



# Blood Safety and AIDS



**UNAIDS**  
point of view

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## Facts and Figures

- Eighty percent of the world's population live in developing countries, but developing countries use only 20% of the world's blood supply for transfusions.

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- The human immunodeficiency virus (HIV) which causes AIDS is easily transmitted through blood transfusions. In fact, the chances that someone who has received a transfusion with HIV-infected blood will himself or herself become infected are estimated at over 90%.

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- While millions of lives are saved each year through blood transfusions, in countries where a safe blood supply is not guaranteed, recipients of blood run an increased risk of infection with HIV.

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- Other diseases – such as hepatitis B, hepatitis C, syphilis, Chagas disease and malaria – can also easily be transmitted through blood transfusions.

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- Worldwide, up to 4 million blood donations a year are not tested for either HIV or hepatitis B. Very few donations are tested for hepatitis C.

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- Blood transfusions will always carry certain risks, but HIV transmission through blood transfusions can virtually always be prevented. One can do this by setting up and maintaining a safe blood supply, and by using the blood appropriately.

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- The difficulties hindering a safe blood supply include:
  - a lack of a national blood policy and plan, lack of an organized blood transfusion service, lack of safe donors, or the presence of unsafe donors; lack of blood screening; and the unnecessary or inappropriate use of blood. Blood screening means testing donated blood for the presence of disease-causing viruses, bacteria or other micro-organisms, or for the presence of antibodies produced against these agents. Shortages of funds, test kits and trained staff also hamper efforts to ensure a safe blood supply.

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- A safe blood supply can be only achieved if three essential elements are in place:
  - There must be a national blood transfusion service run on non-profit lines which is answerable to the ministry of health.
  - There must be a policy of excluding all paid or professional donors, but at the same time encouraging voluntary (non-paid) donors to come back regularly. People are suitable as donors only if they are considered to have a low risk of infection.
  - All donated blood must be screened for HIV, as well as for hepatitis B and syphilis (and hepatitis C, where possible). In addition, both doctors and patients must be aware that blood should be used only for necessary transfusions.

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- In many countries, regulations on blood donations, screening and transfusions exist but are not adhered to. It is important that regulations are established and rigorously enforced.

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## The benefits of transfusions – and the risks attached

The human immunodeficiency virus (HIV) is efficiently transmitted through blood transfusions. The probability of becoming infected through a transfusion of blood tainted with HIV is estimated at over 90%. (In contrast, risk through a single act of sexual intercourse ranges from a few percent to less than one percent.) And the dose of HIV in a single blood transfusion is so large that an adult infected in this way may quickly develop AIDS – on average within three to five years (two years in children).

Blood transfusions save millions of lives each year, but in places where a safe blood supply is not guaranteed, those receiving transfused blood have an increased risk of being infected with HIV.

Other diseases – such as hepatitis B, hepatitis C and syphilis – can be transmitted through transfusions. Blood transfusions can also transmit certain diseases found in tropical regions, including Chagas disease and malaria.

From whole blood, components that can be separated – such as red cells and plasma – are also widely used. Plasma products may be shared internationally, while whole blood and red cells, with a short shelf-life, are usually used nationally.

### Screening

The process of testing blood to see if it contains infectious agents capable of being

transmitted to those who receive the blood is known as screening. In the case of HIV, there are several types of tests.

The majority of these licensed tests detect the presence of antibodies to HIV, not the virus itself. Although “anti-HIV” tests, as they are known, are very sensitive, there is a “window” period. This is the period between the onset of infection with HIV and the appearance of detectable antibodies to the virus. In the case of the most sensitive anti-HIV tests currently recommended, the window period is about three weeks. This period may be longer if less sensitive tests are used. This means that if a unit of blood is donated by a donor within the first 21 days of becoming infected, his or her blood may give a false “negative” result.

Tests also exist that detect the virus itself; they are called HIV antigen tests. It is sometimes possible to detect HIV antigen during the window period if by coincidence the blood donor happens to be tested during the short peak of high levels of circulating virus particles. Although in theory the HIV antigen test can shorten the window period by an additional six days, its use is of limited value and there still remains a window of one to two weeks.

For example, out of over 6 million donated blood samples screened using HIV antigen tests in the United States of America, at an

estimated additional cost of at least US\$ 50 million, only a single HIV-infected sample was detected by the antigen test that was not also found by the ordinary anti-HIV test.

Several studies have shown that careful selection of low-risk donors is a more efficient way of minimizing the risk of transfusion-related infections than testing for HIV antigen. In addition, a well-functioning quality assurance programme will reduce the possibility of false-negative results resulting from technical errors. In most settings, HIV p24 antigen testing of the blood supply is not cost-effective and is not recommended by WHO.

“The cornerstone of a safe and adequate supply of blood and blood products is the recruitment, selection and retention of voluntary, non-remunerated donors. Recruiting donors is not safe, practical or cost-effective unless one ensures that they are from population groups with the lowest risk of infection. However, any information obtained during the recruitment and selection of donors is strictly confidential. It must never be used as a basis for stigmatization or discrimination in the community.”

*Dr Jean Emmanuel, Chief,  
Blood Safety Unit, World  
Health Organization*

## What are the problems in ensuring a "safe" blood supply?

### A lack of safe donors and the presence of unsafe ones

Donors can be divided into three types. The first is the paid or professional donor. There are very strong reasons why they should be prohibited. Paid donors very often come from the poorest sectors of society. They may be in poor health, undernourished and at risk of having infections that can be passed on through transfusions. In some places, paid donors sell blood mainly to buy drugs to inject themselves with. This practice – if they share needles and syringes that are not sterilized – is itself a high-risk activity for contracting HIV.

In addition, paid donors are likely to give blood more often than is recommended, with the result that their blood may become substandard – lacking in iron, for instance. This can be a considerable risk to the recipient. And through over-donating, donors are likely to damage their own health.

The practice of paying donors usually also goes together with the practice of selling blood to the recipients of transfusions. Under such a system, poor families may not be able to afford vitally-needed blood. And apart from everything else, having paid donors undermines the goal of having a voluntary, unpaid system. If unpaid donors

see others around them receiving money for giving blood, they too may want to be paid.

A second type of donor is the replacement donor – sometimes called "family replacement donor". In the replacement donor system, families of people needing a transfusion are asked to donate the same quantity as that given to their relation, and this blood may be used directly, where compatible, or else put into the general pool. For some years, WHO has strongly discouraged this type of arrangement. The "relations" giving the blood are often paid donors, and not related at all. Even if they are related, there are doubts about the safety of their blood – as the normal criteria for selecting or deferring donors cannot be applied. However, the use of such donors is common in many developing countries where there is a great shortage of blood. Developing countries utilize only an estimated 20% of the world's blood supply, but have 80% of its population.


In some countries, the replacement system – often started with well-meant intentions by the authorities – has become a serious problem. In Cambodia, for instance, the International Committee of the Red Cross (ICRC), who are responsible for overseeing the blood supply, take photos of people, claiming to be "relations", who attend

blood donation centres regularly. If they are seen too often, ICRC refuses to take their blood.

"Many countries have all the required regulations and legislation for a safe blood supply in place, but the laws are not enforced. It is urgent that we correct this situation. This can be achieved by whole-hearted political commitment. In many countries, prevalences of HIV and infections such as hepatitis B and C are increasing fast. In these places the blood supply will become even more unsafe than it may already be if the international recommendations for a safe blood supply are not followed."

*Dr Hiroshi Nakajima,  
Director-General,  
World Health Organization*

The third – and safest – type of blood donor is the voluntary, unpaid donor. Such donors give out of altruism, and are not under pressure to donate blood. On the whole, they are more likely to meet national criteria for low-risk donors. And they are also more likely to be willing to donate blood on a regular basis and at properly-spaced intervals – subject to donor selection and deferral techniques. This is very important in maintaining a sufficient stock of blood.



## *What are the problems in ensuring a “safe” blood supply?*

### **Lack of screening**

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This problem is easy to describe, but often very difficult to solve. In many parts of the world, correct screening of blood – for HIV and hepatitis B, as well as for other blood-carried diseases, such as hepatitis C – is still applied to some and not all blood donations. In many developing countries, blood is screened only in the capital city

and perhaps in one or two other large towns.

Lack of screening is most often the result of a lack of funding. It is expensive to set up a national system to test all donated blood. Good organization, planning and management are also required, and these are equally difficult to find. Trained staff at all levels are likely to be lacking, as are test kits to screen blood.

### **Unnecessary transfusions**

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Transfusions are not always necessary or appropriate. Unnecessary transfusions increase the risk of transmitting HIV, especially in places where there is not adequate screening of blood. Apart from that, they create an avoidable shortage in the blood supply. This encourages professional donors to become more active, reducing the safety of the supply.

## So how can we achieve a safe blood supply?

### **“Educate, motivate, recruit and retain” low-risk donors**

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WHO, together with the International Federation of Red Cross and Red Crescent Societies and the International Society of Blood Transfusion, strongly recommend that “the principle of voluntary, non-remunerated donations should be accepted and practised”.

Getting people to give blood for no remuneration – whether in money or something that can be exchanged for money – is difficult. It needs an effective and ongoing campaign to persuade large numbers of the public to give blood voluntarily, out of public spirit, and regularly – that is to say, *motivating* and *recruiting* them.

*Educating* people about what being a blood donor means is also important, so that prospective donors can self-select and self-defer. Self-selection means excluding themselves from giving blood if they know or think they may be infected. Self-deferral is putting off, perhaps only temporarily, blood donation if there are reasons to do so – because of a recent illness, perhaps.

When donors present themselves at blood donation centres, they need to be interviewed by trained staff, so that those who appear to have a high risk of being infected are excluded. *Selecting* donors is thus an important part of the process.

And *retaining* voluntary, non-remunerated blood donors in the system is a key step on the way to achieving a safe and sufficiently large blood supply.

Such an operation needs good guidelines and operating procedures. For instance, the confidentiality of the donors must be guaranteed. The staff who are going to recruit donors and to counsel and select them before taking their blood need themselves to be appointed and trained. Donors need educational materials about what it means to be a blood donor and about the transfusion system. And a good recording system for donors has to be set up.

### **Screen blood and blood products**

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It is essential that all countries move quickly towards screening all blood and blood products – and for all the main diseases that can spread through transfusions, including HIV. This involves using the most appropriate and effective tests and adhering to internationally-approved guidelines to ensure the quality and safety of blood. Often, more than one type of test is recommended for a particular disease. In the case of HIV, WHO has testing strategies to help countries decide how to screen blood.

A national screening programme presents considerable logistical problems, which can only be overcome through good

organization. Such problems include the distribution and storage of reagents and other materials used in testing blood, and storage of the blood itself. Donated blood, for instance, can be kept for a maximum of 35 days if special anticoagulants are used, but needs to be stored at a constant temperature of between +2 °C and +8 °C. And plasma – after being separated from whole blood – must be frozen within a few hours and kept at a temperature of –20 °C or lower. But while facilities may often exist in large cities, suitable refrigeration may not be available in rural or remoter areas – perhaps because electricity is lacking. Or it may be difficult to obtain or store materials used in blood screening, or anticoagulants.

### **Reduce unnecessary and inappropriate transfusions**

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Blood transfusions save many lives – but they should also be used with care. There is a risk of infection as well as of other adverse reactions from transfusions. And inappropriate transfusions waste precious blood that could be used elsewhere. Shortages of available blood encourage paid donors to appear – something that one definitely wants to avoid.

- *Doctors and other medical staff* should be educated to avoid prescribing inappropriate transfusions.

## *So how can we achieve a safe blood supply?*

- *Blood substitutes* should be used where appropriate. Simple alternatives to blood, such as crystalloids (that is, saline solution) or colloids, will not transmit infection and can be obtained at a fraction of the cost of whole blood.

- *The underlying reasons for blood transfusions* should be addressed. A condition for which blood transfusions are often given is chronic anaemia – a lack of red blood cells that carry oxygen to the tissues. Chronic anaemia can be caused by malnutrition, slow loss of blood, and infections such as malaria. If we attack the root causes of chronic anaemia we can reduce the condition itself. We can do this by improving nutrition and giving supplements; controlling malaria; and raising health standards generally in society. Another condition where blood is often needed is complications in childbirth. By ensuring proper care for women before and during delivery, we can again decrease the need for transfusions.

### **A national blood transfusion service**

A national blood transfusion service means making all

transfusion centres and blood banks part of a national network, accountable to the government or else to a government-appointed non-profit organization.

Having a national service makes all the other measures for ensuring safe blood much more possible. Such systems exist in some developed countries, and in several developing ones. It is no coincidence that in places with a good national service, the blood supply is considered safe. As an example from southern Africa, South Africa, Zimbabwe, Namibia and Zambia have national blood transfusion services, while most of their neighbours do not. The blood supply in these countries is regarded as safe.

The service must be developed within the framework of the country's health service and have an adequate budget and trained staff. For it to be successful, there has to be a national system of regulations. Regular independent monitoring of the blood transfusion service is highly important.

The charge for blood should be agreed in annual negotiations between the government and the blood transfusion service.

This is a recovery fee for the service provided, and covers items such as testing, staff salaries, other running costs and capital spending. However, the blood or blood product itself should be free for those receiving transfusions, or paid for by a health insurance scheme, for example.

One can never be 100% sure that blood is free of HIV. But with political commitment, good organization, sufficient funding, and donation of blood from low-risk, voluntary, non-remunerated donors, a national blood supply can be made so safe that the chances of becoming infected through a transfusion are extremely minute.

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### UNAIDS *Best Practice* materials

The Joint United Nations Programme on HIV/AIDS (UNAIDS) is preparing materials on subjects of relevance to HIV infection and AIDS, the causes and consequences of the epidemic, and best practices in AIDS prevention, care and support. A *Best Practice* Collection on any one subject typically includes a short publication for journalists and community leaders (Point of View); a technical summary of the issues, challenges and solutions (Technical Update); case studies from around the world (*Best Practice* Case Studies); a set of presentation graphics; and a listing of key materials (reports, articles, books, audiovisuals, etc.) on the subject. These documents are updated as necessary.

Technical Updates and Points of View are being published in English, French, Russian and Spanish. Single copies of *Best Practice* publications are available free from UNAIDS Information Centres. To find the closest one, visit UNAIDS on the Internet (<http://www.unaids.org>), contact UNAIDS by email ([unaids@unaids.org](mailto:unaids@unaids.org)) or telephone (+41 22 791 4651), or write to the UNAIDS Information Centre, 20 Avenue Appia, 1211 Geneva 27, Switzerland.

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1. Acquired immunodeficiency syndrome – transmission
2. Acquired immunodeficiency syndrome – prevention and control
3. Blood transfusion

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