WINDSOR REGIONAL HOSPITAL
OUTSTANDING CARE – NO EXCEPTIONS!

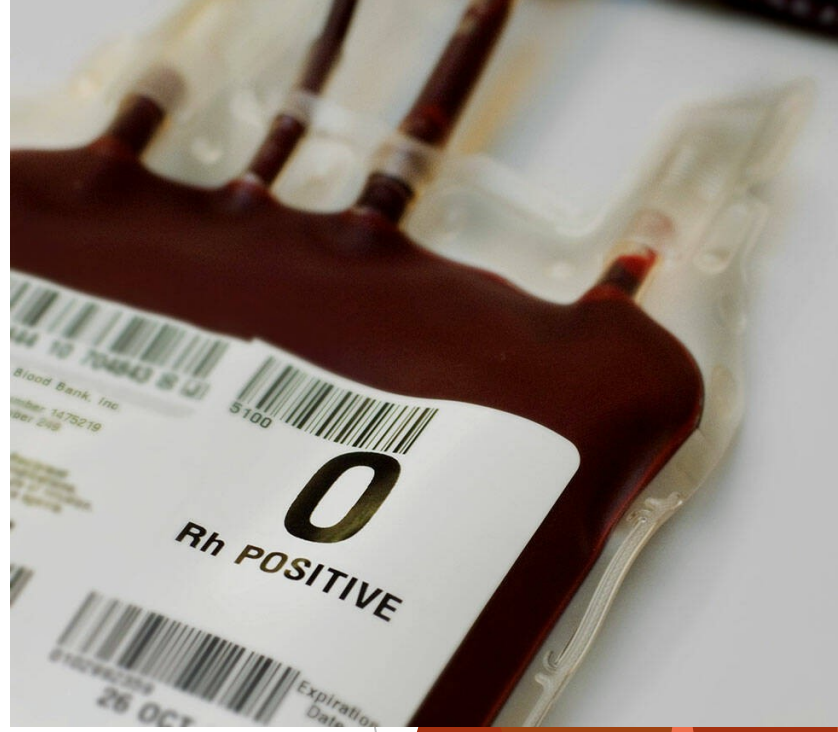
Erie Shores HealthCare
Care Happens Here

Blood and Blood Product Administration

For Physicians and Nurses

Learning Objectives

- Define a group and screen
- Describe types of crossmatches
- List the indications for red blood cells, platelets, plasma and fibrinogen product
- Infusion consent, tubing and flow rates
- Estimate the frequencies of transfusion reactions to blood components in Canada
- Recognize the signs and symptoms of an adverse reaction to blood and blood components
- Summarize measures for the management and prevention of transfusion reactions



Who Regulates Transfusions?

- Health Canada regulates blood collection and testing

Health Canada

- Canadian Blood Services (CBS):
  - Collects blood
  - Screens the donors
  - Processes the blood/ blood products
  - Distributes to hospitals, based on need

Canadian Blood Services

BLOOD
PLASMA
STEM CELLS
ORGANS
& TISSUES

Informed Consent is a Process

A consent to treatment is informed if the patient receives the following information before giving consent:

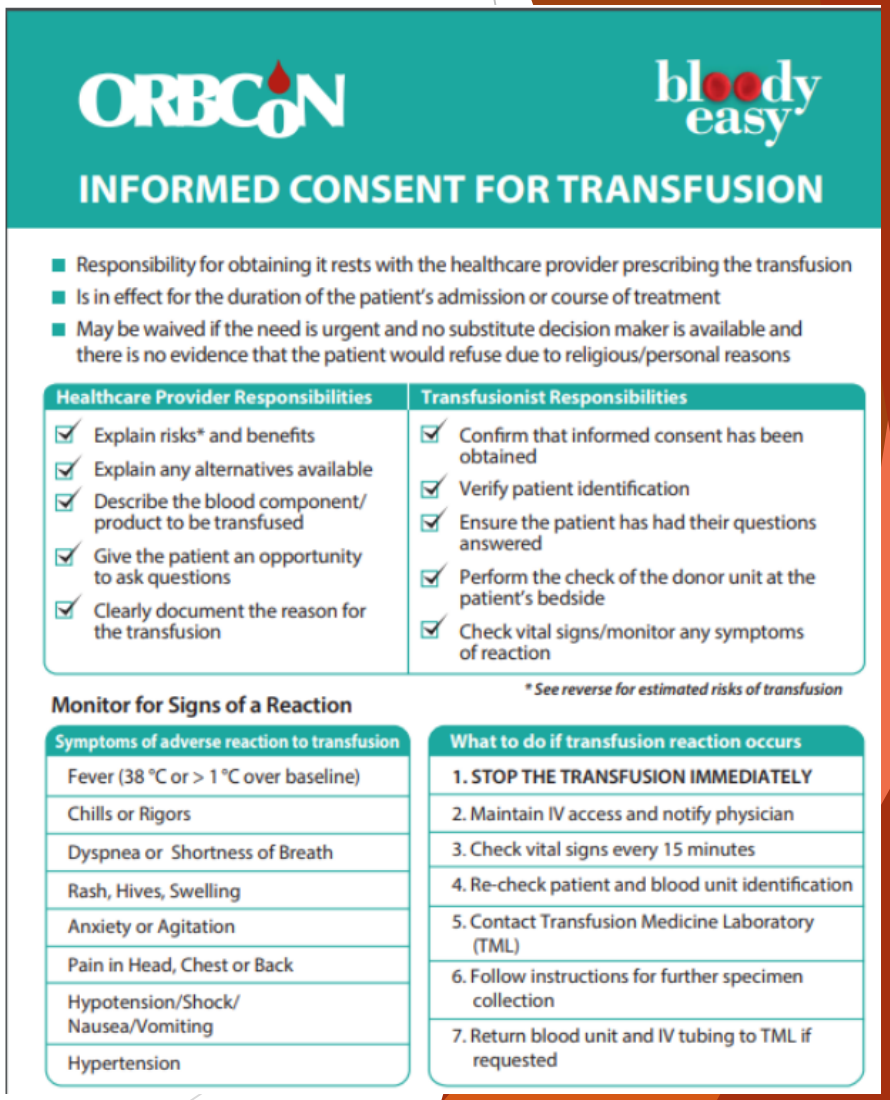
1. **Nature of the treatment (transfusion)**
2. **Expected material benefits of the treatment**
3. **Material risks of the treatment**
4. **Material side effects of the treatment**
5. **Alternative courses of action**
6. **Possible consequences of not having the treatment**

Consent for Transfusion of Blood/ Blood Products

- Consent is obtained by the physician/ nurse practitioner prescribing the treatment for any patient who receives or is likely to receive a blood product.
- For elective surgery, if a group and screen and/or group and crossmatch is ordered, written consent should be obtained
- In an emergency, the physician will obtain the written, informed consent from the patient or substitute decision maker within 24 hours after the transfusion
- **Paper consent is still a requirement for blood and blood products, for crossmatch and for Cerner downtime.**

Requirements for a Valid Consent

- Must be VOLUNTARY
- The patient must have CAPACITY to consent
- The patient must be properly INFORMED
- Provided in language understood by the patient
- Includes all information a reasonable person in similar circumstances would want
- Provides an opportunity to ask questions and make sure the explanations are understood



ORBCoN bloody easy

INFORMED CONSENT FOR TRANSFUSION

- Responsibility for obtaining it rests with the healthcare provider prescribing the transfusion
- Is in effect for the duration of the patient's admission or course of treatment
- May be waived if the need is urgent and no substitute decision maker is available and there is no evidence that the patient would refuse due to religious/personal reasons

Healthcare Provider Responsibilities	Transfusionist Responsibilities
☑ Explain risks* and benefits	☑ Confirm that informed consent has been obtained
☑ Explain any alternatives available	☑ Verify patient identification
☑ Describe the blood component/ product to be transfused	☑ Ensure the patient has had their questions answered
☑ Give the patient an opportunity to ask questions	☑ Perform the check of the donor unit at the patient's bedside
☑ Clearly document the reason for the transfusion	☑ Check vital signs/monitor any symptoms of reaction

See reverse for estimated risks of transfusion

Monitor for Signs of a Reaction

Symptoms of adverse reaction to transfusion	What to do if transfusion reaction occurs
Fever (38 °C or > 1 °C over baseline)	**1. STOP THE TRANSFUSION IMMEDIATELY**
Chills or Rigors	2. Maintain IV access and notify physician
Dyspnea or Shortness of Breath	3. Check vital signs every 15 minutes
Rash, Hives, Swelling	4. Re-check patient and blood unit identification
Anxiety or Agitation	5. Contact Transfusion Medicine Laboratory (TML)
Pain in Head, Chest or Back	6. Follow instructions for further specimen collection
Hypotension/Shock/ Nausea/Vomiting	7. Return blood unit and IV tubing to TML if requested
Hypertension	

Consent Validity

The consent is valid:

- **Until the treatment is completed**
- **Until the patient is discharged (length of stay)**
- **For the course of treatment (inpatient or outpatient)- outpatient consent is renewed annually**
- **Unless there is significant changes in the level of patient acuity requiring interventions not anticipated (Physician/ Nurse Practitioner to re-assess the need for new consent)**
- **Unless the consent is revoked by the patient/substitute decision maker**

Infusion Rates

Please note:

- Physician/ NP orders the rate of infusion/ time frame
- All blood/blood products are to be *infused slowly* the *first 15 minutes* (50ml/hr) under the close supervision of the nurses

Note for IVIG refer to the Physician Order Set for infusion instructions

- Watch for signs/ symptoms which may indicate the start of an adverse reaction (may occur within seconds, hours or days)
- Watch for changes in BP, diastolic or systolic >20-30 mmHg
- Instruct/ educate the patient of the signs and symptoms of reactions during/ following a transfusion

Nursing Responsibilities When a Transfusion is Ordered

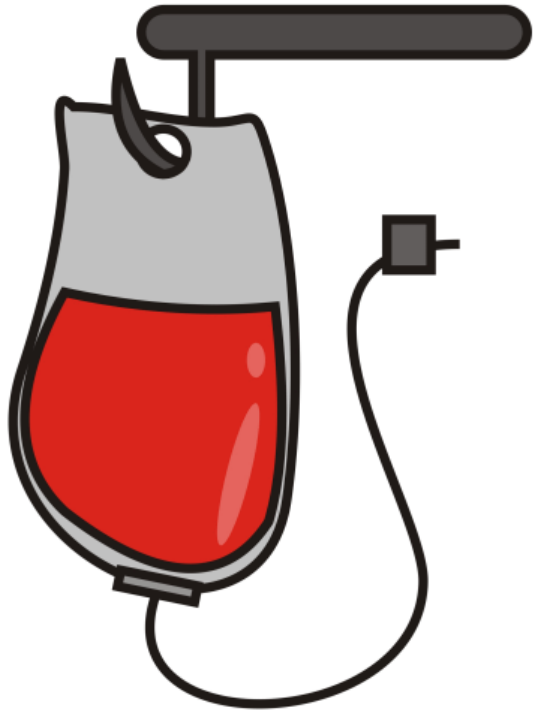
- Check for the signed, written, informed consent (on **paper)**
- **If no consent, the general surgical consent box regarding transfusion should be initiated by MD as applicable**
- Discuss treatment with patient to elicit understanding
- If patient indicates lack of understanding, has questions or concerns, or the consent is not on chart, notify the physician

BRIDGE:

- Removes the need for an independent second check in regular transfusion acitivities
- Keeps a record of all transfusions
- Mandatory documentation, helps standardize transfusion charting

When a Transfusion is Ordered:

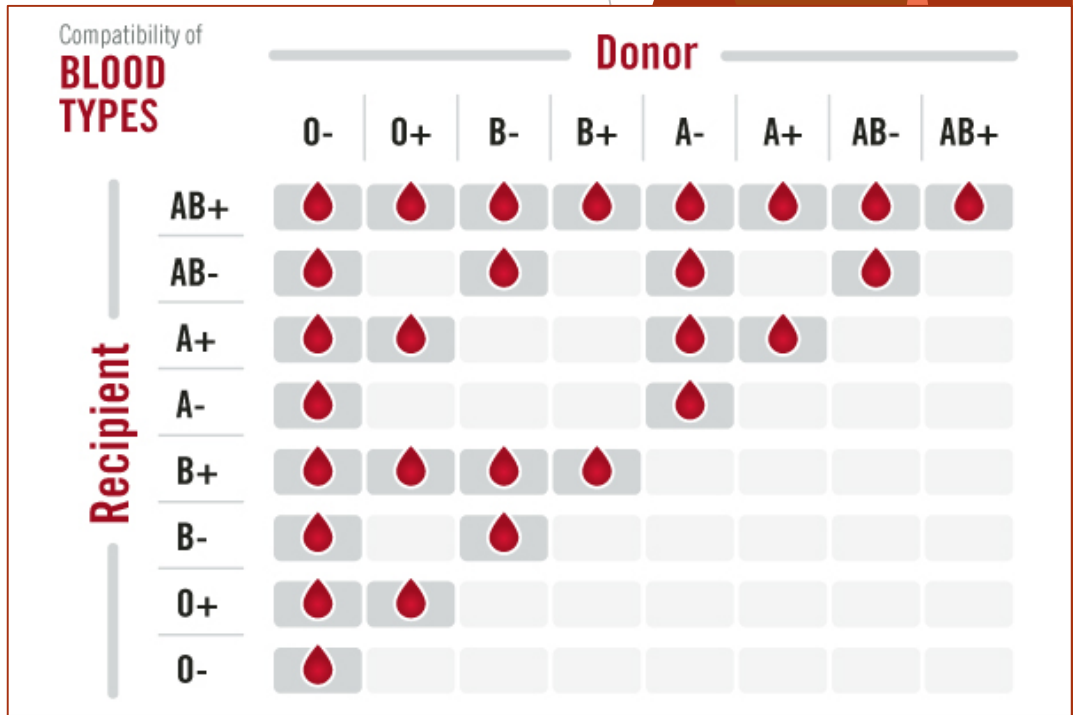
- Set up an IV with blood tubing and normal saline (100ml, 250ml, 500ml as required), measure and record baseline vital signs and lung sounds
- Retrieve blood/blood product from Transfusion Services
- Follow Policy “Blood and Blood Components Transfusion Medicine” for completion of transfusion policy requirements/ procedure (Policy available on intranet)
- All adverse reactions are documented on Bridge app, or separately in Cerner



Pre-Transfusion Compatibility Testing

- Before a transfusion can be issued, a group and screen must be performed

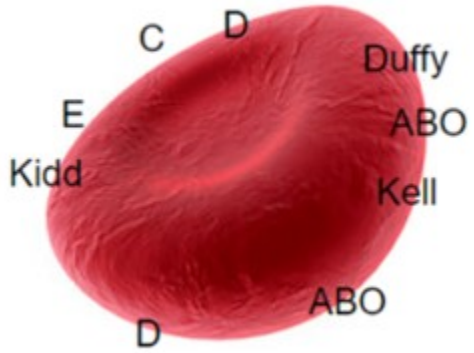
- **Group** is the recipient's blood type (O, A, B, or AB) and RhD group (D positive or D Negative)
  - **The ABO is extremely important because ABO incompatible RBC transfusions can cause severe, sometimes fatal, hemolytic transfusion reactions**
  - **The RhD antigen is the second most important RBC antigen due to its highly immunogenic properties. RhD negative individuals can develop an anti-D following pregnancy or transfusion.**



Pre-Transfusion Compatibility Testing

Minor Blood Group Antigens

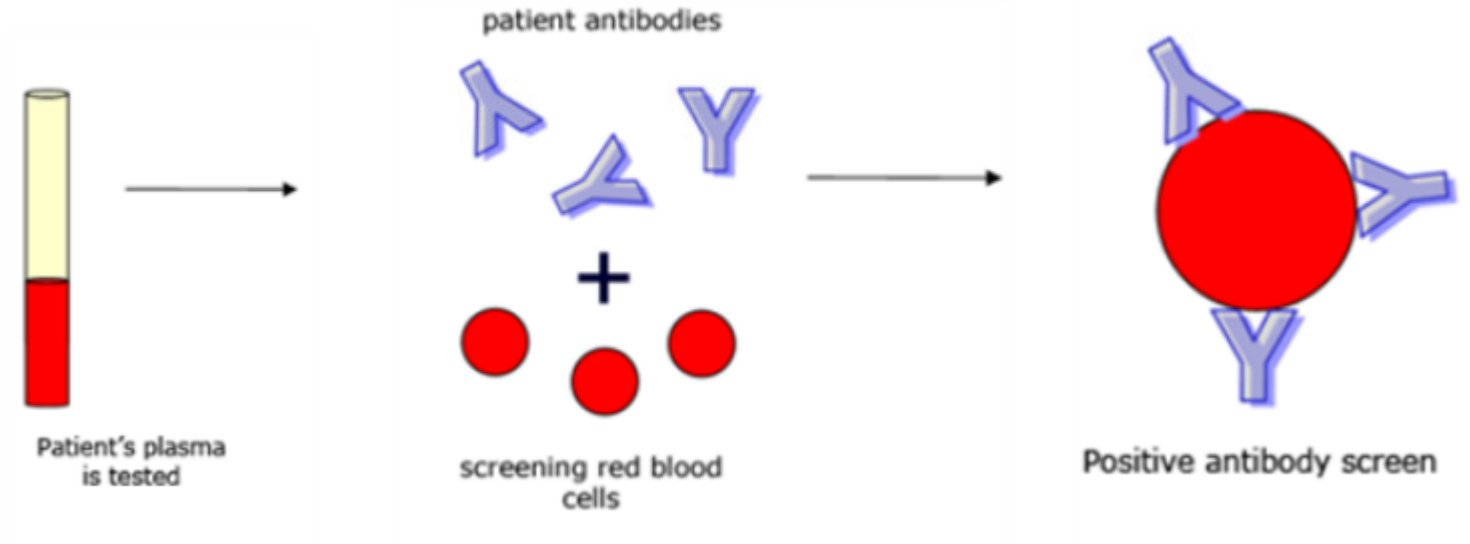
- There are other minor antigens present on the surface of red blood cells that may cause the creation of antibodies from previous immunization (pregnancy or transfusion)
- These antibodies tend to cause less severe reactions that ABO incompatible transfusions



Pre-Transfusion Compatibility Testing

The **antibody screen** tests the recipient's plasma for unexpected antibodies to clinically significant minor red blood cell antigens on screening red cells.

- Approximately 2% of patients have antibodies, usually formed from a previous exposure to the specific antigen (through pregnancy or transfusion).
- The lab will test the **group** and **screen** together prior to crossmatching units. If the antibody screen is **positive**, further testing is required to identify the antibody in order to safely transfuse.



Group and Screen

- Requires at least 45 minutes to perform
- May take hours or days to complete the antibody investigation, and find antigen negative, crossmatch compatible units if the antibody screen is positive
- If a patient has a negative antibody screen, with no history of antibodies, RBC units can be electronically crossmatched within minutes
- Additional special transfusion needs (e.g., sickle cell negative units, irradiated blood) may take longer to source

Crossmatch

The final step in confirming RBC unit compatibility with the recipient:

1. Electronic crossmatch:
   - Donor units and recipient ABO groups have been double checked, and can safely assume compatibility due to recipient's negative antibody screen
2. Immediate spin crossmatch:
   - Involves mixing donor RBCs with recipient plasma to ensure compatibility is seen
3. Full antiglobulin crossmatch:
   - Completed when the antibody screen is positive, or when the patient has special transfusion requirements
   - Can take 45 minutes or more to complete

Uncrossmatched Blood

- When waiting for the group & screen and crossmatch (minimum 45 minutes) is detrimental to the patient, and as determined by the physician, uncrossmatched blood can be issued from the blood bank.
- The most important issue to avoid is ABO Incompatibility:
  - Group O RBCs will be issued if the blood group has not been verified.
  - Group O RhD Negative RBCs should be reserved for women of childbearing age (to prevent the development of anti-D)
  - Group specific (ABO/Rh compatible) units will be issued only when the recipient's ABO/Rh group has been confirmed by a historical result, or a second ABO/Rh group test has been performed.
- Once testing has been completed, and if possible, crossmatch compatible blood will be issued.

Indications for RBC Transfusion

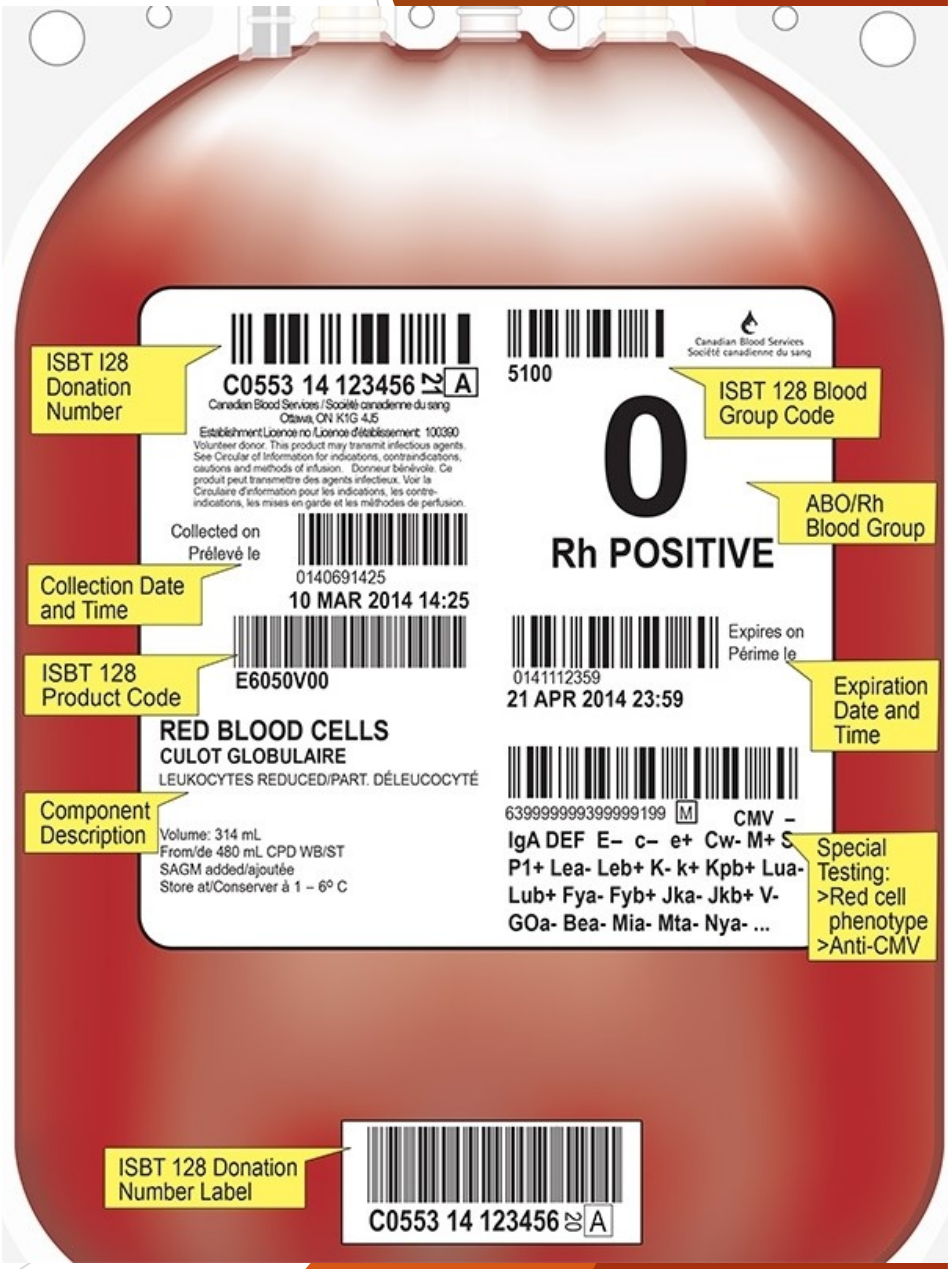
- Each RBC unit has a volume of ~300ml, with a hematocrit of 65-70%.
- Each unit is expected to raise the hemoglobin by about 10g/L in an average sized, non-bleeding adult.
- RBC units should be transfused 1 unit at a time in non-urgent situations.
- Transfusions should take **no more than 4 hours** from the moment the RBC unit leaves the blood bank:
    - Slower transfusion over 3-3.5 hours is indicated in patients over 70 years old, history of heart failure, left ventricular dysfunction, history of myocardial infarction, renal dysfunction, or positive fluid balance.
- RBCs should not be removed from the lab until the patient is ready to be transfused

Indications for RBC Transfusion

Acute Blood Loss:

- Ensure a group and screen has been performed when the hemoglobin <80g/L
- Maintain the hemoglobin >70g/L during active bleeding, or >80g/L for patients with unstable or acute coronary syndrome, coronary artery disease, or uncontrolled/ unpredictable bleeding

Transfusing patients with gastrointestinal hemorrhage results in a higher rate of re-bleeding and mortality when employing liberal transfusion practices (hemoglobin >90 g/L)



Indications for RBC Transfusion

Perioperative patients:

1. Pre-op:
   - Alternatives to transfusion should be considered 4-5weeks in advance of the scheduled surgery to try blood conservation measures (e.g., erythropoietin, iron)
   - Group and screens can be performed prior to the surgery date to ensure blood can be prepared ahead of time

2. Post-op:
   - Investigate persistently low hemoglobins (e.g., occult blood loss or hemolysis), and minimize excessive blood draws to prevent iatrogenic anemia
   - RBC transfusion is advised for hemoglobin <70g/L in non-bleeding and asymptomatic patients

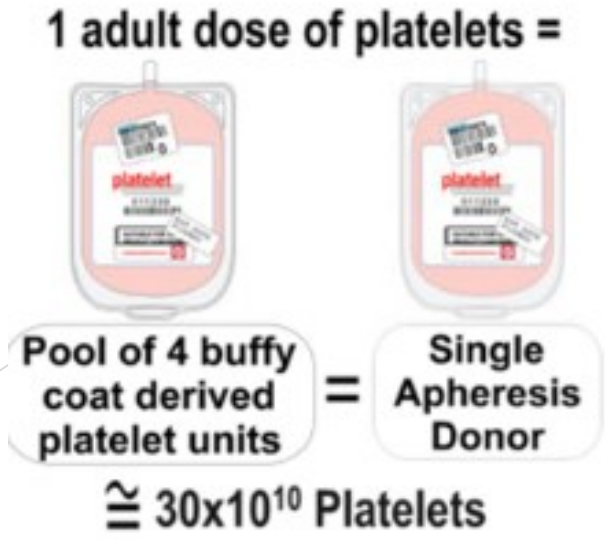
Indications for RBC Transfusion

Summary Table of Hemoglobin Level vs. Transfusion Decision

Hemoglobin	Recommendation
> 90 g/L	Likely inappropriate except in unusual circumstances (e.g. cyanotic heart disease)
70 - 90 g/L	Likely to be appropriate with evidence of impaired oxygen delivery
< 70 g/L	Likely to be appropriate
< 60 g/L	Transfusion highly recommended Young patients with low risk of cardiovascular disease may tolerate hemoglobin levels lower than 60g/L

Indications for Platelet Transfusion

- Each adult dose of platelets contains ~$30x10^{10}$ platelets in 300-350ml and should increase the patient's platelet count by 15-$25x10^{9}$/L
- One dose of platelets should be infused over 1-2 hours (maximum infusion time 3.5hours)
- Knowing the underlying cause of thrombocytopenia is important in understanding when to prescribe platelets (e.g., Heparin- induced thrombocytopenia, thrombotic thrombocytopenic purpura, and catastrophic anti-phospholipid antibody syndrome all have an increased risk of thrombosis, even in the presence of thrombocytopenia)
- Other modalities like steroids, intravenous immunoglobulin and other therapies may be better indicated in immune thrombocytopenia



Indications for Platelet Transfusion

Non-immune thrombocytopenia

- Failure of bone marrow to produce platelets due to miscellaneous conditions (chemotherapy, bone marrow replacement, aplastic anemia, acute leukemia, etc.)
- Prophylactic platelet transfusion support is recommended when platelet count is $<10x10^9/L$

- If platelet count is $<50x10^9/L$, transfuse 1 dose of platelets immediately prior to procedures associated with significant blood loss (anticipated blood loss > 500mL)
- If platelet count is $<20x10^9/L$, transfuse 1 dose of platelets immediately prior to procedures not associated with significant blood loss
- If platelet count is $20\text{-}50x10^9/L$, keep 1 dose of platelets on hold, to transfuse in the case of significant, unexpected bleeding

Don't routinely transfuse platelets for patients with chemotherapy-induced thrombocytopenia if the platelet count is greater than 10 x 10^9/L in the absence of bleeding.

A platelet count of 10 x 10^9/L or greater usually provides adequate hemostasis. Platelet transfusions are associated with adverse events and risks. Considerations in the decision to transfuse platelets include the cause of the thrombocytopenia, comorbid conditions, symptoms of bleeding, risk factors for bleeding, and the need to perform an invasive procedure.

Indications for Plasma Transfusion

- Each unit of plasma has an average volume of 250mL, and can take up to 30 minutes to thaw prior to transfusion (Stored as **FP- frozen plasma)**
- Plasma must be ABO compatible
- Each unit should be given over 30 minutes-2 hours depending on the urgency of the situation and the patient's risk for circulatory overload (max 3.5hours)
- A single dose of 10-15ml/kg can restore the INR and PTT to 1.3-1.8x the normal.
- The effects of plasma only lasts ~6 hours based on the half life of individual coagulation factors
- A repeat INR and PTT should be performed post plasma transfusion

Indications for Plasma Transfusion

- Active bleeding, or prior to an operative procedure in patients with INR, PT or PTT 1.8x greater than the normal, and no other coagulation factor concentrates or alternative therapies are present
- Active bleeding or prior to an operative procedure in patients with severe liver disease with INR >2X the normal
- Massive rapid transfusion (e.g., Code OMEGA (WRH) or Code Transfusion (ESHC) and the patient's clinical status requires immediate treatment

Don't transfuse plasma to correct a mildly elevated (<1.8) international normalized ratio (INR) or activated partial thromboplastin time (aPTT) before a procedure.

A mildly elevated INR is not predictive of an increased risk of bleeding. Furthermore, transfusion of plasma has not been demonstrated to significantly change the INR value when the INR was only minimally elevated (<1.8).

COUNTERIndications for Plasma Transfusion

Plasma is NOT required:

- INR <1.8
- Use of 1:1 (FR:RBC) replacement outside of a massive transfusion
- Elective reversal of warfarin where time allows for warfarin cessation and/or use of vitamin K
- Volume expansion or “nutritional support”
- Reversal of anticoagulants other than warfarin (e.g., heparin/LMWH, apixaban, edoxaban, dabigatran, rivaroxaban) because plasma has no effect in reversing or neutralizing heparins or thrombin inhibitors

Don’t transfuse plasma to correct a mildly elevated (<1.8) international normalized ratio (INR) or activated partial thromboplastin time (aPTT) before a procedure.

A mildly elevated INR is not predictive of an increased risk of bleeding. Furthermore, transfusion of plasma has not been demonstrated to significantly change the INR value when the INR was only minimally elevated (<1.8).

Reversal of Warfarin Anticoagulant Effect

- The warfarin effect should be reversed with vitamin K in a dose of 5-10mg administered intravenously in patients on warfarin who have significant bleeding or requires urgent surgery
- Intravenous vitamin K works faster than oral and is safe
- This will produce partial reversal within 2 hours and normalization within 6-24 hours
- If **emergency** reversal is required (less than 6 hours) for significant hemorrhage or emergency surgery for life- threatening conditions, then prothrombin complex concentrates (Octaplex) should be used in addition to intravenous vitamin K

Prothrombin Complex Concentrates (Octaplex)

- Human derived coagulation factor concentrates that contain factors II, VII, IX, X, Protein C and S
- A dose of 1000/IU is generally sufficient for 50-90kg patient with INR in the therapeutic range (INR <3)
- Vitamin K (5-10mg IV) should also be given as well to ensure as well to ensure a lasting reversal of warfarin (the effects of PCCs last ~6 hours)
- Repeat INR 15 minutes after infusion

DO NOT ADMINISTER PCCs IF:

1. INR <1.6 as coagulation factor levels are adequate for hemostasis
2. Patient has a coagulopathy unrelated to warfarin or Vitamin K deficiency
3. There is a history of heparin induced thrombocytopenia (product contains heparin)

Indications for Fibrinogen Replacement

Fibrinogen concentrate or cryoprecipitate are used for fibrinogen replacement.

Fibrinogen concentrates

- Fibrinogen concentrates are licensed for acquired and congenital hypofibrinogenemia in Canada
- Adult dose 4 grams equivalent to 10 units cryoprecipitate
- Each dose will raise the patient's fibrinogen concentration by approximately 0.9 g/L
- Fibrinogen levels should be determined after infusion to determine efficacy
- Cryoprecipitate
- Each unit has a volume of 10-15 mL.
- The dose is about 1 unit per 10kg body weight. However, it is typically dispensed as a pool of 10 units.
- Each dose will raise the patient's fibrinogen concentration by approximately 0.7 g/L.
- Up to 30 minutes are required to thaw and pool prior to transfusion.
- Recommended infusion time is 15-30 minutes per dose (maximum infusion time 3.5 hours).
- Fibrinogen levels should be determined after infusion to determine efficacy.

Indications for Fibrinogen Replacement

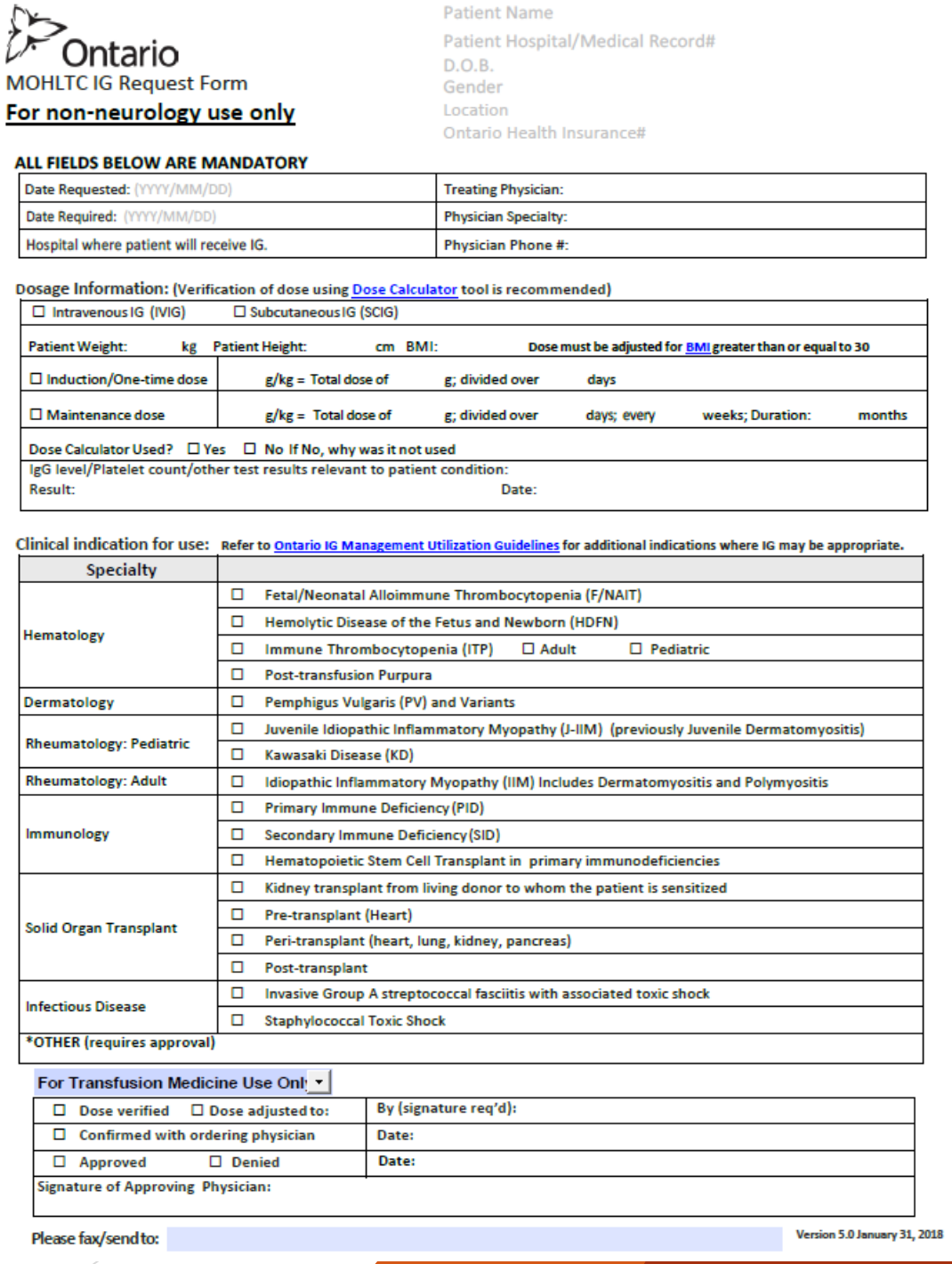
- For bleeding with fibrinogen less than 1.0g/L.
- For massive hemorrhage with fibrinogen less than 1.5 – 2.0 g/L.
- For intracranial hemorrhage related to tissue plasminogen activator with fibrinogen less than 2.0 g/L
- Clinical status suggestive of hypofibrinogenemia without time for laboratory confirmation.
- Obstetrical hemorrhage: massive rapid hyperfibrinolysis can occur in obstetrical hemorrhage and requires prompt cryoprecipitate transfusion from the outset of resuscitation

Cryoprecipitate may be used for patients with hereditary disorders of hemostasis **ONLY** when specific factor concentrates (e.g. Humate P, recombinant factor VIII(Eight)) are not available.

Indications for IVIG

- Primary Humoral Immunodeficinecy
- Idiopathic Thrombocytic Purpura (ITP)
- B-Cell Chronic Lymphocytic Leukemia (CLL)
- Allogenic Bone Marrow transplantation (in clients >20 years of age)
- Pediatric HIV infection

- A MOHLTC IVIG form must be completed (for neurology, or non-neurology)
- Order set and infusion guidelines based on patient's weight
- CBS supplies IVIG products as available



Ontario
MOHLTC IG Request Form
For non-neurology use only

Patient Name
Patient Hospital/Medical Record#
D.O.B.
Gender
Location
Ontario Health Insurance#

ALL FIELDS BELOW ARE MANDATORY

Date Requested: (YYYY/MM/DD)	Treating Physician:
Date Required: (YYYY/MM/DD)	Physician Specialty:
Hospital where patient will receive IG.	Physician Phone #:

Dosage Information: (Verification of dose using Dose Calculator tool is recommended)

☐ Intravenous IG (IVIG) ☐ Subcutaneous IG (SCIG)

Patient Weight: kg Patient Height: cm BMI: **Dose must be adjusted for BMI greater than or equal to 30**

☐ Induction/One-time dose	g/kg = Total dose of g; divided over days
☐ Maintenance dose	g/kg = Total dose of g; divided over days; every weeks; Duration: months

Dose Calculator Used? ☐ Yes ☐ No If No, why was it not used

IgG level/Platelet count/other test results relevant to patient condition:
Result: Date:

Clinical indication for use: Refer to Ontario IG Management Utilization Guidelines for additional indications where IG may be appropriate.

Specialty	
Hematology	☐ Fetal/Neonatal Alloimmune Thrombocytopenia (F/NAIT)
	☐ Hemolytic Disease of the Fetus and Newborn (HDFN)
	☐ Immune Thrombocytopenia (ITP) ☐ Adult ☐ Pediatric
	☐ Post-transfusion Purpura
Dermatology	☐ Pemphigus Vulgaris (PV) and Variants
Rheumatology: Pediatric	☐ Juvenile Idiopathic Inflammatory Myopathy (J-IIM) (previously Juvenile Dermatomyositis)
	☐ Kawasaki Disease (KD)
Rheumatology: Adult	☐ Idiopathic Inflammatory Myopathy (IIM) Includes Dermatomyositis and Polymyositis
Immunology	☐ Primary Immune Deficiency (PID)
	☐ Secondary Immune Deficiency (SID)
	☐ Hematopoietic Stem Cell Transplant in primary immunodeficiencies
Solid Organ Transplant	☐ Kidney transplant from living donor to whom the patient is sensitized
	☐ Pre-transplant (Heart)
	☐ Peri-transplant (heart, lung, kidney, pancreas)
	☐ Post-transplant
Infectious Disease	☐ Invasive Group A streptococcal fasciitis with associated toxic shock
	☐ Staphylococcal Toxic Shock
*OTHER (requires approval)	

For Transfusion Medicine Use Only

☐ Dose verified ☐ Dose adjusted to:	By (signature req'd):
☐ Confirmed with ordering physician	Date:
☐ Approved ☐ Denied	Date:
Signature of Approving Physician:	

Please fax/send to:

Version 5.0 January 31, 2018

IVIG and IV Line Flushes

- Any required flushes must be D5W
- Flush immediately prior to and/or immediately after administration of IVIG, if required
- If a main line is required, use D5W
- D5W flush amount will be withdrawn from a 50mL or 100mL bag of D5W, obtained from unit stock
- Discard the remainder of the IV bag once flush has been withdrawn
- Flushes drawn up by the nurse are only stable for 8 hours

Issuing Blood and Blood Products

- See Policy and Procedure
  - Requires consent
  - Independent Double Check (IDC) of physician order
  - IDC of blood product prior to administration
  - 2 Patient Identification
  - History of patient
    - Any prior transfusions or reactions?
  - Vital signs and lung sounds
  - Venous Access and 0.9% NS (Except with IVIG)- Y type blood set with inline filter
  - Blood must be started within 10 minutes of pick up
  - Visually inspect blood

Blood and Blood Product Administration

- **Use infusion pump**
  - Run at 50 mL/hour for first 15 minutes- Patient to be observed during this time period for reaction
  - If no reaction rate can be increased to the rate ordered
  - Each unit must be fully infused within 4 hours or less

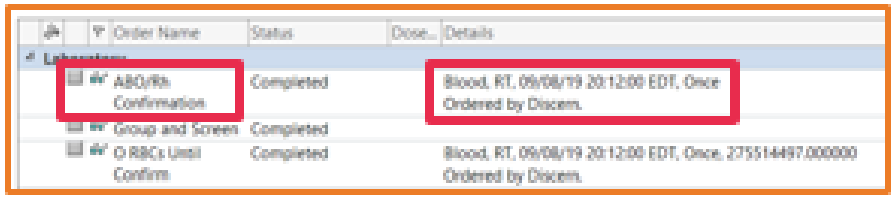
- Vital signs are reassessed after first 15 minutes and then hourly until completed, upon completion of the unit and another set 4 hours following completion

- **Infusion set must be changed:**
  - After the infusion of 2 consecutive units of the same blood product
  - If there is more than 30 minutes lag between consecutive units
  - Between administration of different blood products

Blood Administration Instructions

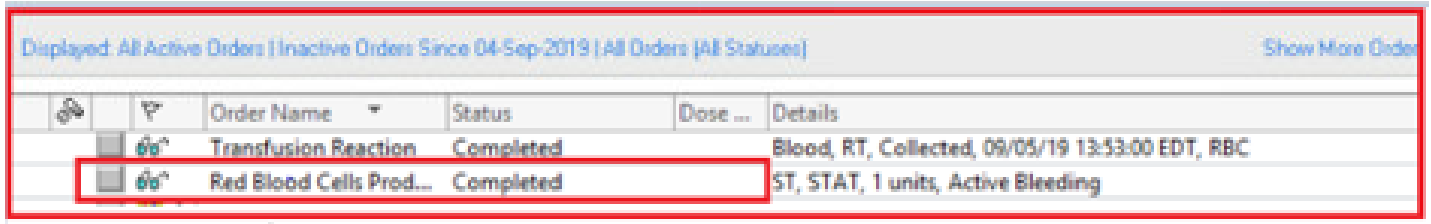
1) The provider enters orders using a powerplan for blood and/or blood products.
   (a) If not already done, an order for a Group and Screen will appear.

2) Lab will look for a history of blood type on file.
   (a) If historical blood type information is on file, products matching the patient blood type will be issued.
   (b) If NO blood type is on file, a second ABO/Rh specimen will be ordered "By Discern."
   - NEW! **O-group blood** will be issued until two separate determinations of the patient's blood group are made.



3) The nurse will receive a notification on Care Compass when the blood products are ready for pick up. The nurse will mark the notification as reviewed.
   (a) For those areas who receive tasks, when PRBC, FFP, Platelets and Cryo are ready, a "**Blood Product Ready**" task will alert for the nurse to see.

   (b) For those areas who don't receive tasks, the product order status will show as "complete" in the orders section.
   - All products will appear in the orders section as "complete" regardless if tasking available or not.



4) Nursing enters an order for "Blood Bank Issue Voucher." This prints a voucher on the nursing unit for the nurse or porter to bring to blood bank when picking up the blood product.

   (a) The nurse enters how many units to be dispensed (i.e. 2 if 2 of 4 units of FFP are needed). When ready for the additional units re-enter the order for "Blood Bank Issue Voucher".
   (b) Pick up the product as per usual processes
   (c) The blood voucher will stay in the blood bank.

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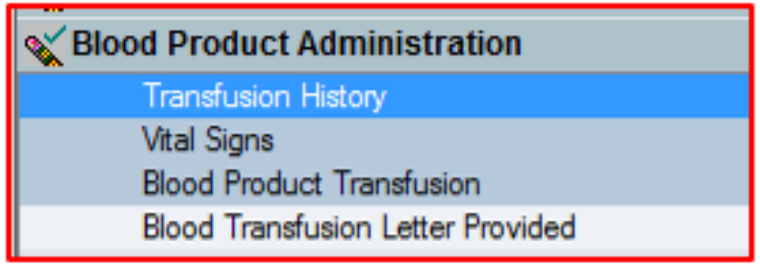
5) Create a dynamic group for the blood product.

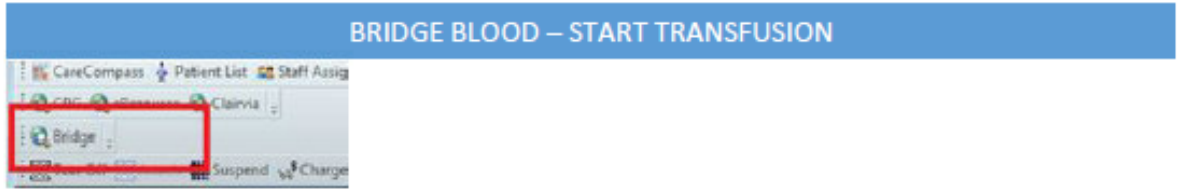


   (a) Document initiation, rate changes, discontinuation, and transfusion reactions or provider notifications (if needed).
   (b) Create a new label (dynamic group) for each different blood product or component.
   (c) Once the transfusion documentation is complete, inactivate the dynamic group by right clicking on product label (i.e. platelets) and selecting inactivate.

6) Document blood products given on the nure discharge summary powerform prior to discharge so the blood administration appears on the discharge instructions.
   - It is an accreditation requirement that a **Notification of Transfusion** is provided to patients who receive <u>blood</u> and <u>blood products</u>.

How to Start a Transfusion

Click the Bridge Link from PowerChart, FirstNet, or SurgiNet

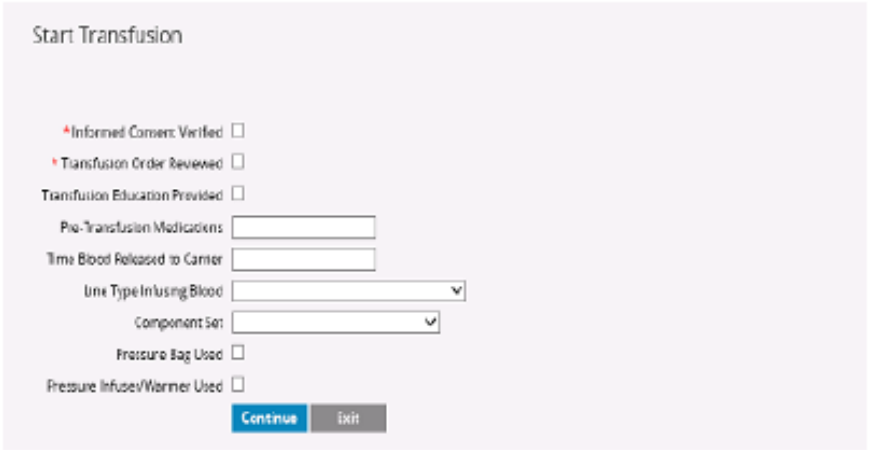


Scan patient's armband

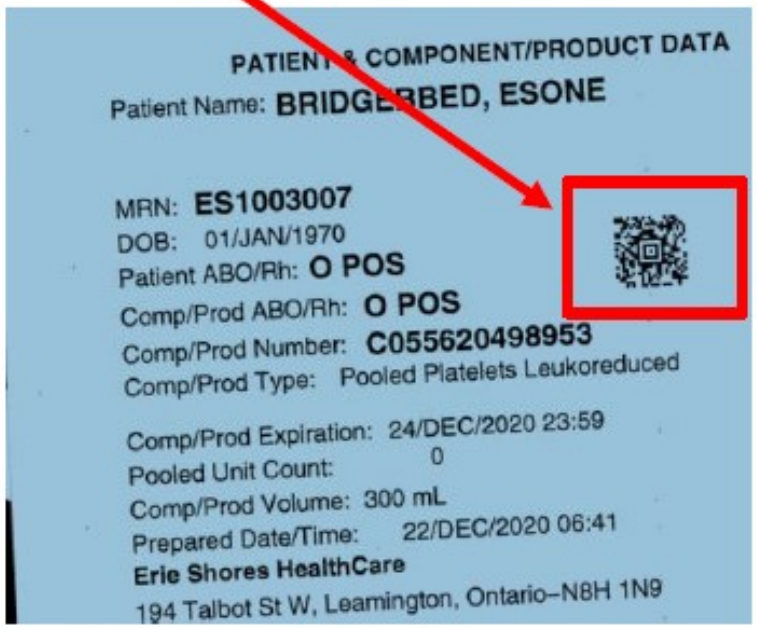
Click Start Transfusion

Complete the Pre-Transfusion Checks – remember, any item with a red asterisk indicates a mandatory field.

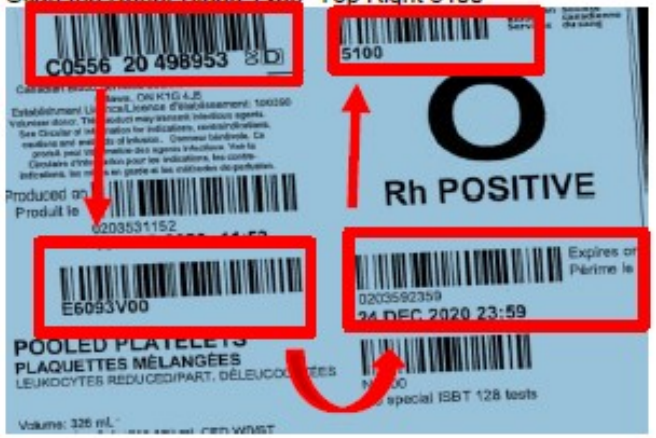
Click Continue.



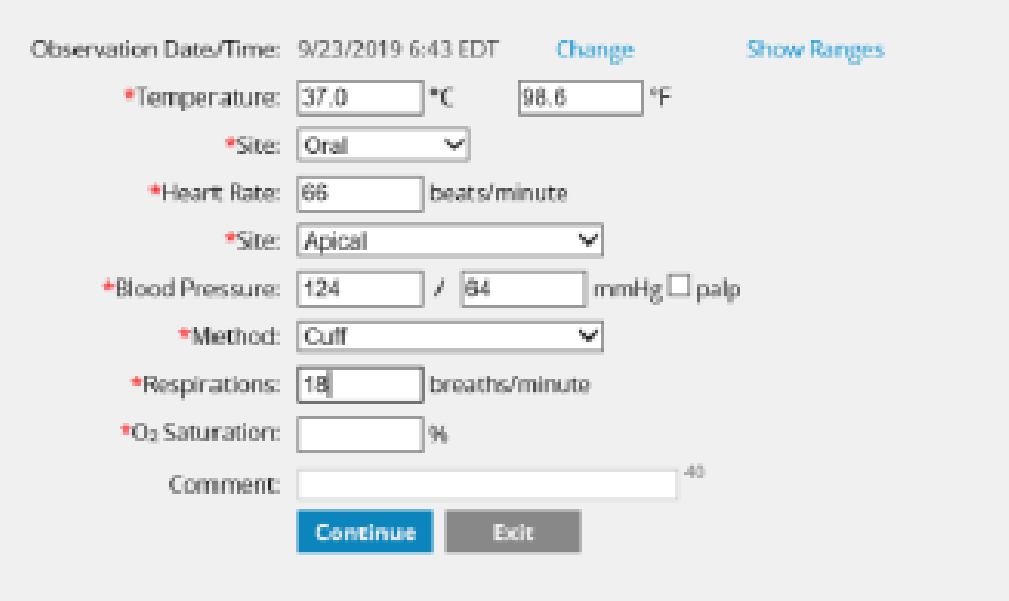
Scan the QR code on the Recipient Transfusion Tag. Recipient information will populate – Verify and click continue.



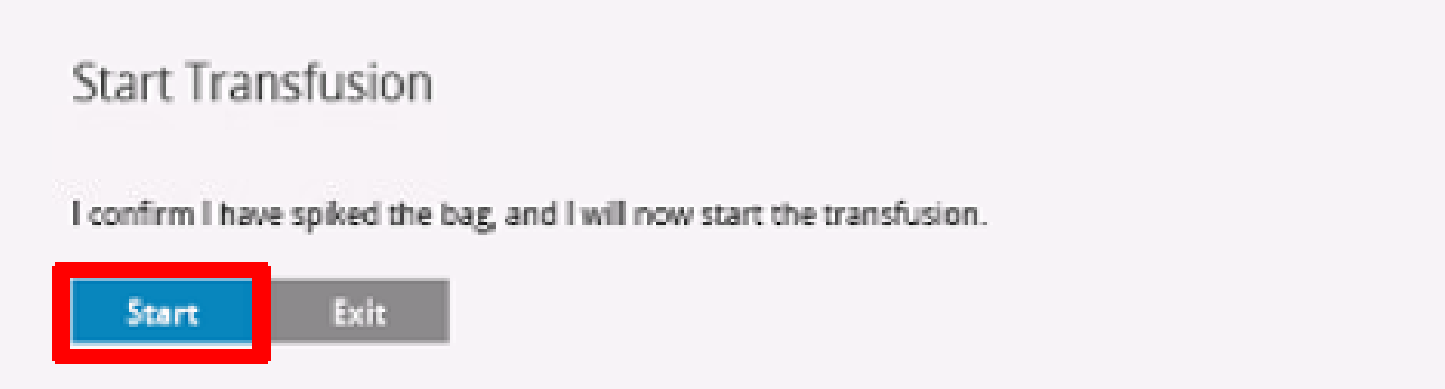
Scan the Blood Donor Bag Label in a U-Shape.
Scan Unit Number – Top Left C0556 20 498953
Scan Blood Product – Bottom Left E6093V00
Scan the Expiration Date – Bottom Right
Scan the Donor Blood Type- Top Right 5100



Enter Vital Signs. Remember, if lung sounds and rate documentation sections are not present, please complete this in 'comments'. Click Continue.



Before clicking 'start', make sure the unit is spiked and primed with a proper IV site. Clicking start documents the exact time when blood hit the patient's vein.



Risk of Events in Transfusion

RISK OF EVENT	EVENT
1 in 13	Red cell sensitization, increasing risk of hemolytic transfusion reaction and hemolytic disease of the fetus and newborn
1 in 20	Febrile non-hemolytic transfusion reaction per pool of platelets
1 in 100	Transfusion-associated circulatory overload per transfusion episode
1 in 100	Minor allergic reactions (urticaria)
1 in 300	Febrile non-hemolytic transfusion reaction per unit of RBC (1 'donor exposure')
1 in 7,000	Delayed hemolytic transfusion reaction
1 in 10,000	Transfusion-related acute lung injury (TRALI)

Risk of Events in Transfusion

RISK OF EVENT	EVENT
1 in 10,000	Symptomatic bacterial sepsis per pool of platelets
1 in 40,000	ABO-incompatible transfusion per RBC transfusion episode
1 in 40,000	Serious allergic reaction per unit of component
1 in 100,000	Post-transfusion purpura
1 in 200,000	Death from bacterial sepsis per pool of platelets
1 in 250,000	Symptomatic bacterial sepsis per unit of RBC
1 in 500,000	Death from bacterial sepsis per unit of RBC

Risk of Events in Transfusion

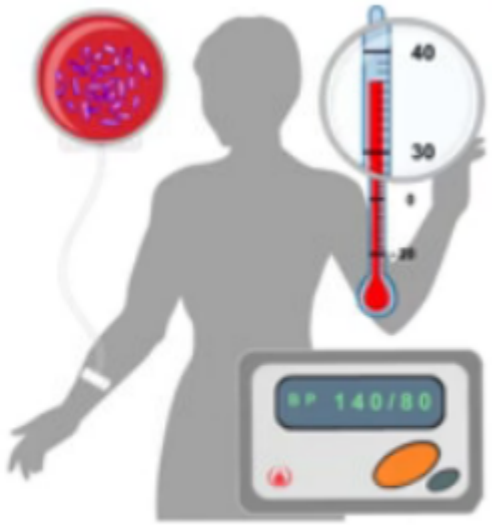
RISK OF EVENT	EVENT
<1 in 1,000,000	Transmission of West Nile Virus
1 in 4,000,000	Transmission of Chagas disease per unit of component
1 in 7,500,000	Transmission of hepatitis B virus per unit of component
1 in 7,600,000	Transmission of HTLV per unit of component
1 in 13,000,000	Transmission of hepatitis C virus per unit of component
1 in 21,000,000	Transmission of human immunodeficiency virus (HIV) per unit of component

Reporting Transfusion Reactions

- All transfusion reactions (mild to life threatening) and transfusion related errors must be reported to the hospital transfusion service (Blood bank)
- The purpose of reporting transfusion reactions to the Blood Bank is to prevent further reactions from occurring by:
  - Removing companion components (from the same donor) from the blood supply (TRALI or bacterial contamination)
  - Tracking to identify processes that may mitigate and prevent future transfusion reactions (TACO, acute hemolytic reactions)
- The Blood Bank will investigate, assess, and report reactions to the TTISS (Transfusion Transmitted Injuries Surveillance System) at the Public Health Agency of Canada and Health Canada, as required.

Transfusion Reaction: Bacterial Sepsis

Clinical Presentation of Bacterial Sepsis



- Fever
- Rigors
- Tachycardia, hypotension, dyspnea
- Nausea and vomiting
- Disseminated intravascular coagulation
- Possibly no immediate clinical signs or symptoms (if the bacterial load is small).

The offending organism may be detected in the patient and the remnants of the transfused product, establishing the diagnosis of transfusion transmitted infection.

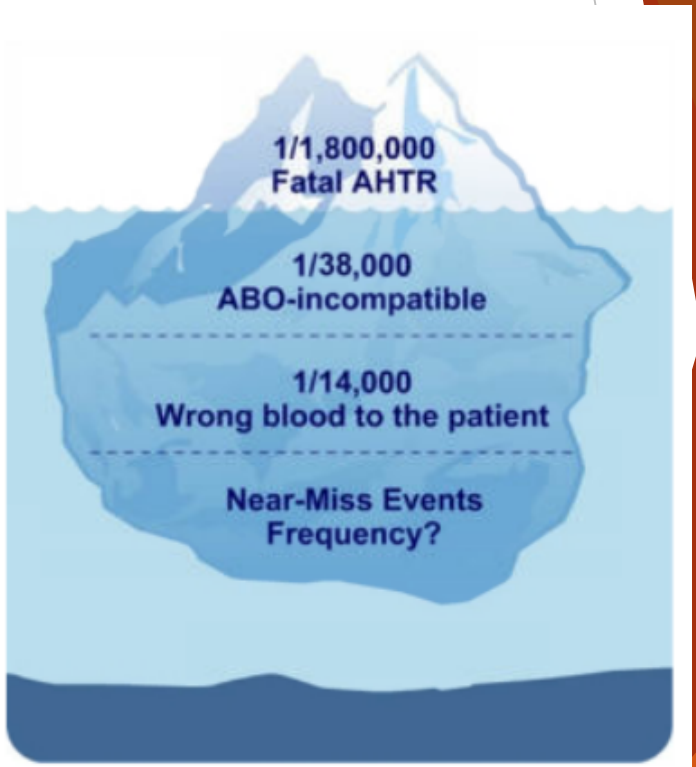
Transfusion Reaction: Acute Hemolytic Transfusion Reaction

AHTR may occur because of:

- Incompatible transfused red cells
  - ABO incompatibility
  - Other minor blood group incompatibilities
- Incompatible transfused plasma
  - Group O platelets with high titers of anti-A and/or anti-B are transfused to non-group O recipients

ABO-incompatible transfusions:

- Occur at a rate of 1 in 38,000
- Most commonly caused by clerical errors in patient identification (sample labeling or at time of transfusion)
- Fatal outcome in less than 10% of cases



Transfusion Reaction: Acute Hemolytic Transfusion Reaction

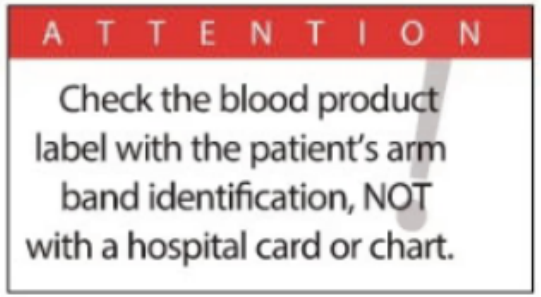
Clinical Presentation of Acute Hemolytic Reactions

The most common presenting features are

- **Fever**
- **Chills / rigors**
- **Hemoglobinuria**

- Other symptoms include nausea, vomiting, infusion site pain, flank pain, hypotension, renal failure, disseminated intravascular coagulation (DIC)

- Fever may be the first and only presenting sign



DYSPNEA: TRALI, TACO, ANAPHYLAXIS

Transfusion related acute lung injury **(TRALI):**

- Acute respiratory distress with hypoxia and bilateral chest X-Ray infiltrates
- Dyspnea and hypoxia, pulmonary capillary wedge NOT elevated
- May be indistinguishable from acute respiratory distress syndrome
- Usually occurs with RBC, PLT, and FP transfusion

1. Stop transfusion as soon as reaction is identified
2. Supportive care
3. Mechanical ventilation required in 75% of cases

DYSPNEA: TRALI, TACO, ANAPHYLAXIS

Transfusion Associated Circulatory Overload (**TACO):**

- Impaired cardiac function, and/or:
- Excessively rapid rate of transfusion
- Dyspnea, orthopnea, elevated jugular venous pressure (JVP), tachycardia, hypertension

Prevention:	Management:
1. Pre-transfusion assessment to identify patients at risk of fluid overload 2. Avoid transfusing more than one unit at a time 3. Transfuse over longer periods (e.g., 3.5hours per unit of RBC) 4. Pre-emptive diuretics before the transfusion	1. Interrupt the transfusion 2. Administer oxygen and diuretics as needed 3. Chest X-RAY 4. Restart the transfusion at a reduced rate if clinical status permits

DYSPNEA: TRALI, TACO, ANAPHYLAXIS

Anaphylaxis (Severe Allergic Reactions):

- Reactions usually begin with 1-45 minutes of starting transfusion
- Cutaneous reactions (urticarial, flushing) are present in most severe allergic reactions
- Airway obstruction with dyspnea, chest pain, chest pain, wheezing, and stridor
- Acute anxiety and feeling of “impending doom”

Management:

1. Stop the transfusion and do not restart
2. Administer 25-50mg diphenhydramine IV
3. Anaphylaxis- prompt administration of epinephrine, corticosteroids, diphenhydramine IV and supportive care including ventilator support as required
4. Epinephrine should be immediately available wherever transfusion is carried out

DYSPNEA

IMMEDIATE MANAGEMENT:

1. Stop transfusion and maintain IV access with 0.9% saline
2. Take the patient's vital signs and repeat every 15 minutes
3. Re-check name of patient and name on blood product
4. Physician assessment required
5. Notify hospital transfusion service (blood bank) and return clamped blood unit and tubing attached

- SUSPECT:
  - CIRCULATORY OVERLOAD
  - TRANSFUSION RELATED ACUTE LUNG INJURY
  - ANAPHYLAXIS
- If TRALI suspected, notify hospital transfusion service (blood bank) so that special donor and recipient testing can be performed
- Order STAT chest x-ray
- Oxygen, diuresis, and supportive care as required

Complications

Complication	Signs/Symptoms	Treatment	Extraneous
Febrile Transfusion Reaction	1 degree rise in temp. May have chills, malaise	Supportive - acetaminophen	Most Common
Hemolytic Transfusion Reaction	Fever, chills, pain at the site of reaction, nausea/ vomiting, shock, dark urine	STOP the transfusion Lots of IV fluids +/- diuretcs	Worst reaction. Often a clerical issue - ABO incompatibility
Allergic Reaction	Urticaria, pruritis, hives. Anaphylaxis is rare	Symptomatic - antihistamines. Do NOT need to stop transfusion	Note: they are not actually allergic to blood but secondary to antibodies in the blood
TRALI (Transfusion Related Acute Lung Injury)	dyspnea, hypoxemia, bilateral chest infiltrates (think ARDS)	STOP the transfusion - airway control, supportive care	Most common cause of death associated with transfusions but..better prognosis than most ARDS
TACO (Transfusion Associated Circulatory Overload)	dyspnea, edema	Give blood slowly (over 3-4 hours) Diuretics with transfusion	Often occurs in the elderly and chronically anemic

Nursing Interventions for Transfusion Reaction

- Stop Transfusion of blood product
- Run NS
- Stay with patient and call for RN support
- Collaborate with RN for required interventions and physician orders

Code Omega: Windsor Regional Hospital

Effective April 1, 2019

- Code Omega (Massive Hemorrhage/Massive Transfusion) Policy
- Initiated by the Most Responsible Physician (MRP) who contacts Transfusion Medicine to commence this code.
- Only initiated in the following locations:
  - Emergency Department
  - Obstetrical Units
  - Endoscopy Suites
  - Interventional DI
  - Cardiac Cath Lab
  - Operating Rooms
  - Critical Care Units
  - All other areas call a Code Blue then transfer to appropriate area to follow Code Omega protocols (Physician, Nurse, Lab checklists)

This is a resource intensive emergency Code for many responding departments. Do not contact Lab services for non-urgent issues until the ***Code Omega "All Clear"*** has been called.

Code Transfusion: Erie Shores Healthcare

- Code Transfusion (Massive Hemorrhage/Massive Transfusion) Policy
- Initiated by the Most Responsible Physician (MRP) who contacts Transfusion Medicine to commence this code.
- Only initiated in the following locations:
  - Emergency Department
  - Obstetrical Units
  - Endoscopy Suites
  - Interventional DI
  - Cardiac Cath Lab
  - Operating Rooms
  - Critical Care Units
  - All other areas call a Code Blue then transfer to appropriate area to follow Code Omega protocols (Physician, Nurse, Lab checklists)

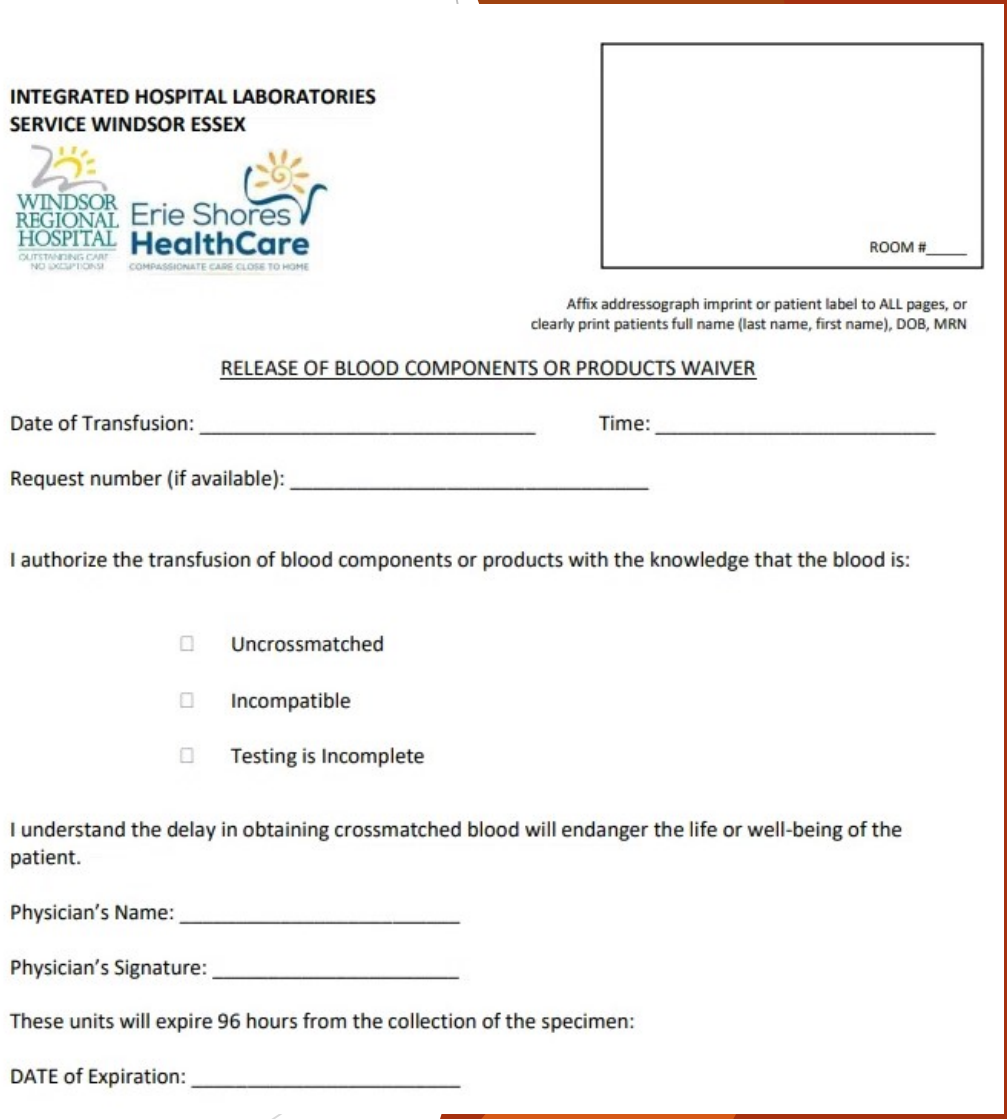
This is a resource intensive emergency Code for many responding departments. Do not contact Lab services for non-urgent issues until the ***Code Transfusion "All Clear"*** has been called.

Release of Blood Components or Products WAIVER

TO BE COMPLETED IF:

- Compatibility testing has not been completed by the Blood Bank
- The unit have been found to be *least incompatible*
- It is emergent, and the risk to the patient receiving this component or product without comprehensive testing is less than the risk of waiting for testing to be complete

- A sample of the patient's blood should be taken BEFORE blood is administered, to ensure that any subsequent units may be properly crossmatched.
- The tag attached to the unit of blood must be clearly labeled with the red "UNCROSSMATCHED" sticker.
- The technologist will complete a full crossmatch on the released unmatched units, and report any incompatibilities to the attending physician immediately.
- The attending physician must sign a "Release of Blood Waiver" or "Uncrossmatched Blood or Multiple Issue of Blood Product" form for Uncrossmatched Blood.



INTEGRATED HOSPITAL LABORATORIES
SERVICE WINDSOR ESSEX

WINDSOR REGIONAL HOSPITAL
Erie Shores HealthCare

ROOM #____

Affix addressograph imprint or patient label to ALL pages, or clearly print patients full name (last name, first name), DOB, MRN

RELEASE OF BLOOD COMPONENTS OR PRODUCTS WAIVER

Date of Transfusion: _____ Time: _____

Request number (if available): _____

I authorize the transfusion of blood components or products with the knowledge that the blood is:

- ☐ Uncrossmatched
- ☐ Incompatible
- ☐ Testing is Incomplete

I understand the delay in obtaining crossmatched blood will endanger the life or well-being of the patient.

Physician's Name: _____

Physician's Signature: _____

These units will expire 96 hours from the collection of the specimen:

DATE of Expiration: _____