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## **Orientation Handbook**

**Penn State Hershey Medical Center**  
**Division of Trauma, Acute Care and Critical Care Surgery**  
**Trauma**  
**July, 2010**

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## **Mission Statement**

*The Division of Trauma, Acute Care and Critical Care Surgery at Penn State Hershey Medical Center is dedicated to providing the very best in acute care surgery with the ultimate goal of returning patients to active, quality lifestyles.*

*To provide the best possible patient care, the service is committed to the education of physicians (both practice and in training), nurses, allied health professionals, pre-hospital personnel and the lay public.*

*To advance our care to the highest level, we are committed to research and the discovery of new treatments and methods of providing acute care surgery.*

*As a Regional Resource Trauma Center, the trauma program is committed to function as a clinical and an educational resource to our region. We are available for consultation, lectures, and tertiary to quaternary care for any patient in our region or contiguous areas. Since most traumas are no accident, the trauma program is committed to promoting prevention strategies to decrease the amount of injury and disability in our region.*

## Introduction

The Penn State Milton S. Hershey Medical Center (HMC) is a state-designated Level 1 Adult Trauma Center and a Level 1 Pediatric Trauma Center, and is accredited by the Pennsylvania Trauma System Foundation.

We currently see over 2500 trauma admissions per year (> 1800 adults and >600 pediatric) with the majority being from motor vehicle accidents. Second most common are severe falls, followed by industrial accidents. Penetrating injuries/assaults account for approximately 6% of our admissions.

Our primary and secondary catchment areas have a population base of over 1.2 million. HMC owns and operates two helicopters for transporting acute care surgery patients.

In addition to caring for trauma patients, the faculty and staff participates in other aspects of acute care surgery. This includes emergency general surgery and surgical critical care. The 30-bed SICU admits primarily acute care surgery patients from our service but also cares for critically ill renal transplant, orthopedic, plastic surgery, OB/GYN, and Urology patients. The service also maintains a busy elective general surgery practice as well. Our acute care surgeons performed collectively over 700 inpatient operative cases and approximately 300 outpatient procedures last year.

## Trauma Surgery Rotation

The Medical Director for the Penn State Shock Trauma Center is Dr. Heidi Frankel.

The educational program for all levels includes daily teaching rounds, didactic lectures and psychomotor skills sessions as well as multidisciplinary trauma rounds. Residents rotate through the Trauma Service during their PGY 1, 3 and 4 years.

### **Overall goals and objectives for the service**

#### **Knowledge:**

- Demonstrate understanding of institutional policies for pre-hospital care and trauma triage
- Complete ATLS verification
- Discuss management of traumatic wounds and musculoskeletal injuries
- Describe the pathophysiology , initial evaluation and management of :
  - CNS Injury-brain and spinal cord
  - Chest trauma –heart , thoracic aorta, chest wall and lungs
  - Abdominal injury-spleen, liver, GI tract and GU systems
  - Musculoskeletal trauma-axial skeleton, pelvis, long bones
  - Burn injury-thermal, chemical, electrical, inhalation injury

Demonstrate knowledge of pharmacologic agents used to treat trauma patients

Recognize the effects of increasing age and concurrent medical illness on organ system physiology as it relates to traumatic injury and the management of elderly patients with injury

#### **Patient Care:**

- Participate in the evaluation, resuscitation, operative and ICU management of trauma surgery patients
- Perform the following procedures:
  - FAST
  - DPL/DPA
  - Echocardiogram
  - Thoracostomy tube
  - Central line insertion
- Apply and remove all types of dressings
- Formulate rehabilitation plans
- Demonstrate accuracy and proficiency in documenting patient care

## **Interpersonal Skills and Communication**

- Educate patients and families in post operative and rehabilitative strategies
- Interact and communicate with other Trauma Team members in an effective, professional manner to facilitate the rapid throughput of the trauma patient through the system

## **System Based Practice**

- Participate in the coordination of the rehabilitation of the trauma patient
- Demonstrate knowledge of cost-effective trauma care
- Advocate for trauma patients within the health care system
- Refer trauma patients to appropriate practitioners and agencies
- Facilitate the timely discharge of trauma patients
- Work with paramedical professionals in the pre-hospital care of trauma patients
- Participate in the quality review process of trauma care.

## **Professionalism**

- Develop a sensitivity of the unique stresses placed on families under care for traumatic injuries
- Demonstrate an unselfish regard for the welfare of trauma patients
- Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population
- Demonstrate firm adherence to a code of moral and ethical values
- Provide appropriately prompt consultations when requested
- Demonstrate sensitivity to the individual patient's profession, life goals and cultural background as they apply to their diagnosis
- Be reliable, punctual and accountable for own actions
- Effectively deal with dissatisfied patients and their families
- Effectively deal with impaired patients and their families
- Understand the benefits and functionality of multidisciplinary health care teams.
- Refer patients to appropriate practitioners and agencies

## Specific Goals by PGY

### PGY 1

#### **A. Medical Knowledge**

1. The resident should understand the principles of ATLS.
2. The resident should be able to identify different forms of shock associated with the injured patient. *Examples include hemorrhagic, neurogenic, cardiogenic and septic shock.*
3. The resident should understand the indications for, and different types of agents used in prophylactic and therapeutic antibiotic use.
4. The resident should understand appropriate fluid and electrolyte resuscitation.
5. The resident should understand the costs, risks and expected information obtained from routine laboratory testing.
6. The resident should understand the basic principles in the diagnostic evaluation of single organ system injury.
7. The resident should understand his or her role in the trauma resuscitation team, and be able to perform the appropriate tasks of that role. The resident must be familiar with trauma protocols.
8. The resident should be able to discuss the costs, risks and expected information obtained from non-invasive diagnostic tests to evaluate the injured patient. *Examples include plain films, ultrasonography and CT scanning.*
9. The resident should understand the costs, risks and expected information obtained from invasive diagnostic tests to evaluate the injured patient. *Examples include wound exploration, DPL and arteriography.*

#### **B. Patient Care**

1. The resident must be aware of his or her limitations and know when to call for help.
2. The resident must attend daily check out rounds for his or her service.
3. The resident should assist with resuscitation in trauma patients presenting to the emergency department.
4. The resident should assume responsibility for care of all patients on the hospital ward, including initial assessment, creating a therapeutic plan, evaluation of daily progress, and initial assessment of new problems.
5. The resident should be able to assess patients on the ward when called for cross-coverage. *Examples include evaluation of patients with fever, oliguria, hypotension, respiratory insufficiency, and intractable pain.*

6. The resident should assume responsibility for discharging patients, including dictating the discharge summary, writing prescriptions, and ensuring appropriate follow-up.
7. Under appropriate supervision, the resident should perform basic operative cases such as

*Insertion of central venous lines Tracheal intubation  
Stabilize long bone fractures Placement of thoracostomy tubes*

### **C. Interpersonal and Communications Skills**

See general goals and objectives

### **D. Practice-Based Learning and Improvement**

1. The resident must successfully pass ATLS.
2. The resident should use books, journal articles, internet access, and other tools available to learn about diseases and treatment of the injured patient.
3. The resident must attend Trauma Rounds every morning between 0700-0710.
4. The resident must attend and participate in the weekly clinics for their service
5. The resident must attend Trauma M&M, Friday mornings at 0700.

### **E. Systems-Based Practice**

The resident should be able to use appropriate consult services in the hospital to improve the care of his or her patients.

### **F. Professionalism**

See general goals and objectives

## **PGY 2**

### **A. Medical Knowledge**

1. The resident should learn the principles of triage and be able to demonstrate appropriate triage of injured patients based on number of patients, severity of injury and available resources.
2. The resident should review the principles of ATLS and be able to perform a rapid primary survey of the trauma patient, followed by an in depth secondary survey to detect all injuries.
3. The resident should be able to prioritize injuries in the multiply injured trauma patient.

4. The resident should understand the principles of resuscitation of the injured patient, including airway management, fluid administration, blood transfusion, fracture stabilization, and hemodynamic support.
5. The resident should be able to outline the signs and symptoms as well as the etiology of respiratory failure in the injured patient.
6. The resident should understand the indications for, and the complications of blood component therapy. *Examples include PRBC's, FFP, platelets and cryoprecipitate.*
7. The resident should be familiar with indications and institution of the massive transfusion protocol.
8. The resident should understand the factors associated with non-surgical bleeding in the injured patient. *Examples include hypothermia, dilutional and consumptive coagulopathy.*

## **B. Patient Care**

1. The resident must attend daily check out rounds for his or her service.
2. The resident should institute the trauma resuscitation protocol in trauma patients presenting to the emergency department.
3. The resident should assume responsibility for care of all patients in the emergency department, including initial assessment, identification of all injuries, creation of a therapeutic plan based on priority of injuries, initial resuscitation, and determination of admission to the hospital ward or to the ICU.
5. The resident should assume responsibility for initial assessment of hospital consultations.
6. Under appropriate supervision, the resident should perform basic procedures such as:

*Insertion of pulmonary artery catheters    Tracheostomy  
Tracheal intubation    Diagnostic peritoneal lavage/aspiration  
Stabilize long bone fractures    Placement of thoracostomy tubes  
Needle pericardiocentesis    Lower extremity amputation*

## **C. Interpersonal and Communications Skills**

See general goals and objectives

**D. Practice-Based Learning and Improvement**

1. The resident should use books, journal articles, internet access, and other tools available to learn about diseases and treatment of the injured patient.
2. The resident must attend Trauma Rounds between 0700-0710.
3. The residents must attend and participate in the weekly clinics for their service
4. The resident must attend Trauma M&M, Friday mornings at 0700.

**E. Systems-Based Practice**

1. The resident should be able to communicate with patients, families, nurses, paramedics, and other allied health care personnel.
2. The resident should take responsibility for posting emergency cases in the operating room.

**F. Professionalism**

See general goals and objectives

**PGY 3****A. Medical Knowledge**

1. The resident should be familiar with all organ-based trauma scoring systems.
2. The resident should learn in detail the management of intra-abdominal injuries. *Examples include injuries of the liver, spleen, stomach, intestine, colon, pancreas, kidney, bladder, ureter, and diaphragm.*
3. The resident should understand rationale and indications for the operative as well as non-operative management of the injured patient.
4. The resident should understand the rationale and indications for the use of adjuncts to both operative and non-operative management of injured patients. *Examples include utilization of therapeutic interventional radiological techniques.*
5. The resident should understand the pathophysiology of traumatic brain injury, altered mental status and spinal cord injury. The resident should also be able to discuss stabilization and initial treatment of patients with severe neurologic injuries.

**B. Patient Care**

1. The resident should assume responsibility for the care of all patients on the trauma service.
2. The resident should examine every patient admitted to the service, ensure that all injuries and comorbid medical problems have been identified, and ensure that adequate therapeutic and diagnostic plans have been made.

3. The resident should ensure that all prophylactic precautions are taken to prevent complications such as DVT, stress gastritis, pressure ulceration, and aspiration pneumonia.
4. The resident should make daily rounds and have full knowledge of the medical problems and progress of all patients on the service.
5. The resident should see every consult and ensure that proper disposition has been made.
6. The resident is responsible for ensuring proper posting in the operating room, ensuring that all information regarding communicable illness has been relayed, and alerting the operating room personnel about specific instrument and equipment needs.
7. Under appropriate supervision, the resident should perform intermediate procedures such as:  
*Exploratory laparotomy Emergency thoracotomy*

*Acquisition of surgical airway Repair of gastrointestinal injuries  
Colostomy, colostomy closure Open splenectomy  
Upper and lower extremity fasciotomy Neck exploration for trauma  
Vascular exposure and repair of peripheral vascular injuries*

### **C. Interpersonal and Communications Skills**

See general goals and objectives

### **D. Practice-Based Learning and Improvement**

1. The resident should use books, journal articles, internet access, anatomy videotapes and other tools available to learn about diseases and treatment of the injured patient.
2. The resident must attend Trauma Rounds every morning between 0700-0710.
3. The residents must attend and participate in the weekly clinics for their service
4. The resident must attend Trauma M&M, Friday mornings at 0700.

### **E. Systems-Based Practice**

1. The resident should be able to communicate with referring physicians from other hospitals and emergency departments.
2. The resident should be able to communicate with families, especially in those instances in which there has been a death.
3. The resident should communicate with his or her peer from the emergency general surgery service to determine the optimal use of resources for the hospital, including timing of procedures in the operating room and recommendation for placing the hospital on divert status.

## F. Professionalism

See general goals and objectives

### CHIEF RESIDENT

#### A. Medical Knowledge

1. The chief resident should be able to discuss in detail the management of complex traumatic injuries. This includes diagnosis, timing of intervention, and therapeutic options. *Examples include traumatic disruption of the thoracic aorta, renovascular injuries, injuries of the portal triad, retrohepatic caval injuries, complex cervical spine fractures, facial fractures, and complex pelvis fractures.*
2. The chief resident should be able to explain in detail advanced surgical procedures for management of injuries in the neck, torso and extremities. *Examples include management of tracheal injuries, stabilization and management of Le Fort fractures of the face, management of flail chest, management of the mangled extremity.*
3. The chief resident should be able to summarize areas of trauma surgery in which patient management is controversial and areas in which change is taking place. *Examples include management of penetrating neck injuries, management of colon injuries, and management of minimal vascular injuries.*

#### B. Patient Care

1. The chief resident should be able to direct the entire team through the trauma resuscitation.
2. The chief resident should be able to correctly triage the diagnostic evaluation of the patient with multiple injuries.
3. The chief resident should be able to perform advanced surgical procedures to manage injuries in the neck, torso and extremities.
4. The chief resident should be able to correctly utilize consultants, yet remain responsible for ultimate patient care issues.
5. The chief resident should be able to manage patients with multiple injuries using operative and non-operative techniques correctly.
6. Under appropriate supervision, the chief resident should perform advanced procedures such as :

*Liver resection for injury    Placement of Shrock shunt*

*Repair of abdominal, chest, or pelvic vascular injury*

*Pancreatic resection for trauma*

*Duodenal diverticularization    Nephrectomy for trauma*

*Repair of ureteral injury*

**C. Interpersonal and Communications Skills**

See general goals and objectives

**D. Practice-Based Learning and Improvement**

1. The resident should use books, journal articles, internet access, anatomy videotapes, and other tools available to learn about diseases and treatment of the injured patient.
2. The resident must attend Trauma Rounds from 0700-0710
3. The resident must attend and participate in the weekly clinics for their service.
4. The resident must attend Trauma M&M, Fridays at 0700.

**E. Systems-Based Practice**

1. The chief resident should be able to understand triage of mass casualties
2. The chief resident should understand the multi-disciplinary approach to management of patients with multiple injuries.
3. The chief resident should understand the concept of trauma systems and the need to transfer patients for the appropriate level of care.

**F. Professionalism**

See general goals and objectives

# PENN STATE SHOCK TRAUMA CENTER

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# **SERVICE OPERATIONS, STRUCTURE, AND FUNCTION**

## **TRAUMA SURGERY SERVICE**

### **RESIDENT INPATIENT COVERAGE**

- All residents must be current in ATLS and ACLS to care for trauma patients
- All residents are assigned daily clinical duties by the Chief Resident and Trauma Attending
- Trauma consultations must be evaluated within 30 minutes of any request
- Resident coverage for trauma team activations and Emergency Department consultations is performed from 0600 until 1800.
- On call resident cross-coverage is provided for trauma team activations and Emergency Department consultations from 6pm to 6am
- Sign in/Sign out report by the service is from 0700-0710. Further discussion of trauma patients and trauma education occurs after Sign out report. The SICU and NSICU teams will send a representative to morning report and give an update on critical care patients daily. Representatives from Rehab Medicine, PT, OT, and Speech Therapy are present on Tuesday mornings.

### **TRAUMA ATTENDING COVERAGE**

- The Trauma Service attending is responsible 24 hours per day for all admitted service patients during the week.
- There is an attending in house 24/7/365 to respond for all activations and consultations.
- The Trauma service attending is available for Emergency Department trauma activations and consultations.
- The Trauma service attending rotates for the week starting on Mondays.
- The Trauma Attending responds to the Emergency Department for trauma activations and consultations from 0700-1700 during the week.
- After 1700 the On Call Attending responds to the Emergency Department for trauma activations.

## NURSE PRACTITIONER & PHYSICIAN ASSISTANT ROLES

- CRNP's and PA's function as an integral part of the team.
- CRNP's and PA's assist in Daily rounds and collaborate with Attending physicians regarding the plan of care.
- CRNP's and PA's have privileges to write orders.
- CRNP's and PA's assist with surgical procedures under direct or general supervision by the attending, depending on level of medical staff privileges. Such procedures include, but are not limited by, a-line insertion, thoracentesis, CT placement, central line placement, intubations, PET's and PEG's.
- CRNP's and PA's assist in all trauma resuscitations.
- PAs are expected to assist the CRNP's with Performance Improvement reporting as needed.
- PA's may occasionally be asked to take the consult pager.
- CRNP's and PA's rotate daily duties of the service along with the residents (i.e. taking pager, doing discharge summaries etc.).
- CRNP's and PA's report **directly** to the attending and collaborate with the resident staff.
- CRNP's and PA's are an important resource in providing consistency in trauma clinical management guidelines and service operations. If there are any general questions regarding service functions, roles and responsibilities, please do not hesitate to ask them.

## GOALS FOR TRAUMA RESUSCITATIONS

- Team is assembled upon patient arrival and discussion of anticipated plan occurs
- All trauma team members must sign-in
- Responsibilities are assigned by the Team Leader
  - Primary and Secondary Survey
    - Stands to the left of the patient
  - Blood draw, rectal exam, Foley catheter insertion
    - Stands to the right of the patient
  - H&P documentation
    - Equipment is assembled and ready for use
    - Universal Precautions are taken
    - ROOM IS QUIET for EMS report if patient is stable and stays quiet: The “one minute rule” refers to the time allocated for EMS personnel make brief patient presentations before primary survey begins
    - ABC’s Followed with C-spine protected
    - Threats to life discovered and treated promptly
    - Labs are drawn within 5 minutes-
    - Chest and pelvic x-rays after patient is removed from the board.
    - Temperature, weight, rectal, and Foley catheter within 20 minutes
    - CT in 30 minutes unless emergent procedure or ongoing resuscitation is necessary.
    - Consider blood products if patients vital signs are abnormal
    - Analgesia and sedation as clinically indicated
    - Call for hospital bed ASAP
    - Trauma H&P must be completely filled out on all trauma patients whether resuscitation or consultation
    - Orders should be completed ASAP
    - Communication to family and patient
    - You have the authority to upgrade the level of activation during any trauma resuscitation if you think it is appropriate

**TRAUMA ACTIVATION STEPS:**

- Trauma stand-by (10-30 minute ETA)
- Call ext 7077, check pre-hospital report
- Get ready to assemble in trauma bay
- Trauma response "stat" (five minutes or less ETA)
- Assemble stat to trauma room
- **ALWAYS/EVERYTIME** use universal precautions in trauma bay (gown and glove, eyewear, caps/masks, lead aprons, shoe covers)

**TRAUMA PAGER IS 2136/EGS SERVICE PAGER IS 4422:**

To transfer pager to yourself to cover, do the following on the phone:

1. Dial 4311
2. \*2136 or \*4422 (respectively for particular service)
3. #11
4. Type in your pager number then hit the # key
5. Listen to verify the pager has been transferred to the correct covering pager

## QUICK TIPS FOR MORNING REPORT AND ATTENDING ROUNDS:

- **ALL** residents must show up at **0600** to help write notes on patients for the day, please call pager 2136 to talk with the overnight resident or PA to see what needs to be done
- Meet in SICU conference room/lounge at 0700 and 1500 for service report
- ALL pertinent information must be presented
- ALL NEW PATIENTS MUST be added to the list by the person who admits them
- A resident and physician extender are EXPECTED to round with an attending
- Write down plan and see patients with them in order to convey the plan at sign out
- Review **ALL** orders (medications, plan of care, labs)
- Call **all** consults while on rounds
- LOOK up all LABS, CXR, Scans
- Fragmin should be started on all trauma patients within 72 hours of admission unless contraindicated
- Place in Aspen collar if cervical collar use is expected for >24 hours
- There should **NEVER** be a patient encounter without a **NOTE!!**
- Trauma Attending must evaluate the patient prior to discharge
- D/C patient on Coumadin or Lovenox if not ambulating >150 feet while inpatient and PCP follow PT/INR and it MUST be set up prior to discharge.

## CONFERENCES

- Trauma M&M is held on Friday Mornings at 0700 in the ED Conference Room, H1059.
- EGS Conference is held on Wednesday afternoons at 1600

## PHONE CALL TIPS

- Please handle all calls promptly, courteously, and compassionately
- Please collect all important information when a call is received-patient name, date of recent admission/discharge, injuries, attending, pertinent ROS, call back telephone number
- **ALWAYS** ask the surgeon's name, date of trauma/surgery, what type of surgery, patients current complaints (i.e. fever, n/v, pain, purulent drainage, redness, appetite, chest pain, SOB, etc)
- If the patient is instructed go to the ED, and the patient lives far away, he/she should go to the closest ED.
- Percocet is a Class II narcotic and **CANNOT** be refilled or reordered by telephone. The patient or a representative may come in to pick up the prescription or it may be faxed to the pharmacist.
- Vicodin/Tylenol 3 are both Class III narcotics and can be written for one refill or are called in by phone
- Please document phone conversation in Power Chart under the "notes" section

## CLINIC SCHEDULE

- Residents are expected to attend clinic and dress appropriately

**Clinics are Monday, Tuesday, Thursday and Friday from 1300-1600 (or until completed) in UPC Suite 3100**

## PATIENT LIST MAINTENANCE

- Access general surgery list by going to:
  1. Explorer Menu Icon on the Desktop
  2. Enter username and password
  3. Select group proxy list (EGS consults/Trauma consults)
  4. Under Med Service, select EGS or Trauma
  5. Hit "Execute" button in right hand corner
  6. New screen with list appears
  7. Select the printer icon in the top left hand corner
  8. Print to the appropriate printer
  
- Acceptable abbreviations:
  1. # is heparin gtt
  2. \$ is tpn
  3. \* coumadin
  4. P/O is pt/ot consulted
  
- List must be updated as often as possible
- Sticky Notes must include pertinent information for each patient

## Trauma Discharge Summary Template

State your name, that you are dictating a trauma discharge summary, and who the discharge attending is.

Patient Name

Medical record number

Date of Birth

Date of Admission

Date of Discharge

Principal Diagnosis

Complete listing of all other Acute Diagnoses pertinent to the stay

Co-Morbid Diagnoses

### **Complete Listing of Procedures and Dates**

History

Age

Gender

Mechanism of Injury

Transfer from scene or acute care facility

Level of activation

Initial blood pressure, heart rate, Glasgow coma scale

### **ED Significant Physical Exam Findings**

- Diagnostic Studies
- Hospital Course
  - Admitted to floor or IMC or SICU
  - Indicate if mechanical ventilation was required (include days on ventilator)
  - SICU length of stay, if applicable
  - “The patient underwent evaluation, observation, and /or treatment of the above mentioned diagnosis that were established during the hospital stay”
  - “A complete listing of the relevant procedures is mentioned above”
  - “The patient’s hospital course was significant for the following complications:”
- Disposition (Home, LTACH, Rehab, Prison)
- Condition at Discharge (stable)
- Discharge Treatment Plan

- Discharge Medications
- Discharge Instructions to the patient
- Follow-up appointments
- Signature of Physician of record

## Trauma PI Program

All trauma centers are expected to demonstrate a clearly defined PI program and how it integrates into the hospital wide program. Modern PI (performance improvement) in trauma care is a continuous cycle of monitoring, assessment, and management. A major objective of PI is to reduce inappropriate variation in care. The data collection process must be reliable, structured and consistent to identify valid opportunities for improvement. The process of analysis should occur at regular intervals and include multidisciplinary review. The focus of review is to focus on behaviors not individuals.

Hershey Medical Center's Trauma Program utilizes the expertise of consistent Trauma clinical staff to concurrently oversee and evaluate that developed standards of practice are being followed. (Trauma Nurse/PI Coordinator, Physician Extenders, Attending Physicians). **Please do not hesitate to ask for guidance from these resources**. The actual identification and documentation of issues is done by the Trauma Program Manager, Trauma Care/PI Nurse Coordinator, and the Trauma Medical Director, and entered into a state mandated database.

The following diagram lists the many forums that you may hear or see this information being exchanged and clarified. Please freely communicate facts, issues, or patient concerns that affect care. This is not punitive action, but a focus on process and systems to learn from.

Trauma Performance Improvement Program Overview:

Morning report is our main forum for issue identification. This forum is attended by the Trauma residents, Extenders, Trauma PI Coordinators and the Trauma Attending of the week.

**All new patient contacts are reviewed and new issues on existing patients are discussed. (issue examples: such as upgrades in care, transfer in/outs, deaths, status change, patient deterioration)**

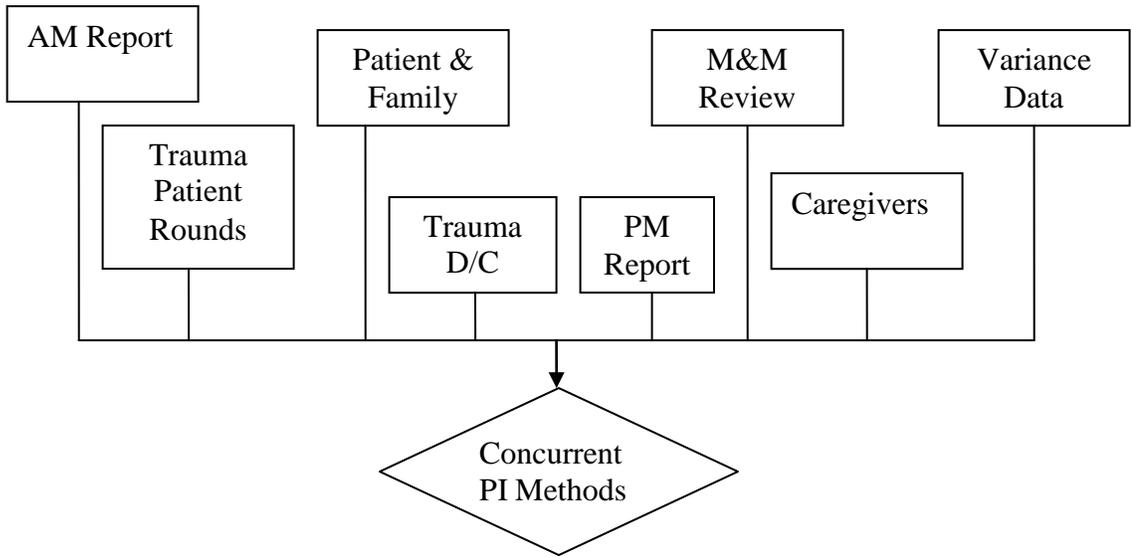
Weekly, representatives from Social Work, Care Coordination, PT/OT/ PM& R are also present for a formal review of each patient's needs and discharge challenges.

Morning report concludes on Monday, Tuesday and Wednesdays with a 30 minute educational discussion of a trauma topic addressed at a level from medical student to faculty. A series of trauma topics is rotated or the education is focused on care challenges brought up in the patient report.

The predominant secondary review forum is Trauma M&M on Friday mornings. Presented cases are selected by the Trauma Medical Director, Trauma Program Manager and the Trauma Nurse Coordinators during a preliminary M&M forum.

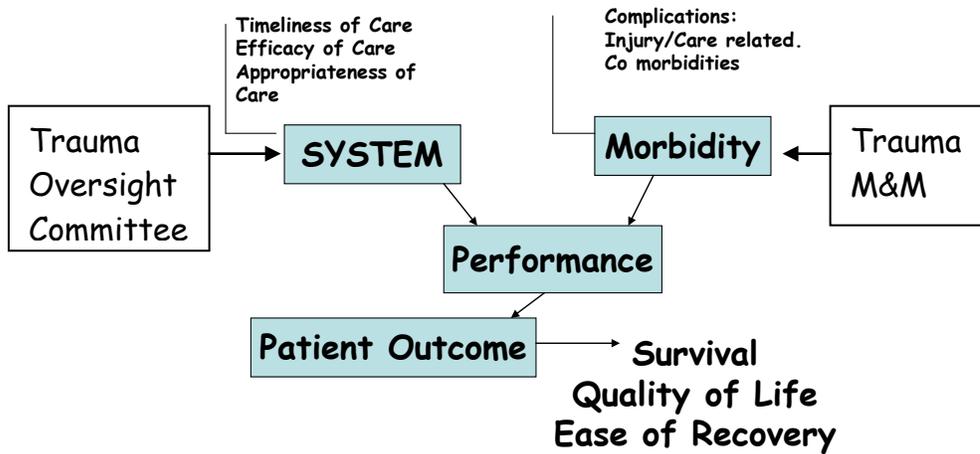
The Trauma Faculty, residents, Extenders, students are present as well as physician and nursing representatives from the SICU, Emergency Medicine, prehospital and nursing staff and administration.

A radiology fellow is present for imaging consultation and Neurosurgery/Orthopedic cases are clustered to ensure consistent presence by our liaisons from these specialties. There is representation from risk/QCRC to provide a link to hospital quality and ensure seamless education on quality initiatives.



The diagram illustrates the Trauma Program’s Performance Improvement Committees. You will participate routinely at Trauma M&M on Friday mornings at 0700.

### Current Trauma Performance Improvement Committee



The following illustrates the audit filters or indicators that Hershey’s Trauma Program is required to submit to the state database in which there is quarterly benchmarked data distributed to all Pennsylvania Trauma Centers.

## PTSF AUDIT FILTERS

PAF01	Ambulance scene time >20 minutes
PAF02	Absence of ambulance report on medical record for patient transported by EMS from scene
PAF03	Patient with admission GCS <14 who does not receive a CT of the head
PAF04a	Absence of sequential neurological documentation on emergency department record of trauma patient with a diagnosis of skull fracture or intracranial injury
PAF04b	Absence of sequential neurological documentation on emergency department record of trauma patient with a diagnosis of spinal cord injury
PAF05	Absence of hourly documentation of blood pressure, pulse and respiration for any trauma patient beginning with arrival in ED, including time spent in radiology, up to admission to the ward, floor, OR, or ICU; death; or transfer to another hospital
PAF06	Patient left ED with a discharge GCS $\leq 8$ and without a definitive airway established
PAF07	Patient seen in ED, discharged and then admitted to the hospital within 72 hours of initial evaluation
PAF08	Any patient sustaining a GSW to the abdomen who is managed non-operatively
PAF09	Patient requiring laparotomy which is not performed within 2 hours of ED arrival & Section of Trauma & Critical Care   Resident Handbook 23
PAF10	Patient with epidural or subdural brain hematoma receiving initial craniotomy >4 hours after arrival at ED, excluding those performed for ICP monitoring
PAF11a	Patient transferred in after 3 hours at initial hospital
PAF11b	Patient transferred out after 3 hours from ED arrival
PAF12	Interval of >8 hours between arrival and initial treatment of blunt open tibial fracture
PAF13	Initial abdominal, intrathoracic, vascular, or cranial surgery performed >24 hours after ED arrival
PAF14	Unplanned return to the operating room within 48 hours of initial procedure
PAF15a	Trauma patient admitted to hospital under care of admitting or attending physician who is not a surgeon
PAF15b	Burn patient with inhalation injury not admitted to burn or pulmonary service

PAF16	Non-fixation of femoral diaphyseal fracture in adult trauma patient
PAF17	Patient developing deep vein thrombosis, pulmonary embolism, or decubitus ulcer
PAF18	Any patient requiring reintubation within 48 hours of extubation
PAF19	Specific occurrences
PAF20	Patient with diagnosis at discharge of cervical spine fracture, subluxation, or neuro deficit not addressed on admission
PAF21	All deaths
PAF22	Adult patient receiving transfusion of platelets or fresh frozen plasma within 24 hours of ED arrival after having received <8 units of packed red blood cells or whole blood
PAF23	Burn patient with inhalation injury and not intubated 24 The Penn State Shock Trauma Center, Adult Trauma Program
PAF24	Burn patient with initial escharotomy performed >8 hours after a admission
JCAHO06	Trauma patient with open fractures of long bones as a result of blunt trauma receiving initial surgical treatment >8 hours after ED arrival
JCAHO07	Trauma patient with diagnosis of liver or spleen laceration undergoing initial laparotomy >2 hours after ED arrival
JCAHO08	Trauma patient undergoing laparotomy for wounds penetrating the abdominal wall (gunshot and stab wounds)
JCAHO11	Intrahospital mortality of trauma patient with 1 or more of the conditions who did not undergo a procedure for the condition: tension pneumothorax, hemoperitoneum, hemothoraces, ruptured aorta, pericardial tamponade, and epidural or subdural hemorrhage
JCAHO12	Trauma patient who expired within 48 hours of ED arrival, with autopsy performed

# TRAUMA PRACTICE GUIDELINES

## THREE TIERED TRAUMA TRIAGE

### LEVEL 1 — TRAUMA ATTENDING REQUESTED

#### VITAL SIGNS:

A Trauma Level I Response (Attending Presence Requested) will be paged for patients with:

Hemodynamic Instability (SBP < 90 mm Hg )

Respiratory rate > 29 or < 10

Intubated

Cricothyroidotomy

Glasgow Coma Scale < 12

Multiple injured patients (3 or more), arriving simultaneously

Stab wounds to the head, neck, chest, abdomen, axilla, and groin.

Axial gunshot wounds (head, neck, chest, abdomen, axilla, and groin)

Severe craniofacial fractures with extensive hemorrhage and/or airway compromise

Witnessed pre-hospital cardiopulmonary arrest with < 15 min CPR for Penetrating Trauma and < 5 min CPR for Blunt Trauma

Pregnancy > 24 weeks

Transfer from other hospitals receiving blood to maintain vital signs

# TRAUMA PRACTICE GUIDELINES

<b>Level I Response Criteria</b>	<b>Level II Response Criteria</b>	<b>Guidelines / Level III Response</b>
<p>1) <b><u>Triage Parameters</u></b></p> <p>a. <b>Physiologic Parameters</b></p> <ol style="list-style-type: none"> <li>1. Prehospital or ED intubation</li> <li>2. Compromised respiratory status (e.g. resp rate &lt; 10/min or &gt; 29/min)</li> <li>3. Systolic BP &lt; 90; sustained (adult)</li> <li>4. Sustained tachycardia of <math>\geq</math> 120</li> <li>5. Pregnancy of 5 months or greater</li> <li>6. GCS&lt;12</li> </ol> <p>b. <b>Anatomic Parameters</b></p> <ol style="list-style-type: none"> <li>1. Airway compromise including but not limited to: <ul style="list-style-type: none"> <li>• Maxillofacial injury</li> <li>• Inhalation injury</li> <li>• Vomiting and altered mental status/combatative behavior</li> <li>• Hanging/strangulation</li> <li>• Facial burns</li> <li>• Absent or unequal breath sounds</li> <li>• Chest wall instability/flail chest</li> </ul> </li> <li>2. Burns involving &gt; 25% BSA</li> <li>3. Paralysis of one or more extremities (e.g. paraplegia, quadriplegia)</li> <li>4. Penetrating injuries - Stab wound or gunshot wounds to head, neck, torso, shoulder, axilla, and groin.</li> <li>5. Major traumatic amputation (i.e. proximal to wrist or /ankle)</li> </ol> <p>c. <b>System logistics</b></p> <ul style="list-style-type: none"> <li>• Simultaneous arrival of three (3) or more trauma alert patients</li> </ul>	<p>1) <b><u>Triage Parameters</u></b></p> <p>a. <b><u>Physiologic Parameters</u></b></p> <ol style="list-style-type: none"> <li>1. Loss of consciousness with persistent altered mental status (GCS <math>\leq</math> 13)</li> <li>2. Patients with significant risk include: <ul style="list-style-type: none"> <li>• Patients with anticoagulation</li> <li>• Extremes of age (&lt; 5 years or &gt; 75 years)</li> </ul> </li> </ol> <p>b. <b><u>Anatomic Parameters</u></b></p> <ol style="list-style-type: none"> <li>1. Significant maxillofacial trauma with no evidence of airway compromise</li> <li>2. Subcutaneous emphysema</li> <li>3. Stab wound and/or gunshot wounds with significant wound depth <i>proximal</i> to knee and elbow are activated as a trauma alert at a minimum; hemodynamic instability are criteria for upgrade to Level I activation</li> <li>4. Two or more long bone deformities</li> <li>5. <i>Major open</i> fracture</li> <li>6. Suspected pelvic fracture</li> <li>7. Suspected cervical, thoracic or Lumbo-sacral spine fracture without CNS involvement</li> <li>8. Severe hand injury</li> <li>9. Major laceration of torso involving fascia</li> <li>10. Burns &lt; 20%</li> </ol> <p>c. <b><u>Mechanism of Injury</u></b></p> <ol style="list-style-type: none"> <li>1. Ejection from vehicle</li> <li>2. Pedestrian struck &gt; 20 mph</li> <li>3. Motorcycle accident &gt; 25 mph</li> <li>4. High energy dissipation <ul style="list-style-type: none"> <li>• Death in same compartment</li> <li>• Intrusion/significant vehicle damage</li> </ul> </li> <li>5. Falls &gt; 20 feet or two (2) stories</li> <li>6. Inhalation injury with no respiratory distress</li> </ol> <p><b><u>System Logistics</u></b></p> <ol style="list-style-type: none"> <li>1. ED patient overload / multiple injured patients</li> </ol>	<p>1) <b><u>Triage Parameters</u></b></p> <p>a. <b><u>Physiologic Parameters</u></b></p> <ol style="list-style-type: none"> <li>1. Normal</li> </ol> <p>b. <b><u>Anatomic Parameters</u></b></p> <ol style="list-style-type: none"> <li>1. Penetrating extremity trauma distal to elbow and knees</li> <li>2. Isolated severe hand injuries</li> <li>3. Burns</li> <li>4. Any mechanism of injury not listed in the higher levels of triage criteria that warrants consideration for expedited work up.</li> </ol> <p>d. <b><u>System logistics</u></b></p> <ol style="list-style-type: none"> <li>1. ED patient overload/multiple injured patients</li> <li>2. Stable interfacility (ED to ED) transfers</li> </ol> <p>The expedited ED work up of stable injured patients meeting the Level III triage criteria will be led by the ED Attending Physician with the assistance of a Surgery Resident rotating the the Trauma Service. There will be communication between the Trauma Attending and the ED Attending or Surgery resident within 60 mins after arrival of injured patient meeting the Level III response criteria.</p>

<u>Team Composition</u>	<u>Lab Panel</u>
Anesthesiology Attending Anesthesiology Resident Emergency Medicine Attending PGY3 Radiology Resident or Attending Trauma Surgery Attending PGY4 or PGY5 Surgical Resident 1 - 2 Junior Surgical Residents Two Emergency Depart. Nurse One Chaplain X-ray Personnel EMT	Lytes BUN Creat Gluc Medical Alcohol Amylase CBC w/Diff PTP PTT Arterial Blood Gas w/Hgb and O2 Sat Ionized calcium

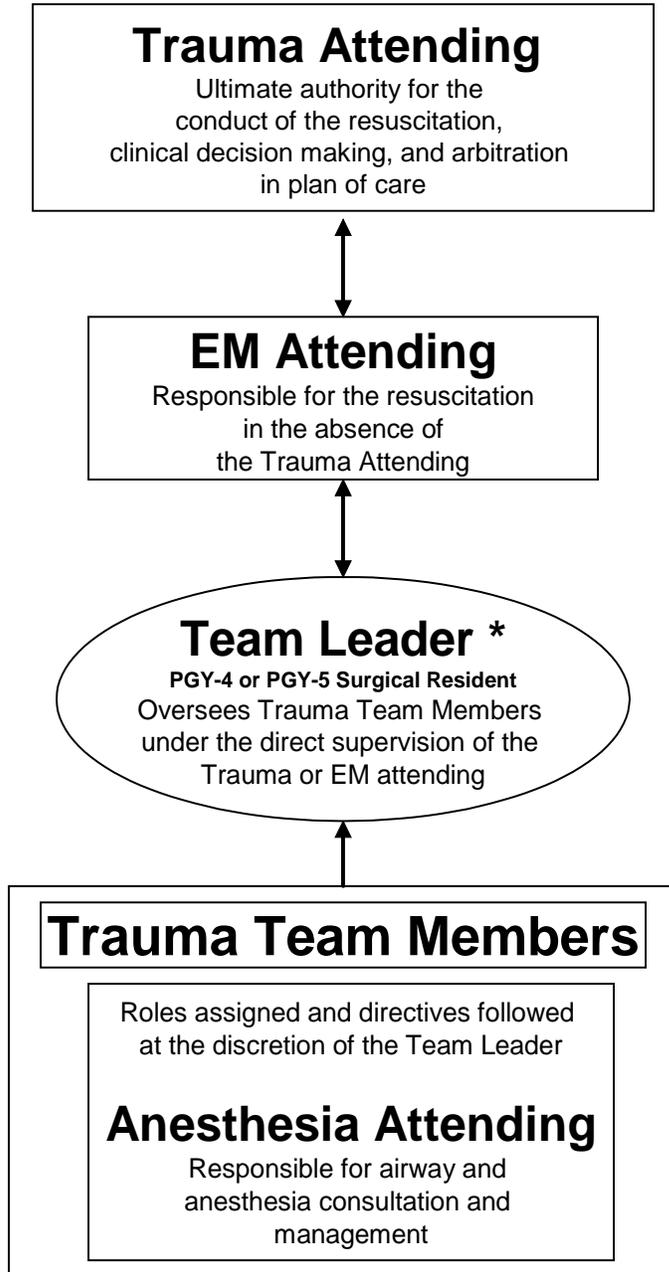
**Level 2 Trauma Alert**

<u>Team Composition</u>	<u>Lab Panel</u>
Emergency Medicine Attending PGY3 Radiology Resident or Attending Trauma Surgery Attending if requested PGY4 or PGY5 Surgical Resident 1-2 Junior Surgical Resident 2 ER Nurses Chaplain X-ray personnel EMT	Basic Metabolic Panel (Lytes, Renal, Gluc, Ca) Medical Alcohol Amylase CBC w/Diff PTP PTT

**Level 3 Trauma Alert**

<b><u>Team Composition</u></b>	<b><u>Lab Panel</u></b>
ER Attending ER PGY3 Resident ER PGY2 Resident Trauma Surgery PGY4 Resident 1 ER Nurse Chaplain X-ray personnel EMT	As Clinically Indicated

# Trauma Team Lines of Authority



# Trauma Team Positioning

- ANESTHESIA  
ATTENDING/RESIDENT
- PGY-2/3 EM RESIDENT
- RESPIRATORY THERAPIST  
\*Airway

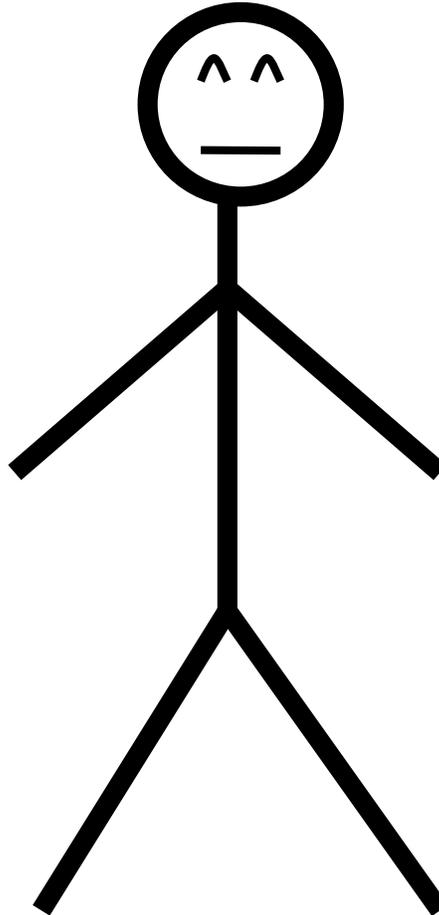
- RESIDENT or PE
- \* Assistant
  - \* Blood Draw
  - \* Foley

- FAST
- EM Resident
  - Surgery Resident

- RESIDENT or PE
- \* Primary Survey
  - \* Secondary Survey

- NURSE
- \* VS
  - \* IVF
  - \* Meds

RADIOLOGY TECH



- CHAPLAIN
- EMT TECH

TRAUMA TEAM LEADER  
Directs Resuscitation

TRAUMA ATTENDING/  
EM ATTENDING

- NURSE and RESIDENT
- \* Record H&P
  - \* Record VS

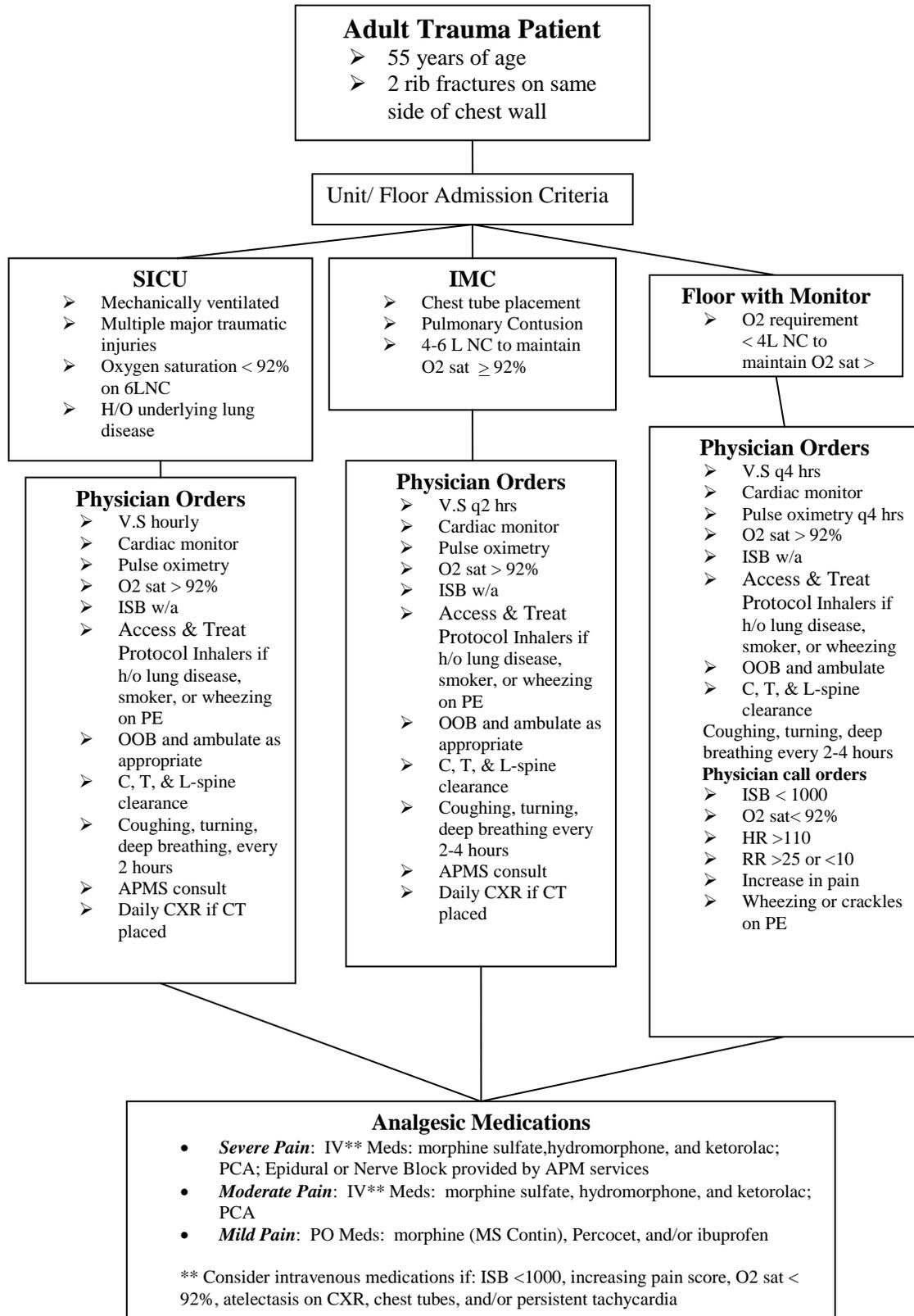
UNIVERSAL PRECAUTIONS

RADIOLOGY RESIDENT

## Professional Courtesy During Trauma Resuscitation

- 1) Lack of respect for ALL staff in the trauma bay will **NOT** be tolerated.
- 2) Team Leaders **must** identify themselves prior to initiating a resuscitation.
- 3) Unless the patient is unstable, please allow EMS personnel up to 1 minute to present their report without interruption and before proceeding with the primary survey.
- 4) Do NOT cut through long board spider straps, ECG cords, etc when transferring patients from the EMS stretcher to the trauma bed.
- 5) Keep noise and unnecessary chatter to a minimum in the trauma bay.
- 6) Please return and hang up all lead gowns. Throwing them on the floor damages their integrity much quicker.
- 7) Dismiss all non-essential personnel from the trauma bay when it has been determined that their presence is no longer needed (ex., OR representatives, Anesthesiologists, etc)
- 8) If a patient has been cleared after a negative trauma work-up, and there is a planned return back to the ED for further evaluation and management, please be sure to provide a DETAILED sign-out of this patient to the ED attending.

# Rib Fracture Management Guidelines in Geriatric Trauma Patients



<b>Clinical Management Guideline for Hemodynamically Unstable Patients with Pelvic Fractures</b>	
<b>Hershey Medical Center – Trauma Policy</b>	<b>Policy Number: 014TPM</b>
<b><u>Replaces: June 2009</u></b>	<b><u>Effective: April 2010</u></b>
Approved: Michael Weitekamp, MD, MHA Chief Medical Officer	
Approved: Heidi L Frankel, MD, FACS, Trauma Program Medical Director	
Approved: J. Spence Reid, MD, Director of Orthopaedic Trauma	

**STATEMENT:**

The purpose of this pathway is to rapidly identify and treat hemodynamically unstable trauma patients with a significant pelvic ring injury. These patients have the potential to exsanguinate rapidly without expeditious diagnosis and treatment. These guidelines are directed at minimizing variability in patient care that could contribute to adverse outcomes. Early consultation of one of our core group of Trauma Orthopaedic Surgeons and Interventional Radiology is essential.

Rapid identification of the source of bleeding is essential. Chest radiography or insertion of bilateral chest tubes (if the patient is in extremis) will be used to rule out significant intrathoracic bleeding. Focused assessment by sonography in trauma (FAST) followed by a diagnostic peritoneal aspiration will be performed to exclude an intraperitoneal source of blood loss. A pelvic radiograph will be obtained promptly.

**GUIDELINES:**

- I. Optimal treatment of these patients demands a close working relationship between the trauma team, the orthopaedic team, the anesthesiologist, and the interventional radiology team.
- II. Volume resuscitation of the patient with appropriate blood products and maintenance of core temperature must be continued during all phases of the resuscitation. The massive transfusion protocol will be utilized (see policy xx). Adjustments will be based on laboratory values of clotting parameters and the patient's clinical response to the activation. Blood products will be administered via the Level I fluid warmer.
- III. Recognition of a pelvic fracture pattern that is at significant risk for bleeding will be the responsibility of the trauma team and the consulting orthopaedic surgeon. The pelvic binder should always be applied in questionable situations as it can be removed later if the fracture is not felt to warrant entry into the pathway.
- IV. If the patient requires laparotomy based on a positive diagnosis study, an upper midline incision is ideal. Care will be taken to avoiding disruption of the retroperitoneal hematoma. The patient should be placed on a CSI table and a 12" fluoroscopic c-arm available in case intra-operative embolization is needed. If the

patient remains unstable at the conclusion of the laparotomy, consideration should be given to preperitoneal packing through a separate incision on on-table angioembolization.

- V. If the pelvic binder does not close the ring and the patient remains hemodynamically stable, then the orthopaedic surgeon should be consulted regarding the need for surgical stabilization of the pelvis. This fixation may involve removal of the pelvic binder and application of external fixation or definitive internal fixation depending on the fracture pattern and other associated injuries. If the patient remains persistently unstable, then preperitoneal packing or OR angioembolization should be considered.

**PERSON RESPONSIBLE FOR REVIEW OF POLICY**

Trauma Program Medical Director

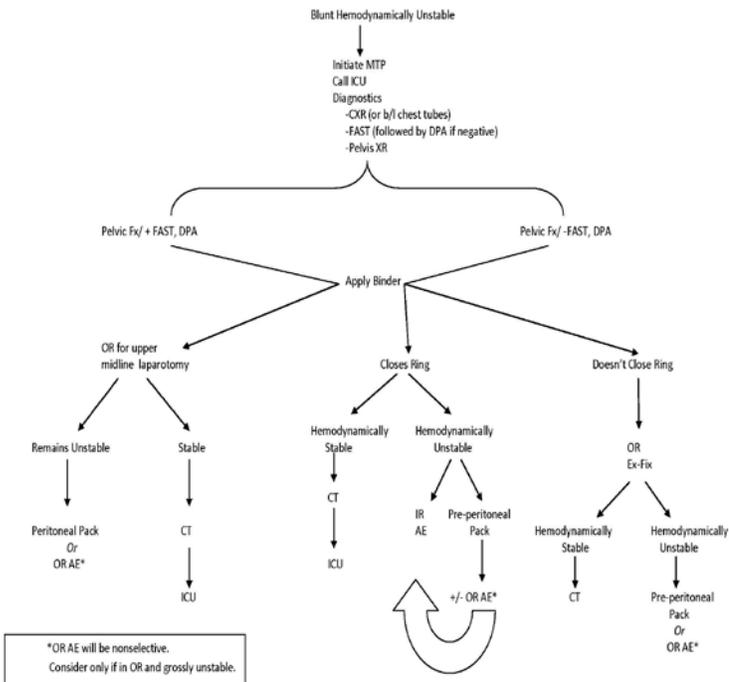
Reviewed: 8/04; 11/05, 6/09.

4/10

Revised: 11/05, 6/09, 4/10

<b>Trauma Policy Manual</b>	<b>Policy Number: 014TPM</b>
<b>Clinical Management Guideline for Hemodynamically Unstable Patients with Pelvic Fractures</b>	<b>Effective: April 2010</b>

### Algorithm for Pelvic Fractures:



## DVT PROPHYLAXIS CLINICAL PRACTICE GUIDELINE - INPATIENT

1. Injured patients admitted will be assessed for risk of DVT.
2. Assign risk using the Risk Factor Assessment Tool (see below).

### **Risk Factor Assessment Tool**

#### **Factors Assigned - 2 points**

Bed confinement >24 hours  
 History of DVT or PE  
 Tibia/Femur fracture  
 Obesity >200 lbs.  
 Displaced pelvis or acetabulum fracture  
 Head injury GCS <8  
 Spinal cord injury  
 Spinal Fracture  
 Family history of thrombi before  
 Penetrating extremity trauma with major venous injury  
 Multiple Rib Fracture (2 or more)

#### **Factors Assigned - 1 point**

Age >40  
 Obesity but <3x ideal BW  
 Malignancy  
 Transfusions >2 units  
 Pregnancy or post-partum <1 month  
 Oral contraceptives  
 OR Procedure  
 Femoral sheath placed  
 Age 45

#### **ADD ALL RISK FACTORS**

score 2 or > consider prophylaxis

score 0 or 1 no prophylaxis need be considered

3. Patients with scores <2 are not required to receive prophylaxis. All other patients will be considered for prophylaxis at the discretion of the attending physician.
4. Order of preference for prophylaxis:
  - a. Sequential compression devices (SCD) if dalteparin contraindicated (see below)

- b. Daltaparin (Fragmin) 2500 units SQ q 12 h
  - c. Pneumatic foot pumps if dalteparin and SCD's are contraindicated (see below)
  - d. If all methods are contraindicated, then proceed only with weekly duplex scans
5. Clinical Guidelines regarding the use of chemoprophylaxis:
- a. Non-operative Splenic Injury- Grade III or IV- Stable Hct and hemodynamics; consider Daltaparin in 72 hours.
  - b. Non-operative Splenic Injury- Unstable on admission; after 48 hrs. repeat abdominal CT Scan
    - CT better or unchanged- consider Daltaparin
    - CT worse- consider operative treatment of splenic injury
    - Post Splenectomy- consider Daltaparin
    - Post Splenorrhaphy - consider Daltaparin in 72 hrs.
6. Liver injury- Grade I, II, or III
7. Liver Injury- Grade IV or V
- CT better or unchanged- consider Daltaparin
  - CT worse- non-operative treatment- weekly duplex scan
  - CT worse- consider operative management
  - Post hepatorrhaphy - consider Daltaparin at 72 hrs.
8. Head Injury- If intracranial bleeding is present, or ICP monitor in place, use secondary method. Daltaparin may be used in trauma patients with intracranial hemorrhage when cleared by the Neurosurgical team.
9. Spinal Cord Injury- Consider Daltaparin after 24 hours as long as neurologic exam is stable and cleared by the Spine Team.
10. Spine/ Epidural- Anesthesia placement of a spinal or epidural catheter or epidural removal within 10 hours of a Daltaparin dose is contraindicated. Daltaparin may be used while catheter is in place.

11. Relative Contraindications:
  - Platelet Count <50,000
  - INR >2.0
  - Hyphema- consult ophthalmologist
  - Hemorrhage, including risk for compartment syndrome
12. Contraindications to Sequential Compression Devices and Foot Pumps:
  - External fixator on lower extremity (SCD) or foot (foot pump)
  - Unstable femur or tibia fracture (SCD) or forefoot (foot pump)
  - Elevated compartment pressures or acute DVT
  - Lower extremity infection or skin breakdown
  - Patient intolerance
13. Pre-op/ Post-op LMW Heparin Dosing
  - Daltaparin should not be instituted earlier than 12 hours after trauma or surgery. 24 hours delay for spine surgery, neurosurgery, or pelvis surgery
  - Daltaparin should be discontinued the night before planned surgery beginning with the 8pm dose. Daltaparin 5000u sq q 24h may be used as DVT prophylaxis for injured patients awaiting reconstructive surgery as an outpatient (pilon, tibial plateau, calcaneus fractures)
14. Standard by the clock dosing should be used in all trauma patients (Q8am/8pm). NOT BID or Q12 hours.
15. Review contraindications during hospital course *as they may change* and Daltaparin may become appropriate as certain conditions improve.
16. All patients should be examined daily for the development of leg edema and calf tenderness. If this occurs, duplex scans should be ordered through the vascular lab during normal working hours (8am to 5pm Monday-Friday). Indications for the study (leg edema, calf tenderness) must be documented on the chart and written on the request form.
17. If a below knee DVT is noted, that does not require chemoprophylaxis, the patient will receive repeat duplex scans at one week intervals while hospitalized.
18. If a patient is ambulatory at discharge then prophylaxis will be discontinued at the discretion of the attending physician.

19. Patients ambulating <150 feet per day may be converted to or started on Coumadin (INR-2.0) prior to discharge. Coumadin therapy should be monitored initially biweekly (Q Monday and Thursday) by prothrombin time and continued until patient is ambulatory, >150 feet. Low molecular weight heparin may be considered an alternative to Coumadin.
20. Spinal cord patients should continue Coumadin for a minimum of 12 weeks.

# IVC FILTER PLACEMENT PROTOCOL - INPATIENT

## PURPOSE

To provide a clinical protocol governing the role of inferior vena cava (IVC) filter placement in the prophylaxis and treatment of pulmonary embolism (PE).

## OVERVIEW OF PROTOCOL

### A. "Traditional" indications supporting the insertion of an IVC filter include:

1. Recurrent PE despite full anticoagulation,
2. Proximal DVT and contraindications to full anticoagulation,
3. Proximal DVT and major bleeding while on full anticoagulation,
4. Progression of iliofemoral clot despite anticoagulation (rare).

### B. "Extended" indications for prophylactic vena cava filter placement in a patient with an established DVT or PE include:

1. Large free-floating thrombus in the iliac vein or IVC,
2. Following massive PE in which recurrent emboli may prove fatal,
3. During/after surgical embolectomy.

### C. "Prophylactic" IVC filter may be considered in very high risk trauma patients:

1. Who cannot receive anticoagulation because of increased bleeding risk, and
2. Have one or more of the following injury patterns:
  - a. Severe closed head injury (GCS <8),
  - b. Spinal cord injury with para or quadriplegia,
  - c. Complex pelvic fractures with associated long-bone fractures,
  - d. Multiple long-bone fractures.

Patients at high risk for bleeding complications for 5 to 10 days after injury would include those with intracranial hemorrhage, ocular injury with associated hemorrhage, solid intraabdominal organ injury (ie. liver,

spleen, kidney), and/or pelvic or retroperitoneal hematoma requiring transfusion. Other risk factors for bleeding include cirrhosis, active peptic ulcer disease, end-stage renal disease, and coagulopathy due to injury, medication, or congenital/hereditary.

#### **D. Retrievable IVC Filters**

Retrievable filters may be considered in trauma patients who meet the above criteria. If a patient no longer requires a retrievable filter, then he/she may be referred to Interventional Radiology for removal. Retrievable filters may be removed safely by Interventional Radiology up to 120 days after placement.

## ADULT TRAUMA MANUAL

Additional Trauma Policies and Practice Guidelines can be found on the infonet under Workplace tools > Policies > Online Policies: Shock Trauma > Adult Trauma Manual Table of Contents

### Administrative Management

Admission of Adolescent Trauma Patients to the Adult Trauma Unit 013TPM

Adult Trauma Surgery Consultation	025TPM
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Collection and Ordering of Laboratory Tests	043TPM
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<b>Massive Transfusion Protocol for Trauma Patients</b>	
<b>Hershey Medical Center – Trauma Manual</b>	<b>Policy Number: 64TPM</b>
<b>Replaces: April, 2008</b>	<b>Effective: January 2010</b>
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**PURPOSE:**

1. Define massive transfusion in patients with traumatic injury.
2. Delineate individual provider responsibility during activation of Massive Transfusion Protocol.
3. Ensure timely access to blood products/components.
4. Prevent/minimize potential complications of massive transfusion.
5. Ensure safe delivery of blood products to patients.
6. Ensure efficient utilization of blood products to avoid wasting

**Prevention of complications of Massive Blood Transfusion:**

Potential complications of massive blood transfusion include electrolyte disturbances, hypothermia, acid-base imbalance, dilutional thrombocytopenia, and coagulopathy. The following preventative measures should be taken:

1. All blood products to be transfused according to institution policy.
2. All products should be warmed prior to or during administration.
3. Istat or similar monitoring may assist blood product administration.
4. Packed Red Blood Cells (PRBC) and Fresh Frozen Plasma (FFP) should be given in a 1:1 ratio to treat and prevent further coagulopathy

5. Platelets should be given according to recommended guidelines to prevent thrombocytopenia.

## **POLICY :**

### **DEFINITIONS**

Massive Transfusion is defined as bleeding requiring the need to replace approximately 50% of the patient's blood volume within a two hour period with continued hemorrhage. Hemodynamic instability in the face of ongoing transfusion may also signal the need to activate the massive transfusion protocol.

**PERSON RESPONSIBLE :** It is the responsibility of the attending physician to determine eligibility, or anticipate eligibility, and to give the order to activate and continue the protocol.

### **EQUIPMENT:**

1. Pre-warmed crystalloids
2. Large-bore IV catheters or central venous access
3. Rapid infusion warming device or other blood warmers (especially for children)
4. Warming devices to maintain patient temperature
5. Blood product packs
6. Coolers for product transport if available
7. I-stat and cartridges (if available)
8. Appropriate IV tubing and filters for blood product transfusions

### **PROTOCOL :**

#### **PATIENT POPULATION**

#### **Patient Presentation / Determination of eligibility for need of Massive Blood Transfusion:**

Activation of the protocol by the attending physician should be considered in the following:

1. Profound hypovolemic shock with associated acidosis (Estimated blood loss: adults 2500ml), infants and children (>20 or >40ml/kg to be determined by PCCM and Ped Surg)
2. Refractory hypotension not responsive to 20 ml/kg of PRBC

Risk Factors for the need for massive blood transfusion in the trauma population

1. Hypothermia
2. Known/potential for high energy chest/abdominal/pelvis trauma
3. Severe closed head injury in young children
4. Suspected aortic injury/rupture or other vascular injury
5. Known/potential for high energy extremity /long bone injury with multi-system injuries
6. Injured patients with known coagulation disorders.

### **PROCEDURE:**

1. Activation of the Massive Blood Transfusion Protocol:
  - Attending physician determines eligibility, **estimates weight of the patient** and gives the order to the charge nurse or attending Trauma staff nurse to activate the protocol by calling the Blood Bank.

- The staff nurse will serve as the contact person for the Blood Bank for all correspondence. Including notification of patient transfer to other care areas, such as OR & ICU.
2. Blood Bank staff:
    - Determines blood bank staff member to serve as contact person for nursing staff
    - Notifies pathology resident of activation of massive blood transfusion protocol
    - Issues first massive transfusion blood pack with Group O uncrossmatched packed cells
    - Begins type and crossmatch of patient blood sample
    - Begins preparing additional massive transfusion blood packs. Once type and crossmatch are complete, type specific products will be sent. If type specific blood is in short supply, type compatible blood will be substituted
    - Prepares and sends massive transfusion blood packs until protocol is deactivated
    - Notifies local suppliers of emergency blood product needs
  3. Nursing responsibilities:
    - a. Staff nurse
      - Notifies charge nurse of activation of massive transfusion protocol
      - Confirm blood bank notification and establishes a contact person in the blood bank
      - Administers blood products and monitors for complications
      - Ensures maintenance of patient's core temperature
      - Draws labs at ordered intervals
      - Completes ongoing documentation of patient status (vitals, labs, hemodynamic status)
      - During handoff communication, the staff nurse includes the name of the blood bank contact person
    - b. Charge Nurse:
      - Assists with communication with blood bank
      - Arranges for the transport of blood products
      - Ensures return of any unused blood products to the blood bank
  4. Laboratory technician responsibilities:
    - Performs all lab requests as "STAT"
  5. Transport personnel responsibilities:
    - Delivers all blood products and lab samples to appropriate departments
    - Remains in contact with charge nurse and staff nurse

## 6. Blood Product Administration:

Massive Transfusion Blood Packs are delivered as soon as available (beginning with thawed plasma and then =plasma thawing time). Emergency uncrossmatched blood may have already been administered.

The following should be considered when preparing and administering the transfusion packs:

- a. Based on availability, as determined by the blood bank, consider the use of O Negative blood in children and pre-menopausal women.
- b. Massive Transfusion Blood Packs include PRBC and FFP in a 1:1 ratio when immediately available.
- c. Recommended guidelines for platelet transfusions: <50,000 in acutely bleeding patients and <100,000 in multi-system or CNS trauma or if there is clinical evidence of coagulopathy
- d. Consider cryoprecipitate if fibrinogen levels remain critical (<100) despite FFP infusions

## 7. Rapid Massive Blood Transfusion packs:

- The blood bank will “keep ahead” by one massive transfusion blood pack during protocol activation.
- The attending physician must ensure communication with blood bank when ordering any alteration to the massive transfusion blood packs.
- **For patients <10kg Estimated Blood Volume (80ml/kg)**
- 1<sup>st</sup> pack: 1 unit PRBC, administer 1 unit thawed plasma, begin thawing 1 unit FFP to be released with the 2<sup>nd</sup> massive transfusion blood pack.
- Each additional massive transfusion blood pack should include platelets starting with the 2<sup>nd</sup> pack. Do not have to wait for platelet count, add rVVIa 90ug/kg (NovoSeven) Clinician needs to report the desired dose, so patient weight (kg) x 90 ug/kg = \_\_\_\_ ug. 2<sup>nd</sup> pack: 1 unit PRBC, 1 unit FFP, 1 random donor platelets
- 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> packs: 1 unit PRBC, 1 unit FFP, 1 random donor platelets, 1 unit cryoprecipitate

## **For Patients 10 kg` 20 kg Estimated Blood Volume (80ml/kg)**

- 1<sup>st</sup> pack: 2 units PRBC, Administer 1 unit thawed plasma, begin thawing 2 units FFP immediately to be released with 2<sup>nd</sup> massive transfusion blood pack
- Each additional massive transfusion blood pack should include platelets starting with the 2<sup>nd</sup> pack. Do not have to wait for platelet count, add rVIIa 90ug/kg (NovoSeven) Clinician needs to report the desired dose, so patient weight (kg) x 90 ug/kg = \_\_\_\_ ug. 2<sup>nd</sup> pack: 2 units PRBC, 2 units FFP, 2 random donor platelets
- 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> packs: 2 units PRBC, 2 units FFP, 2 random donor platelets, 2-4 units cryoprecipitate

### **For Patients 20 kg-49kg Estimated Blood Volume (80ml/kg)**

- 1st pack: 4 units PRBC, Administer 2 units thawed plasma, begin thawing 4 units FFP immediately to be released with 2<sup>nd</sup> massive transfusion blood pack
- Each additional massive transfusion blood pack should include platelets starting with the 2<sup>nd</sup> pack. Do not have to wait for platelet count, add rVIIa 90ug /kg (NovoSeven) Clinician needs to report the desired dose, so patient weight (kg) x 90 ug/kg = \_\_\_\_ ug. 2<sup>nd</sup> pack: 4 units PRBC, 4 units FFP, 4 random donor platelets  
3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> packs: 4 units PRBC, 4 units FFP, 4 random donor platelets, 4-6 units cryoprecipitate

### **For Patients ≥ 50 kg Estimated Blood Volume ( 70ml/kg)**

- 1<sup>st</sup> pack: 6 units PRBC, Administer 4 units thawed plasma, begin thawing 6 units FFP immediately to be released with 2<sup>nd</sup> massive transfusion blood pack
- Each additional massive transfusion blood pack should include platelets starting with the 2<sup>nd</sup> pack. Do not have to wait for platelet count. 2<sup>nd</sup> pack: 6 units PRBC, 6 units FFP, 6 random donor platelets Add rVIIa 90ug/kg (NovoSeven) Clinician needs to report the desired dose, so patient weight (kg) x 90 ug/kg = \_\_\_\_ ug. 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> packs: 6 units PRBC, 6 units FFP, 6 random donor platelets, 6 units cryoprecipitate

## **8. Laboratory tests:**

### **a. Initial Laboratory Testing on Patient Arrival**

The following should be sent immediately upon pt arrival

- 1) type and crossmatch
- 2) Istat (if available)
- 3) CBC with platelets
- 4) Electrolytes
- 5) PT/PTT/INR/Fibrinogen

### **b. Ongoing laboratory testing**

The following should be monitored during the massive blood transfusion and at the discretion of the attending physician:

- 1) Istat (if available)
- 2) Coagulation panel
- 3) CBC

## **9. Deactivation of the Rapid Massive Transfusion Protocol**

After issuing each round of blood products, the blood bank staff will verify that the Trauma Teams wishes to continue the MTP.

## **10. Ongoing Care and Issues**

- a. All unused products should be returned to the blood bank immediately upon deactivation of the protocol.
- b. A new specimen must be submitted for antibody screening and crossmatching 48 hours after massive transfusion has occurred. If the patient continues to receive numerous transfusions, the Clinical Pathologist or the Medical Director may extend the 48 hour limit for TYPE SPECIFIC transfusion.

## REFERENCES

- Alten, J. A., (2009) Pediatric off-label use of recombinant factor VIIa. *Pediatrics* 123 (3) 1066-1072
- Barcelona, S.L., Thompson, A.A., Cote, C.J. (2005). Intraoperative pediatric blood transfusion therapy: a review of common issues. Part II: transfusion therapy, special considerations, and reduction of allogenic blood transfusion. *Pediatric Anesthesia*. 15, 814-830.
- Dominguez, T.E., (2005) Use of recombinant factor VIIa for refractory hemorrhage during extracorporeal membrane oxygenation. *Pediatric Critical Care Medicine*. 6 (3) 348-351.
- Ketchum, L., Hess, J.R., Hiippala, S. (2006). Indications for early fresh frozen plasma, cryoprecipitate, and platelet transfusion in trauma. *The Journal of Trauma*. 60 Suppl, S51-S55.
- Malone, D.L., Hes, J.R., Fingerhut, A. (2006). Massive transfusion practices around the globe and a suggestion for a common massive transfusion protocol. *The Journal of Trauma*. 60 Suppl, S91-S94.
- Waldspurger Robb, W.J. (1999). Massive transfusion in trauma. *AACN Clinical Issues*. 10(1), 69-84.

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