

NATIONAL BLOOD AND BLOOD PRODUCT TRANSFUSION POLICY

PURPOSE AND SCOPE

The purpose of this guideline is to provide guidance to all health workers in all three medical divisions who deal with transfusion of blood and blood products, on the proper management of blood transfusion and processes to follow in order to minimise the risks and prevent complications associated with transfusion of blood and blood products.

The scope of its implementation will be the standard practice adopted in all health facilities in Fiji, where blood transfusion takes place.

The guideline is divided into parts for ease of reference and applicability.

INTRODUCTION

In 2006, of a total of 4352 cross-match procedures undertaken at the Lautoka Hospital Laboratory, a total of 4255 packed cells and 97 whole blood units were issued for transfusion.

421 blood products such as Fresh Plasma, Fresh Frozen Plasma, Cryoprecipitate and Platelet Concentrate were issued for transfusion.

15 Transfusion Reactions were reported to the Lautoka Hospital Pathology Laboratory in 2006. Investigations revealed that errors in the requesting, supply, and administration have lead to significant risks to patients.

Although previous attempts have been made to rectify certain areas, these guidelines have been inadequate in improving the processes and addressing the deficiencies identified in the whole process of collection of blood samples, labelling, requesting, supply, administration and monitoring of practice.

This guideline provides clear instructions and recommendations on the processes and practices to be followed when transfusion of blood and/or blood products is offered as treatment to a patient.

Where applicable, the guideline has delegated responsibility to appropriate officers to fulfil various roles and functions relevant to their expertise to ensure that at all times, quality service is provided through getting the Right Blood to the Right Person at the Right Time.

The processes endorsed in this guideline are discussed under the following major headings:

- I. Requests for Blood Transfusion and Collection of Blood Sample
- II. Blood Grouping and Cross-Matching at Blood Bank
- III. Storage of Blood
- IV. Issue of Blood and Blood Products and Delivery to the Ward or Theatre
- V. Commencement and Documentation of Transfusion
- VI. The Care and Monitoring of Transfused Patients
- VII. Unused Blood and Blood Products
- VIII. Adverse Effects of Transfusion
- IX. Reporting of Adverse Events
- X. Training

I. REQUESTS FOR BLOOD TRANSFUSION AND COLLECTION OF BLOOD SAMPLE.

1. Who requests for transfusion?

It is the responsibility of the medical officer [intern/ registrar/ consultant/ treating doctor at Subdivisional Hospital] to request for blood transfusion.

2. The Requesting Doctor's Role

The medical intern or doctor's role comprises the following:

a. Patient's Consent

Once the decision to transfuse is made, it is the responsibility of the treating doctor to explain to the patient the following:

i) Advantages of transfusion

ii) Adverse effects of transfusion

(Refer to Appendix 7 and Appendix 10)

And secure the **patient's consent** by signing the appropriate consent form.

A copy of the 'Consent For Receipt of Blood and Blood Products' Form is appended

Cultural and religious beliefs and wishes of the patient must be respected at all times.

b. Patient Identity

Verify the identity of the patient by **confirming with the patient if the patient is conscious** and a relative or **second member of staff if the patient is unconscious** the following:

- i) **Patient's Name**
- ii) **Father's Name**
- iii) **Date of Birth**
- iv) **Hospital Number**

c. Requisition Form

Ensure that the completed requisition form has the following detail:

- i) **Correct Patient Name**
- ii) **History - diagnosis/ reason for transfusion, relevant medical history, previous transfusion/ antibodies**
- iii) **Request - Products required, amount, time and date required**
- iv) **Name of requesting clinician**

A copy of the **Requisition for Blood or Blood Products for Transfusion** is appended.

d. Labelling of Sample

The responsibility for correct and complete labelling of samples lies with the person taking the blood sample.

Label the sample bottle correctly at the patient's bedside with the label containing the:

- i) **Patient's first name, and Family name or Father's name**
- ii) **Date of Birth**
- iii) **Gender**
- iv) **Hospital Number**
- v) **Name of Ward where patient is admitted**

The information on the tube must correspond with the information on the Requisition Form because the details on the compatibility label are copied from the request form.

The blood bank will issue blood that is compatible with an identified sample.

Note:

- i) To minimise error, it is recommended that **the tube be not labelled prior to obtaining the specimen**. This will lessen the risk of putting a patient's blood sample into someone else's labelled tube.
- ii) Blood bank staff **will not accept a request for compatibility testing** when **either the blood request form or the patient blood sample is inadequately identified, or the details do not match**.
- iii) Laboratory technicians **are not authorised to amend or add the details of a patient on the Request Form or the Specimen tube**.

e. Urgent Requests

The blood bank should be alerted by phone if the blood is needed urgently. The recipient's blood sample should be taken down to the laboratory as soon as possible.

Refer to form in Appendix 1.

The availability of blood and its collection from the blood bank will also be confirmed by phone in all emergency cases.

f. Elective Requests

These requests will be **processed through the normal process** i.e. the use of the appropriate forms for requisition and issue of blood and blood products, and do not require the blood bank to be alerted by phone.

Refer to appended copies of the forms.

g. When Transfusion is Planned

In all cases **where a transfusion is planned**, request for grouping and **compatibility testing should be made at least 24 hours before** the time of transfusion. **Cross match for elective cases therefore should not be done after normal working hours.**

Family donors when desirable should be arranged 72 hours in advance.

h. For Major Surgical Operations

All cases booked for major surgical operations should be grouped when they are first seen in the clinic and placed on the waiting list. This allows for testing of atypical antibodies at the time and also serves as a check when the patient is regrouped on admission.

i. **How much Blood and Blood Products to Request?**

The blood bank has a list of recommended amount of blood to cross match for various operations - the Maximum Blood Order Schedule (MBOS). It is intended for the guidance of junior medical staff in order to achieve economical and consistent blood ordering practice.

All requests for blood should follow this guideline. When in doubt, seek advice from your consultant or the blood bank. These recommendations can be overridden at the discretion of the surgeon or anaesthetist.

Copy of the MBOS is appended.

II. **BLOOD GROUPING AND CROSS MATCHING AT BLOOD BANK**

1. **Grouping and Cross-match**

Complete grouping and cross matching takes at least ONE AND A HALF HOURS. This may take longer if atypical antibodies are found where compatible blood has to be found.

Donor Blood is not considered to be safely cross-matched, unless the full routine technique is used.

In very urgent cases times can be shortened (10-15 minutes) to obtain ABO compatible blood.

It is the responsibility of the doctor in charge of the patient to define the degree of urgency, to ask if necessary for emergency tests and to accept their limitations.

2. **Group and Hold**

After the initial grouping and cross match, the **laboratory will hold the patients serum for one week.**

If Transfusion has occurred, a fresh blood sample will be required for new cross matching if the request is made 3 or more days after a transfusion. This is because new antibodies may have developed after the last transfusion.

3. **Blood Supply**

GROUP 'O' RHESUS NEGATIVE BLOOD IS CONSTANTLY IN SHORT SUPPLY and at Lautoka Hospital, delays in the provision of this Blood Group (O - ve) should be anticipated with any request.

Supplies of blood groups other than O - ve are generally readily available.

III. STORAGE OF BLOOD

Blood and blood products **should only be stored in the Blood Bank, and under the direct care and control of the blood bank technicians.**

Blood and blood products that have been issued from the Blood Bank should not be stored in the ward or theatre refrigerator.

IV. ISSUE AND COLLECTION OF BLOOD AND BLOOD PRODUCTS FROM THE BLOOD BANK AND DELIVERY TO THE WARD OR OPERATING THEATRE.

1. Who should collect blood from Blood Bank?

A NURSE or MEDICAL OFFICER is responsible for collecting blood from the blood bank. A written documentation (the Requisition For Blood Previously Cross-Matched form – pink in colour) to identify the patient must be presented to blood bank before blood/ blood product can be issued. Copies of this form are kept in all wards and theatres.

Under emergency circumstances or in the presence of severe shortages of staff, the instruction 5 of the Requisition For Blood Previously Cross-Matched form may be activated.

A copy of the Requisition For Blood Previously Cross-Matched form is appended.

2. Complete the Collection Checklist

The Blood Bank officer who is issuing the blood or blood product **must complete the Collection Checklist** before allowing the unit(s) to be removed from the Blood Bank. Copies of this form are kept at the Blood Bank.

A copy of the Collection Checklist is appended.

3. For Platelet Concentrate

Platelet concentrate **should be issued in an insulated carrier that will keep the temperature at about 20 to 24 degrees Celsius.** It should never be placed in the refrigerator and should be transfused as soon as possible.

V. COMMENCEMENT AND DOCUMENTATION OF TRANSFUSION

1. When to commence transfusion

Once issued by the blood bank into its designated insulated container, **the transfusion of whole blood, red cells and thawed fresh frozen plasma should be commenced within 30 minutes of their removal from refrigeration.**

If the transfusion cannot be started within this period, they must be returned to the laboratory so that they can be placed in the proper refrigerator and to be reissued just before transfusion

2. Pre - Transfusion Checklist

The Pre-transfusion Checklist must be completed first by the officer putting up the transfusion, before transfusion commences. This will ensure that the recipient is advised and informed of the procedure, has consented, and is receiving the correct type and amount of blood and/or blood product at the correct time and rate. Copies of the Pre-Transfusion Checklist are kept in all wards and theatres. A copy of the Pre-Transfusion Checklist is appended.

3. Who should put up the Blood or Blood Product unit for transfusion?

It is the responsibility of the treating doctor to put up the first unit of blood or blood product after completing the Pre-transfusion Checklist.

A Registered Nurse can put up subsequent units after completing the Pre-transfusion Checklist.

4. The Blood Giving Set

Blood should be transfused through a sterile blood giving set. The set should be changed every 12hours in order to prevent bacterial growth. The giving set should also be changed if the drip is running too slow.

Platelet Concentrate must never be transfused using a giving set that has been previously used for Whole blood or Packed Cells transfusion.

5. Volumes and Rate of Transfusion

Dogmatic directions should not be given concerning volume and rate of transfusion. The following factors must be considered and the volume and rate of transfusion be tailored according to the -

- i) Age of the patient
- ii) Patient's general condition
- iii) State of patient's circulatory systems
- iv) Indication for transfusion.

Note:

- ii) **Infusion of any unit of blood or blood product should not take more than 4 hours** because of the risk of infection developing in that unit.
- iii) **Special paediatrics giving set is available** and must be used accordingly.
The Formula for calculation of Volume and Rate for Paediatric Cases is appended and must be used in all transfusion in children unless instructed otherwise by the Paediatrician.
- iv) **Infusion Pumps are not indicated for transfusion** for they can damage red cells.
- v) The **rate of infusion is also affected by the size of the IV Cannula used and the choice of vein** cannulated for transfusion.

6. Warming of Blood before Transfusion

There is currently no evidence to suggest that warming blood is beneficial to the patient when infusion is slow.

Cold blood or blood product infused at rates greater than 100mls per minute may become a contributing factor to cardiac arrest. However, **keeping the patient warm is more important than warming the infused blood.**

Special circumstances in which warmed blood is used include:

- i) Large volume rapid transfusion
- ii) Exchange transfusion in infants
- iii) Patient diagnosed with Cold Agglutinins

BLOOD SHOULD ONLY BE WARMED IN THE PROPER BLOOD WARMER AND NEVER IN A BOWL OF HOT WATER as this can lead to haemolysis of Red Blood Cells - It is potentially life threatening to transfuse haemolysed blood.

7. Intravenous Medication

Intravenous Drugs and other medications should not be added to the unit of blood or blood products that is being transfused. However, intravenous medication may be given directly through the venous access whence the blood or blood product is being transfused.

VI. THE CARE AND MONITORING OF TRANSFUSED PATIENTS.

The care of the patient who is receiving a blood or blood product transfusion should include the following:

1. Advice for Patient

It is the responsibility of the treating Doctor to advise the patient about symptoms of the Transfusion reactions and what to do (report immediately to nurse or doctor)

Refer to Appendix 7 and Appendix 10.

2. Visual Observation

Direct visual observation of the patient by the nurse is important.

Transfusion reactions should be considered when assessing a change or deterioration in the patient's condition, particularly in the first 15-20 minutes following the start of a unit

3. Monitoring of Vital Signs

The Attending Nurse in all wards and Units is responsible for monitoring the vital signs of the patient receiving a transfusion of blood and blood products. For patients under anaesthesia, the attending anaesthetist undertakes this responsibility.

The patient's **blood pressure, pulse and temperature** must be measured at the start and at end of transfusion.

Vital signs must be checked at 15 minutes and at 30minutes after the start of each unit of blood or blood component transfusion.

Vital signs must **then be checked every 30 minutes until the end** of the transfusion.

Any abnormal reading of vital signs at any check during the transfusion must be reported immediately to the patient's physician (Intern or Registrar)

4. Start and End of Transfusion

The intern or medical officer is required to start the first unit of blood transfusion and document the starting time. The attending nurse can add subsequent units for transfusion as per the treatment plan.

The nurse documents the finishing time clearly on the observation notes.

5. Routine Observation

Routine observations should be continued even if the patient is unconscious. Transfusion reactions should be considered if there is a change or deterioration in the patient's condition, particularly in the first 15-20 minutes following the start of a unit.

Hypotension, uncontrolled bleeding due to DIC, hemoglobinuria, or oligonuria may be the first indication of haemolytic transfusion reaction in these patients.

VII. UNUSED BLOOD AND BLOOD PRODUCTS

All unused blood and blood products should be returned immediately to the blood bank for record keeping purposes.

Note:

- i) To avoid wastage, the **Blood Bank must be informed immediately if cross-matched blood is not required.** This will 'free-up' the blood units to be cross-matched for other requests.
- ii) It is normal Blood Bank practice that **cross-matched blood and blood products will not be stored for more than 48hrs.** Only requests for **placenta previa cases are exempted.**

VIII. ADVERSE EFFECTS OF TRANSFUSION

An Acute Transfusion Reaction occurs in 1 - 2% of transfused patients. Early recognition and rapid management may save a patient's life.

All staff members who deal with transfusion of blood and blood products should familiarize themselves with the symptoms and signs of transfusion reactions and other adverse effects of transfusion.

The appended **Adverse Effects of Transfusion Of Blood And Blood Products** can be used as a guide and reference.

If an Acute Transfusion Reaction is suspected in a patient receiving an infusion of blood or blood products, **the attending doctor and nurse should do the following:**

1. **Stop the transfusion immediately.**
2. **Substitute a saline infusion** (Normal Saline or Dextrose Saline) using a new transfusion set.

3. **Inform the Blood Bank immediately and do not transfuse** any blood or blood products until the laboratory has rechecked the remains of the unit of blood.
4. **Complete the blue requisition form (coded HE910B – bottom left of the form)** and send it to the laboratory with the remains of the unit of blood or blood product.
A copy of the Blue form is appended.
5. **Send a fresh 10mls of clotted blood (Sterile Tube) and 5mls heparin sample (Anticoagulant Tube) from the patient**, preferably taken from the opposite arm. A **completed Investigation Of A Suspected Transfusion Reaction Form** should accompany these specimens. Copies of this form are available in all wards and theatres.
A copy of the Investigation Of A Suspected Transfusion Reaction Form is appended.
6. **A sample of the patient's next urine** should be collected and send to the laboratory for analysis for products of hemolysis.
7. **If a case of a reaction is suspected to be due to an infected blood unit**, a blood sample should be collected from the patient for blood culture.

Note:

1. It is important that **all specimens** mentioned above, that is:

i) 10 mls clotted blood	}	COMPULSORY
ii) 5 mls heparinized blood		
iii) Patient's next urine sample		
iv) Blood sample for culture	→	WHERE NECESSARY

Accompanied by the **appropriate forms (2 forms, as above)** are sent to the laboratory for a thorough investigation of a transfusion reaction.
3. For the clinical management of Acute Transfusion Reactions, the **WHO Guidelines for the Recognition and Management of Transfusion Reactions** is appended for guidance.

IX. REPORTING OF ADVERSE EVENTS

- 1. In all cases of suspected Transfusion Reaction - it is the responsibility of the medical officer to complete the form for investigation and to provide the laboratory with all specimens needed for the investigation as soon as possible.**
- 2. It is the responsibility of the assigned nurse and the supervisor to fill the UOR if an error in transfusion is detected.** Prompt reporting of adverse events will facilitate early and accurate investigation and prompt remedial action.
- 3. The Hospital Blood Transfusion Committee and the Medical Advisory Committee shall review all adverse events relating to the transfusion of blood and blood products.**

X. TRAINING

It is the **responsibility of the Blood Transfusion Committee and the Pathology Department** to ensure that:

- 1. This guideline is included in the initial orientation of staff in each department or subdivision.**
- 2. All Staff and stakeholders are trained in the blood transfusion guideline and procedures**
- 3. Training is undertaken with regular Audits of practice undertaken.**

XI. REFERENCE

- 1. Government of Fiji Islands Pathology Services Users Handbook 2007**
- 2. Government of Fiji Laboratory Users Handbook Pathology Services 1993**
- 3. The Clinical Use of Blood Handbook, WHO Blood Transfusion Safety, Geneva 2003**
- 4. Maximum Blood Order Schedule (MBOS) Lautoka Hospital, undated memorandum, Dr Dhanna Gounder, Consultant Pathologist, Lautoka Hospital**

Scope and Application	This CPG is intended for use by all health care workers in their daily care of patients who require Blood transfusion services
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REQUISITION FOR BLOOD AND BLOOD PRODUCTS FOR TRANSFUSION

This guideline is designed for prescribers of blood at all levels of the hospital system, particularly clinicians and laboratory staff.

It provides a guide to the use of blood and blood products and, in particular, ways of minimizing unnecessary transfusion.

The appropriate use of blood and blood products means the transfusion of safe blood products only to treat a condition leading to significant morbidity or mortality that cannot be prevented or managed effectively by other means.

Clear communication and cooperation between clinical and blood bank staff are essential in ensuring the safety of blood issued for transfusion.

DEFINITIONS

Blood product

Any therapeutic substance prepared from human blood.

Whole blood

Unseparated blood collected into an approved container containing an anticoagulant-preservative solution

Blood Component

1. A constituent of blood, separated from whole blood such as:

- Red cell concentrate
- Red cell suspension
- Plasma
- Platelet concentrate

2. Plasma or Platelet

3. Cryoprecipitate, prepared from Fresh Frozen Plasma: rich in factor VIII and Fibrinogen

WHOLE BLOOD

A 450 ml whole blood donation contains:

Description:

Up to 510 ml total volume (volume may vary in accordance with local policies)
450 ml donor 63 ml anticoagulant-preservative solution
Haemoglobin approximately 12 g/ml
Haematocrit 35%–45%
No functional platelets
No labile coagulation factors (V and VIII)

Infection risk: Not sterilized, so capable of transmitting any agent present in cells or plasma which has not been detected by routine screening for transfusion transmissible infections, including HIV-1 and HIV-2, hepatitis B and C, other hepatitis viruses, syphilis and malaria

Indications: Red cell replacement in acute blood loss with hypovolaemia
Exchange transfusion
Patients needing red cell transfusions where red concentrates or suspension is not available

Contraindications: Risk of volume overload in patients with:
Chronic anaemia
Incipient cardiac failure

Administration: Must be ABO and RhD compatible with the recipient
Never add medication to a unit of blood
Complete transfusion within 4 hours of commencement

RED CELL CONCENTRATE (Packed Red Cells)

Description: 150–200 ml red cells from which most of the plasma has been removed
Haemoglobin approximately 20 g/100 ml (not less than 45 g per unit)
Haematocrit 55%–75%

Infection risk: Same as whole blood

Indications: Replacement of red cells in anaemic patients

Use with crystalloid replacement fluids or colloid solution in acute blood loss

Hb*	Considerations
<70g/L	Lower thresholds may be acceptable in patients without symptoms and/or where specific therapy is available.
70-100g/L	Likely to be appropriate during surgery associated with major blood loss or if there are signs or symptoms of impaired oxygen transport.
>80g/L	May be appropriate to control anaemia-related symptoms in a patient on a chronic transfusion regimen or during marrow suppressive therapy.
>100g/L	Not likely to be appropriate unless there are specific indications.

* Hb should not be the sole deciding factor. Consider also patient factors, signs and symptoms of hypoxia, ongoing blood loss and the risk to the patient of anaemia.

Administration: Same as whole blood

To improve transfusion flow, normal saline (50–100 ml) may be added using a Y-pattern infusion set.

PLATELET CONCENTRATES
(PREPARED FROM WHOLE BLOOD DONATION)

Description: Single donor unit in a volume of 50–60 ml of plasma should contain:

- At least 55×10^9 platelets
- $<1.2 \times 10^9$ red cells
- $<0.12 \times 10^9$ leucocytes

Infection risk: Same as whole blood, but a normal adult dose involves between 4 and 6 donor exposures
Bacterial contamination affects about 1% of pooled units

Indications: Treatment of bleeding due to:
-Thrombocytopenia
-Platelet function defects
Prevention of bleeding due to thrombocytopenia, such as in bone marrow failure

Use of platelets is likely to be **appropriate as therapy:**

Indication	Considerations
Bleeding	May be appropriate in any patient in whom thrombocytopenia is considered a major contributory factor.
Massive haemorrhage/ transfusion	Use should be confined to patients with thrombocytopenia and/or functional abnormalities who have significant bleeding from this cause. May be appropriate when the platelet count is $<50 \times 10^9/L$ ($<100 \times 10^9/L$ in the presence of diffuse microvascular bleeding).

Use of platelets is likely to be **appropriate as prophylaxis:**

Indication	Considerations
Bone marrow failure	At a platelet count of $<10 \times 10^9/L$ in the absence of risk factors and $<20 \times 10^9/L$ in the presence of risk factors (eg fever, antibiotics, evidence of systemic haemostatic failure).
Surgery/ invasive procedure	To maintain platelet count at $>50 \times 10^9/L$. For surgical procedures with high risk of bleeding (eg ocular or neurosurgery) it may be appropriate to maintain at $100 \times 10^9/L$.
Platelet function disorders	May be appropriate in inherited or acquired disorders, depending on clinical features and setting. In this situation, platelet count is not a reliable indicator.

Contraindications: Not generally indicated for prophylaxis of bleeding in surgical patients, unless known to have significant pre-operative platelet deficiency

Not indicated in:

- Idiopathic autoimmune thrombocytopenic purpura (ITP)
- Thrombotic thrombocytopenic purpura (TTP)
- Untreated disseminated intravascular coagulation (DIC)
- Thrombocytopenia associated with septicemia, until treatment has commenced or in cases of hypersplenism

Dosage: 1 unit of platelet concentrate/10 kg body weight: in a 60 or 70 kg adult, 4–6 single donor units containing at least 240×10^9 platelets should raise the platelet count by $20\text{--}40 \times 10^9/\text{L}$

Increment will be less if there is:

- Splenomegaly
- Disseminated intravascular coagulation
- septicaemia

Administration: After pooling, platelet concentrates should be infused as soon as possible, generally within 4 hours, because of the risk of bacterial proliferation.

Must not be refrigerated before infusion as this reduces platelet function.
4–6 units of platelet concentrates (which may be supplied pooled) should be infused through a fresh standard blood administration set.
Special platelet infusion sets are not required.
Should be infused over a period of about 30 minutes.
Do not give platelet concentrates prepared from RhD positive donors to an RhD negative female with childbearing potential.
Give platelet concentrates that are ABO compatible, whenever possible

Complications: Febrile non-haemolytic and allergic urticarial reactions are not uncommon, especially in patients receiving multiple transfusions

FRESH FROZEN PLASMA

Description: Pack containing the plasma separated from one whole blood donation within 6 hours of collection and then rapidly frozen to -25°C or colder
Contains normal plasma levels of stable clotting factors, albumin and Immunoglobulin
Factor VIII level at least 70% of normal fresh plasma level

Unit of issue: Usual volume of pack is 200–300 ml
Smaller volume packs may be available for children

Infection risk: If untreated, same as whole blood
Very low risk if treated with methylene blue/ultraviolet light inactivation

Indications: Replacement of multiple coagulation factor deficiencies: e.g.
- Liver disease
- Warfarin (anticoagulant) overdose
- Depletion of coagulation factors in patients receiving large volume transfusions

Disseminated intravascular coagulation (DIC)
Thrombotic thrombocytopenic purpura (TTP)

Indication	Considerations
Single factor deficiencies	Use specific factors if available.
Warfin effect	In the presence of life-threatening bleeding. Use in addition to vitamin-K-dependent concentrates.
Acute DIC	Indicated where there is bleeding and abnormal coagulation. Not indicated for chronic DIC.
TTP	Accepted treatment.
Coagulation inhibitor deficiencies	May be appropriate in patients undergoing high-risk procedures. Use specific factors if available.
Following massive transfusion or cardiac bypass	May be appropriate in the presence of bleeding and abnormal coagulation.
Liver disease	May be appropriate in the presence of bleeding and abnormal coagulation.

Precautions: Acute allergic reactions are not uncommon, especially with rapid infusions
Severe life-threatening anaphylactic reactions occasionally occur
Hypovolaemia alone is *not* an indication for use

Dosage: Initial dose of 15 ml/kg

Administration: Must normally be ABO compatible to avoid risk of haemolysis in recipient
No compatibility testing required
Infuse using a standard blood administration set as soon as possible after thawing.
Labile coagulation factors rapidly degrade; use within 6 hours of thawing

CRYOPRECIPITATE

Description: Prepared from fresh frozen plasma by collecting the precipitate formed during controlled thawing at +4°C and resuspending it in 10-20 ml plasma

Contains about half of the Factor VIII and fibrinogen in the donated Whole blood: e.g. Factor VIII: 80-100 iu/ pack; fibrinogen: 150-300 mg/pack

Infection risk: As for plasma, but a normal adult dose involves at least 6 donor exposures

Indications: As an alternative to Factor VIII concentrate in the treatment of inherited deficiencies of:

- Von Willebrand Factor (von Willebrand's disease)
- Factor VIII (haemophilia A)
- Factor XIII

As a source of fibrinogen in acquired coagulopathies:
E.g. disseminated intravascular coagulation (DIC)

Use of cryoprecipitate is likely to be **appropriate**:

Indication	Considerations
Fibrinogen deficiency	May be appropriate where there is clinical bleeding, an invasive procedure, trauma or DIC.

Administration: If possible, use ABO-compatible product

No compatibility testing required

After thawing, infuse as soon as possible through a standard blood administration set

Must be infused within 6 hours of thawing

References

Australian National Health and Medical Research Council (NHMRC) Practice Guidelines

Australasian Society of Blood Transfusion (ASBT)

WHO The Clinical Use of Blood Handbook

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Guideline for the Recognition and Management of Acute Transfusion Reactions.

GUIDELINES FOR THE RECOGNITION AND MANAGEMENT OF ACUTE TRANSFUSION REACTIONS

(The Clinical Use of Blood Handbook, WHO 2003)

CATEGORY 1: MILD REACTIONS		
Signs <ul style="list-style-type: none"> • Localized cutaneous Reactions: <ul style="list-style-type: none"> - Urticaria - Rash 	Symptoms <ul style="list-style-type: none"> • Pruritis (itching) 	Possible Cause <ul style="list-style-type: none"> • Hypersensitivity (mild)
IMMEDIATE MANAGEMENT		
<ol style="list-style-type: none"> 1. Slow the transfusion 2. Administer antihistamine IM (e.g. Chlorpheniramine 0.1mg/kg or equivalent) 		
<ol style="list-style-type: none"> 3. If no clinical improvement within 30 minutes or if signs and symptoms worsen, treat as CATEGORY 2. 		

CATEGORY 2: MODERATELY SEVERE REACTIONS		
Signs <ul style="list-style-type: none"> • Flushing • Urticaria • Rigors • Fever • Restlessness • Tachycardia 	Symptoms <ul style="list-style-type: none"> • Anxiety • Pruritis • Palpitations • Mild dyspnoea • Headache 	Possible Cause <ul style="list-style-type: none"> • Hypersensitivity (moderate-severe) • Febrile non-haemolytic transfusion reactions: <ul style="list-style-type: none"> ◦ Antibodies to white blood cells, platelets ◦ Antibodies to proteins including IgA • Possible contamination with pyrogens and/or Bacteria

IMMEDIATE MANAGEMENT

1. Stop the transfusion. Replace the infusion set and keep IV line open with normal saline.
2. Notify the doctor responsible for the patient and the blood bank immediately.
3. Send blood unit, with infusion set, freshly collected urine and new blood samples (1 clotted and 1 anticoagulated) from vein opposite infusion site with appropriate request form to blood bank for laboratory investigations.
4. Administer antihistamine IM (i.e. chlorpheniramine 0.1mg/kg or equivalent) and oral or rectal antipyretic (e.g. Paracetamol 10mg/kg: 500mg – 1 g in adults). Avoid aspirin in thrombocytopenic patients.
5. Give IV corticosteroids and bronchodilators if there are anaphylactoid features (e.g. bronchospasm, stridor).
6. Collect urine for next 24 hours for evidence of haemolysis and send to laboratory.
7. If clinical improvement, restart transfusion slowly with new blood unit and observe carefully.
8. **If no clinical improvement within 15 minutes or if signs and symptoms worsen, treat as CATEGORY 3.**

CATEGORY 3

LIFE THREATENING REACTIONS

Signs	Symptoms	Possible Causes
<ul style="list-style-type: none"> • Rigors • Fever • Restlessness • Hypotension (fall of 20% in Systolic BP) • Tachycardia (rise of 20% in Heart rate). • Haemoglobinuria -red urine • Unexplained bleeding -DIC 	<ul style="list-style-type: none"> • Anxiety • Chest pain • Pain near infusion site • Respiratory distress/shortness of breath • Loin/back pain • Headache • Dyspnoea 	<ul style="list-style-type: none"> • Acute intravascular haemolysis • Bacterial contamination • Fluid overload • Anaphylaxis • Transfusion associated acute lung injury (TRALI)

NOTE

1. If an acute transfusion reaction occurs, first check the blood pack labels and the patient's identity. If there is any discrepancy, stop the transfusion immediately and consult the blood bank.
2. In an unconscious or anaesthetized patient, hypotension and uncontrolled bleeding may be the only signs of an incompatible transfusion.
3. In a conscious patient, undergoing a severe haemolytic transfusion reaction, signs and symptoms may appear very quickly – within minutes of infusing only 5-10 ml of blood. Close observation at the start of the infusion of each unit is essential.

IMMEDIATE MANAGEMENT

1. Stop the transfusion. Replace the infusion set and keep IV line open with normal saline.
2. Infuse normal saline (initially 20-30 ml/kg) to maintain systolic BP. If hypotensive, give over 5 minutes and elevate patient's legs.
3. Maintain airway and give high flow oxygen by mask.
4. Give adrenalin 1mg (Adults) or **0.01ml/kg of 1/1000 (maximum 0.5ml), into lateral thigh for paediatrics** by slow intramuscular injection.
5. Give IV corticosteroids and bronchodilators if there are anaphylactoid features (e.g. Broncospasm, stridor)
6. Give diuretic, e.g. Frusemide 1mg/kg IV or equivalent.
7. Notify the doctor responsible for patient and blood bank immediately.
8. Send blood unit with infusion set, fresh urine sample and new blood samples (1 clotted and 1 anticoagulated) from vein opposite infusion site with appropriate request form to blood bank for investigations.
9. Check a fresh urine specimen visually for signs of haemoglobinuria.
10. Start a 24-hour urine collection and fluid balance chart and record all intake and output. Maintain fluid balance.
11. Assess for bleeding from puncture sites or wounds. If there is clinical or laboratory evidence of DIC, give platelets (adult: 5-6 units) and either cryoprecipitate (adult: 12 units) or fresh frozen plasma (adult: 3 units).
12. Reassess. If hypotensive:
 - Give further saline 20-30 ml/kg over 5 minutes
 - Give inotrope, if available
13. If urine output falling or laboratory evidence of acute renal failure (rising K+, urea, creatinine):
 - Maintain fluid balance accurately
 - Give further frusemide
 - Consider dopamine infusion, if available
 - Seek expert help: the patient may need renal dialysis.
14. If bacteraemia is suspected (rigors, fever, collapse, no evidence of a haemolytic reaction), start broad-spectrum antibiotics IV.

Type of Drug	EFFECTS	EXAMPLES		NOTES
		Name	Route/Dose	
Intravenous replacement fluid	Expands blood volume	Normal saline	If patient hypotensive, 20-30ml/kg over 5 minutes	Avoid colloid solutions
Antipyretic	Reduces fever and inflammatory response	Paracetamol	Oral or rectal 10ml/kg	Avoid aspirin containing products if low platelet count
Antihistamine	Inhibits histamine mediated responses	Chlorpheniramine	IM or IV 0.1mg/kg	
Bronchodilator	Inhibits immune mediated bronchospasm	Adrenaline Consider Salbutamol Aminophylline	0.01mg/kg (as 1:1000 solution) by slow IM injection By nebuliser 5mg/kg	Dose may be repeated every 10 minutes, according to BP and pulse until improvement
Inotrope	Increases myocardial contractility	Dopamine Dobutamine	IV Infusion 1ug/kg/minute IV Infusion 1-10 ug/kg/minute	Low doses induce vasodilation and improve renal perfusion Doses above 5 ug/kg/minute cause vasoconstriction and worsen heart failure
Diuretic	Inhibits fluid reabsorption from ascending loop of Henle	Frusemide	Slow IV injection 1mg/kg	

Scope and Application	This CPG is intended for use by all health care workers in their daily care of patients who require Blood transfusion services
Effective Date	2010
Supersedes Policy Number	Not applicable
Review Responsibilities	The Chairperson of the Pathology CSN will initiate the review of this guidelines every 3 years from the date of issue or as required.
Further Information	Pathology CSN Chairperson
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