Ontario Regional Blood Coordinating Network

Inspiring and facilitating best transfusion practices in Ontario.

RBC Transfusion: How to Start & Finish; What About In Between?

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

November 27, 2024

Speaker Disclosure

- No commercial product conflicts of interest to declare.

- Transfusion Transmitted Injuries Surveillance System, member Education Committee.
- Canadian Society of Transfusion Medicine, member Standards Committee.

- Focus is adult, routine/non-urgent transfusion.
- Some information is shared for your interest & reference.
- All patient case information presented is fictitious, fabricated to enhance this learning opportunity.

Transfusion Knowledge Question 1 - Pre

A requirement for routine/non-urgent RBC transfusion is:

a) Pre-transfusion, the RBC unit is at room temperature.
b) The patient has not received IV antibiotics within 4 hours pre-transfusion.
c) The RBC unit is crossmatched, compatible.
d) The RBC unit is diluted with 50 mL 5% albumin by Transfusion Medicine Lab (TML).

Transfusion Knowledge Question 2 - Pre

When administering RBC transfusion, it is *most imperative* to document on the patient's health record:

a) RBC transfusion start and stop (finish) times.
b) The patient's vital signs.
c) The RBC unit's volume.
d) The RBC unit's unit number (e.g., CO556 24 317655).

RBC Transfusion: How to Start & Finish; What About In Between?

Learning Objectives
by engaging in this learning, participants will be able to:

1. Define the fundamental principles for safe transfusion of an RBC unit.
2. Explain the procedure for checking an RBC unit, including patient identification & compatibility.
3. Understand idiosyncrasies of IV access, blood tubing & filter, infusion rate, & patient monitoring.
4. Describe RBC transfusion documentation requirements.

Outline:

- Transfusion Checklist
- RBC Transfusion Guidelines
- Transfusion Medicine (TM) Patient Identifiers
- Group & Screen, Crossmatch
- Checking an RBC Unit
- IV access, blood tubing & filter, infusion rate, & patient monitoring.
- What to document (how is included in your hospital's policy/procedure)

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

✓ **Informed Consent**
- Per policy/procedure, questions addressed
- Exception: emergent, life-threatening bleed

✓ **Transfusion Order**
- Indication supported: labs, signs, symptoms
- Complete, required information included

✓ **Group & Screen Testing**
- 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**
- Educate: symptoms indicative of reaction
- Assess for transfusion history and TACO risk factors; follow up if indicated

✓ **Prepare the Equipment**
- 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)
- Patient identification (surname, first name, unique identification number) and order

TRANSFUSION

✓ **Checking Blood Components/Blood Products**
- 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)
- 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)
- 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**
- If any adverse/unexpected/serious symptoms, **STOP** transfusion; refer to TTISS Reaction Chart

POST-TRANSFUSION

✓ **Completing the Transfusion**
- 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:
  - at end of transfusion
  - periodically post-transfusion (reactions may occur 4 hours post-transfusion; for dyspnea reactions up to 24 hours post transfusion)

✓ **Documentation**
- 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

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Ontario Regional Blood Coordinating Network

June 2021, version 1.0 Ontario Regional Blood Coordinating Network

Patient Case – Question 1

Pebbles Flint, a 25-year-old previously healthy female, was diagnosed with Hodgkins' Lymphoma 12 weeks ago.
Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions.

Vital Signs	Temperature (°C)	BP (mmHg)	Pulse (per minute)	Respirations (per minute)	Oxygen Saturation (%)
2024/11/27 0830 hrs	36.8	110/60	66	18	95

Her prescriber might order:

a) 2 units RBC, transfuse each unit over 2 hours.
b) Feramax (oral iron supplement) 150 mg PO daily.
c) 1 unit RBC, transfuse over 2-3 hours.
d) No transfusion order, Pebbles is progressing appropriately.

Transfusion Guidelines: RBC Indications

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

Do not transfuse based on only Hb. Clinical assessment is required.

Adults, not actively bleeding:

- Hb < 70 g/L; 1 unit RBC transfusion likely appropriate (younger adults with low risk of ischemic cardiovascular disease, in some scenarios may tolerate greater degrees of anemia).
- Hb < 80 g/L. Consider 1 unit RBC transfusion, with pre-existing cardiovascular disease or evidence of impaired tissue oxygen delivery (tachycardia, hypotension, cardiac ischemia, syncope, pre-syncope).
- Hb ≤ 90 g/L. Transfusion likely inappropriate unless evidence of impaired tissue oxygenation, acute myocardial infarction (2024 new traumatic brain injury data).
- *Hb > 90 g/L. Transfusion likely inappropriate unless an extraordinary scenario (discuss rationale with patient; document indication in patient health record).*

Transfusion Guidelines: RBC Dose & Details

Adults, routine, non-urgent:

- 1 unit
- Volume = about 300 mL
- RBC shelf-life: 42 days,
  Stored at 1-6°C in approved, monitored refrigerator.

- Transfuse over 2 - 3 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 test result) indicates need.

Patient Case

Pebbles Flint, a 25-year-old previously healthy female, was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions.

Transfusion Order: 1 unit RBC, **irradiated**, transfuse over 2 - 3 hours.

Patient Case – Question 2

Pebbles Flint, a 25-year-old previously healthy female, was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions.

Transfusion Order: 1 unit RBC, irradiated, transfuse over 2 - 3 hours.

You are going to draw her blood for group & screen test.
Pebbles' Patient Identification armband is on her bedside table.
Your first step is:

a) Check Patient Identification on the transfusion order.

b) Draw the blood, identify Pebbles by asking her to state her surname, first name and date of birth.

c) Do not draw Pebbles' blood. Follow hospital policy & procedure for applying armband Patient Identification to a patient.

d) Confirm a second Patient Identification armband for Pebbles is taped to your computer.

Transfusion Medicine Patient Identifiers

Patient Identification = Patient Safety

FLINT, PEBBLES
U #: M000004091
DOB: 24 Apr 1999
DR. ROBERT BEAR

- Hospital Policy & Procedure
- TML Policy & Procedure (Standards)
  - Unequivocal identification.
  - Wearing an identification armband.
  - In the presence of the patient.
- TM Identifiers – Patient/Recipient
  - First and last name
  - Unique identification number
- Rationale:
  VEIN TO VEIN TRACEABILITY

Patient Case – Question 3

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband.

Transfusion Order: 1 unit RBC, irradiated, transfuse over 2 - 3 hours.
You draw her blood for group & screen test.

The group & screen test:

a) Determines the patient's ABO and Rh(D) blood groups.

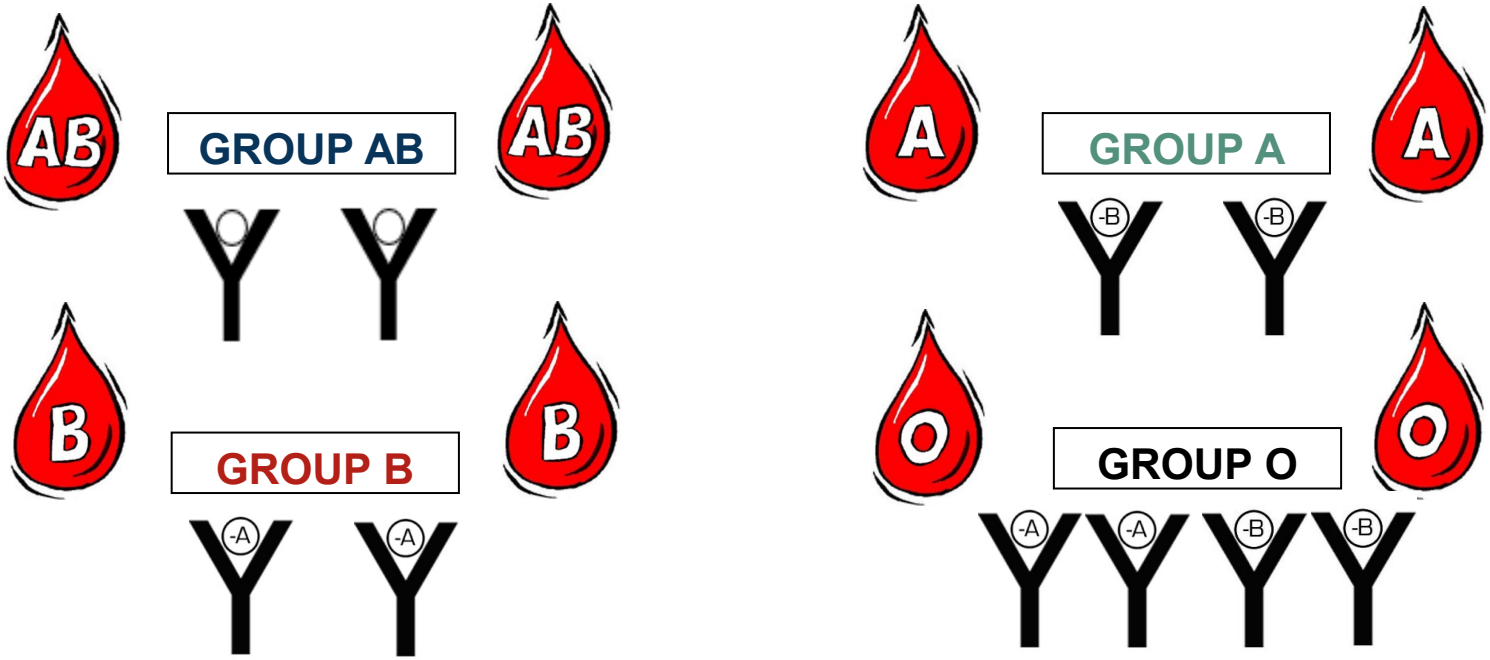
b) Results are required to issue crossmatched, compatible RBC unit.

c) Determines the patient's ABO and Rh(D) blood groups and absence/presence of common clinically significant antibodies.

d) Both a) and b).

e) Both b) and c).

Group & Screen, Crossmatch:
ABO Blood Group System (Antigens, Antibodies)



ABO Antibodies

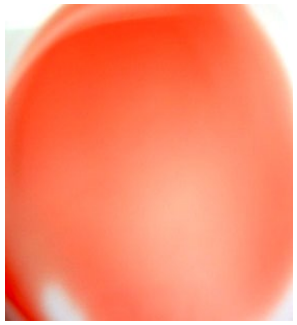
- are naturally acquired, starting at 4 months of age.

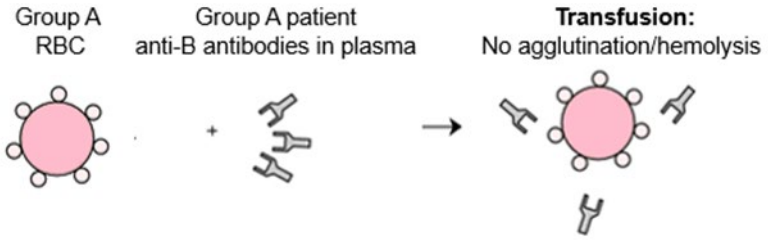
  If, the antigen is present on the surface of the red blood cells,
  then the corresponding antibody will NOT be in the plasma.
  If, the antigen is NOT present on the surface of the red blood cells,
  then the corresponding antibody will be in the plasma.

- cause immediate intravascular red blood cell destruction, may lead to severe/fatal hemolysis

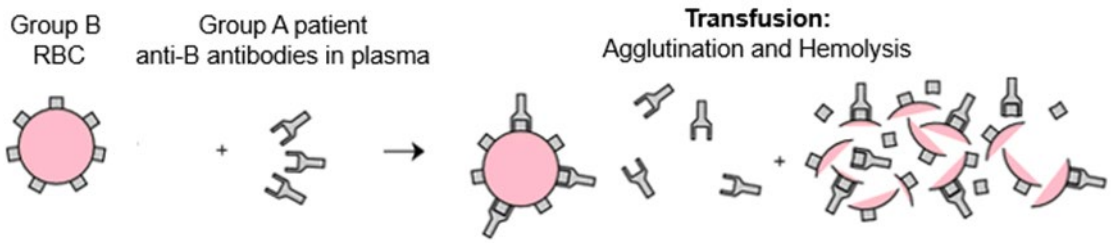
Group & Screen, Crossmatch: ABO Compatibility

RBC unit Group A transfused to patient Group A (microscope, schematic)





RBC unit Group B transfused to patient Group A (microscope, schematic)



Group & Screen, Crossmatch: : Rh(D) Antigen, Rh Blood Group System

Rh(D) is clinically the most important of the 54 antigens in the Rh blood group system.

Group & Screen, Crossmatch: Anti-D Antibody, Rh Blood Group System

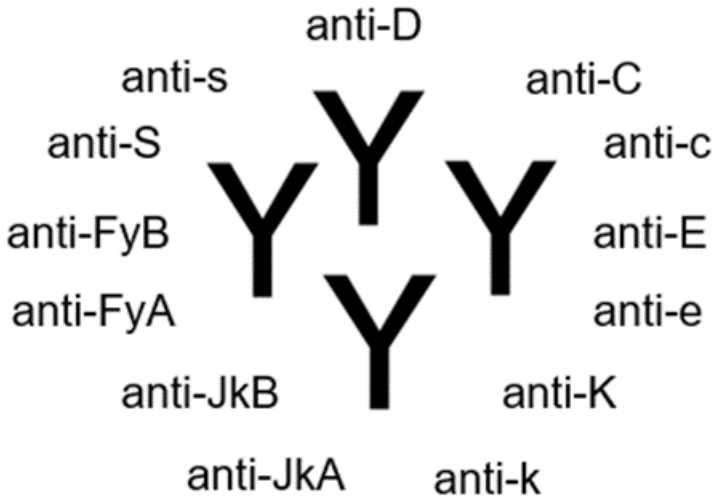
- Anti-D antibody is **NOT** naturally occurring and is **NOT** in the plasma of:
  - Rh(D) positive patients.
  - Rh(D) negative patients ***UNLESS*** exposed to the D antigen, and then anti-D antibody may be produced.

- Rh(D) negative individuals can be exposed to the D antigen (and then may produce anti-D antibody) through:
  - Transfusion of Rh(D) positive RBC.
  - Transfusion of Rh(D) positive platelets (platelets contain small amounts of red blood cells).
  - Pregnancy/delivery of an Rh(D) positive fetus.

- Anti-D antibody (a clinically significant antibody), can cause severe immediate or delayed hemolysis.
- Rh(D) positive blood should not be transfused to a patient with anti-D antibody.
- Anti-D antibody: most common cause of severe Hemolytic Disease of the Fetus & Newborn (HDFN). Rh immune globulin (RhIG) prophylaxis, used since late1960's.

Group & Screen, Crossmatch: Common Clinically Significant Antibodies

- In addition to antigens A, B, and D human red blood cells have many other antigens on their surface.
- If exposed to “foreign” red blood cell antigens via pregnancy or transfusion, antibodies against these antigens may be produced.



Common Clinically Significant Antibodies:
If a patient forms these antibodies, then hemolysis can occur if an RBC unit with corresponding antigen on the red blood cells is transfused.

NOTE: Females of child-bearing potential, by providing Kell antigen negative (K-) RBC, the incidence of K-immunized pregnancies (and potential HDFN) is decreased. In Canada this is established practice, except in emergency transfusion scenarios.

Group & Screen, Crossmatch: Common Clinically Significant Antibodies

Group & Screen Test - antibody screen (antibody detection test):

- TML tests the serum (plasma part of patient blood sample) to either rule out or identify the common clinically significant antibodies.

- If all the common 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-FyA identified in the plasma of the patient's blood sample, then RBC units for transfusion must be antigens c- and FyA-.

Group & Screen, Crossmatch: Common Clinically Significant Antibodies

Anamnestic/Recall Response:

- Clinically significant antibody levels in the patient's plasma will decrease over time; may become non-detectable.
- If a second exposure to the same antigen occurs, the antibody response can be faster, more sustained & antibody levels higher.

- If clinically significant antibody(ies) identified, patient should be counselled, provided "antibody card"; option medical alert bracelet.
- TML maintains transfusion history records; consistently checked.

- For RBC transfusion, when feasible, ask patients/their family (and follow up with TML as indicated).
    - Any previous transfusion; if so any side effects/reactions?
    - Females, pregnancy history, if so any blood issues?

Group & Screen Test

Group & Screen Test – if transfusion might be needed
Group (time for testing 5-15 minutes)
ABO Blood Group (if antigen present, then antibody absent; if antigen absent then antibody present; ABO antibodies are naturally acquired, starting at 4 months of age).
Rh(D) Blood Group (antigen present or absent; Rh(D) antibody is NOT naturally occurring, if exposed to Rh(D) antigen [transfusion or pregnancy], then anti-D may be produced).
Screen (time for testing minimum of 45 minutes; if positive, an additional 1 hour up to days)
Antibody Screen/Detection test (common clinically significant antibodies [anti-D, anti-C, anti-c, anti-E, anti-e, anti-K, anti-k, anti-JkA anti-JkB, anti-FyA, anti-FyB, anti-S, anti-s] are ruled out {negative} or identified {positive}).

Group & Screen Test: Requirements (per TM Standards)

To issue compatible, crossmatched RBC, requires 2 separate patient blood group determinations. One determination must be from a current blood sample**.**

The second blood group determination must be from:

a) patient's previous records *OR*

b) testing of a separate sample collection *OR*

c) retesting of same sample where positive patient identification technology was used for sample collection

Crossmatch Procedure/Test

Crossmatch - if RBC transfusion is ordered.
Group & screen testing completed (two determinations).
Crossmatch is the TML procedure/testing to detect any incompatibilities between the patient and donor RBC unit.

Patients with a negative antibody screen & no history of RBC alloantibodies.

1. Computer Crossmatch: computerized procedure to detect ABO incompatibility; computer confirms an RBC unit that is an ABO & Rh(D) match [donor ABO & Rh(D) groups and patient group & screen tests results have been entered into the Laboratory Information System] (time for testing 2 minutes)

OR

2. Immediate Spin Crossmatch: testing by mixing of donor red blood cells (from a segment removed from the donor RBC unit) and patient's plasma (from the group & screen blood sample) to detect any incompatibility (time for testing 5 minutes)

Patients with a clinically significant antibody identified currently or historical record of RBC alloantibodies.

1. Antiglobulin Crossmatch (several TML method options to use e.g. "tube", "solid phase", "gel"): incubation at 37^{O}C of donor red blood cells (from a segment removed from the donor RBC unit), patient's plasma (from the group & screen blood sample) and anti-IgG to detect any incompatibility. (time for testing 45 minutes)

Group & Screen, Crossmatch: Canadian Blood Services (CBS) Label

ABO Blood Group

Rh(D) Blood Group

PHENOTYPE

- Refers to the antigens which are detectable on the red blood cells.
- Is noted on the CBS label if the donor is antigen negative (the red blood cells in that unit do not have that antigen on their surface and that unit would be compatible for a patient with the corresponding antibody).

Patient Case – Question 4

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband.

TML testing has been completed, the RBC unit has been picked up & administration procedure can begin.

To check the RBC unit, you must (select all that apply):

a) Confirm the prescriber's order at the nurse's desk.

b) Check TM identifiers surname, first name, unique identification number.

c) Confirm the RBC unit number is sequential on the CBS label, transfusion label, & chart label.

d) Check Pebbles' & the RBC unit's ABO, Rh(D) Blood Groups and Antibody Screen are identical/compatible.

Checking an RBC Unit

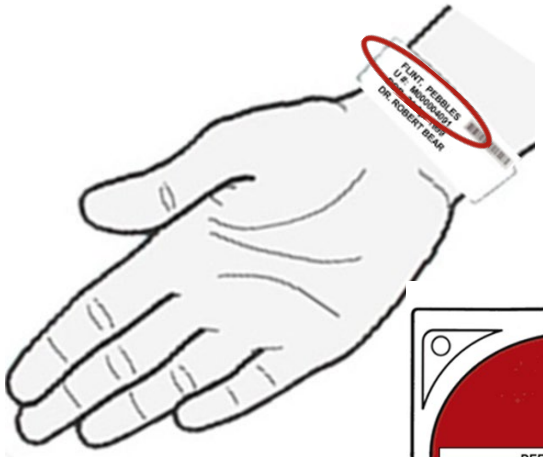
- Steps must be carried out in the physical presence of the patient.
- Confirm blood component received from TML matches the order.
- Unequivocal (unmistakable) identification of the patient is mandatory.
- Patient must be wearing a patient identification armband.
- Patient identification information must remain attached to blood during transfusion.

- For safety, check blood following 4 steps

1. Patient Identification (surname, first name, unique identification number)
2. ABO, Rh(D) Blood Groups; Antibody Screen
3. Unit number
4. Expiry & Visual Inspection

Checking an RBC Unit
1. Patient Identification

Check **surname, first name, unique identification number** are <u>identical</u>
on armband, transfusion order, transfusion label & chart label



COTTAGE HOSPITAL DEEP WOODS REGION

Date: 27/11/24
Run Time: 0835
Printed on: B3-A0-002

PATIENT CARE ORDERS

Date fields on this report are in format DD/MM/YR

PATIENT: Flint, Pebbles
ACCT # : MZ000001/21
DOB: 24/04/99
AGE/SX: 25/F
HIN: 9999-999-999
LOC: Clinic A
ROOM: A-001
BED: 3
STATUS: REG RCR
#: M000004091
REG: 27/11/24
DIS:
REG DR: Bear, Robert A

TRANSFUSION ORDERS

PRODUCT: RBC (RED CELL CONC), IRRADIATED
DATE OF TRANSFUSION: today ASAP
MEDICATION: per MAR, Hodgkin's Lymphoma chemo cycle 4
ALLERGIES: NKDA
COMMENTS:
AMOUNT: 1 unit
INFUSION RATE: over 2-3 hours

PRESCRIBER: Dr. Robert Bear pager 1-9876
DATE: 27/11/24

DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
DATE: 27/11/24

(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MM/YR)

PATIENT: Flint, Pebbles
MRN # : M000004091
A POSITIVE anti-K
TYPENEX #:
25/F
LOCATION : Clinic A
SPEC #: 2605 : BB00003R

PRODUCT : RED CELL CONCENTRATE PRODUCT UNIT # : C055624317655 **A POSITIVE**

COMPATIBLE ? P 27/11/24 0955 <BBWOLF>
MESSENGER : Bear, Mama _____
ISSUED : 27/11/24 1005 <BBWOLF>
UNIT ATTRIBUTES : -K-
IRRADIATED
DATE OF TRANSFUSION : _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT : 236 mL
SIGNATURES :
UNIT ADMINSTERED BY : _____
CHECKED BY : _____
TRANSFUSION COMMENTS :

Checking an RBC Unit

2. ABO, Rh(D) Blood Groups; Antibody Screen

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

Deep Woods Regional Laboratory Medicine Program

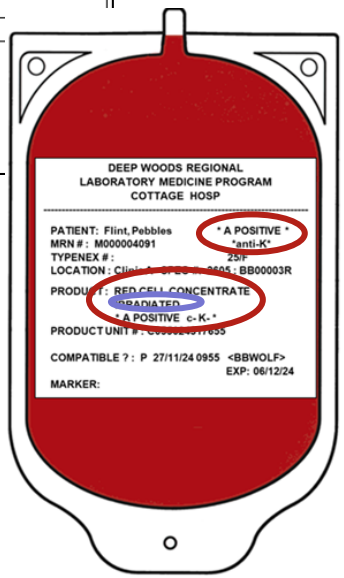
Run Date: 27/11/24 — Specimen Inquiry — Pg. 1
Run Time: 1000
Printed on: B3-A0-002 — Date fields on this report are in format DD/MM/YR

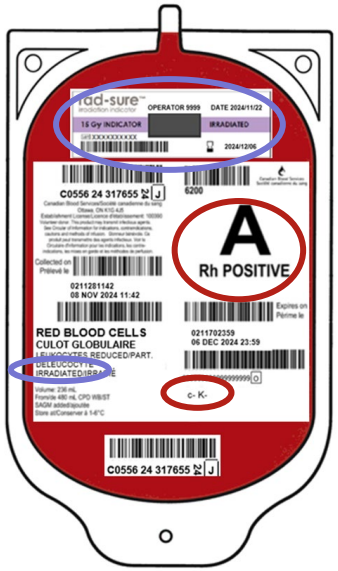
PATIENT: Flint, Pebbles — **ACCT #:** MZ000001/21 — **LOC:** Clinic A — **U #:** M000004091
DOB: 24/04/99 — **ROOM:** A-001 — **REG:** 27/11/24
AGE/SX: 25/F — **BED:** 3 — **DIS:**
HIN: 9999-999-999 — **STATUS:** REG RCR
REG DR: Bear, Robert A — **PT PHONE:**

SPEC #: 2605 : BB00003R — **COLL:** 27/11/24 0840 — **STATUS:** RES — **REQ #:** 0070263
RECD: 27/11/24 0850 — **SUB DR:** Bear, Robert A

ENTERED: 30/08/24 0702 — **OTHER DR:**
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): YES

Test	Results	Flag
HISTORICAL BLOOD GROUP		
	CONFIRMED	
GS EXPIRY	Nov 30	
GROUP & SCREEN		
ABO GROUP & RH	A POS	
AB SCREEN INTERPRETATION	Anti-K	





DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
DATE: 27/11/24
(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MM/YR)

PATIENT: Flint, Pebbles — MRN # : M000004091 — **A POSITIVE anti-K*
TYPENEX #: 25/F
LOCATION : Clinic A — SPEC #: 2605 : BB00003R
PRODUCT : RED CELL CONCENTRATE — PRODUCT UNIT # : C0556243176[illegible] — **A POSITIVE**
COMPATIBLE ? P 27/11/24 0955 <BBWOLF>
MESSENGER : Bear, Mama
ISSUED : [illegible] 1005 <BBWOLF>
UNIT ATTRIBUTES : c- K-
IRRADIATED
DATE OF TRANSFUSION : _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT : 236 mL
SIGNATURES :
UNIT ADMINSTERED BY : _____
CHECKED BY : _____
TRANSFUSION COMMENTS :

Checking an RBC Unit: 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	

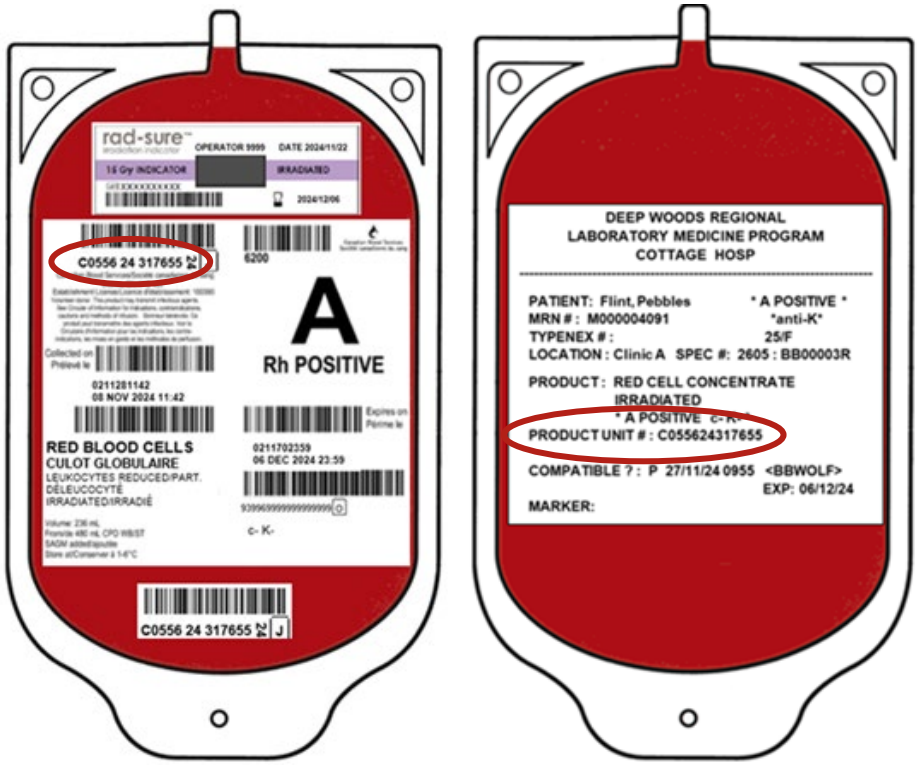
* In urgent bleeding patient situations or during times of short supply, Rh(D) negative patients may need to receive Rh(D) positive RBC and platelets

** 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.

Checking an RBC Unit

3. Unit Number

Check the **Unit number** (lot number for blood products) is <u>identical</u> on CBS label (manufacturer label for blood products), transfusion label & chart label



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PATIENT: Flint, Pebbles MRN # : M000004091 **A POSITIVE anti-K**

TYPENEX #: 25/F

LOCATION : Clinic A SPEC #: 2605 : BB00003R

PRODUCT : RED CELL CONCENTRATE PRODUCT UNIT # : C055624317655 **A POSITIVE**

COMPATIBLE ? P 27/11/24 0955 <BBWOLF>

MESSENGER : Bear, Mama _____

ISSUED : 27/11/24 1005 <BBWOLF>

UNIT ATTRIBUTES : c- K-

IRRADIATED

DATE OF TRANSFUSION : _____

TIME TRANSFUSION BEGAN: _____ ENDED: _____

AMOUNT : 236 mL

SIGNATURES :

UNIT ADMINSTERED BY : _____

CHECKED BY : _____

TRANSFUSION COMMENTS :

Checking an RBC Unit
4. Expiry & Visual Inspection

Expiry

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

Note: In this example, the issue time is 1005 hours 27/11/24. The RBC unit expires 4 hours later at 1405 hours 27/11/24.
By 1405 hours the transfusion must be completed or any remainder discarded.

DEEP WOODS REGIONAL LABORATORY MEDICINE PROGRAM
UNIT ISSUE/TRANSFUSION FORM
DATE: 27/11/24

(DATE FORMATS ON THIS REPORT ARE IN THE FORMAT DD/MM/YR)

PATIENT: Flint, Pebbles MRN # : M000004091 **A POSITIVE anti-K**
TYPENEX #: 25/F
LOCATION : Clinic A SPEC #: 2605 : BB00003R

PRODUCT : RED CELL CONCENTRATE PRODUCT UNIT # : C055624317655 **A POSITIVE**

COMPATIBLE ? P 27/11/24 0955 <BBWOLF>
MESSENGER : Bear, Mama _____
ISSUED : 27/11/24 1005 <BBWOLF>
UNIT ATTRIBUTES : c- K-
IRRADIATED
DATE OF TRANSFUSION : _____
TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT : 236 mL
SIGNATURES :
UNIT ADMINSTERED BY : _____
CHECKED BY : _____
TRANSFUSION COMMENTS :

Visual Inspection

Check the **blood bag** for

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

Click to review the CBS Visual Inspection Tool

Patient Case – Question 5

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband. TML testing has been completed, the RBC unit has been picked up, the RBC unit has been checked & transfusion can begin.

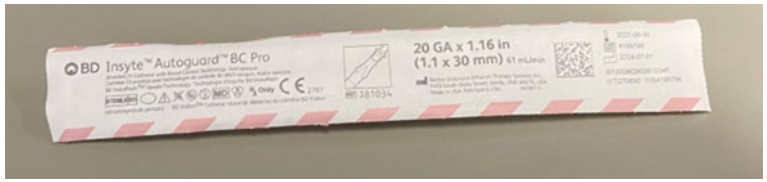
The most appropriate IV gauge for Pebbles' routine, non-urgent RBC transfusion is:

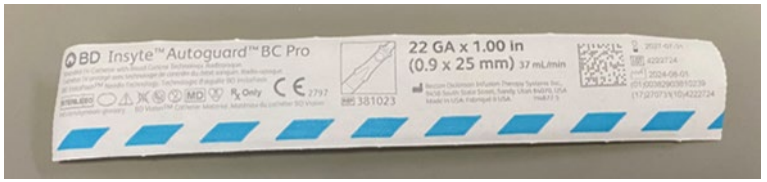
a) 20 or 22 gauge.

b) 16 or 18 gauge.

c) 24 gauge.

d) Any IV gauge is appropriate for a routine, non-urgent RBC transfusion.





IV Access

- Confirm IV established & patent prior to picking up blood from TML.
- Dedicated IV site - peripheral or central venous (if multiple lumen central line, a specific lumen for only the blood).
- IV gauge: diameter large enough to allow appropriate flow rates & avoid cell damage.

Blood Component/Blood Product	IV Gauge
Adults: RBC: rapid/emergent transfusion (rapid infuser)	16 to 18
Adults: RBC: routine transfusion	20 to 22
Adults with fragile, difficult veins: RBC: routine transfusion	* 24
Pediatrics: RBC	22 to 25
Other blood components/blood products	Any is adequate
All blood components/blood products	Central venous access device

* The gauge must be large enough to prevent damage to the red blood cells. When using smaller gauge catheters, it is recommended that the rate be slowed. Consider monitoring for hemolysis (1 to 14 days post transfusion: jaundice, low grade fever, back pain, tea coloured/dark urine, limited Hb increment, hemolysis lab tests).

Patient Case – Question 6

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband. TML testing has been completed, the RBC unit has been picked up, the RBC unit has been checked & transfusion can begin. Pebbles' IV (20 gauge) is patent.

The blood tubing could be primed with (select all that apply):

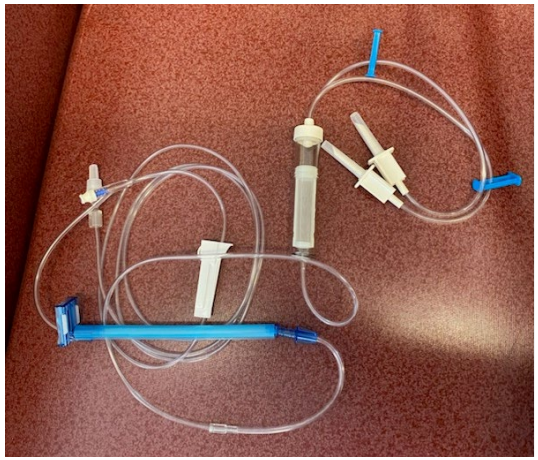
a) 0.9 % Sodium Chloride (NaCl).

b) 0.9 % NaCl with 20 mEq KCL/L.

c) Ringer's lactate.

d) The RBC unit.

Blood Tubing & Filter



- RBC, platelets, plasma must be transfused via blood tubing with 170 to 260-micron filter (captures fibrin debris).
- Prime tubing with blood or 0.9% NaCl
- PLATELET TRANSFUSION:
  Always use NEW/FRESH blood tubing/filter (If previously used filter, platelets will adhere to fibrin captured in filter).
- Change tubing/filter after a maximum of 4 hours of time or 4 units of blood (hospital may have their own policy).

- 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 & 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

Patient Case – Question 7

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband. TML testing has been completed, the RBC unit has been picked up, the RBC unit has been checked & transfusion can begin. Pebbles' IV (20 gauge) is patent.

The blood tubing/filter is primed with 0.9% NaCl.

Pebbles' RBC unit has been spiked.

Your next step is:

a) Initiate the transfusion at 100 mL/hr. (over 2 - 3 hours).

b) Initiate the transfusion at 50 mL/hr. for the first 15 minutes.

c) Re-prime the blood tubing with the RBC unit.

d) Add 50 mL of 0.9% NaCl to the RBC unit.

Infusion Rate

Note:
If blood tubing was primed with 0.9% NaCl, then re-prime tubing with the blood component to ensure the initial slow transfusion rate is infusing the blood component.

Infusion Rate (2)

- 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.
- After 15 minutes, assess patient and re-check vital signs.
- If no signs/symptoms of transfusion reaction, increase to rate ordered (maximum transfusion time is 4 hours from time of issue from TML).

- Usual rate per unit: RBC over 2-3 hours, slower if TACO risk.

Patient Case – Question 8

Pebbles Flint, a 25-year-old previously healthy female was diagnosed with Hodgkins' Lymphoma 12 weeks ago. Today, cycle 4 of her chemotherapy regimen (clinical course is proceeding as anticipated), her Hb is 62 g/L. Pebbles is not actively bleeding. She has required previous transfusions. Pebbles is wearing her patient identification armband. TML testing has been completed, the RBC unit has been picked up, the RBC unit has been checked & transfusion can begin. Pebbles' IV (20 gauge) is patent. The blood tubing/filter was primed with 0.9% NaCl & then re-primed with the RBC unit.

Pebbles' RBC unit has been infusing at 50 mL/hour for 15 minutes.

Your assessment must include (select all that apply):

a) Temperature.

b) Blood pressure & pulse.

c) Respiratory rate & oxygen saturation.

d) Portable chest x-ray.

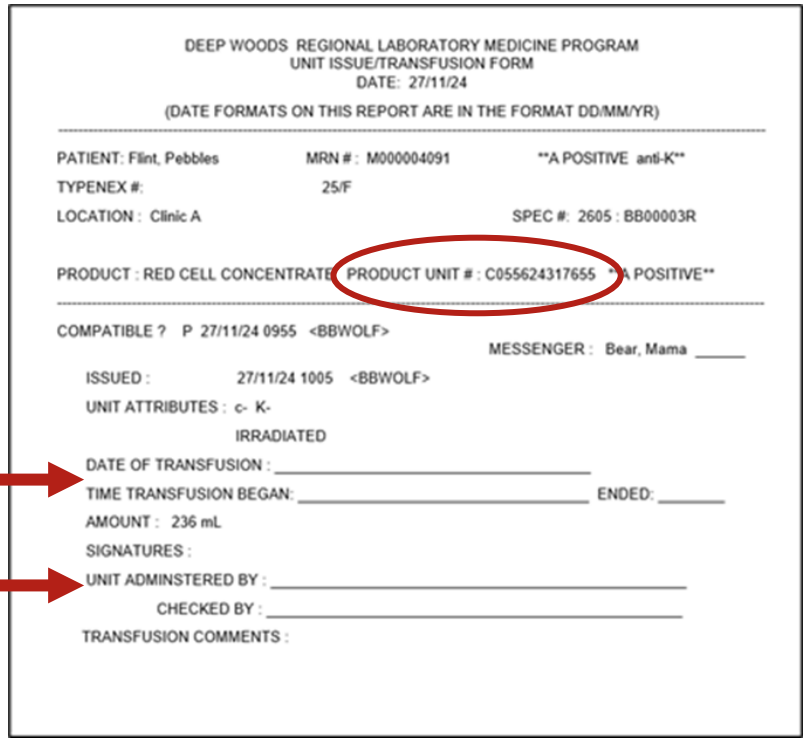
Patient Monitoring

- **Pre-transfusion:** advise patient of signs & symptoms to report ASAP
- **Baseline assessment:** recent fevers, rashes, oxygen requirement, laboured respiration, chest auscultation if TACO risk.
- **Vital signs parameters:** temperature, blood pressure, pulse, respiratory rate, oxygen saturation.
- **Minimum frequency**
  - 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.
  - Hospitals may require hourly following 15 minutes after start assessment.

What to Document

(how is included in your hospital's policy/procedure)

- Include completed chart label (per TML) for each component or product transfused, on the patient's health record.
  TML ensures the documentation mandated by TM standards is incorporated.
  Unit number is critical for VEIN-TO-VEIN TRACEABILITY.
- Transfusionist must complete chart label form by adding:
  - Start and finish date/time
    (confirms transfusion completed within expiry time; provides time reference point, if transfusion reaction occurs)
  - Their identity
    Unit Administered By: _____ *Checked by:* _____



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TIME TRANSFUSION BEGAN: _____ ENDED: _____
AMOUNT : 236 mL
SIGNATURES :
UNIT ADMINSTERED BY : _____
CHECKED BY : _____
TRANSFUSION COMMENTS :

- Document patient care: assessments, vital signs, volume (fluid balance record).
- If a transfusion reaction is suspected, document signs/symptoms, patient care.

Transfusion Knowledge Question 1 - Post

A requirement for routine, non-urgent RBC transfusion is:

a) Pre-transfusion, the RBC unit is at room temperature.
b) The patient has not received IV antibiotics within 4 hours pre-transfusion.
c) The RBC unit is crossmatched, compatible.
d) The RBC unit is diluted with 50 mL 5% albumin by Transfusion Medicine Lab (TML).

Transfusion Knowledge Question 2 - Post

When administering RBC transfusion, it is *most imperative* to document on the patient's health record:

a) RBC transfusion start and stop (finish) times.
b) The patient's vital signs.
c) The RBC unit's volume.
d) The RBC unit's unit number (e.g., CO556 24 317655).

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Acknowledgements

The Ontario Regional Blood Coordinating Network (ORBCoN) gratefully acknowledges funding support provided by the Ontario Ministry of Health. The views expressed in this presentation are those of the authors and of ORBCoN and do not necessarily reflect those of the Ontario Ministry of Health or the Government of Ontario.

Many thanks to my ORBCoN and Transfusion Medicine family for their ongoing mentorship and support.

Your participation is appreciated!

RBC Transfusion: How to Start & Finish; What About In Between?

Email: bertad@mcmaster.ca