U.S. ARMY AEROMEDICAL EVACUATION
SUPPLEMENTAL HANDBOOK FOR THE
STANDARD MEDICAL OPERATING GUIDELINES (SMOG)

CY24 Version
Published 1 FEB 2024
# CONTRIBUTORS

<table>
<thead>
<tr>
<th>Name</th>
<th>Rank, Degree, Certification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armando Yanez</td>
<td>SSG, NREMT-P</td>
</tr>
<tr>
<td>Bradley Mast</td>
<td>SFC, NREMT-P, FP-C</td>
</tr>
<tr>
<td>Brandon Paniagua</td>
<td>MAJ, MAOL, TSP</td>
</tr>
<tr>
<td>Brett Clark</td>
<td>SFC, NREMT-P</td>
</tr>
<tr>
<td>Carl R. Piper</td>
<td>SFC, NREMT-P</td>
</tr>
<tr>
<td>Caroline Sosebee</td>
<td>CPT, DVM</td>
</tr>
<tr>
<td>Christian Castillo</td>
<td>SSG, NREMT-P</td>
</tr>
<tr>
<td>Cord Cunningham</td>
<td>COL, MD, MHA, MPH, FACEP, FAEMS, SFS, DMO, USAR</td>
</tr>
<tr>
<td>Damian Schwab</td>
<td>NREMT-P</td>
</tr>
<tr>
<td>Danielle P. Black</td>
<td>SFC, NREMT-P, FP-C</td>
</tr>
<tr>
<td>Derek Sorensen</td>
<td>LTC, MD, CCATT, (USAF)</td>
</tr>
<tr>
<td>Eric Emmons</td>
<td>SSG, NREMT-P, FP-C</td>
</tr>
<tr>
<td>Eric Pelkey</td>
<td>MSG, NREMT-P, MS ENV SCI</td>
</tr>
<tr>
<td>Erik S. Johnson</td>
<td>LTC, DO, MPH, FAWM, SFS</td>
</tr>
<tr>
<td>Gregory C. Heitmeier</td>
<td>SFC, NREMT-P, FP-C</td>
</tr>
<tr>
<td>J. Joe Pena</td>
<td>LTC, Critical Care APA-C, MSIR, MPH*</td>
</tr>
<tr>
<td>Jeffrey M. Golomboski</td>
<td>SSG, NREMT-P, FP-C</td>
</tr>
<tr>
<td>Jessie R. Turner</td>
<td>1SG, NREMT-P, FP-C*</td>
</tr>
<tr>
<td>John J. Venezia</td>
<td>LTC, DO, MPH, MA, FAsMA, MFS**</td>
</tr>
<tr>
<td>John M. Solak</td>
<td>CPT, MD, MPH, FS</td>
</tr>
<tr>
<td>Joshua Hagen</td>
<td>CPT, BSN, ECCN</td>
</tr>
<tr>
<td>Lauren Blake</td>
<td>MAJ, BSN, CCRN, ECCN, ISR Burn Flight Team</td>
</tr>
<tr>
<td>Michael Bishop</td>
<td>MECCD</td>
</tr>
<tr>
<td>Morgan Bobinski</td>
<td>MAJ, BSN, CCRN, ECCN, ISR Burn Flight Team</td>
</tr>
<tr>
<td>Patrick Lawson</td>
<td>SFC, NREMT-P</td>
</tr>
<tr>
<td>Rodney Dippel</td>
<td>NREMT-P, FP-C</td>
</tr>
<tr>
<td>Ruben Cruz</td>
<td>LTC, BSN, CCRN, ECCN</td>
</tr>
<tr>
<td>Thomas Appelhanz</td>
<td>SFC, NREMT-P, FP-C</td>
</tr>
<tr>
<td>Valeria Melton</td>
<td>SSG</td>
</tr>
<tr>
<td>Vik Bebarta</td>
<td>COL, MD, (USAF Reserve)</td>
</tr>
</tbody>
</table>

Senior Editor **
Chief Editor *
INTRODUCTION

The CY 2024 SMOG release marks the beginning of current format (STANDARD MEDICAL OPERATING GUIDELINES & SUPPLEMENTAL HANDBOOK). The Aeromedical Evacuation community provided developmental feedback leading to a redesign of current written medical guidance and/or policy. All changes are a result of collaboration between Emergency Medicine professionals, experienced Flight Paramedics, Aeromedical Physician Assistants, Critical Care Nurses, and Flight Surgeons across the Department of Defense (DoD). There is close coordination in the development of these guidelines with the Joint Trauma System, and the Defense Committees on Trauma. Our shared goal is to ensure the highest quality enroute care possible and to standardize care across all evacuation/emergency medical pre-hospital units. It is our vision that all these enhancements will advance enroute care across the services and the Department of Defense.

Unit Medical Trainers, Medical Standardization Instructors, Medical Flight Instructors and Medical Directors will evaluate Critical Care Flight Paramedics (CCFP), Enroute Critical Care Nurses (ECCN) Aeromedical Physician Assistants (APA), and Flight Surgeons ability to follow and execute the medical instructions herein. These medical guidelines are intended for CCFPs and prehospital professionals who manage emergencies and treat patients in both garrison, humanitarian, and combat theater environments IAW the Aircrew Training Manual Task 2120. Unit medical providers are expected to adjust these guidelines to fit their unit’s mission and medical air crews training/experience. Medical directors or designated supervising physicians will endorse these guidelines upon appropriate adjustment. They will also manage individual unit medical missions within their Critical Care Flight Paramedics, Enroute Critical Care Nurses, and advanced practice aeromedical providers’ scope of practice. CCFPs should administer medications as listed in these guidelines unless their medical director and/or supervising physician orders deviation. Other medications may be added, so long as the unit supervising physician and/or medical director approves them.

This manual also serves as a reference for physicians providing medical direction and clinical oversight to medical personnel. Treatment direction, which is more appropriate to the patient’s condition than the guideline, should be provided by the physician so long as the medical personnel’s scope of practice is not exceeded.

Any medical guideline that is out of date or has been found to cause further harm will be updated or removed immediately. The Department of Aviation Medicine (DAM) serves as the managing editor of the SMOG and is responsible for content updates, managing the formal review process, and identifying SMOG Charter members for annual review.

The Standard Medical Operating Guidelines and Supplemental Handbook provide medical procedural guidance and is in compliment to other Department of Defense and Department of the Army policies, regulations, and doctrinal guidance. Nothing herein overrides or supersedes laws, rules, regulation, or policies of the United States, DoD, or DA.
# Table of Contents

<table>
<thead>
<tr>
<th>TOPIC</th>
<th>PAGE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEMORRHAGE CONTROL PROCEDURES</td>
<td>6</td>
</tr>
<tr>
<td>TOURNIQUET APPLICATION</td>
<td>8</td>
</tr>
<tr>
<td>JUNCTIONAL TOURNIQUET APPLICATION</td>
<td>9</td>
</tr>
<tr>
<td>TOURNIQUET CONVERSION</td>
<td>10</td>
</tr>
<tr>
<td>AIRWAY PEARLS</td>
<td>11</td>
</tr>
<tr>
<td>IMPACT 731 PREFLIGHT AND TROUBLESHOOTING</td>
<td>12</td>
</tr>
<tr>
<td>ZOLL 754 PREFLIGHT AND TROUBLESHOOTING</td>
<td>14</td>
</tr>
<tr>
<td>HAMILTON T1 PREFLIGHT AND TROUBLESHOOTING</td>
<td>30</td>
</tr>
<tr>
<td>NASO-OROGASTRIC TUBE</td>
<td>33</td>
</tr>
<tr>
<td>NASOPHARYNGEAL AIRWAY</td>
<td>34</td>
</tr>
<tr>
<td>PRE-INTUBATION CHECKLIST</td>
<td>35</td>
</tr>
<tr>
<td>BLIND INSERTION AIRWAY DEVICE</td>
<td>36</td>
</tr>
<tr>
<td>CRICOTHYROIDOTOMY</td>
<td>37</td>
</tr>
<tr>
<td>NEEDLE CRICOTHYROIDOTOMY</td>
<td>38</td>
</tr>
<tr>
<td>NEEDLE THORACOSTOMY</td>
<td>39</td>
</tr>
<tr>
<td>SIMPLE &amp; TUBE THORACOSTOMY</td>
<td>40</td>
</tr>
<tr>
<td>VASCULAR ACCESS (INTRA VENOUS)</td>
<td>41</td>
</tr>
<tr>
<td>VASCULAR ACCESS (INTRA OSEOUS)</td>
<td>42</td>
</tr>
<tr>
<td>VASCULAR ACCESS EJ</td>
<td>43</td>
</tr>
<tr>
<td>VASCULAR ACCESS VIA CENTRAL CATH</td>
<td>44</td>
</tr>
<tr>
<td>INVASIVE PRESSURE MONITORING</td>
<td>47</td>
</tr>
<tr>
<td>REBOA MANAGEMENT</td>
<td>48</td>
</tr>
<tr>
<td>BLOOD GLUCOSE ANALYSIS</td>
<td>49</td>
</tr>
<tr>
<td>CARDIAC DEFIBRILLATION</td>
<td>50</td>
</tr>
<tr>
<td>12-LEAD EKG</td>
<td>51</td>
</tr>
<tr>
<td>SYNCHRONIZED CARDIOVERSION</td>
<td>52</td>
</tr>
<tr>
<td>EXTERNAL CARDIAC PACING</td>
<td>53</td>
</tr>
<tr>
<td>FUNNEL WEB SPIDER ENVENOMATION</td>
<td>54</td>
</tr>
<tr>
<td>SCORPION ENVENOMATION</td>
<td>55</td>
</tr>
<tr>
<td>SNAKEBITE CLINICAL SYNDROMES</td>
<td>56</td>
</tr>
<tr>
<td>SNAKEBITE SUDDEN COLLAPSE</td>
<td>57</td>
</tr>
<tr>
<td>GLOBAL SPIDER AND SCORPION ENVENOMATION</td>
<td>58</td>
</tr>
<tr>
<td>WIDOW SPIDER ENVENOMATION</td>
<td>60</td>
</tr>
<tr>
<td>CBRN CASUALTY MANAGEMENT</td>
<td>61</td>
</tr>
<tr>
<td>CBRN NERVE AGENT</td>
<td>65</td>
</tr>
<tr>
<td>CBRN BLOOD AGENT</td>
<td>66</td>
</tr>
</tbody>
</table>
Standard Medical Operating Guidelines are found at the following website:


Also available, along with all fillable evacuation forms and AARs on the Joint Trauma System website:
https://jts.health.mil/index.cfm/PI_CPGs/cpgs

https://jts.health.mil/assets/docs/forms/DA4700_OP5_JTS_TACEVAC-AAR&PCR.pdf

All comments and/or recommendations should be sent to:
medcoesaamoperations@army.mil

with the subject line “CCFP-SMOG”
HEMORRHAGE
CONTROL PROCEDURES

CLINICAL INDICATIONS:
- Hemorrhage

CONTRAINICATIONS:
- None

PROCEDURE:
- Rapid bleeding and/or arterial source recognized (extremities, axial, inguinal) – immediate application of extremity and/or junctional tourniquets, as appropriately needed, to stop bleeding.
- For compressible (external) hemorrhage not amenable to limb tourniquet use Combat Gauze, the CoTCCC hemostatic dressing of choice.
  - Alternative hemostatic adjuncts:
    - Celox Gauze, ChitoGauze, XStat (best for dep, narrow-tract junctional wounds) or iTCLamp (may be used alone or in conjunction with hemostatic dressing or XStat).
  - Hemostatic dressings should be applied with at least 3 minutes of direct pressure (optional for XStat). Must apply adequate force to compress vessels. If size of wound and bleeding are concerning for adequate control, place hemostatic dressing as close to the bleeding vessel as possible followed by 5 min of direct pressure. Each dressing works differently, so if one fails to control bleeding, it may be removed and a fresh dressing of the same type or a different type applied. (Note: XStat is not to be removed in the field, but additional XStat, other hemostatic adjuncts, or trauma dressings may be applied over it.) If bleeding continues, apply a pressure dressing to the wound if applicable.
  - If unable to control bleeding in extremity wounds with above, apply tourniquet. Note: immediate transition to a tourniquet in an extremity wound hemorrhage is preferred.
  - In penetrating injuries to the abdomen, after removing blood, hemostatic dressings should be pushed into the wound and pressure held for five minutes to encourage clotting. Do not remove bandage after placement. Penetrating abdominal/thoracic injuries require a large amount of pressure to compress vessels.
In pelvic wounds – utilize pelvic binding to limit capacity for hemorrhage (tie pelvis with sheet/commercial binder).

For external hemorrhage of the head and neck where the wound edges can be easily re-approximated, the iTClamp may be used as a primary option for hemorrhage control. Wounds should be packed with a hemostatic dressing or XStat, if appropriate, prior to iTClamp application. DO NOT APPLY on or near the eye or eyelid (within 1cm of the orbit).

- The iTClamp does not require additional direct pressure, either when used alone or in combination with other hemostatic adjuncts.
- If the iTClamp is applied to the neck, perform frequent airway monitoring and evaluate for an expanding hematoma that may compromise the airway. Consider placing a definitive airway if there is evidence of an expanding hematoma.

Administer IVFs as per guideline – use care with internal bleeding so as not to raise SBP above 80mmHg. MAP should be greater than >60mmHg.

Consider 2 Grams TXA if significant blood loss.

Document procedure, results, and vital signs.

***Clear endpoints for fluid resuscitation remain unclear. Resuscitation should be geared towards patient response to therapy. A MAP greater than 60mmHg or a systolic BP between 70-80mmHg is a reasonable goal in trauma patients without a head injury. A MAP between 80-110mmHg or systolic pressure between 110-160mmHg is a recommended goal in patients with a head injury.

MAP= Mean Arterial Pressure: MAP = [(2 x diastolic BP) + systolic BP] / 3

### Hemorrhage Classification (ATLS)

<table>
<thead>
<tr>
<th>Estimated Blood Loss (mL)</th>
<th>Class I</th>
<th>Class II</th>
<th>Class III</th>
<th>Class IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;750 15%</td>
<td>750-1500 15-30%</td>
<td>1500-2000 30-40%</td>
<td>&gt;2000 &gt;40%</td>
<td></td>
</tr>
<tr>
<td>Heart Rate (min)</td>
<td>Normal to slightly elevated</td>
<td>Mild Tachycardia &gt;100-119</td>
<td>Tachycardia 120-140</td>
<td>Tachycardia &gt;140</td>
</tr>
<tr>
<td>Respiratory Rate (min)</td>
<td>Normal 12-20</td>
<td>Mild Tachypnea 20-24</td>
<td>Tachypnea 24-40</td>
<td>Tachypnea 24 - &gt;40</td>
</tr>
<tr>
<td>Blood Pressure (from baseline)</td>
<td>Normal or slightly elevated</td>
<td>SBP with mild decline</td>
<td>SBP decreased*</td>
<td>SBP decreased (&lt;90mmHg)</td>
</tr>
<tr>
<td>Urine Output (mL/hr)</td>
<td>Normal &gt; 30</td>
<td>Slight decrease 20-30</td>
<td>Decreased 5-15</td>
<td>Negligible &lt;5</td>
</tr>
<tr>
<td>Capillary Refill</td>
<td>1-2 seconds</td>
<td>2 seconds</td>
<td>&gt;2 seconds</td>
<td>&gt; 3 seconds</td>
</tr>
<tr>
<td>Mental Status and Skin (color/texture)</td>
<td>Normal or slightly anxious</td>
<td>Mildly anxious, skin may become cool, clammy</td>
<td>Anxious, confused, skin cool, clammy</td>
<td>Confused, lethargic, skin will be cool/cold, pale</td>
</tr>
</tbody>
</table>
TOURNIQUET APPLICATION

CLINICAL INDICATIONS:

- Extremity trauma with continued hemorrhage or amputation.

CONTRAINDICATIONS:

- None

PROCEDURE: All medical personnel should be regularly practiced in deploying and applying all CoTCCC approved tourniquets. Tourniquets should be pre-set and removed from wrapping (ready for immediate use and application).

Initial HASTY placement (over uniform, clearly proximal to bleeding. If site of life-threatening bleeding is not readily apparent, place the tourniquet “high and tight” as proximal as possible on the injured limb.) HASTY tourniquet placement is appropriate for initial treatment of massive hemorrhage or hemorrhage while in care under fire phases. Reassess all HASTY placement tourniquets and assess if hemorrhage is manageable by other methods while in tactical field care or transition to tactical evacuation care. If tourniquet is necessary to manage hemorrhage, replace all HASTY placement tourniquets with DELIBERATE placement tourniquets, preferably prior to patient evacuation, per the following steps:

- Remove clothing as necessary to visualize bleeding area.
- Place tourniquet (commercial or any 2” wide piece of fabric, leather, etc.) directly on skin proximal to wound. Tourniquet should be placed at least 2-3” above bleeding site, proximal or distal to joints, as appropriate.
- Tighten tourniquet by twisting included rod (commercial) or piece of 6” rigid material (e.g., stick) until bleeding stops. If converting from HASTY to DELIBERATE tourniquet placement, loosen HASTY tourniquet. If bleeding is not well controlled with the first tourniquet, apply a second tourniquet side-by-side with the first.
- Secure ends of tension bar to prevent unwinding.
- Document presence of tourniquet and time of placement. (“T” signifies tourniquet). Do not cover tourniquet. Recheck tourniquet intermittently (q 15min) and after any movements to ensure no new bleeding/loosening has occurred.
- TCCC recommendations:
  - Limb tourniquets … should be converted to hemostatic or pressure dressings as soon as possible if three criteria are met: the casualty is not in shock; it is possible to monitor the wound closely for bleeding; and the tourniquet is not being used to control bleeding from an amputated extremity. Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means.
  - Convert all necessary HASTY tourniquets to DELIBERATE tourniquets as soon as tactically feasible.
  - Do not remove a tourniquet that has been in place more than 6 hours unless close monitoring and lab capability is available.

Document procedure, results, and vital signs.
JUNCTIONAL TOURNIQUET APPLICATION

CLINICAL INDICATIONS:
• High level amputation not amendable to a standard tourniquet, non-compressible hemorrhage in a transition zone (inguinal and axilla), and pelvic immobilization.

CONTRAINDICATIONS:
• None

PROCEDURE: All medical personnel should be proficient in deploying and applying all available tourniquets. Junctional tourniquets (JT) should be pre-set and removed from wrapping (ready for immediate use and application). Junctional tourniquets should be applied according to manufacturer’s instructions.
• Remove clothing as necessary to visualize area of application if possible. Remove objects from patient’s pockets or pelvic area. Slide device into place as necessary to proper position.
• Tighten tourniquet by twisting or pumping up balloon/bladder until bleeding stops. (depends on JT used)
• Secure all straps in order to ensure security of device.
• Recheck tourniquet intermittently (q 15min) and after any movements to ensure no new bleeding/loosening has occurred.
• Junctional tourniquets are recommended to be in place for up to four hours.
• ***If using a JT with pump device, additional inflation may be necessary with changes in altitude.
• The uniqueness of junctional tourniquets do not lend themselves to conversion well and should be left to Roles with surgical capability. Use caution if attempting Junctional Tourniquet Conversion. Must have high index of suspicion that injury is compressible and can be managed by other adjuncts.

Document procedure, results, and vital signs.
TOURNIQUET CONVERSION

CLINICAL INDICATIONS:
• Wounds that have high possibility of compressible hemorrhage control with hemostatic or pressure dressings where hemorrhage was originally controlled by a tourniquet

CONTRAINDICATIONS:
• Patient showing signs and symptoms of hypotensive/hemorrhagic shock
• Tourniquets controlling hemorrhage for amputated or partial-amputated extremity.
• Tourniquets that have been in place >6 hours.
• Unable to monitor wound for bleeding post tourniquet conversion due to task saturation, limited visibility or poor positioning.

PROCEDURE: Limb tourniquets and junctional tourniquets should be converted to hemostatic or pressure dressings as soon as possible if no above contraindications are present.

Every effort should be made to convert tourniquets in less than 2 hours if bleeding can be controlled with other means. Do not remove a tourniquet that has been in place more than 6 hours.
• Confirm patient is not showing any signs of hypotensive/hemorrhagic shock.
• With Tourniquet in place, attempt to pack wound with hemostatic dressing and apply a pressure dressing.
  o Combat Gauze is the CoTCCC hemostatic dressing of choice
  o Alternate hemostatic adjuncts:
    ▪ Celox Gauze
    ▪ ChitoGauze
    ▪ XStat (best for deep, narrow-tract junctional wounds)
    ▪ iTClamp (may be used alone or in conjunction with hemostatic dressing or XStat)
• Loosen but don’t remove the tourniquet by unwinding the windlass until pulses return and closely monitor for return of bleeding for 5 minutes.
• If bleeding returns, retighten tourniquet until loss of distal pulse and document procedure failure.
• If no bleeding returns, loosen tourniquet completely but leave loosely looped around limb and monitor for return for bleeding for 5 minutes.
• If bleeding returns, retighten tourniquet until loss of distal pulse and document procedure failure.
• If no bleeding returns, document procedure success and time. Continue to monitor and assess for bleeding.

Document procedure, results, and vital signs.
AIRWAY Pearls

**Signs and Symptoms of Respiratory Distress and/or Failure**
- **SPO2 decreasing <90%** (Room Air) with/without supporting Signs/Symptoms of:
  - Tachypnea, Tachycardia, Fever, Cough, Wheezing, Rhonchi, Rales, Shock
- **Difficulty Breathing or Excess Work** as demonstrated by:
  - Purpling of Lips, Accessory Muscle Involvement, Cyanosis, Decreased Ability to Speak, Diaphoresis, Tripod Breathing
- **Airway Obstruction** Due to Trauma, Edema, Excess Secretions, Foreign Body, or Tongue
- Apnea
- Cyanosis, Central and/or Peripheral: Blue/Pale Tinting and Mottling of Skin
- **Decreased LOC (GCS <8), Altered Responsiveness, Weak Cry**

**Pearls:**
- PCO2 is affected by respiratory rate and tidal volume (ventilation), while PO2 is affected by PEEP and FiO2 (oxygenation)
- Capnography is mandatory for all intubations. Record results. Capnometer (standalone END TIDAL CO2 detector) is an alternate if monitor capnography not available. For capnography, normal range is 35-45 mm Hg; adjust vent as needed.
- All intubated patients should receive nasogastric/orogastric tube (time permitting) and continuous pulse oximetry.
- Maternal Medication: Adverse effects can include respiratory insult to newborn.
- Pediatric is defined as anyone <12yo.
- If RSI is impractical or provider is not credentialed to perform, but patient requires an advanced airway with/without ventilatory support, consider:
  1. Pharmacologically-Assisted Sedation using KETAMINE followed by supraglottic airway device placement (do not attempt BIAD placement without sedation in semi-conscious patients)
  2. Surgical cricothyroidotomy using approved device. (modified 6.0 ET not ideal)
  3. Medical personnel should not actively seek to determine if gag reflex is present by touching the palate, posterior larynx, or posterior pharynx.

**RSI MEDICATIONS: IV/IO Doses**

**Pretreatment:**
- Fentanyl 3mcg/kg IV
- Atropine 0.02mg/kg IV Min: 0.1mg (Infants <1yo)

**Induction Agents:**
- Etomidate 0.3mg/kg 24mg
- *Ketamine 1-2mg/kg  80-160mg
- Midazolam 0.1mg/kg 8mg
- Propofol 1-2.5 mg/kg 80-200mg

**Paralytics:**
- Vecuronium 0.08-0.15 mg/kg
- *Rocuronium 0.6-1.2 mg/kg, q25-40min
- Succinylcholine 1.0-1.5mg/kg

**Continued Sedation:**
- Fentanyl 0.5-2mcg/kg, q20-60min
- Ketamine 0.5-2mg/kg, q10-20min
- Ketamine 0.5-2mg/kg bolus then 0.5-1mg/kg/hr
- Midazolam 0.05mg/kg-NO Paint, q15-30m
- Midazolam 0.05 mg/kg bolus IV x 1 pm, then titrate 0.05-0.1mg/kg/hr IV gtt
- Propofol 10-75 mcg/kg/minute

**VOCAL CORD VISUALIZATION MANEUVERS:**
- Ensure correct alignment - External auditory meatus is aligned with sternal notch and head is in neutral to sniffing position.
- BURP = **B**ackward; **U**pward; **R**ightward; **P**ressure on thyroid cartilage.

**RSI (Abbreviated: see RSI PROCEDURE as needed)**
1. Preoxygenate (100% FiO2 via mask or PPV as needed)
2. Pretreat (Premedicate) as able or mission allows (Atropine blocks reflex bradycardia in pediatric (<2yo only) population)
3. Induce (Primary Sedation / Anesthesia)
4. Paralyze (Neuromuscular blocking agent)
5. Wait for Fasciculation, Jaw Relaxation, Absence of Movement
6. Pass ET Tube or insert BIAD (throughout attempt, ensure good O₂ saturation. If below 94% stop and provide PPV)
7. Confirm Placement and Secure Tube
8. Continue Sedation and Paralytic as needed per dosing time.

Note: Midazolam and Propofol should only be used for continued sedation when pain management is NOT a concern (i.e., Non Trauma Patient or Patient is already on adequate narcotic pain control).

**Rescue Breathing Ventilation Rate Without Advanced Airway:**
- **NEWBORN** = 40-60/min when performed without compressions
- **Infant / Child** = 1 breath / 3-5 seconds
- **Adult** = 1 breath / 5-6 seconds

**VENTILATOR SETTINGS:**
- Mode: AC, SIMV, or ASV
- Rate: 14 initially, then adjust PRN
- Tidal Volume: 6mL/kg initially, then adjust 4-8 mL/kg
- **I:E = 1:2**
- **PEEP:** 5
- **FiO2**: 100% initially. Try to decrease FiO2 as much as possible while keeping O₂ saturation > 93%.
- **Goal FiO2 = 50-60% to conserve battery life and O₂, while maintaining patient SpO₂ >93%.**
ZOLL 731 Ventilator Pre-mission Checks and Troubleshooting

Routine Care

- Keep the ventilator and its accessories clean at all times.
- Clean the unit’s housing and hose connections with a damp, soap cloth
- For general decontamination, apply a 10% bleach solution with a damp cloth.
- After cleaning, thoroughly dry the unit with a lint free cloth. Make sure all exposed surfaces are cleaned and dried.

Duty Inspection

- Ensure the ventilator is clean and free of visible damage
- Inspect all accessories and connectors for signs of damage or excessive wear. Replace worn or defective items.
- Examine high pressure hose for cracking, discoloration, or disfigurement. Examine end connection fittings for damaged threads and sharp edges. Replace worn or defective hoses. *DO NOT attempt to repair hoses
- Examine the ventilator circuit for damage or wear including cracking or discoloration. If there are signs of physical degradation or the unit is indication ventilator circuit problems, replace the circuit
- Examine the filters and replace them if dirty or clogged
- Inspect the external AC/DC adapter, line cords, and DC power cables for wear or damage. Replace if worn or damaged.

*Recommended to use a disposable external filter when operating in areas where fine dust or dirt is airborne due to wind.

* The Zoll Ventilator can operate over the range of -25 to 49 degrees Celsius in emergency situations. When operating at high temperatures, you should remove the unit from its padded case, which allows the unit to pass heat into the surrounding environment.

Operational Test

Before attaching the patient to the ventilator, you must perform an Operational Test to ensure that the breathing circuit is properly attached and that the primary patient safety alarms, such as PATIENT DISCONNECT and AIRWAY PRESSURE HIH, are functioning properly.

1. Press the MANUAL BREATH button; gas should flow out of the patient connection each time the button is pressed.
2. Close the patient port with a gloved hand. During inspiratory phase, the HIGH AIRWAY PRESSURE LIMIT alarm should activate after 2 breaths.

   a. If the AIRWAY PRESSURE HIGH alarm fails to activate, ensure all the tubing connections are secure, the exhalation valve is closing during inhalation, and that the High Airway Pressure Limit is set to 35 cm H2O or less.

3. After a breath or two, release the patient port while allowing the ventilator to operate. The PATIENT DISCONNECT alarm should activate.

4. Partially close the patient port to reset the PATIENT DISCONNECT alarm.

5. With no other alarms occurring, remove external power from the ventilator. The EXTERNAL POWER LOW/DISCONNECT alarms should activate. Reconnect external power to reset alarms. **MAY SKIP THIS STEP IF NOT CONNECTED TO EXTERNAL POWER**

6. If operating using internal battery, verify the Battery Icon indicates sufficient available battery capacity remains to support the anticipated duration of operation.

   If either the HIGH AIRWAY PRESSURE, PATIENT DISCONNECT, or EXTERNAL POWER LOW/DISCONNECT alarms fail to activate, continue to manually ventilate the patient, replace the ventilator, and send the unit in for service.
IMPACT 754 Ventilator Pre-mission checks and Troubleshooting

Routine Care

Clean unit and hose attachments with damp soapy cloth and wipe dry. Inlet filter may be removed to check for dirt or debris. Check metal hose couplings for thread wear and debris.

Duty Inspection

1. Power Off Checks
   a. Within calibration date (6 month maintenance cycle)

   ![Calibration Label]

   b. Air inlet clear and filter in place (Right side of vent)

   ![Air Inlet and Filter]

   c. Gas (“OXYGEN IN” and “AIR IN”) and Patient (“EXHALATION VALVE” and “TRANSDUCER”) connections clear and tight (Top of vent)

   ![Gas Connections]
d. GAS OUT clear leaf valve installed and seated (Reseat if loose, Replace if missing) 
See replacement instructions at the end of this document.

e. Inspect green high pressure oxygen hose for cracks, dry rot, threads, Black O-ring (Replace if damaged).

f. Connect ventilator to high pressure oxygen source, turn on Oxygen tank and ensure no leaks present. Turn off O2 when complete. (Conduct in environment conducive to hearing leaks)
2. Power On Checks

a. Turn “MODE” knob (1) to desired setting (A/C, SIMV, CPAP)

   i. The ventilator will run a SELF-TEST upon set up. **CAUTION:** SELF-CHECK must be performed with the disposable ventilator circuit disconnected. Ignoring this requirement could cause the SELF-CHECK process to sense a residual airway pressure leading to a SELF-CHECK failure.

   1. At this point, CAL is not required. If SELF-TEST results in a Calibration Failure, place (1) to CAL until CAL OK is displayed. If calibration fails, ventilator is deadlined.

b. Check BATT OK
c. Preset ventilator knobs to:
   i. Rate (2) 18
   ii. Inspiration Time (3) 1:2
   iii. Vt (4) 500
   iv. FiO2 (5) 100%
   v. HIGH pressure alarm to 35 cmH2O vi. LOW pressure to 15 cmH2O

d. Turn OFF
e. Store Ventilator with Air Inlet and Gas Out Ports protected and covered.

Ventilator is now pre-set for duty and able to be rapidly employed as needed with minor adjustments to Vt based on patient ideal body weight and turning on O2 source.
Weekly Inspections

*ALL CAUTIONS, WARNINGS, AND NOTIFICATIONS THAT CORRESPOND WITH THE 754 SCREEN WILL BE IN ALL CAPS AND HIGHLIGHTED YELLOW*

1. Complete Duty Inspection
2. Set FiO2 to 21%
3. Attach vent circuit to vent and field expedient training lung:
   a. Slide one large exam glove inside another.
   b. Wrap open end of the gloves around the patient end of the circuit tube.
   c. Secure with rubber band (DD1380) / Cut-off wrist bead of another glove / Penrose drain / Tape
4. Connect high pressure oxygen source and turn on O2
5. Turn vent on and allow respirations to begin (listen for compressor)
6. Set FiO2 to 100%
   a. Internal compressor will stop (audible)
7. Turn off oxygen source
   a. Ventilator will alarm and show
   b. "O2 LOW/FAIL-CHECK OXYGEN SOURCE/CONNECTIONS"
   and
   "FIO2-GAS MIX ERROR. CHECK SOURCE/SETTINGS/CONNECTIONS"
   c. Compressor will turn on (audible)
8. Set FiO2 to 21%.
9. Set HIGH pressure alarm to 5 cmH2O below PEAK.
   a. Ventilator will “stutter” and show “HIGH PRESSURE-PEAK INSPIRATORY PRESSURE TOO HIGH” warning and signal an alarm.

10. Turn PLATEAU pressure ON
    a. Ventilator will display “HIGH PRESSURE-PEAK INSPIRATORY PRESSURE TOO HIGH” and “PLATEAU VOLUME-DELIVERED VOLUME LESS THAN SET VOLUME” and trigger an alarm.
11. Turn HIGH Pressure alarm to 100.

12. Set LOW pressure alarm to 5 cmH2O above PEAK
   a. Ventilator will display “LOW PRESSURE-PEAK INSPIRATORY PRESSURE TOO LOW” and trigger an alarm.

13. Remove circuit from ventilator.
   a. Ventilator will display “DISCONNECT-CHECK CIRCUIT CONNECTIONS” and trigger an alarm.
14. Preset ventilator for use per Duty Inspection Power On Checks and turn off.
***These procedures should be practiced before performed on live patients***

**Any known malfunction of ventilator should be addressed prior to flight. The following are not for routine use but for emergencies when alternate ventilatory measures are not available and long term BVM is not practical**

- Loss of high pressure O2 delivery when needs exceed 21% FiO2 (i.e. missing/unserviceable green high pressure hose.) will alarm and show "O2 LOW/FAIL-CHECK OXYGEN SOURCE/CONNECTIONS" on screen

  NOTE: First Place Patient on BVM with supplemental O2. Second, check oxygen tank volume. Third, check the O2 lines and connections

Alternative methods to increase delivered oxygen content

1. Commercial oxygen reservoir kit for low pressure supply is available (Part # 820-0097-15)

2. Oxygen reservoir fashioned from primary circuit and BVM
   a. Connect short portion of main circuit tube to the BVM and to the airinlet port.
   b. Connect BVM O2 hose to the BVM and the regulator.
   c. Set regulator to desired setting (~10LPM, but no lower than total minute volume.

3. Oxygen reservoir fashioned from second ventilator patient circuit.
   a. Cut/disconnect exhalation valve off of second ventilator circuit.
   b. Remove transducer fitting from exhalation valve at attach it to the main circuit.
c. Connect the transducer hose to the original transducer fitting and the other end to regulated oxygen source.

d. Connect the transducer fitting (still attached to the circuit) to the air inlet port.

e. Set regulator on O2 source to 10 LPM to deliver up to 99% FIO2.

NOTE: Ventilator circuit tubing will provide reservoir for 650-700 ml of O2. Vt of greater than 650-700ml may result in lower FIO2.
Missing or damaged “GAS OUT” leaf valve

1. Missing “GAS OUT” leaf valve will trigger an alarm, give a “DISCONNECT: CHECK CIRCUIT CONNECTIONS”, no “PEAK” value will display, and little to no volume will be delivered to patient.

   a. Place patient on BVM with supplemental O2
   b. Perform DOPE (Dislodgment, Obstruction, Pneumothorax, and Equipment) assessment.
   c. Check “GAS OUT” leaf valve for installation and proper seating.
      i. If folded, use small object to gently unfold or push valve back into place
      ii. If missing, replace ventilator immediately if able. If unable to replace, cover GAS OUT side ports with occlusive dressing.
         (Replacing GAS OUT leaf valve is optimal but time consuming.)

   WARNING: Occluding GAS OUT side ports will enable ventilator to provide full respirations, however, this will eliminate the antiasphyxia function these ports provide (Ventilator failure will result in increased resistance in spontaneous respiration) and strict surveillance must be kept on ventilator to ensure any further failure is caught immediately. Patient must immediately be transitioned to BVM in the event of any failure.

Compressor failure/alarms (may show CODE 2)

1. Place patient on BVM with supplemental O2
2. Cycle ventilator to OFF
3. Turn FiO2 knob (#5) to 100%
4. Cycle back on and to desired settings leaving FiO2 at 100%
   a. PEEP will have to be reset when vent is cycled on.

   Note: This technique will transition the ventilator to using oxygen pressure instead of the compressor to drive ventilation and may hasten oxygen usage

- Battery Failure
  1. Place patient on BVM with supplemental O2
  2. Turn ventilator OFF
  3. Replace ventilator battery with battery from 326M suction apparatus. (Per the manufacturer, they are the exact same!)
     a. 326M battery is in the same location as the 754.
  4. Resume normal operations
     a. PEEP will have to be reset when vent is cycled on.

Fail Code 6
Suctioning to long with inline suction and/or patient inspiratory effort is significant enough to trigger.
1. Place Patient on BVM with O2
2. Assess Patient
3. Cycle Vent off and on (will have to reset Peep)
4. Check vent settings
5. Place patient on ventilator

REPLACING GAS OUT LEAF VALVE

1. Feed suture through small center hole.

2. Tie small square knot over end of tail of leaf valve.

3. Pull gentle tension on suture while guiding the leaf valve into place.
4. Maintain gentle traction against suture while applying pressure against the leaflet valve inside gas port with finger. Remove string once valve is seated. (Use caution to not apply too much tension to suture as leaf valve tail can tear.)
Ventilator inspiratory bacteria filter can be attached to air inlet (Missing air filters allow dust, debris, and/or moisture to be pulled into the ventilator compressor. This results in increased work-load of the ventilator leading to diminished battery life and eventual compressor failure)

**Common Replacement Parts**

**Zoll/ NSN Part Numbers**

- Zoll Part #: 820-0097-15 Oxygen reservoir kit for low pressure supply
- MEDSILS: OXYGEN ADAPTER BLEED-IN RESERVOIR FOR VENTILATORS

**NSN: 6515-01-518-5060**

- Zoll Part #: 704-0754-01 Battery Pack
- MEDSILS: BATTERY POWER SUPPLY USED ON VENTILATOR

**NSN: 6130-01-468-8361**

- Zoll Part #: 490-0005-00 Valve, Leaf
- MEDSILS: VALVE REGULATING SYSTEM PRESSURE

**NSN 6530-01-464-0267**
Routine Care
- Clean unit with disinfecting wipes, Cavicide or alike. Ensure ports are dry prior to setting up.
- Ventilator should be connected to AC power (100-240 V) between uses with all tubing connected and distal end of patient circuit closed with red cap or a glove secured into place.
- Expected battery life with 2 fully charged batteries is 8 hours.
- Battery 2 (removable battery) can be changed out during ventilator use if it runs out of/low on power.

Duty Inspection
1) Initial setup.
   a) Check calibration date, 6-month maintenance cycle.
   b) Air inlet should be clear, NBC filter in place if needed.
   c) Exhalation valve in place and locked into position.
   d) Bacterial/Viral filter on inspiratory (top/1) and expiratory (bottom/2) ports (5).
   e) Flow sensor hoses securely attached to flow sensor connection ports.
   f) Clear to white, blue to blue (4).
   g) Attach tubing to appropriate inspiratory/expiratory ports (1 & 2).
   h) Secure flow sensor on distal (patient) end of tubing (11)
   i) If used, capnography adapter should be attached on the proximal end of the flow sensor and cable connected to the yellow port (10).
   j) Secure red cap on distal end of HME to close the circuit.

2) Preop Checks
   a) Turn unit on with power button

   b) Attach an HME to distal end of flow sensor (14).
   e) Exhalation valve in place and locked into position.
b) Touch **Preop Check** on standby screen.

c) Touch **Tightness** to perform a tightness check.
   i) Follow prompts on screen.
   ii) Pass ✅ or Fail ❌ and date/time of test will display.

d) Touch **Flow Sensor** to calibrate the flow sensor.
   i) Follow prompts on screen for turning flow sensor using the adapter, you will do this twice.
   ii) When complete remove calibration adapter, secure the adapter to the pressure tubing by the connection to the vent.
   iii) Pass ✅ or Fail ❌ and date/time of test will display.

e) Touch **O2 Cell** to calibrate the internal O2 sensor.
   i) Supplemental O2 should **NOT** be connected for this test.
   ii) Pass ✅ or Fail ❌ and date/time of test will display.

f) **Capnography Calibration**
   i) Touch **Sensors**
   ii) Select box for CO2 sensor to activate sensor.
   iii) Touch **Test & Calib**
   iv) Ensure sensor is attached to adapter and adapter is in line.
   v) Touch **CO2 Sensor**
   vi) Pass ✅ or Fail ❌ and date/time of test will display.

**Ventilator is now ready for use.**

### Alarms

1) **Alarms** will display on the top left corner of screen in either a **yellow** or **red** box.

2) **Yellow alarms** (Low to Medium Priority)
   a) Generally, warnings about patient values such as a low temporarily Vt or increased respiratory rate.
   b) Light bar above screen will flash yellow.
   c) These alarms need to be addressed quickly but do not present an imminent threat to life.

3) **Red alarms** (HIGH Priority)
   a) These alarms present an imminent threat to life and need to be addressed immediately.
   b) Oxygen failure, patient disconnection, pressures that are too high or too low, blockage of air inlet, low battery power, and others will display a **red alarm** and light bar will flash red.
   c) **Oxygen failure** will alarm when O2 delivery, as measured by internal sensor, falls outside of the 5%+/-.range.
      i) Place patient on BVM with supplemental O2.
      ii) Put vent on stand-by.
      iii) Check O2 tank volume.
      iv) Check O2 lines and connections.
      v) Can change O2 supplementation from high-pressure (50PSI) to low flow if needed.
   d) **Patient disconnect** will alarm when the expiratory valve/port no longer sense backpressure.
      i) If disconnection at patient airway, reconnect tubing to airway and assess.
      ii) If disconnection not identified at patient airway connect patient to BVM with supplemental O2.
      iii) Place the vent on standby.
      iv) Perform DOPE assessment.
      v) Check that the expiratory valve is in place and in a locked
position, and that the expiratory outlet at the bottom of the valve is not occluded. Replace if needed.

vi) Ensure tubing is attached appropriately.

vii) If alarm persists after reconnecting to Pt airway continue to use BVM and mark unit for maintenance.

e) **High Pressure**

i) Ensure patient airway (ETT) is not kinked.

ii) Suction patient airway. If unable to pass suction catheter may need to replace airway.

iii) Place patient on BVM with supplemental O2.

iv) Place vent on stand-by.

v) Perform DOPE assessment.

vi) Check HME for secretion occlusion, replace if needed.

vii) Check expiratory bacterial/viral filter, if excessive condensation is present replace filter.

viii) If alarm continues, consider a change to patient airway resistance and medicate accordingly.

f) **O2 Sensor Failure**

i) **IMMEDIATELY** place patient on BVM with supplemental O2.

ii) Place vent on standby.

iii) Disconnect supplemental O2 from ventilator.

iv) Conduct O2 Cell calibration.

   (1) Touch **Preop Check**

   (2) Touch **O2 Cell**

   (3) Pass ✔ or Fail ✗ and date/time of test will display.

v) If O2 Cell calibration fails continue to ventilate with BVM and mark unit for maintenance.

vi) If not addressed quickly the ventilator will shut off.

g) **Low Battery**

i) Immediately connect the unit to AC power or replace the removable battery with a changed one.

ii) If no supplemental power supply is available switch patient to BVM with supplemental O2.

iii) Ventilator will shut off 5 minutes after the alarm begins.

4) Alarms can be reviewed as follows:

a) Touch **Alarms** then **Buffer**

i) This will display active and inactive alarms.
NASO / OROGASTRIC TUBE

CLINICAL INDICATIONS:
• Enabling gastric decompression, decreasing risk of vomiting and aspiration, obtain sample of gastric contents.
• Allows for gastric lavage in drug overdose or poisoning.

CONTRAINDICATIONS:
• Nasogastric tubes contraindicated in the presence of massive facial trauma, burns, or suspicion of basilar skull fracture (CSF otorrhea, Battle’s sign, raccoon eyes, mechanism). May insert orogastric tube instead.

PROCEDURE:
• If possible, sit patient upright for optimal neck and stomach alignment.
• Measure tubing from bridge of nose to earlobe, then to the point halfway between the end of the sternum and the navel. Mark measured tube with marker.
• Select most patent nare (or the throat) and pass lubricated tube in a posterior – NOT SUPERIOR – direction. If resistance is met, attempt to corkscrew slightly or remove and attempt in other nare.
• Withdraw tube immediately if changes occur in patient’s respiratory status, if tube coils in mouth, if the patient begins to cough, or becomes cyanotic.
• Advance tube until mark is reached.
• Verify tube placement by listening over stomach while air is passed or examining aspirate when applied to suction. Secure tube. Watch vital sign for changes.

Document procedure, results, and vital signs.
NASOPHARYNGEAL AIRWAY

CLINICAL INDICATIONS:

• Depressed mental status with need for airway augmentation to ensure patency / access.

RELATIVE CONTRAINDICATIONS:

• Patient at high-risk of aspiration and/or unable to protect airway
• Massive facial trauma, burns, or suspicion of basilar skull fracture (e.g., CSF otorrhea, Battle’s sign, raccoon eyes, mechanism).

PROCEDURE:

• Position patient in the sniffing position.
• Select appropriate sized NP tube and lubricate with water-soluble jelly (can measure tube by placing exterior (lipped) end next to nare and tip should reach to angle of mandible).
• Select most patent nare, orient open angle medially, and pass tube in a posterior – not superior – direction. If resistance is met, attempt to corkscrew slightly or remove and attempt in other nare. If unsuccessful, try the next smallest sized tube.
• Pass tube until lip of NP tube rests against nare.
• Bag patient with BVM / mask as needed.

Document procedure, results, and vital signs.
**Pre-Intubation Checklist**

**PRE-INTUBATION CHECKLIST**

**INSTRUCTIONS FOR USE**
The Pre-Intubation Checklist serves as a final reference prior to administering a sedative and paralytic during a Rapid Sequence Intubation. Run the checklist to ensure preparation is complete before embarking on induction and paralysis. Refer to **RAPID SEQUENCE INTUBATION** for how to do an RSI.

**PLAN**

- **Consider Dangerous Physiology Issue: SBP <100, SpO2 <94%, Metabolic Acidosis**
  - Appropriately modify or avoid RSI in unstable patient
  - SBP < 100 → Consider resuscitation with IVF and vasopressors, Lower the dose of sedative
  - Sat < 94% → Consider use of CPAP or BVM with PEEP valve to increase Mean Airway Pressure during Pre-Oxygenation
  - Severe Met. Acidosis → Consider awake intubation or delayed sequence intubation with severe Metabolic Acidosis

- **Difficult Airway Evaluation** (LEMON, HEAVEN Criteria)
  - Consider alternate airway, cricothyrotomy, or modify plan

- **Rapid Sequence Intubation, Delayed Sequence Intubation, Rapid Sequence Airway (SGA), or Cricothyrotomy**
  - Choose the most appropriate technique for physiology and anatomy

- **Evaluate Cricothyrotomy Landmarks and Assess Procedural Difficulty**

- **Induction Agent / Paralytic**
  - Choose and draw up appropriate Sedative and Paralytic

- **Push-Dose Pressors**
  - Consider drawing up or administering Push-dose Epinephrine

- **Post-tube Sedation / Analgesia**
  - Prepare Post-intubation Sedation and Analgesia

- **Consider Pretreatment 3-5 minutes prior**
  - Fentanyl (TBI, CVA, MI, Ao Dissection); Atropine (Pediatric)

- **Failed Airway Plan Verbalized to the team**
  - Discuss management plan for failed intubation

**PATIENT PREPARATION**

- **PreOx ≥ 3 minutes with 15 LPM NRB or BVM + PEEP, and NC 4-6 LPM**

- **Apneic Oxygenation with NC 15 LPM once Induced/Sedated**

- **Oxygenated ≥ 94% prior to Induction**
  - Consider using CPAP or BVM + PEEP if unable to reach 94% with NRB

- **Positioning: 30° Head-up for Pre-Ox, Ear-to-Sternal Notch for Intubation**
  - If C-Spine Consideration, open front of C-Collar and perform Manual In-line Stabilization

- **Monitor is Visible** (HR, BP, SpO2%, RR, etCO2)

- **Reliable IV Access Tested**

**EQUIPMENT**

- BVM (± PEEP Valve) on Oxygen
- Waveform Capnography on BVM (minimum Colorimetric)
- ± Video Laryngoscope powered on
- ± Back-up Laryngoscope ETT, ETT size down, 2x Stylet, 2x Syringe, Tube Securing
- Bougie
- OPA, NPA, SGA (iGel, LMA, King LT)
- Nasogastric or Orogastric Tube
- Cricothyrotomy Kit
- Suction on and accessible
BLIND INSERTION AIRWAY DEVICE (BIAD)

CLINICAL INDICATIONS:
Patient with inadequate respiratory drive or respiratory failure due to any reason (e.g., altered mental status, trauma, infection) other than airway burns, anaphylaxis, or other causes of airway swelling / obstruction.

CONTRAINDICATIONS:
• Massive upper airway trauma distorting anatomy
• Penetrating neck trauma

PROCEDURE:
Consider paralytic/analgesia/sedation medications when placing supraglottic airways devices. In any instance of BIAD placement, caregiver must be prepared for vomiting and aspiration.

• Prepare, position, and pre-oxygenate the patient with 100% O₂. Ensure patient on monitor if possible.
• Select appropriate size BIAD and ensure proper cuff inflation / deflation.
• Lubricate with water-soluble jelly.
• Advance tube towards posterior pharynx until seated in correct position.
• Inflate balloon as per package insert and attempt to ventilate with BVM.
• If good airflow / chest rise / PO₂, secure device in place and ventilate patient with BVM / Vent.
• If unable to ventilate / resistance, leave first BIAD in place, deflate balloon, and pass a second BIAD in the same manner as the first (second should only be able to enter the trachea as the first may have entered into the esophagus approx 5-10%). Once second BAID is in place, remove first and inflate the cuff on the second device. Attempt to bag as above. If successful, ventilate patient.

Document procedure, results, and vital signs.

WARNING: BIADs may not prevent or block aspiration of gastric contents.
CRICOTHYROIDOTOMY

CLINICAL INDICATIONS:

- DIFFICULT AIRWAY- Airway can receive one (1) RSI attempt before calling it a failed airway. Two exceptions exist:
  - Inability to maintain proper O2 saturation above 90% or major trauma or obstruction
- NON-DIFFICULT AIRWAY- Airway can receive two (2) attempts so long as O₂ saturation is >90%.
- Inability to place / ventilate with blind insertion airway device (BIAD) or inability to provide ventilation with Bag-Valve mask.
- Massive facial trauma or neck trauma precluding the use of orotracheal intubation / BIAD.

CONTRAINDICATIONS:

- Age <12yo, abnormal anatomy. (See Needle Cricothyroidotomy)

PROCEDURE:

- Maintain patient in sniffing position or place them into sniffing position. Utilize inline stabilization if indicated.
- Oxygenate the patient with 100% O₂. Identify and cleanse the cricoid area with betadine / alcohol while oxygenating if possible.
- Before incising place static non-dominant hand using the middle and thumb to hold either side of the thyroid cartilage with the palm towards the head leaving an area between the fingers inferiorly to make the incision. This hand will not move until bougie is confirmed in the trachea.
- Using a scalpel, make an adequate (2-3cm) vertical incision over the cricothyroid membrane. Then, using hemostats, bluntly dissect until membrane fully visualized.
- Make an adequate horizontal incision through the cricothyroid membrane into the trachea. Spread incision with either hemostats or scalpel handle.
- At this point the index finger of the hand gripping the thyroid cartilage can be placed within the opening and the posterior aspect of the trachea can be palpated. The index finger maintains the tract should the airway be extremely bloody as this procedure is prone to be. The bougie/stylet is then placed along the index finger ensuring tracheal guidance and not subcutaneous plane dissection or posterior tracheal perforation into the esophagus.
- Once the bougie/stylet is inserted, pass a cricothyroid tube or 6-0 ETT into the trachea (if ETT used, only insert until just past the cuff, then inflate the cuff). Secure tube in place and begin to ventilate with BVM / 100% O₂.
- Confirm placement with capnography, capnometer, bilateral chest rise / breath sounds, good PO₂, ETCO₂, lack of increasing SQ air (a small amount is normal).
- Document procedure, results, and vital signs.
NEEDLE CRICOTHYROIDOTOMY

CLINICAL INDICATIONS:
• Child <10yo in whom open cricothyroidotomy is contraindicated with the following:
  o Failed intubation attempts x 3 by the most experienced provider present with inability to ventilate with BVM / high risk to ventilate with BVM.
  o Inability to place / ventilate with blind insertion airway device (BIAD).
  o Massive facial trauma or neck trauma precluding the use of orotracheal intubation / BIAD.

CONTRAINDICATIONS:
• Ability to ventilate adequately with BVM.
• Prolonged time to definitive care (relative).

NOTE: this technique requires a minimum of 50 psi O₂ or pressurized air flow and a special adapter to connect the line to the catheter hub; do not attempt otherwise.

PROCEDURE:
• Maintain patient in sniffing position or place them into sniffing position. Utilize inline stabilization if indicated.
• Oxygenate the patient with 100% O₂. Identify and cleanse the cricoid area with betadine / alcohol while oxygenating if possible.
• Using a 14Ga IV attached to a 3mL syringe, puncture the cricothyroid membrane at a 90° angle. Do not advance needle once air returned.
• Change angle to 45° and advance Catheter only. Should advance with no resistance. Remove needle and syringe.
• Secure catheter in place. Remove needle and plunger from syringe and place an adapter from a 7-0ETT on end of syringe in place of plunger. Attach this to the catheter.
• Attach a BVM attached to 100% O₂ to the adapter / syringe and ventilate. A large amount of resistance will be felt due to the small catheter size. Evaluate for chest rise and oxygenation. The provider needs to allow a 1:3 ratio of inhalation / exhalation.

Document procedure, results, and vital signs.

NOTE: Needle Cricothyroidotomy only allows for oxygenation, not ventilation. It is meant as a temporizing measure until definitive care – tracheostomy – can be performed at an MTF. This airway should be used for only 20-30min maximum if able.
• Start working alternatives immediately after initiation - such as retrograde wire intubation, surgical cric with needle as an anatomical landmark.
NEEDLE THORACOSTOMY

CLINICAL INDICATIONS:

Suspect a tension pneumothorax and treat when a casualty has significant torso trauma or primary blast injury and one or more of the following:

- Severe or progressive respiratory distress or tachypnea, absent or markedly decreased breath sounds on one side of the chest, chest pain, distended neck vessels, hemoglobin oxygen saturation < 90% on pulse oximetry, shock, traumatic cardiac arrest without obviously fatal wounds

* Note: If not treated promptly, tension pneumothorax may progress from respiratory distress to shock and traumatic cardiac arrest.

PROCEDURE: Note: This intervention is a BRIEF stopgap utilized in order to buy time for a definitive tube thoracostomy. It is not a solution unto itself.

- Decompress the chest on the side of the injury with a 14-gauge or a 10-gauge, 3.25-inch needle/catheter.

- If a casualty has significant torso trauma or primary blast injury and is in traumatic cardiac arrest: decompress both sides of the chest before discontinuing treatment. Clean area if possible with betadine / alcohol, but do not delay treatment for this step.

**Note:** Either the 5th intercostal space (ICS) in the anterior axillary line (AAL) or the 2nd ICS in the mid-clavicular line (MCL) may be used for needle decompression (NDC.) If the anterior (MCL) site is used, do not insert the needle medial to the nipple line.

- The needle/catheter unit should be inserted at an angle perpendicular to the chest wall and just over the top of the lower rib at the insertion site. Insert the needle/catheter unit all the way to the hub and hold it in place for 5-10 seconds to allow decompression to occur.

- After the NDC has been performed, remove the needle and leave the catheter in place.

- The NDC should be considered successful if:
  
  - Respiratory distress improves; there is an obvious hissing sound as air escapes from the chest when NDC is performed (this may be difficult to appreciate in high-noise environments); hemoglobin oxygen saturation increases to 90% or greater (note that this may take several minutes and may not happen at altitude); casualty with no vital signs has return of consciousness and/or radial pulse.

- If the initial NDC was successful, but symptoms later recur:
  
  - Perform another NDC at the same site that was used previously. Use a new needle/catheter unit for the repeat NDC.

- If the second NDC is also not successful:
  
  - Fix appropriate circulation issues and consider finger/tube thoracostomy.

**Document procedure, results, and vital signs.**
SIMPLE (FINGER) and TUBE THORACOSTOMY

CLINICAL INDICATIONS:
- Pneumothorax + positive pressure ventilation or interfering with oxygenation
- Hemothorax + positive pressure ventilation or interfering with oxygenation
- Chest injury with suspected pneumo / hemothorax as above
- Evidence of tension pneumothorax after needle thoracostomy attempts

CONTRAINDICATIONS:
- Stable patient oxygenating well, no tension PTX
- Blood clotting abnormalities (relative)

PROCEDURE (STERILE):
- Ensure all equipment prepared / available: Scalpel, 4X4 gauze, petroleum gauze, suture material (0 – 1-0 silk), 28Fr or larger chest tube, Heimlich valve / Water seal, large Kelly clamp x 2, betadine / skin cleanser, 1-2% lidocaine, 10mL syringe with needle for lidocaine, sterile gloves.
- If possible, position patient supine with shoulder flexed up and hand under his / her head.
- Identify and clean area of insertion with skin cleanser. Area of insertion should be over the 4th or 5th rib (3rd or 4th intercostal space) on injured side.
- If possible, with conscious patient, anesthetize the area with lidocaine. Take care to anesthetize the rib by passing needle perpendicular to skin until bone contacted and backing off slightly to inject lidocaine. May also anesthetize the pleura by advancing needle just until air returned and then injecting area while pulling back needle.
- Make incision in skin / SQ tissue overlying 5th rib. Ensure incision large enough for insertion of tube / finger (approximately 1-2 inch).
- Bluntly dissect tissue going over 5th rib with second clamp until pleura is reached, then puncture the pleura with the clamps. Prevent overly deep insertion by using non-dominant hand to guide insertion or holding clamps in hand with index finger on shaft of the instrument.
- Open clamps as wide as possible to enlarge the pleural opening and remove clamps. Blood and/or air may present at this time.
- Place finger into opening and palpate for any adhesions.
  - If Simple Thoracostomy ONLY, place vented chest seal over opening and position patient on ipsilateral side (if possible) and monitor for signs of tension pneumothorax.
  - If proceeding to tube placement, continue below ensuring tube is clamped closed on distal end before insertion.
- Advance tube into opening directing the tip of the tube posteriorly and superiorly towards the lung apex along the posterior aspect of the chest wall, ensuring all fenestrations are moved into opening. This method ensures tube will drain both hemo and pneumothoraces.
- Holding tube in place – Pad under tube with Kerlix and place modified chest seal around the tube ensuring seal of the wound and securing tube in place. If possible, stitch or staple tube into place.
- Apply suction to tube / Heimlich valve and remove clamp.

Document procedure, results, and vital signs.

CHEST TUBE TROUBLESHOOTING:
- Ensure tube not clamped / kinked and that suction is working.
- Ensure tube has not become dislodged.
- If evidence of tension PTX – remove attachments from end of chest tube (e.g., suction adapter, Heimlich valves, suction devices) to convert to open PTX. Troubleshoot attachments and re-apply if appropriate.
VASCULAR ACCESS (INTRAVENOUS)

CLINICAL INDICATIONS:
- Need for intravascular access to provide resuscitative fluids and/or medications.
- Anticipated need for intravenous access in emergency patients.

CONTRAINDICATIONS:
- Injuries proximal to IV site/ipsilateral to IV site (relative).

PROCEDURE:
- Prepare all necessary equipment: PPE, tourniquet, IV catheters, alcohol/betadine wipe, saline lock or IV tubing, IVFs if administering, and tape/securing device.
- Ensure all IV tubing/saline locks flushed prior to attempting IV.
- Place venous tourniquet proximal to anticipated IV puncture site.
- Identify vein to be cannulated and cleanse overlying area with alcohol/betadine.
- While holding traction on skin/vessel, cannulate the vessel (use a shallow angle of attack with the needle). Once flash returned, advance slightly to ensure catheter in vessel, then advance catheter only fully into vessel (should pass without resistance).
- While holding pressure proximally on vein and maintaining catheter position, remove tourniquet and needle. Attach NS flush and flush IV – this fluid should flow easily into the vein – any resistance suggests missed attempt or “blown” vein. (Note: If blood samples being drawn – they should be taken prior to removing tourniquet and always prior to flush (after flushing – may obtain dilute sample which will alter results.)
- Secure catheter using transparent dressing or tape.
- Repeat until 2 IV sites have been established and are functional.

Document procedure, results, and vital signs.
VASCULAR ACCESS
(INTRAOSSEOUS)

CLINICAL INDICATIONS:
• Need for intravascular access to provide resuscitative fluids and/or medications with inability to obtain adequate peripheral intravascular access (2 failed attempts or greater than 90sec).
• Anticipated need for intravenous access in emergency patients.

CONTRAINDICATIONS:
• Only absolute contraindication is fracture at affected site or prior IO attempt in the same bone.
• Cellulitis overlying puncture site (relative contraindication).
• Injury (not fracture) proximal to puncture site (relative – site dependent).
• FAST Tactical™ device contraindicated in pediatric patients less than 18 years old.

PROCEDURE:
• Prepare all necessary equipment: PPE, IO device, betadine scrub, and IV tubing.
• Ensure all IV tubing/saline locks flushed prior to attempting IV.
• Identify appropriate puncture area as follows:
  o FAST Tactical™
    • Sternum – follow manufacturer instructions or training guidelines.
  o EZ IO™
    • Proximal Humerus (YELLOW 45mm) – 1 to 2 cm above the surgical neck into the most prominent aspect of the greater tubercle lateral to intertubercular (bicipital) groove, aiming 45-degrees downward towards contralateral hip.
    • Distal Femur (peds, BLUE 25mm) – Proximal to patella (max 1cm) and 1-2cm medial to midline.
    • Proximal tibia (BLUE 25mm or PINK 15mm) – 2cm (2 finger widths) distal to tibial tuberosity on medial aspect.
    • Distal tibia (BLUE or PINK) – 2cm (2 finger widths) proximal to medial malleolus.
  o Manual IO
    • Proximal tibia and distal tibia – same as EZ IO™ site.
• Cleanse site well as failure to appropriately disinfect the area can lead to bone infections.
• Applying firm pressure, puncture skin at 90° angle (45 degree down for Humeral IO), puncture bone (felt as loss of resistance, give or “pop”).
  - Confirm placement by (1) needle felling firm in bone and (2) aspiration of blood/bone marrow. If unable to aspirate blood, attempt to aspirate after the flush
  - Flush IO catheter with normal saline. May add 2% preservative-free Lidocaine without epinephrine to flush to decrease pain (2mL or 40 mg in adults, 0.5mg/kg not to exceed 40mg in pediatric).
  - Constantly monitor for increased tension in muscular compartments as misplacement into a compartment with subsequent fluid administration can lead to iatrogenic compartment syndrome.
  - With the exception of adult proximal humerus insertions, routinely inserting the needle set to the hub is not recommended technique.

Document procedure, results, and vital signs.
VASCULAR ACCESS via External Jugular Vein Cannulation

CLINICAL INDICATIONS:
- In the presence of a life-threatening condition, with clear indications for immediate use of medication, blood or fluid bolus. It should only be used when a peripheral IV site cannot be established (Not for prophylactic IV access.)

Equipment:
- IV start kit (alcohol swabs 4 x 4s, tourniquet, tape)
- Large bore IV catheter (14 or 16 gauge)
- IV fluid tubing

PROCEDURE:
- Explain the procedure to the patient
- Select the insertion site
- Find the landmarks midway between the angle of the jaw and the midpoint of the clavicle.
- Turn the patient’s head away from the intended site of insertion. Consider placing the patient in the Trendelenburg position or holding the thumb over the vein to facilitate insertion.
- Insert the IV catheter pointing towards the ipsilateral acromioclavicular joint until a flash fills the chamber of the catheter, then advance the catheter over the stylet and remove the stylet.
- Attach the IV fluids to the catheter and infuse to verify the intravenous line is patent and does not infiltrate.
- Secure the IV catheter using tape and a Tegaderm dressing or a clear occlusive dressing.
- Dispose of sharps in an approved biohazard container.
- Document procedure, results, and vital signs.

Complications:
- Infiltration
- Hematoma formation
- Cellulitis/infection
- Thrombosis
- Phlebitis
VASCULAR ACCESS via CENTRAL CATHETERS

CLINICAL INDICATIONS:

• In the presence of a life threatening condition, with clear indications for immediate use of medication or fluid bolus. (Not for prophylactic IV access.)

CONTRAINDICATIONS:

• Suspected infection at skin site.

PROCEDURE:

• Determine the type of catheter present: PICC, Broviac, Hickman, Groshong Mediport, etc.

Procedure for peripherally inserted Central Catheter (Cook, Neo-PICC, etc.) and Tunneled Catheter (Broviac, Hickman, Groshong, etc.):

• Prepare equipment:
  - 2 - 3 10 ml prefilled syringes of 0.9% NaCl
  - Sterile gloves (if available)

• If more than one lumen is available (PICCs, Hickmans and Broviacs can have one, two, or three lumens), select the largest lumen available.

• Vigorously cleanse the cap of the lumen with chlorhexidine or 70% alcohol prep pad, allow to dry.

• Unclamp the selected catheter lumen and using a prefilled 10 ml syringe:
  - Vigorously flush the catheter using a pulsating technique and maintaining pressure at the end of the flush to prevent reflux of fluid or blood
  - If catheter does not flush easily (note that a PICC line will generally flush more slowly and with greater resistance than a typical intravenous catheter), re-clamp the selected lumen and attempt to use another lumen (if present)
  - If unable to flush any of the lumens, the catheter is unable to be used

• Attach primed IV administration set and observe for free flow of IV fluid.
  - Utilizing an IV pump, set the flow rate based on the patient condition and IAW SMOG

  Document procedure, results, and vital signs.
Procedure for implanted catheter (Port-a-Cath, P.A.S. port, Medi-port):

- Prepare all necessary equipment:
  - Non-coring, right angle needle specific for implanted vascular access ports
  - 2 - 3 10 ml prefilled syringes of 0.9% NaCl
  - Sterile infusion port cap
  - Sterile gloves (if available)
  - Sterile occlusive dressing large enough to completely cover the insertion site
- Identify the access site; usually located in the chest.
- Vigorously cleanse the cap of the lumen with chlorhexidine or 70% alcohol prep pad, allow to dry.
- Attach the infusion port cap to the end of the non-coring, right angle needle tubing.
- Prime the non-coring needle with attached tubing with saline using one of the prefilled 10 ml syringes. Leave the syringe attached to the tubing.
- Palpate the port to determine the size and center of the device.
- Secure the access point port firmly between two fingers and firmly insert the non-coring needle into the port, entering at a direct 90° angle.
- Aspirate 3 – 5 ml of blood with the syringe.
  - If unable to aspirate blood, re-clamp the catheter and do not attempt further use
  - Asking the patient to cough may facilitate access of the port
- Flush the catheter with 3 – 5 ml 0.9% NaCl using a prefilled 10ml syringe.
  - If catheter does not flush easily, do not attempt further use
- Attach IV administration set and observe for free flow of IV fluid.
  - Utilizing an IV pump, set the flow rate based on the patient condition and IAW SMOG
- Cover the needle and insertion site with the sterile occlusive dressing.

Document procedure, results, and vital signs.
<table>
<thead>
<tr>
<th>CATHETER</th>
<th>SIZE</th>
<th>MAX FLOW RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PICC</td>
<td>Less than 2.0 fr</td>
<td>125 mL/hr</td>
</tr>
<tr>
<td>PICC</td>
<td>Greater than 2.0 fr</td>
<td>250 mL/hr</td>
</tr>
<tr>
<td>Groshong PICC</td>
<td>3 fr</td>
<td>240 mL/hr</td>
</tr>
<tr>
<td>Groshong PICC NXT</td>
<td>4 fr</td>
<td>540 mL/hr</td>
</tr>
<tr>
<td>Groshong PICC NXT</td>
<td>5 fr</td>
<td>200 mL/hr</td>
</tr>
<tr>
<td>Hickman/Broviac</td>
<td>8 – 9.5 fr</td>
<td>3000 mL/hr</td>
</tr>
</tbody>
</table>

PEARLS:

- Do not exceed recommended flow rates.
- Avoid taking a blood pressure reading in the same arm as the PICC.
- Only non-coring, right angle needles specific for implanted ports are to be used for vascular access devices that are implanted in the patient. These are generally not carried MEDEVAC units but may be provided by the patient.
- Priming the tubing of the non-coring needle is essential to prevent air embolism.
- There are many peripherally inserted, tunneled and/or implanted ports options. Providers should do their best to discern what option the patient has. Patient may be carrying a reference/wallet card about their device.
- PICC lines will not tolerate rapid infusions or infusions under pressure.
Invasive Pressure Monitoring

**Purpose:**

MEDEVAC Crews are required to monitor invasive pressure on any patient with central venous or arterial access.

**Procedure:**

- If the referring facility’s transducer unit is not compatible with transport unit’s cable, replace with compatible transducer setup using aseptic technique.
- Ensure IV pressure bag is preset and inflated to 300mmHg with stopcock closed
- Place transducer at phlebostatic axis and secure with tape
- Zero the line to obtain a “zeroed” reading on the transport monitor
- Flush the line and perform a square waveform test
  - Evaluate the waveform and numeric values for correlation with recent patient trends

**Notes:**

- Evaluate the insertion site for bleeding, swelling, hematoma, or dislodgement
- Tightly secure stopcocks and cover openings with non-vented endcaps
- Continue monitoring correlation between NIBP and ABP
- Zero the line after movement of patient, at altitude, and if suspected erroneous reading
  - Adjust/re-calibrate monitor every 1000’ if required based upon monitoring device
- If waveform dampened, check pressure bag inflation and reassess position of leg/wrist
- If invasive line is in the femoral artery, keep patient head <30° and leg straight. Reassess distal pulses with any patient movement
- Flush line and evaluate square waveform test as needed
- If invasive line becomes dislodged, immediately apply direct pressure
REBOA MANAGEMENT

Purpose:
Surgical Team or SOF Medic placement for trauma arrest or non-compressible hemorrhage in the pelvis. Secondary to emergency thoracotomy or external junctional tourniquets.

Procedure:
• Receive report from team that placed device.
  o Who inserted the device?
  o What type of device (ER-REBOA)?
  o Where located (Zone 1 or Zone 3)? How confirmed? (xray, ultrasound)
  o When was the balloon inflated?
  o Why was it placed (Arrest? Peri-arrest? Pelvic bleed?)
  o How is the device secured?

• Confirm vital sign trends with sending team
• Confirm security of REBOA device with sutures, commercial securing device, or tape.
• Record the length measurement at insertion site.
• Confirm balloon pressure.
• Check distal circulation and any external hemorrhage (Doppler)
• Connect Arterial line to hemodynamic monitoring device.
• Verbalize plan to move patient to next level of care. Ensure time of balloon inflation.
• Continue to closely monitor until patient is secured in the next level of care (Hemodynamic monitoring, distal circulation, device security, catheter depth)

CONCERNS:
• Changes in altitude
• Transient drop in blood pressure
• Change in balloon pressure
• Dislodge of device
• Loss of distal circulation
• Distal external hemorrhage
BLOOD GLUCOSE ANALYSIS

CLINICAL INDICATIONS:
• Suspicion of blood glucose abnormalities – hyperglycemia/hypoglycemia.

CONTRAINDICATIONS:
• None

PROCEDURE:
• Gather and prepare equipment.
• Obtain blood samples for analysis as per manufacturer’s recommendations.
• Place blood sample onto reagent strip and place into machine for analysis as per manufacturer recommendations.
• Record result and treat any glucose abnormalities per appropriate guideline.
• Perform quality assurance on glucometers weekly. If any suspicious recordings are noted, follow manufacturer’s recommendations

Document procedure, results, and vital signs.
CARDIAC DEFIBRILLATION

CLINICAL INDICATIONS:
• Patient who is in pulseless cardiac arrest with either ventricular fibrillation or ventricular tachycardia seen on monitor.

CONTRAINDICATIONS:
• None

PROCEDURE:
• Ensure patient attached to monitor / defibrillator. If paddles used, ensure that they are several centimeters away from monitor leads to prevent arcing. Use pediatric paddles as indicated – if unavailable and pads used, should place in anterior / posterior position for pediatric patients.
• Set energy level to appropriate level. Start 200J adult (biphasic) or 360J adult (monophasic), or 2J/kg pediatric.
• Press “charge” button 30 seconds prior to end of compressions. This maneuver minimizes time between compressions and defibrillation. Compressions should continue until end of cycle.
• Ensure all personnel clear of patient and pilots aware of cardioversion.
• Press and hold “shock” button until energy delivered.
• If rhythm converts – treat as per post resuscitation protocol.
• Following shock delivery, immediately begin / return to CPR for 2 minutes before checking for pulse.
• If pediatric patient fails to convert – repeat steps 2-7 above using escalating energy levels.
• Document procedure, results, and vital signs on run sheet following mission.

AUTOMATED EXTERNAL DEFIBRILLATOR (AED):
• Turn on power to machine and follow prompts to attach pads to patient and machine.
• Ensure no one touching / moving patient and press the “Analyze” or equivalent button. (If not present, the machine will automatically check the rhythm at dedicated time intervals. A vocal warning will tell you when this is occurring).
• If shock advised, press button to deliver shock and return to CPR for 2 minutes.
• After analysis, if subsequent shocks advised, repeat steps 2-3 up to 3 shocks, until further care arrives, or until no further shock advised. If no shock advised at any time, CHECK PULSE. Continue CPR if no pulse. If pulse present, place patient in recovery position and transport.
12-LEAD ELECTROCARDIOGRAM

CLINICAL INDICATIONS:

- Suspicion of arrhythmia.
- Chest pain believed to be of cardiac origin.
- Toxic ingestion with cardiac side effects.

CONTRAINDICATIONS:

- None

PROCEDURE:

- Ensure patient lying flat on bed and place leads as per diagram.
- If patient is unstable, address any emergent issues prior to attempting the 12-lead EKG.
- May have to shave and/or dry patient for pad adhesion.
- Once leads are in place, instruct the patient to remain still and limit any movements around the patient (as possible).
- Press button to obtain 12-lead EKG.
- If questions exist, maintain supportive care and contact medical control if able.

Document procedure, results, and vital signs.
SYNCHRONIZED CARDIOVERSION

CLINICAL INDICATIONS:
• Unstable patient with tachycardia-dysrhythmia noted on monitor/EKG.
• Patient who has failed conservative and/or chemical cardioversion.
• Pulse present.

CONTRAINDICATIONS:
• None

PROCEDURE:
• Ensure patient attached to monitor/defibrillator with synchronized cardioversion capability.

• Time-permitting, ensure adequate IV / IO access present. Ensure that unsynchronized cardioversion/defibrillation capabilities present in case patient degenerates into another dysrhythmia.

• Consider use of sedating medication (e.g., Midazolam 0.1mg/kg (5mg max dose) prior to delivery of shock. Note: This step is not mandatory and should not delay appropriate management of emergent condition.

• Set energy level to appropriate level. Usually starting at 50J-100J in adults or 0.5J/kg-1J/kg in children for atrial/ventricular arrhythmias, respectively.

• Select Synchronized Cardioversion option. This should result in machine displaying “SYNC” as well as tracking electrical activity (arrow or highlighted segment of EKG).

• Ensure all personnel clear of patient and pilots aware of cardioversion.

• Press and hold “Shock” button until energy delivered. (This may take several seconds for machine to synchronize with cardiac cycle. Shock is not immediately delivered as in defibrillation.)

• If rhythm converts – monitor and treat as appropriate.

• If fails to convert – repeat steps 4-7 above using escalating energy levels. If patient degenerates, treat as per appropriate protocol/CPR. Note: most machines require pushing the “SYNC” after each shock if synchronized cardioversion to be repeated, failure to do so will result in delivery of an unsynchronized shock.

• Document procedure, results, and vital signs on run sheet following mission.
TRANSCUTANEOUS
(EXTERNAL)
CARDIAC PACING

CLINICAL INDICATIONS:

• Patients with pulse rate <60 (or appropriate for age) and signs of inadequate cerebral or end-organ perfusion.

CONTRAINDICATIONS:

• None

PROCEDURE:

• Ensure patient attached to monitor and defibrillator with external cardiac pacing capabilities.

• Time-permitting, ensure adequate IV/IO access prior to pacing. Also, may administer sedative agent (midazolam) prior to beginning pacing.

• Turn selector switch to “Pace.”

• Set rate to twice the patients intrinsic rate (often 70-80 for adult, 100 for pediatric).

• Set energy level to lowest setting and gradually increase until capture is obtained (each pacer spike followed by QRS).

• Once capture obtained, ensure pulse and vital signs correspond with pacing. Evaluate patient for improvement. Monitor and continue sedation as needed.

• If fails to capture at maximal setting, discontinue pacer.

• At any time, if patient degenerates and needs CPR – begin compressions immediately. Pacer pads are insulated and it is okay to perform compressions with pacer running.

• Document procedure, results, and vital signs on run sheet following mission.
Funnel Web Spider Envenomation

The lethal component of funnel web spider venom is robustotoxin. It induces an autonomic storm by causing excessive release of acetylcholine, norepinephrine, and epinephrine. Funnel web spider envenomation causes a biphasic envenomation syndrome. The first phase includes pain at the bite site, perioral tingling, piloerection, and regional fasciculations which may progress to muscle spasm. This muscle spasm may involve the face, tongue, and larynx leading to airway compromise. The increased stimulation of cholinergic and adrenergic systems causes nausea, vomiting, lacrimation, salivation, tachycardia, hypertension, cardiac dysrhythmias, and acute lung injury. Acute lung injury is the predominate cause of death during the first phase. In the second phase the symptoms of the first phase resolve and lead to the gradual onset of refractory hypotension, apnea, and cardiac arrest.

**Pearls:**
- Immediately transport to an MTF with antivenom. Effective funnel web spider antivenom is available in Australia.
- **Anaphylactic reactions should be treated as soon as recognized.**
- Local tissue enzymes may inactivate the venom, therefore the use of pressure immobilization bandage may be helpful in delaying the onset of symptoms, but also may allow for a degree of inactivation of the venom.
- **Ketamine is not recommended** as patients may develop tachycardia and have profound hypertension.
- Benzodiazepines may improve muscle spasms.
- Elevate effected limb to reduce swelling.
- **DO NOT** cut, suck, electrocute, burn, or use chemicals on the envenomation site.
Scorpion Envenomation

Pearls:
- Anaphylactic reactions should be treated as soon as recognized.
- For clinically significant envenomation, management is supportive and focused on the patient’s symptoms and graded 1-4.
- Patients graded 3 & 4 will require antivenom, evacuate to a MTF able to administer antivenom.
- Administer Benzodiazepines aggressively to ensure symptom control.
- For significant neuromuscular spasm, oral secretions, sedation, or other threats to the patent airway, perform endotracheal intubation to prevent aspiration and ensure adequate ventilation.
- Pulmonary edema should be managed with noninvasive or invasive ventilation in combination with optimization of cardiac output.
- Direct acting vaspressors (epinephrine and norepinephrine) are recommended to treat bradycardia and hypotension.
- Elevate effected limb to reduce swelling.
- DO NOT apply constricting bandages or tourniquets as these may worsen local tissue injury and increase the risk of permanent disability.
- DO NOT cut, suck, electrocute, burn, or use chemicals on the envenomation site.

### Clinical Grade and Treatment of Scorpion Stings

<table>
<thead>
<tr>
<th>Grade</th>
<th>Effects</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Local Effects Only</td>
<td>Analgesia</td>
</tr>
<tr>
<td>2</td>
<td>Mild/Moderate autonomic excitation (i.e. tachycardia, hypertension), Agitation and anxiety, Pain and paresthesias remote from the sting site</td>
<td>Benzodiazepines</td>
</tr>
<tr>
<td>3</td>
<td>Pulmonary edema, Hypotension and cardiogenic shock, Neuromuscular excitation, somatic neuromuscular dysfunction or cranial nerve dysfunction (associated with Centruroides species)</td>
<td>Antivenom, vasopressors (i.e., norepinephrine, epinephrine), Antivenom, benzodiazepines</td>
</tr>
<tr>
<td>4</td>
<td>Multorgan failure, coma, seizures, end-organ damage secondary to hypotension, somatic neuromuscular dysfunction and cranial nerve dysfunction (associated with Centruroides species)</td>
<td>Antivenom, vasopressors, sedation (benzodiazepine, propofol, phenobarbital), mechanical ventilation</td>
</tr>
</tbody>
</table>

### HYPOTENSION / SHOCK GUIDELINE

**Hypotension / Cardiogenic Shock:**

**Vasopressors**

- **Norepinephrine**
  - 2-20mcg/min IV/IO, titrate to effect
  - (See Norepinephrine Infusion Chart)
  - 5-20 mcg IV/IO Push; may repeat ONCE in 2-5 minutes. If patient remains hypotensive, proceed to continuous infusion.

- **Epinephrine**
  - 1mg/10ml Infusion (See Epinephrine 1mg/10ml Infusion Chart)

### Allergic Reaction / Anaphylaxis

**Analgesia**

- Consider acetaminophen, NSAIDs, and Opioids:
  - **Acetaminophen**
    - 1gram PO prn every 6-8 hours max 4gm in 24 hour period
  - **Ketorolac**
    - 15mg IV every 6hr or 15-30mg IM every 6hr, max daily dose 120mg
  - **Fentanyl**
    - 50-100 mcg (0.5 – 1.0 mcg/kg) IV/IO
    - 100 mcg IN
    - May repeat every 30 min or
    - PO 800mcg OTFC

**Increased Secretions / Salivation/ Lacrimation**

- **Atropine**
  - 0.5 mg every 3-5 minutes, until atropinization achieved, not to exceed a total of 3 mg or 0.04 mg/kg

### Benzodiazepines

- **Midazolam**
  - 2.5-5mg IV / IO every 15-30 prn
  - 5-10 mg IV/IO; then 5-10 mg in 3-4 hours, if necessary

- **Diazepam**
  - 5-10 mg IV/IO; then 5-10 mg in 3-4 hours, if necessary
Snakebite Envenomation Clinical Syndromes

There are 3 major clinical syndromes of snakebite envenomation worldwide and 3 major signs and symptoms of each. All dangerous snakes capable of injuring or killing a human will produce at least one sign or symptom from at least one of the 3 major snakebite syndromes. Specific antivenoms required will vary regionally but the major triads are applicable globally.

HEMOTOXIC SYNDROME:
- Internal and external active bleeding should cease within 30 – 60 minutes of antivenom administration once the appropriate dose has been given.
- Packed red blood cell or whole blood transfusion can be considered if the patient is in hemorrhagic shock.
- Platelets, fresh frozen plasma, cryoprecipitate, TXA, and other agents are not effective in these cases due to the mechanism of the venoms.

Rapid examination for signs of:
- Pain
- Swelling (edema)
- Tissues destruction (necrosis)

Conduct Focused Assessment and Examination to Identify Envenomation Syndrome With permanent marker:
- Write time of bite on patient
- Circle bite mark on patient

NUEROTOXIC SYNDROME:
- Anticipate the need for aggressive airway management with intubation and prolonged ventilation in all patients presenting with neurotoxic envenomation.

Conduct rapid examination for signs of:
- Persistent local bleeding > 30 mins from the bite wound (if visible) or other lesions
- Inspect the molar gingiva and other mucosa for signs of systemic bleeding

Consider:
- Atropine 0.5mg IV/IO
- Titrated by auscultation to dry up bronchial and oral hypersecretions
- Pediatric Dose: 0.01mg/kg up to .25mg

CYTOTOXIC SYNDROME:
- Mark leading edge of pain with a dash line (- - -) and annotate time
- Mark leading edge of edema with a solid line and annotate time

It is important to keep the limb significantly elevated (> 60º is ideal) whenever possible to limit dependent edema and swelling.

Refer to JOINT TRAUMA SYSTEM CLINICAL PRACTICE GUIDELINE (JTS CPG) Global Snake Envenomation Management (CPG ID: 81) for 1st and 2nd line ANTIVENOM based on Region and Syndrome. Follow JTS CPG for ANTIVENOM administrations.
SNAKEBITE SUDDEN COLLAPSE SYNDROME

Signs and Symptoms:

- Rapid onset of shock (<30 min) from bite with any of the following:
  - Angioedema
  - Altered Mental Status
  - Systemic Bleeding
  - Diarrhea

Differential Diagnosis:

- Neurotoxic Syndrome
- Allergic reactions

---

Patient presents with signs and symptoms of sudden collapse syndrome post snakebite.

Stabilize with Epinephrine:

- IM: 0.3-0.5mg (0.3-0.5 mL 1:1000) or EpiPen®
- IV Bolus: 100 mcg over 5-10 min; mix 0.1mg (0.1 mL of 1:1000 in 10mL NS, and infuse over 5-10 min)
- Initiate infusion if hypotension not responsive to IM/IV:
  - IV Infusion: Start at 1 mcg/min; mix 1mg (1 mL of 1:1000 in 500 mL NS, and infuse at 0.5 mL/min; titrate as needed

Airway edema responsive to Epinephrine:

Regional Antivenom Available?

- NO
  - Airway Guideline

- YES
  - Airway edema responsive to Epinephrine

Maintain SBP >90<100 with IV/IO Fluid Resuscitation and Epinephrine and transport to location with appropriate regional antivenom

Establish Advanced Airway per procedure in the following sequence:

(Move to next procedure per individual competencies, contraindications, and/or attempt failures)

- ENDOTRACHEAL INTUBATION
- BIAID
- CRICOTHYROIDOTOMY

---

Pearls:

- Anaphylactic reactions (or hypovolemic shock) should be treated aggressively while simultaneously treating for severe envenomation with appropriate regional antivenom.
- Priority of care for a patient in snakebite sudden collapse syndrome is the consideration of the shorter of two options: evacuating the patient to a location with antivenom or bringing the antivenom to the patient.
- Most patients presenting with hypotension or angioedema are responsive to epinephrine, but may require IV epinephrine infusions to achieve this effect if they are unresponsive to IM epinephrine.

---

See Snakebite Envenomation Clinical Syndromes Guideline

Continued from: Tactical Evacuation Guideline or Snakebite Envenomation Management
Global Spider and Scorpion Envenomation

Background:
Spider and scorpion envenomations can occur in many environments in which the military operates. Many arthropods possess a significant venom but lack a sufficient apparatus (fangs or talon) to inject it into humans. Most bites and stings involve more danger from anaphylaxis, but several species of spiders and scorpions have significant neurotoxic, cytotoxic, or hemotoxic venoms. While most spider and scorpion envenomations result in mild symptoms, severe toxicity and death can occur. Anaphylaxis is the most concerning initial effect. Recognize and treat it immediately using standard acute allergic reaction therapies. Anaphylaxis from an arthropod envenomation is not an indication for antivenom.

SPIDERS:
While many spider species produce venom, the vast majority lack sufficiently large or strong enough fangs to penetrate human skin and cause clinically significant effects. However, spiders venomous to humans can be found throughout much of the world. The chart below provides information regarding clinically significant venomous spider species.

<table>
<thead>
<tr>
<th>Clinically Significant Venomous Spider Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Widow Spiders</strong> <em>(Latrodectus spp)</em></td>
</tr>
<tr>
<td>a.k.a Black Widow</td>
</tr>
<tr>
<td>Red Widow</td>
</tr>
<tr>
<td>Brown Widow</td>
</tr>
<tr>
<td><strong>Violin Spiders</strong> <em>(Laxosceles reclusa)</em></td>
</tr>
<tr>
<td>a.k.a Brown Recluse</td>
</tr>
<tr>
<td>Fiddleback Spider</td>
</tr>
<tr>
<td><strong>Funnel Web Spiders</strong> <em>(Atrax)</em></td>
</tr>
<tr>
<td>a.k.a Australian Funnel-Web Spider</td>
</tr>
<tr>
<td>Africa</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Asia</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Europe</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>North America</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>South America</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>X</td>
</tr>
<tr>
<td>Picture</td>
</tr>
<tr>
<td><img src="image1" alt="Widow Spider" /></td>
</tr>
<tr>
<td><img src="image2" alt="Violin Spider" /></td>
</tr>
<tr>
<td><img src="image3" alt="Funnel Web Spider" /></td>
</tr>
<tr>
<td>Antivenom Available</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

TABLE OF CONTENTS

58
Global Spider and Scorpion Envenomation (Continued)

Scorpions:
Scorpions envenomate humans by stinging them with the telson on their tail. Around 20 species of medically important (meaning potentially lethal to humans) scorpions are known, and all but one of these (Hemiscorpius lepturus) are members of the Buthidae family. Buthidae family contains the large genera Ananteris, Centruroides, Compsobuthus, and Tityus. Centruroides are the only clinically significant venomous scorpion indigenous to the United States (i.e. Bark Scorpions). The majority of medically significant envenomations occur in the Middle East, tropics (e.g., Southwest Asia, India, Central and South America), and North Africa.

Scorpion venoms are complex and can include phospholipase, acetylcholinesterase, hyaluronidase, serotonin, and neurotoxins. Scorpion venom increases neuronal release by blocking inactivation of the sodium channel, resulting in an increase in the amplitude and duration of neuron action potential. The overall result is excess stimulation of the central nervous system, the neuromuscular system, the sympathetic nervous system, and the parasympathetic nervous system.

The components of scorpion venom are species specific and generally fall into the categories of neurotoxic and cardiotoxic; however, this terminology is misleading since the cardiotoxic effects are secondary to an excess release of catecholamines stimulated by the nervous system. The venom of the unique species, Hemicorpius lepturus, found in Iraq and Iran is predominately cytotoxic, similar to the brown recluse spider.

Antivenom is available for some species; data regarding the benefits and risks of many of these antivenoms are significantly limited. In patients with moderate to severe symptoms refractory to analgesics and benzodiazepines, antivenom, if available, may be indicated. Due to the high risk of immediate or delayed allergic reactions to these antivenoms administration should be done at a controlled clinical location and pre-hospital treatment should be focused on supportive care. Intravenous histamine antagonists (i.e. diphenhydramine), steroids, and epinephrine should be immediately available at the patient's bedside prior to antivenom administration. The Joint Trauma System Clinical Practice Guideline: Global Spider and Scorpion Envenomation Management (CPG ID: 84) contains a list of antivenoms available by country. (https://jts.amedd.army.mil/assets/docs/cpgs/Global_Spider_and_Scorpion_Envenomation_Management_09_Feb_2021_ID84.pdf)

Prehospital/En Route Care Treatment Goals for Spider and Scorpion Bites and Stings:
Some moderate to severe cases of envonomations will require medical evacuation to a treatment facility with the capability to administer antivenom. En Route Care consists primarily of supportive care and pain management. En route care providers should be prepared to counter cholinergic, adrenergic, sympathetic and parasympathetic effects. Aggressive use of benzodiazepines as indicated for agitation, neuromuscular stimulation, tachycardia, and hypertension. Secure the airway and initiate mechanical ventilation if indicated. Anaphylaxis is the most concerning initial effect. See specific treatment guidelines for Widow Spiders, Funnel-Web Spiders and Scorpions for additional guidance.
Widow Spider Envenomation

Patients may or may not feel a pinprick upon the initial bite. A pair of small red spots at the envenomation site may be visible; however, the bite site is often not located. Some patients do not develop systemic toxicity. In those patients who do, symptoms typically begin 15 to 60 minutes following the envenomation. The primary symptom is painful muscle cramping, starting at the bite site and progressing towards the center of the body. Patients may develop a painful, rigid abdomen secondary to abdominal muscle spasms which may be mistaken for peritonitis. The pain increases over time and may occur in waves. In some cases, the patient develops a temporary diaphoretic, grimaced, and contorted appearance of the face referred to as “facies latrodectismica.” Other symptoms include vomiting, diaphoresis, tachycardia, hypertension (often profound), and restlessness. Symptoms of Latrodectus envenomation last hours to days. Fatalities from Latrodectus envenomation are exceedingly rare and, when they do occur, are secondary to cardiac arrest (presumably from severe hypertension in patients with predisposing medical conditions) and wound infection.

<table>
<thead>
<tr>
<th>Consider benzodiazepines:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
</tr>
<tr>
<td>2.5-5mg IV / IO</td>
</tr>
<tr>
<td>every 15-30 prn</td>
</tr>
<tr>
<td>or</td>
</tr>
<tr>
<td>Diazepam</td>
</tr>
<tr>
<td>5-10 mg IV/IO; then 5-10 mg in 3-4 hours, if necessary.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Consider:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ondanestron</td>
</tr>
<tr>
<td>4-8mg IV/IO/IM/PO</td>
</tr>
</tbody>
</table>

**Universal Patient Care Guideline**

- **O₂ (if Hypoxemic)**
- IV / IO Guideline IV/ IO in non-effected limb
- Cardiac Monitor (prn)

**Allergic Reaction Guideline**

- **YES**
- **Allergic Reaction / Anaphylaxis?**
- NO

**Pain Management Guideline**

- **YES**
- Severe muscle cramps/spasms?
- NO

**Nausea / Vomiting?**

- **YES**
- When appropriate, return to: Tactical Evacuation Guideline

**Consider acetaminophen, NSAIDs, and Opioids:**

- **Acetaminophen**
  - 1gram PO prn every 6-8 hours max
  - 4gm in 24 hour period

- **Ketorolac**
  - 15mg IV every 6hr
  - or 15-30mg IM every 6hr,
  - max daily dose 120mg

- **Fentanyl**
  - 50-100 mcg (0.5 – 1.0 mcg/kg) IV/IO
  - 100 mcg IN
  - May repeat every 30 min
  - or
  - PO 800mcg OTFC
  - or
  - Morphine
  - 5mg (0.1 - 0.2 mg/kg) IV/IO
  - every 1-6hr prn

**Pearls:**

- Review country environmental concerns before deployment or visitation.
- **Anaphylactic reactions should be treated as soon as recognized.**
- Given the low risk of infection, antibiotics are not routinely recommended.
- Depending upon the severity of pain, acetaminophen, nonsteroidal anti-inflammatory agents, and opioids can be used for pain control.
- **Ketamine is not recommended** as patients may develop tachycardia and have profound hypertension due to widow spider toxin.
- Benzodiazepines may improve muscle spasms.
- Pain control and benzodiazepines are often sufficient to manage tachycardia and hypertension.
- Patients with severe pain refractory to pain medications, antivenom (if available) may be indicated, evacuate to MTF where antivenom is available if able.
- Elevate effected limb to reduce swelling.
- **DO NOT apply constricting bandages or tourniquets** as these may worsen local tissue injury and increase the risk of permanent disability.
- **DO NOT** cut, suck, electrocute, burn, or use chemicals on the envenomation site.

---

**Widow Spider Envenomation**

Patients may or may not feel a pinprick upon the initial bite. A pair of small red spots at the envenomation site may be visible; however, the bite site is often not located. Some patients do not develop systemic toxicity. In those patients who do, symptoms typically begin 15 to 60 minutes following the envenomation. The primary symptom is painful muscle cramping, starting at the bite site and progressing towards the center of the body. Patients may develop a painful, rigid abdomen secondary to abdominal muscle spasms which may be mistaken for peritonitis. The pain increases over time and may occur in waves. In some cases, the patient develops a temporary diaphoretic, grimaced, and contorted appearance of the face referred to as “facies latrodectismica.” Other symptoms include vomiting, diaphoresis, tachycardia, hypertension (often profound), and restlessness. Symptoms of Latrodectus envenomation last hours to days. Fatalities from Latrodectus envenomation are exceedingly rare and, when they do occur, are secondary to cardiac arrest (presumably from severe hypertension in patients with predisposing medical conditions) and wound infection.
CBRN CASUALTY MANAGEMENT

BASIC PRINCIPLES:
Initial care of the CBRN casualty should be approached in the same manner as other casualties. Life threats require prompt recognition and intervention, and non-life-threatening sequelae can be addressed when clinically appropriate. Early recognition and categorization of CBRN-exposed patients is the foundation for further management, and is key not only for initiating patient treatment but also for preventing contamination of medical personnel, equipment, and facilities. Thorough and appropriate decontamination is a core skill that requires planning and practice. Attention to details such as preventing hypothermia in patients undergoing decontamination and clinical reassessment at each stage of the process will reduce unnecessary morbidity. Basic life saving measures such as airway management and resuscitation are fundamental concepts that must be mastered at the appropriate level for each practitioner in the CBRN care chain.

CBRN CRITICAL TASK LIST:
1. Recognize CBRN exposure that requires action to protect self and others.
2. Don personal protective equipment (PPE) to prevent exposure in self and assist others with PPE.
3. Egress from the threat:
   a. Move upwind, uphill, upstream from threat.
   b. Utilize time/distance/shielding for protection.
4. Recognize signs/symptoms of CBRN exposure that prompt immediate self-treatment or treatment of others utilizing CRESS assessment. (RAPID IDENTIFICATION OF CHEMICAL WARFARE AGENTS).
5. Apply TCCC integrated with CBRN response [TCCC + CBRN = (MARCHE)^2].
6. Apply airway management skills in a CBRN setting (positioning, suction, ventilation to include manual.
7. Perform Rapid Spot Decontamination.
8. Identify and establish Hot/Warm/Cold Zones.
9. Establish a dirty casualty collection point (CCP).
10. Understand decontamination principles and casualty procedures for partial or complete removal of PPE, clothing, and equipment (casualty cut out).
11. Understand cross contamination and take appropriate measures to prevent it.
12. Understand available technology that can aid in agent identification.

CBRN MEDICAL REGULATING CONSIDERATIONS:
1. Military Treatment Facility (MTF).
   a. DECON/Treatment Coordination. Ensure MTF is prepared to receive dirty casualties and determine the most appropriate location for DECON.
   b. Treatment Capabilities (Toxicology, Critical Care, Trauma Surgery). Determine whether the MTF has the services necessary to care for
and sustain the CBRN casualty on site and/or establish telemedicine support.

C. Capacity. The CBRN casualty is far more resource intensive than a typical trauma or critically ill casualty. Assess the MTF’s capacity and capability to treat CBRN casualties and identify potential alternate locations.

2. Integrate the medical regulating system into CBRN casualty evacuation.

EVACUATION PLATFORM CONSIDERATIONS:

1. Evacuation of patients must continue even in a contaminated environment.
2. Clean and Dirty. It is necessary to plan for both clean and dirty platforms for evacuation.
   a. Optimize the use of resources, medical or nonmedical, which are already contaminated before employing uncontaminated resources.
   b. Once a vehicle or aircraft has entered a contaminated area, it is highly unlikely that it will be able to be spared long enough to undergo a complete decontamination. Factors include - contaminant, the tempo of the battle, and the resources available.
   c. Contaminated vehicles (air and ground) will have restricted use and are confined to a contaminated environment until decontamination can occur.
3. Refuel.
   a. Consider the time it takes for refueling in a MASCAL situation, as well as the distance from the objective to the DECON site and MTF.
   b. Factor in any platform decontamination that may be necessary prior to arrival at the refueling site.
   c. WARM ZONE Forward Arming and Refuel Points may be necessary.
4. Preparation time (hasty vs. deliberate). Factor the time it takes to prepare the platform for a hasty or deliberate CBRN mission.
5. Radiological Exposure Limitations:
   a. Operational exposure guidance: MEDEVAC operations will establish operational exposure guidelines by the appropriate Surgeon and Command limiting radiation exposure to crews by absorbed dosage.
   b. Radiation exposure records are maintained by the unit CBRN noncommissioned officer and are made available to the commander, staff, and surgeon.
6. Flying Hour Limitations:
   a. Environmental Relative Factors (ERF) under Mission Oriented Protective Posture (MOPP) 3 and 4 limits flying hours to 3 hours day, night or combined modes of flight.
   b. ERF extensions are limited to a case by case basis.

CBRN LANDING ZONES / AMBULANCE (CASUALTY) EXCHANGE POINTS:
1. Route coordination. Consider alternate routes, primary routes may be jammed or unavailable.
2. Consider appropriate distance to accommodate for aircraft rotor wash and direction of landing for Dirty LZs and Clean LZs at the DECON/CCP locations.
3. Environmental Considerations:
   a. Wind
   b. Terrain / Slope
   c. Drainage (for DECON Sites)
   d. Water Sources

CBRN MILITARY WORKING DOG CASUALTY MANAGEMENT

Chemical protective doctrine for animals is incomplete, and there is no chemical protective equipment in the current inventory for MWDs. Equipment and doctrine for animals are under development but pending its availability, any degree of protection of the MWD in a CBRN agent environment will, at best, be extremely difficult. The MWD’s Handler should be in possession of additional ATNAA and CANA kits to use on their MWD. Attempt to obtain and use those resources first when treating a MWD.

MILITARY WORKING DOG DECONTAMINATION PROCEDURES

While not generally a MEDEVAC mission, ensuring proper MWD Decon prior to transport is vital to ensuring the platform and crew are not contaminated by the agent involved.

- Rinse the MWD thoroughly with plain water beginning at the head along the back and to the tail; then rinse down the MWD’s sides, chest, stomach, legs, and paws.
- Work the soap into the hair starting the head, along the back and to the tip of the tail, then work down the MWD’s sides, chest, and abdomen, legs, and paws. Ensure the soap reaches the MWD’s skin. If the MWD has erect ears, flush the ears with otic solution or water.

**Note.** Special attention should be paid to the MWD’s stomach, face, ears, eyes, under tail, paws and in between legs to ensure all contamination is removed.

- Flushed the eyes with copious amounts of water, ophthalmic solution, or saline.
- Rinse with plain water using the same pattern as the initial rinse (head to back to tail, then down sides, chest, stomach, legs, and paws).
• Allow the MWD to shake off excess water. A tarp or other impervious materiel may be placed around the MWD while it shakes off excess water to prevent contaminating of other people, MWDs, or equipment.

TREATMENT OF MILITARY WORKING DOG CASUALTIES OF NERVE AGENTS

• For mildly exposed MWDs, administer a total of two ATNAA injections (atropine and 2-PAM Cl in a single autoinjector) (carried by the MWD handler) into the back of the thigh of the dog. The initial dosage of atropine is 4 mg and the dosage for 2-PAM Cl is 1200 mg.

• For severely exposed MWDs, administer three ATNAA and one CANA. This is similar to the buddy aid a Service member provides another Service member suffering from severe nerve agent exposure. In general, MWDs should not need additional 2-PAM Cl injections.

• Single atropine injections may be given every 10 to 20 minutes until the nerve agent effects have subsided or signs of atropinization appear. The MWD must be monitored for heat stress. Atropine dries the mucous membranes thus preventing the MWD from expelling body heat.

• The initial dosage of 2-PAM Cl in the dog is 20 mg/kilogram. Three ATNAA injectors should provide sufficient amount of 2-PAM Cl. If a MWD is still showing signs of seizure after initial treatment, the handler may give up to 3 additional CANA autoinjections at 5 to 10 minute intervals until the seizures are gone.

• Maintain a clear airway by removing respiratory secretions and saliva obstructing the airway. Loosen or remove the muzzle. In severe nerve agent exposure, the animal’s respiration is markedly depressed and extreme muscular weakness or paralysis is present. In such cases, assisted ventilation is required to effectively resuscitate the animal.

Adequate atropine and 2-PAM Cl should bring about an improvement or restoration of spontaneous respiration and also improve blood circulation. However, the effectiveness of 2-PAM Cl is lost after a short period of time. The 2-PAM Cl varies in its effectiveness against nerve agents. It is least effective against GD nerve agent. In some cases, severe nerve agent symptoms may persist or recur and require veterinary personnel to administer additional 2-PAM Cl autoinjectors every 8 to 12 hours for up to 3 days.
**NERVE AGENT**

**Nerve Agent**
- Liquid or Vapor
- Non-Persistent (GA, GB, GF)
- Persistent (VX)
- Organophosphate Treatment

**PPE and Detection**
- Mask
- AP-PPE
- JLIST or UIPE
- M8 Detection Paper
  - G – Yellow
  - V – Green

**CRESS Symptomatic Presentation**
- C: altered, unconscious, seizures
- R: tachypnea, wheezing, respiratory distress
- E: miosis (may or may not be present with organophosphate)
- S: copious secretions (salivation, lacrimation, bronchorrhea)
- S: diaphoresis

**NERVE AGENT ANTIDOTE**
Antidote Treatment, Nerve Agent, Auto-Injector (ATNAA)
- ATNAA contains 2.1mg Atropine and 600mg Pralidoxime Cholride (2PAM) in each Auto Injector
- Initial administration is 3x ATNAA in rapid sequence for severe signs of nerve agent poisoning (6.3mg Atropine, 1800mg 2PAM)
- Convulsant Antidote Nerve Agent (CANA)
  - CANA contains 10mg Diazepam
  - Administer 1x CANA following 3x ATNAA

**ATROPINE IV/IO**
- 20mg in 250mL NS IV/IO, titrate 1mg every 3 mins to dry secretions
- Once clinical improvement achieved, adjust to rate of 2-4mg/hr

**PRALIDOXIME IV/IO**
- 1-2gm in 250mL NS IV/IO over 15-30min.

**BENZODIAZEPINES IV/IO**
- MIDAZOLAM (preferred) 1-2mg IV/IO, titrate to effect
- DIAZEPAM 10-20mg IV/IO, titrate to effect

**SCOPOLAMINE IV/IM** (adjunct if available)
- 0.8mg IV/IM

**M2, A2, R2, Reassenment** (clear airway, O2 as needed, filtered air)
- Decontaminate and Cutout
- C2, H2, E
- CIRCULATION (asses vitals, resuscitate) administer COUNTERMEASURES as necessary if ATNAA/CANA administered and symptoms persist
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) HEAD INJURY
- EVACUATE to next role of care/zone

**MARCHÉ2 Reassessment**
- Continue to address any immediate life threats
- Provide AIRWAY and RESPIRATORY support as necessary
- Continue CIRCULATION support / COUNTERMEASURES as symptoms dictate
- Prevent HYPOTHERMIA with HPMK, warm fluids / HEAD INJURY treat elevated ICP, conduct neuro exam, MACE

Reassess regularly, follow protocols for respiratory or cardiac compromise.
# BLOOD AGENT - CYANIDE

**Blood Agent – Cyanide**
- Hydrogen Cyanide, Cyanogen Chloride
- volatile water-soluble liquid
- vapor
- Odor: Bitter Almonds

**PPE and Detection**
- Mask
- AP-PPE
- JLIST or UIPE
- M8 Detection Paper
  - Does not detect

**CRESS Symptomatic Presentation**
- C: altered or unconscious
- R: normal to apneic
- E: normal unless vapor irritant
- S: none
- S: may appear flushed (50% occurrence)

---

## HOT ZONE POI

**Immediate Action + M², A², R², E.**
- address MASSIVE HEMORRHAGE / Mask check
- assess AIRWAY / administer ANTIDOTE
- assess RESPIRATIONS / conduct RAPID SPOT DECON
- Extract (move upwind, uphill, upstream – away from threat)

## WARM ZONE DIRTY CCP

**M², A², R², Reassement** (clear airway, O² as needed, filtered air)

**Decontaminate and Cutout**
- Remove and bag equipment, PPE, and clothing
- Evacuation from exposure + clothing removal is adequate decon
- Can further decontaminate skin with irritation solution, but priority is antidote

**C², H², E**
- CIRCULATION (asses vitals, resuscitate) administer COUNTERMEASURES (initial or second Cyanokit®)
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) HEAD INJURY
- EVACUATE to next role of care/zone

**Antidote Considerations:**
- In hot or warm zone, decision to give based on clinical presentation. Unlikely to have diagnostic adjuncts (lactate, arterial/venous samples) prior to cold zone. High concentrations of cyanide can result in death within seconds to minutes. Early symptoms may include dizziness, headache, weakness, diaphoresis, and dyspnea / hyperpnea. CNS and cardiotoxicity occur due to intracellular hypoxia.
- Consider amyl nitrite (0.3mL ampule)
- If Cyanokit® (hydroxocobalamin) antidote is not available, aggressive supportive care may be sufficient treatment.

---

## HOT ZONE POI

**COLD ZONE**

- Continue to address any immediate life threats
- provide AIRWAY and RESPIRATORY support as necessary, provide supplemental O² even with normal SPO₂
- continue CIRCULATION (monitor) / COUNTERMEASURES 2nd dose as appropriate
- prevent HYPOTHERMIA with HPMK, warm fluids / HEAD INJURY treat elevated ICP, conduct neuro exam, MACE

Anticipate hemodynamic compromise, seizures, cardiac arrhythmias
Reassess regularly, follow protocols for respiratory or cardiac compromise.

---

**Cyanide Antidote**
- HYDROXOCOBALAMIN (Cyanokit®) IV/IO
  - 5gm IV/IO over 5min with 200ml NS or LR or D5W
  - Do not shake vial (gently mix)
  - Do not use if solution is not dark red
  - Reapet second 5gm dose based on severity and clinical response
  - Maximum cumulative dose 10gm
### Pulmonary Agents

**Phosgene, Chlorine**
- Phosgene, Chlorine
- Gas (COCl₂) above 47°F/8.3°C
- Gas (Cl) above 29°F/-1.6°C
- Odor Phosgene: freshly mowed hay
- Phosgene toxic below odor threshold

**PPE and Detection**
- Mask (C2-A1 Filter)
- AP-PPE
- JLIST or UIPE
- M8 Detection Paper
- Not effective

**CRESS Symptomatic Presentation**
- C: conscious (unconscious if asphyxia)
- R: normal to respiratory distress, delayed onset up to 24 hours (phosgene)
- E: irritated, injected (chlorine)
- S: Mucous membrane irritation (rhinorrhea, salivation)
- S: Chlorine: immediate irritation (tearing and rhinorrhea) Phosgene: delayed fluid buildup

---

**Circulation**
- assess vitals
- Prevent hypothermia
- Head Injury
- Resuscitate as necessary
- C2, H2, E
- CIRCULATION (asses vitals) COUNTERMEASURES
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) HEAD INJURY
- EVACUATE to next role of care/zone

**Warm Zone (Dirty CCP)**
- M², A², R², Reassessment
- Clear airway (copious secretions)
- Anticipate laryngospasms
- Place advanced airway (largest bore ET as able), be prepared to conduct cricothyroidotomy for failed airway
- Advanced Ventilatory support (SAVe or simple vent may not be sufficient, ARDS technique, need to manipulate peep, volume, FIO₂)
- O₂ as needed, maintain air filter
- Decontaminate and Cutout
- Remove and bag equipment, PPE, and clothing
- Soap and water sufficient for skin decon
- Remove and replace contaminated treatments (chest seals, tourniquets, etc.)
- Prevent HYPOTHERMIA with HPMK, warm fluids
- HEAD INJURY

**Cold Zone**
- MARCHE² Reassessment
- Continue to address any immediate life threats
- provide AIRWAY and RESPIRATORY support as necessary, provide supplemental O₂ even with normal SPO₂
- continue CIRCULATION support (monitor vitals), resuscitate as necessary / COUNTERMEASURES 2nd dose as appropriate
- prevent HYPOTHERMIA with HPMK, warm fluids / HEAD INJURY treat elevated ICP, conduct neuro exam, MACE

---

**Immediate Action + M², A², R², E.**
- address MASSIVE HEMORRHAGE / Mask check
- assess AIRWAY / administer ANTIDOTE
- assess RESPIRATIONS / conduct RAPID SPOT DECON
- Extract (move upwind, uphill, upstream – away from threat)

---

**There is no antidote for Chlorine or Phosgene exposure. Treatment focus is remove from exposure, aggressive management of airway and respirations, supportive care.**

**PHOSGENE:** Onset of symptoms can be delayed up to 24 hours, generally 2-6 hours after exposure. Exertion is associated with worse outcomes, so keep patients exposed to phosgene at rest. The major effects of phosgene are on peripheral airways, therefore dyspnea, chest tightness or pain, and cough are common symptoms. Development of hypoxia and pulmonary edema. Fluid shifts secondary to pulmonary edema may result in hypovolemia.

**Chlorine:** Onset of symptoms are immediate. Chlorine causes more immediate symptoms in the moist areas of the eyes, mouth, and upper airways. Eye pain, blepharospasm, and lacrimation are common. Other symptoms may include headache, salivation, dyspnea, cough, hemoptysis, chest burning, and vomiting. Irrigate eyes if irritated or burning.

Laryngospasm may occur with both Phosgene and Chlorine. Anticipate airway edema and manage airway early. If advanced airway required, place largest endotracheal tube possible to facilitate suctioning. Intravenous fluids may be necessary in the setting of volume depletion, but should not be given empirically. Fluid overload can contribute to pulmonary edema and should be avoided.

**Consider following for wheezing /bronchospasms:**
- ALBUTEROL (2.5mg in 3ml NS)
- METHYLPREDNISOLONE (125mg IV)
- See RESPIRATORY DISTRESS

**Mechanical Ventilations**
- Use ARDS VENTILATOR MANAGEMENT techniques
VESICANT BLISTER AGENTS

**VESICANT BLISTER AGENTS**

- **Anticholinergics**, **Opioids**, **Riot Control**
  - Lewisite (L), Mustard-Lewisite Mixture (HL)
  - Immediate Acting Agent
  - Oily liquid
  - Persistent, Freezing 0.4°F/-17°C
  - Odors: Geraniums

**PPE and Detection**
- **Mask**
- **AP-PPE**
- **JLIST or UIPE**
- **M8 Detection Paper**
  - Red to Pink
- **LCD Detection**
  - Red or Orange

**CRESS Symptomatic Presentation**
- **C**: Conscious (unconscious due to other effects)
- **R**: Immediate irritation, distress
- **E**: Immediate severe pain, blepharospasm edema
- **S**: Normal to increased
- **OTHER**: Systemic effects – distributive shock

**Immediate Action + M², A², R², E.**
- address **MASSIVE HEMORRHAGE** / Mask check
- assess **AIRWAY** / administer **ANTIDOTE** (none in HOT ZONE)
- assess **RESPIRATIONS** / conduct **RAPID SPOT DECON**
- **Extract** (move upwind, uphill, upstream – away from threat) Extraction to the Dirty CCP [For Small Spills (< 2 kg) move away 100m day/300m night] [Large Spills (< 25kg) = 500m day/1000m night]

**M², A², R², Reassessment**
- Clear airway, **O₂** as needed, maintain filtered air
- **ALBUTEROL** (2.5mg in 3ml NS)
- Invasive airway if unresponsive to albuterol

**Decontaminate and Cutout**
- Remove and bag equipment, PPE, and clothing
- Wipe away gross contamination, RSDL cut line, cut out
- RSDL residual contamination on skin (>2min contact time, then wipe away)
- Remove and replace contaminated treatments (chest seals, tourniquets, etc.)

**C², H², E**
- **CIRCULATION** (assess vitals, resuscitate)
- **COUNTERMEASURES** (rapid decon, irrigate eyes and wounds with water)
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) **HEAD INJURY**
- **EVACUATE** to next role of care/zone

**Supportive Care**
- **PAIN MANAGEMENT**
  - Expect SIRS and ARDS in severe cases

**Mechanical Ventilations**
- Use ARDS VENTILATOR MANAGEMENT techniques

**Skin**
- Burns-apply Silvadene & bandage QID (burn fluid resuscitation not necessary)
- Blister fluid may contain Arsenic, unroof >2cm, irrigate, calamine or steroidal cream

**Eyes**
- Petroleum based ophthalmic ointment,

José Isabel

Lewisite binds to tissues and absorbs systemically within two minutes of contact. Symptoms begin to manifest immediately upon exposure and worsen over time. Control of massive hemorrhage and rapid spot decon are top priorities. Casualties with palm-size exposure without rapid decon, >5% BSA burn, pulmonary edema, or shock symptoms with rapid onset require chelation. Early pain control may be required to ensure casualty cooperation. Administration of BAL within 5 minutes of exposure to skin and eyes can neutralize agent.

**COUNTERMEASURE / TREATMENT**

DIMERCAPROL (BAL) Administration
- **Initial Dose**: 3 mg/kg deep IM repeat every 4 hours for two days
- **Then**: Every 12 hours for 7-10 days
- **Severe & Life Threatening Exposure**: consider 5 mg/kg
- **Side Effects**: Increased BP, Tachycardia, Nausea/vomiting, Headache, Anxiety, Injection Necrosis
- **Contraindications**: Nut Allergy.

**Skin**
- Burns-apply Silvadene & bandage QID (burn fluid resuscitation not necessary)
- Blister fluid may contain Arsenic, unroof >2cm, irrigate, calamine or steroidal cream

**Eyes**
- Petroleum based ophthalmic ointment,
INCAPACITATING AGENTS

Incapacitating Agents: Anticholinergics, Opioids, Riot Control

- Variable; aerosol, smoke/gas, or liquid
- Fentanyl derivatives extremely potent lethality

PPE and Detection
- Mask (C2-A1 Filter)
- AP-PPE
- JLIST or UIPE
- M8 Detection Paper
- Not effective

CRESS Symptomatic Presentation
- C: Conscious (unconscious due to other effects)
- R: Immediate irritation, distress
- E: Immediate severe pain, blepharospasm edema
- S: Normal to increased
- S: Immediate pain, erythema, blisters form hours later

C – Sedation
R – Decreased respirations
E - miosis
S – normal
S+ normal

OPIOID ANTIDOTE:
- NAXOLONE (2-4mg) additional escalating doses up to 10mg dose as needed
- May require NAXOLONE drip at 2/3 of response dose/hr
- Support respirations as needed see RESPIRATORY DISTRESS

ANTICHOLINERGICS
- C – Delirium, agitation
- R – normal, tachypnea, tachycardia
- E - red
- S – mydriasis
- S- red, hot dry

ANTICHOLINERGICS ANTIDOTE:
- Titrate Benzodiazepines (2-4mg IV/IO/IM) to control severe agitation
- Support respirations as needed see RESPIRATORY DISTRESS

M2, A2, R2: Reassessment
- Clear airway (copious secretions)
- Anticipate laryngospasms
- Place advanced airway (largest bore ET as able), be prepared to conduct cricothyroidotomy for failed airway
- Advanced Ventilatory support (SAVe or simple vent may not be sufficient, ARDS technique, need to manipulate peel, volume, FIO2)
- O2 as needed, maintain air filter

Decontaminate and Cutout
- Remove and bag equipment, PPE, and clothing
- Soap and water sufficient for skin decon
- Remove and replace contaminated treatments (chest seals, tourniquets, etc.)

C2, H2, E
- CIRCULATION (asses vitals) COUNTERMEASURES
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) HEAD INJURY
- EVACUATE to next role of care/zone

MARCH2 Reassessment
- Continue to address any immediate life threats
- provide AIRWAY and RESPIRATORY support as necessary, provide supplemental O2 even with normal SPO2
- continue CIRCULATION support (monitor vitals), resuscitate as necessary / COUNTERMEASURES 2nd dose as appropriate
- prevent HYPOTHERMIA with HPMK, warm fluids / HEAD INJURY treat elevated ICP, conduct neuro exam, MACE

COLD ZONE

HOT ZONE

POI

WARM ZONE

DIRTY CCP

Immediating Action + M3, A3, R3, E.
- address MASSIVE HEMORRHAGE / Mask check
- assess AIRWAY / administer ANTIDOTE
- assess RESPIRATIONS / conduct RAPID SPOT DECON
- Extract (move upwind, uphill, upstream – away from threat)

WARM ZONE

Decontamination and Cutout
- Remove and bag equipment, PPE, and clothing
- Soap and water sufficient for skin decon
- Remove and replace contaminated treatments (chest seals, tourniquets, etc.)

C2, H2, E
- CIRCULATION (asses vitals) COUNTERMEASURES
- Prevent HYPOTHERMIA / assess mental status (altered due to agent or trauma?) HEAD INJURY
- EVACUATE to next role of care/zone

Laryngospasm may occur with both Phosgene and Chlorine. Anticipate airway edema and manage airway early. If advanced airway required, place largest endotracheal tube possible to facilitate suctioning. Intravenous fluids may be necessary in the setting of volume depletion, but should not be given empirically. Fluid overload can contribute to pulmonary edema and should be avoided.

Consider following for wheezing /bronchospasms:
- ALBUTEROL (2.5mg in 3ml NS)
- METHYLPREDNISOLONE (125mg IV)
- See RESPIRATORY DISTRESS

Mechanical Ventilations
- Use ARDS VENTILATOR MANAGEMENT techniques
TREATMENT OF MINORS

INDICATIONS:
Responding to treat a minor patient without a parent or legal guardian representative available. For the purpose of these guidelines, all patients under age 18 years will be considered minors. Medical aircrew and medical directors should consult unit rules of engagement and applicable laws and adjust accordingly.

PATIENT MANAGEMENT PROCEDURE:
1. Treatment and transport of any minor requiring immediate care to save a life or prevent severe injury will be performed following the principle of implied consent for emergency care. (Assume any minor who needs treatment to save life, limb, eyesight, or to prevent severe injury has provided consent to treatment.)

2. **ALWAYS** act in the patient’s best interest. **ALWAYS** maintain complete and careful documentation.

3. If the parent or guardian is present, follow these guidelines:
   a. Allow one (1) parent to accompany the child during transport after approval of the pilot in command (PC) and if it does not interfere with patient care or flight safety.
   b. In event of major trauma and/or cardiac arrest, judgment should be exercised in allowing parents to accompany the child. Recent evidence supports this practice in emergency departments and some EMS settings, but care should be exercised to maintain crew safety and mission accomplishment.
   c. Allow the parent to hold or touch the child, if possible, while assuring optimal transport restraints to assure safety.
   d. Remember to be open and honest to both parent and child about the child’s condition and any treatment given. **DO NOT** diagnose, **DO NOT** deceive, and **DO** try to comfort the child and parent.

4. In many jurisdictions, parent or legal guardians **CANNOT** refuse consent for treatment/transport of a minor with a life-threatening condition. Contact your medical director in the event of the parent/guardian refusing treatment/transport of a minor with a life-threatening condition.
SEXUAL ASSAULT

INDICATIONS:
1. Reported and/or suspected assault on any person regardless of age or gender.
2. Trauma and/or bleeding to the vagina, rectum or buttocks that cannot be identified as being the result of any other cause.

REMARKS:
1. Focus shall be placed on the victim and on doing what is necessary and appropriate to support victim recovery and also, if a Service Member, to support that Service Member to be fully mission capable and engaged.
2. Medical personnel should be gender-responsive, culturally competent, and recovery-oriented.
   a. Medical providers giving care to sexual assault victims shall recognize the high prevalence of pre-existing trauma (prior to present sexual assault incident) and the concept of trauma-informed care.
   b. If the attending flight medic is not appropriately trained to utilize a Sexual Assault Forensic Evidence (SAFE) Kit, information will be forwarded to the Medical Treatment Facility in order to make the necessary arrangements to complete the SAFE Kit administration as soon as possible.
3. Flight Paramedics shall abide by the Sexual Assault Prevention and Response (SAPR) Program and coordinate with the Sexual Assault Response Coordinator (SARC) and Sexual Assault Prevention and Response Victim Advocate (SAPR VA). The SARCs shall serve as the single point of contact for coordinating care to ensure that sexual assault victims receive appropriate and responsive care.
4. Sexual assault victims shall be given priority and treated as emergency cases. Emergency care shall consist of emergency medical care and the offer of a SAFE Kit.

PATIENT MANAGEMENT PROCEDURE:
1. In the management of sexual assault patients, the DoD’s first priority for victims is to protect, treat with dignity and respect, and to provide the medical treatment, care, and counseling that patients deserve. Under the DoD Confidentiality Policy, sexual assault victims have two reporting options: Restricted and Unrestricted. It is mandatory that all DoD health care providers (including 68Ws) adhere to the parameters of confidentiality and notification pursuant to each form of reporting.
   a. **Restricted Reporting**: Reporting option that allows assault victims to confidentially disclose the assault to specified individuals (e.g., SARC, SAPR VA, healthcare personnel) and receives medical treatment (including emergency care), counseling, and assignment of a SARC and SAPR VA; without triggering an investigation. The victim’s report provided to healthcare personnel (including the information acquired from a SAFE Kit), SARCs, or SAPR VAs will NOT be reported to law enforcement or to the command to initiate the official investigative process.
unless the victim consents or an established EXCEPTION applies. Restricted reporting applies to Service Members and their military dependents 18 years of age and older. Additional persons who may be entitled to Restricted Reporting are NG and Reserve Component members. Only a SARC, SAPR VA, or healthcare personnel may receive a Restricted Report.

b. **Unrestricted Reporting:** A process that an individual covered by this policy uses to disclose, without requesting confidentiality or Restricted Reporting, that he or she is the victim of a sexual assault. Under these circumstances, the victim’s report provided to healthcare personnel, the SARC, a SAPR VA, command authorities, or other persons is reported to law enforcement and may be used to initiate the official investigative process.

5. Priority treatment as emergency cases includes activities relating to access to healthcare, coding, and medical transfer of evacuation and complete physical assessment, examination, and treatment of injuries including immediate emergency interventions.

6. **DO NOT** attempt to examine the patient without informed consent except to treat immediate life, limb, or eyesight threats. SARC notification must not delay emergency medical care treatment of a victim.
   a. Limit cleaning of wounds to only determine severity.
   b. Check for associated or additional injury and/or other illness. Refer to appropriate medical treatment guidelines as appropriate.

7. In situations where installations do not have SAFE kit capability, the installation commander will require that the eligible victim, who wishes to have a SAFE, be transported to a MTF or local off-base, non-military facility that has a SAFE capability. A local sexual assault nurse examiner or other healthcare providers who are trained and credentialed to perform a SAFE may also be contacted to report to the MTF to conduct the examination.

8. Preserve all evidence:
   a. Bag all personal items (e.g., blood stained items, clothes). Paper bags are recommended if available, in order to prevent excess moisture accumulation and subsequent evidence degradation.
   b. Ensure all items are signed for before handing off.
   c. Ensure all interactions, statements made by the patient, and all treatment given is medically documented in patient care record while maintaining patient confidentiality.
# Lund-Browder Burn Estimate Chart – Adult

<table>
<thead>
<tr>
<th>Total Area front/back (circumferential)</th>
<th>one side– anterior</th>
<th>one side– posterior</th>
<th>Do not include in total TBSA</th>
<th>1st °</th>
<th>2nd °</th>
<th>3rd °</th>
<th>TBSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>7</td>
<td>3.5</td>
<td>3.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior trunk*</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior trunk*</td>
<td>13</td>
<td>0</td>
<td>13</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right buttock</td>
<td>2.5</td>
<td>na</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left buttock</td>
<td>2.5</td>
<td>na</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genitalia</td>
<td>1</td>
<td>1</td>
<td>na</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right upper arm</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left upper arm</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lower arm</td>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left lower arm</td>
<td>3</td>
<td>1.5</td>
<td>1.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right hand</td>
<td>2.5</td>
<td>1.25</td>
<td>1.25</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left hand</td>
<td>2.5</td>
<td>1.25</td>
<td>1.25</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right thigh</td>
<td>9.5</td>
<td>4.75</td>
<td>4.75</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left thigh</td>
<td>9.5</td>
<td>4.75</td>
<td>4.75</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right leg</td>
<td>7</td>
<td>3.5</td>
<td>3.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left leg</td>
<td>7</td>
<td>3.5</td>
<td>3.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right foot</td>
<td>3.5</td>
<td>1.75</td>
<td>1.75</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left foot</td>
<td>3.5</td>
<td>1.75</td>
<td>1.75</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>48</strong></td>
<td><strong>52</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>

**Age:**

**Sex:**

**Weight:**

---

**Patient Identification**

---

**Diagram A**

---

**Rev B 1/9**
### Lund-Browder Burn Estimate Chart – Infant

#### Pediatric Lund Browder Burn Estimate & Diagram

<table>
<thead>
<tr>
<th>Total Area front/back (circumferential)</th>
<th>1 to 4 years</th>
<th>5 to 9 years</th>
<th>10 to 14 years</th>
<th>15 years</th>
<th>Do not include in total TBSA 1st</th>
<th>2nd o</th>
<th>3rd o</th>
<th>TBSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>17</td>
<td>13</td>
<td>11</td>
<td>9</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neck</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anterior trunk*</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posterior trunk*</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right buttock</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left buttock</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Genitalia</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right upper arm</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left upper arm</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right lower arm</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left lower arm</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right hand</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left hand</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right thigh</td>
<td>6.5</td>
<td>8</td>
<td>8.5</td>
<td>9</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left thigh</td>
<td>6.5</td>
<td>8</td>
<td>8.5</td>
<td>9</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right leg</td>
<td>5</td>
<td>5.5</td>
<td>6</td>
<td>6.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left leg</td>
<td>5</td>
<td>5.5</td>
<td>6</td>
<td>6.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right foot</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Left foot</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A

---

1

2

3
ESCHAROTOMY

DESCRIPTION:
Escharotomies are performed on deep partial-thickness (2\textsuperscript{nd} degree) or full-thickness (3\textsuperscript{rd} degree) burns to alleviate restriction from damaged tissue. This procedure should only be done prior to transport of patient by a trained provider or for emergency in-flight treatment by trained medical personnel. Medical Directors that sign the SMOG should only allow this procedure to be conducted by individuals underneath their direction on an individual or case by case basis. Immediately notify a burn center or receiving physician if escharotomies are performed prior to transport.

CLINICAL INDICATIONS:
- Deep partial-thickness or full-thickness circumferential burns to arms or legs
  - This may mimic compartment syndrome or act like a tourniquet, reducing arterial circulation resulting in ischemia or necrosis of the limb.
  - Pulses will feel diminished on exam even after elevation.
- Circumferential, full thickness burns to the chest wall
  - This can result in restriction of chest wall expansion and decreased compliance causing difficulty oxygenating and ventilating of intubated patients.
  - Clinical manifestations of chest wall restriction include rapid, shallow respirations; poor chest wall excursion; and severe agitation.

CONTRAINDICATIONS:
- No contraindications

EQUIPMENT:
1. Scalpel, an electrocautery device, or both
2. Chlorhexidine prep
3. Combat gauze and Kerlex
4. Sterile towels

PROCEDURE:
1. Remove patient’s rings, watch, and other jewelry during the initial examination.
2. Prep sterile items/equipment.
3. Outline or identify landmarks.
4. Follow guidelines to make escharotomies bilaterally (medial and lateral) down to the subcutaneous tissue.
   a. Preferred sites of escharotomy (dashed and solid lines). Particular care is needed to divide eschar over involved joint (solid lines). Care must be taken to avoid major nerves, vessels, and tendons.
b. The incision along the extremities should extend through the length of the eschar, over joints, and down to the subcutaneous fat, laterally and medially.

c. Chest incisions usually are made bilaterally along the anterior axillary lines and are connected by a transverse incision at the costal margin.

5. Repeat pulse exam in all extremities, if there is no return of circulation return to step 4.

6. Achieve hemostasis with combat gauze and dry kerlex

7. Skin color, sensation, capillary refill, and peripheral pulses are assessed and documented hourly.
DENTAL PROBLEMS

**Signs and Symptoms:**
- Bleeding
- Pain
- Fever
- Swelling
- Missing / Fractured Tooth

**Differential Diagnosis:**
- Dental Caries
- Infection
- Fracture
- Avulsion
- Abscess / Cellulitis
- Gingivitis

---

**Universal Patient Care Guideline**
- O₂ (if Hypoxemic)
- IV / IO Guideline (pm)
- Cardiac Monitor (pm)

**Control Bleeding**

**Tooth Avulsion?**

**If less than 1hr – attempt to replace tooth in socket**
("See Pearls")

- Place tooth in NS (milk if available)

---

**PAIN MANAGEMENT Guideline**

**When appropriate, return to:**
- Tactical Evacuation Guideline
- Pain Management Guideline

---

**Pearls:**
- Significant soft tissue swelling to face / mouth can represent cellulitis or an abscess.
- **Avulsion** (Complete Avulsion Only)
  - Gently rinse (do not scrub) tooth with NS and attempt to re-implant with firm pressure into the socket. **Never perform this in children with primary teeth.**
  - As able and without obstructing airway, place bulky dressing over tooth and use as a soft bite block to stabilize tooth. Instruct to bite down gently, do not move jaw.
- **Subluxation** (tooth displaced in socket)
  - Treatment not always required.
  - For obviously loose or displaced tooth consider placing bulky dressing over tooth and use as a soft bite block to stabilize tooth. Instruct to bite down gently, do not move jaw.
- Occasionally, cardiac chest pain can radiate to the jaw.
- Patient with dental abscess may experience significant pain at altitude due to gas volume expansion at lower atmospheric pressure. Consider flying at lower altitude and refer to pain management guideline.
FOLEY CATHETER PLACEMENT

CLINICAL INDICATIONS:
• Bladder distention in an unconscious person, or for blockage / inability to urinate in conscious person.
• Allows for accurate monitoring of output for fluid management.

CONTRAINDICATIONS:
• Known or suspected urethral disruption resulting from pelvic trauma.
• Combative or uncooperative patient.

PROCEDURE:
• Choose appropriate catheter (16-18 for adults) and ready equipment.
• Position patient. Females in supine position with legs abducted. Cleanse urethra and surrounding area with antiseptic solution. Isolate area with drapes provided.
• Insert xylocaine jelly provided into urethra with the syringe provided.
• Insert catheter into urethra. For females advance the catheter approx. 3 inches. For males, pass catheter into the bladder the full length to the junction of the catheter and inflation port for balloon.
• Once urine is obtained, inflate balloon with 5cc NS, then pull catheter outward until balloon against bladder neck. If no urine return is given and procedures to induce urine return (bladder palpation) do not work, DO NOT inflate the balloon.
• Secure catheter to leg with tape to prevent trauma to urethra. Document procedure.

Document procedure, results, and vital signs.
**Rapid Identification of Chemical-Warfare Agents**

<table>
<thead>
<tr>
<th>Assess:</th>
<th>Observations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>C- Consciousness</td>
<td>unconscious, seizures, depressed consciousness, agitation</td>
</tr>
<tr>
<td>R- Respiration</td>
<td>present, absent, labored, increased, decreased, normal, abnormal</td>
</tr>
<tr>
<td>E- Eyes</td>
<td>constricted, dilated, normal</td>
</tr>
<tr>
<td>S- Secretions</td>
<td>dry, normal, increased</td>
</tr>
<tr>
<td>S- Skin</td>
<td>diaphoretic, dry, hot, cyanosis</td>
</tr>
</tbody>
</table>

**Pearls:**
- Treatment goals of CBRN is give anti-dote, provide airway support, conduct spot decontamination.
ALTITUDE PHYSIOLOGY AND PATIENT TRANSFER

ALTITUDE CONCERNS FOR AEROMEDICAL TRANSFERS:

- **Gas expansion** occurs as altitude above sea level increases. Gas volume doubles at 18,000’ mean sea level (½ sea level atmospheric pressure) and increases 25% from 5,000’-10,000’. This will typically not affect the operational ceiling for the UH-60 Blackhawk during Aeromedical Evacuation operations. Certain conditions and precautions to note:

  - **Air embolism / Decompression illness** – This is the only absolute contraindication to transport of patients at altitude. These patients should be transferred at sea level or in an A/C capable of cabin pressurization to sea level.

  - **Pneumothorax** – There is little risk of developing a tension PTX due to gas expansion from altitude during typical aeromedical evacuation flights in rotary-wing A/C. However, altitude should be limited when possible to <5,000’ MSL. If mission requirements mandate higher altitudes, the use of aeromedical evacuation platforms with pressurized cabins should be considered as applicable and tactically capable. Prophylactic chest tubes (for altitude-related concerns) are recommended for any flights above 10,000’ mean sea level.

  - **Gastric distention** – Gas expansion does increase the risk of vomiting and, therefore, aspiration. Therefore, all patients with decreased LOC should have an NG / OG tube placed prior to transfer.

  - **Head injury** – As with PTX, there is little concern of altitude related elevation of elevated ICP in head injured patients although penetrating intracranial or maxillofacial injuries may set conditions for an entrapped-gas phenomenon with adverse clinical consequences. Any evidence of elevated ICP should result in treatment per guideline. Altitude restrictions do not differ from those listed for PTX. Constant vigilance should be maintained for evidence of elevation of ICP.

  - **Eye injury** – Penetrating eye injuries or surgeries may introduce air into the globe. Again, the altitudes obtained for rotary-wing A/C does not pose a risk of elevating the IOP during normal operations.
Gas filled equipment – Medical equipment with gas filled bladders also may suffer from interference at high-altitudes. Primarily, endotracheal tube cuffs and pressure bags which should be evaluated at altitude by testing the pressure of the exterior bladder or filled with air. If able, utilize manometer to verify tube pressure. A cuff pressure between 20-30 cmH2O is recommended to provide adequate seal and reduce the risk of complications or tissue damage. Verify with supervising physician or flight surgeon before filling endotracheal tube with saline. Routine filling of endotracheal tubes with saline is no longer recommended.

- **Flow Rates:** Decreased atmospheric pressure may interfere with IV flow rates and/or pump function. These must be monitored continuously.

- **Invasive Blood Pressure:** Adjust / re-calibrate monitor every 1000' if required based upon monitoring device.

- **Hypothermia:** As altitude increases, the temperature will drop about 3.5° F per 1000 feet. This is further complicated in the H-60 due to rotor-wash, forward air speed, normal lapse rate. Therefore, patients must be protected from hypothermia at all times. This includes use of the Hypothermia Prevention and Management Kit (HPMK), blankets, heaters if available, and closing cabin doors / crew windows during transport.

- **Hypoxia:** Patients are at increased risk of hypoxia during transport at altitude. If transfers are taking place in high-altitude locations, pulse oxygenation should be monitored at all times and the medic / provider should maintain a low threshold for the use of supplemental O2. At no time should the patient’s O2 be allowed to go below 92 percent (commercial pulse oximeters read up to 3 percent off, therefore a sat of 91 percent may be seen in a patient who is really at 88 percent.). **Patients who smoke or have underlying cardiopulmonary disease are at increased risk even at low altitudes.**

- **Dysbarism:** Patients may experience discomfort due to gas expansion in air-filled body spaces (e.g., ears, sinuses, teeth) during ascent. Conversely, patients and aircrew may experience "squeeze" resulting from descent from altitude. These are typically mild during RW transport, however, if severe, altitude should be held and attempts made to alleviate pain and/or slow rate of ascent / descent.

  **Document procedure, results, and vital signs.**
POST-OPERATIVE & CC INTERFACILITY TRANSFER

CLINICAL INDICATIONS:
- Patient at outlying MTF requiring transfer to higher role of care for more definitive surgery/treatment

PRE-TRANSFER Patient Status Requirements:
a. JTS CPG – Intra-theater Transfer and Transport – recommends clinical parameters that should be met prior to transfer; if parameters are not met, they should be addressed and en-route mitigation plans formulated BEFORE departure / transfer:
   1) Heart rate 50>120 bpm
   2) SBP >90 mmHg, MAP >60mmHg (permissive hypotension)
   3) If elevated ICP or CPP, maintain MAP 80>110mmHg, SBP 110>160mmHg
   4) Hematocrit >24% (or Hgb >8g/dL)
   5) Platelet count >50/mm³
   6) INR <2.0
   7) pH >7.3
   8) Base deficit <5mEq/L
   9) Temperature >35.5⁰C or 96⁰F
   10) ETCO₂ 35>45, SPO₂ >92%, and/or PaCO₂ 35>45mmHg

If these criteria are not met, the transferring physician should continue resuscitation or provide documentation indicating limitations that compel urgent transfer. This can be documented in the comments section of the Standard Order Set for Critical Care Transfers document.

b. The four MINIMUM requirements which will be met prior to patient transfer are hemorrhage control, adequate shock resuscitation (SBP 90 mmHg, MAP >60 mmHg, UOP >0.5 mL/kg/hr, and/or BD <2, Temp >97⁰F and <100⁰F), stabilization of fractures, and initial post-operative recovery.

c. Attempt to keep patient packaging time at <25 minutes; use of warming devices in accordance with the JTS Hypothermia Prevention CPG.

d. Movement of Deceased Patients:
   1) In general, patients who meet clinical criteria for death are not to be transported by MEDEVAC, with the exception of extreme extenuating circumstances, such as emergency exfiltration during CSAR.
2) If vital signs are absent prior to launch, make all reasonable attempts to resuscitate as clinical and tactical circumstances permit. If unsuccessful, consider basic cardiac ultrasound (as available) to determine whether any signs of cardiac activity are present. If absent, mission abort is warranted.

3) In such circumstances, contact and consultation with medical control or other available physician is suggested, in order to facilitate field determination of death and cessation of resuscitative efforts.

PROCEDURE:

a. Role 2/3 provider responsibilities:

It is the responsibility of the transferring physician to write enroute care orders appropriate for the transport environment and individualized for each patient in consultation with the Critical Care Flight Paramedic and/or the ECCN (or attending Flight Provider) prior to launch. The Flight Paramedic / Provider should be given a **Standard Order Set for Critical Care Transfers** or similar document with en route care orders signed by the transferring physician.

1) Provide a complete report to Flight Paramedic / Provider.
2) Provide all patient-specific related medical records.
3) Assist Flight Paramedic / Provider with packaging patient for transport as requested.
4) Complete specified areas on the appropriate patient care report
   i. Administrative data
   ii. Most current laboratory data
   iii. Mechanism of Injury (MOI)
   iv. Diagnosis
   v. Procedures
5) Place patient on ventilator at least 30 minutes prior to flight. Obtain pre-flight ABG to ensure patient tolerates ventilator settings.
6) It is strongly suggested that the transferring physician make every possible attempt to contact and discuss the case with the receiving physician or facility representative. Flight Paramedics and ECCNs should confirm or encourage this vital "physician-to-physician hand-off" if practicable.

b. FLIGHT PARAMEDIC / PROVIDER responsibilities prior to transfer:

1) Obtain orders for en route care from transferring physician; review orders and discuss potential en route problems with transferring physician, reconcile medications (ensure needed medications, specific to patient’s
condition, are obtained and prepared), allergies and patient’s weight, confirm patient’s identification, and secure personal effects.

2) Perform primary & secondary assessment ensuring an understanding of the patient’s injuries / illness / procedures performed.

3) Spinal immobilization is indicated during transfer if ordered by transferring physician.

4) Assess placement and secure all tubes, lines, and drains & ensure proper functioning.

5) Ensure endotracheal tube is secure; secure pulse oximeter / ETCO₂ monitor.

6) Review ABG – ABG should be done within 30 minutes of flight; patient should be on transport ventilator with vent settings for transport; ABG obtained 15 minutes after being placed on transport ventilator.

7) Ensure vascular access X 2 - peripheral, central or IO and A-line as needed.

8) Check all bandages, splints, dressing, fixation devices and tourniquets for placement and ensure no evidence of ongoing hemorrhage.

9) If indicated, insert OG/NG tube for gastric decompression, especially in intubated patients; cap or place to suction.

10) Empty Foley catheter bag prior to flight; ensure UOP documentation by transferring facility.

11) For an intubated patient, provide adequate analgesia and sedation PRIOR to giving additional paralytic medications. Re-dose medications as needed prior to flight in accordance with transferring physician’s orders.

12) Continue administration of blood products if ordered by transferring physician. If anticipated administration of blood products enroute, Flight Paramedic/Provider should request orders for blood products and appropriate blood products from the transferring physician and use FDA approved fluid warming device as appropriate for warming fluids.

13) Collect all patient care documentation for transport with patient, i.e. pre-hospital, transport, labs, x-rays, transferring facility notes, etc.

14) Remove all air from IV fluid bags and place all free flowing bags in pressure bags.

15) Ensure patient is properly packaged in a warming device unless contraindicated prior to transfer. Follow directions specific to each warming device ensuring over heating or thermal burns do not occur. Hypothermia, acidosis and coagulopathy constitute the “triad of death” in trauma patients.

16) Securely affix all equipment, supplies, loose tubing and lines to NATO litter prior to moving the patient to the vehicle or aircraft.
17) Once patient is packaged, ensure all lines are leveled and monitors are zeroed.
18) Provide eye and ear protection to patient.

c. Special considerations:
1) Eye Trauma: Fox shields should be placed for any patient with a suspected or confirmed open globe, possible intraocular foreign body or eye injury. **DO NOT remove impaled or stubborn foreign bodies from the eyes.** (even contact lens) **SHIELD AND SHIP.** DO NOT PLACE ANY DRESSINGS UNDER RIGID EYE SHIELD or manipulate the injured eye. Both the injured and uninjured eye should be covered to avoid excessive movement of the injured eye which may result from involuntary convergence. Also want to avoid nausea/vomiting in these patients. Normal Saline may be used to rinse eyes in awake patient with no penetrating injury. (JTTS CPG - Initial Care of Ocular & Adnexal Injuries)

2) Compartment Syndrome: Patients with extremity injuries, abdominal injuries/surgery, burns, coagulopathy and those who have received massive transfusion are at risk for compartment syndrome. Ensure proper assessment prior to flight. If compartment syndrome is suspected during flight, place extremity at the level of the heart. Pain out of proportion to the injury and paresthesia are symptoms of compartment syndrome, as well as pallor, paralysis, pulselessness, and poikilothermia. Patients who are sedated, paralyzed or have an epidural or block in place are at increased risk and require judicious hands on assessment of at risk abdomen and extremities. (JTTS CPG – Compartment Syndrome and Fasciotomy)

3) Burns: For patients with partial and/or full-thickness burns to > 20% TBSA, use of the Burn Patient Admission Orders and **JTTS Burn Resuscitation Flow Sheet** are REQUIRED and should be continued during transfer to another facility. (JTTS CPG – Burn)

4) Advanced pain management modalities: For patients with epidurals, continuous peripheral nerve blocks, PCA infusions, or other pain medicine infusions, a pain note should be completed prior to transport as it is a vital part of provider communication. (JTTS CPG – Management of Pain, Anxiety and Delirium in Injured Warfighters)

5) Sedation and pain management must be maintained at appropriate levels throughout transport. As appropriate and as directed by transferring physician, attempt to maintain sedation target as follows using the Riker Sedation-Agitation Scale (SAS)

**Riker Sedation-Agitation Scale (SAS):** Used as sedation target goal for Post Surgical / CC
• Non-intubated patients, provide sedation as needed to maintain a goal SAS Score of 3-4.
• Intubated patients, provided sedation as needed to maintain a goal SAS Score of 1-2.

<table>
<thead>
<tr>
<th>Definition</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 Dangerous agitation</td>
<td>Pulling at endotracheal tube, trying to remove catheters, climbing over</td>
</tr>
<tr>
<td></td>
<td>bedrail, striking at staff, thrashing from side-to-side</td>
</tr>
<tr>
<td>6 Very agitated</td>
<td>Does not calm despite frequent verbal reminding of limits, requires</td>
</tr>
<tr>
<td></td>
<td>physical restraints, biting endotracheal tube</td>
</tr>
<tr>
<td>5 Agitated</td>
<td>Anxious or physically agitated, attempting to sit up, calms down on verbal</td>
</tr>
<tr>
<td></td>
<td>instructions</td>
</tr>
<tr>
<td>4 Calm, cooperative</td>
<td>Calm, arousals easily, follows commands</td>
</tr>
<tr>
<td>3 Sedated</td>
<td>Difficult to arouse, awakens to verbal stimuli or gentle shaking but drifts</td>
</tr>
<tr>
<td></td>
<td>off again, follows simple commands</td>
</tr>
<tr>
<td>2 Very sedated</td>
<td>Arouses to physical stimuli but does not communicate or follow commands,</td>
</tr>
<tr>
<td></td>
<td>may move spontaneously</td>
</tr>
<tr>
<td>1 Unarousable</td>
<td>Minimal or no response to noxious stimuli, does not communicate or follow</td>
</tr>
<tr>
<td></td>
<td>commands</td>
</tr>
</tbody>
</table>

ECC Nurse Protocols May 2012

d. Patient Care Enroute to the Receiving Hospital

1) Patient vital signs will be monitored continuously enroute and documented at least every 5 – 15 minutes (q5min if on pressors) per transferring physician’s orders.

2) Reassess patient at least every 15 minutes and address events as necessary following transferring physician’s orders and protocols for the specific illness or injury.

3) Assess pain control, sedation and need for paralysis. Re-dose medications as needed in accordance with transferring physician’s orders. Ideally, paralytic medication should not be administered near the end of the flight. Significant, adjunctive analgesia may be required to compensate for initial lift, landing and in flight combat maneuvers, therefore Flight Paramedic/Provider should consider carrying higher volumes of analgesia that would be normally used in ground transport or fixed facilities.

4) All events will be addressed with appropriate interventions according to transferring physician’s orders and protocols. All interventions require reassessment for patient response to the intervention.

5) All enroute care, including ventilator changes, medications, events, interventions, and patient’s response will be documented on the appropriate patient care documentation.
e. Patient Report and Transfer of Care at the Receiving Hospital

1) A verbal and written patient report will be given to the receiving nurse or physician upon delivery of the patient.

2) Routinely, the responsibility of care will be transferred at the receiving ED. On rare occasions (i.e. mass casualty incidents, pending emergency flights, etc.), care may need to be transferred on the helipad rather than at the bedside.

3) For Tail-to-Tail transfers, the Flight Paramedic/Provider initiating transport will send all documentation from the transferring facility and the patient care documentation from the first leg of the flight with the Flight Paramedic/Provider completing the second leg of the transfer. The Flight Paramedic/Provider completing the second leg of the transfer will initiate their own patient care documentation, circling “2nd Leg” at the top of the form and ensure all documentation is turned over to the MTF upon arrival and hand off of patient care.

4) The patient care documentation will be completed and left with the patient at the receiving facility at the time of patient handover. If unable to complete documentation due to extensive mission requirements, the patient care documentation will be forwarded to the appropriate medical information receiving facility/person IAW local / theater policy.

Any in-flight problems should be addressed per appropriate protocol and per written instruction from transferring physician. Continued problems should prompt contacting medical control as soon as it is possible.

Document procedure, results, and vital signs.
### Tactical Evacuation After Action Report & Patient Care Record

#### REPORT TITLE
**Tactical Evacuation After Action Report & Patient Care Record, Page 1**

#### Event:
- Date: ____________
- Time: ____________
- Time Zone: O L O Z
- MM ( ): ____________
- Pt #: ____________
- Tail to Tail: Y O N
- Leg #: ____________

#### 9-Line:
- Time: ____________
- Platform: ____________
- Dispatch Cat: ____________
- Assessed Cat: ____________

#### Trauma MIST Report:
- M: Mechanism of Injury
- I: Injury
- S: Signs & Symptoms
- T: Treatments

#### Disease Diagnosis: ____________

#### Comments: ____________

#### Pickup:
- Time: ____________
- Role: ____________
- Other: ____________
- Region: ____________
- Other: ____________
- Location: ____________

#### Dropoff:
- Time: ____________
- Role: ____________
- Other: ____________
- Region: ____________
- Other: ____________
- Location: ____________

#### Capability: EMT-B, EMT-I, EMT-P, EMT-FPC, RN, CRNA, PA, MD/DO

#### Circulation-Hemorrhage Control
- Direct Pressure: ____________
- Tourniquet: ____________
- Prior TO: ____________
- Reasses/tighten: ____________
- Time On: ____________
- CAT: ____________
- SOFT: ____________
- Other: ____________
- РUE: ____________
- LUE: ____________
- RLE: ____________
- LLE: ____________
- Time On: ____________
- CAT: ____________
- SOFT: ____________
- Other: ____________
- РUE: ____________
- LUE: ____________
- RLE: ____________
- LLE: ____________
- Time On: ____________
- CAT: ____________
- SOFT: ____________
- Other: ____________
- РUE: ____________
- LUE: ____________
- RLE: ____________
- LLE: ____________
- Time On: ____________
- AAUT: ____________
- C佬C: ____________
- JETT: ____________
- SAM: ____________
- Other: ____________
- Functional: ____________
- TQ Comments: ____________

#### Airway
- Self: ____________
- NPA: ____________
- OPA: ____________
- Cric: ____________
- Trach: ____________
- ETT: ____________
- SGA Type: ____________
- Tube Size: ____________
- Pos: ____________
- @: ____________
- Confirmed: ____________
- BS: ____________
- Vis: ____________
- ETCO2: ____________
- O2 Source: NC, NRS, BVM, Vent, LPM
- Intubated: ____________
- Prior to transport: ____________
- By transport crew: ____________
- Suction: ____________
- ETT: ____________
- Yaunker: ____________

#### Breathing
- Needle Decompression: ____________
- Mid-ax: ____________
- Mid-clav: ____________
- Time: ____________
- R: ____________
- L: ____________
- Y: ____________
- E: ____________
- N: ____________
- N/A: ____________
- Respiratory Effort: ____________
- Unlabored: ____________
- Labored: ____________
- Agonal: ____________
- Assisted: ____________
- Chest Tube: ____________
- Time: ____________
- R: ____________
- L: ____________

#### Vent Settings
- Time: ____________
- Mode: ____________
- Rate: ____________
- TV: ____________
- FiO2: ____________
- PEEP: ____________
- PIP: ____________
- ETCO2: ____________

#### Circulation - Assessment
- Pulse: ____________
- Blood Pressure: ____________
- Jots: ____________
- Time: ____________
- Component: ____________
- ABO/RH: ____________
- Unit Number: ____________
- Exp. Date: ____________
- Blood Age: ____________

#### Circulation - Resuscitation
- Transfusion Indication: ____________
- HR > 120: ____________
- SBP < 90: ____________
- IO Type / Site: ____________
- IV Lines: ____________
- Central Line: ____________
- Location: ____________
- Arterial Line: ____________
- WRIST: ____________
- R: ____________
- L: ____________
- GLOW: ____________
- R: ____________
- L: ____________

#### PREPARED BY
- Name, Rank & Title: ____________

#### MEDICAL RECORD-SUPPLEMENTAL MEDICAL DATA

For use of this form, see AR 40-66; the proponent agency is the Office of the Surgeon General

#### JTSAAPPROVED (Date): (12 Jul 2018) - V4.1

### Annotate Injuries
- AM/P/utation: ____________
- (BL/eeding: ____________
- (B)urn %TBSA: ____________
- (C)reputation: ____________
- (D)epiformity: ____________
- (E)DG/Disability: ____________
- (E)cchymosis: ____________
- (F)racture: ____________
- (GS)/Gunshot Wound: ____________
- (H)ematoma: ____________
- (I)mpaired Object: ____________
- (L)aceration: ____________
- (P)ain: ____________
- (P)erforating: ____________
- (P)uncture Wound: ____________
- (S)ubcutaneous Air: ____________
- (T)BI/I: Suspect: ____________
- Other: ____________

### OTHER EXAMINATION OR EVALUATION
- HISTORY/PHYSICAL: ____________
- TREATMENT: ____________
- DIAGNOSTIC STUDIES: ____________
- FLOW CHART: ____________
- OTHER EXAMINATION OR EVALUATION: ____________
- OTHER, Specify: ____________
### Medical Record - Supplemental Medical Data

**Report Title:** Tactical Evacuation After Action Report & Patient Care Record, Page 2

**Prepared By:**

(Signature & Title)

**Documents Received:**
- [ ] TCCS Card
- [ ] Patient Chart
- [ ] None
- [ ] Other

**Narrative Summary of Care:**

---

### Vital Signs

<table>
<thead>
<tr>
<th>Time</th>
<th>HR</th>
<th>BP</th>
<th>RR</th>
<th>SpO₂</th>
<th>ETCO₂</th>
<th>Temp</th>
<th>F</th>
<th>C</th>
<th>AVPU</th>
<th>GCS: Eyes 1-5</th>
<th>Verbal 1-5</th>
<th>Motor 1-5</th>
<th>Total</th>
<th>Pain 0-10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PERRLA:**
- [ ] R Size (mm) __________
- [ ] L Size (mm) __________

**Field Ultrasound Results:**

**Other Diagnostics:**

---

### Additional Interventions

**Foley**
- [ ] Time
- [ ] Comment
- [ ] Gastric Tube
- [ ] Oral
- [ ] Nasal
- [ ] Comment

**Protection**
- [ ] Eye Shield
- [ ] Protective Eyewear
- [ ] Right
- [ ] Left
- [ ] Comment

**Immobilization**
- [ ] C-Collar
- [ ] C-Spine
- [ ] Spine Board
- [ ] Pelvic Splint
- [ ] Pelvic Binder, Type
- [ ] Splint, Type/Location

**Warming**
- [ ] Hypothermia Prevention, Product
- [ ] Hypothermia Prevention, Product

**Other Interventions**

---

### Medications and Fluids

<table>
<thead>
<tr>
<th>Time</th>
<th>Drug/Fluid</th>
<th>Dose</th>
<th>Route</th>
<th>Time</th>
<th>Drug/Fluid</th>
<th>Dose</th>
<th>Route</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Documents Received**
- [ ] TCCS Card
- [ ] Patient Chart
- [ ] None
- [ ] Other

**Narrative Summary of Care**

---

### Enroute Care Provider

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>Rank</th>
<th>Capability</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Email PCR to:** DHAJBSAJ 3.ListJTS Prehospital:email.mi

**Prepared By:**

(Signature & Title)

**Department/Service/Clinic/Training Unit:**

**Date:**

**Patient's Identification:**

(last, first, middle, grade, date-hospital or medical facility)

<table>
<thead>
<tr>
<th>Last Name</th>
<th>First Name</th>
<th>MI</th>
<th>Bra</th>
<th>Rank</th>
<th>Unit</th>
<th>Pt Cat</th>
<th>SSN</th>
<th>DOB</th>
<th>Gender</th>
<th>Age</th>
<th>Allergy</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Exam or Evaluation**

- [ ] Other, Specify

---

91
## Casualty's Protective Equipment

<table>
<thead>
<tr>
<th>Item</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helmet, Ballistic</td>
<td>☐</td>
</tr>
<tr>
<td>Tactical Vest (IOTV)</td>
<td>☐</td>
</tr>
<tr>
<td>Eye Protection</td>
<td>☐</td>
</tr>
<tr>
<td>Ear Protection</td>
<td>☐</td>
</tr>
<tr>
<td>Plate Front</td>
<td>☐</td>
</tr>
<tr>
<td>Plate Back</td>
<td>☐</td>
</tr>
<tr>
<td>Plate Right Side</td>
<td>☐</td>
</tr>
<tr>
<td>Plate Left Side</td>
<td>☐</td>
</tr>
<tr>
<td>Neck Protector (Back)</td>
<td>☐</td>
</tr>
<tr>
<td>Throat Protector (Front, Left)</td>
<td>☐</td>
</tr>
<tr>
<td>Deltoid Right</td>
<td>☐</td>
</tr>
<tr>
<td>Deltoid Left</td>
<td>☐</td>
</tr>
<tr>
<td>Groin Shield</td>
<td>☐</td>
</tr>
<tr>
<td>Pelvic Undergarment Tier 1</td>
<td>☐</td>
</tr>
<tr>
<td>Pelvic Undergarment Tier 2</td>
<td>☐</td>
</tr>
<tr>
<td>Blast Gauge</td>
<td>☐</td>
</tr>
<tr>
<td>Blast Sensor Helmet</td>
<td>☐</td>
</tr>
<tr>
<td>Blast Sensor Other</td>
<td>☐</td>
</tr>
</tbody>
</table>

### AAR Discussion
- Event Date: ____________
- Tactical situation complicated care (Explain in discussion)
TACTICAL COMBAT CASUALTY CARE (TCCC) CARD

BATTLE ROSTER #: ______________________

EVAC: □ Urgent □ Priority □ Routine

NAME (Last, First): ________________________ LAST4: ________

GENDER: □ M □ F DATE (DD-MMM-YY): __________ TIME: ___________

SERVICE: __________ UNIT: __________ ALLERGIES: __________

Mechanism of Injury: (X all that apply)
□ Artillery □ Blunt □ Burn □ Fall □ Grenade □ GSW □ IED
□ Landmine □ MVC □ RPG □ Other: _____________________________

Injury: (Mark injuries with an X)

TQ: RArm
TYPE: ________
TIME: __________

TQ: LArm
TYPE: ________
TIME: __________

TQ: R Leg
TYPE: ________
TIME: __________

TQ: L Leg
TYPE: ________
TIME: __________

Signs & Symptoms: (Fill in the blank)

<table>
<thead>
<tr>
<th>Time</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pulse (Rate &amp; Location)</td>
</tr>
<tr>
<td>I</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>I</td>
<td>Respiratory Rate</td>
</tr>
<tr>
<td>I</td>
<td>Pulse Ox % 02 Sat</td>
</tr>
<tr>
<td>I</td>
<td>AVPU</td>
</tr>
<tr>
<td>I</td>
<td>Pain Scale (0-10)</td>
</tr>
</tbody>
</table>

DD Form 1380, JUN 2014

TCCC CARD
**BATTLE ROSTER #:**

**EVAC:** □ Urgent □ Priority □ Routine

**Treatments:** (X all that apply, and fill in the blank) **Type**

<table>
<thead>
<tr>
<th>C: TQ- □ Extremity □ Junctional □ Truncal</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dressing-□ Hemostatic □ Pressure □ Other</td>
<td></td>
</tr>
<tr>
<td>A: □ Intact □ NPA OCRIC □ ET-Tube □ <strong>SGA</strong></td>
<td></td>
</tr>
</tbody>
</table>

**8:** □ 02 □ Needle-D □ Chest-Tube □ Chest-Seal

**C:**

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Name</th>
<th>Volume</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Blood Product</th>
<th>Name</th>
<th>Volume</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
</table>

**Meds:**

<table>
<thead>
<tr>
<th>Analgesic (e.g., Ketamine, Fentanyl, Morphine)</th>
<th>Name</th>
<th>Dose</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Antibiotic (e.g., Moxifloxacin, Ertapenem)</th>
<th>Name</th>
<th>Dose</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Other (e.g., TXA)</th>
<th>Name</th>
<th>Dose</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
</table>

**OTHER:** □ Combat-Pill-Pack □ Eye-Shield (R L) □ Splint □ Hypothermia-Prevention **Type:**

**NOTES:**

**FIRST RESPONDER**

**NAME** (Last, First): ______________________ LAST4: __________

DD Form 1380, JUN 2014 (Back) **TCCC CARD**
## TACTICAL COMBAT CASUALTY CARE AFTER ACTION REPORT (TCCC AAR)

Complete within 72hrs after mission and submit to the Joint Trauma System via email: DHA.JBSA.j-3.List.JTS-Prehospital@mail.mil

<table>
<thead>
<tr>
<th>Event Date:</th>
<th>Time:</th>
<th>Local</th>
<th>ZULU</th>
<th>Country:</th>
<th>Theater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Injury</td>
<td>Battle Injury (BI):</td>
<td>WIA</td>
<td>KIA</td>
<td>DOW</td>
<td>Non-Battle Injury (NBI):</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evacuation Category</th>
<th>URG</th>
<th>PRI</th>
<th>ROU</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Litter Type</th>
<th>Time of Pick Up:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Vehicle</td>
<td>Time of Pick Up:</td>
</tr>
<tr>
<td>Aircraft</td>
<td>Time of Pick Up:</td>
</tr>
<tr>
<td>Watercraft</td>
<td>Time of Pick Up:</td>
</tr>
</tbody>
</table>

### Casuality Demographics (mini. requirement: last name & last 4 SS#)

<table>
<thead>
<tr>
<th>Last Name:</th>
<th>First Name:</th>
<th>Rank:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>M</th>
<th>F</th>
<th>SSN/DoD ID:</th>
<th>DOB:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Non-Medic (NM) First Responder</th>
<th>Last Name:</th>
<th>First Name:</th>
<th>Rank/Title:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Point-of-Injury</th>
<th>Other POI Provider (OP)</th>
<th>Last Name:</th>
<th>First Name:</th>
<th>Rank/Title:</th>
</tr>
</thead>
</table>

### Mechanism of Injury

- Airborne Operation
- Aircraft Crash
- Blast – Dismounted IED or Mine
- Blast – Mounted IED or Mine
- Blast – RPG or Grenade
- Blast – Indirect Fire (Mortar/Artillery/Missile)
- Blast – Other
- Collapse/Crush/Compartment from Structure
- Fire/Explosion
- Fall, Height: ______ ft
- Fragmentation/Shrapnel
- GSW – Gunshot Wound
- Vehicle Accident/Collision
- Environmental: ____________________________
- Other: ____________________________

### Injuries

| (A) mputation |
| (B) bleeding |
| (Bu)rns, TBBSA: ____% |
| (C)repitus |
| (D)eformity |
| (D)egloving |
| (E)chymosis |
| (F)racture |
| (Gsw) Gun Shot Wound |
| (H)ematoma |
| (L)aceration |
| (P)ain |
| (PP)Peppering |
| (PW)Puncture Wound |

### Signs

- Initial Check: Time
  - A V P U GCS: /15 (E /4 A V P U GCS: /15 (E /4
  - V /5, M /6) RR: HR: BP:

- Last Check: Time
  - A V P U GCS: /15 (E /4
  - V /5, M /6) RR: HR: BP: pO2 (%): Pain level /10: EtCO2 (mmHG):

### Treatments

- Massive Hemorrhage Control (TQ/Hemostatic Adjunct)
- Airway
- Respiration/Breathing

### Annotate Injuries

Eye Opening - 4: spontaneous, 3: to speech, 2: to pain, 1: no response
Motor Response - 6: follows commands, 5: localizes pain, 4: withdraws from pain, 3: decorticate flexion, 2: decerebrate extension, 1: no response
Verbal Response - 5: alert and oriented, 4: disoriented conversation, 3: speaking but nonsensical, 2: moans, unintelligible sounds, 1: no response
# TACTICAL COMBAT CASUALTY CARE AFTER ACTION REPORT (TCCC AAR)

Complete within 72hrs after mission and submit to the Joint Trauma System via email: DHA.JBSA-J-3.List.JTS-Prehospital@mail.mil

## Circulation - Resuscitation

<table>
<thead>
<tr>
<th>Options</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
</tbody>
</table>

## Interventions - Other

<table>
<thead>
<tr>
<th>Options</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
</tbody>
</table>

## Medications - Pain, Infection, Other

<table>
<thead>
<tr>
<th>Options</th>
<th>Time</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
<tr>
<td>NM</td>
<td>M</td>
<td>OP</td>
</tr>
</tbody>
</table>

## Comments - Additional Treatment

Sustains (Treatment, Equipment, Evacuation, Operations):

Improves (Treatment, Equipment, Evacuation, Operations):

Last Name: 
SSN/DoD ID: 96
CANINE-TACTICAL COMBAT CASUALTY CARE CARD (cTCCC)

EVAC CAT: [ ] Urgent  [ ] Priority  [ ] Routine

EVAC TYPE: [ ] Fixed  [ ] Rotary  [ ] Ground  [ ] MEDEVAC  [ ] CASEVAC

UNIT: __________  NAME: __________  TATTOO: __________

DATE: (DD-MM-YY) __________  TIME: ________  GENDER: [ ] M  [ ] F

Mechanism of Injury: (Mark X all that apply)
[ ] IED  [ ] GSW  [ ] MINE  [ ] BURN  [ ] GRENADE  [ ] ARTILLERY  [ ] FALL
[ ] OTHER: __________

Injury: (Mark all injuries that apply with an X)

![Dog illustrations]

Signs and Symptoms: (fill in the blank)

<table>
<thead>
<tr>
<th>Time</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Score (0-10)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature (99-102.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Rate/Location (60-80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respiration (16-30)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood Pressure (120/80)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pulse Ox% (&gt; 95%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capillary Refill (&lt; 2 sec)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTES: __________________________________________________________

______________________________________________________________

DD FORM 3073  OCTOBER 2019  (Send card to dog.consult@us.af.mil)  Page of
CANINE-TACTICAL COMBAT CASUALTY CARE CARD (cTCCC)

Treatments: (Mark X all that apply) and fill in the blank

M: Dressing - □Hemostatic □Pressure □TQ  Other: ____________
A: □Intact □ET-Tube □Tracheostomy ____________
R: □O2 □Needle-D □Chest-Tube □Chest-Seal ____________
C:

Total Crystalloid Shock Volume of fluids is 90 mls/kg:
Administer 20ml/kg over 10-20 min. Reassess (as with human casualty):
If lack of response after 2-3 boluses consider adjunct therapy (HES/HTS.)

<table>
<thead>
<tr>
<th>CRYSTALLOID</th>
<th>Volume</th>
<th>Route</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYDROXYETHYL STARCH (HES): 5mls/kg over 5 - 10 min. After ½ shock crystalloid not effective.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HYPERTONIC SALINE (HTS): 4mls/kg (if two or three ½ shock boluses and 1-2 boluses of HES not effective)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TXA: 10 mg/kg IV in 100ml NaCl or LRS given in first 3hrs. Followed by a 10-15 mg/kg CRI over 8 hours.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

C: □Splint □Other Bandage ____________
H: □Hypothermia-Prevention □Hypothermia-External Cooling
H: □Head Injury

Pain Meds and Antibiotics (Circle if given and write the time in the notes.)

<table>
<thead>
<tr>
<th>DRUG (conc)</th>
<th>DOSE</th>
<th>RTE</th>
<th>60lb/27.3kg</th>
<th>70lb/32kg</th>
<th>80lb/36.4kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ketamine (100mg/ml)</td>
<td>2.5mg/kg</td>
<td>IV/IM</td>
<td>1 ml</td>
<td>1.5 mls</td>
<td>2 mls</td>
</tr>
<tr>
<td>Midazolam (5mg/ml)</td>
<td>0.1-0.3mg/kg</td>
<td>IV/IM</td>
<td>3 mls</td>
<td>4 mls</td>
<td>5 mls</td>
</tr>
<tr>
<td>Morphine (10mg auto inj.)</td>
<td>0.2-0.5 mg/kg</td>
<td>IM</td>
<td>1 auto</td>
<td>1 auto</td>
<td>2 auto</td>
</tr>
<tr>
<td>Meloxicam</td>
<td>0.1-0.2mg/kg</td>
<td>IV/SQ/PO</td>
<td>5 mg</td>
<td>6 mg</td>
<td>7 mg</td>
</tr>
<tr>
<td>Cefazolin/Ceftriaxone</td>
<td>25 mg/kg</td>
<td>IV/IM</td>
<td>600 mg</td>
<td>800 mg</td>
<td>900 mg</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>25 mg/kg</td>
<td>IV/IM/SQ</td>
<td>600 mg</td>
<td>800 mg</td>
<td>900 mg</td>
</tr>
<tr>
<td>Ertapenem (100mg/ml)</td>
<td>15mg/kg</td>
<td>IV/SQ</td>
<td>4 mls</td>
<td>5 mls</td>
<td>6 mls</td>
</tr>
</tbody>
</table>

NOTES: ____________________________________________________________

FIRST RESPONDER:

Name (Last, First): ___________________________ AOC/MOS: ____________

DD FORM 3073 OCTOBER 2019 (Send card to dog.consult@us.af.mil)
<table>
<thead>
<tr>
<th>LINE</th>
<th>ITEM</th>
<th>EVACUATION REQUEST MESSAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Location of Pickup Site.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Radio Frequ., Call Sign, &amp; Suffix.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>No. of Patients by Precedence.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Special Equipment Required.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Number of Patients by Type.</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Security of Pickup Site (Wartime).</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Number and Type of Wound, Injury, or Illness (Peacetime).</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Method of Marking Pickup Site.</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Patient Nationality and Status.</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>NBC Contamination (Wartime).</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Terrain Description (Peacetime).</td>
<td></td>
</tr>
<tr>
<td>LINE ITEM</td>
<td>EXPLANATION</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>1. Location of Pickup Site.</td>
<td>Encrypt grid coordinates. When using DRYAD Numeral Cipher, the same SET line will be used to encrypt grid zone letters and coordinates. To preclude misunderstanding, a statement is made that grid zone letters are included in the message (unless unit SOP specifies its use at all times).</td>
<td></td>
</tr>
<tr>
<td>2. Radio Frequency, Call Sign, Suffix.</td>
<td>Encrypt the frequency of the radio at the pickup site, not a relay frequency. The call sign (and suffix if used) of person to be contacted at the pickup site may be transmitted in the clear.</td>
<td></td>
</tr>
<tr>
<td>3. No. of Patients by Precedence.</td>
<td>Report only applicable info &amp; encrypt brevity codes. A = Urgent, B = Urgent-Surg, C = Priority, D = Routine, E = Convenience. (If 2 or more categories reported in same request, insert the word “break” between each category.)</td>
<td></td>
</tr>
<tr>
<td>5. No. of Patients by Type.</td>
<td>Report only applicable information and encrypt brevity code. If requesting MEDEVAC for both types, insert the word “break” between the litter entry and ambulatory entry: L + # of Pnt -Litter; A + # of Pnt - Ambul (sitting).</td>
<td></td>
</tr>
<tr>
<td>9. NBC Contamination, (Wartime).</td>
<td>Include this line only when applicable. Encrypt the applicable brevity codes. N = nuclear, B = biological, C = chemical.</td>
<td></td>
</tr>
<tr>
<td>9. Terrain Description (Peacetime).</td>
<td>Include details of terrain features in and around proposed landing site. If possible, describe the relationship of site to a prominent terrain feature (lake, mountain, tower).</td>
<td></td>
</tr>
</tbody>
</table>

Reference: ATP 4-02.2, Medical Evacuation.
WE WILL NEVER FORGET

WO1 Jeffery Barnes  CW2 Aaron Healy  CW3 Zachary Esparza  CW2 Rusten Smith
SSG Joshua C. Gore  SGT Emilie Marie Eve Bolanos  SGT Isaac John Gayo
SSG Taylor Mitchell  SGT David Solinas Jr.