

Blood Components: A Guide for Patients

February 2002



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ISBN Print: 1864961503 Online: 1864961562

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FOREWORD

This booklet is derived from the National Health and Medical Research Council *Clinical Practice Guidelines on the Use of Blood Components*

The guidelines are a joint initiative of the National Health and Medical Research Council and the Australasian Society of Blood Transfusion, in cooperation with the Commonwealth Department of Health and Aged Care, the Royal Australasian College of Surgeons, the Australian and New Zealand College of Anaesthetists and other relevant groups.

INTRODUCTION

This booklet was developed for people who are likely to have blood component therapy (also called blood transfusion), their families and carers. It aims to help you gain a better understanding of why you might need blood component therapy.

In 2000, the National Health and Medical Research Council (NHMRC) and the Australasian Society of Blood Transfusion (ASBT) established a joint working party to review the evidence on blood component therapy and develop clinical guidelines on the use of blood components in adults. * The working party included a consumer representative as well as people with expertise in relevant medical specialties. Consumers and other interested groups were consulted during the development of the guidelines.

This booklet is based on the NHMRC/ASBT guidelines. It guides you through the main issues surrounding blood component therapy by:

- explaining what blood components are and how they are used;
- discussing the different conditions that may lead to the need for blood component therapy;
- outlining the risks and benefits of blood component therapy (your doctor or other health professional should explain how these relate to your situation);
- discussing methods that have been developed to reduce the use of blood component therapy;
- describing the different tests that may be used to find out whether blood component therapy is needed in your situation; and
- explaining what informed consent means and outlining what information you should be given to involve you in making decisions about your treatment.

The appendices include:

- a checklist to help you make sure that you have been given enough information about your treatment options;
- details of other sources of information on blood component therapy (including how you can obtain the full version of the *Clinical Practice Guidelines on the Use of Blood Components*); and
- membership of the NHMRC/ASBT Working Party.

* The use of blood component therapy in children and in women during pregnancy and childbirth was considered beyond the scope of the guidelines so it is not discussed in this booklet.

WHAT IS BLOOD COMPONENT THERAPY?

Blood component therapy is also called blood transfusion.

Blood moves through our bodies bringing oxygen and food to the cells and carrying away waste. Whole blood is made up of a number of components including a liquid portion (plasma) and different types of cells.

If you lose a lot of blood or if some blood cells are damaged or there are not enough of them, you may need blood component therapy. This means that the appropriate blood component(s) will be introduced directly into your bloodstream (usually into a vein in your arm).

Some people will need a single emergency transfusion (ie after a road accident or major surgery). Others, such as people with cancer, may need regular blood component therapy throughout their treatment. People with blood disorders or kidney disease may need transfusions throughout their lives.

What are the different blood components?

Blood can be separated into its various components. * In most transfusions, it is not whole blood but a blood component that is given. Blood components include the following.

Red blood cells

Red blood cells are the carriers of haemoglobin, which is a protein needed to transport oxygen around the body. You may be given red blood cells if your haemoglobin level or red blood cell count are low (see *What is anaemia?* on page 10) or if you have lost a lot of blood from an injury or during surgery (see *What happens when a lot of blood is lost* on page 11).

Platelets

Platelets are pieces of cells that help to stop bleeding by sticking together to form a plug. Some people have low numbers of platelets. This may be caused by disease, certain medications (such as chemotherapy) or treatments (such as radiation therapy). Platelets are given to prevent or control bleeding in these people (see *What are clotting disorders?* on page 12 and *What is bone marrow failure?* on page 11).

Platelets may be given once or more to treat a single incident or repeated transfusions may be required over a period of time.

* This booklet discusses the use of red blood cells, platelets, fresh frozen plasma and cryoprecipitate. It does not discuss the use of other blood components, such as albumin.

Fresh frozen plasma and cryoprecipitate

Fresh frozen plasma and cryoprecipitate, which is produced from fresh frozen plasma, contain *clotting factors* which work with platelets to seal wounds. If any of the clotting factors are not present in the blood, bleeding can occur very easily and is difficult to control. You may be given plasma products if your blood is not clotting properly (see *What are clotting disorders?* on page 12).

Where do the blood components come from?

In Australia and New Zealand, blood components are produced from donated whole blood. People who give their blood provide a precious resource that is important in the care of many.

The blood supply in Australia is organised through the Australian Red Cross Blood Service in each State and Territory, and in New Zealand by the New Zealand Blood Service.

WHEN IS BLOOD COMPONENT THERAPY NEEDED? *

Blood component therapy can save lives and help to improve the quality of life for people with blood disorders. This section describes some of the medical situations where blood component therapy may be appropriate.

What is anaemia?

If you have low levels of haemoglobin or red cells in your blood, the amount of oxygen delivered around the body is reduced. This is called anaemia. Anaemia may be caused by loss or destruction of red blood cells or by reduced production of red blood cells (see *What is bone marrow failure?* on page 11). Some dietary deficiencies can also cause anaemia but these do not generally require blood component therapy.

Not everybody who has anaemia will need blood component therapy. However, some people (eg those who are severely ill or who have heart or respiratory disease) may not tolerate anaemia well. Your doctor or other health professional will consider all the signs and symptoms and may carry out tests (see page 14) to see whether red blood cell therapy is the most appropriate treatment in your case.

* This booklet aims to help you to improve your understanding of the need for blood component therapy in your situation. It is not meant as a guide to treating the conditions discussed in this section.

What happens when a lot of blood is lost?

If the amount of blood in the body is greatly reduced (eg through serious bleeding or disease), the body cells suffer from lack of oxygen and nutrients. The use of blood component therapy in these cases is often a lifesaving process.

Blood component therapy may be useful in any condition in which there is loss of a large quantity of blood and there are signs that oxygen is no longer being efficiently transported around the body. These include:

- serious bleeding from injuries;
- blood loss during internal bleeding (eg bleeding ulcers); and
- surgery that involves considerable blood loss.

Blood component therapy in these cases may include giving red blood cells to treat anaemia and/or platelets to help prevent or reduce severe bleeding.

In some cases, plasma may be given following cardiac bypass surgery. This is only likely if there is bleeding and the body's coagulation mechanism is not functioning normally.

What is bone marrow failure?

Bone marrow is the soft, sponge-like material in the cavities of bones, where red blood cells and platelets are formed. Bone marrow can be affected by chemical agents or repeated x-ray exposure. Diseases that affect bone marrow include:

- leukaemia — a malignant disease which causes abnormal development of white blood cells and reduced numbers of red blood cells and platelets;
- pernicious anaemia — which is a type of anaemia resulting from a deficiency in vitamin B¹²;
- cancer;
- kidney or liver disorders; and
- rheumatoid arthritis.

If your bone marrow has been affected by a disease or its treatment, you may need to be given red blood cells (if your haemoglobin level drops too low) and/or platelets (if you have a low platelet count).

What is coagulation?

Coagulation is the process by which a blood clot is formed. When a blood vessel is injured, platelets stick together to form a plug at the site of the injury. Clotting factors in the plasma then work with the platelets to produce a wound-sealing clot.

What are clotting disorders?

If the body's coagulation mechanism breaks down, bleeding is more likely to occur and it becomes more difficult for clotting to take place. This is referred to as a clotting disorder.

A common cause of clotting disorders is a low number of platelets. This is called *thrombocytopenia* and results in bleeding in the skin or mucous membranes (eg the lining of the mouth). The decrease in platelets may be due to reduced production or to increased destruction of the platelets. Possible causes include diseases of the bone marrow, liver disorders and various medications. Platelets may be given to help stop the bleeding.

A serious disorder of clotting involving excessive coagulation is *disseminated intravascular coagulation* (DIC). This disease can occur in people who have massive burns, injuries or wounds, certain acute infections, cancer and some disorders of childbirth. During the progress of DIC, platelets and various clotting factors are used up faster than they can be produced and serious bleeding may result. Fresh frozen plasma may be given to treat *acute* DIC if there is bleeding and the body's coagulation mechanism is not functioning normally. It is not appropriate treatment for *chronic* DIC.

Fibrinogen is one of the many factors involved in clotting of the blood. If your levels of fibrinogen are low (*fibrinogen deficiency*) and you are bleeding, have DIC (see above) or have had an invasive procedure, or been injured or wounded, it is likely that you will be given cryoprecipitate.

WHAT ARE THE RISKS AND BENEFITS OF BLOOD COMPONENT THERAPY?

As with all medical procedures, blood component therapy involves some risks. These are limited as far as possible through the care that is taken when the blood is collected and by ensuring that blood components are only given when appropriate.

Is there a risk of catching HIV, hepatitis or other diseases?

Before being processed, blood donations are carefully checked for viruses (such as HIV and hepatitis) that might be transmitted by transfusion. This means that the risk of viral infection from blood components is very low. The introduction of new technologies will further reduce the risks involved.

The blood supply is also protected from possible hazards, such as bacterial infection. People who may have been in contact with these hazards are not allowed to donate blood. This is known as donor deferral.

Surveillance systems are in place to detect and respond to other risks as they emerge.

Are there other risks?

The health professionals who care for you will ensure that blood component therapy is only given when it is really needed and will be of benefit to you. The risks involved in *not* having blood component therapy when you need it are greater than the risks of having a transfusion.

However, reactions to blood component therapy can sometimes occur:

- if the person receiving the transfusion is given blood of a different type to their own or they are sensitive to some element of the donor blood, symptoms may occur, including headache, fever, a burning sensation along the vein when the transfusion is given, facial flushes or shock;
- transfusion-related lung injury;
- a reaction, known as *graft-versus-host reaction*, which can occur when a recipient with lowered immunity is given an incompatible transfusion; and
- flow of blood under the skin and through the mucous membranes.

These events are rare and the risk of them occurring is reduced by the care that is taken both in deciding whether blood component therapy is appropriate treatment and in carrying out the transfusion itself. As well as having tests (see page 14), you will be asked questions to make sure that you receive exactly the blood component therapy you need. If you are given blood component therapy, you will be monitored closely for early signs of any reactions or problems.

ARE THERE ALTERNATIVES TO BLOOD COMPONENT THERAPY?

Because blood is a limited resource and there have been public concerns about the risks of receiving blood products in the past, alternatives to blood component therapy are continually being developed. These include:

- minimising the need for transfusion by improving surgical methods to prevent or reduce bleeding; and
- using new procedures and medicines so as little blood as possible needs to be transfused.

However, there will still be people who, due to the amount of blood lost, are best treated with blood component therapy.

Your doctor or other health professional will be able to answer any questions you have about alternatives to blood component therapy and whether they would be an appropriate treatment option in your situation.

Is it safer to use my own blood?

Some people feel that it is safer to have their own blood collected and stored before surgery. This is known as *autologous transfusion*.

As careful checks are made on donated blood, there is little advantage to using your own blood. If your own blood is used, the medical team's first priority should still be to use as little of the blood as possible and to achieve the best outcomes for your health.

WHAT TESTS WILL I HAVE?

Many kinds of studies can be made of the blood. Depending on the reason for blood component therapy in your situation, some of the following tests may be used. These will help the health professionals caring for you to make sure that blood component therapy is only given when it is really needed and that it will be of benefit to you.

Full blood count

This test on a sample of blood is used to check the number of red blood cells, white blood cells and platelets in a sample of blood (usually expressed as the number of cells in a cubic millilitre of blood).

Red blood cells

There are two main tests that may be carried out on samples of your blood to see whether your red blood cells are able to carry out their normal functions:

- testing for **haemoglobin levels** in red blood cells shows whether there is enough haemoglobin in the blood to deliver oxygen around the body; and
- the **haematocrit** shows what proportion of your blood is made up of red blood cells.

Coagulation tests

Before surgery and under some other circumstances, it is important to know that the time required for coagulation to take place is not long. As clotting is a complex process involving many elements, slow coagulation may be due to a number of factors.

Several methods can be used to measure the body's ability to coagulate blood. These include:

-
- *bleeding time* (the time needed for a standardised wound to stop bleeding) — if the time needed is longer than normal, there may be a deficiency in platelet numbers or functioning;
 - *activated partial thromboplastin time* — if the time needed is longer than normal, there may be a deficiency of one or more clotting factors;
 - *prothrombin time* — if the time needed is longer than normal, there may be a deficiency of clotting factor VII, liver disease, oral anticoagulant therapy (eg warfarin) or deficiency of vitamin K (which is needed for normal coagulation); and
 - *thrombin clotting time* — if the time needed is longer than normal, there may be a deficiency of fibrinogen.

Your doctor or other health professional may also need to carry out other tests to investigate specific clotting factors.

WHAT IS INFORMED CONSENT?

Before any medical procedure is carried out, you (or a family member) will be asked to give your permission or *consent*.

To be involved in decisions about your treatment, you must have enough information about:

- your condition;
- tests that may be carried out;
- treatment options;
- benefits and possible adverse effects of tests or treatment; and
- the likely result if treatment is not undertaken.

It is not always possible for your doctor or other health professional to provide complete information or to predict outcomes or assess risks with certainty, and you need to be aware of this uncertainty.

Consultations take place in a wide variety of situations which are not always ideal. Often patients are sick or injured and they and their relatives may be anxious. For these and other reasons, patients may have difficulty comprehending the information they are given. It is important that doctors and other health professionals use language that is simple and free of medical jargon, and that they try to ensure that the information is understood and retained. This booklet may help you to better understand the information that is given to you.

In an emergency, there may not be time to discuss your treatment. However, the reasons for the transfusion should be explained to you when you are recovering.

APPENDIX 1

MEMBERSHIP OF THE NHMRC/ASBT WORKING PARTY

Professor George Rubin (Chair)	Professor of Public Health and Community Medicine, University of Sydney at Westmead Director, Effective Healthcare Australia
Mr Christopher Carter	Consumer Representative Perth Division of General Practice
Associate Professor Michael Davies	Director of Anaesthesia St Vincent's Hospital, Melbourne
Dr Mark Dean	Assistant Director, Australian Red Cross Blood Service
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Secretariat

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APPENDIX 2

CHECKLIST FOR BLOOD COMPONENT THERAPY

	Yes	No
1 Do you understand why you may need blood component therapy? Blood component therapy is used in many different situations. Your doctor should explain why the therapy is needed and how it can be expected to improve your health.	<input type="checkbox"/>	<input type="checkbox"/>
2 Have the possible risks of blood component therapy been explained to you? As part of the process of informed consent, the possible risks of blood component therapy in your situation should be clearly explained.	<input type="checkbox"/>	<input type="checkbox"/>
3 Has the use of alternatives to blood component therapy in your situation been discussed? In some cases alternatives to blood component therapy may be appropriate treatment. You can discuss this with your doctor or other health professional.	<input type="checkbox"/>	<input type="checkbox"/>
4 Have all your questions been answered? Remember that you have a right to ask questions and to expect answers that you can understand. It may help to have a family member or friend with you when you are talking to your doctor or other health professional.	<input type="checkbox"/>	<input type="checkbox"/>

If you have answered *No* to any of these questions, you may find it useful to ask your doctor or other health professional to explain the relevant issues to you.

APPENDIX 3

WHERE TO GET MORE INFORMATION

Additional copies of this booklet are available from:

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This booklet was derived from the NHMRC *Clinical Practice Guidelines on the Use of Blood Components* which will be distributed to institutions where blood component therapy is given. The guidelines aim to improve the quality of care for patients in a number of ways including increasing consumer awareness of the benefits and risks of blood component therapy.

Copies of the NHMRC *Clinical Practice Guidelines for the Use of Blood Components* are available from the AusInfo Government Bookshops.

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The National Health and Medical Research Council

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