LSUHSC-S Transfusion Reference Guidelines
GUIDELINES FOR THE TRANSFUSION
OF BLOOD PRODUCTS

ORDERS
Each order for transfusion of any blood product should specify the following:
The patient’s name and other identifiers (date of birth, MRN)
The component
Any special processing required
The date and time of infusion
Flow rate or period of administering the component (must be less than 4 hours)
Route of Infusion (eg, intravenous administration)
Volume of Infusion (# of units or cc’s)

Call orders

Sample orders
- Transfuse 2 units of PRBCs IV over 1-2 hours per unit.
- Transfuse 1 single donor platelet unit IV over 30-90 minutes.
- Infuse 500 cc of 5% albumin IV over 30-60 minutes (albumin orders must include the volume and the
percent of albumin).

Call orders
Call MD for:
- Rise in temperature of greater than 2°F
- Chills, rigors, back or chest pain, hypotension, shortness of breath or wheezing

RISKS OF TRANSFUSION

Transfusion transmitted infections

<table>
<thead>
<tr>
<th>Viral Infection</th>
<th>Estimated risks per Unit transfused</th>
<th>Estimated % of infected Units that transmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIV-1 and –2</td>
<td>1:2,300,000</td>
<td>90</td>
</tr>
<tr>
<td>HTLV-I and –II</td>
<td>1:2,993,000</td>
<td>30</td>
</tr>
<tr>
<td>HAV</td>
<td>1: &lt;1,000,000</td>
<td>90</td>
</tr>
<tr>
<td>HBV</td>
<td>1:220,000</td>
<td>70</td>
</tr>
<tr>
<td>HCV</td>
<td>1:1, 800,000</td>
<td>90</td>
</tr>
<tr>
<td>West Nile virus</td>
<td>Rare</td>
<td>Unknown</td>
</tr>
<tr>
<td>Parvovirus B19</td>
<td>1:20,000-1:50,000</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Parasitic infection

<table>
<thead>
<tr>
<th>Parasitic Infection</th>
<th>Estimated risks per Unit transfused</th>
<th>Estimated % of infected Units that transmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria</td>
<td>1:4,000,000</td>
<td>Unknown</td>
</tr>
<tr>
<td>Babesia</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>Trypanosoma cruzi</td>
<td>Unknown</td>
<td>40%</td>
</tr>
</tbody>
</table>

Noninfectious acute risks
1. Fatal hemolytic transfusion reaction (1/100,000-1:600,000)
2. Febrile nonhemolytic transfusion reaction (1%)
3. Minor allergic (urticarial) reactions (1-3%)
4. Anaphylaxis (1/20,000-1/50,000)
5. Circulatory overload (<1%)
6. Non-cardiogenic pulmonary edema/ Transfusion related acute lung injury (1/5,000-1:190,000)
## TRANSFUSION INDICATIONS -GENERAL

<table>
<thead>
<tr>
<th>Type of Unit/Condition</th>
<th>Indications for Usage</th>
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</table>
| **RBCs in adults**     | 1. Hypovolemia due to acute blood loss  
  - Hypotension and tachycardia not corrected by volume replacement  
  - 30% blood loss for otherwise healthy patients, as long as volume is maintained  
  2. Hb <8-10 g/dL  
  - Symptomatic anemia in a euvelemic patient (angina, syncope, CHF, TIA, dyspnea, tachycardia)  
  - Stable patients with cardiovascular risk factors*  
  3. Hb<7 g/dL  
  - Transfusion in patients with no risk factors for ischemia |
| **Platelets**          | Platelet count:  
  - <10,000/uL  
  - Stable heme-oncology patient  
  - <20,000/uL  
  - Bone marrow aspiration and biopsy  
  - <50,000/uL**  
  - Active bleeding  
  - DIC  
  - Invasive procedure in cirrhosis  
  - Liver biopsy (<50-100,000/uL)  
  - <60-80,000/uL  
  - Surgery  
  - <80-100,000/uL  
  - Neurosurgery or ophthalmic procedures  
  - After cardiopulmonary bypass, intraaortic balloon pump placement, ECMO  
  - Massive transfusion  
  - Potent anti-platelet agents (e.g. clopidogrel) |
| **Fresh Frozen Plasma**| 1. PT>20 sec or PTT>53  
  - To correct coagulation factor deficiencies in a bleeding patient with multiple coagulation factor deficits (i.e. liver disease, DIC, massive transfusion)  
  - Prior to an invasive procedure  
  2. Warfarin overdose or vitamin K deficiency***, when correction of coagulopathy is needed within 12-24 hr  
  - bleeding patient or in a patient with a high risk of bleeding (INR>5.0)  
  - Before an invasive procedure  
  3. Replacement fluid in TTP  
  4. Replacement in Factor V and XI deficiencies |
| **Cryoprecipitate**    | 1. Hypofibrinogenemia -Fibrinogen <100 mg/dL  
  - Massive transfusion  
  - Congenital deficiency  
  - Acquired deficiency (eg DIC)  
  2. Factor XIII deficiency  
  3. Uremia, with bleeding unresponsive to non-transfusion therapy (eg, dialysis, desmopressin)  
  4. Dysfibrinogenemia (dysfunctional fibrinogen) |

*Hb 8g/dL may be adequate for most patients with stable cardio-vascular disease*³

**Lower platelet counts may be adequate in certain cases, eg 20,000-50,000/uL for GI endoscopy in cancer or Fiberoptic bronchoscopy in BMT*⁴
Effective Date: 12/08/11

***Vitamin K may be given also; correction should occur in 24 hours (with normal liver function)***

TRANSFUSION INDICATIONS –GENERAL (p.2)

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| Rh Immune Globulin     | 1. Known or suspected inoculation of Rh(–) mother with unknown or Rh(+) fetal cells  
                         • Threatened abortion, abortion, or ectopic pregnancy  
                         • Amniocentesis or PUBS  
                         • Abdominal Trauma in 2nd-3rd trimester  
                         • Antepartum prophylaxis at 26-28 weeks  
                         • Postpartum if newborn is Rh (+)  
                         2. Transfusion of Rh(+) cellular blood products (e.g. platelets) to an Rh(–) female of child bearing age or younger |
| Albumin                | 1. For oncotic activity in patients who are hypovolemic and hypoproteinemic. Specific indications include:  
                         • shock, burns, nephrotic syndrome  
                         • ascitic fluid removal  
                         • liver failure (or transplant) patients  
                         • severe necrotizing pancreatitis  
                         • patients on enteral feedings  
                         • acute respiratory distress syndrome  
                         2. Replacement fluid in plasma exchange for most indications |
| CMV-negative blood     | 1. CMV-seronegative pregnant women  
                         2. Intrauterine transfusion  
                         3. Premature infants weighing <1200 g born to CMV(-) mothers  
                         4. CMV(-) recipients of allogeneic bone marrow transplants from CMV(-) donors  
                         5. CMV(-) (or CMV-status pending) candidates for allogeneic BMT |
| Irradiated blood       | 1. BMT recipients or candidates  
                         2. Recipients of donation from a relative  
                         3. Hematologic malignancies or solid tumors (Hodgkin’s Lymphoma, neuroblastoma, sarcoma)  
                         4. Immune Deficiency syndromes (cellular)  
                         5. Intrauterine transfusion  
                         6. Infants 4 months of age and below  
                         7. Fludarabine therapy  
                         8. Granulocyte components |
| Washed red cells and   | 1. IgA deficiency with documented antibodies to IgA  
                         2. Neonatal alloimmune thrombocytopenia when the mother is the donor for the fetus or newborn infant |
| platelets              | Liquid plasma          | Massive transfusion |
| Leukoreduced products  | Cellular Products (RBCs and platelets) are now all 3 log leukoreduced |

PROCEDURE FOR HANDLING AND REPORTING ADVERSE REACTIONS

**Signs and symptoms of transfusion reactions include**

1. Fever  
2. Chills  
3. Back Pain  
4. Dyspnea or wheezing  
5. Hypotension  
6. Hemoglobinuria  
7. Bleeding
**Procedure**

If an adverse reaction is suspected, the nursing or physician staff should stop the transfusion immediately, maintain IV access and then follow the instructions on the Transfusion Reaction Form: including collection of appropriate specimens, documentation of vital signs and other pertinent data, and immediate notification of the Blood Bank.

**THESE GUIDELINES AND ADDITIONAL GUIDELINES SPECIFIC TO PEDIATRICS AND SICKLE CELL ANEMIA ARE AVAILABLE ON THE LSUHSC-S WEBSITE**

http://www.sh.lsumc.edu/policies/POLICY_MANUALS_VIA_MS_WORD/home.htm

January 21, 2010

**TRANSFUSION INDICATIONS SPECIFIC TO PEDIATRICS**

<table>
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<tr>
<th>Type of Unit/Condition</th>
<th>Indications for Usage</th>
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| RBCs in patients less than 4 months of age | 1. Hct<20% with low reticulocyte count and symptoms of anemia  
2. Hct<30% with an infant:  
- On<35% hood O2  
- On O2 by nasal cannula  
- On CPAP and/or IMV with mechanical ventilation with mean airway pressure <6 cm H2O  
- With significant apnea or bradycardia  
- With significant tachycardia or tachypnea  
- With low weight gain  
3. Hct<35% with an infant  
- On>35% Hood O2  
- On CPAP/IMV with mean airway pressure >=6-8 cm H2O  
4. Hct<45% with an infant  
- On ECMO or With congenital cyanotic heart disease |
| RBCs in patients greater than 4 months of age | 1. Significant preoperative anemia in emergency surgery or when other corrective therapy is not available  
2. Intraoperative blood loss of >=15% of total blood volume  
3. Hct <24%  
  - In perioperative period with symptoms  
  - While on chemotherapy/radiotherapy  
  - Chronic congenital or acquired symptomatic anemia  
4. Acute blood loss with hypovolemia not responsive to other therapy  
5. Hct<40% with  
  - Severe pulmonary disease  
  - ECMO  
6. Sickle cell disease  
  - See below, page 5  
7. Chronic transfusion programs for disorders of RBC production |
| Platelets in children | With thrombocytopenia  
Platelet count:  
1. 5-10,000/uL with failure of platelet production  
2. <30,000/uL in a neonate with failure of platelet production or in Neonatal alloimmune thrombocytopenia  
3. <50,000/uL in stable premature infant:  
  - With active bleeding  
  - Invasive procedure with failure of platelet production  
4. <100,000/uL in sick premature infant:  
  - With active bleeding  
  - Invasive procedure in patient with DIC |
Platelets in children

<table>
<thead>
<tr>
<th>Indications</th>
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<tbody>
<tr>
<td>Without thrombocytopenia</td>
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<tr>
<td>1. Active bleeding in association with qualitative platelet defect</td>
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<tr>
<td>2. Unexplained excessive bleeding in a patient undergoing cardiopulmonary</td>
</tr>
<tr>
<td>bypass</td>
</tr>
<tr>
<td>3. Patients undergoing ECMO with a platelet count of &lt;100,000 and those with</td>
</tr>
<tr>
<td>higher counts but bleeding</td>
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</table>

**INDICATIONS FOR RBC TRANSFUSION IN SICKLE CELL DISEASE**

<table>
<thead>
<tr>
<th>Simple transfusion</th>
<th>Acute anemia</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>• Hemoglobin decreased more than 20% from baseline</td>
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<tr>
<td></td>
<td>• Symptomatic anemia</td>
</tr>
<tr>
<td></td>
<td>• Hypoxia</td>
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<tr>
<td></td>
<td>• Hemodynamic instability</td>
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<td></td>
<td>• Sepsis</td>
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<td></td>
<td>• Acute hepatic or splenic sequestration</td>
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<tr>
<td>In general, the final Hb level should not be significantly greater than the patients baseline and especially not greater than 10 g/dL to avoid acute hyperviscosity or post transfusion HCT &gt;36%</td>
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<tr>
<td>If retic is &gt;20 % can defer transfusion</td>
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</table>

<table>
<thead>
<tr>
<th>Exchange transfusion</th>
<th>Acute indications for emergent exchange transfusion</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>• acute ischemic stroke</td>
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<tr>
<td></td>
<td>• Acute chest syndrome</td>
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<tr>
<td></td>
<td>• Acute life or organ threatening complications</td>
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<tr>
<td></td>
<td>• Surgical procedure with significant risk for hypoxia (systemic or regional)</td>
</tr>
<tr>
<td>Chronic exchange transfusion</td>
<td>• Pain Crisis</td>
</tr>
<tr>
<td></td>
<td>• To prevent recurrence of CVA  Non healing ulcer</td>
</tr>
<tr>
<td></td>
<td>• Recurrent ACS</td>
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<tr>
<td></td>
<td>• Prevention of iron overload in chronic transfusion recipient</td>
</tr>
</tbody>
</table>

When the target goal of transfusion is to lower HbS, exchange transfusion is strongly recommended for patients with Hb levels over 8 g/dL, especially for Hb over 10 g/dL

<table>
<thead>
<tr>
<th>Other possible indications for transfusion</th>
<th>Preoperative transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preoperatively, simple transfusion is generally considered preferable, but double heterozygous S/C patients may do better after exchange transfusion.</strong></td>
<td></td>
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</tbody>
</table>
| **Pregnancy:** -Hb should be compared to baseline to avoid overtransfusion. -Prophylactic transfusion is not generally recommended. |}

**REFERENCES:**