

Bloody Easy Blood Administration (BEBA) Information for Transfusionists

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Donna Berta RN, BScN
Clinical Project Coordinator – Nursing
Ontario Regional Blood Coordinating Network (ORBCoN)

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Objectives

After completing this learning participants will be able to:

- Explain the transfusion guidelines (indications, dose, and details) for RBC, platelet and plasma transfusion in adult patients.
- Describe the transfusionist's actions to ensure safe transfusion administration.
- Identify signs and symptoms and immediate management actions of a possible transfusion reaction.



Consult your hospital's policies and procedures for additional details specific to your facility.

 Learn More

Links to supplementary information

Summary: Transfusion Checklist (refer to slide 42)

Glossary of Terms & Abbreviations (refer to slides 43-45)



Objectives/Outline

After completing this learning participants will be able to:

- Explain the transfusion guidelines (indications, dose, and details) for RBC, platelet and plasma transfusion in adult patients.

Outline:

Transfusion Guidelines	
<i>Topic:</i>	<i>Refer to slide number:</i>
RBC Transfusion	
Indications	4
Dose & Details	5
Platelet Transfusion	
Indications	6
Dose & Details	7
Plasma Transfusion	
Indications	8
Dose & Details	9



Transfusion Guidelines:

RBC Transfusion - Indications

Rationale: Red blood cells transport oxygen from the lungs to the tissue cells. Oxygen is needed for tissue cells to carry out their functions in the body.

Adults, not actively bleeding, consider if:

- Hb less than 70 g/L
- With evidence of impaired tissue oxygen delivery (tachycardia, hypotension, cardiac ischemia, syncope, pre-syncope)
 - Hb 70 to 80 g/L
 - Some specific patients, Hb 80 to 90 g/L

Note: Do not transfuse based on only a Hb value.
Patient clinical assessment is required.
RBC transfusion is indicated for symptomatic anemia.

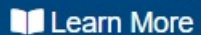


Transfusion Guidelines:

RBC Transfusion - Dose & Details

Adults, not actively bleeding:

- 1 unit
- Volume = about 300 mL
- RBC shelf-life: 42 days, Stored at 1-6°C in approved, monitored refrigerator
- Transfuse over 2 hours, slower if Transfusion Associated Circulatory Overload (TACO) risk
- If urgent Hb re-assessment required, test Hb 15 minutes after RBC is transfused
- 1 unit = about 10 g/L Hb increase
- Consider a 2nd unit only if re-assessment (patient's clinical status, Hb result) indicates need



Canadian Blood Services, [Circular of Information](#) [Scroll down, click on Red Blood Cells, Leukocytes Reduced (LR)]



Transfusion Guidelines:

Platelet Transfusion - Indications

Rationale: Platelets are the first responders in the clotting process to stop bleeding (sticky cells, form the platelet plug).

Adults, Consider if: Clinical situation	Platelet count x 10 ⁹
Prophylactic transfusion	Less than 10
Pre-procedures not associated with significant blood loss	Less than 20
Taking anticoagulants that should not be stopped	Less than 30
Pre-procedures/surgery with anticipated major blood loss, epidural anesthesia, lumbar puncture, significant bleeding	Less than 50
Pre-neurosurgery, head trauma (exception: patient with intra-cranial hemorrhage, not requiring surgery, taking anti-platelet agents – increased morbidity)	Less than 100
If bleeding and platelet dysfunction (i.e., medications: aspirin, clopidogrel; post cardiopulmonary bypass)	Any platelet count
Note: Immune thrombocytopenia (ITP) with life threatening bleeding, clinical situation specific with hematology consultation	



Transfusion Guidelines:

Platelet Transfusion - Dose & Details

Adults:

- 1 dose (Pooled or Apheresis), minimum platelet count is $240 \times 10^9/\text{dose}$ (mean approximately $330 \times 10^9/\text{dose}$)
- Volume: Pooled - mean 317 mL
Apheresis - mean 223 mL
- Platelets shelf-life: 7 days, stored at $20-24^\circ\text{C}$
on an approved, monitored agitator
- Transfuse over 60 minutes, slower if TACO risk
- If pre-procedure, transfuse just prior to procedure
- Re-check platelet count 10 to 60 minutes after platelet is transfused
- 1 dose = $15-25 \times 10^9/\text{L}$ increase in platelet count at 10 to 60 minutes post transfusion



Transfusion Guidelines:

Plasma Transfusion - Indications

Rationale: Plasma contains all the coagulation factors necessary for the clotting process to stop bleeding.

Adults, consider if:

- Active bleeding or prior to major procedure*/surgery, and patient** with $\text{INR} \geq 1.8$ due to multiple coagulation factor deficiency (if no coagulation factor concentrates or alternatives available).
 - * Radiology procedures (major) with bleeding risk include: lumbar puncture or spinal procedure with hematoma risk, arterial intervention, biliary tract intervention or TIPS procedure, deep abscess drainage, urinary tract intervention, solid organ biopsy.
 - ** Liver disease patients: the liver synthesizes all coagulation factors (procoagulant and anticoagulant); hemostatic pathways are rebalanced; often correction of abnormal INR is not needed before a procedure.

Note: Plasma should not be used for urgent reversal of warfarin unless prothrombin complex concentrate (PCC) is unavailable or contraindicated (history of heparin-induced thrombocytopenia).




Transfusion Guidelines:

Plasma Transfusion - Dose & Details

Adults

- 10 to 15 mL/kg; Ordered in units: Small adult - 3 units, Large adult - 4 units
- Volume:
 - 1 unit = about 250 mL [Frozen plasma (FP), Apheresis fresh frozen plasma (AFFP)]
 - some “double” or 2 units = about 500 mL (AFFP)
- Plasma shelf-life: up to 1 year, stored frozen at \leq minus 18°C in approved, monitored freezer
- Thawing plasma requires about 30 minutes of time
- Transfuse each unit over 30 minutes to 2 hours, slower if TACO risk
- 1 dose increases coagulation factors about 20 % for about 6 hours
- As indicated, check INR, PTT 10 to 60 minutes post-transfusion

Note: Thawed 250 mL plasma can be stored refrigerated in TML for up to 5 days (120 hours)
Thawed 500 mL plasma can be stored refrigerated in TML for up to 24 hours

 [Learn More](#)

Canadian Blood Services, [Circular of Information](#) [Scroll down, click on Plasma Components]



Objectives/Outline

After completing this learning participants will be able to:

- Describe the transfusionist's actions to ensure safe transfusion administration.

Outline:

Pre-Transfusion	
<i>Topic:</i>	<i>Refer to slide number:</i>
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IV Access/Fluids/Medications/Infusion Devices	23
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Pre-transfusion:

Transfusion Order

Transfusionist must ensure:

- Indication for transfusion (patient signs & symptoms, laboratory test results) and dose align with transfusion guidelines
- Knowledge of component/product specific administration details



Administration: Blood Components/some Blood Products, [BEBA Handbook](#), pages 98-117

Order must include:

- Patient's surname, first name and unique identification number & Date to be given
- Blood component/blood product & Number of units/doses
- Rate or duration of infusion, e.g. 150 mL/hour or over 2 hours (or per hospital standard protocol)
- Medication orders, if any (premedication or diuretic)
- Special modifications or requirements, if any (washed/irradiated)
- Blood warmer/rapid infusion device, if needed (or per hospital protocol)
- Sequence for transfusion of multiple components/products



Pre-transfusion:

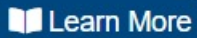
Informed Consent

- Required for blood transfusion
- Obtained by health care professional **prescribing** the transfusion
- Valid for the current course of treatment or hospital admission

Note: In emergency situations with life or health threatening bleeding, prescriber may declare that transfusion proceed without informed consent

Transfusionist role:

- Confirm hospital policy/procedure has been fulfilled prior to transfusion
- If informed consent has not been completed for a non-emergency transfusion, do not transfuse, advise the prescriber
- Advocate for patient; Facilitate the informed consent process



Information [to engage in patient dialogue](#)

For complete transfusion risk details, [BEBA Handbook](#), pages 118-119



Pre-transfusion:

Group & Screen – ABO Blood Groups

A current group & screen test is essential for transfusion of compatible blood components (incompatible [antigen/antibody] transfusion can lead to life-threatening, acute hemolysis).

Group: ABO blood groups

Test patient sample: presence or absence of A and B antigens on the red blood cells
presence or absence of anti-A and anti-B antibodies in the plasma



In the ABO system, antibodies are naturally acquired, starting at 4 months of age.

- If the antigen is present on the surface of the red blood cells, then the corresponding antibody will NOT be in the plasma.
- If the antigen is NOT present on the surface of the red blood cells, then the corresponding antibody will be in the plasma.



Pre-transfusion:

Group & Screen – Rh(D) Blood Groups

A current group & screen test is essential for transfusion of compatible blood components (incompatible [antigen/antibody] transfusion can lead to life-threatening, acute hemolysis).

Group: Rh(D) blood group

Test patient sample: presence or absence of D antigen on the red blood cells



Rh(D) Blood Group: Anti-D Antibody

- In the Rh(D) system, anti-D antibody is NOT naturally occurring and is NOT in the plasma of:
 - Rh(D) positive patients
 - Rh(D) negative patients UNLESS exposed to the D antigen and then anti-D may be produced
- Rh(D) negative individuals can be exposed to the D antigen (and then may produce anti-D) through:
 - Transfusion of Rh(D) positive RBC
 - Transfusion of Rh(D) positive platelets (platelets may contain small amounts of red blood cells)
 - Pregnancy/delivery of an Rh(D) positive fetus



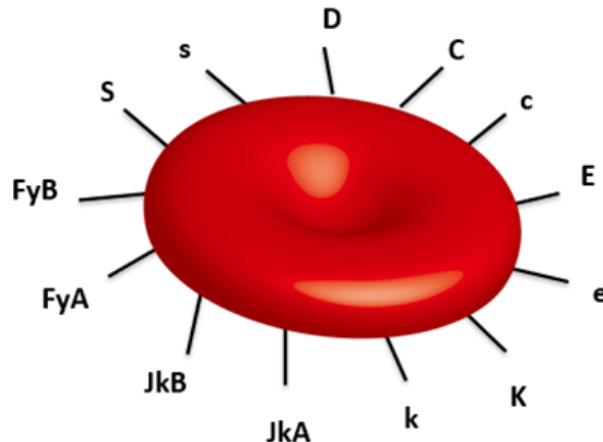
Pre-transfusion:

Group & Screen – Antibody Screen (1)

A current group & screen test is essential for transfusion of compatible blood components (incompatible [antigen/antibody] transfusion can lead to life-threatening, acute hemolysis).

Screen: Antibody Screen

- In addition to antigens A & B, human red blood cells have many antigens
- If exposed to foreign red blood cell antigens via pregnancy or transfusion, antibodies against these antigens may develop
- Some antibodies are clinically significant; they can cause life-threatening acute hemolysis (break down or destruction) of red blood cells that have the corresponding antigen



Antibodies formed against the antigens on this red blood cell are clinically significant



Pre-transfusion:


Group & Screen – Antibody Screen (2)

A current group & screen test is essential for transfusion of compatible blood components (incompatible [antigen/antibody] transfusion can lead to life-threatening, acute hemolysis).

Screen: Antibody Screen

- TML tests the serum (plasma part of blood sample) to rule out or to identify any of the clinically significant antibodies
- If all clinically significant antibodies are ruled out, the antibody screen is reported as negative
- If clinically significant antibody(ies) are identified, then compatible RBC units for transfusion to that patient must be negative for the corresponding antigen(s) (e.g., anti-c and anti-Jk^a identified in patient's blood sample, then RBC units for transfusion must be antigens c- and Jka-)

TML uses the patient's Group & Screen test results to select compatible blood components for transfusion to that patient.

 [Learn More](#)

Group & Screen [BEBA Handbook](#), pages 20-25



Pre-transfusion:

Group & Screen – Group: Summary

A current group & screen test is essential for transfusion of compatible blood components (incompatible [antigen/antibody] transfusion can lead to life-threatening, acute hemolysis).

ABO Blood Groups (if antigen present, then antibody absent; if antigen absent, then antibody present)
ABO antibodies are naturally acquired starting at 4 months of age)

Blood Group	ABO Antigen(s) on red blood cells	ABO Antibody(ies) in plasma
O	none	anti-A, anti-B
A	A	anti-B
B	B	anti-A
AB	A, B	none

Rh(D) Blood Groups (antigen present or absent; no naturally occurring anti-D antibody)

Blood Group	Rh(D) Antigen on red blood cells	Rh(D) Antibody in plasma
Rh(D) Positive	D	none
Rh(D) Negative	none	none; if exposed to Rh(D) antigen (pregnancy or transfusion), then anti-D may be produced



Pre-transfusion:

Group & Screen – Using Test Results/Compatibility (1)

TML uses the patient's Group & Screen test results to select compatible blood components for transfusion to that patient, guided by ABO & Rh(D) compatibility table.

Patient ABO/Rh(D) Blood Group	Compatible Blood Group for Transfusion			
	RBC	Platelets	Plasma	Cryoprecipitate
O Positive	O Rh(D) positive or negative	O preferred** Rh(D) positive or negative	O, A, B, AB	Any Group Note: Very infrequently used component. Cryoprecipitate is interchangeable with Fibrinogen Concentrate for fibrinogen replacement.
O Negative	O Rh(D) negative*	O preferred** Rh(D) negative*	O, A, B, AB	
A Positive	A, O Rh(D) positive or negative	A preferred** Rh(D) positive or negative	A, AB	
A Negative	A, O Rh(D) negative*	A preferred** Rh(D) negative*	A, AB	
B Positive	B, O Rh(D) positive or negative	B preferred** Rh(D) positive or negative	B, AB	
B Negative	B, O Rh(D) negative*	B preferred** Rh(D) negative*	B, AB	
AB Positive	AB, A, B, O Rh(D) positive or negative	AB preferred** Rh(D) positive or negative	AB	
AB Negative	AB, A, B, O Rh(D) negative*	AB preferred** Rh(D) negative*	AB	

* In urgent bleeding patient situations or during times of short supply, Rh(D) negative patients may need to receive Rh(D) positive RBC and platelets

** Platelets should be ABO compatible with patient's red blood cells (donor platelets are suspended in plasma). In urgent bleeding patient situations or during times of short supply, TML will follow established policies for ABO group substitution for platelets.



Pre-transfusion:

Group & Screen – Using Test Results/Compatibility (2)

RBC Transfusion:

- Must be crossmatched (after group & screen test, TML procedure to detect any incompatibility between donor RBC unit & patient)
- Donor RBC unit must be ABO & Rh(D) identical or compatible to patient
- If patient's antibody screen identified clinically significant antibody(ies), then donor RBC unit must be corresponding antigen negative

Platelet Transfusion:

- Donor platelet dose ideally is ABO & Rh(D) identical to patient
- Should be ABO plasma compatible (i.e., compatible with the patient's red blood cells as donor platelets are suspended in plasma)
- If in short supply (occurs often), TML follows policy re: ABO group substitution; ABO plasma incompatible platelets may be transfused

Plasma Transfusion:

- Donor plasma unit ABO identical or compatible to patient
- Rh(D) blood group is not relevant for plasma transfusion (plasma has no red blood cells [i.e., no antigens])

Blood Products (Plasma Protein Products)

- ABO and Rh(D) blood group compatibility is not relevant (blood products are manufactured in lots, from plasma combined from many donors of diverse ABO blood groups).



Pre-transfusion:

Group & Screen – Sample Collection

Meticulous attention to sample collection procedure is essential for patient safety!

Step 1:

- In the presence of the patient, confirm **patient's surname, first name and unique identification number** on the patient's armband and the sample label are identical.
- Some hospitals use bar-code scanning (positive patient identification) systems.

Step 2:

- Immediately after collecting the blood sample, **place the label on the tube of blood at the patient's bedside.**
- Labelling a sample away from the patient greatly increases risk of mislabelling.

Step 3:

- **Document that you collected the sample.** You are documenting your accountability for unequivocal (unmistakable) patient identification.

Note: If patient was transfused or pregnant within the preceding 3 months (or if unknown), the blood sample for crossmatching RBC units must be collected within 96 hours prior to transfusion (ensures patient has not formed any new antibodies related to recent transfusion or pregnancy).

Note: To issue non-group O, ABO compatible RBC, TML requires two separate blood group determinations

One determination must be from current blood sample

Second determination:

from historical record if previous test completed,
or a separate sample collection,
or if sample collection using bar-code scanning, re-test current sample.



Pre-transfusion:

Preparing the Patient

Patient must be wearing a patient identification armband.

- Educate the patient about what to expect during transfusion
(i.e., periodic assessments, vital sign checks, symptoms indicative of a transfusion reaction).
- Assess if history of previous transfusions.
If so, assess if special requirements,
or antibody card,
or transfusion reactions.
If indicated, follow up with prescriber and/or TML.
- Evaluate each transfusion for each patient for Transfusion Associated Circulatory Overload (TACO) risk factors.
If indicated, follow up with prescriber for prevention strategies.



Pre-transfusion:

Transfusion Associated Circulatory Overload (TACO)

- Leading cause of transfusion related deaths; **PREVENTION** is imperative
- Occurs secondary to transfusion at a rapid rate and/or the specific patient's cardiac capacity is unable to tolerate transfusion volume.
- Signs: acute/worsening respiratory distress, decreased oxygen saturation, tachycardia, increased blood pressure, acute pulmonary edema

TACO Risk Factors

- Advanced age
- History of heart failure
- History of myocardial infarction
- Left ventricular dysfunction
- Renal dysfunction
- Positive fluid balance

**If risk, review with prescriber
for prevention strategies**

TACO Prevention Strategies

- Transfuse only 1 unit at a time
- Transfuse slowly over longer time period (maximum 4 hours)
- **Pre-transfusion diuretic**
(PO – 30 minutes prior; IV – just prior)
- TML to divide unit (if equipment available, then transfuse each part over maximum 4 hours)



Pre-transfusion:

IV Access/Fluids/Medications/Infusion Devices

IV Access

- Confirm IV patent; Dedicated site - peripheral or central venous (if multiple lumen central line, a specific lumen for only the blood)
- Adult transfusion IV gauge: Routine - 20 to 22; Rapid - 14 to 18

IV Fluids

- Blood is compatible with only 0.9% sodium chloride (Exception – IVIG, some brands are compatible with only 5% Dextrose in water; refer to brand specific product monograph).

IV Medications

- Do not infuse any medication concurrently with blood (all medications are incompatible).
- If a medication must be given during transfusion, flush IV site with 0.9% sodium chloride flush syringes pre and post medication administration.

Infusion Devices

- Use only if device is Health Canada Medical Device Regulations approved.
- To transfuse blood (RBC, platelets, plasma, IVIG etc.), an infusion pump may be used.
- If ordered, blood warmers and rapid infusers can be used for RBC and plasma transfusion.

Note: Hemolysis can occur with RBC transfusion if: IV gauge too small, IV solutions other than 0.9 % sodium chloride used, improper storage leading to inadvertent heating or freezing, and infusion device malfunctions.



Pre-transfusion:

Tubing/Filter

- RBC, platelets and plasma must be transfused via blood tubing with 170 - 260 micron filter (captures any fibrin debris).
 - Platelet transfusion:
Always use NEW/FRESH blood tubing/filter (If filter was previously used, the platelets will adhere to fibrin captured in the filter; platelets are sticky!).
 - Prime with blood or 0.9% sodium chloride
 - Change after a maximum of 4 units of blood or 4 hours of time
 - Be prepared for a potential transfusion reaction.
Set up IV tubing such that if the transfusion must be stopped abruptly, then IV access can be maintained:
 - 0.9% sodium chloride flush syringes and an IV line with any IV solution are on hand, ready to infuse TKVO
- OR**
- 0.9% sodium chloride IV line is on hand, ready to infuse TKVO



Pre-transfusion:

Picking Up Blood

For patient safety, ensure all pre-transfusion preparation steps have been completed before picking up blood from TML

- RBC, platelets, and plasma transfusion must be completed within 4 hours of issue from TML (i.e., removal from temperature controlled environment).
- NEVER store blood in medication or patient care area refrigerators (temperature is not regulated)
- TML requires documentation of patient identification (surname, first name and unique identification number) to issue blood to patient care area.
- Many hospitals have a form (e.g., pick up slip) which includes the required information



Objectives/Outline

After completing this learning participants will be able to:

- Describe the transfusionist's actions to ensure safe transfusion administration.

Outline:

Administering Transfusion	
<i>Topic:</i>	<i>Refer to slide number:</i>
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Checking Blood	28-34
Patient Identification	29
ABO, Rh(D) Blood Groups	30-32
Unit number/Lot number	33
Expiry & Visual Inspection	34
Assessments & Vital Signs	35
Rate of Infusion	36
Completing Transfusion	37
Documentation	38




Administering Transfusion:

Emergency Transfusion: Uncrossmatched Blood

Emergency Transfusion - Life/health threatening bleeding Uncrossmatched Blood - ABO, Rh(D) Blood Group
RBC Transfusion
Group O Rh(D) negative for females age 45 years and under with childbearing potential
Group O Rh(D) positive for all others
Note: Females age 45 years and under with childbearing potential, if possible should receive antigen K (K1 or Kell) negative RBC unless known to be K positive
Platelet Transfusion
Based on available supply, TML will follow established policies for ABO and Rh(D) blood group
Plasma Transfusion
Group AB (Rh(D) blood group is not relevant for plasma transfusion)
Fibrinogen Replacement
Fibrinogen Concentrate & Cryoprecipitate (infrequently used) are interchangeable

- If uncrossmatched blood is transfused, prescriber must document that clinical situation justifies transfusion.
- Compatibility testing (group and screen, crossmatch) should be completed ASAP, and blood components of the appropriate group issued.
- Platelets: never refrigerate or place in a transport cooler

 Learn More

Massive Hemorrhage Protocol [BEBA Handbook](#), pages 48-56, 122-123



Administering Transfusion:

Checking Blood

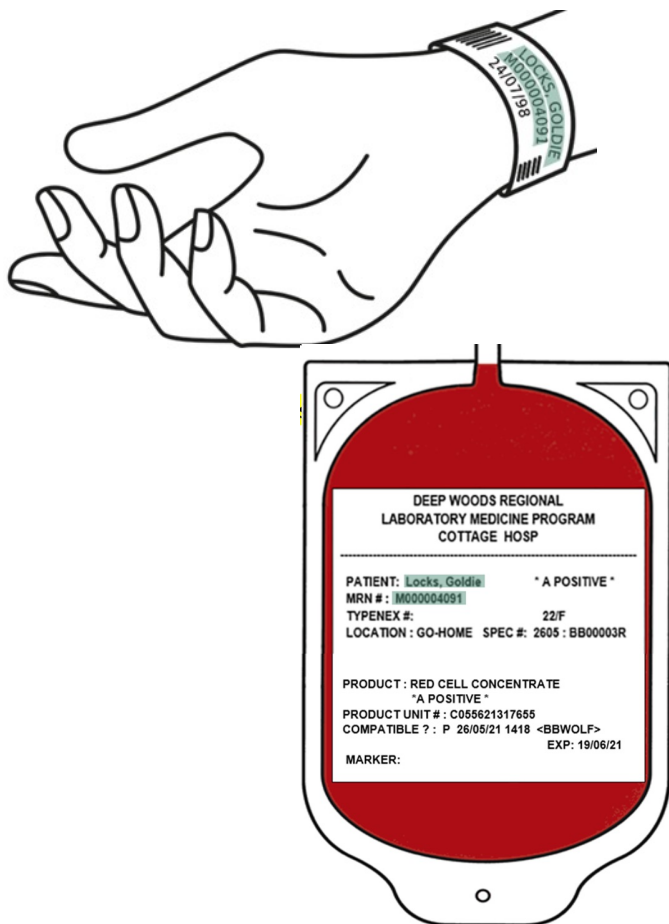
- Unequivocal (unmistakeable) identification of the patient is mandatory.
- Patient must be wearing a patient identification armband.
- Patient identification information must remain attached to blood during transfusion.
- For safety, at the bedside in the presence of the patient, follow 4 steps
 1. Patient Identification
 2. ABO, Rh(D) Blood Groups
 3. Unit number/Lot number
 4. Expiry & Visual Inspection



Administering Transfusion:

Checking Blood 1. Patient Identification

- Check **surname, first name, unique identification number** are identical on armband, transfusion order, transfusion label & chart label/issue form



COTTAGE HOSPITAL DEEP WOODS REGION			
Date: 26/05/21 Run Time: 1330 Printed on: B3-A0-002 Date fields on this report are in format DD/MM/YR			
PATIENT CARE ORDERS			
PATIENT: Locks, Goldie REG DR: Bear, Robert A	ACCT # : MZ000001/21 DOB: 24/07/98 AGE/SX: 22/F HIN:	LOC: GO-HOME ROOM: B-000 BED: 3 STATUS: REG RCR PT PHONE:	U #: M000004091 REG: 26/05/21 DIS:
TRANSFUSION ORDERS			
PRODUCT: RBC (RED CELL CONCENTRATE) DATE OF TRANSFUSION: today ASAP MEDICATION: none COMMENTS:		AMOUNT: 1 unit INFUSION RATE: over 2 hours	
PRESCRIBER: Dr. Robert Bear pager 1-9876		DATE: 26/05/21	

DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM UNIT ISSUE/TRANSFUSION FORM DATE: 26/05/21 (DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MM/YR)			
PATIENT: Locks, Goldie TYPENEX #: 22/F LOCATION : GO-HOME	MRN # : M000004091 SPEC # : 2605 : BB00003R	** A POSITIVE **	
PRODUCT : RED CELL CONCENTRATE COMPATIBLE ? P 26/05/21 1418 <BBWOLF>		PRODUCT UNIT # : C055621317655 MESSENGER : Bear, Mama _____	
ISSUED : 26/05/21 1420 BBWOLF ISSUE COMMENTS :			
DATE OF TRANSFUSION : _____ TIME TRANSFUSION BEGAN: _____ ENDED: _____ AMOUNT : 350 ML SIGNATURES : UNIT ADMINISTERED BY : _____ CHECKED BY : _____ TRANSFUSION COMMENTS :			



Administering Transfusion:

Checking Blood 2. ABO, Rh(D) Blood Groups

- Check **ABO, Rh(D) Blood Groups** (only for blood components, not relevant for blood products) are identical/compatible on Group & screen test, CBS label, transfusion label & chart label/issue form

Deep Woods Regional Laboratory Medicine Program Specimen Inquiry			
Run Date: 26/05/21 Run Time: 1426 User: BBWOLF Printed on: B3-A0-001			
Date fields on this report are in format DD/MM/YR			
PATIENT: Locks, Goldie REG DR: Bear, Robert A		ACCT #: MZ000001/21 DOB: 24/07/98 AGE/SX: 22/F HIN:	
LOC: GO-HOME ROOM: B-000 BED: 3 STATUS: REG RCR PT PHONE:		U #: M000004091 REG: 26/05/21 DIS:	
SPEC #: 2605 : BB00003R COLL: 26/05/21-1355 RECD: 26/05/21-1406		STATUS: RES SUB DR: Bear, Robert A REQ #: 0070263	
ENTERED: 26/05/21-1358 ORD PRODS: RED CELL CONC ORD TESTS: HIST GRP SOURCE, GROUP & SCREEN, HIST ABO&RH GRP, FULL X-MATCH QUERIES: PRE-OP SPECIMEN (Y/N): N PREGNANT NOW (Y/N): N TRANSFUSION IN LAST 3 MTHS (G): N			
OTHER DR:			
Test	Results	Flag	Site
HISTORICAL BLOOD GROUP			
GS EXPIRY	CONFIRMED		COT
GROUP & SCREEN	MAY 29		COT
ABO GROUP & RH	A POS		COT
AB SCREEN INTERPRETATION	NEGATIVE		COT



DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM UNIT ISSUE/TRANSFUSION FORM			
DATE: 26/05/21			
(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MM/YR)			
PATIENT: Locks, Goldie		MRN #: M000004091	** A POSITIVE **
TYPENEX #: 22/F			
LOCATION: GO-HOME		SPEC #: 2605 : BB00003R	
PRODUCT: RED CELL CONCENTRATE		PRODUCT UNIT #: C055621317655	** A POSITIVE **
COMPATIBLE ? P 26/05/21 1418 <BBWOLF>			
ISSUED: 26/05/21 1420		MESSENGER: Bear, Mama	
ISSUE COMMENTS:			
DATE OF TRANSFUSION: _____			
TIME TRANSFUSION BEGAN: _____		ENDED: _____	
AMOUNT: 350 ML			
SIGNATURES: _____			
UNIT ADMINISTERED BY: _____			
CHECKED BY: _____			
TRANSFUSION COMMENTS: _____			



Administering Transfusion:

Checking Blood - ABO, Rh(D) Identical/Compatible

In this example the patient and blood component ABO and Rh(D) blood groups are identical. If the ABO and Rh(D) blood groups are not identical, then check the Compatibility Chart to confirm blood component ABO/Rh(D) blood groups are compatible with the patient's ABO and Rh(D) blood groups.

Patient ABO/Rh(D) Blood Group	Compatible Blood Group for Transfusion			
	RBC	Platelets	Plasma	Cryoprecipitate
O Positive	O Rh(D) positive or negative	O preferred** Rh(D) positive or negative	O, A, B, AB	Any Group Note: Very infrequently used component. Cryoprecipitate is interchangeable with Fibrinogen Concentrate for fibrinogen replacement.
O Negative	O Rh(D) negative*	O preferred** Rh(D) negative*	O, A, B, AB	
A Positive	A, O Rh(D) positive or negative	A preferred** Rh(D) positive or negative	A, AB	
A Negative	A, O Rh(D) negative*	A preferred** Rh(D) negative*	A, AB	
B Positive	B, O Rh(D) positive or negative	B preferred** Rh(D) positive or negative	B, AB	
B Negative	B, O Rh(D) negative*	B preferred** Rh(D) negative*	B, AB	
AB Positive	AB, A, B, O Rh(D) positive or negative	AB preferred** Rh(D) positive or negative	AB	
AB Negative	AB, A, B, O Rh(D) negative*	AB preferred** Rh(D) negative*	AB	

* In urgent bleeding patient situations or during times of short supply, Rh(D) negative patients may need to receive Rh(D) positive RBC and platelets.

** Platelets should be ABO compatible with patient's red blood cells (donor platelets are suspended in plasma).

In urgent bleeding patient situations or during times of short supply, TML will follow established policies for ABO group substitution for platelets.



Administering Transfusion:

Checking Blood - Patient Special Requirements

- TML provides blood as available per inventory and transfusion urgency. If transfusion will be delayed or if not available, then TML advises prescriber

Antigen Negative RBC:


- If group & screen identified clinically significant antibody, then confirm on CBS label the RBC unit is antigen negative e.g., patient has anti-Jk^a, RBC unit: antigen Jk^a-

K Negative RBC:

- If patient female, age 45 years and under with childbearing potential, then confirm on CBS label the RBC unit is antigen K- (unless patient is known K positive)
- Rationale: to prevent anti-K antibody in females who may become pregnant; Anti-K antibody in the mother could cross the placenta and hemolyse the red blood cells of an antigen K positive fetus leading to Hemolytic Disease of the Fetus and Newborn

Irradiated RBC or Platelet:

- If patient requires irradiated blood, then confirm CBS irradiated label is on blood bag

 [Learn More](#)

Irradiated Blood [BEBA Handbook](#), pages 37, 78-79

Note

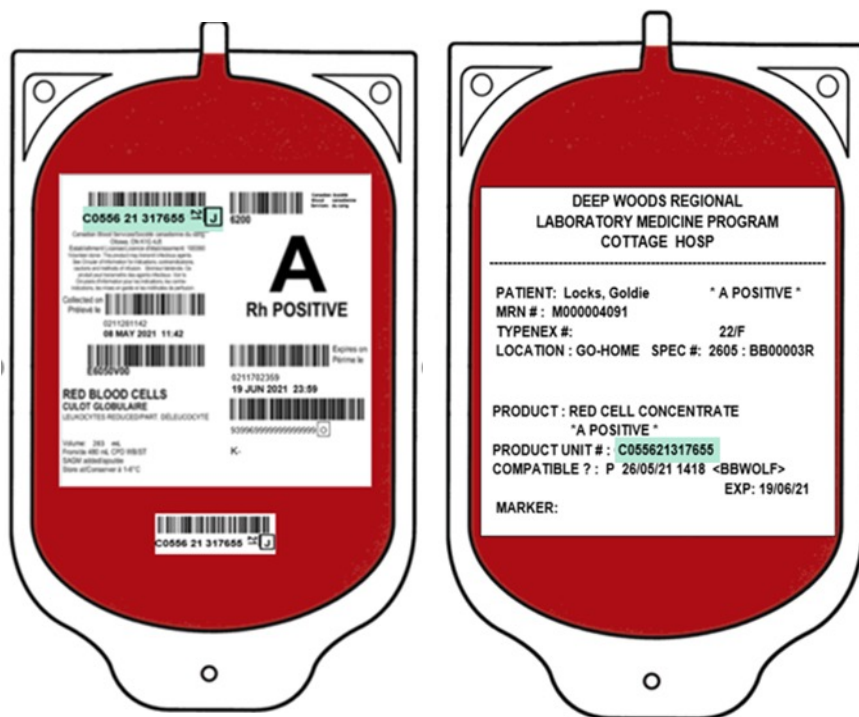
In this example, the patient is female, age 22 years, and should receive antigen K- RBC transfusion. Review the lower right hand section of the CBS label; the unit is K-.



Administering Transfusion:

Checking Blood 3. Unit Number/Lot Number

- Check the **Unit number** (blood components)/Lot number (blood products) are identical on CBS label (blood components)/manufacturer label (blood products), transfusion label & chart label/issue form



DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
DATE: 26/05/21
(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MO/YR)

PATIENT: Locks, Goldie MRN #: M000004091 ** A POSITIVE **
TYPENEX #: 22/F
LOCATION: GO-HOME SPEC #: 2605: BB00003R

PRODUCT: RED CELL CONCENTRATE PRODUCT UNIT #: C055621317655 ** A POSITIVE **

COMPATIBLE ? P 26/05/21 1418 <BBWOLF> MESSENGER: Bear, Mama _____

ISSUED: 26/05/21 1420 BBWOLF
ISSUE COMMENTS:

DATE OF TRANSFUSION: _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT: 350 ML
SIGNATURES:
UNIT ADMINISTERED BY: _____
CHECKED BY: _____
TRANSFUSION COMMENTS:



Administering Transfusion:

Checking Blood 4. Expiry & Visual Inspection

Expiry

- Check **time of issue** (removal from temperature controlled environment) on chart label/issue form
- Blood expires 4 hours from time of issue, transfusion must be completed or any remainder discarded

Note: In this example, the issue time is 1420 hours 26/05/21. The RBC unit expires 4 hours later at 1820 hours 26/05/21. By 1820 hours the transfusion must be completed or any remainder discarded.

DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
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PATIENT: Locks, Goldie MRN #: M000004091 ** A POSITIVE **
TYPENEX #: 22/F
LOCATION: GO-HOME SPEC #: 2605 : BB00003R

PRODUCT: RED CELL CONCENTRATE PRODUCT UNIT #: C055621317655 ** A POSITIVE **

COMPATIBLE ? P 26/05/21 1418 <BBWOLF> MESSENGER: Bear, Mama _____

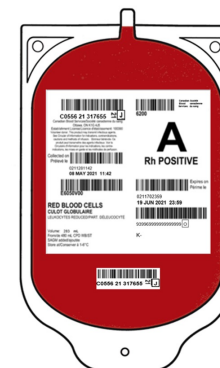
ISSUED: 26/05/21 1420 BBWOLF
ISSUE COMMENTS:


DATE OF TRANSFUSION: _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT: 350 ML
SIGNATURES:
UNIT ADMINISTERED BY: _____
CHECKED BY: _____
TRANSFUSION COMMENTS:

Visual Inspection

Check the **blood bag** for

- Any clots
- Unusual colour
- Ports are intact, no leaking



 Learn More

Click to review the [CBS Visual Assessment Guide](#)



Administering Transfusion:

Assessments & Vital Signs

- **Baseline assessment:** recent fevers, rashes, oxygen required, laboured respiration, chest auscultation if TACO risk
- **Vital signs parameters:** temperature, blood pressure, pulse, respiratory rate, oxygen saturation
- **Minimum frequency**
(Hospital specific policy details regarding patient assessment & vital signs may be more extensive)
 - Baseline within 30 minutes prior to starting transfusion
 - 15 minutes after start of transfusion
 - After transfusion is completed
 - Periodically post-transfusion (reactions may occur up to 4 hours after transfusion; for dyspnea reactions, up to 24 hours after transfusion)
 - If a transfusion reaction is suspected



Administering Transfusion:

Rate of Infusion

- If patient's clinical status permits (i.e., patient stable, not bleeding; transfusion not urgent) initiate blood component transfusion cautiously and slowly.
- Adults: for the first 15 minutes, suggested rate is 50 mL/hour
- Assess patient and re-check vital signs after 15 minutes
- If no signs/symptoms of transfusion reaction, increase to rate ordered (slower if TACO risk; maximum is 4 hours from time of issue from TML).
- Usual rate per unit: RBC over 2 hours
Platelets over 60 minutes
Plasma over 30 minutes to 2 hours

Note: If blood tubing was primed with 0.9% sodium chloride, then re-prime tubing with blood component to ensure initial slow infusion rate is actually infusing blood component (blood tubing volume is 12-15 mL).



Administering Transfusion:

Completing Transfusion

- Comply with expiry time specific to blood component/blood product being transfused
- **Expiry for Blood Components:** within 4 hours of time issued from TML (removal from the temperature controlled environment)
Outside expiry time, discard any remainder
- Flush blood tubing with 0.9% sodium chloride
- Re-assess patient and vital signs
- Disconnect blood tubing when transfusion is completed (tubing can harbour bacteria)
- Hospital may require returning the empty blood bag to TML, otherwise dispose in biohazardous waste



Administering Transfusion: Documentation

- File completed chart label/issue form (includes documentation mandated per Transfusion Medicine standards) for each component or product transfused on patient's health record.
- Transfusionist must complete chart label/issue form by adding:
 - Start and finish date/time
(confirms transfusion completed within expiry time; provides time reference point, if transfusion reaction)
 - Their identity

DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
DATE: 26/05/21
(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MO/YR)

PATIENT: Locks, Goldie MRN #: M000004091 ** A POSITIVE **
TYPENEX #: 22/F
LOCATION : GO-HOME SPEC #: 2605 : BB00003R

PRODUCT : RED CELL CONCENTRATE PRODUCT UNIT # : C055621317655 ** A POSITIVE **

COMPATIBLE ? P 26/05/21 1418 <BBWOLF> MESSENGER : Bear, Mama _____
ISSUED : 26/05/21 1420 BBWOLF
ISSUE COMMENTS :

DATE OF TRANSFUSION : _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT : 350 ML
SIGNATURES :
UNIT ADMINISTERED BY: _____
CHECKED BY: _____
TRANSFUSION COMMENTS :

- Document patient care: assessments, vital signs, volume on intake/output record
- If a transfusion reaction is suspected, document signs/symptoms, patient care
- Hospital policy may require completed “transfusion record” be returned to TML



Objectives/Outline

After completing this learning participants will be able to:

- Identify signs and symptoms and immediate management actions of a possible transfusion reaction.

Outline:

Transfusion Reactions	
<i>Topic:</i>	<i>Refer to slide number:</i>
Signs & Symptoms	40
Immediate Actions	41



Transfusion Reactions:


Signs & Symptoms

- Reactions can be categorized by key signs & symptoms:
 - Fever
 - Urticaria (hives)
 - Dyspnea
 - Hypotension
- Additional signs & symptoms include:
Airway or Facial Edema, Anxiety, Coughing, Diffuse bleeding/oozing, Hemoglobinuria, Hypertension, Itching, Nausea/Vomiting, Pain (Back, Headache, IV site), Rash, Shaking Chills/Rigors, Subjective Chills, Tachycardia, Urine colour – dark/red, Wheezing
- Signs & symptoms may occur during transfusion or within 4 hours post-transfusion, for dyspnea reactions up to 24 hours post-transfusion
- The initial presenting sign/symptom may evolve, if so re-assess with prescriber and re-contact TML. Close patient monitoring is essential.



Transfusion Reactions:

Immediate Actions

- If a possible acute transfusion reaction is suspected:
 -  Stop the transfusion
 - Maintain IV access
 - Check vital signs
 - Verify patient armband identification matches with transfusion label
 - Notify prescriber
 - Patient care as per order
 - Report reaction to TML
 - Document all details
- All unexpected, unusual or serious symptom(s) must be identified, managed and reported to TML for investigation. TML must report certain reactions to CBS/product manufacturer and Health Canada.



Bloody Easy Blood Administration:

Summary – Transfusion Checklist

TRANSFUSION CHECKLIST

For references, refer to [Bloody Easy Blood Administration Version 3](#), Summary: Transfusionist's Accountability: Transfusion Checklist (page 80-89).

Unequivocal (unmistakeable) identification of the patient is mandatory.

Patient must be wearing a patient identification armband. Patient identification information must remain attached to the blood for the duration of the transfusion.

PRE-TRANSFUSION	TRANSFUSION	POST-TRANSFUSION
<ul style="list-style-type: none"> ✓ Informed Consent <ul style="list-style-type: none"> Per policy/procedure, questions addressed Exception: emergent, life-threatening bleed ✓ Transfusion Order <ul style="list-style-type: none"> Indication supported: labs, signs, symptoms Complete, required information included ✓ Group & Screen Testing <ul style="list-style-type: none"> Required for compatible blood components ABO, Rh(D) blood groups, antibody screen (clinically significant antibodies) Label tube of blood at patient's bedside ✓ Prepare the Patient <ul style="list-style-type: none"> Educate: symptoms indicative of reaction Assess for transfusion history and TACO risk factors; follow up if indicated ✓ Prepare the Equipment <ul style="list-style-type: none"> Dedicated, patent IV (peripheral or central) Compatible IV fluid (only 0.9 % NaCl [sodium chloride] for blood components) Blood components – tubing/filter (170-260 microns); change after 4 units or 4 hours Platelets – always NEW/FRESH tubing/filter Prime tubing/filter: blood or compatible IV fluid IV setup to stop abruptly & maintain TKVO: 0.9% NaCl flush syringes + any fluid IV line or 0.9% NaCl IV line Infusion Devices: if Health Canada approved ✓ Pick Up Blood from TML (Transfusion Medicine Lab) <ul style="list-style-type: none"> Patient identification (surname, first name, unique identification number) and order 	<ul style="list-style-type: none"> ✓ Checking Blood Components/Blood Products <ul style="list-style-type: none"> Blood received matches transfusion order At bedside, in physical presence of patient 1. Patient Identification: surname, first name, unique identification number identical on armband, order, transfusion & chart label/tag 2. ABO, Rh(D) Blood Groups (only for Components): identical/compatible on Group & screen test, CBS (Canadian Blood Services) label, transfusion & chart label/tag 3. Unit (Components) / Lot (Products) Number: identical on CBS label (Components) / manufacturer label (Products), transfusion & chart label/tag 4. Visual Inspection & Expiry Components: no clots, usual colour, ports intact, expires 4 hours after issue from TML Products: packaging/seal intact, colour as per manufacturer, vials/glass bottles – once entered/spiked, expires after 4 hours ✓ Patient Assessment and Vital Signs (for each unit) <ul style="list-style-type: none"> Close monitoring/observation required Minimum: within 30 minutes of starting, 15 minutes after starting, upon completion Temp, BP, pulse, respiratory rate, oxygen saturation; if TACO risk - chest auscultation ✓ Infusion Rate (for each unit) <ul style="list-style-type: none"> 50 mL/hour for first 15 minutes; can be deferred if acute bleeding Re-check after 15 minutes, if no indication of reaction then increase to rate as ordered ✓ Possible Transfusion Reaction <ul style="list-style-type: none"> If any adverse/unexpected/serious symptoms, STOP transfusion; refer to TTISS Reaction Chart 	<ul style="list-style-type: none"> ✓ Completing the Transfusion <ul style="list-style-type: none"> Comply with expiry time specific for blood component/blood product Outside the expiry time, discard remainder Component tubing: flush with 0.9 % NaCl Products given IV: flush (tubing/IV site) with compatible IV fluid Some hospitals require returning the empty blood bag to TML Otherwise dispose of blood tubing/bags in biohazardous waste Re-assess patient and re-check vital signs: <ul style="list-style-type: none"> - at end of transfusion - periodically post-transfusion (reactions may occur 4 hours post-transfusion; for dyspnea reactions up to 24 hours post transfusion) ✓ Documentation <ul style="list-style-type: none"> File completed chart label/tag for each component or product transfused on patient's health record (include start and stop times) Some hospitals require a completed "transfusion record" form returned to TML Record volume transfused, vital signs and patient assessments If a transfusion reaction is suspected: report to TML, document signs and symptoms, patient care



June 2021, version 1.0 Ontario Regional Blood Coordinating Network



Glossary of Terms (1)

Agglutination: the clumping and sticking together of normally free cells or bacteria or other small particles forming visible aggregates

Apheresis: blood collection method where an individual component is collected directly via a cell separator machine, can be used to collect platelets or plasma

Blood Component: a therapeutic part of blood intended for transfusion (e.g., RBC, platelets, granulocytes, plasma, cryoprecipitate)

Blood Product: a therapeutic product derived from human blood or plasma and produced by a manufacturing process, also referred to as plasma protein product (e.g., albumin, coagulation products, factor concentrates, immunoglobulins)

Clinically Significant Antibodies: are antibodies with potential to cause harm to transfused patients or to affect their management and treatment; include antibodies capable of causing acute and delayed hemolytic transfusion reactions (HTR) or hemolytic disease of the fetus and newborn (HDFN)

Crossmatch: when RBC transfusion is ordered and group and screen testing completed, the TML procedure to detect any incompatibilities between recipient and donor

Computer (electronic) crossmatch — computerized procedure that is used in place of a serologic crossmatch to detect ABO incompatibility (applicable only if antibody screen is negative)

Serologic crossmatch — in vitro test performed between donor red cells (from a segment removed from the RBC unit) and recipient's serum or plasma (from the group and screen blood sample) to determine compatibility

Direct Antiglobulin Test (DAT): a blood test that determines if there is in vivo binding of immunoglobulin or complement on the red blood cells (in vivo sensitization). It is used for detection and differential diagnosis of several forms of immune hemolysis (such as hemolytic transfusion reactions). Interpreting the clinical significance of a DAT result includes considering the patient's clinical history as well as other laboratory test results.

Dispense: release of blood components or blood products from TML (temperature controlled environment) to the clinical area, synonymous with issue.



Glossary of Terms (2)

Health Care Professional: a person associated with either a specialty or a discipline and who is qualified and allowed by regulatory bodies to provide a healthcare service to a patient.

Hemolysis: breakdown or lysis of red blood cells

Issue: release of blood components or blood products from TML (temperature controlled environment) to the clinical area, synonymous with dispense

Plasma Protein Product: a therapeutic product derived from human blood or plasma and produced by a manufacturing process, also referred to as blood product (e.g., albumin, coagulation factor concentrates, immunoglobulins)

Positive Patient Identification Technology: refers to a computerized system that scans a barcode, radiofrequency identification (RFID) or another electronically readable element on a patient's identification band to confirm identity

Prescriber: for this learning, refers to health care professionals who are authorized to order transfusion of blood components and blood products (physicians, physician assistants, nurse practitioners, midwives, dentists)

Red Blood Cells: the cellular component of blood that transports oxygen from the lungs to the tissue cells. Oxygen is needed for tissue cells to carry out their functions in the body

TIPS procedure: Radiology procedure to insert a transjugular intrahepatic portosystemic shunt (TIPS) to decrease pressure in the portal vein in liver cirrhosis patients

Transfusion Medicine Laboratory (TML): also known as the Blood Bank or Transfusion Service

Transfusionist: Regulated health care professional who administers a blood transfusion



Abbreviations

AFFP: Apheresis fresh frozen plasma (blood component)

AKI: Acute kidney injury

ASAP: As soon as possible

CBS: Canadian Blood Services

DAT: Direct antiglobulin test

DIC: Disseminated intravascular coagulation

FC: Fibrinogen Concentrate

FP: Frozen plasma (blood component)

HLA: Human leukocyte antigen

HPA: Human platelet antigen

IVIG: Intravenous immunoglobulin

LR: Leukocytes reduced

MHP: Massive Hemorrhage Protocol

mL: milliliter

MOH: Ontario Ministry of Health

PCC: Prothrombin Complex Concentrate

PLT: platelet count, laboratory value

PPP: Plasma protein products, also known as blood products

RBC: Red blood cell concentrate unit (blood component)

Rh: Rhesus blood group

RhIG: Rh(D) Immune Globulin

SCIG: Subcutaneous immunoglobulin

TACO: Transfusion Associated Circulatory Overload

TA-GvHD: Transfusion Associated Graft Versus Host Disease

TKVO: To keep vein open

TML: Transfusion Medicine Laboratory

TRALI: Transfusion Related Acute Lung Injury

TTISS-ON: Ontario Transfusion Transmitted Injuries Surveillance System



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Questions



Email: bertad@mcmaster.ca

