

# **Developing a National Policy and Guidelines on the Clinical Use of Blood**

## **Recommendations**



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a National Policy  
and Guidelines  
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of Blood**

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# Preface

The World Health Organization Blood Transfusion Safety programme (WHO/BTS) was established to develop strategies for blood safety and promote them on a global, regional and national basis through advocacy and the provision of technical support to WHO Member States.

WHO/BTS has developed guidelines and recommendations based on World Health Assembly Resolution 28.72 of 1975, which urges Member States to develop national blood transfusion services based on voluntary non-remunerated blood donation. It also provides technical cooperation and assistance to Member States in the development of national blood programmes.

Safe and adequate supplies of blood are dependent on the implementation of an integrated strategy for blood safety:

- 1 The establishment of well-organized, nationally-coordinated blood transfusion service, with quality systems in all areas.
- 2 The collection of blood only from voluntary non-remunerated donors from low-risk populations.
- 3 The screening of all donated blood and blood products for transfusion-transmissible infections, including the human immunodeficiency virus (HIV), hepatitis viruses, syphilis and other infectious agents, and good laboratory practice in all aspects of blood grouping, compatibility testing, component preparation and the storage and transportation of blood products.
- 4 A reduction in unnecessary transfusions through the appropriate clinical use of blood and blood products, and the use of simple alternatives to transfusion, wherever possible.

## **WHO Recommendations on Developing a National Policy and Guidelines on the Clinical Use of Blood**

Many Member States have established national blood transfusion services in accordance with WHO guidelines and recommendations. However, few countries have developed policies and guidelines on the clinical use of blood and blood products which are being effectively implemented at all levels of the health system. There are also wide variations in the approaches and content of national guidelines that currently exist.

WHO has therefore developed these Recommendations to assist Member States in developing, implementing and monitoring national policies and guidelines on the clinical use of blood and ensuring active collaboration between the blood transfusion service and clinicians throughout the management of patients who may require transfusion.

The Recommendations were drafted by an international expert group of blood transfusion and clinical specialists and were field-tested in a Workshop to Develop a National Policy and Guidelines on the Clinical Use of Blood in Honduras in March 1998.

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### **The Clinical Use of Blood**

To support these Recommendations, WHO has produced *The Clinical Use of Blood*, a set of comprehensive learning materials and a pocket handbook to aid prescribers of blood in the appropriate use of blood and blood products.

These materials have been designed to promote good transfusion practice in accordance with national guidelines on the clinical use of blood. They will form a valuable resource both in the development of national policies and guidelines and in the education and training of providers and prescribers of blood at all levels of the health care system.

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# Introduction

Blood transfusion is an essential part of modern health care. Used correctly, it can save life and improve health. However, as with any therapeutic intervention, it may result in acute or delayed complications and carries the risk of transmission of infectious agents, such as HIV, hepatitis viruses, syphilis and Chagas disease. It is also expensive and uses a scarce human resource.

The risks associated with transfusion can only be avoided by close collaboration between the blood transfusion service and clinicians in managing the components of the transfusion process for which they are each responsible:

- An adequate supply of safe blood and blood products
- The effective clinical use of blood and blood products.

## Safe blood and blood products

A prerequisite for the effective clinical use of blood is a well-organized blood transfusion service (BTS) that is able to provide blood and blood products that are safe, accessible at reasonable cost and adequate to meet national needs.

Only blood which has been obtained from appropriately selected donors and has been screened for transfusion-transmissible infectious agents, in accordance with national requirements, should be issued for transfusion, other than in the most exceptional life-threatening situations.

## Low-risk blood donors

Voluntary non-remunerated blood donors from low-risk groups who give blood regularly are the foundation of a safe and adequate blood supply. A reliance on family/ replacement and paid blood donors should be phased out as these donors are associated with a significantly higher prevalence of transfusion-transmissible infections.

The education, motivation, recruitment and retention of voluntary non-remunerated blood donors requires the following activities to be undertaken.

- 1 The establishment of a blood donor unit within the BTS, with an officer responsible for the national blood donor programme and a designated donor recruitment officer.
- 2 The training of staff responsible for donor education, motivation, recruitment and selection.
- 3 The identification of donor populations at low risk for transfusion-transmissible infections.
- 4 Educational and media campaigns in workplaces, communities and educational institutions.
- 5 The maintenance of a register of voluntary non-remunerated blood donors.
- 6 Safe blood collection procedures, including donor selection and deferral, donor care and confidentiality.
- 7 Donor notification and referral for counselling.
- 8 The monitoring of transfusion-transmissible infections in the blood donor population.

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### **Screening and processing of donated blood**

Quality assurance and good laboratory practice are essential in all areas of blood screening and processing. Important activities include:

- 1 The development and implementation of a national strategy for the screening of all donated blood for transfusion-transmissible infections, using the most appropriate and effective assays to test for HIV, hepatitis viruses, syphilis and other infectious agents, such as Chagas disease.
- 2 The training of BTS laboratory technical staff in all aspects of blood screening, blood grouping, compatibility testing, component preparation and the issue of blood for transfusion.
- 3 Good laboratory practice, including the use of standard operating procedures, in all aspects of blood screening and processing.
- 4 Compatibility testing of all whole blood and red cells transfused even if, in life-threatening emergencies, this is performed after they have been issued.
- 5 The procurement, supply, central storage and distribution of reagents and materials to ensure continuity in testing at all sites.
- 6 The maintenance of an effective blood cold chain for the storage and transportation of blood and blood products.

### **The effective clinical use of blood**

The decision to transfuse blood or blood products must be based on a careful assessment of clinical and laboratory indications that a transfusion is necessary to save life or prevent significant morbidity.

Responsibility for the decision to transfuse must ultimately rest with individual prescribers of blood, although this will often be made in consultation when specialist transfusion advice is available. However, consistently effective clinical transfusion practice cannot be achieved unless the following elements are in place.

- 1 A national policy on the clinical use of blood, with appropriate supportive regulations.
- 2 National guidelines on the clinical use of blood to aid prescribers of blood in their clinical decisions about transfusion.
- 3 A National Committee on the Clinical Use of Blood and hospital transfusion committees at local level to implement, regularly review and update the national policy and guidelines.
- 4 The training of all clinical and blood transfusion service staff involved in the transfusion process, based on the national guidelines.
- 5 The availability of simple alternatives to transfusion (crystalloids and colloids) for the correction of hypovolaemia, and pharmaceuticals and medical devices to minimize the need for transfusion.
- 6 Monitoring and evaluation of the implementation of the national policy and guidelines and the use of monitoring data in a quality improvement and education programme to assist clinicians to improve their practice.

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# 1 Steps in Developing a National Policy and Guidelines on the Clinical Use of Blood

The primary responsibility for the development of a national policy and guidelines on the clinical use of blood lies with clinicians, although the process may be initiated either by clinicians or by the BTS. Close collaboration between them is essential since the effective clinical use of blood is dependent on the availability of safe and adequate supplies of blood and blood products from the BTS.

Where there is a national blood transfusion policy and plan and a National Blood Transfusion Committee (NBTC) with required legislative support has already been established, the development of a national policy and guidelines on the clinical use of blood could be undertaken within the same framework.

In countries where an effectively functioning NBTC or similar body does not exist, a small Working Group may be initiated by the BTS or individual clinicians to prepare a draft policy and organize the drafting of the clinical guidelines.

The establishment of a National Committee on the Clinical Use of Blood will subsequently be required to ensure the effective implementation of the national policy and guidelines.

## Steps

Developing and implementing a national policy and guidelines on the clinical use of blood requires systematic planning and extensive consultation. The following steps are recommended, although the sequence and timing of these steps will be determined by national circumstances.

- 1 Sensitization of the Ministry of Health/national health authority to the need for a national policy and guidelines on the clinical use of blood.
- 2 Preparation of a draft national policy on the clinical use of blood by a select Working Group comprising clinical specialists and senior personnel from the BTS.
- 3 Submission of the draft policy to the Ministry of Health/national health authority for approval, endorsement and support.
- 4 National workshop to plan and draft national guidelines on the clinical use of blood, involving:
  - Clinical specialists
  - Senior BTS personnel
  - Senior pharmacists.
- 5 Further development of the draft national guidelines by specialist working groups from major clinical blood use specialties and the blood transfusion service.
- 6 Consolidation and editing of the draft national guidelines by the select Working Group.

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- 7 Circulation of the draft guidelines nationally for review by clinicians.
  - 8 Incorporation of comments and amendments and preparation of the final draft of the national guidelines by the select Working Group.
  - 9 Second national workshop to finalize the guidelines and plan a national strategy and workplan for their dissemination and implementation.
  - 10 Submission of the revised guidelines to the Ministry of Health/ national health authority for approval and endorsement and the preparation of a legislative framework, if required.
  - 11 Establishment of a National Committee on the Clinical Use of Blood.
  - 12 Establishment of a hospital transfusion committee in each hospital to implement and monitor the national policy and guidelines.
  - 13 Dissemination of the national policy and guidelines to the providers and prescribers of blood.
  - 14 Integration of education and training on the effective clinical use of blood into undergraduate, postgraduate, in-service and continuing education programmes for clinical and blood transfusion service staff.
  - 15 Development of indicators for monitoring and the establishment of a national system to monitor and evaluate the implementation of the national policy and guidelines.

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## 2 National Policy on the Clinical Use of Blood

A national policy on the clinical use of blood is an essential component of a strategy to ensure that blood and blood products are transfused only to treat conditions leading to significant morbidity or mortality that cannot be prevented or treated effectively by other means.

### Key elements

A national policy on the clinical use of blood should define the strategy for the effective clinical use of blood, blood products and alternatives to transfusion. This should include the following key elements.

- 1 A commitment by health authorities, health care providers and clinicians to the prevention, early diagnosis and effective treatment of conditions that could lead to the need for transfusion by strengthening public health and primary health care programmes.
- 2 A blood transfusion service that is able to provide adequate and timely supplies of safe blood and blood products.
- 3 The promotion and availability of:
  - Intravenous replacement fluids (crystalloids and colloids) for the correction of hypovolaemia
  - Pharmaceuticals and devices to minimize the need for transfusion
  - Sterile disposable equipment for blood samples, injection and infusion.
- 4 The availability of national guidelines on the clinical use of blood, which include:
  - A standard blood request form
  - A model blood ordering schedule
  - Standard operating procedures for all stages of the clinical transfusion process
  - Information on the specific characteristics of blood products, plasma derivatives, intravenous replacement fluids and pharmaceuticals
  - Clinical indications for transfusion.
- 5 The establishment of a National Committee on the Clinical Use of Blood and hospital transfusion committees at local level.
- 6 Education and training in the effective clinical use of blood and blood products for all clinical and blood bank staff involved in the transfusion process.
- 7 Effective clinical transfusion practice in accordance with the national guidelines on the clinical use of blood.
- 8 Monitoring and evaluation of the clinical use of blood.



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## 3 National Guidelines on the Clinical Use of Blood

Guidelines on the clinical use of blood should represent a national consensus by clinicians, the BTS and pharmacists on the most effective treatment for specific clinical conditions, in the context of local conditions, and should be based on the best available information. The objectives of developing and implementing clinical guidelines are as follows.

- 1 To define clinical and BTS requirements for the appropriate use of blood, blood products and simple alternatives to transfusion, including intravenous replacement fluids, and pharmaceuticals and medical devices to minimize the need for transfusion.
- 2 To make available standard operating procedures for all stages of the transfusion process.
- 3 To facilitate the monitoring and evaluation of transfusion practice nationally and locally in order to improve the clinical use of blood.

### Principles of the clinical use of blood

The following principles should be considered in the formulation of national guidelines on the clinical use of blood.

- 1 Transfusion is only one element of the patient's management.
- 2 Prescribing decisions should be based on the national guidelines on the clinical use of blood, taking individual patient needs into account.
- 3 Blood loss should be minimized to reduce the patient's need for transfusion.
- 4 The patient with acute blood loss should receive effective resuscitation (intravenous replacement fluids, oxygen, etc.) while the need for transfusion is being assessed.
- 5 The patient's haemoglobin value, although important, should not be the sole deciding factor in starting transfusion. The decision to transfuse should be supported by the need to relieve clinical signs and symptoms and prevent significant morbidity and mortality.
- 6 The clinician should be aware of the risks of transfusion-transmissible infection in the blood and blood products that are available for the individual patient.
- 7 Transfusion should be prescribed only when the benefits to the patient are likely to outweigh the risks.
- 8 The clinician should record the reason for transfusion clearly.
- 9 A trained person should monitor the transfused patient and respond immediately if any adverse effects occur.

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## **Key elements**

Guidelines on the clinical use of blood should be practical, comprehensive and relevant to local circumstances for use by clinicians who need to make urgent decisions on whether or not to transfuse a patient.

### **1 Standard blood request form**

All requests for blood and blood products should be accompanied by a blood request form that has been completed by the prescribing clinician. Ideally, a standard blood request form, developed by the blood transfusion service and reviewed and agreed by the National Committee on the Clinical Use of Blood, should be used throughout the country to promote effective clinical transfusion practice and aid in the monitoring and evaluation of clinical blood use.

Annex 1 summarizes the information that should be provided on a blood request form. It also contains a simple checklist that could be printed on the reverse of the form to assist clinicians in applying the principles of the clinical use of blood when making decisions about transfusion.

### **2 Blood ordering schedule**

It is unnecessary for blood to be crossmatched routinely for every surgical procedure since many operations rarely require transfusion. Considerable time and expense can be saved by analysing the usage of blood and developing a blood ordering schedule as a guide to the number of units of blood and blood products that should normally be ordered for common procedures. The use of a blood ordering schedule minimizes unnecessary crossmatching and reduces the amount of blood that becomes outdated. It also makes it possible to ensure that blood is readily available for all patients who need it.

National guidelines on the clinical use of blood should therefore include a blood ordering schedule with guidance on its adaptation by clinicians, in conjunction with the hospital blood bank, in each hospital at different levels of the health system, including national, provincial/regional and district hospitals.

Each hospital's blood ordering schedule should reflect the clinical team's usual use of blood for common procedures, depending on their complexity and expected blood loss, and should take account of both local clinical conditions and the supply of blood, blood products and alternatives to transfusion that are available. It should also include guidance on the use of the group and screen policy for patients undergoing procedures for which red cell transfusion is occasionally, but rarely, required. If no clinically important antibodies are detected, fully crossmatched blood can quickly be made available using a rapid crossmatch technique. If the antibody screening test is positive, antigen negative blood should be crossmatched and reserved for the patient, even when there is little likelihood that transfusion will be needed.

Each hospital transfusion committee should agree a procedure for the prescribing clinician to override the blood ordering schedule when it is probable that a patient will need more blood than is stipulated: for example, if the procedure is likely to be more complex than usual or if the patient has a coagulation defect. In such cases, additional units of blood should be crossmatched as requested by the clinician.

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Annex 2 outlines the process for developing a blood ordering schedule and contains an example of a blood ordering schedule for surgical procedures in adult patients.

### **3 Standard operating procedures**

National guidelines on the clinical use of blood should include standard operating procedures for the following stages in the clinical transfusion process and, ideally, standard documentation such as a transfusion reaction report form.

- 1 Ordering blood and blood products in routine and emergency situations.
- 2 The issue of blood and blood products.
- 3 The transportation of blood and blood products and storage in the clinical setting.
- 4 The administration of blood and blood products.
- 5 Recording all transfusions in patient records.
- 6 Monitoring the patient before, during and after transfusion.
- 7 The management, investigation and recording of transfusion reactions.

Annexes 3 and 4 include guidance on monitoring the transfused patient and investigating and recording acute transfusion reactions.

### **4 Blood, blood products and alternatives to transfusion**

The guidelines should contain information on indications, dosage, risk of transmission of infection, storage conditions, means of administration, contraindications and precautions for the blood products and alternatives to transfusion that are available.

#### **Blood components**

- Whole blood
- Red cells
- Platelet concentrates
- Plasma
- Cryoprecipitate

#### **Plasma derivatives**

- Albumin
- Coagulation factors
- Immunoglobulins

#### **Intravenous replacement fluids**

- Crystalloid solutions
- Colloid solutions

#### **Pharmaceuticals**

- Drugs
- Medical devices for blood salvage and to maximize blood volume
- Sterile disposable equipment for blood samples, injection and infusion



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## 5 Clinical indications for transfusion

The guidelines should include clinical and laboratory indications for the use of blood and blood products in:

- Anaemia
- Chronic blood loss
- Acute blood loss
- Supportive treatment: e.g. haemophilia, thalassaemia and immunodeficiency disorders.

Listed below are some clinical disciplines for which indications for transfusion might be included.

### General medicine

- Anaemia
  - Malaria
  - HIV infection
  - Haemolytic anaemias
- Oncology
- Bone marrow dysfunction
- Haemoglobinopathies
  - Sickle cell disease
  - Thalassaemias
- Disorders of haemostasis
  - Congenital
  - Acquired
- Thrombocytopenia

### Paediatrics

#### Neonatology

- Neonatal anaemia
- Haemolytic disease of the newborn
- Exchange transfusion
- Vitamin K deficiency
- Thrombocytopenia

#### General paediatrics

- Severe paediatric anaemia
  - Nutritional anaemia
  - Malaria
  - Other infections
- Oncology/malignancies
- Haemoglobinopathies
  - Sickle cell disease
  - Thalassaemias
- Disorders of haemostasis
  - Congenital
  - Acquired
- Thrombocytopenia

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**Obstetrics**

- Anaemia in pregnancy
- Major obstetric haemorrhage/complications
- Disseminated intravascular coagulation
- HIV infection

**Surgery and trauma**

- Elective surgery
- Acute surgery and trauma
- Disorders of haemostasis
  - Congenital
  - Acquired
- Thrombocytopenia
- Burns
  - Children
  - Adults

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## 4 National Committee on the Clinical Use of Blood

A National Committee on the Clinical Use of Blood requires authority and support in order to ensure the effective implementation of the national policy and guidelines.

### Role

The principal functions of a National Committee on the Clinical Use of Blood are to:

- 1 Ensure the national policy and guidelines on the clinical use of blood are disseminated to hospitals at all levels of the health system.
- 2 Provide guidance on the establishment of hospital transfusion committees and their roles and responsibilities in implementing and monitoring the national policy and guidelines.
- 3 Ensure that a standard blood request form, developed by the blood transfusion service, is available and used uniformly in all hospitals.
- 4 Promote the development and use of an appropriate blood ordering schedule in each hospital in which surgical procedures are performed.
- 5 Ensure that standard operating procedures for all stages of the clinical transfusion process are available and used uniformly in all hospitals.
- 6 Promote the development of an education and training programme for personnel at all levels who are involved in the prescription and administration of blood and blood products.
- 7 Establish a system to monitor and evaluate the pattern of blood usage, the implementation of the national policy and guidelines, and the effectiveness of the education and training programme.
- 8 Regularly review and, where necessary, update the national policy and guidelines and the strategy for their implementation.

### Membership

The effectiveness of a National Committee on the Clinical Use of Blood will depend on the careful selection of a small number of dedicated, enthusiastic individuals with specialist expertise in clinical transfusion practice who are able to meet on a regular basis.

While the most appropriate composition of the committee will be determined by national circumstances, it should include senior representatives of both the providers and prescribers of blood and blood products, including:

- 1 A senior professional officer from the Ministry of Health/national health authority.

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- 2 Representatives of clinical blood use specialties, such as:
    - Accident and emergency/casualty
    - Anaesthesia/intensive care
    - Surgery
    - Obstetrics and gynaecology
    - Paediatrics
    - General medicine
    - Haematology/oncology
    - Nursing.
  - 3 Representatives of hospital transfusion committees.
  - 4 Senior personnel from the blood transfusion service, such as:
    - Medical director
    - Manager/finance officer
    - Quality manager
    - Senior laboratory technologist.
  - 5 Senior officer (pharmacy or supplies) responsible for the supply of intravenous replacement fluids, pharmaceuticals, medical devices and sterile disposal equipment.
  - 6 Representatives of relevant organizations involved in the clinical aspects of blood transfusion, such as:
    - Education and training institutions
    - Non-governmental organizations:
      - National Red Cross or Red Crescent Society
      - Voluntary blood donor organizations
      - Associated voluntary organizations: e.g. Haemophilia Association, Thalassaemia Association.

Annex 5 shows a possible organizational structure for a National Committee on the Clinical Use of Blood.

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## 5 Hospital Transfusion Committees

A hospital transfusion committee should be set up in each hospital to implement the national policy and guidelines on the clinical use of blood and monitor the use of blood and blood products at the local level. The hospital transfusion committee should have authority within the hospital structure to determine hospital policy in relation to transfusion and resolve any problems that have been identified.

### Role

The principal functions of a hospital transfusion committee are to:

- 1 Monitor the safety, adequacy and reliability of the supply of blood, blood products and alternatives to transfusion.
- 2 Develop systems and procedures for the implementation of the national guidelines on the clinical use of blood within the hospital, including the development of a hospital blood ordering schedule.
- 3 Promote the effective implementation of the national guidelines through the education and training of all clinical and blood bank staff involved in the transfusion process.
- 4 Monitor the usage of blood and blood products in the hospital.
- 5 Monitor the implementation of the national guidelines in the hospital and take appropriate action to overcome any factors hindering their effective implementation.
- 6 Review incidents of severe adverse effects or errors associated with transfusion, identify any corrective action required and refer them to the National Committee on the Clinical Use of Blood.

### Membership

A hospital transfusion committee should be multidisciplinary and involve all departments in the hospital that are involved in providing and prescribing blood and blood products. These may include:

- 1 Senior representatives of clinical specialties that prescribe blood in the hospital.
- 2 The responsible officer from the hospital blood bank and, where applicable, a representative of the blood transfusion service that supplies blood and blood products to the hospital.
- 3 The hospital staff member responsible for the supply of intravenous replacement fluids, pharmaceuticals, medical devices and sterile disposable equipment.
- 4 The senior nurse.

The membership of the hospital transfusion committee will be primarily clinical but, on occasions, may also need to involve other personnel, such as the hospital administrator/finance officer and the medical records officer.

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## 6 Education and Training

The effective implementation of the national policy and guidelines requires the development of a national programme of education and training in the clinical use of blood. This should be incorporated into pre-service, postgraduate and in-service training programmes for clinicians, blood bank staff and other personnel involved in the transfusion process and into continuing medical education programmes.

### **Undergraduate and postgraduate programmes**

- Medical schools and teaching hospitals
- Medical laboratory technology training institutions
- Schools of nursing and midwifery
- Paramedical schools

### **In-service training**

- Clinicians
- Nurses and midwives
- Blood transfusion service/hospital blood bank technical staff

### **Continuing medical education**

- Hospital clinical meetings
- Seminars and conferences
- Medical publications

### **WHO training materials**

Each country's national policy and clinical guidelines should be the principal resource for education and training in the clinical use of blood. The following learning resources are also available from WHO.

#### **Aide-Mémoire: Blood Safety**

##### **The Clinical Use of Blood**

- Aide-Mémoire: The Clinical Use of Blood
- The Clinical Use of Blood in Medicine, Obstetrics, Paediatrics, Surgery & Anaesthesia, Trauma & Burns (learning materials)
- The Clinical Use of Blood (handbook)
- The Clinical Use of Blood: Information sheet for clinicians

##### **Safe Blood and Blood Products**

- Introductory Module: *Guidelines and Principles for Safe Blood Transfusion Practice*
- Module 1: *Safe Blood Donation*
- Module 2: *Screening for HIV and Other Infectious Agents*
- Module 3: *Blood Group Serology*

##### **Establishing a Distance Learning Programme in Blood Safety: A guide for programme coordinators**

- Manual
- Toolkit

##### **The Blood Cold Chain**

- The Blood Cold Chain: Guide to the selection and procurement of equipment and accessories
- Manual on the Management, Maintenance and Use of Blood Cold Chain Equipment

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## 7 Monitoring and Evaluation

A simple system of monitoring and evaluation is essential to assess patterns of blood usage and the impact of the national policy and guidelines on the clinical use of blood. This requires a systematic approach to data collection and analysis at all levels of the health system.

The responsibility for establishing a system of monitoring and evaluation should be shared by the blood transfusion service, the National Committee on the Clinical Use of Blood and the department responsible for the supply of intravenous replacement fluids, pharmaceuticals, medical devices and sterile disposable equipment.

Monitoring and evaluation should also be undertaken in each hospital by the hospital transfusion committee and the results reported to the National Committee on the Clinical Use of Blood.

### Key elements

The following elements should be included in a system for the monitoring and evaluation of clinical blood use.

- 1 The safety, adequacy, and reliability of the supply of blood and blood products.
- 2 The adequacy and reliability of the supply of intravenous replacement fluids (crystalloids and colloids) and pharmaceuticals to avoid unnecessary transfusion, and sterile disposable equipment for blood samples, injection and infusion.
- 3 Differences in blood usage within hospitals and between similar hospitals at national, provincial/regional and district level.
- 4 The availability of the national guidelines on the clinical use of blood at all levels of the health system and the establishment of education and training programmes in their use.
- 5 The establishment of systems needed to ensure the effective use of the guidelines by the providers and prescribers of blood.
- 6 Compliance with the national guidelines in the clinical use of blood, blood products and alternatives to transfusion.

### Indicators for monitoring and evaluation

The following indicators provide a simple framework for the monitoring and evaluation of the clinical use of blood by hospital transfusion committees. Annex 6 provides a more comprehensive list of indicators.

- 1 Are adequate, reliable supplies of safe blood and blood products available to meet demands?

<i>Indicator</i>	Percentage of unfilled requests, by product
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- 2 Are adequate, reliable supplies of intravenous replacement fluids, pharmaceuticals and sterile disposable equipment available to meet demands?

*Indicator* Percentage of unfilled requests

- 3 What proportion of blood and blood products is used by each clinical specialty?

*Indicator* i Units requested/units transfused, by patient category (e.g. obstetrics)

ii Units requested/units transfused, by product

- 4 Are national guidelines on the clinical use of blood available and known?

*Indicator* i Percentage of clinicians trained in the use of the guidelines

ii Percentage of clinicians using the guidelines

- 5 Is a system to support the guidelines in place?

*Indicator* i Availability of blood request form

ii Availability of blood ordering schedule

iii Efficient system for the transportation and storage of blood and blood products in the clinical setting

iv Availability of transfusion reaction report form

v Availability of standard operating procedures for:

- Ordering blood and blood products in routine and emergency situations
- Issue of blood and blood products
- Storage and transportation of blood and blood products
- Administration of blood and blood products
- Recording all transfusions in patient records
- Monitoring the patient before, during and after transfusion
- Management, investigation and recording of transfusion reactions

- 6 Do clinicians comply with the guidelines?

*Indicator* Number of transfusions prescribed in accordance with the guidelines



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# **Annexes**



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# Annex 1

## **Standard blood request form**

A standard blood request form should provide the following information:

- Date of request
- Date and time the blood is needed
- Where the blood should be delivered
- Patient's full name
- Patient's date of birth
- Patient's sex
- Patient's hospital reference number
- Patient's ward
- Provisional diagnosis
- Reason why transfusion is requested
- Number of units of blood or blood products required
- Whether patient's serum should be grouped, screened and held
- Standard or emergency request
- Name and signature of the person requesting the blood

Where previous records or a reliable history are available, the following information should also be provided:

- Patient's blood group, if known
- Presence of any antibodies
- History of any previous transfusions
- History of any previous transfusion reactions
- Females: number of previous pregnancies and maternal/infant incompatibility
- Other relevant medical history or condition

The simple checklist on p. 20 could be printed on the reverse of the blood request form to remind clinicians of factors that need to be considered in the management of patients who may require transfusion.

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### **PRESCRIBING BLOOD: A CHECKLIST FOR CLINICIANS**

Prescribing decisions should be based on national guidelines on the clinical use of blood, taking individual patient needs into account.

Before prescribing blood or blood products for a patient, ask yourself the following questions.

- 1 What improvement in the patient's clinical condition am I aiming to achieve?
- 2 Can I minimize blood loss to reduce this patient's need for transfusion?
- 3 Are there any other treatments I should give before making the decision to transfuse, such as intravenous replacement fluids or oxygen?
- 4 What are the specific clinical or laboratory indications for transfusion for this patient?
- 5 What are the risks of transmitting HIV, hepatitis, syphilis or other infectious agents through the blood products that are available for this patient?
- 6 Do the benefits of transfusion outweigh the risks for this particular patient?
- 7 What other options are there if no blood is available in time?
- 8 Will a trained person monitor this patient and respond immediately if any acute transfusion reactions occur?
- 9 Have I recorded my decision and reasons for transfusion on the patient's chart and the blood request form?

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

- 10 If this blood was for myself or my child, would I accept the transfusion in these circumstances?

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## Annex 2

### **Blood ordering schedule**

A blood ordering schedule is a guide to expected normal blood usage for elective surgical procedures which lists the number of units of blood to be routinely crossmatched or grouped, screened and held for each procedure preoperatively.

The development and use of a blood ordering schedule enables the identification of procedures that can be accommodated by the group and screen procedure. This will lead to:

- Reduction in unnecessary compatibility testing
- Reduction in the return of unused blood
- Reduction in wastage due to outdating
- More efficient management of blood inventory.

### **Developing a blood ordering schedule**

A blood ordering schedule should be developed by each hospital transfusion committee in accordance with national guidance on the adaptation of a model blood ordering schedule for local use.

The process of developing a blood ordering schedule involves the following steps.

- 1 Retrospective analysis of requests for blood over at least a 6-month period.
- 2 For each surgical procedure, analysis of:
  - Type of procedure
  - Reason for request of blood
  - Number of units crossmatched
  - Number of units transfused
  - Percentage of units used.
- 3 Calculation of the C:T ratio (crossmatch to transfusion ratio). A realistic objective for surgical procedures is a C:T ratio of approximately 3:1.
- 4 Surgical procedures with a blood usage of less than 30% should be included in the group and screen (G & S) category.
- 5 Monitoring and evaluation of the blood ordering schedule by verifying compliance.
- 6 Periodic review and, where appropriate, revision of the blood ordering schedule.

An example of a blood ordering schedule for surgical procedures in adult patients is given on p. 22.

## EXAMPLE

### Blood ordering schedule: a guide to expected normal blood usage for surgical procedures in adult patients

Procedure	Action	Procedure	Action
<b>General surgery</b>		<b>Obstetrics &amp; gynaecology</b>	
Cholecystectomy	G & S	Termination of pregnancy	G & S
Laparotomy: planned exploration	G & S	Normal delivery	G & S
Liver biopsy	G & S	Caesarean section	G & S
Hiatus hernia	X-M 2	Placenta praevia/retained placenta	X-M 4
Partial gastrectomy	G & S	Antepartum/postpartum haemorrhage	X-M 2
Colectomy	X-M 2	Dilatation & curettage	G & S
Mastectomy: simple	G & S	Hysterectomy: abdominal or vaginal: simple	G & S
Mastectomy: radical	X-M 2	Hysterectomy: abdominal or vaginal: extended	X-M 2
Thyroidectomy: partial/total	X-M 2 (+ 2)	Myomectomy	X-M 2
<b>Cardiothoracic</b>		Hydatidiform mole	X-M 2
Angioplasty	G & S	Oophorectomy (radical)	X-M 4
Open heart surgery	X-M 4 (+ 4)		
Bronchoscopy	G & S	<b>Orthopaedics</b>	
Open pleural/lung biopsy	G & S	Disc surgery	G & S
Lobectomy/pneumectomy	X-M 2	Laminectomy	G & S
<b>Vascular</b>		Removal hip pin or femoral nail	G & S
Aortic-iliac endarterectomy	X-M 4	Total hip replacement	X-M 2 (+2)
Femoral endarterectomy	G & S	Ostectomy/bone biopsy (except upper femur)	G & S
Femoro-popliteal bypass	G & S	Nailing fractured neck of femur	G & S
Ilio-femoral bypass	X-M 2	Laminectomy	G & S
Resection abdominal aortic aneurysm	X-M 6 (+ 2)	Internal fixation of femur	X-M 2
<b>Neurosurgery</b>		Internal fixation: tibia or ankle	G & S
Craniotomy, craniectomy	G & S	Arthroplasty: total hip	X-M 3
Meningioma	X-M 4	Spinal fusion (scoliosis)	X-M 2
Head injury, extradural haematoma	G & S	Spinal decompression	X-M 2
Vascular surgery (aneurysms, A-V malformations)	X-M 3	Peripheral nerve surgery	G & S
<b>Urology</b>			
Ureterolithotomy	G & S		
Cystotomy	G & S		
Ureterolithotomy & cystotomy	G & S		
Cystectomy	X-M 4		
Open nephrolithotomy	X-M 2		
Open prostatectomy (RPP)	X-M 2		
Transurethral resection prostatectomy (TURP)	G & S		
Renal transplantation	X-M 2		

X-M = Crossmatch

G & S = ABO/Rh group and antibody screen

(+ ) indicates additional units may be required, depending on surgical complications

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## Annex 3

### Monitoring the transfused patient

- 1 **For each unit of blood transfused**, monitor the patient at the following stages:
  - Before starting the transfusion
  - As soon as the transfusion is started
  - 15 minutes after starting transfusion
  - At least every hour during transfusion
  - On completion of the transfusion
  - 4 hours after completing the transfusion.
- 2 At each of these stages, record the following information on the patient's chart:
  - Patient's general appearance
  - Temperature
  - Pulse
  - Blood pressure
  - Respiration
  - Fluid balance:
    - Oral and IV fluid intake
    - Urinary output.
- 3 Record:
  - Time the transfusion is started
  - Time the transfusion is completed
  - Volume and type of all products transfused
  - Unique donation numbers of all products transfused
  - Any adverse effects.
- 4 Monitor the patient particularly carefully during the first 15 minutes of the transfusion to detect early signs and symptoms of adverse effects.

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## Annex 4

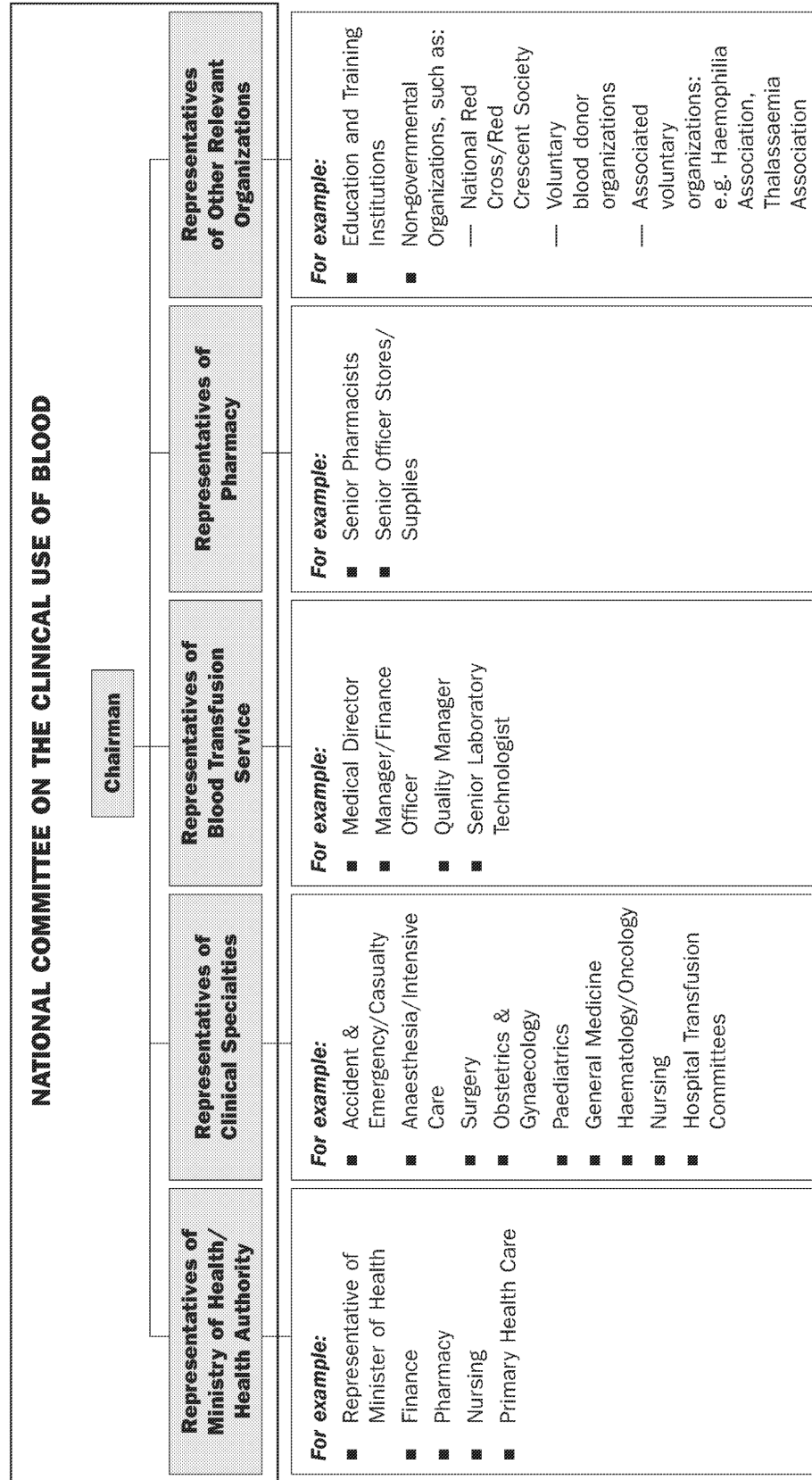
### Investigating and recording acute transfusion reactions

- 1 Stop the transfusion and keep the IV line open with normal saline while making an initial assessment of the acute transfusion reaction and seeking advice.
- 2 Immediately report all acute transfusion reactions, with the exception of mild urticarial reactions, to a medical officer and to the blood bank that supplied the blood.
- 3 Record the following information on the patient's notes:
  - Type of transfusion reaction
  - Length of time after the start of transfusion that the reaction occurred
  - Volume and type of blood products transfused
  - Unique donation numbers of all products transfused.
- 4 Immediately the reaction occurs, take the following samples and send with a request form to the blood bank for laboratory investigations:
  - Immediate post-transfusion blood samples (1 clotted and 1 anticoagulated: EDTA/Sequestrene) from the vein opposite the infusion site
  - Blood culture in a special blood culture bottle, if septic shock due to a contaminated blood unit is suspected
  - The blood unit and giving set containing red cell and plasma residues from the transfused donor blood
  - The first specimen of the patient's urine following the reaction.
- 5 Complete a transfusion reaction report form.
- 6 After the initial investigation of the transfusion reaction, send the following to the blood bank for laboratory investigations:
  - Blood samples (1 clotted and 1 anticoagulated: EDTA/Sequestrene) taken from the vein opposite the infusion site 12 hours and 24 hours after the start of the reaction
  - All patient's urine for at least 24 hours after the start of the reaction.



# Annex 5

## Possible organizational structure for a National Committee on the Clinical Use of Blood



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# Annex 6

## Indicators for monitoring and evaluation

### 1 Adequacy and reliability of supply of safe blood and blood products

- Number of units requested
- Number of units crossmatched
- Number of unfilled requests for blood
- Number of elective surgeries cancelled because of blood shortages
- Number of units issued for transfusion
- Number of units issued and returned unused
- Number of units discarded
- Number of units issued without screening for infectious disease markers (HIV, hepatitis, syphilis and other nationally-required tests)
- Number of units issued without compatibility testing

### 2 Adequacy and reliability of supply of:

#### *Intravenous replacement fluids*

- Crystalloid solutions, including normal saline (0.9% sodium chloride)
- Colloid solutions

#### *Drugs used in:*

- Anaemia
- Malaria
- Labour and delivery
- Shock
- Child-spacing (to reduce pregnancy-associated anaemias)
- Haemolytic disease of the newborn (immunoglobulin anti-D )

#### *Medical devices for:*

- Blood salvage
- Maximization of intravascular volume (pressure cuffs)

#### *Sterile disposable equipment:*

- Needles
- Syringes
- Blood sample tubes
- Blood giving sets, including cannulae/needles

### 3 Proportion of blood and blood products used by each clinical specialty

- Requests for blood and blood products by patient category
- Transfusion of blood and blood products by patient category

- 
- 4 Use of national guidelines on the clinical use of blood**
- Percentage of clinicians trained in the use of the guidelines
  - Percentage of clinicians using the guidelines as a basis for clinical decisions on transfusion
- 5 Establishment of a system and procedures to support the implementation of the guidelines**
- Availability of blood request form
  - Availability of blood ordering schedule
  - Efficient system for transportation and storage of blood and blood products in the clinical setting
  - Availability of transfusion reaction report form
  - Availability of standard operating procedures for:
    - Ordering blood and blood products in routine and emergency situations
    - Issue of blood and blood products
    - Storage and transportation of blood and blood products
    - Administration of blood and blood products
    - Recording all transfusions in patient records
    - Monitoring the patient before, during and after transfusion
    - Management, investigation and recording of transfusion reactions
- 6 Compliance with national guidelines on the clinical use of blood**
- Number of transfusions given in accordance with national guidelines
  - Number of transfusions not given in accordance with national guidelines
  - Outcome of transfusions:
    - Acute complications of transfusion
    - Delayed complications of transfusion
    - Mortality



