ADMINISTRATION OF BLOOD COMPONENTS: SYRINGE METHOD (RED CELLS, PLATELETS, PLASMA, & CRYOPRECIPITATE)

PROCEDURE

Purpose

To provide guidelines for the administration of blood components (red blood cells, platelets, plasma and cryoprecipitate) via syringe delivery

Site Applicability

BC Children's Hospital

Practice Level/Competencies

Administration of blood is a basic skill for regulated health care professionals. At C&W Health Care Professionals (HCP) also receive education in general onboarding orientation and must complete the relevant education module on Learning Hub, Pediatric Blood Administration (6626).

Equipment

- Patient chartlet
- Patient identification band
- Workstation on Wheels
- Personal Protective Equipment (PPE): gloves, goggles, +/-gown, mask
- Chlorhexidine/alcohol swabs
- Cap (for post transfusion CVC cap change)
- Sterile white cap (to cap off existing infusion)
- 10 mL pre-filled syringes with 0.9% Normal Saline for priming & flushing the line
- Microbore 60''tubing
- Infusion pump "brain"
- Syringe pump

From Transfusion Medicine Laboratory (TML)

- Pre filtered blood component in a 50 mL syringe
- Transfusion tag attached to syringe
- Transfusion record

Procedure

PRE-TRANSFUSION	
Steps	**Rationale**
1. **CHECK** patient health record for patient allergies and **REVIEW** provider order for: • Patient identifiers • Blood component type • Priority, see definition list • Quantity description (mL or unit) • Frequency • Dosing (mL/kg) • Special Requirements • Date of the transfusion • Total Quantity • Route of administration • Administer over (duration of transfusion) • Transfusion dosing weight • Indication • Other requirements • Pre-medication	*Transfusion order is required.* *Refer to definitions for priority list and definitions*

• Instructions to nurse and communication orders • Transfusion Requirements component (in respective mPage) for oncology/ hematology /BTM patientsidentifiers	*Most oncology/hematology/BTM patients have additional transfusion requirements.*
2. **ENSURE** that informed consent for transfusion is complete. **REFER** to Informed Consent for Administration of Blood Products Policy. **Informed consent need not be obtained in the following situations:** • When urgent treatment is necessary to preserve a patient's life and continuing health, and • When it is not reasonably possible to obtain consent, and • When there is no substitute decision maker	*Informed consent is required by law for the transfusion of blood. Is the consent current?* • *Consent for transfusion is applicable* • *for the duration of a **hospital stay**, **or*** • *applicable for the **course of the treatment** in the case of ongoing treatment* • *A **course of treatment** is defined as the total course of therapy from induction to completion of treatment.* • *For patients with prolonged transfusion needs consent should be obtained annually*
3. **DETERMINE** if a Group and Screen (G&S)/ Cross Match is required. • **Refer** to the blood component factsheets, see reference list, and Pre-Transfusion Sample Collection Reference Guide. • **Check** for G&S in the Transfusion History component, or in Results Review->Transfusion tab • **Arrange** for G&S collection if there is no G&S	*A G&S is required for red blood cell transfusion.* •
4. **ENSURE** that the family is aware of the planned transfusion. • **Explain** reason for transfusion and transfusion procedure to family. • **Provide** family with the information pamphlet "Blood Transfusion Answers to Some Common Questions" if necessary.	*Allows the family to prepare for the procedure. To ensure that the family understands the reason for transfusion and the transfusion procedure.*
5. **ENSURE** that the patient is wearing an identification band (ID). **No identification band/card, No Transfusion** See: Administration of Blood Products Transfusion Practice Standards # 4 for exceptions to ID band workflow.	*Failure to correctly identify patients prior to procedures may result in errors, see VPP Policy: Patient-Client-Resident Identification.* *A missing identification band is a significant factor in patient misidentification and wrong blood to patient incidents.*
6. **ENSURE** peripheral vascular access or central vascular access line of sufficient gauge is established for the transfusion of blood based on clinical status of patient and urgency of transfusion, see table 1 below.	*Gauge or lumen size should be large enough to allow the flow of the blood within the specified administration time and to prevent cell damage.*

Table 1: Intravenous Access for Administration of Blood Components (Syringe)

Peripheral Intravenous Access		
Patient Group	Lumen Size	Comment
Pediatric	22 and 24 Gauge	Suitable for blood transfusion
Neonatal	greater than or equal to a 26 Gauge	Suitable for blood transfusion
Central Venous Access Devices		
Patient Group	Lumen Size	Comment
All	All	Suitable for blood transfusion
Cuffed & Uncuffed Peripherally Inserted Central Catheter (PICC)		

Patient Group	Lumen Size	Comment
Pediatric Neonatal	3 French or greater	Suitable for blood transfusion.
Pediatric Neonatal	2 French or smaller	**DO NOT** use for blood transfusion.
Uncuffed Double Lumen 4 French PICC		
Patient Group	Lumen Size	Comment
Pediatric Neonatal	20 Gauge (= 3 French)	Suitable for blood transfusion
Pediatric Neonatal	23 Gauge (= 2 French)	**DO NOT** use for blood transfusion

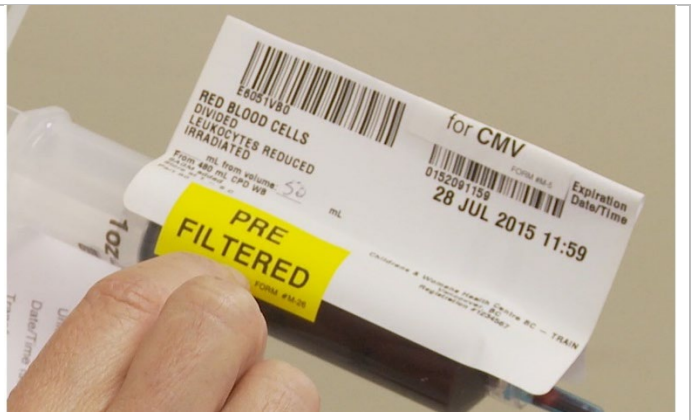
7. **ENSURE** a dedicated line for the administration of blood component. Blood components are compatible with 0.9% Normal Saline and Plasma-Lyte only. **Note:** Co-administration of morphine or hydromorphone with red blood cells can be considered as a last resort for optimal pain management. If approved by a physician, co-infusion of morphine or hydromorphone in 0.9% Normal Saline Y-connected with a blood component is acceptable. The morphine or hydromorphone infusion line should be connected to the port most proximal to the patient and distal from the blood component. A Y-connector with back check valves must be used to prevent backflow.	*To avoid inadvertent co-administration of incompatible fluids or medications.* *Electrolyte and colloid solutions containing calcium should not be administered with blood components as they may cause clotting in the infusion line.* *D5W or hypotonic sodium solutions may cause hemolysis.*
8. **PERFORM** a pre-transfusion patient assessment **Measure** baseline vital signs: • Heart rate • Blood pressure • Temperature • Respiratory rate For patients considered **high risk:** • assess O_2 saturation level • complete a chest auscultation • review fluid balance The baseline vital signs must be recorded no greater than 60 minutes before the start of the transfusion and **before un-capping the syringe**.	*Identify any clinical manifestations that may:* • *necessitate delaying the transfusion e.g. fever.* • *be confused with a transfusion reaction e.g. pre-existing rash.* • *Increase the risk for transfusion-associated fluid overload, e.g. positive fluid balance.* *Extra assessment suggested for patients with:* • *with coexisting medical conditions such as renal failure, or* • *with cardiovascular disease, or* *history of repeated transfusion reactions*
9. **REVIEW** the patient's transfusion reaction history in the Transfusion History component in respective mPage.	*To check for previous transfusion reactions.*
10. **ADMINISTER** premedication as ordered.	*Timing of pre-medication administration should ensure maximum effectiveness.*
11. **DOCUMENT** in Electronic Health Record: • Vital signs: Blood Product Administration band • Education: Blood Product Administration band • Focused assessment findings: Adult, Pediatric, or Newborn Systems Assessment bands • Interventions and response to interventions: Narrative Note (title should denote Blood Product Interventions/Response)	*Establish baseline levels so that any transfusion-related deviations in patient's clinical condition will be recognized.*

• Pre-medications administered: eMAR	
12. **ASSEMBLE** required equipment. **Note:** Blood components issued in a syringe are pre-filtered and do not require a filter at the time of administration.	
13. **ARRANGE** for the transport of the blood component from TML once alerted that it is ready for pick up. **REFER** to Transport of Blood reference guide on SHOP. • **Print** and **complete** the Blood Release Request Form. • In **Orders Profile** select patient care **tree** • right click on administration blood product order • select print • select reprint requisition, then choose printer • Send to TML: • Via 6-inch pneumatic tube system (PTS) to station 610, for units in TACC. • Fax to 3413, for units in the **1982 building** or when the PTS is not working.	*TML will not send the blood until they receive a blood release request form.* *To alert TML that are ready for the blood component.* *The form can be printed in Cerner, or the "down-time" form can be used.* *If the order to transfuse is not placed in Cerner, the "down-time" form MUST be used.*
14. **PERFORM** the **pre-transfusion checking process immediately** after the component arrives and **before un-capping the syringe,** as outlined below. The checking process **must** be completed: • By two health care professionals (HCP) with the required competencies, one of whom must initiate the transfusion. • In the presence of the patient, not at the nurses' station, back room, or other location remote from the patient. • **Steps a & b** can be performed immediately outside the patient's room. • **Step c** must take place at the bedside. • The same two HCPs must complete all steps. • Steps a, b, and c must be performed immediately after each other. • The blood component must not be removed to a different location during or after the pre-transfusion checking process. • Steps b and c must be repeated if: • the checking process is interrupted, *or* • the blood component is removed from the patient's presence (immediately outside their room or the bedside), *or* • there is a delay in starting the transfusion	*Patient safety.* *Most transfusion-associated mortality is due to patients receiving blood intended for another patient.* *To minimize the potential for interruptions, distractions and reduce the risk of error.* *Transfusion Medicine accreditation standards stipulate that the pre-transfusion checking process must occur in the presence of the patient.* *As a routine practice of infection prevention and control, any item(s) brought into patient rooms should not be taken back out.* *Removing the component from the bedside after the final check is a patient safety issue because it compromises the intent of the checking process.*
Pre-transfusion checking steps **a. Visual Inspection:**	*To detect any abnormalities that may indicate that the transfusion should not proceed.* *A leaking syringe poses a **serious risk for***

The integrity of the blood component is checked for: • Leaks at syringe cap • Abnormal colour • Excessive air or bubbles • Any evidence of hemolysis • Clots • Clumping • Turbidity **Note:** If there are concerns about the integrity of blood component: ▪ The transfusion must be withheld ▪ Contact TML at 7388 • if the concerns about the integrity are resolved, the transfusion can proceed • if the concerns about the integrity are not resolved, the transfusion should not proceed: ▪ inform the provider ▪ return the component to TML	***bacterial contamination of component and patient.***
b. Documentation checks: order to transfuse, consent form, transfusion record, product tag, and syringe label. • **CONFIRM** that consent has been obtained and is current. • **COMPARE** the patient details: • First and last name • Medical Record Number (MRN) • Date of Birth (DOB) **On** • Banner bar / Demographic Sheet • Order to transfuse • Consent Form • Transfusion Record • Product tag • **CHECK** the order to transfuse for: • Blood component type • Priority, see definition list • Quantity description (mL or unit) • Frequency • Dosing (mL/kg) • Special Requirements • Date of the transfusion • Total Quantity • Route of administration • Administer over (duration of transfusion) • Transfusion dosing weight • Indication • Pre-medication • Instructions to nurse and communication orders	*The intended patient must be properly identified prior to transfusion.* *Consent is required for transfusion of all blood components.* *To ensure that you are aware of the infusion rate, special requirements, any modifications, and pre or post medications etc. that have been ordered for the transfusion.* *To ensure that patient information and component details on the transfusion record and component tag match.* *To ensure donor/patient compatibility.* *Most oncology/hematology/BTM patients have additional transfusion requirements.*

- Transfusion Requirements component (in respective mPage) for oncology/hematology /BTM patients

- **COMPARE** details on the transfusion record, product tag and syringe label .
  Patient information (top left):
  - First and last name
  - MRN
  - DOB
  - ABO and Rhesus factor
  Component information (top right):
  - Unit number
  - ABO and Rhesus factor
  - Component type e.g., red cells, platelets etc.
  - Unit attributes (special requirements) e.g., irradiation or irradiated equivalent
  - Expiry date and time
  - Volume issued
  Check:
  - For “pre-filtered” sticker on syringe
  - Compatibility status (left side)
  - TML comments in the ‘comment” section
  - Date/time issued (right side)



TML include a prime volume for RBCs, plasma and platelets.
The issue time is important because RBCs, plasma & cryo issued in a syringe must be transfused within 4 hours of issue.
Platelets issued in a syringe have a shorted expiry time.

b. Family involvement and patient identification check:

- The same two HCP must complete step c at the bedside.
- Step one is completed if the family is present and willing to participate in the checking process.
- Steps two and three **must be completed for all transfusions** regardless of the family participation in step one.

1. **ASK** family, where possible, to state their child’s full name and DOB and compare their response to patient full name and DOB on patient ID band or ID card.
2. **COMPARE** the patient identifiers (listed below) on the ID Band/Card against the patient identifiers on product tag:
   - First and last name
   - DOB
   - MRN
3. **CONFIRM** that the patient identifiers on the ID band/card and the product tag are correct and match

Note: If you find any **discrepancies DO NOT proceed**. Contact TML at 7388 immediately.

- if the discrepancy is resolved, the transfusion can proceed

• if the discrepancy is not resolved, the transfusion should not proceed: • inform the provider • return the component to TML The product tag must remain attached to the syringe for the duration of the transfusion.	
15. **DOCUMENT** the checking procedure: • **Transfusion Record:** • Signatures of HCPs who carried out the checks • Date • Start time • **Do not** complete the product tag now, it is completed at the end of the transfusion.	*To confirm that the pre-transfusion checking procedure has been completed.* *The product tag must remain attached to the syringe for the duration of the transfusion for traceability purposes and is completed at the end of the transfusion.*

TRANSFUSION	
PROCEDURE	***RATIONALE***
16. **INITIATE** the transfusion immediately after the pre-transfusion checking process is completed. • If the transfusion is delayed, **return** the blood component to TML immediately. • Never store the component on the unit or in a medication fridge.	*If a blood component is out of temperature-controlled storage for greater than 30 minutes, it may have to be discarded.* *Blood must be stored in special fridges.* *These methods may damage the component and cause harm to the patient.*
17. PRIME, as per aseptic no-touch technique. • **Wash** hands; apply personal protective equipment and prepare field and equipment. • **Prime** microbore tubing with blood product. • **Load** syringe into syringe pump and prime using prime option on pump. **Label** pump channel. • **Program** pump to run at the appropriate/prescribed infusion rate, see infusion rate table below. **Confirm** the programmed rate and volume to be infused. • **Clamp** IV. **Delay** existing infusion for the durations of the transfusion. • **Disconnect** existing infusion. **Connect** sterile white cap to disconnected line to maintain sterility. • **Clean** connection cap. **Flush** with 0.9% Normal Saline and **clamp.** • **Connect** blood component line to patient's IV access and **start** transfusion, see table below	*To prevent contamination of the component.* *Prevent errors in the rate of infusion.*

Table 2: Infusion Rate Table for Non-Emergency situations

INFUSE each syringe at 1 mL/kg/hr, **up to a maximum of 50 mL/hr** (when component reaches the patient), for first 15 minutes.
If a major ABO incompatibility exists or a severe allergic reaction such as anaphylaxis occurs, symptoms usually appear early in the transfusion.
***Applies to all syringes in a multi-unit transfusion**
ADJUST the flow to the appropriate/prescribed infusion rate, if there are no signs or symptoms of a transfusion reaction during the first 15 minutes.

Component	Infusion Rate	Maximum Rate	Expiry Time
Red Blood Cells	2-5 mL/kg/h	5 mL/kg/h	Infuse within 4 hours of issue from TML
Platelets	Over 60 Minutes	20mL/kg/h	Check expiry time on transfusion record*
Plasma	5 to 10 mL/kg/h	10 mL/kg/h	Infuse within 4 hours of issue from TML
Cryoprecipitate	10 to 20mL/kg/h	20mL/kg/h	Infuse within 4 hours of issue from TML

*Platelets issued in a syringe have a short expiry time.

- **These rates may be exceeded in emergency situations**.

18. MONITORING see table 3 below.

- **Instruct** the family to inform a HCP immediately if they observe:
  - Hives, rash or itching
  - Their infant feels hot to touch
  - Difficulty in breathing

Patients will be aware of the:

- *S&S of a transfusion reaction*
- *actions to take should they experience a transfusion reaction*

Table3: Patient Monitoring During Blood Component Transfusion

Remain with, or be able to **closely observe**, the patient for the **first 15 min** following the start of each unit (when component reaches the patient) and observe for signs and symptoms of a transfusion reaction.
Serious and life-threatening reactions can occur unpredictably and progress rapidly therefore patients must be closely monitored throughout the transfusion.

Infants (less than 4 months old)	Pediatric
Measure Vital signs:	Measure Vital signs:
• After 15 minutes • **After 30 minutes** • After 60 minutes • Hourly for remainder of the transfusion	• After 15 minutes • After 60 minutes • Hourly for remainder of the transfusion

Vital signs include:

Heart rate	Temperature	O_2 Saturation level for infant & patients with altered or changing respiratory status
Blood Pressure	Respiration Rate	

Patients should **remain in the clinical area** at all times. Patients who **must leave** the clinical area during the transfusion, e.g. during transfer, must be **accompanied by an RN**.

19. Transfer of care:
Includes shift change, between units, and, rarely, from a different hospital.

- **Review** the order to transfuse.
- **Check** the patient identifiers on the ID band, label on syringe, and product tag
- **Check** the infusion rate/pump setting.
- **Calculate** the end time by checking the issue time on the transfusion record
- **Review** the vital signs.
- **Inform** TML if a patient is transferred from a different hospital with a transfusion in progress.

20. If a second syringe is required**:** • **NOTIFY** TML one hour before it is required • **REPEAT** steps 12 to 17 • Change the microbore tubing when changing syringes. • Platelets must not be transfused through microbore tubing which has been used for red cells.	*To ensure TML staff have sufficent time to prepare the required blood component* *Red cell debris may trap the platelets.*
21. In the event of a suspected transfusion reaction: **STOP the transfusion immediately:** • **Administer** 0.9% Normal Saline • **Reassess** patient vital signs • **Seek** assistance and **notify** physician • **Reconfirm** unique identifiers on both patient and blood component • **Refer** to Transfusion Reaction Procedure & Reference guide • **Complete** Transfusion Reaction Report Form (available in FormFast)	*To minimize patient harm.* *To keep the vein open.* *To seek direction for patient management.* *To ensure correct procedure is followed.* *To report the transfusion reaction.*
POST-TRANSFUSION	
STEPS	***RATIONALE***
22. COMPLETION of transfusion**.** • **Stop** the infusion when the prescribed volume is infused. • **Clean** the connection between microbore tubing IV access. • **Disconnect** the microbore tubing and syringe line. • **Flush** the connection with 0.9% Normal Saline using prefilled syringe. • **Reconnect** and **start** previously set aside existing infusion(s) or **saline/heparin lock** as per prescriber's orders. • Use minimum volume for fluid restricted patients.	*Volume issued in the syringe allows for some discard in the microbore tubing.* *To ensure all the component is cleared from the connection.*
23. DISCARD syringe and microbore tubing in biohazard container	*Routine infection control practices.*
24. PERFORM post transfusion blood work if ordered.	*To monitor the response to the transfusion.*
25. PATIENT MONITORING: • **Record** vital signs check within one hour of the end of the transfusion. • **Observe** in-patients for signs & symptoms of a transfusion reaction post transfusion	*Transfusion reactions can occur after the completion of the transfusion, usually within 6 to 8 hours.*
26. COMPLETE transfusion medicine documents: • **Transfusion Record (line 2):** • Time ended • Volume transfused • Transfusion reaction noted: yes/no • **Product Tag:**	*Traceability requirements.*

• Date transfused • Transfusion reaction noted: yes/no	
27. **FILE** transfusion record in patient's chartlet.	*Traceability requirements.*
28. **GIVE** the family the patient notification tag section of the blood component tag. The notification tag may be filed in the chartlet; but MUST be given to the family at discharge.	*All patients who receive a blood component should receive notification of the transfusion in writing.*
29. RETURN the completed product tag to TML: • For units is TACC sent via the pneumatic tube system to station 610. • For units in the **1982 building:** • put the tag in an **envelope** marked "**Forward to TML**", *and* • send to **tube** station **343** (Lab/accessioning)	*Traceability requirements.* *To protect patient privacy.* *Staff need to know where to forward the envelope with product tag.*
30. For outpatients, • **REVIEW** post transfusion care, *and* • **Give** the "Heading Home After a Transfusion" form to the family (available in FormFast). • **Discharge** when clinically stable.	*The family should be aware of the potential of transfusion reactions and post transfusion care.*

Documentation

In Electronic Health Record:

- Volume infused: Blood Product Administration band -> Transfusion Data iView section
- Vital signs: Blood Product Administration band
- Focused assessment findings: Adult, Pediatric, or Newborn Systems Assessment bands
- Interventions and response to interventions: Narrative Note (title should denote Blood Product Interventions/Response)
- Complete transfusion orders as per inpatient or outpatient workflows: Orders Profile

Traceability

- The transfusion record and product tag must be completed to ensure full traceability of the blood component.
- The transfusion record is retained in the patient chartlet.
- The product tag is returned to transfusion medicine once the transfusion is complete.

Patient & Family Engagement/Education

- Provide the patient/family with the information pamphlet "Blood Transfusion Answers to Some Common Questions (Pediatric)", before the transfusion.
- Give the patient notification tag to the patient/family at the time of the transfusion or at discharge.
- Give the Heading Home After Transfusion Form and provide education about reporting reactions post-discharge to patients discharged post-transfusion.

Definitions

- **Blood component**: a therapeutic part of blood intended for transfusion, e.g. red cells, platelets, granulocytes, plasma, and cryoprecipitate.
- Red cells: blood component containing concentrated red cells
- Platelets: blood component prepared from whole blood or by apheresis, consisting of platelets suspended in plasma or an approved storage solution
- Plasma: Clear portion of whole blood that is separated by centrifugation and stored frozen.
- Cryoprecipitate: the cold-insoluble portion of plasma prepared from frozen plasma

- Irradiated: blood components that have been exposed to gamma radiation
- **Transfusion**: all activities related to the processes of administration of blood components
- **Transfusionist**: individual who administers a blood transfusion
- **Priority list:**
  - **STAT:** Highest priority, ready as soon as possible
  - **Urgent:** Second highest priority, ready within one hour
  - **Routine:** Ready in four hours.
  - **Timed:** Ready at requested time

Aseptic no-touch technique: a standardized technique that is used during clinical procedures to identify and prevent microbial contamination of aseptic key parts and key sites by ensuring that they are not touched either directly or indirectly. A 'key part' is the part of the equipment that must remain sterile and must only contact other key parts or key sites. Or it is the area on the patient such as a wound, or IV insertion site that must be protected from microorganisms. Aseptic key parts can only contact other aseptic

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Factsheets:

- Red Blood Cells
- Platelets
- Plasma
- Cryoprecipitate

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Developed By

CW Transfusion Medicine – Transfusion Safety Nurse Clinician

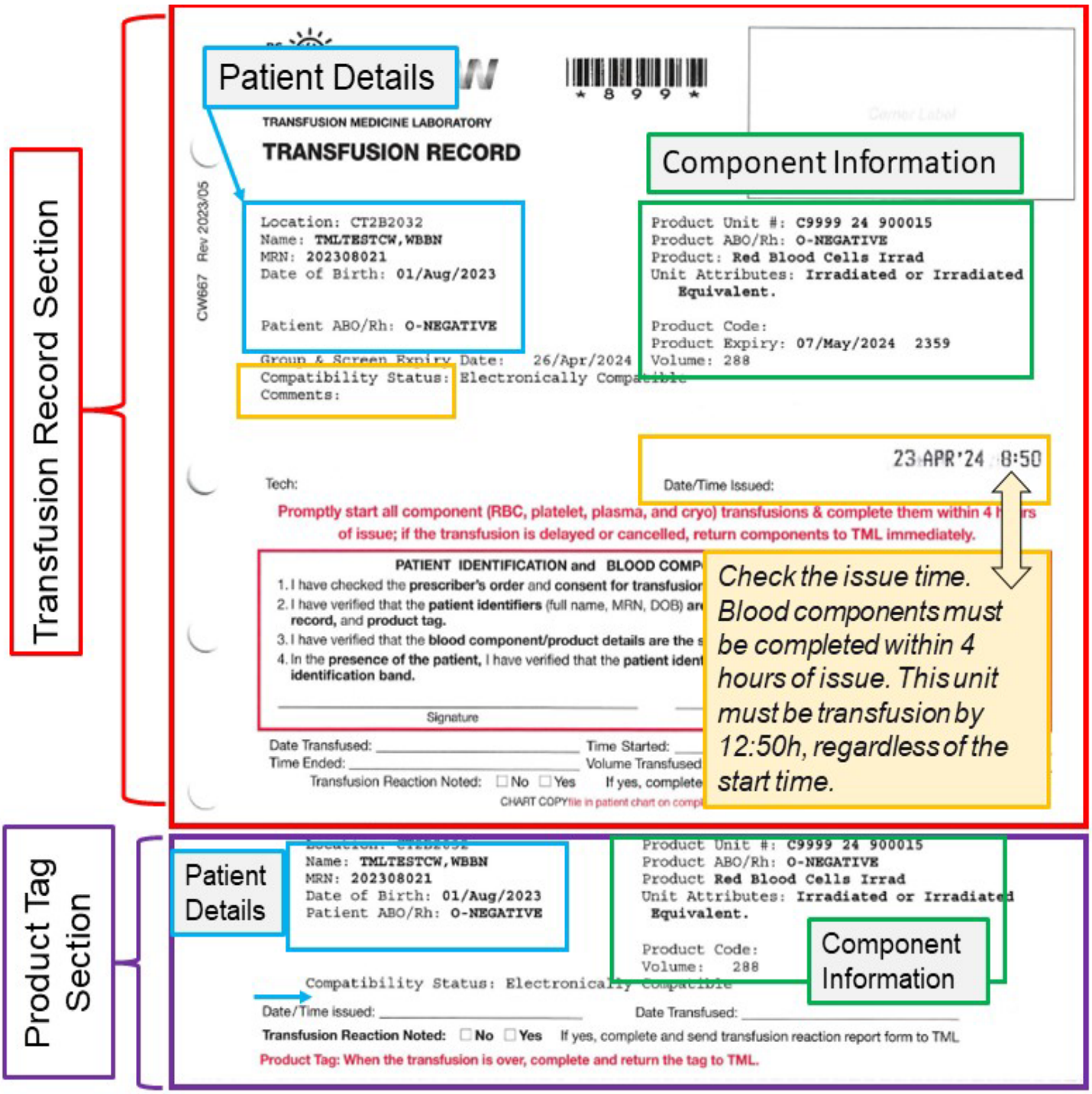
Version History

DATE	DOCUMENT NUMBER and TITLE	ACTION TAKEN

13-Jul-2021	C-05-12-62544 Administration of Blood Products: Syringe Method	Approved at: Transfusion Safety Committee
12-Apr-2022	“”	“
10-May-2022	“	“
17-Apr-2023		Approved at: Transfusion Safety Committee
14-Feb-2025		“

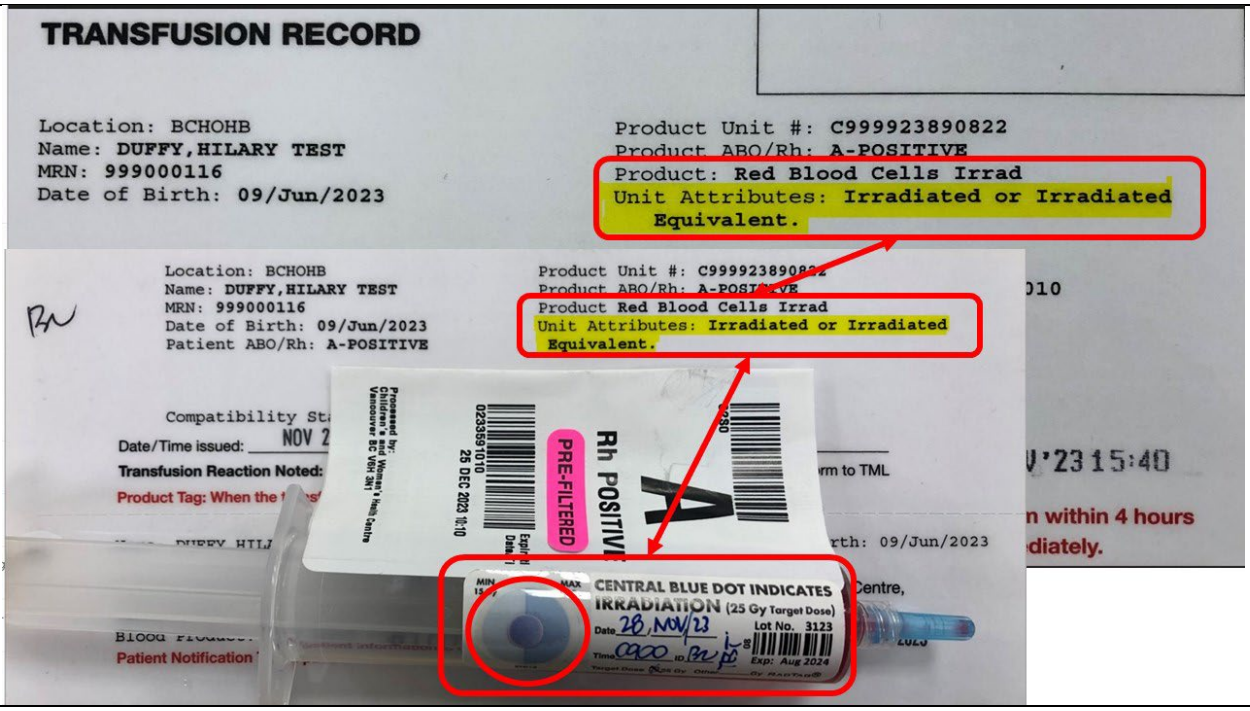
Disclaimer

Appendix 1 Transfusion record / Product Tag Layout



Appendix 2: How to check irradiated components

Red Blood Cells



Platelets