Applies To: **UNM Hospitals** Responsible Department: Transfusion Medicine Effective Date: 06/13/2019

Title: **Obstetric Massive Transfusion Protocol Procedure and Information**	**Procedure**

Patient Age Group:	( ) N/A	( ) All Ages	( ) Newborns	( ) Pediatric	(X) Adult

DESCRIPTION/OVERVIEW

The purpose of the Obstetric Massive Transfusion Protocol (OB MTP) Procedure and information document is to standardize operational steps and provide complete information necessary for a successful OB MTP.

This procedure:

- Provides clarity on the type and quantity of administered blood products during a massive hemorrhage
- Expedites blood product allocation by the patient care team regardless of patient location
- Facilitates early appropriate lab orders
- Assures timely resulting of coagulation and hematology tests
- Describes the required steps of Activation, Notification, Monitoring, Point of Contact Handoff, Prevention of Complications and Endpoints
- Shares important information
- Describes required roles and responsibilities

REFERENCES

External References

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- Skupski DW, Brady D, Lowenwirt IP, et al. Improvement in outcomes of major obstetric hemorrhage through systemic change. *Obstet Gynecol*. 2017, 130(4): 770-77.
- WOMAN Trial Collaborators. Effect of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum hemorrhage (WOMAN): an international, randomized, double-blind, placebo-controlled trial. *Lancet*. 2017, 389(20084): 2105-2116.

Internal References

- Type and Screen
- Issuing Products
- Issuing Blood without Crossmatch
- Transfusion of Blood and Blood Components
- Providing Blood Components for Emergency Transfusion
- Blood Bank Samples Used for Testing
- Transfusion Reaction Workup
- Frozen Plasma
- Platelet Transfusion
- Cryoprecipitate
- Massive Transfusion Protocol Contact Sheet

AREAS OF RESPONSIBILITY

This document applies to UNM Hospitals obstetric peripartum patients who are experiencing massive blood loss/hemorrhage and the clinical staff providing patient care.

RESPONSIBILITIES	
Position/Title/Group	**Requirements/Expectations/Duties**
Nursing	1. Provide appropriate patient identifying information (blood product request forms labeled with patient name and MRN) to the Blood Bank. 2. Ensure appropriate patient identification prior to blood product administration at bedside (reviewing patient's armband for correct name and MRN). 3. Administer MTP blood products as directed by the treating team/physician and as patient status dictates. 3.1. Transfuse using the standard transfusion kits, blood warmers, and/or pressure infusion devices as required by the clinical situation. 4. Monitor the patient for transfusion reactions. 4.1. The treating team should be notified if there is a suspected transfusion reaction. 4.2. A transfusion reaction work-up should be submitted, in a process identical to patients receiving routine transfusions with a suspected transfusion reaction. 5. Arrange for transport of the MTP packs from the Blood Bank to the patient location and provide the transporter with the necessary patient identification to allow blood to be released from the Blood Bank. 6. Draw STAT baseline labs and serial labs. 7. Document time, volume, and type of blood component transfused. 8. Document vital signs and patient status.

Clinical Attending Physicians	1. Activate the MTP when indicated. 1.1. Once the clinical attending physician has made the decision to activate the MTP, either they may order the MTP power plan and notify the Blood Bank of the activation, or they may nominate a designee to do so. 2. Closely monitor the hemodynamic status of the patient throughout the duration of the MTP. 3. Once the decision to deactivate the MTP has been made, it is the clinical team's responsibility to notify the Blood Bank of the decision to discontinue the MTP. At this point the Blood Bank will no longer maintain a ready MTP round for immediate transfusion. The attending physician, or their designee, is then responsible for ordering all subsequent blood products for transfusion. 4. The physician responsible for activating the MTP, or their designee, must sign (within 24 hours of transfusion) an emergency release statement for every unit of red blood cells (RBCs) that was transfused prior to finishing initial patient blood bank testing is completed. 5. All blood products need an electronically signed order before they can be issued. 5.1. The blood bank will start preparing an order as soon as notified; however, there must be an MTP power plan order initiated and signed before the products can be issued. 5.2. The initial MTP power plan order will serve as a valid product order for future red blood cells, plasma, and platelets for the duration of the MTP. 5.3. One pool of cryoprecipitate is included in each of the first two rounds of the OB MTP and will not automatically be provided with subsequent MTP rounds. Additional cryoprecipitate for fibrinogen replacement must be ordered separately and should be guided by laboratory-resulted fibrinogen levels.
Blood Bank Staff	1. Document communications on the MTP contact sheet. 2. Immediately begin to prepare products, and begin to thaw plasma units as soon as notified. The Blood Bank will notify the MTP Point of Contact once a MTP round is ready for pickup. 3. The Blood Bank must notify: 3.1. Pathology resident on day call for Transfusion Medicine. 3.2. Pathology resident on call after hours. 3.3. Pathology resident if the patient has known antibodies or a positive antibody screen with identification is in progress. 3.4. If there are staffing issues, in the blood bank, the lab Lead Tech (934-5186) will be notified that the OB MTP has been activated. The Lead Tech evaluates the staffing needs to facilitate the preparation and distribution of blood products. 4. Alert Vitalant (formerly United Blood Services) if there appears to be a need for an urgent type specific blood delivery, or other critically low blood product shortages. 5. Issuing multiple units during an emergency will follow the streamlined procedure. 6. Data on MTP activations will be tracked by the Blood Bank and Pathology house staff. The pathology resident receiving the call will fill out an information log for Quality Assurance purposes and the daytime Blood Bank resident will follow-up. 7. Appropriateness of activation in each case will be evaluated, as well as blood products issued and patient outcomes. 8. Summaries of these MTP activations will be presented to the Tissue and

	Transfusion Committee and to the Trauma Service on an annual basis. This information will be offered to other services that have participated in MTP activations upon request.
Pathologists	1. Obtain the following information from the Blood Bank: 2. Patient name, MRN, location 2.1. Status of Type and Screen, and any underlying alloantibody or crossmatch incompatibility issues that may delay or compromise the ability to quickly provide blood products. 2.2. Ensure that there is a current MTP point of contact and contact Number. 2.3. Pathology residents will contact their attending Transfusion Medicine physician and/or Transfusion Medicine fellow to relay pertinent clinical information. 3. Triage any questions from the Blood Bank or clinical team. 3.1. The clinical service is responsible for all aspects of communicating orders and picking up blood products. 4. The pathologist does not need to "approve" the request for MTP activation – this decision is made by the clinical attending physician. 5. If the pathology resident is in-house, they assess the clinical situation and actively assist the clinical team to help facilitate the MTP. 6. If the resident is not in-house, they must notify their attending physician of the OB MTP and contact the activating clinical team to assess patient status, any ongoing concerns with resuscitation (i.e. delays in orders, product preparation, antibodies, or questions about products) and be available to come in to the hospital to assist if the clinical situation dictates that need.

PROCEDURE

1. MTP Activation Process

1.1. Activation of the OB MTP is at the discretion of the requesting physician and indications may include the following:

1.1.1. Massive blood loss with profound hemorrhagic/hypovolemic shock

1.1.2. Refractory hypotension (hypovolemic shock) not responsive to volume resuscitation

1.1.3. Continued significant bleeding in the presence of an elevated INR >1.9, depressed fibrinogen (<200 mg/dL), or thrombocytopenia (<50,000/mL).

2. Activate and Run an OB MTP

2.1. Once the decision has been made by the requesting Attending Physician to activate the MTP, a clinical point of contact should be designated. The OB Massive Transfusion power plan must be **ordered, initiated, and signed.**

3. Notification of the Blood Bank

3.1. A member of the clinical team must immediately notify the UNMH Blood Bank that they are activating the OB Massive Transfusion Protocol.

3.1.1. "272-2591 (direct number to Blood Bank)

3.1.2. 333" Emergency Notification Procedure (in-hospital phone)

3.1.3. 272-3333

3.1.4. 925-3333

3.2. The caller must provide the following information:

3.2.1. Patient Name and Medical Record Number (MRN)

3.2.2. Patient Location

3.2.3. Name of the Attending Physician responsible for MTP activation

3.2.4. Point of Contact Name, phone number, and pager number.

3.2.4.1. The clinical team will designate one individual to be the point of contact for the lab.
3.2.4.2. The Blood Bank and pathologist frequently need to contact this person for clinical updates, and to ensure the MTP is running as designed.

3.3. The above provided information will be recorded, along with the date and time the Blood Bank is notified of the OB MTP activation, on the MTP contact sheet by the blood bank technologist.

3.4. The blood bank technologist will perform a read back of the patient's identifying information to the caller, ensuring the information is accurate.

3.5. In order to facilitate effective communication, the Blood Bank requests that unofficial notification not be made.

4. Blood Product Pickup

4.1. **The clinical service is responsible for picking up all blood products required during the MTP, whether from the Blood Bank or from one of the remote release refrigerators (RR refrigerator).**

4.2. The Blood Bank will notify the MTP Point of Contact when each new round of the MTP is ready to be picked up. A new round will be automatically prepared once the previous round has been picked up from the Blood Bank.

4.2.1. The blood bank technologists will document the date and time that blood products are issued during the OB MTP on the MTP contact sheet.

4.3. Blood and other blood products are generally available for pickup at the Blood Bank unless otherwise arranged.

4.3.1. When picking up blood products during an OB MTP, key words that should be conveyed to Blood Bank staff by whomever is sent to pick up blood products are postpartum hemorrhage and OB massive transfusion.

4.4. There are up to 4 emergency uncrossmatched group O-negative RBCs available in the RR refrigerator in the supply room in the Labor and Delivery OR suite.

4.5. Additionally, there are emergency group O-positive and O-negative RBCs and group AB or A plasma available in the adult ED Resuscitation Room. The RR refrigerator between the Trauma-Surgical and Medical Intensive Care Units contains both O-positive and O-negative RBCs.

4.6. RBCs and plasma can be issued in portable coolers, refrigerator on wheels (ROW), or in a plastic container or bag (if time does not permit a cooler to be packed). Product containers should be kept at the patient bedside or with the patient during transport.

4.6.1. Coolers and ROWs are packed by the Blood Bank with RBCs and thawed plasma.

4.6.2. The Blood Bank has coolers in two sizes, one with the capacity for 2 units and the other for 6 units. ROWs can store up to 12 units.

4.6.3. Platelet and cryoprecipitate units stay at room temperature and **do not** go in the coolers or ROWs for any period of time.

5. Labs to be Sent (automatically ordered as part of the OB Massive Transfusion Power Plan)

5.1. Initial Labs to send (hand-deliver to lab):

5.1.1. Type and Screen if there is no current Type and Screen sample (pink or lavender top tube)

5.1.2. Emergency Hemorrhage Panel (EHP): includes Hemoglobin (Hgb), Hematocrit (Hct), Platelet count (Plt), PT/INR, and Fibrinogen. The EHP yields results within 15-20 minutes of specimen arrival in the laboratory (one light blue top and one lavender top tube).

5.1.3. Arterial Blood Gas (ABG)

5.1.4. ROTEM – light blue top tube
5.1.5. Lactate (up to the discretion of the clinical team) – grey top tube

5.2. Monitoring Labs:
5.2.1. A new EHP should be sent to the laboratory after each MTP round or "pack" is given, or every 15-30 minutes during the ongoing MTP.
5.2.2. Additional monitoring labs may include ABG, lactate, and ROTEM, and are ordered at the discretion of the clinical team.
5.2.2.1. All subsequent labs can be hand-delivered or sent in the tube system. Specimens for ABG go in blue priority bags and specimens for EHP are sent in orange priority bags.

6. Antifibrinolytics (Tranexamic Acid)

6.1. Early administration of antifibrinolytics during active hemorrhage, such as Tranexamic Acid (TXA), has been associated with reduced mortality secondary to bleeding in women with post-partum hemorrhage, especially with early administration (within 3 hours of giving birth).

6.2. TXA loading dose is 1 gram reconstituted in saline and administered intravenously over 10 minutes.
6.2.1. Repeat TXA dosing should be based on clinical symptoms, ongoing bleeding, and ROTEM findings of ongoing hyperfibrinolysis.
6.2.2. The repeat dose can be given 30 minutes after the first dose, and is 1 gram reconstituted in saline.

6.3. Tranexamic acid is known to cross the placenta and appear in cord blood at concentrations approximately equal to that of maternal blood. Caution should be used if administering prior to delivery of the fetus or with the intent to prophylactically prevent hemorrhage.

7. Product Description

7.1. Efforts should be made to transfuse at a 1:1:1 ratio of RBCs to plasma to platelets
7.1.1. Each component (RBCs, plasma, and platelets) is prepared to maintain the 1:1:1 ratio.
7.1.2. One apheresis platelet unit is equivalent to a "6 pack" of whole blood platelets.

7.2. The contents of the MTP packs are as follows:

1st MTP Pack	**2nd MTP Pack**	**3rd MTP Pack**	**4th MTP Pack**
6 units RBCs	6 units RBCs	6 units RBCs	6 units RBCs
6 units plasma	6 units plasma	6 units plasma	6 units plasma
1 apheresis platelet	1 apheresis platelet	1 apheresis platelet	1 apheresis platelet
1 pool cryoprecipitate	1 pool cryoprecipitate		

7.3. The MTP products follow the patient during transport between the Emergency Department, Operating Room (OR), procedure areas (i.e. Interventional Radiology), and intensive care units.

7.4. Platelets and cryoprecipitate should NEVER be placed into the MTP coolers/ROW.

7.5. Cryoprecipitate administration:
7.5.1. Cryoprecipitate (1 pool) has been built into the first two rounds of the OB MTP.
7.5.2. Any additional orders for cryoprecipitate will have to be placed separately and dosing should be based on the patient's most current fibrinogen levels, which should be followed throughout the MTP by the use of the EHP.

7.5.3. The target fibrinogen in postpartum hemorrhage should be ≥200 mg/dL.
7.5.4. One pool of cryoprecipitate (5 units of cryoprecipitate) should increase fibrinogen in a 70kg patient by approximately 35mg/dL.

7.6. For severe bleeding that does not respond to standard resuscitation measures, or for catastrophic trauma, recommendations are to call Transfusion Medicine to discuss the use of factor concentrates (fibrinogen concentrate, prothrombin complex concentrates (PCC), or recombinant factor VIIa).

8. Endpoints of Obstetric Massive Transfusion

8.1. The physician deems the patient is hemostatic based on the absence of bleeding requiring additional intervention on the surgical field or after angioembolization.

8.2. The treating physicians agree that the patient is adequately resuscitated based on their normalizing vital signs.

8.3. If it is recognized that further resuscitation is futile, the OB MTP should be discontinued.

8.4. Once an endpoint to massive transfusion has been achieved, the designated Point of Contact should verbally communicate with the Blood Bank (272-2591) to discontinue the protocol.

9. Prevention of Complications of Obstetric Massive Transfusion

9.1. Potential complications of massive transfusion include hypothermia, electrolyte disturbances, dilutional coagulopathy and thrombocytopenia.

9.1.1. All blood products should be transfused according to institutional policy.

9.1.2. Hypothermia Prevention: Red blood cells and plasma should be transfused through a blood warmer during administration per unit protocol.

9.2. Electrolyte Disturbance Prevention:

9.2.1. A Chem7 or ABG is used to monitor electrolytes during the MTP and is ordered at the discretion of the clinical team.

9.2.2. Hypocalcemia Prevention: Consider limiting the rate of product infusion, especially in patients with liver injury. Replace calcium with calcium chloride or calcium gluconate as indicated per unit protocol.

9.2.3. Hyperkalemia Prevention: Closely monitor electrolytes in patients with renal injury or pre-existing renal disease to prevent hyperkalemia.

9.3. Dilutional Coagulopathy and Thrombocytopenia Prevention: Transfuse blood products as outlined in a 1:1:1 ratio to treat and prevent coagulopathy.

10. Point of Contact and Hand-off

10.1. A MTP Point of Contact must be available for status updates and calls throughout the duration of the massive transfusion.

10.2. Transitions:

10.2.1. If the Point of Contact goes off service, they must find a replacement and notify the Blood Bank (272-2591) who the new Point of Contact will be and provide the new contact's phone number.

10.2.2. For any patient location change, for example, if the patient transitions to the OR, the Blood Bank must be informed by the MTP Point of Contact, because it is assumed that the anesthesiologist assigned to the case will be the Point of Contact while in the OR.

10.2.3. If the patient transitions from the OR while on an ongoing MTP, a new Point of Contact must be established and their contact information be conveyed to the Blood Bank.

11. Important Information

11.1. All Massive Transfusion Protocols are considered emergency transfusions; however, not all emergency transfusions are considered Massive Transfusions. The patient's

transfusion needs should be evaluated on a case-by-case basis and should be periodically reevaluated during the course of a Massive Transfusion Protocol event.

11.2. Uncrossmatched blood is available until type-specific blood can be provided for the patient.
  11.2.1. For inpatients requiring emergent transfusion, uncrossmatched RBCs and thawed plasma are available from the Blood Bank when crossmatched blood is not immediately available. In addition, there are up to 4 units of uncrossmatched O-negative RBCs available in the RR refrigerator in Labor and Delivery. There are uncrossmatched O-positive and O-negative RBCs available in the RR refrigerator between the Trauma-Surgical and Medical Intensive Care Units.
  11.2.2. For patients arriving to the ED resuscitation room, there are uncrossmatched O-positive and O-negative RBCs and thawed plasma immediately available in the RR refrigerator in the resuscitation room.
  11.2.3. A small supply of thawed plasma is available at all times in the Blood Bank for emergency release to temporize the patient during the 20-25 minutes it takes to thaw frozen plasma.

11.3. Uncrossmatched type O blood will be given until the patient's Type and Screen has been resulted.
  11.3.1. If the patient has a current Type and Screen, type-specific blood will be released.
  11.3.2. Type-specific blood will **never** be issued based on historical type only. The patient **must** have a current type and screen for type-specific blood to be released.

11.4. The transfusion service recommends, and will try to honor, the use of Rh-negative units for all women who appear younger than 50 years of age and require emergency release RBCs or a MTP.

11.5. The transfusion service recommends the use of Rh-positive units for all men and women who appear older than 50 years of age and require emergency release RBCs or a MTP.

11.6. Blood product modification, apart from leukoreduction, will not be provided, in order to prevent delays in resuscitation.
  11.6.1. Washed or volume reduced products will not be provided for any rounds of the MTP, as washing products will significantly prolong blood product preparation for the patient.
  11.6.2. If the patient is an inpatient, has a current type and screen at the time of MTP activation, and requires irradiated blood products, if irradiated blood products are already available, these can be provided. However, non-irradiated blood products will be given to these patients if no irradiated products are available to avoid delaying resuscitation.

11.7. Because of the short expiration of platelets and to prevent wastages/shortages, a minimal number of platelets are kept in stock at the University Hospital. Additional platelets will be ordered from Vitalant (formerly United Blood Services) as needed for transfusion and to replenish stock.

DEFINITIONS

Obstetric massive transfusion: The acute administration of more than half the patient's estimated blood volume in 3 hours, replacement of 10% of the patient's total blood volume per minute, or anticipated replacement of a patient's total blood volume in less than 24 hours. Massive hemorrhage in an obstetric patient may occur in a variety of settings, including trauma, any surgery or intervention, or associated with a variety of medical conditions.

SUMMARY OF CHANGES

New Document

RESOURCES/TRAINING

Resource/Dept	Contact Information
Joseph Griggs MD, Transfusion Medicine	505-272-4560
Cindy Jones, Technical Specialist Blood Bank	505-272-2592

DOCUMENT APPROVAL & TRACKING

Item	Contact	Date	Approval
Owner	**Department of Pathology, Transfusion Medicine Office: 505-272-4560**		
Consultant(s)	Dr. Jay Raval, Medical Director Transfusion Medicine	1/18/2019	Yes
	Dr. Joseph Griggs, Transfusion Medicine	1/18/2019	Yes
	Dr. Kendall Crookston, Transfusion Medicine	1/18/2019	Yes
	Dr. Marian Rollins-Raval, Coagulation and Hematology	1/18/2019	Yes
	Dr. Eve Espey, Obstetrics & Gynecology	2/2/2019	Yes
	Dr. Kathleen Kennedy, Obstetrics	2/2/2019	Yes
	Dr. Conrad Chao, Maternal Fetal Medicine	2/2/2019	Yes
	Dr. Carolyn Muller, Gynecology Oncology	2/2/2019	Yes
	Kelly Gallagher, CNM	2/2/2019	Yes
	Dr. Katherine Seligman, Obstetric Anesthesia	2/2/2019	Yes
	Amy Stuart, Nursing Educator for L& D	2/2/2019	Yes
	Dr. Jon Marinaro, Adult Critical Care	1/22/2019	Yes
	Dr. Jasmeet Paul, Adult Critical Care	2/2/2019	Yes
	Dr. Jessica Mitchell, Adult Critical Care	2/5/2019	Yes
	Dr. Michelle Harkins, Adult Critical Care	2/2/2019	Yes
	Dr. Sonlee West, Trauma Surgery	2/2/2019	Yes
	Dr. Steven McLaughlin, Emergency Medicine	2/2/2019	Yes
	Dr. William Schaeffer, Interventional Radiology	2/2/2019	Yes
Committee(s)	Transfusion and Tissue Committee	3/13/2019	Yes
	UNM Hospitals Policy and Procedures Committee		Yes
Official Approver	David E Pitcher, MD, Senior Associate Dean for Clinical Affairs	06/13/2019	Yes
Official Signature	**On SharePoint**	06/13/2019	
Effective Date			

ATTACHMENTS

None