WW. TRAUMA PROTOCOL: BURNS

1. Inclusion Criteria
   a) The primary objectives in burn care by EMS clinicians are to stop the burning process, establish IV access, avoid hypothermia, and transport patients quickly and safely to a burn center. While patients with large burns (greater than 20%), facial burns, and/or significant smoke inhalation often require endotracheal intubation and mechanical ventilation during their resuscitation and care, airway compromise in the first few hours following a burn is uncommon.
      (1) In adults, prehospital tracheal intubation following acute burns is generally unnecessary unless signs of respiratory failure are present (symptomatic airway obstruction, shock, altered mental status, hypoxemia while receiving supplemental oxygen, or dyspnea, etc.).
      (2) Pediatric airways are smaller than adult airways and require frequent and thorough assessment for signs of respiratory distress. Intubate if necessary.
   b) Burns are the body's response to injuries to the skin, muscles, bone, nerves, and blood vessels caused by thermal, chemical, electrical, radiation, or light source. Patients may exhibit any of the following: reddening of the skin, deep and intense pain, blisters, mottled appearance, and/or charred black or brown areas with severe or no pain.
   c) Indications for Referral to a Burn Center
      (1) All third degree burns (full thickness)
      (2) Second degree burns (partial thickness) greater than 10% total body surface area
      (3) Burns of the face, hands, feet, major joints, genitalia, or perineum
      (4) Electrical burns, including lightning or contact with high voltage (greater than 120 volts)
      (5) Suspected inhalation injury of toxic smoke (Monitor the patients with suspected inhalation injury for delayed airway obstruction, respiratory distress, or oxygen desaturation as the patient may need emergent airway management.)
      (6) Circumferential burns involving the extremities or torso
      (7) Chemical burns should be transported to the closest appropriate hospital for decontamination prior to referral to a burn center

PATIENTS WITH BURNS AND TRAUMA SHOULD BE REFERRED TO THE NEAREST APPROPRIATE TRAUMA CENTER FOR INITIAL CARE.

CHILDREN WHO MEET BURN INCLUSIVE CRITERIA WHO HAVE NOT REACHED THEIR 15TH BIRTHDAY SHOULD BE TRANSPORTED TO A PEDIATRIC BURN CENTER.

IF PATIENT HAS EXPOSURE TO CARBON MONOXIDE/SMOKE INHALATION, REFER TO CARBON MONOXIDE/SMOKE INHALATION PROTOCOL.

2. Treatment
   a) Extract the patient from burning vehicles or buildings if safe to do so and move patient to a place of relative safety.

WW. TRAUMA PROTOCOL: BURNS (Continued)

b) Do what is necessary to stop the burning process. If water is used to extinguish the fire, remove wet clothing and dry the patient to prevent hypothermia.
c) Administer oxygen in as high a concentration of oxygen as possible *(note: pulse oximetry is not reliable in the presence of carbon monoxide or cyanide exposure)*.
d) Determine percent of body surface area (BSA) burned and depth.
e) Treat associated trauma.
f) For burns greater than 10%, follow Hypothermia Protocol as well.
g) Remove all rings, bracelets, and other jewelry.
h) Cover wounds appropriately (with a clean sheet or Mylar blanket—sterile dressings no longer recommended).
i) For chemical burns, brush off dry chemical, remove clothing, flush with water.

DO NOT GIVE ANYTHING BY MOUTH.

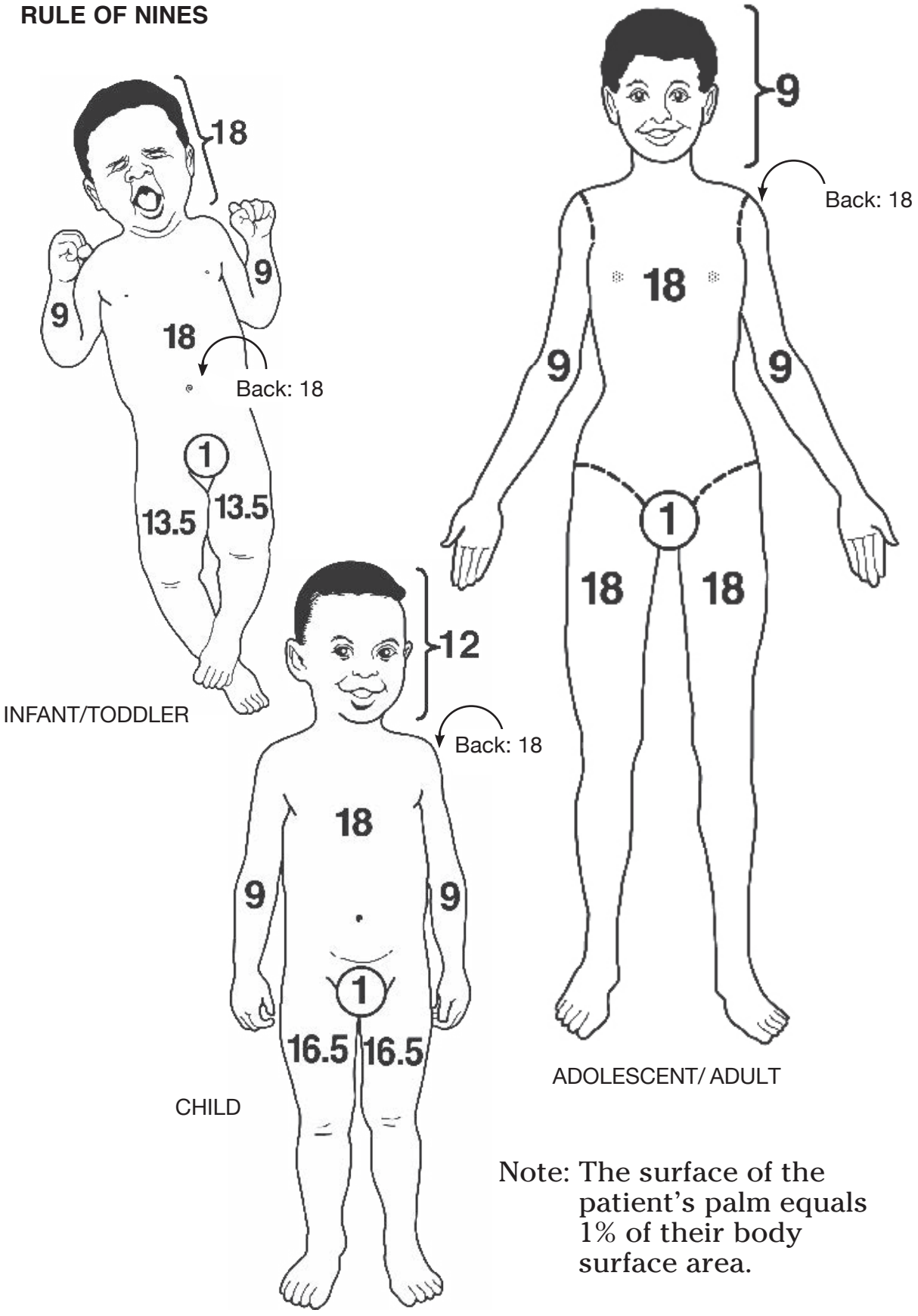
DO NOT PLACE ICE OR ICE PACKS ON ANY PATIENT WITH BURNS GREATER THAN 5% TOTAL BODY SURFACE AREA.

CONSIDER UTILIZING AEROMEDICAL RESOURCE IF PATIENT IS MORE THAN 30 MINUTES FROM A BURN CENTER/HYPERBARIC MEDICINE SPECIALTY CENTER BY GROUND.

j) Establish IV access with LR, if appropriate.
   (1) For shock patients, administer a fluid bolus of 20 mL/kg LR followed by a second 20 mL/kg LR if needed. Titrate to a systolic pressure of 90 mmHg.
k) Administer opioid per Pain Management Protocol.
l)  Consider additional fluid administration. Maximum dose 2,000 mL without medical consultation.

m) Establish IV access with LR, if appropriate.
   (1) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
n)  Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.
o) Administer opioid per Pain Management Protocol.

RULE OF NINES



Note: The surface of the patient's palm equals 1% of their body surface area.

XX. TRAUMA PROTOCOL: EYE TRAUMA

1. Inclusion Criteria

   The patient may present with profuse bleeding, avulsions, lacerations, foreign objects, impaled objects, and/or soft tissue damage to the eye(s) and/or surrounding facial areas.

2. Treatment

NEVER APPLY PRESSURE TO THE EYEBALL OR GLOBE!

IF THE PATIENT HAS OTHER ASSOCIATED TRAUMA OR BURNS, TRANSPORT THE PATIENT TO THE APPROPRIATE TRAUMA OR BURN CENTER; OTHERWISE, TRANSPORT THE PATIENT TO THE NEAREST EYE TRAUMA CENTER, IF APPROPRIATE.

DO NOT USE CHEMICAL COLD PACKS ON THE FACE.

a) **Foreign objects NOT embedded in the eye(s):** Flush with copious amounts of water (preferably sterile), normal saline, or LR from the bridge of the nose outward.

b) **Injury to orbits (area around the eye):** Consider head stabilization and Spinal Protection Protocol.

c) **Lacerations/injuries to the eyeball or globe:** Shield affected eyeball and dress other eye to reduce movement and protect loss of fluids; consider head stabilization and spinal protection and elevate the head to decrease intraocular pressure.

d) **Impaled objects:** Stabilize object, shield affected eyeball, and dress other eye to reduce movement.

e) Establish IV access with LR, if appropriate.

f) Administer opioid per Pain Management Protocol.

g) **Foreign objects NOT embedded in the eye(s):** Flush with copious amounts of water (preferably sterile), normal saline, or LR from the bridge of the nose outward.

h) **Injury to orbits (area around the eye):** Consider head stabilization and Spinal Protection Protocol.

i) **Lacerations/injuries to the eyeball or globe:** Shield affected eyeball and dress other eye to reduce movement and protect loss of fluids; consider head stabilization and spinal protection and elevate the head to decrease intraocular pressure.

j) **Impaled objects:** Stabilize object, shield affected eyeball, and dress other eye to reduce movement.

k) Establish IV/IO access with LR, if appropriate.

l) Administer opioid per Pain Management Protocol.

YY. TRAUMA PROTOCOL: HAND/UPPER/LOWER EXTREMITY TRAUMA (NEW '20)

1. Inclusion Criteria
   - **a) UPPER EXTREMITY**: Patients with any of the following injuries to the hand or upper extremity should be referred to Curtis National Hand Center at Union Memorial Hospital. Pediatric patients who have not yet reached their 15th birthday should be referred to a pediatric trauma center.
     (1) Complete or incomplete hand or finger amputation (except distal fingertip)
     (2) Degloving, high pressure injection, or crush injury
     (3) Compartment syndrome, suspected (excessive swelling and significant pain to extremity)
     (4) Complicated nerve or vascular injury of the forearm and hand
     (5) Stable patients with an isolated upper extremity injury at or below the mid-humerus
     (6) High-pressure injection injuries to hand or upper extremity
     (7) Complicated nerve, vessel, or compartment syndrome (excessive swelling and pain of extremity with possible evolving nerve deficit) injury of the forearm and hand
   - **b) LOWER EXTREMITY**: Patients with any of the following injuries to the lower extremity should be referred to an adult trauma center. Pediatric patients who have not yet reached their 15th birthday should be referred to a pediatric trauma center.
     (1) Complete or incomplete amputation of the lower extremity, ankle, foot
     (2) Degloving, high pressure injection, or crush injury
     (3) Compartment syndrome, suspected (excessive swelling and significant pain to extremity)
     (4) Complicated nerve or vascular injury of the lower extremity

2. Exclusion Criteria
   - **a) UPPER EXTREMITY** (Hand Center)
     (1) Patients with unstable or abnormal vital signs (transport to trauma center)
     (2) Patients with major and/or multiple system trauma (transport to trauma center)
   - **b) LOWER EXREMITY** (Adult/Pediatric Trauma Center)
     (1) Patients with toe amputation (transport to local hospital)

LIFE BEFORE LIMB.

TOE INJURIES FROM LAWN MOWER ARE NOT CANDIDATES FOR REIMPLANTATION AND PATIENTS SHOULD GO TO CLOSEST MEDICAL FACILITY.

YY. TRAUMA PROTOCOL: HAND/UPPER/LOWER EXTREMITY TRAUMA (Continued)

3. Treatment

a) Control bleeding
   (1) Apply direct pressure to the area of bleeding
   (2) Apply tourniquet early if hypovolemic shock is present and/or bleeding is difficult to control. If bleeding source unclear, place tourniquet as proximal as possible on the limb.
   (3) If bleeding from a non-compressible injury (i.e., not able to place a tourniquet to stop bleeding), consider wound packing and/or hemostatic gauze.

b) Splint suspected fracture or dislocated extremity or joint. If suspected fracture appears to have compromised perfusion or neurological function, apply gentle traction and splint in anatomic position

c) Package amputated extremity in sealed plastic bag (keep dry) and place on top of ice to keep cool. **DO NOT FREEZE. DO NOT SUBMERGE IN WATER OR FREEZE AMPUTATED PART.**

ALERT USE TIME, DISTANCE, WEATHER, AND PROXIMITY TO DESIGNATED TRAUMA CENTER TO DETERMINE MODE OF TRANSPORT. IF ESTIMATED TRANSPORT TIME TO DESIGNATED HAND CENTER IS LESS THAN 30 MINUTES, USE GROUND TRANSPORT.

d) Establish IV access with LR, if appropriate.
   If patient develops hypotension or signs of hemorrhagic shock:
   (1) Reassess the patient for other injuries. If multiple system trauma or neurotrauma, transport to a trauma center.
   (2) Administer small boluses of Lactated Ringer's to achieve and maintain a systolic blood pressure of greater than or equal to 90 mmHg (greater than or equal to 110 mmHg if injuries include a suspected head injury). Maximum single bolus of 250 mL prior to additional blood pressure check

e) Maximum dose 2,000 mL without medical consultation

f) Provide pain management per Pain Management Protocol

g) Provide treatment as above in adult BLS section.

h) Establish IV/IO access with LR, if appropriate.
   If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.

i) Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.

j) Provide pain management per Pain Management Protocol.

ZZ. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA (NEW '20)

1. Inclusion Criteria
   a) A patient who sustains multiple or severe traumatic injuries. Patients may present with suspected hypovolemic or neurogenic shock, hypotension, hypertension, rapid or slow heart rate, unequal pupils, shallow or absent respirations, decreased distal pulses, decreased motor or sensory function in the extremities, suspected internal bleeding, external bleeding, fractures, or lacerations.
   b) A patient who meets criteria for any category of the Maryland Trauma Decision Tree (Category Alpha, Bravo, Charlie, or Delta).

WHILE TIME, DISTANCE, AND PROXIMITY ARE ALL FACTORS TO BE CONSIDERED IN THE TRIAGE DECISION, THE TRAUMA DECISION TREE SHOULD BE USED TO DETERMINE WHO SHOULD BE TRANSPORTED TO THE NEAREST APPROPRIATE TRAUMA CENTER AND WHEN THE TRANSPORT SHOULD OCCUR.

PEDIATRIC PATIENTS WHO MEET INCLUSION BASED ON THE TRAUMA DECISION TREE AND WHO HAVE **NOT** REACHED THEIR 15TH BIRTHDAY SHOULD BE TRANSPORTED TO A PEDIATRIC TRAUMA CENTER.

2. Treatment
   a) Airway with Cervical Spine Motion Restriction
      (1) Apply Spinal Motion Restriction Protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilization performed.
      (2) Consider early NPA/OPA placement to establish or maintain a patient airway.
   b) Breathing and Ventilation
      (1) Provide ventilatory support and oxygen via appropriate method for the patient
      (2) Maintain pulse oximetry (SpO2) greater than or equal to 94%
      (3) Hyperventilate the head-injuried patient as follows:
         (a) Adult/Adolescent (greater than 13 years of age): 20 breaths per minute
            (i) Who has signs of herniation such as unequal pupils, posturing or paralysis, **or**
            (ii) Who is manifesting a rapidly decreasing GCS **or**
            (iii)  With on-line medical consultation
      (4) Seal open chest wounds with a vented chest seal
   c) Circulation with Hemorrhage Control
      (1) Apply direct pressure to the area of bleeding
      (2) If bleeding is life-threatening at any time OR continues despite direct pressure, then attempt wound packing, hemostatic bandages, and/or early tourniquet as appropriate
      (3) Apply pelvic stabilization if indicated (use pelvic binder if available)

ZZ. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA (Continued)

d) Breathing and Ventilation
   (1) Maintain $ETCO_2$ between 35-40 mmHg for any patient with significant head injury
   (2) For patients with suspected head injury AND signs of increased intracranial pressure (brainstem herniation), consider adjusting ventilations to achieve an $ETCO_2$ 30-35 mmHg.
   (3) If suspected tension pneumothorax, perform needle decompression thoracostomy; once catheters are placed, do not remove

e) Circulation with Hemorrhage Control
   (1) For patients with a systolic blood pressure greater than or equal to 90 mmHg (greater than or equal to 110 mmHg if injuries include a suspected head injury):
      (a) Establish IV/IO access with a saline lock
   (2) For patients with a systolic blood pressure less than 90 mmHg (less than 110 mmHg if injuries include a suspected head injury):
      (a) Establish IV/IO access
      (b) Administer small boluses of Lactated Ringer's (maximum single bolus of 250 mL prior to additional blood pressure check) to achieve and maintain a systolic blood pressure of greater than or equal to 90 mmHg (110 mmHg if injuries include a suspected head injury)
      (c) Maximum dose 2,000 mL without medical consultation

f) Consider second IV for category alpha and bravo patients ONLY if it does NOT delay transport

g) Consider pain management per Pain Management Protocol

h) Airway with Cervical Spine Motion Restriction

   (1) Apply Spinal Motion Restriction Protocol for blunt trauma patients. Patients with isolated penetrating trauma should not have spinal immobilzation performed.
   (2) Consider early NPA/OPA placement to establish or maintain a patient airway

i) Breathing and Ventilation
   (1) Provide ventilatory support and oxygen via appropriate method for the patient
   (2) Maintain pulse oximetry (SpO2) greater than or equal to 94%
   (3) Hyperventilate the head-injured patient as follows:
      (a) Adult/Adolescent (greater than 13 years of age): 20 breaths per minute
      (b) Child (1-12 years of age): 30 breaths per minute

ZZ. TRAUMA PROTOCOL: MULTIPLE/SEVERE TRAUMA (Continued)

(c) Infant (less than 1 year of age): 35 breaths per minute
(i) Who has signs of herniation such as unequal pupils, posturing, or paralysis, **or**
(ii) Who is manifesting a rapidly decreasing GCS **or**
(iii) With on-line medical consultation

(4) Seal open chest wounds with a vented chest seal

j) Circulation with Hemorrhage Control
(1) Apply direct pressure to the area of bleeding
(2) If bleeding is life-threatening at any time OR continues despite direct pressure, then attempt wound packing, hemostatic bandages, and/or early tourniquet as appropriate
(3) Apply pelvic stabilization technique if indicated

ALERT PELVIC FRACTURES IN PEDIATRIC PATIENTS ARE VERY RARE; PELVIC BINDERS/SPLINTS SHOULD BE APPLIED WITH CAUTION.

k) Breathing and Ventilation
(1) If suspected tension pneumothorax, perform needle decompression thoracostomy; once catheters are placed, do not remove.

l) Circulation with Hemorrhage Control
(1) Establish IV/IO access with LR.
(2) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR.
(3) Third and subsequent fluid boluses at 20 mL/kg LR IV/IO.

m) Consider pain management per Pain Management Protocol

GLASGOW COMA SCALE

Eye Opening

Spontaneously	**4**
To Voice	**3**
To Pain	**2**
No Response	**1**

Motor Response

To Verbal Command - Obeys	**6**
To Painful Stimulus - Localizes Pain	**5**
Flexion - Withdraw	**4**
Flexion - Abnormal	**3**
Extension	**2**
No Response	**1**

Verbal Response

Less than 2 years old	2–5 years old	Greater than 5 years old	
5 SMILES/COOS/CRIES	APPROPRIATE WORDS	ORIENTED AND CONVERSES	**5**
4 CRIES	INAPPROPRIATE WORDS	DISORIENTED AND CONVERSES	**4**
3 INAPPROPRIATE CRIES/SCREAMS	CRIES/SCREAMS	INAPPROPRIATE WORDS	**3**
2 GRUNTS	GRUNTS	INCOMPREHENSIBLE SOUNDS	**2**
1 NO RESPONSE	NO RESPONSE	NO RESPONSE	**1**

Glasgow Coma Score **Total** **(3–15)**

AAA. TRAUMA PROTOCOL: SEXUAL ASSAULT

1. Inclusion Criteria
   Patient may present with no overt evidence of trauma, or may present with the following injuries:
   a) Abrasions, contusions, and/or bleeding
   b) Signs of forcible restraint
   c) Petechiae of the face and conjunctiva, secondary to strangulation
   d) Facial injuries, including eye injuries, broken teeth, swollen jaw, or cheekbone
   e) Vaginal or rectal bleeding or pain

PATIENTS MEETING THE SPECIALTY CENTER CRITERIA OR IN NEED OF TIME-SENSITIVE EMERGENT CARE SHOULD BE PREFERENTIALLY TRANSPORTED TO THE SPECIALTY CENTER OR NEAREST EMERGENCY DEPARTMENT FOR MANAGEMENT, EVEN IF THIS IS NOT A MARYLAND COALITION AGAINST SEXUAL ASSAULT (MCASA) RECOGNIZED FACILITY. MCASA RECOGNITION SHOULD NOT SUPERCEDE SPECIALTY CENTER NEEDS.

ALL HEALTH CARE CLINICIANS ARE OBLIGATED BY LAW TO REPORT CASES OF SUSPECTED CHILD OR VULNERABLE ADULT ABUSE AND/OR NEGLECT TO EITHER THE LOCAL POLICE OR ADULT/CHILD PROTECTIVE SERVICE AGENCIES. DO NOT INITIATE REPORT IN FRONT OF THE PATIENT, PARENT, OR CAREGIVER (MD CODE, FAMILY LAW, § 5-704). UNDER MARYLAND LAW, EMS CLINICIANS ARE PROTECTED FROM LIABILITY IF THEY MAKE A REPORT OF CHILD/VULNERABLE ADULT ABUSE AND NEGLECT IN GOOD FAITH (COURTS AND JUDICIAL PROCEEDINGS ARTICLE § 5-620).

2. Treatment

   a) If practical, allow patient to speak with a clinician with whom they are most comfortable.
   b) Maintain non-judgmental, caring attitude.
   c) Preserve the crime scene and clothing articles, if practical.
   d) Do not perform an examination of the genitals or rectum unless necessary to stabilize the patient.
   e) Dress wounds (do not attempt to clean).
   f) Discourage any self-treatment (shower, washing, changing clothes, brushing teeth).
   g) Treat injuries according to presentation.

IF POSSIBLE, TRANSPORT THE PATIENT TO THE APPROPRIATE MARYLAND COALITION AGAINST SEXUAL ASSAULT (MCASA) RECOGNIZED FACILITY FOR THE SEXUAL ASSAULT FORENSIC EXAM (S.A.F.E.). CLINICIANS SHOULD USE THE TERM “SAFE PATIENT” WHEN NOTIFYING THE RECEIVING FACILITY OF THE TRANSPORT.

h) Patients under **13** years of age should be transported to an MCASA-recognized pediatric facility for the Sexual Assault Forensic Exam.

BBB. TRAUMA PROTOCOL: SPINAL MOTION RESTRICTION

1. Inclusion Criteria
   a) **"Spinal Motion Restriction"** refers to the act of protecting the spinal cord from further injury.
   b) **"Spinal immobilization"** is the act of placing a patient on a backboard with cervical collar for the purpose of trying to prevent excessive movement of the spinal column.
   c) Indications for initiating spinal motion restriction:
      (1) Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability ***AND*** one or more the following should receive spinal motion restriction:
         (a) Midline cervical, thoracic, or lumbar spinal pain, tenderness, or deformity
         (b) Signs and symptoms of new paraplegia or quadriplegia
         (c) Focal neurological deficit (sensory or motor)
         (d) Altered mental status or disorientation
         (e) Distracting injury: Any injury (e.g., fracture, chest, or abdominal trauma) associated with significant discomfort that could potentially distract from a patient's ability to accurately discern or define spinal column pain or tenderness.
      (2) Indications for referral to an Adult Specialty Spinal Center.
         (a) 15 years of age or older **AND**
         (b) Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma **AND**
         (c) Patent airway **AND**
         (d) Hemodynamically stable
         If considering referral to Adult Specialty Spinal Center, consult with both the nearest Trauma Center and the Adult Spinal Specialty Center, when possible.

2. Treatment

   a) All patients meeting the Spinal Motion Restriction Protocol shall have manual in-line cervical spine stabilization and application of a correctly sized cervical collar.

   b) Minimize flexion, extension, and rotation of the spinal column.

   c) Patients meeting the Spinal Motion Restriction Protocol who are with neurological deficit, or not able to ambulate on their own accord, **shall** be immobilized with cervical collar and a backboard.
   d) \The following patients only need application of a cervical collar and do <u>not</u> need to be placed in full immobilization with a backboard:
      (1) Patients who are found by EMS clinicians to be standing or ambulatory,
      (2) Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, or rotation) of the spinal column, and
      (3) Patients who do not have evidence of a neurological deficit.

BBB. TRAUMA PROTOCOL: SPINAL MOTION RESTRICTION (Continued)

e) Patients who are placed in a cervical collar without a need for immobilization on a backboard should be assisted in minimal movement to the EMS stretcher and allowed to lie down supine on their own accord.

f) Patients meeting Spinal Motion Restriction Protocol and not requiring immobilization with a backboard should be secured to the EMS stretcher in a supine position with the head elevated at 30 degrees.

g) Backboards may be used for patient extrication and patient transfer for patients not meeting Spinal Motion Restriction Protocol; however, other devices are preferred (e.g., sheet, Reeves sleeve, or scoop stretcher).

h) If the backboard is used for extrication from the scene to an ambulance, the patient should be removed from the backboard as soon as possible. The stretcher mattress will provide support in place of the backboard.

i) Interfacility transport patients who have already been removed from a backboard should not be placed back on the backboard prior to transport.

j) Helmet Removal
   (1) If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
   (2) If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
   (3) If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

k) Patients found with backboard applied before EMS arrival
   (1) If EMS clinicians find patient immobilized on a backboard applied prior to arrival, the principles of the Spinal Motion Restriction Protocol still apply.

l) If the patient presents with hypotension and concern for neurogenic shock, refer to the neurogenic shock section of the Shock/Hypotension protocol.

In children who have not reached their 15th birthday:
Indications for initiating spinal motion restriction:

m) Patients who have a blunt trauma with a high-energy mechanism of injury that has potential to cause spinal cord injury or vertebral instability ***and*** the presence of or inability to assess one or more of the following should receive spinal motion restriction.

BBB. TRAUMA PROTOCOL: SPINAL MOTION RESTRICTION (Continued)

(1) Midline spinal pain, tenderness, or deformity
(2) Signs and symptoms of new paraplegia or quadriplegia
(3) Focal neurological deficit
(4) Altered mental status or disorientation
(5) Distracting injury
(6) Neck pain or torticollis
(7) High-impact diving incident or high-risk motor vehicle crash (i.e., head-on collision, rollover, ejected from the vehicle, death in the same crash, or speed greater than 55 mph)
(8) Substantial torso injury
(9) Conditions predisposing to spine injury

Indications for referral to a Pediatric Trauma Center:

(10) Patient is less than 15 years of age **AND**
(11) Signs and symptoms of new paraplegia or quadriplegia in the presence of trauma **AND**
(12) Patent airway **AND**
(13) Hemodynamically stable

Consult with nearest Trauma Center and, when possible, the nearest Pediatric Trauma Center.

n) Initiate General Patient Care.

o) All patients meeting the Spinal Motion Restriction Protocol shall have manual in-line cervical spine stabilization and application of a correctly sized cervical collar.

p) Minimize flexion, extension, and rotation of the spinal column.

q) Patients meeting the Spinal Motion Restriction Protocol who are with neurological deficit, not able to ambulate on their own accord, or who are unable to respond during assessment **shall** be immobilized with cervical collar and a backboard.

r) The following patients only need application of a cervical collar and do not need to be placed in full immobilization with a backboard:
   (1) Patients who are found by EMS clinicians to be standing or ambulatory
   (2) Patients who have a GCS of 15 and are able to safely extricate themselves from the environment (e.g., vehicle seat) without gross movement (flexion, extension, or rotation) of the spinal column, and
   (3) Patients who do not have evidence of a neurological deficit.

s) Patients who are placed in a cervical collar without a need for immobilization on a backboard should be assisted in minimal movement to the EMS stretcher and allowed to lie down supine on their own accord.

BBB. TRAUMA PROTOCOL: SPINAL MOTION RESTRICTION (Continued)

t) Patients meeting Spinal Motion Restriction Protocol and not requiring immobilization with a backboard should be secured to the EMS stretcher in a supine position with the head elevated at 30 degrees.

u) Backboards may be used for patient extrication and patient transfer for patients not meeting Spinal Motion Restriction Protocol; however, other devices are preferred (e.g., sheet, Reeves sleeve, or scoop stretcher).

v) If the backboard is used for extrication from the scene to an ambulance, the patient should be removed from the backboard as soon as possible. The stretcher mattress will provide support in place of the backboard.

w) Interfacility transport patients who have already been removed from a backboard should not be placed back on the backboard prior to transport.

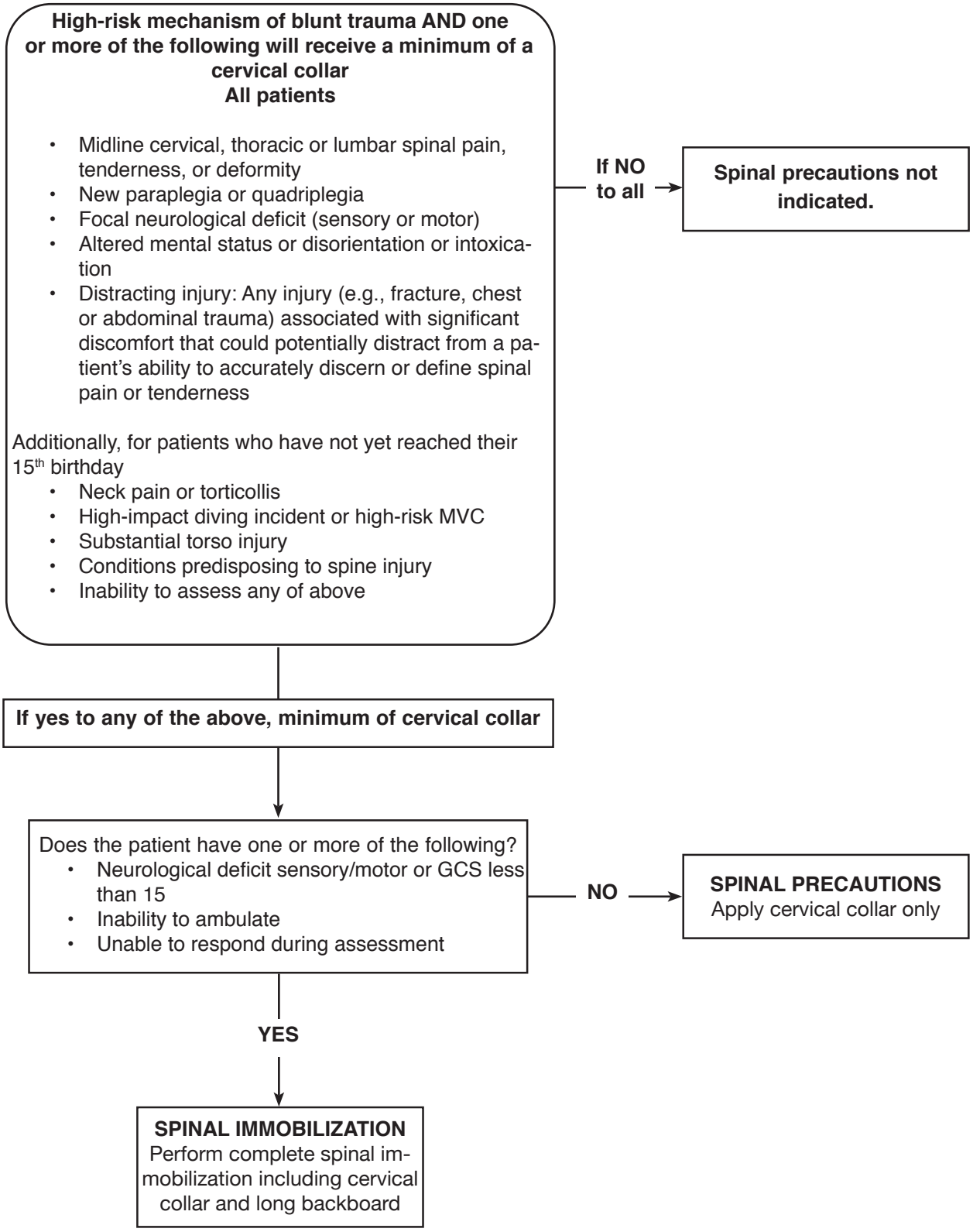
bb) Helmet Removal
- (1) If patient is wearing a helmet, the goals are assessment and management of the airway, breathing, and circulation followed by protection of the spinal column by maintaining neutral alignment of the spinal column.
- (2) If patient is wearing helmet and no shoulder pads, removal of the helmet is indicated.
- (3) If patient is wearing helmet with shoulder pads, removal of the helmet is acceptable only with concurrent removal of shoulder pads. Under these conditions, removal of the helmet is indicated for management of the airway or other facial trauma.

cc) Patients found with backboard applied before EMS arrival
- (2) If EMS clinicians find patient immobilized on a backboard applied prior to arrival, the principles of the Spinal Motion Restriction Protocol still apply.

dd) If the patient presents with hypotension and concern for neurogenic shock, obtain medical consultation and refer to pediatric section of Shock/ Hypoperfusion protocol.

BBB. TRAUMA PROTOCOL: SPINAL MOTION RESTRICTION (Continued)

SPINAL MOTION RESTRICTION ALGORITHM



CCC. TRAUMA PROTOCOL: TRAUMA ARREST

1. Inclusion Criteria

   Patient in cardiac arrest that is suspected to be due to traumatic etiology. Early cardiac arrest secondary to trauma is usually due to severe hypoxia, neurologic injury, or massive hemorrhage.

2. Treatment

   a) Rapid assessment and extrication
   b) Determine if patient meets the criteria for termination of resuscitation for a patient in traumatic arrest. If patient meets criteria, discontinue resuscitation. If criteria are not met, continue resuscitation.
   c) Perform spinal motion restriction for blunt trauma patients only. Patients with isolated penetrating trauma should not have spinal motion restriction. If mechanism includes both blunt and penetrating trauma, perform spinal motion restriction.
   d) CPR with high-quality chest compressions and minimal interruptions.
   e) Consider AED if arrest is believed to be medical in nature and the patient meets the criteria.
   f) Treat reversible causes of traumatic arrest.
      (1) Open airway and ensure adequate ventilation, insert necessary adjunct; consider the need for advanced airway earlier in the resuscitation of the trauma arrest patient.
      (2) Seal open chest wounds with vented chest seals. **(NEW ’20)**
      (3) Control life-threatening external hemorrhage.

ALERT

PENETRATING TRAUMA PATIENTS HAVE AN IMPROVED CHANCE OF SURVIVAL WITH THE IMMEDIATE APPLICATION OF HEMORRHAGE CONTROL AND ALS BILATERAL NEEDLE DECOMPRESSIONS WHILE PREPARING AND LOADING THE PATIENT FOR IMMEDIATE TRANSPORT. IF THE PENETRATING TRAUMA PATIENT IS FOUND IN A RHYTHM OTHER THAN ASYSTOLE, AND THE TRAUMA CENTER IS WITHIN 15 MINUTES, COMPLETE THE TREATMENTS FOR REVERSIBLE CONDITIONS AND TRANSPORT THE PATIENT. IF TRANSPORT TIME EXCEEDS 15 MINUTES, GO TO LOCAL EMERGENCY DEPARTMENT OR FREESTANDING EMERGENCY MEDICAL FACILITY. BLUNT TRAUMA ARREST SHOULD HAVE ALL THE REVERSIBLE CAUSES OF ARREST PERFORMED ON SCENE BEFORE TERMINATION OF RESUSCITATION OR TRANSPORT IF ROSC IS ACHIEVED.

   g) Establish IV/IO access with LR. Begin rapid administration of 20 mL/kg bolus of LR IV/IO.
   h) Treat reversible causes of traumatic arrest.
      (1) Open airway and ensure adequate ventilation, insert necessary adjunct; consider the need for advanced airway earlier in the resuscitation of the trauma arrest patient.
      (2) Seal open chest wounds with vented chest seals. **(NEW ’20)**
      (3) Control life-threatening external hemorrhage.
      (4) Bilateral Needle Decompression Thoracostomy. Catheters should not be removed once placed.

CCC. TRAUMA PROTOCOL: TRAUMA ARREST (Continued)

(5) Establish IV/IO access with LR. Begin rapid administration of 20 mL/kg bolus of LR IV/IO.
(6) Identify rhythm and refer to appropriate algorithm.

EPINEPHRINE IS GENERALLY **NOT** INDICATED IN THE TREATMENT OF TRAUMATIC CARDIAC ARREST FOR ADULT PATIENTS. **(NEW '20)**

i) Rapid assessment and extrication
j) Perform spinal motion restriction for blunt trauma patients only. Patients with isolated penetrating trauma should not have spinal motion restriction performed. If mechanism includes both blunt and penetrating trauma, perform spinal motion restriction.
k) CPR with high-quality chest compressions and minimal interruptions.
l) Consider AED if arrest is believed to be medical in nature. (See Section IV, AED.)

CONSIDERATION SHOULD BE GIVEN TO TRANSPORTING THE PATIENT TO THE NEAREST EMERGENCY DEPARTMENT OR ADULT TRAUMA CENTER IF THE PEDIATRIC TRAUMA CENTER IS MORE THAN 15 MINUTES ADDITIONAL TRANSPORT TIME!

m) Establish IV/IO access with LR.
n) If age-related vital signs and patient's condition indicate hypoperfusion, administer initial fluid bolus of 20 mL/kg LR IV/IO. If patient's condition does not improve, administer the second bolus of fluid at 20 mL/kg LR IV/IO.
o) If traumatic arrest is suspected due to multi-system blunt trauma, or due to penetrating neck, chest, or abdominal trauma, bilateral needle decompressions should be performed. Catheters should not be removed once placed.

DDD. TRAUMA DECISION TREE

Measure vital signs and level of consciousness and assess for major injury

Category Alpha (NEW '20)

- ❑ GCS less than or equal to 13
- ❑ For patients 10 years and older (including adults), systolic blood pressure less than 90 mmHg.
- ❑ For patients under 10 years of age, systolic blood pressure less than 70 + 2x age in years mmHg.
- ❑ Respiratory rate less than 10 or greater than 29 (less than 20 in infant age less than one year) or need for ventilatory support

YES → Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to GPC Section I).

NO → Assess for other injuries.

Category Bravo

- ❑ 2 or more proximal long-bone fractures
- ❑ Crushed, degloved, mangled, or pulseless extremity
- ❑ Pelvic fracture
- ❑ Amputation proximal to wrist or ankle
- ❑ Open or depressed skull fracture
- ❑ Paralysis (spine)
- ❑ Chest wall instability or deformity (e.g., flail chest)
- ❑ Penetrating injuries to head, neck, torso, or extremities proximal to elbow and knee

YES → Transport to trauma center or specialty center per protocol; alert trauma team; consider helicopter transport if quicker and of clinical benefit (refer to GPC Section I).

NO → Evaluate for evidence of mechanism of injury and high-energy impact.

Category Charlie

- ❑ High Risk Auto Crash
  - Intrusion (including roof) greater than 12 in. occupant site; greater than 18 in. any site
  - Ejection (partial or complete) from vehicle
  - Death in same passenger compartment
  - Vehicle telemetry data consistent with high risk of injury
  - Rollover without restraint
  - Auto v. pedestrian/bicyclist thrown, run over, or with significant (greater than 20 mph) impact
  - Motorcycle crash greater than 20 mph
- ❑ Falls
  - Adult: greater than 20 feet (one story is equal to 10 feet)
  - Pediatric: greater than 10 feet or 3 times the child's height
- ❑ Exposure to blast or explosion

YES → Transport to Trauma Center; alert trauma team. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center medical consultation required when considering whether helicopter transport is of clinical benefit (refer to GPC Section I).

NO → Evaluate for other considerations.

Category Delta

- ❑ Older adults
  - Risk of injury/death increases after age 55
  - SBP less than 110 may indicate shock after age 65
  - Low-impact mechanisms (e.g., ground-level falls) may result in severe injury
- ❑ Children (Should be triaged to Pediatric Trauma Center)
- ❑ Burns
  - Without trauma mechanism, triage to Burn Center
  - With trauma mechanism, triage to Trauma Center
- ❑ Pregnancy greater than 20 weeks
- ❑ EMS clinician judgment
- ❑ Anticoagulants and bleeding disorders (Patients with head injury are at high risk for rapid deterioration)

YES → Consider medical direction and transport to trauma center. Patients within a **30-minute drive time** of the closest appropriate trauma/specialty center shall go by ground unless there are extenuating circumstances. Receiving Trauma Center medical consultation required when considering whether helicopter transport is of clinical benefit (refer to GPC Section I).

NO → Transport according to protocol.