**Purpose:**

To outline the necessary steps to be taken by the Harborview Medical Center Transfusion Services Laboratory (TSL) to ensure timely and adequate delivery of blood products to patients experiencing massive hemorrhage when a massive transfusion protocol (MTP) has been activated.

**Procedure:**

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| **Step** | **Action** | | **Related Documents** |
| **General Statements** | | | |
| **1** | * A massive transfusion is defined as:   + Replacement of 30% total blood volume (TBV) within 2 hours (4U PRBC in adult)   + Replacement 50% TBV within 3 hours (5-6U PRBC in adult)   + Replacement 100% TBV within 24hrs (10-12U PRBC in adult) | |  |
| **2** | * A MTP may be activated anytime there is severe hemorrhage/ blood loss and a massive transfusion is anticipated * Activation may occur:   + Prior to patient arrival at HMC (e.g. Trauma with significant hemorrhage en route)   + In the ED (e.g. Severe hemorrhage noted upon patient arrival)   + In the OR (e.g. Massive bleeding occurs)   + In an inpatient unit (e.g. patient develops severe GI bleed) | |  |
| **3** | * An Adult MTP is activated for patients who are: * ≥ 15 years age * ≥ 40 kg * A Pediatric MTP is activated for patients who are * < 15 years age * < 40kg | |  |
| **Blood Components for MTP** | | | |
| **1** | **Stock Trauma Packs**   * At all times the transfusion services laboratory (TSL) maintains:   + Stock Trauma Packs of RBCs, plasma and platelet * As part on an initial trauma response or initial MTP response, RBCs, Plasma, and Platelet Packs are immediately taken to the patient care area | | * Trauma Response Process * Stock Trauma Pack Maintenance * Using Portable Blood Refrigerators |
| **Step** | **Action** | | **Related Documents** |
| **Blood Components for MTP** continued | | | |
| **2** | **MTP** blood component levels are identical to levels issued for a Trauma Response. | |  |
| **3** | **Cryoprecipitate** is **NOT routinely** included in either adult or pediatric MTP response.   * Cryoprecipitate will be ordered “as needed”. * Cryo should NOT be thawed until product ***release*** is requested. | | Selection of Plasma, Platelets and Cryo |
| **Activation of a MTP** | | | |
| **1** | * An MTP may be activated by:   + The patient’s physician   + The Charge nurse or designee   + Transfusion Services Medical Director/Resident/Covering Physician if blood product ordering and release is consistent with levels seen with massive hemorrhage | |  |
| **2** | * Requests may be made:   + Via a phone call to TSL   + In person to a TSL staff member (e.g. present during a trauma response, present in the OR, etc) | |  |
| **3** | * Notify the Transfusion Services Medical Director, Resident or Covering Physician of the MTP activation | |  |
| **Initial Response** | | | |
| **1** | **IF TS staff and portable refrigerator are NOT already present with the patient:**   * + - Respond per Trauma Response Process:       * Age and gender appropriate RBCs, Plasma, and Platelet       * Portable refrigerator, platelet box, and a wireless phone     - Notify clinical care staff of available products and obtain appropriate signature(s) | | * Trauma Response Process * Stock Trauma Pack Maintenance * Using Portable Blood Refrigerators |
| **2** | **IF TS staff & portable refrigerator are already present with the patient**   * Determine what blood products are currently in the refrigerator * Immediately send to the patient care area the required number of blood products to total the number required for the appropriate protocol.   + - Notify clinical care staff of available products and obtain appropriate signature(s) | | * Using Portable Blood Refrigerators |
| **Step** | **Action** | | **Related Documents** |
| **Initial Response** | | | |
| **3** | **Simultaneously**   * Check the patient history in Sunquest and determine if there is:   A current unexpired patient sample  ABO/Rh type & screen (T&S) results from the current HMC hospital encounter  Any crossmatched RBC or other assigned blood products for this patient that can be sent to the patient care area  A history of any atypical RBC antibodies or transfusion reactions | | Using Blood Bank Inquiry Function |
| **4** | **Simultaneously**  Prepare replacement trauma packs. | | * Stock Trauma Pack Maintenance |
| **5** | * + - Coordinate exchange of universal donor type blood components with units released based on:   + Subsequent physician orders   + Admitting name and HID   + In-date sample   + Plasma and Platelets: Type specific or ABO compatible if patient has had ABO/Rh performed during current HMC encounter   NOTE: Every effort should be made to issue products in SQ using patient identifiers even if blood type is not available. Products issued with patient identifiers have increased safety. | |  |
| **Subsequent Blood Products: Selection and Issue** | | | |
| **1** | | Subsequent blood products will be requested and issued based on the patient’s clinical status and laboratory results (e.g. Emergency Hemorrhage Panel – EHP)  If significant concern about the appropriateness of blood products being requested/not requested by clinical team, notify Transfusion Services Medical Director, Resident or Covering Physician **(**e.g. Fibrinogen < 100 mg/dL and no cryo has been given or ordered) |  |
| **2** | | **IF** **the patient does not have a hospital ID**, issue further trauma packs. | Trauma Response Process |

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| **Step** | **Action** | | | Related Documents |
| **Subsequent Blood Products: Selection and Issue** continued | | | | |
| **3** | **NO current, in-date ABO/ Rh type and screen (T&S):** | | | Trauma Response Process  Receiving and Processing Emergency Release Orders |
| **AND** | **AND** | **ISSUE** |
| * No ABO/Rh from current HMC encounter | * No sample yet received in TSL | * Trauma Packs |
| * No ABO/Rh from current HMC encounter | * Sample received in TSL. * ABO/Rh completed * Antibody screen and antibody ID (if applicable) incomplete | * Uncrossmatched group O RBC * Type specific or ABO compatible plasma and platelets |
| * ABO/Rh performed during current HMC encounter | * No sample yet received in TSL | * Uncrossmatched group O RBCs * Type specific or ABO compatible plasma and platelets |
| **4** | **Current, In-date Sample in TSL:**   * T&S performed * Negative antibody screen * No clinically significant antibody history | | Issue crossmatched type specific or ABO/Rh compatible RBCs | * Compatibility Process |
| **5** | **History of clinically significant antibodies and/or a positive antibody screen**:   * Notify the patient’s physician * Notify the Transfusion Services Medical Director/ Resident/ Covering Physician * Issue emergency release uncrossmatched RBC   + Generate a Urgent Blood Product Release form to be signed by the patient’s physician for subsequent RBC orders until patient starts receiving crossmatched, antigen negative (if applicable) units | | | Receiving and Processing Emergency Release Orders  Request for Urgent Blood Product Release form |

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| **Step** | | **Action** | | Related Documents |
| **Subsequent Blood Products: Selection and Issue** continued | | | | |
| **6** | | * + - If an Rh neg female < 50 years old has been transfused > 6-8 units RBC and there is significant ongoing blood loss, it may be prudent to switch blood groups to Rh pos until rapid bleeding subsides for inventory management purposes     - This may ONLY be done with approval by the Medical Director of Transfusion Services/ Resident/Covering Physician     - If there are no Rh neg group O or type specific RBCs in stock for females < 50 years old:       * Release O pos units       * Notify Medical Director/Resident/Covering Physician | |  |
| **7** | | Continue to provide blood products as requested. | |  |
| **Patient Care Area Response & Inventory Management** | | | | |
| **1** | Upon arrival, request clinical team to draw sample as soon as possible if this is not already drawn. TSL will participate in the 2 person sample verification as requested by the clinical care team.  Have patient’s physician sign the Request for Urgent Release of Blood Products form (this can be signed by the anesthesiologist if patient is in the OR)   * ***NOTE:*** *The FDA requires that this be signed even if no RBCs are subsequently transfused.* | | * Blood Product Issue Process * Trauma response * Table A: Pediatric Specimen Requirements | |
| **2** | * Contact TSL: * When patient has been admitted to ED/HMC and has a hospital ID * To request additional blood products * For any questions/updates as applicable | |  | |
| **3** | * Receive blood products/MTP packs and store appropriately * RBC and plasma – in portable refrigerator * Platelets and Cryoprecipitate –in a temperature stabilizer box | |  | |
| **4** | * Continuously update Portable Refrigerator Response Log. | |  | |
| **Inactivation of an MTP** | | | | |
| **1** | * The MTP should be inactivated by the clinical team * If there have been no blood products ordered/released for ≥ 1 hour, check with clinical team if they would like to inactivate the MTP | |  | |
| **Final Disposition of Blood Products** | | | | |
| **1** | * When the portable refrigerator returns to TSL: * Reconcile inventory & disposition of all released blood products on the PRR log * Update Sunquest with transfused units. | | * Using Portable Blood Refrigerators | |

**~~Table A: TSL Specimen Minimum Requirements:~~**

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| **~~Patient Age~~** | **~~Specimen Size~~** |
| ~~< 1 year old (<11kg)~~ | **~~2~~****~~full~~** ~~EDTA purple top~~ **~~microtubes~~** ~~OR~~  ~~≥ 2ml in a~~ **~~3ml~~** ~~EDTA pink top tube~~~~1~~ |
| ~~1-5 years old (10-18kg)~~ | ~~1 full~~ **~~3ml~~** ~~EDTA pink top tube~~~~1, 2~~ |
| ~~> 5 years old (18-39kg)~~ | ~~1 full~~ **~~7ml~~** ~~EDTA pink top tube~~~~1~~ |
| ~~Adult ( ≥ 15 years old) OR pt. ≥ 40kg~~ | ~~1-2 full~~ **~~7ml~~** ~~EDTA pink top tubes~~~~1~~ |

~~1. If no pink top EDTA tubes are immediately available, purple top EDTA tubes will be accepted~~

~~2. When blood volume adequate to tolerate collection of 7ml sample, it is best to collect the full 7ml~~

~~sample to avoid re-draws~~

**References:**

Standards for Blood Banks and Transfusion Services, Current Edition. American Association of Blood Banks. AABB Press, Bethesda, MD.

Roback J (ed). Technical Manual, Current Edition. AABB Press, Bethesda, MD