

# Guidelines for the Appropriate Use of Blood and Blood Products

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# Table of Contents

1. Foreword.....	3
2. Introduction.....	4
3. General Guidelines for Appropriate Transfusion Practice.....	5
4. General Guidelines for the Use of Red Blood Cell Products.....	7
5. Acute Blood Loss , Including Perioperative Transfusion, and Chronic Anaemia.....	9
6. Blood Transfusion in Pregnancy.....	12
7. Paediatric and Neonatal Transfusions.....	14
8. Guidelines for Plasma Transfusion.....	17
9. Guidelines for Platelet Transfusion.....	18
10. Autologous Transfusion.....	19
11. Transfusion Reactions .....	20
12. Implementation of Guidelines.....	23
13. Clinical Transfusion Procedures .....	25
14. Source Documents and References.....	27
15. Guidelines Revision Team .....	28



# Foreword

One of the four pillars the Ministry of Health has identified in promoting blood safety is the rational use of blood and its products. The ministry appreciates that the decision on whether to transfuse a patient or not is often made under emergency conditions for patients in need of critical care and often in facilities with relatively poor infrastructure. At such times the clinician needs a quick tool to assist in decision making. The tool is now available in the form of these National Guidelines for the Appropriate Use of Blood.

These guidelines are designed to assist clinicians in identifying indications and triggers for transfusion and also assist hospital management plan for an audit of blood use. One of the strategies identified in the implementation of these guidelines is the formation of Hospital Blood Transfusion Committees. These committees are expected to act not only as avenues for continuing medical education in blood transfusion but also in assisting hospital administrations to monitor blood use.

It is recognised that apart from the blood prescribers, there are also other stakeholders and professionals involved in the proper administration of blood. These include, but are not limited to the blood banker, laboratory technologist, nursing officer, and the clerical officer. These guidelines are designed to be used by and will be useful to all these professionals.

The section on laboratory aspects has limited information. This is deliberate as more detailed information will be available in the appropriate laboratory guidelines and Standard Operating Procedures. Together these guidelines seek to increase the awareness of all healthcare workers and to ensure that blood and its products are not only appropriately but also safely given.

Finally, I would like to take this opportunity to thank all those individuals and institutions whose efforts have resulted in the production of these guidelines.



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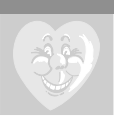
# Introduction

This document has been prepared to assist physicians and other health-care providers in the correct selection of patients for transfusion, and the safe administration of blood and blood products. It is not possible to discuss every situation for which blood transfusion may be indicated; this document, however, covers most of the key situations. Individual assessment of each case is still required, and these guidelines may require adaptation and modification in the presence of some special clinical problems.

The Kenya National Blood Transfusion Service considers blood transfusion as an essential component of quality medical care. Blood transfusion is a treatment or therapy that may involve some risk to the patient. Consequently, each hospital should have a performance monitoring and quality management programme that addresses the use of blood and blood components. The hospital medical staff has the responsibility for taking a leadership role in monitoring and improving transfusion practice.

This document has been compiled from consultations with haematologists, transfusion medicine experts and prescribers of blood within Kenya, and as a result of a review of guidelines found in the published literature.

Severe anaemia is a major health problem in Kenya and is frequently treated with blood transfusion. Transfusions of blood products can save lives, but are not without risks or costs. Some of the possible complications include the transmission of infectious diseases such as human immunodeficiency virus (HIV), hepatitis B, hepatitis C, syphilis, malaria and haemolytic and non-haemolytic transfusion reactions, immunosuppression, and alloimmunisation. Safe blood is a scarce and valuable resource that is expensive to collect, process and administer. Limiting transfusion to patients whose chance of survival or quality of life is improved with blood will help to decrease the high demand for blood products and will reduce unnecessary exposure of patients to the risks of transfusion.




# General Guidelines for Appropriate Transfusion Practice

- Blood should be transfused only when required to save a life. **The decision to transfuse should be based on an estimate of the patient's risk for developing complications of inadequate tissue-oxygen delivery.** Therefore, the decision to transfuse must be based on BOTH the haematologic AND the clinical status of the patient. Red blood cell transfusions should not be initiated in response to a haemoglobin determination alone, or to an increase in heart rate and/or respiratory rate, as these may be normal compensatory mechanisms for anaemia. Studies have also shown that blood transfusion improves survival only if given immediately at the time that it is needed.
- Red cell transfusion is rarely indicated when haemoglobin levels are greater than 10 g/dL, and is usually indicated when haemoglobin concentrations are less than 5 g/dL. However, even severely anaemic patients (less than 5 g/dL Hb) who are clinically stable may not require transfusion.
- The indications for blood transfusion in Kenya are frequently urgent conditions. Efforts should first be made to stabilise patients without the use of blood through prompt and appropriate supportive care, such as the use of intravenous replacement therapy, e.g. crystalloid or colloid solutions, and oxygen therapy. Supportive care should be initiated immediately and should not wait until blood is available.
- A patient should be re-evaluated by clinical and nursing staff immediately prior to blood transfusion to ensure that the transfusion is still required. The patient may have stabilised with supportive measures and may no longer need transfusion. The patient should not be transfused purely because compatible blood is available.
- Effective transfusion requires a minimum of 2 units of blood for an adult or 20ml whole blood (10-15ml packed cells) per kilogram body weight for a child.

Transfusion of one unit in an adult (or equivalent for a child) usually indicates that transfusion was not needed at all.

- The post-transfusion haemoglobin level should be compared to the pre-transfusion value to assess the efficacy of the transfusion.
- Blood transfusion is not a cure for anaemia. Blood transfusion is used to relieve the clinical signs of cardiac or respiratory distress, but the underlying cause of the anaemia still needs to be investigated and treated. Public health measures and community health programmes should be strengthened to prevent anaemia in high-risk groups, especially in children less than three years of age and women of childbearing age.



# General Guidelines for the Use of Red Blood Cell Products

A red blood cell (RBC) transfusion is intended to increase the delivery of oxygen to the tissues. Red blood cells can be transfused as either whole blood or as packed red blood cell concentrates, also known as packed red blood cells (PRBCs). A unit of whole blood has a volume of approximately 400 to 500 ml, with a haematocrit of 45 to 55%. A unit of PRBCs consists of the red blood cells concentrated from a unit of whole blood. Each unit of PRBCs contains approximately 180 to 200 ml of RBCs and 50 to 70 ml of plasma. The haematocrit of PRBCs is 60 to 70%. Each unit of blood contains approximately 60 g of haemoglobin and 250 mg of iron, predominantly in the form of haemoglobin. Both whole blood and PRBCs contain a small amount of citrate anticoagulant and additional preservative solutions. Blood units that are collected in CPDA-1 anticoagulant can be stored for up to 35 days.

PRBCs are indicated for patients with decreased oxygen carrying capacity or hypoxia due to an inadequate red cell mass. PRBCs should not be used to treat long-standing anaemia that can be corrected with non-transfusion therapy such as iron. PRBCs should not be used to increase blood volume, oncotic pressure, coagulation factors or platelets.

Red blood cells must be compatible with the ABO antibodies present in the recipient patient's serum, and must be crossmatched in order to confirm compatibility. Unless the patient is bleeding or haemolysing, the post-transfusion haemoglobin can usually be accurately predicted. One unit of blood (or the equivalent volume in a child) usually increases the patient's haemoglobin by 1 g/dL. In acute haemorrhage, blood transfusion should be initiated as soon as possible to offset the deficit, however, too rapid infusion of large volumes of cold blood with excess extracellular potassium, reduced pH, and excess citrate can sometimes have undesired effects on cardiac rhythm.

The risk of mortality increases significantly in otherwise stable patients when the haemoglobin level falls to approximately 3.5 to 4 g/dL. In ischaemic heart disease, the risk of mortality significantly increases when the haemoglobin falls between 6 and 7.5 g/dL. Perioperative RBC transfusion experience suggests that patients usually require transfusion when their haemoglobin level is less than 6 g/dL and, and only rarely when their haemoglobin is above 10 g/dL. For levels between 6 and 7 g/dL, the transfusion needs depend on the amount of blood loss, underlying coronary/cardiac disease, and overall patient status.





# Acute Blood Loss, Including Perioperative Transfusion and Chronic Anaemia

## Acute Blood Loss

- In a patient with acute blood loss, an early haemoglobin level will not accurately reflect the severity of blood loss until there has been adequate plasma volume replacement. Serial haemoglobin levels are required to determine the need for red cell transfusion. Evaluation of the clinical status of the patient is extremely important.
- As a general rule, less than 15 % loss of blood volume results in minimal symptoms; 15 to 30 % results in tachycardia; 30 to 40 % in signs of shock; and greater than 40% in signs of severe shock. Some patients with underlying diseases may require transfusion at 30 to 40% blood loss. Almost all patients require transfusion with losses greater than this. The first treatment for hypotension, shock, and acute blood loss is volume expansion with normal saline (without dextrose), infused in a volume at least three times the volume lost. Normal saline up to 50 ml/kg is recommended for initial volume replacement. This should be followed by colloid solution, e.g. 6% dextran or 6% hydroxy-ethyl starch, given in equal volume to the blood volume lost. 6% dextran should not exceed 50 ml/kg body weight, and 6% hydroxy-ethyl starch 20 ml/kg body weight in 24 hours. The decision to transfuse should be made on the basis of parameters such as heart rate, blood pressure, haemoglobin, and the presence of active bleeding.
- Blood may be required to restore blood volume and oxygen-carrying capacity in patients with massive haemorrhage (blood loss greater than 40 percent). In massive transfusion (more than four units within 1 hour in an adult, or the replacement of the equivalent of the patient's blood volume within 24 hours), platelets or fresh frozen plasma should be given according to the results of the patient's platelet count and coagulation profile, if possible. Consider giving ABO compatible fresh frozen plasma (FFP) in a dose of 15 ml/kg if the prothrombin time (PT) is

prolonged, and platelet concentrates (4 – 6 donor units for an adult) when the platelet count falls below 20,000 /mm<sup>3</sup>. If the platelet count or coagulation profile are not available, consider giving 2 units of FFP and 6 donor units of platelet concentrate for every 6 units of blood transfused within a period of 24 hours.

## Perioperative Transfusion

- In the perioperative patient, transfusion decisions based on a single haemoglobin measurement are difficult. The physician must also consider clinical signs and symptoms and prior medical history. In anaesthetised patients, vital signs alone may be inadequate. During the intraoperative period, the patient's cardiopulmonary reserve, the amount of anticipated blood loss, oxygen consumption and the presence of atherosclerotic heart disease affect the decision for transfusion.
- Prior to elective surgery, all efforts should be made to correct anaemia without the use of blood. Patients with a Hb level less than 5 g/dL may need transfusion prior to surgery if anaemia cannot be corrected by other means.
- Blood should be cross-matched and made available for immediate use during surgery for patients with a high likelihood of needing a transfusion. Transfusion may be necessary during surgery for patients with a Hb level less than 8 g/dl who lose more than one litre of blood during surgery.
- In the case of postoperative or postpartum haemorrhage, the source of bleeding must be identified and stopped. Transfusion is not indicated as treatment of anaemia in postoperative or postpartum patients if no active bleeding exists.

## Chronic Anaemia

- Blood should be used only to relieve clinical signs of cardiac and respiratory distress in severely anaemic patients, in order to achieve haemodynamic stability. Blood should NOT be used to correct anaemia. Most patients with chronic anaemia have nutritional and/or mild blood loss anaemia responds rapidly and effectively to specific therapies. These patients have normal blood volumes and the transfusion of whole blood may cause circulatory overload, with harmful effects. The transfusion of PRBCs should be carried out slowly, with careful monitoring of the patient.

## Red Blood Cell Transfusion Guidelines

### Acute and Perioperative Blood Loss

1. Evaluate patient for risk of ischaemia
2. Estimate blood loss
  - If > 30-40% of rapid blood loss: transfuse RBCs and use volume expanders
  - If < 30-40% of rapid blood loss: RBCs not usually needed in otherwise healthy person
3. Monitor vital signs
  - Tachycardia and hypotension not corrected with volume expanders: RBCs needed
4. Measure haemoglobin
  - If Hb > 10 g/dL: RBCs rarely needed
  - If Hb < 5 g/dL: RBCs usually needed
  - If Hb 5-10 g/dL: RBCs may be needed, determined by additional clinical conditions

### Chronic Anaemia

1. Transfuse only to decrease symptoms and to minimise risk (generally at Hb of less than 5 g /dL). Do not transfuse above 5 g/dL Hb unless patient is symptomatic.
2. Treat nutritional and mild blood loss anaemia with specific therapeutic agents as indicated (iron, folic acid, B12).
3. Use specific strategies for sickle cell disease and  $\beta$ -thalassaemia (See section below).



# Blood Transfusion in Pregnancy

- In pregnancy, maternal plasma volume increases by 40%, and red cell mass by 25%. Blood loss is usually well tolerated during pregnancy. The mean blood loss during vaginal delivery is 500ml while 1000ml is lost during caesarean section. Indications for transfusion in the pregnant and postpartum patient are similar to those for the non-pregnant patient.
- In addition to the clinical assessment of pallor, all women should have their haemoglobin measured at the first antenatal visit, and subsequently once during every trimester. Clinical evaluation of mucous membranes (conjunctivae and tongue) or palmar pallor may not detect mild or moderate anaemia that may lead to adverse effects later in pregnancy or at the time of delivery.
- All women should have ABO blood grouping and Rhesus (Rh) factor typing performed at the first antenatal visit. Where facilities exist, a screen for unexpected antibodies should be done. All Rh-negative women, with no evidence of immunisation, delivering an Rh-positive foetus (or who have an abortion) should be given Rh Immune Globulin (RhoGAM) in a dose of 300 mg IM within 72 hours of delivery or abortion.
- Nutritional education must be an integral part of routine antenatal care, including recommendations for protein and green leafy vegetables in the diet.
- All women should receive the following prophylactic regimens during pregnancy:
  - Folic acid 5 mg daily through the period of pregnancy
  - Ferrous sulphate 200 mg daily through the period of pregnancy
  - Malaria prophylaxis (in endemic areas)
  - Treatment for helminth infections (in endemic areas, after first trimester).
- Women with a Hb less than 10 g/dL should receive ferrous sulphate 200 mg (60 mg elemental iron) three times a day throughout pregnancy. Clinically stable

pregnant women with severe anaemia (< 7 g/dL) should be evaluated for the cause of their anaemia and treated appropriately. These women should be monitored every 2 to 4 weeks, including measurement of the Hb level. It may be necessary to admit or refer women with a Hb level persistently lower than 7 g/dL for closer clinical monitoring and treatment.

- Blood transfusion should be considered for pregnant women with a Hb level less than 5 g/dL who become symptomatic with dyspnoea, shock, or orthostatic hypotension.
- Blood should be ordered and made available in the delivery room for immediate transfusion in case of haemorrhage at the time of delivery for pregnant women with a Hb level less than 7 g/dL. Pregnant women with a Hb less than 7 g/dL should be referred for delivery at facilities where blood transfusion is available.
- Blood transfusion is not indicated in anaemic women who are clinically stable after delivery.
- In the case of postpartum haemorrhage, the source of bleeding must be identified and corrected. The first therapy of acute blood loss is volume replacement (see section on Acute Blood Loss).



# Paediatric and Neonatal Transfusions

- Transfusion should be considered in a child with a Hb level of less than 4 g/dL.
- Transfusion should be considered in a child with a Hb level of less than 5 g/dL AND clinical signs of cardiac or respiratory distress (intercostal or subcostal retractions, or other signs of cardiac failure). Increases in heart rate or respiratory rate alone may be normal compensatory mechanisms and are not necessarily indications for transfusion.
- Blood is not generally recommended for children with a Hb level between 4 and 5 g/dL who are clinically stable. Many of these children have chronic anaemia. These children should be admitted for evaluation and treatment of the cause of their anaemia and should be monitored closely for changes in Hb level and signs of decompensation.
- Respiratory distress is unlikely to be due to chronic anaemia if the Hb level is 5 g/dL or greater. Children with a Hb level of 5 g/dL or greater should not be transfused indiscriminately, but the cause of their anaemia should be investigated.
- Children should be transfused with 10 to 15 ml/kg of PRBCs or 20 ml/kg of whole blood. Transfusions must be given slowly (over a 4 hour period) in chronically anaemic patients and monitored closely to avoid volume overload. Diuretics should be used if the patient is in congestive cardiac failure.

## Guidelines for Paediatric Transfusion

- If Hb is  $< 4$  g/dL, transfuse.
- If Hb is  $> 4$  g/dL and  $< 5$  g/dL, transfuse when signs of respiratory distress or cardiac failure are present. If patient is clinically stable, monitor closely and treat the cause of the anaemia.
- If Hb is  $> 5$  g/dL, transfusion is usually not necessary. Consider transfusion in cases of shock or severe burns. Otherwise, treat the cause of the underlying anaemia.
- Transfuse with 10 to 15 ml/kg of PRBCs or 20 ml/kg of whole blood. In the presence of profound anaemia or very high malaria parasitaemia, a higher amount may be needed.

## Congenital Anaemias

- Children with congenital anaemias such as sickle cell diseases Hb S/S, Hb S/C, Hb S/ $\beta$ -thalassaemia, like all other children, should only be transfused when they develop cardio-respiratory symptoms from severe anaemia, or the indications listed in the box below.

### Indications for Red Blood Cell Transfusion in Sickle Cell Disease

Symptomatic anaemia due to

- Aplastic crisis
- Splenic sequestration
- Accelerated haemolysis (due to haemolytic anaemia or sickle cell crisis)
- Pre-operative preparation for most types of surgery

Chronic transfusion

- Prevention of recurrent occlusive stroke (< 30% HbS)
- Selected sickle cell pregnancy complications such as recurrent foetal loss

## Unique issues in the neonate

- The total blood volume of neonates is small, although the volume is higher per kg of body weight than that of older children or adults (85 ml/kg for full-term and 100 to 105 ml/kg for pre-term). Transfusions are generally given in very small increments, increasing the risk of infectious disease transmission through multiple donor exposures.
- Blood transfusion in pre-term infants is often given for the anaemia of prematurity, associated with delayed renal production of erythropoietin due to decreased sensitivity to lower haematocrit levels. This commonly develops in neonates after 2 weeks of life. Neonates, especially pre-term, may require multiple transfusions.
- In neonates, a dose of 15 ml/kg of packed red blood cells will increase the haemoglobin by approximately 3 g/dL.
- Avoid using blood donated by blood relatives to transfuse neonates.

## Neonatal Red Blood Cell Transfusion Guidelines

Transfuse with 10-15 ml/kg PRBCs for:

- Acute blood loss of > 10% of blood volume
- Haemoglobin < 7 g/dL
- Haemoglobin < 8 g/dL in a newborn with apnoea, bradycardia, tachycardia, tachypnoea, or decreased vigour
- Haemoglobin of < 12 g/dL with moderate to severe respiratory distress or severe congenital heart disease and absence of weight gain for 7 days with no other explanation

## Prevention and Effective Early Treatment of Paediatric Anaemia

- Malaria is a leading cause of severe anaemia among young children in Kenya. Since resistance to anti-malarial drugs is now widespread, the use of effective anti-malarial drugs is important. Children less than five years of age with malaria and anaemia are a high-risk group, and require careful monitoring and close follow-up. The use of insecticide-treated bed nets must be encouraged to prevent malaria and anaemia.
- Nutritional deficiencies (iron, folic acid, and protein) are important causes of anaemia in children. Nutritional counselling should always be emphasised as part of routine well-child care. Children should be routinely checked for pallor and a Hb measurement performed if pallor exists or if the diet appears to be poor.
- Therapy for helminthic infections, including hookworm, should be included as part of the treatment of anaemia in children 18 months of age or older. Public health education is important to encourage wearing of shoes and to promote other sanitary measures, such as the use of latrines. Periodic treatment for helminthic infection (at least every six months) is recommended in endemic areas.
- Schistosomiasis screening should be performed in endemic areas.

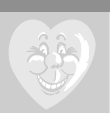




# Guidelines for Plasma Transfusions

Fresh frozen plasma (FFP) is the acellular portion of blood that is frozen within hours of donation. **FFP must be ABO-compatible with the recipient's red blood cells.**

Fresh frozen plasma is indicated for correction of coagulation abnormalities and for correction of microvascular bleeding when prothrombin time and partial thromboplastin time are greater than 1.5 times the mid-range normal reference value. FFP is indicated for treatment of bleeding due to multiple coagulation-factor deficiencies, massive transfusion with coagulation abnormalities, and bleeding due to warfarin therapy. FFP should not be used when a coagulopathy can be corrected with vitamin K.



# Guidelines for Platelet Transfusions

Platelet concentrates are separated from whole blood. Each unit contains greater than  $5.5 \times 10^{10}$  platelets in approximately 50 ml of plasma. Four to eight units of concentrated platelets are the usual adult dose for profound thrombocytopenia. Each unit of platelet concentrate increases the platelet count of an average adult by 7-10,000/ $\text{mm}^3$ . Response to platelet transfusion may be adversely affected by fever, sepsis, severe bleeding, splenomegaly, consumptive coagulopathy and certain drugs.

As a general rule, patients undergoing major invasive procedures require platelet counts of 50,000/ $\text{mm}^3$  or greater. Surgical and obstetrical patients with microvascular bleeding often require platelet transfusions when the platelet count is less than 50,000/ $\text{mm}^3$  and seldom require transfusions if the platelet count is greater than 100,000/ $\text{mm}^3$ . Platelet transfusion is generally not indicated for patients with extrinsic platelet dysfunction (e.g. uraemia) since the transfused platelets will also function inadequately. Prophylactic platelet transfusion is not effective for thrombocytopenia due to increased platelet destruction. The cause for the destruction should first be investigated and treated.

Neonates undergoing minor surgery or invasive procedures may be transfused with platelets at counts of less than 50,000/ $\text{mm}^3$ .

ABO-compatibility should be ensured. Rh-negative patients, particularly women of childbearing age, should receive platelets from Rh-negative donors whenever possible.



# Autologous Transfusions

For elective surgery in patients with a Hb level of 10 g/dL or greater, two to four units of blood may be collected from the patient prior to surgery for the patient's own use during surgery (autologous transfusion). Collections should be at least seven days apart, and the last donation should be at least four days before surgery. There is no indication for a single-unit autologous transfusion in an adult. Unused autologous units can be released into the general donor pool, provided the patient meets all criteria for blood donation and the units are fully screened and tested.

Preoperative isovolaemic haemodilution may be performed prior to surgery. This can be accomplished by removal of two or more units of blood and replacement with an equal volume of crystalloid. This technique improves tissue perfusion during surgery and makes the units of blood available for autologous transfusion during and after surgery.



# Transfusion Reactions

Although transfusion can be a life-saving therapy, it can result in many adverse effects. Approximately 1% of all transfusions lead to some type of adverse reaction. Although many measures have been taken to reduce transfusion related risks, including donor risk screening and laboratory testing of blood products, it is not possible to provide a blood supply with zero risk. Therefore, physicians must carefully weigh the benefits of transfusion against the risks.

Transfusion reactions can be caused by immunological or non-immunological mechanisms, and may be immediate or delayed for some time after the transfusion. The majority of immediate serious reactions are immunological and caused by clerical errors, including incorrect recording of blood type, cross-match results, or patient name resulting in transfusion of the wrong unit or the wrong patient. The importance of proper patient identification and specimen labelling cannot be over-emphasised. Other common serious complications of blood transfusion are related to infectious diseases transmission. The most serious of the transmitted agents are HIV and Hepatitis B and C.

All transfusions should be given under the supervision of a clinician. The patient should be monitored closely for the first 15 minutes of the transfusion since it is during this period that serious haemolytic transfusion reactions can first be detected. The transfusion should be regulated to infuse for a maximum of four hours, with monitoring of the vital signs by the nursing staff every 30 minutes. Any change in vital signs (temperature, pulse, respiratory rate, blood pressure) or level of consciousness may be an indication of a transfusion reaction. The symptoms and signs of a transfusion reaction include pruritus, palpitations, lumbar pain, pain along the entry vein, fever, hypotension, tachypnoea, tachycardia, and altered level of consciousness.

Blood should be set up for transfusion within 30 minutes of leaving the laboratory. Unused blood from the theatre or wards should be returned immediately (within 30 minutes) to the laboratory.

The following table lists some of the common and serious types of transfusion reaction:

## Transfusion Reactions

Immunological reactions:

- Red cells - haemolysis (immediate or delayed)
- White cells - febrile reactions, pulmonary infiltrates
- Platelets - post transfusion purpura
- Plasma proteins - anaphylactic shock, urticaria
- Other - graft versus host disease

Non-immunological reactions:

- Disease Transmission (HIV, Hepatitis B & C, syphilis, malaria, etc)
- Septicaemia
- Air embolism
- Fluid overload
- Iron overload

The majority of transfusion reactions are febrile reactions, characterised by a mild temperature elevation without other clinical signs or symptoms. These can be managed with antipyretics, without having to stop the transfusion. The most common cause of serious haemolytic transfusion reaction is the administration of ABO incompatible blood. If serious transfusion reaction is suspected, the transfusion should be stopped immediately. The patient should have an IV line kept open with saline and vital signs should be monitored. The laboratory should be notified of the suspected transfusion reaction, and a transfusion reaction work-up immediately initiated. The laboratory should report all suspected transfusion reactions to the Hospital Transfusion Committee.

## Symptoms and Signs of Acute Haemolytic Transfusion Reactions

<b>General:</b>	<ul style="list-style-type: none"><li>- Fever, chills, flushing</li><li>- Nausea, vomiting</li><li>- Headache</li><li>- Pain at infusion site</li></ul>
<b>Cardiac/respiratory:</b>	<ul style="list-style-type: none"><li>- Back or loin pain</li><li>- Chest pain</li><li>- Dyspnoea</li><li>- Hypotension</li><li>- Tachycardia</li></ul>
<b>Renal:</b>	<ul style="list-style-type: none"><li>- Haemoglobinuria</li><li>- Oliguria</li><li>- Anuria</li></ul>
<b>Haematological:</b>	<ul style="list-style-type: none"><li>- Anaemia</li><li>- Unexplained bleeding (Disseminated Intravascular Coagulation - DIC)</li><li>- Thrombocytopenia</li></ul>

## Transfusion Reaction Work-up

Stop the transfusion but keep the IV line open with normal saline.

Monitor the vital signs of the patient.

Inform the laboratory about a possible transfusion reaction.

Check the clerical information to ensure that the patient is receiving the correct blood.

Take the following blood samples from the patient (from the opposite arm):

- 10 ml of blood into a plain tube. Check the colour of the plasma for haemolysis.
- 2 ml of blood into an EDTA tube.
- Collect a sample of the first voided urine.

Send to the laboratory:

- All samples correctly labelled.
- The blood that reacted, together with the attached transfusion set.
- All empty blood bags of already transfused units.
- Laboratory request form filled in.

Report all investigations to the Hospital Transfusion Committee.



# Implementation of Guidelines

Effective implementation of guidelines for the appropriate use of blood and transfusion services requires that each hospital establish a Hospital Transfusion Committee. This committee will serve to ensure that the quality of blood transfusion services and practices is maintained at a high level.

The Transfusion Committee should oversee all policies and procedures relating to blood utilisation for the hospital. These include the selection of patients for transfusion; ordering, distribution, handling and administration of appropriate blood and blood components; and the monitoring of the effects of blood on patients, including the investigation of blood transfusion reactions. The committee should monitor the hospital's blood transfusion practices and blood bank services through regular audits of hospital charts and laboratory records. The committee is responsible for ensuring staff education and training on proper blood transfusion practices. The committee should be composed of representatives of the departments that do the majority of blood ordering and transfusing. These include paediatrics, medicine, surgery, obstetrics and anaesthesia. In addition, a pathologist, a blood bank technologist, a nursing service representative, a management representative, and a physician or technologist from the blood collection centre should be on the committee, if possible.

The Transfusion Committee should develop transfusion practice guidelines, with approval of the medical staff. These guidelines should serve as the basis for all transfusion practice review.

## Tasks for the Hospital Transfusion Committee

- i) Review of number of transfusions (monthly or quarterly) and sources of blood (BTS or hospital collection)
- ii) Investigation of transfusion reactions
- iii) Indications for transfusion, benefits and outcomes
- iv) Timing of administration (time of request, time of start and completion of transfusion)
- v) Laboratory records
- vi) Blood storage records and facilities (cold chain maintenance, refrigerator temperature records)
- vii) Annual review of policies and procedures.





# Clinical Transfusion Procedures

## Procedures

- 1 Assess the patient's need for blood transfusion.
- 2 Record the indications for transfusion in the patient's notes.
- 3 Complete a request form accurately and legibly. Include:
  - Patient identification
  - Reason for transfusion
  - Component and amount required
  - Date required; urgency
- 4 Collect and correctly label blood samples (5 cc in a plain tube) for grouping and compatibility testing.
- 5 Send blood request form and sample to the laboratory.
- 6 Collect or receive blood or blood products from the laboratory.
- 7 Check the identity of patient and blood product by checking:
  - Patient's name (from patient records and ask the patient)
  - Hospital number
  - Ward
- 8 Confirm blood or plasma is compatible by checking the blood group on:
  - Patients notes
  - Label on blood bag
- 9 Check expiry date of blood or plasma
- 10 Check blood for:
  - Clots
  - Haemolysis (is the plasma pink?)
  - Appearance of red cells (are they purple or black?)

## Procedures ... cont.

11. Check for leakage of blood bag
12. Start transfusion of whole blood and red cells within 30 minutes of removal from refrigerator
13. Return unused blood or blood products to the laboratory within 30 minutes of removal from the refrigerator
14. Complete infusion of whole blood and red cells within 4 hours, and platelets and plasma within 30 minutes
15. Monitor patient before, during and after transfusion of blood product:
  - Before starting the transfusion
  - As soon as the transfusion is started
  - 15 minutes after starting the transfusion
  - At least every half-hour during transfusion
  - On completion of transfusion
  - 4 hours after completing transfusion
16. Record the following:
  - Patient's appearance
  - Pulse
  - Temperature
  - Blood pressure
  - Respiratory rate
  - Fluid balance: input and output
17. In the patient's notes record:
  - Date of transfusion
  - Time transfusion started and finished
  - Volume and type of blood or products given
  - Blood or plasma unit numbers
  - Any adverse effects
18. Sign the patient's notes
19. Report any adverse reactions immediately to the laboratory
20. Return used/partially used blood bags to the laboratory



# Source Documents and References

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# Guidelines

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