

# **Adult Treatment Protocols – General Procedures**

These protocols and procedures define the Adult (age 15 and over) treatment standards for the Merced County Emergency Medical Services System. This document is divided into two sections: General Procedures and Adult Treatment Protocols.

The General Procedures section contains individual treatment procedures which are referenced in the Adult Treatment Protocols. Included in this section are standard procedures for performing cervical spine immobilization, oxygen administration, pulse oximetry, vascular access, fluid administration, initiation of patient transport, cardiac monitoring and the prehospital determination of death.

The Adult Treatment Protocols outline the specific treatment protocols for adult patients. The Pediatric Treatment Protocols (separate document) are written for patients newborn through age 14 years. Each treatment protocol consists of a table divided into several sections. The top part entitled "Field Treatment - BLS" outlines the procedures for treating that particular illness or injury which are appropriate for either First Responders or ALS personnel to perform. The "Field Treatment – ALS" section is for ALS personnel only. Additionally, there may be a section titled "Considerations," which outlines those medications or procedures that should be evaluated for use by the paramedic.

The bottom "reversed text" section titled "Base Physician Orders" outlines the treatment procedures which require an order from a Base Physician. These orders are known as "Base Physician Orders" and physicians must give these orders directly to paramedics via radio or telephone communication. MICNs may not relay a "Base Physician Order."

The section titled "Base Hospital Orders" outline those medications or procedures that require Base Hospital contact, and may be given by an MICN. In the event that paramedics cannot make base hospital contact or if the clinical condition of the patient is such that a delay in treatment may jeopardize the patient, a paramedic may perform treatments listed in this section without a base hospital order as an "ALS without Base Hospital Contact" procedure. Paramedics must document on an ALS without Base Hospital Contact Report Form each instance where a procedure or medication requiring a Base Hospital Order was performed or administered without such a direct order. Base Hospital Physicians may order any medication or procedure within the paramedic scope of practice for any patient condition regardless of the treatment protocols. Each "Base Hospital Order" must be documented on a Base Hospital Radio Report Form and be available for review.

Additionally paramedics have the right to speak directly to the Base Hospital Physician, if available, for any call.

## **CERVICAL SPINE IMMOBILIZATION:**

While cervical immobilization is a key element in the patient care management of many injured persons, there exists clear indicators for its application. The Cervical Spine Clearance Algorithm card was developed pursuant to clinical standards that have been in use for many years by physicians, and validated through numerous clinical studies.

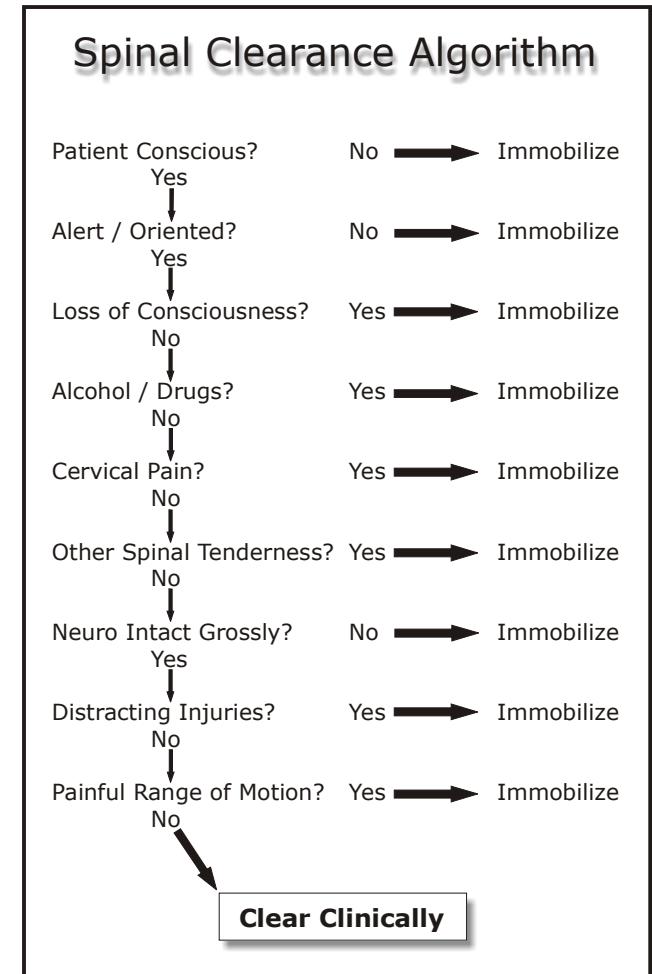
It is important to keep in mind that errors in the decision to not apply c-spine precautions can have disastrous results, and if any question remains about the necessity of c-spine precautions after applying the algorithm, you must error in favor of the patient's best interests and apply it.

Proper c-spine precaution includes all of the following:

- ❖ a rigid cervical collar
- ❖ lightweight head blocks
- ❖ adequate taping to restrict movement
- ❖ a long board which provides for the application of at least three straps
- ❖ minimum of three straps (traditional "X" trunk placement with a third strap across the lower thigh area just above the knees). Currently in this EMS system, "Spider" straps are utilized, which exceeds this minimum.

## **OXYGEN ADMINISTRATION:**

The administration of oxygen is one of the most important interventions available to EMS personnel, and its role in improving compromised patients should not be overlooked. This section is included to provide the basic



guidelines for oxygen use, rather than including specific guidelines for each and every protocol. In general, the following recommendations should apply broadly:

- ❖ When "High-Flow" is indicated in the protocol, this should be interpreted to mean 15 l/min by non-rebreather mask. In the case of some patients (e.g. anxious cardiac patients) this can be reduced to 4-6 L/min via cannula, if the patient will not tolerate a mask. Your use of oxygen should be driven by the patient's level of distress or medical condition, not the Pulse Oximeter.
- ❖ When "as indicated" is listed in the protocol, you should gauge your rate of administration by the patient's level of distress. DO NOT withhold high flow oxygen from a COPD patient in severe respiratory distress, simply be prepared to encourage their respirations and support them with appropriate adjuncts (e.g. BVM, intubation, etc.) as needed.

## **PULSE OXIMETRY:**

The pulse oximeter measures the differences in absorption of light waves by oxygen-saturated vs non-saturated hemoglobin to determine what percent of hemoglobin is carrying oxygen. It does not measure the actual amount of oxygen carried by the blood. Tissue oxygen delivery is proportional to the quantity of blood circulated per unit of time as well as the percent of oxygen saturation. When there is insufficient hemoglobin [i.e., anemia] or diminished circulation, blood may be 100% saturated, but still not carry enough total oxygen for tissue needs. **BASE YOUR USE OF OXYGEN ON THE PATIENT'S LEVEL OF DISTRESS.**

Indications: The monitoring of any patient at risk for hypoxemia from any cause including the administration of medications (such as morphine and diazepam), which can cause respiratory depression, and procedures (such as endotracheal intubation and airway suctioning) during which hypoxia may be worsened.

### **Interpretation:**

greater than 95% = Normal

91-94% = Mild Hypoxemia

86-90% = Moderate Hypoxemia (90% O<sub>2</sub> Sat. = PO<sub>2</sub> ~ 60 TORR)

less than 86% = Severe Hypoxemia (Accuracy below 80% is not reliable)

## **Potential Sources of Error:**

- ❖ Movement of the sensor or its cord ("check sensor" alerts or falsely triggered alarm settings)
- ❖ Exposure of sensor to outside source of bright light (optical interference)
- ❖ Use of BP cuff on same extremity (inability to sense)
- ❖ Low circulatory flow states such as cardiac arrest, hypothermia, shock (overestimation of tissue oxygenation: inability to sense)
- ❖ Black, blue or green nail polish (inability to sense)
- ❖ Finger-print dye (inability to sense)
- ❖ Carbon Monoxide toxicity (falsely elevated readings)
- ❖ Severe anemia (inability to sense; overestimation of oxygenation)
- ❖ Hemoglobin disorders such as sickle cell disease, methemoglobinemia, sulfhemoglobinemia

## **Documentation:**

Pulse oximeter printout strips, if available, should be attached to the PCR and any treatments or conditions that may effect oxygen saturation should be noted on the strip. As with ECG tracings, the PCR number and call date should be documented on the oximeter strip.

## **VASCULAR ACCESS:**

Intravenous access is a Standing Order for all adult patients and pediatric patients when an IV is indicated by protocol. Peripheral IV placement is the preferred choice in all patients.

External Jugular (IV) placement is indicated in patients when no other peripheral IV can be established and the patient requires fluid administration or access for IV medications. Generally external jugular IV lines are established in unconscious patients, but may be used in conscious patients with due regard for the patient's sensitivities.

Intraosseous Access (IO) is used in patients with a GCS less than 8 when a peripheral IV cannot be established and the patient requires fluid administration or access for IV medications. These patients should be in extremis and have an urgent need for vascular access such as cardiac arrest, hypovolemic shock, respiratory arrest, near drowning,

multi-system trauma or status epilepticus. The proximal tibia is the only insertion site allowed in Merced County. Contraindications for site selection includes fractures, infections, and significant orthopedic procedures (ie prosthetic limbs or joints). The paramedic should check skin adipose and muscle thickness when choosing the appropriate needle size. Aspiration of a small amount of blood should be used to confirm placement prior to flush. The paramedic should frequently monitor the insertion site for extravasations.

A base physician order is required for an IO in a patient with a GCS greater than 8. In these **rare** cases, 2% lidocaine may also be ordered by the base physician. Following the placement of an IO needle and prior to fluid administration, the paramedic should:

- Administer 1 mg/kg of 2% Lidocaine (**not to exceed 40mg total**) and infuse *slowly* (over 30 to 60 seconds). Allow 1 minute for anesthetic effect before infusing fluids.

**A base physician order is required for both the placement of the IO (with a GCS greater than 8) and the administration of lidocaine; all cases will be reviewed by the EMS Agency.**

Pre-existing Intravenous Access may be used if the patient has an indwelling IV catheter with an external port and a peripheral IV cannot be established. A pre-existing intravenous access should only be used in patients requiring fluid therapy or IV medications. Paramedics should consult with a Base Hospital MICN or Physician if they are unfamiliar with the type of indwelling catheter the patient has in place. Sterile technique must be followed when using a pre-existing vascular access.

## **FLUID ADMINISTRATION:**

The standard IV fluid for all patients is normal saline.

Adult Fluid Rates, unless otherwise indicated by treatment protocols:

- ❖ For adult patients requiring medications but not fluid therapy maintain IV rate at TKO.

- ❖ For adult patients in traumatic arrest or who require rapid volume replacement, two large bore (16 gauge or larger preferred) IV lines should be established and fluid boluses administered per protocol. Consult with a base hospital physician once the systolic blood pressure of greater than 90 is obtained or 2 liters of fluid is infused.
- ❖ If signs of pulmonary edema develop during IV fluid administration, slow IV rate to TKO and contact a base hospital physician for fluid orders.

## **ADVANCED AIRWAYS**

Oral intubations and/or placement of a King Airway are considered standing orders for adult patients that require advance airway management. Nasal intubations are not permitted in Merced County. Three attempts total, among all providers are allowed for intubation of the patient. A paramedic may decide to go directly to a King Airway at any time. An intubation attempt is defined as “when the laryngoscope has passed the teeth with the intent of intubating the patient.” If intubation attempts are unsuccessful the paramedic will place a King Airway or use good BLS airway techniques to maintain proper oxygenation and ventilation. Medications should not be given down the King Airway. King Airway placement is not to be used in patients under 4 feet in height.

All patients that have been intubated must have end-tidal CO<sub>2</sub> detectors placed to confirm tube placement. Documentation confirming tube placement shall include color change by the CO<sub>2</sub> detector or an attachment of capnography wave form strips with documentation of capnography values. Documentation should also include visualization of the cords, good lung sounds, absent epigastric sounds, and rise and fall of the chest, the size of the tube and the centimeters at which it is secured. The paramedic must re-confirm tube placement after movement and document that assessment on the PCR.

## **TRANSPORT:**

The majority of the treatment protocols do not specifically list “transport” in their treatment orders. Generally paramedics should take steps to minimize their on-scene times with all patients. In protocols where “transport” is not specifically listed paramedics need to initiate transport based on the patient’s clinical condition and scene logistics, such as proximity to a hospital and the availability/appropriateness of air transport.

Paramedics should take steps to transport all critically injured trauma patients and STEMI patients within ten (10) minutes (unless using air evacuation) and most other medical and trauma patients within twenty (20) minutes. When transporting critically injured or ill patients by ground, paramedics should notify the receiving facility of their estimated time of arrival (ETA) as soon as possible to allow the hospital time to activate internal teams and/or other specialized resources.

Paramedics should consider remaining on scene and treating adult cardiac patients with an asystolic rhythm. These patients can be transported after converting to a more stable rhythm or can be declared dead with a base physician order if they fail to respond to specific ALS treatments.

## **CARDIAC MONITORING:**

It is assumed that personnel will place any patient in which the monitoring of their cardiac rhythm is either integral to their management (e.g. cardiac patients, syncope) or beneficial for the paramedic in providing care (monitoring heart rates). While reference to placing a patient on the cardiac monitor remains on several protocols, we have deleted the constant reference to reassessing the cardiac rhythm after treatments, as it is assumed that the need for this is obvious (e.g. following defibrillation or medication administration, etc.).

A good quality 12 lead ECG should be quickly completed for all patients with suspected cardiac ischemic chest pain, preferably prior to nitrate administration. Every effort should be made to obtain an ECG free of artifact and wandering baselines. It may be necessary to provide skin preparation such as shaving or by having the patient hold their breath. If a STEMI is identified, early transport is imperative. When able the paramedic should begin treatments such as IV's and medications enroute.

## **TRANSCUTANEOUS PACING (TCP):**

### **Indications:**

TCP may be utilized for the following patients after 1 mg of Atropine have been administered:

- A. Hemodynamically unstable bradycardic adult patients unresponsive to drug therapy.
- B. Patients in Asystole following electrocution, with a down time of less than 10 minutes.

C. For patients on the order of a physician who is initiating an interfacility transfer. Under these circumstances, the paramedic should confirm the pacing settings from the transferring physician.

### **Contraindications:**

- A. Hemodynamically or symptomatically stable patients.
- B. Any patient in Asystole except as indicated above in section 1(B).

### **Procedure:**

- A. Consider administration of Morphine Sulfate for pain and/or Versed for sedation, as indicated in the Adult Treatment Protocols.
- B. Place pads on the patient's chest and back. Set initial TCP rate at 80 beats per minute (bpm).
- C. Begin output at the lowest milliamps (mA) for the monitor in use and increase by 10mA until capture/pulses are noted. Once capture is confirmed, continue pacing at a slightly higher output level (10%).
- D. If capture is maintained but the patient remains symptomatic of inadequate tissue perfusion (BP less than 90 systolic, altered level of consciousness), consider increasing rate by 10 bpm until symptoms resolve or 100 bpm is achieved.

### **Troubleshooting:**

- A. Make sure the pads are properly placed and have good contact with the skin.
- B. Check the batteries of the pacer.
- C. Use adequate energy to capture the rhythm.
- D. Use adequate analgesia and sedation to minimize patient discomfort.

## **NEEDLE THORACOSTOMY:**

### **Indications:**

Signs and symptoms of a tension pneumothorax include **all of the following**:

- A. Severe respiratory distress (as evidenced by apnea, severe dyspnea with tachypnea, oxygen saturation less than 90% for greater than 30 sec., or difficulty bagging).
- B. Lateralizing exam (decreased breath sounds on one side, or tracheal deviation away from the affected side, or asymmetric chest wall rise).
- C. Hemodynamic compromise (BP less than 90)

**Procedure:**

- A. Use a 10 or 12 gauge IV catheter at least 2 inches long
- B. Insert the catheter immediately above the third rib (second intercostal space), slightly lateral to the mid-clavicular line on the side of decreased breath sounds.
- C. When air returns, advance the catheter and remove the needle.
- D. Attach a one way valve to the catheter hub.
- E. Stabilize the catheter securely to the chest.
- F. Reassess the patient, including breath sounds and vital signs every time the patient is moved.

**TRANSTRACHEAL JET INSUFFLATION:**

**Indications:**

- A. Complete airway obstruction not relieved by manual procedures and airway visualization with laryngoscope.
- B. Inability to intubate and inability to successfully ventilate using BVM ventilation.

**Procedure:**

- A. Locate cricothyroid membrane.
- B. Insert 10 gauge IV catheter through the membrane at a 45° angle, directed toward the feet. Aspirate for air return with a syringe to check placement. Remove needle.
- C. Stabilize catheter securely to neck.
- D. Attach the three way stopcock to catheter.

- E. Supply 100% O<sub>2</sub> to the three way stopcock attach the oxygen tubing from the jet ventilator to the three way stopcock.
- F. Close stop cock and administer a one second breath. Open stock and allow patient to exhale for two seconds. And repeat.

**NOTE:** In children less than 12 years of age ventilate with Bag-Valve-Catheter with 100% oxygen, if unable to ventilate via anesthesia adapter.

- G. Check for proper placement in the following order:

1. Assess chest rise.
2. Check absence of gastric sounds.
3. Check adequacy of breath sounds.
4. Assess for complications, including subcutaneous air.
5. Reassess placement every time patient is moved. Sometimes proper placement is difficult to assess, do not just rely on the indicators listed above. Continual clinical reassessment for adequate oxygenation is essential.

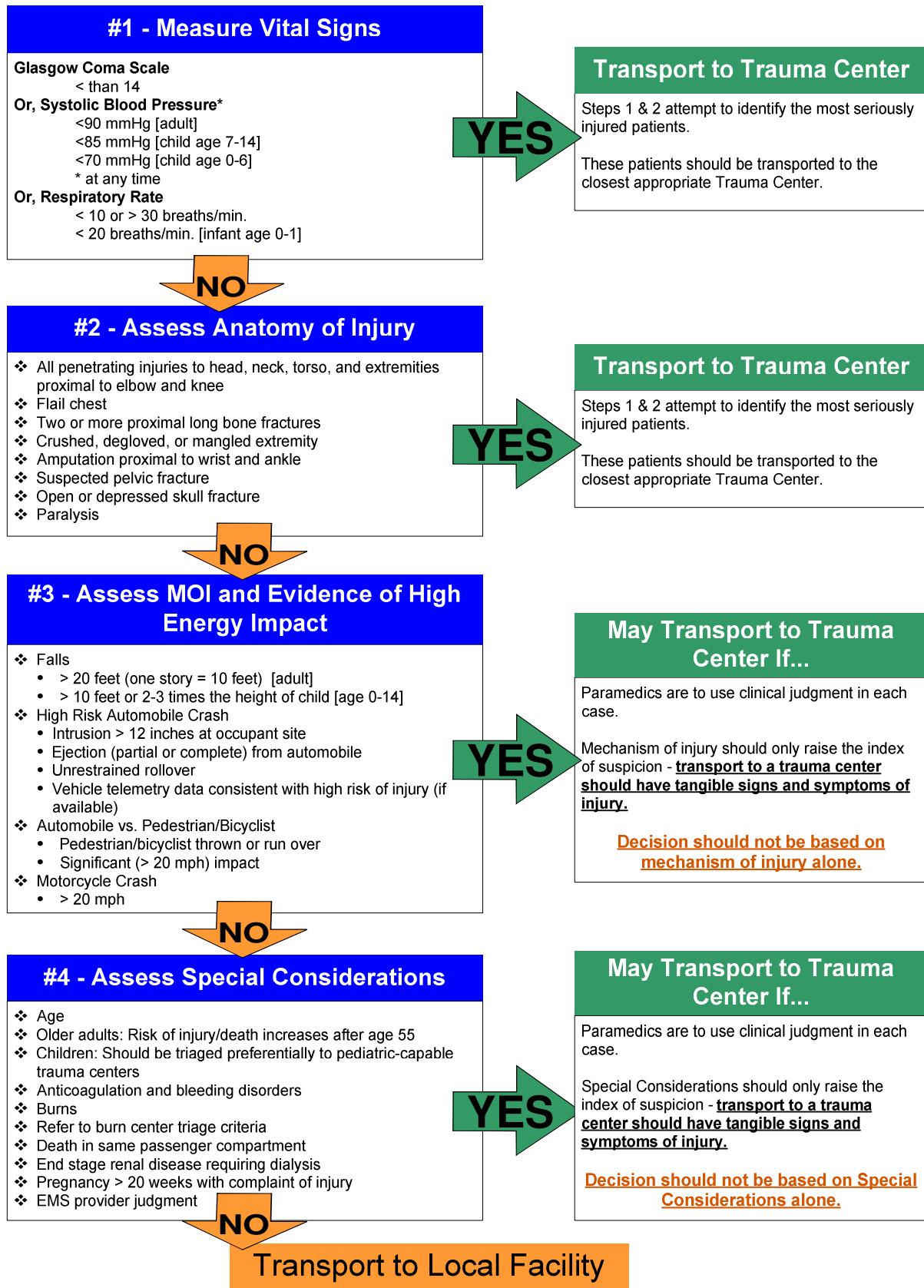
**NOTE: SURGICAL CRICOHYROTOMY IS NOT A LOCALLY APPROVED PARAMEDIC SKILL.**

### **DETERMINATION OF DEATH:**

Medical Arrest: See "Asystole" protocol on Page 3.

Traumatic Arrest: See "Traumatic Arrest" protocols, Page 22.

# **TRAUMA TRIAGE: ADULT**



**Perform Primary Survey**

Assess Vital Signs, Level of Consciousness & Anatomy of Injury



- ❖ GCS < 13 or a decrease of 2 or more from baseline;
- ❖ Age appropriate hypotension (see table, Appendix A)
- ❖ Respiratory rate outside of normal limits (see table, Appendix A)
- ❖ Penetrating injury to the head, neck or trunk
- ❖ Patient < 1 year of age with any visible fractures
- ❖ Open and depressed skull fractures
- ❖ Flail Chest
- ❖ Traumatic Paralysis
- ❖ Unstable pelvic fracture
- ❖ Two or more proximal long bone fractures
- ❖ Paramedic judgment:

Yes

No

Triage to TC

Transport to MHLB,  
MMCM or Emanuel in  
Turlock, whichever is  
closest

**TRAUMA TRIAGE: PEDIATRIC**

**APPENDIX A**

Pediatric Vital Sign Table

AGE	MINIMUM SYSTOLIC BP	NORMAL HR	NORMAL RR
Premature	40	120-170	40-60
Term	60	100-170	40-60
3 months	60	100-170	30-50
6 months	60	100-170	30-50
1 year	72	100-170	30-40
2 years	74	100-160	20-30
4 years	78	80-130	20
6 years	82	70-115	16
8 years	86	70-110	16
10 years	90	60-105	16
12 years	94	60-100	16

## **BURN TRIAGE:**

1. A patient (adult or pediatric) whose primary injuries are burns may be transported directly to a Burn Center from the field. These injuries include:
  - A. Partial/full thickness (2nd or 3rd degree) burns involving greater than 15% TBSA without airway compromise
  - B. Patients with partial/full thickness (2nd or 3rd degree) burns greater than 10% TBSA without airway compromise with the following:
    - 1) Greater than 60 years of age
    - 2) Associated trauma meeting Trauma Triage Criteria (and if transport can be completed within 60 minutes)
    - 3) Significant co-morbidities (e.g. COPD, major medical disorder, bleeding disorder or anticoagulant therapy, dialysis patients)
  - C. Partial/full thickness (2nd or 3rd degree) burns of face, perineum or circumferential burn to any body part
  - D. Significant electrical injuries with loss of consciousness, voltage in excess of 220, and/or open wounds
  - E. Electrical injuries resulting in a loss of distal pulses
  - F. Significant inhalation injury with successful intubation
  - G. Chemical burns with wounds greater than 5% TBSA
2. All burns with airway compromise, wheezing, stridor, carbonaceous sputum, nasal singeing or significant facial edema must have an evaluation for intubation either by air ambulance personnel or by the emergency physician at the closest appropriate receiving facility prior to transport to the Burn Center, if the ground ambulance is unable to intubate the patient.

## **CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP)**

### **Indications:**

- A. Severe shortness of breath with bronchospasm (including COPD and asthma).
- B. Severe shortness of breath with pulmonary edema (including congestive heart failure).
- C. Allergic reactions with severe bronchospasm.
- D. Conscious, breathing spontaneously, and able to follow commands.

### **Contraindications:**

- A. Pediatric patients (14 years old and under).
- B. Actively vomiting.
- C. Hypotensive (systolic blood pressure less 90).
- D. Suspected of having a pneumothorax.
- E. An inability to achieve a good facial seal with the CPAP mask.

### **Procedure:**

- A. Do not delay medication administration to apply CPAP.
- B. The patient must be continuously monitored for development of respiratory failure or vomiting. If either occurs, remove the CPAP circuit, clear the airway as necessary to prevent any aspiration, and provide respiratory assistance with either BVM or other advanced airway adjunct.
- C. CPAP will be delivered at a continuous pressure of 5 up to 10 cm H<sub>2</sub>O utilizing 100% oxygen.
  - 1) Start CPAP at 10 cm H<sub>2</sub>O and decrease if possible.
  - 2) Start oxygen at 100% and titrate for oxygen saturation greater than 95% if possible.
- D. CPAP may introduce transient hypotension via decreased venous return secondary to elevated intrathoracic pressure.
  - 1) If systolic blood pressure falls to less than 80 mmHG, remove CPAP.
  - 2) If systolic blood pressure falls between 80-100 mmHG, decrease CPAP to 5 cm H<sub>2</sub>O if possible.