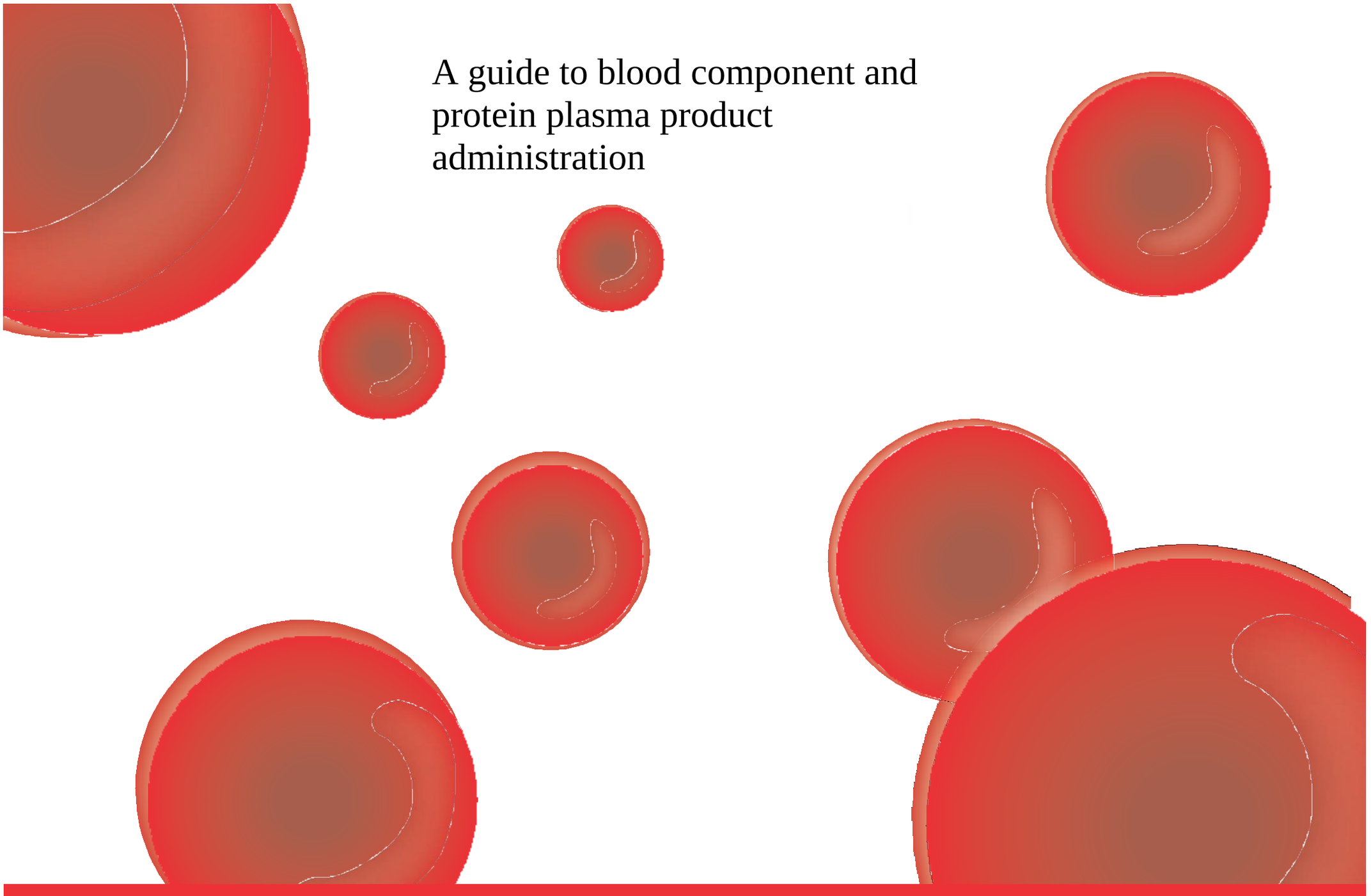
A guide to blood component and protein plasma product administration

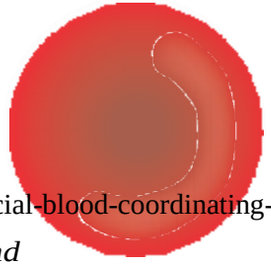


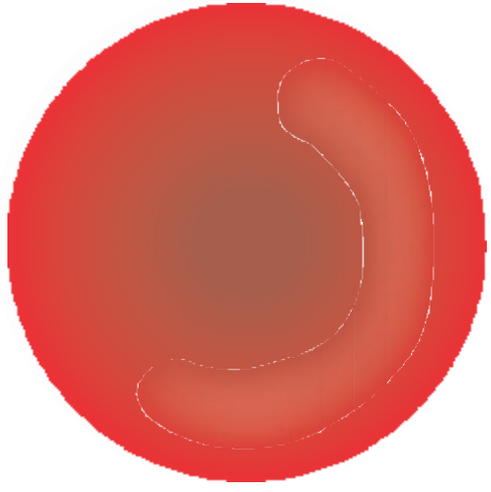
Blood Transfusion Therapy

Nova Scotia Provincial Blood Coordinating Team

Phone: (902) 487-0514
Fax: 1-833-331-3373
Email: nspbcp@nshealth.ca
Website: http://www.cdha.nshealth.ca/nova-scotia-provincial-blood-coordinating-team

The production of this Guide to Blood Component and Protein Plasma Product Administration has been made possible through a financial contribution from the Public Health Agency of Canada.





Definitions

ABO & Rh 'Type'
Testing patients' red cells and plasma/serum to identify ABO blood type and Rh (D) blood type.

Antibody Screen 'Screen'
Testing the patients' plasma/serum for allo-and/or auto-antibodies usually developed after transfusion or following pregnancy.

Antibody Investigation
Extensive testing of the patients' plasma/serum to identify new and/or reconfirm previously identified clinically significant antibodies.

Blood Components
A therapeutic component of blood intended for transfusion (e.g. red cells, granulocytes, platelets, plasma) that can be prepared using the equipment and techniques available in a blood center.

Blood Products (Plasma Protein Products)
Therapeutic products produced with a manufacturing process that pools plasma from many donors.

DAT-Direct Antiglobulin Test
Testing of patient red cells to determine if they are coated with antibody or complement. Used in the investigation of adverse transfusion events, autoimmune hemolytic anemia, drug induced hemolysis, hemolytic disease of the fetus and newborn.

Group & Screen/Type & Screen
Testing performed on a patient's blood sample which includes ABO & Rh and antibody screen.

Serological/Electronic Crossmatch
Testing, manually or electronically, of the patient's plasma/serum with donor red cells to determine compatibility.

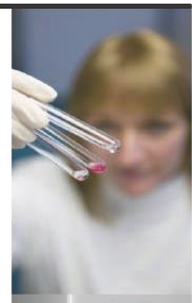
TM-Transfusion Medicine – Blood bank.

General Transfusion Practices

COMPATIBILITY TESTING

Crossmatching must be performed for all red cell components.

Type and screen should be ordered if transfusion is possible but unlikely. Crossmatch should be ordered if transfusion is likely.



STORAGE TEMPERATURE

Blood components and blood products are stored according to facility temperature and storage device policies. In order for blood components or blood products to be re-issued from TM, unused products must be returned to TM within 60 minutes of dispensing and TM will determine whether the blood components/blood products can be safely returned to inventory or discarded.

CAUTION:
Do not store blood in an unmonitored refrigerator.

PRE-TRANSFUSION

Verify prescriber's order.

Verify that consent was obtained.

Provide transfusion pamphlet information for patient.

Verify patient and blood unit identification.

Verify special product requirements.

DOCUMENTATION AND MONITORING

1. Document vital sign intervals within 1 hour prior to administration, minimum of 15 minutes after starting, hourly until transfusion completed and 20-60 minutes following completion of transfusion
2. Complete bedside verification prior to starting transfusion.
3. Monitor patient during and after transfusion for signs of an adverse transfusion reaction.
4. Document volume administered and transfusion reaction.
5. Complete patient notification process.

For more details on this process, consult the Blood Component and Blood Product Administration policy CL-BP-030

FILTERS

Filter all blood components through a standard (170-260 micron) blood filter.

Refer to transplantation or nursing protocol for infusion of HPCs (stem cells).

Blood products do not require a standard blood filter, but may require special infusion sets, consult monograph or administration guidelines.

MEDICATION

CAUTION! Medication must not be added to or piggy-backed with any blood component or plasma derivative.

PUMPS

Use of infusion pumps should be considered for all components/ products. See Smart Infusion Pumps - Policy and Procedure - NSHA MM-MA-010 or IWK - 1140 - Administration of Intravenous Medications

COMPATIBLE INTRAVENOUS SOLUTIONS

Components: Use 0.9% NaCl solutions

DO NOT use Dextrose solutions as they may induce hemolysis

Only consider Ringer's Lactate in consultation with an Authorized Prescriber

Products: Follow manufacturer's instructions for specific products and fluid compatibility

TIME OF INFUSION

Blood components or blood products must be infused within 4 hours of removal from a temperature controlled storage area (see TM tag for removal time).

Before ordering blood components from TM ensure your patient is ready for transfusion: (i.e. consent obtained, IV patent, etc.)

If there is an unexpected delay in starting the transfusion, **return unused blood components or blood products immediately to TM** so lab personnel may determine if it can be safely returned to inventory or discarded.

WARMING

If warming is needed, a calibrated blood warming device must be used to ensure the blood is not warmed to a temperature at which red cell hemolysis occurs (do not exceed 42°C).

A prescriber's order is required for a blood warmer.

Red Blood Cells (RBC)

ABO/Rh COMPATIBILITY

Red cell ABO group and Rh **specific** components are preferred (1st Option); however ABO group and Rh **compatible** red cells are acceptable (2nd Option).

Patient ABO Group	Donor ABO 1st Choice	Donor ABO 2nd Choice
A	A	O
B	B	O
AB	AB	A, B, O
O	O	----------
Unknown	O	----------

Patient Rh	Donor Rh 1st Choice	Donor Rh 2nd Choice
Positive	Positive	Negative
Negative	Negative	Positive (All males and women 45 years or older. Consider use of anti-D Ig for women under 45)

STORAGE TEMPERATURE

Red cells are stored in a controlled TM refrigerator between 1-6ºC.

FILTERS

ALL red cell components must be administered through a standard (170-260 micron) blood filter.

TIME OF INFUSION

Red cells must complete infusion within 4 hours of removal from a temperature controlled storage area.

MEDICATION

DO NOT add, piggyback or push medication with red cell components.

COMPATIBLE INTRAVENOUS SOLUTIONS

0.9% NaCl injection.

PUMPS

Acceptable for use.

SPIKING TECHNIQUE

Do not over-spike the blood units: over-spiking will result in inability to remove the infusion set. Always insert/remove the infusion set using one quarter turn motions. Insert with one quarter turn, clockwise twists and remove with one quarter turn, counter clockwise twists. Do not twist in both directions while spiking or un-spiking. Pulling the spike out in a straight downward motion will result in the tightening of the port on the spike.

Platelets

ABO COMPATIBILITY

For platelets, ABO specific transfusion is preferable but not required. The donor plasma in platelet components should be ABO compatible with the recipient's red cells when possible. In cases where ABO specific platelets (1st Option) are not available, see the Platelet ABO Selection Chart for donor non-specific 2nd choice.

COMPATIBILITY TESTING

ABO/Rh identification of recipient required.

STORAGE TEMPERATURE

20-24°C (room temperature).
DO NOT REFRIGERATE PLATELETS.

FILTERS

ALL platelets must be administered through a standard (170-260 micron) blood filter.

Rh COMPATIBILITY

Rh-negative platelet concentrates can be given to Rh-positive patients. If Rh-positive platelet concentrates are given to Rh-negative patients, the use of Rh Immune Globulin (RhIg) should be given to women of child-bearing age and considered for women (greater than 45 years of age), and men.

Platelet ABO Selection Chart

Patient ABO Group	Donor ABO Specific 1st choice	Donor non-ABO Specific 2nd choice
A	A	AB*
B	B	AB*
AB	AB	TM to consult Medical Director
O	O	A, B, AB
Unknown	AB	TM to consult Medical Director

*If specific 2nd choice is unavailable, a different ABO group may be used with Medical Director approval.

TIME OF INFUSION

Should administer as rapidly as patient can tolerate (20 min. adult average).

Must complete infusion within four hours of dispensing from a temperature controlled storage area.

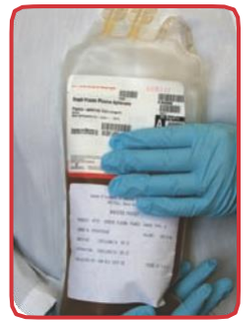
MEDICATION

DO NOT add piggyback or push medication with platelet concentrates.

PUMPS

Acceptable for use via a Fresenius Kabi or B-Braun pumps.

Plasma and Cryoprecipitate



TYPES OF COMPONENTS

Type	Volume/Unit
Plasma (AFFP/FP)	AFFP ~494mL FP ~ 283mL
Cryosupernatant Plasma	~273mL
Cryoprecipitate (CRYO)	~10mL (Some sites may pool CRYO into ~100mL bags)

ABO COMPATIBILITY

Plasma components must be ABO compatible.
Cryoprecipitate does not require ABO compatibility for adult transfusions, but is preferred for pediatrics.

Patient ABO Group	Donor Group 1st Choice	Donor Group 2nd Choice
A	A	AB
B	B	AB
AB	AB	----------
O	O	A, B, AB
Unknown	AB	----------

Rh - Plasma and cryoprecipitate may be transfused without regard to Rh type.

COMPATIBILITY TESTING

ABO identification of recipient required.

STORAGE TEMPERATURE

Plasma and cryoprecipitate are stored frozen and require 30 - 60 minutes to prepare for use.

Multiple units of cryoprecipitate may be pooled together (at specific TM sites).

FILTERS

Plasma and cryoprecipitate must be administered through a blood filter (170-260 micron).

TIME OF INFUSION

Must complete infusion within four hours of dispense from a temperature controlled storage area. Transfuse as rapidly as clinically tolerated and as specified by authorized prescriber.

MEDICATION

DO NOT add, push or piggyback medication with plasma or cryoprecipitate.

PUMPS

Acceptable for use.

Blood Products

EXAMPLES OF PLASMA PROTEIN PRODUCTS

(Note: this is not a comprehensive list)

Albumin (5%, 25%)

Intravenous Immune globulin (IVIg)

Factor VIII concentrates (some are recombinant)

Factor IX concentrates (some are recombinant)

Factor VIIa concentrate (recombinant)

Anti-inhibitor coagulation complex (indicated for patients with high-titre Factor VIII inhibitors).

Rh Immune Globulin (for IM and IV use)

COMPATIBILITY TESTING

Rh status must be determined before administering RhIg

FILTERS

Coagulation factor concentrates given IV direct require filtration for reconstitution. Use the filter supplied with concentrate.

Albumin, plasma protein concentrates, and serum globulins often do not require filtration but may require special infusion sets (I.e. Albumin and IVIg require vented sets). Follow manufacturer's instructions.

TIME OF INFUSION

Must complete infusion as specified by manufacturer's instructions or Appendix C of policy CL-BP-030.

Coagulation concentrates should be transfused immediately after reconstitution and as rapidly as patient can tolerate.

For IVIg infusion rates and IVIg administration guidelines please refer to the NSPBCT site.

With IVIg, ensure the patient is adequately hydrated before initiating transfusion.

Headaches during IVIg transfusion may be rate related. Slowing or stopping the infusion should resolve the issue, however if it does not, or occurs after the transfusion is complete, report the occurrence to TM as an Adverse Event.

MEDICATION

DO NOT add, push or piggyback medication with blood products.

COMPATIBLE IV SOLUTIONS

Refer to manufacturer's instructions for specific blood product information.

PUMPS

Acceptable for use.

STANDARD TRANSFUSION VOLUMES FOR INFANTS AND SMALL CHILDREN

Component	Volume	Estimated Change
RBC	10-15 mL/kg	Hgb↑ 20 to 30 g/L
Plasma	10-15 mL/kg	Factor activity ↑15 to 20%
Platelets	10-15 mL/kg	↑15-25 x10^9/L
Cryo-precipitate	1 unit/ 10 kg	Fibrinogen↑ by 0.5 g/L

TIME OF INFUSION

Must complete infusion within 4 hours of dispense from a temperature controlled storage area.

The rate of infusion depends on clinical condition, size of patient, amount to be infused, component/product being infused and prescriber's order.

IV CONSIDERATIONS

Red blood Cells are usually infused through an 18 gauge cannula to provide optimal flow and prevent hemolysis.

Smaller gauge cannulas can be used for neonates, infants and children.

A 22 gauge is often used for children. Red cells can safely be administered through 23 -25 gauge cannulas, however the rate of infusion will be slower.

FILTERS

Standard 170 -260 micron filter for blood components.

For further information about product and dosing the authorized prescriber can contact the Hematopathologist on call through the IWK switchboard (902) 470-8888

For transfusion administration inquiries, contact Transfusion Medicine Nurse for the IWK Health Centre (902) 470-6531.