



**Hazardous Material Exposure**

Approval: Troy M. Falck, MD – Medical Director

Effective: 06/01/2023

Approval: John Poland – Executive Director

Next Review: 01/2026

**Refer to S-SV EMS Hazardous Material Incidents Policy (836)**

**Important caveats for medical responders:**

- EMS personnel shall not enter or provide treatment in the Contamination Reduction Zone (Warm Zone) or Exclusion Zone (Hot Zone) unless trained, equipped and authorized to do so.
- EMS personnel shall not use Haz Mat specific personal protective equipment (PPE), including self-contained breathing apparatus (SCBA), unless trained, fit tested and authorized to do so.
- Do not transport pts until they have been completely decontaminated. If transport personnel become contaminated, they shall immediately undergo decontamination.
- Do not delay treatment/transport of immediate pts contaminated with radioactive material.
- Early base/modified base hospital contact, and CHEMPACK activation when appropriate (S-SV EMS Nerve Agent Treatment Protocol E-8), will maximize assistance from necessary resources.
- Refer to Hazardous Materials Medical Management Reference as appropriate.

**Information that must be obtained by EMS personnel on every hazardous materials incident:**

- Number of pts.
- Material involved or DOT 4-digit placard #.
- Route(s) of exposure for each pt.
- Signs & symptoms for each pt.
- Decontamination procedure completed for each pt.
- Procedure utilized to determine effectiveness of decontamination procedure.
- Risk of secondary exposure to rescuers.
- PPE required to transport pt.

**BLS**

- Establish and secure airway as necessary
- O<sub>2</sub> at appropriate rate
- Contact base/modified base hospital for assistance in determining a decontamination/treatment plan
- After pt is fully decontaminated, cover with blankets and/or sheets as appropriate
- If eye exposure occurs, irrigate each exposed eye with NS – ensure contact lenses are removed

**See pages 2 & 3 for additional treatment**



**Hazardous Material Exposure**

**Treatment Notes**

- Skin exposure to hydrofluoric acid with a concentration >20% can cause fatal hypocalcemia and should be treated. Provide continuous EKG monitoring to look for QT-interval prolongation which is an early sign of hypocalcemia.
- Precautions must be taken to prevent direct contact with secretions of a pt who has ingested organophosphates or carbamate pesticides.

**ALS**

- Cardiac Monitor
- IV/IO NS TKO in non-burned/non-contaminated extremity (may bolus up to 1000 mL)

**Hydrofluoric Acid**

- **Calcium Chloride 10%**
- 10 ml slow IV/IO
- May repeat every 5 mins

**For hydrofluoric acid burns isolated to the hands, fingers, or toes**

- **Calcium Chloride 10%**
- Pour contents of one ampule into a sterile glove and immerse affected area into solution
- If Calcium Gluconate gel has been applied, do not remove - no further treatment is necessary

**Organophosphate/Carbamate**

- **Atropine**
- 2 mg IV/IO if HR <60
- May repeat every 3 mins to HR >80
- No maximum dose

Refer to Nerve Agent Treatment Protocol (E-8) if additional treatment is necessary



**Hazardous Material Exposure**

**Radiation Emergencies**

- Pt care takes priority over radiological concerns - addressing contamination issues should not delay treatment of life-threatening injuries.
- Viable pts are a high priority - rapidly extricate, treat and transport pts who are most critical and likely to survive.
- It is highly unlikely that the levels of radioactivity associated with a contaminated pt would pose a significant health risk to care providers.
- Body substance isolation clothing (gloves, gowns, N-95 masks, protective eyewear, shoe protectors, and head cap) are recommended, including 2-3 pair of disposable gloves.
- Due to fetal sensitivity to radiation, assign pregnant staff to other duties.

**Ambulance Preparation**

- Avoid using internal and external compartments - work out of mobile kits as much as possible.
- Close all internal compartments prior to loading pt.
- Cover radio communication microphones with a rubber glove.
- Cover floor of ambulance with disposable papers or pads.

**Radiation Exposure Haz Mat Pt**

- If O<sub>2</sub> is warranted, use a non re-breather mask (if tolerated) to provide protection from inadvertent respiratory contamination hazards - an N95 mask is appropriate to protect pt from inadvertent respiratory contamination hazards when O<sub>2</sub> is not indicated
- Frequent glove changes will reduce the spread of contamination and should be considered prior to handling the pt or pt care adjuncts
- All medical procedures should be utilized to save an immediate pt - if it is medically necessary to intubate a pt that is contaminated, then do so - change gloves prior to intubation, and maintain ET tube sterility if possible

**Limited or no field decontamination**

- Initiate ALS care as necessary
- Keep pt wrapped (cocoon style) to minimize potential for contamination spread - only expose areas to assess and treat
- If necessary, cut and remove the pts clothing away from the body, being careful to avoid contamination to the unexposed skin - contain all removed clothing by placing in a sealable bag
- Continue to reassess/monitor vitals while transporting pt to the appropriate receiving facility
- Contact with pt may result in transfer of contamination - change gloves as necessary

**Field decontamination performed**

- Pts with non life-threatening injuries should have field decontamination prior to removal from the Exclusion (Hot) Zone
- Pts condition permits a more thorough radiological survey prior to continued care
- Conduct head to toe assessment as appropriate
- Initiate ALS care as necessary
- If pts clothing has not been removed during decontamination, keep pt wrapped (cocoon style) to minimize potential for contamination spread - only expose areas to assess and treat
- Contact with pt may result in transfer of contamination - change gloves as necessary



**Nerve Agent Treatment**

Approval: Troy M. Falck, MD – Medical Director

Effective: 06/01/2023

Approval: John Poland – Executive Director

Next Review: 01/2026

**Refer to S-SV EMS Hazardous Material Incidents Policy (836)**

**Important caveats for medical responders:**

- EMS personnel shall not enter or provide treatment in the Contamination Reduction Zone (Warm Zone) or Exclusion Zone (Hot Zone) unless trained, equipped and authorized to do so.
- EMS personnel shall not use Haz Mat specific personal protective equipment (PPE), including self-contained breathing apparatus (SCBA), unless trained, fit tested and authorized to do so.
- Do not transport pts until they have been completely decontaminated. If transport personnel become contaminated, they shall immediately undergo decontamination.

**Treatment notes:**

- A base/modified base hospital physician order must be obtained prior to utilizing this protocol for pt treatment. Once an order is obtained, the entire protocol becomes a standing order that applies to all authorized/trained EMS personnel operating at the incident.
- Atropine (2mg) and pralidoxime chloride (600mg) auto-injectors included in MARK I/DuoDote nerve agent antidote kits shall only be used by authorized/trained EMS personnel.
- Paramedics may administer atropine and/or pralidoxime chloride IM/IV in situations where auto-injector nerve agent antidote kits are not available.
- EMS personnel may self-administer nerve agent antidote kits when authorized/trained to do so.
- Adult auto-injectors are not to be used in children under 40 Kg.
- Nerve agent antidote medications are only given if the pt is showing signs & symptoms of nerve agent poisoning, they are not to be given prophylactically. A decrease in bronchospasm and respiratory secretions are the best indicators of a positive response to atropine and pralidoxime.

**Signs/Symptoms of Nerve Agent Exposure (mild to severe)**

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| 1. Runny nose                     | 9. Abdominal cramps                  |
| 2. Chest tightness                | 10. Involuntary urination/defecation |
| 3. Difficulty breathing           | 11. Jerking/twitching/staggering     |
| 4. Bronchospasm                   | 12. Headache                         |
| 5. Pinpoint pupils/blurred vision | 13. Drowsiness                       |
| 6. Drooling                       | 14. Coma                             |
| 7. Excessive sweating             | 15. Convulsions                      |
| 8. Nausea/vomiting                | 16. Apnea                            |

**Nerve Agent Exposure Mnemonic (SLUDGEM)**

- S**alivation
- L**acrimation
- U**rination
- D**efecation
- G**I distress
- E**mesis
- M**iosis/muscle fasciculation

**Nerve Agent Treatment****CHEMPACK****Description:**

- The Centers for Disease Control and Prevention (CDC) established the CHEMPACK project resulting in the forward placement of sustainable caches of nerve agent antidotes.
- CHEMPACK caches have been placed at select sites throughout the S-SV EMS region and surrounding areas according to program requirements and effective transportation alternatives.
- EMS CHEMPACK caches contain enough antidote to treat approximately 454 patients. These caches contain primarily auto-injectors for rapid administration, but also contain some multi-dose vials for variable dosing (including pediatric patients) and prolonged treatment.
- Authorization to deploy CHEMPACK assets will be limited to an event that:
  1. Threatens the medical security of the community; and
  2. Places multiple lives at risk; and
  3. Is otherwise beyond local emergency response capabilities; and
  4. Will likely make the material medically necessary to save human life.

**CHEMPACK requesting/deployment:**

- A requestor is considered to be one of the following entities at the scene of a suspected nerve agent or organophosphate release with known, suspected, or potential contaminated, exposed, or affected patients:
  1. EMS prehospital personnel; or
  2. Incident Commander (IC); or
  3. Medical Group Supervisor (MGS).
- Potential requestors should be familiar with and follow their Operational Area (OA)/county specific CHEMPACK plans and procedures
- The S-SV EMS Duty Officer and applicable MHOAC Program(s) shall be notified as soon as possible in the event of a CHEMPACK request/deployment.

**See page 3 for specific treatment**



### Nerve Agent Treatment

#### Treatment Notes

- Only treat pts located in the Exclusion Zone (Hot Zone) with IM auto-injectors

#### Nerve Agent Exposure Pt

- Remove all clothing
- Blot off the agent
- Flush area with large amounts of water
- Cover the affected area

#### Mild Signs/Symptoms

##### Atropine

- 2 mg IV/IO or IM
- OR**
- Administer one (1) atropine auto-injector IM
  - May repeat every 3-5 mins until symptoms improve

##### Pralidoxime chloride

- If symptoms do not improve in 5 mins, administer one (1) Pralidoxime chloride auto injector (600 mg) IM, one (1) time only

#### Moderate Signs/Symptoms

##### Atropine

- 4 mg IV/IO or IM
- OR**
- Administer two (2) atropine auto-injectors IM
  - May repeat every 3-5 mins until symptoms improve

##### Pralidoxime chloride

- If symptoms do not improve in 5 mins, administer two (2) Pralidoxime chloride auto injectors (1200 mg) IM, one (1) time only

#### Severe Signs/Symptoms

##### Atropine

- 6 mg IV/IO or IM
- OR**
- Administer three (3) atropine auto-injectors IM
  - May repeat every 3-5 mins until symptoms improve

##### Pralidoxime (2-PAM)

- Administer three (3) Pralidoxime chloride auto-injectors (1800 mg) IM

- Establish vascular access (may administer up to 1000 ml NS if SBP <90)
- Cardiac Monitor (if possible)

**If continued seizure activity,  
Go to Seizure Protocol  
N-2**



General Trauma Management

Approval: Troy M. Falck, MD – Medical Director

Effective: 06/01/2023

Approval: John Poland – Executive Director

Next Review: 01/2026

- Limit on scene procedures for pts meeting Field Trauma Triage Criteria to:
  - Pt assessment
  - Airway management
  - Hemorrhage control
  - Immobilization/splinting
  - SMR
- Transport pts with known/apparent third trimester pregnancy in left-lateral position.
- Notify receiving hospital of a 'Trauma Alert' as soon as possible for pts meeting Field Trauma Triage Criteria.

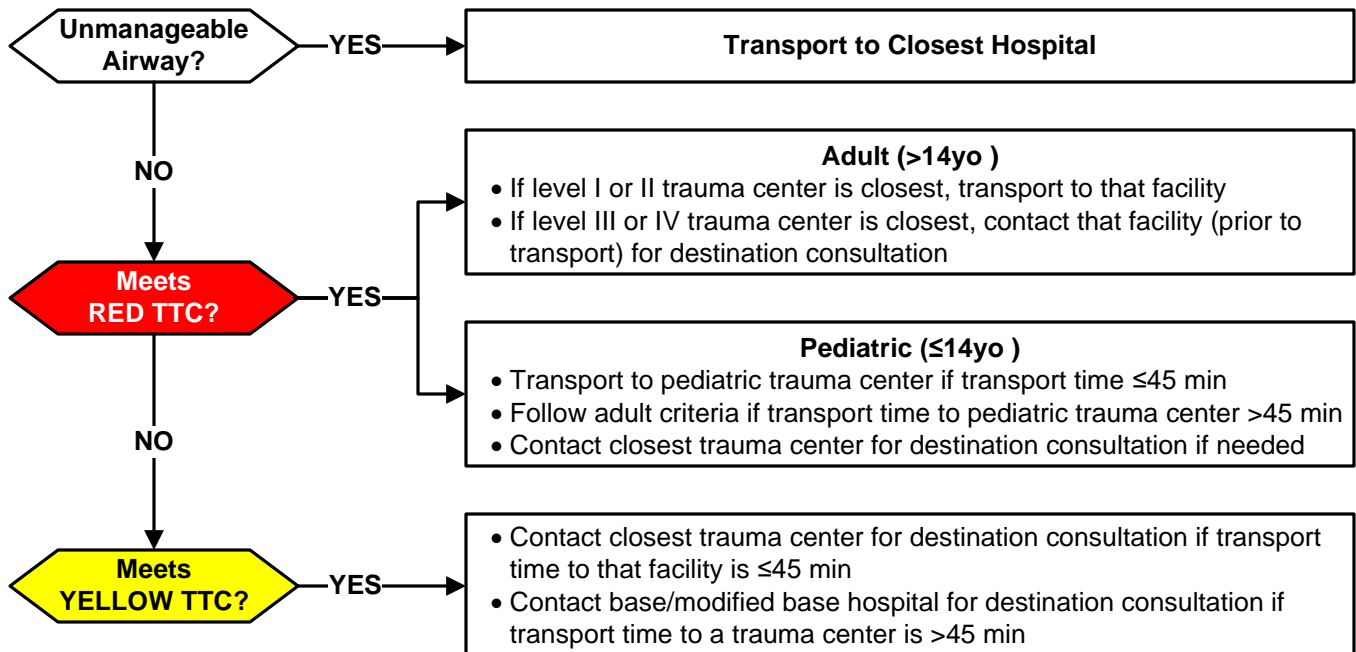
BLS

- Assess & support ABCs
- Assess V/S, including SpO<sub>2</sub>
- O<sub>2</sub> at appropriate rate if hypoxemic (SpO<sub>2</sub> <94%) or short of breath
- Control hemorrhage & immobilize/splint injuries as needed
- Initiate spinal motion restriction (SMR) if indicated (see page 3)
- Maintain body temperature, keep warm

ALS

- Consider advanced airway if indicated
- Consider EtCO<sub>2</sub> monitoring if indicated (see protocol T-3 or P-28)
- Consider application of a pelvic binder if indicated (see page 2)
- Cardiac monitor
- Establish vascular access if indicated (see page 2)
- Consider pain management if indicated (see protocol M-8 or P-34)

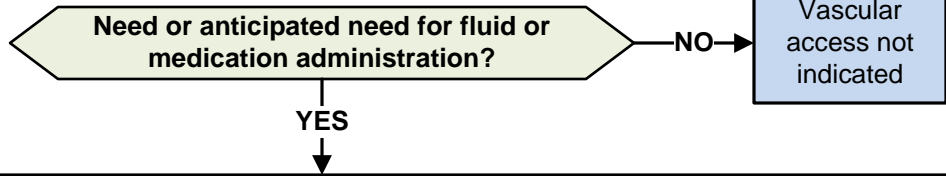
Field Trauma Triage Criteria (TTC) Pt Destination (see page 4 for TTC details)





General Trauma Management

Vascular Access



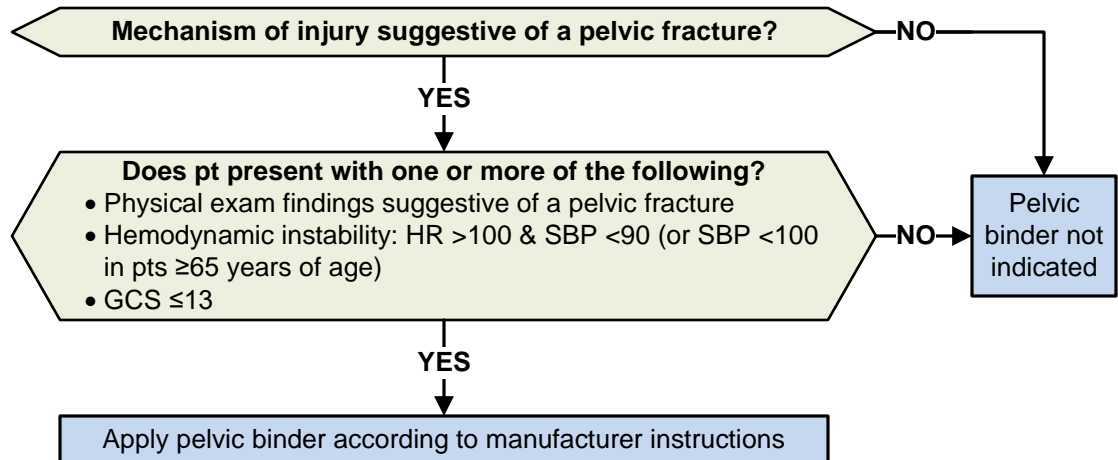
**IV/IO – NS or LR**

- Initiate vascular access on all pts meeting Field Trauma Triage Criteria
- Initiate second vascular access on adult pts presenting with hypotension (SBP <90 for pts <65 years of age, or SBP <100 for pts ≥65 years of age), or if thoracic/abdominal pain is present
- Fluid resuscitation guidelines:
  - Adult pts:
    - Administer 500 mL fluid boluses for signs of hypoperfusion/shock
    - Reassess hemodynamic parameters, respiratory status and lung sounds after each fluid bolus
    - Titrate fluid boluses to SBP of ≥90 for pts <65 years of age, or ≥100 for pts ≥65 years of age
  - Pediatric pts:
    - Administer 20 mL/kg fluid boluses for signs of hypoperfusion/shock
    - Reassess hemodynamic parameters, respiratory status and lung sounds after each bolus
    - Titrate fluid boluses to age appropriate SBP (max: 60 mL/kg)

Commercial Pelvic Binder

Approved Commercial Pelvic Binders: 1) T-POD Pelvic Stabilization Device, 2) SAM Pelvic Sling 2

- Utilization of a commercial pelvic binder is optional, and only approved for AEMT/paramedic personnel. ALS/LALS provider agencies must ensure that their personnel are appropriately trained on the application/use of the device, as misplacement of pelvic binders can significantly decrease the ability of the binder to reduce pelvic ring fractures.
- Physical exam findings which may indicate the presence of a pelvic ring fracture include, but are not limited to:
  - Crepitus when applying compression to the iliac crests
  - Perineal or genital swelling
  - Testicular/groin pain
  - Blood at the urethral meatus
  - Rectal, vaginal or perineal lacerations/bleeding
- When stabilizing a suspected pelvic ring fracture, care must be taken not to over-reduce the fracture. Over-reduction can be assessed by examining the position of the legs, greater trochanters and knees with the pt supine. The goal is to achieve normal anatomic position of the pelvis, so the lower legs should be symmetrical after stabilization.
- When clinically indicated and logistically feasible, the pelvic binder should be placed prior to extrication/movement.
- Pelvic binders should be placed directly to skin. Once applied, pelvic binders should not be removed.
- If possible, avoid log-rolling pts with a suspected pelvic fracture.



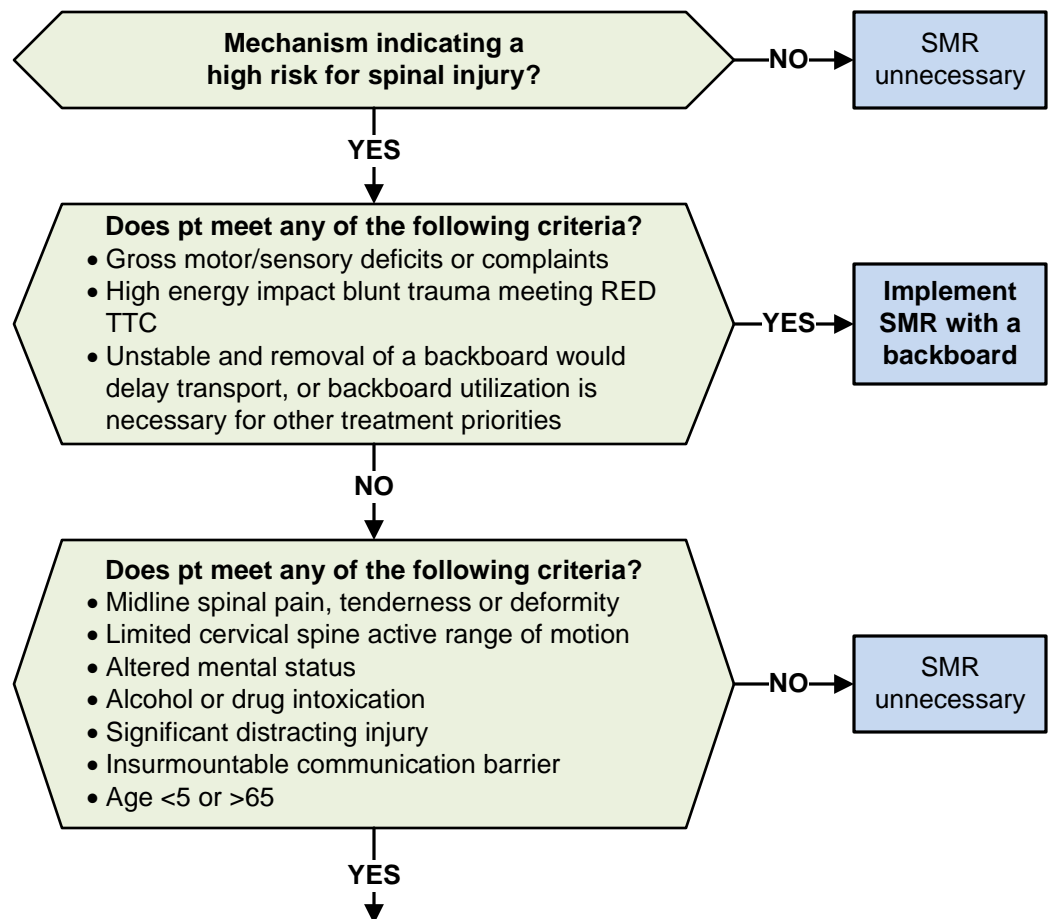




**General Trauma Management**

**Spinal Motion Restriction (SMR)**

- A backboard shall not be utilized for pts with penetrating trauma to the head, neck or torso without evidence of spinal injury
- Helmet removal guidelines:
  - For pts who meet criteria for SMR with a backboard, football helmets should only be removed if they prevent adequate SMR or under the following circumstances:
    - If the helmet and chin strap fail to hold the head securely or prevent adequate airway control.
    - If the facemask cannot be removed.
  - Football helmets should be carefully removed to allow for appropriate SMR of pts who do not meet criteria for backboard utilization.
  - All other types of helmets (bicycle, motorcycle, etc.) should be carefully removed to allow for appropriate SMR.



- Implement SMR without a backboard as follows:**
- Apply a cervical collar
  - Allow ambulatory pts to sit on the stretcher and then lie flat (no 'standing take-down")
  - If necessary, move pt from the position found to the ambulance stretcher utilizing a device such as a KED, scoop stretcher, backboard, or if necessary, by having the pt stand and pivot to the stretcher – do not permit the pt to struggle to their feet from a seated or supine position
  - Once on the ambulance stretcher, remove any hard backboard device & instruct the pt to lie still
  - The head of the stretcher may be elevated 20-30° in a position of comfort
  - Secure cross stretcher straps and over-the-shoulder belts firmly
  - Pts with nausea &/or vomiting may be placed in the lateral recumbent position, maintaining the head in a neutral position using manual stabilization, padding, pillows, &/or the pt's arm



## General Trauma Management

## Field Trauma Triage Criteria (TTC)

## RED TTC (High Risk for Serious Injury)

Injury Patterns	Mental Status/Vital Signs
<ul style="list-style-type: none"> <li>• Penetrating injuries to head, neck, torso, &amp;/or proximal extremities</li> <li>• Skull deformity, suspected skull fracture</li> <li>• Suspected spinal injury with new motor/sensory loss</li> <li>• Chest wall instability, deformity, or suspected flail chest</li> <li>• Suspected pelvic fracture</li> <li>• Suspected fracture of two or more proximal long bones in a pt of any age, or one or more proximal long bone fracture in a pt <math>\leq 14</math> or <math>\geq 65</math> years of age</li> <li>• Suspected open proximal long bone fracture</li> <li>• Crushed, degloved, mangled, or pulseless extremity</li> <li>• Amputation proximal to wrist or ankle</li> <li>• Continued, uncontrolled bleeding despite EMS hemorrhage control measures</li> </ul>	<p style="text-align: center;"><b><u>MENTAL STATUS</u></b></p> <ul style="list-style-type: none"> <li>• <b>&lt;65 years of age:</b> <ul style="list-style-type: none"> <li>○ GCS <math>\leq 13</math></li> </ul> </li> <li>• <b><math>\geq 65</math> years of age:</b> <ul style="list-style-type: none"> <li>○ GCS <math>&lt; 15</math> (or decreased from baseline) with evidence/suspicion of a head strike</li> </ul> </li> </ul> <p style="text-align: center;"><b><u>RESPIRATORY STATUS</u></b></p> <ul style="list-style-type: none"> <li>• <b>All pt ages:</b> <ul style="list-style-type: none"> <li>○ RR <math>&lt; 10</math> or <math>&gt; 29</math> breaths/min</li> <li>○ Resp. distress or need for resp. support</li> <li>○ Room-air SpO<sub>2</sub> <math>&lt; 90\%</math></li> </ul> </li> </ul> <p style="text-align: center;"><b><u>CIRCULATORY STATUS</u></b></p> <p><b>0-9 years of age:</b></p> <ul style="list-style-type: none"> <li>• SBP <math>&lt; 70</math> mm Hg + (2 x age years)</li> </ul> <p><b>10-64 years of age:</b></p> <ul style="list-style-type: none"> <li>• SBP <math>&lt; 90</math> mmHg OR HR <math>&gt;</math> SBP</li> </ul> <p><b><math>\geq 65</math> years of age:</b></p> <ul style="list-style-type: none"> <li>• SBP <math>&lt; 100</math> mmHG OR HR <math>&gt;</math> SBP</li> </ul>

## YELLOW TTC (Moderate Risk for Serious Injury)

Mechanism of Injury	EMS Judgement
<ul style="list-style-type: none"> <li>• High-Risk Auto Crash <ul style="list-style-type: none"> <li>○ Partial or complete ejection</li> <li>○ Significant intrusion (including roof) <ul style="list-style-type: none"> <li>- <math>&gt; 12</math> inches occupant site; or</li> <li>- <math>&gt; 18</math> inches any site; or</li> <li>- Need for extrication for entrapped pt</li> </ul> </li> <li>○ Death in passenger compartment</li> <li>○ Child (0-9 years of age) unrestrained or in unsecured child safety seat</li> <li>○ Vehicle telemetry data consistent with severe injury</li> </ul> </li> <li>• Rider separated from transport vehicle with significant impact (motorcycle, ATV, horse, etc.)</li> <li>• Pedestrian/bicycle rider thrown, run over, or with significant impact</li> <li>• Fall from height <math>&gt; 10</math> feet (all ages)</li> </ul>	<p>EMS personnel should consider the following risk factors, and contact the closest trauma center or base/modified base hospital for destination consultation (see page 1), if transport to a trauma center is believed to be in the pt's best interest:</p> <ul style="list-style-type: none"> <li>• Low-level falls in young children (<math>\leq 5</math> years of age) or older adults (<math>\geq 65</math> years of age) with significant head impact</li> <li>• Anticoagulant use</li> <li>• Suspicion of child abuse</li> <li>• Special, high-resource healthcare needs</li> <li>• Pregnancy <math>&gt; 20</math> weeks</li> <li>• Burns in conjunction with trauma</li> </ul>



**Burns**

Approval: Troy M. Falck, MD – Medical Director

Effective: 06/01/2023

Approval: John Poland – Executive Director

Next Review: 01/2026

**Information Needed**

- Type/source of burn: chemical, electrical, thermal, steam
- Complicating factors: concomitant trauma, exposure in enclosed space, total time of exposure, drug or alcohol use, smoke or toxic fumes, delayed resuscitation, compartment syndrome of extremities, chest, or abdomen.

**Objective Findings**

- Evidence of inhalation injury or toxic exposure (i.e., carbonaceous sputum, hoarseness/stridor, or singed nasal hairs).
- Extent of burn: full or partial thickness and body surface area (BSA) affected.
- Entrance or exit wounds for electrical or lightning strike or trauma from an explosion, electrical shock or fall.

**Transport Notes**

- All pts suffering from an electrical burn shall be transported for evaluation.
- Contact the closest base/modified base hospital for destination consultation on pts with any of the following:
  - Full thickness (3°) burns of the hands, feet, face, perineum, or >2% of any BSA
  - Partial thickness (2°) burns >9% of BSA
  - Significant electrical or chemical burns

**BLS**

- O<sub>2</sub> at appropriate rate, consider BVM early for altered LOC or respiratory distress
- Assess V/S, including SpO<sub>2</sub>
- Remove wet dressings and cover with dry, clean dressings

**ALS**

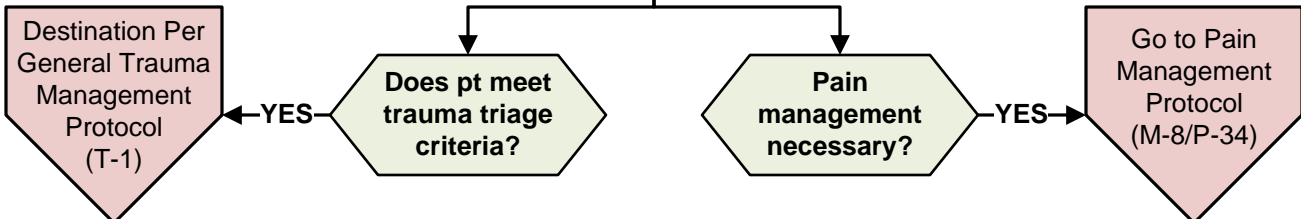
- Cardiac monitor
- Consider EtCO<sub>2</sub> monitoring/trending
- Consider early advanced airway if evidence of inhalation injury or compromised respiratory effort
  - ① The likelihood of airway compromise is increased in burn pts receiving IV/IO fluid administration
  - ① Airway compromise/occlusion is likely for pts with burns >25-30% BSA, regardless of location of burns

**IV/IO – NS/LR TKO (in non-burned extremity)**

- For 2° & 3° burns >9% BSA, facial burns, or if IV/IO pain management is necessary
- Administer 1000 mL fluid bolus for adult pts or 20 mL/kg fluid bolus for pediatric pts with 2° or 3° burns >9% BSA or signs of hypovolemia (note increased airway compromise warning above & closely monitor)

**Albuterol (if wheezes are present)**

- 5 mg in 6 mL NS via HHN, mask or BVM





Burns

Burn Chart

