BLOOD AND BLOOD COMPONENTS

Group 1

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INVENTORY

Managing blood and blood product inventory is made up of two key factors:

1. Product availability. Planning of inventory levels held, timing of deliveries and order volume; and

2. Product integrity. Physical and process control of product in your facility, to ensure efficient and effective handling to maintain availability and minimise wastage.

PRODUCT AVAILABILITY

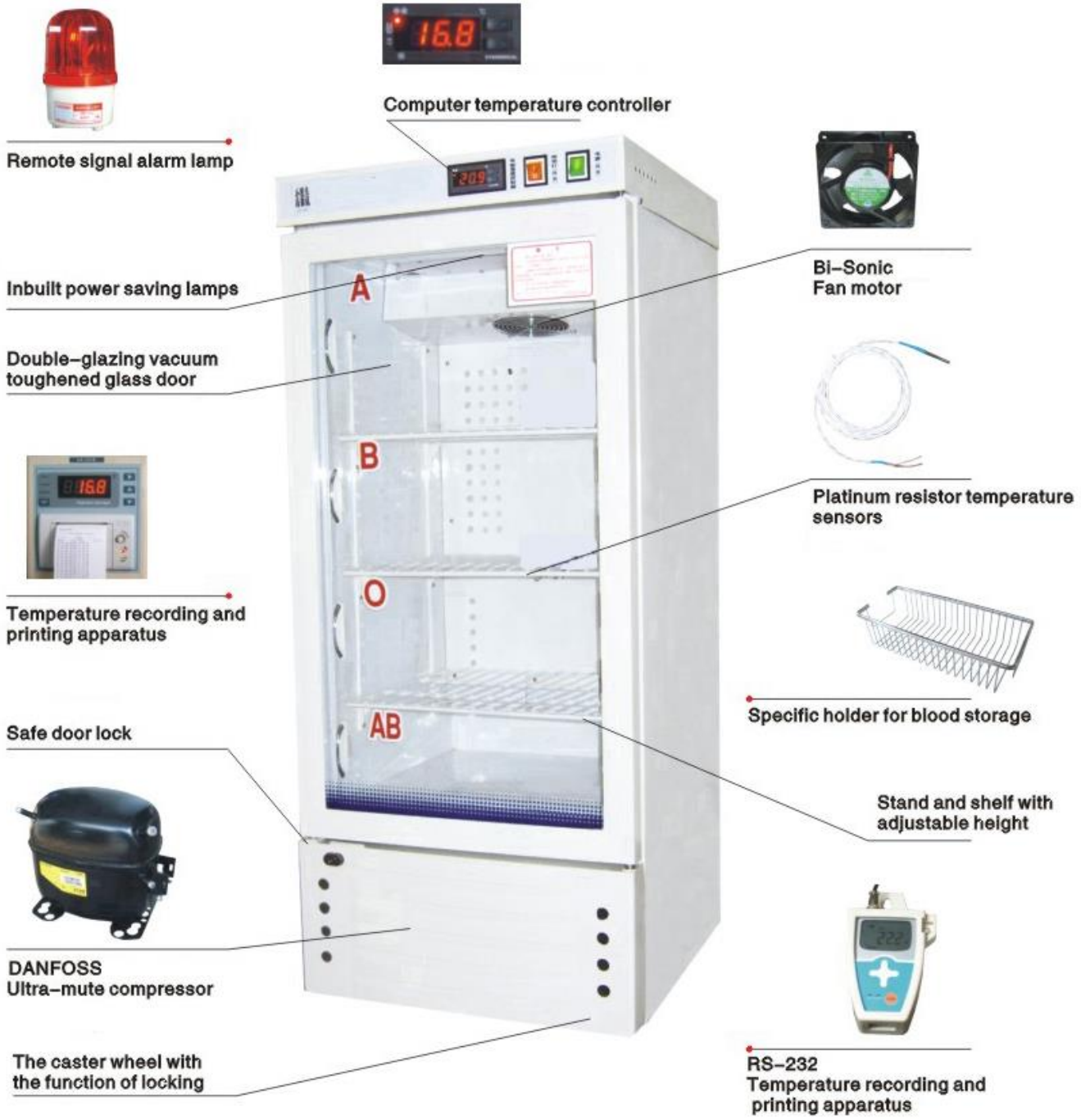
1. Inventory is planned by the previous history of inventory maintained in the blood bank/ storage.

2. The inventory is planned according to requests received from the user ends

STORAGE

1. The blood and blood products are to be stored in right temperature as per guidelines

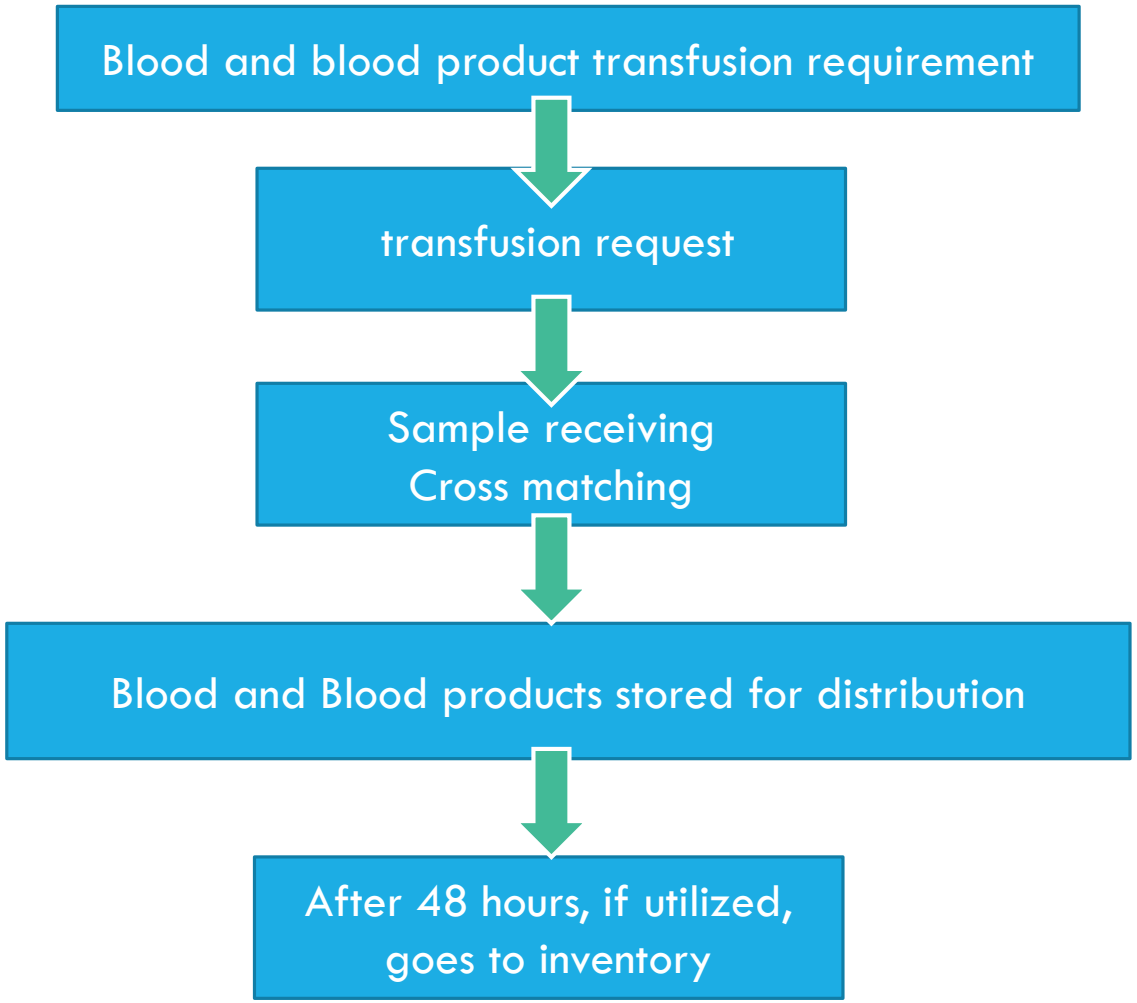
2. The blood and blood products are stored as per FIFO system.

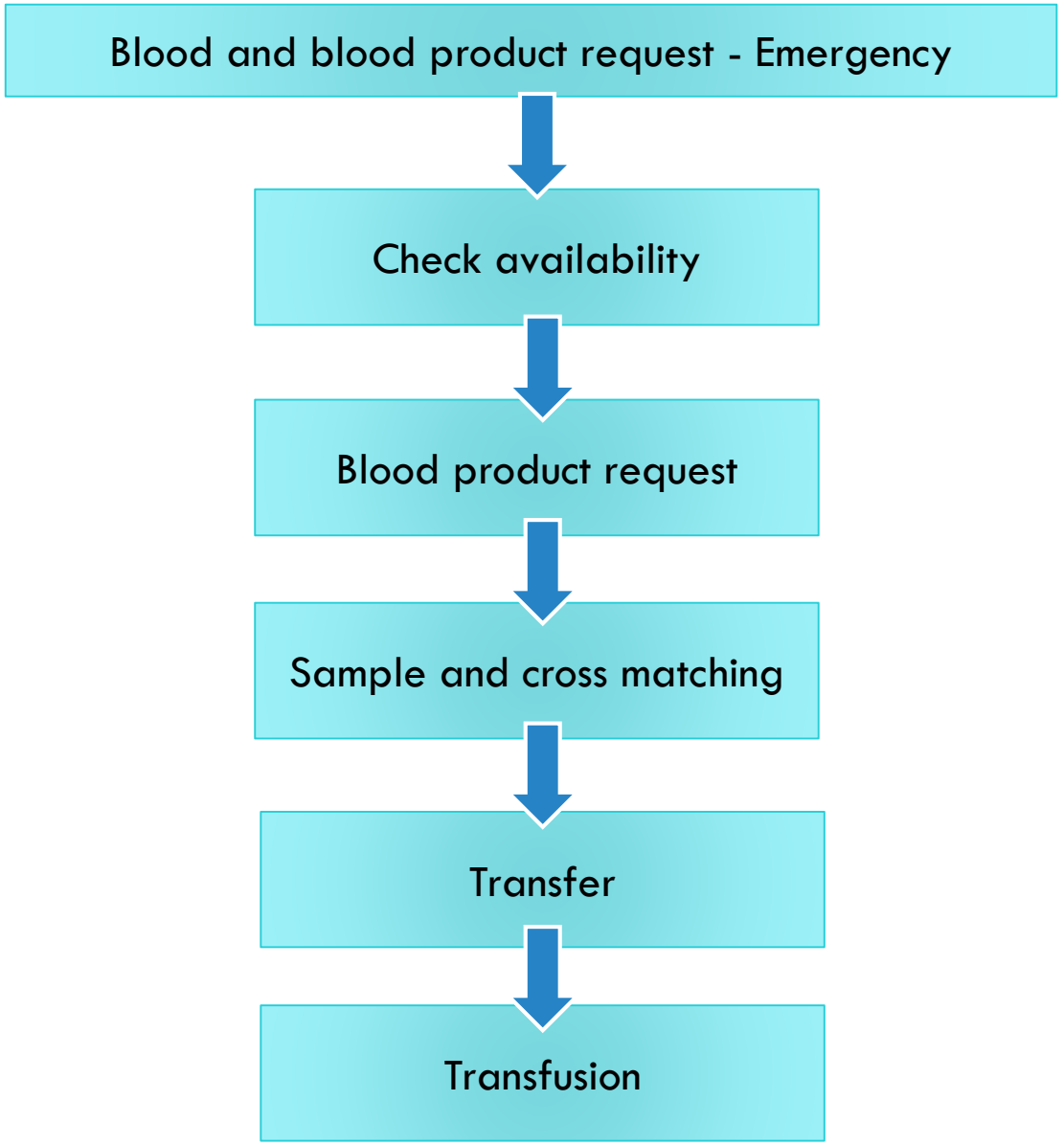


- The monitoring of temperature is done every 4 hours
- Alarm system to be present for temperature variations
- Performance of alarm system should be checked weekly
- Continuous power supply

S.No	BLOOD AND BLOOD COMPONENTS	DAYS OF STORAGE	TEMPERATURE
1	Whole Blood	without Anticoagulant 21 days with anticoagulant 35 days	2◦ C to 6◦ C
2	Red Blood Cells	24 hours after seperation of plasma - 24 hours (with preservatives- 42 days)	2◦ C to 6◦ C
3	Frozen Red cells	10 years	(-) 80◦ C to (-)196◦ C
4	Washed and deglycerolized RBC	24 hours after processing	2◦ C to 6◦ C
5	Leucocytes depleted RBC	24 hours in open system	2◦ C to 6◦ C
6	Platelet Concentrate	without anticoagulant 3 days with anticoagulant 5 days	20◦ C to 24◦ C
7	Granulocyte concentrate	24 hours	20◦ C to 24◦ C
8	Single donor Plasma	5 days	2◦ C to 6◦ C
9	Single donor Plasma	1 year	(-)30◦ C
10	Fresh Frozen Plasma and Cryoprecipitate	1 year	(-)30◦ C
11	Fresh Frozen Plasma and Cryoprecipitate	5 years	(-)60◦ C

BLOOD AND BLOOD PRODUCTS REQUEST





BLOOD SAMPLE CARRYING BOX

- The blood samples are transported in dedicated sample carrying box
- It should be shock proof, leak proof and with biohazard symbol

BLOOD AND BLOOD PRODUCTS TRANSPORTATION

- The blood and blood products are transported in dedicated blood and blood component carrier.
- It should be shock proof and temperature control with biohazard symbol

TRANSFUSION CONSENT

1. procedure
2. Reason
3. Procedure performed by
4. Risks
5. Benefits
6. Alternatives
7. Validity (6 months for the transfusion dependent)
8. Patient signature, Witness signature and Procedure physicians or delegated physicians.

Name of the Hospital_____

CONSENT FORM FOR THE TRANSFUSION OF BLOOD / BLOOD COMPONENTS

Patient Name _____CR Number_____Ward/Bed No._____

Blood transfusion is a life saving medical procedure. Blood can be given as "whole blood" or as components such as: Red cells, Platelets, Plasma and Cryoprecipitate.

1. I /My patient have been informed of the transfusion options available and expected benefits of transfusion of blood and / or components.
2. I /My patient agree to the administration of blood and / or components in the interest of proper medical care.
3. I /My patient understand that blood / blood components to be administered have been prepared and tested in accordance with rules established by National Regulation. However, there is still a very small chance that an adverse reaction can occur such as: fever with or without chills and rigor, itching and hives, which are treatable. Rarely an unpredictable life threatening event can also occur.
4. I/My patient have been informed that despite mandatory screening for blood borne infections such as HIV, Hepatitis B, Hepatitis C, Syphilis and Malaria, the risk of acquiring these infections is not totally eliminated.
5. I/My patient have had the opportunity to ask questions about transfusions, alternatives to transfusion, risk of not transfusing, the procedures to be used and the relative risks and hazards involved.
6. I/My patient believe that I have been sufficiently informed to make a decision to give a consent for transfusion of blood / blood components.
7. I/My patient have been informed and explained the above in a language that I/my patient understand.

AUTHORIZATION BY PATIENT

Signature/Thumb impression_____ Signature/Thumb impression:_____

Name of the Patient_____ Name of Witness:_____

Date_____ Doctor _____

Designation_____

PATIENT'S ATTENDANT/NEXT OF KIN

The patient is unable to give consent because _____

And I_____(name / relationship to patient), therefore consent for the patient. I acknowledge that I have had an opportunity to discuss this procedure, as stated above, with my physician, physician designee and hereby consent to this procedure.

Signature/Thumb impression _____ Signature/Thumb impression:_____

Name of the Patient attendant/Next of kin_____ Name of Witness:_____

Date:_____ Doctor_____

Designation_____

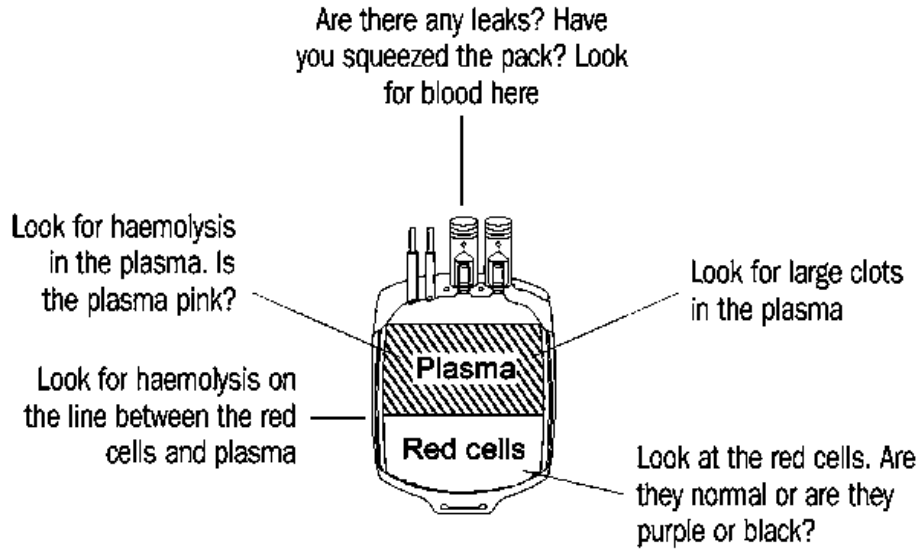
CHECKLIST- BEFORE STARTING TRANSFUSION

Blood bag should be checked for:

1. Any sign of haemolysis in the plasma indicating that the blood has been contaminated, allowed to freeze or to warm.
2. Any sign of haemolysis on the line between the red cells and plasma during storage.
3. Any sign of contamination, such as a change of colour in the red cells, which often look darker/ purple/ black when contaminated.
4. Any clot, which may mean that the blood was not mixed properly with the anticoagulant when it was collected or might also indicate bacterial contamination due to the utilization of citrate by proliferating bacteria.
5. Any sign that there is a leak in the bag or that it has already been opened.

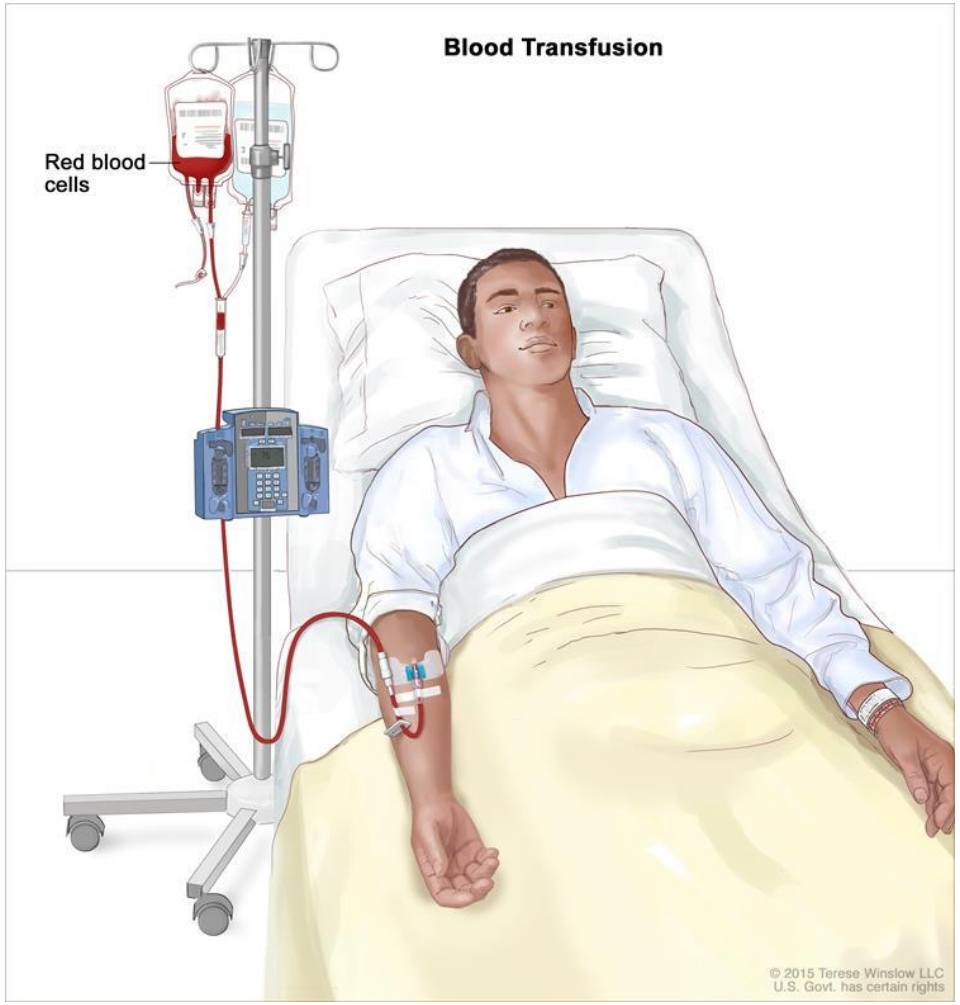
The blood unit must be discarded if:

1. It has been out of the refrigerator for longer than 30 minutes, or
2. The seal is broken, or
3. There is any sign of haemolysis, clotting or contamination.



TRANSFUSION

1. Pre transfusion vitals
2. Double checking (Blood product received and request and order by Medical officer and RN)
3. Transfusion initiation by Medical Officer
4. Vital checking every 5 minutes for first 15 minutes followed by every 30 minutes
5. Checking for any complications or adverse reactions – Notifying the medical officer if any reactions and stop the transfusion.
6. Post transfusion vitals – Immediate, after 30 minutes, 1 hour, 4 hours, 12 hours, 24 hours, 48 hours
7. Post transfusion reactions
8. Feed back forms



TRANSFUSION RATES

WHOLE BLOOD	
ADULTS	150-200 ml/ hr
PEDIATRIC	2-5 ml/ kg/ hr
PRBC	
ADULTS	100-150 ml/hr
PEDIATRIC	2-5 ml/kg/hr
PLASMA/ PLATELETS	
ADULTS	150-300 ml/hr
PEDIATRIC	1-2 ml/min

TIME LIMITS FOR TRANSFUSION

1. There is a risk of bacterial proliferation or loss of function in blood products once they have been removed from the correct storage conditions.

2. Transfusion of a unit of blood should be completed within a maximum period of four hours after removal from the blood fridge: discard the unit if this period is exceeded.

3. If blood has been out of the blood bank refrigerator for more than 30 minutes and is not transfused, then the unit must be returned to the laboratory, where it will be disposed of.

Adverse Transfusion Reaction – SIGNS AND SYMPTOMS

For all signs and symptoms: STOP TRANSFUSION IMMEDIATELY! Maintain IV access with 0.9% sodium chloride.

Type of Reaction	Suspected Transfusion Reaction Signs & Symptoms	Timing of Symptoms	Actions & Suggested Treatment / Investigations
ACUTE (< 24 hours)			
Minor Allergic Reaction	Intensely pruritic localized/or widespread urticaria less than 2/3 of the body; generalized erythema or flushing	During transfusion up to 2-3 hours from start	Consult with Physician–diphenhydramine hydrochloride 25-50 mg PO/IM or IV; proceed with CAUTION
Anaphylactic	Angioedema–localized non-pitting deep edema; upper airway obstruction–laryngeal edema, hoarseness, stridor, 'lump in the throat;' lower airway obstruction–bronchospasm, wheeze, chest tightness, dyspnea, cyanosis; profound hypotension	1-45 minutes after start of infusion; majority within 5 minutes	Epinephrine 0.3 - 0.5mg S/C or IV (up to 3 doses); fluid bolus; vasopressors if intractable hypotension; DO NOT RESTART TRANSFUSION
Hypotension	Abrupt onset of clinically significant hypotension–facial flushing with or without mild respiratory symptoms	Within 5 minutes after start of infusion	Supportive therapy; DO NOT RESTART TRANSFUSION
Febrile Non-Hemolytic	Cold sensation, rigors, nausea, vomiting with/without temperature greater than 1°C above baseline.	Usually within 30 minutes after start of infusion; up to one (1) hour after completed	Consult with Physician–Acetaminophen 325-500 mg PO; proceed with CAUTION
Acute Hemolytic (AHTR)	Temperature ≥39°C, hypotension, tachycardia, rigors/chills, anxiety, dyspnea, anemia, hyperbilirubinemia, hemoglobinuria/oliguria, bleeding at IV site, nausea/vomiting, DIC, pain–back/chest/head/flank/abdomen/groin/IV site	Usually within first 15 minutes; up to 24 hours following transfusion.	Serologic testing: group and screen, cross-match, DAT, LDH, BUN, creatinine, TB; IV Fluids DO NOT RESTART TRANSFUSION
Circulatory Overload	Dyspnea, orthopnea, cyanosis, hypoxemia, tachycardia, hypertension, pulmonary/pedal edema, elevated JVP	Within 1-2, up to 6 hours following start of transfusion	Oxygen, diuretics; elevate head of bed. DO NOT RESTART TRANSFUSION
Transfusion Related Acute Lung Injury (TRALI)	Acute respiratory distress, dyspnea, cyanosis, severe hypoxemia, severe bilateral pulmonary edema, bilateral infiltrates on x-ray, hypotension unresponsive to fluid bolus	Within 1-2 hours during transfusion or within 6 hours post-transfusion	Oxygen, intubation and ventilation, vasopressors DO NOT RESTART TRANSFUSION
Bacterial Contamination	Fever, chills, hypotension, shock, nausea/vomiting, tachycardia, hypotension	During or within 4 hours of transfusion	Treatment of shock, DIC, renal failure, product and recipient cultures, antibiotics–broad spectrum initially; anti-*pseudomonas* if red cells implicated
DELAYED (>24 hours)			
Delayed Hemolytic	Weakness, unexplained fall in post-transfusion hemoglobin, elevated serum bilirubin	Within 3-7 days post-transfusion and up to 21 days post-transfusion	Provide antigen negative blood products for subsequent transfusions
Transfusion Associated Graft Versus Host Disease	Fever, erythematous cutaneous pruritic rash which progresses to generalized erythroderma, watery/bloody diarrhea, pancytopenia, liver dysfunction, anorexia, nausea/vomiting	Within 2-50 days of transfusion (usually 1-2 weeks)	Largely ineffective–Immunosuppressive therapy, cyclosporine/OKT3, cyclophosphamide/antithymocyte, T cell monoclonal antibodies, HPC transplants, irradiated components. Mortality is greater than 90%
Post Transfusion Purpura	Purpura, bleeding, platelet count less than 10×10^9/L	1-24 days post transfusion	IVIG

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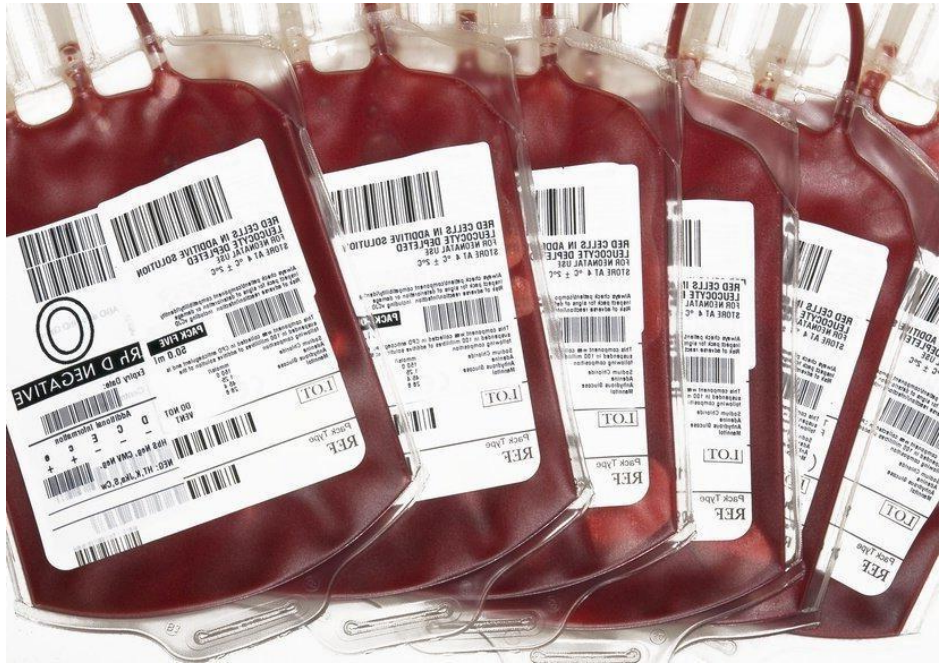
BLOOD TRANSFUSION COMMITTEE

1. Blood bank Volume
2. Transfusion reactions- CAPA
3. Feedbacks – CAPA
4. TAT
5. Quality indicators

1. Medical Director – Chair
2. Blood bank In charge Medical Officer – Co Chair
3. Medical Officer/ Technician – Convener
4. Surgeons – Members
5. ICU Doctors – Members
6. Safety Nurse – Member

DISCARDING OF UNUSED/ EXPIRED/ CONTAMINATED BLOOD BAGS

- The Unused/ expired/ contaminated blood bags are discarded in the Yellow BMW bags/bin and autoclaved (steam auto-clavable bags).
- The vacutainers, Tubes (after removal of needles) are discarded in red.



QUALITY INDICATORS

1. $$\text{TTI \%} = \frac{\text{Combined TTI cases (HIV + HBV + HCV + Syphilis + MP)}}{\text{Total no. of donors}} \times 100$$

2. **Adverse Transfusion Reaction Rate % =**

$$\frac{\text{No. of adverse transfusion reactions}}{\text{Total number of blood and component issues}} \times 100$$

(All major and minor reactions to be classified as per NHvPI and reported to blood bank)

3. **Wastage Rates =**

$$\frac{\text{No. of blood/ blood components discarded}}{\text{Total no. of blood/ blood components issued}} \times 100$$

4. **Turnaround Time (TAT) of Blood Issues =**

$$\frac{\text{Sum of the time taken}}{\text{Total number of blood and blood components cross matched/reserved}}$$

(Time taken to be calculated from the time the request/ sample is received in the blood bank till the blood is cross matched/ reserved and available for transfusion. Blood Bank shall set upper limits for routine and emergency issues separately)

5. **Component QC failures (for each component) =**

$$\frac{\text{No. of component QC failures}}{\text{Total no of component tested}} \times 100$$

6. **Adverse Donor Reaction Rate %=**

$$\frac{\text{No. of donors experiencing adverse reaction}}{\text{Total no. of donors}} \times 100$$

7. **Donor Deferral Rate % =**

$$\frac{\text{No. of donor deferrals}}{\text{Total no. of donation + total no. of deferrals}} \times 100$$

8. **% of components =**

$$\frac{\text{Total component issues}}{\text{Total whole blood + component issues}} \times 100$$

9. **TTI outliers % age =**

$$\frac{\text{No. of deviations beyond } \pm 2SD}{\text{Total no. of batch assays}} \times 100$$

10. **Delays in transfusion beyond 30 min after issue-** sample audit by BB every month.

THANK YOU!

Organizing for Action