Massive Transfusion Policy (MTP) for Adult & Pediatric Patients

This Policy is Applicable to the following sites:
SH GR Hospitals

Applicability Limited to: Emergency Department (ED), Surgery (OR), Adult Critical Care (ACC), Pediatric Critical Care Medicine (PCCM), Obstetrics (OB), Labor & Delivery (LD) and Anesthesia (ANES)

Reference #: 8591
Version #: 2
Effective Date: 10/23/2014
Functional Area: Clinical Operations

Purpose: To outline the process and steps for rapid preparation, issue, and infusion of blood components for patients in extremis due to massive bleeding. To provide goal directed therapy through use of the Thromboelastography (TEG). In the absence of goal directed therapy a ratio of 1:1:1 component therapy is desired.

Responsibility: Physicians, Registered Nurse (RN), Blood Bank, Laboratory, Pharmacy

Definitions:
1. **Adult Massive transfusion**: the actual or anticipated rapid transfusion of blood products and other intravenous fluids that may equal the replacement of greater than patient’s blood volume.
   a. OB patients will follow the adult MTP.
   b. Adult MTP Pack is composed of 4 units of packed red blood cells, 4 units of thawed fresh frozen plasma and 5 units (1 pooled pack) of platelets with cryoprecipitate between packs.

2. **Pediatric Massive transfusion**: the actual or anticipated rapid transfusion of blood products and other intravenous fluids to individuals less than 18 years of age to replace greater than the patient’s estimated blood volume within twenty-four (24) hour period and/or need for transfusion equal to half of the patient’s estimated blood volume at one time, such as within one hour. Estimates of total blood volume vary by age (Appendix A).

Policy Content:
Policy
Appendix A Pediatric Definitions, Criteria, and Dosing
Appendix B Suggested Component replacement Guideline during Trauma Resuscitation-Adult Patients
Appendix C Complications of Massive Transfusion Policy (greater than 20 units of components)
Appendix D Adult Massive Transfusion Checklist
Appendix E Massive Transfusion Tracking Form
Policy
1. Criteria for Initiation of MTP
   a. Actual or anticipated blood loss is requiring rapid infusion of ≥ 4 units of PRBC with the anticipation of additional PRBC or other blood products as an emergent situation
2. The MTP must be initiated and terminated by a physician
3. The Blood bank will monitor and provide the total number of units dispensed
4. All blood products and fluids should be warmed
5. All blood and blood components administered will be documented in the EHR and progress notes

Procedure

<table>
<thead>
<tr>
<th>Responsible Individual</th>
<th>Action</th>
</tr>
</thead>
</table>
| Physician or designee  | 1. Order the initiation of the MTP  
|                        |   • Verbalize “Initiate MTP”  
|                        | 2. Initiate “Mass Transfusion Careset” (Adult) or the “Mass Transfusion PEDS Careset” in Cerner  
|                        | 3. Ensure STAT type and screen has been ordered and obtained.  
|                        |   • For emergency department patients, obtain and begin administration of the 6 units of emergent uncrossed PRBCs in the Trauma Bay blood refrigerator while initiating the MTP  
|                        | 4. Continually evaluate for possible termination of the MTP  
|                        | 5. Notify Blood Bank and place order to terminate MTP  
|                        | 6. Document total units of blood and components administered in progress notes |
| Charge Nurse           | 1. Notify blood bank of MTP (391-1853)  
|                        | 2. Verbalize “Initiate MTP”  
|                        | 3. Provide patient name and MRN to blood bank  
|                        | 4. Confirm with physician MTP order placed & STAT labs draw  
|                        |   Assign a team member to continue communication with blood bank throughout MTP  
|                        | 6. Assign runner to pick up and return MTP packs from Blood Bank  
|                        | 7. Request pharmacist to patient bedside (For adult patients outside of ED, call 4Heart satellite 391-6495) |
| RN #1                  | 1. Assure blood bank receives patient sticker or a blood bank green “pick up” slip with patient name and MR number  
|                        | 2. Administer blood products per clinical Policy Blood/Blood components |
| RN #2                  | 1. Maintain direct communication with Blood bank regarding patient status and blood/components requested by physician team leader  
|                        | 2. Complete MTP (x15847) tracking form  
|                        | 3. Record all blood products, factors, and fluid in the I/O section of EHR. Anesthesiology will document in OR per their standard  
|                        | 4. Complete Blood Bank green “pick up slip” with physician signature Prior to termination of MTP (preferred with first pack request)  
|                        | 5. At MTP termination request a transfusion summary |
| Laboratory             | 1. Obtain and perform the following STAT tests:  
|                        |   • PT  
|                        |   • PTT  
|                        |   • Fibrinogen  
|                        |   • Hemoglobin  
|                        |   • Platelet Count |
| Runner | • pH, base deficit  
• Ionized Calcium (after 1st MTP Pack)  
• Thromboelastogram (TEG) per specific physician order  
2. Repeat Labs as ordered by physician |
|---|---|
| Blood Bank | 1. Bring patient sticker or Blood Bank green “pick up slip” to obtain MTP pack  
2. Bring MTP packs to patient bedside  
3. Maintain direct communication with RN #2 regarding patient status and need for additional blood/components  
4. Place tracking form (x15847) on the first MTP pack  
5. Validate the patient’s name and medical record number with clinical team member (physician or nurse)  
6. When MTP terminated, provide transfusion summary listing total number of units dispensed by category.  
7. Switch to type specific units as soon as the patient’s ABO-Rh type is established (if un-cross matched "O-pos" or "O-neg" PRBC units were used initially)  
8. Place blood product tally sheet in 1st cooler.  |
| Pharmacist | 1. Respond immediately to trauma bay when trauma activation (level I or II) or to other location of MTP when requested  
2. Collaborate with and prompt physician to order tranexamic acid, calcium chloride, PCC or rFVIIa administration, as indicated by clinical status (See Appendix A - peds or Appendix B - adults)  
3. Facilitate timely drug delivery throughout MTP (including transitions from one clinical area to another)  
4. Ensure all medications given for massive transfusion are ordered and documented in EHR |

**Revisions**
Spectrum Health reserves the right to alter, amend, modify or eliminate this policy at any time without prior written notice.

**Policies Superseded and Replaced:** This policy supersedes and replaces the following policies as of the effective date of this policy: CPNP-M00-S3275

**References**

Blood, Blood Components Administration - Adult, Blood Components Administration –Peds  
Consent for Transfusion of Blood and Blood Products (X04161); Spanish (X09809)  
Recombinant Factor VIIa/Factor IX Pharmacy Department 2011 protocol  
Stanford Mass Transfusion Guidelines 2005  
Children's Healthcare of Atlanta, Trauma Massive Transfusion Protocol, 2009

**Policy Development and Approval**

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8/27/12

**Keywords**
blood, trauma, hemorrhage, MTP, massive transfusion, transfusion
Management of the pediatric trauma patient in hemorrhagic shock depends upon accurate assessment of blood loss and size-appropriate goals for resuscitation.

**Definition** – Massive transfusion is defined as actual or anticipated transfusion of blood products and other intravenous fluids to replace greater than the patient’s estimated blood volume within twenty-four (24) hour period and/or need for transfusion equal to half of the patient’s estimated blood volume at one time, such as within one hour. Estimates of total blood volume vary by age (see below).

<table>
<thead>
<tr>
<th>Age</th>
<th>Est blood volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Premature infant</td>
<td>90-100 ml/kg</td>
</tr>
<tr>
<td>Term infant to 3 months</td>
<td>80-90 ml/kg</td>
</tr>
<tr>
<td>Children older than 3 months</td>
<td>70 ml/kg</td>
</tr>
<tr>
<td>Obese children</td>
<td>65 ml/kg</td>
</tr>
</tbody>
</table>

*(Dehmer, 2010)*

Packed Red Blood Cells (PRBC): 1 bag = 1 unit = 350 ml

Fresh Frozen Plasma (FFP): 1 bag = 1 unit = 250 ml

Platelets (PLT): 1 bag = 1 pack = 5 units = 250 ml

Cryoprecipitate: 1 bag = 5 units = 200 ml

**Calcium Chloride:** Pediatric Dose: 10-20 mg/kg IV, max 1 gram, **preferred, must have a central line**

**Calcium Gluconate:** Pediatric Dose: 50-100 mg/kg/dose IV, max 2 grams

**Tranexamic Acid:** see “Use of Tranexamic Acid (TXA) for pediatric trauma patients with uncontrolled hemorrhage” Clinical Practice Guideline.

Pediatric Dose:  
- a. Give 20 mg/kg bolus over 10 minutes (maximum of 1000 mg) followed by the same dose (20 mg/kg, maximum of 1000 mg) infused over 8 hours. May continue if significant ongoing bleeding is observed beyond eight hours but not to exceed 24 hours.
- b. The first dose optimally should be given within three hours of injury.
- c. If a dedicated intravenous access for an infusion is not available, a repeat of the 20 mg/kg (maximum 1000 mg) bolus dose could be given after 3 hours instead of the 8 hour infusion. May continue to give every 8 hours if significant ongoing bleeding is observed but not to exceed 24 hours.
- d. The infusion and boluses should be discontinued once bleeding is controlled.

**Recombinant Factor VIIa:** Pediatric Dose: 90-120 mcg/kg IV (round dose to the nearest vial size when possible – 1 mg, 2 mg or 5 mg vials are available).

- Effective only with a pH of 7.20 or greater with hemorrhage.
- After administration evaluate the need to continue MTP.
Prothrombin complex concentrate (PCC)/Factor IX Complex: NOT APPROVED FOR USE IN PEDIATRIC TRAUMA

Pediatric weight-based doses of blood product follow on the next page.
**Children <10 kg:** Blood products are to be physician order specific for any child <10kg.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PRBC</td>
<td>25ml/kg</td>
<td>25ml/kg</td>
<td>25ml/kg</td>
<td>25ml/kg</td>
</tr>
<tr>
<td>FFP</td>
<td>20ml/kg</td>
<td>20ml/kg</td>
<td>20ml/kg</td>
<td>20ml/kg</td>
</tr>
<tr>
<td>PLT</td>
<td>10ml/kg</td>
<td>10ml/kg</td>
<td>10ml/kg</td>
<td>10ml/kg</td>
</tr>
</tbody>
</table>

[^1]: for additional MTP Packs, repeat cycle as needed
[^2]: additional cryoprecipitate available by request only, if indicated based on fibrinogen levels
[^3]: consider calcium replacement
[^4]: consider administering rFVIIa

**Children 11 – 25kg:**

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PRBC</td>
<td>2 Units</td>
<td>2 Units</td>
<td>2 Units</td>
<td>2 Units</td>
</tr>
<tr>
<td>FFP</td>
<td>2 Unit</td>
<td>2 Unit</td>
<td>2 Unit</td>
<td>2 Unit</td>
</tr>
<tr>
<td>PLT</td>
<td>1 Pack</td>
<td>1 Pack</td>
<td>1 Pack</td>
<td>1 Pack</td>
</tr>
<tr>
<td>Cryo.</td>
<td>2.5 Units</td>
<td>2.5 Units[^3]</td>
<td>2.5 Units</td>
<td>2.5 Units[^3]</td>
</tr>
<tr>
<td></td>
<td>(½ bag)</td>
<td>(½ bag[^2,4])</td>
<td>(½ bag[^2,3])</td>
<td>(½ bag[^2,3])</td>
</tr>
<tr>
<td></td>
<td>(100mL)</td>
<td>(100mL)</td>
<td>(100mL)</td>
<td>(100mL)</td>
</tr>
</tbody>
</table>

[^1]: for additional MTP Packs, repeat cycle as needed
[^2]: additional cryoprecipitate available by request only, if indicated based on fibrinogen levels
[^3]: consider calcium replacement
[^4]: consider administering rFVIIa

**Children 26 kg and up:**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>PRBC</td>
<td>4 Units</td>
<td>4 Units</td>
<td>4 Units</td>
<td>4 Units</td>
</tr>
<tr>
<td>FFP</td>
<td>4 Unit</td>
<td>4 Unit</td>
<td>4 Unit</td>
<td>4 Unit</td>
</tr>
<tr>
<td>PLT</td>
<td>1 Pack</td>
<td>1 Pack</td>
<td>1 Pack</td>
<td>1 Pack</td>
</tr>
<tr>
<td></td>
<td>(1 bag)</td>
<td>(1 bag)</td>
<td>(1 bag)</td>
<td>(1 bag)</td>
</tr>
</tbody>
</table>

[^1]: for additional MTP Packs, repeat cycle as needed
[^2]: additional cryoprecipitate available by request only, if indicated based on fibrinogen levels
[^3]: consider calcium replacement
[^4]: consider administering rFVIIa
# APPENDIX B

**SUGGESTED COMPONENT REPLACEMENT GUIDELINE DURING TRAUMA RESUSCITATION - Adult Patients**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>GUIDELINE</th>
<th>INDICATIONS</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Packed Red Blood Cells (PRBC)</strong></td>
<td>Goal: initial 4 units of uncrossed O negative or O positive emergent blood</td>
<td>Base Deficit negative 6 or greater; INR greater than 1.5; Hgb less than 10; Systolic BP less than 90 mmHg</td>
<td>All PRBC use Rapid Infuser warmer Use Normosol solution for adult blood administration</td>
</tr>
<tr>
<td><strong>Fresh Frozen Plasma (FFP)</strong></td>
<td>Goal: 1 unit of FFP for every 1 unit PRBC's [utilize pre-thaw option] •For timeliness in massive transfusion, 1:1 ratio of PRBC to FFP should be simultaneously infused. •Monitor INR thereafter to guide FFP replacement. PT, PTT greater than 1.5 times control and/or INR greater than 1.8. 2- Massive transfusion by itself is an indication of FFP at least at the beginning of the MTP</td>
<td>Ice chest of blood product taken to ED / OR / ACC 2 units thawed at all times in Blood Bank</td>
<td></td>
</tr>
<tr>
<td><strong>Platelets</strong></td>
<td>Goal: 5 pooled units (1 Pack) after each 4 units PRBC's</td>
<td>Oozing Platelet count less than 50000</td>
<td>Infuse in over 5 minutes at room temperature. Note: Do not infuse by rapid blood warmer pump (Belmont), Can use Enflow warmer for platelets</td>
</tr>
<tr>
<td><strong>Calcium</strong></td>
<td><strong>Calcium Chloride:</strong> 1000 mg slow IVP over 10 minutes, must have a central line Pediatric Dose: <strong>SEE APPENDIX A</strong> <strong>Calcium Gluconate:</strong> 3000 mg slow IVP over 10 minutes Pediatric Dose: <strong>SEE APPENDIX A</strong></td>
<td>After every other MTP Pack and based on lab results</td>
<td>Calcium Chloride preferred. Use calcium gluconate if no central line</td>
</tr>
<tr>
<td><strong>Tranexamic Acid</strong></td>
<td>Preferred Dose: 1,000 mg IVPB over 10 minutes then 1,000 mg IVPB infused over 8 hours Alternative Dosing for Limited Access: 1,000 mg IVPB over 10 minutes then repeat 1,000 mg IVPB over 10 minutes at 3 hours</td>
<td></td>
<td>Administer with initiation of 1st MTP pack</td>
</tr>
</tbody>
</table>

Policy Reference #: 8999 Policy Version #: 2 Effective Date: 10/23/2014
<table>
<thead>
<tr>
<th>Kcentra&lt;sup&gt;®&lt;/sup&gt; Prothrombin complex concentrate (PCC)</th>
<th>Dose: 50 units/kg IV based on actual body weight.</th>
<th>Consider after 2nd round of MTP packs administered if bleeding persists.</th>
<th>Kcentra&lt;sup&gt;®&lt;/sup&gt; Prothrombin Complex Concentrate (PCC)</th>
</tr>
</thead>
</table>
| OR | PCC IS NOT APPROVED FOR USE IN PEDIATRIC TRAUMA  
- Infuse no faster than 10 ml/min.  
- Avoid if patient is in DIC.  
- After administration evaluate the need to continue the MTP  
- BeneFix® (Factor IX) is not equivalent to Profilnine® SD (Factor IX Complex) and SHOULD NOT be used for massive transfusion. |  |
| Factor VIIa | Dose:  
Weight <100 kg or less: 5 mg rFVIIa  
Weight >100 kg: consider 6 mg rFVIIa  
For Pediatric Dose, see Appendix A  
- Effective only with a pH of 7.20 or greater with hemorrhage.  
- After administration evaluate the need to continue MTP. | Consider after PCC failure or after 2nd round of MTP packs administered if bleeding persists. | NovoSeven® RT (Recombinant Factor VII)  
Round to nearest vial size when possible (1 mg, 2 mg or 5 mg vials) |
## APPENDIX C
COMPLICATIONS OF MASSIVE TRANSFUSION (Greater than 20 units components)

<table>
<thead>
<tr>
<th>COMPLICATION</th>
<th>RATIONALE</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothermia</td>
<td>Banked blood is kept at 4 degrees C</td>
<td>Blood should be administered using a warmer</td>
</tr>
<tr>
<td>Hypocalcaemia</td>
<td>High citrate load in blood additives can lead to decreased levels of ionized calcium</td>
<td>Monitor ionized calcium with transfusions greater than 4 units</td>
</tr>
<tr>
<td>Coagulopathy</td>
<td>Multifactor: coagulation abnormalities, excessive fibrinolysis, hypothermia, acidosis, dilutional coagulopathy.</td>
<td>Aggressive resuscitation with warming measures, timely FFP and Platelet (which also have Fibrinogen) administration.</td>
</tr>
</tbody>
</table>
### Adult Massive Transfusion Checklist

<table>
<thead>
<tr>
<th>Initiation</th>
<th>Maintenance</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Call for resources</td>
<td>- Repeat labs between every 2 MTP packs or hourly (Hgb, PT, fibrinogen, Plt, ABG, iCa, TEG)</td>
<td>- Call Blood Bank and terminate MTP</td>
</tr>
<tr>
<td>- Initiate “Mass Transfusion” Careset in Cerner (choose adult or ped)</td>
<td>- Assign individual to tally of product transfused. Maintain 1PRBC: 1 FFP ratio</td>
<td>- Cancel orders in Cerner</td>
</tr>
<tr>
<td>- Consider ordering TEG with other labs. Ensure Type &amp; Screen drawn/sent</td>
<td>- Administer Cryoprecipitate every 2 MTP packs (fibrinogen less than 80-100mg/dl)</td>
<td>- Complete charting/tracking sheet and tally total product transfused include both crystalloid and</td>
</tr>
<tr>
<td>- Call Blood Bank at 391-1853 and state “initiating MTP”</td>
<td>- Assign individual to maintain communication with blood bank</td>
<td>blood products in total volume)</td>
</tr>
<tr>
<td>- Call Pharmacy 391-6495 if need pharmacist at bedside</td>
<td>- Move to OR / Interventional Radiology/ICU</td>
<td>- Complete progress note with fluid tally included</td>
</tr>
<tr>
<td>- Obtain green blood slip or Patient sticker with MRN for blood bank</td>
<td>- Re-evaluate ongoing need for MTP by physician</td>
<td>- Debrief with team</td>
</tr>
<tr>
<td>- Assign RN to run Rapid Fluid/Blood infuser. Confirm adequate IV access</td>
<td>- Consider PCC or rFVIIa in consultation with Pharmacist</td>
<td></td>
</tr>
<tr>
<td>- Assign runner to take green or Patient sticker with MRN slip to Blood Bank and retrieve MTP packs</td>
<td>- Start infusion of 2nd dose of tranexamic acid</td>
<td></td>
</tr>
<tr>
<td>- Utilize MTP Tracking form to record products</td>
<td>- Continue monitoring temperature (warm fluids, forced air warming blanket, adjust room temp)</td>
<td></td>
</tr>
<tr>
<td>- Administer tranexamic acid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Vital Signs with O2 Sat Q 5-15 minutes(goal mean arterial pressure 50-60)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Transfuse Aggressively (1 PRBC: 1 FFP )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Consider placement of Foley with urimeter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Identify/treat site of hemorrhage (IR, OR)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Provider consider Insertion of arterial line and single lumen line (power inject preferred)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Initiate warming methods (warm fluids, forced air warming blanket, adjust room temperature) to avoid hypothermia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Recognize Need for rapid infusion of ≥4 units PRBC with ongoing hemorrhage**

**Emergency Department Should Access Trauma Bay Blood prior to Initiating MTP**
Appendix E: Adult Massive Transfusion Policy Tracking Form

### Products Prior to Massive Transfusion:
- **Flight**
- **Regional Facility**
- **ED/Trauma Bay**
- **L & D**
- **Other**

### PRBC
- 4-PRBC
- 4-PRBC
- 4-PRBC
- 4-PRBC

### FFP
- 4-FFP
- 4-FFP
- 4-FFP
- 4-FFP

### PLT
- 1-PLT
- 1-PLT
- 1-PLT
- 1-PLT

### CRYO
- 1-CRYO
- 1-CRYO
- 1-CRYO
- 1-CRYO

Please check appropriate box:  
- Flight
- Regional Facility
- ED/Trauma Bay
- L & D
- Other

Please Record Total # of Units Transfused prior to initiation of MTP:
- PRBC
- FFP

*If Fibrinogen < 100mg/dl, Call Blood Bank for CRYO*

<table>
<thead>
<tr>
<th>Pack #1</th>
<th>Pack #2</th>
<th>Repeat Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-PRBC</td>
<td>PRBC</td>
<td>PRBC PRBC PRBC PRBC</td>
</tr>
<tr>
<td>4-FFP</td>
<td>FFP</td>
<td>FFP FFP FFP FFP</td>
</tr>
<tr>
<td>1-PLT</td>
<td>PLT</td>
<td>PLT</td>
</tr>
</tbody>
</table>

Re-evaluate patient and move to next pack

<table>
<thead>
<tr>
<th>Pack #3</th>
<th>Pack #4</th>
<th>Repeat Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-PRBC</td>
<td>PRBC</td>
<td>PRBC PRBC</td>
</tr>
<tr>
<td>4-FFP</td>
<td>FFP</td>
<td>FFP FFP</td>
</tr>
<tr>
<td>1-PLT</td>
<td>PLT</td>
<td>PLT</td>
</tr>
</tbody>
</table>

Re-evaluate patient and move to next pack

<table>
<thead>
<tr>
<th>Pack #5</th>
<th>Pack #6</th>
<th>Repeat Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-PRBC</td>
<td>PRBC</td>
<td>PRBC PRBC</td>
</tr>
<tr>
<td>4-FFP</td>
<td>FFP</td>
<td>FFP FFP</td>
</tr>
<tr>
<td>1-PLT</td>
<td>PLT</td>
<td>PLT</td>
</tr>
</tbody>
</table>

Re-evaluate patient and move to next pack

<table>
<thead>
<tr>
<th>Pack #7</th>
<th>Pack #8</th>
<th>Repeat Labs</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-PRBC</td>
<td>PRBC</td>
<td>PRBC PRBC</td>
</tr>
<tr>
<td>4-FFP</td>
<td>FFP</td>
<td>FFP FFP</td>
</tr>
<tr>
<td>1-PLT</td>
<td>PLT</td>
<td>PLT</td>
</tr>
</tbody>
</table>

Re-evaluate patient and move to next pack

**NOT A PART OF THE PERMANENT MEDICAL RECORD**

SEND TO BLOOD BANK WHEN COMPLETED