control consultation.

NOTE:
Endotracheally intubated patients may be given Albuterol/Atrovent by attaching the nebulizer inline.
Subcutaneous Epinephrine is NOT an alternate drug for these patients.
Indications

1. **Patients presenting with dyspnea, having a history of CHF, MI, HTN or coronary artery disease with three or more of the following:**
   
   A. cyanosis
   B. rales
   C. peripheral edema
   D. frothy pink sputum
   E. respiratory rate > 25 or < 10
   F. neck vein distension

2. **Systolic blood pressure must be > 90 mm Hg and pulse < 150 (otherwise go to shock or arrhythmia protocols).**

**Adult Care**

General Supportive Care, IV Peripheral saline lock, fowlers position. In severe pulmonary edema with impending respiratory failure, endotracheal intubation and ventilatory support may be necessary.

*If normotensive or hypertensive, Nitroglycerin one metered dose, 0.4 mg oral puff. Before each administration, check the patient’s pulse and blood pressure to ensure the patient is hemodynamically stable.*

*If normotensive or hypertensive, Lasix 40 mg IV. For those patients already on a daily dose of Lasix, up to 80 mg IV may be given.*

*If normotensive or hypertensive, Morphine 2 - 10 mg, slow IV.*

Benadryl to Morphine or Demerol for nausea. 25 mg slow IV push.

*If normotensive or hypertensive, Nitroglycerin, additional 0.4 mg oral puff.*
Pulmonary Edema

Patients presenting with dyspnea, having a history of CHF, MI, HTN, or coronary artery disease with three or more of the following:

- A. cyanosis
- B. rales
- C. peripheral edema
- D. frothy pink sputum
- E. resp. rate > 25 or < 10
- F. neck vein distention

Systolic blood pressure must be > 90 mm Hg and pulse < 150 (otherwise go to shock or arrythmia protocols)

Adult ALS Care

General Supportive Care

CPAP ventilation indicated for the treatment of impending ventilatory failure

If normotensive or hypertensive, Nitroglycerin one metered dose, 0.4 mg oral puff

If normotensive or hypertensive, Lasix 40 mg IV, those patients already on a daily dose of Lasix, up to 80 mgs IV may be given after consult with On-Line Medical Control

If normotensive or hypertensive, Morphine 2-10 mgs IV after consult with On-Line Medical Control

Benadryl to Morphine or Demerol for nausea 25 mgs/slow IV, after consult with On-Line Medical Control

Pediatric ALS Care

General Supportive Care

If normotensive or hypertensive for patient’s age, Lasix 1 mg/kg IV, after consult with On-Line Medical Control

If normotensive or hypertensive, Nitroglycerin, additional 0.4 mg oral puff, after consult with On-Line Medical Control

BEHAVIORAL DISORDERS
Adult Care

If potential injury to self or others, notify PD.

Remove those individuals who aggravate the situation.

Establish a calm, quiet atmosphere, and if it can be done safely, remove potential weapons from the patient.

General Supportive Care.

Obtain patient history. If suicidal behavior is suspected, do not leave the patient alone.

Obtain vital signs and perform physical exam as indicated.

Treat any medical problem according to appropriate protocol.

If restraints are required, utilize Kerlix and sheets.
Notify PD if the patient indicates potential injury to self or others

Remove those individuals who aggravate the situation

Est. a calm, quiet atmosphere, and if can be safely done, remove potential weapons from the patient

General Supportive Care

Obtain patient history, do not leave the patient alone

Obtain vital signs and perform a physical exam as indicated

Treat any medical problems according to the appropriate protocol

If restraints are required, utilize Kerlix and sheets

COMA: UNKNOWN ETIOLOGY
Although alcohol is a common cause of altered mental status, it is NOT commonly a cause of frank coma (i.e., total unresponsiveness to pain). No judgment in the field should be made concerning the importance of the presence of alcohol on any patient’s breath who presents totally unresponsive to pain.

**Adult Care**

Consider need for cervical spine immobilization.

General Supportive Care. Consider simple airway adjuncts. Use appropriate discretion regarding immediate intubation of patients who may quickly regain gag reflexes and/or consciousness, such as hypoglycemic after D50 or opiate overdose cases after Narcan.

If Chemstrip less than or equal to \( \leq 80 \text{ mg/dL} \), give D50, 50 ml (25 Gm) IV. Repeat Chemstrip.

If no improvement from D50 or Chemstrip > 80 mg/dL, give Narcan 0.5 mg, IV, ET, or IM. If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.5 mg doses of Narcan may be given to a total of 2 mgs. If overdose with synthetic narcotics suspected (e.g. Talwin, Darvocet), use Narcan 2 mg IV, ET or IM. ET doses are two times the IV dose.
Coma: Unknown Etiology

Adult ALS Care

Consider need for cervical spine immobilization

General Supportive Care

If Chemstrip is ≤ to 80 mg/dl, give 50 ml (25grams) D50 IV. Repeat Chemstrip

If no improvement from D50 or Chemstrip > 80 mg/dl, give Narcan 0.5 mgs IV, ET, IM. If the patient partially responds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.5 doses may be given to a max. of 2 mgs

Pediatric ALS Care

Consider need for cervical spine immobilization

General Supportive Care

If patient is < 12 years of age and Chemstrip ≤ 60 mg/dL, give Dextrose, 2 ml/kg IV as D25. If patient is > 12 years of age and Chemstrip ≤ 60 mg/dL, give Dextrose, 1 ml/kg IV as D50

If no improvement from D25/50 or Chemstrip > 80 mg/dl, give Narcan 0.5 mgs IV, ET, IM. If the patient partially responds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.5 doses may be given to a max. of 2 mgs.

If unable to establish venous access, administer Glucagon 0.5 mg < 44 lbs (20 kg), 1 mg > 44 lbs (20 kg) IM

If no improvement from D25/50 or Chemstrip < 60 mg/dl, give Narcan 0.1 mg/kg IV, ET, or IM, not to exceed 2 mgs. If the patient partially reponds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.1 mg/kg doses may be given to a max of 2 mgs.
Hypoglycemic Diabetic Patient:

One of the most frequent medical problems resulting in a non-transport is the diabetic patient with hypoglycemia. As we all have experienced, once the patient is treated with D50W and has returned to normal mental status, they often refuse further evaluation and treatment.

Most people consider patients with Insulin-Dependent Diabetes to be at a greater risk in this scenario, when in fact, the patient on oral hypoglycemic medication is at the most risk for recurrence of hypoglycemia.

The long half-life of many of these oral agents predisposes the patient to recurrent episodes until the drug is metabolized. For example, Chlorpropamide has a half-life of 36 hours with duration of effect up to 2 – 5 days. Second generation drugs such as Glyburide have much shorter half-lives but the duration of action ranges from 10 – 16 hours up to 24 hours.

Patients on oral hypoglycemic agents who have experienced a hypoglycemic reaction should be transported for further evaluation and care. If the patient continues to refuse transport, informed consent should include information regarding the likelihood of the recurrence of hypoglycemia, and they should never be left without adult supervision.

Adult Care

General Supportive Care, draw pre-glucose blood sample and perform Chemstrip (glucometer) regardless of need for IV.

If Chemstrip less than or equal to <= 80 mg/dL and patient is alert, give oral self-administered sugar solution.

If patient is stuporous or unconscious and Chemstrip is less than or equal to <= 80 mg/dL, administer D50 (25 gm) 50 ml, IV (Intermediates may administer D50 if medical director approves protocols).

Do not delay transport to determine response to D50.

Repeat Chemstrip. If Chemstrip remains less than < 80 mg/dL, repeat D50 IV.

If unable to start IV, administer glucagon, 1 unit, IM.

If no improvement from D50 or Chemstrip greater than > 80 mg/dL, give Narcan 0.5 mg, IV, ET, or IM. If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.5 mg doses of Narcan may be given to a total of 2 mgs. If overdose with synthetic narcotics suspected (e.g. Talwin, Darvocet), use Narcan 2 mg IV, ET or IM. ET doses are two times the IV dose.
Diabetic Emergencies

**Adult ALS Care**

- If Chemstrip \(\leq 80 \text{ mg/dl}\) and the patient is alert, give oral self-administered sugar solution.
- If the patient is stuporous or unconscious and Chemstrip is \(\leq 80 \text{ mg/dl}\), administer Dextrose D50 (25 grams) 50 ml, IV.
- Repeat Chemstrip, if Chemstrip remains \(< 80 \text{ mg/dl}\), repeat D50 IV.
- If unable to start an IV, administer Glucagon 1 unit IM (1 mg).
- If no improvement from D50 or Chemstrip \(> 80 \text{ mg/dl}\), give Narcan 0.5 mgs IV, ET, IM. If the patient partially responds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.5 doses may be given to a max. of 2 mgs.

**Pediatric ALS Care**

- If Chemstrip is \(\leq 60 \text{ mg/dl}\) and the patient is alert, give oral self-administered sugar solution.
- If patient is < 12 years of age and Chemstrip is \(\leq 60 \text{ mg/dl}\), give Dextrose, 2 ml/kg IV as D25.
- If patient > 12 years of age and Chemstrip is \(\leq 60 \text{ mg/dl}\), give Dextrose, 1 ml/kg as D50.
- Repeat Chemstrip, if Chemstrip remains \(< 60 \text{ mg/dl}\), repeat D25/D50 IV.
- If unable to establish venous access, administer Glucagon 0.5 mg < 44 lbs (20 kgs), 1 mg > 44 lbs (20 kgs) IM.
- If no improvement from D25/50 or Chemstrip is > 60 mg/dl, give Narcan 0.1 mg/kg IV, ET, or IM, not to exceed 2 mgs. If the patient partially responds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.1 mg/kg doses may be given to a max of 2 mgs.
Adult Care

General Supportive Care. (Special attention provided to airway protection with consideration given to placement in coma position and/or intubation. Inhaled toxins should be treated with 100% NRB mask unless specifically contraindicated IV NS.

If cutaneous exposure, remove patient from environment and decontaminate with copious amounts of water. All clothes should be removed and care should be taken not to contaminate rescuers.

For patient with suspected narcotic involvement and Chemstrip >80 mg/dL, Narcan 0.5 mg, IV, ET, or IM. If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.5 mg doses of Narcan may be given to a total of 2 mgs. If overdose with synthetic narcotics suspected (e.g. Talwin, Darvocet), use Narcan 2 mg IV, ET or IM. ET doses are two times the IV dose.

Contact Poison Control for information on the suspected poison(s) or drugs if needed.

Save any spontaneous emesis if possible.

Contact law enforcement if needed for assistance in managing possibly suicidal patients.

Gather all medications or over-the-counter drugs and transport with the patient to the ED.

If patient is conscious and cooperative, give Charcoal 1 gm/kg PO.

For Dystonic Reactions, Benadryl 50 mg slow IV or deep IM.

Medical Control will give instructions regarding treatments specific to suspected toxins, such as Atropine 2PAMCl* for organophosphate poisoning and Sodium Bicarbonate** for tricyclic antidepressant overdose.

Sodium Bicarbonate dosages for tricyclic antidepressant overdose: (agencies are encouraged to develop agency specific protocols for the use of Sodium Bicarbonate)

Potential indications:

The most important issue for paramedics is to treat all patients with a history of TRICYCLIC-ANTIDEPRESSANTS as an emergency with a significant possibility for rapid decompensation of vital signs and mental status. Sodium Bicarbonate remains the first line drug for cardiovascular morbidity in CA poisonings.

Signs and Symptoms of Tricyclic Antidepressant Overdose:

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**DRUG OVERDOSE/POISONING (cont.)**
Tricyclic Antidepressants cause multi-system organ involvement (most prominently in the cardiovascular system, central nervous system, and parasympathetic nervous system. Symptoms can progress rapidly. Fatalities have presented initially asymptomatic and then rapidly deteriorated. Symptoms of toxicity include tachycardia, hypotension due to arrhythmias, and hypoxia due to hypoventilation/aspiration. The major clinical signs and symptoms requiring therapy are CNS and cardiac dysfunction. Seizures are the major CNS indication for treatment while QRS widening or any associated dysrhythmia requires urgent medical therapy.

Hypotension with evidence of shock and not responsive to judicious fluid therapy and sodium bicarbonate are indications for Dopamine.

Adult Dosage: 1 – 2 meq/kg IV push initially. Monitor the patient closely and give bolused Sodium Bicarbonate as needed if the QRS widening, blocks etc., do not resolve with initial treatment.

Pediatric: 1 meq/kg IV slow push.

DRUG OVERDOSE/POISONING (cont.)
Drug Overdose/Poisoning

Adult ALS Care

General Supportive Care

If cutaneous exposure, remove the patient from the environment and decontaminate with water

If patient is suspected of narcotic involvement and Chemstrip > 80 mg/dl, Narcan 0.5 mg IV, ET, IM
If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.5 mg doses may be given to a max of 2 mgs

Contact On-Line Medical Control for information on the suspected poison(s) or drugs as needed.

If possible, save any spontaneous emesis, gather all medications or over the counter drugs and transport them to the hospital with the patient

Contact law enforcement if needed for assistance in managing possible suicidal patients

Is the patient conscious?

No Yes

Assist respirations as needed

Administer Charcoal 1 mg/kg PO, after consult with On-Line Medical Control

For Dystonic reactions, administer Benadryl 50 mg IV, or IM, after consult with On-Line Medical Control

Pediatric ALS Care

General Supportive Care

If cutaneous exposure, remove the patient from the environment and decontaminate with water

If patient is suspected of narcotic involvement and Chemstrip > 60 mg/dl, Narcan 0.1 mg IV, ET, IO or IM
If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.1 mg doses may be given to a max of 2 mgs

Contact On-Line Medical Control for information on the suspected poison(s) or drugs as needed.

If possible, save any spontaneous emesis, gather all medications or over the counter drugs and transport them to the hospital with the patient

Contact law enforcement if needed for assistance in managing possible suicidal patients

Is the patient conscious?

No Yes

Assist respirations as needed

Administer Charcoal 1 mg/kg PO, after consult with On-Line Medical Control

For Dystonic reactions, administer Benadryl 1 mg/kg IV, after consult with On-Line Medical Control

DRUG OVERDOSE/POISONING (cont.)
Drug Overdose/Poisoning
Continued:

Adult ALS Care
On-Line Medical Control will give instructions regarding treatments specific to suspected toxins, such as Atropine 2PAMCL for organophosphate poisoning and Sodium Bicarbonate for tricyclic antidepressant overdose

Atropine 2 mgs IV or IM followed by 2PAMCL, 600 mg IM repeated q 15 minutes until Atropinization is achieved, after consult with On-Line Medical Control

Pediatric ALS Care
On-Line Medical Control will give instructions regarding treatments specific to suspected toxins, such as Atropine 2PAMCL for organophosphate poisoning and Sodium Bicarbonate for tricyclic antidepressant overdose

If age > 12 years, Atropine 2 mgs IV or IM followed by 2PAMCL, 600 mg IM repeated q 15 minutes until Atropinization is achieved, after consult with On-Line Medical Control

Sodium Bicarbonate 1-2 meq/kg IV, after consult with On-Line Medical Control

Tricyclic Overdose

If age < 12 years, Atropine 0.05 mg/kg repeated q 15 minutes until atropinization is achieved
Maintain Atropinization with repeated dosages of .02-.05 mg/kg, after consult with On-Line Medical Control

Sodium Bicarbonate 1 meq/kg IV, after consult with On-Line Medical Control

SEIZURES AND STATUS EPILEPTICUS
**NOTE:** Use this protocol when patient has witnessed continuous seizures or repetitive seizures without regaining consciousness. Consider underlying etiology, such as hypoglycemia, cardiac arrhythmias, overdose, head injury or fever.

**Adult Care**

General Supportive Care. IV NS.

If Chemstrip less than or equal to ≤ 80 mg/dL, give D50, 50 ml (25 gm), IV.

If Chemstrip greater than > 80 mg/dL, administer Diazepam (Valium) 2-10 mg slow IVP until seizures begin to diminish or,

If unable to obtain venous access, then Valium 5-10 mg IM or,

Diastat rectal injection 0.2 mg/kg, 10 mg or 20 mg. (Because Diastat is provided in fixed adult unit dose of 10 mg, the prescribed dose is obtained by rounding upward to the next available dose. For rectal injections, lubricate syringe and insert gently 1 – 2 inches into rectum or just past rectal sphincter)

None
Seizures and Status Epilepticus

Adult ALS Care

General Supportive Care

If Chemstrip ≤ 80 mg/dl, give D50, 50 ml (25 gm) IV

If Chemstrip > 80 mg/dl, administer Valium 2-10 mgs IV until seizure stops

OR

If unable to establish venous access, Valium 5-10 mgs IM

OR

Rectal Diastat 0.2 mg/kg, 10 or 20 mgs

Pediatric ALS Care

General Supportive Care

If Chemstrip ≤ 60 mg/dl, give D25 2 ml/kg IV if age < 12 years old

or

D50 1 ml/kg if age > 12 years old

If unable to establish venous access, Valium 0.5 mg < 44 lbs (20 kg), 1 mg > 44 lbs (20 kg) IM

Repeat Chemstrip if > 60 mg/dl administer rectal Diastat 0.3-0.5 mg/kg (max 10 mgs)

If Chemstrip > 60 mg/dl for children < 2 years of age, and IV access has not been established, give Valium IV solution rectally at 0.5 mg/kg (not to exceed 5 mgs)

OR

If Chemstrip is > 60 mg/dl and IV access has been established administer Valium 0.2 mg/kg (not to exceed 5 mgs) slow IV after consult with On-Line Medical Control

SYNCOPAL EPISODE
NOTE: Syncope is by definition a transient state of unconsciousness from which the patient has recovered. If the patient is still unconscious, treat as coma. Emphasis should be placed on suspicion of underlying cause.

Adult Care

General Supportive Care. C-spine precautions if spinal injury suspected. Consider history and possibility of transient dysrhythmia, hypovolemia, medication side effects, glucose imbalance, inner ear disorders, CVA and TIA.

SYNCOPAL EPISODE (cont.)
Syncopal Episode

General Supportive Care

Consider need for cervical spine immobilization

Consider history and the possibility of transient dysrhythmia, hypovolemia, medication side effects, glucose imbalance, inner ear disorder, CVA and TIA
The goals of prehospital management of patients with suspected stroke include:

2. Support of vital functions.
3. Rapid transport of the patient to the receiving facility.
4. Early prearrival notification of the receiving facility with the following information:
   - Physical findings compatible with stroke symptoms
   - Approximate time the patient first began to experience symptoms, i.e., greater than or less than 3 hours
   - If the patient awoke with stroke symptoms, determine and inform receiving facility when the last time the patient was symptom-free

Adult Care

General Supportive Care. Establish “Life Net”. IV peripheral saline lock (Bolus administration of fluids is not indicated unless hypovolemia is present). Once the finding of stroke is suspected, time in the field must be minimized.

The patient must be carefully examined for any trauma, because head injury can mimic stroke or result from a fall caused by a stroke. Consider the need for cervical spine immobilization.

Rapid recognition of stroke patient is essential. By utilizing the Cincinnati Stroke Scale, i.e., assessing for facial droop, arm drift, and difficulty with speech, preliminary diagnosis of a possible stroke can be made quickly.

A. The Cincinnati Stroke Scale can be evaluated with a series of simple tests:

1. Facial Droop: have patient show teeth or smile
   - Normal: both sides of face move equally
   - Abnormal: one side of face does not move as well as the other side

2. Arm Drift: patient closes eyes and holds both arms out
   - Normal: both arms move the same or both arms do not move at all
   - Abnormal: one arm does not move or one arm drifts down compared with the other

3. Speech: Have the patient say “you can’t teach an old dog new tricks”
   - Normal: Patient uses correct words with no slurring
   - Abnormal: Patient slurs words, uses inappropriate words, or is unable to speak

If patient is stuporous or unconscious and Chemstrip reading is less than or equal to <= 80 mg/dL administer D50 (25 gm) 50 ml, IV. Administer Glucagon 1 unit IM if unable to start IV. Note: Glucose may actually worsen brain resuscitation, except in confirmed hypoglycemia.

CEREBROVASCULAR ACCIDENTS (cont.)

Repeat Chemstrip. If Chemstrip remains less than < 80 mg/dL, repeat D50 IV.
If no improvement from D50 or Chemstrip is greater than > 80 mg/dL, give Narcan 0.5 mg, IV, ET, or IM. If the patient partially responds or has pinpoint pupils, decreased respirations or drug paraphernalia present, additional 0.5 mg doses of Narcan may be given to a total of 2 mgs. If overdose with synthetic narcotics suspected (e.g. Talwin, Darvocet), use Narcan 2 mg IV, ET or IM. ET doses are two times the IV dose.

Continuous monitoring of the airway is vital due to decreased gag reflex and increased secretions.

Keep head elevated if possible; monitor pupils.

Maintain body heat; protect affected limbs from injury; anticipate seizures.

A stroke victim may be found with a very high blood pressure, either because hypertension caused the stroke or because the high pressure is necessary to supply blood to the ischemic tissue. In general, prehospital treatment of hypertension in stroke patients is not advisable. If blood pressure is a concern, contact On-Line Medical Control.

Early notification of the receiving hospital is essential. Briefly describe the patient’s condition, including the abnormal Cincinnati Stroke Scale findings.
Cerebrovascular Accident

Adult ALS Care

General Supportive Care

Consider need for cervical spinal immobilization

Utilize the Cincinnati Stroke Scale to determine preliminary diagnosis of a stroke

Is patient stuporous or unconscious with a Chemstrip ≤ 80 mg/dl

Yes

Administer D50, 50 ml (25 gm) IV or if unable to establish IV access, administer Glucagon 1 unit (1 mg) IM

Repeat Chemstrip, if Chemstrip remains < 80 mg/dl, repeat D50 or Glucagon

If no improvement from D50 or Chemstrip > 80 mg/dl, give Narcan 0.5 mg IV, ET, IM. If the patient partially responds, has pin point pupils, decreased respirations or drug paraphernalia present, additional 0.5 doses may be given (max of 2 mgs)

No

Continuous monitoring, transport with patient's head elevated

Maintain body heat, protect affected limbs from injury, anticipate seizures

Notify the receiving hospital as early as possible, describe patient's findings

Pediatric ALS Care

See Coma Unknown Etiology

ABDOMINAL PAIN
**Adult Care**

*General Supportive Care.*

*Position of comfort.*

*Nothing by mouth.*
Abdominal Pain

- Adult ALS Care
  - General Supportive Care
    - Position of comfort
      - Nothing by mouth

- Pediatric ALS Care
  - General Supportive Care
    - Position of comfort
      - Nothing by mouth
Oklahoma State EMS Protocols

Indications:

1. All patients with dyspnea, hoarseness, dysphonia or stridor following an allergic reaction OR
2. Patients with wheezing and other signs of bronchospasm associated with above OR
3. Hypotension and/or decreased level of consciousness associated with above.

Adult Care

Elicit past medical history to determine previous reaction.

General Supportive Care. IV NS or LR. Consider fluid bolus (Basic and Intermediates may use Epinephrine Auto-Injectors if Medical Director approves)

If patient normotensive with a moderate allergic reaction, Epinephrine 1:1,000 0.3 mg SQ.

If patient normotensive with a moderate allergic reaction, Diphenhydramine 50 mg, IV or IM.

If systolic blood pressure less than < 90 with signs of shock, fluid bolus 200 to 500 cc IV, AND Epinephrine 1:10,000 1 ml, slow IV over 3-5 min.

If shortness of breath and wheezing present: Unit dose vial 5 mg Albuterol and .5 mg of Atrovent. Contents of vials shall be nebulized and administered until dose complete (Do not use Albuterol/Atrovent if Epinephrine has been effective).

Methylprednisolone 125 mg IV.

ANAPHYLACTIC REACTIONS (cont.)
**Oklahoma State EMS Protocols**

**Anaphylactic Reactions**

All patients with dyspnea, hoarseness, dysphonia or stridor following an allergic reaction OR patients with wheezing and other signs of bronchospasm associated with above OR hypotension and/or decreased level of consciousness associated with above

- **Adult ALS Care**
  - Elicit past medical history
  - General Supportive Care
  - IV NS Patients requiring fluid bolus administration for any reason require consult with On-Line Medical Control
  - Moderate Reaction
    - If patient is normotensive
      - Epinephrine (1:1000) 0.3 mg SQ
    - If systolic BP < 90 with signs of shock, fluid bolus 200 to 500 cc IV AND Epinephrine (1:10,000) 1 ml IV, after consult with On-Line Medical Control
    - Unit dose 5 mgs Albuterol with 0.5 mg Atrovent, contents nebulized and administered until complete, after consult with On-Line Medical Control
    - Methylprednisolone 125 mgs IV, after consult with On-Line Medical Control
  - Severe Reaction
    - If patient is normotensive
      - Benadryl 50 mgs IV or IM
    - If hypovolemic based on patients' age with signs of shock, fluid bolus 20 cc/kg IV AND Epinephrine (1:10,000) 0.1 ml/kg IV not to exceed 1 ml/dose, after consult with On-Line Medical Control
    - Establish IO access if needed and authorized by On-Line Medical Control
    - Albuterol 2.5 mg with 0.25 mg Atrovent if patient < 15 kgs
    - Albuterol 5 mg with 0.25 Atrovent if patient is >/= 15 kgs, after consult with On-Line Medical Control
    - Methylprednisolone 2 mg/kg IV, after consult with On-Line Medical Control

- **Pediatric ALS Care**
  - Elicit past medical history
  - General Supportive Care
  - IV NS Patients requiring fluid bolus administration for any reason require consult with On-Line Medical Control
  - Moderate Reaction
    - If patient is normotensive
      - Epinephrine (1:1000) 0.01 ml/kg SQ, not to exceed 0.3 mg
    - If hypovolemic based on patients' age with signs of shock, fluid bolus 20 cc/kg IV AND Epinephrine (1:10,000) 0.1 ml/kg IV not to exceed 1 ml/dose, after consult with On-Line Medical Control
    - Albuterol 2.5 mg with 0.25 mg Atrovent if patient < 15 kgs
    - Albuterol 5 mg with 0.25 Atrovent if patient is >/= 15 kgs, after consult with On-Line Medical Control
    - Methylprednisolone 2 mg/kg IV, after consult with On-Line Medical Control

**Bites and Stings**

Oklahoma EMS Protocols 89 Revised 10/02
**Adult Care**

*Trauma and Hypovolemic Supportive Care.* Any suspected bite with poison should receive an IV of NS.

*Treat complications (i.e. anaphylaxis, shock) per specific protocols.*

*Splint affected area, keep patient quiet.*

*None.*
**Bites and Stings**

- **Adult ALS Care**
  - IV NS, treat complications per specific protocol
  - Splint affected area, keep patient quiet

- **Pediatric ALS Care**
  - IV NS, treat complications per specific protocol
  - Splint affected area, keep patient quiet

**Trauma and Hypovolemic Supportive Care**
Adult Care

General Supportive Care - IV, NS.

Remove from environment.

Cool body, including head, with water or saline. Avoid “dumping” fluid on body. If spray bottles or misting system unavailable, use tubing or wet linens.

Direct the patient compartment fan over the patient to promote evaporation.

Apply cold packs to the groin and axillary areas.

Continue cooling en route by spraying patient with water. (see above)

Valium 5-10 mg IV for seizures.

If unable to obtain venous access, then Valium 5 – 10 mg IM or Diastat rectal injection 0.2 mg/kg, 10 mg or 20 mg. (Because Diastat is provided in fixed adult unit dose of 10 mg, the prescribed dose is obtained by rounding upward to the next available dose. For rectal injections, lubricate syringe and insert gently 1 – 2 inches into rectum or just past rectal sphincter).

None.
Hyperthermia

Adult ALS Care

General Supportive Care

Remove the patient from the environment, cool the patient with water or saline

Apply cold packs to the groin and axillary areas

Valium 5-10 mgs IV for seizures

If unable to establish IV the Valium 5-10 mgs IM or Diastat 0.2 mg/kg, 10 mg or 20 mg.

Pediatric ALS Care

General Supportive Care

Remove the patient from the environment, cool the patient with water or saline

Apply cold packs to the groin and axillary areas

Diastat 0.3 mg-0.5 mg/kg (not to exceed 10 mgs) for seizures

For children < 2 years of age, and IV access has not been established, give Valium IV solution rectally at 0.5 mg/kg (not to exceed 5 mgs)

If Chemstrip is > 60 mg/dl and IV has been established administer Valium 0.2 mg/kg (not to exceed 5 mgs) slow IV after consult with On-Line Medical Control
**Adult Care**

Generalized:

General Supportive Care. Take extra time to confirm pulse. Use doppler or heart monitor if possible

Prolonged CPR may be required. If patient in V-fib/pulseless V-tach, attempt a single sequence of 3 stacked defibrillations. Standard AED protocols do not apply in this case. Limit shocks to a single stack of three. (200J – 300-360J – 360J)

Avoid unnecessary suctioning or airway manipulation.

Remove wet or constrictive clothes from patient. Wrap in blankets and protect from wind exposure.

IV NS. Solution should be warmed, if possible. Do not start IV until patient is moved to transport vehicle.

D50, 50 ml IV, if Chemstrip less than or equal to <= 80 mg/dL.

Narcan, 0.5 - 2 mg, IV, if narcotic overdose suspected.

None.

Local Cold Injury (frostbite):

Remove wet or constricting clothing. Keep skin dry and protected from wind.

Do not rewarm the limb if there is a chance that limb may refreeze before evacuation is complete or if patient must walk to transportation.

Dress injured areas lightly in clean cloth to protect from pressure, trauma or friction. Do not rub. Do not break blisters.

Maintain core temperature by keeping patient warm with blankets, warm fluids, etc.

Transport with frostbitten areas supported and elevated, if feasible.

**HYPOTHERMIA AND FROSTBITE (cont.)**
HYPOTHERMIA AND FROSTBITE (cont.)
Hypothermia and Frostbite Continued:

Local Frostbite

Remove wet or constricting clothing, keep the skin dry and protected from wind

Do not rewarm the limb if there is a chance that the limb may refreeze before transportation

Dress injured areas lightly in clean cloth, protect from pressure, trauma, or friction.

Maintain core temperature by keeping the patient warm.

Transport with frostbitten areas supported and elevated if feasible
Oklahoma State EMS Protocols

Definitions:

Imminent Delivery:

1. Amniotic sac has broken.
2. Contractions are 2-3 minutes apart or less.
3. If there is crowning of the fetal head or bulging in the perineum that suggests the fetus is about to exit the birth canal.

Delayed Delivery:

1. Contractions are 5 or more minutes apart.
2. Amniotic sac is not broken.
3. First pregnancy for the mother and both of the above are present.

Determine:

1. The number of previous pregnancies the mother has had.
2. The frequency and duration of contractions.
3. The condition of the amniotic sac (broken, unbroken).
4. The presence or absence of vaginal bleeding.
5. Approximate gestational age of the fetus.

Adult Care

General Supportive Care, IV NS. To avoid pressure on the vena cava, position patient with advanced pregnancy on left side. If on spine board for trauma, tilt board to left.

Begin transport and establish contact with receiving facility as soon as possible. Transport to closest hospital if delivery is not imminent.

Delivery

Use clean or sterile technique.

Guide and control but do not retard or hurry delivery.

Once the fetus’s head has emerged, check for nuchal cord, suction the mouth, then nose with bulb syringe.

Suction again after delivery. Stimulate by drying.

OBSTETRICAL EMERGENCIES (cont.)

Observe the infant:
Oklahoma State EMS Protocols

a) if color poor, child limp, or poor vital signs (Apgar 7 or less), begin neonatal resuscitation.
b) if child pink, crying, moving well (Apgar 8-10), dry completely, wrap in sterile or clean blanket, and place next to mother to conserve heat.

Clamp the cord in two places approximately 4-6 inches from the infant.

Cut the cord between the clamps.

If excessive bleeding occurs postpartum, massage the uterus gently.

Do not delay transport for or attempt to deliver placenta. If placenta delivers spontaneously, take to the hospital.

None.

Prolapsed Cord

Place the mother in Trendelenberg position.

Insert gloved hand for counter-pressure against head to allow blood flow through cord. Elevation of the buttocks may also help to alleviate pressure on the cord.

Transport Code 1 to the nearest appropriate facility.

None.

Breached Position

If the presenting part of the fetus is not the head, place the patient in the Trendelenberg position.

Coach the mother through a controlled delivery.

Transport Code 1 to the nearest appropriate facility.

None.

Nuchal Cord

If the fetus presents at the perineum with the umbilical cord wrapped around its neck, try to slip the cord gently over the baby’s head. If unable to do so, place two clamps about 2 inches apart on the cord and cut in between.

None.

OBSTETRICAL EMERGENCIES (cont.)

Adult Care
Obstetric Emergencies: Pre – Eclampsia and Eclampsia

Indications:

Patients in third trimester of pregnancy who were normotensive prior to pregnancy and now have BP greater than > 140/90; this may be associated with edema of hands and face. This usually occurs during patient’s FIRST pregnancy.

NOTE: Definitive treatment is delivery of fetus. RAPID TRANSPORT IS INDICATED.

General Supportive Care, IV NS. To avoid pressure on the vena cava, position patient with advanced pregnancy on left side. If on spine board for trauma, tilt board to left.

If patient has generalized (grand mal) seizure:

1. Administer MAGNESIUM SULFATE 1 gm/minute IV push until seizure stops. Maximum dose is 4 g.

2. Possible additional orders include:
   A. Valium 5 mg IV slow push (maybe repeated as needed).
   B. If unable to obtain venous access, then Valium 5 – 10 mg IM or Diastat rectal injection 0.2 mg/kg, 10 mg or 20 mg or Versed 0.2 mg/kg IM not to exceed 10 mg. (Because Diastat is provided in fixed adult unit dose of 10 mg, the prescribed dose is obtained by rounding upward to the next available dose. For rectal injections, lubricate syringe and insert gently 1 – 2 inches into rectum or just past rectal sphincter)
   B. Additional Magnesium Sulfate

The Obstetrical Patient in Cardiac Arrest

In the setting of medical and traumatic cardiac arrest in pregnancy, the greatest chances of fetal survival occurs if peri-mortem C-Section is performed within five minutes of the arrest. There are case reports of intact infant survival after more than 20 minutes of complete maternal arrest.

Therefore, it is recommended that those obstetrical patients who sustain a medical or traumatic cardiac arrest be expeditiously transported to the closest comprehensive facility so that the decision regarding a peri-mortem C-Section may be made.

During transport, standard resuscitative measures, pharmacologic therapy, and procedures should be initiated without modification.

OBSTETRICAL EMERGENCIES (cont.)
Obstetrical Emergencies

General Supportive Care
IV NS

Delivery
Use clean sterile technique
Guide control but do not retard or hurry delivery
If the fetus’ head is delivered, check for nuchal cord, suction the mouth then the patient’s nose
Observe the infant
Appar 8-10
Dry patient, wrap in sterile clean blanket, place next to mother
Clamp and cut the cord approximately 4-6 inches from the infant
If excess bleeding occurs postpartum, massage the uterus gently
Apgar 7 or less

Appar 8-10

Prolapsed Cord
Place the mother in Trendelenberg position
Insert a gloved hand for counter pressure against the fetus’ head
Elevation of the mother's buttocks to assist in alleviating pressure on the cord
Coach the mother through a controlled delivery

Breach Position
If the presenting part is not the head, place the mother in Trendelenberg position
Coach the mother through a controlled delivery

Nuchal Cord
If the fetus presents with the cord wrapped around its neck, attempt to slip the cord over the fetus’ head
If unable to slip the cord over the fetus’ head, place two clamps 2 inches apart and cut the cord
Coach the mother through a controlled delivery

PreEclampsia
BP > 140/90, may have associated edema to the face and hands
Magnesium Sulfate 1 gram/min IV (max 4 grams) for control of seizures, after consult with On-Line Medical Control
Possible Additional Orders:
Valium 5-10 mg IV or IM
Rectal Diastat 0.2 mg/kg, 10 or 20 mgs
Versed 0.2 mg/kg IM (max 10 mgs)
Additional Magnesium Sulfate

Transport Code 1 to the nearest appropriate facility

ABDOMINAL/PELVIC TRAUMA
Adult Care.

Trauma and Hypovolemia Supportive Care.

Cover eviscerated tissue with moist saline dressing, then dry sterile dressing. Do not attempt to replace eviscerated contents back into abdominal cavity.

Stabilize impaled objects without removing them.
Cover eviscerated tissue with moist saline dressing, then dry dressing

Stabilize impaled objects without removing them
Adult Care

Trauma and Hypovolemic Supportive Care.

Clean stump with saline, cover with moistened gauze, and dress to control hemorrhage.

Irrigate amputated part thoroughly and gently in NS.

Wrap in moistened sterile gauze (several layers).

Place in plastic bag.

If ice is available, float bag in container filled with ice water.

Transport part with patient as quickly as possible.

Do not freeze part by placing it directly on ice or by adding any other coolant such as dry ice.

Do not float part in a container of solution.

Do not use any antiseptic or other solution.

Morphine Sulfate, 2-10 mg IV slowly for pain relief. If allergic to Morphine, Meperidine 25-50 mg IV slowly.

Benadryl, 25 mg slow IV push, as adjunct to Morphine or Demerol for nausea.

AMPUTATION (cont.)
Amputation

Trauma and Hypovolemic Supportive Care

Clean stump with saline, cover with moistened gauze, dress to control hemorrhage

Irrigate amputated part thoroughly and gently in NS

Wrap part in moistened sterile gauze, place in a plastic bag

If available, float bag in container filled with ice water

Transport the severed part with the patient as quickly as possible

Adult ALS Care

Morphine 2-10 mgs IV or Demerol 25-50 mgs IV for pain relief, after consult with On-Line Medical Control

Benadryl 25 mgs IV for nausea, after consult with On-Line Medical Control

Pediatric ALS Care

Morphine 0.1-0.2 mg/kg IV (max 5 mgs) or Demerol 1 mg/kg IV (50 mgs) for pain relief, after consult with On-Line Medical Control

Benadryl 1 mg/kg IV or IM for nausea, after consult with On-Line Medical Control
A. **Thermal Burns**

1. Gasses, usually carbon monoxide, are given off. It is important to record if the burn occurred inside and what materials were burning.
2. Two percent or greater burns should be seen by a physician.

B. **Chemical Burns**

1. Usually more localized than thermal burns.
2. Noxious gases often affect the lungs to produce pulmonary injury. Laryngeal and bronchial edema may cause subsequent airway obstruction.
3. Remove dry particles, then flood the area with water.
   a) If lime is in the eyes, WASH IT OUT.

C. **Electrical Burns**

1. Be sure the patient is no longer in contact with the electrical source.
2. Evaluate airway and cardiac status.
3. Patients often suffer from fall injuries.
4. Even though the surface area of the burn may be small, involvement of muscle and bone are often extensive.
5. All electrical burns should be seen by a physician.

D. **Assess the burns by the following criteria:**

1. Percent of body burn:
   a) "Rule of Nines" (see attached chart)

2. Depth of burn:
   a) First (superficial), Second (partial thickness), or Third Degree (full thickness) (see attached chart).

3. Age of the patient.

4. Site of burns:
   a) Face, extremities, etc.
E. **American Burn Association criteria for transport to burn center:**

1. Second and third degree burns of 10% or more of the body surface in patients under 10 or over 50 years.
2. Second and third degree burns of more than 20% of the body surface area in other age groups.
3. Third degree burns of more than 5% of the body surface area in any age group.
4. Second and third degree burns that involve the face, hands, feet, genitalia, perineum, or major joints.
5. Electric burns, including lightning injury.
6. Chemical burns with serious threat of functional or cosmetic impairment.
7. Inhalation injury.
8. Lesser burns in patients with pre-existing medical problems that could complicate management.
9. Combined mechanical and thermal injury in which the burn injury poses the greater risk.

**Adult Care**

Trauma and Hypovolemia Supportive Care.

Stop the burn process:

a) Remove clothes.
b) Flood with water only if flames not extinguished, smoldering present, or significant heat still being dissipated.

Obtain information regarding possibility of smoke/toxic fume inhalation. Treat with 100% NRBM.

Advanced Burn Life Support guidelines for fluid resuscitation:

a) Indications:
   1) Burns exceeding 20% BSA and transport time greater than > 60 minutes.
   2) Potential for hypovolemic shock from associated injuries.
   3) Management of life threatening ventricular arrhythmias.
   4) Patients requiring endotracheal intubation.

b) IV NS fluid rates for above indications:
   1) 500 ml/hour, age greater than > 15.

Cover burned area with clean, dry sheets or appropriate burn dressing.

**BURNS (cont.)**
Notify Burn Unit and transport.

a) Transport to nearest emergency facility if patient is in acute respiratory distress.

Morphine Sulfate, 2-10 mg IV slowly for pain relief. If allergic to Morphine, Meperidine 25-50 mg IV slowly.

Benadryl, 25 mg slow IV push, as adjunct to Morphine or Demerol for nausea.

**TABLE I - 5**

**PERCENTAGE OF BURNS FOR CHILDREN USE TABLE**

<table>
<thead>
<tr>
<th>Area</th>
<th>Newborn</th>
<th>3-Years</th>
<th>6-years</th>
<th>12-Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head &amp; Neck</td>
<td>18%</td>
<td>15%</td>
<td>12%</td>
<td>6%</td>
</tr>
<tr>
<td>Trunk</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>38%</td>
</tr>
<tr>
<td>Arms</td>
<td>16%</td>
<td>16%</td>
<td>16%</td>
<td>18%</td>
</tr>
<tr>
<td>Legs</td>
<td>26%</td>
<td>29%</td>
<td>32%</td>
<td>38%</td>
</tr>
</tbody>
</table>

**TABLE I - 6**

**CHARACTERISTIC OF BURNS**

<table>
<thead>
<tr>
<th>Degree</th>
<th>Appearance</th>
<th>Sensation</th>
<th>Depth Involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>Erythema (reddening)</td>
<td>Painful</td>
<td>Confined to Epidermis (superficial)</td>
</tr>
<tr>
<td></td>
<td>of the skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>Blisters</td>
<td>Painful</td>
<td>Epidermis and part of dermis lost (partial thickness)</td>
</tr>
<tr>
<td>Third</td>
<td>Unblistered - May be white, leathery, with thrombosed vessels seen beneath or charred</td>
<td>Not Painful</td>
<td>Epidermis and full dermal layer, and may go down to muscle or bone (full thickness)</td>
</tr>
</tbody>
</table>

*BURNS (cont.)*
**Oklahoma State EMS Protocols**

**Burns**

**Adult ALS Care**
- **Trauma and Hypovolemic Supportive Care**
  - Stop the burn process by removing clothes.
  - Flood with water only if flames are not extinguished, smoldering present, or significant heat still being dissipated.
  - Treat with 100% Oxygen by NRB mask.
  - If indicated IV NS fluid resuscitation 500 ml/hour age > 15
  - Cover the burned area with a clean dry sheet or appropriate burn sheet
  - Morphine 2-10 mgs IV (max 5 mgs) or Demerol 25-50 mgs IV (max 50 mgs) for pain, after consult with On-Line Medical Control
  - Benadryl 25 mgs IV or IM for nausea after consult with On-Line Medical Control
  - Transport to nearest emergency facility if patient is in acute respiratory distress

**Pediatric ALS Care**
- **Trauma and Hypovolemic Supportive Care**
  - Stop the burn process by removing clothes.
  - Flood with water only if flames are not extinguished, smoldering present, or significant heat still being dissipated.
  - Treat with 100% Oxygen by NRB mask.
  - If indicated IV NS fluid resuscitation 250 ml/hr age 5-15 < 5 years old, fluid resuscitation is not indicated
  - Cover the burned area with a clean dry sheet or appropriate burn sheet
  - Morphine 0.1-0.2 mg/kg IV (max 5 mgs) or Demerol 1 mg/kg IV (max 50 mgs) for pain, after consult with On-Line Medical Control
  - Benadryl 1 mg/kg IV or IM for nausea after consult with On-Line Medical Control

**CHEST TRAUMA**

Oklahoma EMS Protocols 108 Revised 10/02
**Adult Care**

*Trauma and Hypovolemia Supportive Care.*

Stabilize flail segments with bulky dressings.

Cover open chest wound with vaseline gauze taped on three sides to vent air out. Do not attempt to remove impaled objects; stabilize these by any means necessary.

Needle thoracostomy if suspected tension pneumothorax.
Chest Trauma

Adult and Pediatric ALS Care

Trauma and Hypovolemic Supportive Care

Stabilize flail segments with bulky dressings

Cover open chest wound with vaseline gauze taped on three sides to vent air out. Stabilize impaled objects by any means necessary

Needle thoracotomy if suspected tension pneumothorax, after consult with On-Line Medical Control
Adult Care

Trauma and hypovolemic supportive care.

Check distal pulses and sensation prior to immobilization of injured extremity.

Apply sterile dressing to open fractures. Note carefully wounds that appear to communicate with bone, and initial position of bone in wound.

Splint areas of tenderness or deformity; immobilize the joint above and below the injury in the splint.

Check distal pulses and sensation after splinting.

Elevate simple extremity injuries. Apply padded ice if time and extent of injuries allow.

Monitor circulation (pulse and skin temperature), sensation, and motor function distal to site of injury during transport.

Morphine Sulfate, 2-10 mg IV slowly for pain relief. If allergic to Morphine, Meperidine 25-50 mg IV slowly.

Benadryl, 25 mg slow IV push, as adjunct to Morphine or Demerol for nausea.

EXTREMITY INJURIES (cont.)
**Adult Care**

Trauma and Hypovolemia Supportive Care. Be alert for concomitant head and cervical injury.

Attempt to gently irrigate eye with normal saline if chemical contamination is present. Do not irrigate if globe disruption is suspected. Do not attempt to remove foreign bodies by other means.

If suspected or obvious laceration or disruption of the globe is present, do not place any pressure on the globe or orbit. Place metal eye shields over both eyes, but only if they do not contact any impaled foreign bodies.

If hyphema is present, do not put pressure on the orbit or globe. Transport patient in sitting position or with head elevated unless patient immobilization is required. Place metal eye shields over both eyes, but only if they do not contact any impaled foreign bodies.
Eye Injuries

Adult and Pediatric ALS Care

Trauma and Hypovolemic Supportive Care

Consider need for cervical spine immobilization

Globe Disruption present?

No

Attempt to irrigate the eye with normal saline if chemical contamination is present.

Do not attempt to remove impaled or foreign objects, place metal eye shields over both eyes unless the shield would come in contact with the foreign object.

Transport the patient in a position of comfort with head elevated, unless the patient requires immobilization.

Yes

Do not irrigate the globe. Do not place pressure on the globe or orbit.

HEAD AND SPINAL INJURIES
**Adult Care**

Trauma and Hypovolemic Supportive Care, running fluids at TKO rate unless hypotensive. If hypotensive, fluid resuscitation should be titrated to a systolic blood pressure no higher than 90 mm/Hg

If unconscious, hyperventilate at 24 breaths/min.

**HEAD AND SPINAL INJURIES (cont.)**
If the patient is hypotensive, fluid resuscitation should be titrated to a systolic blood pressure no higher than 90 mm/hg.

If unconscious, hyperventilate at 24 breaths per minute.
Near drowning is a submersion accident after which the patient survives for at least 24 hours. The return of consciousness does not necessarily assure recovery. Intensive supportive therapy may be required for several days. Post immersion syndrome, or “secondary drowning,” is respiratory distress after an initial period of apparent recovery from near drowning. This syndrome usually occurs within 12 hours of rescue but can be delayed for as long as 72 hours. Because of the possible delay in presentation symptoms, hospital evaluation is mandatory after any submersion accident.

**Adult Care**

*General Supportive Care. Consider need for cervical immobilization.*

*For the conscious and alert patient with signs of hypoxemia, initiate airway and ventilation protocols*

*Treat dysrhythmia per other specific protocols.*
Near Drowning
(Post Immersion Syndrome is respiratory distress after recovery from near drowning. Because of delay in presentation of symptoms, hospital evaluation is mandatory for any submersion accident)

Adult ALS Care

General Supportive Care

Consider the need for cervical spinal immobilization

Is the patient conscious, alert with signs of hypoxia

Yes

No

Mask CPAP, may reverse the hypoxia

Endotracheal intubation with mechanical ventilation

Treat dysrhythmias pre-specific protocols

Pediatric ALS Care

General Supportive Care

Consider the need for cervical spinal immobilization

Treat dysrhythmias per specific protocols

SUSPECTED OR CONFIRMED TERRORIST EVENT

It is strongly encouraged that all agencies develop specific protocols for terrorist events and mass casualty incidents. The protocols that are listed are generally and should be considered a foundation from which to build your own protocols.

Oklahoma EMS Protocols Revised 10/02
Your protocols will not only need to include treatment as well as the policies and procedures for mutual aid and evacuation.

“Terrorism is the unlawful use of force or violence against persons or property to intimidate or coerce a government or civilian population in furtherance of political or social objectives, (FBI).”

The CIA and FBI tell us, “Terrorist based in the Middle East or elsewhere will someday almost certainly use chemical, biological, and possibly nuclear weapons of mass destruction against U.S. targets.”

The intentional release of Nuclear, Biological, or Chemical (NBC) warfare material into a civilian community would create a unique emergency scene. Certainly, specialized Hazardous Material Response Teams (HMRTs) would be required. If the attack succeeded, a MCI would result, requiring emergency responders to facilitate the treatment of dozens, hundreds, or even thousands of victims. Another significant factor that distinguishes NBC terrorism is that the incident itself is a crime. While casualty care and preservation of life will be the most important response priorities, crime scene investigation (including the gathering and preservation of evidence) will be ongoing activity at the incident scene.

1. **Nuclear (Radiation)**  Radiation is an invisible threat whose adverse effects may be delayed for days to years depending on the dose. The risk to victims and responders varies by the route of exposure (that is, interval vs. external) and the type of ionizing radiation released. In some respects, nuclear weapons offer a unique advantage to healthcare providers. Instruments designed to check for their presence are readily available. This is not the case with chemical and biological weapons. Radiation may be in form of alpha, beta, gamma, or neutrons. Nuclear agents may be used by terrorists through three mechanisms:

   A. **Improvised nuclear device:** an actual nuclear weapon explosion (conventional bomb plus radioactive material).

   B. **Radiological dispersal device:** bomb laced with radioactive material or a failed nuclear device.

   C. **Simple radiological device:** simple radiological dispersal, which spreads radioactive particles without an explosion.

**SUSPECTED OR CONFIRMED TERRORIST EVENT (cont.)**

2. **Biological Agents.** These agents are accessible to the terrorist and are relatively easy to produce. They are primarily an inhalation threat and are usually dispersed in their aerosolized form, in the 1 to 5 micron size. They have effects that usually go undetected for
days, until large numbers of the population begin to present with a similar pattern of symptoms. The symptoms vary from incapacitating to lethal and fall into three categories:

A. **Bacteria**: Plague, Anthrax, Tularemia.

B. **Viruses**: Smallpox, Venezuelan Equine Ecephalitis (VEE), Viral Hemorrhagic Fevers (VHFs) (such as Ebola).

C. **Toxins**: Botulism, Ricin, Staphylococcal Enterotoxin B (SEB).

3. **Chemical warfare agents.** These are generally liquids that are disseminated as vapors or aerosols. They vary in their persistency (ease of evaporation), have an onset time of a few seconds to hours, and are designed to irritate, incapacitate, injure, or kill. The chemical agents present an inhalation and dermal threat and are divided according to physiologic effects.

   A. Nerve agents: sarin, VX
   B. Cyanide: hydrogen cyanide, cyanogens chloride
   C. Pulmonary agents: phosgene, chlorine
   D. Miscellaneous: Ammonia
   E. Vesicants: sulfur mustard, lewsite
   F. Riot control agents: Mace, pepper spray, “tear gas”
   G. Incapacitating agent: BZ

**NOTE:** While riot control agents generally do not cause serious injury, their impact as a terrorist weapon should not be underestimated. This was clearly demonstrated in early 1997, when a riot control chemical was released into Baltimore-Washington International Airport. The irritating effects of the agent caused a portion of the airport to close, and several travelers were transported to local hospitals for treatment. If the perpetrators of this incident were attempting to disrupt the operation of the facility, they certainly succeeded, even though the chemical “weapon” did not have fatal effects.

**EMS Management of Nuclear Casualties**

**Emergency Response Actions:**

1. If a radioactive material is known or suspected to have been released, it should be assumed that all property and personnel are contaminated. Approach to the site should be made with caution, surveying for evidence of hazardous materials. Position personnel and vehicles at a distance of 300 feet upwind from the site (2,000 feet or more in the case of a nuclear explosion).

**SUSPECTED OR CONFIRMED TERRORIST EVENT (cont.)**

2. The identification of the radioactive material and the extent of both the exposure/contamination will require specialized detection devices and outside assistance [such as Hazardous Material Response Team (HMRTs) state radiological health officials, Radiological Safety Officers (RSO), Radiological Assistance Program (RAP), etc.] This is
NOT considered a primary responsibility of EMS personnel. However, it is desirable that all EMS personnel be equipped with personal dosimeters which measure their level of exposure. The extent of their exposure can be determined at a later date.

3. **EMS personnel will not enter the area without personal protective equipment, which includes a respirator or high-efficiency particulate air (HEPA) filter mask, eye protection, and gloves.**

4. A scene evaluation (hazard analysis) shall be performed by first response personnel with the information provided to the Incident Commander. Identify all hazards including fire, explosion, toxic fumes, electrical, structural collapse or their potential. If available, use radiation survey instruments.

5. Checking for radioactive contamination should be done prior to any rescue and decontamination efforts.

6. The principles of triage in a radiological event are similar to a hazardous material incident or accident scene. Victims are classified with regard to the need for treatment and are categorized as requiring minimal treatment, immediate treatment, delayed care, or as expectant. Reference section: Administrative Protocol: Protocol I.7; Multi-Patient Scene/Mass Casualty Incident/Triage.

7. Victims who have received very high doses of radiation from a gamma or neutron source might exhibit signs and symptoms that would indicate their level of exposure. Neurologic signs, such as confusion or delirium, indicate a lethal dose or radiation. Other signs of lethal radiation injury include high fever, profuse vomiting, and bloody diarrhea within 2 hours of exposure (nearly 100 percent mortality).

**Trauma and Hypovolemic Supportive Care.**

Treatment (including life saving procedures) should not be delayed for decontamination although treatment might be delayed to ensure the safety of EMS personnel. No danger will occur to responding and treating personnel if proper PPE is utilized, the victims’ clothing is removed, and the patients are properly decontaminated.

Decontamination procedures for patient and equipment per protocol. NOTE: If the patient is unstable, just removing their clothing will eliminate 80 percent of contamination. After removing the clothing, wrap the patient in a clean sheet to help contain any remaining contamination. This simple procedure will allow safe and expeditious transport to the emergency department.

EMS vehicle and crew should not return to service until ambulance, personnel, and equipment have undergone monitoring and necessary decontamination by the radiation safety officer.

**SUSPECTED OR CONFIRMED TERRORIST EVENT (cont)**

**EMS Management of Biological Casualties**

**Emergency Response Actions:**
1. EMS personnel are often the first members of the healthcare community to have contact with patients. It should be emphasized that EMS crews are the first “eyes and ears” of care providers at higher levels of the system. Hospital care providers might miss epidemiological clues if several patients with similar symptoms are distributed among numerous hospitals. EMS personnel must be aware that they may hold the key to early identification of biological terrorist attack.

2. Recognizing clues or pattern of illnesses will alert EMS personnel to begin interviewing patients and their families to obtain useful epidemiological information for public health officials. Questions asked should focus on the patient’s recent history of travel, infectious contacts, employment, and activities over the proceeding 3 to 5 days.

3. When compared to chemical weapons, the ill effects of Biological Weapons (BW) would be delayed for hours to days, would be more difficult to detect, and would have a lower risk of secondary contamination.

General Principles for EMS personnel

1. Victims of a BW attack would initially go unnoticed. Signs and symptoms that are typically so non-specific that probably no one would recognize them as being out of the ordinary.

2. Victims would be unaware of their exposure initially. Victims will not present from one central location, i.e., train station, sporting event.

3. Victims would present sporadically to healthcare facilities. Once patient complaints were confirmed to be secondary to BW attack and this information became public, hospitals and EMS providers would quickly become overwhelmed by infected patients.

4. The principles of triage in a BW event as similar to a hazardous material incident or accident scene. Victims are classified with regard to the need for treatment and are categorized as requiring minimal treatment, immediate treatment, delayed care, or as expectant. Reference section: Administrative Protocol: Protocol I.7; Multi-Patient Scene/Mass Casualty Incident/Triage.

5. EMS personnel must treat every patient with respiratory complaints (fever, cough, and shortness of breath) and open wounds as possibly infectious. Wear eye protection, HEPA filter mask and follow standard blood and wound precautions when treating patients.

SUSPECTED OR CONFIRMED TERRORIST EVENT (cont)

General Supportive Care should be implemented and not delayed to provide patient decontamination. Symptomatic individuals will typically have respiratory complaints (shortness of breath and cough) requiring some degree of airway management, oxygen therapy, nebulized bronchodilators, and assisted ventilation. If feasible, patients whose symptoms suggest a
respiratory infection may be fitted with a HEPA filter-styled mask to reduce risk of secondary transmission

EMS Management of Chemical Casualties

1. EMS personnel are key resources in the initial assessment, stabilization, treatment, and transport of casualties following a chemical agent attack, i.e., administration of antidote, establishment of an airway, and insuring adequate ventilation are critically important, particularly for severely intoxicated nerve agent and cyanide victims.

2. Remain calm. This will help you make more accurate decisions and help control stress and hysteria among casualties.


4. Set up triage area in a safe and secure area and wear protective equipment. Follow universal wound and blood precautions. Victims are classified with regard to the need for treatment and are categorized as requiring minimal treatment, immediate treatment, delayed care, or as expectant. Reference section: Administrative Protocol: Protocol I.7; Multi-Patient Scene/Mass Casualty Incident/Triage.

General Supportive Care. Severely intoxicated patients will die if aggressive airway management is not quickly available. With large numbers of victims, rapid scene and resource assessment will influence triage decisions about treatment.

Medical Control will give instructions regarding treatments specific to suspected toxins (sarin, VX). Three medications will be used to treatment the signs and symptoms of nerve agent intoxication: Atropine Sulfate, Pralidoxime Chloride, and Diazapam.

SUSPECTED OR CONFIRMED TERRORIST EVENT (cont)

EMS Management of Chemical Casualties (cont)

Use of MARK-1 Kit for nerve agent intoxication. Atropine and Pralidoxime Chloride (2-PAMCI) are used in autoinjectors. The Atropine autoinjector contains 2 mg of Atropine and the 2-PAMCI autoinjector contains 600 mg of Pralidoxime Chloride. Both autoinjectors are used by pressing the end of the device onto the thigh. A spring pushes the needle into the
muscle and causes the medications to be injected. The general indications for use of these antidotes will be based upon mild, moderate, or severe nerve agent intoxication.

**Adults and children over the age of 12.**

A. **Mild Symptoms**
   1. Rhinorrhea
   2. Headache
   3. Drooling
   4. Dim vision
   5. Tight chest
   6. Short of breath
   7. Localized sweating
   8. Muscular twitching
   9. Stomach cramps
   10. Nausea
   11. Mild bradycardia

B. **Moderate Symptoms**
   1. Increased severity of mild findings
   2. Significant fatigue, weakness
   3. Generalized muscular fasciculation

C. **Severe Symptoms**
   1. Altered mental status
   2. Wheezing, severe dyspnea
   3. Pin-point pupils
   4. Lacrimation
   5. Salvation
   6. Emesis
   7. Loss of bowel control
   8. Loss of bladder control
   9. Bradycardia
   10. Severe muscular twitching
   11. Severe motor weakness
   12. Seizure
   13. Loss of consciousness
   14. Respiratory Failure

**Atropine 2 mg IM**

**2PAMCI, 600 mg IM**

Repeat Once within 15 minutes if symptomatic or if symptoms progress

Repeat up to a maximum of 3 times within a 30 minutes period if still symptomatic or until signs and symptoms of Atropinization.*

Children under 12 years: .05 mg /kg body weight, repeated every 15 minutes until Atropinization is achieved. *Maintain Atropinization with repeated dosage of .02 - .05 mg/kg body weight.

*Atropinization is achieved, (e.g., flushing, dry mouth, dilated pupils and tachycardia (pulse of 140 beats per minute).

**Non-Traumatic Lumbosacral Pain (Non-Traumatic Lower Back Pain)**

**Introduction:**

Lower back pain is a very common problem. There are three groups of patients with this type of pain:

1. **The previously healthy patient with an acute episode experiencing typical signs and symptoms of isolated lumbosacral back pain.**
2. The chronically afflicted patient with lumbosacral problems experiencing a recurrence of typical signs and symptoms for their condition.
3. The patient with back pain but experiencing other signs and symptoms that might represent another diagnosis other than isolated non-traumatic lumbosacral pain.

The majority of patients fall into the 1st or 2nd group, while patients in the 3rd group potentially represent more serious and even life-threatening conditions, i.e., kidney stones or abdominal aortic aneurysm.

Adult Care

PERFORM THOROUGH PHYSICAL EXAMINATION to safely rule out major trauma or serious medical problems.

General Supportive Care. Appropriate questions to pose during the history are the following: Onset, Position, Quality, Radiation, Associated Symptoms. In particular, note the patient’s position. Most patients with severe musculoskeletal back pain lie flat and still. Document any obvious deformities or trauma. Palpate the spine and lower back looking for tenderness. Musculoskeletal lumbosacral strain is the most common cause of lower back pain. The patient commonly relates a history of strenuous activity several hours before presentation. The pain is often exacerbated by hip flexion. Other than tenderness, the physical examination is usually normal.

NOTE: Signs and symptoms of potential serious medical problems include abnormal vital signs particularly a low blood pressure in a patient whose age is greater than (> 50 years, syncope or near syncopal episodes, abnormal abdominal findings such as tenderness, distention, or pulsatile mass, which might trigger back pain that causes the patient to move about rather than remain still. As a consequence, this back pain is not accompanied by tenderness to palpation over paraspinous muscles. (If abdominal aortic aneurysm suspected refer to Protocol II.25: Abdominal Pain)

Implement spinal immobilization procedures with a history of trauma with spine pain or tenderness. Vertebral compression fractures usually are caused by a fall or acute flexion of the spine. The conditions of osteoporosis, metastatic malignancy, and metabolic bone disease predispose patients to these fractures. Pain occurs immediately, and point tenderness can be elicited on physical examination.

IV of Normal Saline.

Non-Traumatic Lumbosacral Pain (Non-Traumatic Lower Back Pain)(cont)

Contact Medical Control and establish need for pain control eligibility. Morphine Sulfate, 2-10 mg IV slowly until adequate pain relief. If allergic to Morphine, Meperidine 25-50 mg IV slowly.

Benadryl, 25 mg slow IV push, as adjunct to Morphine or Demerol for nausea.

NOTE: Transport patient as indicated by primary condition, closely monitoring vital signs, respiratory effort, and level of consciousness.
Non-Traumatic Lumbosacral Pain (Non-Traumatic Lower Back Pain) (cont.)
Non-Traumatic Lower Back Pain

Perform a thorough physical examination

Adult Care
- General Supportive Care
  - If signs and symptoms of potential serious medical problems exist refer to appropriate Protocol II.25 (Abdominal Pain)

Pediatric Care
- General Supportive Care
  - Suspicion of cervical/spinal injury?
    - No
      - IV of Normal saline
    - Yes
      - Implement Spinal Immobilization
      - Morphine Sulfate 2-10 mgs IVP or Demerol 25-50 mgs IVP, after consult with Medical Control
      - Benadryl, 25 mgs slow IVP for nausea, after consult with Medical Control

Electrocution/Lightning Injuries
Introduction:

Electrical injuries are a relatively common, complex and potentially devastating form of trauma. The manifestations and severity of electrical trauma encompass a wide spectrum, ranging from a transient unpleasant sensation due to brief contact with low-intensity household current to instantaneous death and massive injury from high-voltage electrocution/lightning injury. Unlike thermal burns, electrical injuries commonly involve multiple body systems with the potential to pose difficult challenges regarding accurate assessment and proper management.

Therefore, injury due to electricity may include burns to the skin and deeper tissues, cardiac rhythm disturbances and associated injuries from falls and other trauma. The amperage, voltage, type of current (AC vs. DC) duration of contact, tissue resistance and current pathway through the body will determine the type and extent of injury. Higher voltage, greater current, longer contact and flow through the heart are associated with worse injury and worse outcome. In general, lightning exposure/contact may result in the most severe form of electrical injury.

Lightning Injuries:

Lightning strikes create different injury patterns. A direct strike occurs when the current passes directly through the victim. This causes cardiac standstill, pulmonary arrest, and unconsciousness. More commonly, a flashover occurs, creating significant superficial burns, which appear as fernlike, red streaks on the skin.

Side flash occurs when lightning strikes another object and the resulting energy splashes or sprays through air and strikes the victim. In this scenario, the degree of injury is similar to a direct strike and depends on the path of least resistance.

Ground strike causes the energy to spread in a circular pattern striking the victim in its path. It’s widely thought that the current must travel up one leg and down the other, like two prongs of an electrical plug. Side Flashes and Ground Strikes often result in multiple victims.

Given the likelihood of cardiac and respiratory arrest, the initial assessment takes on additional significance. Most patients will become unresponsive at the time of the strike and will begin to regain cognitive functions as long as cardiac and pulmonary function has been maintained. Commonly, patients will be unable to remember events before and after the strike.

The patients pupils should be examined for dilation and the ears examined for bleeding or decreased hearing suggestive of tympanic membrane rupture. Pulses in the extremities may not only be abnormal in the presence of dysrhythmias but also may be absent in extreme vasospasm. In the latter case the patient’s extremity will also be cold or ashen. The skin should be examined for evidence of burns. Although ferning and superficial burns may be seen with lightning splashes, energy may pass from the ground and enter the patient through the leg or foot. In this instance, the entrance wound may resemble a high voltage entrance burn.
STANDARD advanced life support methods should be provided as indicated, including intubation and administration of rhythm appropriate medication. When working with the airway, the patient’s cervical spine should be protected because these patients are considered victims of MAJOR TRAUMA. Full spinal immobilization is indicated.

Cardiac monitor should be applied and IV access using normal saline solution. Fluid administration depends on the setting. Without the presence of hypotension, which would suggest serious blunt trauma injuries, extensive volume resuscitation is seldom necessary. In addition, cerebral edema and other intracranial injuries may become worse if uncontrolled fluid resuscitation is initiated. The patient should be rapidly transported to the trauma center.

Electrical Injuries:

Electrical burns predominate in certain populations. Preschoolers often stick objects into uncovered wall sockets or chew on extension cords. Children climb trees often sustain electrical injury from power lines. Firefighters can suffer electrical injury when ladders or other equipment contacts hidden wires. Patients injured by lightning or high-tension electricity are similar to multiple-trauma victims. In addition to neurovascular damage, look for blunt and penetrating injuries from the acceleration/deceleration of a patient who’s been thrown by the current or struck by flying debris. EMS personnel must realize that wound size does not correlate to internal injury. The greatest injury often occurs internally as the current passes through vulnerable organs and tissue.
Assure scene safety, i.e. by ascertaining that the source of electricity is removed from the patient and the rescue area. Death and injury to rescuers have frequently occurred when they attempt to aid the victims prior to removal of electrical hazard. High-tension wires may jump or bounce across a road, posing a continued risk. Call appropriate public service agencies for assistance if needed.

NOTE: In the case of multiple lightning-strike victims, it is appropriate to deviate from the standard practice of sorting patients in cardiopulmonary arrest as the lowest priority. Cardiac arrest patients should be placed in the rapid transport category. In lightning strike victims you should expect non-reactive dilated pupils. This does NOT signify death with this type of patient. The massive electrical force creates a transient autonomic instability, which prevents the normal pupillary reaction. This condition will resolve in time.

Obtain appropriate history related to event (voltage source, time of contact, path of flow through body, unresponsiveness or seizures; most information regarding lightning strike is gathered from bystanders; in most serious cases, the patient will be unresponsive or have an altered mental status).

Stop the burning process and put out smoldering clothes. Manage burn injuries and/or entrance and exit wounds according to Burn Protocol.

Remove clothes and assess patient for entry and exit wounds, particularly under rings or other metal objects.

Trauma and Hypovolemic Supportive Care.

Assume spinal and other potential traumatic injuries and treat properly.

Administer high flow oxygen by non-rebreather mask or bag valve mask as determined by patient's condition. Intubate as indicated and use cervical precautions with these patients.

Treat cardiac dysrhythmias according to protocol.

Initiate IV Normal Saline and follow Burn Protocol guidelines for fluid resuscitation. Initiate transport as soon as possible and notify trauma center.

For congestive heart failure that may develop, follow pulmonary edema protocol.

For pain relief burns, ADULT: 2 to 10 mg of Morphine Sulfate slow IV or 25 – 50 mg of Meperidine slow IV. PEDIATRIC: Morphine Sulfate, 0.1 – 0.2 mg/kg IV slow IV, (maximum of 5 mg) or Meperidine 1mg/kg/dose IV (maximum single dose 50 mg).
Assume spinal and other potential traumatic injuries and treat properly.

Administer high flow oxygen, intubate as indicated and use cervical precautions.

IV Normal saline, following Burn Protocol guidelines for fluid resuscitation.

For pain relief from burns: Morphine Sulfate 2-10 mg/kg slow IVP or Meperidine 25-50 mgs slow IVP after consult with On Line Medical Control.
Section III

Procedure Protocols

Airway Management: General Principles
The following principles should be followed to allow optimum care of the airway without unnecessary intervention.

1. Use the simplest method of airway management appropriate to the patient.
2. Use a method with which you are comfortable.
3. Use meticulous suctioning to keep the airway clear of debris.
4. Monitor continuously to be sure that your treatment is still effective.
5. Understand the difference between various aspects of airway management:
   A. Patency: how open and clear is the airway, free of foreign substances, blood, vomitus, and tongue.
   B. Ventilation: the amount of air the patient is able to inhale and exhale in a given time.
   C. Oxygenation: the amount of oxygen the patient is carrying to his tissues.

Each needs to be treated separately and requires different techniques and equipment.

The following protocols are recommended as a guide for approaching difficult medical and trauma airway problems. They assume that the responder is skilled in the various procedures, and will need to be modified according to training level. Advanced procedures should only be attempted if simpler ones fail and if the technician is qualified. Individual cases may require modification of these protocols.

Medical Respiratory Arrest:
1. Open airway using head tilt-chin lift.
2. Apply pocket mask (or BVM) with supplemental oxygen to ventilate.
3. Insert nasopharyngeal airway or oropharyngeal airway if patency is difficult to maintain.
4. Suction as needed.
5. Perform orotracheal intubation after initial airway management, if arrest continues.
   Other Advanced airway adjuncts may be used if medical director approves those devices.

Medical Respiratory Insufficiency:
1. Open the airway using most efficient method.
2. Insert nasopharyngeal airway.
Medical Respiratory Insufficiency (cont.):

3. Suction as needed.

4. Apply supplemental $O_2$ by mask as needed.

5. Assist respirations via BVM or other ventilatory assist systems available. **NOTE:** Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

6. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. *(Each agency is encouraged to develop agency specific guidelines for head immobilization when any advanced airway device is used.)*

7. Perform nasotracheal or orotracheal intubation if prolonged support is needed, or if airway requires continued protection from aspiration.

Traumatic Respiratory Arrest:

1. Have assistant apply in-line stabilization to head and neck.

2. Open airway using jaw thrust maneuver, protecting neck.

3. Clear the airway using suction.

4. Use hand to draw tongue and mandible forward if needed in patients with facial injuries.

5. Use pocket mask for initial ventilation.

6. Perform orotracheal intubation with in-line stabilization. Pressure over larynx may make intubation easier.

7. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. *(Each agency should create agency specific protocols for the use of CID’s when any advanced airway device is in place.)*
8. If intubation cannot be performed due to severe facial injury, and patient cannot be ventilated with mask: perform cricothyroid puncture and initiate trans-tracheal ventilation.

Traumatic Respiratory Insufficiency:

1. Have assistant apply continuous in-line stabilization to head and neck.
2. Open airway using jaw thrust maneuver, protecting neck.
3. Clear the airway using suction.
4. Use hand to draw tongue and mandible forward if needed in patients with facial injuries.
5. Insert nasopharyngeal airway.(Do not use NPA if head trauma is suspected)
6. Administer high flow O₂, assist ventilations if necessary.
7. Attempt nasotracheal intubation to secure airway if needed and if no significant midface trauma.
   (Caution should be used when intubating a patient through the nasal cavity if head trauma is suspected)
8. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (See above CID recommendations)

9. If patient deteriorates, and cannot be supported by less invasive means:
   A. Attempt orotracheal intubation with in-line stabilization, or
   B. Perform cricothyroid puncture and initiate trans-tracheal ventilation.
Indications:

1. Inadequate air exchange in the lungs due to jaw or facial fracture causing narrowing of air passage.
2. Lax jaw or tongue muscles causing airway narrowing in the unconscious patient.
3. Noisy breathing or excessive respiratory effort, which could be due to partial obstruction.
4. In preparation for suctioning, assisted ventilation or other airway management maneuvers.

Precautions:

A. For trauma victims, keep neck in midline and avoid flexion or extension.
B. For medical patients, neck extension may be difficult in elderly persons with extensive arthritis and little neck motion. Do not use force; jaw thrust or chin lift without head tilt will be more successful.
C. All airway maneuvers should be followed by an evaluation of their success; if breathing is still labored, a different method or more time for recovery may be needed.
D. Children's airways have less supporting cartilage; overextension can kink the airway and increase the obstruction. Watch chest movement to determine the best head angle.
E. Dentures should usually be left in place since they provide a framework for the lips and cheeks and allow more effective mouth-to-mouth, bag-valve-mask, or automatic ventilation.

Technique:

A. To OPEN THE AIRWAY initially, choose method most suitable for patient
B. Assess ventilations.
C. Relieve partial or complete obstruction, if present.
D. Assess oxygenation; use supplemental O₂ as needed.
Technique (cont.):

E. Choose method to MAINTAIN AIRWAY PATENCY during transport:

1. Position patient on side (if medical problem).
2. Oropharyngeal airway:
   a) Choose size by measuring from mouth to ear margin.
   b) Depress tongue with tongue blade, or insert gently with curve pointing UPWARD. Avoid snagging posterior tongue or palate.
   c) Insert to back of tongue, then turn to follow curve of airway. Move gently to be sure the tip is free in back of pharynx.

3. Nasopharyngeal airway:
   a) Lubricate tube with water soluble lubricant.
   b) Insert in right nostril, along floor of nose until flange is seated at nostril. Keep curve in line with normal airway curve. If you meet resistance or passage appears too narrow, try left side.

G. Listen to breathing to be sure maneuver has resolved problem.

H. Consider intubation or other advanced airway device.

I. Resume ventilatory assistance and oxygenation as appropriate.

Complications:

A. Cervical spinal cord injury from neck motion in trauma victim with cervical fracture.

B. Neck fractures in older patients with rigid neck due to forced extension during airway maneuvers.

C. Death due to inadequate ventilation or hypoxia.

D. Nasal or posterior pharyngeal bleeding due to trauma from insertion of airways.

E. Increased airway obstruction from tongue following improper oropharyngeal airway placement.

F. Aspiration of blood or vomitus from inadequate suctioning and continued aspiration into lungs from upper airway.

Airway Management: Opening the Airway (cont.)
Special Notes:

A. During transport, medical patients can be placed in a STABLE POSITION on their sides for effective airway control. Use a flexed leg, arms, or pillows for support.

B. Nasopharyngeal airways are very useful for airway maintenance, and are underused. The nasal insertion provides more stability, the airway is better tolerated in partially awake patients, and it does not carry the risk of blocking the airway further like the stiff oropharyngeal airway.

METHODS OF OPENING THE AIRWAY

HEAD TILT-CHIN LIFT:

Technique:
From beside head, place one hand on forehead and apply firm backward pressure to tilt the head back. Place the fingers of the other hand under the bony part of the chin. Lift the chin forward and support the jaw, helping to tilt the head back.

Indications:
Medical patient.

JAW THRUST:

Technique:
Position yourself above patient. Place fingers of each hand under angle of jaw, just below ears, using forearms to maintain head alignment. Gently thrust angle of jaw forward.

Indications:
Trauma or medical patient where neck extension is not possible.

Airway Management: Clearing and Suctioning the Airway

Indications:
1. Trauma to the upper airway, with blood, teeth, or other material causing partial obstruction.

2. Vomitus, food boluses or other foreign material in airway.

3. Excess secretions or pulmonary edema fluid in upper airway or lungs (with endotracheal tube in place).

4. Meconium or amniotic fluid in mouth, nose and oropharynx of newborn.

Precautions:

A. Suctioning, particularly through endotracheal tubes and other definitive airway devices, always risks suctioning the available oxygen as well as the fluid from the airway. Limit the suction time to a few seconds while the catheter is being withdrawn.

B. This precaution should NOT be followed when vomitus or other material continues to well up and completely obstruct airway. Then suctioning must be continued until an airway is reestablished.

C. Use equipment large enough for the job at hand. Pepperoni will not be cleared out with hard tonsil suckers. Large amounts of particulate matter require open-ended suction using connecting tubing.

D. The catheter and tubing will require frequent rinsing with water or saline to permit continued suctioning. Have a bottle of water or saline at hand before you begin. Use gauze to remove large material from the end of the catheter.

E. Never attempt to insert a suction catheter with the suction functioning. Suction only on withdrawal of the catheter.

Technique:

A. Open airway and inspect for visible foreign material.

B. Turn patient on side if possible to facilitate clearance.

C. Remove large or obvious foreign matter with gloved hands. Sweep finger ACROSS posterior pharynx and clear material out of mouth.

D. Attach suction machine.

Airway Management: Clearing and Suctioning the Airway (cont.)

Technique (cont.):
E. **Suction of oropharynx:**

1. Attach tonsil tip (or use open end for large amounts of debris).
2. Ventilate and oxygenate the patient prior to the procedure as needed.
3. Insert tip into oropharynx under direct vision, with sweeping motion.
4. Continue intermittent suction interspersed with active oxygenation by mask. Use ventilatory assistance device if needed.
5. If suction becomes clogged, dilute by suctioning water from a glass to clean tubing. If suction clogs repeatedly, use connecting tubing alone, or manually remove large debris.

F. **Catheter suction of endotracheal tube:**

1. Attach suction catheter to tubing of suction device (leaving suction end in sterile container).
2. Hyperventilate patient 4 - 5 times rapidly.
3. Detach bag from endotracheal tube and insert sterile tip of suction catheter without suction.
4. When catheter tip has been gently advanced as far as possible, apply suction and withdraw catheter slowly.
5. Rinse catheter tip in sterile water or saline.
6. Hyperventilate patient before each suction attempt.

**Complications:**

A. Hypoxia due to excessive suctioning time without adequate ventilation between attempts.
B. Persistent obstruction due to inadequate tubing size for removal of debris.
C. Lung injury from aspiration of stomach contents due to inadequate suctioning.
D. Asphyxia due to recurrent obstruction if airway is not monitored after initial suctioning.
E. Trauma to the posterior pharynx from forced use of equipment.
F. Vomiting and aspiration from stimulation of gag reflex.
G. Induction of cardiorespiratory arrest from vagal stimulation.

**Airway Management: Clearing and Suctioning the Airway (cont.)**

**Special Notes:**
A. Patients with pulmonary edema may have endless frothy secretions. Be sure to oxygenate and assist ventilations even though you might be tempted to suction continuously.

B. You will note that complications may be caused both by inadequate and overly vigorous suctioning. Technique and choice of equipment are very important. Choose equipment with enough power to suction large amounts rapidly to allow time for ventilation.

C. Proper airway clearance can make the difference between a patient who survives and one who dies. Airway obstruction is one of the most common treatable causes of pre-hospital death.

**Airway Management: Assisting Ventilation**

**Indications:**
1. Inadequate patient ventilation due to fatigue, coma, or other causes of respiratory depression.

2. To ventilate patients in respiratory arrest.

3. For use in conjunction with ET, Combitube or other advanced airway adjunct. 

**Technique:**

A. Open the airway.

B. Check for ventilation.

C. If patient is not breathing, perform 2 quick breaths, and check pulse. Begin CPR as needed.

D. If pulse is present, but patient is not breathing, continue mouth-to-mask ventilation until adjuncts are available.

E. Attach O₂ to BVM or other ventilatory system. **NOTE:** Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

F. Position yourself above patient's head, continue to hold airway position, seat mask firmly on face, and begin assisted ventilation.

G. Watch chest for rise, and feel for air leak or resistance to air passage. Adjust mask fit as needed.

H. If patient resumes spontaneous respirations, attach mask strap and continue to administer supplemental oxygen. Intermittent assistance with ventilation may still be needed.

**Complications:**

A. Inadequate ventilations due to poor seal between patient's mouth and ventilatory device.

B. Gastric distention, possibly causing vomiting.

C. Pneumothorax in children.

**Airway Management: Assisting Ventilation (cont.)**

**Special Notes:**

A. Flip the pocket mask so the narrow end is toward the chin for children and cover both nose and mouth while ventilating.
B. Assisted ventilation will not hurt a patient, and should be used whenever the breathing pattern seems shallow, slow, or otherwise abnormal. Do not be afraid to be aggressive about assisting ventilations, even in patients who do not require or will not tolerate intubation.

Advanced Airway Management: Orotracheal Intubation

Indications:
1. Patient with persistent hypoxia and hypoventilation despite initial simple airway maneuvers and adjuncts.

2. Patient requiring airway protection:
   A. To prevent aspiration of gastric contents, upper airway secretions, or bleeding.
   B. To suction secretions and maintain airway patency.

3. To administer drugs during resuscitation for absorption through the lungs.

4. To allow more effective CPR.

5. To prevent aspiration of gastric contents, upper airway secretions, or bleeding.

6. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures. (Follow CID Precautions)

Precautions:

A. Do not use intubation as the initial method of managing the airway in an arrest. Oxygenate prior to intubation (accomplish with BVM or autoventilator as needed).

B. Nasotracheal intubation is preferred in the breathing patient. Oral intubation with in-line stabilization of the cervical spine is the best alternative in the non-breathing trauma patient. Cricothyroid puncture and trans-tracheal jet ventilation may be indicated in a traumatic respiratory arrest if intubation is not successful.

C. Never lever the laryngoscope against the teeth. The jaw should be lifted with direct upward traction by the laryngoscope.

D. Prepare suction beforehand. Vomiting is particularly common when the esophagus is intubated.

E. Intubation should take no more than 15-20 seconds to complete; do not lose track of time. If visualization is difficult, stop and reventilate before trying again.

Advanced Airway Management: Orotracheal Intubation (cont.)

Technique:
A. Assemble the equipment while continuing ventilation:
   1. Choose tube size.
   2. Introduce the stylette and be sure it stops 1/2" short of the tube’s end.
   3. Assemble laryngoscope and check light.
   4. Connect and check suction.
   5. Lubricate tube with water soluble lubricant.

B. Position patient: neck flexed forward, head extended back. Back of head should be level with or higher than back of shoulders.

C. Give a minimum of 4 good ventilations before starting procedure.

D. Insert laryngoscope to right of midline. Move it to midline, pushing tongue to left and out of view.

E. Lift straight up on blade (no levering) to expose posterior pharynx.

F. Identify epiglottis: tip of curved blade should sit in vallecula (in front of epiglottis), straight blade should slip over epiglottis.

G. With gentle traction to straighten the airway, identify trachea from arytenoid cartilages and vocal cords.

H. Insert tube from right side of mouth, along blade into trachea under DIRECT VISION.

I. Advance tube so cuff is 1-1.5" beyond cords. Ventilate and watch for chest rise. Listen for sounds over stomach (should not be heard) and lungs and axillae.

J. Inflate cuff with 7-8 ml air.

K. Re-auscultate over stomach, both sides of chest and axillae.

L. Note proper tube position (21 cm women, 23 cm men) and secure tube with tape or endotracheal tube holder.

**Advanced Airway Management: Orotracheal Intubation (cont.)**

**Complications:**

A. Esophageal intubation: particularly common when tube not visualized as it passes through cords. The greatest danger is in not recognizing the error. Auscultation over stomach during
trial ventilations should reveal air gurgling through gastric contents with esophageal placement. Also, make sure your patient's color improves as it should when ventilating.

B. **Intubation of right mainstem bronchus:** be sure to listen to chest bilaterally.

C. **Upper airway trauma due to excess force with laryngoscope or to traumatic tube placement.**

D. **Vomiting and aspiration during traumatic intubation or intubation of patient with intact gag reflex.**

E. **Cervical spine fracture in patients with arthritis and poor cervical mobility.**

F. **Hypoxia due to prolonged intubation attempt.**

G. **Cervical cord damage in trauma victims with unrecognized spine injury.**

H. **Ventricular arrhythmias or fibrillation in hypothermia patients from stimulation of airway.**

I. **Induction of pneumothorax, either from traumatic insertion, forceful bagging, or aggravation of underlying pneumothorax.**

**Special Notes:**

A. Orotracheal intubation can be accomplished in trauma victims if an assistant maintains in-line stabilization of the cervical spine and keeps the neck in neutral position. Careful visualization with the laryngoscope is needed.

B. **REMEMBER:** Endotracheal intubation is NOT the procedure of choice in the first seconds of a resuscitation. It is a secondary procedure only. Most persons can be adequately ventilated with a BVM or autoventilator to mask with oropharyngeal or nasopharyngeal airway.

C. Difficult intubations can occasionally be made easier by continuous pressure placed over the thyroid and cricoid cartilages moving the vocal cords posteriorly into view (Sellick Maneuver).

D. Do not be overly aggressive and quick to intubate in trauma victims with upper airway trauma. If you are able to manage secretions and ventilate, intubation is often not required and the complications may outweigh the advantages.

---

**Advanced Airway Management: Nasotracheal Intubation**

**Indications:**

1. Same function as orotracheal intubation.
2. Most useful in breathing, comatose patients requiring intubation. May be better tolerated than oral intubation in partly conscious patients.

3. Asthma, pulmonary edema, and epiglottitis with respiratory failure, where intubation may need to be achieved in a sitting position.

**Precautions:**

A. Head must be exactly in midline for successful intubation.

B. Have suction ready. Vomiting can occur, as with any stimulation of the airway.

C. Nasotracheal intubation is more time-consuming than orotracheal intubation.

D. Often nares are asymmetrical and one side is much easier to intubate. Avoid inducing bilateral nasal hemorrhage by forcing a nasotracheal tube on multiple attempts.

E. Do not use in patients with significant nasal or craniofacial trauma.

F. Be sure adapter on distal end of tube is firmly in place.

G. Nasotracheal intubation is not recommended in children less than 8 years of age.

H. Patients suspected of a narcotic overdose/hypoglycemia prior to administration of Narcan/D50W.

I. Coumadin anticoagulation therapy or hemostatic disorders.

**Technique:**

A. Choose correct ET tube size (usually 7.5 mm tube in adult). Limitation is nasal canal diameter.

B. Position patient with head in midline, neutral position (cervical collar may be in place, or assistant may hold in-line stabilization in trauma patients).

C. Assist ventilations prior to procedure if spontaneous respirations are inadequate.

D. Lubricate ET tube with 2% viscous Lidocaine. Give 2 sprays of neosynephrine 1% in each nostril.

**Advanced Airway Management: Nasotracheal Intubation (cont.)**

**Technique (cont.):**

E. With gentle steady pressure, advance the tube through the nose to the posterior pharynx. Use right nostril if possible.
Oklahoma State EMS Protocols

F. There will be a slight resistance just before entering trachea. Wait for an inspiratory effort before final advance into trachea. Patient may also cough or buck just before breath.

G. Laryngospasm, "bucking the tube", may be encountered during nasotracheal intubation. 5 cc of 2% Lidocaine given down the tube may resolve this problem.

H. Continue advancing until air is exchanging through the tube.

I. Advance about 1-1.5 inch further, then inflate cuff.

J. Ventilate and check for breath sounds bilaterally and abdominal (stomach).

K. Note proper tube position and tape securely.

L. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures.

Complications:

A. Same as orotracheal intubation. (i.e., esophageal intubation, right main-stem intubation), In addition:

B. Further craniofacial injury particularly in patients presenting with facial trauma.

C. Upper airway bleeding caused by tube trauma.

D. Vomiting and aspiration in the patient with intact gag reflex.

Special Notes:

A. In the field, the secret of blind intubation is perfect positioning and gentle patience.

B. After accomplishing nasotracheal intubation, avoid flexion or extension of the patient’s head as this may result in extubation or advancement down the right main stem bronchus.

Advanced Airway Management:

Combitube: Esophageal Tracheal Double Lumen Airway

Indications:

1. Patient requiring advanced airway and attempts at orotracheal intubation have been unsuccessful.
Contraindications:

A. Patients under the age of 16 and under 5 feet tall.

B. Responsive patients with an intact gag reflex.

C. Patients with known esophageal disease or has a history of esophageal trauma.

D. Patients who have ingested caustic substances.

E. Patient with a tracheotomy or laryngectomy.

F. Patient with a foreign body in the trachea.

G. Patient suspected of a narcotic overdose/hypoglycemia prior to administration of Narcan/D50W.

Techniques:

A. If possible, begin artificial respiration or CPR, taking usual precautions to verify an open airway.

B. Prepare Combitube for insertion.

C. Insert Combitube quickly between ventilations.

D. In the supine patient, lift the tongue and lower jaw upward with one hand. (See Illustration A)

CAUTION: When facial trauma has resulted in sharp, broken teeth or dentures, remove dentures and exercise extreme caution when passing the Combitube into the mouth to prevent the cuff from tearing.

E. With the other hand, hold the Combitube so that it curves in the same direction as the natural curvature of the pharynx. Insert the tip into the mouth and advance gently until the printed ring is aligned with the teeth or alveolar ridges.

CAUTION: DO NOT FORCE THE COMBITUBE. If the tube does not advance easily, redirect it or withdraw and reinsert.

Advanced Airway Management:

Combitube: Esophageal Tracheal Double Lumen Airway (cont.)

F. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures.
G. Inflate line 1, blue pilot balloon leading to the pharyngeal cuff, with 100 ml of air using the 140 ml (cc) syringe. (This may cause the Combitube to move slightly from the patient’s mouth.) (See Illustration B)

H. Inflate line 2, white pilot balloon leading to the distal cuff, with approximately 15 ml of air using the 20 ml (cc) syringe.

I. Begin ventilation through the longer blue connecting tube. If auscultation of breath sounds is positive and auscultation of gastric insufflation is negative, continue ventilation. (If possible confirm by observing chest expansion.) (See Illustration C) Under this usage condition, the second clear connecting tube may be used for the removal of gastric fluids with the suction catheter provided in the kit.

J. IF NECESSARY, if auscultation of breath sounds is negative, and gastric insufflation is positive, immediately begin ventilation through the shorter clear connecting tube. Confirm tracheal ventilation by auscultation of breath sounds and absence of gastric insufflation. (See Illustration D)

Do NOT remove the Combitube airway in the field unless the patient’s gag reflex returns or the patient has been endotracheally intubated first.

Advanced Airway Management:
Cricothyroid Puncture/Trans-Tracheal Ventilation (CTP/TTV)

Description:

CTP/TTV is an emergency procedure involving puncturing the cricothyroid membrane to access the trachea for ventilation purposes (Only performed with On-Line Medical Control authorization).

Indications:

1. CTP/TTV is indicated for relief of life-threatening partial upper airway obstruction in situations in which manual maneuvers to establish an airway and attempts at ventilation have failed, and endotracheal intubation is not feasible. Such circumstances might include the patient with severe laryngeal edema, or facial and upper laryngeal trauma. This procedure may also be useful in the patient whose upper airway is partially obstructed by a foreign body that cannot be extricated with direct laryngoscopy techniques.

Contraindications:

A. CTP/TTV should not be performed on infants and children.

Precautions:

A. This procedure is not without considerable hazards. The cricothyroid membrane must be correctly identified to prevent uncontrollable bleeding and possible damage to surrounding structures when the puncture is made.

Side Effects:

A. The only side effect when this procedure is performed properly might be a high PCO₂ level in the blood due to passive exhalation.

Adverse Reactions:

A. Should air escape out of the trachea through the hole created by the catheter, subcutaneous or mediastinal emphysema could develop. Also, if bleeding is severe, this could hamper proper gas diffusion in the lungs, as with pulmonary edema.
Technique:

A. The laryngeal framework is made up of the thyroid cartilage and cricoid cartilage. The shield-like thyroid cartilage is the prominent "Adam's apple" that is often seen in men. At the superior aspect of the shield is a prominent notch that is easily palpable through the skin. This notch is the only reliable landmark in the neck. Attempting to find the thyroid cartilage in women or in people with short, fat necks is difficult if this notch is not sought, because the hyoid bone or the cricoid cartilage may be easily be misidentified as the thyroid cartilage with disastrous surgical results. Once the thyroid cartilage is identified, the airway is followed caudally by palpation until the first complete ring is found. This is the cricoid ring, the only circumferential ring in the airway. This cartilage is shaped like a high school class ring with the shield located posteriorly. The membrane connecting the cartilages is the cricothyroid membrane.

B. With continued attempts at ventilation and oxygenation, the cricothyroid membrane is punctured by the cannula firmly attached to a 5 cc syringe filled with 1-2 cc of saline. 2 ml of 2% Lidocaine can be used instead of saline, to produce local anesthesia of the mucosa in the area of the distal port of the cannula.

C. The cannula is directed downward, with continual aspiration to demonstrate entry into the larynx, identified when bubbles of air are readily aspirated. At this point, if Lidocaine is contained in the syringe, it can be injected to provide some anesthesia and prevent the coughing that sometimes occurs in those patients who are somewhat responsive.

D. On entry into the larynx, the cannula is slid off the needle trocar and is held in place while the TTV device is connected to the proximal port of the cannula.

E. The patient is immediately ventilated using 1-second bursts of oxygen from the 50-psi manual source. The rate used is at least 20 per minute (i.e., an inspiratory/expiratory ratio of 1:2).

F. Tape and 4 X 4s are used to fasten the cannula firmly. Firm pressure at the site of insertion can reduce the small amount of subcutaneous emphysema that usually occurs with this technique.

G. Auscultate chest for adequate ventilations.

Advanced Airway Management:
Clinical Definitions

Oklahoma EMS Protocols

Cricothyroid Puncture/Trans-Tracheal Ventilation (CTP/TTV)(cont.)

Basic anatomy. Note that the notch of the thyroid cartilage is the most consistently identifiable structure in the neck.
Clinical Definitions

It is necessary to make a differentiation between neonatal, infant and adult patients to select appropriate protocols.

A. Neonate:

The difference between neonates and infants, for the purposes of these protocols, is based on age. A neonate is in a physiological transition from mechanisms used in utero to those that are used after delivery and severance of the umbilical cord. Thus, a patient less than six weeks old will be considered as a neonate.

B. Infant:

Infants have functional differences from older children that relate to their developing physiology and their poorly developed intellect. Infant’s ability to communicate and understand is limited. This is a distinction based on age, not size. A patient less than one (1) year of age will be considered as an infant.

C. Pediatric and Adult:

The term "pediatric" is used in these protocols as a collective term, including neonates, infants, children and adolescents. Any patient less than 18 years old is considered pediatric, from a legal standpoint (except emancipated minor, pregnant minor or married minor). The legal standpoint must be considered in decisions about patient rights in regard to treatment refusals, choice of hospital, etc.

For medical purposes, differences between neonates, infants and children may appear in protocols such as dysrhythmia and arrest protocols. Without specific notations, all these groups are treated similarly. Age in these young patients may still be an important factor in the history, influencing the probability for accidental ingestion of poisons or the occurrence of certain types of accidents.

A more subtle distinction, from a medical perspective, is made between adolescents and adults. Adolescents are nearly equal physiologically to adults, aside from age and size. Most significantly, drug dosages for adults assume a body size between 50 and 200 kg (100 - 400 lbs.). From a medication dosage standpoint, pediatric patients weigh less than 50 kg (100 lbs).

Reference:

### TABLE II - 1

**PEDIATRIC TRAUMA SCORE**

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<thead>
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<th>Score</th>
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<th>+1</th>
<th>-1</th>
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<td>10-20 kg</td>
<td>&lt; 10 kg</td>
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<td>Airway</td>
<td>Normal</td>
<td>Maintainable without invasive procedures</td>
<td>Requires invasive procedures</td>
<td></td>
</tr>
<tr>
<td>CNS</td>
<td>Alert, no history of loss of consciousness</td>
<td>Responds to verbal or painful stimuli</td>
<td>Unresponsive</td>
<td></td>
</tr>
<tr>
<td>Systolic BP</td>
<td>Pulse at wrist &gt; 90 mm Hg</td>
<td>Carotid or femoral pulse palpable 50-90 mm Hg</td>
<td>No palpable pulse</td>
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</tr>
<tr>
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<td>Minor</td>
<td>Major/penetrating</td>
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<tr>
<td></td>
<td>None</td>
<td>Closed fracture</td>
<td>Open or multiple fractures</td>
<td></td>
</tr>
</tbody>
</table>

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**Glucose Testing**

**Indications:**
A. In patients with altered mental status or unconsciousness where hypoglycemia is suspected.

**Technique:**

A. Assemble items need to obtain blood sample
B. Obtain blood sample through venipuncture or capillary puncture
C. Perform glucose test in accordance with procedure manual for the device being used to measure blood glucose.
Endotracheal Drug Administration

Rationale:
In critical situations requiring pharmacologic intervention, intravenous access may be difficult to achieve. Research beginning in the 1960's has revealed that endotracheal administration of certain drugs provides adequate systemic absorption to achieve the desired effects. This is made possible by the large absorptive surface of the distal bronchial tree and the proximity of capillary beds to that area. Absorption is not as effective in the proximal bronchial tree; therefore, consideration must be given to methods that deliver the drug most distally. Because endotracheal intubation is one of the first interventions in many critically ill patients, the endotracheal route of drug delivery is often available long before venous access is obtained. Optimal drug doses have not been determined; in most cases, drugs are given in doses two times the intravenous dose.

Drugs Available for Endotracheal Use:
1. Lidocaine
2. Epinephrine
3. Atropine
4. Narcan

Drug Dosage:
A. Refer to drug summaries and protocols for individual drug doses.

Method of Administration:
A. Hyperventilate the patient.

B. Inject above solution into ET tube, as deeply as possible. If CPR is in progress, stop chest compressions during injection. Momentarily occlude ET tube with finger while reattaching oxygen source to prevent medication from being expelled by residual air in lungs.

C. Follow injection with 3 to 5 bagged breaths to further disperse drug distally. Resume CPR. (Entire process should take less than 10 seconds.)

D. Total volume of all endotracheal medications should not exceed a maximum of 1 ml per kg.

E. Adult: Use a volume of approximately 10 ml of each drug administration.

F. Pediatric: Each medication should be administered in a minimum volume of 2 ml.

G. Mix volume of medication with additional normal saline to reach suggested volumes.

Endotracheal Drug Administration (cont.)
Indications:

1. **Endotracheal bolus drug administration** is indicated for certain drugs during cardiopulmonary arrest or when intravenous access is not available.

Contraindications:

A. There are no specific contraindications to administering drugs via an endotracheal tube. However, paramedics must remember the four medications listed above that can be given ETT without detriment to the patient.

Precautions:

A. Only the drugs listed above should be given via the endotracheal route. Other medications may either not be absorbed adequately or may actually damage the pulmonary mucosa.

B. Blood, emesis, or secretions in the airway may impair delivery and absorption of the drug. The patient should be suctioned prior to drug administration, if needed.

C. Care should be taken, especially in pediatric patients, not to bag the patient overly vigorously to disperse the medication. Such bagging may create barotrauma such as pneumothorax.

D. All intubated patients should have their head and neck immobilized in a neutral position after confirmation of proper ET tube placement in a manner similar to immobilization of suspected neck injuries. The head should be immobilized in place on an appropriate device and the neck secured in a fixed position via a cervical collar or other appropriate means. Reconfirmation of proper ET tube placement should occur after head/neck immobilization to ensure the tip of tube was not displaced during immobilization procedures.
Background:

External pacers were actually developed many years ago, but the early models were not very effective and caused excessive pain. Transvenous pacers (where a pacer wire is threaded through central veins into the right ventricle) have been available for some time, and are most effective. However, placement of a transvenous pacer is often time-consuming and difficult, as well as invasive, with several potential complications. Transthoracic pacers (electrode needle inserted directly through the chest wall into the heart) are also effective, but placement is just as invasive and difficult as the transvenous route. Neither type is suitable for field use. New developments in external pacing technology have produced several pacing units that are safe, effective, and easy to use. With practice, these units can be applied and pacing begun within less than a minute.

Failure of the conduction system:

Any portion of the specialized conduction tissue in the heart may fail. If the SA node fails to generate an impulse, conduction tissue farther down the line will initiate one. Generally speaking, the farther down the conduction system the failure occurs, the slower the heart rate.

There are several reasons why the conduction system may fail including coronary artery disease, acute myocardial infarction, drug or toxin overdose, fibrosis of the conduction system, acute renal failure, trauma or hypoxia. Conduction of impulses may not occur in areas of damaged conductive tissue and lower pacemakers may need to take over. This may result in a slow heart rate (bradycardia) or in extreme cases cardiac standstill (asystole).

Indications:

External pacing can be used in the following settings:

1. Symptomatic bradycardia with pulse unresponsive to pharmacologic therapy: In patients with symptoms (significant hypotension, altered mentation, chest pain) due to any form of bradycardia, treatment should include supplemental oxygen, ventilatory support as needed, establishment of IV access, and administration of Atropine (0.5-1.0 mg every 5 minutes until desired response or total of 0.04 mg/kg given). The pacer should be placed on the patient but not turned on immediately. Pacing should be considered if the patient does not respond to Atropine, if IV access cannot be obtained, or if symptoms are so severe that waiting for a maximal response to Atropine would be dangerous. In patients with severe bradycardia but no symptoms, the external pacer should be put in place, but not turned on unless the patient's status deteriorates.

External Cardiac Pacing (cont.)
2. Cardiac Arrest:

A. Asystole.

*If the onset of asystole is witnessed by the paramedic (e.g. postdefibrillation appearance of asystole) initiate transcutaneous pacing. If pacing is unsuccessful, after approximately 30 seconds, return to conventional therapy.*

*Pacing may be reattempted after 5 minutes of resuscitative efforts, not to exceed 3 attempts at obtaining effective mechanical capture. Limit CPR interruptions to 30 seconds.*

**Contraindications:**

Pacing should NOT be started in the following patients:

A. Traumatic cardiac arrest patients (except electrocutions).

B. Hypothermic patients in cardiac arrest.

C. Bradycardia in the severe hypothermic patient.

**NOTE:** If bradycardia and no pulse, this should be treated as PEA.
A. Check for a pulse.
B. The pacer will make chest and back muscles twitch at the same rate as the heart, so palpation of the left carotid or left femoral artery can be misleading. Check for a right carotid, right femoral or either brachial pulses.
C. During pacing the patient should continually monitored by ECG, under constant direct observation, and be frequently assessed for mechanical and electrical capture.
D. Electrical capture occurs when a pacing stimulus leads to depolarization of the ventricles and is confirmed by ECG changes displayed on the monitor. It is usually represented by a widening of the QRS complex and a tall, broad T wave which is typical of a complex originating in the ventricle. The deflection of the captured complex may be positive or negative. It resembles the ventricular capture seen in permanent or temporary pacing.
E. Mechanical capture is the contraction of the myocardium and is evidenced by presence of a pulse and signs of improved cardiac output. Both electrical and mechanical capture must occur to benefit the patient, (i.e., rise in blood pressure, improved level of consciousness, improved skin color and temperature).
F. Many patients achieve capture at 50 to 90 mA, although individual thresholds vary markedly. Recent thoracic surgery, pericardial effusion, pericardial tamponade, hypoxia, acidosis and other physiological variables may lead to high capture thresholds. Capture thresholds are not related to body surface area or weight. The most common error in pacing is failure to advance the current high enough to achieve capture. Current must be increased until electrical capture is identified.

Troubleshooting:

Common pacing problems such as discomfort, failure to capture, undersensing, oversensing and a noisy ECG signal should be promptly addressed. Effective troubleshooting is important for successful delivery of pacing therapy.

Discomfort:

A. Many patients describe the sensation of pacing as a tingle, twitch, tap, or thud, ranging from noticeable to intolerable. A simple explanation of the way in which pacing works and why it is necessary may help the conscious patient and family cope with the procedure. Research indicates that without sedation and analgesia, most subjects have difficulty tolerating pacing when current is above 50 mA. Unfortunately, capture thresholds are generally above this level; therefore, analgesia and sedation should be routinely considered for conscious patients.
A. The most common reason for not obtaining capture is failure to increase the current sufficiently to electrically stimulate the heart. Capture thresholds vary markedly among individuals and may change over time. Current should be increased as much as needed for electrical capture.

B. Moving the pacing electrode to another place on the pericardium may facilitate capture. Determine if underlying pathophysiology, such as metabolic acidosis or hypoxia, is preventing cardiac response to pacing. The pacemaker, electrodes and cables need to be examined for proper placement and function. Attempting another form of temporary pacing, if available, may be necessary.

**Undersensing:**

A. Sensing is the ability of the demand pacemaker to identify electrical activity which stems from the myocardium. Undersensing occurs when the pacemaker does not sense intrinsic activity, and delivers a pace pulse (current).

B. To correct undersensing, increase the ECG size setting on the pacemaker. Other troubleshooting measures include selecting a different lead or repositioning the ECG electrodes. These troubleshooting measures focus on changing the appearance of the ECG signal to the monitor in order for proper sensing to occur. Skin preparation may need to be repeated and new ECG electrodes applied.

**Oversensing:**

A. Oversensing is inappropriate inhibition of a demand pacemaker due to detection of signals other than R waves, such as muscle artifact or T waves. When oversensing occurs the pacemaker will not maintain the set rate. The actual pace rate will lag behind the set pace rate. This normally can be corrected by decreasing the ECG size. If oversensing persists, change to a different ECG lead or reposition the ECG electrodes.

**Noisy ECG signal:**

A. If the ECG signal is noisy, skin preparation measures may need to be evaluated and corrected. The ECG electrodes may need to be moved farther away from the pacing electrodes, moving the sensitive ECG pick-up away from the source of the current. Finally, selecting another ECG lead may produce a clearer trace. ECG signal noise may also be caused from electromagnetic interference, which may result from close proximity to equipment such as diathermy, radios, or cellular phones. In extreme cases electromagnetic interference can disable a pacemaker. It is important to keep distance between patients and sources of electromagnetic interference.

**External Cardiac Pacing (cont.)**

**Summary of Noninvasive Pacing:**
The typical patient who benefits from noninvasive pacing is one with a primary conduction disturbance or transient disorder such as a postcardioversion bradycardia or bradycardia secondary to drug toxicity. Early intervention is key.

Pacing is less likely to benefit patients who have been in prolonged cardiac arrest or have extensive myocardial damage or cardiac trauma. Noninvasive pacing will not convert rhythms such as ventricular fibrillation, atrial fibrillation, or atrial flutter.

Noninvasive pacing is a valuable therapy in emergency cardiac care. Noninvasive pacing allows rapid initiation of emergency pacing and “buys time” to stabilize the patient and plan further care.

Infectious Disease  (Move this section to the front)

In order to make this policy effective, it is imperative to become familiar with the signs and symptoms of contagious disease, and the procedures in handling them.
The application of aseptic practices in the field will assist in preventing additional complications in the compromised patient as well as protect you and those you treat later.

A. Signs and Symptoms of:

1. AIDS
   a) Fever
   b) Night sweats
   c) Weight loss
   d) Enlarged lymph nodes
   e) Chronic diarrhea
   f) Malaise

2. HEPATITIS
   (A, B, NON-A/NON-B)
   a) Fever
   b) Malaise
   c) Nausea and vomiting
   d) Loss of appetite
   e) Dark urine - light stools
   f) Jaundice
   g) Joint pain (Hepatitis B)
   h) Rash (Hepatitis B)

3. TUBERCULOSIS (TB)
   a) Weight loss
   b) Persistent and productive cough
   c) Fever
   d) Night sweats
   e) Hemoptysis

Infectious Disease (cont.)

4. MENINGITIS (Neisseria meningitides)
   a) Fever
   b) Vomiting
Oklahoma State EMS Protocols

c) Headache
d) Stiff neck - not common in children
e) Altered consciousness – confusion
f) Rash

5. In general, beware of draining open sores and bodily discharges (vomitus, fecal matter, urine, blood).

B. Any patient having an infectious disease, or suspected of having an infectious disease will be handled in the following manner:

1. Personnel will use eye protection, mask, gown, and latex gloves.

2. Open sores, i.e. staph infection, will be covered both proximal and distal to the site, and taped down.

3. Intravenous infusions will be started with gloves. (Should already be on).

C. Following transport of a patient who might have a communicable disease, additional measures should include the following:

1. Strip and place all disposables in a red plastic bag and dispose of the bag by following the policies on biohazardous waste.

2. Air the vehicle with all doors and windows open for five (5) minutes if unit was used for transport.

3. Wipe down all areas of patient contact with 1 1/2 cups of bleach (hypochlorite solution) in one (1) gallon of water. Use gloves. (Each service is encouraged to develop agency specific protocols regarding use of cleaning solutions)

Infectious Disease (cont.)

D. Infection Control Procedure for Medical Equipment:

1. Suction Equipment

   a) Wear gloves.
b) All disposable parts of the set-up should be discarded in a red bag. 

c) The latex tubing and the suction bottle should be washed as follows:

i) Wash with soap and water. Use a small brush, if necessary.

ii) Rinse thoroughly.

iii) Dip in a basin containing bleach (hydrochloride solution) and allow parts to be covered with the solution for 10 minutes.

iv) Rinse thoroughly (sufficiently to rid the parts of chloride smell).

v) Allow to air dry.

vi) Reassemble.

E. Needle Punctures

1. Personnel who are punctured by a contaminated needle, regardless of whether the patient has a contagious disease or not, should notify the appropriate administrator on-call. A needle should be considered contaminated if it came in contact with a patient.

2. The Risk Manager will contact the receiving facility and check about the patient’s infectious disease status.

3. If an infectious disease is confirmed, then follow up care is indicated subject to departmental policy.

Each agency should have a plan for the accidental exposure employees may encounter. OSHA and the Oklahoma DOL require these plans as well as a plan regarding how “sharps” are handled. Consult those agencies if you have questions.

Intraosseous Infusion

Rationale:

Even with the relatively recent addition of the endotracheal route for administration of some resuscitative drugs, the ability to gain access to the circulatory system for drug and volume administration often still remains essential. Intraosseous infusion is a technique which has been studied since the 1940’s, but which has become available for prehospital use only in the last few years. Although the technique was first used in adults, its present application appears to be mostly
in the treatment of critically ill or injured children. Prehospital use in adults is undergoing evaluation.

In children, the bone marrow is a very vascular space, with rapid drainage into the central circulation. In children less than 6 years of age, it is quickly accessible with the appropriate equipment and does not collapse during shock as does the venous system. Crystalloid, blood, antibiotics, and the classic resuscitative drugs have all been delivered successfully via this route. To date, no drug has been specifically contraindicated for use by intraosseous infusion. The technique is not without limitations, however. Because it is a painful technique, it should be used only in unconscious patients. All intraosseous lines should be replaced within 24 hours of insertion to avoid complications such as osteomyelitis. Because of these factors and the fact that IV infusion involves growing bone that could, at least theoretically, be permanently affected if complications arise, intraosseous infusion should only be used when other methods of venous access are exhausted or not immediately available. Cardiopulmonary arrest and severe shock are the most frequently encountered indications for use of IO.

**Indications:**

1. Child less than 6 years of age AND
2. Child unconscious AND
3. There is an urgent need to administer IV fluids or drugs that cannot be given effectively by another route AND
4. Peripheral venous access is not obtainable after 2 unsuccessful attempts or 2 minutes.
5. NOTE: INTRAOSSEOUS INFUSION IS A LEVEL II INTERVENTION AND MUST BE AUTHORIZED BY MEDICAL CONTROL BEFORE BEING ATTEMPTED, EXCEPT IN SITUATIONS OF CARDIAC ARREST.

**Contraindications:**

A. Intraosseous lines should not be started through obviously infected skin or tissues.

B. Intraosseous lines should not be started in extremities with bone or crush injuries because of fluid and/or drug infiltration through disrupted bone or venous circulation.

C. Intraosseous lines are never to be attempted in a responsive child.

D. Insertion of an intraosseous line should not delay transport in a load-and-go situation.

**Intraosseous Infusion (cont.)**

**Sites for Insertion:**

A. Proximal Tibia:

1. Site of first choice.
2. Anterior medial surface of the tibia 2 cm below the tibial tuberosity.

B. Distal Tibia:
1. Site of second choice.
2. Approximately 0.5 to 1 cm proximal to the medial malleolus.

NOTE:

If the bony cortex has been penetrated during a failed insertion attempt, no further attempts should be made on that bone.

Technique:

A. Assemble the following materials:

1. Bone Marrow Aspiration Needle
   a) Size 18 G. for infants up to 6 months of age.
   b) Size 15 G. for children from 6 months to 6 years of age.

2. Alcohol and/or betadine prep.

3. Sterile gauze and tape for dressing.

4. Arm board/splint for stabilization of extremity.

5. 5 or 10 cc syringe containing 5 cc of NS flush solution.

B. Clean the insertion site with alcohol and/or betadine.

C. Immobilize the extremity.

D. Set the phalange on the needle to the estimated depth of penetration to marrow (generally between 1/4 and 1/2 inch).

Intraosseous Infusion (cont.)

E. Insert the needle and obturator into the bone at the selected site, using a back and forth twisting motion. If using the proximal tibia site, angle the needle slightly inferiorly, away from the knee. If using the distal tibial site, angle the needle slightly superiorly, away from the ankle. When the needle reaches the marrow space, a "pop" is usually felt. DO NOT ROCK THE NEEDLE.

F. When the "pop", or at least a decrease in resistance is felt, remove the obturator and attempt to aspirate marrow through the needle with the syringe containing flush solution. If unable to aspirate marrow, the needle may be plugged or malpositioned. Try rotating the
needle to reorient the bevel and aspirate again. If still unsuccessful, try aspirating with a larger syringe. If unsuccessful then, reinsert the obturator and either pull back or advance very slightly and reaspirate. If unable to obtain marrow by then, pull the needle out and try another site on a different bone. The properly placed needle will stand upright without support.

G. Flush needle with at least 5 cc of NS. If line flushes easily without signs of significant subcutaneous infiltration, attach IV line. If line flushes with difficulty, try repeating aspiration to clear out possible clots, rotating the needle bevel, or repositioning the needle.

H. Secure the needle with gauze and tape but maintain surveillance of the site for signs of infiltration. Should significant infiltration occur, remove the needle and place pressure at the puncture site.

I. Drug boluses should be flushed into the circulation with 1 to 2 cc of flush for ages less than 1 year, 5 cc for ages greater than 1 year. Hypertonic solutions such as dextrose and Sodium Bicarbonate should be diluted and pushed slowly, as with peripheral IV administration.

**Potential Complications:**

A. Localized bleeding and infiltration of fluid and drugs into surrounding tissues.

B. Osteomyelitis or sepsis.

C. Injury to the growth plate of the bone if placed incorrectly.

D. Tibial fracture in small newborns.

E. Fat embolus. (Much less fat is present in a child's bone marrow than in an adult's.)

F. Extravasation of fluid and drugs into popliteal space if needle tip perforates through posterior cortex of tibia, causing compression of popliteal vessels or tibial nerve.

G. Fluid overload if volume administered and patient is not carefully monitored.

*Intraosseous Infusion (cont.)*
A schematic diagram illustrating the venous drainage from the marrow of a long bone with an intramedullary needle in place.
Medication Administration

**Indications:**

1. Illness or injury that requires medication to improve or maintain the patient's condition.

**Precautions:**

A. Certain medications can be administered via one route only, others via several. If you are uncertain about the drug you are giving - check with Medical Control or medical reference guides.

B. Make certain that the medication you want to give is the one in your hand. Always double check medication and dose before administration.

**Technique:**

A. Use syringe just large enough to hold appropriate quantity of medication (or use prefilled syringe).

B. Attach large gauge needle (18-21 gauge) to syringe.

C. Break ampule or cleanse multi-dose vial with alcohol (the latter is less desirable for field use).

D. Using sterile technique, draw medication into syringe.

E. Change needles to small gauge (21 g or smaller) for IM, SQ, or SL.

**Intravenous Injection Technique:**

A. Use needle appropriate for viscosity of fluid injected. Glucose requires larger gauge needle (18g); for most other medications, 20 g or smaller is appropriate.

B. Cleanse IV tubing injection site with alcohol.

C. Check medication in hand - confirm medication, dose, and amount.

D. Eject air from syringe.

E. Insert needle into injection site.

F. Pinch IV tubing closed between bottle and needle.

G. Inject at rate slow enough to stop if any untoward effects develop.
H. Withdraw needle and release tubing to restore flow.
I. Record medication given, dose, amount, and time.

**Endotracheal Injection Technique:**
A. Drugs that may be given ET are:
   1. Lidocaine
   2. Epinephrine
   3. Atropine
   4. Narcan
B. The dose of endotracheal medications should be two times the IV dose. The endotracheal dose should be considered equivalent to the IV dose when calculating the total dose given.
C. Ventilate fully and rapidly 4-5 times prior to disconnecting the bag from the endotracheal tube.
D. Check medication in hand. Confirm medication, dose, and amount.
E. Administer the appropriate dose into the endotracheal tube. Dilute with NS so that the drug administered is in a total volume consistent with Endotracheal Drug Administration Protocol.
F. Connect the bag and ventilate rapidly an additional 4-5 times.
G. Record medication given, dose, amount, and time.

**Sublingual Injection Technique:**
A. Use 25 g needle 5/8” length.
B. Check medication in hand - confirm medication, dose and amount.
C. Eject air from syringe.
D. Expose injection site by lifting tongue.
E. Insert needle posteriorly in mucosa at base of tongue, where tongue meets floor of mouth.
F. Inject medication into site. The maximum volume used should be 2 ml.

*Medication Administration (cont.)*
Sublingual Injection Technique (cont.)

G. Remove needle and watch for excessive bleeding.

H. Record medication given, dose, amount, and time.

Intramuscular Injection Technique:

A. Use long 21-22-gauge needle (1-1.5”).

B. Check medication in hand - confirm medication, dose and amount.

C. Select injection site (usually deltoid, but may be upper outer quadrant of gluteus if more convenient).

D. Cleanse site.

E. Eject air from syringe.

F. Stretch skin over injection site.

G. Insert needle through skin into muscle, aspirate and, if no blood return, inject medication.

H. Remove needle and put pressure over injection site with sterile swab.

I. Record medication given, dose, amount, and time.

Subcutaneous Injection Technique:

A. Use 25 g needle 5/8” length for most subcutaneous injections.

B. Check medication in hand - confirm medication, dose, and amount.

C. Select injection site (usually just distal and posterior to deltoid).

D. Cleanse site.

E. Eject air from syringe.

F. Insert needle tangentially, just underneath the skin.
Subcutaneous Injection Technique (cont.):

G. Aspirate and, if there is no blood return, inject medication.

H. Remove needle and put pressure over injection site with sterile swab.

I. Record medication given, dose, amount, and time.

Complications:

A. Local extravasation during IV medication injection, particularly with calcium or dextrose, may cause tissue necrosis. Watch carefully and be ready to stop injection immediately.

B. Allergic and anaphylactic reactions occur more rapidly with IV injections, but may occur with medication administered by any route.

C. Too rapid IV injection can cause untoward side effects; for example, Diazepam can cause apnea, and Epinephrine can cause severe hypertension and malignant arrhythmias.

D. IM or SQ injection causes uncertain medication levels over time. Later treatment may be jeopardized because of slow release and late effects of medication given hours before.

Rectal Administration Technique/Use of Diastat rectal delivery system:

A. Put person on their side where they can’t fall.
B. Push up with thumb and pull to remove protective cover from syringe.
C. Lubricate rectal tip with lubricating jelly.
D. Turn person on side facing you.
E. Bend upper leg forward to expose rectum.
F. Separate buttocks to expose rectum.
G. Gently insert syringe tip into rectum.
H. Slowly count to 3 while gently pushing plunger in until it stops.
I. Slowly count to 3 while hold buttocks together to prevent leakage
J. Note time and amount given.
K. Continue to evaluate status of patient.

Medication Administration (cont.)

Special Notes:
A. Several medications are carried in different concentrations in an emergency medical kit. Be sure you are using the correct concentration! Epinephrine 1:10,000 and 1:1,000 are the most common to confuse.

B. Carry pediatric drugs in separate areas of the drug case.

C. Sublingual injection provides access to the central veins via a venous plexus in the base of the tongue. Onset of medication effect is almost as rapid as with IV injection.

D. Endotracheal medication administration provides onset of drug effect almost as rapid as with IV administration.

Nebulized Bronchodilators

A. Proper technique in the administration of Nebulized Bronchodilators is crucial to its successful delivery into the lower airways.
If possible, an IV line and EKG should be placed if clinically indicated. In cooperative patients, determine peak flow before and after treatment.

B. Use the following procedure to administer the drug:

1. Place the bronchodilator, (Albuterol/Atrovent solution), in the reservoir well of the nebulizer.

2. Assemble the unit including the mouthpiece, and oxygen supply tubing.

3. Ensure that the unit is held upright to facilitate proper updraft and nebulization of the medication.

4. Connect to oxygen source and set flow at about 6 liters per minute until "vapor" is coming out of the unit.

5. Have the patient sit upright and close their lips around the mouthpiece. Have them breathe the medication in and out as slowly and as deeply as possible. Encourage the patient to keep their lips closed around the mouthpiece.

6. To assist in effectively administering the drug, the patient should be coached in deep smooth slow breaths.

7. If the patient is extremely hypoxic, consider intubation followed by nebulization of Albuterol through the endotracheal tube.

8. Monitor the patient, ECG, pulse oximetry, and vital signs for medication effect.

C. In children unable to use mouthpiece, administer by mask or by removing mouthpiece from tubing.

Neonatal CPR

A. Care of the infant delivered outside of the hospital should be directed at resuscitation of the distressed neonate and maintaining proper body temperature in all cases. Emphasis should
be placed on rapid transport of the distressed infant to the hospital. The misconception that an infant is merely a tiny adult should be dismissed as an outdated belief.

B. When the baby is fully delivered, lay it along your arm, and grasp it with one arm and shoulder between your fingers. Keep the baby's head dependent to aid drainage. **REMEMBER: BABIES ARE SLIPPERY!** Wipe away any blood and mucus from the nose and mouth with a sterile gauze. Then take a rubber bulb aspirator and suction mouth and both nostrils. Wrap child in a clean blanket.

C. **Principles of Resuscitation:**

1. The APGAR score is assessed 1 and 5 minutes of age for every newly delivered infant. If the score is 7 or less at 1 minute, the neonate requires resuscitation.

2. **Steps to follow during resuscitation:**

   a. Maintain body temperature. When the cord is clamped, blot the infant dry with a sterile towel and place him or her atop a clean blanket on the stretcher.

   b. Clear the airway. Gently suction the mouth, then the nose with a bulb syringe. A 15 second examination should be performed to determine the need for resuscitation. This examination should include an assessment of heart rate, respiratory effort, color, and muscular activity.

   c. Initiate breathing. If the infant is apneic or the respiratory rate is slow and irregular, administer positive pressure ventilation with a bag-valve-mask using 100% oxygen. The respiratory rate should be maintained at 40 breaths per minute with pressure applied to gently move the chest wall. In an infant who has not yet taken a breath, over 40 cm H₂O pressure may be necessary to expand the lungs. In mildly asphyxiated infants this will produce a prompt increase in heart rate and the onset of regular respirations. If both do not occur within 2 minutes, the trachea should be intubated under closely monitored conditions and assisted ventilation continued.

**Neonatal CPR (cont.)**

d. Meconium staining. Meconium staining of the amniotic fluid varies from 0.5 to 20 percent of all births. Meconium aspiration carries a 20 to 50 percent mortality rate; however, with proper management mortality can be significantly
reduced. When gross meconium is noted at the time of delivery, the following procedure should be followed:

1) After delivery of the infant's head, but before delivery of the shoulders, the mouth, pharynx, and should be thoroughly suctioned with a bulb syringe.
2) Suctioning the upper airway should be repeated as the infant is placed on the stretcher.
3) The trachea should then be visualized with a laryngoscope and the meconium aspirated by direct suctioning through an endotracheal tube. Suctioning is repeated until no more meconium is present. Do not ventilate the patient until all meconium is cleared.
4) The infant may then be ventilated with positive pressure as indicated. Failure to clear the trachea before assisted or spontaneous ventilation will disseminate meconium through airways.

### TABLE II - 18

**APGAR SCORE FOR NEWBORNS**

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>0</th>
<th>+1</th>
<th>+2</th>
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</thead>
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<tr>
<td>Heart Rate</td>
<td>Absent</td>
<td>&lt; 100 per min.</td>
<td>&gt; 100 per min.</td>
</tr>
<tr>
<td>Respirations</td>
<td>Absent</td>
<td>Slow, irregular</td>
<td>Good, crying</td>
</tr>
<tr>
<td>Muscle Tone</td>
<td>Limp</td>
<td>Some flexion</td>
<td>Active motion</td>
</tr>
<tr>
<td>Reflex</td>
<td>No response</td>
<td>Grimace</td>
<td>Cough or sneeze</td>
</tr>
<tr>
<td>Irritability</td>
<td>Blue or pale</td>
<td>Pink with blue extremities</td>
<td>Completely pink</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Oxygen Tolerance in COPD

A. It is common to find protocols that caution against the use of high concentrations of supplemental oxygen for patients with COPD (emphysema, chronic bronchitis). Such protocols may restrict supplemental oxygen for a spontaneously breathing COPD patient at 2 liters/minute by nasal cannula. The intent is to avoid inhibition of their spontaneous
respiratory efforts. However, it is desirable to minimize the length of time that any patient, including one with COPD, suffers from hypoxia. Hypoxia is life threatening. All hypoxic patients should receive supplemental oxygen as quickly and as in as high a concentration as their respiratory drive will tolerate. The clinical problem in the field is determining how much supplementary oxygen a COPD patient can safely tolerate.

B. The COPD patient regulates his spontaneous ventilation by internal measurement of the oxygen content in their blood. This is different from normal patients who use CO₂ content to drive ventilation. When a COPD patient is hypoxic, ventilation is over-stimulated. If the COPD patient has a large surplus of oxygen, as may occur with inappropriate use of high concentrations of supplemental oxygen, spontaneous ventilation decreases. An understanding of this simple physiologic control mechanism can be used to safely titrate oxygen administration with COPD patients.

C. When COPD patients have acute respiratory distress, oxygen may be given in high concentrations until the rapid respiratory rate begins to slow down towards normal. This shows that hypoxia is becoming less severe and respiratory drive is starting to return to normal. The supplemental oxygen dosage may then be reduced in a titrated manner as the respiratory rate returns to normal. This approach allows oxygenation to be restored as quickly as possible and reduces the potential harm of extended hypoxia.

Each Service is encouraged to develop agency specific protocols regarding the use of oxygen. The above protocol is only a guideline.

Peripheral IV Line Insertion

Indications:

1. Intravenous cannulation is indicated for the administration of drugs or fluids in any serious or critically ill or potentially critically ill patient.
Contraindications:

A. Although there are no true absolute contraindications, peripheral intravenous cannulation should not significantly delay scene times. Intravenous cannulation in serious trauma patients should be started while enroute to the hospital when possible.

Precautions:

A. Do not start IVs distal to a fracture site or through skin damaged with more than erythema or superficial abrasion.

B. All IVs started in the field are considered contaminated and should be changed within 6 hours of insertion.

Make certain the IV solution in hand is the correct one.

Peripheral IV Line Insertion (cont.)

Technique:

NOTE: Use universal precautions.

A. Extremity:
1. Explain the procedure to the patient when possible.
2. Connect tubing to IV solution bag.
3. Fill drip chamber one-half full by squeezing (microdrip for cardiac patients or infants, macrodrip for trauma).
4. Tear sufficient tape to anchor IV in place.
5. Apply tourniquet proximal to proposed site. Alternatively, use blood pressure cuff blown up to 40 mm Hg.
6. Scrub insertion site. (Betadine vs. alcohol is less important than vigor).
7. Hold vein in place by applying gentle traction on vein distal to point of entry.
8. Puncture the skin with the bevel of the needle upward about 0.5 to 1 cm from the vein and enter the vein from the side or from above.
9. Note blood return and advance the catheter either over or through the needle (depending on type).
10. Remove needle and connect tubing. Note: blood for laboratory work may be drawn with syringe before connecting tubing.
11. Release tourniquet.
12. Open IV tubing clamp full to check flow and placement, then slow rate to TKO or as directed.
13. Secure tubing with tape, making sure of at least one 180 degree turn in the taped tubing to be sure any traction on the tubing is not transmitted to the cannula itself.
14. Anchor with arm board or splint as needed to minimize chance of losing line with movement.
15. Recheck to be sure IV rate is as desired, and monitor.

B. External Jugular Vein:

Indication:

1. External jugular vein cannulation is indicated in a patient who requires peripheral intravenous cannulation in whom an extremity vein cannot be catheterized.

Peripheral IV Line Insertion (cont.)

Contraindications:

A. Inability to visualize the vein

B. Obscured landmarks caused by local trauma, hematoma, or subcutaneous emphysema
C. Cervical collar

1. Explain the procedure to the patient when possible.
2. Connect tubing to IV solution bag.
3. Fill drip chamber one-half full by squeezing (microdrip for cardiac patients or infants, macrodrip for trauma).
4. Tear sufficient tape to anchor IV in place.
5. Position the patient: supine, head down (this may not be necessary or desirable if congestive heart failure or respiratory distress present). Turn patient's head to opposite side from procedure. Maintain C-Spine immobilization in trauma patient.
6. Expose vein by having patient bear down if possible, and "tourniquet" vein with finger pressure just above clavicle.
7. Scrub insertion site. (Betadine vs. alcohol is less important than vigor.)
8. Align the cannula in the direction of the vein, with the point aimed toward the shoulder on the same side.
9. Puncture skin over vein first, then puncture vein itself. Use other hand to traction vein near clavicle to prevent rolling.
10. Attach syringe and aspirate if pressure in vein not sufficient to give flash-back. Advance cannula well into vein once it is penetrated. Attach IV tubing.
11. Open IV tubing clamp full to check flow and placement, then slow rate to TKO or as directed.
12. Secure tubing with tape, making sure of at least one 180 degree turn in the taped tubing to be sure any traction on the tubing is not transmitted to the cannula itself.
13. Recheck to be sure IV rate is as desired, and monitor.

Complications:

A. Pyrogenic reactions due to contaminated fluids become evident in about 30 minutes after starting the IV. Patient will develop fever, chills, nausea, vomiting, headache, backache, or general malaise. If observed, stop and remove IV immediately. Save the solution so it may be cultured.

B. Local: hematoma formation, infection, thrombosis, phlebitis. Note: The incidence of phlebitis is particularly high in the leg. Avoid use of lower extremity if possible.

C. Systemic: sepsis, catheter fragment embolus, fiber embolus from solution in IV.

Peripheral IV Line Insertion (cont.)

Special Notes:

A. Antecubital veins are useful access sites for patients in shock, but if possible, avoid areas near joints (or splint well!).

B. The point between the junction of two veins is more stable and often easier to use.
C. Start distally and, if successive attempts are necessary, you will be able to make more proximal attempts on the same vein without extravasating IV fluid.

D. Venipuncture itself is seldom morbid, but excess fluids inadvertently administered when nobody is watching can be fatal!

E. The most difficult problem with IV insertion is to know when to try and when to stop trying. If the procedure is not accomplished after two attempts or two minutes, the paramedic must consider expediting transport to the hospital, with further attempts enroute. This does not pertain to the trauma patient where rapid transport is advised with IV’s performed enroute to the hospital.

F. Renal dialysis fistulas, central lines, and IV/medication ports should not be used by paramedics for intravenous access. If the patient is critically ill or injured and peripheral or external jugular venous access is not successful, consult with On-Line Medical Control regarding the use of these specialized intravenous access sites.

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**Pneumatic Anti Shock Garment (PASG-formerly MAST)**

*The use of the PASG or MAST is controversial. Research for and against its use is well documented. Each service is expected to consult with medical direction regarding the use of this medical device. The following should only be considered a guideline for which to build service specific protocols.*

The trousers enclose the patient from the lower rib cage to the ankle. Air is then pumped into the compartments of the garment. The external air pressure is then used to constrict blood vessels. This constriction redistributes blood from those vessels to the chest, lungs, and brain. The suit acts to increase the volume in the available circulatory system.
In addition to the use of countering shock, the garment may be used as a splint and to control external bleeding. The air pressure acts in a similar manner to an air splint for fractures. The air pressure also acts in a similar manner to direct pressure to control bleeding.

**Indications**

1. When a patient presents with a systolic blood pressure of < 90mm Hg.
2. Signs and Symptoms of Hypovolemia or Hypovolemic Shock

**Contraindications**

1. Pulmonary Edema
2. Cardiogenic Shock. (hypoperfusion resulting from cardiac insufficiency)

**Precautions**

1. Pregnancy beyond the second trimester (do not inflate the abdominal section)
2. An evisceration of the abdomen (do not inflate the abdominal section)
3. Presence of an impaled object (do not inflate area with impaled object)

**Methodology for application**

1. Conduct Initial Assessment. (remember spinal precautions)
2. Provide Emergency Interventions to protect Airway, Breathing, Circulation
3. Assess for need of PASG. (consider MOI, signs and symptoms, vital signs)
4. Begin with basic interventions for Shock (oxygen, elevation of lower extremities, keep patient warm)
5. If basic interventions fail, apply PASG (There are several techniques available regarding the application of the garment. Follow local guidelines and manufactures suggestions regarding use and application)

**Complications**

1. Possibility of the garment limiting the diaphragmatic movement, resulting in dyspnea
2. Abdominal pressure may cause vomiting
3. Anaerobic Metabolism in tissue under the garment

**Deflation Procedure**

1. Generally preformed in the Hospital
2. Do not cut the suit or simply rip it off.
Restraint  Each Agency should create agency specific guidelines for working with uncooperative patients.

Indications:

1. A patient who needs to be transported for medical care, who is refusing transport or care, and who has been determined by law enforcement to be incompetent, necessitating a mental hold

Precautions:

A. Any attempt at restraint involves risk to patient and EMT or Paramedic. Do not attempt to restrain patient without adequate assistance.
B. Physical restraints are a last resort. All possible means of verbal persuasion should be attempted first.

C. A patient who is alert, oriented, aware of his condition, and capable of understanding the consequences of his refusal is entitled to refuse treatment. He may not be restrained and treated against his will.

D. If there is a significant chance of the patient vomiting (e.g., intoxicants, withdrawal states), do not restrain in supine position, but rather in lateral position to decrease risk of aspiration.

**Techniques:**

A. Obtain adequate manpower for assistance.

B. Treat the patient with respect. Tell him he is being restrained because he is unable to control himself and might injure himself or someone else.

C. Organize your help in advance. Assign at least one person to each limb. A fifth person can coordinate the procedure.

D. Have all equipment ready.

E. Utilize kerlix and sheets for restraints.

F. Explain the procedure to the patient.

G. Restrain arms and legs. Avoid body restraints as they may result in strangulation.

**Restraint (cont.)**

**Techniques (cont.):**

H. Reassure patient, remind him that you are there to help not harm.

I. Check restraints as soon as applied and every 10 minutes thereafter to ensure no injury to extremities.

J. Pad restraints as necessary.

K. Once in restraints - do not leave the patient at any time.
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L. Remove restraints only with sufficient personnel available to control patient, generally only in the hospital.

Complications:

A. Radial nerve palsy (sensory loss on hand) can result from pinching of the nerve over the wrist prominences.

B. Aspiration can occur if patient is restrained on his back and cannot protect his own airway.

C. Medical causes for combativeness, if overlooked, may result in further injury to patient or inappropriate placement. Do not forget the medical differential of altered mental states: hypoglycemia, hypoxia, stroke, hyperthermia, hypothermia, or drug ingestion.

D. Deterioration may cause your patient to "calm down", be sure you are not falsely reassured.

Special Notes:

A. Use with caution in patients with extremity injuries.

B. Written and verbal reports must completely document the necessity for the use of physical restraints.

C. Record condition of limbs before applying restraints and recheck and record neurovascular status on arrival at hospital.

Splinting: Axial

This is meant to be a guideline only. Each service is encouraged to develop agency specific guidelines for the clearance of spinal injuries in the field.

Indications:

1. Pain, swelling, or deformity of spine which may be due to fracture, dislocation, or ligamentous instability.

2. Neurologic deficit that might be due to spine injury.

3. Prevention of neurologic deficit or further deficit in patients with suspected spine injury or instability.
4. In all trauma victims who are unconscious or with impaired consciousness due to head injury or drug ingestion, to protect against damage or further damage in patients where injury to the spine cannot be ruled out by exam or history.

5. Significant mechanism of injury likely to cause impairment, i.e., Head-on collision; T-bone collision; rear-end collision, rollover collision; small vehicle crashes (ATVs); pedestrian injuries; significant fall.

**AXIAL SPLINTING PRECAUTIONS MAY BE OMITTED WHEN ALL OF THE FOLLOWING CONDITIONS APPLY:**

A. Normal neurological examination:
   1. Alert.
   2. Fully oriented to person, place, time, and situation.
   3. Normal sensory and motor function in extremities.

B. Absence of neck or spinal pain by patient report

C. Absence of neck or spinal tenderness elicited on palpation.

D. No evidence of intoxication or impairment by a drug.

E. Normal vital signs.

F. Patient’s age is greater than (>) 12.

G. Absence of any major painful injury that could distract the patient’s ability to appreciate pain.

*No history of loss of consciousness.*

I. No significant mechanism of injury.

**Splinting: Axial (cont.)**

**CERVICAL SPINE STABILIZATION WHEN APPLIED MUST INCLUDE:**

A. Long spineboard

**Cervical Collar.**

A. Approved stabilization device for lateral support. (Cervical Immobilization Device)

B. Straps across patient’s chest, abdomen, and legs to secure patient to device and prevent movement in any direction. (The strap system is less important than the actual security of the patient. Use a system that works)

C. Secure the head to the board. (Cervical Immobilization Device)
Precautions:
A. All patients with significant head trauma should be immobilized because of the potential for unrecognized coexistent neck trauma.
B. Perform and document complete neurologic exam prior to movement if at all possible. Redocument after your splinting is complete.

Cervical Splinting Technique:
Follow Manufacturers recommendations for sizing and application directions
A. Use assistant to apply in-line immobilization while completing primary survey.
B. Advise patient of procedure and purpose before and during application.
C. Immobilize the cervical spine with a rigid cervical collar, commercial immobilizer for side support, and tape.
D. Use long or short spine board to support patient as situation dictates.
E. Use straps to secure patient effectively and allow turning as a unit for airway control.
F. Instruct bystander or assistant to monitor airway and effectiveness of immobilization.

Spine Immobilization Technique:
A. Immobilize cervical spine during primary survey.
B. Complete physical exam and splint fractures prior to movement of patient when possible.
C. Document neurologic findings. Perform neurological assessment before and after performing techniques and when the patient is moved.

Splinting: Axial (cont.)
Spine Immobilization Technique (cont.):
D. In a sitting patient, use KED:
   1. Slide KED behind patient.
   2. Apply chest straps snugly.
   3. Apply thigh straps as close to the groin as possible.
   4. Use padding as needed to keep neck in cervical collar in a neutral position.
   5. Secure head to board with tape.
E. Use long board or orthopedic scoop for supine patients or sitting patients after KED applied:
   1. Logroll or lift patient as a unit to board.
2. Release leg straps if short board was used.
3. Use padding as needed behind knees to support a neutral axis under small of back, neck and knees.
4. Use blanket roll or commercial immobilizer and tape to secure neck immobilization.
5. Apply straps to secure chest, thighs, and lower legs to allow turning as a unit in case of vomiting or airway difficulty.

F. Reassess patient status, particularly airway and neurologic findings.

G. Assign assistant or volunteer to monitor airway and neck immobilization.

Complications:

A. Vomiting is common in head/spine-injured patients. Your splinting must be good enough to allow turning of the patient for airway protection.

B. Cord injury with neurologic deficit may be accompanied by neurogenic shock. Elevate foot of long board 10-12” or prop legs on blankets and secure with tape. Watch also for the more dangerous hypovolemia!

C. It is easy to miss injuries below the level of a neurological deficit. Look carefully for abdominal and chest injuries, pelvis fractures, and extremity injuries without symptoms. With loss of sensation below T-8, there will be no guarding, rebound, or tenderness to clue you to internal abdominal injuries.

Splinting: Axial (cont.)

Special Notes:

A. Pelvic fractures are difficult to diagnose in the field. Suspected pelvic injury can be immobilized by use of the long board during spine immobilization. Grossly unstable fractures may be stabilized and tamponaded with the PASG.

B. It is the patient without neurologic deficit or with only partial deficit who most needs your care and protection from further injury.
Splinting: Extremity

Indications:
1. Pain, swelling, or deformity in extremity which may be due to fracture or dislocation.
2. In an unstable extremity injury: to reduce pain; limit bleeding at the site of injury; and prevent further injury to soft tissues, blood vessels or nerves.

Precautions:
A. Critically injured trauma victims should not have transport delayed by lengthy evaluation of possible non-critical extremity injuries. Prevention of further damage may be accomplished by securing the patient to a spine board when other injuries demand prompt hospital treatment.
B. The patient with altered level of consciousness from head injury or drug influences should be carefully examined and conservatively treated, because his ability to recognize pain and injury is impaired.

C. Make sure the obvious injury is also the only one. It is particularly easy to miss fractures proximal to the most visible one.

D. In a stable patient in whom no environmental hazard exists, splinting should be done prior to moving the patient.

E. Never deliberately test for crepitus or instability.

F. Air splints are useful to control bleeding, but avoid overinflation and circulatory compromise. Temperature and altitude changes during transport will alter splint pressure.

**Extremity Splinting Technique:**

Follow the manufacturers recommendations for application of specific splints.

A. Check pulse and sensation distally prior to movement.

B. Remove bracelets, watches, or other constricting bands prior to splint application.

C. Identify and dress open wounds. Note wounds that contain exposed bone or lie near fracture sites and may communicate with a fracture.

D. Avoid sudden or unnecessary movement of fracture site to minimize pain and soft tissue damage.

**Splinting: Extremity (cont.)**

**Extremity Splinting Technique (cont.):**

E. Choose splint to immobilize joint above and below injury. Pad rigid splints to prevent pressure injury to extremity.

F. Apply gentle continuous traction to extremity and support fracture site during splinting operation.

G. Check distal pulses and sensation after splinting.

**Traction Splinting Technique (for suspected femur fractures):** This guideline refers to the application of a Hare Traction Splint. If an agency uses a different traction splint, then agency specific guidelines will need to be developed.

A. Use two persons for splint application procedure.
B. Remove sock and shoe and check for distal pulse and sensation (unless you cannot protect exposed foot from weather; then just ask patient about sensation and observe movement).

C. Identify and dress open wounds, and note exposed bone or wounds overlying fractures as potential communicating wounds.

D. Measure splint length prior to application.

E. Apply gentle axial traction with support to calf and thigh reducing angulation or open fractures as necessary for secure tractioning.

F. Position ischial pad under buttocks, up against bony prominence (ischial tuberosity). Empty pockets if needed.

G. Secure groin strap.

H. Maintain continuous traction and support fracture site throughout procedure.

I. Adjust support straps to appropriate positions under leg.

J. Apply ankle hitch and tighten traction until patient experiences improved comfort. (Movement at the fracture site will cause some pain, but if traction continues to cause increased pain, do not proceed. Splint and support leg in position of most comfort.)

K. Secure support straps after traction properly adjusted.

L. Recheck distal pulses and sensation.

Splinting: Extremity (cont.)

Complications:

A. Circulatory compromise from excessive constriction of limb.

B. Continued bleeding not visible under splint.

C. Pressure damage to skin and nerves from inadequate padding.

C. Delayed treatment of life-threatening injuries due to prolonged splinting procedures.

Managing compound or severely angulated fractures

Never let distorted or wounded extremities occupy your attention when there may be more life threatening injuries present. These dramatic injuries are easy to identify upon first encountering the patient and may be more life threatening injuries present. These dramatic injuries are easy to identify upon first encountering the patient and may be disabling, but are rarely immediately life
threatening. It is important to remember that the movement of air through the airway, the mechanics of breathing, the maintenance of circulating blood volume, and the appropriate treatment of shock always come before the splinting of any fractures. This does not mean that you have no responsibility to identify and protect extremity fractures, but rather implies that it may be more appropriate to do some splinting in the vehicle enroute to the hospital. It is never appropriate to sacrifice time immobilizing a limb to prevent disability, when that same time may be needed to save the patient’s life. Conversely, if the patient appears to be stable, extremity fractures should be splinted before moving the patient.

Proper management of fractures and dislocations will decrease the incidence of pain, disability, bleeding, and serious complications. Treatment in the prehospital setting is directed at proper immobilization of the injured part by the use of an appropriate splint. General rules for splinting are as follows:

1. Make sure you can adequately visualize the injured part. Clothing should be cut off not pulled off unless there is only an isolated injury that presents no problem with maintaining immobilization

2. Check and record distal sensation and circulation before and after splinting.

Splinting: Extremity (cont.)

3. If the extremity is severely angulated and pulses are absent, you should apply gentle traction in an attempt to straighten it. This traction should never exceed 10 pounds of pressure. If resistance is encountered, splint the extremity in the angulated position.

4. Open wounds should be covered with a sterile dressing before you apply the splint. Splints should always be applied on the side of the extremity away from open wounds to prevent pressure necrosis.

5. Use the splint that will immobilize one joint above and below the injury.

6. Pad splints well. This is particularly true if there is any skin defect or if bony prominence may press against a hard splint.

7. DO NOT attempt to push bone ends back under the skin. If you apply traction and the bone end retracts back into the wound, do not increase the amount of traction. You should not use your hands or any tools to try to pull the bone ends back out, and be sure to notify the receiving physician. Be sure to carefully pad bone ends with bandages prior to the application of splints.
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to the extremities. The healing of bone is improved if the bone ends are kept moist when transport time is prolonged.

8. When there is a life-threatening situation, injuries may be splinted as the patient is being moved. In cases where the injury is less severe, splint all injuries before moving patient.

9. If there is any doubt, splint a possible injury.

Special Notes:

A. Traction splints should only be used if the leg can be straightened easily and patient is comfortable with the traction device on. Forced application of traction device can cause increased pain and damage. If this occurs, do not use traction device, but support leg with pillows, sandbags, or other support in position of most comfort and best neurovascular status.

B. When in doubt and patient stable, splint. Do not be deceived by absence of deformity or disability. Fractured limbs often retain some ability to function.

C. Splinting body parts together can be a very effective way of immobilizing: arm-to-trunk or leg-to-leg. Padding will increase comfort. This method can be very useful in children when traction devices and pre-made splints do not fit.

Tension Pneumothorax Decompression

Indications:

1. Increasing respiratory insufficiency in a susceptible patient:
   
   A. Spontaneous pneumothorax.
   B. CPR with appearance of PEA, increased difficulty bagging patient.
   C. Sucking chest wound which has been covered completely and which has not responded to removal of the dressing.
   D. Chest trauma with suspected pneumothorax AND

2. Systolic blood pressure less than 90 mm/Hg. AND

3. Three or more of the below:
   
   A. "Air Hunger".
   B. Cyanosis.
   C. Decreased breath sounds.
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D. JVD.
E. Tracheal shift.

Precautions:

A. Be sure to understand the difference between the two types of pneumothorax. A SIMPLE pneumothorax causes some degree of respiratory distress and chest pain, and MAY be associated with decreased or absent breath sounds on the side of the collapse and with subcutaneous air if the cause is traumatic. TENSION pneumothorax is associated with progressive respiratory distress, dropping BP, "drum-like" hyperexpanded chest, distended neck veins, and general patient deterioration. Tracheal shift may be present.

B. Pneumothorax rarely presents with tension on initial assessment. Be particularly suspicious with deterioration during transport, and with patients requiring assisted ventilation.

Technique:

A. If covered sucking chest wound is present, remove the seal and allow chest pressures to equilibrate. No further treatment should be necessary.

Technique (cont.):

B. Needle decompression (angiocath only):

1. Expose the entire chest.
2. Clean area for insertion vigorously alcohol or Betadine.
3. Attach 3 ml syringe to a 14 Ga angiocath or leave angiocath open.
4. Insert 14 Ga angiocath into the pleural space by entering the chest in the second intercostal space in the mid-clavicular line. The catheter should be inserted on top of the rib so as to avoid the intercostal vessels and nerve.
5. When tension is present, plunger will blow out back of syringe, or an immediate hiss of air escaping will be heard. A second catheter may be needed with severe air leak.
6. If no hiss or evidence of tension seen, remove angiocath and reassess reason for patient deterioration.
7. If air under pressure is demonstrated, remove the needle trocar and advance the catheter.
8. Tape in place.
9. Connect to flutter valve, if time permits.
10. If patient deteriorates after needle decompression, be prepared to assist ventilation and
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continue hyperoxygenating.

Complications:

A. Creation of pneumothorax if none existed previously.

B. Pulmonary edema from reinflation of collapsed lung, particularly in spontaneous pneumothorax.

C. Laceration of lung.

D. Laceration of blood vessels: slide above rib (intercostal vessels run in groove under each rib).

E. Infection: clean rapidly but vigorously; use sterile gloves.

Special Notes:

A. Sudden onset of chest pain and shortness of breath in a normal individual may be caused by a pneumothorax (particularly in patients with chronic lung disease or asthmatics). These can also progress to a "tension" state.
Tension Pneumothorax Decompression (cont.) The Pulse Oximeter

SITE FOR CHEST DECOMPRESSION

FLUTTER VALVE FROM RUBBER GLOVE FINGER

Inhalation

Exhalation
**Tension Pneumothorax Decompression (cont.)**

**The Pulse Oximeter**

**INDICATIONS FOR USE**

**Clinical Situations in which pulse oximetry should be used:**

A. Respiratory Disorders (Asthma, COPD, Pulmonary Edema).
B. Cardiovascular Disorders (CHF, Chest Pain of any etiology).
C. Neurologic Disorders (Seizures, CVA/TIA).
D. Overdoses.
E. Trauma.
F. Patients with poor color.
G. Post-intubation or after assisting ventilation.

**Procedures to follow when using the Pulse Oximeter:**

A. Turn on the monitor.
B. Select a good probe site.
   1. Good color.
   2. Not distal to orthopedic injuries.
C. Place the probe on the patient.
D. Read the pulse rate and \( SaO_2 \) %.
E. Institute or modify treatment based on \( SaO_2 \).
F. Document the \( SaO_2 \) after any change in treatment.

**Oxygen Saturation Levels:**

A. \( SaO_2 \) Levels: 90% and above is generally acceptable in almost any patient.
B. \( SaO_2 \) Levels: Less than 90% generally indicates hypoxemia.
The Pulse Oximeter (cont.)

Precautions:

A. Pulse oximetry values may be inaccurate in hemodynamically compromised patients (shock states), carbon monoxide poisonings or smoke inhalations, and conditions that may cause methemoglobinemia or sulfhemoglobinemia. These conditions may cause false high or low readings. The paramedic must correlate the patient's clinical condition with the $\text{SaO}_2$ findings.

B. Trends prove more informative than a single reading. At least two (2) readings should be performed and documented.
Peripheral Saline Locks

Indications:

1. Intravenous maintenance with a saline lock intermittent infusion device is indicated in those patients requiring prophylactic IV access at a KVO rate or medication administration, excluding patients requiring fluid, constant drug infusion or cardiac arrests.

Procedure:

A. Assemble and prepare the equipment: catheter, Interlink injection site, syringe containing 1.0 ml 0.9% sodium chloride.

B. Explain the procedure to the patient.

C. Put on personal protective equipment and apply a tourniquet above the intended site of injection.

D. Prep the puncture site with Providine unless iodine allergy exists, then use alcohol prep.

E. Insert the catheter with the bevel of the needle facing upward.

F. Once blood return has been verified, stabilize the catheter, remove the needle and screw on the Interlink injection site.

G. Once the Interlink injection site is secured, remove the tourniquet.

H. Inject 1.0 ml 0.9% sodium chloride into the catheter.

I. Tape the catheter in place and cover the puncture site with the usual sterile dressing.

J. Dispose of needles in disposal container.

K. If the patient requires fluid administration after the insertion of the Interlink injection site, prepare and flush the IV tubing. Connect the IV tubing to the Interlink lock cannula, then insert the lock cannula with the IV tubing into the injection site. Regulate the flow rate as appropriate.

L. If the patient requires drug administration, flush the lock catheter with 0.9% sodium chloride after every intermittent intravenous medication infusion.

M. Document on patient care record the IV insertion site and catheter used.

Continuous Positive Airway Pressure (CPAP) Use of CPAP Mask

Continuous Positive Airway Pressure (CPAP) is used to deliver increased airway pressure to improve alveolar oxygen exchange.
Agencies wishing to implement CPAP equipment and protocols are encouraged to develop agency specific guidelines for the use and implementation of the CPAP equipment.

During Mask CPAP, a tight, well-fitted mask is placed over the patient’s mouth and nose. Mask CPAP treatment has been shown to be a useful adjunct in the treatment of acute cardiogenic pulmonary edema and near drownings. Mask CPAP results in early physiological improvement and reduces the need for intubation and mechanical ventilation in patients with pulmonary edema. Patients with acute pulmonary edema often benefit from CPAP support for several reasons: reduced work of breathing; reduced oxygen consumption; improved mixed venous oxygen content (possibly) decreased sympathetic tone; and increased alveolar recruitment with improved oxygenation.

Indications:

A. Mask CPAP ventilation is indicated for the treatment of impending ventilatory failure in an attempt to avoid intubation and standard mechanical ventilation. This non-invasive pressure support system seems best applied to patients whose respiratory failure is expected to quickly respond to medical therapy, as continuous mask CPAP or ventilation requires close attention. Mask CPAP for acute respiratory failure requires an alert patient capable of protecting the airway and handling secretions.

Contraindications:

A. Contraindications for the use of the CPAP mask include the inability to obtain a good mask fit.

B. Inability of the patient to cooperate with the therapy. NOTE: Intubation and standard ventilatory support is preferred for patients who require total ventilatory support, because the mask may slip and effective ventilation may cease.

Procedure:

A. Prior to initiation of the mask CPAP treatment, the patient must be informed of the purpose of the mask and cooperation ensured. It helps to inform the patient of the alternative therapy should this technique not meet the patient needs. NOTE: Despite intervention with this system, emergency intubation and mechanical ventilation may be needed.

B. The Mask CPAP System components are assembled (CPAP mask, tubing, pressure relief valve) and connected to oxygen—generally at the same flow settings as the patient is currently receiving (generally 10 to 15 liters per minute).

C. Connect the pressure tubing and pressure relief valve to the connection post.

Continuous Positive Airway Pressure (CPAP) Use of CPAP Mask (cont)

D. Turn on oxygen supply

E. Verify controls are set (FiO2).
F. Hold the mask in place as the patient adjusts to the ventilatory support. With the mask in place, the CPAP System settings are modified to optimize the patient’s ventilatory status. Adjust the connected generator to a pressure support of 10 cm of H2O.

Encourage the patient to breathe deeply.

Adjust the mask for comfort and to minimize air leak especially about the eyes.

Periodic evaluation of the patient’s status should be coupled with ongoing vital sign and pulse oximetry measurements.

**Complications:**

A. Complications of this form of therapy includes facial irritation, abrasion, or even facial necrosis; conjunctivitis due to air leak; aspiration; and gastric distention.

B. Although the pressures used are generally low, all of the complications of positive pressure ventilation may be seen with this technique.

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**Automatic Transport Ventilator**

*Agencies wishing to implement mechanical or other ventilatory support systems are encouraged to develop agency specific guidelines based on their equipment and personnel.*
**Indications:**

A. **General:** Anytime the patient’s ventilations would need to be assisted with a bag-valve mask, bag to endotracheal or combitube or appropriate adjunct.

B. **Specific:** The following protocols allow use of the paraPAC Medic™ autoventilator without prior approval of a medical control physician when indicated.

   1. General Supportive Care
   2. Trauma and Hypovolemic Supportive Care
   3. Cardiopulmonary Arrest
   4. Cardiogenic Shock
   5. Post resuscitation of patients immediately after cardiac arrest
   6. Respiratory Distress
   7. Near-Drowning

**Contraindications:**

A. Patients with suspected pneumothorax or tension pneumothorax.

B. Patients with an elevated-pulmonary-pressure syndrome, (water ascent injury)

**Technique:**

A. Determine need for assisted ventilations.

B. Establish airway and employ conventional BLS airway adjuncts and ventilatory support according to protocol.

C. Perform oral, nasal tracheal, or combitube intubation according to protocol.

D. Tube shall be secured and proper placement confirmed using a bag-valve device and conventional assessment methods.

E. Assemble components of automated-ventilator.

F. Determine proper tidal volume for patient. Use the following equation: 10 ml times lean body weight in kilograms = (equals) tidal volume (10 ml/kg) **NOTE:** All adult volumes are based on lean body weights as judged by the patient’s height and frame, not on gross weight.

G. Set desired breaths per minute on the ventilator’s control module, i.e., (12 b/m adult, 20 b/m infant).

H. Remove bag-valve device, and attach the outlet port of the ventilator assembly to the endotracheal tube.

I. Observe chest rise during the ventilation cycles. Chest rise should appear normal and symmetrical.

J. Monitor chest rise throughout the remainder of patient care, as is done normally using a bag-valve device.

K. Monitor PSI in oxygen cylinder.

**Automatic Transport Ventilator (cont.)**

**Precautions:**

A. Initial airway management and ventilation cannot and must not be compromised while setting up the ventilator.
B. If problems arise during ventilator use or if you are not sure about the adequacy of oxygenation and ventilations with the portable ventilator, then STOP and ensure oxygenation and ventilation with the usual methods.

C. Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using a bag-ventilation technique.

D. The incidence of a pneumothorax is increased in the presence of penetrating chest trauma.

E. As a general guideline, in an UNINTUBATED ADULT patient, tidal volumes of below 800 ml should NOT be provided.

F. Using a mechanical ventilation device will remove the ability to determine early changes in pulmonary compliance, such as may be detected using bag-ventilation technique.

G. Gastric distention can cause resistance to mechanical ventilation. Gastric distention should be suspected in patients with an acutely distended abdomen after difficult endotracheal intubation, especially if CPR was performed. To relieve gastric distention insert nasogastric tube immediately and apply low suction until distention is relieved. If the nasogastric tube does not relieve abdominal distention, a gastric rupture should be suspected.

Care of the Automatic Transport Ventilator:

A. Carefully inspect the complete system daily.

B. Check for:

1. Damage to hoses.
2. Contamination of any component
3. Evidence of any part damaged due to excessive force.
4. Missing parts.
5. Gas cylinder contents.

Automatic Transport Ventilator (Cont.)

5. Clean all parts as appropriate and complete the function check as follows:

Set the ventilator controls to following settings:

1. Main switch Off
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2. Frequency 12 breath per minute (bpm) detent position
3. Tidal Volume 900 ml
4. Air mix switch 100% O2
5. Relief pressure 20 cm H2O

D. Store the system in a clean dry area in its carrying case.

Capnography

Overview:

Capnography is the noninvasive measurement of the level of carbon dioxide in exhaled breath (EtCO2). It is used to assess a patient’s ventilatory status.
Capnography is the “ventilation vital sign” because of the valuable information it provides in a multitude of clinical situations. Capnographs are useful for monitoring ventilation status, warning of airway leaks and ventilator circuit disconnections, and ensuring proper endotracheal tube placement.

**Capnography is useful in the following circumstances:**

1. To provide evidence of the correct placement of the endotracheal tube. This especially helpful in a noisy environment. Capnography is used as an adjunct to conventional assessment measures by detecting the exhaled CO2 in tracheal air that is not normally found in the esophagus.
2. To assure continued tracheal intubation placement during transport and transfer of the patient to the emergency department. A sudden drop in EtCO2 reading could indicate displacement of the endotracheal tube.
3. To detect malignant hyperthermia. A massive increase in CO2 production is caused by muscle metabolism. This increase occurs early before the rise in temperature. Early detection of this is one of the most important reasons for routinely monitoring EtCO2 after ingestion of Ecstasy or other designer drugs.
4. To detect air, fat or pulmonary emboli. A massive decrease in EtCO2 occurs as a result of increased dead space.
5. To assess the effectiveness of CPR. If no effective circulation is present, CO2 may not be present in the lungs. The capnograph is not susceptible to the mechanical artifacts associated with chest compressions and the ECG monitor and chest compressions do not have to be interrupted to assess circulation.
6. To detect increasing respiratory depression and hypoventilation as a result of tiring accessory muscles, changes in LOC or sedation. EtCO2 levels will increase.
7. To detect low cardiac output conditions such as congestive heart failure or hypovolemia. EtCO2 levels will decrease since the delivery of CO2 to the alveoli depends on blood flow through the pulmonary vasculature.
8. To monitor asthma/COPD patient and responses to bronchodilator therapy. Incomplete emptying due to asthmatic bronchiolar constriction increases the slope of the plateau and rounds the peak of the capnogram. These distinctive features can be continuously monitored as an objective, quantitative measure of response to bronchodilator therapy in children and adults. Increasing CO2 retention (decreasing EtCO2) warns of a worsening of obstructive pulmonary disease.

**Capnography (cont.)**

**Indications:**

Capnography should be used on all patients with potential or actual change in metabolism, circulation, respiration, airway or breathing system function. This would include but not limited to:
1. All intubated patients
2. Patients receiving CPR
3. Patients who have received sedation or pain medication
4. Patients receiving oxygen supplementation for the following working diagnoses:
   a. Respiratory distress
   b. Chest pain
   c. Altered mental status
   d. Allergic reaction
   e. Trauma
   f. Shock
   g. Hypo/Hyperthermia

**Technique:**

A. Open the CO2 tubing connector door and connect the appropriate Microstream CO2 Filterline tubing by the turning the tubing clockwise. NOTE: Connect the tubing to the LifePak 12 first; then connect it to the patient’s airway.

B. Press ON. Adjust contrast if necessary.

C. Verify that the EtCO2 monitor display is on.

B. Connect the appropriate Microstream Filterline to the patient.

C. Display CO2 waveform in Channel 3.

When CO2 is **NOT** detected, three factors must be quickly evaluated for possible causes:

A. Loss of airway function
   1) Improper placement of endotracheal tube (esophageal placement?)
   2) Apnea

B. Loss of circulatory function
   1) Massive pulmonary embolism
   2) Cardiac arrest
   3) Exsanguination (extensive loss of blood)

C. Equipment malfunction
   1) ETT extubation
   2) ETT obstruction

**Capnography (cont.)**

**Contraindications:**

None known.

**Troubleshooting Tips for EtCO2 monitoring:**

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Cause</th>
<th>Corrective Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oklahoma EMS Protocols</td>
<td>209</td>
<td>Revised 10/02</td>
</tr>
</tbody>
</table>
## ALARM APNEA

**message appears**

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>No breath has been detected for 30 seconds since last valid breath</td>
<td>Check the patient, then ventilation equipment for leaks or disconnected tubing</td>
</tr>
</tbody>
</table>

## CO2 FILTERLINE OFF

**message appears**

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>FilterLine, or any other CO2 accessories disconnected or not securely connected to the LifePak 12 EtCO2 connector</td>
<td>Connect FilterLine, or any other CO2 accessories, to input connector or tighten connection</td>
</tr>
</tbody>
</table>

## CO2 FILTERLINE BLOCKAGE

**message appears**

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>FilterLine is twisted or clogged. The message appears after 30 seconds of unsuccessful purging Airway Adapter clogged</td>
<td>Check the FilterLine and if necessary replace it Check the Airway Adapter and necessary, replace it</td>
</tr>
</tbody>
</table>

## CO2 FILTERLINE PURGING

**message appears**

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>FilterLine tube twisted or clogged with water, or rapid altitude change occurred</td>
<td>Check the FilterLine and if necessary, untwist or reconnect it</td>
</tr>
</tbody>
</table>

## EtCO2 values erratic

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>A leak in the tubing Mechanically ventilated patient breaths spontaneously</td>
<td>Check for connection leaks and line leaks to patient and correct if necessary No action required</td>
</tr>
</tbody>
</table>

## EtCO2 values are consistently higher or lower than expected

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological cause Ventilator malfunction Improper calibration</td>
<td>Check patient Check ventilator and patient Contact qualified service personnel</td>
</tr>
</tbody>
</table>

## XXX appears in place of EtCO2 value

<table>
<thead>
<tr>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO2 module not calibrated successfully CO2 module failed</td>
<td>Contact qualified service personnel Contact qualified service personnel</td>
</tr>
</tbody>
</table>

### Nasogastric Tube Insertion

Insertion of a nasogastric tube (NG tube) is the placement of a specialized suction catheter through the nose, down the esophagus, and into the stomach to remove air or stomach contents.

**Indications:** Decompression of gastric distention in adult and pediatric patients.

**Level I order for intubated patients.**

**Level II order for other clinical conditions.**
Oklahoma State EMS Protocols

Contraindications:

A. An NG tube should NOT be inserted through the nose of a patient with severe facial trauma. The patient may have a fracture of the cribriform plate, resulting in accidental placement of the tube into the cranial cavity.
B. Suspected fracture of the basilar skull.
C. Known or suspected esophageal varices.
D. Ingestion of a caustic substance.

Adverse effects:

A. Passage of the tube into the trachea.
B. Coiling of the tube in the posterior pharynx.
C. Nasal trauma.
D. Emesis.
E. Passage of the tube into the cranial in cases of basilar skull fracture or cribriform plate fractures.

Procedure:

A. Assemble equipment.
B. Premature infants, Size 3.5 – 5 fr.
C. Infant to child, Size 8 – 10 fr.
D. Adolescents to adults, Size 12-16 fr.
E. NG Tube.
F. Water-soluble lubricant.
G. 30 ml irrigation syringe with catheter tip.
H. Tape.

Nasogastric Tube Insertion (cont.)

Prepare patient:

B. Maintain patient supine with head in neutral or slightly flexed position.
C. Measure the tube from the patient's earlobe to the tip of the nose. Then measure from the earlobe to the bottom of the xiphoid process (bottom of sternum).
D. Total these two measurements and mark the correct length of the tube with adhesive tape.
E. Lubricate 6 to 8 inches of the tube with water-soluble gel.
Oklahoma State EMS Protocols

F. Insert the tube in one of the nostrils and gently advance it toward the posterior nasopharynx. It is easiest if you direct the tube toward the patient’s ear.

G. Insert the tube through nose as far as marked length.

H. DO NOT force the tube if resistance is encountered.

I. May insert NG tube through the mouth as alternate method.

Assess for placement:

D. Visualize mouth and hypopharynx for inappropriately coiled tube – removed it if necessary.

E. Check for placement of the tube by injection 6 – 10 ml of air into the stomach while auscultating over area.

F. Tape the tube in place and connect to low suction for prompt gastric decompression.
Section IV

Pediatric Protocols
EMSC Partnership for Children

National Association of EMS Physicians

Model Pediatric Protocols

2000 Revision

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Introduction

The Need for Standardized Protocols
Our emergency medical services system is founded on the principle of delegated practice. Medical oversight establishes a certain standard of emergency patient care, which is then carried out by prehospital providers in the field.

Broadly speaking, the term medical oversight encompasses both direct and indirect facets of medical control. Direct medical control is the on-line guidance provided by designated physicians to prehospital providers during emergency calls. Indirect medical control consists of training programs, patient care protocols, and quality assurance measures that are initiated by local, regional, state, and agency medical directors or advisory boards. Throughout this document, the term Medical Direction represents all forms of medical oversight as applied by any state, region or agency.

To make a delegated system work, medical direction must ensure that all prehospital providers are equipped to meet appropriate standards of patient care. This requires education and training, treatment protocols to guide rescuers' actions in the field, and support from qualified on-line medical control physicians as needed. The responsibilities of medical direction include authorizing an accepted scope of practice for EMTs of varying skill levels; verifying that EMTs have received the necessary training to render field care swiftly and skillfully; and developing and approving protocols that delineate the proper steps in patient management.

Protocols represent an important element in furthering the quality of prehospital care. While they cannot replace sound clinical judgement, they facilitate rapid and effective treatment. They serve to standardize management actions so that prehospital providers will know how to proceed in a given patient presentation. They also provide an unambiguous gauge by which adherence to EMS practice standards may be measured.

Putting the Protocols to Use
EMS systems provide services under widely varying conditions. Current protocols therefore differ between agencies. The protocols developed and presented in this document provide a basis for medical direction to create or refine existing protocols to meet local, regional, and state needs. In this manner, the protocols set forth a standardized approach to pediatric treatment that can be employed by a wide variety of EMS systems.

The ultimate authority for prehospital patient care rests with medical direction and the state EMS agency. Each EMS jurisdiction must authorize each of these protocols prior to their use. Each EMS jurisdiction must review these protocols and further designate the following:
Oklahoma State EMS Protocols

- interventions that are considered standing orders, requiring no consultation with on-line medical control
- interventions that are considered medical control options, to be carried out only after obtaining approval from an on-line physician
- interventions that are not applicable due to local conditions, training, and resources

Because this is a highly individual determination, these model protocols do not designate these aspects of practice for any specific EMS system

In deciding which interventions should be standing orders and which will require authorization, EMS systems and medical direction should consider critical time factors. For certain lifesaving interventions, taking the time to consult an on-line medical control physician before initiating the action could have a detrimental effect on patient survival. These interventions should be designated standing orders.

Examples of such actions would include

- any measure needed to establish or maintain airway patency, including advanced airway procedures
- treatment for respiratory distress, failure or arrest
- defibrillation or cardioversion for cardiopulmonary failure or arrest
- treatment for shock
- treatment for active seizures
- treatment for anaphylaxis

In addition to standing orders for life-threatening conditions, contingency guidelines should be established to address circumstances in which an on-line medical control physician is not available.

While these protocols address both basic and advanced life support measures, they do not attempt to differentiate between the two, nor do they specify which actions are appropriate for EMS providers of varying certification levels. Proper patient care does not vary, regardless of the provider’s skills or certification. Ideally, every necessary action should be carried out as specified in the protocol. Realistically, the EMT’s skill level will limit the actions that can be provided in the field. Defining how these limitations will be applied to providers at different certification levels is up to medical direction. However, it is important to emphasize that basic life support of airway and breathing are, in most cases, the only actions necessary to deliver a pediatric patient safely to definitive care.

Protocols require constant reevaluation to ensure that they reflect advances in EMS training, medical knowledge, science, and technology. Medical direction must continually evaluate providers’ skills to ensure competency and compliance with applicable EMS standards. Implementing new protocols may necessitate that educational and training programs be updated in both initial and continuing prehospital education to ensure that providers have the necessary skills and training to carry out their responsibilities. Medical direction must maintain an ongoing commitment to keep abreast of changes in medical knowledge that may affect the protocols. It is also essential for medical direction to implement continual quality improvement efforts that may lead to further clarification or revision of the protocols and amended standards for provider training.
Protocol Development Process
To develop these protocols, the process employed by the writing team was a combination of literature based and expert consensus judgement. To start the process the writing team reviewed more than 250 representative protocols selected from a national sample, then generated a list of commonly encountered protocols and collated the individual steps associated with each.

To ensure compliance with accepted national standards, the draft protocols were compared with practices described in the EMT-Basic and EMT-Paramedic National Standard Curricula, AHA Pediatric Advanced Life Support program, AAP and AHA Neonatal Resuscitation program, ACS Advanced Trauma Life Support program, the Center for Pediatric Emergency Medicine’s Teaching Resource for Instructors in Prehospital Pediatrics, and NAEMT's Prehospital Trauma Life Support program. The published literature was also reviewed for prehospital pediatric studies that would provide additional guidance. If a point of controversy was not addressed in the prehospital literature, a search of the literature in pediatric emergency medicine was conducted and conclusions were extrapolated for applicability to the prehospital environment. Further guidance was obtained when needed from an expert consensus group representing major national professional organizations in EMSC, EMS, pediatric emergency medicine, and emergency medicine.

The resultant draft version of the protocols was mailed to representatives named by major EMS and medical professional organizations with a request for written comments. Based on the responses received, a second draft was developed.

In August 1998, a meeting was held in Washington, DC at which individuals representing the national EMS, EMSC, and medical professional organizations reviewed this second draft. Each protocol was evaluated to see if it was either supported by predominance of scientific literature or based on accepted national standards. All protocols that met one of these criteria were considered acceptable. Participants then reviewed the remaining protocols and based on consensus judgement decided which would be accepted and which would be modified to meet specific recommendations.

In addition to content decisions the group also addressed formatting and overall medical direction issues. The group determined that the protocols should be constructed so that any single protocol could be used independently. Although this strategy necessitates repeating many standard patient care steps from one protocol to the next, it serves to stress the universal importance of initial airway and breathing interventions in pediatric care and highlights the concept that many children may require only basic life support measures as delineated. Furthermore establishing stand-alone protocols greatly facilitates the selection of individual protocols from the overall document as appropriate for various systems.

The group discussed the advisability of designating which actions should be considered standing orders for each protocol, but concluded that this should be a regional decision depending on many variables, including the level of medical oversight, the training received by EMS providers at different certification levels, the clinical experience of individual EMS providers, and the frequency with which the skills are performed. The group ultimately established its recommendation that certain lifesaving procedures should be considered standing orders in all regions based on critical time factors.
involved. Additional factors governing standing orders should be determined by medical direction.

The group also discussed the advisability of designating separate BLS and ALS protocols and designating which steps applied to which EMS provider certification levels. While the Department of Transportation's National Highway and Traffic Safety Administration has established national training guidelines for Certified First Responder, EMT-Basic, EMT-Intermediate, and EMT-Paramedic, significant variations exist among EMS systems regarding the actual level of provider training, scope of practice, and certification levels for each of these designations. Therefore, the group concluded that while these protocols define the care to be provided, regional EMS systems should determine which actions fall within specific providers’ scope of practice.

Finally, the group noted that several protocols include decision points at which more than one treatment option or medication choice could be considered medically acceptable. For those protocols, all options would be listed and medical direction could select the option they would implement. Similarly, when a useful treatment option exists that might exceed providers’ capabilities, system resources or system needs in certain regions, the step is listed with the qualifier that it should be considered as permitted by medical direction.

At the conclusion of this meeting, a third draft was generated and distributed to the writing team for comments, which were incorporated into the fourth draft.

This draft was copyedited, then forwarded to the review panel and all state and territorial EMS directors. In an effort to further broaden the input into the development process and to be as inclusive as possible, the protocols were also posted on the NAEMSP web site for download with a comment form to be returned to the writing team. The web site posting was also available through links from other major EMS and EMSC web sites. The comments obtained from this draft were incorporated into the final document. In addition to review of the document, the state EMS directors were asked to suggest mechanisms for distributing the finished protocols nationally and within their individual states and territories.

These protocols are intended to represent model treatment practices. EMS agencies can rely on them to direct patient care, whether they are implemented as standing orders or as medical control options authorized by on-line physicians. In either case, the protocols should serve as a quality measure to ensure uniformity of care. The authors hope that individuals, EMS providers, and medical directors will use these protocols to help improve the care children receive in emergencies.

2000 Revision Process
Since medical knowledge is an ever evolving subject, it was decided during the initial development process that it would be necessary to create an on-going review and revision process for these protocols. The process and timeline that was chosen is that there would be a review of the protocols in September of each year to determine if there was any new research data or new peer reviewed guidelines, which might necessitate a change in the protocols. If such a change was needed, the protocols would be revised with the draft circulated for comment to the organizations involved in the original review process and then edited based on those comments. The edited draft would then be presented at the annual NAEMSP meeting, first to the Pediatric Task Force and then to the board of directors for final approval. The approved and revised
protocols would then be distributed as were the original set of protocols via the NAEMSP and EMSC NRC Web sites and via direct mailing to the State and Territorial EMS Directors. Lastly any revised protocols would be submitted to Prehospital Emergency Care for publication.

The first major revision occurred in the Fall of 2000 and was largely a reflection of the new Emergency Cardiac Care Committee guidelines released August, 2000.

Acknowledgments
This project was initially supported by the Health Resources and Services Administration, Maternal and Child Health Bureau, and the Department of Transportation, National Highway Traffic Safety Administration EMSC Partnership for Children (purchase order #97-MCHB-HO763A). The authors would like to acknowledge the valuable staff assistance and funding for this effort provided by the MCHB’s EMSC Program and by NHTSA.

It is important to note the significant effort, time, insight and knowledge brought to the original protocol process by the Project Directors of the original purchase order, Deborah Mulligan Smith, MD and Robert O’Connor, MD. Without their foresight and tireless effort this process would never have begun.

We would particularly like to thank Dr. Jean Athey, whose vision, insight, and dedication helped to initiate this effort and guide it through its development and completion. In addition, we would like to thank the members of the EMSC National Resource Center for their guidance, review, and support. In particular, we thank Dr. Jane Ball, who provided general guidance and assistance throughout the project; Dr. Renee Barrett, who assisted with the protocol review process, directed the contract, and managed administrative aspects; and Mr. Robert Waddell, who spent many hours evaluating these protocols and providing additional direction. At NAEMSP, a great deal of invaluable support was offered by leadership members of the organization, particularly past president Robert A. Swor, DO and current president Jon R. Krohmer, MD. In addition we wish to acknowledge the efforts of Jeff Andrews, EMT-P who spent several tireless days helping to collect, collate and review over 300 representative protocols used as part of the initial document development process. We would like to express special appreciation for Ms. Jennifer Kimzey’s tireless efforts as contract administrator for the project.

We also wish to recognize the detailed evaluation and comments provided by members of the review panel appointed as liaisons from national EMS and medical professional organizations. We acknowledge that their comments represent the opinions of individual reviewers on behalf of their organizations but do not necessarily constitute organizational approval of protocol content. Review panel members are listed below, together with the organizations they represent:
We also thank the state and territorial EMS directors, all of whom provided their expert review of the initial draft protocols. We appreciate the efforts of every individual and extend a special acknowledgement to the following persons, who returned detailed analyses and insightful comments on behalf of their states:

Alaska        Matt Anderson
              Doreen Risley
California    Richard Watson
              (EMSC Advisory Committee)
              Philip Stent, MD
              Cheryl Mayeran, MPH
Connecticut   Leslee Stein-Spencer
Kentucky      Mary Fallat, MD
Louisiana     Nancy Bourgeois
              Mary Stewart, RN
              (EMSC Committee)
Maryland      Joseph Wright, MD, MPH
New Jersey    Gerard Muench
New Mexico    Keith Mausner, MD
              Robert Sapien, MD
              Jim Flaherty, MD (Navaho Nation EMS)
New York      Richard Hunt, MD
Rhode Island  Peter Leary
              Kenneth Williams, MD
Washington    Janet Griffith
West Virginia Mark King
              Lee Pyles, MD
We would like to acknowledge the contributions of several individuals who reviewed the protocols on behalf of their organizations:

- American Academy of Pediatrics NRP Steering Committee: Susan Niermeyer, MD  
  John Kattwinkel, MD
- Center for Pediatric Emergency Medicine: George Foltin, MD  
  Michael Tunik, MD
- National Association of EMS Physicians: Dave Cone, MD  
  Richard Hunt, MD  
  Jon Krohmer, MD  
  Robert Swor, DO  
  Brian Zachariah, MD

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- Arthur Hsieh, EMT-P
- Andrew Stern, EMT-P

We wish to also acknowledge John Todaro, REMT-P, RN, the Florida Association of EMS Educators and the Florida SIDS Alliance, for providing us with their SIDS protocol that served as the basis for the creation of the Death of a Child and SIDS protocol included in this document.

Finally, we want to acknowledge the exceptional assistance of our copyeditor, Ms. Tamia Karpeles, whose skill created the well-structured, uniform, and well-written first set of protocols which served as the template for the revised protocols.
GENERAL PATIENT CARE

This protocol provides general guidelines for patient management. Refer to additional protocols as appropriate for treatment of specific conditions. A length-based resuscitation tape is recommended to help EMS personnel quickly determine appropriate equipment size, normal vital signs, and correct drug dosages.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess the patient’s breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Obtain pulse oximeter reading.

11. If chest rise indicates inadequate ventilation, reposition airway and reassess.

12. If inadequate chest rise is noted after repositioning airway, suspect a foreign body obstruction of the airway. Refer to the appropriate protocol for treatment options.

13. Assess for signs of respiratory distress, failure, or arrest. If present, refer to the appropriate protocol for treatment options.

14. If the child is not breathing or breathing is inadequate, initiate assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. Begin with two slow, deep breaths of about 1-1/2 seconds’ duration, then ventilate at 20 breaths/minute for all ages. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

15. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.
16. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

17. Control hemorrhage using direct pressure or a pressure dressing.

18. Assess circulation and perfusion by measuring heart rate and observing skin color and temperature, capillary refill time, and the quality of central and peripheral pulses. Blood pressure should be measured only in children older than three years.

19. For children with absent pulses, initiate cardiopulmonary resuscitation at a combined rate of 120 compressions per minute for newborns (three compressions to each breath) or 100 compressions per minute for infants and children (fifteen compressions to each 2 breaths for children greater than 8 years of age until the airway is secured with intubation and five compressions to each breath for patients less than 8 years of age and those over 8 years of age with a secured airway). Compression depth is 1/2 to 3/4 inch for neonates, 1/2 to 1 inch for infants, and 1 to 1-1/2 inches for children. There should be a pause in compressions for ventilation until the airway is secured with intubation.

20. Initiate cardiac monitoring.

21. If there is evidence of shock, obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

22. Evaluate mental status, including pupillary reaction, distal function and sensation, and AVPU assessment.

23. If spinal trauma is suspected, continue manual stabilization, place a rigid cervical collar, and immobilize the patient on long backboard or similar device.

24. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

25. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

27. Reassess the patient frequently.

28. Contact medical control for additional instructions.
TRAUMA

The priorities in pediatric trauma management are to prevent further injury, provide rapid transport, notify the receiving facility, and initiate definitive treatment. On-scene time for a traumatic injury should be no longer than 10 minutes unless there are extenuating circumstances, such as extrication, hazardous conditions, or multiple victims. Document these circumstances on the patient record. Inform the receiving hospital as early as possible about the patient’s status and condition. This will allow hospital personnel extra time to mobilize resources.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. Manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using a modified jaw thrust.

8. Suction as necessary.

9. Considering placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious. Note that the nasopharyngeal airway is contraindicated in the presence of facial trauma.


11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach. If facial trauma is present or a basilar skull fracture is suspected, use an orogastric tube instead.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, respiratory failure is present or if prolonged assisted ventilation is anticipated, perform a Sellick maneuver followed by endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO2 monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If absent breath sounds or signs of severe respiratory distress are noted together with a mechanism of injury that could cause a tension pneumothorax, perform needle decompression. Use an 18- or 20-gauge needle...
over-the-needle catheter. Insert the needle in the mid-clavicular line at the second intercostal space, just above the third rib.

15. Control hemorrhage using direct pressure or a pressure dressing.


17. Initiate cardiac monitoring.

18. Assess mental status.

19. Continue manual stabilization while placing a rigid cervical collar. Immobilize the patient on a long backboard or similar device.

20. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

21. Initiate transport to an appropriate trauma facility no more than 10 minutes after arriving on the scene unless extenuating circumstances exist or directed by medical direction.

22. Obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing and administer normal saline at a sufficient rate to keep the vein open. If extenuating circumstances delay transport, obtain vascular access on the scene, but do not delay transport to obtain vascular access.

23. If there is evidence of shock, initiate vascular access in two sites. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

24. Splint obvious fractures of long bones.

25. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. Reassess the patient frequently.

27. Contact medical control for additional instructions.
BURNS

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Stop the burning process. If a dry chemical is involved, brush it off, then flush with copious amounts of water. If a caustic liquid is involved, flush with copious amounts of water. Remove all of patient’s clothing prior to irrigation. Be prepared to treat hypothermia, which may arise secondary to these interventions. For chemical burns with eye involvement, immediately begin flushing the eye with normal saline. Continue flushing throughout assessment and transport.

6. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine. Remove the patient’s clothing and jewelry in any affected area.

7. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

8. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

11. Assess breathing. Obtain pulse oximeter reading. Refer to the appropriate protocol for management of respiratory distress.

12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. This step should also be undertaken if inhalation injury is suspected. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask for potential inhalation injury or any serious thermal burn.

15. Assess circulation and perfusion.
16. For electrical burns, initiate cardiac monitoring and determine rhythm. If a dysrhythmia is present, refer to the appropriate protocol for treatment options.

17. If there is evidence of shock in a patient with major thermal burns, obtain vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate. Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

18. Assess mental status.

19. If spinal trauma is suspected, continue manual stabilization, place a rigid cervical collar, and immobilize the patient on a long backboard or similar device.

20. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

21. Apply a burn sheet or dry sterile dressings to burned areas. To prevent hypothermia, avoid moist or cool dressings and do not leave wounds or skin exposed.

22. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

23. Pain management is usually indicated. Refer to the appropriate protocol for treatment options.

24. Reassess the patient frequently.

25. Contact medical control for additional instructions.
FOREIGN BODY AIRWAY OBSTRUCTION

The following protocol applies to an unconscious child or infant with a foreign body obstruction of the airway.

1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Confirm that the patient is unresponsive.
6. Open the airway using a head tilt/chin lift.
7. Attempt assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If unsuccessful, reposition airway and attempt bag-valve-mask assisted ventilation again.
8. Use age-appropriate techniques to dislodge the obstruction (for infants younger than one year, apply back blows with chest thrusts; for children one year and older, use abdominal thrusts).
9. If unsuccessful, establish a direct view of the object and attempt to remove it with Magill forceps.
10. If unsuccessful, attempt endotracheal intubation and ventilate the patient.
11. If unsuccessful, perform needle cricothyrotomy and needle jet insufflation.
14. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.
15. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.
16. Reassess the patient frequently.
17. Contact medical control for additional instructions.
RESPIRATORY DISTRESS, FAILURE, OR ARREST
*A patient who presents with acute respiratory distress of sudden onset accompanied by fever, drooling, hoarseness, stridor, and tripod positioning may have a partial airway obstruction. Do nothing to upset the child. Perform critical assessments only. Enlist the parent to administer blow-by oxygen. Place the patient in a position of comfort. Do not attempt vascular access. Transport immediately.

Definitions
Respiratory distress is indicated by the following findings:
- alert, irritable, anxious
- stridor
- audible wheezing
- respiratory rate faster than normal for age
- intercostal retractions
- nasal flaring
- neck muscle use
- central cyanosis that resolves with oxygen administration
- mild tachycardia
- able to maintain sitting position (children older than four months)

Respiratory failure involves the findings above with any of the following additions or modifications:
- sleepy, intermittently combative, or agitated
- increased respiratory effort at sternal notch
- marked use of accessory muscles
- retractions, head bobbing, grunting
- central cyanosis
- marked tachycardia
- poor peripheral perfusion
- decreased muscle tone

Respiratory arrest involves the findings above with any of the following additions or modifications:
- unresponsive to voice or touch
- absent or shallow chest wall motion
- absent breath sounds
- respiratory rate slower than 10 breaths per minute
- weak to absent pulses
- bradycardia or asystole
- limp muscle tone
- unable to maintain sitting position (children older than four months)

Procedure
1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction. Signs include

- absent breath sounds
- tachypnea
- intercostal retractions
- stridor or drooling
- choking
- bradycardia
- cyanosis

7. If foreign body obstruction of the airway is suspected, refer to the appropriate protocol for treatment options.

8. **Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.**

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

11. Assess the patient’s breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Assess for signs of respiratory distress, failure, or arrest. Obtain pulse oximeter reading.

12. If chest rise indicates inadequate ventilation, reposition airway and reassess. If inadequate chest rise is noted after repositioning airway, suspect a foreign body obstruction of the airway. Refer to the appropriate protocol for treatment options.

13. If signs of respiratory arrest or respiratory failure with inadequate breathing are present, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen.

14. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

15. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO2 monitoring.

16. If breathing is adequate and patient exhibits signs of respiratory distress, administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

17. If bronchospasm is present, refer to the appropriate protocol for treatment options.


19. Initiate cardiac monitoring.
20. If the patient shows signs of severe respiratory failure or respiratory arrest, consider establishing vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.


22. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

23. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

24. Reassess the patient frequently.

25. Contact medical control for additional instructions.
RESPIRATORY DISTRESS IN THE CHILD WITH A TRACHEOSTOMY

The following protocol applies to a patient with a tracheostomy who is experiencing respiratory distress

1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Open the airway using a head tilt/chin lift.
6. Assess the patient’s breathing, including rate, auscultation, inspection, effort, and adequacy of ventilation as indicated by chest rise. Assess for signs of respiratory distress, failure, or arrest. Obtain pulse oximeter reading.
7. If signs of respiratory arrest or respiratory failure with inadequate breathing are present, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen via the tracheostomy. If unsuccessful, reposition airway and attempt bag-valve-mask assisted ventilation again.
8. If unable to ventilate via the tracheostomy or respiratory distress is present, attempt to suction through the tracheostomy. Again attempt assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen via the tracheostomy.
9. If unable to ventilate via the tracheostomy, change the tracheostomy tube by
   A. Insert a suction catheter through a new tracheostomy tube
   B. Cut the tracheostomy ties and remove the old tracheostomy tube
   C. Insert the suction catheter in to the tracheostomy
   D. Advance the new tracheostomy tube over the suction catheter
   E. Remove the suction catheter
   F. If unable to insert new tracheostomy try this same procedure with a smaller size tube
   G. If still unable to insert the tracheostomy tube insert similar size endotracheal tube in to tracheostomy or attempt orotracheal intubation.
   H. Confirm placement of the new tracheostomy tube using clinical assessment and end-tidal CO₂ monitoring
10. Again attempt assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen via the tracheostomy.
11. If unsuccessful, attempt to perform endotracheal intubation.
12. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.
13. If breathing is adequate and patient exhibits signs of respiratory distress, administer high-flow, 100% concentration oxygen as necessary. Use a nonbreather mask or blow-by as tolerated. In the patient with respiratory distress and absent breath sounds consider obstruction of the tracheostomy tube and proceed with step 9.
14. If bronchospasm is present, refer to the appropriate protocol for treatment options.

15. Assess circulation and perfusion.


17. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

18. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. Reassess the patient frequently.

20. Contact medical control for additional instructions.
BRONCHOSPASM

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

Definition

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

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

Procedure

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If the patient shows signs of respiratory distress or respiratory failure together with clinical evidence of bronchospasm or a history of asthma, administer 2.5 mg albuterol via nebulizer over a 10- to 15-minute
period. If these respiratory findings persist, repeat 2.5 mg albuterol via nebulizer at 15-minute intervals throughout transport. Do not delay transport to administer medications.

15. If the patient shows signs of respiratory distress or respiratory failure together with clinical evidence of bronchospasm or a history of asthma and inadequate ventilation, administer a systemic agent for bronchodilation. Use either epinephrine 1:1000 at 0.01 mg/kg (maximum individual dose 0.3 mg) or terbutaline at 0.01 mg/kg (maximum individual dose 0.4 mg) administered via subcutaneous route.

16. If severe respiratory distress and bronchospasm persist despite albuterol administration, consider administering 500 mcg ipratropium bromide via nebulizer over a 10- to 15-minute period as permitted by medical direction. Ipratropium bromide and albuterol may be mixed together and administered simultaneously.

17. Assess circulation and perfusion.

18. Initiate cardiac monitoring.

19. If the patient shows signs of severe respiratory failure or respiratory arrest, consider establishing vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained in a patient with respiratory arrest, proceed with intraosseous access. Do not delay transport to obtain vascular access.

20. Consider administration of steroids in one of the following preparations as permitted by medical direction:

- Prednisone 2.0 mg/kg (maximum individual dose 60 mg) PO
- Methylprednisolone 2.0 mg/kg (maximum individual dose 120 mg) IV/IM
- Hydrocortisone 4.0 mg/kg (maximum individual dose 250 mg) IV/IM


22. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

23. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

24. Reassess the patient frequently.

25. Contact medical control for additional instructions.
NEWBORN RESUSCITATION

This protocol describes procedures for the resuscitation of a newly delivered infant.

1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions.
3. Observe standard precautions.
4. Suction the infant’s airway using a bulb syringe as soon as the infant’s head is delivered and before delivery of the body. Suction the mouth first, then the nasopharynx.
5. Once the body is fully delivered, dry the baby, replace wet towels with dry ones, and wrap the baby in a thermal blanket or dry towel. Cover the infant’s scalp to preserve warmth.
6. Open and position the airway. Suction the infant’s airway again using a bulb syringe. Suction the mouth first, then the nasopharynx.
7. If thick meconium is present and the patient exhibits either absent or depressed respirations, hear rate less than 100 bpm or poor muscle tone, initiate endotracheal intubation before the infant takes a first breath. Suction the airway using an appropriate suction adapter while withdrawing the endotracheal tube. Repeat this procedure until the endotracheal tube is clear of meconium. If the infant’s heart rate becomes bradycardic, discontinue suctioning immediately and provide ventilation until the infant recovers. Note: If the infant is already breathing or crying, this step may be omitted.
8. Assess breathing and adequacy of ventilation.
9. If ventilation is inadequate, stimulate the infant by gently rubbing the back and flicking the soles of the feet.
10. If ventilation is still inadequate after brief stimulation, begin assisted ventilation at 40 to 60 breaths per minute using a bag-valve-mask device with high-flow, 100% concentration oxygen. If the ventilation remains inadequate despite assisted ventilation perform endotracheal intubation.
11. If ventilation is adequate and the infant displays central cyanosis, administer high-flow, 100% concentration oxygen via blow-by. Hold the tubing 1 to 1-1/2 inches from the infant’s mouth and nose and cup a hand around the end of the tubing to help direct the oxygen flow toward the infant’s face.
12. Assess heart rate by auscultation or by palpation of the brachial artery or umbilical cord stump.
13. If the heart rate is slower than 60 beats per minute after 30 seconds of assisted ventilation with high-flow, 100% concentration oxygen, initiate the following actions:

A. Continue assisted ventilation.
B. Perform endotracheal intubation if not already done.
C. Begin chest compressions at a combined rate of 120/minute (three compressions to each ventilation with a pause for ventilation until the airway is secured with intubation).
D. If there is no improvement in heart rate after intubation and ventilation, administer 1:10,000 epinephrine solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via endotracheal tube, or establish vascular access and administer the same dose. In the neonate, vascular access may be obtained intraosseously, intravenously, or through the umbilical vein (if medical direction permits). Repeat epinephrine at the same dose every 3 to 5 minutes as needed.
E. Initiate transport. Reassess heart rate and respirations en route.

14. If the heart rate is faster than 100 beats per minute, initiate the following actions:

A. Assess skin color. If central cyanosis is still present, continue blow-by oxygen.
B. Initiate transport. Reassess heart rate and respirations en route.

15. Reassess the patient frequently.

16. Contact medical control for additional instructions.
Oklahoma State EMS Protocols

BRADYCARDIA

Bradycardia generally arises due to hypoxia. Therefore, airway, ventilation, and oxygenation are the highest management priorities. The cause of the hypoxia should be identified and corrected.

**Definition**

*Severe cardiorespiratory compromise is indicated by*

- poor perfusion as evidenced by delayed capillary refill, weak or absent peripheral pulses
- altered mental status
- hypotension
- respiratory difficulty

**Procedure**

1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.
7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.
8. Suction as necessary.
9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.
10. Assess breathing. Obtain pulse oximeter reading.
11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.
12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, if prolonged assisted ventilation is anticipated, or the patient continues to have severe cardiorespiratory compromised despite oxygenation and ventilation, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.
13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.


15. Initiate cardiac monitoring and determine rhythm.

16. If signs of severe cardiopulmonary compromise are present in an infant or neonate and the heart rate remains slower than 60 beats per minute despite oxygenation and ventilation, initiate chest compressions.

17. If the patient shows signs of severe cardiopulmonary compromise, establish vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained in a child younger than six years, proceed with intraosseous access. Do not delay transport to obtain vascular access.

18. Check blood glucose.

19. If signs of severe cardiopulmonary compromise persist, administer epinephrine using the first available route as follows: 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube or 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route. Repeat the dose every 3 to 5 minutes until either the bradycardia or severe cardiopulmonary compromise resolves.

20. If signs of severe cardiopulmonary compromise and bradycardia persist despite epinephrine, administer atropine at 0.02 mg/kg via intravenous route, intraosseous route, or endotracheal tube. The minimum dose is 0.1 mg; the maximum individual dose is 0.5 mg for a child and 1.0 mg for an adolescent. Atropine may be repeated once after 3 to 5 minutes and may be doubled. The minimum doubled dose is 0.1 mg; the maximum doubled individual dose is 1.0 mg for a child and 2.0 mg for an adolescent.

Note: If bradycardia is due to increased vagal tone or primary AV block Atropine should be given prior to epinephrine.

21. For persistent bradycardia with severe cardiopulmonary compromise, consider external pacing as permitted by medical direction.

22. Assess mental status.

23. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

24. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

25. Reassess the patient frequently.

26. Contact medical control for additional instructions, including

- initiation of external pacing
- repeated administration of epinephrine
- repeated administration of atropine
TACHYCARDIA

Definitions
Poor perfusion is indicated by
- delayed capillary refill
- weak or absent peripheral pulses
- altered mental status
- hypotension

The three types of tachycardia may be distinguished by the following signs:

Sinus tachycardia is usually present when
- An infant exhibits tachycardia in which the heart rate is slower than 220 beats per minute or a child exhibits tachycardia in which the heart rate is slower than 180 beats per minute
- There is a normal QRS duration for age (less than or equal to 0.08 seconds)
- Normal P waves are present, the R-R interval is variable, and the P-R interval is constant
- Heart rate varies with activity

Supraventricular tachycardia is usually present when
- An infant exhibits tachycardia in which the heart rate is faster than 220 beats per minute or a child exhibits tachycardia in which the heart rate is faster than 180 beats per minute
- There is a normal QRS duration for age (less than or equal to 0.08 seconds)
- P waves are abnormal or absent
- Abrupt changes in heart rate

Presumptive ventricular tachycardia is present when
- The QRS duration is wide for age (greater than 0.08 seconds)

Procedure
1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.
7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.
8. Suction as necessary.
9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.
10. Assess breathing. Obtain pulse oximeter reading.
11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.


15. Initiate cardiac monitoring and determine rhythm.

16. Establish vascular access and administering normal saline at a sufficient rate to keep the vein open. If intravenous access cannot be obtained and the patient shows signs of poor perfusion, proceed with intraosseous access. Do not delay transport to obtain vascular access.

17. Check blood glucose.

18. For probable sinus tachycardia, identify and treat possible causes, such as hypovolemia, shock, hypoxia, or pneumothorax.

19. For probable supraventricular tachycardia with signs of poor perfusion, the following steps should be taken:

   A. Administer adenosine at 0.1 mg/kg (maximum individual dose 6.0 mg) via rapid IV bolus at the port closest to IV hub. Adenosine may be repeated twice at 0.2 mg/kg (maximum individual dose 12 mg) as needed.

   or

   Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in supraventricular tachycardia, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.

   B. Consider treatment with alternative antiarrhythmic medications including:
      - Amiodarone 5 mg/kg IV over 20-60 minutes
      - Procainamide 15 mg/kg over 30-60 minutes
      - Lidocaine 1 mg/kg IV bolus

20. For probable ventricular tachycardia with a pulse and poor perfusion, the following steps should be taken:

   A. Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in ventricular tachycardia with a pulse, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.

   B. Consider treatment with antiarrhythmic medications including:
      - Amiodarone 5 mg/kg IV over 20-60 minutes
Procainamide 15 mg/kg over 30-60 minutes
Lidocaine 1 mg/kg IV bolus

21. For probable ventricular tachycardia with a pulse and adequate perfusion, the following steps should be taken:

   A. Consider treatment with antiarrhythmic medications including:
      Amiodarone 5 mg/kg IV over 20-60 minutes
      Procainamide 15 mg/kg over 30-60 minutes
      Lidocaine 1 mg/kg IV bolus

   B. Perform synchronized cardioversion at 0.5 to 1.0 J/kg. If the patient remains in ventricular tachycardia with a pulse, repeat cardioversion at double the energy (max 360J). Sedate the patient before cardioversion as permitted by medical direction. Sedation may be accomplished by administering midazolam at 0.1 mg/kg (maximum individual dose 2.0 mg) or diazepam at 0.2 mg/kg (maximum individual dose 5.0 mg) via intravenous route.

22. Assess mental status.

23. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

24. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

25. Reassess the patient frequently.

26. Contact medical control for additional instructions
NON-TRAUMATIC CARDIAC ARREST

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Confirm apnea and provide assisted ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

7. Confirm absent pulse and begin chest compressions at age-appropriate rate and ratio.


9. Obtain vascular access. If intravenous access cannot be obtained, proceed with intraosseous access.

10. Initiate cardiac monitoring and determine rhythm.

11. Refer to appropriate protocol for further management actions:

   - Ventricular Fibrillation/Pulseless Ventricular Tachycardia
   - Asystole or Pulseless Electrical Activity
VENTRICULAR FIBRILLATION OR PULSELESS VENTRICULAR TACHYCARDIA

Throughout the following resuscitation sequence, check pulses and cardiac rhythm after each shock and drug administration.

1. Perform steps 1 through 11 as listed in the protocol for non-traumatic cardiac arrest. Confirm the presence of ventricular fibrillation (VF) or pulseless ventricular tachycardia (VT).

2. Defibrillate at 2.0 J/kg (maximum 200 joules).

3. Defibrillate at 4.0 J/kg (maximum 360 joules).

4. Defibrillate at 4.0 J/kg (maximum 360 joules).

5. Using the most readily available route, administer epinephrine 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube or 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route. Subsequent doses of epinephrine should be administered every 3 to 5 minutes for the remainder of resuscitation. Consider higher doses of epinephrine for the second or subsequent doses.

6. Flush the medication port with 10 to 20 ml of intravenous fluid after each dose of IV medication to aid entry of drugs into central circulation.

7. Defibrillate at 4.0 J/kg (maximum 360 joules) 30 to 60 seconds after each medication bolus. From this point the pattern should be compressions, followed by medication administration and then an attempt at defibrillation.

8. Administer an antiarrhythmic agent from the following:
   - Amiodarone 5 mg/kg IV/IO bolus
   - Lidocaine 1 mg/kg IV/IO bolus
   - Magnesium 25-50 mg/kg IV/IO bolus for torsades de pointes or hypomagnesia (max. dose of 2 grams)

9. Defibrillate at 4.0 J/kg (maximum 360 joules). Followed by compressions.

10. Continue compressions and repeat steps 8-9.

11. If VF or pulseless VT recurs after successful defibrillation, repeat defibrillation using the last energy level that restored perfusing rhythm.

12. Contact medical control for additional instructions.

13. Initiate transport.


15. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

16. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

17. Reassess the patient frequently.
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ASYSTOLE AND PULSELESS ELECTRICAL ACTIVITY
Potentially treatable causes of asystole and pulseless electrical activity include severe hypoxemia, severe acidosis, severe hypovolemia, tension pneumothorax, cardiac tamponade, profound hypothermia, toxic ingestion, severe bradycardia, and hyperkalemia (renal failure).

Definition
Pulseless electrical activity (PEA) appears upon cardiac monitoring as absent pulses with organized QRS complexes. The following dysrhythmias may present as PEA:
- electromechanical dissociation (EMD)
- pseudo-EMD
- idioventricular rhythms
- ventricular escape rhythms
- bradyasystolic rhythms
- post-defibrillation idioventricular rhythms

1. Perform steps 1 through 11 as listed in the protocol for non-traumatic cardiac arrest. Confirm the presence of asystole in two leads.

2. Using the most readily available route, administer epinephrine 1:1000 solution at 0.1 mg/kg (maximum individual dose 10 mg) via endotracheal tube or 1:10,000 solution at 0.01 mg/kg (maximum individual dose 1.0 mg) via intravenous or intraosseous route.

3. Repeat epinephrine every 3 to 5 minutes. Consider higher doses of epinephrine for second or subsequent doses.

4. Flush the medication port with 10 to 20 ml of intravenous fluid after each dose of IV medication to aid entry of drugs into central circulation.

5. Contact medical control for additional instructions.

6. Initiate transport.

7. Assess mental status.

8. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

9. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

10. Asystole that does not respond to the above treatment sequence may be considered refractory. It may be appropriate to discontinue resuscitative efforts in refractory asystole as permitted by medical direction.

11. Reassess the patient frequently.
ALTERED MENTAL STATUS

This protocol is intended for patients with an altered mental status of unknown etiology.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as lidocaine, sedatives, and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

14. If signs of respiratory distress, respiratory failure, or respiratory arrest are present, refer to the appropriate protocol for treatment options.

15. Assess circulation and perfusion.

16. Initiate cardiac monitoring.

17. Obtain vascular access. If intravenous access cannot be obtained, proceed with intraosseous access.

18. Determine blood glucose level.
19. If blood glucose level is lower than 80 mg/dl or cannot be determined, administer dextrose via intravenous or intraosseous route as follows:

- D50W at 1.0 ml/kg for children older than two years
- D25W at 2.0 ml/kg for children younger than two years
- D10W at 5.0 ml/kg for neonates

*If vascular access is unavailable, administer 1.0 mg glucagon via intramuscular injection.*

20. Repeat blood glucose determination 1 to 2 minutes after dextrose is administered.

21. Dextrose may be repeated once at the same dosage if blood glucose level remains lower than 80 mg/dl or if the blood glucose level cannot be determined and there is no change in the patient’s mental status after the initial dose.

22. Administer naloxone at 0.1 mg/kg (maximum individual dose 2.0 mg) via intravenous or intraosseous route. Naloxone may be given via endotracheal tube or intramuscular injection at the same dose if vascular access is not available.

23. If there is evidence of shock or a history of dehydration, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.


25. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

26. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

27. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

28. Consider causes of altered mental status, such as chemical or drug intoxication, toxic exposure, head trauma, or seizure.

29. Reassess the patient frequently.

30. Contact medical control for additional instructions.
SEIZURES

This protocol is intended for patients who are experiencing status epilepticus. To manage seizures in patients who are not experiencing status epilepticus, contact on-line medical control for instructions.

Definition
In status epilepticus, the patient will be experiencing an active seizure when rescuers arrive, with
• a single episode of seizure activity lasting longer than 5 minutes, or
• two or more episodes of seizure activity between which the patient does not regain consciousness

Procedure
1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. Protect the patient from injury during involuntary muscular movements.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. The actively seizing patient should not be intubated without the usage of pharmacological agents. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. Initiate cardiac monitoring.

16. Establish vascular access. Administer normal saline at a sufficient rate to keep the vein open.

17. Determine blood glucose level.

18. If blood glucose level is lower than 80 mg/dl or cannot be determined, administer intravenous dextrose as follows:

- $D_{50}W$ at 1.0 ml/kg for children older than two years
- $D_{25}W$ at 2.0 ml/kg for children younger than two years
- $D_{10}W$ at 5.0 ml/kg for neonates

*If vascular access is unavailable, administer 1.0 mg glucagon via intramuscular injection.*

19. **Repeat blood glucose determination 1 to 2 minutes after dextrose is administered.**

20. Dextrose may be repeated once at the same dosage if blood glucose level remains lower than 80 mg/dl or if the blood glucose level cannot be determined and the patient is still in status epilepticus after the initial dose.

21. Administer one of the following anticonvulsants as chosen by medical direction, all intravenous anticonvulsants should be given slowly (over 1-2 minutes) to avoid apnea:

- Diazepam 0.2 mg/kg (maximum individual dose 10 mg) via intravenous route or 0.5 mg/kg (maximum individual dose 10 mg) via rectal route
- Lorazepam 0.1 mg/kg (maximum individual dose 5.0 mg) via intravenous or intramuscular route
- Midazolam 0.15 mg/kg (maximum individual dose 5.0 mg) via intravenous or intramuscular route
- Fosphenytoin 20 phenytoin equivalents/kg (maximum individual dose 1000 phenytoin equivalents) via intravenous or intramuscular route

22. If seizures persist, repeat any listed anticonvulsant except fosphenytoin at the same dose or contact medical control for further instructions.

23. Assess mental status.

24. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

25. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

27. Reassess the patient frequently.

28. Contact medical control for additional instructions.
NON-TRAUMATIC HYPOPERFUSION (SHOCK)

Definition
Shock may be categorized as hypovolemic, distributive, obstructive, or cardiogenic. Manifestations of shock include
- altered mental status
- tachypnea
- tachycardia
- absent peripheral pulses
- cool, clammy, mottled skin
- capillary refill time longer than 2 seconds
- hypotension and/or bradycardia (late findings)

Procedure
1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.
7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.
8. Suction as necessary.
9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.
10. Assess breathing. Obtain pulse oximeter reading.
11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.
12. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.
13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.
15. Initiate cardiac monitoring.

16. Establish vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

17. If there is still evidence of shock, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

18. Assess mental status.

19. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

20. Initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

21. Reassess the patient frequently.

22. Contact medical control for additional instructions.
ANAPHYLACTIC SHOCK/ALLERGIC REACTION

The following protocol is intended for patients with allergic reaction or anaphylactic shock. For patients with generalized allergic manifestations that do not meet the criteria listed below, contact medical control prior to treatment.

Definitions
The patient with an allergic reaction will have
• generalized allergic manifestations, such as urticaria (hives)
• a history of allergic exposure

To meet the criteria for anaphylactic shock, the patient must have the findings listed above plus one of the following:
• partial or complete airway obstruction
• signs of shock, such as altered mental status, respiratory distress, weak or absent peripheral pulses, cyanosis

Procedure
1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.
7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is possible.
8. Suction as necessary.
9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.
10. If patient meets criteria for anaphylactic shock, administer epinephrine 1:1000 solution at 0.01 mg/kg (maximum individual dose 0.3 mg) via subcutaneous injection. Massage the injection site vigorously for 30 to 60 seconds.
12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.
13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by
medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. If bronchospasm is present in a patient with adequate ventilation, administer 2.5 mg albuterol via nebulizer over a 10- to 15-minute period. If bronchospasm persists, repeat 2.5 mg albuterol via nebulizer at 15-minute intervals throughout transport.


17. Reassess patient for signs of anaphylactic shock. If criteria are still present, repeat epinephrine 1:1000 solution at 0.01 mg/kg (maximum individual dose 0.3 mg) via subcutaneous injection.

18. Initiate cardiac monitoring.

19. If the patient meets criteria for anaphylactic shock, establish vascular access using an age-appropriate large-bore catheter with large-caliber tubing. If intravenous access cannot be obtained, proceed with intraosseous access. Do not delay transport to obtain vascular access.

20. If evidence of shock persists, administer a fluid bolus of normal saline at 20 ml/kg set to maximum flow rate (at a minimum < 20 minutes). Reassess patient after bolus. If signs of shock persist, bolus may be repeated at the same dose up to two times for a maximum total of 60 ml/kg.

21. Administer diphenhydramine at 1.0 mg/kg (maximum individual dose 50 mg) via intravenous route or deep intramuscular injection.

22. Consider administering steroids (such as methylprednisolone at 2.0 mg/kg) via intravenous route as permitted by medical direction.

23. Assess mental status.

24. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

25. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

26. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

27. Reassess the patient frequently.

28. Contact medical control for additional instructions.
ANAPHYLACTIC SHOCK TREATED WITH AUTO-INJECTOR DEVICE

The following protocol is intended for patients in anaphylactic shock and providers whose only epinephrine route is as an auto-injector. For other instances of patients with generalized allergic manifestations or anaphylaxis refer to Anaphylactic Shock /Allergic Reaction Protocol.

Definitions
The patient with anaphylactic shock will have evidence of an allergic reaction including

- generalized allergic manifestations, such as urticaria (hives)
- a history of allergic exposure

And evidence of airway or circulatory compromise as evidenced by:

- partial or complete airway obstruction
- signs of shock, such as altered mental status, respiratory distress, weak or absent peripheral pulses, cyanosis

Procedure
1. Ensure scene safety.
2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.
3. Form a first impression of the patient’s condition.
4. Observe standard precautions.
5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.
6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.
7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is possible.
8. Suction as necessary.
9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.
10. If patient meets criteria for anaphylactic shock, administer epinephrine via auto-injector device. Massage the injection site vigorously for 30 to 60 seconds. Use a 0.3 mg auto-injector for children over 30 kg and a 0.15 mg auto-injector for children less than 30 kg.
12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.
13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. Reassess patient for signs of anaphylactic shock. If criteria are still present, repeat auto-injector at same dosage.


17. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

18. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

20. Reassess the patient frequently.

21. Contact medical control for additional instructions.
TOXIC EXPOSURE

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Look for the source of the toxic exposure. Collect any containers or medication bottles to transport with the patient to the hospital. Consult a local poison control center as appropriate.

4. Form a first impression of the patient’s condition.

5. Observe standard precautions.

6. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

7. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

8. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

9. Suction as necessary.

10. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.


12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

14. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.

15. Assess circulation and perfusion.

16. Initiate cardiac monitoring.

17. Obtain vascular access as indicated.

18. If respiratory depression is present and a narcotic overdose is suspected, administer naloxone at 0.1 mg/kg (maximum individual dose 2.0 mg) via intravenous, intraosseous, or intramuscular route.
19. Treatment for other toxic exposures may be instituted as permitted by medical direction, including the following:

- High-dose atropine for organophosphates
- Sodium bicarbonate for tricyclic antidepressants
- Glucagon for calcium channel blockers or beta-blockers
- Diphenhydramine for dystonic reactions
- Dextrose for insulin overdose

Contact medical control for specific information about individual toxic exposures and treatments.

20. Assess mental status.

21. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

22. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

23. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

24. Reassess the patient frequently.

25. Contact medical control for additional instructions.
NEAR-DROWNING

Hypothermia may offer some degree of cerebral protection in a near-drowning incident, but it also increases cardiac irritability. Refractory dysrhythmias may arise during assessment and treatment. Contact medical control as early as possible.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury. If hazardous conditions are present (such as swift water, hazardous materials, electrical hazard, or confined space), contact an appropriate agency before approaching the patient. Wait for the designated specialist to secure the scene and patient as necessary.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. Assess breathing. Obtain pulse oximeter reading.

11. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

12. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO₂ monitoring.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.


15. Initiate cardiac monitoring and determine rhythm. Consult the appropriate protocol for treatment of specific dysrhythmias.

16. Obtain vascular access. Administer normal saline at a sufficient rate to keep the vein open.
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17. Assess mental status.

18. If spinal trauma is suspected, continue manual stabilization, apply a rigid cervical collar, and immobilize the patient on a long backboard or similar device.

19. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.

20. If the child’s condition is critical or unstable, initiate transport as quickly as possible. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

21. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

22. Reassess patient frequently.

23. Contact medical control for additional instructions.
PAIN MANAGEMENT

This protocol is intended for patients who require pain management in addition to other clinical interventions. Pain medication often causes sedation and affects a patient’s mental status. As a result analgesia should not be administered in a patient with head trauma.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

6. Assess the patient’s airway for patency, protective reflexes and the possible need for advanced airway management. Look for signs of airway obstruction.

7. Open the airway using head tilt/chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.

8. Suction as necessary.

9. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning and the patient is unconscious.

10. If the airway cannot be maintained by other means, including attempts at assisted ventilation, or if prolonged assisted ventilation is anticipated, perform endotracheal intubation. Consider administration of pharmacological adjuncts, such as sedatives and paralytic agents, to aid with intubation as permitted by medical direction. Confirm placement of endotracheal tube using clinical assessment and end-tidal CO2 monitoring.


12. If breathing is inadequate, assist ventilation using a bag-valve-mask device with high-flow, 100% concentration oxygen. If abdominal distention arises, consider placing a nasogastric tube to decompress the stomach.

13. If breathing is adequate, place the child in a position of comfort and administer high-flow, 100% concentration oxygen as necessary. Use a nonrebreather mask or blow-by as tolerated.


15. Obtain vascular access. Administer normal saline at a sufficient rate to keep the vein open.


17. Expose the child only as necessary to perform further assessments. Maintain the child’s body temperature throughout the examination.
18. If the child’s condition is critical or unstable, initiate transport. Perform focused history and detailed physical examination en route to the hospital if patient status and management of resources permit.

19. If the child’s condition is stable, perform focused history and detailed physical examination on the scene, then initiate transport.

20. Assess the patient’s pain using a numerical scale or visual analogue scale as appropriate to child’s abilities.

21. Administer one of the following analgesic agents:
   - Morphine 0.1 mg/kg (maximum individual dose 10 mg) via intravenous or subcutaneous route
   - Fentanyl 1.0 mcg/kg (maximum individual dose 100 mcg) via intravenous route
   - Nitrous oxide

22. After drug administration, reassess the patient using the appropriate pain scale. Carefully note adequacy of ventilation and perfusion.

23. Reassess the patient frequently.

24. Contact medical control for further instructions.
CENTRAL VASCULAR ACCESS VIA MEDIPORT OR BROVIAC

The following protocol is intended for patients with a Broviac or Mediport who require vascular access as defined by other patient care protocols. If there is any question of the need to access these devices, contact medical control prior to accessing a central catheter.

Procedure

1. Observe standard precautions.

2. Establish vascular access using an age-appropriate large-bore catheter with large-caliber tubing. Attempt to use a peripheral vein if readily accessible. If intravenous access cannot be obtained in a child with a Broviac or Mediport, proceed with central access. Do not delay transport to obtain vascular access.

3. Ask parents or caregivers for supplies and assistance at attempting central access.

4. For a Broviac

   A. Prepare the intended IV solution and tubing
   B. Remove the cap on the end of the catheter
   C. Clean the end of the catheter with alcohol
   D. Attach a 10cc syringe to the catheter
   E. Unclamp the catheter
   F. Aspirate blood with the syringe
   G. Re-Clamp the catheter
   H. Attach the IV tubing and unclamp the catheter
   I. Observe for free flow of the IV fluid
   J. Adjust the flow rate
   K. Tape the catheter and tubing in place

5. For a Mediport

   A. Prepare the intended IV solution and tubing
   B. Clean the Mediport site with Betadine
   C. Remove the Betadine with an alcohol swab
   D. Hold the Mediport firmly between two fingers
   E. Attach a 10cc syringe to the tubing at the end of the Haberman Needle (in emergency, if Haberman needle is unavailable use a standard 20-21 gauge needle)
   F. Insert a Haberman Needle in to the Mediport until it is felt to enter the cavity
   G. Unclamp the tubing
   H. Aspirate blood with the syringe
   I. Re-Clamp the tubing
   J. Attach the IV tubing and unclamp the tubing
   K. Observe for free flow of the IV fluid
   L. Adjust the flow rate
   M. Secure the needle in place

6. If shock is not present allow the fluid to run at a rate of 10 cc/hour to prevent the central catheter from clotting.
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DEATH OF A CHILD AND SUDDEN INFANT DEATH SYNDROME (SIDS)

There is no normal parental reaction to the death of a child or a SIDS event. Individual responses may range from emotional outbursts to apparent withdrawal. **Rescuers should not make any assumptions or judgments.** Maintain a professional demeanor at all times. Perform the initial assessment, environmental assessment, and focused history as part of the clinical process. Observe, assess, and document accurately and objectively.

1. Ensure scene safety.

2. Perform a scene survey to assess environmental conditions and mechanism of illness or injury.

3. Form a first impression of the patient’s condition.

4. Observe standard precautions.

5. Establish patient responsiveness.


9. Determine whether to perform further resuscitation measures:

   - If patient does not exhibit lividity or rigor, proceed with cardiopulmonary resuscitation as permitted by medical direction, following the protocol for non-traumatic cardiac arrest. During resuscitation, perform steps 11 and 12 below. Initiate transport.

   - If patient exhibits lividity and rigor, do not resuscitate as permitted by medical direction. Proceed with step 10. Note: Lividity can be mistaken for bruising and evidence of abuse. **Do not make any assumptions or judgments.**

10. Provide supportive measures for parents and siblings:

    - Explain the resuscitation process, transport decision, and further actions to be taken by hospital personnel or the medical examiner.
    - Reassure parents that there was nothing they could have done to prevent death.
    - Allow the parents to see the child and say goodbye.
    - Maintain a supportive, professional attitude no matter how the parents react.
    - Whenever possible, be responsive to parental requests. Be sensitive to ethnic and religious needs or responses and make allowances for them.
11. Obtain patient history using a nonjudgmental approach. Ask open-ended questions as follows:

- Has the child been sick?
- Can you describe what happened?
- Who found the child? Where?
- What actions were taken after the child was discovered?
- Has the child been moved?
- When was the child last seen before this occurred, and by whom?
- How did the child seem when last seen?
- When was the last feeding provided?

12. Reassess the environment. Document findings, noting the following:

- Where the child was located upon arrival
- Description of objects located near the child upon arrival
- Unusual environmental conditions, such as a high temperature in the room, abnormal odors, or other significant findings

13. If the parents interfere with treatment or attempt to alter the scene, initiate the following actions:

- Remain supportive, sympathetic, and professional
- Avoid arguing with the parents or exhibiting anger
- Do not restrain the parents or request that they be restrained unless scene safety is clearly threatened

14. Document the emergency call, including the following information:

- Time of arrival
- Initial assessment findings and basis for resuscitation decision
- Time of resuscitation decision
- Time of arrival at hospital if resuscitation and transport were initiated
- Parental support measures provided if resuscitation was not initiated
- History obtained (note who provided the information)
- Environmental conditions
- Time law enforcement personnel arrived on scene
- Time that scene responsibility was turned over to law enforcement personnel
Prehospital Protocols
for
Children with Special Health Care Needs

Center for Prehospital Pediatrics
Division of Emergency Medicine
Children’s National Medical Center
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Washington DC, 20010
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December 2001
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Children with Special Health Care Needs (CSHCN) are defined as “those who have or are at an increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally.” Twelve million US children (18% of the pediatric population) have special health care needs. Improvements in medical technology, managed care, and changing social views about institutionalizing children has increased the number of CSHCN living in the community. Due to their underlying medical condition, these children often require emergency medical care. CSHCN account for up to one-fourth of the children seen in pediatric emergency departments. Therefore, a protocol to guide the treatment that CSHCN receive in the prehospital emergency setting has become necessary.

The Center for Prehospital Pediatrics at Children’s National Medical Center was tasked with revising the prehospital pediatric protocols for the District of Columbia. This effort was conducted through an EMSC state partnership grant. In revising prehospital pediatric protocols, it became evident that although there are several training programs that highlight CSHCN, there are very few EMS jurisdictions that support training with specific protocols to treat CSHCN.

The following protocols were developed by a review of the existing literature, focusing on evidence based treatment modalities and through in-house expertise regarding prehospital treatment of CSHCN. A national review of these protocols is necessary to ensure that they become a comprehensive and relevant resource for EMS jurisdictions.

This is the first draft of the CSHCN protocols. Subsequent drafts will be distributed as necessary. Appropriate credit will be given to all those who provide substantive feedback on these protocols.

Please send all comments and revisions by January 15, 2001 to:

Center for Prehospital Pediatrics
Division of Emergency Medicine
Children’s National Medical Center
111 Michigan Ave NW
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Thank you for your participation!
All Provider Levels:

1. Follow general patient care guidelines

2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

3. Check and open the airway. Assess the tracheostomy tube. If the obturator has been left in place, remove it to open the tracheostomy tube. If the child has a fenestrated tube, make sure the decannulation plug is removed. If suctioning is needed, follow step 11.

4. Position the child in a neutral position with a towel roll underneath the shoulders as needed.

5. Assess the patient’s breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading.

6. If the child is in respiratory distress, attempt assisted ventilation through the tracheostomy tube. For ventilator dependent children, follow the ventilator protocols in addition to the following steps. Note: if the tracheostomy is a double lumen tube, the inner cannula must be in place for the bag-valve device to connect.

7. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Follow the steps below for airway management.

8. Ask the caregivers for the child’s baseline vital signs, and if they are on home oxygen, and the amount and method by which they receive the oxygen.

9. Obtain a complete history including a history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival.

BLS Only

10. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.
All Provider Levels:

11. Check breath sounds while ventilating. If breath sounds are not clear (or gurgling sounds are heard), suction the tracheostomy tube as follows:

- If thick secretions are noted, inject 1 to 3 cc of sterile Normal Saline into the tracheostomy tube.

- **Use a suction catheter from the patient’s supplies, if available. Otherwise, select a suction catheter small enough to pass easily through the child’s tracheostomy tube.**

  Note: To estimate the size of the suction catheter, double the inner diameter of the tracheostomy size. For example, a neonatal or pediatric inner diameter 3.5 tracheostomy tube (3.5 x 2 = 7) would take a size 6 suction catheter.

- If using a portable suction machine, set it to 100mm/Hg or less.

- Deliver high flow oxygen by placing an oxygen mask directly over the tracheostomy opening or with manual ventilations. If unable to ventilate, proceed to the next step. (If the child has excessive secretions, or receives humidified oxygen at home, insert 1cc of normal saline into the tracheostomy tube every 15 minutes. (EMT-I and EMT-P providers may alternatively provide humidification through an in-line normal saline nebulizer).

- **Determine proper suction catheter length by measuring the obturator. If the obturator is unavailable, insert the suction catheter approximately 2 to 3 inches into the tracheostomy tube. Do not use force!**

- **Apply suction for no more than 10 seconds while slowly withdrawing the catheter, rolling the catheter between the fingers.**

- If unable to pass a suction catheter proceed to step 12.

12. If manual ventilation continues to be difficult, depress the pop off valve on the bag-valve device. If ventilation continues to be difficult, change the tracheostomy tube as follows:

  Note: BLS providers can only perform this step with the permission of medical control and in the presence of a knowledgeable caregiver.

This procedure requires the presence of two people. Initiate the help of a knowledgeable caregiver when available.

- Ask the caregivers for a replacement tracheostomy tube. If the caregivers do not have a replacement tube, follow the next four steps to remove the tracheostomy tube and ventilate by placing the bag-mask device with an infant mask attached, directly over the stoma. Cover the child’s mouth and nose. Alternatively, the child can be ventilated by placing a mask over the nose and mouth and covering the stoma.
If the child has a cuffed tracheostomy tube, deflate the balloon by connecting a syringe to the valve on the pilot balloon. Draw air out until the pilot balloon collapses. Do not cut the pilot balloon, as this will NOT deflate the cuff.

If the child has a double cannula tracheostomy tube, remove the inner cannula. If removal of the inner cannula fails to clear the airway, the outer cannula should then be removed after performing the next step.

Cut the cloth or Velcro ties that hold the tracheostomy tube in place.

Remove the tracheostomy tube using a slow, outward and downward motion.

Gently insert the same size tracheostomy tube, with the obturator in place. Point the curve of the tube downward. DO NOT FORCE THE TUBE!

Note: the tracheostomy tube may be lubricated with water-soluble gel or with normal saline

If the tracheostomy tube cannot be inserted easily, withdraw the tube and attempt to pass a smaller size tracheostomy tube. If a smaller tracheostomy tube is not available or cannot be inserted, attempt to insert an endotracheal tube (ETT) no more than two inches into the opening. Select an endotracheal tube with an inner diameter equal to or smaller than the inner diameter of the last tracheostomy tube attempted. Aim the tip of the endotracheal tube downward to prevent tissue damage after passing it through the stoma. If the endotracheal tube has a cuff, inflate the cuff after checking proper placement.

Note: make sure the outer diameter of the endotracheal tube is smaller than the outer diameter of the tracheostomy tube most recently attempted.

If a replacement tube cannot be inserted, ventilate by placing the bag mask device with an infant mask attached, directly over the stoma. Cover the child’s mouth and nose. Alternatively, the child can be ventilated by placing a mask over the nose and mouth and covering the stoma.

If ventilations fail through the mouth and nose, or stoma, insert a suction catheter approximately two inches into the stoma. Connect oxygen and transport immediately.

If the tracheostomy tube is successfully placed, assess breath sounds, then secure the tube with the tracheostomy ties. If an ET tube was placed and there is chest rise and equal breath sounds with manual ventilation, secure the tube with tape. Do not cut the endotracheal tube to make it shorter.

Assess breath sounds every 3-5 minutes.

**ALS Only**

13. If ventilation is successful through the nose and mouth, and a replacement tube is unable to be passed through the stoma, orally intubate with an appropriately sized endotracheal tube.
14. Initiate cardiac monitoring. Treat any arrhythmias following the appropriate protocol.

*All Provider Levels:*

15. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen by placing an infant mask directly over the stoma (or as tolerated by the child).

16. Obtain the child’s medical history from the caregiver, including a history of the present illness and past medical history.

17. Assess circulation and perfusion.

*ALS Only*

18. If bronchospasm is present in a patient with adequate ventilation, administer **2.5 mg albuterol** via nebulizer over a 10-15 minute period by placing the aerosol mask directly over the tracheostomy tube. If the patient is being assisted with ventilations, set up an in-line albuterol nebulizer treatment and administer directly through the tracheostomy tube.

19. Initiate cardiac monitoring. If an arrhythmia is present, follow the appropriate algorithm.

20. If bronchospasm persists, repeat **2.5 mg albuterol** via nebulizer up to two times at 15 minute intervals throughout transport.

*All Provider Levels*

21. Contact medical control for additional instructions.

22. Initiate transport to the nearest appropriate facility as soon as possible.

23. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the caregiver may have for the tracheostomy tube. (Note: some caregivers carry a “go bag” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

24. If the child has a ventilator or apnea monitor, bring it to the hospital.

25. Perform focused history and detailed physical exam en route to the hospital.

26. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
All Provider Levels:

1. Follow general patient care guidelines

2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

3. Assess the patient’s airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Follow protocols to assess and manage the tracheostomy tube in addition to these protocols.

4. Look at the ventilator and determine the alarm code (i.e. heart rate, respiratory rate, apnea etc).

5. If no breathing is present, follow the steps below:
   - Disconnect the ventilator tubing from the tracheostomy tube.
   - Ask the caregivers to turn the ventilator off to prevent the alarm from sounding.
   - Attach the bag-valve device to the opening of the tracheostomy tube and begin manual ventilation. If the tracheostomy has an inner cannula, it must be present in order to attach the bag-valve device.
   - Assess for equal chest rise and breath sounds on both sides.
   - If chest rise is shallow, adjust the patient’s airway position and check to see that the bag-valve device is securely connected to the tracheostomy tube. Depress the pop off valve on the resuscitation bag if present. If chest rise does not improve, assess the tracheostomy tube for obstructions by following the tracheostomy protocols.

6. Obtain a pulse oximeter reading.

7. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.


9. Ask the caregivers for the child’s baseline vital signs, ventilator settings and if, they are on home oxygen, the amount and method by which they receive the oxygen.

10. Obtain a complete history including a history of the present illness, past medical history and interventions taken to correct the emergency before EMS arrival.
11. Ask the caregivers or assess the ventilator to determine if the machine is a ventilator or a BiPAP or CPAP machine. BiPAP and CPAP are designed to assist or augment patient breathing and do not ventilate. A child can be transported on CPAP and BiPAP providing his or her respiratory drive is not compromised. If the child has a poor or non-existent respiratory drive, manual ventilations must be initiated immediately. **Please note: BiPAP and CPAP machines do not have internal batteries and only function if they are powered by a source of electricity.**

**BLS Only**

12. If the child has respiratory distress or cardiac arrest, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**ALS Only:**

13. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

14. If bronchospasm is present in a patient with adequate ventilation, administer 2.5 mg albuterol via nebulizer over a 10-15 minute period by placing the aerosol mask directly over the tracheostomy tube. If the patient is being assisted with ventilations, set up an in-line albuterol nebulizer and administer directly through the tracheostomy tube.

**All Provider Levels:**

15. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

16. Check the ventilator and correct any ventilator problems per the following table:

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible causes</th>
<th>Interventions</th>
</tr>
</thead>
</table>
| Low Pressure / Apnea (results in inadequate ventilations or chest rise) | - Loose or disconnected circuit  
- Leak in the circuit  
- Leak around the tracheostomy site | - Ensure that all circuits are connected  
- Check the tracheostomy balloon  
- Ensure that the tracheostomy is well seated |
| Low Power | Internal battery is nearly depleted | Plug the ventilator into a power outlet |
| High Pressure | - Plugged or obstructed airway or circuit (secretions, water)  
- Patient coughing or bronchospasm | - Clear obstruction  
- Suction tracheostomy  
- Administer bronchodilator (ALS Only) |
| Setting Error | Ventilator settings are not within equipment capacity (settings have been incorrectly adjusted) | - Manually ventilate the patient  
- Transport the ventilator and patient |
| Power Switchover | The unit has switched from AC power to internal battery | Press the “Alarm silent” button after ensuring that the battery is powering the ventilator |
19. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have for the tracheostomy tube. (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

20. **Bring the ventilator to the hospital.** If the child is not experiencing respiratory distress, ensure that the ambulance can power the ventilator, or that the ventilator has adequate battery power. If not, disconnect the child from the ventilator and manually ventilate the child.

21. Initiate transport to the nearest appropriate facility as soon as possible.

22. Perform focused history and detailed physical exam en route to the hospital.

23. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
1. Follow general patient care guidelines

2. **Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.**

3. **Assess the patient’s airway and breathing including determination of rate and effort and adequacy of ventilation as determined by inspection and auscultation. Obtain a pulse oximeter reading.**

4. **If child is not breathing then open the airway and begin bag valve ventilation using 100% oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

5. **Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.**

6. **Assess circulation and perfusion.**

7. **Ask the caregivers for the child’s baseline vital signs.**

8. Look at the apnea monitor and determine the alarm code (i.e. heart rate, apnea etc).

9. Check the electrodes or monitor chest belt and ensure proper placement.

10. Make sure that the monitor is powered and is not low on batteries.

**BLS Only**

11. If the child has respiratory distress or cardiac arrest, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

12. Transport the child on the apnea monitor.

**ALS Only:**

13. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

14. Disconnect and power off the apnea monitor to prevent interference. Transport the apnea monitor.
**All Provider Levels:**

15. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

16. Contact medical control for additional instructions.

17. **Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies for other adjuncts the child needs.** (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

18. **Bring the apnea monitor to the hospital with the child.**

19. Initiate transport to the nearest appropriate facility as soon as possible.

20. Perform focused history and detailed physical exam en route to the hospital.

21. Reassess at least every 3-5 minutes or more frequently as necessary and possible.
All Provider Levels:

1. Follow general patient care guidelines

2. **Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.**

3. **Open the airway using a head tilt chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

4. Assess the patient’s breathing including rate, inspection, and auscultation. Assess effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading.

5. **If no breathing is present then position the airway and start bag mask ventilation using 100% oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Follow the steps below to manage the central line.


8. **Ask the caregivers for the child’s baseline vital signs.**

9. Determine if the cause of the emergency is related to the central line by examining the central line and its site of placement. Also determine whether it is an implanted catheter, peripherally inserted central venous catheter (PICC) or tunneled central venous catheter.

10. If the central venous line is partially or completely dislodged, or if there is bleeding from the site, apply direct pressure to the skin site. Estimate the amount of blood loss and evaluate for signs of a hemopneumothorax and air embolus.

11. If the catheter is damaged, clamp the catheter proximal to the break with a hemostat wrapped in gauze. Estimate the amount of blood that may have been lost.

12. If there are fluids infusing through the central line, determine the nature of the fluids and the time that the fluids were started.
13. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history.

14. Assess for signs and symptoms of an air embolism (tachypnea, chest pain, shortness of breath, or loss of consciousness) or blood clots. If an air embolism is suspected, clamp the central line with the clamp on the tube itself, place the child on the left side in a head down position, and administer high flow oxygen.

**BLS Only**

15. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

16. If there are fluids infusing through the central line and ALS transport is not available, ask the primary care providers to stop the infusion before transport.

**ALS Only:**

17. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

18. If the child has a fever or if the central line is damaged, stop fluid infusion immediately. If the child does not have a fever, contact medical control to determine whether fluid infusion should be stopped or changed to normal saline.

19. If the child is in cardiac arrest, the central line is not damaged, and the catheter is not an implanted catheter, utilize the central line to infuse fluids and medications. Access the central line using the guidelines outlined in step 20.

20. Obtain IV access. If IV access is not available, and the child is under six years of age, obtain IO access. If the child is over six years of age or IO access is not available, and the patient presents with signs and symptoms of shock, contact medical control for permission to access the central line. Note: If the central line is damaged, or it is an implanted catheter, it cannot be used. (If you do not have the equipment to access the central line, ask the caregivers for supplies).

21. With permission from medical control access the central line as follows: Note: Do not use the catheter if it is damaged.

**For a central venous catheter:**

- Wash hands and wear sterile gloves
- Scrub the injection cap with alcohol, (not Providine-iodine).
- Clamp the catheter 3 inches from the cap prior to removing the injection cap.
- Remove the cap and secure a 10 cc or 12 cc syringe filled with 5 cc’s of normal saline onto the injection port site of the central line.
- Unclamp the catheter and attempt to slowly aspirate 5cc’s of blood (if blood clots are aspirated: immediately clamp the catheter, contact medical control and do not proceed further.) Clamp the catheter and discard aspirate.
- Secure a new syringe filled with 10 cc's of Normal Saline, unclamp and slowly infuse 5 to 7 cc's into the catheter to ensure patency. (If resistance is met, immediately stop procedure and clamp catheter).
- Clamp the catheter and remove the syringe.
- Place a well-primed IV line onto the injection port and secure with tape.
- Unclamp the line.
- Administer fluids and medications as necessary.

For a Peripherally Inserted Central Venous Catheter (PICC)

- Access using the same procedure as that of an IV line. Follow the precautions below:
  - Do not place a tourniquet on the same arm as the PICC
  - Do not clamp the PICC tubing, instead, clamp the extension tubing
  - Do not flush or aspirate from a PICC with less than a 10 CC syringe (smaller size syringes generate too much pressure and can damage the catheter)
  - The maximum flow rates for a PICC line is 125 ml/hour for less than 2.0 sized Fr. catheters and 250 ml/hour for catheters over 2.0 sized Fr. Catheters.

  Note: Do not take a blood pressure in the same arm as the PICC line.

22. If signs and symptoms of shock exist, infuse a fluid bolus of 20cc/kg of normal saline. This bolus may be repeated up to two times. If signs and symptoms of shock do not exist, infuse normal saline at a KVO rate.

All Provider Levels:

23. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

24. Contact medical control for additional instructions.

25. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the caregiver may have for the central line. (Note: some caregivers carry a “go bag” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

26. Initiate transport to the nearest appropriate facility as soon as possible.

27. Perform focused history and detailed physical exam en route to the hospital.

28. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
Levels:

1. Follow general patient care guidelines

2. Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.

3. Assess the patient’s airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. If the child has a tracheostomy tube, follow protocols to assess and manage the tracheostomy tube in addition to these protocols.

4. If no breathing is present, manually ventilate the patient at an age appropriate rate. DO NOT HYPERVENTILATE!

5. Obtain a pulse oximeter reading.

6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.


8. Ask the caregivers for the child’s baseline vital signs.

9. Assess for signs and symptoms of shunt obstruction or shunt infection. (Signs and symptoms of shunt obstruction or infection include headache, nausea, vomiting, increased sleep, blurred vision, irritability, loss of coordination, altered mental status, bradycardia or other arrhythmias, redness along the shunt track, apnea, seizures, high pitched cry, fever, or full or bulging fontanel).

10. Assess for signs and symptoms of increased intracranial pressure.

11. Obtain a complete history including a history of the present illness and past medical history.

BLS Only

12. Call for ALS support.
ALS Only:

13. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

All Provider Levels:

14. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen. Elevate the child’s head.

15. Contact medical control for additional instructions.

16. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have. (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

17. Initiate transport to the nearest appropriate facility as soon as possible.

18. Perform focused history and detailed physical exam en route to the hospital.

19. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
**Children with Special Health Care Needs**

**All Provider Levels:**

1. Follow general patient care guidelines

2. *Establish patient responsiveness.* If cervical spine trauma is suspected, manually stabilize the spine.

3. *Open the airway using a head tilt chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected.* Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. *Suction as necessary.* If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.

4. Assess the patient’s breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading.

5. *If no breathing is present then position the airway and start bag mask ventilations using 100% oxygen.* If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.

6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.


8. *Ask the caregivers for the child’s baseline vital signs.*

9. Assess the abdomen for signs of distention. If distention is present follow step 15.

10. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history.

11. Determine if the cause of the emergency is related to the feeding tube by examining the feeding tube and its site of placement. Determine the type of feeding tube that is in place.

**BLS Only**

12. Call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

Version 1: December 2001
Center for Prehospital Pediatrics
Children’s National Medical Center
Washington, DC
All Provider Levels:

13. Treat problems associated with the tube as per the following table:

<table>
<thead>
<tr>
<th>Naso or oral feeding tube</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complete catheter dislodgement</strong></td>
<td>Assess respiratory status. Assess for dehydration. Ask if the child has missed any feedings.</td>
</tr>
<tr>
<td><strong>Partially dislodged catheter</strong></td>
<td>Ask the caregiver to check the tube position. If the tube’s position cannot be confirmed, remove the tube by gently pulling the tube out of the nose or mouth. (ALS Only)</td>
</tr>
<tr>
<td><strong>Gastric distention</strong></td>
<td>Connect an appropriately sized syringe to the external opening of the feeding tube. Aspirate until resistance is met. (See step 15). If blood is seen in the aspirated contents, contact medical control and report findings.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Button or Gastrostomy Tube</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Complete catheter dislodgement</strong></td>
<td>Assess for dehydration. Ask if the child has missed any feedings. Place some gauze over the site with direct pressure to site. Rapidly transport to an appropriate hospital. Reinsertion of the tube is immediately needed.</td>
</tr>
<tr>
<td><strong>Insertion site is irritated or bleeding</strong></td>
<td>Cover the site with a sterile dressing and control any bleeding with direct pressure.</td>
</tr>
<tr>
<td><strong>Gastric contents are leaking around catheter</strong></td>
<td>Cover the site with sterile gauze and assess the abdomen. Causes for leakage may include balloon deflation, coughing, constipation, bowel obstruction, and seizure. Treat any medical problem according to the appropriate protocol.</td>
</tr>
<tr>
<td><strong>Gastric distention</strong></td>
<td>Connect the appropriate tubing and syringe to the external opening of the feeding tube. (If the equipment is not available on the ambulance, ask the caregivers for supplies). Aspirate until resistance is met. Distention may be a cause of bowel obstruction or air in the stomach.</td>
</tr>
<tr>
<td><strong>Obstructed tube</strong></td>
<td>Transport immediately to an appropriate facility. The tube needs to be cleared or replaced immediately. Do not force fluids through the tube. Clamp tube.</td>
</tr>
<tr>
<td><strong>Feeding tube adaptor breaks</strong></td>
<td>Clamp the tube and transport immediately to an appropriate facility. The tube needs to be replaced.</td>
</tr>
</tbody>
</table>
14. If there are fluids infusing through the feeding tube, determine the nature of the fluids and the time that the fluids were started. If the feeding tube appears damaged, or the site is irritated, stop all infusing fluids, flush the tube with water and clamp the tube.

15. If abdominal distention is noted, decompress the stomach as follows:

- Ask the caregivers for an appropriate size syringe (or tubing adaptor if the child has an anti-reflux valve).
- Unclamp the distal end of the tube.
- Connect the syringe and tubing adaptor (if indicated), to the external opening of the tube.
- Gently and slowly aspirate air and gastric contents until resistance is met.
- The tube can either then be re-clamped or left open. If left open, place the distal end of the tube in a cup below the level of the stomach so the contents can drain.

**BLS Only:**

16. If there are fluids infusing through the feeding tube and ALS transport is not available, ask the primary care providers to stop the infusion and flush the tube with water before transport.

**ALS Only:**

17. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

18. Obtain IV access. If IV access is not available, and the child is under six years of age, obtain IO access. If the child is over six years of age contact medical control for permission to obtain IO access.

19. If signs and symptoms of shock exist, infuse a fluid bolus of **20cc/kg** of normal saline. This bolus may be repeated up to two times. If signs and symptoms of shock do not exist, infuse normal saline at a KVO rate. If a history consistent with possible dehydration is noted, infuse one fluid bolus at **20cc/kg** of normal saline.

**All Provider Levels:**

20. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

21. Contact medical control for additional instructions.

22. If fluids are infusing through the feeding tube, transport the feeding pump if there is space on the ambulance and if there is a power source for transport. If the pump cannot be transported, stop infusing fluids (**ALS Only**) or ask the caregivers to stop fluid infusion and flush the tube with water.

23. If the fluid infusion was stopped within 30 minutes of transport time, (either before or after EMS arrival), transport the child sitting up.
24. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have for the feeding tube. (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

25. Initiate transport to the nearest appropriate facility as soon as possible.

26. Perform focused history and detailed physical exam en route to the hospital.

27. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
Special Care Protocols:
Children with Special Health Care Needs
Internal Pacemakers/Defibrillators

All Provider Levels:

1. Follow general patient care guidelines

2. **Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.**

3. **Open the airway using a head tilt chin lift if no spinal trauma is suspected, or modified jaw thrust if spinal trauma is suspected. Consider placing an oropharyngeal or nasopharyngeal airway adjunct if the airway cannot be maintained with positioning. Suction as necessary. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

4. Assess the patient’s breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading.

5. **If no breathing is present then position the airway and start bag valve ventilations using 100% oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

6. Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm. Determine if the child has a pacemaker or a defibrillator. The internal pacemaker can easily be felt near the clavicle, or in the abdomen in younger children. If defibrillation or pacing is needed, do not place the defibrillator paddles or pacemaker patches directly over the internal pacemaker or defibrillator generator.

7. **Assess circulation and perfusion.**

8. **Ask the caregivers for the child’s baseline vital signs.**

**BLS Only**

9. Call for ALS support.

**ALS Only**

10. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.
All Provider Levels:

11. Obtain a complete medical history for the patient, including a history of the present illness and the past medical history. Specifically ask the following questions and document the answers.

For a child with an internal pacemaker:

- What type of heart problem does the child have?
- What is the child’s baseline rhythm and what is his/her baseline or underlying heart rate?
- What type of pacemaker does the child have?
- Is the child dependent on the pacemaker?
- When was the pacemaker implanted? (Note: pacemakers may only have a 3-5 year battery life).

For a child with an internal defibrillator:

- What type of heart problem does the child’s have?
- What is the child’s baseline rhythm and what is his/her baseline or underlying heart rate?
- What is the setting for the child’s defibrillator or at what heart rate does the defibrillator fire?
- How many shocks has the child felt?
- Has the child experienced any of the following:
  - felt more than 3 shocks in a row
  - unusual symptoms after experiencing a shock (such as dizziness, palpitations etc)
  - sensations of dizziness, light headedness, palpitations, etc. for a period of time with out any shocks.
- When was the defibrillator implanted? (Note: defibrillators may only have a 3-5 year battery life).

12. Determine if the cause of the emergency is related to a malfunction of the pacemaker/defibrillator.

BLS Only

13. Obtain IV access. If IV access is not available, and the child is under six years of age, obtain IO access. If the child is over six years of age contact medical control for permission to obtain IO access.

All Provider Levels:

14. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

15. Contact medical control for additional instructions.
16. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have. (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

17. Initiate transport to the nearest appropriate facility as soon as possible.

18. Perform focused history and detailed physical exam en route to the hospital.

19. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
All Provider Levels:

1. Follow general patient care guidelines

2. **Establish patient responsiveness. If cervical spine trauma is suspected, manually stabilize the spine.**

3. **Assess the patient’s airway and breathing including rate, auscultation, inspection, effort and adequacy of ventilation as indicated by chest rise. Obtain a pulse oximeter reading.**

4. **If no breathing is present then position the airway and start bag mask ventilations using 100% oxygen. If the child has a tracheostomy tube, follow protocols to manage the tracheostomy tube.**

5. **Check pulse. If no pulse is present, begin chest compressions and follow the appropriate algorithm.**

6. **Assess circulation and perfusion.**

7. Assess the child’s colostomy bag and note any damage to the bag or irritation around the site of the colostomy.

8. If the colostomy site appears irritated or infected (signs of infection include red, warm, tender skin spreading away from the stoma site), empty the colostomy bag (or ask the caregivers to empty the bag) and transport immediately.

9. If the collection bag breaks or is torn off, ask the caregivers for a replacement bag and ensure that the bag fits and seals over the stoma. If a replacement bag is not available, place moist gauze over the stoma opening and place a plastic bag over the gauze to collect any contents. Alternatively, several layers of dressing may be applied over the stoma to collect any contents.

10. Assess the abdomen and note any significant findings.

11. Obtain a complete medical history including history of the present illness. Also, ask the time and amount of the last feeding.


13. **Ask the caregivers for the child’s baseline vital signs.**
**BLS Only**

14. If signs and symptoms of dehydration exist, call for ALS support. Initiate care and do not delay transport waiting for an ALS unit.

**ALS Only:**

15. Initiate cardiac monitoring. Treat any arrhythmias with the appropriate algorithm.

16. Obtain IV access. If IV access is not available, the child is unstable, and less than six years of age, obtain IO access. If the child is over six years of age contact medical control for permission to obtain IO access.

17. If signs and symptoms of shock exist, infuse a fluid bolus of **20cc/kg** of normal saline. This bolus may be repeated up to two times. If a history consistent with possible dehydration is noted, infuse one fluid bolus at **20cc/kg** of normal saline.

**All Provider Levels:**

18. If breathing is adequate, place the child in a position of comfort and administer 100% oxygen.

19. Contact medical control for additional instructions.

20. Bring any of the child’s medical charts or medical forms that the caregiver may have, as well as any supplies that the parent may have for the feeding tube. (Note: some parents carry “go bags” for their children with extra supplies, ask the parent if they have a “go bag” or similar bag for their child and bring it to the hospital).

21. Initiate transport to the nearest appropriate facility as soon as possible.

22. Perform focused history and detailed physical exam en route to the hospital.

23. Reassess at least every 3-5 minutes, more frequently as necessary and possible.
References


Section V

Condition Criteria
Abdominal Pain

Specific Information Needed:

A. **Pain:** nature (crampy or constant), duration, location; radiation to back, groin, chest, shoulder.

B. **Associated symptoms:** nausea, vomiting (bloody or coffee-ground), diarrhea, constipation, black or tarry stools, urinary difficulties, menstrual history, fever.

C. **Past history:** previous trauma, abnormal ingestions, medications, known diseases, surgery.

Specific Objective Findings:

A. **Vital signs.**

B. **General appearance:** restless, quiet, sweaty, pale.

C. **Abdomen:** tenderness, guarding, bowel sounds, distention, rigidity, pulsatile mass.

D. **Emesis:** describe, amount.

Specific Precautions:

A. Causes of abdominal pain can rarely be determined in the field. Pain medication is seldom indicated and may change details of the physical exam necessary to diagnose the patient in the Emergency Department.

B. The most important diagnoses to consider are those associated with catastrophic internal bleeding: ruptured aneurysm, liver, spleen, ectopic pregnancy, etc. Since the bleeding is not apparent, you must think of the volume depletion and monitor patient closely to recognize shock.

C. Elderly patients may have significant hypovolemic shock with systolic blood pressures above 90 mm hg. With signs of hypovolemia initiate fluid resuscitation (see Medical Shock).

Abdominal Trauma
Specific Information Needed:
A. Patient complaints.
B. For penetrating trauma: weapon, trajectory.
C. For auto: condition of steering wheel, dash, vehicle. Speed, patient trajectory. Seatbelts in use, type? Ejected? Entrapped?
D. Past history: medical problems, medications.

Specific Objective Findings:
A. Observe: distention, bruising, entrance/exit wounds.
B. Palpate: areas of tenderness, guarding; pelvis stability to lateral and suprapubic compression.
C. Condition of vehicle and steering wheel.

Special Precautions:
A. The extent of abdominal injury is difficult to assess in the field. Be very suspicious; with significant blunt trauma, injuries to multiple organs are the rule.
B. Patients with spinal cord injury or altered sensorium due to drugs, alcohol, or head injury may not complain of tenderness and may lack guarding in the face of significant intra-abdominal injury.
C. Seatbelts, steering wheels, and other blunt objects may cause occult intra-abdominal injury, which is not apparent until several hours after the trauma. You must consider forces involved to properly treat a trauma victim.
D. Initiate rapid transport and consider ALS intercept or Air Medical Service is the following is detected.
   1. Penetrating abdominal trauma.
   2. Paralysis.
   3. Penetrating chest trauma.
   4. Signs and symptoms of cardiac tamponade.
   5. Shock.

Allergy/Anaphylaxis
Specific Information Needed:

A. History: exposure to allergens (bee stings, drugs, nuts, seafood most common), also antibiotics, prior allergic reactions. Exercise may also induce allergic reactions.

B. Current symptoms: itching, wheezing, respiratory distress, nausea, weakness, lightheadedness or syncope.

C. Medications.

Specific Objective Findings:

A. Vital signs, level of consciousness.

B. Respirations: wheezing, upper airway noise, effort.

C. Mouth: tongue or upper airway swelling.

D. Skin: hives, swelling, flushing.

Specific Precautions:

A. Allergic reactions can take multiple forms.

B. Anxiety, tremor, palpitations, tachycardia, and headache are not uncommon with administration of Epinephrine. These may be particularly severe when given IV. In children, Epinephrine may induce vomiting. In elderly patients angina, MI, or dysrhythmias may be precipitated.

C. Two forms of Epinephrine are carried as part of Paramedic equipment. The standard ampules of aqueous Epinephrine contain a 1:1,000 dilution appropriate for SQ or IM injection. IV Epinephrine should be given in a 1:10,000 dilution. Use the "cardiac" Epinephrine, which is premixed for IV dosing to avoid mistakes. BE SURE YOU ARE GIVING THE PROPER DILUTION TO YOUR PATIENT.

D. Before treating anaphylaxis, be sure your patient has objective signs as well as subjective symptoms and history. Hyperventilators will occasionally think they are having an allergic reaction. Epinephrine will just aggravate their anxiety.

Altered Mental States

Specific Information Needed:

A. History: of recent crisis, emotional trauma, bizarre or abrupt changes in behavior, suicidal ideas, alcohol/drug intoxication, toxic exposure, exertion or heat exposure.
B. Past history: previous psychiatric disorders, medical problems (seizures, diabetes) or medications (including insulin, anti-depressants, other mood-altering drugs).

Specific Objective Findings:
A. Vital signs (note pupil size, symmetry, reactivity).
B. Mental status.
C. Characteristic odor to breath.
D. Medical alert tags.
E. Outside air temperature; patient's temperature.

Specific Precautions:
A. It is important not to forget the organic causes for altered mental states. Psychiatric disorder must be at the bottom of your list, or you may forget important treatable conditions.

<table>
<thead>
<tr>
<th>Hypoxia</th>
<th>Post-ictal states</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycemia</td>
<td>Drug exposure/overdose</td>
</tr>
<tr>
<td>Head injury</td>
<td>Toxic or inhalant exposure</td>
</tr>
<tr>
<td>Hyperthermia</td>
<td>Hypothermia</td>
</tr>
</tbody>
</table>

B. An odor of alcohol is very common in emergency patients, and often is not the primary problem. Do not blame the alcohol without looking carefully first for other potential problems.

C. If the patient is medically stable and emergency treatment is not needed, do not unnecessarily invade the patient's privacy. Try not to escalate verbal violence to physical violence. Do not shout at your patient.

D. If the situation appears threatening, a show of force involving police may be necessary before an attempt to restrain the patient is made. Consider your own safety and limitations. Use enough back up to be confident and forthright.

E. Beware of the combative patient who becomes quiet; check vital signs and airway promptly, and begin resuscitation if needed.

Amputated Parts

Specific Information Needed:
A. History: time and mechanism of amputation; care of severed part prior to rescuer arrival.
B. Past history: medications, bleeding tendencies, medical problems.
Specific Objective Findings:

A. Vital signs.
B. Other injuries.
C. Blood loss at scene.
D. Structural attachments in partial amputations if identifiable.

Specific Precautions:

A. Partial amputations should be dressed and splinted in alignment with extremity to ensure optimum blood flow. Avoid torsion in handling and splinting.

B. Do not use dry ice to preserve severed part.

C. Control all bleeding by direct pressure only to preserve tissues. The most profuse bleeding may occur in partial amputations, where cut vessel ends cannot retract to stop bleeding. Avoid tourniquet if at all possible. Never clamp bleeding vessels.

D. Many factors enter into the decision to attempt reimplantation (age, location, condition of tissues, other options). A decision regarding treatment cannot be made until the patient and part have been examined by a physician; and may not be made at the primary care hospital. Try to help the family and patient understand this and don't falsely elevate hopes.

Arrhythmias: General

Specific Information Needed:

A. Present symptoms: sudden or gradual onset, palpitations.

B. Associated symptoms: chest pain, dizziness or fainting, trouble breathing, abdominal pain, fever.
C. Prior history: arrhythmias, cardiac disease, exercise level, pacemaker.

D. Current medications, particularly cardiac.

**Specific Objective Findings:**

A. Vital signs.

B. Signs of poor cardiac output:
   1. Altered level of consciousness.
   3. Systolic BP < 90 mm Hg.

C. Signs of cardiac failure (increased back-up pressure):
   1. Neck vein distention.
   2. Lung congestion, crackles (rales)
   3. Peripheral edema: sign of chronic failure, not acute.

D. Signs of hypovolemia:
   1. Sinus tachycardia, 100-160 (usually).
   2. Flat neck veins.
   3. Poor peripheral perfusion.
   4. Evidence of blood loss (see Medical Shock).

**Specific Precautions:**

A. Documentation of arrhythmias is extremely important: field treatment of an arrhythmia may be life saving, but long-term treatment requires knowing what the problem was. Documentation also allows for learning and discussion after the case. Certain arrhythmias are not common, and should be reviewed and used as learning tools by as many persons as possible.

**Arrhythmias: General (cont.)**

**Specific Precautions (cont.):**

B. Correct arrhythmia diagnosis based only on monitor strip recordings can be difficult and often not possible. Treatment must be based on observed parameters: rate, patient condition and distance from the hospital.
C. Cardiac arrest and life-threatening arrhythmias can be successfully treated in the field, and show the benefits of "stabilization before transfer" in prehospital care.

Arrhythmias: Bradycardia, Normal Rate, and Tachycardia

BRADYCARDIA:

Specific Precautions:
A. Pain from injury can occasionally cause marked vagal stimulation, with bradycardia and hypotension. This will respond to positioning with legs elevated or administration of Atropine or fluids. Pain control may also be helpful.

B. Well conditioned athletes may normally be bradycardic, with pulses equal to or less than 40 beats/min.; ask your patient what is normal for him or her. In the setting of chest pain or possible acute MI, sinus bradycardia under 50 beats/min. should be treated. Even if the patient appears to be tolerating the rate, inadequate cardiac perfusion should not be risked.

C. Atropine is more likely to be effective when block is not complete.

D. Differentiate premature ventricular beats from escape beats, which are wide complexes occurring late after the preceding beat as a lower pacemaker cell takes over. Escape beats are beneficial to the patient and should be treated by increasing the underlying rate and conduction; not by suppressing the escape beat.

NORMAL RATE:

Special Precautions:

A. PVCs are common in elderly patients who are seen for any reason. They should only be treated in the presence of acute cardiac symptoms.

B. Propranolol and other beta-blockers can prevent the tachycardiac response to pain, hypoxia, or hypovolemia. Look carefully for hidden problems in patients on these medications.

C. Acute atrial fibrillation may cause hypotension because the atrial "kick" is lost and ventricular filling suddenly becomes less adequate. Acutely, it is usually accompanied by a ventricular response > 160/min. If the ventricular rate is in the normal range, the rhythm is most likely chronic. Look for other causes of patient deterioration.

Arrhythmias: Bradycardia, Normal Rate, and Tachycardia (cont.)

TACHYCARDIA:

Special Precautions:
A. Wide complex tachycardias may be ventricular or supraventricular in origin. Treatment should be based on adequacy of perfusion. Assume ventricular tachycardia unless your patient is asymptomatic.

B. It is most difficult to know how aggressive to be in treating the patient in the "grey" zone: symptomatic but conscious. Discuss with Medical Control; transport time, patient complaints, and vital signs will need to be considered.

Bites and Stings

Specific Information Needed:

A. Type of animal; time of exposure.
**Oklahoma State EMS Protocols**

**B. Symptoms:**

1. Local: pain, stinging, redness, swelling.
2. Generalized: dizziness, weakness, itching, trouble breathing, muscle cramps.

**C. History of previous exposures; allergic reactions.**

**Specific Objective Findings:**

A. Identification of spider, bee, marine animal, if possible.

B. Local signs: erythema, swelling, heat in area of bite.

C. Systemic signs: hives, wheezing, respiratory distress, abnormal vital signs.

**Specific Precautions:**

A. For all types of bites and stings, the goal of prehospital care is to prevent further inoculations and to treat allergic reactions.

B. Allergy kits consist of injectable Epinephrine and oral antihistamine, and are prescribed for persons with known systemic allergic reactions. If you respond as an emergency provider, you may assist your patient if the patient requests your assistance and has his own materials.

C. About 60% of patients who have experienced a generalized reaction to a bite or sting in the past will have a similar or more severe reaction upon reinoculation. Thus, although it is not inevitable, this group of patients must be considered at high risk for anaphylaxis. In addition, a small group of patients will have anaphylaxis as a "first" reaction.

D. Time since envenomation is important. Anaphylaxis rarely develops more than 60 minutes after inoculations.

**Burns**

**Specific Information Needed:**

A. History of injury: time elapsed since burn. Was patient in a closed space with steam or smoke? Electrical contact? Loss of consciousness? Accompanying explosion, toxic fumes?
B. Past history: prior cardiac or pulmonary disease medications?

Specific Objective Findings:

A. Vital signs.

B. Extent of burns.

C. Depth of burns:
   1. Superficial - erythema only.
   2. Significant - blistered or charred areas.

D. Evidence of CO poisoning or other toxic inhalation: altered mental state, headache, vomiting, seizure, coma.

E. Evidence of inhalation burns: respiratory distress, cough, hoarseness; singed nasal or facial hair; soot or erythema of mouth.

F. Entrance and exit wounds for electrical burns.

Specific Precautions:

A. Leave blisters intact when possible.

B. Suspect airway burns in any facial burns or burns received in closed places. Edema may become severe. Avoid unnecessary trauma to the airway. Humidified O₂ is useful if available.

C. Death in the first 24 hours after burn injury is due to airway burns, fluid loss, or toxic inhalants (especially carbon monoxide or cyanide).

D. Assume carbon monoxide poisoning in all closed space burns. Treatment is 100% O₂ by NRB mask. In addition, other toxic products of combustion are more commonly encountered than we realize.

Burns (cont.)

Special Precautions (cont.):

E. Consider MI as a cause of injury in firefighters who are burned. Consider suicide attempt as cause of burn, and child abuse in pediatric burns.
F. Lightning injuries can cause prolonged respiratory arrest. Prompt, continuous respiratory assistance (sometimes for hours to days) can result in full recovery.

G. Field decontamination of chemical exposures has been shown to significantly reduce extent of burn. It is rare to encounter a chemical which is not properly decontaminated by copious water. Unless a specific contraindication is known, do not waste time before initiating treatment to find out the specific culprit. The Poison Control Center, however, can be invaluable in providing added information en route or at the hospital.

Cardiac Arrest

Specific Information Needed:

A. History of arrest: onset, preceding symptoms, witnessed, bystander CPR, or other treatment; duration of arrest.
Oklahoma State EMS Protocols

B. Past history: diseases, medications.

C. Surroundings: evidence of drug ingestion, trauma, other unusual presentations.

Specific Objective Findings:

A. Absence of consciousness.

B. Terminal or no respirations.

C. Absence of pulse.

D. Signs of trauma, blood loss.

E. Air temperature; skin temperature.

Specific Precautions:

A. Survival from cardiac arrest is related to the time to BOTH BLS and ALS treatment. Don’t forget CPR and AED protocols in the rush for advanced equipment.

B. Be sure to recheck for pulselessness and unresponsiveness when you arrive, even if CPR is in progress. This will avoid needless and dangerous treatment of “collapsed” patients who are inaccurately diagnosed initially or who have spontaneous return of cardiac function after an arrhythmia or vasovagal episode.

Chest Injury

Specific Information Needed:

A. Patient complaints: chest pain (type), respiratory distress, neck pain, other areas of injury.

B. Mechanism: amount of force involved, particularly deceleration; speed of impact; seatbelt use, type.
C. **Penetrating trauma:** size of object, caliber of bullet.

D. **Past medical history:** medications, prior medical problems.

**Specific Objective Findings:**

A. **Observe:** wounds, air leaks, chest wall movement, neck veins.

B. **Palpate:** tenderness, crepitus, tracheal position, tenderness on sternal compression, pulse pressure.

C. **Auscultate:** breath sounds, heart sounds (quality).

D. **Surroundings:** vehicle, steering wheel condition.

**Specific Precautions:**

A. Chest trauma is treated with difficulty in the field and prolonged treatment before transport is NOT indicated if significant injury is suspected. If patient is critical, transport rapidly and avoid treatment of non-emergent problems at the scene. Penetrating injury particularly should receive immediate transport with minimal intervention in the field.

B. Consider medical causes of respiratory distress such as asthma, pulmonary edema or COPD that have been aggravated by trauma.

C. Chest injuries sufficient to cause respiratory distress are commonly associated with significant blood loss. Look for hypovolemia.

D. Myocardial contusion can occur, particularly with anterior chest wall injury, as from a steering wheel. Monitor your patient and treat arrhythmias as you would in a medical patient.

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**Chest Pain**

**Specific Information Needed:**

A. **Pain:** nature, onset, duration, location, radiation, aggravation, alleviation, relationship to exertion.

B. **Associated symptoms:** nausea, vomiting, diaphoresis, respiratory difficulty, cough, fever.
C. Past history: previous cardiac or pulmonary problems, medications, drug allergies.

Specific Objective Findings:
A. Vital signs.
B. General appearance: color, apprehension, sweating.
C. Signs of heart failure: neck vein distention, peripheral edema, respiratory distress.
D. Lung exam by auscultation: crackles, wheezes or decreased sounds.
E. Chest wall tenderness, abdominal tenderness.

Specific Precautions:
A. Suspicion of an acute MI is based on history. Do NOT be reassured by a "normal" monitor strip. Conversely, "abnormal" strips (particularly ST and T changes) can be due to technical factors or nonacute cardiac diseases. ST elevation that changes after nitroglycerin administration can be significant and should be documented.

B. Constant monitoring is essential. As many as 50% of patients with acute MI who develop ventricular fibrillation may have no warning arrhythmias.

Childbirth

Specific Information Needed:
A. History of pregnancy(s): due date, bleeding, swelling of face or extremities, prior problems with pregnancy, prenatal care.

C. Medical history: medications, medical problems, patient’s age, number of prior pregnancies.

Specific Objective Findings:

A. Vital signs, particularly any degree of hypertension.

B. Swelling of face or extremities.

C. Contraction and relaxation of uterus.

D. Where privacy is possible, examine perineum for:
   1. Vaginal bleeding or fluid: color? odor?
   2. Crowning (head visible during contraction)?
   3. Abnormal presentation (foot, arm, cord)?

E. If delivery occurs, APGAR score of child at one and five minutes.

Specific Precautions:

A. It is safe to assume that any medical or trauma condition will be complicated in pregnancy. Conversely, pregnancy can be complicated by any trauma or medical condition. The abdominal pain complained of by a pregnant woman may not be uterine contractions.

B. Do not pull on cord. Premature delivery of the placenta is accompanied by tearing, partial separation and sometimes severe bleeding.

C. Eclampsia may complicate any pregnancy. Hypertension (often of mild degree) and peripheral edema are usually evident, and the patient may exhibit behavior changes or muscle irritability. Seizures occurring before or after the time of delivery may cause hypoxic risk to fetus or mother.

D. Ask patient if she feels as though she’s delivering. Particularly with prior deliveries, most mothers will know. Subsequent deliveries are frequently faster.

Childbirth (cont.)

Specific Precautions (cont.)

E. Babies are slippery.

F. Babies have poor temperature regulation and no clothes. Bundle, preferably with mother. If O₂ is administered to the infant, use a portable tank since O₂ from the vehicle delivery system may promote hypothermia.
G. Keep your cool. Women have been delivering babies for many years. In most cases you will do nothing more than preside at a natural event.

H. Under no circumstances is episiotomy needed or indicated in the field.

Coma

Specific Information Needed:

A. Present history: duration of illness, onset and progression of present state; antecedent symptoms such as headaches, seizures, confusion, trauma, etc.

B. Past history: previous medical or psychiatric problems.

C. Medications: use or abuse.
Specific Objective Findings:

A. Safety to rescuer: check for gases or other toxins.

B. Vital signs.

C. Level of consciousness and neurological status.

D. Signs of trauma: head, body.

E. Breath odor.

F. Needle tracks.

G. Medical alert tag.

Specific Precautions:

A. Be particularly attentive to airway. Difficulty with secretions, vomiting, and inadequate tidal volume is common.

B. Hypoglycemia may present as focal neurologic deficit (stroke-like picture) or coma in elderly persons.

C. Coma in the diabetic may be due to hypoglycemia or to hyperglycemia (diabetic ketoacidos). Do not give oral sugar to an unconscious patient.

D. Be sure the airway and the patient are controlled before giving Naloxone to a known opiate addict. The acute withdrawal precipitated in an addict may result in violent combativeness.

Drowning/Near-Drowning

Specific Information Needed:

A. How long was patient submerged?

B. Fresh or salt water, degree of contamination, water temperature.

C. Diving accident? Water depth?

Specific Objective Findings:
A. Vital signs.

B. Neurologic status: monitor on a continuing basis.

C. Lung exam: crackles or signs of pulmonary edema, respiratory distress.

Specific Precautions:

A. Be prepared for vomiting. Patients should be secure on spineboard for log-rolling to protect airway.

B. **All near-drownings or submersions should be transported.** Even if patients initially appear fine, they can deteriorate. Monitor closely. Pulmonary edema often occurs due to aspiration, hypoxia, and other factors. It may not be evident for several hours after near-drowning.

C. Beware of neck injuries - they often go unrecognized. Collar and backboard can be applied in the water if the patient is not yet on land.

D. If patient is hypothermic, defibrillation may be unsuccessful until the patient is rewarmed. Prolonged CPR may be needed. See Hypothermia Protocol.

**Extremity Injuries**

Specific Information Needed:

A. Mechanism of injury, direction of forces, if known.

B. Areas of pain or limited movement.

C. Treatment prior to arrival: reduction of open or closed fracture; movement of patient.

Specific Objective Findings:

A. Vital signs.
B. Observe: localized swelling, discoloration, angulation, lacerations, exposed bone fragments, loss of function, guarding.

C. Palpate: tenderness, crepitus, instability, quality of distal pulses, sensation.

D. Note estimated blood loss at scene.

Special Precautions:

A. Patients with multiple injuries have a limited capacity to recognize areas which have been injured. A patient with a femur fracture may be unable to recognize that he has other areas of pain. Be particularly aware of missing injuries proximal to the obvious ones (e.g., a hip dislocation with a femur fracture, or a humerus fracture with a forearm fracture).

B. Do not use ice or cold packs directly on skin or under air splints; pad with towels or leave cooling for hospital setting.

C. Do not attempt to reduce dislocations in the field. Splint in the position of comfort.

D. Fractures do not necessarily lead to loss of function: impacted fractures may cause pain but little or no loss of function.

E. Do not allow severely angulated, open, bloody fractures to distract you from a less obvious pneumothorax with respiratory distress. Extremity injuries benefit from appropriate care, but are of low priority in a multiply injured patient. Quick stabilization with a long board and generous taping is ample for the seriously injured patient.

F. Injuries around joints may become more painful and circulation may be lost with attempted reduction. If this occurs, stabilize the limb in the position of most comfort and with the best distal circulation.

Face and Neck Trauma

Specific Information Needed:

A. Mechanism of injury: impact to steering wheel, windshield, or other objects. Clothesline-type injury to face or neck.

B. Management before arrival by bystanders, first responders.

C. Patient complaints: areas of pain; trouble with vision, hearing, neck pain; abnormal bite.

D. Past medical history: medications, medical illnesses.
Specific Objective Findings:

A. Vital signs.

B. Airway: jaw or tongue instability; loose teeth, vomitus or blood in airway; other evidence of impairment or obstruction.

C. Neck: tenderness, crepitus, hoarseness, bruising, swelling.

D. Blood or drainage from ears, nose.

E. Level of consciousness, evidence of head trauma.

F. Injury to eye: lid laceration, blood anterior to pupil, abnormal pupil, abnormal globe position or softness.

Specific Precautions:

A. Fracture of the larynx should be suspected in patients with respiratory distress, abnormal voice, and history of direct blow to neck from steering wheel, rope, fence wire, etc. Both intubation and cricothyrotomy may be unsuccessful in the patient with a fractured larynx and attempts may precipitate respiratory arrest. Transport rapidly for definitive treatment if you suspect this potentially lethal injury. Do not attempt intubation or cricothyrotomy unless the patient arrests.

B. Airway obstruction is the primary cause of death in persons sustaining head and face trauma. Meticulous attention to suctioning, and stabilization of tongue and mandible may be the most important treatment rendered.

C. Remember that the apex of the lung extends into the lower neck and may be injured in penetrating injuries of the lower neck, resulting in pneumothorax or hemothorax.

Face and Neck Trauma (cont.)

D. Do not be concerned with contact lens removal in the field. Remind the Emergency Department of their presence. If they have broken, irrigate with normal saline and IV tubing, just as you would for any foreign body.
Head Trauma

Specific Information Needed:

A. History: mechanism of injury, estimate of force involved; with motorcycle or bicycle, was helmet worn?

B. History since injury: loss of consciousness (duration), change in level of consciousness, memory loss for events before and after trauma, movement (spontaneous or moved by bystanders).

C. Past history: medications (especially Insulin), medical problems, seizure history.

Specific Objective Findings:

A. Vital signs (note respiratory pattern and rate).
B. Neurologic assessment, including pupils, response to stimuli and Glasgow Coma Scale observation:

C. External evidence of trauma: contusions, abrasions, lacerations, bleeding from nose, ears.

Specific Precautions:

A. When head injury patients deteriorate, check first for airway, oxygenation and blood pressure. These are the most common causes of "neurologic" deterioration. If the patient has tachycardia or hypotension, look for hidden hypovolemia from associated injuries and do not blame the head injury.

B. The most important information you provide for the base physician is level of consciousness and its changes. Is the patient stable, deteriorating or improving?

C. Assume cervical spine injury in all patients with head trauma.

D. Restlessness can be a sign of hypoxia. Cerebral anoxia is the most frequent cause of death in head injury.

E. If active airway ventilation is needed, intubate and hyperventilate at 24 breaths/min. Hypoventilation aggravates cerebral edema.

F. Do not try to stop bleeding from nose and ears. Cover with clean gauze if needed to prevent further contamination.

Head Trauma (cont.)

G. Scalp lacerations can cause profuse bleeding, and are difficult to define and control in the field. If direct local pressure is insufficient to control the bleeding, evacuate any large clots from flaps and large lacerations with sterile gauze, and use direct hand pressure to provide hemostasis. If the underlying skull is unstable, pressure should be applied to the periphery of the laceration over intact bone.
**Hypertension**

*Specific Information Needed:*

A. History of hypertension and current medications.

B. New symptoms: dizziness, nausea, confusion, visual impairment.

C. Drug use: Phenylpropanolamine, amphetamines, Cocaine.

D. Other symptoms: chest pain, breathing difficulty, abdominal/back pain, severe headache.

*Specific Objective Findings:*

A. Evidence of encephalopathy: confusion, seizures, coma, vomiting.
B. Presence of associated findings: pulmonary edema, neurologic signs, neck stiffness, unequal peripheral pulses.

Specific Precautions:

A. Secondary hypertension (high BP in response to stress or pain) is commonly seen in the field. It does not require field treatment, and may not even mean the patient has chronic hypertension requiring ongoing treatment.

B. Hypertensive encephalopathy is uncommon. Hypertension is more common in association with other problems (pulmonary edema, seizures, chest pain, coma, or altered mental states). It should be managed by treating the other problem, which is usually primary.

C. Don’t forget that false elevation of BP can result from a cuff that is too small for the patient. The cuff should cover 1/3 to 1/2 of the upper arm and the bladder should completely encircle the arm.

D. Hypertension is seen in severe head injury and intracranial bleeding and is thought to be a protective response that increases perfusion to the brain. Treatment should be directed at the intracranial process, not the blood pressure.

Hyperthermia

Specific Information Needed:

A. Patient age, activity level.

B. Medications: depressants, tranquilizers, alcohol, etc.

C. Associated symptoms: cramps, headache, orthostatic symptoms, nausea, weakness.

Specific Objective Findings:

A. Vital signs; temperature: usually 104 degree F (axiallary) (40 degree C) or greater.

B. Mental status: confusion, coma, seizures, psychosis.

C. Skin flushed and warm: with or without sweating.
D. Air temperature and humidity, patient dress.

Specific Precautions:

A. Heat stroke is a medical emergency. Sweating may still be present, especially in exercise-induced heat stroke. The other patients at risk for heat stroke are the elderly and persons on medications that impair the body’s ability to regulate heat.

B. Differentiate heat stroke from: heat exhaustion (hypovolemia of more gradual onset) and heat cramps (abdominal or leg cramps). Be aware that heat exhaustion can progress to heat stroke.

C. Do not use wet sheets over patient without good airflow. Wet sheets will tend to limit evaporative loss.

D. DO NOT LET COOLING IN THE FIELD DELAY YOUR TRANSPORT. Cool patient while en route.

Hypothermia and Frostbite

Specific Information Needed:

A. Length of exposure.

B. Air temperature, water temperature, winds, patient wet?

C. History and timing of changes in mental status.

D. Drugs: alcohol, tranquilizers, anticonvulsants, others.

E. Medical problems: diabetes, epilepsy, alcoholism, etc.

F. With local injury: history of thawing/refreezing?

Specific Objective Findings:
A. Vital signs, mental status, shivering. (Prolonged observation for 1-2 minutes may be necessary to detect pulse, respirations.)

B. Temperature: rectal 95 degree F (35 degree C) is significant. Note also current temperature of environment.

C. Evidence of local injury: blanching, blistering, erythema of extremities, ears, nose.

D. Cardiac rhythm.

Specific Precautions:

HYPOTHERMIA:

A. Shivering does not occur below 90 degree F (32 degree C).

B. The heart is most likely to fibrillate below 85-88 degree F (30 degree C). A single sequence of three stacked defibrillations should be attempted once, but prolonged CPR may be necessary until the temperature is above this level.

C. ALS drugs should be used sparingly, since peripheral vasoconstriction may prevent entry into central circulation until temperature is restored; at that time a large bolus of unwanted drugs may be infused into the heart. Bradycardias are normal and should not be treated.

D. Any handling and airway manipulation may induce ventricular fibrillation in the hypothermic patient. Delay intubation if airway can be managed by less invasive means.

Hypothermia and Frostbite (cont.)

Specific Precautions (cont.):

HYPOTHERMIA (cont.):

E. If patient has even a faint pulse, organized monitor rhythm and occasional respirations, CPR is currently felt to be unnecessary. In general, even very slow rates are probably sufficient for metabolic demands. CPR is indicated for asystole and ventricular fibrillation.

F. Patients who appear dead after prolonged exposure to cold air or water should not be pronounced "dead" until they have been rewarmed. Full recovery from hypothermia with undetectable vital signs, severe bradycardia, and even periods of cardiac arrest has been reported.

G. Rewarming should be accomplished with careful monitoring in a hospital setting whenever possible.
H. Early recognition of hypothermia is essential when exposed to cold weather. Death often occurs because patient becomes apathetic, confused, and unable to help himself/herself.

FROSTBITE:

A. Thawing is extremely painful and should be done under controlled conditions, preferably in the hospital. Careful monitoring, pain medication, rapid rewarming, and sterile handling are required.

B. It is clear that partial rewarming, or rewarming followed by refreezing, is far more injurious to tissues than delay in rewarming or walking on a frozen extremity to reach help. Do not rewarm prematurely. Indications for field rewarming are almost nonexistent.

C. Warming with heaters or stoves, rubbing with snow, drinking alcohol and other methods of stimulating the circulation are dangerous and should not be used.

Neurologic Deficit

Specific Information Needed:

A. Present history: when last well, where found, sequence of deficits, antecedent symptoms such as headache, head trauma, seizure, etc.

B. Past history: seizures, diabetes, cardiovascular diseases; medications.

Specific Objective Findings:

A. Vital signs. Level of consciousness.

B. Movement and symmetry of face, extremities.

C. Medical alert tags.

D. Signs of dehydration or of adrenaline effect (diaphoresis, tremor, tachycardia).
**Specific Precautions:**

A. Not all neurologic deficits are caused by stroke. Look for treatable medical conditions: hypoglycemia, hypothermia, hypoxia, and hyperthermia. Hypotension with resultant poor cerebral blood flow may be another reversible cause of neurologic deficit.

B. Hypoglycemia is the great mimic. It can present with: seizures, coma, behavior problems, intoxication, confusion or stroke-like picture with focal deficits (particularly in elderly patients).

C. A patient with a stroke can present with aphasia (inability to talk) and still be completely alert. Talk to the patient, explain everything that you are doing, and avoid comments that you would not want to hear yourself.

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**Poisons and Overdoses**

**Specific Information Needed:**

A. Type of ingestion: What, when, and how much was ingested? Bring the poison, the container, sample of emesis, all medications and everything questionable in the area with the patient to the Emergency Department.

B. Reason for ingestion: think of child neglect, suicidal problems.

C. Symptoms: burning, eye irritation, respiratory distress, sleepiness, nausea.

D. Past history: medications, diseases.

E. Action taken by bystanders: induced emesis? "antidote" given?

**Specific Objective Findings:**

A. Vital signs.
Oklahoma State EMS Protocols

B. Airway: patency and adequacy of ventilations.

C. Level of consciousness and neurologic status: check frequently.

D. Breath odor, increased salivation, oral soot or burns.

E. Skin: sweating, evidence of skin burns.

F. Eye irritation.

G. Systemic signs: vomiting, arrhythmias, lung findings.

Specific Precautions:

A. There are few specific "antidotes". Product labels and home kits can be misleading and dangerous. Watch the ABCs, these are important.

B. Do NOT neutralize acids with alkalis. Do NOT neutralize alkalis with acids. These "treatments" cause heat-releasing chemical reactions that can further injure the GI tract.

C. A commonly missed external contamination is gasoline. Be sure that spilled gasoline in trauma victims is washed off promptly and clothing removed to prevent irritant burns.

D. Inhalation poisoning is particularly dangerous to rescuers. Recognize an environment with continuing contamination and extricate rapidly.

Respiratory Distress

Specific Information Needed:

A. History: acute change or injury, slow deterioration.

B. Past history: chronic lung or heart problems or known diagnosis; medications; home oxygen; past allergic reactions; recent surgery; diabetes.

C. Associated symptoms: chest pain; cough; hand or mouth paresthesias; fever.

Specific Objective Findings:

A. Vital signs.

B. Oxygenation: level of consciousness, cyanosis.

C. Ventilatory effort: accessory muscle use, forward position, hyperinflation, pursed lips.

E. Signs of upper airway obstruction: hoarseness, drooling, exaggerated chest wall movements, inspiratory stridor.

F. Signs of congestive failure: neck vein distention in upright position, wet crackling lung sounds, peripheral edema.

G. Breath sounds: clear, decreased, wet or crackling (rales), wheezing, or rhonchi (lower sounds from large tube obstructions).

H. Hives, upper airway edema.

I. Evidence of trauma: crepitus of neck or chest, bruising, steering wheel damage, penetrating wounds. (see Chest Injury)

Specific Precautions:

A. When children with croup, epiglottitis, or laryngeal edema develop respiratory arrest, it is usually due to exhaustion or spasm. You will still be able to ventilate with mouth-to-mouth, pocket mask, or BVM. Don't attempt intubation unless these techniques fail.

Respiratory Distress (cont.)

Specific Precautions (cont.):

B. Don't diagnose "hyperventilation" in the field. Your patient could have a pulmonary embolus or other serious problem. Treatment with oxygen will not harm the hyperventilator, and it will keep you from underestimating the problem.

C. Wheezing in older persons may be due to pulmonary edema ("cardiac asthma").

D. Patients with COPD and severe respiratory distress are commonly seen in the field and are very difficult to evaluate. Acute problems may be due to bronchospasm, but Epinephrine may have undesirable effects also. Pneumothorax may occur but is difficult to diagnose. Often the patient with COPD must be transported rapidly with supportive care only. You cannot differentiate acute-superimposed-upon-chronic respiratory failure in a few minutes. Observe the patient closely for somnolence. Discuss the patient with Medical Control if specific modes of treatment seem appropriate.

Table IV.1

BREATH SOUNDS IN RESPIRATORY DISTRESS
### Oklahoma State EMS Protocols

<table>
<thead>
<tr>
<th>Auscultation</th>
<th>Location</th>
<th>Possible Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear</td>
<td>Bilateral</td>
<td>MI, metabolic, pulmonary embolus, anxiety, toxin</td>
</tr>
<tr>
<td>Decreased</td>
<td>Bilateral</td>
<td>COPD</td>
</tr>
<tr>
<td></td>
<td>Localized</td>
<td>COPD, pneumothorax, pulmonary embolus, pneumonia</td>
</tr>
<tr>
<td>Crackles (rales) (inspiration)</td>
<td>Bilateral</td>
<td>Pulmonary edema, extensive pneumonia or lung disease</td>
</tr>
<tr>
<td></td>
<td>Localized</td>
<td>Pneumonia, pulmonary edema</td>
</tr>
<tr>
<td>Wheezes (Expiration)</td>
<td>Bilateral</td>
<td>Asthma; occasionally (expiration) pulmonary edema, embolus.</td>
</tr>
<tr>
<td></td>
<td>Localized</td>
<td>Foreign body, embolus, COPD</td>
</tr>
<tr>
<td>Rhonchi (coarse, wet sounds)</td>
<td>Bilateral</td>
<td>Bronchitis, COPD, pneumonia</td>
</tr>
</tbody>
</table>

### Seizures

**Specific Information Needed:**

A. Seizure history: onset, time interval, previous seizures, type of seizure.

B. Medical history: especially head trauma, diabetes, headaches, drugs, alcohol, medications, pregnancy.

**Specific Objective Findings:**

A. Vital signs.

B. Description of seizure activity.

C. Level of consciousness.

D. Head and mouth trauma.

E. Incontinence.
F. Air temperature; patient temperature.

G. Skin color and moisture.

Specific Precautions:

A. Move hazards away from patient. Restrain the patient only if needed to prevent injury. Protect patient’s head.

B. Attempting to force an airway into the patient’s mouth can completely obstruct airway. Do not use bite sticks.

C. Seizure can be due to lack of glucose or oxygen to the brain, as well as to the irritable focus associated with epilepsy. Don’t forget to check for pulse once a seizure terminates.

D. Alcohol-related seizures are common, but cannot be differentiated from other causes of seizure in the field. Assessment in the intoxicated patient should still include consideration of hypoglycemia and all other potential causes. Field management is as for any seizure.

E. In patients over the age of 50, seizures may be due to arrhythmias or stroke. Of these, arrhythmia is the most important to recognize in the field.

Shock: Medical

Specific Information Needed:

A. Onset: gradual or sudden; precipitating cause or event.

B. Associated symptoms: itching, peripheral or facial edema, thirst, weakness, respiratory distress, abdominal or chest pain, dizziness on standing.

C. History: allergies, medications, bloody vomitus or stools, significant medical diseases, history of recent trauma, last menstrual period, vaginal bleeding, fever.

Specific objective findings:

A. Vital signs: pulse > 120 (occasionally < 50); BP < 90 systolic.

B. Mental status: apathy, confusion, restlessness.

C. Skin: flushed, pale, sweaty, cool or warm, hives, or other rash.

D. Signs of trauma, particularly blunt.
E. Signs of pump failure (back-up pressure): jugular venous distention in upright position, wet lung sounds, peripheral edema (indicates chronic pump failure).

Shock: Traumatic

Specific Information Needed:
A. Mechanism of injury: forces, speed, trajectory.
B. Patient complaints: thirst, dizziness, weakness, chest pain, trouble breathing.
C. Car: steering wheel and vehicle condition; seatbelts, use and type?
D. Past medical history: medications, medical illnesses.

Specific Objective Findings:
A. Vital signs: pulse > 120 (bradycardia or normal pulse rate may occur in some patients); BP < 90 systolic.
B. Mental status: apathy, confusion, restlessness.
C. Skin: flushed, constricted, sweaty, cool or warm, color.
D. Signs of blunt injury or bleeding: flank hematoma, chest or abdominal wall contusion.
E. Jugular veins: flat or distended?

Specific Precautions:

A. Hypotension itself is a late sign of hypovolemia. You must anticipate blood loss from the mechanism of injury and be ready to treat. Often a patient may suddenly "go bad" if the subtle clues aren't noticed beforehand.

B. Hypertensive and elderly patients can have significant hypovolemia at higher pressures than 90 mm Hg systolic. Look for the adrenergic signs: vasoconstriction, sweating, mental alterations, agitation. Treat the entire picture and not just the blood pressure.

C. Neurogenic shock is caused by relative hypovolemia as blood vessels lose tone from spinal cord injury. Treat as for hypovolemia, and if hypotension persists, consider occult blood loss as an additional cause of shock.

D. While most shock in the setting of trauma is hypovolemic, assessment and treatment priorities should be organized to include a check for the possible "cardiogenic" causes that should be managed differently. Pericardial tamponade, tension pneumothorax, myocardial contusion are uncommon but should be looked for!

Shock: Traumatic (cont.)

Specific Precautions (cont.):

E. Scalp lacerations can cause profuse bleeding, and are difficult to define and control in the field. Expose the wound if bleeding cannot be controlled easily, evacuate any large clots from flaps and large lacerations with sterile gauze, and use direct hand pressure to provide hemostasis.

F. Another important and increasingly frequent cause of "relative" bradycardia (P < 100) in the face of hypovolemic shock is the patient on beta-blocker drugs (e.g., propranolol), who cannot respond to blood loss with a tachycardia.
Special Trauma Problems

Certain trauma situations call for assessment and treatment that goes beyond the standard treatment given for the patients presenting complaints and injury. Treatment of physical injuries should be as listed in the protocols, but the following special considerations should be noted:

Sexual Assault:

A. History should not be more extensive than necessary from a medical standpoint. Legal and psychological details are best left to persons who will be able to use that information, follow it up with appropriate actions, and provide ongoing support to the patient.

B. You can, however, help with the patient's psychological needs. Do not judge the victim, who already feels debased, worthless, and guilty, no matter how blameless. Allow the patient as much freedom of choice in dealing with the medical community as possible. Do as little controlling as you need to; let the patient control any aspects of care that he or she can.

C. Remember that the radio waves are public; particularly with sexual assault victims, refrain from names and details.

D. There may be hesitancy on the part of the victim to accept assistance from the same sex as the assailant. If an attendant of the other sex is available, it may be preferable to allow that attendant to treat. Be aware, however, that this can be a chance to revive faith in the other sex. Allow the patient to choose how interactive he or she would like to be.
E. You should encourage the victim to leave the same clothes on, and not to bathe before coming to the hospital. This goes against a victim’s instincts at the time, but will help preserve legal evidence.

F. Encourage the victim to seek treatment even if reluctant to call the police and initiate legal action. There is still important medical treatment that can be offered, and the hospital staff or crisis counselor may allow the patient a better understanding of legal choices.

Child Abuse/Neglect:

A. Observe child for evidence of other injury, healing old wounds, multiple bruises. Also note relationship of child to adults, physical and emotional relations within family unit.

Special Trauma Problems (cont.)

Child Abuse/Neglect (cont.):

B. Although some injuries such as cigarette burns are characteristic of child abuse, most abuse injuries are similar to many other injuries. Suspicious scenarios include:

1. Injured child without obvious mechanism, injuries which do not match story or which are inappropriate to the child’s age.
3. Blame of third party.
4. Multiple different stories.
5. History of multiple previous episodes of trauma.

C. Don’t accuse or judge. Observe, and share your observations with appropriate authorities. This is an instance where your skilled powers of observation in the field, and your ability to be discreet and to keep an open mind are most needed.

D. If abuse is suspected, transport the child, even if the injuries themselves do not warrant it. The same child may even be admitted for minor injuries to provide sufficient time to assess the situation and prevent serious injury or death from occurring in the future.

Pregnant Trauma Patient:
A. AVOID SUPINE POSITIONING in obviously pregnant patient. Pressure from the uterus on the inferior vena cava prevents venous return to the heart, and can result in severe hypotension. Turn backboard to side or use your hands to hold uterus off central abdominal vessels.

B. Blunt abdominal trauma is difficult to evaluate because the abdominal exam is unreliable. Deceleration forces can cause placental separation. Seatbelts should be worn, but lap belts should be low, next to the pelvis, and fit snugly. (More injuries still occur due to lack of seatbelt than are caused by them.) All obviously pregnant patients should be transported for close evaluation and observation. Note presence or absence of fetal movement.

C. Think of eclampsia as a possible cause of injury in the trauma victim with altered mental state, seizures, or hypertension.

D. Pregnancy alters normal vital signs, as well as response to hypovolemia. Normal BP will be lower, with pulse slightly increased. Changes with hypovolemia are often delayed. Anticipate potential problems.

Special Trauma Problems (cont.)

E. The fetus is much more sensitive to hypoxia and hypovolemia than the mother. For this reason O₂ should always be applied, and treatment for blood loss should begin before hypotension becomes evident.
**Spinal Trauma**

**Specific Information Needed:**

A. *Mechanism of injury and forces involved.* Be suspicious with falls, airplane crashes, decelerations, diving accidents.

B. *Past medical problems and medications.*

**Specific Objective Findings:**

A. *Vital signs, including neurologic assessment.*

B. *Level of sensory deficit.* Presence of any neurologic function below level of injury.

C. *Physical exam with careful attention to organs or limbs that may not have sensation.*

**Specific Precautions:**

A. *Be prepared to tip entire board on side if patient vomits* (patient must be adequately secured to spine board or scoop stretcher).

B. *Neurogenic shock is likely with significant spinal cord injury.* Raise the foot of the spine board. Be sure respirations remain adequate.
C. If hypotension is unresponsive to simple measures, it is likely due to other injuries. Neurologic deficits make these other injuries hard to evaluate. Cord injury above the level of T-8 removes tenderness, rigidity, and guarding as clues to abdominal injury.

D. The patient with spinal trauma and normal neurologic function or only a partial deficit should not be treated more casually than the patient with a complete deficit. This is the patient who can benefit most from your conscientious splinting efforts and protection from further injury.

E. A blanket or towel roll around the patient’s head is preferable to immobilization with sandbags. If the backboard must be tipped, sandbags may cause additional weight on the head or C-spine causing further injury.

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**Syncope**

**Specific Information Needed:**

A. History of the event: onset, duration, seizure activity, precipitating factors. Was the patient sitting, standing, or lying?

B. Past history: medications (including birth control pills), diseases, prior syncope, trauma or long bone immobilization.

C. Associated symptoms: dizziness, nausea, chest or abdominal/back pain, headache, palpitations.

**Specific Objective Findings:**

A. Vital signs.

B. Neurologic status: level of consciousness, residual neurologic deficit.

C. Signs of head trauma, mouth trauma, incontinence.

D. Neck stiffness.

**Specific Precautions:**
Oklahoma State EMS Protocols

A. Syncope is by definition a transient state of unconsciousness from which the patient has recovered. If the patient is still unconscious, treat as Coma.

B. Most syncope is vasovagal, with dizziness progressing to faint over several minutes. Recumbent position should be sufficient to restore vital signs and level of consciousness to normal.

C. Syncope which occurs without warning or while in a recumbent position is potentially serious, and often caused by arrhythmia.

D. Patients over the age of 40 with syncope, even though apparently normal, should be transported. In middle-aged or elderly patients, syncope can be due to a number of potentially serious problems. The most important to monitor and recognize are: arrhythmias, occult GI bleeding, seizure, or ruptured abdominal aortic aneurysm.

Vaginal Bleeding

Specific Information Needed:

A. Symptoms: cramping, passage of clots or tissue, dizziness, weakness, thirst.

B. Present history: duration, amount, last menstrual period (normal?) birth control method. If pregnant: due date. If postpartum: time and place of delivery, current medications.

C. Past history: bleeding problems, pregnancies, medications, allergies.

Specific Objective Findings:

A. Vital Signs.

B. Evidence of blood loss, clots, or tissue fragments. (Bring tissue to ED.)

C. Signs of hypovolemic shock: altered mental status, hypotension, tachycardia, sweating, skin pallor.

Specific Precautions:

A. Amount of vaginal bleeding is difficult to estimate. Visual estimates from sheets and towels can be misleading. Try to get an estimate of number of saturated pads in previous 6 hr.
B. A patient in shock from vaginal bleeding should be treated like any patient with hypovolemic shock.

C. If patient is pregnant, bring in any tissue that has been passed. Laboratory analysis may be important in determining status of pregnancy.

D. Always consider pregnancy as a cause of vaginal bleeding. The only patients who “can’t be pregnant” are male.
Formulary

Formulary Listing:

Activated Charcoal (25 gms/unit dose)
Adenosine (6 mg/2 ml)
Albuterol (2.5 mg Albuterol Sulfate/3 ml)
Aspirin (81 mg tablets)
Atropine Sulfate (1 mg/10 ml)
Atropine Sulfate (autoinjector 2 mg)
Atrovent (0.5 mg in 2.5 ml unit dose)
Cordarone (150 mg/3 ml vial)
Dextrose (25 gms/50 ml)
Diastat (Rectal injections,
    Pediatric Twin Pack = 5.0 mg/delivery system
    Adult Twin Pack = 10 mg/delivery system)
Diazepam (10 mg/2 ml)
Diphenhydramine (50 mg/1 ml)
Dopamine (400 mg/10 ml)
Epinephrine (1:1000, 1 mg/1 ml)
Epinephrine (1:10,000, 1 mg/10 ml)
Furosemide (40 mg/4 ml)
Glucagon (1 mg/ml)
IV Fluids: D5W and Normal Saline
Lidocaine (100 mg/5 ml)
Lidocaine (2% Viscous)
Magnesium Sulfate (10% in 20 ml)
Meperidine (25 mg/ml)
Midazolam (5mg/2ml)
Morphine Sulfate (4 mg/1 ml)
ACTIVATED CHARCOAL

A. ACTIONS

Absorbs toxic substances ingested, and inhibits gastrointestinal absorption by forming an effective barrier between remaining particulate material and the gastrointestinal mucosa.

B. INDICATIONS

Effective in the management of poisoning or overdose of many substances. (Also see Precautions)

C. PRECAUTIONS

Activated Charcoal should NOT be given to patients who are unconscious or who may have a rapidly diminishing level of consciousness.

Activated Charcoal may be ineffective in ingestions such as mineral acids, alkalis, or petroleum products.

Administration of Activated Charcoal can result in aspiration or significant particulate obstruction of the airway.

D. SIDE EFFECTS

Aspiration
Nausea
Vomiting
Diarrhea
ADENOSINE (ADENOCARD)

A. ACTIONS

Adenocard slows conduction time through the A-V node, can interrupt the reentry pathways through the A-V node and can restore normal sinus rhythm in patients with paroxysmal supraventricular tachycardia (PSVT), including PSVT associated with Wolff-Parkinson-White Syndrome. The half-life is estimated to be less than 20 seconds. In controlled clinical trials, 92% of patients with PSVT were converted after a bolus dose of 12 mg. Adenosine is not effective in converting rhythms other than PSVT, such as atrial flutter, atrial fibrillation or ventricular tachycardia. However, administration of Adenocard in such patients has not had adverse consequences.

B. INDICATIONS:

Conversion to sinus rhythm of PSVT including that associated with accessory bypass tracts (WPW).

C. CONTRAINDICATIONS:

Second or third degree A-V Block (except in patients with a functioning artificial pacemaker).

Sick Sinus Syndrome (except in patients with a functioning artificial pacemaker).

Rhythms other than PSVT, such as atrial flutter, atrial fibrillation or ventricular tachycardia.

Known hypersensitivity to Adenosine.
D. SIDE EFFECTS.

CNS - lightheadedness, dizziness, tingling, numbness.

CV - facial flushing, headache, sweating, palpitations.

GI - nausea, tightness in throat.

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ADENOSINE (ADENOCARD)(cont.)

E. DOSAGE

Initial dose: 6 mg administered over a 1-2 second period followed by a 20 mL rapid saline flush.

Repeat administration: If the first dose does not convert the PSVT within 1-2 minutes, 12 mg should be given as a rapid intravenous bolus. This 12 mg dose may be repeated a second time if required. Single doses greater than 12 mg are not recommended.

F. HOW SUPPLIED

6 mg/2 ml vial
ALBUTEROL (PROVENTIL, VENTOLIN)

A. ACTIONS

Albuterol is primarily a beta-2 sympathomimetic and as such produces bronchodilatation. Because of its greater specificity for beta-2 adrenergic receptors, it produces fewer cardiovascular side effects and more prolonged bronchodilatation than Isuprel. Onset is within 15 minutes; peaks in 60 - 90 minutes. Therapeutic effects may be active up to 5 hours.

B. INDICATIONS

Nebulized Albuterol is indicated for relief of bronchospasm in patients with reversible obstructive airway disease, including asthma.

C. CONTRAINDICATIONS

Albuterol is contraindicated in patients with a history of hypersensitivity.

D. SIDE EFFECTS AND ADVERSE REACTIONS

CNS: Nervousness, tremor, headache, dizziness, insomnia
CV: Tachycardia, hypertension, angina
GI: Drying of oropharynx, nausea, vomiting, unusual taste

E. WARNINGS

Use cautiously in patients with coronary artery disease, hypertension, hyperthyroidism, diabetes.

Epinephrine should not be used at the same time as Albuterol, however, either may be used subsequent to a failure of the other.
Administer cautiously to patients on MAO inhibitors or tricyclic antidepressants.

Beta-Blockers and Albuterol will inhibit each other.

F. DOSAGE

Each unit dose delivers 2.5 mg of Albuterol Sulfate/3 ml total solution. Adult dosage 5 mg. In children, if patient < 15 kg, 2.5 mg of Albuterol if ≥ 15 kg, administer 5 mg of Albuterol.

G. HOW SUPPLIED

3 ml unit dose (2.5 mg Albuterol sulfate/3 ml).

ASPIRIN

A. ACTIONS

Prevents blood clot formation (specifically in coronary arteries), decreases inflammation, controls pain, and decreases fever (antipyretic)

B. INDICATIONS

Chest pain consistent with acute myocardial infarction following the administration of Nitroglycerin.

C. CONTRAINDICATIONS

Do not administer this medication (Aspirin) if the patient is hypersensitive to this drug or has active bleeding., i.e., blood in stools or melena.

D. PRECAUTIONS

Adverse effects are primarily gastrointestinal, including blood loss, gastritis, esophagitis, nephropathy, and renal – function abnormalities. Hepatotoxicity, hearing loss, tinnitus, and inhibition of platelet aggregation have been reported. Caution is advised with use of the drug in children and adolescents with viral illnesses, due to the possible association with and increased risk of Reye’s syndrome.

E. HOW SUPPLIED

81 mg tablets for oral use.

F. DOSAGE

Adult dosage: 162 mg chewed and swallowed with a small amount of water immediately after onset of chest pain.
G. OTHER CONSIDERATIONS

Aspirin is also effective as an antipyretic and analgesic although it is not recommended in the prehospital setting for these indications.

ATROPINE SULFATE  (As an Antidote for Poisonings)

A. ACTIONS

Atropine is a potent parasympatholytic that binds to acetylcholine receptors thus diminishing the actions of acetylcholine.

B. INDICATIONS

Organophosphate (i.e., parathion, malathion, rid-a-bug) and carbamate (Baygon, sevin, and many common roach and ant sprays)

POISONING SIGNS ARE:

- Salivation
- Pinpoint pupils
- Lacrimation
- Bradycardia
- Urination
- Excessive sweating
- Defecation
- Emesis
- Abdominal Cramping

C. CONTRAINDICATIONS

None when used in the management of severe organophosphate poisoning.

D. SIDE EFFECTS

Victims of organophosphate poisoning can tolerate large doses of Atropine. Signs of atropinization are the end point of treatment: Flushing, pupil dilation, dry mouth, tachycardia.

E. WARNINGS
It is important that the patient be adequately oxygenated and ventilated prior to using Atropine as Atropine may precipitate ventricular fibrillation in a poorly oxygenated patient.

F. DOSAGE

Adults: 2 mg IV or IM. May repeat with 2-5 mg q 15 minutes until atropinization occurs. Pediatrics: 0.05 mg/kg repeat q 15 minutes if necessary.

G. HOW SUPPLIED

Pre-filled syringes containing 1 mg/10 ml. Autoinjector 2 mg.

ATROPINE SULFATE (As a Cardiac Agent)

A. ACTIONS

Atropine is a potent parasympatholytic anticholinergic that reduces vagal tone and thus increases automatically the SA node and increases A-V conduction.

B. INDICATIONS

Sinus Bradycardia accompanied by hemodynamic compromise, i.e., hypotension (systolic less than 90 mm hg); confusion; frequent PVC's; pale, cold, clammy skin

Symptomatic second and third degree A-V blocks.

Asystole.

C. CONTRAINDICATIONS

None in emergency situations.

D. SIDE EFFECTS

CNS: Restlessness, agitation, confusion, psychotic reaction, pupil dilation, blurred vision, headache.
CV: Increase heart rate, may worsen ischemia or increase area of infarction, ventricular fibrillation.
GI: Dry mouth, difficulty swallowing.
GU: Urinary retention.
OTHER: Worsened pre-existing glaucoma.

E. WARNINGS
Too small a dose (< 0.5 mg) or if normal dose pushed too slowly, may initially cause the heart rate to decrease. Atropine is potentiated by antihistamines and antidepressants. A maximum dose of 0.04 mg/kg should not be exceeded.

F. DOSAGE

Adults: Bradycardias: 0.5-1 mg IV or ET may repeat every 5 minutes until improved or total dose of 0.04 mg/kg has been reached. Asystole: 1 mg IV or 2 mg ET. Pediatrics: 0.02 mg/kg IV, IO or ET - minimum dose is 0.1 mg and maximum total dose is 1 mg in a child and 2 mg in an adolescent

G. HOW SUPPLIED

Pre-filled syringes containing 1 mg in 10 ml of solution.

ATROVENT (Ipratropium Bromide)

ACTIONS

Inhibits interaction of acetylcholine at receptor sites on the bronchial smooth muscle, resulting in bronchodilation.

INDICATIONS

Bronchodilation during bronchospasm in those with COPD.

CONTRAINDICATIONS

Atrovent is contraindicated in known or suspected cases of hypersensitivity to Atrovent, to Atropine and its derivatives, or patients allergic to peanut or soy products.

PRECAUTIONS

Atrovent should be used with caution in patients with narrow-angle glaucoma, prostatic hypertrophy or bladder-neck obstruction.

SIDE EFFECTS/ADVERSE REACTIONS

GI: Nausea, vomiting, cramps.
EENT: Dry mouth, blurred vision.
CNS: Anxiety, dizziness, headache, nervousness.
RESP: Cough, worsening of symptoms, bronchospasms.
INTEG: Rash.
CV: Palpitation.

DOSAGE
Cordarone blocks sodium channels at rapid pacing frequencies and it exerts a noncompetitive antisypathetic action. One of its main effects, with prolonged administration, is to lengthen the cardiac action potential. In addition to blocking sodium channels, Amiodarone blocks myocardial potassium channels, which contributes to slowing of conduction and prolongation of refractoriness. The antisypathetic action and the block of calcium and potassium channels are responsible for the negative dromotroic effects on the sinus node and for the slowing of conduction and prolongation of refractoriness in the atrioventricular (AV) node. Its vasodilatory action can decrease cardiac workload and consequently myocardial oxygen consumption.

B. INDICATIONS

Cordarone is indicated for the treatment of recurring VF/VT and adequately perfusing VT.

C. CONTRAINDICATIONS

Cordarone is contraindicated in severe sinus-node dysfunction, causing marked sinus bradycardia; second- and third-degree atrioventricular block; and when episodes of bradycardia have caused syncope.

Cordarone is contraindicated in patients with a known hypersensitivity to the drug.

D. SIDE EFFECTS AND ADVERSE REACTIONS

Hypotension is the most common adverse effect seen with Cordarone IV. May precipitate if combined in the same IV line with Sodium Bicarbonate.

E. DOSAGE

Recurring VF/VT: 300 mg peripheral rapid infusion.
Stable VT (adequately perfusing) Amiodarone 150 mg over FIRST 10 minutes; (15 mg/min to minimize the potential for hypotension) IV for monomorphic ventricular tachycardia patients with AMI, if the VT is not accompanied by hypotension, or altered mental status. Amiodarone infusion procedure: Add 3 ml of Amiodarone (150 mg) to 50 ml of D5W. Infuse 50 ml over 10 minutes, only after resolution with bolus. Combine 150 mg of Amiodarone in 50 ml of D5W using the Buretrol Infusion set to accurately measure the mixture. Then set the Dial – a – Flow at 250 gtts/minute. This will deliver the desired dosage in approximately 10 minutes.

F. HOW SUPPLIED

150 mg/3 ml vial.

**DEXTROSE 50%**

A. ACTIONS

A monosaccharide which provides calories for metabolic needs, spares body proteins and loss of electrolytes. Readily excreted by kidneys producing diuresis. Hypertonic solution.

B. INDICATIONS

Hypoglycemia.

C. CONTRAINDICATIONS

Cerebral ischemia (i.e. cardiac arrest, stroke), Intracranial or intraspinal hemorrhage; DT's with dehydration.

D. SIDE EFFECTS

CV: Thrombosis, sclerosing if given in peripheral vein.
INTEG: Tissue irritation if infiltrates.
OTHERS: Acidosis, alkalosis, hyperglycemia, hypokalemia.

E. WARNINGS

May theoretically cause Wernicke-Korsakoff syndrome in acute alcohol intoxication.

F. DOSAGE

Adults: 50 ml of a 50% solution (25 gms) IV.
Pediatrics: Give as D25 (2 ml/kg) if age less than 12, as D50 (1 ml/kg) if age greater than 12. D25 is made by diluting D50 with an equal volume (1:1 solution) of saline, or sterile water.

G. HOW SUPPLIED
Prefilled syringes containing 25 gms of glucose in 50 ml of water.

**DIASTAT (Diazepam Rectal Gel)**

Diatstat rectal delivery system is a non-sterile Diazepam gel provided in a prefilled, unit-dose, rectal delivery system.

**A. ACTIONS**

A member of the benzodiazepine family, Diazepam, depresses the limbic system, thalamus, and hypothalamus resulting in calming effects. Diazepam produces an amnesic effect and is also a muscle relaxant.

**B. INDICATIONS**

Status epilepticus.
Premedication prior to cardioversion.
Seizures associated with Hyperthermia.

**C. CONTRAINDICATIONS**

Diatstat should not be administered to patients with acute alcohol intoxication, and pregnancy.

Diatstat in contraindicated in patient with a known hypersensitivity to Diazepam or patients with acute narrow angle glaucoma.

NOTE: Clinical studies have not been conducted to establish the efficacy and safety of Diastat in children under the two years of age.

**D. SIDE EFFECTS**

CNS: Confusion, muscular weakness, blurred vision, drowsiness, respiratory depression, respiratory arrest, slurred speech.
CV: Bradycardia, hypotension, cardiovascular collapse.

**E. WARNINGS**
In elderly patients Diastat would be used with caution due to an increase in half-life with a corresponding decrease in the clearance of free Diazepam. It is also recommended that the dosage be decreased to reduce the likelihood of ataxia or oversedation.

**DIASTAT (Diazepam Rectal Gel)(cont)**

**F. DOSAGE**

Adults: (0.2 mg/kg) 10 mg or 20 mg.
Because Diastat is provided in fixed adult unit dose of 10 mg, the prescribed dose is obtained by rounding upward to the next available dose.

Pediatrics: (0.3 mg – 0.5 mg/kg not to exceed 10 mg)
Because Diastat is provided in fixed pediatric unit dose of 5 mg, the prescribed dose is obtained by rounding upward to the next available dose.

  \(< 25 \text{ kg} – \text{the dosing will be 5 mg}
  \>
  \text{> 25 kg – the dosing will be 10 mg}

Diastat rectal gel is not recommended for children less than < two (2) years of age. For children less than < two (2) years of age, Valium IV solution may be administered rectally (0.5 mg/kg) not to exceed 5 mg.

**G. HOW SUPPLIED**

Adult twin pack, 10 mg/rectal delivery system.
Pediatric twin pack, 5 mg/rectal delivery system.
DIAZEPAM  (VALIUM)

A. ACTIONS

A member of the benzodiazepine family, Diazepam, depresses the limbic system, thalamus, and hypothalamus resulting in calming effects. Diazepam produces an amnesic effect and is also a muscle relaxant.

B. INDICATIONS

Status epilepticus.
Premedication prior to cardioversion.
Eclampsia.
Seizures associated with Hyperthermia.

C. CONTRAINDICATIONS

Diazepam should not be administered to patients with acute alcohol intoxication, pregnancy, neonates.

D. SIDE EFFECTS

CNS: Confusion, muscular weakness, blurred vision, drowsiness, respiratory depression, respiratory arrest, slurred speech.
CV: Bradycardia, hypotension, cardiovascular collapse.

E. WARNINGS

Do not mix Diazepam with any other solutions or drugs. When injecting IV, administer slowly through the IV tubing as close as possible to the vein insertion to prevent precipitation with the IV fluid.
Do not administer into small veins such as those on dorsum of the hand--causes local irritation and possibly venous thrombosis in small veins.

F. DOSAGE

Adults: 2-10 mg, IV or IM. IV route should be administered slowly - no faster than 5 mg/min.
Pediatrics: 0.2 mg/kg IV, not to exceed 5 mg. IV route should be administered slowly - no faster than 1 mg/min. For patients less than (<) two (2) years of age and IV access has not been obtained, administer Valium rectally. Draw up 0.5 mg/kg of Valium in tuberculin syringe. Lubricate end of syringe (without needle) and insert into rectum past sphincter, 1 – 2 inches (often done most easily with child recumbent). The total dose should not exceed five (5) mg.

G. HOW SUPPLIED

Prefilled syringes containing 10 mg/2 ml

DIPHENHYDRAMINE (BENADRYL)

A. ACTIONS

Diphenhydramine is an antihistamine with anticholinergic (drying) and sedative side effects. Antihistamines appear to compete with histamine for cell receptor sites on effector cells. Diphenhydramine prevents, but does not reverse histamine-mediated responses, particularly histamines effects on the smooth muscle of the bronchial airways, gastrointestinal tract, uterus, and blood vessels.

B. INDICATIONS

Anaphylaxis.
Dystolic reactions.

C. CONTRAINDICATIONS

Benadryl is not to be used in newborn or premature infants or in nursing mothers. Benadryl is also not to be used in patients with lower respiratory tract symptoms, including asthma.

D. SIDE EFFECTS AND ADVERSE REACTIONS

CNS: (especially in the elderly) Drowsiness, confusion, insomnia, headache, vertigo, hyperactivity in children.
CV: Palpitations, tachycardia, PVC's, hypotension.
GI: Nausea, vomiting, diarrhea, dry mouth, constipation.
GU: Dysuria, urinary retention.
RESP: Thickening of bronchial secretions, tightness of the chest, wheezing, nasal stuffiness.

E. WARNINGS

In infants and children especially, antihistamines in overdosage may cause hallucinations, convulsions, or death.
As in adults, antihistamines may diminish mental alertness in children. In young children, they may produce excitation.
Benadryl has additive effects with alcohol and other CNS depressants (hypnotics, sedatives, tranquilizers, etc.)
Antihistamines are more likely to cause dizziness, sedation, and hypotension in the elderly (60 years or older) patient.

F. DOSAGE

Adults: 25 - 50 mg IV or deep IM.  
Pediatrics: 1 mg/kg IV or IM.

G. HOW SUPPLIED

50 mg diphenhydramine HCL in 1 ml ampules.

DOPAMINE (INTROPIN)

A. ACTIONS

Dopamine stimulates dopaminergic, beta-adrenergic, and alpha-adrenergic receptors of the sympathetic nervous system. It exerts an inotropic effect on the myocardium resulting in an increased cardiac output. Dopamine produces less increase in myocardial oxygen consumption than does Isoproterenol and its use is usually not associated with a tachyarrhythmia. Dopamine dilates renal and mesenteric blood vessels at low doses that may not increase heart rate or blood pressure. Therapeutic doses have predominant beta-adrenergic receptor stimulating actions that result in increases in cardiac output without marked increases in pulmonary occlusive pressure. At high doses, Dopamine has alpha receptor stimulating actions that result in peripheral vasoconstriction and marked increases in pulmonary occlusive pressure.

B. INDICATIONS

Cardiogenic Shock.

C. CONTRAINDICATIONS

Dopamine should not be used in patients with pheochromocytoma.

D. SIDE EFFECTS AND ADVERSE REACTIONS

CNS: Headache.  
CV: Ectopic beats, tachycardia, anginal pain, palpitations, hypotension.  
GI: Nausea, vomiting.  
LOCAL: Necrosis and tissue sloughing with extravasation.  
OTHER: Piloerection, dyspnea.

E. WARNINGS

Do not administer Dopamine in the presence of uncorrected tachyarrhythmias or ventricular fibrillation. Do not add Dopamine to any alkaline dilatant solution since the drug is inactivated in alkaline solution.

Patients who have been treated with monoamine oxidase (MAO) inhibitors will require substantially reduced dosage.
F. DOSAGE

Adults: Begin infusion at 5 mcg/kg/min. (400 mg in 250 ml D5W – concentration 1600 mcg/ml).

G. HOW SUPPLIED

Intropin is supplied in 10 ml ampules containing 400 mg.

**EPINEPHRINE (1:1000)**

A. ACTIONS

Epinephrine is a sympathomimetic which stimulates both alpha and beta adrenergic receptors causing immediate bronchodilatation, increase in heart rate and an increase in the force of cardiac contraction. Subcutaneous dose lasts 5-15 minutes.

B. INDICATIONS (1:1000)

Pediatric asthma.
Anaphylaxis.
Pediatric Cardiac Arrest.
Adult asthma - age <45.

C. CONTRAINDICATION

Hyperthyroidism, hypertension, cerebral arteriosclerosis.

D. SIDE EFFECTS

Same as Epinephrine 1:10,000.

E. WARNINGS

Same as Epinephrine 1:10,000. Also causes hyperglycemia. 1:1000 Epinephrine should not be given intravenously in adults.

F. DOSAGE

Adults: 0.3-0.5 mg (0.3-0.5 ml) subcutaneously. May be repeated every 15 minutes x 3.

NOTE: Epinephrine as a 1:1,000 solution is contraindicated IV in adults.

Pediatrics: 0.01 ml/kg up to 0.3 ml subcutaneously.
Pediatric Cardiac Arrest 1:1,000 0.1 mL/kg.

G. HOW SUPPLIED

Ampule containing 1 mg/1 ml.
**EPINEPHRINE (1:10,000)**

A. ACTIONS

Epinephrine is a sympathomimetic which stimulates both alpha and beta receptors. As a result of its effects, myocardial and cerebral blood flow are increased during ventilation and chest compression. Epinephrine increases systemic vascular resistance and thus may enhance defibrillation.

B. INDICATIONS

Asystole, ventricular fibrillation unresponsive to defibrillation, PEA, anaphylaxis with hypotension.

C. CONTRAINDICATIONS

None in the cardiac arrest situation.

D. SIDE EFFECTS

CNS: Anxiety, headache, cerebral hemorrhage.
CV: Tachycardia, ventricular dysrhythmias, hypertension, angina, palpitations.
GI: Nausea and vomiting.

E. WARNINGS

Epinephrine is inactivated by alkaline solutions - never mix with Sodium Bicarbonate. Action of catecholamines depressed by acidosis - attention to ventilation and circulation is essential. Antidepressants potentiate the effect of Epinephrine.

F. DOSAGE

Adults: 1.0 mg (10 ml) IV, 2 mg ET. May repeat every 3-5 minutes.
Anaphylaxis with hypotension: 1 ml IV slowly over 3-5 minutes.

Pediatrics: 0.01 mg/kg (0.1 ml/kg) IV or IO. For subsequent doses, use Epinephrine 1:1,000 @ 0.1 mg/kg (0.1 mL/kg). Repeat every 5 minutes as necessary.
Anaphylaxis with hypotension: 0.1 ml/kg IV over 3-5 minutes (not to exceed 1 ml).

G. HOW SUPPLIED

Prefilled syringes containing 1 mg/10 ml.
FUROSEMIDE (LASIX)

A. ACTIONS

Lasix is a sulfonamide derivative and potent diuretic which inhibits the reabsorption of sodium and chloride in the proximal and distal renal tubules, as well as in the Loop of Henle. With IV administration, onset of diuresis is within 5 minutes; peaks in 30 minutes; and has a duration of 2 hours.

B. INDICATIONS

Pulmonary edema.

C. CONTRAINDICATIONS

Lasix is contraindicated in anuria. Use in patients allergic to sulfa drugs is relatively contraindicated. If previous reaction to sulfa drug was minor, consideration should be given to risks versus benefit to the patient. Lasix should be used in pregnancy only when benefits clearly outweigh risks.

D. SIDE EFFECTS

CNS: Dizziness, tinnitus, hearing loss, headache, blurred vision, weakness.
GI: Anorexia, vomiting, nausea.
CV: Hypotension.
OTHER: Pruritus, urticaria, muscle cramping.

E. WARNINGS

Furosemide should be protected from light. Dehydration and electrolyte imbalance can result from excessive dosages. Rapid diuresis can lead to hypotension and thromboembolic episodes.

F. DOSAGE

Adults: 40 mg IV slowly over 1-2 minutes.
Pediatrics: 1.0 mg/kg IV slowly over 1-2 minutes.

G. HOW SUPPLIED

Prefilled syringes containing 40 mg/4 ml.
GLUCAGON

A. ACTIONS

Glucagon, produced in the pancreas by the Alpha cells of the Islands of Langerhans, causes an increase in blood glucose concentrations. It is effective in small doses and no evidence of toxicity has been reported with its use. Glucagon acts only on liver glycogen, converting it to glucose.

B. INDICATIONS

Glucagon is indicated for the treatment of hypoglycemia when IV access cannot be obtained.

C. CONTRAINDICATIONS

Since Glucagon is a protein, hypersensitivity is a possibility.

D. SIDE EFFECTS AND ADVERSE REACTIONS

GI: Occasional nausea and vomiting.

E. WARNINGS

Glucagon should be administered with caution in patients with a history of insulinoma and/or pheochromocytoma.

F. DOSAGE

1.0 unit of glucagon IM.

G. HOW SUPPLIED

Rubber-stoppered vials with 1.0 unit (1.0 mg) glucagon (dry powder) and 1 ml of diluting solution.
LIDOCAINE (XYLOCAINE)

A. ACTIONS

Decreases ventricular automatically and raises the ventricular fibrillation threshold.

B. INDICATIONS

PVC's: Greater than (> 6 per minute, R-on T phenomenon, multifocal, or in bursts of 2 or more in a row
Ventricular tachycardia, Ventricular fibrillation

C. CONTRAINDICATIONS

Lidocaine is contraindicated in second-degree heart block, Mobitz II; complete A-V block; and Stokes-Adams syndrome. If PVC’s occur in conjunction with sinus bradycardia, the bradycardia should be treated first.

D. SIDE EFFECTS

CNS: Drowsiness, numbness, dizziness, blurred vision, tinnitus, euphoria, muscle twitching, convulsions, tremors.
CV: Rare, but with toxic levels - hypotension, widening of QRS complex, bradycardia, cardiac arrest.
RESP: At toxic levels - resp depression and/or arrest.

E. WARNINGS

Lidocaine is metabolized in the liver. Maintenance dosage should be decreased by half in patients with liver disease and low cardiac output states, e.g., acute MI, shock, congestive heart failure, patient older than 70 years old.

F. DOSAGE

Adults: 1 mg/kg IV bolus, repeat with 0.5 mg/kg q 8 - 10 minutes if necessary to a total of 3 mg/kg. Can also be administered ET or IM followed by an infusion at 2 - 4 mg/min. Lidocaine infusion containing 1 gm Lidocaine in 250 ml D5W given at a rate of 2 - 4 mg/min (30-60 microdrops/min). For cardiac arrest, doses of 1.5 mg/kg every 5 minutes to a total dose of 3 mg/kg should be used.

Pediatrics: 1 mg/kg IV bolus. Repeat bolus of 0.5 mg/kg q 10 min if needed, to total of 3 mg/kg. IV infusion should contain 120 mg lidocaine/100 ml D5W to infuse at a rate of 20-50 mcg/kg/min (1-2.5 drops/kg per minute by microdrip). Infusions are rarely necessary in pediatrics; treatment of ectopy should focus on maximization of oxygenation and ventilation and bolus doses of antiarrhythmics.
LIDOCAINE 2% VISCOUS GEL (Xylocaine)

A. ACTIONS

Lidocaine stabilizes the neuronal membrane by inhibiting the ionic fluxes required for the initiation and conduction of impulses, thereby effecting local anesthetic action.

B. INDICATIONS

Lidocaine Gel is indicated for production of anesthesia of accessible mucous membranes of the oropharynx. It is also useful as an anesthetic lubricant for intubation.

C. CONTRAINDICATIONS

Lidocaine is contraindicated in patients with a known history of hypersensitivity to local anesthetics of the amide type or to other components of Lidocaine 2% Gel.

D. WARNINGS

Lidocaine 2% Gel should be used with extreme caution in the presence of sepsis or severely traumatized mucosa in the area of application, since under such conditions there is the potential for rapid systemic absorption.

E. DOSAGE

A single application should not exceed 5 gm of Lidocaine 2% Gel.

F. HOW SUPPLIED

Lidocaine 2% Viscous Gel.
MAGNESIUM SULFATE 10%

A. ACTIONS

Affects impulse formation and conduction time in myocardium and thereby reduces incidence of dysrhythmias associated with hypomagnesemia or prolonged QT interval

Decreases acetylcholine in motor – end terminals, which produces anti-convulsant properties and stops seizures associated with eclampsia.

B. INDICATIONS

Ventricular Fibrillation/Pulseless VT:

Third – line antiarrhythmic (after Amiodarone and Lidocaine) in cardiac arrests with VF/pulseless VT
Give early if suspected Torsades de Pointes pattern. (A rare variation of ventricular tachycardia)
Seizures associated with toxemia of pregnancy (eclampsia)

C. CONTRAINDICATIONS

Kidney failure; heart block; respiratory depression.

D. PRECAUTIONS AND SIDE EFFECTS

Since Magnesium Sulfate affects neuromuscular transmission in body, it must be given carefully and monitored closely in the patient with a pulse.

In non – arrest patients, Magnesium toxicity may cause hypotension, bradycardia, and/or respiratory arrest.

Early warning that Magnesium Sulfate toxicity is developing is decrease in reflexes measured at patella, antecubital area, or heel.

Other side effects include sweating, flushing, and sensation of body warmth.

E. DRUG INTERACTIONS

May interfere with effect of neuromuscular blocking agents and calcium.
MAGNESIUM SULFATE 10% (Cont.)

F.  DOSAGE

Ventricular Fibrillation/Pulseless VT; 1.0 grams IV push over 1 minute. Electrical defibrillation is then attempted again.

If Torsades is present Magnesium Sulfate 1 gm over 1 – 2 minutes. If Torsades is refractory or reoccurs repeat dose in 3 minutes.

Eclampsia; Administer MAGNESIUM SULFATE 1 gm/minute IV push until seizure stops. Maximum dose is 4 g.

G.  HOW SUPPLIED

Vials containing 10% in 20 ml.

H.  SPECIAL NOTES

Main prehospital indication is shockable cardiac arrest or suspected Torsades.

Suspect Torsades in a patient in VF/pulseless, VT, or in wide complex tachycardia with classic Torsades pattern.

I.  CONDITIONS OF PATIENTS WHO ARE AT RISK TO DEVELOP TORSADES INCLUDE:

Toxic level of certain antidysrhythmics including Procainamide (Pronestyl) and Quinidine.

Toxic levels of certain psychotropic drugs including tricyclic antidepressants and some phenothiazines.

Exposure to organophosphate insecticides.

Cerebrovascular disease including strokes.

Electrolyte disorders including hypokalemia, hypomagnesemia, hypocalcemia.

Hypothyroidism.

Coronary artery disease including AMI, left ventricular failure.

Pacemaker malfunction.
MEPERIDINE (Demerol)

H. ACTIONS

Meperidine is a narcotic analgesic which depresses the central nervous system and suppresses pain via binding at opioid receptors of the brain.

B. INDICATIONS

Pain from acute MI.
Pain from other sources.

C. CONTRAINDICATIONS

Meperidine is contraindicated in patients with pain due to trauma or acute abdomen. It should not be given to patient with volume depletion or hypotension. It is contraindicated in patients with head trauma, acute alcoholism, acute asthma, and in those who are hypersensitive to the drug.

D. SIDE EFFECTS

CNS: Euphoria, drowsiness, pupillary constriction, respiratory arrest.
CV: Bradycardia, hypotension.
GI: Decreases gastric motility, nausea and vomiting.
GU: Urinary retention.
RESP: Bronchoconstriction, decrease cough reflex.

E. DOSAGE

Adults: 25 - 50 mg IV slowly.
Pediatrics: 1 mg/kg/dose (maximum single dose 50 mg).

F. HOW SUPPLIED

Tubex prefilled cartridges containing 25 mg/1 ml.
MIDAZOLAN (Versed)

A. ACTIONS

Midazolan is a short acting benzodiazepine central nervous system depressant.

B. INDICATIONS

Severe agitation or anxiety states.
Premedication prior to cardioversion.
Premedication prior to external transthoracic pacing.

C. CONTRAINDICATIONS

Midazolan is contraindicated in patients with a known hypersensitivity to the drug, patients with a history of glaucoma or any patient with signs or symptoms of shock.

D. SIDE EFFECTS

CNS: Euphoria, drowsiness, confusion, dizziness, amnesia.
CV: Hypotension.
GU: Nausea and Vomiting.
RESP: Respiratory depression or arrest.

E. WARNINGS

Emergency resuscitative equipment should be readily available, respiratory depression is more common with Midazolan than with any other benzodiazepines.

F. DOSAGE

Adults: 0.15 mg/kg slow IVP to a maximum dose of 5 mg.
Adults: 0.2 mg/kg IM.
Pediatrics: 0.1 mg/kg slow IV push to a maximum dose of 4 mg.

G. HOW SUPPLIED

Tubex containing 5 mg/2mL prefill syringe
MORPHINE SULFATE (MS)

A. ACTIONS

Morphine is a narcotic analgesic which depresses the central nervous system and suppresses pain via binding at opioid receptors of the brain. It increases venous capacitance, decreases venous return, and produces mild peripheral vasodilation. Morphine also decreases myocardial oxygen demand.

B. INDICATIONS

Pain from acute MI.
Pulmonary edema.
Pain from other sources.

C. CONTRAINDICATIONS

Morphine is contraindicated in patients with pain due to trauma or acute abdomen. It should not be given to patient with volume depletion or hypotension. It is contraindicated in patients with head trauma, acute alcoholism, acute asthma, and in those who are hypersensitive to the drug.

D. SIDE EFFECTS

CNS: Euphoria, drowsiness, pupillary constriction, respiratory arrest.
CV: Bradycardia, hypotension.
GI: Decreases gastric motility, nausea and vomiting.
GU: Urinary retention.
RESP: Bronchoconstriction, decrease cough reflex.

E. WARNINGS

Morphine is detoxified by the liver. It is potentiated by alcohol, antihistamines, barbiturates, phenothiazines, and other sedatives.

F. DOSAGE

Adults: 2-10 mg IV slowly.
Pediatrics: 0.1-0.2 mg/kg IV slowly, maximum single dose 5 mg.

G. HOW SUPPLIED

Tubex containing 4 mg/ml.
NALOXONE (NARCAN)

A. ACTIONS

The mechanism of action is not fully understood. It does appear that Narcan antagonizes the effects of opiates by competing at same receptor sites. When given IV, the action is apparent within two (2) minutes. IM or SC administration is slightly less rapid.

B. INDICATIONS

Narcan is indicated for the complete or partial reversal of narcotic depression and respiratory depression secondary to narcotics or related drugs:

- Heroin
- Meperidine (Demerol)
- Codeine
- Morphine
- Methadone
- Lomotil
- Hydromorphone (dilaudid)
- Pentazocine (talwin)
- Propoxyphene (darvon)
- Percodan

C. CONTRAINDICATIONS

Narcan is contraindicated in patients known to be hypersensitive to it.

D. SIDE EFFECTS AND ADVERSE REACTIONS

CNS: Tremor, agitation, belligerence, pupillary dilation, seizures, increased tear production, sweating.
CV: Hypertension, hypotension, ventricular tachycardia, pulmonary edema, ventricular fibrillation.
GI: Nausea, vomiting.

E. WARNINGS

Narcan should be administered cautiously to persons including newborns of mothers who are known or suspected to be physically dependent on opiates - may precipitate an acute abstinence syndrome.
NALOXONE (NARCAN) (cont.)

2. May need to repeat Narcan since duration of action of some narcotics may exceed that of Narcan.

3. Narcan is not effective against a respiratory depression due to non-opioid drugs.

4. Use caution during administration as patient may become violent as level of consciousness increases.

F. DOSAGE

Adults: An initial dose of 0.5 - 2 mg may be administered IV, IM, or ET. Give larger dose if overdose with synthetic narcotics suspected (e.g., Talwin, Darvocet).

Pediatrics: 0.1 mg/kg IV, IO, IM, not to exceed 2 mg.

G. HOW SUPPLIED

Narcan is available in 2 mg/2 ml ampules.
NEOSYNEPHRINE

A. ACTIONS

12 Hour nasal decongestant.

B. INDICATIONS

May be used to facilitate nasotracheal intubation.

C. WARNINGS

Do not exceed recommended dosage because symptoms may occur such as burning, stinging, sneezing, or increase of nasal discharge.

D. DOSAGE

Adults and children 8 years of age and over: With head upright, spray two or three times in each nostril.

NITROGLYCERIN (NITROSTAT)
A. ACTIONS

Nitroglycerin is a direct vasodilator which acts primarily on the venous system, although it also produces direct coronary artery vasodilation as a result. There is a decrease in venous return which decreases the workload on the heart and thus, decreases myocardial oxygen demand. Sublingual Nitroglycerin spray is preferred as it is more reliably absorbed and bio-available.

B. INDICATIONS

Angina Pectoris.
Hypertensive crisis.
Pulmonary edema.

C. CONTRAINDICATIONS

Patients with increased intracranial pressure, systolic less than (<) 90 mm Hg, and children under 12.

D. SIDE EFFECTS

CNS: Headache, dizziness, flushing, nausea, and vomiting.
CV: Hypotension, reflex tachycardia.

E. PRECAUTIONS

Because of an easily developed tolerance, patients on chronic nitrate therapy may require larger doses of Nitroglycerin during acute anginal episodes. Nitro tablets are inactivated by light, air and moisture. Must be kept in amber glass containers with tight-fitting lids. Once opened, Nitroglycerin has a shelf life of 3 months. Nitrospray has a shelf life of 1 to 2 years. Alcohol will accentuate vasodilating and hypotensive effects.

Viagra may cause hypotension, and in a patient with coronary artery disease, can precipitate angina or an M.I. Recent cases have shown that the use of Viagra within a 24-hour time frame from the use of Nitroglycerin may cause irreversible hypotension.

All patients who are to be treated with Nitroglycerin must be asked about possible use of the medication Viagra within the past twenty-four- (24) hours.

If no use of Viagra is discovered in the screening, and history taking of the patient, continue treatment as per protocol.

If the patient has taken Viagra within the past twenty-four- (24) hours, record a set of vital signs, and contact on line Medical Control for further direction.
NOTE: Open mouth and bring the canister as close as possible, press button firmly with forefinger to release spray onto or under tongue. Advise patient not to inhale spray.

F. DOSAGE

Adults: 1 puff sublingually. For chest pain, may be repeated every 5 minutes up to a maximum of 3 dosages if systolic BP greater than (> 90 mm/Hg.
Pediatrics: Not indicated.

G. HOW SUPPLIED

Metered dose spray (1/150 grain) 0.4 mg/metered dose.
*120 mg (7ml) of Lidocaine

TO

100 ml of diluent

at 1 mcgtt/kg/min or according to following table in order

20 mcg/kg/min Lidocaine

<table>
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*Based on the following concentrations: Lidocaine = 10mg/ml

PRALIDOXIME CHLORIDE (2PAMCI)
A. ACTIONS

The principle action of Pralidoxime Chloride is to reactivate cholinesterase (mainly outside the central nervous system) which has been inactivated by organophosphate pesticide or related compound. The destruction of accumulated acetylcholine can then proceed, and neuromuscular junctions will again function normally. The drug has its most critical effect in relieving paralysis of the muscles of respiration. Because Pralidoxime Chloride is less effective in relieving depression of the respiratory center, Atropine is always required concomitantly to block the effect of accumulated acetylcholine at the site. The drug is rapidly excreted in the urine partly unchanged, and partly as a metabolite produced by the liver. Consequently, Pralidoxime Chloride is short acting and repeated doses may be needed, especially where there is any evidence of continuing absorption.

B. INDICATIONS

Treatment of poisoning due to those pesticides and chemicals of the organophosphate class which have anticholinesterase activity.

In the control of overdosage by anticholinesterase drugs used in the treatment of myasthenia gravis.

C. CONTRAINDICATIONS

There are no known absolute contraindications for the use of Pralidoxime Chloride. Relative contraindications include known hypersensitivity to the drug and other situations in which the risk of its use clearly outweighs possible benefit.

D. SIDE EFFECTS

Forty to sixty minutes after intramuscular injection, mild to moderate pain may be experienced at the site of injection. Pralidoxime Chloride may cause blurred vision, diplopia, impaired accommodation, dizziness, headache, drowsiness, nausea, tachycardia, increased systolic and diastolic blood pressure, hyperventilation, and muscular weakness. In patients, it is very difficult to differentiate the toxic effects produced by Atropine or the organophosphate compounds from those of the drug. When Atropine and Pralidoxime Chloride are used together, the signs of Atropinization may occur earlier than might be expected when Atropine is used alone. This is especially true if the total dose of Atropine has been large and the administration of Pralidoxime has been delayed.
E. **PRECAUTIONS**

Pralidoxime Chloride is not effective in the treatment of poisoning due to phosphorus, inorganic phosphates or organophosphates not having anticholinesterase activity. Pralidoxime Chloride is **NOT** indicated as an antidote for intoxication by pesticides of the carbonate class since it may increase the toxicity of carbaryl.

F. **DOSAGE**

Pralidoxime Chloride is most effective if administered immediately after poisonings. Severe poisoning (coma, cyanosis, respiratory depression) requires intensive management. This includes the removal of secretions, airway management, the correction of acidosis, and hypoxemia. The Mark 1 Kit contains one-(1) Pralidoxime Chloride autoinjector, 600 mg. The autoinjector is used by pressing the end of the device onto the thigh. A spring pushes the needle into the muscle and causes the medications to be injected. The general indications for use of this antidote will be based upon mild, moderate, or severe nerve agent intoxication.

Adults and children over the age of 12, 600 mg IM.

G. **HOW SUPPLIED**

Autoinjector, 600 mg in 2 ml.

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**SODIUM BICARBONATE**

A. **ACTIONS**
Bicarbonate combines with excess acids (usually lactic acid) present in the body to form a weak, volatile acid. This acid is broken down into CO2 and H2O. Sodium Bicarbonate is effective only when administered with adequate ventilation and oxygenation.

B. INDICATIONS

Metabolic acidosis due to cardiac arrest.
Salicylate overdose (increases urinary excretion of drug).
Barbiturate overdose (increases urinary excretion of drug).
Tricyclic antidepressant overdose (increases serum pH).

C. CONTRAINDICATIONS

Congestive heart failure; alkalotic states.

D. SIDE EFFECTS

Metabolic alkalosis.
Hypernatremia.
Cerebral acidosis.
Sodium and H2O retention which can cause CHF.

E. WARNINGS

Excessive bicarbonate therapy inhibits the release of oxygen. Bicarbonate does not improve the ability to defibrillate. May inactivate simultaneously administered catecholamines. Will precipitate if mixed with Calcium Chloride. Administration should be guided by arterial blood gasses and pH.

F. DOSAGE

Adults: 1 meq/kg IV. Repeat with 0.5 meq/kg q 10 minutes.
Pediatrics: 1 meq/kg IV. Repeat with 0.5 meq/kg q 10 minutes.
Infants: 0.5 meq/kg IV (diluted) slowly. May repeat in 10 minutes.

G. HOW SUPPLIED

Pre-filled syringes containing 50 meq/50 ml.

SOLU–MEDROL (Methylprednisolone)

A. ACTIONS
Solu-Medrol is a potent, synthetic anti-inflammatory steroid. Decreases inflammatory response and reduces edema in many tissues.

B. INDICATIONS

Severe anaphylactic and hypersensitivity reactions; acute asthma and COPD exacerbations; acute spinal cord injury.

C. CONTRAINDICATIONS

Premature infants, spinal – cord injuries more that eight (8) hours old.

D. SIDE EFFECTS

Side effects are commonly seen with prolonged administration but are not seen with single doses.

E. HOW SUPPLIED

125 mg Vials.

DOSAGE

Adult Asthma: 125 mg, IV
Adult COPD: 125 mg, IV.

Pediatric Asthma: 2 mg/kg, IV.

OTHER CONSIDERATIONS:

Steroids have been shown to have little effect on cerebral edema associated with head trauma and are not recommended in the prehospital setting for this reason. Corticosteroids should be avoided in burn or smoke inhalation patients with wheezing because studies have shown an increased risk of infection and mortality.
Section VI

Appendix
Appendix A

Medical Control

MEDICAL CONTROL (310:641-3-50. Requirement)

A. While performing with a licensed ambulance service and/or a certified first response agency, emergency medical personnel shall perform authorized procedures, which may not exceed the level of license or certification.
B. Each licensed ambulance service and/or certified first response agency shall have a physician medical director who is a fully licensed, non-restricted doctor of medicine (M.D.) or a doctor of osteopathy (D.O.) in the State of Oklahoma. Medical direction for a certified first response agency shall be provided by or approved by the sponsoring licensed ambulance service. The Department shall be notified within twenty-four (24) hours of any lapse of medical direction by the respective agency.

1. The physician medical director of an air, ground, specialty care ambulance service and/or first response agency based in another state shall not be required to be licensed to practice in the State of Oklahoma, but shall be fully licensed in good standing in the home state of that air, ground, or specialty care ambulance service and/or certified first response agency.

2. The physician medical director for an ambulance service and/or first response agency operated by the federal government shall be fully licensed in good standing in Oklahoma or another state. If not licensed in Oklahoma, the physician shall be actively employed by the federal agency responsible for the operation of the ambulance service or first response agency.

C. The physician director shall:

1. Demonstrate appropriate training and experience in adult and pediatric emergency medical services. Demonstrated training and experience may include appropriate board certification or successful completion of training programs such as Advanced Cardiac Life Support (ACLS), Pediatric Advanced Life Support (PALS), and Advanced Trauma Life Support (ATLS) or other equivalent training.

2. Be familiar with the design and operation of pre-hospital emergency medical services systems, and knowledgeable about the capabilities of the different levels of licensed personnel and of the established protocols.

3. Have experience in the emergency department management of the acutely ill or injured patient(s), in the urban setting. In the rural setting, the physician shall routinely and actively participate in the care for acutely ill or injured patient(s).

4. Be knowledgeable and actively involved in quality assurance and the educational activities of the emergency medical technician, by either direct involvement or appropriate designation and surveillance of his responsible designee.

5. Have knowledge and a relationship with the licensed ambulance service(s) and/or first response agency(ies) and their primary service area coverage. A physician may be the medical director for more than one (1) licensed ambulance service and/or first responder agency.

MEDICAL CONTROL (310:641-3-50. Requirement) (Cont.)

6. Provide a written statement, to the Department, which includes consent to be the medical director, address, an Oklahoma Bureau of Narcotics and Dangerous Drugs (OBNDD) number, and be actively involved in pre-hospital care.

7. Develop medical protocols for patient care techniques, both on-line and off-line standing orders and present written EMT Intermediate, EMT Advanced/Cardiac and EMT Paramedic life
support protocols to the Department for approval, before use. Protocols shall include medications to be used, treatment modalities for patient care procedures, and appropriate security procedures for controlled and dangerous drugs.

8. List all medications with quantities to be carried on each emergency vehicle.

9. Supervise a quality assurance (QA) program. The QA program, or policy, shall be submitted with treatment protocols, for approval by the Department. Quality assurance documentation may be requested by the Department.

10. Participate in the statewide emergency medical services system.
Appendix B

Minimal Equipment and Supplies

Minimal Equipment and Supplies (310:641-3-23. Equipment for ground transport vehicles)

A. Each ambulance vehicle, except for stretcher aid vans, shall carry the following:

1. A functioning portable suction apparatus with wide-bore tubing (1/4"), rigid and soft suction catheters for adults, children and infants, which may be electronically, manual or oxygen powered;

2. An adult, pediatric and infant bag-valve mask resuscitators with an adult, child, and infant clear masks;
3. Oropharyngeal airways, set or a minimum of one (1) of each size for adult (size 7,8,or 9), child (size 3,4,5,or 6), and infant (sizes 0,1,or 2), -- nasal pharyngeal airways are optional;

4. Portable and wall mounted oxygen sets, with variable flow regulators and adequate length tubing, and an extra bottle of portable oxygen;

5. Oxygen masks in adult, child, and infant sizes, and cannulas for adults;

6. Bite sticks, clean and single plastic wrapped;

7. Pocket mask with one-way valve and oxygen inlet;

8. Bandaging materials, as follows:
   a. Two (2) burn sheets, clean, wrapped, and marked in plastic bag does which not need to be sterile;
   b. Fifty (50) sterile 4"x4" dressings;
   c. Six (6) sterile 6"x8" or 8"x10" dressings;
   d. Ten (10) roller bandages, soft (kerlex, kling or equivalent) and/or elastic (2" or larger);
   e. Four (4) rolls of tape (1/2" and larger);
   f. Four (4) sterile occlusive dressings, 3" x 8" or larger;
   g. Eight (8) triangular bandages, and;
   h. One (1) pair of bandage scissors.

9. Fracture immobilization devices, as follows:
   a. One (1) traction splint for lower extremity, with limb support slings, padded ankle hitch, padded pelvic support, traction strap;
   b. Upper and lower extremity splints for joint above and below fracture (such as pneumatic, wire ladder, wood, cardboard);
   c. Short spine board or vest type including straps and accessories;
   d. Long spine board including straps and accessories;
   e. Rigid extrication collars in large, medium, small adult sizes, and pediatric sizes for children ages 2 years or older and infants;

Minimal Equipment and Supplies (310:641-3-23. Equipment for ground transport vehicles)(Cont.)

10. Miscellaneous medical equipment, as follows:
   a. Portable blood pressure set in adult, child, and infant sizes;
   b. Stethoscope;
c. Obstetrical kit, sterile with towels, 4"x4" dressing, umbilical tape, bulb syringe, clamps, sterile gloves, aluminum foil, and blanket;
d. Universal communicable disease precaution equipment including gloves, mask, goggles, gown, and other universal precautions;
e. Blood-glucose measurement equipment per local medical direction and Department approval;

11. Other mandatory equipment, as follows:
a. Trash receptacle containment, shall include twelve (12) bags and container (contaminated medical supplies shall display the "biological hazard" emblem);
b. Two way radio communication equipment on UHF and/or VHF;
c. One (1) sturdy, lightweight, all-level cot for the primary patient;
d. A crash stable side or center mounting litter (cot) fastener and/or anchorage assembly of the quick release type;
e. At least three (3) strap type restraining devices (chest, hip, and knee), and compliant shoulder harness shall be provided per stretcher, cot, and litter (not less than two (2") inches wide, nylon, easily removable for cleaning, two (2) piece assembly with quick release buckles)
f. Patient run reports;
g. Two (2) fire extinguishers, mounted with quick release in cab and patient compartment (each dry powder, ABC, five (5#) pound);
h. Flashlight;

I. Intermediate equipment, in addition to the basic equipment listed, as follows:

1. Intravenous administration equipment;

2. Intraosseous administration equipment per local medical direction;

3. Esophageal obturator airway, mask, thirty five (35) cc syringe and laryngoscope handle, blades), straight sizes 0, 1, and 2, and sizes 3 and 4, straight or curved, endotracheal tubes sizes 3.0 - 5.0 mm uncuffed and 5.5 - 8.0 mm cuffed (2 each), ten (10) cc syringe, and stylettes (pediatric and adult), forceps in adult, pediatric and infant sizes;

4. Blood sampling equipment, and;

5. An Occupational Health and Safety Administration (OSHA) approved "sharps" container.

Minimal Equipment and Supplies (310:641-3-23. Equipment for ground transport vehicles) (Cont.)

J. Paramedic equipment, in addition to the intermediate equipment listed, as follows:

1. Cardiac monitor/defibrillator (with tape write out), defibrillator pads, quick-look paddles, EKG leads, chest attachment pads (telemetry radio capability is optional), re-calibrated every twelve (12) months, and;
2. Drugs (pre-load when available) approved by medical control, including those which are compatible with the standards set by the American Heart Association's Emergency Cardiac Care Committee, as reflected in the Advanced Cardiac Life Support and Pediatric Advanced Life Support.

3. Extrication equipment shall be available for each ambulance service by either mutual aid assistance with a fire department, other ambulance service, rescue squad, or carried in total on the service's vehicle.

4. All ambulance vehicles shall carry the following equipment:

   a. Three (3) reflectors (triangular) or battery flares;
   b. One (1) wrench (12" adjustable crescent type);
   c. Two (2) screwdrivers (12" flat and 12" phillips head);
   d. One (1) hacksaw (12" blade);
   e. One (1) pliers (12" vice grip type);
   f. One (1) seatbelt cutter;
   g. One (1) wrecking bar (24" handle);
   h. Hard hat (ANSI Z 89.1), one (1) per occupant; and
   i. Gauntlet leather gloves, one (1) pair per occupant

5. All ambulance services shall have available the following additional extrication equipment:

   a. One (1) hammer (3# to 5# with 15" handle);
   b. One (1) fire ax, flat head
   c. One (1) crowbar, (51" pinch point)
   d. One (1) bolt cutter (minimum 18")
   e. One (1) power jack, portable, hydraulic or pneumatic, and one (1) spreader tool kit, hand powered, at least of four (4) ton capacity and one (1) air gun kit, air cutting tools, (250psi with cylinder and chisels); "Jaws of Life" may be substituted
   f. One (1) shovel, pointed blade
   g. One (1) tin snip, double action (at least 8")
   h. Two (2) ropes, synthetic, kernmantle (50' x 3/4")
   i. Protective goggles, one (1) per occupant
   j. Two (2) utility knives, curved blade
   k. Two (2) lights, portable, battery operated;
   l. One (1) blanket (large 5'x 6' for patient protection during extrication)
   m. Two (2) baling hooks;

   n. One (1) spring loaded window punch;
   o. Twelve (12) blocks, hardwood shoring, (2"x4"x12" blocks with rope handles);
   p. Four (4) blocks, hardwood cribbing, (4"x4"x12" blocks with rope handles);
   q. Four (4) blocks, hardwood cribbing, (wedge shaped with rope handles);

Mineral Equipment and Supplies (310:641-3-23. Equipment for ground transport vehicles) (Cont.)

5. Extrication equipment (cont)
Oklahoma State EMS Protocols

r. One (1) come-along (2 ton, chain type and two (2) pull chains, alloy steel, rescue type (10’ at least with grab hooks and rings);
s. Two (2) extrication straps, synthetic fabric, (9’ with quick release buckles)
t. One (1) loop sling, extrication, (1” wide nylon or equal x 6' circumference with closure ring)

K. Optional equipment:

1. Ambulance services and first response agencies who are authorized by the Department and comply with Section 310:641-3-50(7) shall have a semi-automatic advisory defibrillator (SAAD) on the vehicle(s).
2. Pulse oximetry device per local medical direction.
3. Portable battery powered ventilator per local medical direction.
4. Pneumatic anti shock garment (PASG), compartmentalized (legs and abdomen separate), control valves (closed/open), inflation pump per local medical direction.