CES 1/2022

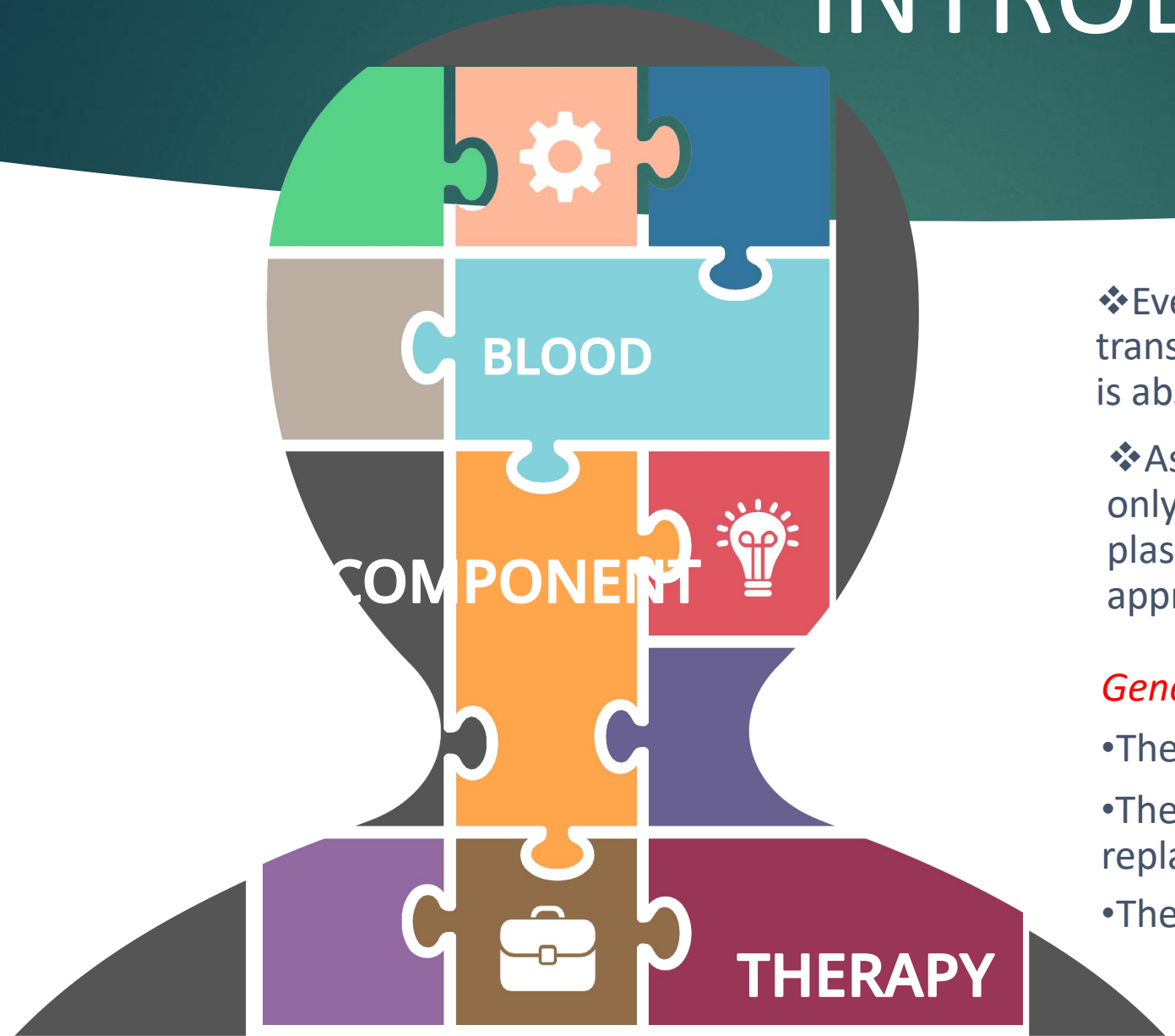
Transfusion of Blood & Blood Products

DR UMMI MOHLISI BINTI MOHD ASMAWI
Pathologist (Haematology),

TOPICS:

- Blood Bag Label
- Indication: Blood components
- Pre-Administration Blood Component Transfusion: Bedside Check
- Transportation/Collection of Blood Components
- Cases in Blood Bank
- Rejection Rate in Haematology Unit: July-Dec 2022

INTRODUCTION



❖Every effort should be made to avoid transfusion of blood and blood products unless it is absolutely necessary.

❖As far as possible, the patient should receive only those particular component (red cells, plasma, or platelets) that are clinically appropriate and afford optimal safety.

General principal:

- The cause of the deficiency should be identified
- The deficient component only should be replaced
- The blood product should be as safe as possible

BLOOD PRODUCT DEFINITION

1

WHOLE BLOOD

One unit of donor blood collected in an anticoagulant/preservative solution and which contains red cells and plasma.

2

BLOOD COMPONENTS

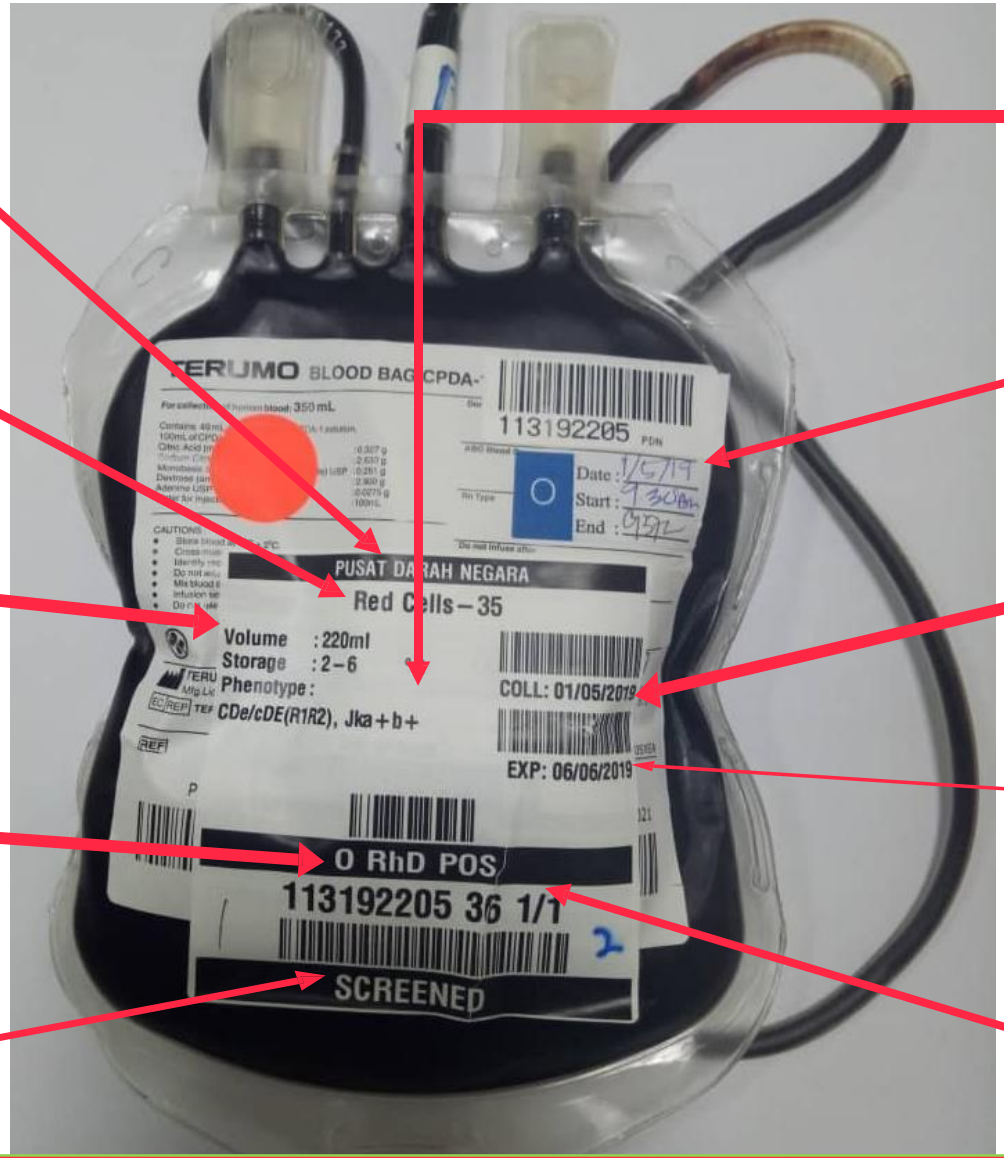
Constituent separated from whole blood, by differential centrifugation of one donor unit/ by apheresis, e.g. red cell concentrate, fresh frozen plasma, platelet, cryoprecipitate

3

BLOOD DERIVATIVES

A product obtained from multiple donor units of plasma by fractionation, e.g. factor VIII, factor IX, albumin, immunoglobulin

INFORMATION ON BLOOD BAG LABEL



The name of the blood processing centre

Name of the blood component

Volume of the blood component

ABO & Rh D group

The word **SCREENED**

Other details e.g. Irradiated, phenotype

Donation details

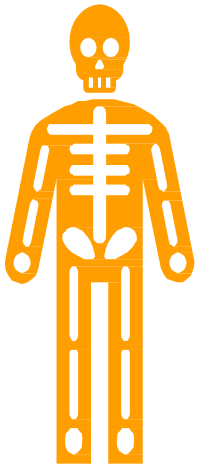
Date of collection

Date of expiry

Unique Barcode Number

A unique barcode number: to allow for full traceability to the donor and the collection, testing, processing, storage, release, distribution and the final fate of the components.

WHOLE BLOOD

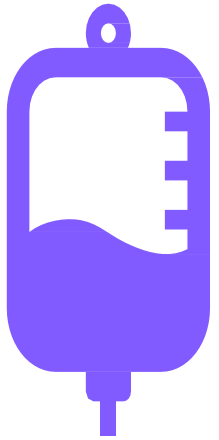


Shelf life

28-35/7 depending on the anticoagulant/preservative used.

Storage

+2°C to +6°C



Indication

Exchange transfusion(neonates)

Autologous transfusion

RARELY used

PACKED CELL/ RED CELL CONCENTRATE

DEFINITION

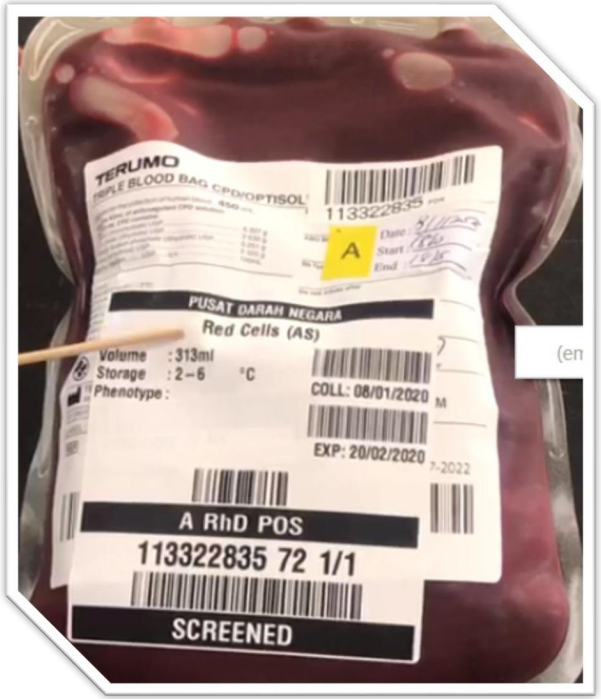
A component obtained by removing most of the plasma from WB.

SHELF-LIFE

28-35/7 depending on the anticoagulant/preservative used.

INDICATION

Acute anaemia
Haemorrhagic shock
Chronic anaemia



PRECAUTION

Rapid transfusion of large
V: hypothermia/hyperK

STORAGE

+2°C to +6°C

OTHER TYPES

Red cells, leucocyte-depleted, red cells, irradiated, etc.

RED CELLS, LEUCOCYTE-DEPLETED

A component obtained from red cells by removing the leucocytes to a residual leucocyte content of less than $1x10^6$ per unit.

Shelf life

35-42/7depending on the anticoagulant/additive solution used.

Storage

+2°C to +6°C

Indication

Prevention of FNHTRs

Prophylaxis against alloimmunisation (thalassaemia pts)

Reduce the transmission of CMV

RED CELLS, IRRADIATED

Red cells that have been irradiated with gamma rays/X rays to inactivate lymphocytes to prevent TA- GVHD.

Shelf life

35-42/7depending on the anticoagulant/additive solution used.

Storage

+2°C to +6°C

Expiry date: 14 days from date of irradiation

Indication

At risk of TA-GVHD

Intrauterine transfusion

Recipient of components from blood relatives

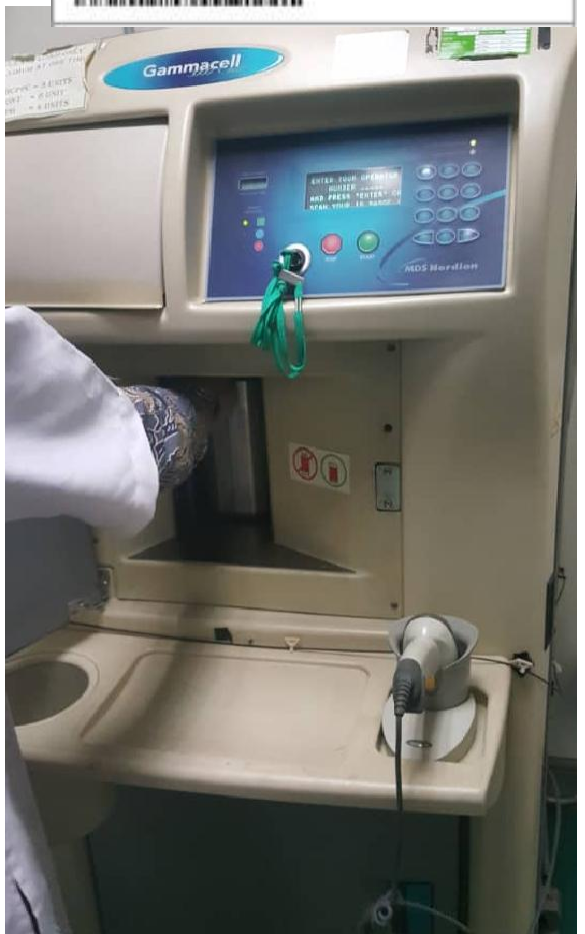


TABLE 20-2. Selection of ABO-Compatible Red Blood Cell Units

Recipient Blood Group	Compatible Red Blood Cell Units*
A	A, O
B	B, O
AB	AB, A, B, O
O	O

*Red Blood Cells prepared as additive system or "packed" units.

PLATELET

	TYPES OF PLATELET CONCENTRATE	
Types	Platelet concentrate, Random	Plateletpheresis
Definition	Derived from WB containing majority of the original platelet content, suspended in plasma	A component which contains platelet in a therapeutically effective dose suspended in plasma obtained from a single donor by apheresis technique using automated cell separation equipment.
Storage	Room temperature +20 TO +24^{o}C on agitator.	
Shelf-life	5 days	
	• 1 unit is expected to raise platelet count between 5-10 x 10^{9}/L • Volume of 1 unit = 50 ± 10 mls • 1 adult needs 4-6 units	• 1 bag is expected to raise platelet count between 30-60 x 10^{9}/L • Volume of 1 unit = 200-250 mls • 1 adult needs ONLY 1 bag at one time.

CHART VII : GUIDE FOR THE USE OF PLATELET TRANSFUSION

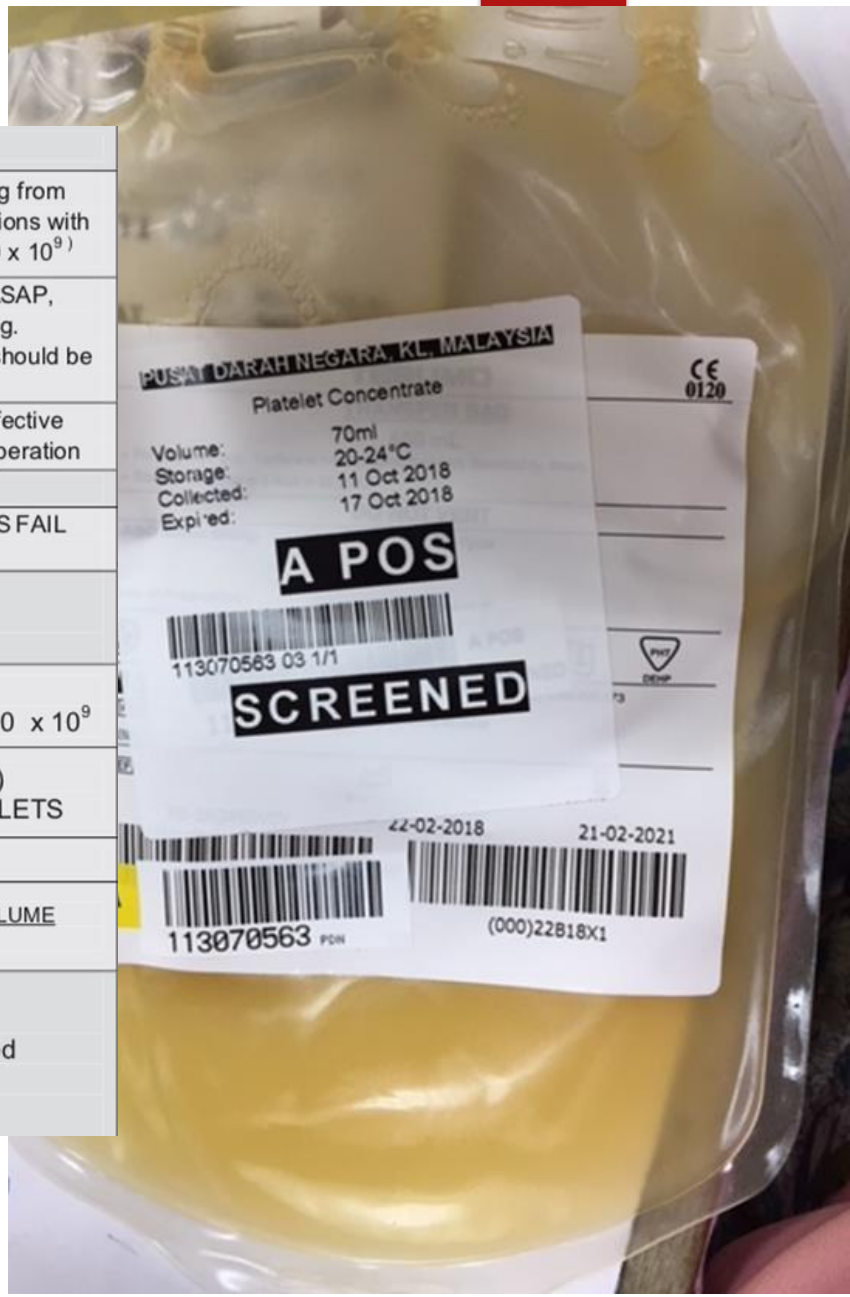
Table 2: :Indication for Platelet Transfusion	
CLINICAL INDICATIONS	**CUT-OFF VALUES OF PLATELET COUNT**
HAEMATOLOGICAL MALIGNANCIES	> 20 X 10^9 is the safe limit unless: fever, bleeding, on antibiotics or coagulapathy
PROCEDURES:	
1. BONE MARROW ASPIRATION & TREPHINE	> 20 X 10^9 providing adequate surface pressure is applied
2. LUMBAR PUNCTURE, EPIDURAL, OGDS & BIOPSY, INDWELLING LINES, TRANSBRONCHIAL BIOPSY, LIVER BIOPSY, LAPARATOMY	Platelet count should be raised to at least 50 X 10^9
3. FOR OPERATION AT CRITICAL SITES: EYE & BRAIN	Platelet count should be raised up to at least 100 X 10^9
MASSIVE TRANSFUSIONS:	
1. ACUTE BLEEDING	Platelet count should be raised up to at least 50 X 10^9
2. MULTIPLE TRAUMA / CNS INJURY	Higher target level of 100 X 10^9
DISSEMINATED INTRAVASCULAR COAGULATION:	
1. ACUTE DISSEMINATED INTRAVASCULAR COAGULOPATHY (DIC)	Frequent estimation of platelet count & coagulation screen should be done Aim to maintain platelet count at >50 X 10^9
2. CHRONIC DIC / ABSENCE OF BLEEDING	Platelet transfusion should not be given
CABG/ RUPTURED ABDOMINAL AORTIC ANEURYSM:	
PRE-OPERATIVE ASSESSMENT OF MEDICATIONS KIV DELAY SURGERY @ PRE-OPERATIVE TRANSFUSION	Should be reserved for those with post-operative bleeding & surgical cause has been excluded

IMMUNE THROMBOCYTOPAENIA:	
1. AUTOIMMUNE THROMBOCYTOPAENIA	Only for life-threatening bleeding from GIT/GUT/CNS and other conditions with severe thrombocytopaenia (<10 x 10^9)
2. NEONATAL AUTOIMMUNE THROMBOCYTOPAENIA (NAITP)	Transfuse compatible platelet ASAP, ideally HPA-1a neg, HPA-5b neg. Platelet prepared from mother should be irradiated and washed.
3. POST TRANSFUSION PURPURA	Platelet transfusion usually ineffective M/B used in acute phase e.g. operation
PLATELET FUNCTION DISORDERS:	
PLATELET TRANSFUSION ONLY INDICATED IF OTHER MEASURES FAIL TO CONTROL THE BLEEDING	

Table 2: CALCULATION OF DOSE:

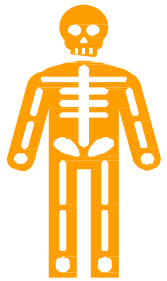
RANDOM PLATELET	>60 x 10^9 / UNIT (VOLUME = 50 ml) 1 UNIT RANDOM INCREASES UP TO 5-10 x 10^9
1 UNIT APHERESIS	>200 x 10^9 / UNIT (VOLUME = 200-300 ml) EQUALS TO 4-6 UNITS RANDOM PLATELETS
<20 kg CHILD	10 – 15 Ml / kg
ADULT	$\frac{\text{PLATELET INCREMENT TARGET x BLOOD VOLUME}}{\text{CORRECTION FACTOR (0.67)}}$

*****PLATELET TRANSFUSION IS CONTRAINDICATED IN:***
Thrombotic Thrombocytopaenic Purpura (TTP), Heparin-induced Thrombocytopaenia (HIT) & Kasabach Meritt Syndrome



FRESH FROZEN PLASMA

A



Shelf life

36 months at or below -25°C

3 months at -18°C to -25°C

Storage

below -25°C

-18°C to -25°C

Indication

- Bleeding pts with multiple coagulation fx def eg DIC/liver disease/dilutional coagulopathy d2 massive transfusion/V replacement
- Plasma exchange e.g. thrombotic thrombocytopenic purpura(TTP)
- Immediate reversal of over warfarinisation + vit K (PCC not available)

TABLE 20-7. Guidelines for Correction of Excessive Oral Anticoagulation

Clinical Situation	Guideline
INR > therapeutic but < 5, no significant bleeding	Lower anticoagulant dosage.
	Temporarily discontinue drug if necessary.
INR > 5 but < 9, no significant bleeding	Omit 1-2 doses; monitor INR. Resume oral anticoagulation when INR is in therapeutic range or, if patient is at increased risk of hemorrhage, omit a dose and give 1-2.5 mg vitamin K_1 orally.
	For rapid reversal before urgent surgery: 2-4 mg vitamin K_1 orally; repeat dose with 1-2 mg at 24 hours if INR remains elevated.
INR > 9, no significant bleeding	Omit warfarin; give 5-10 mg vitamin K_1 orally.
	Closely monitor INR; give additional vitamin K_1 if necessary.
	Resume warfarin at lower dose when INR is within therapeutic range.
Serious bleeding at any elevation of INR	Omit warfarin.
	Give 10 mg vitamin K_1 by slow intravenous infusion.
	Supplement with plasma or prothrombin complex concentrate depending on urgency of correction.
	Vitamin K_1 infusions can be repeated every 12 hours.
Life-threatening hemorrhage	Omit warfarin.
	Give prothrombin complex concentrate with 10 mg vitamin K_1 by slow intravenous infusion.
	Repeat as necessary, depending on INR.

INR = international normalized ratio.

Adapted from guidelines developed by the American College of Chest Physicians.[174]

CRYOPRECPITATE

A component containing the cryoglobulin fraction obtained by thawing and further processing of FFP.

Shelf life

- 36 months at or below -25°C
- 3 months at -18°C to -25°C

Storage

- < -25°C.
- -18°C to -25°C

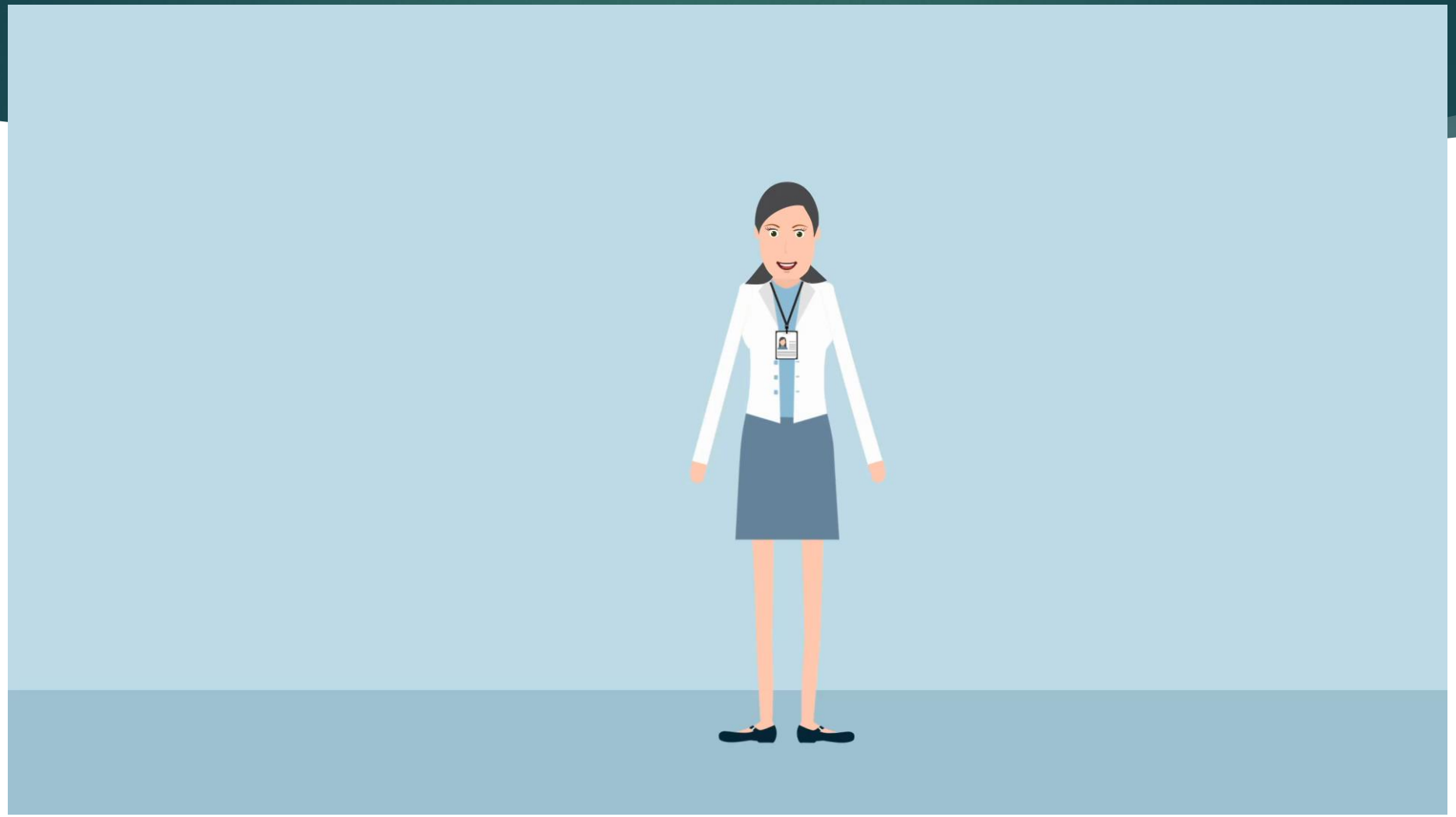
Indication

- Low fibrinogen level (fib <1 g/dL)
- Dysfibrinogaemia
- DIVC
- In massive bleeding
- Fx XIII def
- Uraemic pts with bleeding

TABLE 21-1. Blood Component Transfusions in Nonemergency Settings

Component	Suggested Adult Flow Rate		Special Considerations	ABO Compatibility	Filter
	First 15 Minutes	After 15 Minutes			
Red Blood Cells (RBCs)	1-2 mL/min (60-120 mL/hour)	As rapidly as tolerated; approximately 4 mL/ minute or 240 mL/hour	Infusion duration should not exceed 4 hours. For patients at risk of fluid overload, may adjust flow rate to as low as 1 mL/kg/ hour.	Whole blood: ABO identical RBCs: ABO compatible with recipient's plasma Crossmatch required	In-line (170-260 micron) Leukocyte reduction if indicated
Platelets	2-5 mL/min (120-300 mL/hour)	300 mL/hour or as tolerated	Usually given over 1-2 hours For patients at risk of fluid overload, use slower flow rate (see under RBCs)	Crossmatch not required ABO/Rh compatibility preferable but not required May be HLA matched	In-line (170-260 micron) Leukocyte reduction if indicated
Plasma	2-5 mL/min (120-300 mL/hour)	As rapidly as tolerated; approximately 300 mL/ hour	Thaw time may be needed before issue For patients at risk of fluid overload, use slower flow rate (see under RBCs)	Crossmatch not required ABO compatibility with recipient red cells	In-line (170-260 micron)
Granulocytes	1-2 mL/min (60-120 mL/hour)	120-150 mL/hour or as tolerated	Over approximately 2 hours Infuse as soon as possible after collection/release of product; irradiate	Crossmatch required ABO/Rh compatibility required May be HLA matched	In-line (170-260 micron) No leukocyte reduction filter or depth-type micro aggregate filters
Cryoprecipitated AHF	As rapidly as tolerated		Infuse as soon as possible after thawing; pooling is preferred.	Crossmatch and ABO compatibility not required	In-line (170-260 micron)

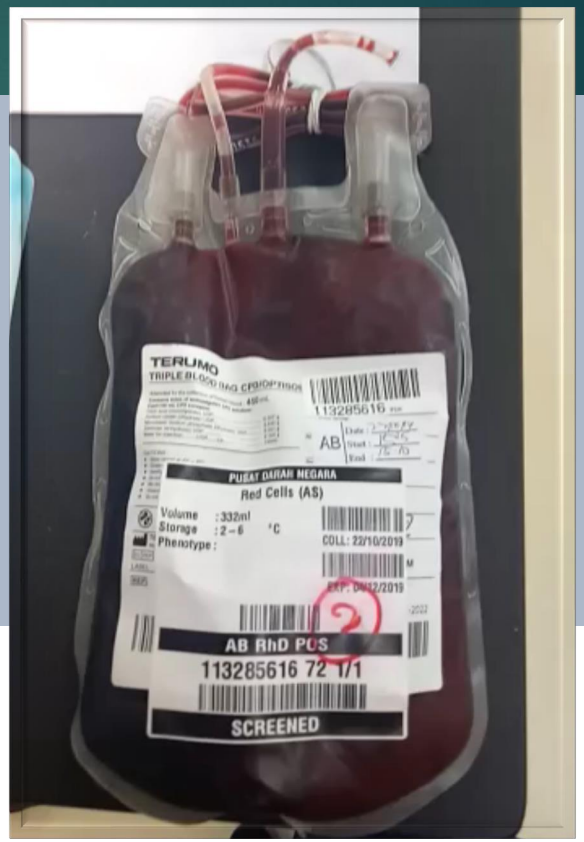
Pre-administration blood component transfusion: Bedside check



Adapted from The Pre-administration Blood Component Transfusion Bedside Check (NHS) video
Credit to Dr Madyhah

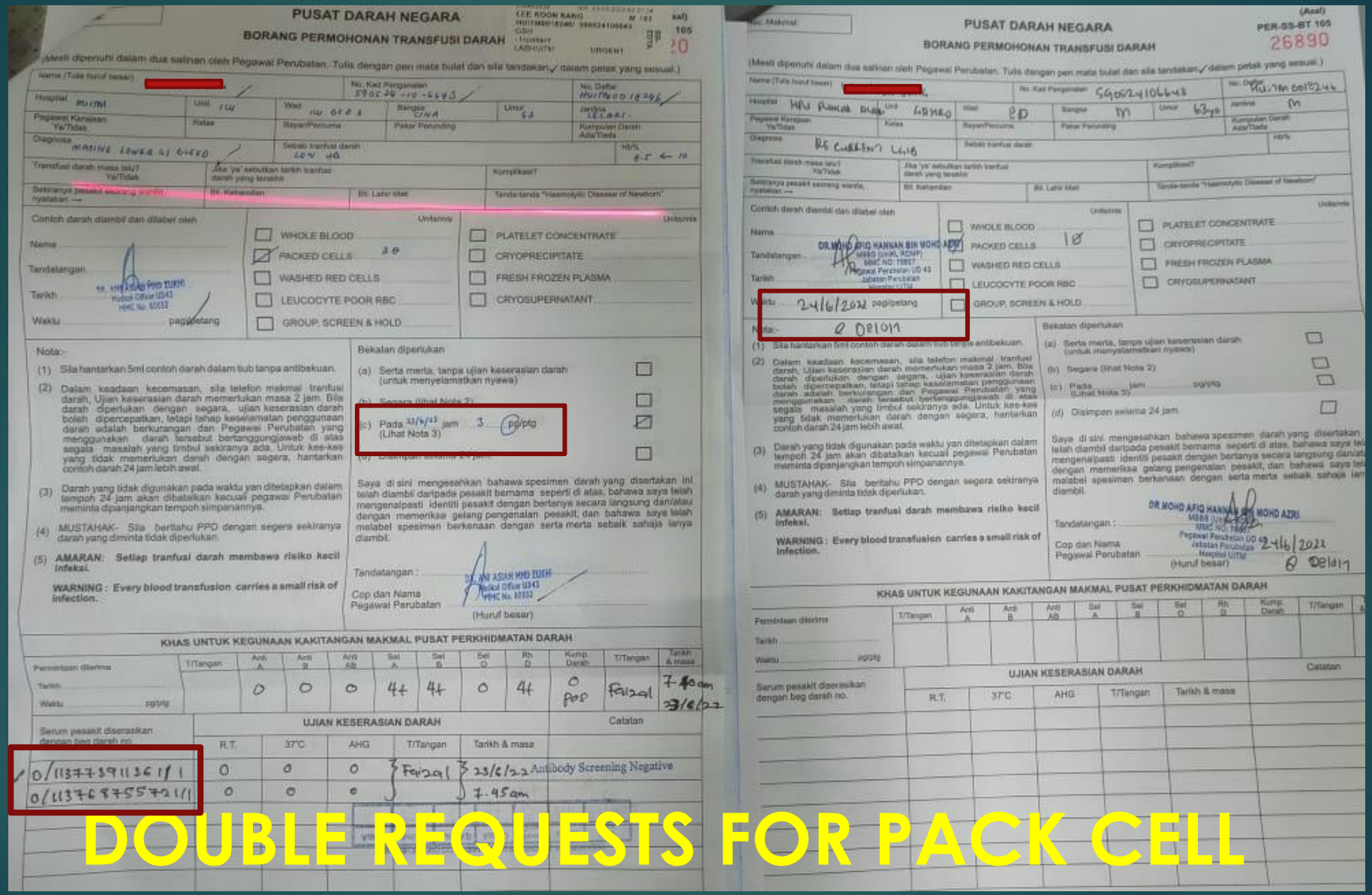
TRANSPORTATION/COLLECTION OF BLOOD COMPONENTS

Platelet : blood box with NO ICE

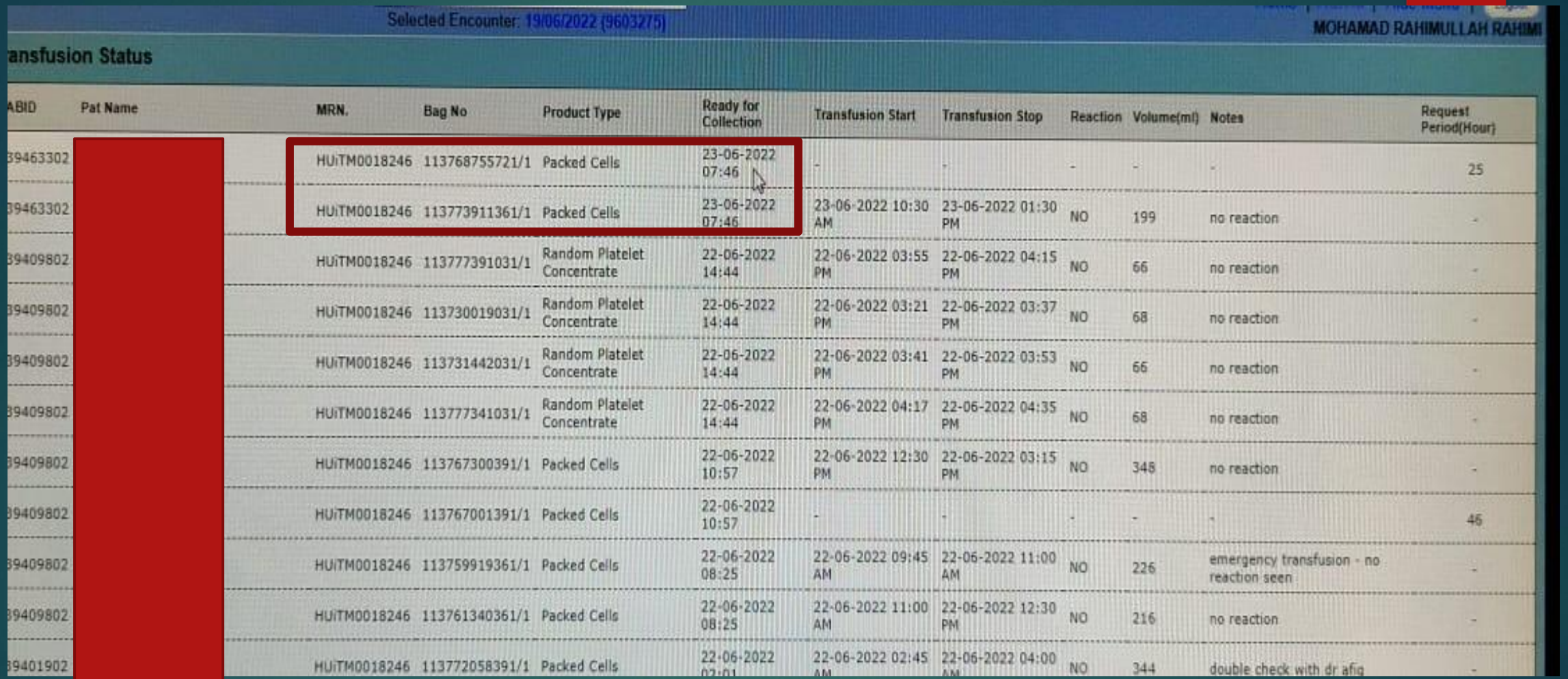


Red cell concentrate, FFP, cryoprecipitate : blood box with coolant pack, direct contact with coolant shall be AVOIDED

CASE 1



DOUBLE REQUESTS FOR PACK CELL



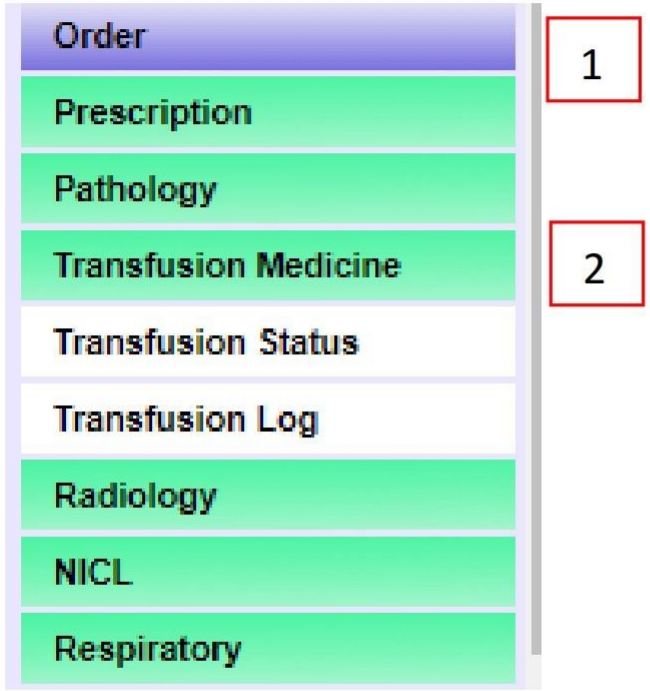
Selected Encounter: 19/06/2022 (9603275)

MOHAMAD RAHIMULLAH RAHIMI

ransfusion Status

ABID	Pat Name	MRN.	Bag No	Product Type	Ready for Collection	Transfusion Start	Transfusion Stop	Reaction	Volume(ml)	Notes	Request Period(Hour)
39463302		HUiTM0018246	113768755721/1	Packed Cells	23-06-2022 07:46	-	-	-	-	-	25
39463302		HUiTM0018246	113773911361/1	Packed Cells	23-06-2022 07:46	23-06-2022 10:30 AM	23-06-2022 01:30 PM	NO	199	no reaction	-
39409802		HUiTM0018246	113777391031/1	Random Platelet Concentrate	22-06-2022 14:44	22-06-2022 03:55 PM	22-06-2022 04:15 PM	NO	66	no reaction	-
39409802		HUiTM0018246	113730019031/1	Random Platelet Concentrate	22-06-2022 14:44	22-06-2022 03:21 PM	22-06-2022 03:37 PM	NO	68	no reaction	-
39409802		HUiTM0018246	113731442031/1	Random Platelet Concentrate	22-06-2022 14:44	22-06-2022 03:41 PM	22-06-2022 03:53 PM	NO	66	no reaction	-
39409802		HUiTM0018246	113777341031/1	Random Platelet Concentrate	22-06-2022 14:44	22-06-2022 04:17 PM	22-06-2022 04:35 PM	NO	68	no reaction	-
39409802		HUiTM0018246	113767300391/1	Packed Cells	22-06-2022 10:57	22-06-2022 12:30 PM	22-06-2022 03:15 PM	NO	348	no reaction	-
39409802		HUiTM0018246	113767001391/1	Packed Cells	22-06-2022 10:57	-	-	-	-	-	46
39409802		HUiTM0018246	113759919361/1	Packed Cells	22-06-2022 08:25	22-06-2022 09:45 AM	22-06-2022 11:00 AM	NO	226	emergency transfusion - no reaction seen	-
39409802		HUiTM0018246	113761340361/1	Packed Cells	22-06-2022 08:25	22-06-2022 11:00 AM	22-06-2022 12:30 PM	NO	216	no reaction	-
39401902		HUiTM0018246	113772058391/1	Packed Cells	22-06-2022 02:01	22-06-2022 02:45 AM	22-06-2022 04:00 AM	NO	344	double check with dr afiq	-

Reminder: Must select patient and active encounter.



1. Click Menu Order
2. Click Transfusion Medicine

1. <u>Click Transfusion Status</u> – To view status request of blood product.

Transfusion Status

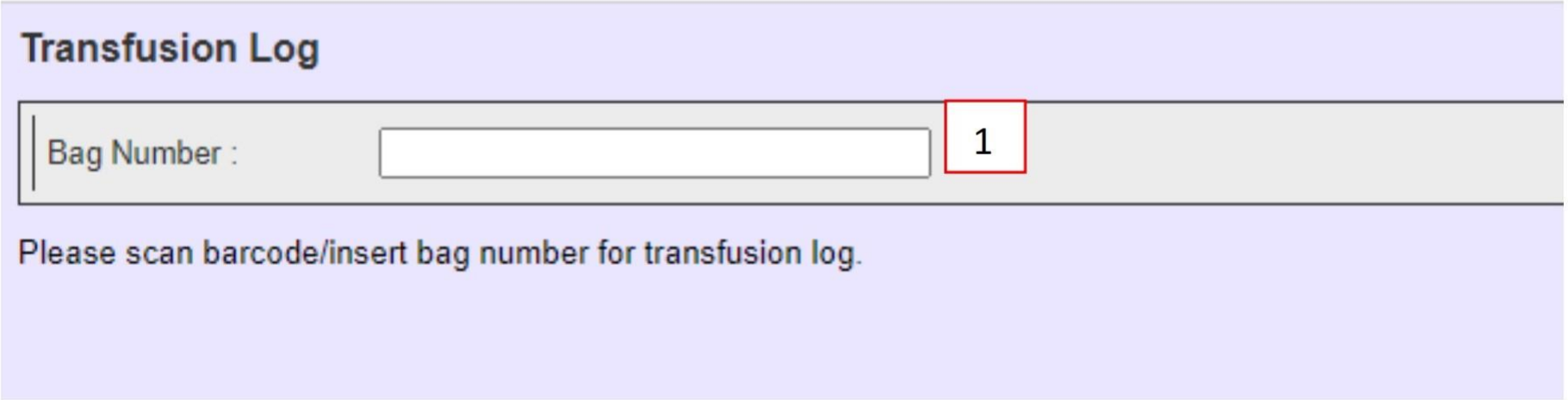
LABID	Pat Name	MRN.	Bag No	Product Type	Ready for Collection	Transfusion Start	Transfusion Stop	Reaction	Volume(ml)	Notes
525797202	TEST PAT'IENT LAB 3	1810000000	61919000100/2	Packed Cells	05-10-2021 15:50	-	-	-	-	-
525797202	TEST PAT'IENT LAB 3	1810000000	1317818181/2	Packed Cells	05-10-2021 15:50	-	-	-	-	-
525797202	TEST PAT'IENT LAB 3	1810000000	7110000181/2	Packed Cells	05-10-202	05-10-2021 03:30 PM	05-10-2021 03:48 PM	NO	100	transfusion complete. Dr Aminah Hassan
525769402	TEST PAT'IENT LAB 3	1810000000	113589337721/1	Packed Cells	01-09-202	01-09-2021 07:04 PM	01-09-2021 07:09 PM	NO	50	Finished without reaction.

1
2
3

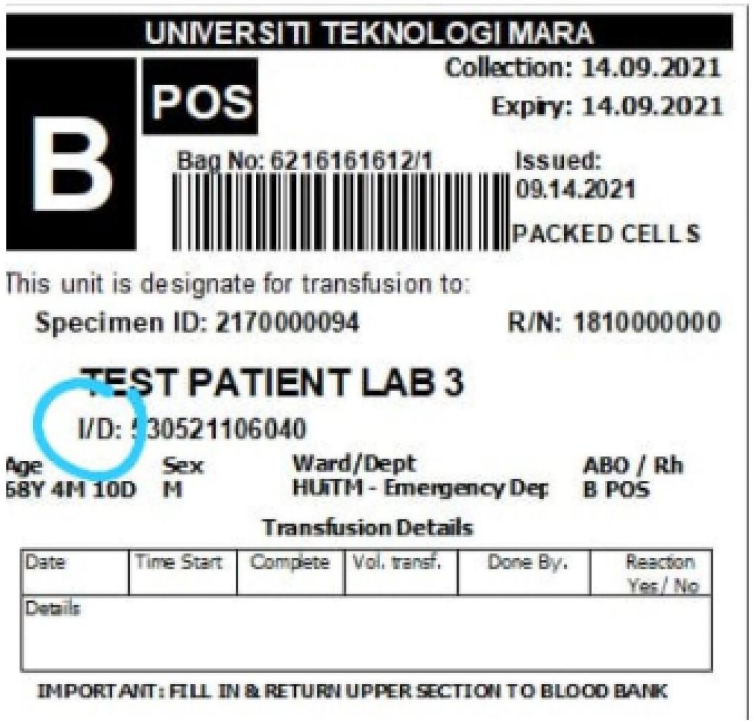
1. Patient detail for confirmation.
2. ‘Ready for Collection’ – Requestor from ward/dept ready to collect product in Blood bank unit.
3. ‘Transfusion Start, Transfusion Stop, Reaction, Volume(ml), Notes’ – transfusion information after key-in Transfusion Log.

2. Click Transfusion Log – To key in transfusion log information after done transfusion process.

   Reminder: Transfusion Log need to complete within 24 hours and before patient discharge. Charges for GXM & product will drop once transfusion log complete under current active encounter.



1. Scan barcode/ key-in bag no to key-in transfusion log.


UNIVERSITI TEKNOLOGI MARA

B POS

Collection: 14.09.2021

Expiry: 14.09.2021

Bag No: 6216161612/1

Issued: 09.14.2021

PACKED CELLS

This unit is designate for transfusion to:

Specimen ID: 2170000094 R/N: 1810000000

TEST PATIENT LAB 3

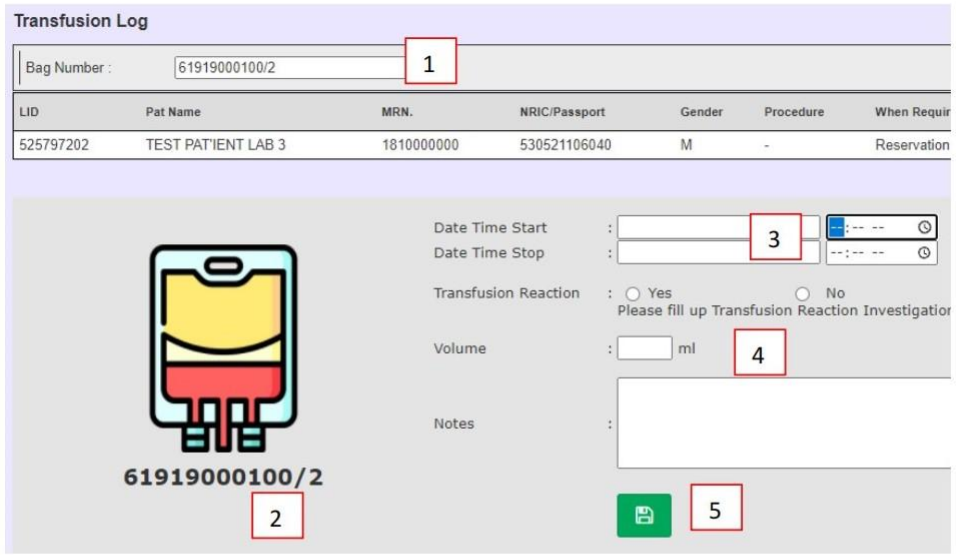
I/D: 530521106040

Age	Sex	Ward/Dept	ABO / Rh
58Y 4M 10D	M	HUiTM - Emergency Dep	B POS

Transfusion Details

Date	Time Start	Complete	Vol. transf.	Done By.	Reaction Yes / No
Details					

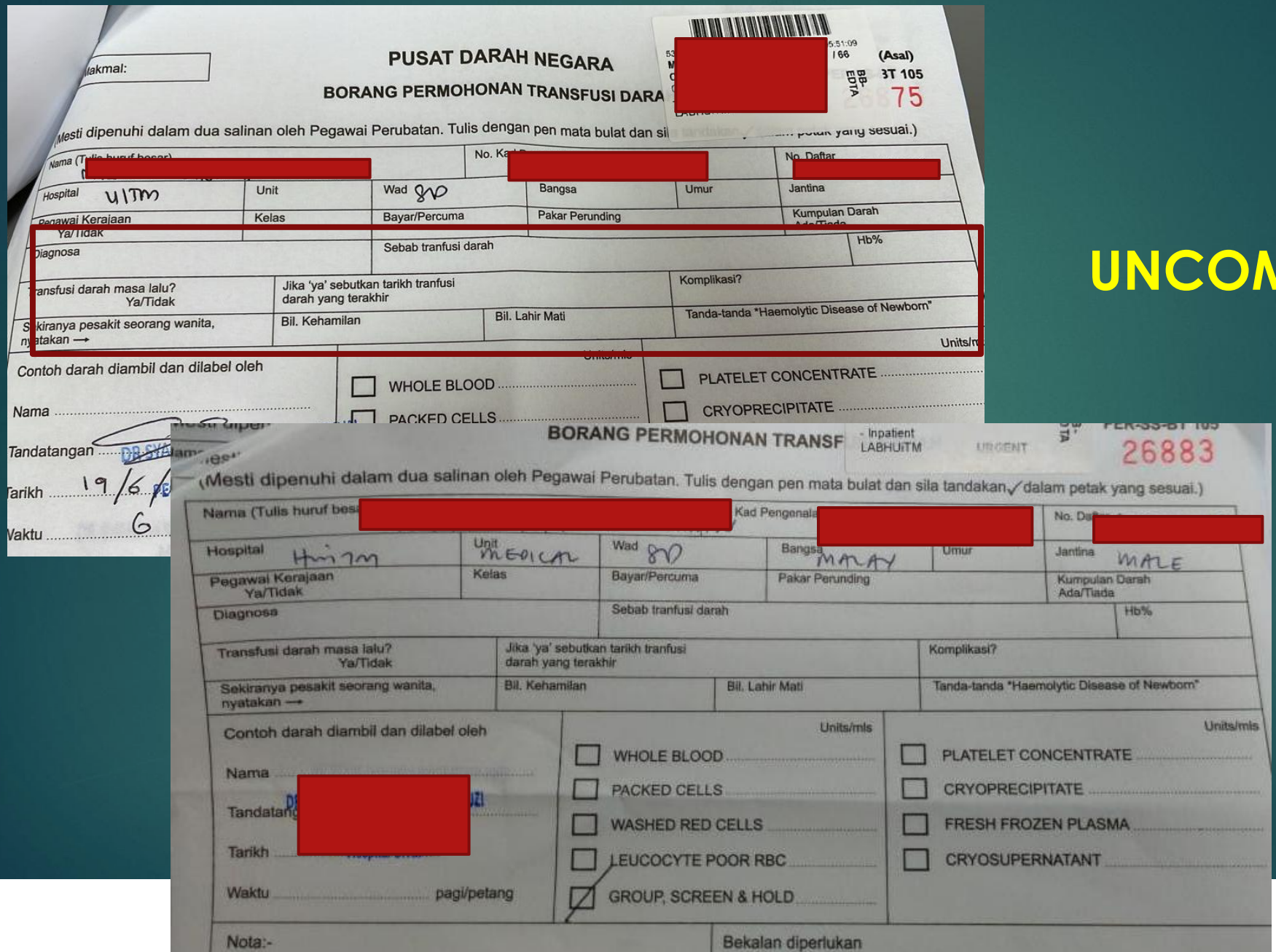
IMPORTANT: FILL IN & RETURN UPPER SECTION TO BLOOD BANK



1. Scan barcode/insert blood bag.
2. Bag no for confirmation.
3. Insert date time start and date time stop.
4. Insert others information (Reaction, volume, notes). Notes need to put doctor name in charge.
5. Click 'Save' button to save the information. (Charges for GXM and blood product will be drop)

CASE 2

UNCOMPLETE FORMS



PUSAT DARAH NEGARA

BORANG PERMOHONAN TRANSFUSI DARA

(Mesti dipenuhi dalam dua salinan oleh Pegawai Perubatan. Tulis dengan pen mata bulat dan sila tandakan ✓ dalam petak yang sesuai.)

Hospital UiTM | Unit | Wad 8D | Bangsa | Umur | Jantina

Pegawai Kerajaan Ya/Tidak | Kelas | Bayar/Percuma | Pakar Perunding | Kumpulan Darah

Diagnosa | Sebab tranfusi darah | Hb%

Transfusi darah masa lalu? Ya/Tidak | Jika 'ya' sebutkan tarikh tranfusi darah yang terakhir | Komplikasi?

Sekiranya pesakit seorang wanita, nyatakan → | Bil. Kehamilan | Bil. Lahir Mati | Tanda-tanda "Haemolytic Disease of Newborn"

Contoh darah diambil dan dilabel oleh

Nama

Tandatangan

Tarikh 19/6

Waktu 6

Units/mls

☐ WHOLE BLOCK

☐ PACKED CELLS

☐ PLATELET CONCENTRATE

☐ CRYOPRECIPITATE

BORANG PERMOHONAN TRANSF

- Inpatient LABHUiTM URGENT

26883

(Mesti dipenuhi dalam dua salinan oleh Pegawai Perubatan. Tulis dengan pen mata bulat dan sila tandakan ✓ dalam petak yang sesuai.)

Nama (Tulis huruf besar) | Kad Pengenalan | No. Daftar

Hospital Hi7m | Unit MEDICAL | Wad 8D | Bangsa MALAY | Umur | Jantina MALE

Pegawai Kerajaan Ya/Tidak | Kelas | Bayar/Percuma | Pakar Perunding | Kumpulan Darah Ada/Tiada

Diagnosa | Sebab tranfusi darah | Hb%

Transfusi darah masa lalu? Ya/Tidak | Jika 'ya' sebutkan tarikh tranfusi darah yang terakhir | Komplikasi?

Sekiranya pesakit seorang wanita, nyatakan → | Bil. Kehamilan | Bil. Lahir Mati | Tanda-tanda "Haemolytic Disease of Newborn"

Contoh darah diambil dan dilabel oleh

Nama

Tandatangan

Tarikh

Waktu pagi/petang

Units/mls

☐ WHOLE BLOOD

☐ PACKED CELLS

☐ WASHED RED CELLS

☐ LEUCOCYTE POOR RBC

☑ GROUP, SCREEN & HOLD

Units/mls

☐ PLATELET CONCENTRATE

☐ CRYOPRECIPITATE

☐ FRESH FROZEN PLASMA

☐ CRYOSUPERNATANT

Nota:-

Bekalan diperlukan

CASE 3

APPENDIX 13.1

Request for Conversion of Group, Screen and Hold (GSH) to Group and Crossmatch (GXM)
PPUiTM Sungai Buloh

Date:

Packed red blood cell	Amount	Comment, if any (MO code, etc)
Patient		
Name		
MRN		
Ward		

Reason for conversion:

Requesting Dr.	
Name	
Staff ID/ IC No	
Department	

APPENDIX 27.2

Return of Unused Blood Product(s)

PPUiTM Sungai Buloh

Date:

Patient the blood product was intended for:	
Name	
MRN	
Ward	
Type of blood product	
Amount (no. of units)	

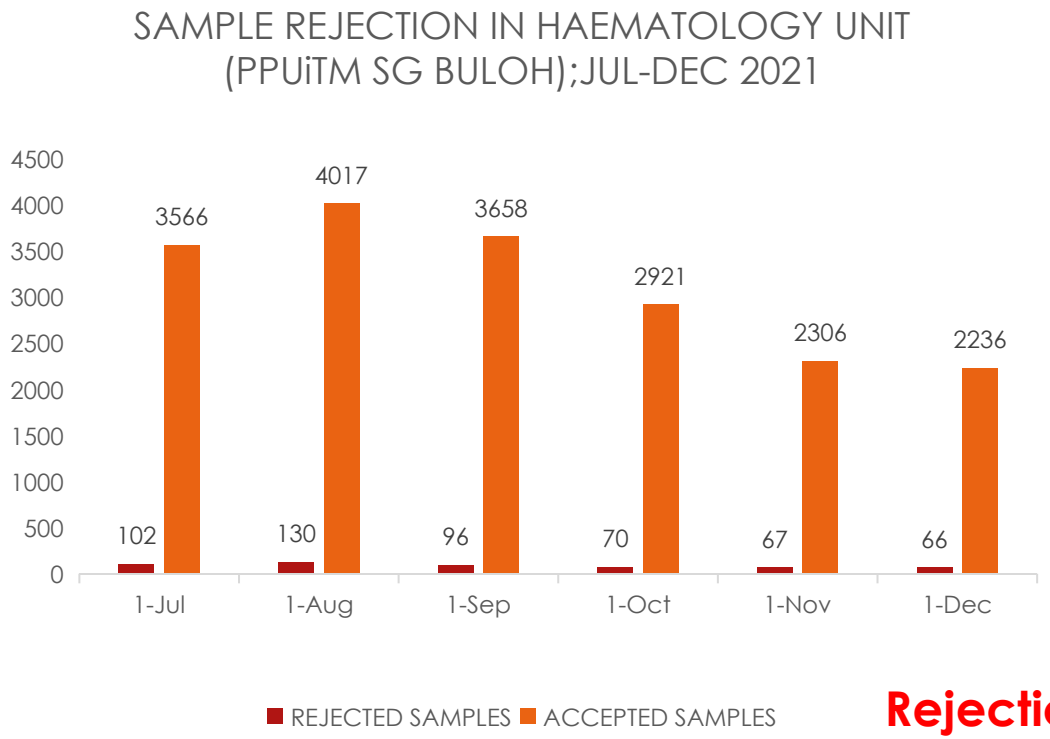
Reason for return:

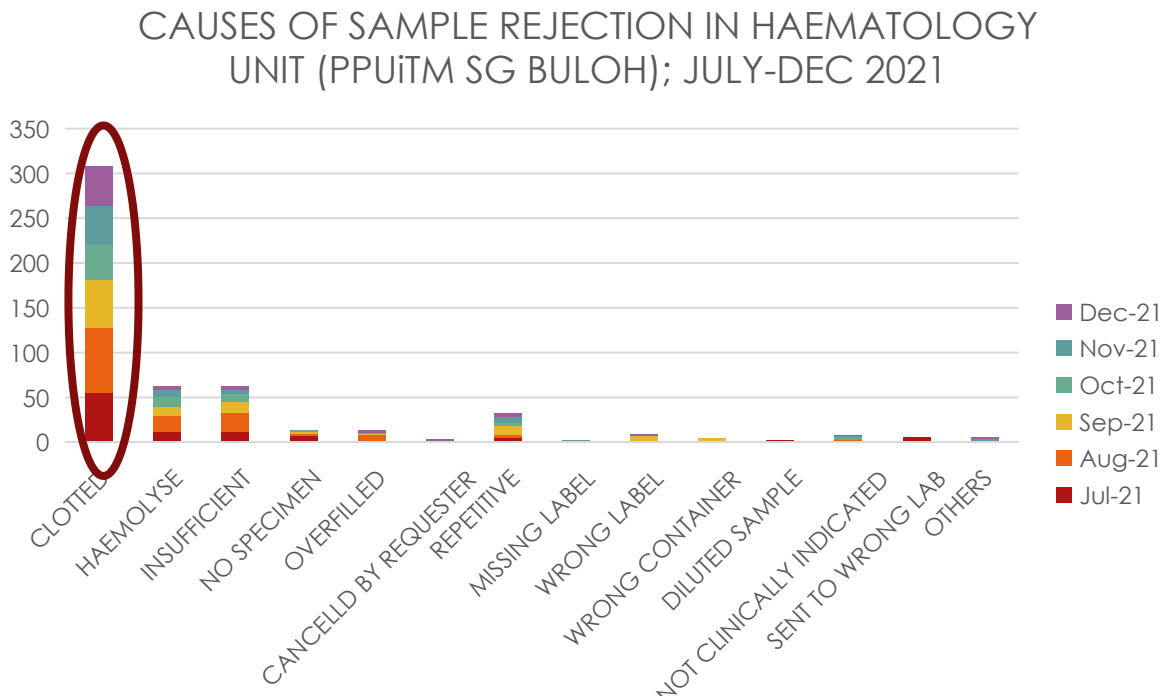
Attending Dr.	
Name	
Staff ID/ IC No	
Department	

ONLY USED IN PPUITM SG BULOH

REJECTION RATE (Haematology) July-Dec 2021

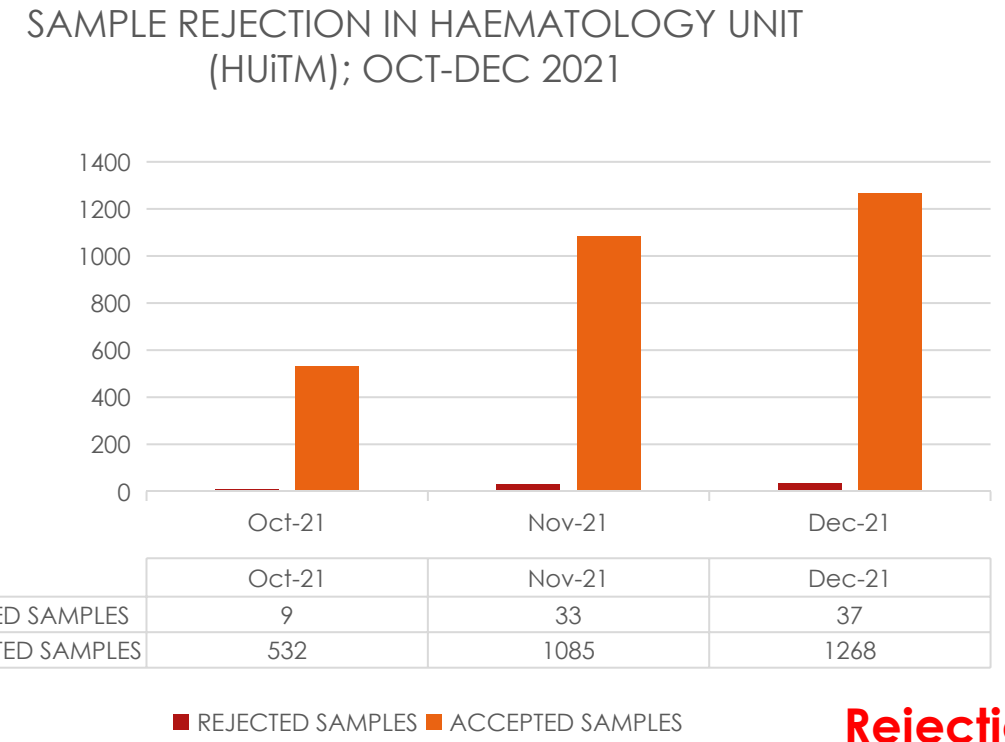
PPUiTM Sungai Buloh



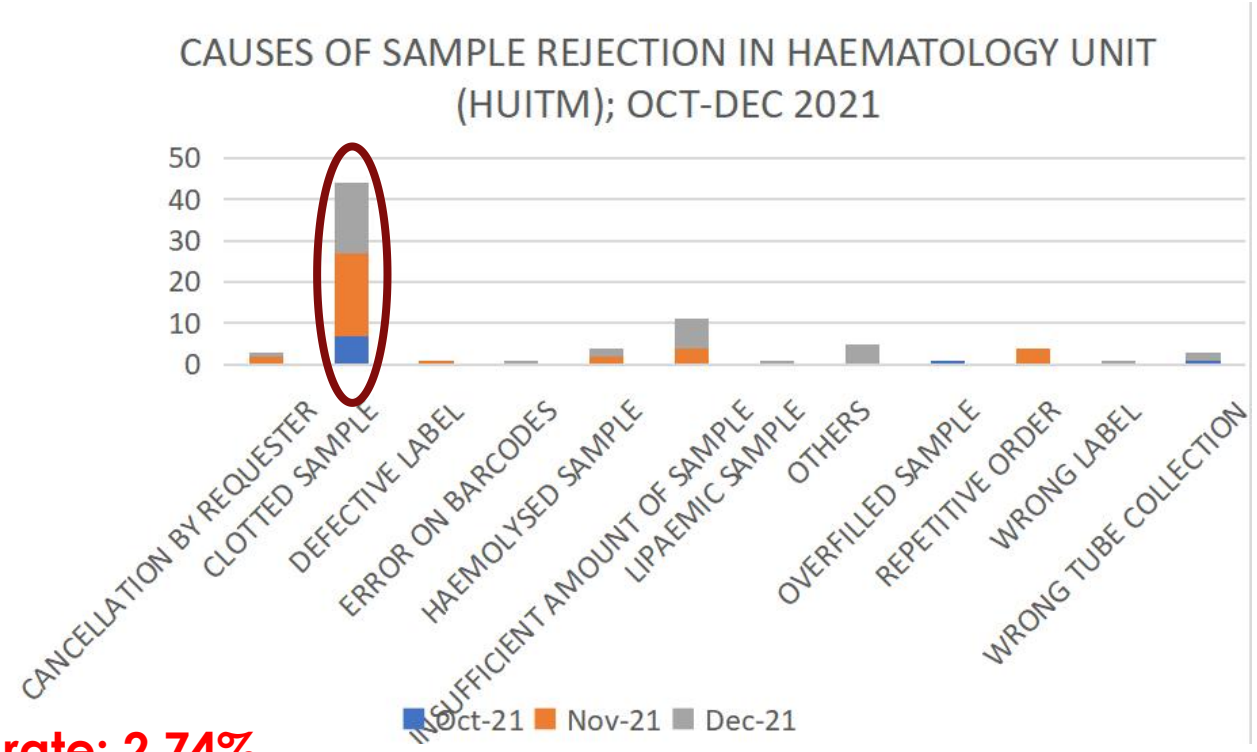


Rejection rate: 2.76 %

HUiTM Puncak Alam



	Oct-21	Nov-21	Dec-21
REJECTED SAMPLES	9	33	37
ACCEPTED SAMPLES	532	1085	1268



Rejection rate: 2.74%

References

- Transfusion Practice Guidelines for Clinical & Laboratory Personnel- 4th Edition 2016
- Handbook on Clinical Use of Blood- 3rd Edition 2020
- AABB Technical Manual -19th edition 2017
- https://youtu.be/3AwTw__cVyE The Pre-administration Blood Component Transfusion Bedside Check


Thank
You