Donor selection and management

1. Introduction

The purpose of a transfusion unit is to provide a service for the replacement of blood and its components to patients. The major objective is obviously to provide final products that conform to very high safety standards, and that the starting point are variable sources (donors) that themselves may be affected by genetic variability e.g. thalassaemia, G6PD deficiency and other factors such as different haemoglobin levels, smoking habits or exposure to chemical environments, carriers of normal code viruses, cancer immunoglobulin deficiencies and others.

Specific tests are used to detect and prevent illnesses from being transmitted. However some problems still arise, since there are many diseases that can be carried by blood. In the case of some illnesses, such as the common cold and other viral infections, specific tests for infection detection are not currently available. Even if cancer is not so easily transmitted through transfusions as yet there are no simple blood tests that have been developed for its initial screening. One must not forget that even though tests may be available for the detection of various infections, there is a window period during which the blood may be infected but this would not show up in the tests.

Both donor and recipient safety must be assured during blood transfusions. For this reason it is important that an on-going program for donor recruitment is maintained and that the general public is kept constantly informed and made aware of shortages in blood availability. This is done through appeals on the media, awareness programmes in schools, organizations and at places of work which at the same time convey information about requirements for persons to become blood donors.

2. Blood Safety and Quality Regulations

According to the EU directives on Blood Safety and Quality Regulations 2005, the public should be granted free access to information regarding blood products and their derivatives.
Imparting of this information should be in conjunction with other information about how the actual donation procedure is performed and, most importantly, information about the importance of blood donation, and the risks involved during the process. It must also be made clear to the donor that prior to the donation, one must attend for a medical interview, during which the doctor may decide against allowing the donation to proceed. This would be due either to resulting inherent risks to transfusion recipients’ health or detected risks to the donor’s own health. In both circumstances the donor has to be informed as to why the donation is not being allowed. An informed consent form is required to be signed by the donor, so as to authorise sensitive testing for infectious diseases to be performed on the blood donated. The donor must also be informed that should the blood test positive in any of these tests, it would have to be discarded and the donor informed accordingly. A donor encountering such circumstances would be listed with the deferrals. Procedures must ensure that the donor is made aware of the importance of providing information about any medical condition which might render the donation unsuitable for transfusion. In this regard the donor is given the option to decide not to proceed with the donation process without having to answer questions that could cause him embarrassment or discomfort. The donor must also be informed when the donation is not intended for transfusion requirements and the reasons why non-transfused donations might be discarded.

It must be made clear to the donor that all information submitted will not be disclosed, other than in accordance with the requirements of the said Regulations. On each visit the donor is encouraged to seek any further clarifications should he so requires.

3. Donor selection

McClelland et al. (1996) define donor selection as the procedure used to identify and to exclude donors who have a potential risk of transmitting an infection to the recipient of their blood, or who in turn may be harmed by donating.

Blood centres and transfusion services depend on voluntary donors to provide the blood necessary to meet the needs of the patients they serve. Donor selection is important not
only to exclude donors who are at a high risk of transmitting infected blood but also as a means of preventing harm to the donors themselves during the donation process.

To attract volunteer donors initially, and to encourage their continued participation, it is essential that environmental conditions of blood donation areas be as pleasant, safe and convenient as possible. The donor area should be attractive, well-lit, comfortably ventilated, and clean. Blood services must be provided at convenient hours for donors. Personnel should be friendly and understanding, as well as professional and well trained. Whether blood is collected at the blood centre or at mobile units, every effort should be made to make the donation process a safe and pleasant experience.

The personal information provided by the donor during registration must clearly identify him and if necessary, allow his subsequent notification or recall. Current information must be obtained and recorded for each donation. This data is then kept indefinitely. The following information would be required:

- Identity card number
- Date of donation
- Name
- Address
- Telephone
- Gender
- Age and / or date of birth (a donor must not be below 17 years, although there may be some exceptions)
- Details of any previous deferrals, if any.

Donor selection is important to ascertain that the potential donor is in good health, as to ensure that no harm occurs to the donor during or after the blood donation, and the patient receiving transfusion is protected from harmful transmission of disease or drugs.

It is essential that only healthy people with a sound medical history be considered eligible to donate blood. As it is not possible to perform a full medical and physical examination of the donor prior to the actual blood donation procedure, the suitability of donors must be determined by a qualified physician, or by other qualified persons.
working under his direction, through a simple examination and by asking a few questions related to the general health and lifestyle of the donor.

Volunteer donors come to the collection site because of their motivation to donate blood. Deferring or rejecting potential donors often leaves these persons with negative feelings about themselves and about the system. Donor deferral rates should therefore be closely monitored by the blood bank physician to ensure they fall within a reasonable range. Donors who are deferred have to be given a full explanation regarding their deferral and should be informed whether and when they may return.

3.1 Self-excluding questionnaire

Relevant information about the donor’s medical history and general health may be obtained through the completion of a pre-printed questionnaire.

On coming to the collection centre, donors are presented with a self-excluding questionnaire. They are required to go through all the questions carefully before they register to donate blood. If any question applies to the potential donor, he is free to leave without registering and having to answer any questions. Alternatively the donor may opt to register and to discuss any problems with the duty physician in utmost confidentiality. The questionnaire is signed by the donor and by the person who carries out the medical examination, thus certifying that the relevant questions have been asked. In the case that the donor is found unsuitable to donate blood, the doctor must explain clearly to the donor why it is not possible for him to donate. A highly confidential list of deferred donors is kept, which would serve to alert should the deferred donor try to donate blood on some subsequent occasion. However this procedure is not meant to prevent the donor from discussing the reasons of his previous deferral with the doctor on other occasions as in some cases, when the previous deferral problem has been overcome, the donor becomes eligible to donate blood and he would therefore be removed from the deferral list.

A possibility to be considered is that of sending the self-excluding questionnaire by post to the potential donors. The result would be better time management. On the one hand the donor would not waste his time to come to the blood bank if on going through the
questionnaire it is found that he would not be eligible to donate blood. On the other hand medical staff is left to focus on potential donors. In all situations it is essential for the public to be informed and aware of the great risk situation in which patients are placed if the donors do not strictly abide by the rules for safe blood donation.

As described by Orton et al. (2000) the use of the self-excluding questionnaire is a key factor in the donor selection procedure, however these questions are rarely evaluated for comprehension. It is therefore important for the questions to be as precise as possible, whilst at the same time adopting simple non technical words which the donor may more easily comprehend.

In a study conducted by Norris and Galea (2001) dealing with new methods for donor selection, a new questionnaire format was proposed using tick-boxes, enabling the donor to provide additional information, which may otherwise not have been collected. This new selection method was specially recommended to target deferred donors, particularly those which may be in the window period of viral transmission.

3.2 Medical examination

During the medical examination, some very specific questions will be needed to be asked ensure, to the greatest extent possible, that it is safe for the donor to donate and for the blood to be transfused. Questions are asked about issues such as the person’s motivation to donate blood and the presence of diseases or other illnesses in the family. Answers would need to be honest and must be kept in complete confidentiality.

It is routine practice to test each donation for viral diseases. This includes testing for the immunodeficiency virus (HIV), Hepatitis and syphilis. It is of utmost importance to immediately identify risk behaviour donors who donate blood for the motivation of being screened for such diseases. In a survey based on the risk behaviour among blood donors conducted by Stigum et al. (2001) at a specified blood bank, it was found that in that particular centre, the number of donors who donated blood to be HIV screened was higher than expected, even tough the majority of the donors did not have any identifiable HIV risks. In this regard it might be appropriate to specify on the self-excluding
questionnaire that one should not donate blood so as to be screened for viral diseases, even though at the end one has to depend on the sincerity of the donor.

To ascertain that all the appropriate questions are asked and that donors are imparted a consistent message uniform donor medical history questionnaires are used. A good amount of pertinent information can be obtained through the use of some general or leading questions that are phrased in simple terms that the donor can understand. Such questions fall into two categories: those questions which are used to protect the donor and those to protect the recipients.

During the medical examination the heart, lungs, lymph nodes, spleen and liver are examined. Urinalysis and temperature are also monitored.

Other examinations involve:

**Body weight**

A standard donation should not be collected from persons weighing less than 50 kg. The blood volume may be estimated from height and weight of the donor.

A standard blood donation is 450 ml ± 10% exclusive of anticoagulants. Not more than 13% of the estimated blood volume should be taken as whole blood during one blood donation.

**Age**

In most countries the minimum age of a blood donor is 18 years. However, where national legislation permits, the age of blood donors may be reduced to 17 years provided other conditions are met.

The maximum age for blood donors is 65 years. Bleeding donors beyond this age limit may be carried out at the discretion of the centre’s physician, as is the recruitment of any first-time donor above the age of 60.

**Inspection of donor’s appearance**
Special note would be taken of instances of plethora, poor physique, debilitation, under-nutrition, anaemia, jaundice, cyanosis, dyspnoea, mental instability, intoxication from alcohol or narcotic drugs. The skin at the venepuncture site should be free from lesions including local eczema.

**Pulse and blood pressure**

Pulse and blood pressure of donors are tested before each donation. The pulse should be regular and between 50 and 100 beats per minute. It is recognised that recording the blood pressure may be subject to several variables but as a guide the systolic blood pressure should not exceed 180 mm of mercury and the diastolic pressure 100 mm.

**Haemoglobin levels**

Haemoglobin levels are determined before each donation. This is carried out to prevent potential anaemic donors from placing themselves at risk during the actual donation process.

Haemoglobin levels are determined before each donation, unless substituted by the estimation of haematocrit (Hct).

Minimum values of haemoglobin before donation should be:

- Female donors: 125 g/l or 7.8 mmol/l (min. Hct = 0.38);
- Male donors: 135 g/l or 8.4 mmol/l (min. Hct = 0.4);

Individual donations with lower levels may be accepted by the responsible physician; or as established by a national control authority based on norms for this specific population.

Abnormally high and low values are further investigated as should also a fall in haemoglobin concentration of more than 20 g/litre between two successive donations.

Haemoglobin levels are determined by a simple test where a drop of blood obtained by a finger prick is analysed using an automated haemoglobin reader or manually using the
copper-sulphate specific gravity method. Lotfi et al. (2005) maintain that such testing has low reliability, unnecessarily prolongs the donation procedure, and is invasive. To this end Ziemann et al. (2006) suggest that it is considered safe to exclude pre phlebotomy haemoglobin testing on donors who have previous donation haemoglobin histories, which are above the recommended range, so long as the results of routine questioning and medical status are satisfactory.

3.3 Interval between donations

It is recommended that established donation rates are never exceeded under any circumstances. It is general recommended that donations should have an interval of at least three months for males and four months for females and should ordinarily not be exceeded. Donors who donate at shorter intervals should be accepted by a transfusion service only after careful consideration of the dietary habits of the populations concerned and in the knowledge that extra care may be necessary, beyond routine haemoglobin or haematocrit estimation, in the monitoring of donors for iron deficiency.

It is further recommended that an active donor pool be maintained, of sufficient size to allow donors to be bled less often than the established maximum rates thus affording the donors extra protection whilst giving the system flexibility to deal with large-scale emergency situations.

4. Donor management

There are three major aspects when dealing with blood donor management.

These are:

- educating the public to increase its awareness of the need for a constant blood supply;
- recruiting new healthy donors; and
- the return of regular donors after the donation interval.
The starting point to achieve such management is the setting up of a communication programme. To this end the World Health Organization (WHO) provides guidelines for the organization, collection of information, and plan development.

These include:

- Maintaining national blood donor programmes for the education, recruitment and retention of low-risk blood donors, including community-based voluntary blood donor organizations and youth programmes;
- Appointment of an officer responsible for the national blood donor programmes to include donor education, motivation, recruitment and retention;
- Training of donor recruitment and donor care staff in donor education, motivation, recruitment, selection and retention;
- Development of donor education and recruitment materials;
- Establishing guidelines and protocols for donor selection and deferral, donor confidentiality and donor care;
- Guidelines on the management of donor sessions and blood collection.

4.1 Donor education

McClellan et al. (1996) define donor education as making the donor aware of the individual characteristics that should lead a person to refrain from donating blood. To this end WHO suggests that low risk donors be identified and strategies developed to promote positive attitudes towards voluntary blood donation via educational and media campaigns in workplaces, communities and educational institutions.

4.2 Donor recruitment

WHO advocates the development of partnerships with non-governmental institutions, such as voluntary blood donor organizations, national service organizations and the media to assist in the recruitment of blood donors, especially in times when blood supply is critical.

4.2.1 Autologous blood donors
No matter how safe volunteer blood donors may be, the safest type of blood transfused is one’s own. As with all types of donation, potential autologous donors must be in satisfactory health conditions which will enable them to easily tolerate whole blood donations.

4.2.2 Directed blood donors

As the name implies, directed blood donations are especially reserved for specific people. This method of recruiting blood donors may be divided into two distinct categories.

The first method is that where the blood bank calls donors registered on its database as having specific blood groups that have been previously found to be compatible with patients carrying specific antibodies that may interfere with blood donated from other blood donations.

The other category of directed donations is when family and friends donate blood at request of the patient and the donor requests that this donation be specifically reserved for the requesting patient. This category of directed blood donations are not much encouraged. If for one reason or another the donor provides false or incorrect information during the pre-donation stage and is in fact infected by a transmittable disease which may not be detected during routine screening tests, the recipient patient will also become infected.

4.2.3 Paying for blood donors

One of the greatest controversies that have arisen over the past years is whether by paying blood donors the number of donations would increase. It is the aim of all blood banks to provide a continuous safe supply of blood for patients. It is has therefore been established that the safest blood is that provided by volunteer donors. To this end the European Commission (2001) concur that unpaid blood donations are to be encouraged. van der Poel et al. (2002) carried out a study which confirmed that utilizing blood from paid donors carries great risks. Even though paying blood donors is not an option to be promoted some Centres have opted to establish a sort of donor award program, where
the donor is granted an award as token of appreciation for the donation. However there has to be a significant limitation to such an approach if the donation is to continue to be considered as voluntary.

4.3 Donor retention

For a Blood Bank to operate efficiently it is essential that donors return to make further and regular blood donations. Considering that such donations are made on a voluntary basis the main factor that has to be addressed by the Management would be that of ensuring donor loyalty, namely that donors are happy to return for further donations.

For the promotion of such loyalty it is essential that information about the workings of the Blood Bank are constantly provided and updated and reach all donors as to maintain their interest in supporting the Centre. It is also important that the Blood Bank would clearly quantify its needs and targets.

Another factor which would need to be overcome to promote loyalty would be that of the related facelessness of the operation. On the one hand anonymity and privacy need to be maintained whilst on the other hand donors need to be made welcome by staff who have to provide somewhat personal care, attention and understanding of the respective donor.

It is also essential that the Blood Bank maintains a high level of repute to ensure a corresponding good standard of performance and thus to enjoy a significant level of public confidence.

4.4 Donor Deferrals

Donor deferrals are defined as those donors who for one reason or another are found to be unsuitable to donate blood. There are two distinct categories of donor deferrals, namely the temporarily deferred category, which disallows the donor from donating blood for periods ranging from one week to longer periods of two to three years. The other category covers permanently deferred donors, which rules out such persons from ever donating blood again.
The EU directives on Blood Safety and Quality Regulations 2005 have provided guiding criteria for the regulation of deferrals.

### 4.4.1 Temporary deferrals

Donors are temporally deferred in relation to the following specific issues:

1. **Infections** – In cases of serious infections deferrals range from 2 years in cases such as tuberculosis and rheumatic fever, to 1 year for syphilis and 6 months or less for toxoplasmosis, West Nile virus, fever and flu like illnesses. Special more stringent provisions apply in cases of donors who have lived in malarial areas or who have a history of malaria.

2. **Exposure to risk of acquiring a transfusion-transmissible infection** – Such deferrals are usually of six months and applicable in instances of major surgery, tattoo, body piercing, acupuncture by unqualified practitioners, close household contact with persons with hepatitis B, and behavioural exposure to risks of acquiring infectious diseases.

3. **Vaccination** – Donors vaccinated with attenuated viruses of bacteria vaccines are deferred for 4 weeks after vaccination. However there may be no deferral, so long as the donor is feeling well and there is no exposure, in cases of vaccination with inactivated/killed viruses, bacteria or rickettsiae, toxoids, hepatitis A or hepatitis B vaccines, rabies and tick-borne encephalitis vaccines.

4. **Other temporary deferrals** – Such deferrals are applied at the discretion of a physician after pregnancy, minor surgery and other instances of medication.

### 4.4.2 Permanent deferred donors

Donors are permanently deferred in instances of acute or chronic illness such as cardiovascular, bleeding tendencies, infectious diseases, and diabetes, subjection to xenotransplants, and instances of high risk sexual behaviour.
4.5 Communication

As with all management programmes, communication is a major key factor. In Blood Banking communication plays an even more important role and it is essential that qualified personnel are available to provide an appropriate customer care and support unit. WHO have provided guidelines for the training of such teams for these to be able to provide the donor with the necessary customer care and support. The donor should be able to direct any queries and complaints to such qualified persons and at the same time be able to seek and receive appropriate counselling at the Blood Bank facility, especially in the case of deferrals.

4.6 The establishment and upkeep of a database/register of donor records

There has been a considerable increase in the availability of laboratory tests for the screening of donated blood, due in part to the development of new diagnostic tests and also because of the development, availability and increased use of automated analyzers. Computerized laboratory information systems (LIS) have been developed to assist with the recording, management and delivery of the donor records. LIS track the progress of events, starting from the arrival of the donor at the Blood Bank and recording of the results of the initial medical examination, continuing through to the results of tests performed on the blood samples from the blood donation, utilization of the blood donation for the derivation of blood products and ending with appropriate recording of the final recipient.

Such LIS systems provide useful tools for the rapid screening of regular donors and for the rapid calling and recalling of these persons in instances of emergencies.

A crucial function of such information systems is their inherent security applications that are available to limit access to the system to only authorized individuals.

The first level of security determines that a person is allowed access to the information system, a user at this point should be required to have both a user code and an
individual password. The system should also require users to change their password periodically to optimize the security of the system.

A second level of security is implemented within the software application itself. At this level, users are allowed access only to those specific applications to which they have been granted authorized access by the Blood Bank administration. Once donors are registered and duly recorded in such a database the system allocates them distinct donor numbers. At each donation the LIS, through such donor number codes automatically runs checks on previously inserted data and results, without disclosing these to the inquiring user, and confirms or otherwise the eligibility of a donor to donate.

To maintain confidentiality, persons engaged on the testing of the samples and the distribution of the resulting blood products can only input their data into the system by referral to a system generated donation number. Naturally suitably authorized officers may have access to all information and records of donors as to enable their recall in the event that circumstances so require.

5 Conclusion

Blood Banks are committed to provide an adequate and constant supply of blood at the same time ensuring the safety of both donors and recipients.

To this end, over the past decades, great improvements have been made in this field. Technologically, screening tests and extensive automated procedures have been developed to provide a rapid and efficient evaluation of donations. At the same time efforts have been made to establish common criteria and standards amongst Blood Banks which regulate procedures for the recruitment of eligible donors.

Although, according to WHO, hundreds of thousands of persons are registered as blood donors worldwide, shortage of blood invariably remains a recurring occurrence of major concern. Increase in life expectancy is further contributing to the demand and consequent need for an increased availability of blood.
As matters stand today certain lifestyles unfortunately rule out the recruitment of many otherwise healthy potential donors. Donor selection has, and must remain, properly controlled and regulated to ensure both the donors’ and recipient patients’ safety. However as research continues, and technological advances permit, in the future adjustments could result in donor recruitment and changed criteria for deferrals so as to increase blood availability.

Increased and improved public awareness programmes would undoubtedly serve to help increase blood availability. Unfortunately, since blood is generally in short supply, such campaigns have become part of everyday life and therefore are not having the desired effect on the public. Good donor management by Blood Bankers shall ensure that donors are perceived as providing a service and that consequently donors are appreciated and welcomed. Appropriate ongoing forward planning of educational programmes for donor recruitment and donor care will contribute to an increased public awareness of the importance of donating blood.

References
