Adult/Pediatric Trauma Triage

PURPOSE

These guidelines were developed to assist the emergency responder to determine what constitutes a trauma patient and where to transport the trauma patient. The goal of any trauma patient assessment and transportation guideline is to facilitate delivery of the patient to the most appropriate level of care in the most expeditious manner.

This protocol applies to all patients who are seriously injured or potentially seriously injured. The criteria listed below serve to identify the injured patients who are likely to require comprehensive trauma care. An **ADULT** trauma patient is defined as an injured patient (age 15 or greater) who meets any of the following criteria or when in the judgment of EMS personnel, evidence for potential serious injury exists. A **PEDIATRIC** trauma patient is defined as an injured patient (age 14 years or younger) who meets any of the following criteria or when in the judgment of EMS personnel, evidence for potential serious injury exists. These guidelines are meant to supplement, but not replace, the judgment of the EMS personnel at the scene.

TRAUMA TRIAGE DESTINATION DECISIONS

Any **ADULT** trauma patient meeting the Physiologic or Anatomic criteria should be transported to the closest appropriate Level 1 or Level 2 trauma center if within 45 minutes, otherwise transport to an appropriate Level 3 (preferred) or Level 4 trauma center if the patient can arrive within 45 minutes. Any **PEDIATRIC** trauma patient meeting the Physiologic or Anatomic criteria should be transported to the closest appropriate Level 1 or Level 2 **PEDIATRIC** trauma center if within 45 minutes, otherwise transport to an appropriate Level 1 or Level 2 adult trauma center if the patient can arrive within 45 minutes, otherwise transport to an appropriate Level 3 (preferred) or Level 4 trauma center if the patient can arrive within 45 minutes. If none of these are available transport to the closest facility. Appropriate centers are determined by the Medical Control Authority as indicated in the **Trauma Triage Supplement**. Notify the trauma center as soon as possible, including inclusion criteria and ETA.

PHYSIOLOGIC CRITERIA

<u>Vital signs& level of consciousness</u>

- Glasgow Coma Scale <14

- Systolic Blood Pressure <90 mm Hg

- Respiratory Rate <10 or >29 breaths per minute, or need for ventilatory support

ANATOMIC CRITERIA

Anatomy of injury

- All penetrating injuries to head, neck, torso and extremities proximal to elbow or knee

- Chest wall instability or deformity (e.g. flail chest)

- Two or more proximal long bone fractures (femur and or humerus)

- Crush, degloved, mangled or pulseless extremity

- Amputation proximal to wrist or ankle

- Pelvic fracture

- Open or depressed skull fracture

- Paralysis

Any **ADULT** trauma patient meeting the Mechanism of Injury or Special Considerations criteria should be transported to the closest appropriate Level 1, Level 2 or Level 3 trauma center if within 45 minutes, otherwise transport to an appropriate Level 4 trauma center if the patient can arrive within 45 minutes. Any **PEDIATRIC** trauma patient meeting the Mechanism of Injury or Special Considerations criteria should be transported to the closest appropriate Level 1 or Level 2 **PEDIATRIC** trauma center if within 45 minutes, otherwise transport to an appropriate Level 1, 2 or 3 adult trauma center if the patient can arrive within 45 minutes, otherwise transport to an appropriate Level 4 adult trauma center if the patient can arrive within 45 minutes. If none of these are available, transport to the closest facility. Appropriate centers are determined by the Medical Control Authority as indicated in the **Trauma Triage Supplement**. Notify the trauma center as soon as possible, including inclusion criteria and ETA.

MECHANISM OFINJURY

Mechanism and evidence of high-energy impact -Falls

- **ADULT** >20 feet (one story is equal to 10 ft.)

- **PEDIATRIC** >10 feet (one story is equal to 10 ft.) or two or three times

Height of the child

-High-risk auto crash

- Intrusion, including roof: > 12 in. occupant site; >18 in. any site

- Ejection (partial or complete) from automobile

- Death in same passenger compartment

- Vehicle telemetry data consistent with a high risk injury

-Auto vs. pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact
-Motorcycle/Recreational Vehicle crash >20 mph

SPECIAL CONSIDERATIONS

Special patient or system considerations

-Older Adults

- Risk of injury/death increases after age 55

- SBP < 110 mmHg may represent shock after age 65

- Low impact mechanisms (e.g. Ground level falls) may result in severe injury

-Children

Should be triaged preferentially to pediatric capable trauma centers

-Anticoagulation and bleeding disorders

Patients with head injury are at high risk for rapid deterioration

-Burns

Without other trauma mechanism: triage to bum facility with trauma mechanism: triage to trauma center

-Pregnancy >20 weeks

-Any other injuries felt by EMS personnel to require specialized trauma care

Exception to these triage guidelines is made for trauma patients requiring airway intervention that cannot be accomplished by pre-hospital personnel. These patients will be transported to closest appropriate hospital to allow for airway management, stabilization and subsequent transfer.

NOTES

1. Medical Control may be contacted to determine the appropriate destination when indicated.
2. Helicopter transport should be considered for patients meeting the trauma inclusion criteria and who have a projected ground transport time to the trauma center is greater than 45 minutes.

CDC Guidelines for Field Triage of Injured Patients.

Measure Vital signs and level of consciousness:

Glasgow Coma Scale	<14
Systolic Blood Pressure (mmHg)	<90 mmHg
Respiratory Rate	<10 or >29 breaths per minute, **or** need for ventilatory support (<20 in infants aged <1 year)

YES → **Transport to a trauma center**.

Steps 1 and 2 attempt to identify the most seriously injured patients. These patients should be transported preferentially to the highest level of care within the defined trauma system (level 1 or 2).

No

Assess anatomy of injury:

- All penetrating injuries to head, neck, torso and extremities proximal to elbow or knee
- Chest wall instability of deformity
- Two or more proximal long-bone fractures
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Pelvic fracture
- Open or depressed skull fracture
- Paralysis

YES → **Transport to a trauma center**, which, depending upon the defined trauma system, need not be the highest level trauma center.

No

Assess mechanism of injury and evidence of high-energy impact:

- **Falls**
  - Adults: > 20 feet (one story is equal to 10 feet)
  - Children: > 10 feet or two or three times the height of the child
- **High-risk auto crash**
  - Intrusion, including roof: >12 inches occupant site; > 18 inches any site
  - Ejection (partial or complete) from automobile
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with a high risk of injury
- **Auto vs Pedestrian/bicyclist thrown, run over, or with significant (>20 mph) impact**
- **Motorcycle/Recreational Vehicle crash >20 mph**

YES → **Transport to a trauma center**, or hospital capable of timely and thorough evaluation and initial management of potentially serious injuries. Consider consultation with medical control

No

Assess special patient or system considerations:

- **Older Adults**
  - Risk of injury/death increases after 55 years
  - SBP <110 may represent shock after age 65
  - Low impact mechanisms (e.g. ground level falls) may result in severe injury
- **Children**
  - Should be triaged preferentially to pediatric capable trauma centers
- **Anticoagulants and bleeding disorders**
  - Patients with head injury are at high risk for rapid deterioration
- **Burns**
  - Without other trauma mechanism: triage to burn facility
  - With trauma mechanism: triage to trauma center
- **Pregnancy > 20 weeks**
- **EMS provider judgement**

NO → **TRANSPORT ACCORDING TO PROTOCOL**

When in doubt, transport to a trauma center

General Trauma

This protocol should be followed for severely injured patients meeting trauma triage guidelines and methodology; including chest injuries, and patients with symptoms of spinal cord injury, along with extremity weakness, numbness or sensory loss. It consists of assessment, stabilization, extrication, initiation of resuscitation, and rapid transportation to the closest appropriate facility.

Aliases: Trauma, injury, injuries

GENERAL TRAUMA MANAGEMENT

1. Follow **General Pre-hospital Care Protocol**.
2. Stabilize spinal column while opening the airway, determine level of consciousness. Refer to **Spinal Injury Assessment Protocol**.
3. Manage airway and ventilation per **Emergency Airway Procedure**. Avoid Hyperventilation/Hyperoxygenation.
4. Control major external bleeding. Refer to **Soft Tissue and Orthopedic Injuries Protocol.**
5. If shock present, refer to **Shock Protocol**.
6. Refer to **Mass Casualty Incidents Protocol** if appropriate.
7. Initiate transport according to the **Trauma Triage Protocol** or refer to applicable **MCA Protocol**.
8. Alert receiving hospital as soon as appropriate. Include pertinent trauma triage criteria.
9. Obtain vascular access (in a manner that will not delay transport).
10. Refer to **Pain Management Procedure**.

CHEST INJURY

1. Control hemorrhage per **Soft Tissue and Orthopedic Injuries Protocol**.
2. Assess, monitor, and treat life threatening respiratory problems.
    A. Administer oxygen to maintain a pulse oximetry (if available) of 94% to 99%. *Avoid positive pressure ventilation if possible.*
    B. All open and/or sucking chest wounds should be covered with an FDA **and** MCA approved occlusive seal device, or improvised occlusive dressing.
        1. Release dressing if worsened shortness of breath, or signs of tension pneumothorax.
3. If tension pneumothorax suspected, perform needle decompression per **Pleural Decompression Procedure.**

ABDOMINAL INJURY

1. Cover intestinal eviscerations with a sterile dressing moistened with sterile saline or water; cover the area with an occlusive material (aluminum foil or plastic wrap). Cover the area with a towel or blanket to keep it warm. Transport with knees slightly bent, if possible. DO NOT PUSH VISCERA BACK INTO ABDOMEN.

Follow **General Pre-hospital Care Protocol.**

- Stabilize spinal column while opening airway, determine level of consciousness. Refer to **Spinal Injury Assessment Protocol.**
- Manage airway ventilation per **Emergency Airway Procedure.** Avoid Hyperventilation/Hyperoxygenation.
- Control major external bleeding. Refer to **Soft Tissue and Orthopedic Injuries Protocol**.
- If shock present, refer to **Shock Protocol.**

Refer to **Mass Casualty Protocol** as appropriate

Initiate transport according to **Trauma Triage and Destination Protocol** or refer to applicable **MCA Protocol**

- Obtain vascular access (in a manner that will not delay transport).

Refer to **Pain Management Procedure as needed**

If hypotensive, refer to **Shock Protocol**

Chest Injury

Control hemorrhage per **Soft Tissue and Orthopedic Injuries Protocol**.

Assess, monitor, and treat life threatening respiratory problems.

- Administer oxygen to maintain a pulse oximetry (if available) of 94% to 99%. *Avoid positive pressure ventilation if possible.*
- All open and/or sucking chest wounds should be covered with an FDA **and** MCA approved occlusive seal, or improvised occlusive dressing.
  - Release dressing if worsened shortness of breath, or signs of tension pneumothorax.

If tension pneumothorax suspected, refer to **Pleural Decompression Procedure**.

Abdominal Injury

- Cover intestinal eviscerations with a sterile dressing moistened with sterile saline or water; cover the area with an occlusive material (aluminum foil or plastic wrap).
- Cover the area with a towel or blanket to keep it warm. Transport with knees slightly bent, if possible.
- **DO NOT PUSH VISCERA BACK INTO ABDOMEN**.

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Burns

General Treatment:

1. Follow **General Pre-hospital Care Protocol**.
2. If evidence of possible airway burn, consider aggressive airway management per **Emergency Airway Procedure.**
3. Administer 100% O2 to all patients rescued from a confined space fire (i.e., building, automobile) regardless of pulse oximetry reading.
4. Determine burn extent & severity (rule of nines or palm = 1%).
5. Keep patient warm and avoid hypothermia.
6. If possibility of cyanide poisoning, refer to **Cyanide Exposure Protocol.**

THERMAL BURNS:

1. Stop the burning process. Remove smoldering and non-adherent clothing. Irrigate with sterile water or saline, if available.
2. Consider potential for secondary contamination (i.e., methamphetamine).
3. Assess and treat associated trauma.
4. Remove any constricting items.
5. If burn is
    a. Less than 15% of total body surface area (TBSA), consider covering with wet dressings for comfort.
    b. More than 15% of total body surface area (TBSA), cover wounds with dry clean dressings to avoid hypothermia.

CHEMICAL BURNS:

1. Protect personnel from contamination.
2. Remove all clothing and constricting items.
3. Decontaminate patient prior to transport, brushing off dry chemicals prior to irrigation.
4. Assess and treat for associated injuries.
5. Evaluate for systemic symptoms, which might be caused by chemical contamination.
6. Notify receiving hospital of possible chemical contamination.
7. Cover burned area in clean, dry dressing for transport.

ELECTRICAL INJURY:

1. Protect rescuers from live electric wires.
2. When energy source is removed, remove patient from electrical source.
3. Treat associated injuries provide spinal precautions per **Spinal Injury Assessment Protocol** and **Spinal Precautions Procedure** when indicated.
4. Assess and treat contact wound(s).

5. Monitor patient ECG for possible arrhythmias. Treat as per specific arrhythmia protocol.

FOR ALL TYPES OF BURNS:

1. Obtain vascular access if indicated for pain management or fluid therapy.
2. Administer NS IV/IO fluid bolus up to 1 liter wide open for hypotension or burn greater than 15% TBSA. Repeat as indicated.  (20 ml/kg for pediatrics)

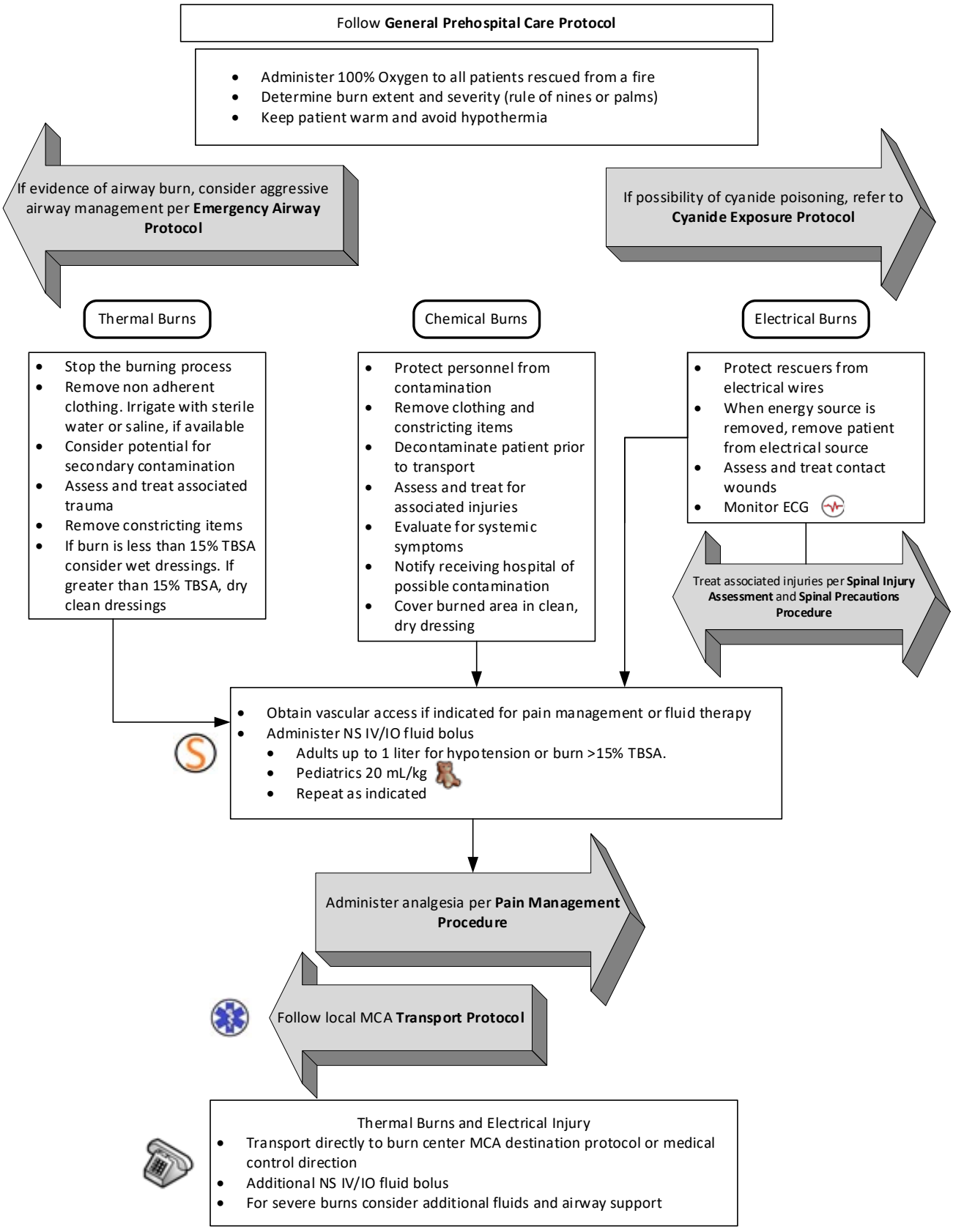
3. Administer Analgesic Medication. Refer to **Pain Management Procedure.**

Transport:

4. Follow local MCA **Transport Protocol**.
5. Special Transport Considerations
    a. The most appropriate facility may be a trauma center when there is airway or respiratory involvement, or when multi-trauma or blast injury is suspected.
    b. Consider transport directly to burn center if BSA > 20% partial thickness, BSA > 10% full thickness, involvement of hands/feet, genitalia, face; circumferential burns
    c. Consider air ambulance transportation for long transport times, pain control requiring deep sedation, and airway concerns that might necessitate advanced airway management.

Thermal Burns and Electrical Injury:

1. Transport directly to burn center per MCA destination protocol or medical control direction.
2. Additional NS IV/IO fluid bolus, up to 2 liters, wide open**.**
3. For severe burns, consider:
    a. Additional fluid needs
    b. Airway support


Follow **General Prehospital Care Protocol**
Administer 100% Oxygen to all patients rescued from a fire
Determine burn extent and severity (rule of nines or palms)
Keep patient warm and avoid hypothermia
If evidence of airway burn, consider aggressive airway management per **Emergency Airway Protocol**
If possibility of cyanide poisoning, refer to **Cyanide Exposure Protocol**
Thermal Burns
Stop the burning process
Remove non adherent clothing. Irrigate with sterile water or saline, if available
Consider potential for secondary contamination
Assess and treat associated trauma
Remove constricting items
If burn is less than 15% TBSA consider wet dressings. If greater than 15% TBSA, dry clean dressings
Chemical Burns
Protect personnel from contamination
Remove clothing and constricting items
Decontaminate patient prior to transport
Assess and treat for associated injuries
Evaluate for systemic symptoms
Notify receiving hospital of possible contamination
Cover burned area in clean, dry dressing
Electrical Burns
Protect rescuers from electrical wires
When energy source is removed, remove patient from electrical source
Assess and treat contact wounds
Monitor ECG
Treat associated injuries per **Spinal Injury Assessment** and **Spinal Precautions Procedure**
Obtain vascular access if indicated for pain management or fluid therapy
Administer NS IV/IO fluid bolus
Adults up to 1 liter for hypotension or burn >15% TBSA.
Pediatrics 20 mL/kg
Repeat as indicated
Administer analgesia per **Pain Management Procedure**
Follow local MCA **Transport Protocol**
Thermal Burns and Electrical Injury
Transport directly to burn center MCA destination protocol or medical control direction
Additional NS IV/IO fluid bolus
For severe burns consider additional fluids and airway support

General Crush Injury

Purpose:

This protocol should be considered when the patient has been entrapped at the scene for more than one hour, one or more full extremities trapped by an object capable of causing a crush injury, including machinery, dirt, rock, and rubble or there is entrapment of patient with history of previous cardiac or renal disease or dialysis treatment.

Crush Syndrome:

Should be suspected in patients with entrapment/compression of greater than one hour, especially when a large muscle mass/group is involved. Treatment of the patient at risk for Crush Syndrome **should begin before the patient is removed when practical.**

Treatment:

1. Follow **General Trauma Protocol**, identify and treat life threats.
2. Assess for signs of Compartment Syndrome or Crush Syndrome.
3. Use tourniquet as indicated (see **Tourniquet Application** procedure).

4. Establish large bore IV(s) and infuse one (1) to two (2) liters of Normal Saline *just prior to removal of patient when practical.*
5. Treat patient pain per the **Pain Management Procedure**.
6. Initiate cardiac monitoring and assess for hyperkalemia, i.e. wide QRS or peaked T waves.
7. Perform 12-Lead ECG, if conditions allow.
8. Administer **Oxygen** to patient if environment allows.
9. Administer **Sodium Bicarbonate**
    a. Adults 100 mEq IVP prior to extrication and 50 mEq/hr IVPB or slow IVP if extrication is prolonged and hyperkalemia is suspected.
    b. Pediatrics 1 mEq/kg (max dose 50 mEq) IV
10. Consider **Albuterol** 2.5 mg via NMT (nebulized mist treatment) during extrication process.
11. Administer **Calcium Chloride** if hyperkalemia is suspected (peaked T waves, widened QRS, hypotension)
    a. Adults 1 gram slow IVP over 5 minutes
    b. Pediatrics 20 mg/kg, max dose 1 gram over 5 minutes

Soft Tissue & Orthopedic Injuries

1. Follow **General Pre-hospital Care Protocol**.
2. Control bleeding.
    A. Utilize direct pressure.
    B. Consider early tourniquet use (refer to **Tourniquet Application Procedure**).
    C. Consider FDA **and** MCA approved hemostatic agents and hemorrhage control devices.
    D. Consider use of pressure dressings with deep wound packing.
    E. Consider pelvic binding for suspected unstable pelvic fracture.
3. If appropriate, maintain spinal precautions for patient per **Spinal Injury Assessment Protocol.**
4. Assess pain on 1-10 scale.
5. Immobilize/splint orthopedic injuries as appropriate.
    A. Special Considerations
        i. Consider traction splinting for femur fractures (excluding hip/femoral neck).
        ii. Straighten severely angulated fractures if distal extremity has signs of decreased perfusion.
        iii. Evaluate and document neurovascular status before and after splinting.
        iv. Dress open fractures.
6. Partial/complete amputations
    A. Control bleeding as above.
    B. Cover wounds with sterile dressings moistened with sterile solution.
    C. Splint extremity.
    D. Recoverable amputated parts should be brought to hospital as soon as possible.
    E. Wrap amputated part in sterile dressing moistened with sterile solution. Seal in a plastic bag and, if available, place bag in container of ice and water. DO NOT place part directly on ice.
    F. Frequent monitoring of circulation, sensation, and motion distal to the injury during transport.
7. For severe crush injuries, refer to **General Crush Injury Protocol**.
8. Impaled objects are left in place and stabilized. Removal of impaled objects is only with approval of medical control.
9. Follow local MCA transport protocol.
10. Provide pain management per **Pain Management Procedure.**
11. Consideration sedation per **Patient Sedation Procedure**.

Follow **General Pre-Hospital Care Protocol**.

Control bleeding
- Utilize direct pressure
- Consider early tourniquet use (refer to **Tourniquet Application Procedure**).
- Consider FDA **and** MCA approved hemostatic agents and hemorrhage control devices.
- Consider use of pressure dressings with deep wound packing.

If appropriate, stabilize cervical spine and immobilize patient per **Spinal Injury Assessment Protocol**.

Consider tourniquet use when applicable (refer to **Tourniquet Application Procedure**).

Immobilize/splint orthopedic injuries as appropriate
- Special Considerations.
  - Consider traction splinting for femur fractures (excluding hip/femoral neck).
  - Straighten severely angulated fractures if distal extremity has signs of decreased perfusion.
  - Evaluate and document neurovascular status before and after splinting.
  - Dress open fractures.

Provide pain management per **Pain Management Procedure**.

For severe crush injuries, refer to **General Crush Injury Protocol.**

Impaled objects are left in place & stabilized. Removal of impaled objects is only with approval of medical control.

Contact Medical Control

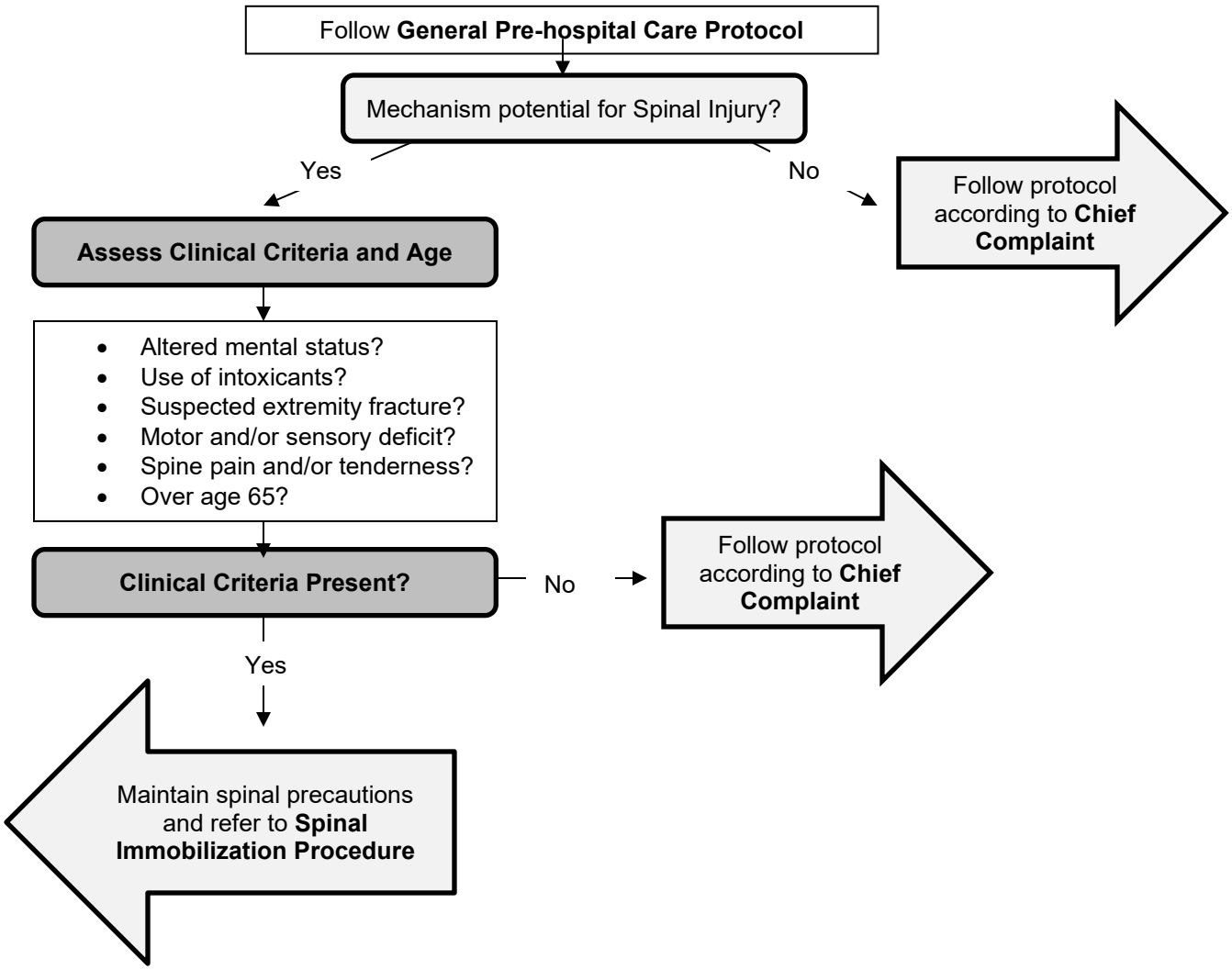
Follow local MCA transport protocol.

Partial/complete amputations
- Control bleeding as above
- Cover wounds with sterile dressings moistened with sterile solution.
- Splint extremity.
- Recoverable amputated parts should be brought to hospital as soon as possible.
- Wrap amputated part in sterile dressing moistened with sterile solution. Seal in a plastic bag and, if available, place bag in container of ice and water. DO NOT place part directly on ice.
- Frequent monitoring of circulation, sensation, and motion distal to the injury during transport.

Paramedics, consider sedation per **Patient Sedation Procedure.**

Spinal Injury Assessment

1. Follow **General Pre-hospital Care protocol**.
2. Assess the mechanism of injury.
    A. Negative mechanism does not need a spine injury clinical assessment
    B. Patients with mechanism of injury with the potential for causing spine injury shall have a spine injury clinical assessment performed.
3. Clinical criteria are used as the basis for assessment. If any of the clinical criteria are present or if the assessment cannot be completed, the patient has a positive spine injury assessment.
4. If the mechanism of injury with the potential for causing spine injury exists, the following clinical criteria are assessed:
    A. Altered mental status
    B. Use of intoxicants
    C. Suspected extremity fracture
    D. Motor and/or sensory deficit
    E. Spine pain and/or tenderness
5. If any of the clinical criteria are present the patient has a positive spine injury assessment. If none of the clinical criteria are present the patient has a negative spine injury assessment.
6. Patients with a positive spine injury assessment should have spinal precautions maintained during movement and transport. Refer to **Spinal Precautions Procedure.**
7. Patients over the age of 65 with a mechanism of injury with the potential for causing spine injury will have a rigid extrication collar applied even if the spinal injury clinical assessment is negative.


Follow **General Pre-hospital Care Protocol**
Mechanism potential for Spinal Injury?
Yes
No
Follow protocol according to **Chief Complaint**
Assess Clinical Criteria and Age
Altered mental status?
Use of intoxicants?
Suspected extremity fracture?
Motor and/or sensory deficit?
Spine pain and/or tenderness?
Over age 65?
Clinical Criteria Present?
No
Follow protocol according to **Chief Complaint**
Yes
Maintain spinal precautions and refer to **Spinal Immobilization Procedure**

Traumatic Arrest

Purpose: To facilitate management of patients in cardiac arrest from a suspected traumatic cause. Successful resuscitation of the traumatic cardiac arrest patient requires rapid identification and correction of specific injuries, (blunt or penetrating) with prompt transport to appropriate facility.

1. Patient that meets DOA criteria, refer to **Dead on Scene Protocol.**
2. If the trauma appears to be minor and a medical condition appears to be the cause of the cardiac arrest, follow the appropriate cardiac arrest protocol.
3. If appropriate, begin high performance CPR, if witnessed arrest or arrest was within a few minutes of EMS arrival.
4. Airway - establish patent airway with 100% oxygen administration.
5. Control bleeding, any extremity injury with significant bleeding should have a tourniquet applied. If tourniquet application is not possible, apply a pressure dressing. For blunt trauma, considerations should be made for a pelvic fracture apply a pelvic binder (commercial or sheet).
6. Prepare for transport per MCA **Trauma Triage Destination Protocol**.
7. Follow **Emergency Airway Procedure**.


8. When indicated, volume administration with 2 large bore IV / IO with normal saline wide open.


9. Chest decompression for relief of tension pneumothorax. Use at least 3” catheter either (12g, 14g, or 16g angiocath).


10. If there is no response to resuscitation efforts, consult with online Medical Control for termination of resuscitation.

Drowning/Submersion Injury

Drowning is defined as**, "**A process resulting in primary respiratory impairment from submersion or immersion in a liquid medium." (American Heart Association, 2010).

Uncertainty exists regarding survival in cold water drowning, however, recent literature suggests the following:

1. In cold water (temperature is less than 43° F (6° C)) and the patient is submerged with evidence of cardiac arrest:
    A. Survival is possible for submersion time less than 90 minutes and resuscitative efforts should be initiated
    B. Survival is not likely for submersion time greater than 90 minutes and providers may consider not initiating resuscitation or termination of resuscitation on scene
2. If warm water (temperature is greater than 43° F (6° C)) and the patient is submerged with evidence of cardiac arrest:
    A. Survival is possible for submersion time less than 30 minutes and resuscitative efforts should be initiated
    B. Survival is not likely for submersion time greater than 30 minutes and providers may consider not initiating resuscitation or termination of resuscitation on scene.
3. It may often be impractical to determine water temperature; subsurface water temperatures may be considerably colder than surface temperature. When in doubt, consider water to be cold.
4. Time estimation begins when the patient is presumed to be submersed.

If SCUBA incident with rapid ascent, transport the patient in the left lateral recumbent position.

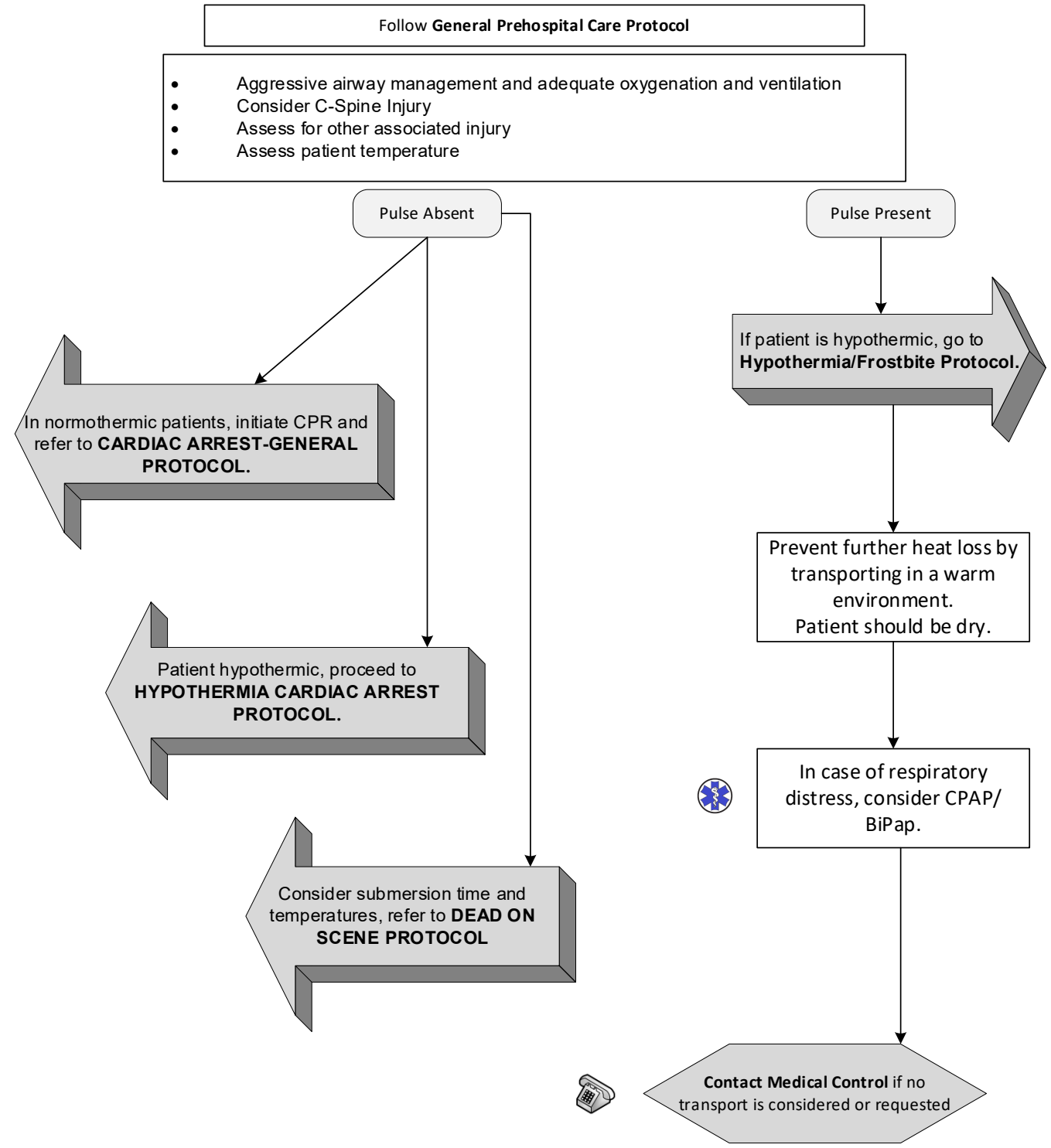
1. Follow **General Pre-hospital Care Protocol.**
    A. Primary survey should include aggressive airway management and restoration of adequate oxygenation and ventilation.
    B. Exam should include consideration of possible c-spine injury.
    C. Assess for other associated injury such as injury to the head or dive-related emergency.
    D. Assess patient's temperature.

2. **If pulse is absent**:
    A. If pulse is absent, consider submersion time and temperatures as indicated above. Refer to the **Dead on Scene Procedure as indicated.**
    B. In normothermic, (> 34 C or 93F) patients initiate CPR and refer to **Cardiac Arrest – General Protocol (Adult or Pediatric)**.
    C. If patient is hypothermic, (≤ 34C or 93F) go to **Hypothermia Cardiac Arrest Protocol.**

3. **If pulse is present:**
   A. If patient is hypothermic, go to **Hypothermia/Frostbite Protocol**.
   B. Prevent further heat loss by transport in a warm environment.
   C. Patient should be dry.
   D. Patients may develop subacute respiratory difficulty after drowning and therefore all victims of drowning should be transported for observation.

   E. Consider **CPAP/BiPAP** (if available) per **CPAP/BiPAP Procedure.**
   F. Contact Medical Control if no transport is considered or requested.

*Note: For SCUBA incident with rapid ascent, medical control can consider contacting the Divers Alert Network (DAN) @ 919-684-9111 to arrange evacuation and hyperbaric re-compression at a properly equipped and staffed chamber.



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Poisoning/Overdose/Environmental Exposure

GENERAL MANAGEMENT OF TOXIC EXPOSURE (INCLUDING INGESTION)

1. Follow **General Pre-hospital Care Protocol.**
2. Use proper protective equipment and prepare for decontamination if necessary.
3. Remove clothing exposed to chemical (dry decon).
4. Identification of the substance (patient has been exposed to).
5. If altered mental status, refer to **Altered Mental Status Protocol**.
6. If respiratory distress, refer to **Respiratory Distress Protocol.**
7. If the patient is seizing, refer to **Seizure Protocol**.

8. Alert receiving hospital if patient may present HAZMAT risk.
9. Sample of drug or substance and any medication or poison containers should be brought in with patient if it does NOT pose a risk to rescuers.

10. Refer to **Pain Management Procedure**

INHALATION EXPOSURES:

1. Ensure high concentration of oxygen is provided.
2. If suspected cyanide gas exposure, refer to **Cyanide Exposure Protocol** and contact medical control immediately.

INGESTION:

1. Use protective eye equipment.
2. If suspected opioid overdose, refer to **Naloxone Administration Procedure.**

3. If cardiac dysrhythmia, refer to appropriate dysrhythmia protocol.

4. For extrapyramidal dystonic reactions, administer Diphenhydramine
    a. For adults, 50 mg IV.
    b. For pediatrics 1 mg/kg IV (max dose 50 mg).

5. For symptomatic tricyclic antidepressant ingestions (tachycardia, wide complex QRS), administer sodium bicarbonate
    a. Adults 50 mEq IV, repeat as needed.
    b. Pediatrics 1mEq/kg IV, repeat as needed.
6. For symptomatic calcium channel blocker overdose, consider Calcium Chloride
    a. Adults 1 gm IV.
    b. Pediatrics 20 mg/kg IV (max dose 1 gm).

EYE CONTAMINATION:

1. Irrigate continuously with Normal Saline or tap water for 15 minutes (attempt to continue enroute) or as directed by Medical Control.
2. For alkali exposure, maintain continuous irrigation.

3. If available, administer Tetracaine, 1-2 drops per eye to facilitate irrigation. Ensure patient does not rub eye.

Tetracaine Included?

☐Yes ☐No

SKIN ABSORPTION:

1. Brush off dry chemicals before irrigation
2. Irrigate continuously with Normal Saline, or tap water for 15 minutes or as directed by Medical Control.

MANAGEMENT OF BITES AND STINGS

SPIDERS, SNAKES AND SCORPIONS:

1. Protect rescuers. Bring in spider, snake or scorpion if captured and contained or if dead for accurate identification.
2. Ice for comfort on spider or scorpion bite; DO NOT apply ice to snake bites.

BEES AND WASPS:

1. Remove stinger by scraping out. Do not squeeze venom sac if this remains on stinger.
2. Provide wound care.
3. Observe patient for signs of systemic allergic reaction. Treat anaphylaxis per **Anaphylaxis/Allergic Reaction Protocol.**

NERVE AGENT/ORGANOPHOSPHATE EXPOSURE

1. **Evaluate for signs and symptoms of exposure:** Salivation, Lacrimation, Urination, Defecation, Gastrointestinal hypermotility, Emesis, Muscle twitching or spasm (seizures)
    a. ***Minor symptoms only*** – alert, salivation, eye watering, dim vision, drooling, nasal drainage, constricted pupils, abdominal cramps, diaphoresis
    b. ***Moderate symptoms*** – alert, vomiting, muscle twitching, increase in minor symptoms
    c. ***Severe signs & symptoms*** – decline in LOC, urinary incontinence, defecation, severe muscle twitching, seizure, respiratory distress/wheezing
2. Evaluate and maintain the airway, provide oxygenation and support ventilation as needed.
3. NOTE: Anticipate need for extensive suctioning
4. Antidote administration per Mark I Kit/Duo Dote auto-injector Dosing Directive – See Chart

5. Establish vascular access

6. Atropine 2-6 mg IV/IM per Mark I Kit Dosing Directive if Mark I Kit is not available (each Mark I Kit/Duo Dote auto-injector contains 2 mg of atropine)
7. Treat seizures
    a. **Adult**
        i. Administer Midazolam 10 mg IM prior to IV start
        ii. (or) if IV/IO already established, administer Midazolam 5 mg IV/IO
        iii. (or) If available, Valium auto-injector

    b. **Pediatrics**
        i. Administer Midazolam 0.1 mg/kg IM (maximum individual dose 10 mg) prior to IV start
        ii. (or) if IV/IO already established, administer Midazolam 0.05 mg/kg IV/IO (maximum individual dose 5 mg)
        iii. (or) If available, Valium auto-injector
8. Monitor EKG
9. Additional **Atropine** 2 mg IV/IM for continued secretions (0.05 mg/kg for pediatrics)

10. For severe symptoms (if 3 Nerve-agent Antidote kits are administered), administer benzodiazepine as noted for seizures.

*NA Kit Dosing Directive				
	Clinical Findings	**Signs/Symptoms**	**Required Conditions**	**NA Kits To Be Delivered**
SELF-RESCUE	**Threshold Symptoms**	• Dim vision • Increased tearing • Runny nose • Nausea/vomiting • Abdominal cramps • Shortness of breath	Threshold Symptoms *-and-* Positive evidence of nerve agent or OPP on site	1 NA Kit (self-rescue)
ADULT PATIENT	**Mild Symptoms and Signs**	• Increased tearing • Increased salivation • Dim Vision • Runny nose • Sweating • Nausea/vomiting • Abdominal cramps • Diarrhea	Medical Control Order	1 NA Kit
	Moderate Symptoms and Signs	• Constricted pupils • Difficulty breathing • Severe vomiting	Constricted Pupils	2 NA Kits
	Severe Signs	• Constricted pupils • Unconsciousness • Seizures • Severe difficulty breathing	Constricted Pupils	3 NA Kits (If 3 NA Kits are used, administer 1st dose of available benzodiazepine)
PEDIATRIC	**Pediatric Patient with Non-Severe Signs/Symptoms**	*Mild or moderate symptoms as above*	Positive evidence of nerve agent or OPP on site	Age ≥8 years old: • As Above Age <8 years old • Per Medical Control
	Pediatric Patient with Severe Signs/Symptoms	• Constricted pupils • Unconsciousness • Seizures • Severe difficulty breathing	Severe breathing difficulty Weakness	Age ≥ 8 years old: • 3 NA Kits Age < 8 years old: • 1 NA Kit Contact Medical Control as needed

***NOTE: Nerve-agent Antidote (NA) =1 Duo Dote or 1 Mark I**

Follow **General Prehospital Care Protocol**

GENERAL MANAGEMENT OF TOXIC EXPOSURE

- Use proper equipment & prepare for decontamination
- Remove clothing exposed to chemical
- Identify substance, if possible
- Alert receiving hospital if patient presents HAZMAT risk
- Sample of substance & any containers should be brought with patient if it does not pose a risk to others

Refer to **Pain Management Procedure** as needed

INGESTION

If altered, refer to **Altered Mental Status Protocol**

If in cardiac dysrhythmia, refer to **appropriate dysrhythmia protocol**

If respiratory distress, refer to **Respiratory Distress Protocol**

If patient is seizing, refer to **Seizures Protocol**

If opioid overdose, refer to **Naloxone Administration Procedure**

INGESTION (CONTINUED)

Contact Medical Control

Administer

If symptomatic tricyclic antidepressant ingestion → **Sodium Bicarbonate 50mEq IV or 1 mEq/kg for pediatrics**

If extrapyramidal dystonic reactions → **Diphenhydramine 50 mg IV or 1 mg/kg for pediatrics**

If symptomatic calcium channel blocker overdose → Consider **calcium chloride 1 gm IV or 20 mg/kg for pediatrics**

INHALATION EXPOSURE

- Dilute noxious gas
- Ensure high concentration of oxygen

If suspected cyanide gas exposure, refer to **Cyanide Exposure Protocol**

EYE CONTAMINATION

- Irrigate continuously with Normal Saline or tap water for 15 minutes
- Attempt to continue during transport
- For alkali exposure, maintain continuous irrigation

If available, administer **Tetracaine, 1-2 drops per eye**, per MCA selection (ensure patient does not rub eye)

Tetracaine Included?

☐Yes ☐No

SKIN ABSORPTION

- Brush off dry chemicals
- Irrigate continuously with Normal Saline for 15 minutes or
- As directed by medical control

BITES AND STINGS

Spiders, Snakes, & Scorpions

- Protect rescuers
- Bring in for accurate identification (if contained and/or dead)
- Ice for comfort (spiders or scorpions **ONLY**)

Bees & Wasps

- Remove sting mechanism
- Do not squeeze
- Provide wound care
- Observe for systemic reaction

If systemic reaction, refer to **Anaphylaxis, Allergic Reaction Protocol**

NERVE AGENT/ORGANOPHOSPHATE EXPOSURE

- Evaluate for signs and symptoms
  - Minor Symptoms
  - Moderate Symptoms
  - Severe Symptoms
- Evaluate and maintain the airway, provide oxygenation and support ventilation as needed.
- Anticipate the need for extensive suctioning
- Antidote administration per Mark I Kit/Duo Dote auto-injector Dosing Direction – see chart

Establish vascular access

Atropine 2-6 mg IV/IM per Dosing Directive if Mark I Kit is not available
(Each Mark I kit has 2 mg of Atropine)

Seizures?

Adults
- Administer **Midazolam** 0.1 mg/kg to max 10 mg IM
- If available, **Valium** auto-injector

Pediatrics
- **Midazolam** 0.1 mg/kg IV/IM (maximum individual dose 5 mg)
- If available, **Valium** auto-injector

Monitor EKG

Additional **Atropine** 2 mg IV/IM for continued secretions (0.05 mg/kg for pediatrics)

Heat Emergencies

1. Follow **General Pre-hospital Care Protocol**.
2. Determine history/evidence of heat exposure.
3. Check blood glucose and treat hypoglycemia per **Altered Mental Status Protocol**.

HEAT CRAMPS:

1. Move the patient to a cool environment and attempt oral liquids.
2. Contact medical control.

HEAT EXHAUSTION:

1. Move the patient to a cool environment.
2. Remove tight clothing.
3. Cool patient, provide air conditioning/fanning. Avoid chilling/shivering.
4. NS IV/IO fluid bolus up to 1 liter, wide open.
   A. Patient may take oral fluid replacement rather than IV if no nausea. Allow oral intake of cool fluids or water (may use commercial sports/rehydration drinks). Do not permit patient to drink if altered mental status, abdominal pain or nausea. Avoid carbonated, alcoholic and caffeinated beverages.
5. Contact medical control.

HEAT STROKE:

1. Move the patient to a cool environment.
2. Remove tight clothing.
3. Immediate cooling – provide air conditioning and fanning. Avoid chilling/shivering.
4. Place patient in semi-reclining position with head elevated.
5. NS IV/IO fluid bolus up to 1 liter, wide open, repeat as indicated.
6. Contact medical control.

MANAGEMENT OF PATIENT WITH EXERTIONAL HEAT STROKE

7. Cool as quickly as possible via ice or cool-water immersion, if possible. Alternative means, such as continually misting the exposed skin with tepid water while fanning the victim, may be used if immersion is not possible.
   A. Cool as much of the body as possible, especially the torso.
8. **Cool first, transport second when possible.**
9. Obtain vascular access; consider resting the patient's arm on the side of immersion tub to start IV while patient is still immersed.
10. If patient experiences seizures, refer to **Seizures Protocol**.
11. Monitor ECG (lead cables can go in the water).
12. If uncontrolled shivering occurs during cooling, consider midazolam per **Patient Sedation Protocol.**

Follow **General Pre-Hospital Care Protocol**

- Determine history/evidence of heat exposure

Refer to **Altered Mental Status Protocol**

HEAT CRAMPS

- Move patient to a cool environment
- Attempt oral liquids

Contact Medical Control

HEAT EXHAUSTION

- Move patient to a cool environment
- Remove tight clothing
- Cool patient without chilling or shivering
- NS IV/IO fluid bolus up to 1 Liter
  - Patient can take fluids by mouth if preferred and no nausea (no alcohol, carbonation, caffeine)

Contact Medical Control

HEAT STROKE

- Move patient to a cool environment
- Remove tight clothing
- Immediately cool patient without chilling or shivering
- Place patient in semi-reclining position with head elevated
- NS IV/IO fluid bolus up to 1 Liter

Contact Medical Control

EXERTIONAL HEAT STROKE

- Cool as quickly as possible via ice or cool-water immersion, if possible
- Alternative means, such as misting the skin with tepid water while fanning may be used if needed
- Cool as much of the body as possible (especially the torso)
- **Cool FIRST, transport second when possible**
- Obtain vascular access
- Monitor ECG

If the patient seizes, refer to **Seizures Protocol**

Contact Medical Control

If uncontrollable shivering occurs, consider **Patient Sedation Protocol**

Hypothermia/Frostbite

1. Follow **General Pre-hospital Care Protocol**

HYPOTHERMIA:

1. If cardiac arrest develops follow **Hypothermia Cardiac Arrest Protocol**.
2. Move patient to a warm dry place, remove wet clothing & wrap in warm blankets and protect from wind exposure.
3. If the patient's temperature is greater than 30° C (86° F) or patient shivering & conscious:
   A. Apply heat packs to groin, axillae, and neck if possible.
   B. Use warmed humidified oxygen if available.
4. If patient is alert, administer warm non-caffeinated beverages (if available) by mouth, slowly.
5. If patient temperature is less than 30° C (86° F)
   A. Gentle handling is required.
   B. Facilitate transport immediately.
6. If alterations in mental status, consider measuring blood glucose and treat as indicated per **Altered Mental Status Protocol** and assess for other causes of alterations of mentation.

7. Administer warm NS IV/IO fluid bolus up to 1 liter, wide open, if available.
   A. Pediatrics 20 ml/kg

8. Use warmed humidified oxygen if available.

SUSPECTED FROSTBITE:

1. Remove wet or constricting clothing. Keep skin dry and protected from wind.
2. Do not allow the limb to thaw if there is a chance that limb may re-freeze before evacuation is complete or if patient must walk to transportation.
3. Dress injured areas lightly in clean cloth to protect from pressure, trauma or friction. Do not rub. Do not break blisters.
4. Keep patient warm.
5. Frostbitten areas should be supported and elevated during transport.

6. Treat pain per **Pain Management Procedure**.

Follow **General Pre-hospital Care Protocol**

Hypothermia

- Move patient to warm dry place
- Remove wet clothing
- Wrap in warm blankets
- Protect from wind exposure

→ If cardiac arrest develops, follow **Hypothermia Cardiac Arrest Protocol**

Patient temperature is greater than 30° C (86° F)? or
Patient is shivering and conscious?

Yes

- Apply heat packs to groin, axillae and neck if possible
- Use warmed humidified oxygen if available
- Administer warm non-caffeinated beverages (if available) by mouth slowly

No

→ For altered mental status, follow **Altered Mental Status Protocol**

- Follow local MCA transport protocol
- Use warm humidified oxygen if available
- Administer warm NS IV/IO fluid bolus up to 1 liter, wide open, if available (specialist/paramedic)

Suspected Frostbite

- Remove wet or constricting clothing
- Keep skin dry and protected from wind
- Do not allow limb to thaw if there is a chance that limb may re-freeze or if patient must walk to transportation
- Dress injured areas lightly in cloth to protect from pressure, trauma or friction.
- Do not rub
- Do not break blisters
- Keep patient warm
- Frostbitten areas should be supported and elevated during transport

Paramedics refer to **Pain Management Procedure**

Hypothermia Cardiac Arrest

1. Follow **General Pre-hospital Care Protocol.**
2. Follow **Cardiac Arrest – General or Pediatric Cardiac Arrest – General**
3. Assess body temperature. If temperature is less than 30° C (86° F):
4. Protect against heat loss.
5. Apply heat packs, if available, to axillae, groin, and neck.
6. Administer warmed humidified oxygen, if possible.

7. Administer warmed NS IV/IO, if possible.

8. Initiate transport per **MCA Destination or Transport Protocol**.

Bleeding Control

Indications:
Patients with significant traumatic or non-traumatic (i.e. hemodialysis access) external hemorrhage

I. Follow **General Pre-hospital Care Protocol** and **Soft Tissue & Orthopedic Injuries Protocol.**
II. Apply direct pressure to the wound with clean gauze using universal precautions.
III. If the bleeding is not controlled with direct pressure, treat according to the location of the wound.
   a. Extremity bleeding - apply tourniquet:
      i. Check neurovascular status prior to tourniquet application (pulse, sensation, motor function distal to hemorrhage).
      ii. Apply tourniquet as proximal as possible on the limb.
      iii. Secure the tourniquet in place; continue to tighten the tourniquet until arterial occlusion.
      iv. A successfully placed tourniquet may cause significant pain. (Refer to **Pain Management Procedure**)
      v. Document the time the tourniquet was applied.
      vi. Reassess neurovascular status every five minutes post application.
      vii. Notify the receiving hospital that a tourniquet is in place.
      viii. Do not adjust or remove tourniquet once bleeding is controlled.
      ix. Consider a second tourniquet immediately adjacent to the first tourniquet if bleeding not controlled.
      x. If tourniquet unsuccessful or unavailable, treat as a neck, shoulder, or groin bleeding.
   b. Neck, shoulder, or groin bleeding:
      i. Pack wound with MCA approved hemostatic dressing, if available, following manufacturers instructions.
      ii. If no hemostatic gauze, utilize clean dressing or gauze to pack the wound.
      iii. Use as much of the dressing as needed to stop the blood flow.
      iv. Quickly apply pressure until the bleeding stops. (Approximately 3-5 minutes)
      v. Leave the dressing in place and wrap area with bandaging to secure the dressing.
IV. Do not remove the bandage or hemostatic dressing
V. Elevate the injury, if possible.
VI. Reassess for bleeding through or around the dressing.
VII. For patients who have signs or symptoms of shock, secondary to hemorrhage, refer to **Hemorrhagic Shock Protocol**.
VIII. Transport according to **Adult and Pediatric Trauma Triage** and local **Destination and Diversion Guidelines.**

Notes:

If hemostatic dressing is used, contact medical control to advise of application, document time of use, and send packaging from dressing to hospital with patient for removal instructions. 

Hemorrhagic Shock

I. Follow **General Pre-hospital Care Protocol** and **Soft Tissue & Orthopedic Injuries Protocol,** control bleeding according to **Bleeding Control Protocol.**
II. Transport according to **Adult and Pediatric Trauma Triage Protocol** and local **Destination and Diversion Protocol**.
III. No intervention should delay transport.
IV. Obtain vascular access.
V. Fluid should administered if:
   a. Significant head trauma with SBP less than 100 mm/Hg.
   b. Altered mental status secondary to hemorrhage with absent radial pulses.
VI. Fluid administration:
   a. NS IV/IO up to 1 liter, titrated to mental status and radial pulse.
   b. For pediatrics administer fluid bolus up to 20 mL/kg, titrated to resolution of shock. Maximum fluid administration of 1 liter.
   c. Additional fluids may only be administered post medical control contact.
VII. Consider other causes of traumatic hypotension and refer to appropriate protocol.
   a. Tension pneumothorax
   b. Cardiac tamponade
   c. Spinal shock
VIII. Per MCA Selection, if bleeding is uncontrolled and non-compressible, administer Tranexamic Acid (TXA).

Tranexamic Acid Included

☐ **Yes** ☐ **No**

I. Draw up and mix 1 gram of TXA into a 100 ml bag of normal saline solution (0.9% Sodium Chloride Solution).
   a. Use a filter needle if the medication is supplied in an ampule.
   b. Apply pre-printed “TXA added” fluorescent-colored label to IV bag
II. Administer mixed medication via piggy back into IV/IO line over 10 minutes

   a. Hospital Notification and Documentation
      i. The receiving hospital must be verbally notified that TXA has been given, prior to arrival.
      ii. A verbal report that TXA was administered must be provided to hospital ED staff (receiving physician preferred) upon hand-off of the patient from EMS.
      iii. The administration of TXA **must** be clearly documented on the EMS patient care record.
   b. Medical control may order TXA for selected patients with suspected compensated shock not meeting the above vital sign criteria.