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Editorial

Donors and donation of whole blood, blood components, tissues and solid organs are the themes of this edition of *Blood Matters*. This diversity reflects the breadth of specialist areas now encompassed within the NHSBT portfolio. Whilst donated materials vary considerably, the principles governing recruitment of donors and their appropriate selection and testing strategies have much in common.

The donor is central to the existence of transplantation services and to the safe, sufficient and timely supply of blood components which clinicians and patients have come to expect in support of increasingly sophisticated treatment regimes. It is the stated aim of the International Society for Blood Transfusion that donors should be voluntary and unpaid and this has been the basis of the relationship between donors and the UK Blood Services from their earliest beginnings shortly after World War 2. In the absence of any significant financial or other reward, donors' main motivation is altruism and concern for others. It is therefore of great importance that we do not abuse this unselfish generosity and that we respect donors' wishes and, where appropriate, those of their relatives. We must also continue to be mindful that donation, though generally safe for donors, is not without risk. Data presented in this edition indicate that approximately 8 blood donors (1:5000 attendances) each week require medical advice or treatment outside the NBS for complications directly related to donation. Although the majority of these are relatively minor in clinical terms, and a full and speedy recovery is the norm, they can be frightening for the donor e.g. a delayed faint or extensive, painful bruising and a minority of more serious injuries do lead to prolonged symptoms and/or incapacity and time off work.

Suitable donors who meet the specification for a particular component are often very scarce e.g. rare red cell or platelet phenotypes. For short shelf life components e.g. platelet hyperconcentrates for intra-uterine transfusion, the timing of donation is critical. For these highly specialised components, the donor must also be prepared to donate by apheresis. Moreover, if the treatment is to be repeated, this may sometimes rely on only 1 or 2 donors who not only meet the specification but are also willing to donate at times and frequencies sometimes inconvenient to themselves.

An increasingly important challenge is responding to the inexorable decline in the number of blood donors. Despite increased marketing and recruitment efforts the NBS donor base has fallen by 20 percent (from 1.79 million to 1.41 million) over the last 5 years and 6 percent in the last 12 months. This is in part explained by social trends away from a focus on the family and community which was prevalent in the post war years when the UK Blood Services were established. Equally important is that blood collection programmes, which met the needs of earlier generations of donors, no longer meet the changed and more demanding requirements imposed by hectic, modern lifestyles. Opportunities for each individual to donate, at a time and venue convenient to their personal schedule, are far from ideal. To address this, the NBS is embarking on an ambitious programme of radically restructuring the blood collection services to provide smaller, more frequent, local sessions with extended opening hours. A flexible appointment system has been developed and is currently being implemented as a priority to facilitate this.

Another initiative is to explore the practicality and donor acceptability of collecting finished blood components at the bedside, using portable automated apheresis machines at routine, local sessions. Trials are underway in selected areas and preliminary results are encouraging. Either one adult therapeutic dose of platelets plus one unit of red cells, or two units of red cells can be collected in one procedure. The initial driver was the Department of Health's instruction to increase the proportion of platelets sourced by apheresis, in order to reduce the risk of vCJD (reduced donor exposure). There are similar potential benefits for recipients, if both red cell units sourced from one donor can be targeted to transfusion dependent patients. Evidence is accumulating that another significant benefit of this technology is its attraction for donors, particularly the young, and this may aid their recruitment and retention. The possibility of donating two red cell units at one sitting is also attractive for donors who attend infrequently, though the minimum weight limit (70Kg) means that it is mainly available to men and the interval between donation is longer than normal to compensate for the increased iron loss.

Donor selection criteria in the UK are the same, irrespective of the type of donation (blood component, organ, tissue), unless there is good scientific, medical or practical reason for them to differ. In recent years safety initiatives have continually added more stringent exclusions e.g. permanent deferral of previously transfused donors. More people travel regularly outside Europe and are therefore subject to temporary deferral appropriate to the infection(s) to which they may have been exposed e.g. malaria, *T.cruzi*, West Nile Virus. As a result, fewer potential donors are now eligible to donate and a higher proportion of volunteers are temporarily deferred. In 2006/07 12 percent of attendees at our blood donor sessions were deferred. It is well known that this has a negative effect on these individuals who are less likely to return compared with those who successfully donate.

Many of the blood donor selection criteria are specified in the EU Blood Directive and are now written into UK legislation in the Blood Safety and Quality Regulations (2005). These tend to be cautious both in respect of donors' health and recipient safety. This may have been laudable when there was an excess of volunteers, but in the current climate it is recognised that they need critical review and analysis as part of the wider blood safety versus sufficiency debate. The new legal status of these criteria adds further complexity to any proposals to relax them.

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There is a huge amount of resource devoted to ensuring that adequate numbers of suitable donors are available. A common theme is the increased efforts now required to recruit donors of all types. One example, given in this edition, highlights the range of NBS activities involved in the sustained initiative to encourage donors from ethnic minorities to donate blood and bone marrow. Another is the description from NHSBT Tissue Services of the innovative, dedicated donation facility in Liverpool for the retrieval of post-mortem tissues. This, with successful local strategies to ensure that deaths in hospital are routinely notified to the Tissue Coordinators, has been extremely effective in increasing donation rates. Similarly, the role of local donor transplant co-ordinators in the procurement of solid organs has been facilitated and improved by national co-ordination provided from UK Transplant.

It behoves us all, whether we collect donations or 'prescribe' their use for patients, to champion, respect and be advocates for the donors whose precious gifts are the essential part of much medical practice as we know it today. We live in changing times where a reliable and sufficient supply of blood donations may not be assured. We cannot be complacent and assume that enough suitable donors will volunteer unless we continue, together, both to strive to meet their needs and to ensure the appropriate use of their altruistic donations. You will find more details on these linked themes in papers on the following pages and I extend my grateful thanks to all the contributors.

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Respect for Donor Autonomy

Respect for autonomy is the first of four ethical principles laid down by Beauchamp and Childress, to guide moral decision making in healthcare[1]. The other principles are beneficence, non-maleficence and justice. Autonomy, which literally means self-governance, is defined as a personal rule of the self that is free from both controlling influences of others and from personal limitations that prevent meaningful choice, such as inadequate understanding. The autonomous individual freely acts in accordance with a self-chosen plan. Autonomy is central in bioethical discourse and ought to be respected, in so far as such respect is compatible with respect for the autonomy of others[2]. Coercion is the process of directing an autonomous individual to act against their wishes to meet some external interests. Paternalism on the other hand, is directing individuals to pursue what is felt to be in their best interest. Infringement of autonomy in healthcare is mainly exerted by misinformation, withholding of information, or by restricting, or not offering choices.

Constrains unduly imposed on autonomous individuals may raise concerns in most situations that involve interaction with healthcare professionals. However, one may argue that this is unlikely to be the case in a voluntary unpaid blood donation in a developed country such as the UK. Blood donors have put themselves forward for the procedure. They are in a good health, in control of their decisions and able to defend their autonomy. The process of blood donation is relatively simple, quick and carries fewer risks than therapeutic manoeuvres. This stands in contrast with patients seeking treatment. Such patients, being desperate for medical expertise to alleviate their illness, may be subjected to variable degrees of paternalism.

These views, however, ignore the complexity of blood donation and the sophisticated relationship between blood donors and collection services. The process of collecting blood for transfusion constitutes an ethically unique situation that requires further moral analysis. There are several factors that may explain this special interaction.

Firstly, deciding acceptable levels of inconveniences, or risks to blood donors is problematic. A patient may undergo a major surgical operation, only if the operation's benefits outweigh risks and inconveniences to this particular patient. In the case of blood donation, there is inherent difficulty in assessing acceptable levels of inconvenience to one person, against possible benefits to another person.

Secondly, blood component donation can be demanding. For example, collection of blood cells or plasma using cell separator machines takes a longer time than whole blood donation, and involves other types of inconveniences such as exposure to citrate and/or starch and the likelihood of donors being called more frequently to donate. Blood services ensure that donors, who agree to take a further step and move form being whole blood donors to be component donors, are adequately informed. Administration of cytokines, such as colony stimulating factor (G-CSF) to facilitate granulocyte collection is not currently performed on blood donors, due to the uncertainty about its long-term side-effects. Although this cytokine is commonly prescribed to treat patients, its use in a donor setting is prohibited in blood component donors at the present time. Provision of meaningful information to blood donors, to ensure autonomous decision, requires special considerations and is not necessarily comparable with informing patients undergoing therapeutic procedures.

Thirdly, modern blood services enter an implicit contract with donors. This allows communicating some patients' needs to donors at the time of an emergency. Donors may be contacted specifically to provide special donations to patients with rare blood groups or other specific needs. The process of donation is not usually a one-off procedure. Arrangements need to be in place to ensure donors' autonomy is maintained at all times and that donors do not exceed the limits they set for themselves.

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Fourthly, individuals may be subjected to direct or indirect coercive forces from a third party, such as peer pressure in a university campus, or from other members of the public, who believe that there is a moral obligation to donate blood. This phenomenon may be exacerbated at times of blood shortages when blood services call for more attendance to donor sessions.

Finally, seeking efficiency, blood services may adopt modern communication methods such as inviting donors to sessions by e-mails, by recorded messages or asking donors to book appointments by visiting a web site. Implementation of such means ought to be achieved without any hindrance to the flow of information from professionals, or the ability of donors to ask questions. It should not impose undue pressure on donors and it should take into consideration preference of some donors to communicate directly with an expert.

In summary, blood donation is a healthcare process that is largely governed by the general principles of healthcare ethics. On the other hand, blood donation has fundamental differences from familiar therapeutic procedures. Consideration to blood donation practicalities is required to ensure that donor moral needs, such as respect to their autonomy, are met.

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The Donor Selection Guidelines

The donor selection criteria are set by all blood services in order to maintain a safe and adequate blood supply for patients, and also to avoid any harm to donors. Whenever possible these criteria should be evidence based and new criteria considered carefully so that any reduction of risk to recipients is not offset by excessive impact on donors. The Donor Selection Guidelines (DSG)[1] form a part of the Guidelines for the Blood Transfusion Services in the United Kingdom[2]. The DSG and Donor Selection Criteria are regularly reviewed by a Standing Advisory Committee, which is a subcommittee of the Joint Professional Advisory Committee (JPAC), an UK wide organisation which approves all the standards and guidelines for the 4 UK Blood Services. They were first compiled in the early 1990's. At that time each of the Regional Blood Transfusion Centres in England and Wales, and also in Scotland and Northern Ireland, worked to their own local donor selection guidelines and so the introduction of National Guidelines was one of the first steps towards a more consistent and unified Service. In November 2005, the EU Blood Directive was incorporated into UK law in the Blood Safety and Quality Regulations (2005). As a result, many donor selection criteria became legal requirements for the first time.

Who Can Donate Blood?

Donors should be fit and in good health. The minimum weight for whole blood donation is 50kgs (7st 12lbs), because no donor should lose more than 13 percent of their blood volume when donating, in order to protect them from side effects such as fainting or becoming anaemic. There is no upper weight limit but care has to be taken not to overestimate the blood volume of obese individuals because fat contains less blood in proportion to its weight than muscle.

Age limits for blood donation are from 17, which takes account of the legal age for consent, to an upper limit of 60 for a first time whole blood donor. The age limit for regular donation was extended in 1998 from 65 to 70. Even after 9 years experience of this age limit, there is little evidence that adverse events related to donation are any more frequent in older donors. However, with advancing age, there is an increase in prevalence of asymptomatic cardiovascular disease, so there is slightly increased risk that a donor might suffer a heart attack or stroke coincidentally during or shortly after giving blood.

People with high blood pressure may be accepted if on treatment with diuretics and/or beta-blocking drugs, but currently not if on ACE inhibitors or other therapies which work by vasodilatation and may block the normal vasomotor response to donation and so that a person is more likely to faint.

Donors are asked if they are taking any medicine or tablets, whether prescribed or on self-medication. The underlying illness is usually more important than the drug itself in determining eligibility to donate. In general, traces of drugs in donated blood are not considered harmful to recipients. Deferral, however, is advised with certain drugs used to treat acne, psoriasis, and prostatic problems where the potential risk to recipients is considered significant, e.g. teratogenesis.

The minimum levels of haemoglobin required for acceptance are 135g/L for men, and 125g/L for women. This is mandated in the Blood Safety and Quality Regulations 2005, with higher standards of measurement in the interests of quality and consistency of blood and also donor health.

Why Some People Cannot Donate Blood

Firstly, donors have to be selected to make sure that they do not come to harm from donation, and secondly, to ensure that components made from their donation are unlikely to harm any recipient.

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1. DONOR SAFETY

Even if in good health, individuals should not be accepted if they fail to meet any of the above limits for age, weight or haemoglobin level.

Cardiovascular disease is a contraindication to donation, because individuals are unlikely to be fit enough for safe removal of a large volume of blood. Donation should not be accepted from anyone who has been advised to take prophylactic antibiotics for prevention of bacterial endocarditis, because accidental entry of skin flora to a donor's circulation cannot be fully prevented by proven methods for skin cleansing. Individuals who have had correction of congenital cardiac abnormalities with no residual disability and do not require antibiotic cover, may be able to donate safely.

Donors on a surgical waiting list should be deferred to avoid any risk of anaemia or reduced iron stores if surgery is likely to result in significant blood loss, and also to minimise the need for transfusion, which would prevent them from continuing as a donor when they have recovered. Some donors awaiting medical or surgical treatment may have to be permanently excluded depending on the underlying condition.

2. RECIPIENT SAFETY

It is considered safer not to accept blood from people who have had a malignancy, because some malignancies may be caused by bloodborne viruses, and metastases are known to be carried through the circulation. Exceptions are made for basal cell carcinoma, which does not spread through the blood and for cervical carcinoma in situ which, by definition, has not spread beyond the cervix.

In autoimmune diseases, such as systemic lupus erythematosus, diabetes mellitus and some thyroid disorders, the transfusion of autoimmune antibodies or immune cells in blood or tissues could lead to similar damage in the recipient. Acceptance may be possible if the donor has not needed immunosuppressive or other treatment in the previous 12 months.

Chronic infections including those blood borne infections for which blood donors are routinely screened, are usually grounds for permanent exclusion. Donors whose lifestyle activities are associated with increased risk of infection with HIV or hepatitis are deferred temporarily or permanently. Donors are briefly deferred following acute infections and vaccination (with live vaccines) and for up to 12 months after tattoos, acupuncture or other skin piercing.

Also to comply with the Blood Safety and Quality Regulations (2005) we ask people not to donate for 6 months after examination or treatment using a flexible endoscope. This is because flexible endoscopes can be difficult to disinfect and sterilise, and there have been cases where infection has been transmitted after procedures involving this type of instrument. If examination was carried out with a rigid endoscope, a donor can be accepted if well and not awaiting any further tests or results.

Since April 2004, donors have been permanently deferred if they have received blood or blood components at any time since January 1980 as a precaution against transmission of variant CJD. Since 2003 evidence has accumulated that variant CJD infection has been transmitted by transfusion from four donors who subsequently developed vCJD and may have been carriers at the time of the implicated donation. As a precaution against sporadic CJD we continue to exclude donors with a family history of CJD, or those who have received pituitary hormone of human origin before 1985 or dura mater grafts before August 1992.

Reflecting the ever-increasing popularity of foreign travel, and awareness of newly identified infections, the Donor Selection Guidelines are now supplemented by a Geographical Disease Risk Index which lists more than 800 countries world-wide according to relative risk for malaria, T.cruzi, West Nile virus and Chikungunya virus. Donors whose travel history puts them at risk of infection are deferred for appropriate periods. If suitable blood tests are available, the deferral periods can be reduced. Donors are encouraged to check the NBS website or contact the Helpline for advice following or preferably before foreign travel, to save themselves a wasted journey to a blood donor session.

Whenever necessary the Guidelines are updated according to the latest medical and scientific information and the Selection Criteria are updated if there are any policy changes. One example in which the benefits of risk reduction to recipients had to be balanced against loss of donations was the decision to permanently exclude recipients of blood components as a precaution against the risk of transfusion transmission of variant CJD. This is estimated to have reduced the Donor base by at least 6 percent. So far, this has been compensated by a significant reduction in red cell use over the last few years. However, the Donor base is continuing to fall and so the National Blood Service has commenced a comprehensive review and reorganisation of all aspects of Donor Services, and serious consideration is being given to relaxing some of the more stringent donor selection criteria.

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OneBlood – Targeting BME Donors

In 2003/04 the NBS commissioned the Central Office of Information (COI) to assist in developing a long-term strategy to attract more people from Black and Minority Ethnic (BME) communities to give blood and join the British Bone Marrow Register (BBMR). Some strategic development research was commissioned among ethnic minorities (Asian, Black and Chinese) to explore:

- attitudes towards giving blood
- barriers to donating blood
- drivers that would encourage blood donation
- preferred communication channels

Overall, the findings showed that people from ethnic minorities generally consider blood donation to be a good thing to do. Few are opposed to it in principle. Most can see that blood donation has a number of benefits, including saving patients' lives and making the donor feel good about themselves. Blood donation was more favourably regarded than bone marrow or organ donation, the benefits of which were less evident to respondents.

Having said this, it was also clear that donation is not part of UK ethnic minority culture – it was seen as 'something which white people do'. As a result, respondents were not very aware of the issues or procedures involved and they were unlikely to have thought about donation or discussed it with others. They did not usually know anyone who was a regular donor and did not want to risk the disapproval of their family, friends or the wider community by becoming a donor. There were also important trust issues to be overcome, as people were frightened of the possible health risks and some were suspicious of how their donated blood would be used.

Some spiritual and religious barriers were also apparent, particularly among the Muslim and Chinese communities. Some Muslim respondents perceived that donation is against Islam, while others were unsure. Among the Chinese community, the older respondents reported that donation clashes with their traditional belief in ancestor worship i.e. they believe they belong to their ancestors, so it would be disrespectful to give a part of themselves away, including their blood or bone marrow.

Contrary to what might have been expected at the outset, the research suggests that younger people (aged 18-24) are less likely to consider donating than those aged 25-40. Added to this, younger people in general were deterred by the questions on the donor health check form, the rationale for which they did not fully understand and which they felt were unnecessarily intrusive.

In order to address these barriers, the OneBlood campaign was launched in September 2004 with the aim of:

- raising awareness of the importance and relevance of blood donation
- encouraging individual and community ownership of the issue
- tackling religious objections and myths
- encouraging blood donation

Nationally, campaign activity has included:

- A series of four short films that were produced to launch the campaign. These were screened on Channel 4's The Slot after the evening news.
- Ten celebrities from BME groups participated in a photo shoot for the "Are you my Type" advertising campaign.
- PR activities have been created such as "The Circle of Life", where celebrities from BME groups were encouraged to illustrate what blood donation meant to them and their communities.
- The NBS sponsored the 2005 and 2006 ACLT (African Caribbean Leukaemia Trust) "Gift of Life" Ball, showcasing the blood and bone marrow issue to opinion formers within this BME community.
- Asian Community Football Cup – three-day tournament with teams attending from around the country. The NBS presented the Top Scorer trophy. The NBS logo was featured on the London Tigers (last year's winners) team kit and on all promotional materials.

As well as radio and press advertising, the above activities generated significant media interest including coverage on GMTV, London Today (lunchtime), London Tonight, BBC 1Xtra and BlackBritain.

Although all regions participate in the OneBlood initiative, the campaign strategy involves a particular focus on an extensive targeted outreach programme in London and the West Midlands (the highest ethnic minority populations in the UK), building partnerships between community/faith organisations and NBS regional offices at a local level. This is the most effective way to reach these audiences as building trust and long-term relationships is critical, especially when communicating with an audience that is very cynical about Government, and education is required. It is also a good way to tackle issues such as the malaria zone and some of the questions in the donor health check form that cannot be sufficiently addressed in an advertising campaign.

It's worth noting that a lot of this type of work is at a grassroots level, involving face to face communication. Therefore this may be invisible to the wider population unless it is publicised in the mainstream media.

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Ethnicity	2001/02	2002/03	2003/04	2004/05	2005/06
White	98.9%	98.6%	98.2%	97.9%	97.7%
Mixed	0.37%	0.45%	0.53%	0.59%	0.63%
Asian	0.32%	0.50%	0.70%	0.86%	0.94%
Black	0.26%	0.30%	0.36%	0.37%	0.41%
Chinese	0.07%	0.10%	0.14%	0.16%	0.17%
Other	0.07%	0.09%	0.11%	0.13%	0.17%

To date, the NBS has formed partnerships with more than 20 groups including Black Police Associations in the North West and Merseyside, Hindu Centres in Ilford and Cambridge and the Bangladeshi Islamic Centre in East London. NBS donor recruitment teams have attended more than 24 events including the National Mega Mela in Birmingham, Greenford Carnival and the RISE Festival in London. Blood donor sessions arranged with support and publicity in local communities have also been held and are continuing in many areas including Bradford, Bristol and Birmingham.

The table above shows the growth in the proportion of donors donating from BME communities, resulting from the above activity.

The OneBlood campaign is definitely empowering NBS staff who may not be familiar with the various cultural nuances, sowing the seed for a longer-term benefit - partnership approach with community organisations, raising awareness and challenging some of the prevailing attitudes and perceptions. The organisation remains committed to continuing with this approach in the future.

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Clinical and Operational Aspects of Component Donation in the Mobile Environment

The factors driving expansion of component donation using cell separators include improved safety, in particular minimising the risk of transmission of vCJD, by collection of an increased percentage of platelet units from single donors to reduce donor exposures. Additionally, collection of Double Red Cells (DRC) can maximise donors' contributions at a time when red cell collection is challenged by falling donor attendance coupled with increasingly stringent selection criteria which affect donor eligibility. Moreover, research has shown that the quality of DRC is excellent in terms of uniformity of haemoglobin content. Recipients of regular red cell transfusions, e.g. patients with thalassaemia, benefit both from product uniformity and also reduced donor exposure since they receive two units from a single donor.

The NBS is currently conducting trials of component collection using cell separators in the mobile environment. Studies by the Huntingdon and Leicester teams are evaluating two forms of mobile component donation – '1+1' (1 unit of platelets and 1 unit of red cells) and DRC.

Currently, 97 percent of donors donate whole blood, largely because Component Donation has until now been carried out in static clinics. With machines now specifically developed for use in the mobile environment, this trial has been set up to assess whether donors would be willing to donate in this way and to provide information on product quality and donor safety.

1+1 donations were collected using the Haemonetics MCS+ machine. Regularly attending male donors were identified from local panels and sent an invitation letter and information leaflet. The majority who were eligible agreed to try the new procedure and attended an initial appointment for assessment and platelet count. Suitable donors meeting the guidelines for platelet donation were accepted with a minimum platelet count of $150x10^9$/L.

1+1 donation was successfully implemented from the start with both donors and staff highly motivated. The donation proved highly popular with donors although the donation procedure was much longer than anticipated, with times of up to 95 minutes. However, by selecting donors with a minimum platelet count of $200x10^9$/L, donation time can be reduced to an average of 75 minutes. Concern about the lack of an on the day platelet count is offset by a safety feature within the machine that will notify staff if few platelets are present. Where this happens, a sample is taken from the donor and sent to the Testing Laboratory for urgent analysis and follow up.

DRC were collected on Baxter Alyx and Haemonetics MCS+ machines. Again, the majority of eligible donors approached agreed to donate this way. The average donation time was 35 minutes.

Donor adverse events for both '1+1' and DRC have remained in the same order as those reported within Static Component Donation sites and no Serious Adverse Events of Donation have been reported.

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Feedback from these donors has been encouraging - they particularly like the idea that they are able to donate more at every visit and have accepted the longer donation time. Most donors who have given either DRC or 1+1 donations have already made an appointment for their next donation.

Preliminary results from the trials show that DRC provides a consistent product, 100 percent within specification for volume, Hb and haematocrit according to the Guidelines for the Blood Transfusion Services in the UK 2005[1]. The haemoglobin levels are very good with a narrow range. The mean Hb is equal to 56.2g (range 48.9–62.4g, *n* = 88) compared with a mean Hb of 59.6g (range 45.2-76.6g, *n* = 265) from whole blood donation (Harrison 2006[2]). However, there are some problems relating to the efficiency of leucodepletion which are being investigated.

The '1+1' red cell product is consistent in quality, though with a lower mean Hb at 49.9g (range 33.0-55.9g, *n* = 479). The quality of the platelets is comparable with those collected at static sites. Of the 510 platelet units tested, 89.8 percent were within specification for platelet yield and 99.6 percent for volume. However, 3.5 percent of units failed to leucodeplete which, together with the lower Hb level of the red cells is again being investigated.

In summary, DRC are of high quality, easy to collect and popular with donors and staff. It is likely that DRC collection will increase in the future in order to maximise each donor's contribution against the background of falling donor attendance, whilst the consistency of the product confers maximum benefit to the recipient and can decrease donor exposure in multi-transfused patients provided that the two units are given to the same patient.

'1+1' has been less successful in view of the long donation time and low haemoglobin content of the red cells. A further drawback is the inability of 1+1 to reconcile the need to maximise collection of the 'universal' red cell group O with collection of the 'universal' platelet Group A. An efficient response to increased demand for Group O red cells and Group A platelets will not easily be achieved by this form of collection.

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Adverse Events of Blood Donation

Background

As a part of risk management and clinical governance, the NBS records and manages all donor clinical risks, which arise as a consequence of donating blood. A single recording system for the management of adverse events of blood donation arising during and after donation has been in place since April 2003. As yet there are no agreed international definitions or processes for donor adverse events.

Adverse events occurring at session are documented on the Donor Health Check (DHC). The DHC is the document used at blood donor sessions which contains the donor's donation record, consent for donation and the health check questionnaire that the donor has to complete at each attendance. Post donation events are reported by the donor via the NBS National Contact Centre (donor helpline). All adverse events are recorded in PULSE (NBS computerised donor database) and managed according to national protocols.

Donor Adverse Events

From 2.3 million attendances during April 2006 to March 2007, a total of 30,993 donors experienced a vasovagal event ranging from grade 1 (no loss of consciousness) to grade 3 (loss of consciousness and complications), an incidence of 1.3 /100 attendees. During the same period the following venepuncture related problems were recorded:

90	arterial punctures (1: 28,000)
236	direct nerve injury (1: 9,700)
1,525	bruise/haematoma of all grades (1: 1,500).

Serious Adverse Events of Donation (SAEDs)

A serious adverse event of donation is an adverse event resulting in treatment by or referral to a non-NBS clinical professional. All SAEDs occurring at blood donor sessions are immediately reported by phone to the local donor services medical officer during working hours and the on-call duty medical officer out of hours.

Information relating to SAEDs received from the collection teams and directly from the donor are reviewed by the centre medical officer who will ensure immediate clinical care has been given, follow up the donor and log the event on the NBS Management Software System (Q- PULSE). This is a windows-based application for managing quality assurance issues.

Categories of SAED

1. **Vasovagal I** - This includes all grades of immediate and delayed vasovagal events, like feeling faint, loss of consciousness, which may

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warrant referral to A&E but not admission to hospital.

2. **Vasovagal II** - This includes all grades of immediate and delayed vasovagal events, like feeling faint, loss of consciousness, which results in the donor sustaining a fracture, head injury, or vehicle accident and admission to hospital.

3. **Needle injury to vein** – These are usually uncomplicated haematomas or haematomas complicated by either neurological symptoms, infection/inflammation e.g. thrombophlebitis/ phlebitis, or thrombosis.

4. **Needle injury to artery** - This includes arterial puncture and complications of arterial puncture: brachial artery pseudo-aneurysm, AV fistula or compartment syndrome.

5. **Needle injury to nerve** - This is direct needle injury (recognised because the symptoms occurred immediately during venepuncture) with residual neurological symptoms.

6. **Other Clinical Adverse Events** - Includes events directly related to (a) donation of whole blood but not covered by the other categories e.g. allergic reactions, anaphylaxis, feeling unwell but not vasovagal and (b) apheresis component donation e.g. anaphylaxis, haemolysis, loss of red cells.

7. **Co-incidental Clinical Adverse Events** - Includes medical emergencies which occur after donation e.g. angina, myocardial infarction, stroke and which may not be related to donation.

8. **Needlestick or splash contamination** - These are rare but potentially serious adverse events, which are recorded irrespective of whether NBS or non-NBS clinical professionals are involved.

RESULTS

SAEDs – April 2006 to March 2007	
Vasovagal I	156
Vasovagal II	51
Needle injury to vein	85
Needle injury to artery	10
Needle injury to nerve	31
Other Clinical Adverse Events	23
Coincidental Clinical Adverse Events	29
Needlestick/splash Contamination	03
Total	388
(Incidence of 16.8 / 100,000 attendees)	

Type of Referral

Seen by GP / Nurse	155 (42%)
Seen in A&E / Hospital	166 (45%)
Treated by Paramedics	49 (13%)

Life threatening, disabling or incapacitating donor adverse events are escalated for urgent national action.

Management of SAEDs

Where appropriate, corrective action reports are issued to the collection teams for investigation and resolution of the cause of the event. Local review of all SAEDs are conducted through the Regional Donor Services Clinical Teams. Immediate assessment of the organisational risk of escalated SAEDs is made at a national level and action taken.

Conclusion

Since the early years of organised blood collection, common and uncommon donor reactions that result from blood donation have been recognised. Most reactions are minor, but some donors go on to experience more serious reactions, which require medical care from outside the NBS. The NBS has a well-defined system for the identification, recording and follow-up of all adverse events of blood donation. There have been no donor deaths reported in the U.K. since 2001. At present we have no figures from other blood services to compare our incidence of serious adverse events of blood donation.

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Potential Uses for Double Red Cells

An accompanying article in this issue of *Blood Matters* explains the NBS plans to expand component donation, including double red cells (DRC). Whilst donors and blood services may appreciate these new methods of donation, patients can also benefit from DRC. In addition to their role in securing an adequate blood supply, the main benefits of DRC are:

1. Reduced donor exposure. A typical transfusion dependent adult patient may receive four red cell units every month. The transfusion of two pairs of DRC would allow donor exposure rates to be halved with a consequent reduction in the risk of transfusion transmitted infection, including those infections that are currently tested and new and evolving infections that are not (e.g. vCJD). This approach can be combined with other blood safety initiatives the NBS is considering (e.g. prion reduction filters, pathogen inactivation, additional donation testing).

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The presence of red cell alloantibodies can prolong the investigation of patient samples by hospital transfusion laboratories and delay the release of compatible blood for transfusion. Several studies of transfusion dependent patients have shown rates of antibody formation rise with increasing transfusion. Therefore, reducing donor exposure may reduce antibody formation rates, however it is not clear if this is offset by increasing the red cell 'dose' from each donor. Hospitals should not forget the importance of selecting Rh and Kell matched red cell units for transfusion dependent patients (BCSH 2004, Ranasinghe 2004).

2. 'Standardised' haemoglobin content. Red cells collected by component donation offer a more consistent haemoglobin content, volume and haematocrit compared to red cells obtained by the traditional whole blood collection method. For patients and clinicians this benefit could translate to more predictable transfusion responses as assessed by haemoglobin increments.

It seems likely that patients requiring long-term support with red cell transfusion could benefit from DRC. This group includes patients with thalassaemias, haemoglobinopathies, aplastic anaemia and myelodysplastic syndromes. Epidemiological studies suggest that at least 5 percent of all red cells issued by the NBS are given to such patients, although this proportion may be much higher in some geographical areas and individual hospitals.

Many studies have assessed the safety of DRC donation and the quality of red cells obtained by component donation (reviewed in Harrison 2006). However it is acknowledged that there is little clinical evidence to support the use of DRC at present. Heffernan et al (2004) assessed the logistics of supporting 44 thalassaemia patients enrolled to receive DRC. A panel of 400 DRC donors was established for the purpose. Poor donor attendance was noted, although this improved with donor education. As expected, DRC were found to have a more consistent haematocrit and volume compared to 'standard' red cells. The response to transfusion was reported in nine patients who attended more regularly. In this group their pretransfusion haemoglobin varied by 5 – 16 g/L. No other clinical outcome was reported.

Reducing donor exposure with DRC could also be considered for children under 16 years of age as a further measure to reduce the risk of transfusion transmitted vCJD. If implemented this policy would consolidate the current use of non-UK FFP and apheresis platelets in this age group.

At the time of writing the NBS only collects a small number of DRC and therefore we are not able to support any patients with these components regularly. However if this method of donation becomes more widespread, the NBS will be in a position to work with hospitals to support transfusion dependent patients with two units of DRC from one donor. As well as a reliable supply, this will require a stock of DRC with an appropriate mix of ABO and Rh groups and other phenotypes.

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The Preparation and Use of Platelet Hyperconcentrates for Intra-Uterine Transfusion for Use in the Antenatal Management of Neonatal Alloimmune Thrombocytopenia

Fetal and neonatal alloimmune thrombocytopenia (AIT) is analogous to the fetal/neonatal anaemia caused by haemolytic disease of the fetus and newborn, and is the commonest cause of severe neonatal thrombocytopenia. Incompatibility for the human platelet antigen HPA-1a is found in about 80 percent of cases, and the overall incidence of AIT due to anti-HPA-1a is estimated to be about 1 in 1200 live births. AIT is usually suspected in neonates with bleeding or unexplained isolated postnatal thrombocytopenia, but severe antenatal haemorrhage, such as intracranial haemorrhage (ICH), may occur in about 10 percent of cases.

The optimal postnatal management of AIT depends on its rapid recognition, and prompt correction by transfusion of platelet concentrates to neonates who are severely thrombocytopenic or bleeding. It is not appropriate to wait for the laboratory confirmation of the diagnosis in suspected cases. Platelet concentrates from HPA-1a and 5b negative donors should be used initially on the basis of the certainty of their effectiveness in more than 90 percent of cases of AIT which are due to anti-HPA-1a or anti-HPA-5b. The thrombocytopenia in AIT usually resolves within 2 weeks.

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The subsequent pregnancies of HPA-1a alloimunised women with a history of a previously affected infant with AIT are well recognised to be associated with a high risk of recurrence of AIT and poor outcome. The antenatal management of AIT is challenging, because severe haemorrhage occurs as early as 16 weeks' gestation and there is no non-invasive investigation which reliably predicts the severity of AIT *in utero*.

The strategies for antenatal treatment have included early delivery by Caesarean section, the use of serial fetal platelet transfusions, which while effective are invasive and associated with significant morbidity and mortality, and maternal therapy involving the administration of intravenous immunoglobulin (IVIgG) and/or steroids which is also effective and associated with fewer risks to the fetus. Significant recent progress has involved the refinement of maternal treatment, stratifying it according to the likely severity of AIT based on the history in previous pregnancies (*Murphy & Bussel*, 2007).

The first description of the use of ultrasound-guided fetal blood sampling (FBS) in AIT was in Paris in 1984 when it was used to obtain the fetal platelet count at 32 weeks' gestation in the second pregnancy of a woman whose first child had ICH due to AIT; the fetal platelet count was 15 x 10^9/L. There was no ultrasound evidence of ICH by 37 weeks, and an *in utero* transfusion of maternal platelets was given 6 hours prior to delivery by Caesarean section. Later studies in the mid-1980s highlighted the short survival of transfused platelets, and the difficulty of maintaining the fetal platelet count at a 'safe' level. The risks to the fetus of repeated fetal platelet transfusions were recognised, but there was no proven alternative for the management of affected pregnancies thought to be at high risk of ICH.

Further experience with the use of concentrated platelets indicated that it was possible to maintain the fetal platelet count above 30 x 10^9/L using transfusions at weekly intervals, and the success of this approach was reported in 10/14 'high risk' pregnancies with severe AIT managed at King's College Hospital (*Murphy et al*, 1994). The 4 unsuccessful cases comprised two where ICH occurred at 16 and 21 weeks' gestation before the first FBS, one where there was fetal death associated with a heavy fall by the mother despite the successful initiation of transfusions, and one fetal death due to a cord haematoma at the first FBS at 25 weeks. One of the drivers for the development of maternally directed antenatal treatment for AIT was concern about the risks of FBS and platelet transfusion, particularly haemorrhage from the cord. FBS is now usually used to monitor the effectiveness of maternal IVIgG and steroid therapy, and to identify those not responding to standard maternal treatment where additional treatment is required. Because of the serious consequences of bleeding associated with FBS, it is routine practice to transfuse platelets to the fetus following FBS in all cases of known or suspected AIT.

There are a number of important issues relating to the preparation of platelet concentrates for fetal transfusions. They include using HPA-typed donors (usually HPA-1a and –5b negative) who are compatible with the maternal antibodies. The risk of transfusion-transmitted infection is minimized by standard microbiological testing of donors including serology for cytomegalovirus (CMV), and concentrates are gamma-irradiated to prevent transfusion-associated graft-versus host disease. Concentration of platelets to produce a 'hyperconcentrate' with a platelet count of 2,500-4,000 x 10^9/L (up to 4x the concentration of a standard platelet concentrate) is essential to achieve satisfactory post-transfusion platelet counts without an unacceptably high transfusion volume risking circulatory overload of the fetus. For example, the fetoplacental blood volume is about 20mL at 20 weeks' gestation; 20mL of a standard platelet concentrate would be required to provide a satisfactory platelet transfusion which is clearly unacceptable, whereas the volume of a hyperconcentrate would be 5mL. Another important issue in the preparation of hyperconcentrates is leucocyte-reduction, which was recommended for fetal transfusions long before universal leucocyte-reduction of blood components was introduced in 1999.

Historically, 'hyperconcentrates' were produced by re-centrifugation of platelet concentrates. Such a procedure was time-consuming and occasionally led to platelet activation and aggregation. Over the years we have developed protocols using the modern apheresis technology of the day to collect hyperconcentrates (Dumont et al, 2000). This has the considerable advantage that the platelet concentrate requires no further manipulation or processing before transfusion. The high concentration of platelets limits their storage, and the shelf-life is currently limited to 24 hours. This is an additional challenge to ensuring the correct product is provided at the right time, and emphasises the need for close collaboration between the fetal medicine unit, the hospital blood transfusion laboratory and the NBS apheresis unit.

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UK Transplant and the Local Donor Transplant Co-ordinator Service

In 1998/9 United Kingdom Transplant Support Services Authority (UKTSSA), UK Transplant's predecessor organisation underwent a Quinquennial review (Department of Health 2000). Following the review, Parliamentary Ministers announced their acceptance of the review recommendations and the Authority's remit was expanded to include responsibility for:

- Increasing solid organ donation and solid organ donation rates
- Providing central support to transplant co-ordinators nationally
- Closer involvement in communications and public relations.

The Quinquennial Review suggested that the absence of a central professional organisation to oversee co-ordination inhibited the full potential of transplant co-ordination services. It also raised particular concerns regarding the shortfall in the availability of solid organ donors, the significant regional variations in donor rates across the country and between hospitals with similar sized intensive care units. It is widely recognised that donor transplant co-ordinators have an important role in improving donation services and maximising donor rates (Siminoff 2001). In the UK however, since 1979 their role has developed in an ad hoc fashion, principally driven in response to local need rather than being evidence based (BMA 2000). As a result there were variations in co-ordinators' job descriptions, salary, grading, competency, workloads and management arrangements across the UK.

The outcome of the review was that UK Transplant was given responsibility for providing central support and leadership to donor transplant co-ordinators, thus ensuring that donor transplant co-ordination would be appropriately co-ordinated across the country in order that all services work to a common aim and that means of maximising donor rates were identified.

Current Co-ordinator Arrangements in the UK

There are 114 whole time equivalent donor transplant co-ordinators employed in the UK. These posts are divided between 18 co-ordinator teams. The primary role of donor transplant coordinators is to promote and facilitate the donation of solid organs after death. However they also facilitate the donation of tissues in the course of their work. In some cases, teams are currently actively involved in all aspects of tissue donation whilst in others their involvement is less.

A Director of Donor Care and Co-ordination was appointed by UK Transplant in 2001 along with a team of five regional managers to provide central professional leadership to the 18 teams of donor transplant co-ordinators. Team leaders have been appointed in 95 percent of the 18 teams; 1 whole time equivalent donor transplant co-ordinator per million population has been established resulting in 1:4 on-call rotas; national person specifications and job descriptions had been accepted and implemented prior to Agenda for Change along with nationally agreed standards of practice, competencies and policies which guide professional practice. This has been achieved within a framework of managing by influence.

At present the management and employment of donor transplant co-ordinator teams is facilitated by local NHS Trusts/Boards, with a significant number of teams (89 percent) still managed under the umbrella of the local Transplant Unit.

The co-ordinator teams are employed at a local level and work in conjunction with the Intensive/Critical Care Units to identify and refer patients who could potentially donate organs and tissue. Donor transplant co-ordinators have worked towards establishing relationships with key individuals within their local intensive/critical care units. At times the influence and assistance of key players within the critical care units is crucial in developing local policy and taking forward change. However it is the key responsibility of the donor transplant co-ordinator team to maximise the quality and quantity of organs available for transplantation

The current system of professional leadership from UK Transplant is one that at present works well, via the regional management structure. Donor transplant co-ordinator teams gain support and professional leadership from a group that has key insight and expertise into the donation process and the challenges faced on a daily basis by the co-ordinator teams. Most donor co-ordinators have an intensive care nurse background, with their knowledge of donation increasing with exposure and time within the field. Their current employment managers have very little knowledge around the specialised area and as such have difficulty supporting them when often their focus is purely on transplantation.

The gap between the number of organ donors and those waiting for a transplant has been on a steady rise. The relationship between the donor transplant co-ordinators and the central professional leadership via UK Transplant is unique within the National Health Service. All those involved have embraced the developments, which has resulted in having an excellent donor transplant co-ordinator service across the whole of the UK.

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The Dedicated Donation Facility. Routine Notification of Death: A Novel Approach

NHS Blood and Transplant Tissue Services is the UK's major provider of human tissue for transplant. It procures, processes and supplies tissue grafts from around 400 donors per year and responds on a 24hr basis to over 6,000 donor referrals.

Every year thousands of lives are saved with the help of donated organs such as hearts and kidneys. However, it is not widely recognised that every year donated tissues also save or improve the lives of thousands of patients. Just like organs, skin and other tissues from the body such as bone, tendons and corneas can be donated after death. Unlike organs, these tissues can be donated up to 48 hours after the heart stops beating. A single donor could improve the lives of up to 30 patients.

The Human Tissue Act 2004 came into full effect in September 2006, and this outlined consent as the fundamental principle underpinning the lawful donation, storage and use of human bodies, body parts, organs and tissues from deceased persons. The codes of practice drawn up by the Human Tissue Authority (the regulatory body concerning the removal, storage, use and disposal of human tissue) makes clear the expectation that the wishes in life of every deceased person with regard to donation should be ascertained. This should be done by checking for registration on the Organ Donor Register (ODR) or by asking the nominated representative or closest relative of the deceased. In the absence of an expressed or registered wish, families must be given an opportunity to have information and choice regarding tissue donation and to make informed decisions based on their knowledge of the deceased.

Currently it is common for the donation procedure to take place in the hospital mortuary. As there is no national policy or agreement regarding accepted standards for the specialised teams to work in, this has limitations in terms of environmental and bacterial quality control and this can also affect donation rates.

In April 2006, NHSBT opened a Dedicated Donation Facility specifically designed for tissue donation at their centre in Liverpool. Donors are now routinely transferred from two local hospitals to the centre for the procedure before being returned to their families via the hospital. This ensures that the donation can be made in the best possible environment, as well as assuring the care and dignity of the donor at all times.

The Dedicated Donation Facility initiative in Liverpool is part of a 2-year pilot study. Following recommendations from the Royal College of Pathologists, tissue services commissioned independent market research into the attitudes of present and past donor families, all of which indicated support for the initiative. The report recommended a 2-year pilot, focussed on a 40-mile radius of the facility. The project will produce a final report for consideration by the Department Health and NHSBT, which will include a robust audit of donor family experiences.

The initial stage of the project was to examine professional expert opinions at a local level. The project needed to identify key 'Alliance' hospital sites within a 40-mile radius and ascertain the views and opinions of the local HM Coroners and pathologists. Tissue Services currently facilitates donation of tissue before post-mortem examinations in selected cases on a national basis, so it was crucial to gain support from coroners and pathologists. Liverpool also had the added complication of being associated with the Alder Hey retention incident, which made approval of the pilot at a local public and professional level more crucial.

An initial Steering Group meeting held at the centre in April 2006 brought together an impressive group of local professional experts, a donor family representative, a lay advisor from a local patient interest group and the deputy head of ethics at the British Medical Association. The Steering Group recently reconvened after facilitating 18 successful tissue donations within the facility.

Tissue Services nurses worked with the Corporate Communications Department to conduct a variety of local PR campaigns about the new facility and received local television and media coverage. They also worked closely with the PCT's and local schools. As a result of the success of the Donation Facility and the promotion within the city, Liverpool University and John Moores University have agreed to student nurses being placed within Tissue Services as part of their management module. Student nurses will further secure the promotion of tissue donation as a routine option for bereaved families.

The Dedicated Donation Facility became operational around the time of legislative changes such as The Human Tissue Act (2004) and the EU Directive on Tissues and Cells (2004/23/EC) (2006). This enabled donation to be widely promoted within the local hospitals and for the nursing team to have an increased confidence in driving forward a modernised system of referral.

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The traditional, largely passive approach to referrals made to NHSBT Nurse Practitioners, for example, via clinicians, nurse, HM Coroners, had proved to have a limited impact on tissue donation rates. One of the significant challenges for Tissue Services was not only to ensure that the Donation Facility became accepted and normalised but also to simultaneously increase donation rates.

As a result a revolutionary approach to donation referrals was initially created in Leeds Teaching Hospitals NHS Trust, based on already established US and Spanish systems. These systems were replicated in the two trusts in the Liverpool area to directly compliment the donation facility. In one trust the hospital porters notify the specialist nurses in the National Referral Centre, via a pager, of a recent death and then the nurses contact families to offer information and choice about donation. The other hospital trust notifies Tissue Services via a nurse to nurse fax system and again families are routinely contacted.

The systems in place have so far proven extremely effective in increasing donation rates. Families who choose to decline donation will often thank the nurses for their contact and appreciate that even if donation does not proceed that the specialist nurses are an additional point of contact for them and an extra support particularly out of hours and weekends.

It is vital that current donation rates increase within the UK. A modern NHS needs to be prepared and adequately equipped for a potential disaster and to be able to provide life saving and life enhancing tissue on demand. The creation of the Dedicated Donation Facility and Routine Notification of Death systems have been a significant challenge for the Tissue Services team. The rolling out of further Alliance sites will secure the future of both the facility and the excellent and highly specialised service that the nurses provide. It is hoped that this change in practice will continue to reflect a modern, open and transparent approach to donation and bereavement services.

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www.rdforum.nhs.uk/htact.htm

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DIARY DATES

- 4 September 2007, **Introduction to Transfusion Medicine**, Colindale Blood Centre, North London. Further information: www.blood.co.uk/hospitals/training or contact Wendy Sewell, Tel: 020 8258 2734, email *wendy.sewell@nbs.nhs.uk*
- 13 - 15 September 2007, **BBTS 25th Annual Scientific Meeting**, T*he Exhibition & Conference Centre, Glasgow*. Further information: *https://www.eventsforce.net/bbts/frontend/frontEndFrameset1.csp?eventID=22*
- 24 - 25 September 2007, **Current Issues in Platelet Production, Storage and Safety,** *America's Blood Centers, Washington DC, USA*. Further information: *http://www.transfusionguidelines.org.uk/docs/pdfs/diary_20070924_info.pdf*
- 24 – 26 September 2007, **IBMS Congress 2007**, ICC Birmingham. Further information: *http://www.ibms.org/index.cfm?method=congress.home*
- 8 October 2007 **Obstetric and Perinatal Haematology**, RCN HQ London email: *melanie.smith@nhsbt.nhs.uk*
- 20 – 23 October 2007, **AABB Annual Meeting & TXPO**, Anaheim Convention Center in Anaheim, California. Further information: *http://www.aabb.org/Content/Meetings_and_Events/Annual_Meeting_and_TXPO*
- 9 - 10 November 2007, **Introduction to Pre-Transfusion Testing**, Tooting Blood Centre, London. Further information: contact: *www.blood.co.uk/hospitals/training*

NEXT EDITION

Following the 3rd Better Blood Transfusion seminar which took place in March this year, the next edition of *Blood Matters* will focus on the Better Blood Transfusion initiative and appropriate use of blood. Some of the areas that will be discussed are:

- outcomes of the BBT seminar and re-audit of compliance against previous BBT initiatives;
- UK audit of Transfusion Practitioner posts;
- highlights from the national comparative audits of platelets and orthorpaedics;
- safe and appropriate use of blood and products in obstetrics;
- overnight transfusion;
- UK Cell Salvage survey.

The next edition is due for publication towards the end of 2007; if you would like to receive a copy and are currently not on the mailing list, please contact Charlotte Green (*email charlotte.green@nhsbt.nhs.uk or by phone to 01865 440042*).

CPD Questionnaire

Q1. Infringement of autonomy in Health Care is mainly exerted by

a) Paternalism.

b) Coercion.

c) Misinformation.

d) Maleficence.

Q2. Blood Donation is a Health Care process

a) That does not require consideration of donation practicalities to ensure that respect of donor autonomy are met.

b) That is largely governed by the general principles of health care ethics.

c) That is fundamentally the same as familiar therapeutic procedures.

d) That does not require consideration of donation practicalities to ensure that donor moral needs are met.

Q3. Donor Selection Guidelines

a) Are only regularly reviewed by the National Blood Service.

b) Were first compiled in 2001 as National Guidelines.

c) Are regularly reviewed by a SAC of JPAC.

d) Are set only to maintain a safe blood supply for patients.

Q4. Donor Selection Guidelines

a) A donor should lose no more than 15% of their blood volume when donating.

b) A donor should lose no more than 19% of their blood volume when donating.

c) A donor should lose no more than 17% of their blood volume when donating.

d) A donor should lose no more than 13% of their blood volume when donating.

Q5. Donor Selection Guidelines: As a precaution against transmission of variant CJD

a) Since April 2004, donors have been asked if they have received blood or blood components at any time since January 1980.

b) Since April 2004, donors have been asked if they have received blood or blood components at any time since January 1989.

c) Since April 2004, donors have been asked if they have received blood or blood components at any time since January 1986.

d) Since April 2004, donors have been asked if they have received blood or blood components at any time since January 1983.

Q6. OneBlood

a) Bone Marrow donation is more favourably regarded than blood donation, in ethnic minorities.

b) There are no spiritual or religious barriers to blood donation in ethnic minorities

c) Despite a national campaign and formation of partnership, there has been no increase in donation among ethnic minorities.

d) Ethnic minorities generally consider blood donation to be a good thing to do.

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Q7. Multi-component donation in Mobile Environment

a) Only static clinics are able to offer multi-component donation.

b) 97% of donors give only whole blood at present.

c) A longer donation time was not accepted by the donors.

d) The quality of platelets collected did not compare favourably with those collected at static sites.

Q8. Adverse Events of Blood Donation: Serious Adverse events of Donation had an incidence, in April 2006 – March 2007, of:

a) 23.2/100,000 attendees.

b) 36.8/100,000 attendees.

c) 18.6/100,000 attendees.

d) 16.8/100,000 attendees.

Q9. Double Red Cells (DRC)

a) At present, there is much published evidence to support the use of DRC.

b) Use of DRC would not reduce donor exposure.

c) At least 5% of Red Cells issued at present, are given to a group that could, theoretically, benefit from DRC.

d) Are readily available.

Q10. Platelet Hyperconcentrates

a) Shelf-life is currently 24 hours.

b) Ideally have a platelet count of 600 – 1,000x10^9/L.

c) Only occasionally transfused to the foetus following fetal blood sampling in all cases of neonatal alloimmune thrombocytopenia.

d) Are universally produced by re-centrifugation of platelet concentrates.

The NBS is part of NHS Blood and Transplant.
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