

This guide provides information about blood transfusion including the Australian blood supply, risks and benefits of transfusion and appropriate and safe use of blood components. It may assist you in being able to provide answers to some of the questions that your patients may ask if blood transfusion is being considered as part of their treatment.

Introduction

Blood transfusion may be a part of the management of a variety of medical and surgical conditions. Transfusion can save lives and improve the quality of life for many people. For many patients there is no alternative to treatment with human blood or blood products.

However, it has been increasingly evident that blood transfusion has its limitations and that the decision to transfuse should be made with great care. Due to increasing pressure on the blood supply, it is also essential to optimise use of this precious resource.

The Australian blood supply

Australia has one of the safest systems of blood collection and transfusion in the world. To ensure this, the Australian Red Cross Blood Service (ARCBS) has developed many safeguards.

Blood is only obtained from unpaid volunteer donors. Prior to each donation every donor is required to undergo a confidential interview and to complete a detailed questionnaire which asks about their medical history and any factors that may affect the safety of the blood donation or the safety of their donating blood. Volunteers who are not suitable are not permitted to donate.

Tests that are performed on donated blood

Every unit of donated blood is tested for the following infections:

- ◆ HIV (Human Immunodeficiency Virus)
- ◆ Hepatitis B and C
- ◆ HTLV (Human T-cell Lymphotropic Virus - an uncommon virus which may, in a small percentage of cases, cause blood or nervous system problems)
- ◆ Syphilis

Only blood that tests negative for these potentially transfusion-transmissible infections is accepted for use.

The ABO and Rh D blood group of the donated blood is also determined.

What are some of the possible risks of blood transfusion?

Although Australia’s blood supply is very safe, as with all medical procedures, blood transfusion is not risk-free.

It is important to realise that the majority of the population have a very poor understanding of risk. An effective way of discussing medical risk with patients is to relate it to the risks of daily activities and to use verbal descriptions such as ‘moderate’ or ‘low’ rather than statistics.

Some of the main risks of transfusion are outlined below. In this outline a verbal description of the risk has been given but the quoted occurrence also been given for your own information.

The terms used are from the Calman Chart as follows:

High:	more than 1:100	eg transmission of chickenpox to household contacts
Moderate:	1:100 - 1: 1000	eg risks due to smoking 10 cigs/ per day
Low :	1:1000 - 1:10,000	eg road accident
Very low:	1:10,000 – 1: 100, 000	eg accident at work
Minimal:	1: 100,000 – 1: 1,000,000	
Negligible:	< 1,000,000	eg hit by lightning

Some of the main risks of blood transfusion are:

- ◆ Minor temporary reactions such as mild fever, skin rash or urticaria which occur quite commonly (approximately 1-2 /100 transfusions)
- ◆ More severe reactions:
 - Bacterial contamination is the most significant infectious complication of transfusion. The chance of receiving a bacterially contaminated transfusion is however very low. It has been reported in up to 1 in 80,000 transfusions and is more common in platelet transfusions as platelets are stored at 22°C rather than 4°C as for red cells.

It is important to remember that bacterial contamination can equally be present in autologous units.

- Transfusion related acute lung injury (TRALI)¹ is due to an immune reaction usually caused by antibodies to white cells present in the donated units. The risk of TRALI is low with current estimates from 1:5,000 – 1: 10,000 transfusions.
- ABO incompatibility between donor and patient blood types is one of the most serious adverse events following transfusion. Although again the risk is very low, being reported in up to 1 in 12,000 red cell transfusions, these reactions are preventable. They stem from human error or failure to follow procedures eg incorrect labelling at the time of specimen collection or inadequate identification of the patient at the time of transfusion.

It is important to know that the data from the UK Serious Hazards of Transfusion reporting scheme, shows that 'wrong blood to patient' is the most common cause of adverse events associated with transfusion.

- ◆ Patients are still most often worried about the risks of transfusion transmitted infection. However, the risk of transmission of these viruses is negligible. For patients who are interested in the statistics of incidence, based on available data¹, ARCBS has estimated the current infection risks for blood transfusion in Australia to be:

HIV	1 in 4,808,000
Hepatitis C	1 in 3,112,000
Hepatitis B	1 in 971,000
HTLV	considerably less than 1 in 1,000,000
Syphilis	considerably less than 1 in 1,000,000

Some patients have also been concerned about variant Creutzfeldt Jacob disease (vCJD) or what is often referred to as Mad Cow disease. As a precautionary measure, blood donations are not accepted from people who have spent six months or more in the United Kingdom between 1980 and 1996.

Although the risks of transfusion are small it is still important to ensure that wherever possible transfusion is avoided and that blood components are only given when really needed.

What blood is used for transfusion?

Almost all blood is now separated by centrifugation into various components. By separating whole blood, it is possible for the particular component of blood to be used when needed. Therefore one donation has the potential to help a number of different patients who require different components and whose specific needs can therefore be met.

Blood components include:

- Red blood cells which contain haemoglobin and transport oxygen around the body. Red cells are usually given to patients with symptomatic anaemia.
- Platelets which help to stop bleeding. They are given to patients with low platelet numbers (thrombocytopenia) or platelets which are dysfunctional for example due to medication
- Plasma which contains clotting factors, albumin and immunoglobulin. Plasma is used when the patient has coagulopathy and bleeding due to deficiency of multiple coagulation factors eg liver disease, warfarin overdose or disseminated intravascular coagulation (DIC). More rarely it is used in the management of rare conditions such as thrombotic thrombocytopenic purpura (TTP)
- Cryoprecipitate contains factor VIII, fibrinogen, fibronectin and factor XIII. It is mostly used as a source of fibrinogen in acquired coagulopathies such as DIC.

It is essential for safe and effective treatment of patients that blood transfusion is only given when clinically indicated. In effort to guide practice, the National Health and Medical Research Council (NHMRC) and the Australasian Society of Blood Transfusion (ASBT), in a joint initiative with relevant Colleges and professional groups, developed *Clinical Practice Guidelines on the Use of Blood Components* which were released in 2002. These recommendations aim to support clinical decisions for use of each component based upon current scientific evidence. The guidelines also make recommendations about the organisational change which is needed to support improvements in transfusion practice. This includes such aspects such as the formation of hospital transfusion committees to review and ensure the safe and appropriate use of blood in the hospital.

The guidelines can be found at www.nhmrc.health.gov.au . The information is also available from the hospital blood bank.

Administration of transfusion

Everyone involved in the clinical transfusion process has the responsibility to ensure that the *right blood* gets to the *right patient* at the *right time*.

When collecting samples for blood grouping and cross matching, it is essential to correctly identify the patient, hand label the samples at the bedside before leaving the patient and have a witness (the patient if competent) confirm the identity and correct labelling.

Wherever blood transfusion is ordered the clinical and laboratory indications for the decision must be documented in the patient notes.

In an effort to ensure more appropriate use of blood components, the hospital transfusion laboratory may refer blood transfusion orders which are considered 'outside' current guidelines to a haematologist for further clarification. Hospitals will also have a process for clinical review in place to monitor the appropriateness and safety of use of blood transfusion.

Prior to commencing a transfusion, two staff must perform the final identity check and sign to confirm that it is correct. The checking must confirm that the right blood component is to be transfused to the right patient by confirming that the following are the same:

- ◆ the patient identity (by asking the patient to state their name and DOB and/or checking the patient's wrist band)
- ◆ the patient, blood component and cross match information on the identification label on the blood component

and

- ◆ the patient, blood component and cross match information on the accompanying documentation from the blood transfusion laboratory.

The bedside check is the final opportunity to detect an identification error and prevent a potentially fatal incompatible transfusion.

The patient's notes must contain the record of

- ◆ the type and volume of each component transfused

- ◆ the blood group and donation number of each unit transfused
- ◆ the time at which unit was commenced and completed and
- ◆ the signature of the person administering the transfusion

Each transfusion is administered through a specific blood administration giving set. In addition, some patients, such as those with haematological malignancies or immune compromise, may require the blood to be administered through a filter to remove or reduce the number of white cells (called a leucoreduction filter). Each hospital will have policies for specifying indications for use of leucoreduction filters.

The patient's vital signs must be monitored before, during and after the transfusion in order that any adverse effect is identified and immediate management initiated. Any transfusion reaction must be recorded in the patient's notes and, dependent upon severity, referred to the transfusion laboratory for further follow up.

Patient consent for blood transfusion

It is important that each patient be given a clear explanation of the reasons why transfusion has been recommended, the risks and benefits of transfusion in their particular case and any possible alternatives to transfusion. Patients have the right to decide whether or not they will have the transfusion. Informed consent must be given prior to the transfusion and this must be documented in the clinical notes. Some hospitals have a specific form to use to document consent for transfusion. In NSW it is the Department of Health policy that written consent for transfusion be obtained (refer NSW Health Circular 99/16: *Patient Information and Consent for Medical Treatment*).

Perioperative blood management

Most elective surgery does not result in sufficient blood loss to require blood transfusion. Careful assessment and management of patients preoperatively will reduce patient morbidity and mortality.

It is important to identify and treat anaemia, identify bleeding disorders and stop medications that may impair haemostasis. Intra-operative blood loss can be minimised by measures such as meticulous surgical technique, use of posture and tourniquets, anaesthetic techniques and antifibrinolytic drugs.

When it is anticipated that there may be significant blood loss, there are a variety of techniques which can be used to use the patient's own blood for transfusion. However, these need to be performed by clinicians experienced with the techniques and equipment. Blood which is lost during surgery can be collected and returned to the patient using specially designed re infusion devices which wash/filter the blood- termed *intra-operative blood salvage*. One or two units of blood may be collected immediately prior to surgery, kept in the operating theatre and reinfused at the end of the procedure- termed *intra-operative haemodilution*.

Some people request to have their own blood collected and stored before surgery - called *autologous predonation*. Although previously favoured, it is now recognised that there are only limited situations in which autologous predonation should be considered. It is also important to remember that although autologous predonation may avert the small risk of viral transmission from donated units, it still carries the same risk of bacterial transmission and possible adverse events due to clerical or administrative error. Patients may also request that blood from a

patient or relative is collected for use – termed *directed donation*. Studies have shown that directed donations are no more safe, and are potentially less safe, than blood from health volunteers. Generally directed donations are discouraged except for some specific clinical situations. . If there is no medical indication but the patient still insists on a directed donation being collected, the ARCBS requires:

- *a signed request from a medical officer indicating the patient, date required and location*
- *confirmation that the donor and patient have the same ABO blood group*
- *that the donor is a regular donor having donated in the last 12 months except in the case of donation from a parent to child under 12 years of age*
- *that the donor meets the normal donor selection criteria and the unit is tested as per routine testing of homologous units*
- *that the donation is collected at least 72 normal working hours before being needed*
- *that the donation is irradiated if it is collected from a blood relative*

The collection of the donation also incurs a \$200 charge. If the donation is not used then it will be discarded.

If patients request autologous or directed donation further information can be obtained by phoning the ARCBS in NSW on 02-92294444.

What can be done to ensure that a safe supply of blood is available?

Only 3% of eligible people in Australia donate blood. It is important that wherever possible healthy Australians are encouraged to donate. This will help ensure a safe and adequate blood supply for patient care. Information on donating blood can be found by phoning 131495 or visiting www.arcbs.redcross.org.au.

Further information/useful websites :

www.nhmrc.gov.au www.ansbt.org.au

www.arcbs.redcross.org.au

The Clinical Use of Blood Handbook, WHO, 2001

Clinical practice guidelines on the use of blood components, NHMRC/ASBT 2001

PRESCRIBING BLOOD COMPONENTS: CHECKLIST FOR CLINICIANS

Transfusion is only one part of the patient's management. Decisions should be based upon the NHMRC/ASBT *Clinical Practice Guidelines for the Use Blood Components*, taking individual patient needs into account. Before prescribing transfusion ask yourself the following questions:

1. *What improvement in the patient's condition am I aiming to achieve?*
2. *Can I minimise blood loss to reduce the patient's need for transfusion?*
3. *Are there any other treatments which I could give before making the decision to transfuse?*
4. *What are the specific and laboratory indications for transfusion in this patient's case?*
5. *Do the benefits outweigh the risks for this particular patient?*
6. *Will a trained person monitor this patient and respond immediately if any acute reaction occurs?*
7. *Have I recorded my decision to transfuse and reasons for transfusion on the patient's chart and any documentation used in the ordering or administering of blood components?*
8. *Has the patient been given a clear explanation of the potential risks and benefits of blood component therapy in his or her particular case?*

Finally, if in doubt, ask yourself the following question:

9. *If this blood was for myself, my child or a family member, would I accept the transfusion in these circumstances?*