Manual	**CLINICAL PRACTICE MANUAL**		
Section	Planning and Providing Care		
Title	Blood and Blood Product Administration		
Issuing Body/ Prepared By	Professional Practice Supervisors		
Approved by	Collaborative Practice Council		**Number**: CPM-P&PC-A-08.01
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Key Words: blood, blood administration, transfusion, transfusion reaction, packed red cells

Purpose Statement:
Health Canada regulates blood collection, testing, processing, and distribution and has published standards related to hospital transfusion practices. Bluewater Health applies these standards to guide administration processes and practices to ensure the safety of patients receiving blood and blood products.

Policy Statements:

- Most Responsible Provider (MRP) order ***must*** include the rate of administration
- **Consent:**
    - Informed consent must be obtained from the patient or Substitute Decision Maker (SDM) by the MRP proposing the treatment and be documented by completing the Consent to Treatment form
    - Refusal of blood products must be documented on the Consent to Treatment form and be must be clearly communicated to all responsible health care provider(s)
    - Refusal of blood products is indicated by initialing the space provided on the Consent to Treatment
    - Consent must be obtained on each hospital admission
    - In the outpatient setting, consent is considered valid for one year
    - In the event that informed consent cannot be obtained, blood may be ordered for administration if the following conditions are met:
        1. Urgent/Emergent transfusion needed to preserve life or continuing health,
        2. Patient unable to consent and SDM is not available and,

3. No evidence of prior wishes refusing transfusion for personal or religious reasons

- Any nurse that meets the required competencies of Bluewater Health may administer blood/blood products
- For Children:
    - Parental or SDM consent is required if the child is deemed incapable of informed consent (HCCC, 1996, c.2, Sched A.s.10)
    - Children under 16 years of age cannot have an advanced directive (HCCC, 1996 c.2, Sched A., s 21 (1-4) therefore it must be confirmed that a refusal of blood treatment/directive is valid and was signed after the person attained 16 years of age
- Blood and Blood Products will not be released from the Blood Bank without the signed Physician/MRP Order(s) and the completed Consent to Treatment form
- Bluewater Health employees with appropriate training may receive blood products from the blood bank
- Two health care professionals must check the blood/blood product using the patient's two unique patient identifiers, as outlined in the **Patient Identification – The Red Rule Policy CPM-PtS-A10.01** at the patient's bedside prior to infusion. Once the blood has been checked at the bedside, the nurse cannot leave the unit of blood or the bedside. If the nurse is called away the above checks must be repeated
- The two health care professionals may be the administering nurse and;
    - Charge Nurse/Unit Leader/Delegate
    - Physician/MRP
- If a discrepancy is found anywhere in the identification process i.e. patient identification, unit of blood/blood products the transfusion will **not** be initiated. The discrepancy must be resolved and the blood/blood product must be returned to the blood bank
- Visually inspect the unit for any visible clots, perforation and/or discoloration
- Blood and blood products may require a filtered administration set. (See Appendix B)
- Blood/Blood Products must be administered using an infusion pump, unless specified by the MRP
- Blood/Blood Products administration sets are to be changed:
    - After **2 units** of blood or **4 hours**, whichever occurs sooner
    - If flow is reduced due to clogged filter
    - On completion of transfusion, before starting other intravenous (IV) solutions
    - If there is a delay of more than 1 hour between units
    - If transfusion reaction occurs
- No medication or IV fluid other than 0.9% Normal Saline can be added to, or run concurrently through one venous access or the same tubing as blood/blood products. In emergencies, blood infusion can be temporarily halted and medication infused, but the tubing must be thoroughly flushed with 0.9% Normal Saline before and after medication administration and between the units of blood.

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- A unit of blood should be infused at the prescribed rate up to **4 hours from time of issue.** Issue time is documented on the issue/transfuse (I/T) form accompanying the blood/blood product.
- Blood can be only administered under pressure when ordered by an MRP.
- Use of a blood warmer/rapid infuser may only be done with MRP's order.
    - Blood / IV fluid warmers must have a visible temperature display and audible alarm system
    - The temperature must be documented on the issue transfuse form

Charlotte Eleanor Englehart Hospital (CEEH): When the lab is unavailable, blood is pre- issued and appropriately stored in the lab for the health care provider to retrieve and sign out in the log. The unit of blood will be checked at the desk and again at the bedside by two health care professionals.

Immunocompromised patients may require irradiated blood. Collaboration with the ordering health care professional may be required.

See Appendix A for Blood Product Administration IV Catheter Selection Chart
See Appendix B for Blood and Blood Products Administration Guidelines
See Appendix C for Blood compatibility Chart

Applicability or Scope:
All Health Care Providers/Professionals involved in the transfusion process.

Procedure:

- Ensure Consent for Treatment for the administration of blood/blood products (Transfusion) has been completed by the MRP and is signed by the patient
- Ensure order for blood product is complete and includes infusion rate, by using specific order set
- Enter order into Meditech under BBK

1. Ensure IV access is dedicated to infusion
2. Ensure IV pump with primed tubing is running 0.9% Normal Saline at 20 mL/hr and ensure site is patent
3. Obtain and record base line vital signs within the 30 minutes prior to beginning the transfusion
4. Obtain blood product from lab blood bank - Take signed Consent to Treatment form and the order to transfuse to blood bank
   Note: if blood cannot be started within 30 minutes, return to blood bank
5. **Verification of the blood product is performed by two health care professionals (RN, RPN, Nurse Practitioner or Physician with the Charge Nurse/Unit Leader/Delegate) using two patient identifiers (The Red Rule) in the presence of the patient or at the patient bedside,**

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prior to transfusion, and validating name, DOB and GOO (medical record number) verbally with the patient when possible:

a. Patient's armband
b. Issue transfuse form
c. The two labels on the blood product

6. Sign the issue transfuse form (both health care professionals who have completed the verification process) and document completely as directed on issue transfuse form
7. Set up the Transfusion on the infusion pump:
    a. Connect blood product to blood administration set. Do not add saline to the unit of blood
    b. Choose the appropriate blood/blood product from the administration library on the infusion pump
    c. To prime the administration set with blood, set the rate to 200mL/hr. and the Volume to be Infused (VTBI) to 20 mL. The IV pump will alarm when the VTBI is complete
    d. Change the rate of infusion to 50mL/hr and the VTBI to 15 mL (this will allow the minimum amount of blood to be infused into your patient during the first 15 minutes while **you remain with the patient**)
    e. Once above is completed, set the infusion pump to the prescribed rate of infusion and the VTBI with the remaining volume
8. **You must remain at the patient's bedside for the first 15 minutes of each transfused unit/product** to observe for signs and symptoms of transfusion reaction
9. Record vital signs 15 minutes after transfusion began and document on I/T Form and in nursing electronic documentation
10. Record vital signs at 30 minutes and document on I/T form and nursing electronic documentation
11. Record vital signs when transfusion is complete and document stop time on I/T form and in nursing electronic documentation
12. Dispose of empty blood bags in biohazardous container. **EXCEPTION**: If transfusion reaction has occurred and it is determined that the unit will not be reinitiated, return blood bag and tubing to the lab in a biohazard bag (one bag per unit) with barcode visible

Autologous and Directed Donor Blood Product procedure is available. See:**LAB-BBK-INV-C-029**

Suspected Transfusion Reactions:

1. If any signs or symptoms listed on I/T Form occur, a transfusion reaction work-up must be initiated – refer to I/T Form for step by step instructions
2. **STOP the transfusion immediately**, change the IV tubing and keep the vein open with 0.9% Normal Saline
3. Check/Document vital signs and have a nurse stay with the patient

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4. Verify that patient Identification (armband) matches the Blood Bank label and Canadian Blood Supply labels
5. Order Transfusion Reaction in Meditech order entry under BBK > TRX and call Blood Bank **immediately** (ext. 5203) to inform them of the suspected Transfusion Reaction.
    a. ***Note****: Transfusion Reaction (BBK>TRX) is to be ordered every time a reaction is observed, even if the order received from MRP is to continue the transfusion*
    b. Blood Bank will ask if the verification of right product to right patient was completed, checking for discrepancy and confirming this was re-checked at the bedside with patient identifiers
    c. Blood Bank will request nurse's mnemonic for confirmation
    d. **DO NOT RESTART** transfusion until confirmed with Blood Bank that there is no ABO incompatibility
6. Notify the MRP of the presenting signs and symptoms of possible transfusion reaction
7. If there are no ABO incompatibilities and the MRP determines that blood transfusion can be safely continued, treat patient as per MRP orders
8. If the unit is **NOT** approved for restart of the infusion, return product and blood set to the lab as soon as possible, ensuring any sharps are removed. Return one blood bag per biohazardous bag
9. Fax a copy of I/T Form to Blood Bank as soon as possible (Fax: 519 346 4702). Complete electronic documentation

Pediatric and Neonatal Considerations

1. A 24 gauge IV catheter or umbilical line may be used to administer blood products. A second IV site may be required if glucose administration is required simultaneously as this is not compatible with blood product (i.e. Packed Red Blood Cells)
2. Ensure blood is warm prior to administration – warm by gently rolling between hands.
3. Blood may be administered via large volume IV pump, with care taken to program volume limit **OR**

4. Blood may be administered via syringe pump:
    - Attach a 3 way stopcock to the end of blood tubing
    - Prime blood tubing with blood
    - Attach a 20, 30 or 60mL syringe to the stopcock and aspirate required amount
    - Remove syringe and place sterile cap on stopcock
    - Connect syringe to extension set and prime
    - Attach to primary IV tubing or to IV site and infuse via syringe pump taking care to
    - set volume limit

5. Monitor vital signs every 15 minutes for one hour, then every hour for the duration of the transfusion

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6. Signs of adverse reaction in neonates include: tachycardia, cyanosis, rash, hypertension, hematuria or hyperthermia

Education

- Random audits for competency assessment
- Completion of annual e-learning Bloody Easy with resource Attachments

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Appendix A

Recommended IV Catheter Selection

Transfusion	IV Access
Red cells – rapid infusions in adults	16-18 G (Gauge)
Red cells – routine transfusions in adults	20-22 G
Other components or products	Any size adequate
Pediatrics	22-25 G
All components and products - adults and pediatrics	Central venous access device (CVAD)

Reference:

Ontario Regional Blood Coordinating Network (2016). Bloody easy 4: A Guide to Transfusion Medicine. (4th ed.). pg 21 Author; Ontario

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Appendix B
Administration Guidelines

Consent must be obtained by prescriber for all of the following products				
Blood Product	***Tubing***	***IV pump***	***Rate***	***Administration Tips***
Packed Red Blood Cells (RBC)	• Use blood infusion set • Use aseptic technique to prime and flush tubing with 0.9% Normal Saline only • Squeeze and release blood filter until filter is completely covered. • Spike blood bag using remaining spike and hang • Change tubing after 2 units of blood or after 4 hours, whichever comes first (see page 2 of policy for additional information)	Yes	• Prescriber must order rate of infusion • Start slow at 50ml/hr for first 15 min **for each unit** then increase to ordered rate • Infuse within 4 hours of issue from Blood Bank fridge	• **Before initiating transfusion, check** must be done **at bedside** with 2 healthcare providers (RN,RPN, NP,MD) • Vital signs: pre, 15-min **and 30-min** into, and post transfusion minimum • unmatched units (O neg) take up to 10 minutes to prepare (stat) • Cross matched units take 90 minutes (stat) or 12 minutes (urgent) if Group and Screening has not been completed • Routine cross matched units are prepared within the same day • **Patient with antibodies require additional time for preparation depending on type and number of antibodies** • MUST be started within 30 minutes of issue from blood bank • Ensure IV and supplies are ready prior to

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Consent must be obtained by prescriber for all of the following products				
Blood Product	***Tubing***	***IV pump***	***Rate***	***Administration Tips***
				picking up blood product
Albumin 5% or 25%	• Use Infusion Set with vent cap • Compatible with all solutions	Yes	• **Prescriber to order rate** of infusion • **Infuse within 4 hours of opening** • Should not exceed 1mL to 2mL per min as it can cause fluid overload.	• Cross match not required • Store at room temperature
Plasma Fresh frozen • FFP	• Use Blood infusion set • Compatible ONLY with Normal Saline	Yes	• Prescriber to order rate of infusion • Transfuse slowly (50 ml/ hr) for the first 15 min when possible • Monitor the patient closely for the first 15 min • Refer to issue transfusion form for blood product administration •	• Takes 30 **min** or greater to thaw by blood bank • Must be transfused within 4 hours of issue from the blood bank
Platelets	• Blood administration set dedicated to only platelets • Only compatible with Normal Saline	Yes	• Prescriber to order rate of infusion • Transfuse slowly (50 ml/ hr) for the first 15 min when possible • Monitor the patient closely for the first 15 min	• **Minimal stock kept in blood bank** • Readily available if in stock • May have to be ordered from blood services which may take up to 12 hours • **Platelets should not be infused using a blood warmer**

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Consent must be obtained by prescriber for all of the following products				
Blood Product	***Tubing***	***IV pump***	***Rate***	***Administration Tips***
			• Refer to issue transfusion form for blood product administration • Recommended infusion time is 60 min per dose (Max infusion time 4 hours)	• Do Not Refrigerate
Rh(D) immune Globulin (for Rh negative patients)	• Use Infusion Set with vent cap	Yes	Refer to product monograph for more information	• Usually given IM injection, but may be given IV infusion • Consult monograph for more information
Immunoglobulin (IVIG)		Yes	• Start IVIG infusion according to specific product :check product monograph insert for infusion rate based on that product	• Baseline vitals within 30 min prior to infusion • Repeat vitals at 15 min And with any increase in infusion rate • Must complete a Ministry of Health and Long Term Care IVIG Request Form for the initial treatment and every 6 months if treatment continues
Cryoprecipitate	• Blood administration set • Only compatible with Normal Saline	Yes	• Prescriber to order rate of infusion • Recommended infusion time is 10 to 30 min per dose • Maximum infusion time 4 hours	• May take 30 minutes to thaw • Do not refrigerate

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Consent must be obtained by prescriber for all of the following products				
Blood Product	***Tubing***	***IV pump***	***Rate***	***Administration Tips***
Prothrombin complex concentrate (PCC) • Octaplex or Beriplex may be issued	• Use Infusion Set with vent cap • IV infusion set must be dedicated to only PCC infusion	Yes	• **Rate of 3 mL/min**	**See Appendix C** • Use immediately after reconstitution. • Dose based on patient weight and INR value. • Since dose effect is not universally applicable, efficacy of dosing must be determined using **INR – 10-30 minutes post PCC administration**. • If correction to an INR <1.5 has not been achieved and there is insufficient time to wait for Vitamin K to take effect, a subsequent dose of PCC may be required if the patient continues to demonstrate clinical bleeding. • Effect is immediate and lasts 6-12 hours

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Appendix C

National Advisory Committee on Blood and Blood Products; May 16, 2014
Prothrombin Complex Concentrate (PCC) – INR Based Dosing

Dosing Schedules For Adult Patients

INR Based Dosing: The 2011 National Advisory Committee (NAC) recommendation based on the dosing of prothrombin complex concentrate on the INR as per the table below but stated that if the INR is unknown and major bleeding is present, 2000 units (80 mL) should be administered.

	PCC Dose if INR greater than 5	PCC Dose if INR 3 to 5	PCC Dose if INR less than 3
Dose	3000 units (120 mL)	2000 units (80 mL)	1000 units (40 mL)

****Dose Banding using both weight and INR (for approx. INR target 1.5)**

Weight - kg	PCC Dose if INR greater than 6 (40 Units/kg)	PCC Dose if INR 3-6 (30 Units/kg)	PCC Dose if INR 2-2.9 (20 Units/kg)
35-37	1500 units (60 mL)	1000 units (40 mL)	500 units (20 mL)
38-41	1500 units (60 mL)	1000 units (40 mL)	1000 units (40 mL)
42-43	1500 units (60 mL)	1500 units (60 mL)	1000 units (40 mL)
44-56	2000 units (80 mL)	1500 units (60 mL)	1000 units (40 mL)
57-58	2500 units (100mL)	1500 units (60 mL)	1000 units (40 mL)
59-62	2500 units (100mL)	2000 units (80 mL)	1000 units (40 mL)
63-68	2500 units (100mL)	2000 units (80 mL)	1500 units (60 mL)
69-75	3000 units (120 mL)	2000 units (80 mL)	1500 units (60 mL)
76-87	3000 units (120 mL)	2500 units (100 mL)	1500 units (60 mL)
88-91	3000 units (120 mL)	2500 units (100 mL)	2000 units (80 mL)
92-112	3000 units (120 mL)	3000 units (120 mL)	2000 units (80 mL)
113-136	3000 units (120 mL)	3000 units (120 mL)	2500 units (100 mL)
137 or greater	3000 units (120 mL)	3000 units (120 mL)	3000 units (120 mL)

**** Doses are rounded up or down to nearest multiple of 500 Units (20 mL vial)**
Single doses should NOT exceed 3000 Units
BLOOD PRODUCT – ORDER THROUGH BLOODBANK

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National Advisory Committee on Blood and Blood Products; May 16, 2014
Prothrombin Complex Concentrate (PCC) – INR Based Dosing

Administration Guidelines:

Must be administered intravenously
May be administered by direct IV push, syringe pump, or mini-bag
The manufacturer's recommended maximal rates of infusion are:

The manufacturer's recommended maximal rates of infusion are:
PCC = 3 mL/min (as it is programmed in Alaris® IV pump)

Phytonadione (Vitamin K1) Injection:

- Vitamin K1 (10 mg IV) co-administration is strongly recommended if reversal is required for longer than 6 hours (the half-life of PCC). The onset of action of Vitamin K1 is within 4-6 hours IV.
- When oral Vitamin K1 is used as an alternate, the injectable formulation, which can be given orally or intravenously, is preferred. Intramuscular and subcutaneous routes of Vitamin K1 administration are NOT recommended.

Post Dose Monitoring:

1. INR Values. Since dose effect is not universally applicable, efficacy of dosing must be determined by using the Surrogate marker of an **INR 10-30 minutes post PCC administration**. If correction to an INR of less than 1.5 has not been achieved and there is insufficient time to wait for Vitamin K1 to take effect, a subsequent dose of PCC may be required if the patient continues to demonstrate clinical bleeding.
2. Clinical outcomes including evaluation of mortality and thrombotic events at 24 hours and 30 days post dose.

Reference: National Advisory Committee (NAC) on Blood and Blood Products, May 16th, 2014.

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Appendix D

Compatibility Chart: Blood Easy Blood Administration

Patient Blood Group	Compatible Donor Blood Group			
	Red Blood Cells	Platelets	Plasma/ Cryosupernatant Plasma***	Cryoprecipitate***
O Positive	O Positive O Negative	Rh Positive or Negative O preferred	Any Group	Any Group
O Negative*	O Negative	Rh Negative O preferred	Any Group	Any Group
A Positive	A Positive, A Negative O Positive, O Negative	Rh Positive or Negative A preferred	A, AB	Any Group
A Negative*	A Negative O Negative	Rh Negative A preferred	A, AB	Any Group
B Positive	B Positive, B Negative O Positive, O Negative	Rh Positive or Negative B preferred	B, AB	Any Group
B Negative*	B Negative O Negative	Rh Negative B preferred	B, AB	Any Group
AB Positive	Any Group Positive/Negative	Rh Positive or Negative AB preferred	AB	Any Group
AB Negative*	Any Group Negative	Rh Negative AB preferred	AB	Any Group

* In urgent situations (or during times of shortages) Rh Negative patients may need to receive Rh Positive RBCs and Platelets

** Rh of plasma and cryoprecipitate is not relevant and no longer appears on CBS label

Universal RBC for urgent transfusion:
- O Negative for females less than 45 years
- O Positive for all others

Universal Plasma for urgent transfusion:
- AB

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