



Origination 05/2005
Last 01/2026
Approved
Effective 01/2026
Last Revised 01/2026
Next Review 01/2029

Contact Stephanie Spain:
Trauma Prgm
Mgr Adult
Area Trauma Surgical
Critical Care
Applicability Erlanger Health -
Baroness

Massive Transfusion Protocol

1. Policy Statement:

To provide a consistent and expedient method for preparing and obtaining blood products for use in patients experiencing massive hemorrhage.

2. Who Should Read This Policy?

Emergency Departments, Critical Care Units, Surgical and Procedural Areas, Labor and Delivery Departments, Medical Staff, Anesthesiology Personnel, Pharmacy, Blood Bank Personnel, and Nursing

3. Indication for Activation

The Attending Physician or their Designee is the only individual authorized to activate the MTP.

Activation should occur when the clinical team anticipates significant ongoing or imminent blood loss likely to exceed routine resuscitation.

- A. Class IV Shock (estimated blood loss >1500-2000mL), with no imminent control of bleeding.
- B. Anticipated need for ~ 10 units of RBCs. This is intended to prompt early activation based on clinical judgment, not to wait until blood loss has occurred.
- C. Clinical scenarios associated with massive hemorrhage, such as multiple trauma with chest/abdominal bleeding, amputations, or massive pelvic fractures.

Note: Activation should be based on acute or imminent substantial blood loss and a high likelihood that bleeding will continue. Retrospective triggers (e.g., 10 units/24 hours) are not practical for early activation.

- D. Revised Assessment of Bleeding and Transfusion (RABT) score of ≥ 2 , recognizing this typically reflects late activation and should not replace clinical judgment.

- E. Continued shock after available blood has been given or an obvious mechanism of severe injury (e.g., gunshot wound to the chest) that warrants early activation to ensure rapid resource mobilization.
- F. All MTP activations include active efforts to control hemorrhage to minimize unnecessary blood utilization.

4. The Policy

- A. **Initiation of Massive Transfusion Protocol (MTP):** Only the attending physician or senior resident directly involved in the care of the patient may implement this protocol. **The Trauma Attending has the authority to override the protocol in life or death situations.** The physician who implements the protocol is responsible for ordering cessation of the MTP when the patient's condition stabilizes. If the care of the patient has been transferred to another attending or senior resident physician, then that physician also inherits responsibility for the MTP. It can be discontinued at any time by calling the Blood Bank.
- B. To initiate MTP call #7789 (rapid response line) and tell the EROC staff to initiate the Massive Transfusion Protocol page, state the age, gender, and location of the patient. This page will then be sent to the CCNC (Critical Care Nurse Clinician or "Red Shirt"), Blood Bank, OR, Anesthesia, and House Supervisor. CCNC will respond to all areas within BEH to administer the MTP when available.
- C. The Massive Transfusion Protocol order set will be activated via Epic as follows:
 - a. In the ED, the nurse assigned to the trauma bay (or designee) will place the order.
 - b. In the operating room, the OR circulator will place the order.
 - c. For all other areas of the hospital, the bedside nurse designated for the patient will place the order.
- D. Two pink tubes will be drawn on patients who meet MTP criteria. Tubes will be labeled with the standard blood bank identification information including a typenex number on each tube. Specimen should be drawn as soon as possible and sent to Blood Bank to avoid unnecessary use of Group O blood products.
- E. When inventory allows, the trauma bay, OR, and Labor and Delivery have a blood refrigerator with uncrossed blood products available for emergent transfusion. After these units have been exhausted or if the patient is outside these areas, a "Red Tag Pack" with an additional two units of O negative blood or O positive blood and 2 units plasma can be picked up from the blood bank.
- F. The cooler will be labeled with the cooler expiration date and time. The coolants should be replaced by the Blood Bank and any unused blood products brought back 15 minutes before the expiration date and time on the cooler.
- G. Upon activation of MTP, the CCNC or Charge Nurse in the unit will designate someone to be the blood courier.
- H. Close communication with blood bank personnel is essential to ensure effective and efficient use of products with minimal wastage. The CCNC will call the Blood Bank directly at #7265 and the Blood Bank will communicate with the CCNC via #805-8411/805-8308/280-4406. If there is no answer to those numbers call #5184 for the ED bed 8 or #5580 for the OR runner

depending on current patient location.

- I. As soon as a blood sample is received in the Blood Bank, a type will be performed Stat. Once the blood type has been obtained, all subsequent products will be type and crossed or type specific. The Blood Bank will notify the CCNC as soon as the first cycle of blood products is ready for pick up. Blood Bank staff is to stay ahead of all requested blood products to ensure an uninterrupted supply of appropriate blood products.
- J. Crystalloid use during MTP contributes to metabolic acidosis, lung and visceral edema. Its use should be restricted to less than 2 liters during massive transfusion. Use of more than 2 liters will be an automatic audit filter for review by the MTP Committee.
- K. The Blood Bank will select and prepare the cycles using the appropriate administration schedule below based on whole blood availability:

a. **MTP with Whole Blood Administration Schedule:**

- I. Cycle 1- Whole Blood- 4 units
- II. Cycle 2- PRBC- 6 units, plasma- 6 units, one platelet pack
- III. Cycle 3- PRBC- 6 units, plasma- 6 units, one platelet pack, 10 units cryoprecipitate¹

b. **MTP without Whole Blood Administration Schedule:**

- I. Cycle 1- PRBC- 6 units, plasma- 6 units, one platelet pack
- II. Cycle 2- PRBC- 6 units, plasma- 6 units, one platelet pack, 10 units cryoprecipitate¹
- III. Cycle 3- PRBC- 6 units, plasma- 6 units, one platelet pack

L. **Notes on Uncrossed Blood Transfusion, Whole Blood, and Cryo Substitute:**

- a. Uncrossed O- Use: Females of childbearing age or capacity (age ≤50 years old and no hysterectomy) and males <15 years old.
- b. Uncrossed O+ Use: Females NOT of childbearing age or capacity (age >50 years old or known hysterectomy) and males ≥15 years old.
- c. Whole Blood: Whole blood will be limited to four units during the first cycle of the MTP. One unit of whole blood is the equivalent to one unit of PRBC and one unit of plasma.
- d. Cryo Substitute¹: Fibryga will be utilized if no cryoprecipitate is available.

¹If Blood Bank is out of cryoprecipitate, 3 grams of the fibrinogen concentrate (Fibryga) will be substituted. This must be ordered in Epic and obtained from the main pharmacy.

- M. If, after Cycle 3, patient is still requiring MTP start over at Cycle 2 and keep repeating Cycles 2 and 3 until source of hemorrhage has been controlled and MTP can be discontinued. Further blood product administration will be based on most current laboratory values at the trauma physician's discretion. Unless specified by the Trauma Attending, blood products will be released in a full cycle.
- N. PRBC and plasma will be given in a 1:1 ratio, one unit of plasma for every one unit of PRBC.

- O. The blood courier from the appropriate unit will obtain the blood pickup ticket and patient sticker and will pick up the cooler of blood products.
- P. Blood Bank Cooler Rotation Schedule: For the 1st cycle and 2nd cycle the courier will receive separate coolers for each cycle. For the 3rd cycle to be picked up, the 1st cooler must be returned empty for a temperature check and restocking of the next cycle. This process will continue for any subsequent cycles with empty coolers being returned for restocking of blood product cycles. This process helps ensure proper storage and temperature control of blood products to alleviate any blood product wastage.
- Q. The CCNC will track the number of units of the different blood products the patient has received and document on the MTP form.
- R. Warming measures will be initiated on any patient that requires the MTP.
- S. No routine labs should be done until the source of bleeding/hemorrhage has been definitively controlled, with the exception of ABGs and iStats run by resuscitative personnel.
- T. PT, PTT, TEG, CBC, calcium, and fibrinogen will be drawn at the conclusion of the MTP.
- U. The nurse in charge of the patient is responsible for communicating any lab results to the trauma surgeon in charge of the case IMMEDIATELY.
- V. CCNC, ED, ICU and/or Surgery staff are responsible for completing and returning any emergency blood request forms that have been issued with the blood.
- W. The CCNC is responsible for ensuring the cooler and any unused products are returned to the blood bank after MTP has been discontinued.

5. Calcium Chloride Administration

3 gm of Calcium Chloride will be administered in each MTP cycle unless otherwise indicated. Additional calcium may be administered as indicated by lab values. If an iCal is available from the ABGs, it should be used to guide calcium therapy, or obtain periodic iCal from the lab.

6. Tranexamic Acid (TXA)

- A. Tranexamic Acid (TXA) (Order set No. 10233): This can be administered through a central line or peripheral IV as long as blood is not being infused through the same line.
 - 1. Criteria for use:
 - a. Trauma patients with massive hemorrhage, with massive transfusion protocol activation, or who are at risk for hemorrhage within 3 hours of traumatic injury (after 3 hours of injury no benefit is realized).
 - b. No contraindication to administration such as pregnancy, known history of thromboembolism or hypercoagulable disorder. Provider may consider holding TXA in patients with known blunt cerebrovascular injury.
 - c. Tranexamic Acid Dosing
 - i. No pre-hospital TXA given:
 - a. TXA 1000 mg/100 ml IVPB given over 10 minutes, every 10 minutes x 2 doses (600ml/hr)

- ii. 1 gm TXA given pre-hospital:
 - a. TXA 1000 mg/100 mL IVPB given over 10 minutes x 1 dose (600ml/hr)
- iii. 2 gm TXA given pre-hospital:
 - a. No additional TXA needed unless the section below (section iv.) applies
- iv. After administration of the TXA 2 gm bolus, physician may order an infusion dose if the MTP is ongoing and/or Thromboelastography (TEG) shows fibrinolysis (LY30 > 3%).
 - a. TXA 1000mg/100ml IVPB given over 8 hours x1 dose (12.5ml/hr)

7. Specialty Locations with Immediate Access to Emergent Blood Products:

- Blood Bank inventory may necessitate removal of products listed below to ensure fulfillment of hospital-wide needs.
- Operating Room Blood Refrigerator:
 - 4 units O positive blood
- ED Trauma Bay Blood Refrigerator:
 - 2 units O positive blood, and 2 units liquid plasma

8. Quality Assurance Process:

- Governed by Hospital Patient Safety and Quality, a multidisciplinary group convenes monthly to review all MTP activations for BEH and EEH. Each one is closed or will have action items assigned when opportunities for improvement are identified. It will remain open until action items have been closed in a satisfactory manner.
- Additional agenda items may be discussed that pertain to the MTP process and data points reviewed such as adherence to the ideal transfusion ratio of blood products.
- BEH and EEH will each maintain a spreadsheet that documents each case, action items, and resolution.

9. References:

ACS TQIP Massive Transfusion in Trauma Guidelines. (2015, April 16). Retrieved April 15, 2019, from https://www.facs.org/~media/files/quality_programs/trauma/tqip/massive_transfusion_in_trauma_guidelines.ashx

American College of Surgeons. (2015, May 28). *New Rapid-Deployment Plasma Protocol for Trauma Care*

Effectively Treats Patients Quicker in the Emergency Room [Press release]. Retrieved April 15, 2019, from <https://www.facs.org/media/press-releases/2015/trauma0515>

[The European guideline on management of major bleeding and coagulopathy following trauma: sixth edition - PubMed](#)

[Hemostatic defects in massive transfusion: an update and treatment recommendations - PubMed](#)

Attachments

[📎 Massive Transfusion Protocol Algorithm.pdf](#)

Approval Signatures

Step Description	Approver	Date
VP Approval	Jessica Holladay: VP & ACNO Surg & Trauma Svcs	01/2026
OC/MEC	Shana Fox: Director Medical Staff & Cred.	01/2026
Trauma Services Committee Approval	Stephanie Spain: Trauma Prgm Mgr Adult	12/2025
	Stephanie Spain: Trauma Prgm Mgr Adult	12/2025

Applicability

Erlanger Health - Baroness