

**Purpose:**

A team must be rapidly assembled to provide for the initial evaluation and resuscitation of major trauma patients in an organized and efficient manner.

**Policy:**

The team is a multi-disciplinary group of professionals assembled in an organized fashion to perform the tasks necessary to efficiently resuscitate seriously injured patients.

**The Activation criteria are as follows:**

Tier-1 activation: Activate the Tier-1 Trauma Team upon realization that any of the following patient conditions exists, either upon arrival of the patient or notification by EMS.

Adult or pediatric trauma patient and presenting with:

- Altered Level of consciousness secondary to trauma; GCS  $\leq$  10 or less than “V” on AVPU scale.
- Respiratory distress, airway compromise, intubation or respiratory rate outside of acceptable range.
  - ❖ Adult  $< 10$  or  $> 30$
  - ❖ Child

AGE	RR
$\geq 6$	$<10$ or $>30$
2-5	$<10$ or $>40$
12-24 months	$<10$ or $>50$
0-12 months	$<20$ or $>60$

- Evidence of shock or diminished perfusion:
  - ❖ Transient hypotensive episode.
  - ❖ Vital signs outside of acceptable range:
  - ❖ Adult SBP  $\leq 90$
  - ❖ Child capillary refill  $> 2$  seconds or age-specific hypotension.

AGE	SBP(mmHg)
2-10 yrs.	$\leq 70 + [2 \times \text{age in years}]$
$\leq 1$ yr.	$\leq 60$

- ❖ Persistent heart rate > 120 in adult or age specific tachycardia in a child

AGE	HR
2-5 yrs.	>160
< 2 yr.	>180

- ❖ Shock index  $\geq 1$  (HR>BP)
- ❖ SpO<sub>2</sub>  $\leq 70\%$  in adult
- ❖ Positive abdominal or cardiac FAST exam
- ❖ Provider impression of hypoperfusion (consider absent distal pulses, agitation, anxiety, confusion, delayed capillary refill, diaphoresis, pallor, tachypnea.)
- Arterial tourniquet indicated
- Suspected cardiac or major vessel injury
- Penetrating wound to the head, neck, chest, abdomen or pelvis
- Suspected severe orthopedic injuries:
  - ❖ Pelvic fracture
  - ❖ Unstable facial fracture
  - ❖ More than one proximal long bone fracture
- Burns with concomitant trauma
- Pregnancy > 20 weeks with vaginal bleeding or contractions
- Aeromedical launched by EMS
- Provider discretion (for those patients not meeting any of the tier-1 criteria)

### Mechanism of Injury

- Fall:
  - ❖ > 15 feet
  - ❖ > 65 years old and fall from elevation or down stairs (consider blood thinners)
  - ❖ Pediatric < 10 years old: >2x patient height
- Ejection from automobile
- Pedestrian struck and thrown by automobile

Tier-2 activation: Activate the Tier-2 Trauma Team upon realization that any of the following conditions exist, either upon arrival of the patient or notification by EMS.

Adult or Pediatric patient presenting with:

- GCS > 10 and < 14 secondary to trauma

- Suspected severe orthopedic injuries
  - ❖ Femur fracture
  - ❖ Open long bone fracture
  - ❖ Knee dislocation
  
- Burns
  - ❖ > 20% TBSA
  - ❖ Facial burns
  - ❖ Suspected inhalation burn
- Traumatic paralysis or focal neurological signs/symptoms (i.e., numbness, tingling)
- Provider discretion; consider for:
  - ❖ Multipole injuries (two or more systems) or severe single system injury
  - ❖ Co-morbid factors:
    - Anti-coagulant therapy
    - Age <5 or >55 years old
    - Multiple co-morbidities

### Mechanism of Injury

- Death in the same passenger compartment
- Extrication time > 20 minutes (i.e., time spent accomplishing extrication)
- Motorcycle, snowmobile, or ATV crash with separation of rider
- Bicyclist struck by automobile with separation of rider

### **For each tier of activation, the trauma team members are:**

- Tier-1 activation
  - Emergency physician\* (present within 15 minutes of patient's arrival)
  - General surgeon (present within 30 minutes of patient's arrival)
  - Operating room team (present within 30 minutes of patient's arrival)
  - Two emergency department RNs\*
  - Nursing supervisor
  - Emergency department tech or EMT
  - Respiratory therapy
  - Anesthesia
  - Laboratory technician
  - Radiology technician

- Emergency department HUC
- Security
- Social services or chaplain

\*Note one physician, two RN's and an EDT per critical patient

## 2. Tier-2 activation

- Emergency physician\* (present within 15 minutes of patient's arrival)
- Two emergency department RNs\*
- Nursing supervisor
- Emergency department tech or EMT
- Radiology technician
- Laboratory technician
- Emergency department HUC
- Security

\*Note one physician two RN's and an EDT per critical patient

The individual roles of the team members are subject to change based on the needs of the patient and resources available during the resuscitation. Below is a guideline. The physician leading the resuscitation may modify the duties of any team member if in the best interest of the patient.

### **Emergency physician and general surgeon**

- Perform primary and secondary survey.
- Perform or delegate airway management.
- Perform procedures as needed such as chest tube insertion, central venous access, ultrasound exam.
- Order appropriate lab and radiographs.
- Responsible for all medications and fluids given.
- Make triage and transfer decisions.
- Determine mode of inter-facility transfer (air vs. ground).
- Communicate directly with receiving physician at trauma hospital regarding transfer.
- Document case (complete trauma flow sheet, dictate emergency department note).
- Complete and sign patient transfer form.
- Coordinate priorities when more than one critical patient in the emergency department

### **Emergency Department Nurses**

- Prepare trauma room before the patient arrival.

- Place X-ray trauma blocks on the gurney.
- Assist EMS with transfer from EMS gurney to trauma bed.
- Attach BP, cardiac and oximetry monitors to the patient.
- Obtain initial vital signs and report out loud to emergency department physician and critical care nurse. (BP, HR, RR, SpO2 and temp (core temp if hypothermia is considered)).
- Maintain and monitor all intravenous lines. Obtain fluid resuscitation orders and IV rate from emergency department physician. Report to recorder total IV intake and urine output at end of emergency department course.
- Set up fluid and blood warmer. Start blood transfusion as ordered.
- Remain at patient's bedside throughout the emergency department course.
- Remove patient's clothing.
- Draw up and label airway drugs (Succinylcholine, Etomidate, etc.). Be prepared to administer drugs as ordered by the emergency department physician.
- Obtain IV access if needed. (If primary IV is done, place second IV and draw bloods)
- Insert Foley catheter when authorized by the emergency department physician.
- Set up chest tube drainage system if needed.
- Assist physician with procedures as needed.
- Administer tetanus booster and antibiotics when ordered by emergency department physician.
- Initially document emergency department course by filling out the trauma resuscitation record.
- Record vital signs initially and every five minutes; make sure that physician in charge is aware of any significant changes in the patient's status.
- Accompany patient out of department for any diagnostic procedures.
- Accompany patient to ICU, report off to ICU staff.

### **Nursing Supervisor**

- Assess staffing needs; delegate additional nursing staff as required to attend trauma patient or others in the emergency department.
- Ensure all team members are wearing appropriate protective equipment (see below).
- Monitor activities of the trauma team.
- Control traffic in the trauma room; attentive to patient's privacy, e.g., keep curtains closed, keep other patients and family members away from traffic areas.
- Assist others with equipment and procedures as needed.
- Communicate with family in collaboration with family support staff member.
- Escort family members to trauma room and attend them when appropriate.

**Emergency Department Technician (EDT)**

- Assist with transfer from the EMS gurney to the trauma bed.
- Assist in removing patient's clothing; cover patient immediately with warm blankets.
- Assist with intubation: provide in line cervical spine immobilization or Sellick's maneuver as directed.
- Assist with procedures as needed.
- Assist with transport of patient to CT scanner.

**Respiratory Therapist**

- Check airway equipment before the patient's arrival (e.g., suction, laryngoscopes, bag-valve-mask, O<sub>2</sub>).
- Maintain oxygen; ensure SpO<sub>2</sub> unit functions properly; assist ventilation with BVM as necessary and as directed by emergency department physician.
- Assist with intubation; perform Sellick's maneuver after paralytic is given; ensure that in-line cervical spine immobilization is delegated for the intubation.
- Check tube placement after intubation with esophageal detector device, attach end tidal CO<sub>2</sub> monitor and secure ET tube.
- Ventilate patient; set up transport ventilator if necessary.
- Monitor end tidal CO<sub>2</sub> and SpO<sub>2</sub>.
- Draw ABGs if requested.

**Anesthesia (CRNA or MDA)**

- Initially assist with airway management as directed by physician in charge.
- Assist with vascular access (peripheral or central).
- Assist with ventilation if respiratory therapy unavailable (if RT not in house).
- Serve as team leader for an individual patient when emergency department physician unavailable.
- Place NG or OG tube as directed by physician in charge.

**Laboratory Technician**

- Obtain pre-labeled blood tubes from trauma room; attach ID bracelet to patient.
- Obtain syringes from IV start (by RN) or perform venipuncture to obtain blood for trauma battery.
- Determine availability of blood; bring O negative blood to trauma room immediately if requested.
- Run phase 1 and phase 2 labs (see below).

- Obtain urine from Foley insertion and run UA on all patients. Run urine HCG on all females in reproductive age group.
- Run ABGs.
- Ensure type specific blood is available in blood bank.
- Perform ECG if requested.

## **Radiology Technician**

- Respond immediately to trauma team activation page; transfer portable X-ray machine to trauma room, ensure enough film plates for basic trauma radiographs (e.g., lateral c-spine, chest and pelvis).
- Place chest plate on trauma cart under backboard before patient arrives.
- Obtain radiographic priorities from physician in charge.
- Ensure at least two additional aprons are in trauma room and available for emergency department staff.
- Develop films and immediately take them to the trauma room.
- Inquire if CT will be needed; call in/notify CT tech to prepare for emergency scan.
- Copy radiographs if patient will be transferred; ensure originals accompany the patient.

## **Health Unit Coordinator (HUC)**

- Activate trauma team upon notification of TTA; confirm all team members have arrived and record arrival times.
- Determine if additional medical staff will be needed.
- Contact receiving trauma hospital as directed by emergency department physician.
- Assemble and copy all documentation for transport team, e.g., trauma flow sheet, chart, labs, X-ray.
- Direct family members to family support person.
- Prepare patient transfer forms and obtain emergency department physician signature if patient is transferred.

## **Security**

- Assist with procedures during resuscitation.
- Secure helicopter landing pad and assist flight crew with equipment.
- Assist with transportation of the patient to CT or helipad as needed.

## **Family Support Person (Social Services, Chaplain, or Nursing Supervisor)**

- Meet family members; escort them to the family consultation room.
- Offer to contact others, e.g., family, friends or clergy.

- For pediatric resuscitations, accompany parents into the trauma room; attend them continuously.
- Authorize food services to provide refreshments to family members as necessary.
- If the patient is transferred, ensure that family members have transportation and directions to receiving facility.
- In the case of patient's death, assist with contacting funeral service and/or Medical Examiner

### **Back up physicians ( non-emergency department physician called in to assist with multiple causalities)**

- Assist with procedures as delegated by the physician in charge.
- Assume responsibility for additional trauma patients or other emergency department patients as directed by physician in charge.
- Inform physician in charge of findings, patient progress; consult regarding treatment/triage/transfer plans.

### **Procedure**

1. The emergency department nurse, emergency department physician or EMS becomes aware of a patient meeting TTA criteria and instructs HUC to call the hospital operator and inform them to page overhead a tier 1 or 2 TTA and the expected ETA. Call a TTA upon receipt of notification that the incoming patient's condition meets the TTA criteria. Do not wait for the patient to arrive in the emergency department before activating the team.
2. The operator pages overhead "Tier [1 or 2] Trauma Team Stat, [ETA]," a total of 3 times.
3. Team members assemble in the emergency department immediately.
4. The physician team leader briefs the team on the condition of the patient and begins to assign duties.
5. The physician team leader should immediately consider the need to transfer the patient and activate the trauma transfer protocol, if indicated.

### **Guiding Principles**

- The trauma lab panels are typically:
  - ❖ Phase 1
    - Alcohol
    - CBC w/ differential
    - Electrolytes
    - PT/INR
    - PTT



- Type and screen
- ❖ Phase 2
  - Arterial blood gases
  - Pregnancy test (serum or urine) on all females in reproductive age group
  - UA
  - Urine toxicology screen
- Personal Protective Equipment (PPE) should be worn by all personnel who work directly with the patient
  - ❖ Gowns
  - ❖ Gloves
  - ❖ Masks to include eye shields
  - ❖ Shoe covers, surgical caps
  - ❖ Lead aprons
- Keep talking and noise to a minimum. Discuss the patient's condition only behind closed doors and after ensuring a private environment.
- Keep doors and curtains closed. Vigilantly maintain the patient's privacy. Encourage other patients and family members to stay in their cubicles during the resuscitation.
- Ensure that the patient is informed of procedures before they are performed. Continuously ascertain the patient's comfort level (e.g., pain, temperature).
- Verbally acknowledge orders; inform the source when the request has been completed; when giving orders, ensure their receipt.
- Stand in an area removed from the patient until called upon or dismissed, if not directly involved in patient care.
- Select proximal sites for peripheral IVs, when possible; they may need to be converted to rapid infusion catheters.
- Vacate the room when X-rays are being taken unless fitted with a lead apron.
- Place the patient's clothing and belongings into labeled bags as soon as possible.