Red Cells – Adult Inpatient

These recommendations apply to adult inpatients and may not apply to transfusion-dependent outpatients. For patients with hemoglobinopathies (e.g. sickle cell disease) or cyanotic heart disease, consult hematology prior to transfusing.

Clinical Setting	Recommendation and Dose
Hb less than 50-60 g/L	The following patients typically do not require transfusion until Hb less than 50-60 g/L: • Patients with sickle cell disease and uncomplicated vaso-occlusive crisis. Consult hematology. • Healthy patients with chronic nutritional anemia without hemodynamic symptoms (e.g. chest pain, syncope). Transfuse 1 unit and recheck patient symptoms and Hb before ordering additional units.
Hb less than 70 g/L	Consider transfusion* • Younger adults without ischemic cardiovascular disease and transient reversible anemia may tolerate lower hemoglobin levels. Transfuse 1 unit and recheck patient symptoms and Hb before ordering additional units.
Hb less than 80 g/L	Consider transfusion* in patients with pre-existing uncorrected cardiovascular disease. Transfuse 1 unit and recheck patient symptoms and Hb before ordering additional units.
Hb less than 90 g/L	Transfusion likely inappropriate* unless evidence of impaired tissue oxygenation. Transfuse 1 unit and recheck patient symptoms and Hb before ordering additional.
Hb less than 90-100 g/L	Transfusion likely appropriate in patients with acute myocardial infarction.
Hb greater than 90 g/L	Transfusion likely inappropriate (except for patients with acute myocardial infarction). If transfusion is ordered, clearly document indication in patient's chart and discuss reason(s) with patient.
Bleeding patient	Maintain Hb greater than 70 g/L If pre-existing cardiovascular disease, maintain Hb greater than 80g/L. In massive hemorrhage protocol, target Hb between 70-90 g/L.

Hb = hemoglobin

- *Do not transfuse based on Hb value alone. For non-bleeding patients, transfuse 1 unit and recheck patient symptoms (dyspnea, chest pain, syncope) and Hb before considering additional units. Depending on etiology of anemia, alternative therapies (e.g. iron) may be more appropriate than transfusion.
- One unit usually raises the Hb by approximately 10 g/L in adult patients.
- Identify patients at risk of transfusion-associated circulatory overload. Risk factors include: age over 70 years, history of heart failure, left ventricular dysfunction, history of myocardial infarction, renal dysfunction and positive fluid balance. In these patients, consider preventative strategies including: transfusing one unit at a time, slowing the rate of transfusion to a maximum of 4 hours per unit and pre-transfusion diuretics.
- Premedication for allergic reactions is usually indicated only in patients with recurrent minor transfusion reactions or previous anaphylactic transfusion reactions.
- Whenever possible, non-urgent transfusions should be completed during the day shift, for optimum patient safety.

Platelets – Adult Inpatient

Clinical Setting		Recommendation and Dose
Diagnosis/Indication	**Platelet Count x 10^9/L**	
Hypoproliferative thrombocytopenia	Less than 10	1 dose
Immune thrombocytopenia (immune thrombocytopenic purpura, heparin-induced thrombocytopenia, post-transfusion purpura, thrombotic thrombocytopenic purpura).	Case Specific	For life-threatening bleeding only. Consult hematology.
Procedures not associated with significant blood loss, including percutaneous procedures (e.g. non-subclavian central line placement, lumbar puncture, paracentesis)	Less than 20	1 dose
Patients with acute thrombosis and high risk of thrombus progression, where therapeutic anticoagulation cannot be stopped	Less than 50	1 dose, and consult thrombosis specialist
Procedures with expected blood loss greater than 500 mL Major non-neuraxial surgery Major bleeding including massive hemorrhage	Less than 50	1 dose, immediately before procedure and check platelet count before starting procedure
Neuraxial surgery	Less than 50-80	1 dose
Head trauma or CNS hemorrhage	Less than 100	1 dose and check platelet count
Platelet dysfunction **and** significant bleeding e.g. post cardiopulmonary bypass Exception: Transfusing platelets for spontaneous intracranial hemorrhage not requiring surgical management in patients on antiplatelet agents with platelet count > 100 x 10^9/L leads to increased morbidity	Any	1 dose

- In general, 1 dose should raise the platelet count by at least 15-25 x 10^9/L within 60 minutes. (Consult blood bank if post transfusion increment is < 7.5 x 10^9/L for investigation for platelet refractoriness).
- In Canada, platelets are now "pathogen reduced" and available as Pooled Platelets Psoralen Treated and Apheresis Platelets Psoralen Treated. Pathogen reduced platelets have a decreased risk of bacterial transmission and transfusion-transmitted infections. For patients requiring irradiated blood, irradiation is not necessary as psoralen treatment is considered equivalent.
- 1 dose = 1 pooled platelet psoralen treated or 1 apheresis platelet psoralen treated.

Plasma – Adult Inpatients

Clinical Setting		Recommendation and Dose
Diagnosis/Indication	**INR**	
Liver disease with coagulopathy and low-risk invasive procedure planned (e.g. arterial line, intravenous line, PICC line, bone marrow procedure, paracentesis, and thoracentesis).	Any	Do not transfuse plasma
Major bleeding Liver disease with coagulopathy and invasive procedure planned (see Notes below)	Greater than or equal to 1.8	10-15 mL/kg
Microvascular bleeding Massive transfusion	Greater than 1.5 to 2.0 or unknown and cannot wait for result	For massive hemorrhage, commence at a minimum ratio of 2:1 (RBC: plasma) for the first 30-60 minutes and then administer based on coagulation test results. 10-15 mL/kg
Urgent warfarin reversal and • Serious bleeding; or • Urgent surgical procedure required within 6 hours	Greater than 1.5	Do not use plasma unless prothrombin complex concentrate (PCC) is not available or is contraindicated (e.g. history of heparin-induced thrombocytopenia). Co-administer 10 mg IV Vitamin K.
Congenital coagulation factor deficiency where a factor concentrate is not available and • Serious bleeding; or • Urgent surgical procedure required	Any	Consult a hematologist

- The effectiveness of plasma in reversing an elevated INR is dependent upon the etiology of the coagulopathy and the degree of PT/INR elevation.
- In general, the dose is 10-15 mL/kg. A dose of 10-15 mL/kg raises coagulation factor levels by approximately 20% for about 5 hours. The volume for SDP is 200 mL/unit while the mean volume for FP is 289 mL/unit. Weight-based dosing tables are available in Plasma reference #4 from NAC recommendations.
- Allow time for thawing (30 minutes).
- Identify patients at risk for transfusion-associated circulatory overload. Risk factors include: age over 70 years, history of heart failure, left ventricular dysfunction, history of myocardial infarction, renal dysfunction and positive fluid balance. In these patients, consider preventative strategies including: transfusing one unit at a time, slowing the rate of transfusion to a maximum of 4 hours per unit, and pre-transfusion diuretics.

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These guidelines have been adapted with permission from the Ontario Transfusion Quality Improvement Plan Recommendations.

General (Red cells, Platelets and Plasma)

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