Children's Wisconsin – Fox Valley

Pediatric Blood Products Clinical Practice Guideline

These guidelines are recommendations only

This guideline does not mean that patients need to be transfused when they meet these indications; nor does it mean that patients must be transfused for these indications only. The decision to transfuse should be made by the patient's provider only after a careful assessment of the patient's clinical condition and laboratory parameters. Documentation for transfusion of all blood and blood components should include the indication(s) for the transfusion; this is especially important if the circumstances/indication for the transfusion falls outside established guidelines.

General Considerations

BLOOD BANK PHONE NUMBER ThedaCare Neenah (TCN): **920 454-5862**

- See Addendum A for blood modifications and attributes.
- CMV-negative products only needed for neonates with birth weight (BW) < or = to 1500 grams and Cytomegalovirus (CMV) negative transplant recipients, TCN blood bank has CMV negative for all neonates < 120 days of age. If CMV negative products are unavailable, CMV-safe products are considered an equivalent option.
- **Contact hematology service for suspected factor deficiencies**.

Definitions

<	Less than	**hgb**	hemoglobin
>	Greater than	**hct**	hematocrit
g	grams	**µL**	microliter
dL	deciliter	**PLT**	platelets

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Or
Consult with Children's Wisconsin Pediatric Hematology

PACKED RED BLOOD CELLS (PRBC)

INDICATIONS:

Recommended thresholds for RBC transfusion (each patient's clinical condition should be assessed when deciding to transfuse):

< or = to 4 months of age	>4 months of age
1. Shock due to blood loss 2. If ≤7 days old and • Sick or requiring respiratory support: hgb <11 g/dl or hct < 33% • Not sick, with no significant respiratory support: hgb <10 g/dl or hct <30% 3. If 8-21 days old and • Sick or requiring respiratory support: hgb <10 g/dl or hct <30% • Not sick, with no significant respiratory support: hgb <8.5 g/dl or hct < 26% 4. If >21 days old and • Sick or requiring respiratory support: hgb <9 g/dl or hct < 27% • Not sick, with no significant respiratory support: hgb <7 g/dl or hct <21% 5. If with cyanotic congenital heart disease before portocaval connection surgery or while actively treating Patent Ductus Arteriosus (PDA) in infants with birth weight <1500 grams: <13 g/dL or hct 39% Note: Above recommendations are based on results of 2 large, randomized control trials in extremely low birth weight infants, so should be applicable to older premature and term babies.	1. Acute (>15%) blood loss with hypovolemic shock 2. Hgb < 7 g/dL or hct <21%: • Symptomatic (elevated RR, HR, low BP, dizzy) • Pre-operative anemia with other corrective therapy not available • While on chemo or radiation • Severe Traumatic Brain Injury (TBI) 3. Hgb < 13 g/dL or hct < 39% with: • Severe pulmonary disease • Cyanotic heart disease 4. Chronic hemolytic or other anemia • Sickle cell disease (cerebrovascular accident [CVA]; acute chest syndrome; splenic sequestration; aplastic crisis; recurrent or prolonged priapism) • Pre-operative requirement to reach Hgb of 10 g/dl or hct < 30%

DOSE: 10-15 mL/kg to rise Hgb 2-3 g/dL or Hematocrit (Hct) by 6%

- Product should be used within 4 hours of release by the blood bank.
- Order volume you need off the standard adult unit (350 mL). Blood bank will hold on to the unit for the rest of the hospital stay (expiration date printed on the product) in case more packed RBCs are needed. Satellite bags are up to 150 mL in size.

Product Attributes (See Addendum A)	
CMV negative (for BW < or = 1500 grams)	CMV negative if: • CMV negative candidate for or recipient of transplant • Immunodeficiency/suppression
Irradiated Neonatal PRBC: O negative, CMV negative, irradiated and sickle cell negative	Irradiated if: a. Patient based indications: • Infants < or = 12 months • T Cellular immune deficiency (DiGeorge, Severe Combined Immunodeficiency [SCID], common variable immunodeficiency [CVID]) • Immunosuppressed (chemo/radiation)

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PLATELETS

INDICATIONS:

Recommended thresholds for PLT transfusion (each patient's clinical condition should be assessed when deciding to transfuse):

< or = 4 months	>4 months
1. Platelets < 25,000 microliter (µL) in stable term and preterm neonates who are not bleeding (prophylaxis) 2. Platelets < 50,000 µL in stable neonates that are < or = 1500 grams birthweight and < or = 14 days of age with either of the following: a. Any evidence of bleeding b. Prior to an invasive procedure 3. Platelet count <100,000/µL in critically ill neonates 4. Platelet dysfunction, as directed by hematology	1. Active bleeding or prior to invasive procedure when: a. Platelets < 50,000 µL b. Platelets < 100,000 µL if critically ill or neurosurgery c. Platelet dysfunction regardless of count 2. Massive bleeding 3. Prophylaxis in bone marrow failure and count < 10,000 µL 4. DIC/Sepsis and platelet count < 10,000 µL NOTE: in Immune thrombocytopenia and thrombotic thrombocytopenic purpura (ITP/TTP) platelet transfusion will not result in significant increase in platelet count.

DOSE: 5-10 mL/kg to increase 30,000/µL to 50,000/µL

- Order the volume you need of the standard adult apheresis unit (350 mL)
- Blood bank will hold remainder of the unit in case additional PLT needed for the rest of the hospitalization (up to 72 hours).

Product Attributes (See Addendum A)

CMV negative for BW < 1500 gram	CMV negative if: • CMV negative candidate for or recipient of transplant • Immunodeficiency/suppression
Irradiated	Irradiated if: a. Patient based indications: • Infants < or = 12 months • T Cellular immune deficiency (DiGeorge, Severe Combined Immunodeficiency [SCID], common variable immunodeficiency [CVID]) • Immunosuppressed (chemo/radiation)
Saline washed for Neonatal alloimmune thrombocytopenia (NAIT) only if maternal platelets are used.	

WHOLE BLOOD OR RECONSTITUTED WHOLE BLOOD

INDICATIONS:

1. Exchange transfusion
2. Massive blood loss (>1 blood volume in 24 hours)

Reconstituted packed RBC and Plasma for Exchange transfusion:

1. Fresh (RBC < or = 7 days)
2. 24-hour stability once reconstituted by blood supplier
3. 50% +/- 3% hematocrit, unless other HCT specified
4. Irradiated
5. Suspended in citrate-phosphate-dextrose-adenine (CPDA-1); volume reduced if suspended in Adsol
6. O Rh-negative red cells, AB plasma
7. Lacking implicated red cell antigen
8. Leucocyte reduced
9. Hgb-S negative

GRANULOCYTE CONCENTRATE

- Limited indications for granulocyte concentrate but it can be *considered* for select patients with severe neutropenia and severe infection in coordination with hematology, immunology, or infectious disease. Consult with blood bank medical director for treatment duration.
- Always irradiated and collected from steroid- and/or GCSF-stimulated donors.

FRESH FROZEN PLASMA

INDICATIONS:

1. Disseminated intravascular coagulation (DIC)
2. Bleeding with documented coagulopathy Prothrombin Time/Partial prothrombin Time (PT/PTT) > 1.5 x normal)
3. Replacement for clinically significant deficiency:
   - Multiple coagulation factor defects (ex. Liver disease, vitamin K deficiency)
   - When specific factor replacement concentrates not available (factor 2,5,10, 11, fibrinogen)
   - Therapeutic plasma exchange (e.g., TTP)
   - Clinically significant plasma protein deficiency (ADAMTS-13, cl esterase inhibitor, Protein S)
   - Emergent reversal of Vitamin K antagonist (e.g., Active bleeding, emergent surgery) when prothrombin complex concentrate not available.
   - Unexplained bleeding unresponsive to other measures

Note: FFP not indicated for volume expansion, enhancement of wound healing or heparin reversal.

DOSE: 10-20 mL/kg

- Order the necessary volume (A full adult unit = 200-300 mL will be dispensed)
- About 20 mL/kg will increase coagulation factors into the therapeutic range.

CRYOPRECIPITATE

Contains: Fibrinogen, von Willebrand Factor (vWF), Factor 8 and 13

INDICATIONS:

1. Hypofibrinogenemia (fibrinogen < 100 mg/dL) or dysfibrinogenemia with active bleeding or requiring invasive procedure.
2. Hemophilia A or vWF if recombinant factor unavailable or Desmopressin acetate (DDAVP) cannot be used
3. Factor XIII deficiency with active bleeding or requiring an invasive procedure, if factor 13 concentrate is not available.

DOSE: 5-10mL/kg for neonates

1 unit per 5-10kg body weight for older infants and children

Addendum A

Blood Product Modification/Attributes

Procedure	Used for prevention of:	Blood products that undergo modification at CW	Comments
Irradiation	• Transfusion-associated graft versus host disease in immunocompromised patients and those receiving products from HLA-similar donor	All: • RBCs (MKE) • Platelets • Granulocytes	• Not required for previously frozen products (FFP/FP24, cryoprecipitate AHF) • Some units for trauma resuscitation may not be irradiated due to urgency
Pre-storage leukocyte reduction	• Febrile non-hemolytic transfusion reaction • HLA alloimmunization • Transfusion-transmitted CMV	All: • RBCs • Platelets	
Saline washing	• Complications of hyperkalemia (in large volume transfusions [>20 ml/kg], CV surgery, renal failure) • Recurrence of anaphylactic and some severe allergic transfusion reactions (including from IgA deficiency) • Maternal blood products for infant with NAIT	Upon request: • RBCs • Platelets	• Some loss of RBCs, platelets • Some platelet activation • Unit expires 24h after washing completed • **Not** available for STAT transfusions (required 3 hours prep)
Plasma-/volume-reduction	• Fluid overload in vulnerable recipients • Recurrent refractory allergic transfusion reaction	Upon request: • Platelets	• RBCs will be hard-packed instead
Extended RBC antigen matching	• RBC alloimmunization in patients with sickle cell disease or thalassemia	RBCs	• Most immunogenic antigens (C, c, E, e, K) are matched initially
Directed donation	• Prevention of hemolysis or platelet refractoriness in alloimmunized (HLA, RBC and platelet antigens) individuals • Recurrent anaphylactic transfusion reaction	As determined by blood bank	• In the US, direct-donated blood products from family members are not safer than those from random donors

FV Standard work:

1. **Consent:**
   a. Obtained by ordering provider.
   b. Required for all blood products **EXCEPT: IVIG, albumin, manufactured/factor products**
   c. If refused, call social worker, and follow policy: Refusal to Consent to Treatment or Blood Products
   d. Emergency: Type O negative. Specific release form.

2. **Order the blood product:**
   a. Order set NICU/PEDS Blood transfusion # 201088; entered by PROVIDER.
   b. The type and SCREEN order is asking the blood bank to PREP the unit (used to be the type and cross) and the second order is when you are committed to administer it.
   c. Indication for transfusion
   d. Pregnancy status for females and transgender males > 11 years of age
   e. Type of blood/component with any special requirements (see above)
   f. Amount:
      - NICU: in mL and add 10 mL for blood used in priming tubing
      - PEDS: in mL or units (up to 350 mL for one unit)
      - Order to send the volume you need in a satellite unit (up to 150 mL). The rest of the bag will stay in the blood bank labeled for the patient for the rest of the stay up to 72 hours in case additional volume is needed.
   g. Date/time to be given
   h. Length of time product should infuse over
      a. PRBC usually over 1.5-3 hours. (2.5 mL/kg/hr for first 15 minutes then 5 mL/kg/hr)
   i. Instructions regarding other meds that need to be administered (e.g., get second line, hold or delay medication administration, etc.)

3. **Transfusion Reaction (any unexpected event during or within 4 hours after transfusion):**
   1. Assess and determine type of reaction
   2. Order transfusion reaction testing
   3. Complete provider section on Transfusion Reaction Report
   4. Consider resuming infusion if reaction was only localized urticarial that resolved with antihistamine.
   5. See FV Blood & Blood Components P&P addendum B and ThedaCare policy stat number: 13249360

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Approved by FV Pediatric Blood Product workgroup on 06/02/2025; FV JCMC 06/09/2025

Medical Disclaimer

This Clinical Practice Guideline (CPG) is designed to provide a framework for evaluation and treatment. It is not intended to establish a protocol for all patients with this condition, nor is it intended to replace a clinician's judgement. Adherence to this CPG is voluntary. Decisions to adopt recommendations from this CPG must be made by the clinician in light of available resources and the individual circumstances of the patient. Medicine is a dynamic science; as research and clinical experience enhance and inform the practice of medicine, changes in treatment protocols and drug therapies are required. The authors have checked with sources believed to be reliable in their effort to provide information that is complete and generally in accord with standards accepted at the time of publication. However, because of the possibility of human error and changes in medical science, neither the authors nor Children's Hospital and Health System, Inc., nor any other party involved in the preparation of this work warrant that the information contained in this work is in every respect accurate or complete, and they are not responsible for any errors in, omissions from, or results obtained from the use of this information.

For questions concerning this work: Contact CW Guidelines & Pathways@Childrenswi.org