

STANDARD OPERATING PROCEDURE

Packed Red Cell (PRC) Transfusion

Standard Operating Procedure (SOP)

Department of Health · Special Region (1)
Union of Myanmar

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Document Control

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1. Purpose

To ensure safe storage, compatibility testing, issue, and laboratory support for appropriate use of Packed Red Cells (PRC).

2. Scope

This SOP applies to all laboratory personnel involved in:

- Storage and monitoring of PRC
- Pre-transfusion testing
- Issue and documentation of PRC units

3. Responsibility

- **Pathologist / Transfusion Specialist:** Overall supervision and policy compliance
- **Medical Laboratory Technologist:** Testing, validation, and authorization of issue
- **Laboratory Technician:** Storage, labeling, monitoring, and documentation

4. Definitions

Term	Definition
Packed Red Cells (PRC)	Red blood cell component prepared by removal of most plasma
Compatibility Testing	Laboratory procedures ensuring donor-recipient compatibility
FEFO	First-Expired-First-Out principle for inventory management
AHG (Coombs) Crossmatch	Antihuman globulin crossmatch for detecting incomplete antibodies

5. Procedure

5.1 Preparation of Packed Red Cells

- PRC shall be prepared from **whole blood collected in anticoagulant-preservative solution**.
- Centrifuge whole blood using **heavy (hard) spin** at appropriate settings:
 - Temperature setting of 4°C
 - 5,000 × g for 5 minutes, **or**
 - 5,000 × g for 7 minutes (plus deceleration time)
- To calculate RPM for the centrifuge, the following formula is used:

$$\text{RCF} = 1.118 \times 10^{-5} \times r \times (\text{RPM})^2$$

Where:

RCF = Relative centrifugal force (in × g)

r = Radius in millimetres (distance from axis of rotation to bottom of rotor bucket)

RPM = Revolutions per minute

- Separate plasma from red cells using a **plasma extractor**.
- Transfer plasma into a satellite bag under sterile conditions.
- Seal tubing and retain packed red cells in the primary bag.
- Ensure:
 - Proper **labeling** (donor ID, blood group, date, component type)
 - Maintenance of a **closed system** to preserve sterility
 - Minimal hemolysis during processing

5.2 Storage of Packed Red Cells

- PRC shall be stored in a **validated blood bank refrigerator at 2–6°C**.
- Maintain **continuous temperature monitoring with alarm system**.
- Record temperature **at least twice daily**.
- Apply **First-Expired-First-Out (FEFO)** principle.
- Shelf life:
 - **35 days** (CPDA-1)
 - **Up to 42 days** (additive solutions e.g., SAGM/AS-1)
- During transport/issue, temperature may rise but should **not exceed 10°C for a limited period**.

- Each unit must be **visually inspected before issue** for:
 - Hemolysis
 - Clots
 - Leakage
 - Discoloration or contamination
- Any abnormal unit must be **discarded according to policy**.

5.3 Pre-Transfusion Testing

a. Patient and Sample Identification

- Verify correct patient identification and properly labeled sample.
- Ensure request form includes relevant clinical information.

b. Blood Grouping

- Perform **ABO and Rh (D) typing** for donor and recipient.

c. Antibody Screening

- Perform antibody screening where available.
- More sensitive than crossmatch for detecting unexpected antibodies.

d. Compatibility Testing (Crossmatch)

- Perform **major crossmatch** for all routine transfusions.
- If antibody screen is negative and system is validated:
 - Immediate spin or electronic crossmatch may be used.
- If antibody is present:
 - Perform **AHG (Coombs) crossmatch**.

Interpretation:

- No agglutination → Compatible
- Agglutination → Incompatible (do not issue)

5.4 Clinical Indications

Transfusion decisions must consider **clinical condition + laboratory findings**.

Restrictive Transfusion Thresholds

Haemoglobin Level	Patient Category
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Hb < 7 g/dL	Stable, non-bleeding patients
Hb < 8 g/dL	Cardiac disease, peri-operative patients

Indications

- Acute blood loss / haemorrhage
- Symptomatic anaemia:
 - Tachycardia
 - Hypotension
 - Hypoxia
- Peri-operative anaemia
- Chronic transfusion-dependent conditions

Not indicated for:

- Volume expansion
- Nutritional anaemia without symptoms

5.5 Issue and Handling of PRC

Before Issue

- Verify:
 - Patient identity (**minimum two identifiers**)
 - Blood group compatibility
 - Crossmatch result
 - Unit number and expiry date
- Perform final visual inspection.

At Issue

- Document:
 - Patient details
 - Unit number
 - Blood group
 - Date and time
 - Staff signature

After Issue

- Transfusion should **start promptly according to hospital policy.**

- Must be **completed within 4 hours**.

5.6 Post-Issue / Return

- Unused PRC units must be returned promptly to the blood bank.
- A unit may be returned to inventory only if **ALL** conditions are met:
 - The unit has not been transfused or entered.
 - The unit has been maintained within controlled storage temperature (2–6°C).
 - The unit has been outside controlled storage for no longer than the maximum allowable time (within 30 minutes).
 - The unit is visually acceptable (no hemolysis, clots, leakage, or contamination).
 - The unit identity and labeling are intact and traceable.

Do NOT re-store the unit if:

- Temperature control is not maintained
- Time outside controlled storage exceeds defined policy limits
- The unit is damaged, leaking, or contaminated
- Abnormal appearance is observed

6. Quality Control and Assurance

- **Maintain:**
 - Continuous temperature monitoring
 - Full traceability of each unit
 - Complete documentation of all procedures
- **Perform:**
 - Regular equipment calibration and validation
- **Participate in:**
 - Quality assurance programs
 - Proficiency testing

7. Safety Precautions

- Use personal protective equipment (PPE).
- Treat all blood as potentially infectious.
- Follow biosafety and waste disposal procedures.

- Ensure compliance with infection screening protocols.

8. Documentation

Maintain the following records:

- Donor and unit records
- ABO/Rh typing results
- Antibody screening results
- Crossmatch records
- Blood issue register
- Temperature logs
- Discard/damage records

9. References

1. AABB Standards for Blood Banks and Transfusion Services (latest edition).
2. AABB Technical Manual (latest edition).
3. Guidelines for Blood Transfusion Service, Ministry of Health and Sports (MOHS), Myanmar, 2018.

Audit Statement

This SOP is based on AABB standards and aligned with MOHS guidelines where applicable.