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General Notes Section
COMMUNICATIONS

RADIO COMMUNICATIONS

Four radio channels are designated for communications with hospitals in Contra Costa County. Receiving hospital communications are done via XCC EMS 2, whereas paramedic base hospital communications may occur via XCC EMS 2 or XCC EMS 3, depending on location.

<table>
<thead>
<tr>
<th>Channel</th>
<th>Frequency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>XCC EMS 1 (formerly L9)</td>
<td>T: 491.4375 R: 488.4375</td>
<td>Use for Sheriff’s Dispatch-to-ambulance communication</td>
</tr>
<tr>
<td>XCC EMS 2 (formerly L19)</td>
<td>T: 491.9125 R: 488.9125</td>
<td>Primary channel for base contact for West County paramedic units. Also used county-wide for BLS and helicopter radio traffic</td>
</tr>
<tr>
<td>XCC EMS 3</td>
<td>T: 491.6125 R: 488.6125</td>
<td>Primary channel for base contact for paramedic units operating south of Ygnacio Valley Road and west of I-680 along Highway 24</td>
</tr>
<tr>
<td>XCC EMS 4</td>
<td>T: 491.6625 R: 488.6625</td>
<td>Primary channel for base contact for paramedic units operating in East County and Central County north of Ygnacio Valley Road.</td>
</tr>
</tbody>
</table>

Whenever possible, paramedic personnel should use the XCC EMS channel assigned to the area in which they are responding, for ambulance-to-base hospital communications. XCC EMS 2 is the county-wide backup ALS channel and should be used if XCC EMS 3 or XCC EMS 4 is not available. Ambulance and helicopter personnel are to contact Sheriff’s Dispatch on XCC EMS 1 to request the use of XCC EMS 2 prior to utilizing the channel. The dispatcher shall be given unit identification and a description of current traffic (Code 2, Code 3 or trauma destination decision).

No request for use is necessary for XCC EMS 3 or XCC EMS 4. However, each unit must monitor the channel prior to use to ensure that other units are not already using the channel. Radio identification procedures must be strictly followed, as more than one call may be occurring at the same time. If traffic is in progress on a XCC EMS channel, other ambulance personnel may either wait until current traffic is finished or find an alternate means of contacting the desired hospital. Any unit may, in cases such as trauma destination decisions, request that Sheriff’s Dispatch break into current traffic on XCC EMS 2 to request temporary use of the channel. Units using XCC EMS 3 or XCC EMS 4 may request use of the channel from a unit that is currently on that channel. When making base contact for trauma destination only, the initial transmission should make the purpose of the call clear. Cellular phones may also be used as a means of communication.

BASE HOSPITAL COMMUNICATIONS

<table>
<thead>
<tr>
<th>CONTRA COSTA COUNTY BASE HOSPITAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>HOSPITAL</td>
</tr>
<tr>
<td>John Muir Medical Center – Walnut Creek Campus 1601 Ygnacio Valley Road Walnut Creek, CA 94598</td>
</tr>
</tbody>
</table>
The base hospital is on-call 24 hours per day.

**BASE HOSPITAL REPORT FORMAT**

Base hospital contacts requesting base orders should contain the following information and follow the basic order listed below:

- Hospital name
- Agency name
- Unit #
- Response code and ETA
- Patient age and sex
- Patient chief complaint
- Patient’s current level of consciousness
- Vital signs
- Pertinent past medical history
- Prehospital treatment and patient response to treatment
- Specific request for additional orders or questions regarding care

<table>
<thead>
<tr>
<th>CONTRA COSTA COUNTY TRAUMA CENTER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HOSPITAL</strong></td>
</tr>
<tr>
<td>John Muir Medical Center – Walnut Creek Campus</td>
</tr>
<tr>
<td>1601 Ygnacio Valley Road</td>
</tr>
<tr>
<td>Walnut Creek, CA 94598</td>
</tr>
</tbody>
</table>

**TRAUMA REPORT FORMAT**

This report is for personnel calling the base hospital either for destination decision or to inform the base of a patient who is being transported to the trauma center (meets criteria for direct transport).

1. Ambulance agency name and unit number
2. State need for “Trauma Destination Decision” or if en route with patient meeting “High-Risk” criteria
3. ETA to trauma center
4. Patient age and sex
5. Chief Complaint/Mechanism of injury (brief description)
6. Basic scene information
   - Seatbelt or helmet use
   - Airbag deployment
   - Extrication time if prolonged
   - Estimated MPH if known
7. Primary Survey – ABCD (can report as ABCD normal except…..)
   - Items to report if abnormal:
     - Airway (if not patent)
     - Breathing (labored, shallow, or rapid)
     - Circulation (delayed capillary refill, pulse rate/quality, BP if obtained or pulses palpable), presence or absence of active hemorrhage (from what site), EBL
• Disability (level of consciousness, orientation if altered or intoxication—if not awake/alert, pupils if abnormal
8. Secondary Survey – Head-to toe – report abnormal findings only
9. Prehospital treatment(s) and patient response
10. Paramedic concerns

List of examples of positive findings on secondary survey that would be appropriate to report (not exhaustive list, other important findings need reporting):

HEENT:
Blood, swelling anywhere on head, around eyes, ears, mouth, nose
Inability to open mouth
Neck:
Midline tenderness to touch
Chest:
Visible wounds
Breath sounds unequal
Pain upon compression
Abdomen:
Visible wounds
Tender to palpation
Distention
Pelvis:
Pain on compression
Extremities:
Deformity/Tenderness/Swelling
Neurological:
Presence of numbness or tingling
Abnormal motor exam of extremities (if non-tender/not splinted)
Spine:
Tenderness to palpation

🚨 TRAUMA CENTER REPORT FORMAT – MIVT

The MIVT report is given at the trauma center upon arrival. The goal is to efficiently relate the most critical prehospital information to the trauma physician or ED physician in the trauma room in a time frame of 30 seconds or less.

If there are major issues that the paramedic feels are critical to the first minute of care that need to be relayed these can be reported in brief at the end of the report. The paramedic should remain available to provide more detailed or additional information to the scribe in the trauma suite.

**Format:**

MECHANISM OF INJURY

This should be brief! (e.g. MVA, rollover, ejection, GSW, blunt head with pipe)

INJURIES SUSTAINED/LEVEL OF CONSCIOUSNESS

Injuries: Major anatomy involved, major patient complaints—does not need to be all-inclusive
Level of consciousness: AVPU format. Should include changes noted on scene and en route.

VITAL SIGNS
Blood pressure: If known, otherwise quality/location of pulse
Pulse: Rate and quality
Respiratory rate: Add abnormal lung sounds if noted
ECG Rhythm: If anything other than NSR or sinus tachycardia
Pulse oximetry: If known
Treatment and patient’s response to treatment

◊ RECEIVING FACILITY COMMUNICATIONS

<table>
<thead>
<tr>
<th>HOSPITAL CODES FOR USE ON XCC EMS 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra Costa Regional Medical Center</td>
</tr>
<tr>
<td>Doctors Medical Center – San Pablo</td>
</tr>
<tr>
<td>John Muir Medical Center – Walnut Creek Campus</td>
</tr>
<tr>
<td>Kaiser Medical Center – Richmond</td>
</tr>
</tbody>
</table>

◊ RECEIVING FACILITY REPORT FORMAT

Receiving facility reports should contain the following information and follow the basic order listed below:

✔ Hospital name
✔ Agency name
✔ Unit #
✔ Response code and ETA
✔ Patient age and sex
✔ Patient chief complaint
✔ Patient’s current level of consciousness
✔ Vital signs
✔ Pertinent physical findings (briefly)
✔ Presence of drugs/alcohol (for 5150 transport to Contra Costa Regional Medical Center)
✔ Prehospital treatment and patient response to treatment
## CONTRA COSTA COUNTY HOSPITALS

<table>
<thead>
<tr>
<th>HOSPITAL</th>
<th>SERVICES</th>
<th>ED PHONE #</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contra Costa Regional Medical Center</td>
<td>Basic ED, OB/Neonatal</td>
<td>(925) 370-5170</td>
</tr>
<tr>
<td>2500 Alhambra Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Martinez, CA 94553</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor’s Medical Center – San Pablo</td>
<td>Basic ED</td>
<td>(510) 232-6622</td>
</tr>
<tr>
<td>2000 Vale Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Pablo, CA 94806</td>
<td></td>
<td></td>
</tr>
<tr>
<td>John Muir Medical Center – Walnut Creek Campus</td>
<td>Basic ED, OB/Neonatal</td>
<td>(925) 939-5800</td>
</tr>
<tr>
<td>1601 Ygnacio Valley Road</td>
<td>Trauma Center</td>
<td></td>
</tr>
<tr>
<td>Walnut Creek, CA 94598</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaiser Medical Center – Richmond</td>
<td>Basic ED</td>
<td>(510) 307-1566</td>
</tr>
<tr>
<td>901 Nevin Avenue</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richmond, CA 94504</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kaiser Medical Center – Walnut Creek</td>
<td>Basic ED, OB/Neonatal</td>
<td>(925) 295-4820</td>
</tr>
<tr>
<td>1425 South Main Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walnut Creek, CA 94596</td>
<td></td>
<td></td>
</tr>
<tr>
<td>John Muir Medical Center – Concord Campus</td>
<td>Basic ED</td>
<td>(925) 674-2333</td>
</tr>
<tr>
<td>2540 East Street</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concord, CA 94520</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Ramon Regional Medical Center</td>
<td>Basic ED, OB/Neonatal</td>
<td>(925) 275-8338</td>
</tr>
<tr>
<td>6001 Norris Canyon Road</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Ramon, CA 94583</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sutter/Delta Medical Center</td>
<td>Basic ED, OB/Neonatal</td>
<td>(925) 779-7273</td>
</tr>
<tr>
<td>3901 Lone Tree Way</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antioch, CA 94509</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### PATIENT DESTINATION DETERMINATION
DIALYSIS PATIENTS

Patients with advanced renal disease requiring dialysis have special medical needs that may deserve specific attention in the pre-hospital setting. Problems that may occur include fluid overload and electrolyte imbalances. Patients may be particularly prone to these problems if they should miss scheduled dialysis sessions.

Fluid overload may lead to pulmonary edema. The initial treatment of this is similar to other patients with pulmonary edema, and may include oxygen, nitroglycerin, furosemide and morphine. Definitive treatment at a center that provides acute dialysis capabilities is often necessary. The preferable transport destination for this type of patient is the hospital at which the patient has received dialysis care. Patients in extremis will need transport to the closest emergency department.

Hyperkalemia is also common in renal failure patients, leading to arrhythmia or ventricular fibrillation. Treatment in the field may include sodium bicarbonate and calcium chloride.

LOAD AND GO PROCEDURES

Patients with severe medical conditions or traumatic injuries often need to be transported without delay. Field treatment is to be minimized to essential stabilization and the emphasis is placed on prompt transport to an appropriate receiving facility.

Conditions to be considered for "Load and Go" transport include:

- unmanageable airways in any patient;
- obstetrical emergencies including prolapsed cord, abnormal presentation, abnormal bleeding, or maternal seizures.
- patients in hypovolemic shock
- severe trauma, especially to the head, chest, or abdomen; for severe trauma, scene time should not exceed 15 minutes. Reasons for extended scene times should be documented on the patient care report

NOTES ON PEDIATRIC PATIENTS

The causes of catastrophic events, such as cardiac arrest are most often related to respiratory failure, shock or central nervous system injuries. Early treatment is critical in this population.

INITIAL APPROACH

- Remain calm and confident as the child may pick up on any anxiety.
- DO NOT SEPARATE THE CHILD FROM THE PARENT unless absolutely necessary.
- Establish a rapport with the parents as well as the child, and encourage the parents to touch, hold or cuddle the child when appropriate.
- Go from least intrusive to most intrusive in your initial assessment.
- LOOK, then LISTEN, then FEEL
- Always explain what you are doing as you proceed.
• Avoid manipulating any area that appears to be painful until late in the examination, and always tell the child before you touch those potentially painful areas.

✧ **PEDIATRIC AGE DEFINITIONS**

• Neonate is 0-1 month
• Pediatric patient is less than 14 years old

✧ **PEDIATRIC VITAL SIGNS**

Vital signs are valuable in the assessment of pediatric patients, but have significant limitations and can be dangerously misleading. Children can be in compensated shock with a normal blood pressure. However, they will exhibit signs of poor peripheral circulation. Blood pressure is maintained by increasing peripheral vascular resistance and heart rate. This will cause the skin to appear pale, dusky or mottled, and to feel cool, clammy or moist. Capillary refill may also be delayed. Capillary refill greater than 2 seconds is a sign of poor circulation. Capillary refill time of 5 seconds or greater indicates impending circulatory failure.

Hypotension is a late and often sudden sign of cardiovascular decompensation. The systolic pressure may not drop until the patient has a decrease of 25-30% in blood volume, therefore, relatively little blood loss in an infant or young child may cause decompensation and cardiopulmonary arrest. Tachycardia (heart rate greater than 100) will persist until cardiac reserve is depleted. Bradycardia (heart rate less than 60) in a distressed child is an ominous sign of impending cardiac arrest.

<table>
<thead>
<tr>
<th>Age</th>
<th>Resp Rate</th>
<th>Pulse</th>
<th>BP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neonate (less than 1 month)</td>
<td>less than 40, greater than 60</td>
<td>less than 100, greater than 160</td>
<td>Variable – use skin signs</td>
</tr>
<tr>
<td>Infant (1 month – 1 year)</td>
<td>greater than 40</td>
<td>greater than 160</td>
<td>less than 60</td>
</tr>
<tr>
<td>Toddler (1 – 4 years)</td>
<td>greater than 30</td>
<td>greater than 140</td>
<td>less than 75</td>
</tr>
<tr>
<td>School Age (5 – 13 years)</td>
<td>greater than 25</td>
<td>greater than 120</td>
<td>less than 85</td>
</tr>
<tr>
<td>Adolescent (greater than 13 years)</td>
<td>greater than 20</td>
<td>greater than 110</td>
<td>less than 90</td>
</tr>
</tbody>
</table>

拜师学艺 **NOTES ON OB/GYN EMERGENCIES**

✧ **VAGINAL BLEEDING**

Vaginal bleeding that is not a result of direct trauma or a women's normal menstrual cycle may indicate a serious gynecological emergency. Determining the specific cause of the bleeding may be impossible, therefore, all women who have vaginal bleeding should be treated as though they have a potentially life-threatening condition. This is especially true if the bleeding is associated with abdominal pain. The most serious complication of vaginal bleeding is hypovolemic shock due to blood loss.
✧ **SEXUAL ASSAULT**

Care of the patient who has been sexually assaulted must include both medical and psychological considerations. The best approach is to be nonjudgmental and to maintain a professional but compassionate attitude. Examine the victim for injury that requires immediate stabilization. Though your responsibilities do not include law enforcement, try wherever possible to preserve evidence. Field personnel are required to notify law enforcement personnel in these cases.

✧ **CHILDBIRTH**

Since childbirth is a natural process, the decision field personnel will need to make is whether there is time to transport the patient to the hospital or whether they should prepare for a field delivery. If delivery appears imminent, immediately prepare to assist the delivery.

➢ **NOTES ON TRAUMA**

<table>
<thead>
<tr>
<th>Glasgow Coma Scale (GCS)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EYES</strong></td>
</tr>
<tr>
<td>Open Spontaneously .......... 4</td>
</tr>
<tr>
<td>Open to verbal command ........... 3</td>
</tr>
<tr>
<td>Open to pain .................. 2</td>
</tr>
<tr>
<td>No response ...................... 1</td>
</tr>
<tr>
<td><strong>BEST VERBAL RESPONSE</strong></td>
</tr>
<tr>
<td>Oriented and converses ............. 5</td>
</tr>
<tr>
<td>Disoriented and converses .......... 4</td>
</tr>
<tr>
<td>Inappropriate words ............... 3</td>
</tr>
<tr>
<td>Incomprehensible sounds .......... 2</td>
</tr>
<tr>
<td>No response ...................... 1</td>
</tr>
<tr>
<td><strong>BEST MOTOR RESPONSE</strong></td>
</tr>
<tr>
<td>Obeys verbal commands .......... 6</td>
</tr>
<tr>
<td>Localizes pain .................... 5</td>
</tr>
<tr>
<td>Flexion – withdraws from pain .......... 4</td>
</tr>
<tr>
<td>Flexion – abnormal (decorticate) .......... 3</td>
</tr>
<tr>
<td>Extension (decerebrate) ............ 2</td>
</tr>
<tr>
<td>No response ...................... 1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
</tr>
</tbody>
</table>

✧ **HELMET REMOVAL**

Patients wearing helmets present special management needs regarding airway maintenance and monitoring. There are generally two types of helmets, and the type of helmet determines how easily or difficult it may be to maintain or monitor the airway with the helmet in place:

- **Sports Helmets** (football, hockey, etc) - these helmets are generally open anteriorly and allow for easy airway access. The face mask should be removed to facilitate easy airway access. If spinal immobilization is required, the helmet should not be removed. If the helmet must be removed, the shoulder pads must also be removed to maintain neutral spinal alignment.

- **Motorcycle Helmets** - these helmets may have full face shields, which makes airway assessment and management very difficult.
As a general guideline **DO NOT REMOVE HELMETS**, unless:

1. The helmet interferes with airway management.
2. The helmet has improper fit, which allows the head to move within the helmet.
3. The helmet interferes with proper spinal immobilization.
4. The patient is in cardiac arrest.

**CERVICAL COLLARS**

The primary purpose of a cervical collar is to protect the cervical spine from compression. Cervical collars are an important adjunct to immobilization but **must always** be used in conjunction with manual immobilization or with mechanical immobilization provided by a suitable spine immobilization device. The rigid anterior portion of the collar also provides a safe pathway for the lower head strap across the neck.

Proper sizing of a cervical collar is critical. The **key dimension** on a patient is the distance between an imaginary line drawn across the top of the shoulders, where the collar will sit, and the bottom plane of the patient's chin. The **key dimension** on the collar is the distance between the black fastener and the lower edge of the rigid plastic encircling band, not the foam padding. When the patient is being held in a neutral position, measure the distance from the shoulder to the chin in finger widths. Then select the size collar that most closely matches the key dimensions of the patient. The tallest collar that does not hyperextend a patient should be used.

The **most important step in application is the proper positioning of the chin piece**. Position the chin piece by sliding the collar up the chest wall. Be sure that the chin is well supported by the chin piece and that the chin extends far enough onto the chin piece to at least cover the central fastener. Difficulty in positioning the chin piece may indicate the need for a shorter collar.

A cervical collar must **NOT** inhibit the patient's ability to open his mouth or your ability to open the patient's mouth if vomiting occurs. A cervical collar must not obstruct or hinder ventilation in any way.

**SPINAL IMMOBILIZATION**

Spinal immobilization is a critical procedure necessary in many, but not all patients suffering trauma. Proper evaluation, including assessment of the mechanism of injury, assessment of the patient (particularly with regard to neurologic function) and assessment of confounding factors (drugs, pain, etc.) are necessary in order to make a proper decision about spinal immobilization.

One overriding principle is that if any doubt exists as to whether a patient has sustained a spinal injury, immobilization should be done. A poor neurologic outcome because immobilization was not performed far outweighs the discomfort of immobilization for those without injuries. A systematic approach will allow appropriate evaluation of patients with potential for spinal injury and application of immobilization techniques for those patients. Patients who do not meet criteria will avoid the discomfort, delay and additional unnecessary testing that often accompanies spinal immobilization.

In all situations, airway and ventilation have the highest priority and must be addressed with minimal movement of the patient prior to full assessment.

A wide variety of devices and methods exist for immobilizing a patient. The specific method and equipment to be used should be based upon the situation, the patient's condition and available resources. Regardless of the specific device the focus should be on the patient and their needs.
**HEAD INJURY**

Priorities for treatment of head-injury patients include maintenance of adequate oxygenation and blood pressure as well as appropriate attention to possible cervical spine injury. Hyperventilation of head-injury patients should be avoided in all but the most severe cases, as it may worsen delivery of oxygen to the brain.

Patients with adequate ventilatory effort (10-12 breaths per minute in adults) should receive 100% oxygen by mask. Patients with poor ventilatory effort (either in terms of slow rate or shallow breathing) may need assisted ventilations at normal rate. Deeply comatose patients may require intubation to assure an adequate airway. Capnography and end-tidal CO₂ Levels should guide ventilation rate (levels of 35-45 mm Hg are optimal).

In the prehospital setting, aggressive hyperventilation is to be avoided. Patients with a dilated pupil on one side, or who have decerebrate or decorticate posturing likely have severe brain injury and swelling that may lead to brain herniation. For these patients, an increase in respiratory rate of 2-4 per minute is appropriate to provide the small degree of hyperventilation advised for these most severe cases.

Fluid administration should not be withheld in hypotensive head injury patients, as hypotension also worsens brain injury. Rapid transport of trauma patients is essential, and it is appropriate to obtain IV access and administer fluids during transport.

**AMPUTATIONS**

For partial amputations, splint in anatomic position and elevate the extremity. If the part is completely amputated, place the amputated part in a sterile, dry container or bag. Seal or tie off the bag, and place it in a second container or bag. Seal or tie off the second bag and place on ice. DO NOT PLACE THE AMPUTATED PART DIRECTLY ON ICE OR IN WATER. Elevate the extremity involved and dress with dry gauze.

**NOTES ON HYPOTHERMIA**

Many patients seen in the prehospital setting may have predisposing factors that lead to hypothermia. Common medical conditions leading to hypothermia include hypoglycemia or stroke. Trauma with shock may also lead to hypothermia, and this can be worsened by exposure to a cold environment. Resuscitative efforts for these patients are less effective in the setting of hypothermia. Newborns and infants as well as the elderly have an increased predisposition to hypothermia, as do some persons with drug and alcohol abuse.

For any patient with a predisposition to or suspected hypothermia, general treatment measures include removing wet clothing and drying the patient. Insulate against additional heat loss by covering the patient with a blanket. In newborns and infants, the head should also be covered to prevent heat loss. Patients should be removed from cold environments as soon as possible.

Severe hypothermia leading to marked lowering of core body temperature is rare in our county. Severely hypothermic patients may have impaired speech, memory, judgment, and coordination. Hypotension may also be present. Gentle handling of these patients, general warming/treatment measures listed above, and prompt transport (in a warmed ambulance) is appropriate.
NOTES ON BURNS

REGIONAL BURN CENTERS

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Services</th>
<th>Transport Considerations</th>
<th>Phone</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Santa Clara Valley Medical Center</strong></td>
<td>Adult and Pediatric</td>
<td>Closest to West and Central County by air ambulance</td>
<td>(408) 885-2005</td>
</tr>
<tr>
<td>751 S. Bascom Ave.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>San Jose, California</td>
<td></td>
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</tr>
<tr>
<td><strong>UC Davis Medical Center</strong></td>
<td>Adult and Pediatric</td>
<td>Closest to East County by air ambulance</td>
<td>(916) 734-3636</td>
</tr>
<tr>
<td><strong>Regional Burn Center</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2315 Stockton Blvd.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sacramento, California</td>
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<tr>
<td><strong>St. Francis Memorial Hospital</strong></td>
<td>Adult and Pediatric</td>
<td>Closest by ground ambulance, but exceeds 45 min. transport from most areas of County (consider transport to closer Basic ED if air ambulance unavailable)</td>
<td>(415) 353-6255</td>
</tr>
<tr>
<td><strong>Bothin Burn Center</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>900 Hyde Street</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>San Francisco, California</td>
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</table>

After the patient has been removed from direct contact with the source of the burn, and the acute burning process has been stopped, then the priorities for burned patients are the same as for any other type of injury or illness.

In the case of chemical burns (other than dry chemicals that may become more harmful when wet), remove the patient's shoes, hose or shower over the clothes, and then remove the clothes. Remove potentially constricting jewelry. Do not remove clothing that has stuck to the skin as a result of the burning. Protection should be afforded to prehospital personnel during this process.

Airway problems should be suspected whenever the patient was burned or otherwise exposed to smoke in an enclosed space, when there was exposure to toxic fumes, or when there are burns or evidence of soot or hair singing to the face and/or upper airway. Pulmonary complications are usually delayed; however, if early airway problems are evident or likely, apply oxygen and transport immediately to the nearest appropriate facility. Further care can be given en route. All patients exposed to smoke should be treated for possible carbon monoxide poisoning using high flow oxygen. Chronic lung patients will be more dramatically affected and should be more closely observed.

Shock from burns is usually delayed. If the patient is in shock, consider other causes. Associated injuries are likely to be more acutely life threatening than the burn itself.

If the burn has just occurred (less than 3 minutes prior), cool wet dressings should be used to stop the burning process and to limit the depth of injury. Dry dressings should then be placed on burns. If patients have large burns (more than 10% of total body surface area), cooling measures and exposure may lead to hypothermia. Those patients should be covered with blankets to preserve body heat (can be placed over wet dressings).
Use the Rule-of-Nines to estimate the extent of the burn:

The following patients may be appropriate for initial transport to a Burn Center:

a. Partial thickness (2\textsuperscript{nd} degree) greater than 20\% TBSA
b. Full thickness (3\textsuperscript{rd} degree) greater than 10\%
c. Significant burns to face, hands, feet, genitalia, perineum, or circumferential burns of the torso or extremities
d. Chemical or high voltage electrical burns
e. Smoke inhalation with external burns

Patients with other life threatening injuries may require stabilization at the closest appropriate receiving facility prior to transfer to a burn center. Transporting units may be directed past closer facilities by the base hospital physician, once it has been determined that the patient is stable enough and that the burn center is prepared to receive the patient.
BLS NOTES
Section
EMERGENCY MEDICAL TECHNICIAN (EMT) SCOPE OF PRACTICE

"Emergency Medical Technician I" or "EMT-I" means a person who has successfully completed an EMT-I course which meets the requirements of this Chapter, has passed all required tests, and who has been certified by the EMT-I certifying authority.

100063. Scope of Practice of Emergency Medical Technician-I (EMT-I).

a) During training, while at the scene of an emergency, during transport of the sick or injured, or during interfacility transfer, a supervised EMT-I student or certified EMT-I is authorized to do any of the following:

1) Evaluate the ill and injured.
2) Render basic life support, rescue and emergency medical care to patients.
3) Obtain diagnostic signs to include, but not be limited to the assessment of temperature, blood pressure, pulse and respiration rates, level of consciousness, and pupil status.
4) Perform cardiopulmonary resuscitation, including the use of mechanical adjuncts to basic cardiopulmonary resuscitation.
5) Use the following adjunctive airway breathing aids:
   A) oropharyngeal airway;
   B) nasopharyngeal airway;
   C) suction devices;
   D) basic oxygen delivery devices; and
   E) manual and mechanical ventilating devices designed for prehospital use.
6) Use various types of stretchers and body immobilization devices.
7) Provide initial prehospital emergency care of trauma.
8) Administer oral glucose or sugar solutions.
9) Extricate entrapped persons.
10) Perform field triage.
11) Transport patients.
12) Set up for ALS procedures, under the direction of an EMT-II or EMT-P.
13) Perform automated external defibrillation when authorized by an EMT AED service provider.
14) Assist patients with the administration of physician prescribed devices, including but not limited to, patient operated medication pumps, sublingual nitroglycerin, and self-administered emergency medications, including epinephrine devices.

b) In addition to the activities authorized by subdivision (a) of this section, the medical director of the local EMS agency may also establish policies and procedures to allow a certified EMT-I or a supervised EMT-I student in the prehospital setting and/or during interfacility transport to:

1) Monitor intravenous lines delivering glucose solutions or isotonic balanced salt solutions including Ringer’s lactate for volume replacement;
2) Monitor, maintain, and adjust if necessary in order to maintain, a preset rate of flow and turn off the flow of intravenous fluid; and

3) Transfer a patient who is deemed appropriate for transfer by the transferring physician, and who has nasogastric (NG) tubes, gastrostomy tubes, heparin locks, foley catheters, tracheostomy tubes and/or indwelling vascular access lines, excluding arterial lines;

4) Monitor preexisting vascular access devices and peripheral lines delivering intravenous fluids with additional medications pre-approved by the Director of the EMS Authority (not currently allowed in Contra Costa County).

c) The scope of practice of an EMT-I shall not exceed those activities authorized in this Section, Section 100064, and Section 100064.1.

➢ **BLS MANAGEMENT OF PATIENTS ENCOUNTERED PRIOR TO ACTIVATION OF 9-1-1**

EMT-I's who encounter a patient where the 9-1-1 system has not been activated should assess the patient to determine whether the care needed by that patient is beyond their scope of practice. If it is determined that the patient may benefit from ALS level care, the 9-1-1 system should be activated. After assuring activation of the 9-1-1 system, EMT-I personnel should assess the patient and begin any care required that is allowed in the EMT-I Scope of Practice.

If the EMT-I unit has transport capabilities, the personnel should determine if the ETA of the paramedic unit is greater than the transport time to the closest appropriate receiving facility. If so, the EMT-I unit should proceed with patient transport and cancel the ALS unit. If the ETA of the paramedic unit is less than the transport time to the closest appropriate receiving facility, remain on scene and turn the patient over to the paramedic unit upon their arrival.

Documentation of the patient's chief complaint, history of present illness, past medical history, medications, allergies, vital signs, findings from the physical exam, and a general assessment and any treatment initiated is to be completed. A copy of the patient documentation should be given to the transport unit prior to transport, if possible.

➢ **ADMINISTRATION OF ORAL GLUCOSE**

EMT-I's may administer an approved oral glucose agent by utilizing the following procedure:

1. Confirm altered level of consciousness in a patient with a known history of diabetes, and that the patient is conscious and able to sit in an upright position.

2. Dispense up to 30 grams of the oral glucose solution into the patient's mouth. Optimally, the patient will self-administer the solution.

3. If the patient has difficulty swallowing the solution, discontinue the procedure. The first priority is keeping an open airway.

4. Record the administration of the oral glucose solution with the time given and any changes in the patient's level of consciousness.
 PUBLIC SAFETY DEFIBRILLATION

PATIENT ASSESSMENT

All patients are to be assessed upon arrival for level of consciousness and the presence or absence of a pulse and respirations, even if CPR is being done. The results of this initial assessment are to be verbalized in the initial report.

If the patient is an unwitnessed arrest or a witnessed arrest with no CPR for 5 minutes or more, two minutes of CPR shall be done prior to attaching the defibrillator for analysis. If the patient was a witnessed arrest with CPR or a downtime less than 5 minutes proceed to attach defibrillator and immediately initiate analysis.

VERBAL REPORT

Verbal reports are very important and should begin once the self-check for the Lifepak 500 has cleared the screen. The initial report should include the name of the person reporting, engine company designation, status of the defibrillator self-check (e.g., self-check ok), patient location, estimated patient age, patient sex, and findings from the initial assessment of the patient. Continue to verbally report events as they occur (e.g., attaching electrodes, analyzing rhythm, paramedics (unit number) on-scene at...). If a shock is advised, verify that everyone (including the operator) is clear of the patient, and verbalize that everyone is clear.

DEFIBRILLATOR ELECTRODES

Do not use the defibrillation electrode if the gel is torn, separated or split from the foil. This may cause arcing and patient burns. Peel the protective backing from the electrode slowly to prevent damage to the gel.

Patients with implanted pacemakers or implantable defibrillators are treated just like any other patient. If possible, do not place the electrodes on the pulse generator of the pacemaker. EMS personnel may feel the shock from an implantable defibrillator as a slight "buzz", but it will not harm them.

PATIENT CARE DATA

Patient data should be downloaded and a patient care report completed and sent to the EMS Agency as soon as possible after the use of the AED.
**Spinal Immobilization**

Spinal immobilization is a critical procedure necessary in many, but not all patients suffering trauma. Proper evaluation, including assessment of the mechanism of injury (high velocity motor vehicle crash, significant fall, penetrating trauma that may have potential spinal involvement, etc.), assessment of the patient (particularly with regard to neurologic function) and assessment of confounding factors (drugs, pain, etc.) are necessary in order to make a proper decision about spinal immobilization.

If any doubt exists as to whether a patient has sustained a spinal injury, immobilization should be done. In all situations, airway and ventilation have the highest priority and must be addressed with minimal movement of the patient prior to full assessment.

» **Indications**

- Any patient with:
  - acute motor or sensory deficit
  - spine pain or tenderness
  - trauma severe enough to qualify for trauma center disposition (with suitable mechanism or area of injury)

- Patients with potential injury mechanism who are unable to be assessed because of:
  - head injury
  - altered level of consciousness of any cause
  - suspected presence of drugs or alcohol
  - distracting painful or emotional (including psychiatric) conditions

» **Equipment**

- Rigid cervical collar
- Long backboard
- Straps (for torso immobilization)
- Head immobilization device
- Padding

» **Procedure**

1) Provide manual in-line immobilization immediately, moving the head into a proper in-line position, unless contraindicated*. Continue to support and immobilize the head without interruption.

2) Evaluate the patient's ABC's and provide any immediately required intervention.

3) Check motor, sensory and circulation in all four extremities.

4) If patient meets ALL of the following criteria, immobilization may be omitted:
   a. Alert, fully oriented to person, place, time and situation
   b. No evidence or suspicion of alcohol or substance abuse
   c. Able to communicate effectively with prehospital personnel (other than language barrier)
   d. Normal sensory and motor function in extremities
   e. No areas of tingling, numbness or paresthesia
   f. No neck or spinal tenderness on palpation
   g. No neck or spinal pain with movement
   h. No distracting painful or emotional conditions
5) If patient does not meet all criteria listed in #4, immobilize:

a. Examine the neck and apply a properly fitting, effective cervical collar.

b. Pick the immobilization device that you will use, and immobilize the torso to the device so that the torso cannot move up or down, left or right.

c. Evaluate and pad behind the head as needed.

d. After the torso straps have been tightened, immobilize the head, maintaining a neutral in-line position.

e. Tie the feet together and immobilize the legs so that they can not move anteriorly or laterally.

f. Fasten the arms to the immobilization device.

g. If patient is pregnant, elevate spine board on patient's right side to approximately 15 degree angle (left lateral recumbent) to promote venous return.

h. Recheck the ABC's and motor, sensory, and circulation in all four extremities.

* In-line movement should not be attempted if the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders. Other contraindications would be if careful movement of the head and neck into a neutral in-line position results in neck muscle spasm, increased pain, the commencement or increase of a neurological deficit such as numbness, tingling or loss of motor ability, or compromise of the airway or ventilation.
ALS Notes
Section
PARAMEDIC SCOPE OF PRACTICE

California Code of Regulations, Title 22, Division 9, Chapter 4:

100145. Scope of Practice of Paramedic.

a) A paramedic may perform any activity identified in the scope of practice of an EMT-I in Chapter 2 of the Division, or any activity identified in the scope of practice of an EMT-II in Chapter 3 of this Division.

b) A paramedic shall be affiliated with an approved paramedic service provider in order to perform the scope of practice specified in this Chapter.

c) A paramedic student or a licensed paramedic, as part of an organized EMS system, while caring for patients in a hospital as part of his/her training or continuing education under the direct supervision of a physician, registered nurse, or physician assistant, or while at the scene of a medical emergency or during transport, or during interfacility transfer, or while working in a small and rural hospital pursuant to section 1797.195 of the Health and Safety Code, may perform the following procedures or administer the following medications when such are approved by the medical director of the local EMS agency and are included in the written policies and procedures of the local EMS agency.

1) Basic Scope of Practice:

A) Perform defibrillation and synchronized cardioversion.
B) Visualize the airway by use of the laryngoscope and remove foreign body(ies) with forceps.
C) Perform pulmonary ventilation by use of lower airway multi-lumen adjuncts, the esophageal airway, and adult endotracheal intubation.
D) Institute intravenous (IV) catheters, heparin locks, saline locks, needles, or other cannulae (IV lines), in peripheral veins; and monitor and administer medications through pre-existing vascular access.
E) Administer intravenous glucose solutions or isotonic balanced salt solutions, including Ringer's lactate solution.
F) Obtain venous blood samples.
G) Use glucose measuring device.
H) Perform Valsalva maneuver.
I) Perform needle cricothyroidotomy.
J) Perform needle thoracostomy.
K) Monitor thoracostomy tubes.
L) Monitor and adjust IV solutions containing potassium, equal to or less than 20 mEq/L.
M) Administer approved medications by the following routes: intravenous, intramuscular, subcutaneous, inhalation, transcutaneous, rectal, sublingual, endotracheal, oral or topical.
N) Administer, using prepackaged products when available, the following medications:
   (1) 25% and 50% dextrose;
   (2) activated charcoal;
   (3) adenosine;
   (4) aerosolized or nebulized beta-2 specific bronchodilators;
   (5) aspirin;
(6) atropine sulfate;
(7) pralidoxime chloride;
(8) calcium chloride;
(9) diazepam; *(not currently used in Contra Costa County)*
(10) diphenhydramine hydrochloride;
(11) dopamine hydrochloride;
(12) epinephrine;
(13) furosemide;
(14) glucagon;
(15) midazolam
(16) lidocaine hydrochloride;
(17) morphine sulfate;
(18) naloxone hydrochloride;
(19) nitroglycerin preparations, except intravenous, unless permitted under (c)(2)(A) of this section;
(20) sodium bicarbonate

2) Local Optional Scope of Practice:

A) Perform or monitor other procedure(s) or administer any other medication(s) determined to be appropriate for paramedic use, in the professional judgment of the medical director of the local EMS agency, that have been approved by the Director of the Emergency Medical Services Authority when the paramedic has been trained and tested to demonstrate competence in performing the additional procedures and administering the additional medications.

**Contra Costa Local Optional Scope of Practice**

The following medications and procedures are approved for use in the Contra Costa County local optional scope of practice:

- Pediatric Endotracheal Intubation  
- Intraosseous Infusion
- External Cardiac Pacing
- Amiodarone *(CCT-P Only)*
- Heparin Infusion *(CCT-P Only)*
- Lidocaine Infusion *(CCT-P Only)*
- Nitroglycerin Infusion *(CCT-P Only)*
- KCL Infusion *(CCT-P Only)*  
- Ipratropium *(CCT-P Only)*
- Midazolam Infusion *(CCT-P Only)*
- Blood/Blood Product Infusion *(CCT-P Only)*
- Glycoprotein IIb/IIIa Receptor Inhibitor Infusion *(CCT-P Only)*
- Morphine Sulfate Infusion *(CCT-P Only)*
- Sodium Bicarbonate Infusion *(CCT-P Only)*
- Total Parenteral Nutrition (TPN) Infusion *(CCT-P Only)*
**ADVANCED LIFE SUPPORT SKILLS LIST**

The following skills may be performed by Contra Costa County paramedics following treatment guidelines or base hospital orders:

1. Adult oral endotracheal intubation
2. Esophageal/Tracheal Double Lumen Airway (ETDLA)
3. Removal of foreign body obstruction with magill forceps
4. Needle cricothyrotomy
5. Defibrillation
6. Cardioversion
7. Intravenous therapy
8. Drug therapy (see drug list)
9. Needle thoracostomy
10. Intraosseous infusion*
11. Pediatric oral endotracheal intubation*
12. Use of pulse oximeter
13. Glucose Testing
14. External Cardiac Pacing*
15. 12-Lead ECG
16. Continuous Positive Airway Pressure (CPAP)

*Only paramedics who are currently accredited in Contra Costa County may perform these skills.*

**ALS DRUG LIST**

<table>
<thead>
<tr>
<th>DRUG</th>
<th>CONCENTRATION</th>
<th>DOSE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACTIVATED CHARCOAL</td>
<td>25 gm in slurry solution</td>
<td>50 gm PO</td>
<td>Contraindicated in caustic or corrosive ingestions. Not effective in some overdoses (alcohol, sodium, potassium, iron, cyanide). Should not be given if patient has decreased level of consciousness or potential rapid deterioration (such as tricyclic antidepressant or benzodiazepine overdose).</td>
</tr>
<tr>
<td>ADENOSINE</td>
<td>3 mg/ml</td>
<td>6 mg rapid IV, followed by 20 ml NS rapid bolus; if no conversion in 1-2 minutes, may give 12 mg rapid IV, followed by 20 ml NS rapid bolus; if no conversion in 1-2 minutes, may repeat</td>
<td>Contraindicated in 2nd or 3rd degree heart blocks. May cause transient heart blocks or transient asystole. Side effects may include palpitations, chest pain/pressure, hypotension, dyspnea, feeling of impending doom. Use caution when patient is taking carbamazepine, dipyridamole or methylxanthines.</td>
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<tr>
<td>DRUG</td>
<td>CONCENTRATION</td>
<td>DOSE</td>
<td>NOTES</td>
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<tr>
<td>ALBUTEROL</td>
<td>2.5 mg of Albuterol in 0.083% inhalant solution per 3 ml unit dose ampule</td>
<td>3 ml of 0.083% solution per unit dose ampule nebulized to deliver 2.5 mg of albuterol - may be delivered via ETT 5 - 15 minutes per nebulized treatment (2 ampules)</td>
<td>This long acting Beta-2 stimulator should be used with caution in patients taking monoamineoxidase (MAO) inhibitor drugs (e.g., Nardil, Parnate).</td>
</tr>
<tr>
<td>ASPIRIN</td>
<td>81 mg tablet</td>
<td>4 tablets to be chewed by patient</td>
<td>Do not administer if patient has a history of allergy to aspirin or salicylates</td>
</tr>
<tr>
<td>ATROPINE</td>
<td>0.1 mg/ml</td>
<td>0.5 mg IV for bradycardia — may repeat every 5 min to max 3 mg; 1 mg IV for asystole — may repeat every 3-5 min to max 3 mg; 2 mg via ETT — may repeat every 3-5 min to max 3 mg; 2 mg IV for organophosphate poisoning — may repeat every 5 min</td>
<td>Doses less than 0.5 mg can cause paradoxical bradycardia. Atropine can dilate pupils, aggravate glaucoma, cause urinary retention, confusion, and dysrhythmias, including V-tach and V-fib. Increases myocardial O2 consumption. Remove clothing of victim of organophosphate poisonings, and flush skin to remove traces of poison.</td>
</tr>
<tr>
<td>CALCIUM CHLORIDE</td>
<td>100 mg/ml</td>
<td>500 mg IV - May repeat once</td>
<td>Use cautiously or not at all in digitalized patients. Avoid extravasation. Rapid administration can cause dysrhythmias or arrest. Use for patients with suspected hyperkalemia.</td>
</tr>
<tr>
<td>DEXTROSE 50%</td>
<td>500 mg/ml</td>
<td>25-50 gm IV</td>
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</tr>
<tr>
<td>DIPHENHYDRAMINE (Benadryl)</td>
<td>50 mg/ml</td>
<td>25-50 mg IV or IM (1mg/kg)</td>
<td>Indicated for hives/itching or for dystonic reactions</td>
</tr>
<tr>
<td>DOPAMINE</td>
<td>1600 mcg/ml</td>
<td>By Microdrip: 800 mg/500 ml D5W 15–60 gtts/min = 5–20 mcg/kg/min x 70 kg</td>
<td>See DOPAMINE CHART — TABLE 1 Mid dose(5–10 mcg/kg/min) increases cardiac output without increasing heart rate or BP - Higher dose(10–20 mcg/kg/min) causes peripheral vasoconstriction and increases BP - Doses higher than 20 mcg/kg/min may result in decreased mesenteric and renal perfusion. Antecubital veins are preferred. Avoid extravasation. Avoid exposure to light. Can cause dysrhythmias.</td>
</tr>
<tr>
<td>EPINEPHRINE 1:10,000</td>
<td>0.1 mg/ml</td>
<td>1 mg IV in cardiac arrest 2 mg ETT in cardiac arrest May repeat every 3-5 min 0.1-0.5 mg slow IV for anaphylaxis in 0.1 mg increments</td>
<td>Alpha and beta sympathomimetic. May cause serious dysrhythmias and exacerbate angina. Its use in patients with a history of heart disease should be avoided unless the patient is severely symptomatic and there is absolute certainty that the dyspnea is due to asthmatic bronchospasm. Avoid exposure to light. IM or SC absorption may be delayed in patients in shock.</td>
</tr>
<tr>
<td>EPINEPHRINE 1:1,000</td>
<td>1 mg/ml</td>
<td>0.3 – 0.5 mg IM, SC (0.01 mg/kg)</td>
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<tr>
<td>DRUG</td>
<td>CONCENTRATION</td>
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<tr>
<td>FUROSEMIDE (Lasix)</td>
<td>10 mg/ml</td>
<td>40 mg IV</td>
<td>Inject slowly. Tinnitus and hearing loss have been associated with rapid injection, high doses, and impaired renal function.</td>
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<tr>
<td>GLUCAGON</td>
<td>1 mg/ml</td>
<td>1 mg IM</td>
<td>Effect may be delayed 5–20 minutes - if patient responds, give PO sugar</td>
</tr>
<tr>
<td>LIDOCAINE 2%</td>
<td>20 mg/ml</td>
<td>1.5 mg/kg IV initially for cardiac arrest Subsequent doses 0.75mg/kg for cardiac arrest to total 3 mg/kg 3 mg/kg ETT in 10 ml saline for cardiac arrest, may repeat x 1 1 mg/kg IV for if return of circulation after vfib/vtach, followed by 0.5-0.75 mg/kg Maximum dose – 3 mg/kg Blood levels decline rapidly. When possible, bolus over 1-2 min. CNS toxicity manifested by drowsiness, disorientation, decreased hearing, paresthesia, twitching, agitation, seizures. Metabolism slowed by decreased hepatic blood flow, cirrhosis, decreased cardiac output.</td>
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</tr>
<tr>
<td>MIDAZOLAM (Versed)</td>
<td>5 mg/ml</td>
<td>- 0.2mg/kg IM or 1-5mg IV - Maximum dose: 5 mg IV for seizures 10mg IM for seizures 5 mg IV for sedation Observe respiratory status. Use with caution in patients over age 60. With IV dosing, begin with 1mg. IV increments should not exceed 2 mg. Can cause hypotension and respiratory depression (which can be subtle). Hypotension is more common in patients with low cardiac output or volume depletion. Nausea is a frequent side effect rapid administration. Titrate in 2-5 mg boluses, rechecking VS between each dose. Reversible with Narcan (with possible exception of vascular effects).</td>
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<tr>
<td>MORPHINE SULFATE</td>
<td>10 mg/ml</td>
<td>2-20 mg IV (chest pain, trauma, burns, abdominal pain or for other non-traumatic pain management) 2-5 mg IV (pulmonary edema) 1-5 mg IV (sedation) Should be given IV whenever possible. Shorter duration of action than that of most narcotics. Higher doses may sometimes be necessary. May not reverse vascular effects of narcotics. Consider effect on patients using narcotics for pain relief.</td>
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<tr>
<td>NALOXONE (Narcan)</td>
<td>Varies</td>
<td>1–2 mg IV or IM 1 mg diluted in 9.0 ml NS ETT or for administration to terminal patients with overmedication Can cause hypotension and headache. Protect from heat and light. Do not use if systolic BP less than 90 or if patient has taken Viagra, Cialis, Levitra or similar drugs within the past 24 hours.</td>
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<tr>
<td>NITROGLYCERIN 1/150</td>
<td>0.4 mg/tablet or unit dose spray</td>
<td>1-6 tablets or unit dose spray SL Can cause hypotension and headache. Protect from heat and light. Do not use if systolic BP less than 90 or if patient has taken Viagra, Cialis, Levitra or similar drugs within the past 24 hours.</td>
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<tr>
<td>SODIUM BICARBONATE 8.4%</td>
<td>1 mEq/ml</td>
<td>50–100 mEq (1 mEq/kg) Assure adequate ventilation. Can precipitate or inactivate other drugs. NOT A FIRST LINE DRUG FOR CARDIAC ARREST.</td>
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</table>
AIRWAY MANAGEMENT

Based on paramedic assessment, airway management should be accomplished with the least-invasive method that successfully and safely ventilates the patient (pulse oximetry greater than 90% with open airway maintained).

AIRWAY MANAGEMENT ALGORITHM

- Inadequate ventilation, GCS less than or equal to 8
  - Initiate Bag-Valve-Mask ventilation with oral or nasal airway
    - BLS airway adequate
      - Maintain BLS Airway
    - BLS airway not adequate or patient apneic (Consider airway obstruction)
      - Endotracheal intubation - No more than 3 attempts per patient. No more than 30-second interruption in ventilation to attempt. Ventilate 100% O₂ for 1 minute between attempts. May proceed to ETDLA prior to 3 attempts.
        - Intubation unsuccessful
          - Esophageal-tracheal double lumen airway (Combitube) - No more than 2 attempts per patient. No more than 30-second interruption in ventilation to attempt. Ventilate 100% O₂ for 1 minute between attempts.
            - Intubation unsuccessful
              - Resume BLS Airway management
                - Complete airway obstruction
                  - Needle Cricothyrotomy
ALS PROCEDURES

Oral Endotracheal Intubation

» Indications

- Patient with decreased sensorium (GCS less than or equal to 8) and apneic (adults)
- Patient with decreased sensorium (GCS less than or equal to 8), ventilation unable to be maintained with BLS airway

» Contraindications

- Suspected hypoglycemia or narcotic overdose
- Maxillo-facial trauma with unrecognizable facial landmarks
- Patients experiencing seizures
- Patients with an active gag reflex

<table>
<thead>
<tr>
<th>COMMENTS ON SPECIFIC CLINICAL SITUATIONS</th>
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<tbody>
<tr>
<td><strong>Cardiac arrest</strong></td>
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<tr>
<td><strong>Pediatric</strong></td>
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<tr>
<td><strong>Trauma</strong></td>
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<tr>
<td><strong>Pulmonary Edema</strong></td>
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<tr>
<td><strong>Overdose</strong></td>
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<tr>
<td><strong>Stroke</strong></td>
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<tr>
<td><strong>Respiratory arrest</strong></td>
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Nasotracheal intubation is not an approved skill in Contra Costa County.

No more than three attempts at endotracheal intubation should be done. An intubation attempt is defined as the laryngoscopy and passing of an ET tube beyond the teeth with the intent of placing an endotracheal tube. Ventilation should be interrupted no more than 30 seconds for an intubation attempt, and patients should be ventilated with 100% oxygen for 1 minute via bag-valve mask between attempts. It is not necessary to attempt intubation 3 times in order to move to EDTLA or BLS maneuvers.

Base hospital physician consultation is recommended if there is any question concerning the need to intubate a patient. The base hospital physician may also approve extubation of a patient in the field (extubation for meconium aspiration of newborns does not require Base Hospital physician approval).
Procedure

1) Assure an adequate BLS airway.

2) Oxygenate with 100% oxygen using a bag-valve-mask.

3) Select appropriate ET tube. If appropriate tube has a cuff, check cuff to ensure that it does not leak; note the amount of air needed to inflate. Deflate tube cuff. Leave syringe attached.
   a. Insert appropriate stylet, making sure that it is recessed at least one cm. from the distal opening of the ET tube. Lubricate the tip of the tube.
   b. Endotracheal tube introducer (bougie) may be used in place of stylet (see Endotracheal tube introducer procedure).

4) Assure c-spine immobilization with suspected trauma.

5) Insert laryngoscope and visualize the vocal cords.

6) Suction if necessary and remove any loose or obstructing foreign bodies.

7) CAREFULLY pass the endotracheal tube tip past the vocal cords; remove the stylet; advance the ET tube until the cuff is just beyond the vocal cords

8) Inflate the cuff with 5-7ml of air. For uncuffed pediatric tubes, advance tube no more than 2.5 cm beyond vocal cords (use vocal cord marker line if present on tube).

9) Immediately assess tube placement with capnography or colorimetric end-tidal CO2 indicator and/or esophageal detector bulb (see tube confirmation procedure):

10) Following successful confirmation of intubation, auscultation of lungs, epigastrium, and observation of chest rise should be done. If chest does not rise, extubate and reintubate.

11) Secure the tube with tape or ET holder and ventilate. Mark the TUBE at the level of the lips.

Confirmation of Tube Placement / Post-Intubation Monitoring

1) Following tube placement and cuff inflation, attach capnography unit or colorimetric end-tidal CO2 indicator
   a. If the capnography waveform or colorimetric indicator indicates exhaled carbon dioxide, the tube should be secured.
   b. If the capnography waveform or colorimetric indicator does not indicate exhaled carbon dioxide:
      i. In a patient with pulses, the tube should be removed and reintubation attempted.
      ii. In a patient without pulses, placement should be further assessed with the esophageal detector bulb.
         1. If the esophageal detector bulb inflates rapidly, this indicates tracheal placement, and the tube should be secured.
         2. If the esophageal detector bulb inflates slowly or there is no air return, remove the tube and re-attempt intubation.
         3. In some circumstances, false results can occur (the tube is in the trachea, but the bulb will not inflate). This may occur because of secretions, CHF or obesity. If the paramedic confident of placement, the tube can be rotated 90°, suctioned and the bulb can be checked again. If there is continued slow inflation or no air return, remove the tube and re-attempt intubation.
         4. If a second intubation attempt results in slow air return or no inflation and the paramedic is confident of tube placement, confirmation by direct visualization of the tube via laryngoscopy may be needed.
2) Reassessment should occur after any patient movement, and should include esophageal
detector bulb in pulseless patients who are not exhaling carbon dioxide.
3) Continued monitoring includes both physical exam findings and use of capnometry in all
intubated patients.
   a. In perfusing patients, end-tidal carbon dioxide levels of 35-45 are considered normal.
   b. The numerical value can aid in assessing hypoventilation (increased EtCO₂) or
      hyperventilation (decreased EtCO₂) in perfusing patients.
   c. Avoidance of hyperventilation is critical in both head-injured patients and in CPR

<table>
<thead>
<tr>
<th>SIGNIFICANCE OF END-TIDAL CO₂ WAVEFORM / CHANGES AFTER INTUBATION</th>
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<tbody>
<tr>
<td>Loss of previous waveform with EtCO₂ near zero</td>
</tr>
<tr>
<td>• Endotracheal tube disconnected, dislodged, kinked or obstructed</td>
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<tr>
<td>• Loss of circulatory function</td>
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<tr>
<td>Decreasing EtCO₂ with loss of plateau</td>
</tr>
<tr>
<td>• Endotracheal tube cuff leak or deflation</td>
</tr>
<tr>
<td>• Endotracheal tube located in hypopharynx</td>
</tr>
<tr>
<td>• Partial obstruction</td>
</tr>
<tr>
<td>Sudden increase in EtCO₂</td>
</tr>
<tr>
<td>• Return of spontaneous circulation</td>
</tr>
<tr>
<td>Gradual increase in EtCO₂</td>
</tr>
<tr>
<td>• If elevated above normal levels, need for increased ventilation</td>
</tr>
<tr>
<td>• From low levels, improvement in perfusion</td>
</tr>
<tr>
<td>Gradual decrease in EtCO₂</td>
</tr>
<tr>
<td>• Effects of hyperventilation</td>
</tr>
<tr>
<td>• Worsening of perfusion</td>
</tr>
<tr>
<td>“Sharkfin” waveform</td>
</tr>
<tr>
<td>• Asthma or COPD</td>
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</tbody>
</table>

► Endotracheal Medications

Lidocaine, epinephrine, atropine, and naloxone (Narcan) can be administered via endotracheal tube if no
intravenous or intraosseous access. Albuterol can be aerosolized via endotracheal tube.

In general, endotracheal doses should be doubled from the usual intravenous dosage. In pediatric
patients (other than neonates), endotracheal doses of epinephrine are increased by ten-fold by usage of
1:1,000 preparation for endotracheal administration.

In adult patients, there is no limit to the number of doses or total volume of fluid which may be
administered. Medications should be diluted to a volume of 10ml prior to administration.

A maximum of 3 doses of medication may be instilled in pediatric patients (base physician may order
additional doses). Medications in pediatric patients should be diluted to a volume of 3 - 5 ml prior to
administration through the ETT. Several ventilations should be provided using BVM after medication
administration.
Tracheostomy Tube Replacement

Establishing a patent airway in a patient with a tracheostomy may be accomplished by suctioning or by replacement of an old tracheostomy tube when suctioning is not successful. Tracheostomy tube replacement may only be performed when patient has a new replacement tracheostomy tube available. If tracheostomy tube is not available, or placement of a new tube is unsuccessful, use of an endotracheal tube is appropriate (stomal intubation).

**Indications:**
- Dislodged tracheostomy tube (decannulation)
- Tracheostomy tube obstruction not resolved by suction

**Contraindications:**
- Recent tracheostomy surgery (less than 1 month)
- Inadequately sized tract or stoma for insertion of new tube (use endotracheal tube instead)

**Procedure:**
1. Remove old tracheostomy tube if obstructed
   a. Hyperextend head to extent possible to expose tracheostomy site
   b. Apply oxygen over mouth and nose and occlude stoma or tracheostomy tube
   c. If existing tube has a cuff, deflate with 5-10 ml syringe (do not cut balloon)
   d. Cut or untie cloth ties holding tube in place
   e. Withdraw tube using a slow and steady outward and downward motion
   f. Assess airway for patency and adequate ventilation
   g. Provide oxygen through stoma as needed
2. Replace tracheostomy tube
   a. If tube has obturator, place in tube. If tube has outer and inner cannula, use the outer cannula and obturator for placement.
   b. Moisten or lubricate tip of tube and obturator with water, saline, or a water-soluble lubricant
   c. Hold device by flange (wings) or actual tube like a pencil
   d. Gently insert tube with arching motion (follow curvature of tube) posteriorly and then downward. Slight traction on skin above and below stoma may help.
   e. Once tube is in place, remove obturator, attach BVM and attempt to ventilate. If tube uses inner cannula, insert to allow ventilation with BVM.
   f. Check for proper placement by observing bilateral chest rise, listening for equal breath sounds, and general patient assessment. Signs of improper placement include lack of chest rise, unusual resistance to assisted ventilation, air in surrounding tissues, or lack of patient improvement.
   g. If tube cannot be inserted, withdraw, administer oxygen, and ventilate as needed.
   h. If insertion not successful, consider use of smaller tracheostomy tube (if available) or endotracheal tube placement.
   i. An additional aid in placement may be use of a suction catheter as a guide (without applying suction) for tube placement. Remove obturator and slide tube along suction catheter into stoma. Remove suction catheter after placement and assess.
j. If still unsuccessful and patient requires ventilation, consider endotracheal intubation or BVM ventilation through newborn mask or via nose and mouth with stoma occluded.

3. After proper placement, place tracheostomy ties through openings on flanges and tie around neck, allowing room for a little finger to pass between ties and neck.

» Possible Complications
- Creation of false lumen
- Subcutaneous air
- Pneumothorax or pneumomediastinum
- Bleeding at insertion site or through tube

► Stomal Intubation

For patients with existing tracheostomy without tube (mature stoma):

1. Assure an adequate BLS airway.
2. Oxygenate with 100% oxygen using a bag-valve-mask.
3. Select the largest endotracheal tube that will fit through the stoma without force (it should not be necessary to lubricate the tube).
4. Check cuff, if applicable.
5. Do not use a stylet.
6. Pass endotracheal tube until the cuff is just past the stoma. Right mainstem bronchus intubation may occur if the tube is placed further since the distance from tracheostomy to carina is less than 10 cm. The tube will protrude from the neck by several inches.
7. Inflate the cuff
8. Immediately assess tube placement with colorimetric end-tidal CO₂ indicator (see confirmation of tube/post-intubation procedure).
9. Auscultate the chest for air entry on the right and left sides equally. Look for symmetric chest wall rise. Check neck for subcutaneous emphysema, which indicates false passage of tube. If the chest DOES NOT RISE, extubate and repeat steps 2-7.
10. Secure the tube with tape and ventilate.

Note: Do not attempt to reinsert a dislodged pre-existing tracheostomy tube.
Endotracheal Tube Introducer (Bougie)

The flexible endotracheal tube introducer is a useful adjunct which can be used on any intubation. It is particularly helpful when vocal cord visualization is anticipated to be difficult (e.g. short neck, limited neck mobility, spinal immobilization). A two-person or a one-person technique can be used. Do not force introducer as it can potentially cause tracheal or pharyngeal perforation. The introducer cannot be used in endotracheal tubes smaller than 6.0.

1. Two-Person Technique (recommended when visualization is less than ideal)
   a. Using laryngoscope, visualize as well as possible
   b. Place stylet just behind the epiglottis with the bent tip anterior and midline
   c. Gently advance the tip through the cords, maintaining anterior contact
   d. Use stylet to feel for tracheal rings
   e. Advance stylet black mark past teeth to feel for the carina. If no stop felt, remove as stylet is in esophagus, and retry.
   f. Withdraw the stylet to align the black mark with the teeth.
   g. Have assistant load and advance ETT tip to the black mark
   h. Have assistant grasp and hold steady the straight end of stylet
   i. Advance endotracheal tube while maintaining laryngoscope position
   j. At glottic opening turn endotracheal tube 90 degrees counterclockwise to assist passage over arytenoids
   k. Advance endotracheal tube to appropriate position
   l. Maintaining endotracheal tube position, withdraw stylet

2. One-Person Technique or Pre-loaded technique (recommended when visualization better but cords too anterior to pass tube). Can be used, by paramedic choice, for any intubation.
   a. Load stylet into endotracheal tube with bent end approximately 10 cm past distal end of tube
   b. Pinch the endotracheal tube against the stylet
   c. With bent tip anterior, visualize cords and advance stylet through cords
   d. Maintain laryngoscope position
   e. When black mark on stylet is at the teeth, ease grip to allow tube to slide over the stylet. If available, have an assistant stabilize the stylet.
   f. At glottic opening, turn endotracheal tube 90 degrees counter-clockwise to assist passage over the arytenoids.
   g. Advance endotracheal tube to appropriate position
   h. Maintaining endotracheal tube position, withdraw stylet
**Eosophageal/Tracheal Double Lumen Airway (ETDLA)**

The Esophageal/Tracheal Double Lumen Airway (ETDLA) or *Combitube* is a secondary option to endotracheal intubation in providing a method of ventilating patients who are unconscious, apneic and pulseless. It is not necessary to attempt intubation 3 times before opting for the ETDLA. Two intubation attempts with EDTLA are permissible. Ventilation should be interrupted no more than 30 seconds for an intubation attempt, and patients should be ventilated with 100% oxygen for 1 minute via bag-valve mask between the attempts.

The ETDLA does not require direct visualization of the airway or significant manipulation of the neck. It can be used in patients 4 feet tall and up, including taller pediatric patients.

» **Indications**

- When attempts at intubation have failed
- Situations where the airway cannot be visualized for intubation
  - Trauma/blood/vomit/other secretions
  - Entrapment of the patient with limited access to the airway

» **Contraindications**

- Active gag reflex
- Caustic ingestion or extensive airway burn
- Known esophageal disease (e.g., cancer, varices, stricture, others)
- Laryngectomy with stoma (can place ET tube in stoma)
- Height less than 4 feet tall

» **Equipment**

- SA Rollup Kit
- Suction
- Water-soluble lubricant
- Bag-Valve-Mask
- Stethoscope

» **Procedure**

1) Assure an adequate BLS airway
2) Check ETDLA cuffs to ensure that they do not leak. Deflate tube cuffs. Leave syringes attached. Lubricate the tip of the tube.
3) Attach "fluid deflector" elbow to tube #2.
4) Oxygenate with 100% oxygen.
5) CAREFULLY insert the "ETDLA" into the mouth, keeping tube midline, advancing the tube until the double black line on the tube matches up to the teeth or the alveolar ridge.
6) Inflate #1 pilot balloon with 85ml of air
7) Inflate #2 pilot balloon with 12 ml of air
8) Ventilate through tube #1 (blue)
9) Auscultate the chest for air entry on the right and left sides for equal air entry
10) If breath sounds present - continue to ventilate
11) If breath sounds absent
   a. Ventilate tube #2
   b. Auscultate the chest for air entry on the right and left sides for equal air entry
   c. If breath sounds present – continue to ventilate
12) Secure the tube with tape
13) Continue to monitor the patient for proper tube placement throughout prehospital treatment and transport. For patients with perfusing pulses, end-tidal CO₂ detectors will work and should be used (see Confirmation of Tube/Post-Intubation Monitoring procedure). Do not use esophageal detector device with ETDLA.
14) Document "ETDLA" placement times and results of tube placement checks performed throughout the resuscitation and transport.

Troubleshooting:

- If air leak is heard, increase inflation slightly through pilot balloon #1 and recheck
- If no breath sounds are heard with ventilation through either tube #1 or tube #2, it is possible that the tube has been placed too far into the pharynx. Deflate the #1 pilot balloon and retract tube 2-3cm, then reinflate cuff. Recheck sounds.
- If placement is unsuccessful, remove tube, ventilate via BVM and repeat sequence of steps.
- If unsuccessful on second attempt, BLS airway management should be resumed.
- Most unsuccessful placements relate to failure to keep tube in midline during placement.

Additional Information:

- Medications can be given via the ETDLA only if the tube is in the trachea (when ventilating through tube #2). Medications should not be administered with esophageal placement (ventilating through tube #1).
- Cuffs can be lacerated by broken teeth or dentures. Remove dentures before placing tube.
- Do not force tube, as airway trauma may occur.
**Needle Cricothyrotomy**

This skill is to be performed on-scene with partner assistance. Once needle cricothyrotomy has been performed, percutaneous transtracheal ventilation (PTV) is to be used to provide oxygenation for the patient. The patient’s oxygenation should be monitored with pulse oximetry.

» **Indications**

- Respiratory arrest secondary to complete airway obstruction
- Failure to relieve obstruction with Heimlich or Magill Forceps

» **Contraindications**

- Any condition other than respiratory arrest secondary to complete airway obstruction

» **Equipment**

- 10 – 13 gauge 2 – 3” angiocath
- Betadine and alcohol swabs
- Occulsive dressing/Vaseline gauze
- Oxygen tubing
- IV extension tubing
- 10 ml syringe
- Sterile gauze pads
- ½ “ tape
- Inhalation/Exhalation port

» **Procedure**

1) Attach 10ml syringe to 10 - 13 gauge angiocath and attach IV extension tubing and oxygen tubing to the inhalation/exhalation port, then connect oxygen tubing to oxygen source at 15 lpm.
2) Locate the cricothyroid membrane.
3) Cleanse site with betadine.
4) Using two fingers from non-dominant hand:
   a. place one finger on thyroid cartilage and the other on the cricoid cartilage.
   b. apply traction to the skin.
5) Make midline puncture with scalpel (optional).
6) Holding needle and syringe at a downward, 60° angle make puncture in midline using steady firm pressure.
7) Should feel a "give" when cricoid membrane is penetrated. When air can be freely aspirated, catheter is in the trachea. Remove the syringe
8) Advance catheter downward until hub is seated against the skin and remove the needle.
9) Connect IV extension tubing to angiocath.
10) Ventilate by placing thumb over the open end of the inhalation/exhalation port — one second on, four seconds off (patient is being oxygenated-not ventilated).
11) Observe for subcutaneous emphysema.
12) Apply occlusive dressing, and sterile gauze pads to site and secure the catheter.
## Continuous Positive Airway Pressure (CPAP)

The purpose of CPAP is to improve ventilation and oxygenation and avoid intubation in patients with congestive heart failure (CHF) with acute pulmonary edema. CPAP is generally indicated for patients in moderate to severe respiratory distress who are completely alert and able to maintain their airway.

### Indications

Patients 8 years and older in severe respiratory distress and:

- History of CHF with pulmonary edema and one or more of the following:
  - Peripheral edema
  - Current medications such as digoxin, or lasix
  - Orthopnea
  - Anxious
  - Rales or coarse wheezes
  - Diaphoresis

OR

- Near drowning

### Absolute Contraindications: (Do NOT Use)

- Age less than 8
- Respiratory or cardiac arrest
- Agonal respirations
- Severely decreased level of consciousness
- Systolic BP less than 90
- Signs and symptoms of pneumothorax
- Inability to maintain patent airway
- Major trauma, especially head trauma with increased ICP or significant chest trauma
- Facial anomalies or trauma (e.g. burns, fractures)
- Vomiting

### Relative Contraindications: (Use with CAUTION)

- History of Asthma/COPD
- History of Pulmonary Fibrosis
- Decreased LOC
- Claustrophobia/unable to tolerate mask (after 1-2 minute trial)

### Procedure

1. Place patient in a seated position
2. Monitor ECG, Vital signs (BP, HR, RR, SPO2)
3. Set up the CPAP system (per manufacturers recommendation)
4. Explain what you will be doing to the patient

5. Apply mask while reassuring patient to breathe normally (may have a tendency to oxygenate)

6. Reevaluate the patient every 5 minutes – normally the patient will improve in the first 5 minutes with CPAP as evidenced by:
   - Decreased heart rate
   - Decreased respiratory rate
   - Decreased blood pressure
   - Increased SPO2

BVM ventilation or endotracheal intubation should be considered if the patient fails to show improvement.

**Additional Notes:**

If using a portable tank, it is important to conserve oxygen. At 100% FIO2 and at full flow, a full tank will last approximately:
- “D” cylinder = 3.5-4 minutes
- “E” cylinder = 5.5-6 minutes
- “M” cylinder = 28 minutes

At 28% FIO2, a full tank will last approximately:
- “D” cylinder = 30 minutes
- “E” cylinder = 45-50 minutes
- “M” cylinder = 236 minutes

Correct CPAP pressure must be delivered at all times. The flow from the generator should always be in excess of the patients demand.
Needle thoracostomy may be performed to relieve a tension pneumothorax.

**Indications**

- Signs and symptoms of tension pneumothorax, including:
  - altered level of consciousness
  - decreased B/P; increased pulse and respirations
  - absent breath sounds on the affected side
  - hyperresonance to percussion on the affected side
  - jugular vein distension
  - increased dyspnea or difficulty ventilating
  - tracheal shift away from the affected side (often difficult to assess)

**Contraindications**

- Any condition other than tension pneumothorax

**Equipment**

- 12 – 14 gauge 2 – 3” angiocath
- One-way valve
- Betadine and alcohol swabs
- Occulsive dressing/vaseline gauze
- 10-30 ml syringe
- Rubber connecting tubing
- Sterile gauze pads
- Tape

**Procedure**

1) Locate the 2nd ICS in the midclavicular line on the same side as the pneumothorax (An alternate site is the fourth or fifth intercostal space, in the mid-axillary line).

2) Prep site

3) Attach syringe to 10 - 14 gauge angiocath.

4) Make insertion on top of lower rib at a 90° angle.

5) Advance slightly superior to clear rib, then back to 90° angle, to make "Z" track puncture.

6) A "give" will be felt upon entering the pleural space. Air and/or blood should push the syringe plunger back.

7) Advance catheter superiorly, remove needle and allow pressure to be relieved.

8) Attach one-way valve.

9) Apply vaseline gauze/occlusive dressing to site.

10) Secure catheter and one-way valve.

   a. criss-cross taping for catheter.
   b. tape vaseline gauze down to prevent leakage.
   c. tape one-way valve in dependent position.

11) Reassess - expect rapid improvement in clinical condition and breath sounds.
Saline Lock

A saline lock is used to provide IV access in patients who do not require continuous infusion of solutions and administration of multiple medications is not anticipated. If a saline lock is in place, it may be used to administer one to two medications in an emergent situation, prior to connecting a primed IV line.

- **Indications**
  - Any patient where placement of a prophylactic IV line is appropriate

- **Contraindications**
  - Patient presentations which may require IV fluid replacement or multiple IV medication administrations
  - Patients requiring administration of D50

- **Equipment**
  - IV start pak or equivalent
  - Intravenous catheter of appropriate gauge (not to be used with 24 gauge catheters).
  - Saline lock catheter plug with short extension
  - 3ml syringe
  - Sterile normal saline (3-5ml)

- **Procedure**
  1) Explain the procedure to the patient.
  2) Remove catheter plug and attached extension set from package and prime with normal saline.
  3) Prepare the site for venipuncture.
  4) After venipuncture, secure extension set to hub of catheter and affix to patient's skin.
  5) Prep rubber stopper on saline lock, insert needle, and slowly flush with at least 3ml of normal saline while observing for signs of infiltration.
  6) While injecting the last .2ml of normal saline, continue exerting pressure on the syringe plunger while withdrawing the needle from the saline lock.
  7) If a medication is administered via the saline lock, flush with at least 3ml of normal saline following administration of the medication.

**NOTE:** If the patient requires fluid bolus or administration of multiple medications, remove saline lock and secure primed IV tubing to catheter.
Intraosseous Infusion (Pediatric and Adult)

Pediatric Intraosseous Infusion

Establishing vascular access is often difficult or impossible during life-threatening emergencies in infants and young children. Intraosseous infusion offers an excellent alternative to give drugs or fluids in these situations.

» Indications
  • After evaluation of potential IV sites, it is determined that an IV attempt would not be successful;
  • One of the following conditions exists:
    o cardiac or respiratory arrest, impending arrest, or unstable dysrhythmia
    o shock or evolving shock, regardless of cause

» Absolute Contraindications
  • Fracture of the selected tibia or suspected vascular compromise of the selected extremity
  • Inability to locate anatomical landmarks for insertion

» Relative Contraindications
  • Skin infection or burn overlying the area of insertion

» Equipment
  ✓ Povidone-based prep solution
  ✓ IV of NS attached to volutrol or 250-500ml bag
  ✓ 10/12 ml syringe filled with normal saline
  ✓ Sterile gloves
  ✓ Intraosseous needle (suitable to age 8) - OR -
  ✓ Automated IO insertion device (EZ-IO PD) up to 40 kg
  ✓ Automated IO insertion device (EZ-IO AD) if over 40 kg

» Procedure
  1) Place the child supine with a rolled towel under the knee, restrain if necessary.
  2) Use the flat surface of the proximal tibia, just distal to the tibial tubercle. Put on gloves and thoroughly prep the area with the antiseptic solution.
  3) Introduce the intraosseous needle at a 90° angle, to the flat surface of the tibia.
  4) For manual insertion, pierce the bony cortex using a firm rotary or drilling motion (do not move needle side to side or up and down). A distinct change in resistance will be felt upon entry into the medullary space.
  5) Remove the stylet and confirm intramedullary placement by injecting, without marked resistance, 10 ml normal saline.
  6) Attach IV tubing to the intraosseous hub.
  7) Anchor needle to overlying skin with tape.
  8) If unable to establish on first attempt, make one attempt on opposite leg, no more than two (2) attempts total.
  9) Monitor pulses distal to area of placement
  10) Monitor leg for signs of swelling or cool temperature which may indicate infiltration of fluids into surrounding tissue.

» Possible Complications
  • local infiltration of fluids/drugs into the subcutaneous tissue due to improper needle placement
  • cessation of the infusion due to clotting in the needle, or the bevel of the needle being lodged against the posterior cortex
  • osteomyelitis or sepsis
  • fluid overload
  • fat or bone emboli
  • fracture
**Adult (age 14 or older) Intraosseous Infusion (Optional for Provider Agencies)**

Intraosseous infusion may be performed on adult patients by EMT-Ps who have successfully completed a Contra Costa County EMS approved training course and whose provider has equipment to perform this skill.

» **Indications**
  - After evaluation of potential IV sites, it is determined that an IV attempt would not be successful;
  - One of the following conditions exists:
    - cardiac or respiratory arrest, a rapidly deteriorating patient with impending arrest, or unstable dysrhythmia
    - shock or evolving shock, regardless of cause

» **Absolute Contraindications**
  - Fracture of the selected tibia or suspected vascular compromise of the selected extremity
  - Inability to recognize anatomical landmarks for insertion
  - Prosthetic knee joint

» **Relative Contraindications**
  - Skin infection or burn overlying the area of insertion
  - History of bone disease (osteoporosis, osteogenesis imperfecta) affecting lower extremities

» **Equipment**
  - Povidone-based prep solution
  - IV of NS and tubing
  - 10/12 ml syringe filled with normal saline
  - Automated IO insertion device (EZ-IO AD) over 40 kg
  - Automated IO insertion device (EZ-IO PD) under 40 kg
  - Pressure bag for IV fluid administration (if available)
  - Sterile gloves

» **Procedure**
  1) Locate and prep the insertion site
  2) Follow manufacturer’s instructions for needle insertion
  3) Introduce the intraosseous needle at a 90° angle to the flat surface of the tibia
  4) Remove the stylet and confirm intramedullary placement by injecting, without marked resistance, 10 ml normal saline.
  5) Attach IV tubing to the intraosseous hub.
  6) Anchor needle to overlying skin with tape.
  7) If unable to establish on first attempt, make one attempt on opposite leg, no more than two (2) attempts total.
  8) Monitor pulses distal to area of placement
  9) Monitor leg for signs of swelling or cool temperature which may indicate infiltration of fluids into surrounding tissue.

» **Possible Complications**
  - local infiltration of fluids/drugs into the subcutaneous tissue due to improper needle placement
  - cessation of the infusion due to clotting in the needle, or the bevel of the needle being lodged against the posterior cortex
  - osteomyelitis or sepsis
  - fluid overload
  - fat or bone emboli
  - fracture
**Pulse Oximetry**

Pulse oximetry is a method of detecting hypoxia in patients. A pulse oximeter measures arterial blood oxygen saturation and provides a reading as a percent of hemoglobin saturated with oxygen. (% SpO2) A normal pulse oximetry reading for a person breathing room air is in the high 90s. A SpO2 reading of less than 95% may indicate hypoxia and should be investigated.

While the pulse oximeter is a sensitive device that may detect hypoxia long before overt signs and symptoms of hypoxia are present, it is very important to remember that the pulse oximeter is just one tool used in assessment of the patient. The reading must be used in conjunction with other assessment findings to make a determination of whether the patient is hypoxic or not.

In addition to indicating hypoxia, the pulse oximeter is a good tool for monitoring the effectiveness of airway management and oxygen therapy and to detect if the patient is deteriorating or improving.

» **Indications:**

- When the patient’s oxygen status is a concern
- When hypoxia is suspected

» **Limitations:**

The pulse oximeter needs pulsatile arterial blood flow to determine an accurate reading. Any condition that interferes with the blood flow in the area where the probe is attached may produce an erroneous reading. The following conditions may produce no reading or inaccurate readings:

- Shock or hypoperfusion states associated with blood loss or poor perfusion
- Hypothermia or cold injury to the extremities
- Excessive movement of the patient
- During some types of seizures
- Nail polish if the finger probe is used
- Carbon monoxide poisoning
- Anemia

» **Equipment:**

- Pulse Oximeter
- Probes

» **Procedure:**

1. If possible, apply the pulse oximeter prior to administration of oxygen. Do not delay administration of oxygen in a suspected hypoxic patient.
2. Choose a site that is well perfused and least restricts a conscious patient’s movement.
3. Clean and dry site prior to sensor placement.
4. Apply appropriate sensor for patient.
5. Monitor and document the SpO2 as a sixth vital sign.
6. Continue to assess the respiratory status, include rate and tidal volume.
- **Blood Glucose Testing**

Glucose testing is to be done on all patients presenting with an altered level of consciousness, from either medical or traumatic causes. Patients with known diabetes and suspected hypoglycemia (e.g., diaphoresis, weakness) should also be tested. Testing may be done from a digit blood sample or a venous sample.

- **Indications**
  - Any patient with an altered level of consciousness
  - Any patient with signs or symptoms suggestive of hypoglycemia

- **Equipment**
  - Alcohol Swabs
  - Finger lancets (for digit samples)
  - Cotton Balls/sterile gauze pads
  - Glucose Testing device and strips

- **Procedure**
  1) If obtaining blood sample via finger stick:
     a. Cleanse finger with alcohol swab.
     b. Puncture finger tip with lancet.
     c. Place drop of blood on glucose test strip per manufacturer's instructions.
     d. Place gauze/cotton ball on puncture site with pressure to stop bleeding.
     e. Use glucose testing device per manufacturer's instructions.
     f. If blood sugar is less than or equal to 60mg/dl, give Dextrose as specified in field treatment guidelines.
  2) If obtaining blood sample via venipuncture (e.g., at IV start), follow steps c-f above.
External cardiac pacing may be performed for the treatment of symptomatic bradycardia. This procedure is required for transport providers and optionally available for first-responder paramedic providers.

**Indications**
- Symptomatic bradycardia (heart rate less than 60 and one or more signs or symptoms below)
  - Signs and symptoms:
    - Blood pressure less than 90 systolic;
    - Shock—Signs of poor perfusion, evidenced by:
      - decreased level of consciousness or decreased sensorium;
      - prolonged capillary refill;
      - cool extremities or cyanosis;
    - Chest pain, diaphoresis;
    - CHF or acute shortness of breath.

**Contraindications**
- Asystole
- Brady-asystolic cardiac arrest
- Hypothermia (relative contraindication) – patient warming measures have precedence
- Children less than 14 years old (hypoxia/respiratory problems are most likely causes of bradycardia in children and should be addressed.)

**Equipment**
- Cardiac monitor/defibrillator with pacing capability
- Pacing electrodes

**Procedure**
1) Patient assessment and treatment per Symptomatic Bradycardia treatment guideline. If IV access not promptly available, proceed to pacing (should not wait to administer atropine/wait for response to treatment).
2) Explain procedure to the patient.
3) Place pacing electrodes and attach pacing cable to pacing device per manufacturer's recommendations.
4) Set pacing mode to demand mode, pacing rate to 80 BPM, and current at zero milliamps (mA).
5) As possible/if required, provide patient sedation/pain relief with midazolam or morphine sulfate IV or IM. Patients with profound shock and markedly altered level of consciousness may not require sedation/pain relief initially.
6) Activate pacing device and increase the current in 10 mA increments until capture is achieved (pacemaker produces pulse with each paced QRS complex).
7) Assess patient for mechanical capture and clinical improvement (BP, pulses, skin signs, LOC).
8) Continue monitoring. Contact base for further orders if patient symptoms are not resolving (consideration for dopamine, further alteration of pacer settings) or if further sedation/pain control orders required.

**NOTE:** Patients with high grade AV block (second degree type II or third degree block) who do not have symptoms do not require pacing. However, equipment should be immediately available if symptoms arise. Patients with symptoms who respond initially to atropine should have pacing equipment immediately available.
12-Lead Electrocardiography

» Indications

- Chest pain/Acute Coronary Syndrome
  - Includes patients with atypical symptoms or anginal equivalents such as dyspnea, syncope, dizziness, weakness, diaphoresis, nausea/vomiting, or altered level of consciousness
- Consider in arrhythmias if patient stable or not in extremis
- Consider in pulmonary edema if patient not in extremis
- Consider in cardiogenic shock or post-cardioversion patients en route (do not delay on scene)

» Contraindications (relative)

- Uncooperative patient
- Presence of ventricular tachycardia, ventricular fibrillation, or 3\textsuperscript{rd} degree block
- Life-threatening conditions
- Any condition in which delay to obtain ECG would compromise care of the patient

» Equipment

- Monitor-defibrillator with 12-lead ECG capability
- Electrode pads for limb leads and chest leads
- Clippers, scissors, or razor for chest hair removal
- Gauze or commercially available skin prep for electrode placement
- Sheet or blanket to cover patient as necessary while obtaining ECG

» Procedure

1. Expose Chest. Remove excess hair, prep skin.
2. Place electrodes on chest and limbs. See section below (12-lead placement).
3. Acquire ECG tracing as per manufacturer’s directions. ECG can be done prior to medication administration if it can be done in timely fashion. May acquire ECG at incident location or in vehicle prior to beginning transport.
4. Make patient report to receiving hospital as soon as possible if machine notes ***Acute MI*** or ***Acute MI Suspected***.
5. Leave electrodes in place unless defibrillation, cardioversion, or pacing is required
6. Deliver copy of ECG to hospital registered nurse or physician upon arrival.

» Documentation

1. PCR documentation should reflect findings of 12-lead ECG. Electronic attachment of 12-lead ECG data to PCR should be done if available.
2. A copy of 12-lead ECG shall be forwarded with the PCR to the appropriate identified personnel at the provider agency.

» **Hospital Report**

1. Receiving hospitals will receive report as soon as possible in the instances in which the 12-lead ECG indicates ***Acute MI*** or ***Acute MI Suspected***.

2. Report will include:
   
   a. ETA to facility
   
   b. patient age and gender;
   
   c. chief complaint, including duration of complaint (PQRST)
   
   d. Vital signs
   
   e. Significant physical findings
   
   f. ECG interpretation (**message**)
   
   g. Paramedic treatments and response to treatments
   
   h. ETA to facility

» **12-Lead Placement**

1. Limb leads should be placed on distal extremities if possible. May be moved to proximal if needed.

2. Chest leads should be placed:
   
   V1 – 4\(^{th}\) intercostal space at the right sternal border
   
   V2 – 4\(^{th}\) intercostal space at the left sternal border
   
   V3 – Directly between V2 and V4
   
   V4 – 5\(^{th}\) intercostal space at left midclavicular line
   
   V5 – Level of V4 at left anterior axillary line
   
   V6 – Level of V4 at left mid-axillary line
Treatment Guidelines
CARDIAC EMERGENCIES
Shock (Non-Traumatic) C1

SHOCK

Signs and symptoms of shock with dry lungs, flat neck veins. May have poor skin turgor, history of GI bleeding, vomiting or diarrhea. May be warm and flushed, febrile. May have history of high fever (SEPSIS).

1. Ensure a patent airway
   • **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. Shock position, if tolerated
3. Keep patient warm
4. Cardiac monitor – treat dysrhythmias per specific treatment guideline
5. Early transport, **CODE 3**
6. **IV ACCESS** – two (2) large bore IVs enroute, 250-500 ml fluid bolus. Recheck vitals every 250 ml to a maximum of 1 liter
7. Test **BLOOD GLUCOSE** level
8. Consider:
   • **NARCAN** 1-2 mg per dose IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose suspected
   • **DEXTROSE 50%** 25 gm IV if blood glucose level less than 60
9. Consider:
   • **DOPAMINE** infusion beginning at 5 mcg/kg/min if hypotension persists (see Table 1)
10. *Contact Base Hospital if any questions or if additional therapy is required*

CARDIOGENIC SHOCK

Signs and symptoms of shock, history of congestive heart failure, chest pain, rales, shortness of breath, pedal edema.

1. Ensure a patent airway
   • **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. Position of comfort
3. Keep patient warm
4. Cardiac monitor – treat dysrhythmias per specific treatment guideline
5. Early transport, **CODE 3**
6. **IV ACCESS** TKO
7. Consider:
   • **DOPAMINE** infusion beginning at 5 mcg/kg/min if hypotension persists (see Table 1)
   • Consider 12-lead ECG if time and patient stability permit.
8. *Contact Base Hospital if any questions or if additional therapy is required*
BASIC THERAPY – Public Safety Defibrillation

NON-TRANSPORTING UNIT

1. CONFIRM:
   - unconscious, pulseless, and apneic or
   - unconscious, pulseless with agonal respirations
   - if 1-8 years of age, attach pediatric electrodes, if available. If not, attach adult electrodes if able to
do so without electrodes touching

IF TRAUMA: Prepare patient for immediate transport. As time permits, prior to transport unit arrival,
initiate defibrillation protocol

2. If unwitnessed or there is a known down time of 5 minutes or greater with no effective CPR
   - CPR for 2 minutes
   - If patient remains unconscious, pulseless and apneic proceed to 3

   If witnessed and the down time is less than 5 minutes proceed to 3

3. Attach Defibrillator and Initiate Analyze/Defibrillation
   - Clear bystanders and crew
   - Have machine analyze the patient’s rhythm

3.1 If the rhythm is shockable
   - Clear bystanders and crew
   - Deliver shock
   - Machine will reanalyze rhythm as indicated by manufacturer protocol

3.2 If the rhythm is NOT shockable
   - Resume CPR beginning with chest compressions
   - Machine will reanalyze the rhythm

4. If the patient begins breathing or becomes responsive:
   - Maintain airway
   - Assist ventilations as necessary
   - Check blood pressure, if equipment is available
   If the patient again stops breathing or becomes unresponsive:
   - Clear bystanders and crew
   - Have the machine analyze the patient’s rhythm
   - Proceed as in 3 above

5. If a paramedic unit arrives to transport the patient, turn the patient over to paramedic personnel when
you reach the point where CPR is appropriate. If turnover is delayed, continue to provide care
according to this protocol.

6. If a BLS unit, without defibrillation capability, arrives to transport the patient, accompany the patient
to the hospital providing care enroute. Deliver no more than nine (9) defibrillations on-scene prior to
beginning transport.
VENTRICULAR FIBRILLATION & PULSESLESS VENTRICULAR TACHYCARDIA

**Minimize interruptions in CPR**

1. For unwitnessed arrests or witnessed arrests with 5 minutes or more time elapsed without CPR before first EMS responders arrive, provide 2 minutes or 5 cycles of CPR. For all other witnessed arrests, provide CPR until defibrillator available. Do not interrupt CPR for advanced airway management in initial management.

2. **DEFIBRILLATION** (see chart below)

3. Continue CPR for 2 minutes or 5 cycles

4. Advanced airway management

5. **IV or IO ACCESS TKO**

6. **EPINEPHINE 1:10,000** 1 mg IV or IO or 2 mg ETT – repeat every 3-5 minutes

7. **DEFIBRILLATION** (see chart below)

8. **LIDOCAINE** 1.5 mg/kg IV or IO or 3 mg/kg ETT

9. **DEFIBRILLATION** (see chart below)

10. Repeat **LIDOCAINE** 0.75 mg/kg IV or IO every 5-10 minutes to total of 3 mg/kg. Repeat **LIDOCAINE** 3 mg/kg ETT X 1 if using ETT route

11. Prepare for transport

12. Consider:

   - **SODIUM BICARBONATE** 1 mEq/kg IV or IO for suspected hyperkalemia, profound acidosis or prolonged down time with return of circulation. Do not give if patient is not intubated.

13. **Contact Base Hospital if any questions or if additional therapy is required**

   Note: If return of spontaneous circulation from any defibrillation with narrow QRS complex during resuscitation:

   - **LIDOCAINE** 1 mg/kg IV or IO if no prior Lidocaine dose has been administered
   - **LIDOCAINE** 0.5-0.75 mg/kg IV or IO – repeat every 5-10 minutes to total dose of 3 mg/kg
   - Consider 250-500 ml IV or IO fluid bolus if BP less than 90 systolic

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<table>
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<th>DEFIBRILLATION ENERGY SETTINGS</th>
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<tr>
<td>Third Shock</td>
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<td>Subsequent Shocks</td>
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</table>

*If for any reason the manufacturer/type is not known, defibrillate at 200 w/s initially.*
PULSELESS ELECTRICAL ACTIVITY

1. CPR – minimize interruptions

2. Consider causes:
   - Hypovolemia
   - Hypoxia – increase ventilations
   - Cardiac Tamponade
   - Tension Pneumothorax – NEEDLE THORACOSTOMY
   - Hypothermia
   - Massive Pulmonary Embolism
   - Drug Overdoses (tricyclics, digitalis, beta-blockers, calcium channel blockers)
   - Hyperkalemia – suspect in kidney dialysis patients
   - Acidosis
   - Massive Acute Myocardial Infarction

3. Advanced airway management

4. Establish IV or IO ACCESS TKO

5. EPINEPHRINE 1:10,000 1 mg IV or IO or 2 mg ETT – repeat every 3-5 minutes

6. Consider:
   - ATROPINE 1 mg IV or IO — 2 mg ETT repeat every 3-5 minutes – total dose of 3 mg (IV, IO or ETT) if pulse less than 60
   - Fluid bolus 250-500 ml, reassess

7. Transport

8. Consider:
   - SODIUM BICARBONATE 1 mEq/kg IV or IO for suspected hyperkalemia or profound acidosis
   - CALCIUM CHLORIDE 500 mg (5ml of 10% solution) IV or IO if hyperkalemia is suspected. May repeat in 5-10 minutes.

9. Contact Base Hospital if any questions or if additional therapy is required
ASYSTOLE

1. CPR unless patient meets criteria for determination of death. Minimize interruptions in CPR.
2. Advanced airway management
3. IV ACCESS TKO
4. Consider causes:
   - Hypoxia - increase ventilations
   - Drug Overdoses
   - Hyperkalemia - suspect in kidney dialysis patients
   - Pre-existing Acidosis
   - Hypokalemia
   - Hypothermia
5. **EPINEPHRINE 1:10,000** 1 mg IV or IO or 2 mg ETT - repeat every 3-5 minutes
6. **ATROPINE** 1 mg IV or IO — 2 mg ETT repeat every 3-5 minutes to total dose of 3 mg
7. Consider:
   - **SODIUM BICARBONATE** 1 mEq/kg IV or IO for suspected hyperkalemia or profound acidosis
   - **CALCIUM CHLORIDE** 500 mg (5 ml of 10% solution) IV or IO if hyperkalemia suspected. May repeat x1 in 5-10 minutes.
8. Consider termination of efforts
9. **Contact Base Hospital if any questions or if additional therapy is required**

*If rhythm is unclear and possibly ventricular fibrillation, defibrillate as for ventricular fibrillation.*
VENTRICULAR TACHYCARDIA WITH PULSES: STABLE

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation as needed.
2. IV ACCESS TKO
3. CARDIAC MONITOR – record continuous strip during therapy.
4. Consider 12-lead ECG if patient without distress.
5. LIDOCAINE 1 mg/kg IV
6. Consider:
   - LIDOCAINE 0.5 - 0.75 mg/kg IV every 5 minutes until ventricular tachycardia is resolved or 3 mg/kg reached.
   - If no response, then treat as unstable Ventricular Tachycardia
7. Contact Base Hospital if any questions or if additional therapy is required

VENTRICULAR TACHYCARDIA WITH PULSES: UNSTABLE

Signs of poor perfusion, chest pain, dyspnea, blood pressure less than 90, or CHF.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation as needed.
2. IV ACCESS TKO
3. Prepare for SYNCHRONIZED CARDIOVERSION. If sedation is needed, MIDAZOLAM - initial dose 1mg, titrate in 1-2 mg increments (maximum dose 5mg). Use caution in patients over age 60.
   - SYNCHRONIZED CARDIOVERSION 100 W/S (low energy setting – 75 W/S)
   - SYNCHRONIZED CARDIOVERSION 200 W/S (low energy setting – 120 W/S)
   - SYNCHRONIZED CARDIOVERSION 300 W/S (low energy setting – 150 W/S)
   - SYNCHRONIZED CARDIOVERSION 360 W/S (low energy setting – 200 W/S)
4. LIDOCAINE 1 mg/kg IV
5. Consider:
   - If Ventricular Tachycardia recurs, SYNCHRONIZED CARDIOVERSION (use lowest w/s level previously successful)
   - LIDOCAINE 0.5 - 0.75 mg/kg IV every 5-10 minutes to total dose of 3 mg/kg (with CHF, liver failure, age greater than 70 or shock, consider 10 minute time interval between doses)
   - 12-Lead ECG
6. Contact Base Hospital if any questions or if additional therapy is required
SUPRAVENTRICULAR TACHYCARDIA: STABLE

Heart rate greater than 150 beats per minute – usually narrow QRS complex. May have mild chest discomfort.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation as needed.
2. CARDIAC MONITOR – record continuous strip during therapy
3. Consider 12-lead ECG
4. IV ACCESS TKO
5. VALSALVA
6. Consider:
   - ADENOSINE 6 mg rapid IV - followed by 20 ml bolus of normal saline
   - If patient has not converted, ADENOSINE 12 mg rapid IV - followed by 20 ml bolus of normal saline, 1-2 minutes after initial dose. May repeat dose once.
7. Contact Base Hospital if any questions or if additional therapy is required

SUPRAVENTRICULAR TACHYCARDIA: UNSTABLE

Signs of poor perfusion, moderate to severe chest pain, dyspnea, blood pressure less than 90 or CHF. Heart rate greater than 150 beats per minute - usually narrow QRS complex. If wide QRS complex consider ventricular tachycardia.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation as needed.
2. Position of comfort. If decrease level of consciousness, position left lateral decubitus
3. CARDIAC MONITOR – record continuous strip during therapy
4. Consider 12-lead ECG if patient not in extremis
5. IV ACCESS TKO
6. Consider:
   - ADENOSINE 6 mg rapid IV - followed by 20 ml bolus of normal saline
   - If patient has not converted, ADENOSINE 12 mg rapid IV - followed by 20 ml bolus of normal saline, 1-2 minutes after initial dose. May repeat dose once.
7. Prepare for SYNCHRONIZED CARDIOVERSION. If sedation is needed, MIDAZOLAM - initial dose 1 mg, titrate in 1-2 mg increments (maximum dose 5 mg).– Use caution in patients over age 60.
   - SYNCHRONIZED CARDIOVERSION 50 W/S (low energy setting – 50 W/S)
   - SYNCHRONIZED CARDIOVERSION 100 W/S (low energy setting – 75 W/S)
   - SYNCHRONIZED CARDIOVERSION 200 W/S (low energy setting – 120 W/S)
   - SYNCHRONIZED CARDIOVERSION 300 W/S (low energy setting – 150 W/S)
   - SYNCHRONIZED CARDIOVERSION 360 W/S (low energy setting – 200 W/S)
8. Consider 12-Lead ECG
9. Contact Base Hospital if any questions or if additional therapy is required
BRADYCARDIA: SYMPTOMATIC

Heart rate less than 60, chest pain, shortness of breath, decreased level of consciousness, low BP, shock, pulmonary congestion, and/or congestive heart failure.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation as needed.
2. Position of comfort. If decreased level of consciousness, position left lateral decubitus
3. Cardiac monitor - Consider 12-lead ECG if patient not in extremis
4. IV ACCESS TKO - if not promptly available, proceed to external cardiac pacing
5. ATROPINE 0.5 mg IV
6. EXTERNAL CARDIAC PACING - start at zero milliamps and increase in 10 mA increments until capture is achieved
   - MIDAZOLAM 1-5 mg IV in 1 mg increments or 1-5 mg IM for sedation
   - MORPHINE SULFATE 1-5 mg IV or IM for pain relief
7. Transport
8. Consider:
   - Repeat ATROPINE 0.5-1 mg every 3-5 minutes to maximum of 3 mg - use with caution in patients with suspected ongoing cardiac ischemia.
9. Consider:
   - DOPAMINE infusion beginning at 5 mcg/kg/min if rhythm not responsive to pacing or atropine (see Table 1)
   - Fluid bolus 250-500 ml if clear lung sounds and no respiratory distress
10. Contact Base Hospital if any questions or if additional therapy is required
SINUS TACHYCARDIA

*Heart rate 100-160, regular.*

1. Ensure a patent airway
   - **OXYGEN** - low flow
2. Position of comfort. If decreased level of consciousness, position on left side
3. Cardiac monitor
4. Consider:
   - **IV ACCESS** TKO if other vital signs abnormality exists
   - Treat underlying cause

ATRIAL Fibrillation

1. Ensure a patent airway
   - **OXYGEN** - low flow
2. Cardiac monitor
3. **IV ACCESS** TKO
4. If well tolerated, transport with cardiac monitoring
5. If unstable:
   - ventricular rate greater than 150 and;
   - BP less than 80, or;
   - unconsciousness or obtundation, or;
   - severe chest pain or dyspnea
6. Consider: If sedation is needed, **MIDAZOLAM** - initial dose 1 mg, titrate in 1-2 mg increments (maximum dose 5 mg) – Use caution in patients over age 60.
   - **SYNCHRONIZED CARDIOVERSION** at 100 w/s (low energy setting – 75 W/S)
   - **SYNCHRONIZED CARDIOVERSION** at 200 w/s (low energy setting – 120 W/S)
   - **SYNCHRONIZED CARDIOVERSION** at 300 w/s (low energy setting – 150 W/S)
   - **SYNCHRONIZED CARDIOVERSION** at 360 w/s (low energy setting – 200 W/S)
   - 12-Lead ECG
7. *Contact Base Hospital if any questions or if additional therapy is required*
CARDIAC EMERGENCIES
Other Cardiac Dysrhythmias C9

ATRIAL FLUTTER

*Variable rate depending on block. Atrial rate between 250-350, “saw-tooth” pattern.*

1. Ensure a patent airway
   - [OXYGEN - low flow](#)
2. Cardiac monitor
3. [IV ACCESS TKO](#)
4. If well tolerated, transport with cardiac monitoring
5. If unstable:
   - ventricular rate greater than 150 and;
     - BP less than 80, or;
     - unconsciousness or obtundation, or;
     - severe chest pain or dyspnea
6. Consider: (if sedation is needed, MIDAZOLAM 1-5 mg IV (initial dose 1mg, titrate in 1-2 mg increments - use caution in patients over age 60)
   - [SYNCHRONIZED CARDIOVERSION at 50 w/s](#) (low energy setting – 50 W/S)
   - [SYNCHRONIZED CARDIOVERSION at 100 w/s](#) (low energy setting – 75 W/S)
   - [SYNCHRONIZED CARDIOVERSION at 200 w/s](#) (low energy setting – 120 W/S)
   - [SYNCHRONIZED CARDIOVERSION at 300 w/s](#) (low energy setting – 150 W/S)
   - [SYNCHRONIZED CARDIOVERSION at 360 w/s](#) (low energy setting – 200 W/S)
7. Consider:
   - 12-Lead ECG
8. *Contact Base Hospital if any questions or if additional therapy is required*
CHEST PAIN OR SUSPECTED ACUTE CORONARY SYNDROME

Subternal pain, discomfort or tightness with radiation to jaw, left shoulder or arm, nausea, diaphoresis, dyspnea, anxiety.

1. Ensure a patent airway
   - **OXYGEN** - low flow
2. Reassure patient and place in position of comfort
3. Restrict patient movement - loosen tight clothing
4. Allow patient to take their own Nitroglycerin, if systolic BP is greater than 90 mmHg and patient has not taken Viagra, Levitra or similar drugs within the previous 24 hours or Cialis within the previous 36 hours.
5. Cardiac monitor - 12 lead ECG
6. **IV ACCESS** TKO

   **ASPIRIN** 325mg (or four 81mg tablets) PO to be chewed by patient. **DO NOT** administer if patient has allergies to aspirin or salicylates, or has apparent active gastrointestinal bleeding

   **NITROGLYCERIN** 0.4 mg (gr. 1/150) SL if systolic BP greater than 90 and patient has not taken Viagra, Levitra or similar drugs within the previous 24 hours or Cialis within the previous 36 hours - may repeat every 5 minutes until maximum of 6 doses administered, or pain subsides or BP less than 90 systolic

   **MORPHINE SULFATE** 2-4 mg increments slow IV push - maximum 20 mg should be considered if pain not relieved by first three (3) doses of nitroglycerin. Consider earlier administration to patients in severe distress from pain. Titrate to pain relief, systolic BP greater than 90 and adequate respiratory effort. CONTINUE ADMINISTRATION OF NITROGLYCERIN TO MAX SIX (6) DOSES.

7. Consider:
   - **Fluid bolus** 250 ml if BP less than 90, unresponsive to positioning. Do not administer with rales, ronchi or suspected pulmonary edema. Reassess and consider repeating once.
   - Repeat ECG if patient’s symptoms or vital signs change markedly.
   - For ventricular ectopy causing hemodynamic compromise (hypotension, confusion), **LIDOCAINE** 1 mg/kg IV. Administer only if rate is greater than 60 and no evidence of heart block exists. Ectopy that does not result in hemodynamic compromise should not be treated.
   - Repeat **LIDOCAINE** 0.5 mg/kg IV every 5-10 minutes until ectopy resolved or 3 mg/kg reached (with CHF, liver failure, age greater than 70 or shock, consider 10 minutes time interval between doses).

8. **Contact Base Hospital if pain is not resolved or if further treatment considered**
HEAT CRAMPS/HEAT EXHAUSTION

Exhaustion, vague flu-like symptoms, normal/slightly elevated body temperature, normal mental status.

1. Ensure a patent airway
   - OXYGEN - low flow
2. Move patient to a cool environment
3. Consider:
   - IV ACCESS TKO
Suspect heat stroke in any patient with an altered level of consciousness in a hot environment, or any patient with hot, dry skin.

HEAT STROKE

Triad of exposure to heat stress, altered level of consciousness and elevated body temperature, often associated with absence of sweating, tachycardia, and hypotension.

1. Ensure a patent airway
   - OXYGEN - high flow
2. Move to cool environment and begin cooling measures:
   - remove clothing and splash/sponge with water
   - place cool packs on neck and in axilla and inguinal areas
   - promote cooling by fanning
   - be prepared for possible seizures
3. IV ACCESS TKO
4. FLUID BOLUS up to 500ml, repeat vital signs
5. Test BLOOD GLUCOSE level
6. DEXTROSE 50% 25 gm IV if blood glucose level equal to or less than 60
7. NARCAN 1-2 mg per dose IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose is suspected
8. Consider:
   - repeat FLUID BOLUS 500 ml, repeat vital signs
   - DOPAMINE infusion beginning at 5 mcg/kg/min if hypotension persists (see Table 1)
For seizures in the setting of heat stroke:
   - MIDAZOLAM 1-5 mg IV (initial dose 1 mg, titrate in 1-2 mg increments). Use caution in patients over age 60
   - MIDAZOLAM 0.2 mg/kg IM (maximum dose 10 mg IM) if IV route unavailable
9. Contact Base Hospital if any questions or if additional therapy is required
ENVIRONMENTAL EMERGENCIES
Hypothermia E2

MODERATE HYPOTHERMIA

Conscious and shivering but lethargic, skin pale and cold (body temperature 84-95°F)

1. Ensure a patent airway
   - OXYGEN - low flow
2. Gently move to sheltered area minimizing physical exertion or movement of the patient
3. Cut away wet clothing and cover patient with warm, dry sheets or blankets
4. IV ACCESS TKO

SEVERE HYPOTHERMIA

Stuporous or comatose, dilated pupils, hypotensive to pulseless, slowed to absent respirations (body temperature below 84°F).

1. Handle gently, but ensure a patent airway - Be prepared to support ventilations as needed
   - OXYGEN - high flow using warm, humidified oxygen if available. Avoid hyperventilating the patient
2. Gently move to sheltered area minimizing physical exertion or movement of the patient
3. Cut away wet clothing and cover patient with warm, dry sheets or blankets
4. Consider:
   - If spontaneous respirations are present, intubate only if absolutely necessary to prevent aspiration or if ventilations are inadequate.
5. Cardiac monitor. Observe for organized rhythm and pulses for one minute. If organized rhythm present, move quickly but gently to warm environment.
6. IV ACCESS TKO, preferably enroute
7. Test BLOOD GLUCOSE level
8. DEXTROSE 50% 25 gm IV if blood glucose level equal to or less than 60
9. NARCAN 1-2 mg per dose IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose is suspected

SEVERE HYPOTHERMIA PATIENTS MAY APPEAR DEAD. WHEN IN DOUBT, BEGIN RESUSCITATION.
BURNS

Damage to the skin caused by contact with caustic material, electricity, or fire. Second or third degree burns involving 20% of the body surface area, or those associated with respiratory involvement are considered major burns.

1. Remove patient to a safe area
2. Stop the burning process:
   - Remove contact with agent, unless it is adhered to skin
   - Brush off chemical powders
   - Flush with water to stop burning process or to decontaminate
   - Apply dry dressings to wounds
3. Ensure a patent airway
   - OXYGEN — high flow. Be prepared to support ventilation as needed
4. Protect the burned area:
   - Do not break blisters
   - Cover with clean dressings or sheets
   - Remove restrictive clothing/jewelry if possible
5. Assess for associated injuries
6. Consider:
   - IV or IO ACCESS TKO
     - For pain relief in the absence of hypotension (systolic BP less than 100), significant other trauma, altered level of consciousness, MORPHINE SULFATE 2-20 mg IV or IO, titrated in 2 - 4 mg increments to pain relief.
     - If IV or IO access not available, MORPHINE SULFATE 5-20 mg IM
7. Contact Base Hospital if any questions or if additional therapy is required
ENVIRONMENTAL EMERGENCIES

Envenomation E4

SNAKE BITES

*If the snake is positively identified as non-poisonous, treat with basic wound care.*

1. Keep patient calm
2. Identify type of snake, if possible
3. Splint affected extremity and restrict patient movement - immobilize the extremity at the level of the patient's heart
4. Remove rings, bracelets, or other constricting items on the affected extremity
5. Monitor vital signs frequently
6. If patient has signs of shock:
   - Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
7. Consider:
   - Cardiac monitor
   - **IV ACCESS** TKO

BEES/WASPS

*Symptoms of stings usually occur at the site of injury and have no specific treatment. Reactions to allergens can be severe, and may lead to anaphylactic shock.*

1. Keep patient calm
2. Remove stinger by flicking it off the skin with card or knife edge - **Do not squeeze stinger**
3. Apply cold pack
4. Remove rings, bracelets, or other constricting items on the affected extremity
5. Monitor vital signs
6. If patient has signs of allergic reaction:
   - Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
7. Consider:
   - Cardiac monitor
   - **IV ACCESS** TKO
HAZARDOUS MATERIALS EMERGENCIES
General Priorities and Treatment H1

Priorities
1. Recognize the call as a hazardous materials incident, or potential incident.
2. Stay upwind, uphill, upstream and upgrade of the incident
3. If first-in unit, isolate the scene and deny entry
4. Use Incident Command Structure (ICS). Consider Medical Advisory Alert or activation of the Multi-Casualty (MCI) plan.
5. Rescuer safety is critical. Do not become a victim. Stay out of "Exclusion" and "Contamination Reduction" zones unless trained, equipped and authorized to enter.
6. Decontamination generally takes priority over treatment or transport. If in doubt about the need for, or adequacy of, decontamination, refer to DOT North American Emergency Response Handbook. In general, remove contaminated clothing and flush skin and eyes with water for 2-5 minutes. Eye irrigation should continue with saline for 10-15 minutes.
7. Refer to field treatment guidelines for specific treatment.
8. Be aware of secondary contamination potential. Pesticides pose serious hazard due to ability of these chemicals to be absorbed through intact skin. Liquid irritant gases (such as acids, ammonia or chlorine), solid or liquid cyanide compounds, petroleum distillates and hydrocarbons also pose secondary contamination hazards. Refer to DOT Handbook for specific agents.

General Treatment Guidelines
1. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. If patient with significant eye symptoms from exposure, irrigate with saline.
3. Cardiac monitor.
4. Transport
5. Consider:
   - **IV ACCESS TKO**
   - **ACTIVATED CHARCOAL** - in oral ingestions such as cyanide, sulfur-containing compounds, petroleum distillates and hydrocarbons, or pesticides.
     - Adult 50 gm
     - Pediatric 1 gm/kg
   - **ALBUTEROL** 5 mg/6 ml saline via nebulizer if patient wheezing. Note: Cardiac arrhythmias in patients with petroleum distillate or hydrocarbon exposure may be exacerbated.
6. **Contact Base Hospital if any questions or if additional therapy is required**

Information about decontamination procedures may be obtained from the following sources:
- Department of Transportation North American Emergency Response Guidebook
- CHEMTREC - 1-800-424-9300
- County Hazardous Materials Agency - (925)646-2286 (contact Sheriff's Dispatch at night or on weekends)
- Poison Center - 1-800-523-2222
HYDROFLUORIC ACID

1. Ensure provider safety - skin contact with hydrofluoric acid **MUST** be avoided.
2. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
3. Continue decontamination initiated on scene
4. Cardiac monitor
5. **IV ACCESS TKO**
6. Transport
7. Consider:
   - **CALCIUM CHLORIDE** 500mg (5 ml of 10% solution) IV for tetany or cardiac arrest
   - For pain relief in the absence of hypotension (systolic BP less than 100), significant other trauma, altered level of consciousness, **MORPHINE SULFATE** 2-20 mg IV, titrated in 2 - 4 mg increments to pain relief. If IV access not available, **MORPHINE SULFATE** 5-10 mg IM
8. **Contact Base Hospital is any questions or if additional therapy is required**

Concentrated hydrofluoric acid burns are especially serious and warrant base hospital contact. The emphasis should be on continuous irrigation and rapid transport.

**Background** - This substance causes minimal burning sensation on initial contact, but is highly toxic and may penetrate tissue to cause ulceration and bone destruction. Pain may ultimately be very severe.

**Signs and Symptoms** - *INHALATION* exposure causes eye, nose, and throat irritation, cough, tracheobronchitis, and delayed onset of pulmonary edema. *INGESTION* will cause severe corrosive burns. *SYSTEMIC* absorption causes hyperkalemia, hypocalcemia, hypomagnesia, and can result in tetany and/or cardiac arrest. *TOPICAL* exposure may or may not exhibit redness to the skin.

**Decontamination PRIOR to EMS management** - Remove contaminated clothing and flush affected areas for 1 to 2 minutes.

**Secondary contamination** - No risk after initial decontamination procedures completed.
HAZARDOUS MATERIALS EMERGENCIES
Pesticides – Carbamates and Organophosphates H3

PESTICIDES – CARBAMATES AND ORGANOPHOSPHATES

1. Ensure provider safety - serious hazard prior to decontamination due to the ability of these chemicals to be absorbed through intact skin.

2. DO NOT INDUCE VOMITING

3. Ensure a patent airway
   - OXYGEN – high flow. Be prepared to support ventilations as needed

4. Irrigate injured eyes

5. Cardiac monitor

6. Consider:
   - IV ACCESS TKO

7. Transport

8. Consider:
   - ATROPINE 1-2 mg IV repeat as necessary until relief of symptoms. Large doses of Atropine may be required.
   - ACTIVATED CHARCOAL PO
     - Adult 50 gm
     - Pediatric 1 gm/kg

9. Contact Base Hospital is any questions or if additional therapy is required

Background - These products are widely used in home gardening and commercial agriculture.

Signs and Symptoms - Hypersalivation, sweating, bronchospasm, abdominal cramping, diarrhea, muscle weakness, small/pinpoint pupils, muscle twitching, and/or seizures may occur. Death is due to respiratory muscle paralysis.

Dizziness, nausea and vomiting, headache, and upper airway irritation (after inhalation exposure), may be from the petroleum based solvent, and not due to cholinesterase inhibition from the carbamate or organophosphate exposure.

Decontamination PRIOR to EMS management - If LIQUID contaminant remove clothing and flush for 1 to 2 minutes - if SOLID or POWDER contaminant, brush powder off victim, then flush for 1 to 2 minute.

Secondary contamination - Serious hazard prior to decontamination due to the ability of these chemicals to be absorbed through intact skin.
ABDOMINAL PAIN (NON-TRAUMATIC)

1. Ensure a patent airway
2. Position of comfort
3. NOTHING BY MOUTH
4. Consider:
   - **IV ACCESS TKO**
     - Fluid bolus 250-500 ml if history of poor fluid intake, persistent vomiting or diarrhea or suspected volume depletion. Reassess and consider repeating once.
   - **MORPHINE SULFATE** 2-20 mg IV in 2-5 mg increments for pain relief. Titrate to pain relief and maintain systolic BP greater than 90. Use with caution in patients with drug or alcohol intoxication, in elderly patients or in patients with possible fluid deficits. Do not use in patients with altered level of consciousness.
MEDICAL EMERGENCIES
Systemic Allergic Reactions/Anaphylactic Shock M2

SYSTEMIC ALLERGIC REACTION

Reaction involving upper or lower respiratory tract - dyspnea, stridor, wheezing, tachycardia, anxiety, tightness in chest.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, left lateral decubitus
3. NOTHING BY MOUTH
4. May assist patient with physician-prescribed Epi-Pen
5. Cardiac monitor - treat dysrhythmias per specific treatment guidelines
6. Consider:
   - IV ACCESS TKO
   - EPINEPHRINE 1:1,000 0.3 - 0.5 mg subcutaneously
   - ALBUTEROL 5 mg/6 ml saline via nebulizer. May repeat as needed
   - DIPHENHYDRAMINE 25 - 50 mg slow IV or IM for hives or itching if unable to establish IV access (consider 25 mg dose if patient has taken PO diphenhydramine).
7. Frequent reassessment of vital signs and respiratory status
8. Contact Base Hospital if any questions or if additional therapy is required

ANAPHYLACTIC SHOCK

Serious progression for a reaction with respiratory/airway features to one which may include hypotension, altered level of consciousness, cyanosis or severe respiratory distress/arrest.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations as needed
2. Position of comfort
3. NOTHING BY MOUTH
4. Cardiac monitor — treat dysrhythmias per specific treatment guidelines
5. Consider early transport
6. IV or IO ACCESS with large bore cannula wide open. Recheck vitals after every 250 ml.
7. If BP less than 80 systolic, EPINEPHRINE 1:10,000 titrate in 0.1mg doses slow IV or IO to a total of 0.5 mg
   - EPINEPHRINE 1:1,000 0.3-0.5 mg IM if unable to establish IV or IO access
8. ALBUTEROL 5 mg/6 ml saline via nebulizer. May repeat as needed
9. Consider:
   - DIPHENHYDRAMINE 25 - 50 mg slow IV or IO for hives or itching (consider 25 mg dose if patient has taken PO diphenhydramine).
10. Frequent reassessment of vital signs and respiratory status
11. Contact Base Hospital if any questions or if additional therapy is required
DYSTONIC REACTIONS

Restlessness, muscle spasms of the neck, jaw, and back, oculogyric crisis, history of ingestion of phenothiazine or related compounds (primarily anti-psychotic medications).

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations as needed
2. Position of comfort
3. IV ACCESS TKO
4. DIPHENHYDRAMINE 25-50 mg IV
   - DIPHENHYDRAMINE 50 mg IM if unable to establish IV access
5. Contact Base Hospital if any questions or if additional therapy is required
INGESTIONS
(Basic Therapy)
1. Ensure a patent airway
   - **OXYGEN** - low flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, left lateral decubitus
3. Identify substance and time ingested and bring sample to hospital
4. Cardiac monitor
5. Consider:
   - **IV ACCESS TKO**
6. Consider:
   - Being careful not to contaminate yourself and others, remove contaminated clothing, brush off powders, wash off liquids
   - Treat specific ingestions/exposures according to specific treatment guidelines
   - **ACTIVATED CHARCOAL** 25-50 gm PO
7. **Contact Base Hospital if any questions or if additional therapy is required**

NARCOTICS/SEDATIVES
1. Ensure a patent airway
   - **OXYGEN** - low flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, left lateral decubitus
3. **IV ACCESS TKO**
4. If altered mental status is present, consider:
   - **NARCAN** 1-2 mg IV or IM (if unable to establish IV) if patient has respiratory compromise
   - **NARCAN** 0.1 mg increments IV (dilute 1:10 with saline) up to 2 mg total to address inadequate respirations for patients who are receiving narcotics for terminal illness
5. Consider:
   - **ACTIVATED CHARCOAL** 25-50 gm PO, if alert and ingestion has occurred within the last 20 minutes
6. **Contact Base Hospital if any questions or if additional therapy is required**

CAUSTICS AND CORROSIVES
*Ingestion of substances that cause intra-oral burns, painful swallowing or inability to handle secretions.*
1. **DO NOT INDUCE VOMITING**
2. Ensure a patent airway
   - **OXYGEN** - low flow. Be prepared to support ventilations as needed
3. Position of comfort - if decreased level of consciousness, left lateral decubitus
4. Consider:
   - PO water or milk
5. **IV ACCESS TKO**
TRICYCLIC ANTIDEPRESSANTS

Substances which cause anticholinergic crisis characterized by altered mental status, fever, dilated pupils, flushed skin, and dry mucous membranes. Frequently associated with respiratory depression, almost always accompanied by tachycardia. Widened QRS complexes and associated ventricular arrhythmias are generally signs of a life-threatening ingestion.

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, left lateral decubitus
3. **IV ACCESS TKO**
4. For life-threatening dysrhythmias, hemodynamically significant supraventricular rhythms, ventricular dysrhythmias:
   - hyperventilation if assisting ventilations or if intubated
   - **SODIUM BICARBONATE** 1 mEq/kg slow IV
5. For seizures:
   - **MIDAZOLAM** 1-5 mg IV (initial dose 1mg, titrate in 1-2mg increments - use caution for patients over age 60)
   - **MIDAZOLAM** 0.2 mg/kg IM (maximum dose 10 mg IM), if IV route unavailable
6. Contact Base Hospital if any questions or if additional therapy is required
PAIN MANAGEMENT (NON-TRAUMATIC)

All patients expressing verbal or behavioral indicators of pain shall have an appropriate assessment and management of pain. Morphine should be given in an amount sufficient to manage the pain, not necessarily eliminate it.

Contraindications for Morphine:
- Childbirth/Suspected active labor
- Closed head injury
- Altered level of consciousness
- Headache
- Systolic BP less than 90
- Respiratory failure or worsening respiratory status

Use morphine with caution in patients with suspected drug or alcohol ingestion.

1. OXYGEN – low flow
2. IV ACCESS- TKO
3. Assess and document the intensity of the pain using the visual analog scale below.
   - Reassess and document the intensity of the pain after any intervention that could affect pain intensity
4. Consider:
   - MORPHINE SULFATE 2-20 mg IV, titrated in 2-5 mg increments to pain relief. Use with caution in patients with suspected drug or alcohol ingestion or with suspected hypovolemia.
   - MORPHINE SULFATE 5-10 mg IM if IV route unavailable
5. Contact Base Hospital if any questions or additional therapy is required

<table>
<thead>
<tr>
<th>PAIN RATING SCALE</th>
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<tbody>
<tr>
<td><img src="image" alt="Pain Rating Scale" /></td>
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<tr>
<td>0</td>
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<tr>
<td>MILD</td>
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</tbody>
</table>
COMA/ALTERED LEVEL OF CONSCIOUSNESS

_Glasgow Coma Scale less than 15, etiology unclear (consider AEIOU TIPS)._  

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
2. If decreased level of consciousness, position patient on left side
3. Consider:
   - **ORAL GLUCOSE** - if patient is a known diabetic, is conscious, able to sit in an upright position, and able to self-administer solution
4. Cardiac monitor
5. Test **BLOOD GLUCOSE** level
6. **IV ACCESS** TKO (wide open if in shock)
7. **DEXTROSE 50%** 25 gm IV if blood glucose level equal to or less than 60
   - **GLUCAGON** 1 mg IM if unable to establish IV access
8. **NARCAN** 1-2 mg per dose IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose is suspected
   - **NARCAN** 0.1 mg increments IV (dilute 1:10 with saline) up to 2 mg total to address inadequate respirations for patients who are receiving narcotics for terminal illness
9. Consider:
   - Test **BLOOD GLUCOSE** level if symptoms not resolved
   - **DEXTROSE 50%** 25 gm IV as a repeat dose if blood glucose level equal to or less than 60
10. **Contact Base Hospital if ALOC is not resolved**
NEUROLOGIC EMERGENCIES
Seizures/Status Epilepticus N2

SEIZURES

*Tonic, clonic movements followed by a period of unconsciousness (post-ictal period). Usually history of prior seizures, on medication, or alcohol withdrawal. Most seizures are self-limiting and do not require field treatment. A continuous or recurrent seizure is seizure activity greater than 10 minutes or recurrent seizures without patient regaining consciousness.*

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
2. Left lateral position if no trauma
3. Protect patient from injury by placing padding appropriately - **DO NOT FORCIBLY RESTRAIN THE PATIENT**
4. Cardiac monitor
5. Test **BLOOD GLUCOSE** level
6. Consider:
   - **IV ACCESS** TKO
   - **DEXTROSE 50%** 25 gm IV if blood glucose level equal to or less than 60
   - **NARCAN** 1-2 mg IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose suspected
7. For continuous or recurrent seizures, consider:
   - **MIDAZOLAM** 1-5 mg IV (initial dose 1 mg, titrate in 1-2 mg increments). Use caution in patients over age 60.
   - **MIDAZOLAM** 0.2 mg/kg IM (maximum 10 mg IM) if IV route unavailable.
8. **Contact Base Hospital if any questions or if additional therapy is required**
ACUTE CEREBROVASCULAR ACCIDENT (STROKE)

Sudden onset of weakness, paralysis, confusion, speech disturbances, visual field deficit, may be associated with headache. Determination of time of onset of symptoms is the most crucial historical information needed.

<table>
<thead>
<tr>
<th>CINCINNATI STROKE SCALE</th>
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<tbody>
<tr>
<td><strong>Facial Droop</strong></td>
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<tr>
<td><strong>Arm Weakness</strong></td>
</tr>
<tr>
<td><strong>Speech Abnormalities</strong></td>
</tr>
</tbody>
</table>

If any one of these three tests are abnormal and is a new finding, the Stroke Scale is abnormal and may indicate an acute stroke.

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, left lateral decubitus position
3. Cardiac monitor
4. TRANSPORT
5. Test **BLOOD GLUCOSE** level
6. **IV ACCESS** TKO enroute
7. Consider:
   - **FLUID BOLUS** 250-500 ml if hypotensive or poor perfusion - reassess
   - **DEXTROSE 50%** 25 gm IV if blood glucose level equal to or less than 60
   - **NARCAN** 1-2 mg per dose IV or IM – should be given only if patient has respiratory compromise and narcotic overdose suspected.
8. **Contact receiving hospital to inform of time of onset, ETA, physical findings and results of Cincinnati Stroke Scale**
9. **Contact Base Hospital if any questions or if additional therapy is required**
SYNCOPE/NEAR SYNCOPE

_Brief loss of consciousness, dizziness. Often postural following valsalva maneuver, or early pregnancy. May have cardiac history._

1. Ensure a patent airway
   - **OXYGEN** - low flow
2. Supine position, elevate legs if indicated
3. Cardiac monitor — treat dysrhythmias per specific treatment guidelines
4. Consider:
   - **IV ACCESS TKO**
   - 12-lead ECG if cardiac history or cardiac cause suspected
   - Test **BLOOD GLUCOSE** level
   - **DEXTROSE 50%** 25 gm IV if blood glucose level equal to or less than 60
VAGINAL HEMORRHAGE

SHOCK

Profuse vaginal bleeding, signs of shock

1. Ensure a patent airway
   - OXYGEN - high flow
2. Place patient on left side, if pregnant
3. Monitor vital signs frequently
4. If post-partum, perform firm uterine massage, put baby to breast
5. Save any tissue passed
6. IV ACCESS – two (2) large bore IVs enroute - 250 - 500 ml fluid bolus. Recheck vitals after every 250 ml to maximum of one (1) liter.
7. Contact Base Hospital if any questions or if additional therapy is required

VAGINAL BLEEDING – NOT IN SHOCK

Abnormal (non-menstrual) vaginal bleeding, between menses, during pregnancy, post partum or post operative.

1. Ensure a patent airway
   - OXYGEN - high flow
2. Place patient on left side, if pregnant
3. If post-partum, perform firm uterine massage, put baby to breast
4. Save any tissue passed
5. Consider:
   - IV ACCESS TKO
OB-GYN EMERGENCIES
Imminent Delivery (Normal) O2

IMMINENT DELIVERY, NORMAL PRESENTATION

Regular contractions, bloody show, low back pain, feels like bearing down, crowning.

1. Ensure a patent airway
2. Prepare for home delivery. Reassure mother, instruct during delivery
3. BLS - continue with delivery — If ALS and time allows, consider:
   - IV ACCESS TKO
4. As head is delivered, apply gentle pressure to prevent rapid delivery of the infant. Gently suction baby's mouth, then nose, keeping the head dependent. If cord is wrapped around neck and can't be slipped over the infant's head, double clamp and cut between clamps
5. Immediately clamp cord 6-8 inches from baby and cut between clamps
6. Assess baby by APGAR score at 1 and 5 minutes (see below)
7. Dry baby and keep warm, placing baby on mother's abdomen or breast
8. If placenta delivers, save it and bring to the hospital with mother and child. DO NOT PULL ON CORD TO DELIVER PLACENTA
9. Observe mother and infant frequently for complications. To decrease post-partum hemorrhage, perform firm fundal massage, put baby to mother's breast
10. Prepare mother and infant for transport
11. If delivery is premature (less than 36 weeks gestation), prepare for neonatal resuscitation
12. Contact Base Hospital if any questions or if additional therapy is required

<table>
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<tr>
<th>APPEARANCE</th>
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<td>No Response</td>
<td>Grimace</td>
<td>Cough, Cry, Sneeze</td>
</tr>
<tr>
<td>ACTIVITY</td>
<td>Flaccid</td>
<td>Some Flexion</td>
<td>Active Movement</td>
</tr>
<tr>
<td>RESPIRATORY EFFORT</td>
<td>Absent</td>
<td>Slow, Irregular</td>
<td>Strongly Crying</td>
</tr>
</tbody>
</table>

APGAR CHART
BREECH PRESENTATION

_Presentation of buttocks or feet._

1. Ensure a patent airway
2. Begin transport with early Base Hospital contact, if transporting unit; if non-transporting unit, prepare to assist delivery
3. Allow delivery to proceed passively until the baby's waist appears
4. Rotate baby to face down position (DO NOT PULL)
5. If the head does not readily deliver in 4-6 minutes, insert a gloved hand into the vagina to create an air passage for the infant
6. If ALS and time allows, consider:
   - IV ACCESS TKO

PROLAPSED CORD

_Cord presents first and is compressed during delivery, compromising infant circulation._

1. Ensure a patent airway
2. Insert gloved hand into vagina and gently push presenting part off of the cord. Do not attempt to reposition the cord. Cover cord with saline soaked gauze
3. Place mother in trendelenburg position with hips elevated
4. Begin transport with early Base Hospital contact, if transporting unit; if non-transporting unit, prepare to assist delivery
5. IfALS and time allows, consider:
   - IV ACCESS TKO
SEVERE PRE-ECLAMPSIA/ECLAMPSIA

Third trimester pregnancy with hypertension (BP greater than 160 systolic, greater than 110 diastolic), mental status changes, visual disturbances, peripheral edema (pre-eclampsia), seizures and/or coma (eclampsia).

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
2. Position mother in left lateral decubitus position
3. Maintain a quiet environment - darken the room
4. **IV ACCESS** TKO while enroute
5. Treat seizures or coma per appropriate field treatment guidelines
6. *Contact Base Hospital if any questions or if additional therapy is required*
PEDIATRIC EMERGENCIES
Routine Medical Care P1

PRIMARY/SECONDARY GENERAL SURVEY

- A pediatric patient is defined as age 14 or less. A neonate is 0-1 month of age. Unless otherwise specified, pediatric protocols should be used to treat these patients.
- Consideration of family anxieties during pediatric emergencies is essential. Whenever possible, given the situation encountered and condition of the child, provide family support through sensitivity to their concerns and emotions.
- Use of the Pediatric Assessment Triangle as taught in PEPP can aid in the rapid categorization of physiologic problems and help establish urgency for treatment and transport.

1. Establish level of consciousness
2. Evaluate airway
   - Identify signs of airway obstruction and respiratory distress, including cyanosis, stridor, drooling, nasal flaring, choking, intercostal retractions, absent breath sounds, apnea or near-apnea, tachypnea, and/or grunting
   - Open airway. Suction PRN.
   - Consider placement of oropharyngeal airway if child is unconscious.
   - **Always begin with BLS airway maneuvers**
     - Establishment and maintenance of a patent airway and support of adequate ventilation are the most critical components of Basic Life Support.
     - Proceed to intubation only when BLS airway maneuvers are ineffective.
4. Assess need for ventilatory assistance
   - Use chest rise as an indicator of ventilation
   - Pulse oximetry if available
5. Evaluate and support circulation. Stop hemorrhage
   - Assess perfusion using the following indicators: heart rate, skin signs, capillary refill, mental status, quality of pulse, blood pressure.
6. Continue with secondary survey
   - Perform head to toe assessment
   - Obtain patient history
   - Do an environmental assessment including consideration of intentional injury
7. Determine appropriate treatment protocols
   - Use length based resuscitation tape to estimate patient weight, fluid volumes, defibrillation settings, and equipment sizes. Use **drug charts** on page 110 as references for dosages.
   - For infants less than 3kg, children greater than 34 kg, and medications not listed on the tape, determine appropriate drug dose by using the standard dose listed on the drug chart.
   - Pediatric patients are subject to rapid changes in body temperature. Steps should be taken to prevent loss for increase in body temperature.
   - Compared to adults, a small amount of fluid loss can result in shock in children
   - Compared to adults, a small amount of excess fluid administration can result in pulmonary edema in children
   - Scene time for treatment of pediatric patients should be kept to a minimum. Most treatment can be done enroute.
NEONATAL RESUSCITATION

IF MECONIUM IS PRESENT:

- Presence of meconium requires thorough suctioning before other resuscitation. **Suctioning should occur after delivery of child’s head (before delivery of the torso), if delivery is in progress.**
- Presence of thin meconium (watery) is not an indication (by itself) for intubation.
- If thick meconium is present, and the infant is not crying, **intubation and direct suctioning through an endotracheal tube should be done immediately after delivery, before any stimulation or drying.** The endotracheal tube should be withdrawn during each suctioning attempt. No more than three (3) intubation/suction/extubation sequences should be done.
- Ventilate with 100% oxygen

1. If infant heart rate above 100 but cyanotic, provide supplemental oxygen 100% by mask
2. If infant has weak or gasping respirations, or is not breathing, initiate bag mask ventilation at a rate of 40-60/minute with 100% oxygen
3. **Heart rate less than 100:**
   - ventilate at 40 - 60/minute with 100% oxygen
4. **Heart rate less than 60:**
   - begin chest compressions and ventilate
   - use ratio of 3 chest compressions:1 ventilation (90 compressions and 30 ventilations per minute)
5. Consider:
   - Intubation
6. **Heart rate less than 60** after adequate ventilation and chest compressions:
   - **EPINEPHRINE 1:10,000,** 0.01 mg/kg IV, IO, ETT
   - repeat **EPINEPHRINE 1:10,000,** 0.01 mg/kg IV, IO, ETT every 3-5 minutes
   - **IV/IO ACCESS** TKO using volutrol or 250-500 ml bag (use care to avoid inadvertent fluid administration). **Do not delay transport for IV or IO access**
7. **Heart rate is between 80-100,** stop compressions, continue ventilation.
8. **Heart rate is 100 or above,** stop compressions, evaluate respiration. If infant is breathing normally at a rate of 40-60, stop ventilation.
   - If pink, gradually decrease oxygen and discontinue if patient continues to remain well perfused and pink.
   - If cyanotic, continue 100% oxygen by mask.
9. Consider IV or IO fluid bolus 10 ml/kg. May repeat once if needed.
10. **Contact Base Hospital if any questions or if additional therapy is required**

Always keep infant warm and dry:
- skin to skin contact with mother if possible
- cover with blanket
- place hat on infant
PEDIATRIC CARDIOPULMONARY ARREST – Basic Therapy

*No spontaneous pulses or respirations in a non-traumatic setting.*

1. CPR with airway management, until defibrillator available (AED as appropriate for patient age and manufacturer recommendation)
2. Determine cardiac rhythm
3. Proceed to specific dysrhythmia treatment guidelines

VENTRICULAR FIBRILLATION/PULSELESS VENTRICULAR TACHYCARDIA

*It is critical to defibrillate as early as possible if ventricular fibrillation is present.*

1. BLS airway management. Perform advanced airway management only if BLS management cannot be successfully done
2. Continue CPR
3. **DEFIBRILLATE** 2 w/kg Use **Infant Paddles** for patients up to 1 year old or 10kg
4. Continue CPR for 2 minutes or 5 cycles
5. **IV or IO ACCESS** TKO using volutrol or 250-500 ml bag
   - **EPINEPHRINE 1:10,000** 0.01 mg/kg IV, IO, OR
   - **EPINEPHRINE 1:1,000** 0.1 mg/kg ETT
   - **DEFIBRILLATE** 4 w/kg - *Do not delay defibrillation for IV or IO access or medication administration*
6. Continue CPR for 2 minutes or 5 cycles
7. **LIDOCAINE** 1 mg/kg IV, IO, OR
   - **LIDOCAINE** 2 mg/kg ETT
   - **DEFIBRILLATE** 4 w/kg
8. Repeat **EPINEPHRINE 1:10,000** 0.01 mg/kg IV, IO OR
   - **EPINEPHRINE 1:1,000** 0.1 mg/kg ETT every 3-5 minutes
9. Consider:
   - **Base Hospital contact**
   - repeat **LIDOCAINE** 1 mg/kg IV, IO, or ETT in 15 minutes
   - **DEFIBRILLATE** 4 w/kg
ASYSTOLE/PULSELESS ELECTRICAL ACTIVITY (PEA)

Causes of PEA: severe hypoxemia, severe acidosis, severe hypovolemia, tension pneumothorax, cardiac tamponade, profound hypothermia.

1. BLS airway management. Perform advanced airway management only if BLS management cannot be successfully done
2. Continue CPR
3. IV or IO ACCESS TKO using volutrol or 250-500 ml bag
4. EPINEPHRINE 1:10,000 0.01 mg/kg IV, IO, or
   - EPINEPHRINE 1:1,000 0.1 mg/kg ETT
     - repeat EPINEPHRINE 1:10,000 0.01 mg/kg IV, IO or
       - EPINEPHRINE 1:1,000 0.1 mg/kg ETT every 3-5 minutes
5. Consider:
   - FLUID BOLUS 20 ml/kg bolus using volutrol or 250-500 ml bag, if hypovolemia is suspected. May repeat boluses of 20 ml/kg x2.
6. Contact Base Hospital if any questions or if additional therapy is required
BRADYCARDIA

90% of all pediatric bradycardias are related to respiratory depression and only require support of ventilation. Only unstable, severe bradycardia causing cardiopulmonary compromise will require further treatment. Signs of severe cardiorespiratory compromise are poor perfusion, delayed capillary refill, hypotension, respiratory difficulty, altered level of consciousness.

1. Ensure a patent airway
   - **OXYGEN** - high flow
   - Support ventilation as needed with appropriate airway management- usually bag mask ventilation
2. If unstable, **IV ACCESS TKO or IO ACCESS** using volutrol or 250-500 ml bag
3. Begin **CPR** if evidence of poor perfusion
4. Be prepared to support airway with appropriate advanced airway management as indicated
5. **EPINEPHRINE 1:10,000** 0.01 mg/kg IV or IO - repeat every 3-5 minutes **OR**
   - **EPINEPHRINE 1:1,000** 0.1 mg/kg ETT - repeat every 3-5 minutes
6. Consider:
   - **ATROPINE** 0.02 mg/kg IV, IO (0.1 mg minimum dose), **OR**
     - **ATROPINE** 0.03 mg/kg ETT
     - Maximum single dose 0.5 mg (pre-adolescent child)
     - Maximum total dose 1 mg (pre-adolescent child)
     - Maximum single dose 1 mg (adolescent – puberty and older)
     - Maximum total dose 2 mg (adolescent)
   - If continued heart rate less than 60, repeat **ATROPINE** 0.02 mg/kg IV or IO, **OR**
     - **ATROPINE** 0.03 mg/kg ETT
7. **Contact Base Hospital if any questions or if additional therapy is required**
PEDIATRIC EMERGENCIES

Tachycardia P5

STABLE TACHYCARDIA – Normal QRS Duration

Normal level of consciousness, normal capillary refill, able to palpate blood pressure that is normal for patient’s age.

1. Ensure a patent airway
   - **OXYGEN** - low flow. Be prepared to support ventilation with appropriate airway management
2. Cardiac Monitor
3. **Contact Base Hospital if any questions or if additional therapy is required**

UNSTABLE TACHYCARDIA

Altered level of consciousness, delayed capillary refill, abnormal skin signs and unable to palpate blood pressure.

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations with appropriate airway management
2. Cardiac Monitor
3. **IV ACCESS** TKO (must be rapidly available) or **IO ACCESS** using volutrol or 250-500 ml bag
4. **FLUID BOLUS** - 20 ml/kg if hypovolemia suspected
5. **CONTACT BASE HOSPITAL**
6. **NORMAL QRS** (0.08 or less):
   - Rate greater than 180 in child or greater than 220 in infant, absent or abnormal 'P' waves:
     A. If IV or IO access is obtained, consider:
        - **ADENOSINE** 0.1 mg/kg rapid IV (maximum dose 6mg) - followed by 10-20 ml bolus of NS
        - **ADENOSINE** 0.2 mg/kg IV (maximum single dose 12mg) - followed by 10-20 ml bolus of NS if patient has not converted.
        - Sedation with **MIDAZOLAM** 0.1 mg/kg IV (titrated in 1 mg max increments - max dose 5 mg). Do not delay cardioversion if difficult IV access.
     - **CARDIOVERSION** 0.5-1 ws/kg
     - Repeat **CARDIOVERSION** 2 ws/kg
   B. If IV access is **NOT** obtained, consider **CARDIOVERSION** 0.5-1.0 ws/kg
7. **WIDENED QRS** (greater than 0.08):
   A. If IV or IO access is obtained:
      - **LIDOCAINE**, 1 mg/kg IV, IO
      - Sedation with **MIDAZOLAM** 0.1 mg/kg IV or IO (titrated in 1mg max increments - max dose 5mg). Do not delay cardioversion if difficult IV access
      - **CARDIOVERSION** 0.5-1 ws/kg, if Lidocaine is not rapidly effective
      - Repeat **CARDIOVERSION** 2 ws/kg
   B. If IV access is **NOT** obtained:
      - **CARDIOVERSION** 0.5-1 ws/kg
      - Repeat **CARDIOVERSION** 2 ws/kg
8. Consider repeat **FLUID BOLUS** 20 ml/kg
**HYPOTENSION/SHOCK**

*Altered level of consciousness; cool, clammy, mottled skin; capillary refill greater than 2 seconds; tachycardia; blood pressure less than 70 systolic. Listless infant or child with poor skin turgor, dry mucous membranes, history of fever may indicate sepsis, meningitis. Settings of trauma may indicate hemorrhage, vomiting, diarrhea, dehydration.*

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations with appropriate airway management

2. Keep warm

3. **IV ACCESS** if readily available or **IO ACCESS**, using volutrol or 250-500 ml bag. Do not delay transport for difficult access.

4. **FLUID BOLUS** 20 ml/kg over 10 minutes and re-assess. May repeat boluses of 20 ml/kg x 2.

5. Cardiac Monitor

6. Test **BLOOD GLUCOSE** level

7. Consider:
   - **DEXTROSE**- 0.5 gm/kg IV or IO if blood glucose level equal to or less than 60 in the following concentrations & volumes:
     - 25% - 2 ml/kg if 1 month or older
     - 12.5% - 4 ml/kg if less than 1 month old. (Dilute D25 1:1 with sterile saline)

8. *Contact Base Hospital if any questions or if additional therapy is required*
ALTERED LEVEL OF CONSCIOUSNESS

*Identify and document neurological deficits. If Glasgow Coma Scale less than 15 and etiology unclear, consider AEIOU TIPS.*

1. Ensure a patent airway - consider C-spine precautions
   - **OXYGEN** - high flow. Be prepared to support ventilations with appropriate airway management
2. If decreased level of consciousness, position patient in left lateral decubitus position
3. Cardiac monitor - treat dysrhythmias per specific treatment guidelines
4. Test **BLOOD GLUCOSE** level
5. **ORAL GLUCOSE** if blood glucose equal or less than 60 and patient is known diabetic, is conscious, able to sit upright and swallow.
6. Consider:
   - **IV ACCESS** TKO using volutrol or 250-500 ml bag
   - **DEXTROSE** - 0.5 gm/kg IV or IO if blood glucose level equal to or less than 60 in the following concentrations & volumes:
     - **25%** - 2 ml/kg if 1 month or older
     - **12.5%** - 4 ml/kg if less than 1 month old. (Dilute D 25 1:1 with sterile saline)
   - **GLUCAGON** 0.1 mg/kg IM - if unable to establish IV - maximum of 1 mg
   - **NARCAN** - 0.1 mg/kg IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose is suspected - maximum dose 2 mg
7. Consider:
   - Re-test **BLOOD GLUCOSE** level, if not responsive to therapy
   - **DEXTROSE** - 0.5 gm/kg IV or IO as a repeat dose if blood glucose level equal to or less than 60 in the following concentrations & volumes:
     - **25%** - 2 ml/kg if 1 month or older
     - **12.5%** - 4 ml/kg if less than 1 month old. (Dilute D 25 1:1 with sterile saline)
8. *Contact Base Hospital if any questions or if additional therapy is required*
SEIZURES

Tonic, clonic movements followed by a period of unconsciousness (post-ictal period). Usually febrile in nature, between ages of 6 months and 5 years. Most seizures are self-limiting and do not require field treatment. Continuous/recurrent seizures are seizure activity greater than 10 minutes or recurrent seizures without patient regaining consciousness.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations with appropriate airway management
2. Left lateral decubitus position if no trauma
3. Protect patient from injury by placing padding appropriately - **DO NOT FORCIBLY RESTRAIN THE PATIENT**
4. Consider:
   - Undress patient if febrile and heavily clothed
5. Test **BLOOD GLUCOSE** level
6. Consider:
   - IV ACCESS TKO using volutrol or 250-500 ml bag
   - DEXTROSE - 0.5 gm/kg IV or IO if blood glucose level equal to or less than 60 in the following concentrations & volumes:
     - 25% - 2 ml/kg if 1 month or older
     - 12.5% - 4 ml/kg if less than 1 month old. (Dilute D 25 1:1 with sterile saline)
     - may repeat if patient is not responding and re-test of glucose is less than or equal to 60
   - NARCAN - 0.1 mg/kg IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose suspected - maximum dose 2 mg
7. For continuous or recurrent seizures, consider:
   - MIDAZOLAM 0.1 mg/kg IV (titrated in 1mg increments - max dose 5 mg)
   - MIDAZOLAM IM 0.2 mg/kg (maximum 10mg IM) if IV route unavailable
8. **Contact Base Hospital if any questions or if additional therapy is required**
POISONING

Determine type, amount time of material absorbed by the patient. Bring in the container and/or label.

1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations with appropriate airway management
2. Position of comfort - if decreased level of consciousness, left lateral decubitus
3. Identify substance and time ingested and bring sample to hospital
4. Consider:
   - In unstable patients, IV ACCESS TKO using volutrol or 250-500 ml bag
   - Cardiac monitor
   - Treat dysrhythmias per specific treatment guidelines
   - NARCAN - 0.1 mg/kg IV or IM (if unable to establish IV) if patient has respiratory compromise and narcotic overdose suspected - maximum dose 2 mg
   - ACTIVATED CHARCOAL 1gm/kg PO
5. Contact Base Hospital if any questions or if additional therapy is required
SYSTEMIC ALLERGIC REACTION

Reaction involving upper or lower respiratory tract - dyspnea, stridor, wheezing, tachycardia, anxiety, tightness in chest - the more rapid the onset, the more severe the reaction

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations with appropriate airway management
2. Position of comfort
3. **NOTHING BY MOUTH**
4. Cardiac monitor - treat dysrhythmias per specific treatment guideline
5. **IV ACCESS** TKO using volutrol or 250-500 ml bag
   - **EPINEPHRINE 1:1,000**, 0.01 mg/kg SC - maximum dose 0.3 mg
   - **ALBUTEROL** 5 mg/6 ml saline via nebulizer. May repeat once if no improvement after initial treatment
   - **DIPHENHYDRAMINE** 1 mg/kg IV, IM (maximum dose of 50 mg) for hives or itching
6. Frequent reassessment of vital signs and respiratory status
7. **Contact Base Hospital if any questions or additional therapy is required**

ANAPHYLACTIC SHOCK

Serious progression from a reaction with respiratory/airway features to one which may include hypotension, altered level of consciousness, cyanosis or severe respiratory distress. **RAPID Transport** is essential in anaphylaxis.

1. Ensure a patent airway
   - **OXYGEN** - high flow. Be prepared to support ventilations with appropriate airway management
2. Position of comfort
3. **NOTHING BY MOUTH**
4. Cardiac monitor - treat dysrhythmias per specific treatment guideline
5. **IV ACCESS** or **IO ACCESS** using volutrol or 250-500 ml bag - 20 ml/kg fluid bolus. May repeat x2 to a maximum of 60 ml/kg.
6. **EPINEPHRINE 1:10,000** 0.01 mg/kg, maximum single dose 0.1 mg, slow IV or IO - maximum total dose 0.3 mg
   - If no IV or IO access - **EPINEPHRINE 1:1,000** 0.01 mg/kg IM (maximum dose 0.3 mg) OR **EPINEPHRINE 1:1,000** 0.1 mg/kg ETT if intubated.
7. **ALBUTEROL** 5 mg/6 ml NS via nebulizer. May repeat once if no improvement after initial treatment
8. Consider:
   - **DIPHENHYDRAMINE** 1 mg/kg IV, IO, IM (maximum of 50 mg) for hives or itching
9. Frequent reassessment of vital signs and respiratory status
10. **Contact Base Hospital if any questions or additional therapy is required**
PEDIATRIC EMERGENCIES
Airway Obstruction P11

INFANT/CHILD (LESS THAN ONE YEAR OLD) WITH COMPLETE AIRWAY OBSTRUCTION
1. With complete airway obstruction, start with five (5) back slaps. Then turn the infant over and deliver five (5) chest thrusts in a manner similar to CPR at one per second. Finger sweeps are to be avoided unless the foreign body can be seen and plucked from the infant's mouth. If the infant becomes unresponsive, begin CPR.
2. Prior to initiation of ALS, assure 2 cycles of BLS maneuvers. If patient is still obstructed, VISUALIZE THE AIRWAY WITH THE LARYNGOSCOPE AND REMOVE THE FOREIGN BODY, IF VISIBLE, WITH MAGILL FORCEPS.

CONSCIOUS PATIENT – ABLE TO SPEAK – Age one year and older
1. Leave the patient alone; offer reassurance
2. Encourage coughing
3. Ensure a patent airway
4. Frequent suctioning as needed to control secretions
5. Avoid agitating the patient
6. Cardiac monitor

CONSCIOUS PATIENT – UNABLE TO COUGH OR SPEAK – Age one year and older
1. Ask the patient if s/he is choking
2. Administer abdominal thrusts until the foreign body is expelled or until the patient becomes unconscious
3. After obstruction is relieved, reassess the airway, lung sounds, skin color and vital signs
4. Ensure a patent airway
5. Cardiac monitor

PATIENT WHO BECOMES UNCONSCIOUS – Age one year and older
1. Roll patient supine; open airway; remove an object if you see it and begin CPR
2. Every time you open airway to give breaths, open the mouth and look for object
3. If patient is still obstructed, VISUALIZE THE AIRWAY WITH THE LARYNGOSCOPE AND REMOVE THE FOREIGN BODY, IF VISIBLE, WITH MAGILL FORCEPS
4. Contact Base Hospital if any questions or if additional therapy is required
Determine degree of physiologic distress: increased respiratory rate; use of accessory muscles; inadequate ventilation; tired appearing; depressed level of consciousness; cyanosis. Determine which causes best fit patient signs and symptoms, initiate treatment.

CROUP/EPIGLOTITIS
The presence of upper respiratory infection or croupy cough, sore throat, fever, stridor or drooling.
1. Ensure a patent airway
   - Offer reassurance; keep patient calm - allow parent to hold child during transport, if feasible
   - OXYGEN therapy - high flow as tolerated
2. If patient deteriorates, or becomes completely obstructed, positive pressure ventilation via bag-valve-mask should be attempted.
3. Contact Base Hospital if any questions or if additional therapy is required

ACUTE ASTHMA/BRONCHOSPASM
Acute onset of respiratory difficulty usually with a history of prior attacks, wheezes, coughing.
1. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilation with appropriate airway management
2. Position of comfort - left lateral decubitus if decreased level of consciousness
3. Limit any physical exertion or movement - attempt to reduce patient anxiety
4. Consider ALBUTEROL 5 mg/6 ml NS via nebulizer
5. Consider:
   - repeat ALBUTEROL 5 mg/6 ml NS via nebulizer, as necessary
   - EPINEPHRINE 1:1,000 0.01 mg/kg SC - maximum 0.3 mg/dose, if not responsive to Albuterol and greater than 10 minute transport time anticipated
6. Contact Base Hospital if any questions or if additional therapy is required
TRAUMA PATIENTS (HIGH RISK OR MEETING MECHANISM CRITERIA FOR CALL-IN)

High-risk trauma patients shall be transported directly to a trauma center. Patients with trauma mechanisms, but not meeting high-risk criteria are triaged via destination decision by the base hospital. Patients with unmanageable airways or trauma arrests that do not qualify for field pronouncement go to the closest appropriate facility.

1. Ensure a patent airway
   - Airway management/support with spinal immobilization/precautions. Needle cricothyrotomy may be indicated in an unmanageable airway.
   - OXYGEN - high flow. Be prepared to support ventilations as needed.
   - Immobilization of the head, cervical/thoracic/lumbar spine with the body secured to the backboard

2. LOAD AND GO PROTOCOL

3. Early notification call to Trauma Base Hospital if patient meets high-risk criteria or call-in for destination decision if patient meets mechanism criteria

4. Place splints/cold packs on injuries and dressings/pressure on bleeding sites as needed

5. Address hypothermia

6. IV or IO ACCESS using volutrol or 250-500 ml bag. Do not delay on-scene for IV or IO access.

7. Consider:
   - FLUID BOLUS 20 ml/kg, recheck vitals.
   - If continued poor perfusion, repeat FLUID BOLUS 20 ml/kg x2
   - For relief of extremity pain in the absence of head or torso trauma, hypotension or poor perfusion or altered level of consciousness, MORPHINE SULFATE 0.05-0.1 mg/kg IV in up to 2 mg increments. Titrate to pain relief and age appropriate BP. Use caution if suspected drug or alcohol intoxication.

8. Cardiac monitor

9. **Contact Trauma Base Hospital - give a brief patient presentation**

10. Trauma receiving hospital update of patient status, completion of patient assessment, repeat vital signs when five minutes out. Receiving hospital report if triaged to receiving facility.
MINOR TRAUMA

Patients with trauma not meeting high risk or call-in criteria.

1. Ensure a patent airway
   - Airway management/support with spinal immobilization/precautions, if indicated
   - OXYGEN - low flow
2. Assess extremities for pulses, circulation, motor function and sensation
3. Place splints, dressings, and pressure on bleeding sites as needed
4. Address hypothermia, remove wet clothing, keep warm
5. Consider:
   - IV ACCESS using volutrol or 250-500 ml bag
   - For pain, MORPHINE SULFATE 0.05 - 0.1 mg/kg IV in up to 2 mg increments to a maximum total dose 10 mg. Titrate to pain relief and age appropriate systolic BP. Avoid use with patients with suspected significant head injury. Use caution if suspected drug or alcohol intoxication.
   - MORPHINE SULFATE 0.1 mg/kg IM if IV route unavailable (maximum dose 10 mg)
6. Contact Base Hospital if any questions or if additional therapy is required
CARDIOPULMONARY ARREST DUE TO TRAUMATIC INJURY

1. Begin CPR
   - Airway management/support with spinal immobilization/precautions
   - OXYGEN - ventilate with 100% O₂
2. Cardiac monitor - defibrillate if in ventricular fibrillation
3. IV or IO ACCESS
4. FLUID BOLUS 20 ml/kg using volutrol or 250-500 ml bag. May repeat up to 60 ml/kg. Do not delay transport for IV access or to administer fluid.
5. Contact Receiving Hospital with update of patient
6. Contact Trauma Base Hospital - give brief patient presentation, if time allows
BURNS

*Damage to the skin caused by contact with caustic material, electricity, or fire. Second or third degree burns involving 10% of the body surface area, or those associated with respiratory involvement are considered major burns.*

1. Remove patient to a safe area
2. Stop the burning process:
   - Remove contact with agent, unless it is adhered to skin
   - Brush off chemical powders
   - Flush with water to stop burning process or to decontaminate
   - Apply dry dressings to wounds.
3. Ensure a patent airway
   - OXYGEN - high flow. Be prepared to support ventilations with appropriate airway management
4. Consider:
   - IV or IO ACCESS TKO
   - Pain relief (in the absence of hypotension or poor perfusion) MORPHINE SULFATE 0.1 mg/kg IV or IO in up to 2 mg increments, maximum total dose 20 mg. Titrate to pain relief and age appropriate systolic BP. If no IV access available, MORPHINE SULFATE 0.1 mg/kg IM (maximum dose 10 mg).
5. Protect the burned area:
   - Do not break blisters
   - Remove restrictive clothing/jewelry if possible
   - Cover with clean dressings or sheets
6. Assess for associated injuries
7. **Contact Base Hospital if any questions or if additional therapy is required**
APPARENT LIFE-THREATENING EVENT (ALTE)

An Apparent Life-Threatening Event (ALTE) was formally known as a “near-miss SIDS” episode. This is an event that is frightening to the observer (may think the infant has died) and involves some combination of apnea, color change, marked change in muscle tone, choking, or gagging. It usually occurs in infants less than 12 months of age, though any child with symptoms described under 2 years of age may be considered an ALTE. Most patients have a normal physical exam when assessed by responding personnel.

Approximately half of the cases have no known cause, but the other half do have a significant underlying cause such as infection, seizures, tumors, respiratory or airway problems, child abuse, or SIDS. Because of the high incidence of problems and the normal assessment usually seen, there is potential for significant problems if the child’s symptoms are not seriously addressed.

1. Obtain history, including duration and severity of event, whether patient awake or asleep at time of episode, and what resuscitative measures were done by the parent or caretaker
2. Obtain medical history, including history of chronic diseases, seizure activity, current or recent infections, gastroesophageal reflux, recent trauma, medication history. Obtain history with regard to mixing of formula
3. Perform comprehensive exam, including general appearance, skin color, interaction with environment, or evidence of trauma
4. Treat identifiable cause if appropriate
5. Transport
6. If treatment/transport is refused by parent or guardian, contact base hospital to consult prior to leaving patient.
CONSCIOUS PATIENT – ABLE TO SPEAK

1. Leave the patient alone; offer reassurance
2. Encourage coughing
3. Ensure a patent airway
4. Frequent suctioning as needed to control secretions
5. Avoid agitating the patient
6. Cardiac monitor

CONSCIOUS ADULT PATIENT – UNABLE TO COUGH OR SPEAK

1. Ask the patient if s/he is choking
2. Administer abdominal thrusts until the foreign body is expelled or until the patient becomes unconscious
3. After obstruction is relieved, reassess the airway, lung sounds, skin color and vital signs
4. Ensure a patent airway
5. Cardiac monitor

ADULT PATIENT WHO BECOMES UNCONSCIOUS

1. Roll patient supine; open airway; remove an object if you see it and begin CPR.
2. Every time you open the airway to give breaths, open the mouth and look for object.
3. If patient is still obstructed, VISUALIZE THE AIRWAY WITH THE LARYNGOSCOPE AND REMOVE THE FOREIGN BODY, IF VISIBLE, WITH MAGILL FORCEPS
4. NEEDLE CRICOTHYROTOMY, if attempts with Magill Forceps are unsuccessful
5. Contact Base Hospital if any questions or if additional therapy is required
RESPIRATORY DISTRESS

Increased respiratory rate, sensation of difficulty breathing not clearly due to the clinical entities specified below. May be due to pneumonia, inhalation of toxic substances, pulmonary embolus, sepsis.

1. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, place in left lateral decubitus position
3. Cardiac monitor
4. Consider:
   - **IV ACCESS TKO**
5. *Contact Base Hospital if symptoms are not resolved*

CHRONIC OBSTRUCTIVE PULMONARY DISEASE

Chronic symptoms of pulmonary disease, wheezing, cough, decreased breath sounds, may have barrel chest.

1. Ensure a patent airway
   - **OXYGEN** – low flow and increase as indicated. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, place in left lateral decubitus position
3. Consider:
   - Limit any physical exertion or movement
   - Loosen tight clothing
   - Keep patient warm, but not overheated
4. Cardiac monitor
5. Consider:
   - **ALBUTEROL** 5 mg/6 ml NS via nebulizer. May repeat as necessary.
   - **IV ACCESS TKO**
6. *Contact Base Hospital if symptoms are not resolved*
ACUTE ASTHMA/BRONCHOSPASM

Acute onset of respiratory difficulty usually with a history of prior attacks, wheezes, coughing.

1. Ensure a patent airway
   - OXYGEN – low flow and increase as indicated. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, place in left lateral decubitus position
3. Consider:
   - Allow patient to take his/her medications
   - Limit any physical exertion or movement
   - Attempt to reduce patient anxiety
4. Cardiac monitor
5. Consider:
   - ALBUTEROL 5 mg/6 ml NS via nebulizer. May repeat as necessary
   - IV ACCESS TKO
   - For patients without history of coronary artery disease or hypertension, EPINEPHRINE 1:1,000
     0.3-0.5 mg SC, if patient's respiratory status is deteriorating despite repeat doses of Albuterol and
     greater than 10 minute transport time anticipated.
   - EPINEPHRINE 1:1,000 0.3-0.5 mg IM if patient has sustained respiratory arrest due to
     asthma/bronchospasm.
6. Contact Base Hospital if symptoms are not resolved
RESPIRATORY EMERGENCIES
Respiratory Arrest R3

RESPIRATORY ARREST

Absence of spontaneous ventilations without cardiac arrest. Consider narcotic overdose.

1. Ensure a patent airway
   - Support ventilations as needed
   - OXYGEN – ventilate with 100% O₂
2. Cardiac monitor
3. Consider:
   - IV ACCESS TKO
   - NARCAN 1-2 mg IV or IM (if unable to establish IV) initially if patient has respiratory compromise and narcotic overdose suspected.
   - EPINEPHRINE 1:1,000 0.3-0.5 mg IM, if patient has sustained respiratory arrest due to asthma/bronchospasm.
4. Transport with further treatment as indicated by patient response or presence of dysrhythmias.
ACUTE PULMONARY EDEMA

Acute onset of respiratory difficulty, may have history of cardiac disease, rales, occasional wheezes.

1. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed

2. Position of comfort - if decreased level of consciousness, place patient in left lateral decubitus position

3. Consider:
   - CPAP if available and patient meets requirements
   - Limit any physical exertion or movement by the patient
   - Calm and reassure the patient

4. Cardiac monitor. Consider 12-lead ECG if patient not in extremis

5. **IV ACCESS** TKO

6. Consider:
   - **NITROGLYCERIN** 0.4 mg (1/150 gr.) SL if systolic BP greater than 90 and less than 150 OR **NITROGLYCERIN** 0.8 mg if systolic BP greater than 150. If blood pressure decreases below 150 systolic after treatment, use lower dose for subsequent treatment(s). May repeat every five minutes to a total dose of 4.8 mg (12 sprays or tablets), until condition improves or BP less than 90 systolic. Patient must not have taken Viagra or Levitra with the previous twenty four hours or Cialis within the previous thirty six hours.
   - **FUROSEMIDE** 40 mg IV if moderate to severe dyspnea and hypoxia despite supplemental oxygen (pulse oximetry less than 93%)
   - **MORPHINE SULFATE** 2-5 mg IV in 1-2 mg increments if BP greater than 90. Titrate to reduction in symptoms. Do not use in patients with altered mental status or decreased respiratory effort.
   - **DOPAMINE** infusion beginning at 5 mcg/kg/min (see Table 1) if BP is less than 90 systolic

7. Contact Base Hospital if any questions or if additional therapy is required
RESPIRATORY EMERGENCIES
Pneumothorax R5

SIMPLE PNEUMOTHORAX

*May be normotensive; absent or diminished breath sounds on one side with no tracheal deviation, distended neck veins or history of trauma.*

1. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. Cardiac monitor
3. Begin transport
4. Consider:
   - **IV ACCESS TKO**
5. *Contact Trauma Base Hospital if any questions or if additional therapy is required*
6. Continuously monitor for signs of tension pneumothorax

TENSION PNEUMOTHORAX

*Absent or diminished breath sounds on one side with some combination of falling blood pressure, distended neck veins, hyperresonance on side without breath sounds with possible tracheal deviation to the opposite side, cyanosis.*

1. Ensure a patent airway
   - **OXYGEN** – high flow. Be prepared to support ventilations as needed
2. Cardiac monitor
3. Begin transport
4. **IV ACCESS TKO**
5. **NEEDLE THORACOSTOMY** on affected side
6. *Contact Trauma Base Hospital*
TRAUMATIC EMERGENCIES
Trauma Patients T1

TRAUMA PATIENTS (HIGH RISK OR MEETING MECHANISM CRITERIA FOR CALL-IN)

High-risk trauma patients shall be transported directly to a trauma center. Patients with trauma mechanisms but not meeting high-risk criteria are triaged via destination decision by the base hospital. Patients with unmanageable airways or trauma arrests that do not qualify for field pronouncement go to the closest appropriate facility.

1. Ensure a patent airway
   - Airway management/support with spinal immobilization/precautions: Needle cricothyrotomy may be indicated in unmanageable airway.
   - **OXYGEN** - high flow. Be prepared to support ventilations as needed
   - Immobilization of the head, cervical/thoracic/lumbar spine with the body secured to the backboard/scoop stretcher

2. LOAD AND GO PROTOCOL IF HIGH RISK

3. **Early notification call to Trauma Base Hospital if patient meets high-risk criteria or call-in for destination decision if patient meets mechanism criteria**

4. Place splints/cold packs on injuries and dressings/pressure on bleeding sites as needed

5. Address hypothermia

6. Consider:
   - Advanced airway management with in-line cervical immobilization if unable to maintain adequate oxygenation (pulse oximetry above 90%) with basic airway management
   - Evaluate for tension pneumothorax

7. **IV ACCESS** – two (2) large bore IVs enroute – **IO ACCESS** if IV not available. **DO NOT DELAY ON-SCENE FOR IV OR IO ACCESS.**

8. Consider:
   - 250-500 ml fluid bolus, recheck vitals

9. Consider: If GCS is less than 15
   - Test **BLOOD GLUCOSE** level
   - **DEXTROSE 50%** 25 gm IV if blood glucose level less than 60

10. Consider:
    - For relief of extremity pain in the absence of head or torso trauma, hypotension (BP less than 100) or poor perfusion or altered level of consciousness, **MORPHINE SULFATE** 2-20 mg IV in 2-5 mg increments. Titrate to pain relief and systolic BP greater than 100. Use with caution in patients with drug or alcohol intoxication

11. Cardiac monitor

12. **Contact Base Hospital if any questions or additional therapy is required**

13. Base Hospital update of patient status, completion of patient assessment, repeat vital signs when 5 minutes out. Receiving hospital report if triaged to receiving facility.
MINOR TRAUMA

Patients with trauma not meeting high risk or call-in criteria.

1. Ensure a patent airway
   - Airway management/support with spinal immobilization/precautions as needed
   - OXYGEN - low flow.
2. Assess extremities for pulses, circulation, motor function and sensation
3. Place splints/cold packs and dressings/pressure on bleeding sites as needed
4. Consider:
   - IV ACCESS – TKO
     - For pain relief, MORPHINE SULFATE 2-20 mg IV, titrated in 2-5 mg increments to pain relief and systolic BP greater than 100, for pain relief in the absence of hypotension or altered level of consciousness. Avoid use with patient with suspected significant head injury. Use with caution in patients with suspected drug, or alcohol intoxication.
     - MORPHINE SULFATE 5-10 mg IM if IV route unavailable.
5. Contact Base Hospital if any questions or additional therapy is required
CRUSH INJURY/CRUSH SYNDROME

_Hypovolemia and hyperkalemia may occur, particularly in extended entrapments. Release of compression may release cellular toxins and potassium._

1. Ensure a patent airway
   - Airway management/support with spinal immobilization/precautions, if indicated
   - **OXYGEN** - high flow - support ventilations as required
2. Place splints, dressings and pressure on bleeding sites as needed
3. Consider:
   - **IV ACCESS** - two large bore IV's
   - Cardiac monitor
   - If wheezing, **ALBUTEROL 5 mg/6 ml NS via nebulizer**
   - **FLUID RESUSCITATION** - 20ml/kg prior to release of compression
4. Consider:
   - **MORPHINE SULFATE** 2-20 mg IV (in 2 - 4 mg increments) or IM - titrate to pain relief and systolic BP greater than 100 - caution if major traumatic injuries suspected
5. Release compression/patient extrication
6. Additional splints and dressings as needed
7. If hyperkalemia suspected (entrapment greater than 4 hours, suspicion on ECG monitor with peaked ‘T’ waves, absent ‘P’ waves or widened QRS complexes)
   - **ALBUTEROL 5 mg/6ml NS continuously via nebulizer**
   - **CALCIUM CHLORIDE 1 gm slow IV over 60 seconds**
     Note: Flush tubing after administration of CALCIUM CHLORIDE to avoid precipitation with SODIUM BICARBONATE
   - **SODIUM BICARBONATE 1 mEq/kg IV**
8. Consider:
   - **SODIUM BICARBONATE 1 mEq/kg added to NS - use second IV line as other medications may not be compatible**
9. **Contact Trauma Base Hospital**
DOPAMINE DRIP RATES

TABLE 1 – Dopamine Drip Rates: Dopamine 1600 mcg/ml solution – 400mg in 250 ml D5W. Drops per minute based on microdrip tubing (60 gtts/ml)

<table>
<thead>
<tr>
<th>Pt. Weight (kg)</th>
<th>5 mcg/kg/min</th>
<th>10 mcg/kg/min</th>
<th>15 mcg/kg/min</th>
<th>20 mcg/kg/min</th>
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</thead>
<tbody>
<tr>
<td>40</td>
<td>8</td>
<td>15</td>
<td>23</td>
<td>30</td>
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<tr>
<td>110</td>
<td>21</td>
<td>41</td>
<td>62</td>
<td>83</td>
</tr>
</tbody>
</table>
## Pediatric Drug Dosage Chart (3-16 kg)

*Use Length-based Resuscitation Tape To Estimate If Weight Is Not Known*

<table>
<thead>
<tr>
<th>Drug</th>
<th>Activated Charcoal 200 mg/ml</th>
<th>Adenosine 3 mg/ml</th>
<th>Adenosine 3 mg/ml</th>
<th>Atropine Sulfate 0.1 mg/ml</th>
<th>Dextrose 12.5% (Dilute D25 1:1) 0.5 g/kg (under 1 mo)</th>
<th>Dextrose 25% (greater than 1 mo) 1 g/kg</th>
<th>Diphenhydramine 50 mg/ml 1 mg/kg</th>
<th>Epinephrine 1:1,000 For asthma, 0.01 mg/kg subcutaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td>1 gm/kg</td>
<td>0.1 mg/kg</td>
<td>0.2 mg/kg</td>
<td>0.02 mg/kg</td>
<td>1.5 g (12 ml)</td>
<td>1.5 g (6 ml)</td>
<td>3 mg (0.06 ml)</td>
<td>0.03 mg (0.03 ml sc)</td>
</tr>
<tr>
<td>3 kg</td>
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<tr>
<td>4 kg</td>
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<td>5 kg</td>
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<tr>
<td>6 kg</td>
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<tr>
<td>7 kg</td>
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<td>8 kg</td>
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<td>9 kg</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10 kg</td>
<td>10 g (50 ml)</td>
<td>1 mg (0.33 ml)</td>
<td>2 mg (0.67 ml)</td>
<td>0.2 mg (2 ml)</td>
<td></td>
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<tr>
<td>11 kg</td>
<td>11 g (55 ml)</td>
<td>1.1 mg (0.36 ml)</td>
<td>2.2 mg (0.73 ml)</td>
<td>0.22 mg (2.2 ml)</td>
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</tr>
<tr>
<td>12 kg</td>
<td>12 g (60 ml)</td>
<td>1.2 mg (0.4 ml)</td>
<td>2.4 mg (0.8 ml)</td>
<td>0.24 mg (2.4 ml)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 kg</td>
<td>13 g (65 ml)</td>
<td>1.3 mg (0.43 ml)</td>
<td>2.6 mg (0.87 ml)</td>
<td>0.26 mg (2.6 ml)</td>
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<tr>
<td>14 kg</td>
<td>14 g (70 ml)</td>
<td>1.4 mg (0.46 ml)</td>
<td>2.8 mg (0.94 ml)</td>
<td>0.28 mg (2.8 ml)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>15 kg</td>
<td>15 g (75 ml)</td>
<td>1.5 mg (0.5 ml)</td>
<td>3 mg (1 ml)</td>
<td>0.3 mg (3 ml)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 kg</td>
<td>16 g (80 ml)</td>
<td>1.6 mg (0.53 ml)</td>
<td>3.2 mg (1.07 ml)</td>
<td>0.32 mg (3.2 ml)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Pediatric Drug Dosage Chart (3-16 kg)

*Use Length-based Resuscitation Tape To Estimate If Weight Is Not Known*

<table>
<thead>
<tr>
<th>Drug</th>
<th>Epinephrine 1:1,000 1 mg/ml</th>
<th>Epinephrine 1:10,000 0.1 mg/ml</th>
<th>Glucagon 1 mg/ml</th>
<th>Lidocaine 2% 100 mg/5 ml 0.1 mg/kg</th>
<th>Midazolam 5 mg/ml 0.2 mg/kg IV IM</th>
<th>Midazolam 5 mg/ml</th>
<th>Morphine Sulfate 10 mg/ml 0.05 mg/kg to 0.1 mg/kg</th>
<th>Naloxone 0.1 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 kg</td>
<td>0.3 mg (0.3 ml)</td>
<td>0.03 mg (0.3 ml)</td>
<td>0.3 mg (0.3 ml)</td>
<td>3 mg (0.15 ml)</td>
<td>0.6 mg (0.12 ml)</td>
<td>0.15-0.3 mg (0.02-0.04 ml)</td>
<td>0.3 mg</td>
<td></td>
</tr>
<tr>
<td>4 kg</td>
<td>0.4 mg (0.4 ml)</td>
<td>0.04 mg (0.4 ml)</td>
<td>0.4 mg (0.4 ml)</td>
<td>4 mg (0.2 ml)</td>
<td>0.8 mg (0.16 ml)</td>
<td>0.2-0.4 mg (0.02-0.04 ml)</td>
<td>0.4 mg</td>
<td></td>
</tr>
<tr>
<td>5 kg</td>
<td>0.5 mg (0.5 ml)</td>
<td>0.05 mg (0.5 ml)</td>
<td>0.5 mg (0.5 ml)</td>
<td>5 mg (0.25 ml)</td>
<td>1 mg (0.2 ml)</td>
<td>0.5 mg (0.03-0.05 ml)</td>
<td>0.5 mg</td>
<td></td>
</tr>
<tr>
<td>6 kg</td>
<td>0.6 mg (0.6 ml)</td>
<td>0.06 mg (0.6 ml)</td>
<td>0.6 mg (0.6 ml)</td>
<td>6 mg (0.3 ml)</td>
<td>1.2 mg (0.32 ml)</td>
<td>0.5 mg (0.03-0.06 ml)</td>
<td>0.6 mg</td>
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<tr>
<td>7 kg</td>
<td>0.7 mg (0.7 ml)</td>
<td>0.07 mg (0.7 ml)</td>
<td>0.7 mg (0.7 ml)</td>
<td>7 mg (0.35 ml)</td>
<td>1.4 mg (0.28 ml)</td>
<td>0.5 mg (0.04-0.07 ml)</td>
<td>0.7 mg</td>
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</tr>
<tr>
<td>8 kg</td>
<td>0.8 mg (0.8 ml)</td>
<td>0.08 mg (0.8 ml)</td>
<td>0.8 mg (0.8 ml)</td>
<td>8 mg (0.4 ml)</td>
<td>1.6 mg (0.32 ml)</td>
<td>0.5 mg (0.04-0.08 ml)</td>
<td>0.8 mg</td>
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<tr>
<td>9 kg</td>
<td>0.9 mg (0.9 ml)</td>
<td>0.09 mg (0.9 ml)</td>
<td>0.9 mg (0.9 ml)</td>
<td>9 mg (0.45 ml)</td>
<td>1.8 mg (0.36 ml)</td>
<td>0.5 mg (0.04-0.08 ml)</td>
<td>0.9 mg</td>
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<tr>
<td>10 kg</td>
<td>1 mg (1 ml)</td>
<td>0.1 mg (1 ml)</td>
<td>1 mg (1 ml)</td>
<td>10 mg (0.5 ml)</td>
<td>2 mg (0.4 ml)</td>
<td>1 mg (0.05-0.1 ml)</td>
<td>1 mg</td>
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</tr>
<tr>
<td>11 kg</td>
<td>1.1 mg (1.1 ml)</td>
<td>0.11 mg (1.1 ml)</td>
<td>1 mg (1 ml)</td>
<td>11 mg (0.55 ml)</td>
<td>2.2 mg (0.44 ml)</td>
<td>1.1 mg (0.06-0.11 ml)</td>
<td>1.1 mg</td>
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<tr>
<td>12 kg</td>
<td>1.2 mg (1.2 ml)</td>
<td>0.12 mg (1.2 ml)</td>
<td>1 mg (1 ml)</td>
<td>12 mg (0.6 ml)</td>
<td>2.4 mg (0.48 ml)</td>
<td>1.2 mg (0.06-0.12 ml)</td>
<td>1.2 mg</td>
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</tr>
<tr>
<td>13 kg</td>
<td>1.3 mg (1.3 ml)</td>
<td>0.13 mg (1.3 ml)</td>
<td>1 mg (1 ml)</td>
<td>13 mg (0.65 ml)</td>
<td>2.6 mg (0.52 ml)</td>
<td>1.3 mg (0.07-0.13 ml)</td>
<td>1.3 mg</td>
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<tr>
<td>14 kg</td>
<td>1.4 mg (1.4 ml)</td>
<td>0.14 mg (1.4 ml)</td>
<td>1 mg (1 ml)</td>
<td>14 mg (0.7 ml)</td>
<td>2.8 mg (0.56 ml)</td>
<td>1.4 mg (0.07-0.14 ml)</td>
<td>1.4 mg</td>
<td></td>
</tr>
<tr>
<td>15 kg</td>
<td>1.5 mg (1.5 ml)</td>
<td>0.15 mg (1.5 ml)</td>
<td>1 mg (1 ml)</td>
<td>15 mg (0.75 ml)</td>
<td>3 mg (0.6 ml)</td>
<td>1.5 mg (0.08-0.15 ml)</td>
<td>1.5 mg</td>
<td></td>
</tr>
<tr>
<td>16 kg</td>
<td>1.6 mg (1.6 ml)</td>
<td>0.16 mg (1.6 ml)</td>
<td>1 mg (1 ml)</td>
<td>16 mg (0.8 ml)</td>
<td>3.2 mg (0.64 ml)</td>
<td>1.6 mg (0.08-0.16 ml)</td>
<td>1.6 mg</td>
<td></td>
</tr>
</tbody>
</table>
### Pediatric Drug Dosage Chart (17-50 kg)

*Use Length-based Resuscitation Tape To Estimate If Weight Is Not Known*

#### Chart Valid Only If Concentration Is Same As Listed

<table>
<thead>
<tr>
<th>Drug</th>
<th>Activated Charcoal 200 mg/ml</th>
<th>Adenosine 3 mg/ml</th>
<th>Adenosine 3 mg/ml</th>
<th>Atropine Sulfate 0.1 mg/ml</th>
<th>Dextrose 25% 0.5 gm/kg</th>
<th>Diphenhydramine 50 mg/ml</th>
<th>Epinephrine 1:1,000 1 mg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dose</strong></td>
<td><strong>1 gm/kg</strong></td>
<td><strong>0.1 mg/kg</strong></td>
<td><strong>0.2 mg/kg</strong></td>
<td><strong>0.02 mg/kg</strong></td>
<td><strong>1 mg/kg</strong></td>
<td><strong>1 mg/kg</strong></td>
<td><strong>For asthma, 0.01 mg/kg subcutaneous</strong></td>
</tr>
</tbody>
</table>

<p>| <strong>17 kg</strong>  | <strong>17 gm</strong> (85 ml)            | <strong>1.7 mg</strong> (0.57 ml) | <strong>3.4 mg</strong> (1.13 ml) | <strong>0.34 mg</strong> (3.4 ml) | <strong>8.5 gm</strong> (34 ml) | <strong>17 mg</strong> (0.34 ml) | <strong>0.17 mg</strong> (0.17 ml sc) |
| <strong>18 kg</strong>  | <strong>18 gm</strong> (90 ml)            | <strong>1.8 mg</strong> (0.6 ml) | <strong>3.6 mg</strong> (1.2 ml) | <strong>0.36 mg</strong> (3.6 ml) | <strong>9 gm</strong> (36 ml) | <strong>18 mg</strong> (0.36 ml) | <strong>0.18 mg</strong> (0.18 ml sc) |
| <strong>19 kg</strong>  | <strong>19 gm</strong> (95 ml)            | <strong>1.9 mg</strong> (0.63 ml) | <strong>3.8 mg</strong> (1.27 ml) | <strong>0.38 mg</strong> (3.8 ml) | <strong>9.5 gm</strong> (38 ml) | <strong>19 mg</strong> (0.38 ml) | <strong>0.19 mg</strong> (0.19 ml sc) |
| <strong>20 kg</strong>  | <strong>20 gm</strong> (100 ml)           | <strong>2 mg</strong> (0.67 ml) | <strong>4 mg</strong> (1.33 ml) | <strong>0.4 mg</strong> (4 ml) | <strong>10 gm</strong> (40 ml) | <strong>20 mg</strong> (0.4 ml) | <strong>0.2 mg</strong> (0.20 ml sc) |
| <strong>22 kg</strong>  | <strong>22 gm</strong> (110 ml)           | <strong>2.2 mg</strong> (0.73 ml) | <strong>4.4 mg</strong> (1.47 ml) | <strong>0.44 mg</strong> (4.4 ml) | <strong>11 gm</strong> (44 ml) | <strong>22 mg</strong> (0.44 ml) | <strong>0.22 mg</strong> (0.22 ml sc) |
| <strong>24 kg</strong>  | <strong>24 gm</strong> (120 ml)           | <strong>2.4 mg</strong> (0.8 ml) | <strong>4.8 mg</strong> (1.6 ml) | <strong>0.48 mg</strong> (4.8 ml) | <strong>12 gm</strong> (48 ml) | <strong>24 mg</strong> (0.48 ml) | <strong>0.24 mg</strong> (0.24 ml sc) |
| <strong>26 kg</strong>  | <strong>26 gm</strong> (130 ml)           | <strong>2.6 mg</strong> (0.87 ml) | <strong>5.2 mg</strong> (1.73 ml) | <strong>0.5 mg</strong> (5 ml) | <strong>13 gm</strong> (52 ml) | <strong>26 mg</strong> (0.52 ml) | <strong>0.26 mg</strong> (0.26 ml sc) |
| <strong>28 kg</strong>  | <strong>28 gm</strong> (140 ml)           | <strong>2.8 mg</strong> (0.93 ml) | <strong>5.6 mg</strong> (1.87 ml) | <strong>0.5 mg</strong> (5 ml) | <strong>14 gm</strong> (56 ml) | <strong>28 mg</strong> (0.56 ml) | <strong>0.28 mg</strong> (0.28 ml sc) |
| <strong>30 kg</strong>  | <strong>30 gm</strong> (150 ml)           | <strong>3 mg</strong> (1 ml)    | <strong>6 mg</strong> (2 ml)    | <strong>0.5 mg</strong> (5 ml) | <strong>15 gm</strong> (60 ml) | <strong>30 mg</strong> (0.6 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |
| <strong>32 kg</strong>  | <strong>32 gm</strong> (160 ml)           | <strong>3.2 mg</strong> (1.06 ml) | <strong>6.4 mg</strong> (2.13 ml) | <strong>0.5 mg</strong> (5 ml) | <strong>16 gm</strong> (64 ml) | <strong>32 mg</strong> (0.64 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |
| <strong>34 kg</strong>  | <strong>34 gm</strong> (170 ml)           | <strong>3.4 mg</strong> (1.13 ml) | <strong>6.8 mg</strong> (2.27 ml) | <strong>0.5 mg</strong> (5 ml) | <strong>17 gm</strong> (68 ml) | <strong>34 mg</strong> (0.68 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |
| <strong>40 kg</strong>  | <strong>40 gm</strong> (200 ml)           | <strong>4 mg</strong> (1.33 ml) | <strong>8 mg</strong> (2.7 ml) | <strong>0.5 mg (5 ml)</strong> | <strong>1 mg (10 ml)</strong> | <strong>20 gm</strong> (80 ml) | <strong>40 mg</strong> (0.8 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |
| <strong>45 kg</strong>  | <strong>45 gm</strong> (225 ml)           | <strong>4.5 mg</strong> (1.5 ml) | <strong>9 mg</strong> (3 ml) | <strong>0.5 mg (5 ml)</strong> | <strong>1 mg (10 ml)</strong> | <strong>22.5 gm</strong> (90 ml) | <strong>45 mg</strong> (0.9 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |
| <strong>50 kg</strong>  | <strong>50 gm</strong> (250 ml)           | <strong>5 mg</strong> (1.67 ml) | <strong>10 mg</strong> (3.3 ml) | <strong>0.5 mg (5 ml)</strong> | <strong>1 mg (10 ml)</strong> | <strong>25 gm</strong> (100 ml) | <strong>50 mg</strong> (1 ml) | <strong>0.3 mg</strong> (0.3 ml sc)  |</p>
<table>
<thead>
<tr>
<th>Drug</th>
<th>Epinephrine 1:1,000 1 mg/ml For arrest (repeat IV doses) or via ETT if greater than 1 mo 0.1 mg/kg</th>
<th>Epinephrine 1:10,000 0.1 mg/ml For arrest, ETT neonate 0.01 mg/kg</th>
<th>Glucagon 1 mg/ml 0.1 mg/kg</th>
<th>Lidocaine 2% 100 mg/5 ml 1 mg/kg</th>
<th>Midazolam 5 mg/ml 0.2 mg/kg IM</th>
<th>Midazolam Sulfate 5 mg/ml 0.1 mg/kg IV</th>
<th>Morphine Sulfate 10 mg/ml 0.05 mg/kg to 0.1 mg/kg</th>
<th>Naloxone 0.1 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dose</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 kg</td>
<td>1.7 mg (1.7 ml)</td>
<td>0.17 mg (1.7 ml)</td>
<td>1 mg (1 ml)</td>
<td>17 mg (0.85 ml)</td>
<td>3.4 mg (0.68 ml)</td>
<td>1.7 mg (0.34 ml)</td>
<td>0.85-1.7 mg (0.09-0.17 ml)</td>
<td>1.7 mg</td>
</tr>
<tr>
<td>18 kg</td>
<td>1.8 mg (1.8 ml)</td>
<td>0.18 mg (1.8 ml)</td>
<td>1 mg (1 ml)</td>
<td>18 mg (0.9 ml)</td>
<td>3.6 mg (0.72 ml)</td>
<td>1.8 mg (0.36 ml)</td>
<td>0.9-1.8 mg (0.09-0.18 ml)</td>
<td>1.8 mg</td>
</tr>
<tr>
<td>19 kg</td>
<td>1.9 mg (1.9 ml)</td>
<td>0.19 mg (1.9 ml)</td>
<td>1 mg (1 ml)</td>
<td>19 mg (0.95 ml)</td>
<td>3.8 mg (0.76 ml)</td>
<td>1.9 mg (0.38 ml)</td>
<td>0.95-1.9 mg (0.1-0.19 ml)</td>
<td>1.9 mg</td>
</tr>
<tr>
<td>20 kg</td>
<td>2 mg (2 ml)</td>
<td>0.2 mg (2 ml)</td>
<td>1 mg (1 ml)</td>
<td>20 mg (1 ml)</td>
<td>4 mg (0.8 ml)</td>
<td>2 mg (0.4 ml)</td>
<td>1-2 mg (0.1-0.2 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>22 kg</td>
<td>2.2 mg (2.2 ml)</td>
<td>0.22 mg (2.2 ml)</td>
<td>1 mg (1 ml)</td>
<td>22 mg (1.1 ml)</td>
<td>4.4 mg (0.88 ml)</td>
<td>2.2 mg (0.44 ml)</td>
<td>1.1-2.2 mg (0.11-0.22 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>24 kg</td>
<td>2.4 mg (2.4 ml)</td>
<td>0.24 mg (2.4 ml)</td>
<td>1 mg (1 ml)</td>
<td>24 mg (1.2 ml)</td>
<td>4.8 mg (0.96 ml)</td>
<td>2.4 mg (0.48 ml)</td>
<td>1.2-2.4 mg (0.12-0.24 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>26 kg</td>
<td>2.6 mg (2.6 ml)</td>
<td>0.26 mg (2.6 ml)</td>
<td>1 mg (1 ml)</td>
<td>26 mg (1.3 ml)</td>
<td>5.2 mg (1.04 ml)</td>
<td>2.6 mg (0.52 ml)</td>
<td>1.3-2.6 mg (0.13-0.26 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>28 kg</td>
<td>2.8 mg (2.8 ml)</td>
<td>0.28 mg (2.8 ml)</td>
<td>1 mg (1 ml)</td>
<td>28 mg (1.4 ml)</td>
<td>5.6 mg (1.12 ml)</td>
<td>2.8 mg (0.56 ml)</td>
<td>1.4-2.8 mg (0.14-0.28 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>30 kg</td>
<td>3 mg (3 ml)</td>
<td>0.3 mg (3 ml)</td>
<td>1 mg (1 ml)</td>
<td>30 mg (1.5 ml)</td>
<td>6 mg (1.2 ml)</td>
<td>3 mg (0.6 ml)</td>
<td>1.5-3 mg (0.15-0.3 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>32 kg</td>
<td>3.2 mg (3.2 ml)</td>
<td>0.32 mg (3.2 ml)</td>
<td>1 mg (1 ml)</td>
<td>32 mg (1.6 ml)</td>
<td>6.4 mg (1.28 ml)</td>
<td>3.2 mg (0.64 ml)</td>
<td>1.6-3.2 mg (0.16-0.32 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>34 kg</td>
<td>3.4 mg (3.4 ml)</td>
<td>0.34 mg (3.4 ml)</td>
<td>1 mg (1 ml)</td>
<td>34 mg (1.7 ml)</td>
<td>6.8 mg (1.36 ml)</td>
<td>3.4 mg (0.68 ml)</td>
<td>1.7-3.4 mg (0.17-0.34 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>40 kg</td>
<td>4 mg (4 ml)</td>
<td>0.4 mg (4 ml)</td>
<td>1 mg (1 ml)</td>
<td>40 mg (2 ml)</td>
<td>8 mg (1.6 ml)</td>
<td>4 mg (0.8 ml)</td>
<td>2-4 mg (0.2-0.4 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>45 kg</td>
<td>4.5 mg (4.5 ml)</td>
<td>0.45 mg (4.5 ml)</td>
<td>1 mg (1 ml)</td>
<td>45 mg (2.25 ml)</td>
<td>9 mg (1.8 ml)</td>
<td>4.5 mg (0.9 ml)</td>
<td>2.25-4.5 mg (0.23-0.45 ml)</td>
<td>2 mg</td>
</tr>
<tr>
<td>50 kg</td>
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<td>1 mg (1 ml)</td>
<td>50 mg (2.5 ml)</td>
<td>10 mg (2 ml)</td>
<td>5 mg (1 ml)</td>
<td>2.5-5 mg (0.25-0.5 ml)</td>
<td>2 mg</td>
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</table>
APPENDIX B

Critical Care Transport-Paramedic (CCT-P) Procedures
RESPIRATORY EMERGENCIES – CCT-P Units Only
Acute Respiratory Distress R2

ACUTE ASTHMA/BRONCHOSPASM

Acute onset of respiratory difficulty usually with a history of prior attacks, severe wheezing/SOB, coughing, cyanosis, accessory muscle use or inability to speak.

1. Ensure a patent airway
   - OXYGEN – low flow and increase as indicated. Be prepared to support ventilations as needed
2. Position of comfort - if decreased level of consciousness, place in left lateral decubitus position
3. Consider:
   - Allow patient to take his/her medications
   - Limit any physical exertion or movement
   - Attempt to reduce patient anxiety
4. Cardiac monitor
5. Consider:
   - ALBUTEROL 5 mg/6 ml NS via nebulizer. May repeat as necessary
   - IV ACCESS TKO
   - IPRATROPIUM 550mcg (2.5ml) via nebulizer or BVM
   - For patients without history of coronary artery disease or hypertension, EPINEPHRINE 1:1,000 0.01 mb/kg SC, (max dose 0.5mg) if patient's respiratory status is deteriorating despite repeat doses of Albuterol and greater than 10 minute transport time anticipated.
   - EPINEPHRINE 1:1,000 0.3-0.5mg IM if patient has sustained respiratory arrest due to asthma/bronchospasm
6. Contact Base Hospital if symptoms are not resolved
Amiodarone

Only authorized CCT-Ps will be permitted to monitor amiodarone hydrochloride infusions during scheduled interfacility transports. CCT-Ps may not initiate amiodarone hydrochloride.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the amiodarone hydrochloride infusion during transport.
3. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the amiodarone hydrochloride infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
5. The following parameters shall apply to all patients with pre-existing amiodarone hydrochloride infusions:
   - Medication concentration must be a minimum concentration of 150mg/250mL (0.6 mg/mL); unstable in more dilute solutions.
   - Infusion rates must remain constant during transport with no regulation of rates being performed by the CCT-P, except for the discontinuation of the infusion.
   - Infusion rates may vary between 0.5 - 1.0 mg/min.
   - Physician orders must specify the infusion rate.
   - Vital signs are to be monitored as indicated in the transfer orders, not less frequently than every 15 minutes.
   - Y-Injection incompatibility; the following will precipitate with amiodarone hydrochloride
     - Heparin Sodium
     - Sodium Bicarbonate
   - Amiodarone hydrochloride intravenous infusion monitoring is not approved for patients less than 14 years old without base physician contact.
   - In infusions longer than one hour, amiodarone hydrochloride concentrations should not exceed 2mg/mL unless a central venous catheter is used.
Automatic Transport Ventilators

Only authorized CCT-Ps will be permitted to monitor and adjust ATV’s during scheduled interfacility transports. CCT-Ps may not initiate ventilator support.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. A continuous end-tidal CO2 detector must be employed during transport.
3. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide parameters for maintaining and adjusting ventilations via ATV during transport.
4. Ventilator support must be regulated by an ATV familiar to the CCT-P. If an ATV failure occurs and cannot be corrected, the paramedic is to discontinue use of the ATV and initiate ventilation by bag-valve and notify the transferring physician or the base physician if the transferring physician is not available.
5. Personnel shall monitor the PSI level in the oxygen cylinder.
6. CCT-Ps shall continually observe the patient and document patient response to any changes while the device is operational. CCT-Ps shall chart the initial settings and any subsequent changes. Such documentation shall appear on the patient care report.

PRECAUTIONS

1. The CCT-P is responsible for all airway management and must frequently reassess endotracheal tube placement. Bilateral breath sounds are to be checked after each patient movement.
2. ATV’s are not intended nor shall be used to reduce current personnel staffing levels.

SPECIAL INFORMATION

1. The ventilator that the provider is to use should be able to match the existing ventilator settings. The following minimum device features (including circuit) must be present for this category of patient:
   - Set rate of ventilations
   - Adjustable delivered tidal volume
   - Adjustable Inspiratory and Expiratory ratios (I:E ratio)
   - Positive End-Expiratory Pressure (PEEP)
   - Peak airway pressure gauge
   - Modes
     - Assist Control (AC)
     - Synchronized Intermittent Mandatory Ventilation (SIMV)
     - Controlled Mechanical Ventilation (CMV)
     - Continuous Positive Airway Pressure (CPAP)
     - Bi-level Positive Airway Pressure (BiPAP)
   - Alarms
     - Peak airway pressure
     - Disconnect
• Strongly recommended option – blend percentage

2. Agencies using this equipment must be certain to follow the manufacturer's instructions regarding the use, maintenance, cleaning and regular testing of this device.
   • The units must be inspected and tested after every patient use.
   • The units must be disinfected after use unless a disposable units is used.
   • The units shall undergo preventative testing and maintenance by qualified personnel annually.
   • Agencies shall arrange for (at least) annual inspections and testing of the equipment by a manufacturer's representative (or designee). Documentation of this service shall be maintained in a service log. This record shall be kept by each agency using ATV's.

**CCT-Ps must be thoroughly trained and regularly retrained in the devices use. Such training shall occur annually and shall be documented.**
Blood/Blood Product Infusions

Only authorized CCT-Ps will be permitted to monitor blood/blood product infusions during scheduled interfacility transports. CCT-Ps may not initiate blood/blood product infusions.

1. Identify the patient and blood by checking the patient ID band against the blood/blood product label and blood/blood product order for name, blood type, unit identifying number and expiration date. The blood/blood product must be hung and the infusion initiated by a RN or MD prior to the CCT-P accepting the patient for transfer.

2. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.

3. A non-invasive or manual blood pressure monitoring device that will provide accurate blood pressure readings and a means of measuring temperature, will be utilized every fifteen (15) minutes to monitor for signs of adverse effects.

4. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the blood/blood products infusion during transport.

5. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders. Use caution to prevent inadvertent overdose of medication.

6. The following parameters shall apply to all patients with pre-existing morphine sulfate infusions:
   - Infusion will be through filtered infusion tubing.
   - Regulation of the infusion rate will occur within the parameters as defined by the transferring physician. No other flow adjustments may be made by the CCT-P, other than to discontinue the infusion in the event of complications.
   - Adverse reactions may include:
     a) **Hemolytic reactions:** Hemolytic reactions are the most life-threatening. Clinical manifestations may vary considerably: fever, headache, chest or back pain, pain at the infusion site, hypotension, nausea, generalized bleeding or oozing from a surgical site or shock. The most common cause is from ABO incompatibility due to clerical error or transfusion to the wrong patient. Chances of survival are dose dependent, therefore it is important to stop the transfusion immediately if a hemolytic reaction is suspected. Give fluid challenge of NS.
     b) **Febrile non-hemolytic reaction:** Chills and fever (rise from baseline temperature of 1°C or 1.8°F).
     c) **Allergic reaction:** Characterized by appearance of hives and itching (urticaria or diffuse rash). See Treatment Guideline M2 – Systemic Allergic Reaction, after discontinuing the infusion.
     d) **Anaphylaxis:** May occur after administration of only a few ml’s of a plasma containing component. Symptoms include coughing, bronchospasm, respiratory distress, vascular instability, nausea, abdominal cramps, vomiting, diarrhea, shock and loss of consciousness. See Treatment Guideline M2 – Systemic Allergic Reaction, after discontinuing the infusion.
     e) **Volume overload:** Characterized by dyspnea, headache, peripheral edema, coughing, frothy sputum or other signs of congestive heart failure occurring during or soon after transfusion. Restrict fluids.

In cases of suspected transfusion reactions, the blood/blood products infusion will be discontinued and notification made to both the transferring physician and Base Hospital.
Glycoprotein IIb/IIIa Receptor Inhibitor Infusions

Only authorized CCT-Ps will be permitted to monitoring glycoprotein receptor inhibitor infusions during scheduled interfacility transports. CCT-Ps may not initiate glycoprotein receptor inhibitor infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the glycoprotein receptor inhibitor infusion during transport.
3. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the glycoprotein receptor inhibitor infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
5. The following parameters shall apply to all patients with pre-existing glycoprotein receptor inhibitor infusions:
   • Medication concentration will not exceed the standard manufacturer concentration.
   • Infusion rates must remain constant during transport with no regulation of rates being performed by the CCT-P, except for the discontinuation of the infusion (e.g., as in a case of bleeding).
   • Documentation of calculation of the ordered infusion rate based on recent patient weight (in kilograms).
   • Documentation of the following lab values:
     - Blood urea nitrogen
     - Creatinine
     - Hemoglobin
     - Hematocrit
     - Platelet count
     - Coagulation studies
   • Vital signs are to be monitored as indicated in the transfer orders.

Incompatible with Diazepam (Valium) if given via the same IV line.

### INFUSION RATE CHARTS

<table>
<thead>
<tr>
<th>Eptifibatide (Integrilin) 36 mcg/ml concentration</th>
<th>infusion rate MAY NOT EXCEED 2 mcg/kg/min</th>
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<tbody>
<tr>
<td>Patient weight in kg</td>
<td>50</td>
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<tr>
<td>Drip: 2 mcg/kg/min</td>
<td>8 ml/hr</td>
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</tbody>
</table>

<table>
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<tr>
<th>Tirofiban (Aggrastat) 0.75 mg/ml concentration</th>
<th>infusion rate MAY NOT EXCEED 0.1 mcg/kg/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient weight in kg</td>
<td>50</td>
</tr>
<tr>
<td>Drip: 0.1 mcg/kg/min</td>
<td>6 ml/hr</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Abciximab (ReoPro) 50 mcg/ml concentration</th>
<th>infusion rate MAY NOT EXCEED 0.125 mcg/kg/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient weight in kg</td>
<td>50</td>
</tr>
<tr>
<td>Drip: 0.125 mcg/kg/min</td>
<td>10.4 ml/hr</td>
</tr>
</tbody>
</table>
Heparin Infusions

Only authorized CCT-Ps will be permitted to monitor heparin infusions during scheduled interfacility transports. **CCT-Ps may not initiate heparin infusions.**

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.

2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the heparin infusion during transport.

3. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.

4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the heparin infusion and notify the transferring physician, or the base physician if the transferring physician is not available.

5. The following parameters shall apply to all patients with pre-existing heparin infusions:
   - Medication concentration will not exceed 100 Units / ml of IV fluid (25,000 Units/250ml or 50,000 Units/500ml).
   - Infusion rates must remain constant during transport with no regulation of rates being performed by the CCT-P, except for the discontinuation of the infusion (e.g., as in a case of bleeding).
   - Vital signs are to be monitored as indicated in the transfer orders.
Lidocaine Infusions

Only authorized CCT-Ps will be permitted to monitor lidocaine infusions during scheduled interfacility transports. CCT-Ps may not initiate lidocaine infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the lidocaine infusion during transport, and the circumstances under which the rate will be changed or the infusion discontinued.
3. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the lidocaine infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
5. The following parameters shall apply to all patients with pre-existing lidocaine infusions:
   - Infusion fluid will be either NS or D5W. Medication concentration will be either
     - 1 gram/250ml or
     - 2 grams/500ml
   - Regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but in no case will changes be in greater than 1mg/minute increments every 3 - 5 minutes.
   - CCT-Ps may institute two infusion rate changes prior to consulting with the Base Hospital. Any additional changes must be made only after contact with the Base Hospital.
   - INFUSION RATES MAY NOT EXCEED 4 mg/min.
   - Vital signs are to be monitored as indicated in the transfer orders.

<table>
<thead>
<tr>
<th>Standard Strength</th>
<th>1 gram/250ml D5W or NS</th>
<th>2 gram/500ml</th>
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</thead>
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<tr>
<td>ml/hr</td>
<td>mg/min</td>
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<tr>
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</table>
Midazolam Infusions

Only authorized CCT-Ps will be permitted to monitor midazolam infusions during scheduled interfacility transports. CCT-Ps may not initiate midazolam infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. A non-invasive blood pressure monitoring device that will provide accurate blood pressure readings every five (5) to fifteen (15) minutes will be utilized.
3. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the midazolam infusion during transport.
4. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
5. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the midazolam infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
6. The following parameters shall apply to all patients with pre-existing midazolam infusions:
   - The infusion concentration and regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but may be titrated to the individuals response during transport.
   - In cases of severe respiratory depression, partial airway obstruction (especially when combined with narcotics), hypertension, hypotension and excess sedation, the medication infusion will be discontinued and the transferring physician and Base Hospital are to be notified.
   - Additional precautions include:
     a. Dosage reductions are recommended for patients in CHF, septic shock, renal and/or hepatic dysfunction, low serum albumin, pulmonary insufficiency, COPD or elderly patients.

Reduce dose by 30% in patients premedicated with narcotics and/or CNS depressants.
Morphine Sulfate Infusions

Only authorized CCT-Ps will be permitted to monitor morphine sulfate infusions during scheduled interfacility transports. CCT-Ps may not initiate morphine sulfate infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. A non-invasive blood pressure monitoring device that will provide accurate blood pressure readings every five (5) to fifteen (15) minutes will be utilized.
3. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the morphine sulfate infusion during transport.
4. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
5. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the morphine sulfate infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
6. The following parameters shall apply to all patients with pre-existing morphine sulfate infusions:
   • The infusion concentration and regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but may be titrated to the individuals response during transport.

In cases of severe respiratory depression, depression, sedation, confusion, hypotension, bradycardia, nausea and vomiting, the medication infusion will be discontinued and naloxone may be administered as directed in Contra Costa Treatment Guideline M4. The transferring physician and Base Hospital are to be notified.
Nitroglycerin Infusions

Only authorized CCT-Ps will be permitted to monitor nitroglycerin infusions during scheduled interfacility transports. CCT-Ps may not initiate nitroglycerin infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. A non-invasive blood pressure monitoring device that will provide accurate blood pressure readings every five (5) to fifteen (15) minutes will be utilized.
3. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the nitroglycerin infusion during transport.
4. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
5. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the nitroglycerin infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
6. The following parameters shall apply to all patients with pre-existing nitroglycerin infusions:
   - Infusion fluid will be either NS or D5W.
   2. Regulation of the infusion rate will occur within the parameters as defined by the transferring physician, but in no case will changes be in greater than 10mcg/minute increments every 5 - 10 minutes.
   3. In cases of severe hypotension, the medication infusion will be discontinued and the transferring physician and Base Hospital notified.
Potassium Chloride (KCL) Infusions

Only authorized CCT-Ps will be permitted to monitor KCL infusions during scheduled interfacility transports. **CCT-Ps may not initiate KCL infusions.**

1. Patients shall be placed and maintained on a cardiac monitor during transport.
2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the KCL infusion during the transport.
3. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the EMT-P may restart the line as delineated in the transfer orders.
4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the KCL infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
5. The following parameters shall apply to all patients with pre-existing KCL infusions:
   - Medication concentration will not exceed 40 mEq per liter of IV fluid except in the following instance:
     - A more concentrated solution that contains no more than 10 mEq KCL TOTAL in the infusion bag is allowable.
   - Infusion rates must remain constant during transport with no regulation of rate being performed by the paramedic.
   - **INFUSION RATES MAY NOT EXCEED 10 mEq PER HOUR.**
   - Vital signs are to be monitored as indicated in the transfer orders.
Sedation For Ventilator/Agitated Patients

Only authorized CCT-Ps will be permitted to utilize chemical sedation without base hospital contact. Midazolam will be used for:

- ventilator dependent patients requiring chemical sedation or restraint due to agitation, restlessness and/or anxiety that is compromising the patients stability.
- agitated patients requiring chemical sedation or restraint due to restlessness and/or anxiety that is compromising the patients stability

**INDICATIONS**

- Subjective: Any or all of the following symptoms:
  - Agitation
  - Restlessness
  - Anxiety
- Objective:
  - Changes in Cardiac Monitor
  - Increase in level of distress
  - Change in vital signs
  - Need for invasive procedure
  - Decrease in pulse oximetry

**CONTRAINDICATIONS**

- Agitation (if patient is pregnant)

**PROCEDURE**

A. Ventilator patients

1. Apply soft, four point restraints.
2. Continuously monitor oxygen saturation, ETCO2, heart rate, blood pressure, and LOC.
3. Administer midazolam as per physician orders, if no orders, use guidelines below.
4. Guidelines for the administration of midazolam as follows:
   - Adult: (Age 12 and older)
     a) 2 - 4 mg, slow IV push
     b) May repeat intravenous dose every 20 - 30 minutes as needed for sedation. Maximum total dose is 10mg.
     c) Use IM only if IV access is unavailable, dose is 3 - 5 mg, given deep into a large muscle mass. Maximum total dose is 10 mg.
     d) May repeat IM dose every 60 - 90 min. as needed for sedation.
   - Children: (Not to be used in neonates)
     a) Initial IV dose: .05 - .10 mg/kg slow IV push, Max: 4 mg.
     b) May repeat with smaller intravenous doses of .025 - .05mg/kg every 20 - 30 minutes as needed for sedation. Maximum total dose is 10 mg.
c) Use IM only if IV access is unavailable, dose is 0.1 - 0.15 mg/Kg, given deep into a large muscle mass. Maximum dose is 5 mg.
d) May repeat with smaller IM dose of .05 - .10 mg/kg every 60 - 90 min. as needed for sedation. Maximum total dose is 10 mg.

B. Agitated Patients

1. Continuously monitor oxygen saturation, ETCO2, heart rate, blood pressure, and LOC.
2. Administer midazolam as per physician orders, if no orders, use guidelines below.
3. Guidelines for the administration of midazolam as follows:
   **Adult: (Ages 12 and over )**
   a) 2 - 4 mg, slow IV push
   b) May repeat with smaller intravenous dose of 1 - 2 mg every 20 - 30 minutes as needed for sedation. Maximum total dose is 6 mg.
c) Use IM only if IV access is unavailable, dose is 3 - 5 mg, given deep into a large muscle mass.
d) May repeat with smaller IM dose of 1 - 3 mg every 60 - 90 min. as needed for sedation. Maximum total dose is 6 mg

   **Children: ( Not to be used with neonates )**
a) Initial IV dose: .025 - .05 mg/kg slow IV push, Max: 3 mg.
b) May repeat with smaller intravenous doses of .025mg/kg every 20 - 30 minutes as needed for sedation. Maximum total dose is 6 mg.
c) Use IM only if IV access is unavailable, dose is 0.05 - 0.15 mg/Kg, given deep into a large muscle mass.
d) May repeat with smaller IM dose of .05mg/kg every 60 - 90 min. as needed for sedation. Maximum total dose is 10 mg.

**PRECAUTIONS**

1. Assess for sedative effects. Midazolam is 3 - 4 times more potent than diazepam.
2. The half-life of midazolam is less than 2 hours.
3. Onset of action is usually 2 - 5 minutes. Wait after each incremental dose to assess effect. A total dose greater than 6 mg is usually not necessary.
4. Serious cardiorespiratory adverse events have occurred. These include respiratory depression, apnea, respiratory and/or cardiac arrest. Resuscitative equipment should be immediately available.
5. Hypotension has been noted, particularly with concomitant narcotic administration.
6. Use 25 - 33 % less if narcotics are co-administered or administered prior to arrival by hospital staff.
7. Do not administer midazolam, or decrease the dose by 50% if the patient is hypovolemic.
8. Children under age of 6 years old may require relatively larger doses than older children.
9. Do not administer midazolam for agitation in pregnant patients.
Sodium Bicarbonate Infusions

Only authorized CCT-Ps will be permitted to monitor sodium bicarbonate infusions during scheduled interfacility transports. CCT-Ps may not initiate sodium bicarbonate infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. A non-invasive blood pressure monitoring device that will provide accurate blood pressure readings every five (5) to fifteen (15) minutes will be utilized.
3. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the sodium bicarbonate infusion during transport.
4. If medication administration is interrupted (infiltration, accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders.
5. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the sodium bicarbonate infusion and notify the transferring physician, or the base physician if the transferring physician is not available.
6. The following parameters shall apply to all patients with pre-existing sodium bicarbonate infusions:
   - The infusion concentration and regulation of the infusion rate will occur within the parameters as defined by the transferring physician.
   - In cases of overcompensation resulting in metabolic alkalosis presenting as: impaired tissue perfusion, hypokalemia, hypocalcemia, decrease in the patient’s fibrillation threshold or sodium and water overload, the medication infusion will be discontinued and the transferring physician and Base Hospital are to be notified.
   - Additional precautions for the use of sodium bicarbonate infusions are as follows:
     a) Inactivated catecholamines
     b) Precipitates calcium salts
     c) Extravasation into subcutaneous tissues may cause:
        o Scleroses small veins
        o Local chemical burn
     d) Intercranial hemorrhage in newborns (hyperosmolality)

Use only 4.2% bicarbonate for ages less than three (3) months
Thoracostomy Tube Monitoring

Only authorized CCT-Ps will be permitted to monitor thoracostomy tubes during scheduled interfacility transports. CCT-Ps may not perform placement of thoracostomy tubes.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.
2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for specifying the maintenance of the chest tube either to gravity or mechanical suction drainage. The amount of mechanical suction must be specified.
3. Mechanical suction rates must remain constant during the transport with no regulation of the rate being performed by the CCT-P.
4. The collection receptacle must be kept below the level of the chest to prevent drained fluid from re-entering the pleural space. Do not allow the collection receptacle to tip over.
5. If hemorrhage occurs through the chest tube, observe for signs and symptoms of shock and treat according to protocol.

COMPLICATIONS

1. If the thoracostomy tube is partially pulled out:
   - Do not push the tube back into the neck.
   - Secure the site.
2. If the thoracostomy tube is completely pulled out, place an occlusive dressing over the insertion site.
3. If air leaks are present, check all connections.
4. If the patient becomes dyspneic:
   1. Assess breath sounds
   2. Contact the base hospital (needle thoracostomy may need to be performed).

PRECAUTIONS

1. Avoid pulling on the thoracostomy tube to prevent accidental dislodging of the tube.
2. Do not permit dependent loops or kinks to form in the tubing, as this will interfere with the flow of drainage leading to increased pleural pressure or formation of clots.
3. Do not disconnect the drainage system or puncture the tubing. Tape all connections securely to prevent violation of sterility and loss of negative pressure.
Total Parenteral Nutrition (TPN) Infusions

Only authorized CCT-Ps will be permitted to monitor TPN infusions during scheduled interfacility transports. CCT-Ps may not initiate TPN infusions.

1. Patients shall be placed and maintained on cardiac and pulse oximetry monitors during transport.

2. Signed transfer orders from the transferring physician must be obtained prior to transport. Transfer orders must provide for maintaining the TPN infusion during transport.

3. If medication administration is interrupted (accidental disconnection, malfunctioning pump, etc), the CCT-P may restart the line as delineated in the transfer orders. If the medication has infiltrated, the CCT-P may not restart the infusion. TPN may only be delivered through a central line.

4. Infusions must be regulated by a mechanical pump familiar to the CCT-P. If a pump failure occurs and cannot be corrected, the paramedic is to discontinue the TPN infusion and notify the transferring physician, or the base physician if the transferring physician is not available.

5. The following parameters shall apply to all patients with pre-existing TPN infusions:

   • Infusion rates must remain constant during transport with no regulation of rates being performed by the CCT-P, except for the discontinuation of the infusion (e.g., as in a case of infiltration).

   • All patients who have insulin as a part of the TPN solution shall have documentation of the most recent blood sugar analysis.

   • TPN solution with Lipid emulsion must be infused through special filtered intravenous tubing compatible with the CCT-P infusion device.

   • TPN solution intravenous line shall not be used for any medication or fluid administration.

   • Vital signs are to be monitored as indicated in the transfer orders.
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