AUTOLOGOUS BLOOD TRANSFUSION IN ZARIA, NIGERIA

ABSTRACT
BACKGROUND
Since the AIDS epidemics of the early 80s the interest in alternatives to allogeneic transfusion has grown. The increasing fear of this transfusion transmitted infection (HIV), has consequently led to the need to minimize allogeneic blood exposure. Autologous blood transfusion is an accepted alternative and practiced in elective surgical procedures, particularly in developed countries.

AIM
To review the introduction and practice of autologous blood transfusion in a developing country

METHODS
The blood donor register and patient case notes were reviewed over a two year period from 1st November 2006 to 31st October 2008 at the Ahmadu Bello University Teaching Hospital Zaria, a tertiary health care centre in North Western Nigeria.

RESULTS
5,027 units of whole blood were donated over the two year period, only 29 (0.58%) donated autologous blood. Pre-deposit autologous transfusion was the only method carried out. Most (70%) donated 2 units of blood. Donors mean age was 40.5 years ± 13.83, the mean packed cell volume of autologous donors was 0.41± 0.049. The male to female ratio was 1.3:1. Ten (34.5%) of the autologous donors had Orthopaedic surgeries, another ten (34.5%) had Oto-rhino-laryngological surgeries and 9 (31%) had Gynaecological surgeries respectively.

CONCLUSION
Autologous transfusion has not exerted a significant impact on the transfusion requirements in our centre. There is a need for improved patient and surgeon awareness on the need to encourage autologous transfusion in order to reduce the risks posed by allogeneic blood transfusion.

AUTOLOGOUS BLOOD TRANSFUSION IN ZARIA, NIGERIA

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KEYWORDS
Autologous, Blood transfusion, Nigeria

ABSTRACT
CONTEXTE
Depuis l’épidémie de SIDA au début des années 80, l’intérêt de solutions de rechange à la transfusion allogénique s’est accru. L’augmentation de la peur de cette infection transmise par la transfusion (VIH), a donc conduit à la nécessité de réduire au minimum l’exposition au sang allogénique. La transfusion de sang autologue est une alternative acceptée et pratiquée dans les procédures chirurgicales électives, particulièrement dans les pays développés.

BUT
Pour évaluer la pratique de la transfusion de sang autologue dans un pays en développement

MÉTHODES
Le registre des donneurs de sang et les dossiers des patients ont été examinés pour une période de deux ans à partir du 1er Novembre 2006 au 31 Octobre 2008 au centre hospitalier universitaire de ZARIA de l’Université Ahmadu Bello, un centre de soins tertiaire dans le nord-ouest du Nigeria.

RÉSULTATS
5027 unités de sang total ont été donnés au cours de la période de deux ans, seulement 29 (0.58%) ont fait un don de sang autologue. Le pré-dépôt de la transfusion autologue a été la seule méthode effectuée. La plupart (70%) a fait don de 2 unités de sang. L’âge moyen des donneurs était de 40,5 ± 13,83 années, l’hématocrite moyen des donneurs autologues était de 0,41 ± 0,049. Le sex-ratio était égal à 1.3. Dix (34,5%) des donneurs autologues avaient bénéficié de chirurgie orthopédique, dix autres (34,5%) de chirurgie Oto-rhino-laryngologique et 9 (31%) de chirurgie gynécologique.

CONCLUSION
La transfusion autologue n’a pas exercé un impact significatif sur les exigences de la transfusion dans notre centre. Il est nécessaire d’améliorer la sensibilisation du patient et du chirurgien sur la nécessité d’encourager la transfusion autologue en vue de réduire les risques posés par la transfusion de sang allogénique.
BACKGROUND

The provision of adequate and safe blood still remains a daunting challenge to Nigeria, in spite of its large population of about 150 million people. This is due to the lack of a sizable committed voluntary non remunerated donor pool. The country’s health system depends mostly on family replacement donors and regrettably quite a number of commercial donors. However, in March 2005 the Federal government of Nigeria appointed a coordinator for the National Blood Transfusion Service (NBTS). The NBTS is mandated to mobilise, standardise and coordinate the collection of blood in the country.

Nigeria mobilises about 500,000 allogeneic units of whole blood yearly and this is mainly from government hospitals and commercial blood banks. A large proportion of the blood donors in government hospitals are family replacement donors while those in the private or commercial blood banks are commercial blood donors who pose a higher risk of transfusion transmissible infections (TTI). Transfusion transmissible infections still remains a major problem in our setting where infectious agents are detected by immunodiagnostic screening techniques, with incidences of HIV among blood donors of 2.8% in our centre. Hepatitis C virus antibodies have been detected in 6% of blood donors in the neighbouring town of Jos. In view of the high incidences of TTIs, autologous transfusion becomes a necessary alternative.

Autologous blood transfusion is a planned procedure where the person going for certain surgeries but are otherwise healthy donates his own blood usually 2-6 units over a 2-4 week period. Autologous blood transfusion is considered to be generally safe. Therefore at every opportunity both surgeons and patients going for elective surgeries should be encouraged to go for autologous blood donation if they are eligible. Autologous blood donations have been commonly used in the western world for decades however its use is still minimal in our clinical settings. This study was carried out with the aim of finding out the level of utilization of autologous blood donation for elective surgical operations at the Ahmadu Bello University Teaching Hospital (ABUTH) Zaria in Northern Western Nigeria.

MATERIALS AND METHODS

ABUTH is a tertiary health institution that has its own independent blood bank involved in recruitment of donors, processing and storage of blood for the use of the hospital. It serves Kaduna, Zamfara, Katsina, Abuja and parts of Kano and Niger States.

The donor register of the ABUTH blood bank and the case notes of patients that have undergone elective surgery over a two year period from 1st November 2006 to 31st October 2008 were reviewed and analysed. Basic mathematical percentages and statistics were done.

RESULT

Over a two year period only 29 patients (0.58%) donated autologous blood while a total of 5,027 allogeneic blood units were donated. The mean age of the autologous donors was 40.5 years ± 13.83, while the mean packed cell volume was 0.41± 0.049. The male to female ratio was 1.3:1. Pre-deposit autologous transfusion was carried out in all the autologous donor/patient. None had peri-operative autologous transfusion or red cell salvage techniques due to lack of expertise and facilities. Out of the autologous units, 20 (69%) donated 2 units of blood while the remaining donated only one unit. Ten of the autologous donors (34.5%) had orthopaedic surgeries, another 10 (34.5%) had otoro-laryngological surgeries and 9 (31%) had gynaecological surgeries.

DISCUSSION

Autologous blood donation is relatively new in our centre and although it has not exerted a significant impact on the transfusion requirements in our centre, it has reduced the need for allogeneic blood. In our centre it constitute about 0.6% of blood donated over a two year period while in a neighbouring tertiary hospital (Aminu kano Teaching Hospital-North Western Nigeria) in Kano, Kuliya-Gwarzo et al reported only a 0.02% of autologous blood donation. This may be due to increase awareness of both the TTIs and the availability of autologous procedure by the health care providers and patients as well in our centre. Ahmed and colleagues in University of Maiduguri teaching hospital in the North-east Nigeria reported a rising autologous donation rate of 1-9% from 1984 to 2006 which is significantly higher than our findings.

The main mode of blood donation in ABUTH is allogeneic mostly from family replacement donors and occasional voluntary non remunerated donors. Autologous blood transfusion is one of the recognised relatively low risk and cost effective means of blood transfusion. Even though it is a technique that was first performed by Blundell in 1818 in England, autologous blood transfusion has undergone modification and standardisation over the years thus making it safer and to a large extent cost effective even in African settings. It accounts for about 5% of blood donated in the USA and parts of Europe. On the contrary Dziewiatkowska et al in Poland reported a relatively low interest in autologous donations in Poland, due to a quite sufficient supply of hospitals with allogeneic red blood cell concentrates. Its contribution and impact on blood transfusion in our centre has not been ascertained previously. The Ahmadu Bello University Teaching Hospital like most tertiary hospitals in Nigeria has an independent blood bank. This is due to the lack of a centralised blood collection and processing process prior to 2006 when the National blood transfusion service was established. However ABUTH and most other tertiary hospital still maintain their blood banks.
CONCLUSION

There is a need to intensify interest in autologous donations in the absence of more effective Nucleic acid techniques of identifying viral infections and due to insufficient numbers of voluntary non remunerated donors. The recently established National blood transfusion service must make every effort to fulfil the task of providing safe blood, in a timely manner and in sufficient quantity.

REFERENCES

EVIDENCE BASED SELECTION CRITERIA FOR WINNERS OF THE PROVINCIAL SCHOOLS BLOOD DONOR SHIELD AWARDS IN ZIMBABWE

Muchokwani E, Mapako T, Masvikeni E
National Blood Service Zimbabwe

BACKGROUND

National Blood Service Zimbabwe (NBSZ) collects blood from about 660 schools annually. Each of the schools is visited (once each term) after every 4 months with an average yield of 40 units per visit. The frequent visits and the relations created by NBSZ staff have created a good rapport with schools and have enabled well coordinated blood drives. As a gesture of appreciation the organisation has been recognizing the best performing schools in each of the country’s 10 provinces annually.

The Schools Blood Donor Shield is a concept aimed at recognizing and acknowledging the role played by schools in contributing to safe and adequate blood supplies through voluntary non-remunerated blood donation. Traditionally, National Blood Service Zimbabwe would award the floating shield, first aid kit, sporting equipment and refreshments to the winning schools during the first school term, after considering collections made in the previous year.

CONTEXTE

Service National du Sang du Zimbabwe (SNSZ) collecte le sang dans environ 660 écoles chaque année. Chacune des écoles est visitée (périodiquement), après tous les 4 mois avec un rendement moyen de 40 unités par visite. Les visites fréquentes et les relations créées par l’équipe du SNSZ ont créé un bon rapport avec les écoles et ont permis de bien coordonné collectes de sang. En guise de récompense, l’organisation distingue les écoles les plus performantes dans chacune des 10 provinces du pays chaque année.

Le concours du don de sang des écoles est un concept visant à féliciter et reconnaître le rôle joué par les écoles pour contribuer à la sécurité et la fourniture suffisante de sang par le biais du don de sang volontaire non rémunérés. Traditionnellement, le Service National du Sang du Zimbabwe primait les meilleurs du concours, avec une trousse de premiers soins, des équipements sportifs et des rafraîchissements aux écoles gagnantes au cours de la première période de l’année scolaire, après avoir examiné les collectes faites au cours l’année précédente.
PARTNERSHIP AND WORLD BLOOD DONORS DAY

Since 2007 a mobile cellular network, Net One, through its Easy Call brand entered into partnership with NBSZ in sponsoring the event in all 10 provinces. To make it more relevant NBSZ decided to make shield presentation coincide with World blood Donor Day (WBDD) held on the 14th of June each year. The winning school in the province hosting WBDD is recognized during the ceremony. Shield presentations in the rest of the schools are done through their respective NBSZ and Net One branches throughout the month of June, now set aside as Blood Donor Month by NBSZ. It is mainly for this reason that winners are selected based on activities for the 2nd and 3rd terms as well as the 1st term of the awarding year.

SELECTION CRITERIA

1. Scores
The winning school in each province is determined by total points scored considering percentage marks accumulated in three categories namely collections, drive and reception.

a) Collections: This refers to the average collections made per visit (during period under review) expressed as a percentage of the school’s overall enrolment e.g. if a school of a total enrolment of 500 students has an average collection of 50 units its collection is expressed as 10%.

b) Drive: This is the Donor Recruitment staff rating (on a 1-10 scale expressed as a percentage for each blood drive) of the school’s drive or motivation towards NBSZ activities. It is an overall assessment of the relationship between the school and the Service. It includes such aspects as eagerness to partner such activities as the Peer Promoters program, and booking for bleeds and talk e.g. if the Donor Recruiter’s average rate for the school’s Drive is 7 then it is expressed as 70%.

c) Reception: This is the mobile team leader’s rating (on a 1-10 scale expressed as a percentage for each blood drive) of the school’s hosting of the whole blood drive. It includes roles played by the school authorities, contact persons, peer promoters in ensuring the smooth running of the blood collection process.

2. Weighting
The following weights are attached to the three variables as follows:
- Collections: 50%
- Drive: 25%
- Reception: 25%

3. Determining the ultimate winner:
The ultimate winner is the school with the highest points, based on total of the weighted scores. In the event of a tie the school with a higher weighted score on collections is considered the winner.

MOTIVATIONAL EXAMPLE

In order to illustrate how the selection criteria is used we consider the following motivational example. Table 1 shows the raw scores (%) of a sample of five schools A, B, C, D and E in a given province.

<table>
<thead>
<tr>
<th>School</th>
<th>Collections</th>
<th>Drive</th>
<th>Reception</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>80</td>
<td>40</td>
<td>20</td>
<td>140</td>
</tr>
<tr>
<td>B</td>
<td>40</td>
<td>60</td>
<td>70</td>
<td>170</td>
</tr>
<tr>
<td>C</td>
<td>60</td>
<td>30</td>
<td>90</td>
<td>180</td>
</tr>
<tr>
<td>D</td>
<td>50</td>
<td>70</td>
<td>30</td>
<td>150</td>
</tr>
<tr>
<td>E</td>
<td>50</td>
<td>80</td>
<td>50</td>
<td>180</td>
</tr>
</tbody>
</table>

Based on weights we calculate the weighted scores for Table 1 as shown in Table 2. The weighted scores for school A are obtained as follows:
- Collections 0.5 x 80 = 40
- Drive 0.25 x 40=10
- Reception 0.25 x 20=5

Weighted scores for schools B-E are calculated in the same way

<table>
<thead>
<tr>
<th>School</th>
<th>Collections</th>
<th>Drive</th>
<th>Reception</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>40</td>
<td>10.0</td>
<td>5.0</td>
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</tr>
<tr>
<td>B</td>
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<td>15.0</td>
<td>17.5</td>
<td>52.5</td>
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<td>C</td>
<td>30</td>
<td>7.5</td>
<td>22.5</td>
<td>60.0</td>
</tr>
<tr>
<td>D</td>
<td>25</td>
<td>17.5</td>
<td>7.5</td>
<td>50.0</td>
</tr>
<tr>
<td>E</td>
<td>25</td>
<td>20.0</td>
<td>12.5</td>
<td>57.5</td>
</tr>
</tbody>
</table>

From Table 2 schools C is the ultimate winner based on the total of weighted scores despite having the same raw total scores with school E as shown in Table 1.

CONCLUSION

The evidence-based approach of assessing schools performance helps not only to ensure transparency but also assist in the gathering of essential data necessary for monitoring each school’s performance to enable appropriate remedial action.
ABSTRACTS

ABSTRACTS OF 5TH INTERNATIONAL BLOOD TRANSFUSION CONGRESS OF THE AFRICA SOCIETY FOR BLOOD TRANSFUSION, NAIROBI: 25-27 JUNE 2009

The Africa Society for Blood Transfusion (AfSBT) held its 5th International Congress in Nairobi, Kenya from 25-27 June 2009. Thanks to the generous donation of funds by the AABB, ILEX and the NBI, the AfSBT was able to arrange sponsorship for a total of 50 individuals to attend the Congress. Keen interest in the Congress was shown by the good attendance of nearly 320 delegates, not only from African countries, but also from many other parts of the world - 60 countries were represented. The theme was 'Meeting the Needs for Safe Blood in Africa', and the Congress provided a unique opportunity for those either directly or indirectly involved in addressing the challenges of safe and sufficient blood in Africa to focus for a few days on the many challenges and to learn from one another - to compare trials and tribulations, and learn from the successes and accomplishments shared.

Even though you may not have been able to attend we are pleased to announce that all abstracts from this Congress will be published in Africa Sanguine as follows:

- Volume 12 no. 1 will include abstracts 1 to 40
- Volume 12 no. 2 will include abstracts 41 to 81

HOW CAN YOU GET INVOLVED?

We welcome feedback, comments or questions you may have with regard to these abstracts. Every effort will be made to have questions answered by the respective author(s), and we will publish correspondence in a subsequent issue of the journal. You are encouraged to participate and make use of this opportunity to share your ideas, thoughts or views. Submit correspondence to the Editor: beryl.afsbt@nbi-kzn.org.za or leesha.raman@gmail.com

The Kenya Congress also made a great impression on one of the attendants from Nairobi, Ms Violin Kinyanjui, who was inspired to write a poem as a result. It is printed below, with permission:

THE MUSTARD
Violin Wairimu Kinyanjui

Pressure in, pressure out as days approach to the big event, the big release.
The beauty none can fathom, the diversity is incomprehensible.
Black, white uniting for a course untold, a course unspoken.
Blood a necessity and scarcity, many be denied.

Numbers trickle in, in excitement, with expectations hopeful Africa and the world will know.
Smiles on their faces, laughter in their hearts an only sign of their zeal and love.
Organisations be it local or international know their course well,
Blood a necessity and scarcity, many be denied.

Exhibitors with the love for humanity, bubbling with knowledge expose their projects.
Keen attention from the attendants knowing only too well forward progression.
To attain quality blood drawing methods, quality donor retention methods and quality blood preservation be their goal.
Blood a necessity and scarcity, many be denied.

Four days of progression not dwindling but growing,
not vaporizing but growing to be a great project.
Social moments a spotlight to many, to learn and to teach,
to know their mistakes and know better ways.
A gala gives life to the social moments, a dance to make young, a dance as we make merry.
Sharing a meal made the seed be watered, its roots deepened,
it growth progress as target of all is met.
A society with enough blood for life preservation be our goal.
Blood a necessity and scarcity, many be denied.
THE STATUS OF BLOOD SAFETY IN THE WHO AFRICAN REGION

Mainuka P1, Tapko JB 2
1. Medical Officer Blood Safety, Ethiopia
2. Regional Adviser Blood Safety, WHO African Region

BACKGROUND
The WHO AFRO region with a population of over 773 million people needs about 8 million units of blood per annum to cater for the transfusion needs of its population. The demand for blood in Africa is driven by the high maternal mortality rate, high prevalence of malaria as well as high rates of road traffic accident related injury and death as well as other indications for blood transfusion. Additionally Africa has the highest prevalence of infections transmitted through blood transfusion which not only makes it difficult to select enough donors at reduced risk of infection but also increases the demand for blood transfusion. In recognition of these challenges the WHO African region adopted a strategy in 2001 urging member states to develop conducive policies to ensure the safety of their blood supplies. It set targets in the field of blood donor recruitment, testing and appropriate use of blood to be achieved by member states by the year 2012. Analysis of data on various aspects of the blood transfusion services was done to monitor progress on the regional targets and comparison with the period since 1999.

METHODS
Data from member states was collected using the Global Database on Blood Safety (GDBS) since 1999. The data was then entered in the database for blood safety at the regional office for Africa and analyzed using Excel. Trends in policy formulation, development of implementation plans, implementation rate, blood collection, testing, blood usage and quality were analyzed.

RESULTS
The number of countries with national blood policy raised from 24 in 1999 to 43 by 2006. 38 of these countries had an implementation plan while 32 reported a supportive legislative framework. Total number of units collected in 2006 was 3,191,808 units of which 58% was voluntary. The proportion of voluntary blood donors had increased to 73% in 2007. More than 12 countries had reached the target of collecting 100% voluntary blood donation while more than 14 of the 38 countries that reported were collecting more than 10 units/1000 of the population. 40 of the 46 countries were testing all their blood for HIV, while the proportion of units tested showed an increasing trend over the years. 40 countries had developed guidelines on appropriate clinical use of blood. 74% of the units were transfused as whole blood and 33 countries had a designated quality manager.

DISCUSSION AND CONCLUSION
Since the development of the regional strategy on blood safety considerable progress has been made in the area of blood safety in the region. Development of national blood policy and plans gave clear strategic directions on blood safety. These give the framework under which the other aspects of the service have improved over the years. Although there have been a lot of challenges to attainment of the targets enshrined in the regional strategy, there is need to consolidate what has been achieved and more effort to improve on the shortfalls.

MALAWI EXPERIENCE: ORGANISATION & MANAGEMENT OF BTS

M’baya B, Malawi Blood Transfusion Service

The Malawi Blood Transfusion Service (MBTS) is the national blood service for Malawi, a small resource poor country in Southern Africa. 85% of the 13.1 million population of Malawi is rural. The economy is agriculture based with tobacco being the main cash crop. The main health problems are Malaria, TB and HIV-AIDS. HIV prevalence in the general population is 12.2%. Life expectancy is at 37 years. The government provides the majority of health services followed by religious based organisations. The private sector serves less than 1% of the population. MBTS is responsible for blood collections, screening and component preparation. The hospital blood banks collect blood from MBTS and they are responsible for its storage, crossmatch and issue to individual patients within their individual hospitals.

MBTS is an independent trust established by the government of Malawi through the Ministry of Health. The Minister of Health appoints trustees on 3 year renewable terms. The Board of Trustees oversees the running of MBTS and appoints the Chief Executive Officer, Medical Director and Finance and Administration Director, who are non-voting members of the Board, to run MBTS.

There is the Public Relations Department (PRD) responsible for recruiting and retaining suitable blood donors; the Blood Donor Department (BDD) for collecting blood from voluntary non-renumerated blood donors and the Laboratory for screening the donated blood for HIV, Hepatitis B and C, syphilis and malaria; for ABO and RhD grouping and for component production. There is also a Quality Department for quality assurance in all areas of work including maintenance of the blood cold chain, EQAS and the running of a NQAS for local hospital blood banks. There is also a finance department and an administration department. MBTS also encourages appropriate clinical use of blood to prevent unnecessary transfusions and its potential risks. This is done through training, Hospital transfusion committees and the supporting of the development of blood and blood products transfusion guidelines.

MBTS was established in late 2004 with a temporary centre in Blantyre, southern Malawi. A second centre was opened in June 2005, in Central Malawi. A third and last centre will be opened this year in Northern Malawi. These centres are responsible for blood collection, component preparation and blood distribution. All testing is centralised at the headquarters in Blantyre. MBTS routinely produces the following blood products: paediatric and adult red cell concentrates, fresh frozen plasma, cryoprecipitate and platelet concentrates.

As an autonomous organisation, MBTS has its own budget, staff members, capital assets and offices. MBTS procure, stores and manages all its requirements. MBTS is funded by donors, the Government of Malawi and also raises funds through a cost recovery system with the private health sector. Staff members are all employees of the trust. They are recruited, managed, disciplined and rewarded by MBTS. Training of its staff members and hospital staff is a key activity for MBTS. MBTS has registered many successes during its short period of existence. This has been possible because of its enabling organisational structure; the technical assistance it received, its emphasis on training and because of the commitment of the Government of Malawi.
NAMIBIA EXPERIENCE: ORGANIZATION AND MANAGEMENT OF THE BLOOD TRANSFUSION PROGRAMME

Wilkinson R, The Blood Transfusion Service of Namibia

Prior to 2007 the Blood Transfusion Service of Namibia (NAMBTS), a non-governmental institution registered in terms of the Companies Act as an “Association not for gain”, was licensed by the Ministry of Health and Social Services (MoHSS), through the Medical Director, to operate a blood collection and processing facility and to provide blood and blood products to all the hospitals in Namibia. This ensured that blood was available, but the responsibility for many important aspects of blood safety, such as for cold chain management following the release of blood by NAMBTS, for the appropriate usage of blood and blood products, for haemovigilance and for the general monitoring and evaluation of the blood programme were ill defined.

The National Blood Policy, developed jointly by the MoHSS, NAMBTS, the Namibia Institute of Pathology (NIP) and the World Health Organization (WHO) (appointed as Technical Assistance Providers in Namibia under the PEPFAR initiative) was released in September 2007. This National Blood Policy defined a National Blood Programme for Namibia that covered all links in the blood transfusion chain, from donor selection to haemovigilance, and clearly defined the responsibility for each of these steps. It also established an overall system of governance to ensure that the needs of the donors, patients and all other role players were efficiently addressed.

### Organizational Framework

**The MoHSS**

*Overall responsibility for the National Blood Programme*

**The National Blood Authority**

*Liaison between MoHSS, NAMBTS, Medical Fraternity and Blood Transfusion Experts*

**The Blood Transfusion Service of Namibia**

*Responsible for Collection, Processing, Testing, Distribution, Training, Haemovigilance*

A three year strategic plan (2008 to 2010) was developed to ensure the effective implementation of the National Blood Policy, and an informal “Blood Safety Team” comprised of representatives from the MoHSS, NAMBTS, WHO and NIP meets regularly to monitor progress.

KENYA EXPERIENCE: VOLUNTARY NON REMUNERATED BLOOD DONATION

Odongo T, National Blood Transfusion Service - Kenya

**INTRODUCTION**

Kenya's ground coverage is 582,650 sq. km, population 36,913,721 million, annual growth rate 3.09%, 56% of population living below poverty line, 53% aged 16-65 years, 80% live in rural areas and life expectancy at birth is 47 years. With massive constantly growing population, the country has adopted a policy of voluntary non remunerated blood donation.

**AIMS**

To recruit, educate, and retain voluntary non remunerated blood donors thus reducing high TTI rates.

**MATERIALS AND METHODS**

To achieve our goal, NBTS used a marketing approach in segmenting the donors by demographics by Age - youth groups, societies and clubs. Gender - women groups and men groups. Occupation - formal and informal sectors and religions further narrowed down to faith and community based, work places and high schools. In targeting, a scientific marketing approach with reference to the Ansoft matrix (Growth Strategies) was used as follows:

1. **Penetration** - segments identified were already active with donors but needed to be maintained. However, to further tap in to these segments, we chose not to change any of our offerings but sought to further penetrate by regularising donations to at least thrice annually as opposed to once a year as was previously the case.

2. **Development and diversification** - these were necessitated by the need to develop untapped individuals within the population by generating new segments that would ensure an adequate supply of blood and thus facilitate the shift from over reliance on high school children to the adult population thus a diverse blood donor base.

3. **Positioning** - blood donor recruiters positioned in the mindset of the above segments that blood donation is a safe voluntary humanitarian act that aims to save life. This has served to instill pride and satisfaction in the donors that their benevolent act saves lives. With this in place, it was important to further strengthen and reinforce this approach by placing great emphasis on private / public sector partnerships with the aim of getting full or partial sponsorship of items such as media, transport (road and air), major blood drives and donor incentives.

**RESULTS**

Collections have risen as follows: 2005 - 85,000 units, 2006 - 117,000 units, 2007 - 130,000 units and 2008 -100,000 units. Seroprevalence of HIV has reduced from 6% during 2001 to a current 1.4% and repeat donors raised to 30% annually. Adult donors now compose 32% of donor pool.

**CONCLUSION**

100% of donors bled by BTS are voluntary and non remunerated. The adoption of a marketing approach has quickened the move with recruitment being done in a planned and coordinated manner and donors educated with emphasis put on retention towards repeat donations.
ZIMBABWE EXPERIENCE IN QUALITY MANAGEMENT SYSTEMS

Marowa LM, National Blood Service Zimbabwe - NBSZ

BACKGROUND
NBSZ was founded in 1958 and registered as a not for profit social welfare organisation. Over the years, it has grown and currently there are five strategically positioned branches in the country. All centres collect blood through static and mobile donor clinics. All donated blood is routinely tested for the four TTI markers by fully automated processes at the main laboratory and results are made available to the other branches over wide area network (WAN). Greater than 60% of collected blood is processed into components in 3 of the 5 branches. The 2 biggest branches of NBSZ were ISO 9001:2000 certified in the year 2007. The remaining branches will be incorporated in due course.

THE QMS
Quality awareness at NBSZ has always been high. However, there was no defined system and various standards were in use simultaneously, thus a decision was made to choose one standard, namely ISO 9001:2000 since it is a system standard applicable across the whole organisation and not just the laboratories.

EXPERIENCES IN IMPLEMENTATION
Implementation of the QMS took approximately 3 years under a twinning arrangement with the Swiss Red Cross. Initially, a full fledged Quality department was set up. This was done by recruiting within the organisation and capacity building of staff members. This was followed by awareness training of management and general staff in order to cultivate a quality culture. Radical changes in documentation ensued, with the introduction of document indexing and numbering. The implementation was not easy as there were many changes introduced, some of which were met with resistance in staff and management alike, especially as there were monetary rewards anticipated by staff in particular. However, these had to be overcome in due course and the benefits reaped so far outweigh the challenges experienced. Some of the benefits are that quality is now a part of the business system thinking and is no longer viewed as an extra task, audit trails are more evident, there is increased national and international recognition and improved data collection, processing and usage in decision making.

CHALLENGES AND WAY FORWARD
Maintenance of the QMS has been very challenging due to the unfavourable macro-economic and political conditions in Zimbabwe in 2007 to early 2009. NBSZ lost numerous key personnel to neighbouring countries thus there was constant recruitment and training expense. Budgeting was difficult due to inflation thus operations were difficult to sustain. The introduction of foreign currency licences at the end of 2008 worsened the situation since NBSZ had to buy all consumables in foreign currency but could only trade in the Zimbabwean dollar because it was not licensed. This has slightly improved due to dollarization of the economy.

NBSZ managed to cope through this trying period due to various stop-gap measures such as the re-introduction of laboratory based training (SCBBT Course) as well as internal grooming of QMS personnel among many other techniques. Giving up the system is not an option therefore we are currently upgrading to the revised ISO 9001:2008 standard.

We remain committed to the provision of safe adequate blood from vein to vein!!
DONOR RECRUITMENT, MOTIVATION & RETENTION - KENYA

Michar0 F
HOPE Worldwide Kenya Blood Donor Recruitment Program

INTRODUCTION AND BACKGROUND
Kenya has experienced a decrease in the number of units of blood collected annually. According to Kenya National Blood Transfusion Services, the number of units realized fell from about 150,000 in the 1960’s to about 60,000 in the mid-nineties. This has been occasioned by the HIV AIDS epidemic, lack of education among potential donors and poor motivation and retention strategies. The current need is 200,000 units annually. KNBTS was able to collect 100,032 units in 2008, 50% of the required number.

There has been a heavy reliance on Secondary School students leading to drastic reduction of the amount of blood donated during vacation months.

According to the Kenya National Bureau of Statistics (2007), the out-of-school population in Kenya (20 - 64 years old) constitutes 48% of the Kenyan population. This population contributes only 30% of the blood collected in the country. School-going children aged 15-19 years make up 11% of the population of potential blood donors and contribute over 70% of all the blood donated. Targeting to reach more of the out-of-school population to regularly donate blood would help bridge the gap.

AIM
Build a pool of regular safe donors within the out-of-school population.

MATERIALS AND METHODS
HOPE worldwide Kenya, through the President’s Emergency Plan for Aids Relief (PEPFAR) funding, recruits, retains and motivates blood donors mainly from the out-of-school population within Faith Based Organizations (FBOs), Community Based Organizations (CBOs) and the general public around the six regional blood centres in Kenya i.e. Nairobi, Mombasa, Nakuru, Embu, Eldoret, and Kisumu. This is done through health talks, distribution of Information, Education and Communication (IEC) materials, engagement of electronic and print media, and celebrity campaigns. Blood donation mobile clinics are organized within identified specific sites, FBOs and CBOs in the six regions. Public Private Partnerships have been engaged to support blood donor campaigns. Pledge 25 clubs have been formed within the out-of-school potential blood donors for regular blood donation.

RESULTS
Using the above mentioned methods, 14,675 units were collected as shown in the Table 1 above. About 41% (5,957) of the donors were repeat-donors. This indicates that it is possible to inculcate a culture of regular blood donation among the out-of-school population.

CONCLUSION
More emphasis needs to be placed on recruitment of the out-of-school population. Specific campaigns are needed to capture this population of potential blood donors through motivation and retention strategies.


Resource mobilization through Public Private Partnership would enhance motivation for donors.

<table>
<thead>
<tr>
<th>Collection area</th>
<th>No. of Units</th>
<th>No. of Repeat Donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile sites</td>
<td>6,705</td>
<td>3,867</td>
</tr>
<tr>
<td>FBOs</td>
<td>1,509</td>
<td>645</td>
</tr>
<tr>
<td>Schools / colleges</td>
<td>919</td>
<td>190</td>
</tr>
<tr>
<td>(Eldoret/Nakuru/Embu/Mombasa)</td>
<td>5,542</td>
<td>1,255</td>
</tr>
<tr>
<td>Total</td>
<td>14,675</td>
<td>5,957</td>
</tr>
</tbody>
</table>

DONOR BLOOD INSUFFICIENCY IN AFRICA: GENDER AND CULTURAL DIMENSIONS

Adewuyi JO, Olawumi HO
University of Ilorin Teaching Hospital, Nigeria

BACKGROUND
Gender and cultural factors are thought to contribute to the insufficiency of donor blood in Africa. Using Nigeria as a case study, reasons for gender disproportion in voluntary blood donations were investigated.

METHODS
Information was gathered from male and female subjects between the ages of 16 and 65 years by questionnaires, on their knowledge of, and attitude to blood donation and their experience as blood donors where applicable. Respondents’ views were sought on possible motivational and inhibitory factors for voluntary blood donation.

RESULTS
Only 5.2% of the women have ever donated blood compared to 11.6% for the men. Of the male donors, 65%, and the female donors, 73.5%, were first-time donors, and 65% and 57% of them donated blood at family request, respectively. Paid donation was more common with men than women while 27% of men and 11% of women thought blood donation was for men only. The commonest reason given for not donating blood was the absence of advocacy and the strongest suggested motivational factor was family request, not altruism.

CONCLUSION
With fewer windows of opportunity for regular blood donation, coupled with cultural and gender inhibitions, greater advocacy is required to increase the numbers of female voluntary blood donors in Africa.
CHALLENGES TO BLOOD DONOR RECRUITMENT PROGRAMMES IN THE EAST AFRICAN REGION

Mbabazi E
Uganda Blood Transfusion Service

INTRODUCTION AND BACKGROUND
The overall goal for all National Blood Transfusion services in the East African (EA) region is to recruit and retain adequate numbers of voluntary non-remunerated, altruistic blood donors from low risk populations so as to ensure a constant supply of safe blood that meets transfusion needs in the health sector. However, there are a number of challenges that present varying constraints, which in turn frustrate efforts to attain the goal. The Blood Donor Recruitment (BDR) programme has been put in place to continuously engage donor communities and motivate them to give blood. But, currently the programme operates below demand levels.

AIM
This paper presents major challenges facing the BDR programme and proposes strategies to minimize these. It also attempts to review the state of BDR programmes in the region.

METHODS
Experience in donor recruitment, observation, documentary analysis and interaction with colleagues engaged in BDR activities are the basis of the analysis.

RESULTS: CHALLENGES
The analysis of BDR programmes reveals that donor recruitment is confronted by a multiplicity of cross cutting challenges that hinder attainment of the desired goal. These challenges include a vague programme and job title which is not clearly perceived by government public service ministries. Consequently most BDR officers are not government employees and are less committed to work. Some health workers have been trained for BDR but the health service has transferred them to other medical departments, leading to increased training costs. Additionally, donor recruitment activities with sub-operational units are too costly for national budgets.

High costs affect sustainability of programme activities and production of adequate IEC materials. In addition, IEC materials are produced largely in two languages - English and Swahili, meaning that some donor populations may fail to understand the intended messages.

There is no uniformity in TTIs notification polices. BTS continues to take blood from people who may be infected with TTIs thus increasing wastage and risk of blood transfusions. Lastly there is the challenge on the continued agitation for donor awards and gifts. Donor recruiters use awards as a tool to help them persuade and attract blood donors, negatively affecting the concept of voluntarism and altruism.

CONCLUSIONS
Despite the fact that NBTSs in the EA region are at varying levels of development in BDR programmes, they continue to experience similar constraints such as low voluntary donor rates, unstable donor retention rates, existence of replacement/paid donors, social myths and misconceptions, negative attitudes, fragmented blood systems, non-compliance with QA requirements, high prevalence of TTIs, ever increasing demand for blood and inadequate funding.

It is important to develop reliable, sustainable and dependable BDR programmes that recruit and retain safe and committed blood donors. This calls for the establishment of autonomous NBTSs with good governance of the blood programme that ensures quality standards, public trust and sustainable growth and development of voluntary blood donor programmes.

STRATEGIES TO MAINTAIN EFFECTIVE DONOR RECRUITMENT AND RETENTION IN A HARSH OPERATING ENVIRONMENT - LESSONS FROM ZIMBABWE

Masvikeni EM, Mapako T
National Blood Service Zimbabwe - NBSZ

INTRODUCTION AND BACKGROUND
The World Health Organization promotes the collection of blood from voluntary non-remunerated donors from low risk population groups, and 100% testing of donated blood. NBSZ has attained both benchmarks. Unfortunately, due to a myriad of operational challenges which were a consequence of deterioration in the economic and political environment, NBSZ performance was severely affected. Some factors which militated against NBSZ operations include:
- A politically unstable environment
- Record year on year inflation of 231 million % (July 2008)
- Shortage of foreign currency
- Cash shortage
- Shortage of basic commodities
- Loss of regular donors due to migration
- Fuel shortage
- Company closures and disruption to the school calendar

As a result, blood donors were hardest hit; e.g. failure by NBSZ to turn up for blood drives, non-provision of donor incentives and at times lack of donor care. In the face of this, NBSZ set itself ambitious standards such as ISO 9001: 2000 certification and other interventions in order to continue providing safe blood, albeit inadequate.

AIM
To highlight the negative impact of the harsh operating environment on NBSZ's donor recruitment programme and the impact of intervention strategies that NBSZ introduced to mitigate these challenges.

MATERIALS AND METHODS
Data was obtained from NBSZ blood donor management system, the SafeNet and Annual Reports. Blood collection and TTI data for the past ten years (1998-2008) was analysed in order to identify trends and possible explanation for the trends.
RESULTS
Blood collections decreased by 39% from 80,233 (1998) to 48,916 (2008) whilst HIV sero-prevalence amongst blood donors decreased from 0.89% to 0.50% over the same period.

Despite difficulties in incentivising donors, and recruiting and retaining staff, NBSZ has:
- Maintained a system based on 100% voluntary non-remunerated blood donation and 100% testing of donated blood.
- Streamlined and targeted high yielding panels resulting in sustained year on year donor retention of about 34%.
- Introduced schemes to motivate critical staff by awarding foreign currency allowances.
- Reduced staff costs by freezing vacant post where appropriate.
- Introduced centralised blood group serology resulting in cost reduction.

CONCLUSION
Despite challenges in the operating environment, it is incumbent upon Blood Transfusion Services to develop strategies that build confidence with stakeholders in order to retain donor and customer confidence and to prevent a drop in quality standards.

DONOR RECRUITMENT, MOTIVATION AND RETENTION IN CONSTANTIA PARK, SOUTH AFRICA

Mbombo Z, Ndayi S
South African National Blood Service - SANBS

INTRODUCTION
SANBS has faced many challenges in its mission to provide all patients with sufficient safe, quality blood products in an equitable, cost effective manner. The decision to become a regular blood donor is a hard sell in a time-deprived, self-centred community with increasing risk due to the high HIV prevalence rate

AIMS
Knowledge, attitudes and perception study was undertaken in 2005 to determine whether the target market is reached and whether there is an increased awareness and a positive change in the behaviour of the target market.

DESIGN AND METHODS
The target group included three primary types of respondents within South African communities: Current donors - individuals who have donated blood in the 12 months prior to the study, lapsed donors - individuals who have donated blood previously but not in the 12 months prior to the study - Non-donor individuals who have never donated blood.

METHODOLOGY
Fifteen communities were selected at random. Door-to-door interviews were conducted with non-donors of 16+ years within these communities. Sampling was based on the community size - ensuring that at least 60 non-donor interviews would be conducted per community. Sample of 180 non-donor interviews per community cluster selected.

RESULTS
The traditional donors highlighted altruistic motives as the main reasons for donating and the majority of the donors were White/Afrikaans and English speaking, higher education and Income levels. The potential respondents (non-donors) included younger, cosmopolitan, less conservative, self confident and analytical. Have a sense of social responsibility but want to lead a busy, sociable and rewarding lifestyle. Strike a balance between living for today and planning for the future. Try and keep physically fit to stay ahead.

During 2006 and 2007 there was a move to recruit and motivate the latter group, and a post implementation study revealed a change in the donor demographics. Those retained were between the ages of 31-40. The second highest donations were ages 41-50. Notwithstanding that, there were more donations from the age group 16-19 than those who are 20-30. Emphasis has been on the youth and these have been segmented into the following groups:

7-12 Years: Raised interest through education - introduced program for schools to 'Adopt a fixed site for a month' and kids encouraged to recruit their parents to be blood donors.


Focus has also been on recruiting and retaining all population groups with a strong emphasis on the Black communities.

The increase has been most evident in new donors. Between 2007 and 2008 collections from White donors decreased by 4.7%, whilst donations from the Black donors increased drastically by 42%. Consequently in 2007, there were more blood collections from Black donors than there were from Asian and Coloured donations. Establishing 5 new blood donor clinics in Black communities has also necessitated the increase in Black donors.

CONCLUSION AND RECOMMENDATIONS
The donor recruitment and retention programmes in South Africa have been intense with pockets of successes. SANBS marketing interventions which are/were primarily aimed at Black donors had a positive impact; the challenge remains to retain low risk blood donors.
KENYA NBTS / JICA PROJECT; SCOPE, GOALS AND OUTPUTS

Sugut WK
National Blood Transfusion Service, Kenya

INTRODUCTION

JICA launched a blood safety project in Kenya in October 2006 after the signing of record of discussion by both Permanent Secretaries of Ministry of Health and Finance from Kenya and JICA representative.

AIMS

The overall goal of the project was to develop, demonstrate and apply national standards to approaches for safe, appropriate and efficient use of blood and blood products on pilot in Nakuru, and then role out nationally, pegged on initial success.

MATERIALS AND METHODS

The above was conducted through
1. Composition of project team comprising of NBTS, RBTC Nakuru and JICA experts.
2. Identify model hospitals and form HTCs.
3. Conduct regular project team meetings.
4. Review existing guidelines, tools, SOPs for further development.
5. Develop checklist / indicators for BTS / Project monitoring.
6. Situational analysis of BTS.
7. Conduct sensitization workshops.
8. Cost analysis on Nakuru RBTC for future expansion planning.
9. Develop a computerized bar code system for BTS.
10. Conduct dissemination workshops / educational tour to share project outputs with stakeholders.
11. Develop strategy to introduce small volume blood packs for children.
12. Provide necessary equipment to RBTC and model hospitals.
13. Train trainers and lab techs. on product preparation.
14. Develop a logistics and inventory management strategy and train trainers and related staff of NBTS and hospitals.
15. Develop a strategy to improve cleanliness, safety and appropriate clinical use of blood products by training trainers and medical personnel.
16. Develop a monitoring and supervision system between hospital and RBTC.
17. Document findings

RESULTS

Hospital Transfusion Committees were established in each of the model hospitals and are now providing the communication linkage between hospitals and transfusion service. Preparation and use of small volume paediatric packs has been piloted in Nakuru PGH and now in use in the three model hospitals. Logistics and inventory management is now well established and the good practices are already being rolled out to other hospitals countrywide. RBTC Nakuru has now started preparing components for use in the three model hospitals initially starting with the Provincial hospital.

CONCLUSION

The situation of blood transfusion services in Nakuru is better understood and linkages and communication to hospitals strengthened. Smaller volume blood packs for paediatric transfusion are prepared and safely transfused. Logistics and inventory management of blood products is improved at NBTS, RBTC and model hospitals. Blood products are safely and appropriately transfused at model hospitals and can now be rolled out nationally.

INTRODUCTION OF SMALL VOLUME PACKS FOR PAEDIATRIC TRANSFUSION IN RIFY VALLEY PROVINCIAL GENERAL HOSPITAL, NAKURU

Dahir AJ1, Sugut W1, Orgut I1, Njuguna P2, Nyamongo J3, Miller M3, Koga S3
1. Kenya National Blood Transfusion Service
2. Rift Valley Provincial General Hospital Nakuru
3. NBTS/JICA Blood Safety Project

BACKGROUND

The National Blood Transfusion Service is entrusted with the responsibility of managing the blood programme in the country. It recognizes children to be a major proportion of transfusion recipients in the country. The standard volume of whole blood is 450 ml, while most paediatric transfusion requires smaller volume than 450 ml. This standard volume does not only threaten the safety of blood transfusion but a considerable amount of blood is wasted.

An earlier survey conducted in 2002 in Kenya estimated paediatric transfusion to children <12 years at 32.8%; a third of all transfusions. A pilot study was carried out in PGH Nakuru through the support of NBTS/JICA blood safety project to address paediatric transfusion. The objective was to reduce blood wastage and find a more cost effective way of transfusing children.

The Regional Blood Transfusion Center (RBTC) Nakuru started the preparation and production of 125 ml packed red cells (PRC) for paediatric patients at Provincial General Hospital (PGH), Nakuru in November 2007.

MATERIALS USED

Triple bag with SAG-M additive solution; digital weighing scale; blood stand; labels R1 & R2; 125 ml printed stamp; stock inventory ledger; Request & Issue voucher.

<table>
<thead>
<tr>
<th>Table: Calculation of unit numbers at start of pilot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usage calculations</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>1. Monthly maximum</td>
</tr>
<tr>
<td>2. Monthly average</td>
</tr>
<tr>
<td>3. Average of 1+2 above</td>
</tr>
<tr>
<td>4. No. small packs to be prepared for 2 weeks based on 3 above</td>
</tr>
</tbody>
</table>
RESULTS
A retrospective study from 1 June 2006 to 31 December 2006 showed that of 2,015 units crossmatched at PGH Nakuru, 184 units were transfused to paediatric patients, representing 9.13%. The preparation of PRCs for paediatric transfusion was done in RBTC Nakuru. In addition, the number of small packs to be prepared was determined through a survey conducted between May and December 2006.

Out of 228 small volume packs prepared, 136 units (60%) was transfused to paediatric patients and 33 units (14%) transfused to adults to avoid expiry.

CONCLUSION
According to the evaluation and analysis report in July 2008, the use of 125 ml packed RBCs is meaningful for treating paediatric patients and improving blood transfusion safety. A constant supply of RBCs was achieved due to sub-division of adult units into two units and overall blood wastage was reduced. Volume in 95% of paediatric transfusion was <126 ml. There may be a further need to adjust the volume to 100 ml to increase adequacy of supply while minimizing blood wastage and maximizing cost reduction.

PRONOUNCED COLOUR CHANGE IN SMALL VOLUME PACKED RED CELLS

Miller M1, Dahir A1, Orgut I2, Njuguna P3, Nyamongo J4, Koga S4, Nagashima M4
1. Kenya National Blood Transfusion Service
2. Regional Blood Transfusion Center- Nakuru
3. Rift Valley Provincial General Hospital Nakuru
4. NBTS/JICA Blood Safety Project

INTRODUCTION AND BACKGROUND
There was blood wastage when 450 ml whole blood bags were used on paediatric patients, because paediatric patients require a much lower volume than adult patients. To reduce blood wastage and try to find a more cost effective way in Kenya, we at the Regional Blood Transfusion Center (RBTC), Nakuru started producing 125 ml Packed Red Cells (small PRCs) for paediatric patients at Provincial General Hospital (PGH), Nakuru in November 2007. Later, we realized that there was frequently a pronounced colour change to bright red to 125 ml PRCs, 2-3 weeks after collection date.

AIM
To investigate the cause of the colour change issue and evaluate three kinds of triple blood bags with CPD/SAG-M solution.

MATERIALS AND METHODS
A, B, and C brand triple blood bags with CPD/SAG-M solution were used. Blood was donated from ordinary donors in Rift Vary Province, Kenya. Blood was tested biochemically and haematologically at Aga Khan laboratories in Nairobi and Nakuru, and bacteriologically at Nagasaki University Nairobi Station (Kenya Medical Research Institute).

RESULTS
No haemolysis could be detected by observing the supernatant. The results of bacterial cultures were negative. But according to gas analysis, pronounced colour change was caused by extraordinary oxygenation (PO2 260.7 mmHg, SD: 44.3, n=3) due to the use of 450 ml bags for 125 ml PRCs, which is uncommon. Also, Hb levels were lower (the lowest Hb was 8.2 g/dL) than the normal range for PRCs, which made the Hb link to more oxygen.

CONCLUSIONS
It was concluded that the oxygenation that led to the colour changes in PRCs could be affected by the following possible factors:

1. Thickness of blood bags: Brand A triple blood bags allow more oxygen to penetrate (PO2 260.7 mmHg, SD: 44.3, n=3) during the storage period than Brand B triple bags (PO2 66.7 mmHg, SD: 8.3, n=2), because they are thinner. Blood gas analysis was not available when we wanted to test Brand C’s triple bags.

2. Surface area of blood bags: Bags with a larger surface area allow for more oxygenation than ones with a smaller surface area. This is because the volume of blood in larger or smaller bags is the same, but a greater surface area will allow more oxygen to penetrate the bag. B and C brand triple bags had lower surface areas than A brand triple bags.

3. Low Hb level blood: Although there is nothing wrong with having more oxygen in PRCs, since PRCs are not tested specifically for Hb level, a bright red colour may be an indication of low Hb level, which is ineffective. PRCs with lower Hb levels are penetrated by more oxygen per Hb, which makes the colour change earlier (about 2 weeks after the collection date). This is because the permeation rate is the same, but there is less Hb for it to bind to, making the Hb more oxygenated and giving it a brighter red colour.

BLOOD TEMPERATURE MONITORING DURING TRANSPORTATION

Wanyoike G1, Noguchi N2, Maalim I3, Muiruri G4
1. Ministry of Health, stationed at National Blood Transfusion Services (NBTS)
2. Japan International Cooperation Agency (JICA) for JICA/NBTS blood safety project
3. Ministry of Health stationed at Garissa Provincial General Hospital (PGH)
4. Ministry of Health stationed at NBTS

INTRODUCTION AND BACKGROUND
In Kenya, six Regional Blood Transfusion Centers (RBTCs) collect, screen and provide blood to hospitals. In general each hospital comes to the nearest RBTC and picks up blood in a cool box. Most hospitals are within an average distance of 200 km
from the respective RBTC, and it takes up to six hours for the blood to reach the hospital, due to other errands allocated to the vehicle coming to fetch the blood. Ambient temperatures in the country vary from 15 °C in the cold season to 30 °C in the hot season. However, data to guarantee safe blood transportation temperatures was not available. A study was conducted by Kenya Blood Transfusion Services, Nairobi in March 2008, on temperature monitoring during transportation of blood from Nairobi NBTC to Garissa PGH, an approximate distance of 400 km, and the findings of this study are presented.

AIMS
1. To determine the temperature of the blood units being transported in actual conditions during the hot season.
2. To provide data for use and reference when writing or reviewing the Standard Operating Procedure on packing of blood units for transportation.
3. To extrapolate the results for application in other conditions.

MATERIALS
Transportation box (Coleman ice chest); 8 ice packs of 450 g frozen at -18 °C; separation cartons, 3 pieces; temperature monitors; download reader, polystyrene packs and open cabin transportation vehicle.

METHOD
We allowed the laboratory technicians to pack the blood units as they usually do, not being influenced by the study:
Thirty three units of blood were packed in two layers, with 4 ice packs on the top and bottom of the blood units, and insulated from direct contact with the units by pieces of carton. Two temperature monitors were placed inside the cool box (upper and lower), while a third monitor was fastened on the cool box and the blood transported to destination.

RESULTS
1. The average ambient temperature during transportation was 26.0 °C.
2. The monitor within the top layer of the blood units conformed to storage temperature requirements having a maximum temperature of 3.2 °C, and a minimum temperature of 3.1 °C.
3. The monitor within the bottom layer of the blood units conformed to upper limit storage temperature requirements, but had a minimum temperature of 0.8 °C, and maintained a temperature of below 1 °C for 2 h, 29 min.

CONCLUSIONS
1. During packaging of blood units for transportation, it is appropriate to have one layer of ice packs (on the top). Cold air descends, and therefore it will cool both the blood units on the top and bottom. An extra layer of ice packs at the bottom of the ice chest will further reduce temperatures below the lower limits, risking hemolysis.
2. Alternatively the ice packs may be kept at room temperature for about five minutes to raise the temperature above -18 °C.

INTRODUCTION OF NEW BLOOD MANAGEMENT SYSTEM IN NAKURU REGION, KENYA
Agata J1, Noguchi N2, Nyamongo J3, Nagashima M3, Kiptanui N4, Orgut I6, Koga S3, Sugut W3
1. Regional Blood Transfusion Center, Nakuru
2. NBTS/Japanese International Cooperation Agency (JICA) Blood Safety Project

INTRODUCTION
Regional Blood Transfusion (RBTC) Nakuru established in 2002 serves forty nine transfusing hospitals in the region. For the RBTC to effectively serve them with adequate blood and monitor usage there was need to understand blood inventory management system at Hospitals in the region and come up with systems of strengthening their capacity.

AIMS:
To determine whether:
G Hospital staff knew when and how many units of blood per group should be requested (answer was ‘no’ by all 3 hospitals)
G Hospital and RBTC staff knew average daily consumption per blood type (answer was ‘no’)

METHOD:
Three hospitals - Rift Valley Provincial General Hospital (PGH Nakuru), Koibatek, and Naivasha District hospitals were chosen as model sites, plus RBTC Nakuru.

Baseline survey was conducted using a questionnaire.

Issue record at RBTC and crossmatch record data at model hospitals were analyzed in March 2007.

Actions taken include:
G Introduction of requisition system based on maximum and minimum stock balance theory.
G Revision of request/issue/receipt voucher form.
G Introduction of blood stock ledger.
G Periodical supervisory visits.
G Data collection during periodic supervisory visits to monitor the activities.

Analysis of data collected was done in May 2008, and compared with baseline survey results.

RESULT
Maximum and minimum stock levels of all Rh positive and negative blood groups were set in the three model hospitals. The three hospitals made a request whenever stock level of any blood group fell below the minimum. As a result stock out of the blood was reduced in Naivasha and Koibatek District hospitals, which is explained by drastic reduction of atypical (out of group) transfusion in crossmatch record. Percentage of O Rh positive blood among all issued blood was decreased and overuse of group O Rh positive blood was reduced in the two hospitals.
Decrease in “maximum interval of blood receipts in a year” explains the improvement in regularity at which hospitals collected blood. Stock ledger was introduced and staff keep the record as a routine job, hence they can see the amount of stock per blood type without opening the fridge and utilize record data to improve stock management.

CONCLUSION
The result in the three model hospitals was so impressive, that we expanded the system to other hospitals in the region. The system has worked well in the hospitals and now no hospital over requests O Rh positive blood any more. Due to good results the system is now being adopted nationally and its sustainability will go a long way in addressing shortage of blood in the hospitals.

MANUAL ON SUPPORT SUPERVISION

Noguchi N1, Ongwae S2, Agata J3, Rombo C2, Sugut W2
1. Japan International Cooperation Agency
3. Nakuru Regional Blood Transfusion Center, Kenya

INTRODUCTION
In Kenya, 6 Regional Blood Transfusion Centers (RBTCs) collect and screen blood for transfusion, and provide it to hospitals in the area. For effective and efficient use and proper handling of blood at hospitals, technical support and supervision is crucial. RBTCs are recommended to visit hospitals in their area, for supervision, quarterly. However, only a few hospitals were actually visited by RBTC staff and the method of supervision has not been standardized. Based on experiences in Nakuru, that supervisory visits to hospitals by RBTC staff with a supervision checklist is so effective to improve handling and use of blood at hospitals, as well as to promote mutual communication between provider (RBTC) and receiver (hospital), National Blood Transfusion Service (NBTS) started developing a checklist for supervisory visits, and a supervisor’s manual.

AIMS
Purposes of development of the checklist and its manual are:
- To provide criteria to monitor activities at hospital labs on blood transfusion.
- To instruct supervisors to prepare hospital visits, monitor activities at the lab and give advice to lab staff.
- To collect data and analyze for further improvement of RBTC activities.
- To establish standardized system of supervisory visits from RBTC to hospitals.

METHOD/PROCESS
1. Framework of checklist was agreed among development team members.
2. First draft of checklist and supervisor’s manual were written according to framework.
3. Discussed contents with future users at workshop (16 participants).
4. Second draft was written and validation studies were conducted.
5. Draft revised and sent to authorities and stakeholders to obtain their opinions.
6. Final draft was written and then submitted to Ministry of Medical Service for approval.
7. Checklist and manual printed and provided to RBTCs at training workshop.

RESULT/PRODUCT
The checklist consists of 6 parts:
1. General information
2. Record/Manual
3. Stock-taking
4. Condition of fridge
5. Other equipment & supplies
6. Other issues
Thirty three Yes/No questions are included. Condition of fridge is scored with 10 questions.

Supervisors' manual includes ways of preparation and arrangement of supervisory visit, and actions to be taken according to result of checklist.

CONCLUSION
Standardized and validated checklist for supervisory visit and supervisors’ manual were developed. Involvement of future user in the process of development encourages them to exploit the checklist and manual afterwards. System of supervisory visit by RBTCs to hospitals was established. The checklist and manual can be applicable to other countries in Africa.
APPLICATION OF LESSONS LEARNED IN IMPROVING ACCESS TO SAFE BLOOD

Nagashima M
Japanese International Cooperation Agency (JICA)
Blood Safety Project

BACKGROUND
In the Republic of Kenya, whole blood has been commonly given to patients requiring blood transfusion, but blood components such as packed red cells (PRC), FFP and platelets should be selected as appropriate, to avoid the unnecessary use of whole blood. JICA and NBTS started a joint project for appropriate and safe blood since October, 2006 and have continued working towards this goal. We learned a lot of lessons from the activities of the project.

APPLICATION OF LESSONS LEARNED
Looking back at the history of Japanese blood transfusion policy, many people have made frequent errors and there have been many tragic blood transfusion-related experiences regardless of enthusiasm to improve the situation, and after hard work, some were successful. These errors often promoted better blood transfusion systems. Kenya may have difficult problems and errors for establishing a better system, but these must be the cornerstone for the future.

Supply of component blood started in March this year from the Regional Blood Transfusion Centre, Nakuru to the Provincial General Hospital, Nakuru due to hard work of staff concerned. There have been many problems to be solved along the way to the establishment of a blood component system. Now almost 100% of blood ordered by doctors for blood transfusion is PRCs, except for rare cases. This success will easily bring NBTS a nationwide system of blood transfusion which benefits people in Kenya.

A Hospital Transfusion Committee was launched in each model hospital in Nakuru District about a year ago and has enthusiastically continued developing. It has become a good place for discussing freely and sharing the important issues on blood transfusion among interdisciplinary hospital personnel. Because of these open discussions, ideas and information are widely expanded in the hospitals and are useful for providing better health care for the patients.

It seems that “haemovigilance” is a new concept, but generally medical care carries the risk of adverse effects, sometimes beyond our control. In order to provide good medication for patients, we have to make efforts to prevent avoidable adverse events in all medical facilities. Haemovigilance of blood transfusion therapy is included in this concept of “hospital risk management” and is a good way to expand and establish it in the hospital.

A diversity of improvement and accomplishment in blood transfusion policy has been brought about since starting the project. Hereafter, what will be needed most importantly is to sustain and to develop the budget, human resources, and academic research in Kenya.

LIAISON ROLE OF SCHOOL TEACHERS IN BLOOD COLLECTION, DONOR MOTIVATION AND RETENTION AT SCHOOLS

Los APM
IDTM, Groningen - NL

INTRODUCTION AND BACKGROUND
Secondary school students are a major source of voluntary blood donors in most African countries, regularly accountable for 60-80% of the blood supply. A nation wide inventory was carried out in Uganda secondary schools to assess teachers’ attitudes, knowledge and motivation on blood donation issues, organization and performance practice of mobile collection teams.

AIM
To improve on the organization of voluntary blood donor motivation, retention and continuity of blood donation in schools and post schooling. To improve cooperation and create synergy between major stakeholders: Uganda Blood Transfusion Service (UBTS), Uganda Red Cross Society (URCS), and school teacher liaison.

MATERIALS AND METHODS
Presentation of results of initial inventory/assessment in 2 day workshop for Blood Donor Recruiters (BDR), followed by 4 regional one-day workshops for BDR and teachers together with UBTS and URCS staff. Participants were given the following issues to discuss and to prepare their views for presentation in plenary:
1. role and importance of school teacher liaison,
2. approaches to giving information to students,
3. approach to teachers-parents associations,
4. problems encountered with notification of test results,
5. approaches to follow up of donors in the community.

RESULTS
Response to initial 2006 assessment: 570/1600 (36%). 86% approved attention to blood donation in school through: sensitization by URCS, UBTS team, and 96% were willing to participate in relevant workshops. Teachers expressed willingness to liaise as focal points in their respective schools and facilitate the process of giving information to students about voluntary blood donation. They expressed willingness to facilitate and assist in the organization of blood collection visits and to sensitize other teachers and school authorities to the need for blood and regular donors. They highlighted the importance of parents-teachers meetings as a venue to mobilize and raise awareness in the community at large about the importance of voluntary blood donation.

CONCLUSION
Results confirmed and consolidated the importance of the role of teachers in promoting the concepts of voluntary blood donation. Most important item: teachers emphasize the necessity to change from their individual role in the blood donation practice to a more organized collective panel,
to become a strong partner in the liaison between UBTS, URCS and themselves. Communication procedures with schools, teachers and students have to be readjusted in the light of comments raised by teachers. The retention and recall of donors after they leave school depends on the effectiveness of donor records and computerization. School environment seems not conducive to extending donor care and support required during notification of test results due to problems of student privacy. Practical points of attention: schools should be visited regularly for communication and information, and not only for collecting blood. The Uganda liaison of UBTS, URCS and teachers could probably serve as a model for improving blood transfusion practice in Africa.

OVERVIEW OF SENSITIZATION OF BLOOD DONORS BY INTERPERSONAL CONTACT IN DRC: 2000-2008

David NN
Centre National de Transfusion Sanguine, Democratic Republic of the Congo

INTRODUCTION AND BACKGROUND
In spite of many efforts, the CNTS of DRC covers only 40% of the needs of blood products.

AIM
- To assess the impact of sensitization of blood donors by the classic strategy of Information, Education and Communication (IEC) and interpersonal contact.
- To improve donor recruitment strategy by implementing / creating Club 25 for young people.

MATERIALS AND METHODS
Review of literature concerning blood donation in DRC. Review of annual reports of the CNTS from 2000 to 2008.

RESULTS
Table 1: Evolution of blood donors (by %): 2000-2008 in DRC

<table>
<thead>
<tr>
<th>Year</th>
<th>Voluntary donors</th>
<th>Family donors</th>
<th>Paid donors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>11</td>
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<td>67</td>
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<td>35</td>
<td>59</td>
<td>6</td>
</tr>
<tr>
<td>2008</td>
<td>39</td>
<td>59</td>
<td>5.4</td>
</tr>
</tbody>
</table>

* information not available

CONCLUSION
This study shows that:
- A continuous increase in voluntary donors requires permanent sensitizing.
- An external financial support system only from partners constitutes a threat to the programme of recruitment of voluntary donors.
- In DRC, in spite of much effort and a financial allocation for the last 8 years, the proportion of voluntary donors remains low (< 50%).
- Weak impact of the strategy to increase voluntary donors means that the 2012 target of 80% voluntary donors will not be met.
- An innovative approach, such as Club 25 that has been used successfully in other countries, is needed.

IS THE YOUNG DONOR THE SILVER LINING OR THE ACHILLES HEEL OF BLOOD DONATION?

Knox P
Part Time Lecturer, Postgraduate Diploma in Transfusion Medicine, University of Free State

INTRODUCTION AND BACKGROUND
The young donor is an attractive option for donor recruitment. For developed countries the young donor is seen as the answer to an aging donor population. In the developing world where blood donation is not fully established the youth offer a captive and enthusiastic audience. However it is not all a bed of roses when handling these young donors.

AIM
To review some issues which make the youthful donor problematic unless adequate planning and preventative management is considered.
METHOD
During this presentation 5 areas of concern will be discussed:
1. The millennial generation are more civic minded; determined to help their communities. However, they do this at their convenience; hence stop donating once they leave school. Although they receive HIV education at school it is necessary to remind them frequently and repeatedly of the risks and impact on the safety of the blood. HIV prevention among young people is an urgent priority, since according to UNAIDS 45% of HIV transmission worldwide takes place in young people aged 15 to 24 years. Over a 4 year period an increasing HIV prevalence was seen in school clinics.

2. The large numbers which present at school clinics require forward planning and additional well trained tolerant staff to screen these playful young donors who will challenge the staff by misrepresenting the facts such as permission from parents, correct age, playing sport post donation and jointly completing their donor questionnaires.

3. The majority of the youth are very open and honest about their sexuality. During the donor one-on-one interview staff should be non-judgemental and have counselling skills that prevent donors changing their answers. Out of 51 HIV positive scholars, 14 (27%) had changed an answer during a one-on-one interview (Eastern Cape SA, 2005 - 2008).

4. A higher donor reaction rate has been noted in the literature. It is well known that the first time donor is more likely to faint, female donors and low weight especially among young girls provides ample reason for a higher donor reaction rate. A preventative measure which appears to have some merit is preloading these donors with fluids 10 to 15 minutes prior to donation.

5. HIV counselling of HIV positive donors provides enormous challenges. These students are difficult to contact, both phone and letters can result in loss of confidentiality. Once contacted the ability to come for counselling is often difficult due to transport or finances. The option of BTS staff going to the scholar is a poor one due to the risk of stigmatisation of both scholar and school.

CONCLUSION
The youth are the donors of the future yet without careful planning the Blood Service could scare them off for life. Planning of meaningful education prior to clinics, sufficient staffing at clinics and processes to manage donor reactions and donor counselling must be in place prior to embarking on bleeding these donors.

PERCEPTIONS AND BELIEFS OF POTENTIAL BLOOD DONORS
Koster J, Fonderson MS
Give Safe Blood Foundation

INTRODUCTION
Increasing attention focuses on the major shortages of blood that should be available for blood transfusions in African hospitals. For this reason, a number of organizations have dedicated their services to implementing sustainable blood supply systems and quality control in blood products. These structures are important for the maintenance of safe blood, but the crux of the problem commonly lies in motivating and mobilizing people to donate blood to their local blood bank or hospital. For this reason, an equal amount of attention is needed in understanding the deep-seated cultural perceptions surrounding blood. Identifying these perceptions may facilitate certain traditional practices towards initiating the ‘marketable’ character of blood as a product.

AIMS
The primary aim of this study was to identify (major) barriers people experienced when asked to donate blood or receive a blood transfusion. The secondary aim was to investigate the contemporary transfusion services in a district hospital. Outcome variables included results derived from questionnaires taken by the researcher and volunteers.

MATERIALS AND METHODS
A qualitative medical anthropological research was carried out in an urban region of Bamenda, Cameroon. With the aid of a semi-structured open-interview, visitors of the district hospital in Bamenda and medical staff were asked to take part. A total of 30 respondents took part in the interviews. A group of nurses from the Bamenda hospital and a group of youths from a secondary school were also engaged in a focus group discussion.

RESULTS
The main findings revealed that, for participants in the questionnaire, a voluntary blood donation simply means that it is done out of one’s own free will. This does not mean, however, that voluntary blood donors might not ask for reimbursement. Participants emphasized that even though they would probably ask for money for donating, this donation will still be viewed as a voluntary blood donation. Participants shared the notion that blood should be replaced by certain products once it was ‘lost from their bodies’. Furthermore, many participants feared receiving blood from others due to the belief that they would receive a donor’s ‘bad character’. This was further elaborated by the commonly shared fear that a blood donation might be misused or dispatched to unknown destinations (outside the immediate family). There was a reluctance to donate blood out of fear that the blood would be screened for diseases such as HIV and that early death would be inevitable if HIV was indeed detected. Finally it was observed that an interdisciplinary computer database that shared demographic information on donors could assist hospitals in attracting blood donors efficiently.
SUMMARY/CONCLUSION
This study highlights that the concept of voluntary blood donation as perceived in Western countries is not the same as in certain sub-Saharan African countries. Knowing that voluntary donation differs from an unpaid, non-remunerated donation is vital for the recruitment and sustainability of donors. Due to structural fears and the marginal position of donors and recipients, their status concerning the giving and receiving of blood is under constant negotiation. The cultural barriers illuminate the micro-negotiable level to which blood donations and transfusions are subjected.

DONOR COUNSELLING CAN PROVIDE VALUABLE INFORMATION TO IMPROVE BLOOD SAFETY

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INTRODUCTION AND BACKGROUND
The HIV epidemic has had a devastating effect on the safety of the blood supply in Sub Saharan African and South Africa is no exception. For the protection of the people of South Africa, there is a legal requirement to provide both pre and post test counselling to anyone who undergoes an HIV test. This in the operational setting of Blood Transfusion is not always logistically possible and may be seen as a waste of precious limited resources. Post donation counselling of HIV positive donors can however provide valuable feedback on the effectiveness of donor screening and provide opportunities to improve both the donor interview and the questionnaire to improve blood safety.

AIM
The aim was to attempt to contact and counsel HIV positive donors from East London and surrounding areas. Information provided at the counselling session was compared with that provided on the donor questionnaire and in the one-on-one interview.

MATERIALS AND METHODS
On notification of a confirmed HIV positive result, the donor counsellor would contact the donor to set up a counselling appointment. In East London the first contact is made by means of a telephone call. If this provided no response then 2 further attempts to contact the donor were made over the next 6 months. Information acquired during the counselling session was entered onto a standardised information sheet and at a later stage transferred into a database which also contained donor demographics and questionnaire information.

RESULTS
Out of a total of 179 HIV positive donors during 2005 to December 2008, 138 were contacted. Many made appointments but failed to arrive. 39% were counselled and the following interesting facts emerged.
- 25% of ill-informed donors did not understand the window period.
- Multiple partners was a major problem with 15 donors having more than one partner in 12 months and 24 donors more than one partner in 3 years. Although most donors denied concurrency of partners on further questioning many would provide answers which suggest concurrent partners.
- Inconsistent use of condoms was highlighted with 24% admitting always, 41% sometimes and 31% never using a condom.
- Many donors (34.5%) changed the answer to a risk question during the one-on-one interview. The question which was most often changed was that which queried the lifestyle of their sex partners and the question which asked if the donor thought their blood was safe.

CONCLUSION
Although time consuming and emotionally draining, important information as to why HIV positive donors are not being detected by the donor screening process can be obtained. It can be concluded that additional important information was obtained by donor staff with additional counselling training. Counselling skills are of paramount importance for all donor staff involved in screening as it provides them with the ability to ask open-ended questions, probe without being pushy and defer donors without confrontation. Counselling skills should be a high priority for any donor staff training program.
IMPACT OF STRUCTURED BLOOD DONOR EDUCATION PROGRAMME ON SAFETY OF THE BLOOD SUPPLY

South African National Blood Service

BACKGROUND
The high HIV prevalence in South Africa threatens the safety of the country’s blood supply. The demographics of the blood donor population are skewed and although 85% of the population is black, they donated only 12% of the 722,207 units of whole blood procured in 2008. We report on the impact of structured language and culture specific donor education and self-exclusion programmes that focus on the youth and aim to increase the black donor base.

METHODS
Trained nursing and public relations staff educate and recruit blood donors stressing the merits of donating blood regularly, the relationship of safe blood with low-risk sexual behaviour, and the importance of the abstinence and be-faithful message. Blood donors are interviewed and complete a donor self-exclusion health questionnaire. They are deferred if not healthy or it is suspected that they may transmit viruses such as HIV to blood recipients. Donors are informed of their HIV status and this is reinforced in regular donors because all donations are screened.

RESULTS
Establishing 5 new blood donor clinics in black communities and focusing on the recruitment of black donors doubled the donations procured from these donors from 6.2% of SANBS donations in 2005 to 12% in 2008. The increase was most evident in new donors: donations from the black population increased from 17.3% of SANBS donations in 2005 to 32.8% in 2008. However the efforts to recruit black donors will be strengthened since only 2 per 1,000 of the black population donate blood as compared to 14 per 1,000 of the population of all donors. Donors from all ethnic groups were educated on HIV prevention. Donors are informed of their HIV status and this is reinforced in regular donors because all donations are screened.

CONCLUSION
The blood donor education and recruitment programme in South Africa is highly successful and has ensured a sufficient safe blood supply in a country with a very high HIV prevalence. The blood donors, particularly the youth, are considered peer promoters equipped with the knowledge to inform their community on the merits of a healthy lifestyle and donating blood. The blood donor education programme thus should be recognised as a valuable, validated public health HIV prevention initiative.

CHALLENGES TO BLOOD SAFETY IN THE BLOOD TRANSFUSION SERVICE IN A DEVELOPING SETTING

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INTRODUCTION
First do no harm is a statement for all involved in providing a medical service. Transfused blood must not transmit disease. However there are many processes involved in donor blood that pose challenges to safety.

OBJECTIVE
To document key challenges to blood safety in the hospital blood transfusion service.

SETTING
Blood transfusion unit at the Kenyatta National, MP Shah and Nairobi West Hospitals.

MATERIALS AND METHOD
Perusal and noting down the required information of the following documents on Kenya National Blood Transfusion service (NBTS); policy guidelines on blood transfusion, implementation of the new blood safety policy, National standards for blood transfusion services in Kenya, guidelines for the appropriate use of blood products and the standard operating procedure for getting donor blood at the Kenyatta National Hospital and MP Shah Hospital Nairobi.

MAIN OUTCOME MEASURES
Availability and use of the documents, applicability of the standard operating procedures as stipulated in the national documents, tests on donor blood, for hepatitis B and C, syphilis, HIV 1 and 2 and any other tests performed with respect to safety. Also documented were sources of donor blood and re-screening of donor blood obtained outside the user hospital, and methods used in getting blood donors and the type of staff involved in the blood donors and aspects of socioeconomic status of the recipient of donor blood.

RESULTS
All the three hospitals relied on availability of donor blood supply from the National Blood Centre in Nairobi and the hospitals’ ability to get the blood donors. The staff involved included trained staff, nurses, drivers, managers, accountants, donor organizers, volunteers and others. Numerous techniques are employed by donor mobilizers and hospitals to get blood donors. Donor factors were social, cultural and economic. The tests which were always performed were Hepatitis B, Syphilis and HIV, while Hepatitis C only occasionally when test kits were available. Only one of the three hospitals always repeated tests done by NBTC. The level of staff expertise, training, and experience determined retesting and extent of tests.

CONCLUSION
The challenges to blood safety are the structure of the service, the level of expertise of the staff, the hospital of admission, adherence to policy documents and guidelines and socioeconomic status of the recipient.
MALARIA AS TRANSFUSION TRANSMISSIBLE INFECTION: PRE-AND POST-TRANSFUSION THERAPY OR DEFERRALS?

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Malaria was first identified as a transfusion transmissible infection (TTI) in 1911 and nearly a century later, it remains a major TTI especially in endemic countries where, according to the World Health Organization, it is endemic in over 100 countries and home to about 2.4 billion people. There are an estimated 500 million cases of malaria occurring worldwide annually, with about a million deaths in the same interval.

Although non-endemic countries have felt the impact of malaria as a TTI through serious outcomes, some of which have been fatal (Williamson, 1999; Slinger et al, 2001; Mejia et al, 2006; Alkhuwani et al, 2008), the endemic countries tend to bear the brunt of it. For example, in studies carried out in some endemic countries of Sub-Saharan Africa, very high prevalences of malaria parasites have been reported among blood donors. With Nigeria and Benin reporting alarming prevalences of more than 30% in blood donors (Kinde-Gazard et al, 2000; Okocha et al, 2005; Uneke et al, 2006,) and Cameroon of 66.5% in antigenic analysis (Mbanya, 2002), the impact cannot be underestimated.

Several reports have indicated that Falciparum malaria is the most predominant and deadly type of malaria in most regions of sub-Saharan Africa, and a major cause of anaemia, thrombocytopenia and neutropenia, which may require transfusions. In the face of this vicious cycle, it remains a dilemma as to what strategies to adopt in malaria endemic regions:

- Pre-donation treatment?
- Post-transfusion treatment?
- Donor deferral?

BLOOD TRANSFUSION SAFETY IN RWANDA: DECADE, 1998 - 2008

Senyana F
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INTRODUCTION AND BACKGROUND
Following the 1994 genocide, the Rwandan national blood transfusion service has required major rehabilitation to achieve its mission to produce sufficient quantities of screened blood units for transfusion. In 1997, blood shortages were caused by the lack of testing reagents and cold chain equipment, inadequate systems for transporting blood from rural sites to regional centers, and insufficient production of blood components.

No national blood transfusion policies, guidelines, or standards existed. Three regional transfusion centers provided inequitable distribution of services at a national level.

AIM
Since 1999, blood donation has been promoted through national campaigns. In 2004, a comprehensive program was initiated to increase the quantity and quality of blood available for transfusion. National policies on transfusion, quality, and laboratory standard operating procedures were produced. Prospective blood donors were screened through questionnaires and medical consultation to retain eligible individuals. To reduce reagent stockouts, annual procurement planning was instituted with the national central drug purchasing unit (Camerwa). All 42 public hospitals in Rwanda received equipment for storing and transporting blood. Nine vehicles were dedicated for transporting blood from the periphery to regional centers. Equipment and trained personnel for platelet production were placed in Kigali in 2007. Two new regional centers in the remaining underserved provinces have been renovated and two other under renovation will become functional in 2010.

MATERIAL AND METHODS
A retrospective study was conducted to assess the prevalence of HIV, HBV, HCV and syphilis among blood donors at the National Blood Transfusion Center in Rwanda, from January 1998 to December 2008. All blood units were tested for HIV, HCV, HBV surface antigen (HBsAg) and syphilis. Enzyme-linked immunosorbent assay techniques with reagents from Abbott were used to test blood samples for anti-HIV, HBsAg and anti-HCV, and the RPR test was used to test for syphilis.

RESULTS AND LESSONS LEARNED
Between 1998 and 2008, the number of donated blood units increased from 19,722 to 35,495. During this same period, donor screening appeared to have improved: the proportions of HIV-infected blood units dropped from 1.50% to 0.74%; syphilis-infected blood units decreased from 0.70% to 0.34%; hepatitis B surface antigen-positive blood units dropped from 2.80% to 2.00%; and hepatitis C-infected units from 3.50% to 0.94%. Overall, the proportion of blood units discarded due to laboratory-diagnosed infections fell from 5.17% to 3.96% from 1998 to 2008. No reagent shortages were experienced during 2008. However, most donated blood units derive from rural (68%) rather than urban (5%) areas. In 2008 the mean cost to produce a unit of blood in Rwanda was 50 USD.

KEY RECOMMENDATIONS
An in-depth evaluation should be conducted to identify whether current blood supply meets demand, and to project future needs for blood components. The introduction of automated testing would reduce the numbers of equivocal results and discarded units. To lower transport costs, more donors should be sought in urban areas. Scenarios for cost recovery and financial sustainability of blood transfusion services must be explored especially in the context of international financial crisis.
PREVENTION OF HIV INFECTION TRANSMITTED BY BLOOD TRANSFUSION IN SOUTH AFRICA

Gulube S
South African National Blood Service - SANBS

INTRODUCTION AND BACKGROUND
In 2001, SANBS initiated a national haemovigilance programme to monitor transfusion transmitted infections and adverse blood transfusion reactions. Between 2001 and 2005 HIV antibody and HIV p24 antigen tests were used to screen all blood donations. In October 2005 a more sensitive test, the HIV nucleic acid amplification test (NAT) was introduced to prevent transfusion of HIV by infected blood collected during the window period before seroconversion.

AIM
To review the number of HIV transmissions by transfusion in South Africa since 2001 that were reported to the haemovigilance and lookback programmes.

MATERIALS AND METHODS
A transfusion recipient who becomes HIV reactive is reported to the programme. An investigation to determine the identity of donors involved is then initiated. The identified donors are retested for HIV. If the donors cannot be traced for a period of more than 12 months the case is reported as a possible transfusion related HIV infection. Data of the transmissions of HIV by blood transfusion reported to the programme is then reviewed.

RESULTS
Between 2001 and 2007, 5,884,536 units of blood products were transfused. Eight cases of HIV transmission by blood transfusion were reported to the programme. For 2001, 2002 and 2003, two cases were reported for each year. In 2004 and 2005 only one case per year was reported. The case of HIV transfusion-related infection in 2005 was reported as a possible transmission because; of the six donors implicated in the transfusion history of the patient, four were traceable and subsequently tested negative in the follow up tests. Two of the implicated donors were untraceable and hence the case was classified as a possible transfusion transmitted HIV-1 infection. Of the seven cases reported between 2001 and 2004 all the implicated donors were traced and found to be repeat donors who were in the window period of their infections. Initially their donations tested negative for HIV antibody and HIV p24 antigens, but subsequently became reactive in follow up tests.

CONCLUSION
The risk of donations, non-reactive for anti-HIV and p24 antigen, transmitting HIV is extremely low. To reduce the risk of HIV transmission by window period donations South Africa introduced NAT in October 2005.

As of January 2009, since the introduction of NAT testing, there has not been any reported transmission of HIV by blood transfusion to the haemovigilance and lookback programme in South Africa. It is recommended that South Africa continues the national haemovigilance / lookback programme to maximize the safety of blood transfusion.

IS THE NEED FOR SAFETY OF THE BLOOD SUPPLY IN AFRICA DIFFERENT FROM OTHER RESOURCE LIMITED PARTS OF THE WORLD?

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INTRODUCTION
With the 1948 UN declaration of universal human rights, the principles of equity of global citizens have been endorsed by all member states. Some of these universal human rights relate immediately to blood transfusion - education, health care, respect and dignity. It underlines the principles of the procurement and clinical use of human tissue - non-commerce, anonymity, sharing and rationality to avoid doing harm. Blood is one such tissue to be regarded as a national resource and to be made available and accessible to all citizens in need. That implicitly makes Governments responsible and accountable for an appropriate and protected blood supply and clinical use system; responsible for the provision to citizens and accountable to UN for the implementation of the declaration.

OBSERVATIONS
To guarantee an equal accessibility of human blood for clinical use there are global prerequisites to be observed that have been spelled out by WHO, the health organization within UN. These prerequisites are elements of a holistic composite, transfusion medicine as an integral part of a Nation’s health care approach, based on the 1948 UN declaration. There are the prerequisites that relate to the architecture of the system in a country, including the physical infrastructure starting with political commitment and responsibility, budget, provision of an environment and culture, logistics and an ongoing assessment of the national needs. There are also the prerequisites that relate to the operations of the procurement and clinical application, such as management of operations and quality, human resources and competence, ongoing community, professional and clinical awareness and the operations logistics.

Although these groups of prerequisites are well known, they are not always observed or perceived as elements of the holistic composite. Often focus is on seemingly isolated details or parts of the composite without regarding the larger entity. Often the initiatives are ad hoc, not coordinated and limited in time for implementation, hampering the important aspect of sustainability. All over the world, in particular in the economy restricted parts, there is continuation of fragmentation and local ‘back yard’ thinking rather than working on the holistic broader structure that would bring along a better containment of costs and an optimizing of the use of the available resources. The numerical dimensions of the national, regional and continental problems may differ, but the principles and their impact on a Nation’s health care are equal.

CONCLUSION
Globally there are general principles and prerequisites applicable, fundamental to the organisational and operational network to guarantee the sustained availability of safe and efficacious blood for use in clinical health care. In that respect there is no difference between Africa and any other continent or subcontinent on this globe.
**DEMOGRAPHIC AND SOCIAL CHARACTERISTICS OF REGULAR DONORS WHO SEROCONVERTED IN HARARE**

Mandisodza A  
*National Blood Service, Zimbabwe*

**BACKGROUND**  
Zimbabwe, like other countries, is currently experiencing a fast growing HIV/AIDS pandemic. Transfusion of unsafe blood products may result in HIV infection. It is critical to identify risk factors when screening prospective individuals for blood donation.

**OBJECTIVES**  
To determine risk factors, events and socio-demographic characteristics associated with incidence of HIV infections in order identify high risk individuals so that the transfusion service can avoid enrolling them as donors.

**DESIGN**  
A retrospective cross sectional study.

**SETTING**  
National Blood Transfusion Services.

**SUBJECTS**  
22,922 regular donors at National Blood Transfusion Services in Harare.

**MAIN OUTCOME MEASURES**  
The number of all regular donors who sero-converted and their status during the 1999 to 2001 period was determined.

**RESULTS**  
About 327 (1.4%) of the regular donors sero-converted. Two hundred and seventy-four (84%) were males and 53 (16%) were females. 52.6% of the males were married, 46.7% were single and 0.7% separated. About 30.2% of the females were married, 67.9% were single and 1.9% were separated. Increased seroconversion was associated with unemployment, high-density area residence and the sexually active age group (21 to 45 year olds). There was an association between gender and marital status among seroconverters (c² = 8.48; p-value = 0.014) and males were likely to be older than females (t = 2.9; p-value = 0.0019).

**CONCLUSION**  
It can be concluded that unemployment and living in high-density residential areas are highly associated with HIV seroconversion among regular donors. Single females, working class males and the sexually active age group are highly exposed to risk factors. It is recommended that knowledge of these factors should be considered during donor recruitment.

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**AN ANALYSIS OF PLEDGE 25 CLUB GRADUATES DATA IN ZIMBABWE**

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*National Blood Service Zimbabwe*

**INTRODUCTION AND BACKGROUND**  
One of the long term objectives of the Pledge 25 Club model is to address the issue of blood adequacy. It is expected that the club’s ‘graduates’ (members who have fulfilled their pledge by donating at least 25 times) would continue to widen the donor base. National Blood Service Zimbabwe (NBSZ) which started the Pledge 25 Club programme in 1994 had its first graduates in 2004, and since then more members have been graduating annually. An analysis of Pledge 25 Club graduates data will give an insight into the role the club is playing in contributing to the supply of adequate blood.

**AIM**  
To establish the number of Pledge 25 graduates and highlight profiles such as gender distribution, donor retention, donor regularity, and dates of first donation.

**MATERIALS AND METHODS**  
A retrospective descriptive study of Pledge 25 Club members who donated at least 25 units of blood. Data on Pledge 25 Club graduates up to February 2009 was extracted from the NBSZ SafeNet database. The data was analysed according to gender, number of donations, date of last donation, mean donations per year and percentage of members still active.

**RESULTS**  
The summary data of the Pledge 25 graduates is shown in Table 1 below.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency</th>
<th>%</th>
</tr>
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<tbody>
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<td>100</td>
</tr>
<tr>
<td>Gender distribution Male</td>
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<td>96</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>4</td>
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<tr>
<td>Donor retention</td>
<td>184</td>
<td>76</td>
</tr>
<tr>
<td>Donations per year 1</td>
<td>1</td>
<td>0.41</td>
</tr>
<tr>
<td>2</td>
<td>70</td>
<td>28.93</td>
</tr>
<tr>
<td>3+</td>
<td>171</td>
<td>70.66</td>
</tr>
<tr>
<td>Total No. of donations 25-30</td>
<td>136</td>
<td>56.20</td>
</tr>
<tr>
<td>31-35</td>
<td>49</td>
<td>20.25</td>
</tr>
<tr>
<td>36-40</td>
<td>49</td>
<td>13.64</td>
</tr>
<tr>
<td>41-45</td>
<td>12</td>
<td>4.96</td>
</tr>
<tr>
<td>46-50</td>
<td>6</td>
<td>2.48</td>
</tr>
<tr>
<td>51+</td>
<td>6</td>
<td>2.48</td>
</tr>
<tr>
<td>Year of first donation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 1993</td>
<td>44</td>
<td>18.1</td>
</tr>
<tr>
<td>1994 - 1996</td>
<td>90</td>
<td>37.1</td>
</tr>
<tr>
<td>1997 - 1999</td>
<td>85</td>
<td>35.1</td>
</tr>
<tr>
<td>&gt;= 2000</td>
<td>23</td>
<td>9.5</td>
</tr>
</tbody>
</table>

*last donation date <12 months*

Pledge 25 graduates donor retention rate of 76% is higher than the overall donor population annual retention of 36%. 71% of the graduates donate at least 3 times per year compared to 8% for the overall donor population. Only 4% of the graduates are females.

**CONCLUSION**  
The Pledge 25 Club programme plays an important role in nurturing, among blood donors, a culture of regular blood donation and high donor retention. The club has the potential of widening the adult donor base as well as enabling the Service to collect more blood from fewer donors thus saving on recruitment costs.
KNOWLEDGE, ATTITUDE AND PARTICIPATION IN BLOOD DONATION EXERCISES AMONG PEOPLE ATTENDING NYERI PROVINCIAL GENERAL HOSPITAL, CENTRAL PROVINCE, KENYA

Wachirah DM
Nyeri Provincial General Hospital, Kenya

INTRODUCTION AND BACKGROUND
The blood donation programme is handled and spearheaded by Kenya National Blood Transfusion Services (KNBTS). Despite the high demand for blood in the country, misguided attitudes towards this noble exercise exist among rural and urban populations. Some people feel that donation of blood may be fatal, and some fear disclosure of their HIV status.

The study was conducted at the Provincial General Hospital (PGH), Nyeri District, Central Province, Kenya between 2 and 30 June 2008. The hospital hosts both rural and urban clients. It is also a referral hospital in Central Province and neighbouring Provinces such as Eastern and parts of Rift Valley Provinces.

Two hundred clients who attended the outpatient department were targeted. They were interviewed through questionnaires and gave various responses with regard to the subject.

AIM
The study aimed at determining the subjects' knowledge, attitude and their level of participation towards blood donation exercises.

MATERIALS AND METHODS
Descriptive research design was utilized. The variables included age, sex, marital status, educational level, occupation, religion and residence (urban or rural). Formal interviews were conducted based on Questionnaires.

RESULTS
1. 100% of the respondents were aware of blood donation and transfusion practice in general.
2. 98% of the respondents held a positive attitude towards blood donation.
3. Only 30% of the subjects had donated blood in their lifetime.

SUMMARY/CONCLUSION
The study revealed that most of the respondents had never donated blood despite high levels of awareness and positive attitude towards the exercise. This scenario calls for more measures to sensitize the public on the need for voluntary blood donation.

MOTIVES FOR BLOOD DONATION IN LOKOJA, KOGI STATE, NIGERIA

Ejeh UC, Umameh A
NBTS, Lokoja, Nigeria

INTRODUCTION
The hallmark of blood safety practice is the ability of an organisation to get 100% of blood donations from regular non-remunerated blood donors. In an emerging blood transfusion service of the Nigerian government, the intrinsic drive for blood donation has to be identified and utilised to effectively motivate and mobilise blood donors for an effective retention program. The understanding of their motivation drivers is crucial for the improvement of donor recruitment and retention effectiveness.

AIM
The aim of this study was to identify the motives that serve as blood donation drivers among present donors as well as their attitudes to non-remunerated donation. The establishment of motivational and socio-demographic factors are important for the development of a long-term commitment as a voluntary, non-remunerated blood donor in Kogi State, Nigeria.

MATERIALS AND METHODS
A longitudinal purposive sampling survey of active blood donors in Lokoja, Kogi state of Nigeria, was conducted. Donors filled in a self-administered questionnaire during donation. Data on motivation were analysed using factor analysis.

RESULTS
The blood donors' socio-demographic characteristics were found to be similar to those of the population as a whole. The single, most important, recruitment channel was the influence of moral duties. Five dimensions of blood donor motivation were identified with factor analysis. These were: moral obligation, pressure group, social reasons (such as the influence of friends and family); strengthening of one's self-esteem; and positive experiences associated with donation. Support for statements on altruistic motives for donation was very weak and similar in long-time and short-time donors. In contrast, both short-time and long time donors were more likely to be motivated by factors related to moral duties.

CONCLUSION
The ‘good habit’ of continued blood donation has to be developed through a behavioural change mechanism. The current donor panel needs to be migrated from donating out of moral duties to altruistic reasons over a period of time. The culture of altruistic blood donation has to be achieved through blood donor carrier progression (the migration of donors from individualistic behaviour to altruism needs to follow a graded sequence of change; which means a gradual weaning of donors from their current “baseline motives” practice to the acceptable behaviour of donating purely for altruistic reasons).
The increased demand for platelets and desire to improve on service delivery saw the launch of an apheresis programme at National Blood Service Zimbabwe in May 1997. Intensive apheresis donor education was carried out, and by end of 1998, a total of 119 donors had registered for apheresis donations.

AIM
To evaluate the apheresis programme in Zimbabwe.

MATERIALS AND METHODS
A retrospective review of apheresis records available at NBSZ was carried out. All apheresis procedures (donations and therapeutic) were reviewed from NBSZ Safenet database and records since 1998.

RESULTS
We examined trends in apheresis procedures since 1998 when the programme was fully operational in Harare.

Table 1: Summary data for the apheresis programme

<table>
<thead>
<tr>
<th>Year</th>
<th>No of donors</th>
<th>Platelets collected</th>
<th>Patients treated</th>
<th>TPE Procedures</th>
<th>Donor retention</th>
<th>Serological discard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>119</td>
<td>611</td>
<td>25</td>
<td>66</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>1999</td>
<td>80</td>
<td>324</td>
<td>16</td>
<td>50</td>
<td>60</td>
<td>-</td>
</tr>
<tr>
<td>2000</td>
<td>78</td>
<td>305</td>
<td>17</td>
<td>66</td>
<td>46</td>
<td>1</td>
</tr>
<tr>
<td>2001</td>
<td>72</td>
<td>228</td>
<td>12</td>
<td>50</td>
<td>36</td>
<td>-</td>
</tr>
<tr>
<td>2002</td>
<td>27</td>
<td>33</td>
<td>5</td>
<td>27</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>2003</td>
<td>37</td>
<td>102</td>
<td>5</td>
<td>20</td>
<td>19</td>
<td>1</td>
</tr>
<tr>
<td>2004</td>
<td>48</td>
<td>205</td>
<td>6</td>
<td>22</td>
<td>17</td>
<td>1</td>
</tr>
<tr>
<td>2005</td>
<td>51</td>
<td>163</td>
<td>5</td>
<td>44</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>2006</td>
<td>50</td>
<td>147</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>2007</td>
<td>26</td>
<td>59</td>
<td>5</td>
<td>22</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>2008</td>
<td>32</td>
<td>130</td>
<td>1</td>
<td>5</td>
<td>12</td>
<td>-</td>
</tr>
</tbody>
</table>

Key: TPE: Therapeutic Plasma Exchange / Serological discard: 3 HIV; 1 HBV

Single donor platelet donations decreased from 611 in 1998 to 130 in 2008. The donor pool decreased from 119 in 1998 to 32 in 2008. This was attributed to Zimbabwe’s hyperinflationary environment which made operations very difficult. The apheresis units were not functional for the greater part of the year in 2002, 2003 and 2007 due to the above problems.

CHALLENGES
- Erratic supply of disposable kits and ACD-A solution due to shortage of foreign currency.
- Patients not being able to afford the fees charged for therapeutic procedures.
- Regular donors leaving the country for ‘greener pastures’ in other countries.

CONCLUSIONS
Careful planning is important for the sustenance of the programme. The programme is strongly recommended for other Blood Transfusion Services that would like to improve on platelet safety and complement medical care. Apheresis is strongly recommended for platelet collection as Blood Transfusion Services can then meet demand by maximising single donor platelets. Increased donor retention enhances blood safety and supply.
SEROPREVALENCE OF HIV/HBV; HIV/HCV; HIV/ SYPHILIS CO-INFECTIONS IN RWANDAN BLOOD DONORS

Senyana F, Rwandamuriye FX
Rwanda National Centre for Blood Transfusion

INTRODUCTION AND BACKGROUND
Human Immunodeficiency Virus (HIV), Hepatitis B virus (HBV), Hepatitis C virus (HCV) and syphilis share certain epidemiological characteristics. Improved survival due to the success of highly active antiretroviral therapy (HAART) has enabled conditions with long latency, such as chronic viral hepatitis, to become a major source of co-morbidity in HIV-infected populations.1

For example, scientific research shows that the course of syphilis in HIV-positive patients with depressed immune function is thought to differ from that in HIV-negative patients.2

AIM
Rwanda has very low rates of HIV infection but unfortunately there is no existing information on the prevalence of HBV, HCV and syphilis co-infections among HIV reactive patients or in blood donors.

MATERIALS AND METHODS
A retrospective study was conducted to assess the prevalence of HIV, HCV, HBV surface antigen (HBsAg) and syphilis among blood donors at the National Blood Transfusion Center in Rwanda, from January 2008 to December 2008. A total of 35,495 blood donors were tested for HIV, HCV, HBV surface antigen (HBsAg) and syphilis.

Enzyme-linked immunosorbent assay techniques with reagents from Abbott were used to test blood samples for anti-HIV, HBsAg and anti-HCV, and the RPR test was used to test for syphilis.

RESULTS
The prevalence of sero-reactivity was 0.74% for HIV, 2.0% for HBsAg, 0.94% for HCV and 0.34% for syphilis. The HIV/HBV co-infection cases were 5 out of 264 initially reactive HIV cases; this co-infection rate was only 1.9% in this population. The HIV/HCV cases were 0 and the HIV/syphilis cases were 3 out of 264 to give a co-infection rate of 1.13%.

CONCLUSIONS
Co-infection rates were unexpectedly low in this blood donor population.

Confirmatory tests of the 4 infectious markers should be systematically implemented in the Rwandan blood service, and the result notification program should be improved, as should the care of these co-infection cases.

REFERENCES
1. D Lincoln et al. National Centre in HIV epidemiology and clinical care, the University of new South Wales, Sydney, Australia, 2003.
CONCLUSION
Although HIV transmission through blood transfusion has received more attention, this study has shown that among Nairobi region voluntary blood donors, hepatitis B is the most prevalent and urgent interventions are important. Among the observed TTI co-infections, HIV and HBV were found to be common among voluntary donors. A study with bigger sample size is needed to validate the current findings. Most blood donors in the region are blood group O Rh positive and therefore the blood bank should keep more of it to sustain surrounding hospitals.

IMPACT OF INDIVIDUAL DONATION NUCLEIC ACID TESTING (ID-NAT) ON THE RESIDUAL HIV TRANSMISSION RISK OF SOUTH AFRICAN BLOOD TRANSFUSIONS: THREE YEAR EXPERIENCE

Vermeulen M1, Sykes W1, Gaggia L1, Coleman C1, Swanevelder R1, Lelie N1, Gulube S1, Busch M3, Reddy R1
1. South African National Blood Service (SANBS)

INTRODUCTION
In 2005 SANBS implemented ID-NAT and at the same time ethnicity was no longer used to prioritize blood transfusion according to a hierarchy of potential risk. The prevalence of HIV infections in first time donors has steadily increased from 0.67% in 2006 to 1.1% in 2008, but new infections remained stable over the three years in lapsed donors (0.27-0.31%) and repeat donations (0.02%).

AIMS
To compare the residual HIV transmission risk in the first, second and third year of NAT screening and to compare the risk caused by pre-ID-NAT window period (WP) donations from first time, lapsed and repeat donors.

MATERIALS AND METHODS
HIV confirmed serology and NAT yield data were compiled by year and by donor status. Risk of potentially infectious WP donations was calculated from HIV ID-NAT yield rates using the WP ratio model (Busch et al, Transfusion, 2005;45:254) and transmission risk was estimated using a refined model to be published by Weusten et al. The first model assumes a conservative 100% infection risk starting at a concentration of 1 virion/20 mL plasma in a pack of red blood cells (RBCs). The second model estimates the transmission risk based on the product of two probabilities: (1) that the ID-NAT test is non-reactive and (2) that the undetected viral load is infectious in a RBC unit assuming a median minimum infectious dose (MID₅₀) of 10 virions/20 mL.

RESULTS
The NAT yield rate doubled from year 1 to year 2 (mainly in repeat donors) but did not increase much further in year 3, although from year 2 to year 3 the NAT yield in first time donors had doubled. The estimated residual risk of a donation being in the pre-ID-NAT WP doubled in 2007 (1:140,000 to 1:70,000) but then remained stable in 2008. In 2007 the largest increase in risk was in lapsed and repeat donors, with little increase in first-time donors. In 2008 the risk of WP donations in first time donors doubled to 1:28,000, but there was no further increase in repeat or lapsed donors. The HIV transmission risk increased from 1:330,000 in 2006 to 1:170,000 and 1:160,000 in 2007 and 2008, respectively.

CONCLUSIONS
Although there has been a steady increase in the prevalence of HIV in SANBS donors and the NAT yield rate increased dramatically during the second year, the residual HIV transmission risk seems to have reached a plateau in the third year. The largest increases in NAT yield were observed in repeat donors in year 2 and in first time donors in year 3. The HIV transmission risk depends largely on minimum infectious dose of HIV and is currently estimated at 1:160,000 transfusions.

EFFICACY OF INDIVIDUAL DONATION NUCLEIC ACID TESTING IN REDUCING THE RISK OF TRANSFUSION TRANSMITTED VIRAL INFECTION AND IMPLICATIONS FOR SCREENING STRATEGIES IN AFRICA

Lelie N
Novartis Vaccines and Diagnostics, Suresnes, France

INTRODUCTION
With the introduction of the TIGRIS® system and the PROCLEIX ULTRIO® HBV/HCV/HIV-1 transcription mediated amplification (TMA) assay, fully automated individual donation...
nucleic acid testing (ID-NAT) has become technically feasible. Surveillance studies in highly endemic regions for HIV-1, HCV and HBV have demonstrated significant value of ID-NAT screening in reducing the risk of transfusion transmitted viral infection (TTVI). In a high prevalence African donor population, pre-donation screening with rapid serology assays followed by post-donation MP-NAT has been proposed as a cost-economic option to increase blood safety (Owosu-Ofori S, Transfusion 2005;45:133). However, there is accumulating evidence that replacement of post-donation serology testing by ID-NAT could be a more effective approach.

AIMS
To estimate the reduction in TTVI risk in highly endemic regions for HIV-1 (South-Africa) and HCV (Egypt) in a theoretical scenario whereby ID-NAT would be used to replace serologic testing.

METHODS
The residual risk of infection by donations in the infectious WP is mainly driven by the dynamics of viraemia in the early ramp up phase, the infectivity of the virus and the volume of plasma in blood components (Weusten et al, Transfusion 2009, in press). This transmission risk model estimates WP risk day equivalents based on a 50% minimum infectious dose (ID50) of 3-10 virions as established in animal infectivity experiments. A thorough review of the literature shows that the infectivity of HIV-1, HCV and HBV in the early acute phase is approximately 100-fold higher than in the late acute phase. The relative infectivity of the virus in NAT negative chronic or late recovery phases of infection may be further reduced by neutralizing antibodies (Kleinman et al, Transfusion, in press). For the purpose of the transmission risk analysis a 100-fold higher ID50 of 300-1000 virions is used as a worst case estimate in a NAT non reactive stage of chronic or recovering infection.

RESULTS
A study among 15,655 Egyptian first time donors (El Ekiaby et al, Vox Sang 2009;86 Suppl 1; abstract p23) showed the following WP risk day equivalents and residual HCV transmission risk estimates for RBCs in different testing scenarios: ‘anti-HCV only’ 65 days, 1:3100; ‘HCV Ag/Ab combo EIA’ 39 days, 1:5200; ‘ID-NAT only’ 2.5 days 1:78,900; ‘anti-HCV.ID-NAT’ 2.0 days, 1:98,600 and ‘anti-HCV/MP-NAT’ 3.8 days, 1:51,900. In the first year of ID-NAT screening of 603,564 repeat donations in South Africa (Vermeulen et al, Transfusion 2009, in press) the following HIV transmission risk estimates were found: ‘anti-HIV/24-Ag testing’ 12.6 days, 1:76,500; ‘anti-HIV/MP16-NAT’ 5.4 days, 1:177,600 and ‘ID-NAT alone’ 2.6 days, 1:44.900. In 73,293 first time donations the low viral load was measured and in two of these cases a more accurate estimation of the concentration was obtained by limiting dilution analysis. One platelet apheresis donation was in the eclipse phase (4 days after exposure) and a concentration of 1 copy/ml was back-estimated by regression analysis. In three other donations the viral load was not available; it was assumed that these donations contained a viral load at the MP-NAT 50% hit rate (Table 1, copy numbers in italics). The 50% NAT detection limits of newer NAT assays, expressed as copies/ml quantified in bDNA 3.0 assay (1 IU = ~0.5 copy), were estimated by probit analysis from a database of NAT results on standard regression analysis. In three other donations the viral load was not available; it was assumed that these donations contained a viral load at the MP-NAT 50% hit rate (Table 1, copy numbers in italics). The 50% NAT detection limits of newer NAT assays, expressed as copies/ml quantified in bDNA 3.0 assay (1 IU ~ 0.5 copy), were estimated by probit analysis from a database of NAT results on standard dilutions (Delft Diagnostic Laboratories). The transmission risk was estimated by the model published by Weusten et al (Transfusion 2002, 42;537-548). In 6 donations the low viral load was measured and in two of these cases a more accurate estimation of the concentration was obtained by limiting dilution analysis. One platelet apheresis donation was in the eclipse phase (4 days after exposure) and a concentration of 1 copy/ml was back-estimated by regression analysis. In three other donations the viral load was not available; it was assumed that these donations contained a viral load at the MP-NAT 50% hit rate (Table 1, copy numbers in italics). The 50% NAT detection limits of newer NAT assays, expressed as copies/ml quantified in bDNA 3.0 assay (1 IU ~ 0.5 copy), were estimated by probit analysis from a database of NAT results on standard dilutions (Delft Diagnostic Laboratories). The transmission risk was estimated by the model published by Weusten et al (Transfusion 2002, 42;537-548).

RESULTS
The table shows that 11/15 blood products (73%) were infectious, and from these data a 50% minimum infectious dose (ID50) of ~400 virions was estimated by probit analysis. As a result, the probability of the 15 individual blood products being infectious ranged from 13% to 98%. The probability that the current triplex NAT systems would have interdicted these transmission events.

MINIPOOL NAT HIV-1 BREAKTHROUGH TRANSMISSION CASES AND PROBABILITY OF INTERDICTION BY CURRENT SMALL POOL OR INDIVIDUAL DONATION NAT SCREENING SYSTEMS

<table>
<thead>
<tr>
<th>System</th>
<th>Probability of Interdiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP-NAT</td>
<td>95%</td>
</tr>
<tr>
<td>ID-NAT</td>
<td>99.5%</td>
</tr>
</tbody>
</table>

Kleinman S1, van Drimmelen H2, Lelie N3, Busch M4
1. University of British Columbia, Vancouver, Canada
2. Biologicals Quality Control, Delft Diagnostic Laboratories, Voorburg, the Netherlands
3. Chiron, Novartis Vaccines & Diagnostics SAS, Suresnes, France
4. BSRI, San Francisco, CA, USA

INTRODUCTION
Since introduction of NAT screening in minipools of 16 to 96 donations in the late 1990s 7 reports describe HIV window period (WP) donations that were not detected by MP-NAT and 3 reports describe such donations from non-NAT tested units that would have been missed by MP-NAT. Eleven of 15 blood products prepared from these 10 donations were infectious and 4 were not.

AIMS
To estimate the probability that current individual donation (ID) or MP 6-8 triplex NAT systems would have interdicted these transmission events.

METHODS
Table 1 summarizes data extracted from the 10 reports. In 6 donations the low viral load was measured and in two of these cases a more accurate estimation of the concentration was obtained by limiting dilution analysis. One platelet apheresis donation was in the eclipse phase (4 days after exposure) and a concentration of 1 copy/ml was back-estimated by regression analysis. In three other donations the viral load was not available; it was assumed that these donations contained a viral load at the MP-NAT 50% hit rate (Table 1, copy numbers in italics). The 50% NAT detection limits of newer NAT assays, expressed as copies/ml quantified in bDNA 3.0 assay (1 IU ~ 0.5 copy), were estimated by probit analysis from a database of NAT results on standard dilutions (Delft Diagnostic Laboratories). The transmission risk was estimated by the model published by Weusten et al (Transfusion 2002, 42;537-548).

RESULTS
The table shows that 11/15 blood products (73%) were infectious, and from these data a 50% minimum infectious dose (ID50) of ~400 virions was estimated by probit analysis. As a result, the probability of the 15 individual blood products being infectious ranged from 13% to 98%. The probability that the current triplex NAT systems would have interdicted the transmission events were estimated at 99.5% for ULTRIO in ID-NAT format, 79.5% by s 201 MP-6 and 77.5% by ULTRIO MP-8.
CONCLUSION AND DISCUSSION

Both FFP units and all 3 whole blood derived platelet concentrates containing ~600-3000 virions were infectious, but 3/9 (33%) red blood cell concentrates (RBCs) containing ~500-5000 virions were not infectious. The ID\textsubscript{50} estimated from these 15 low viral load HIV-1 transfusion cases is 100-fold higher than that estimated from infectivity experiments with SIV in macaques (Ma et al, J Virology 2009;83:3288). A possible explanation may be that HIV-1 infectivity in the human cases has been reduced due to virus degradation upon storage of RBCs at 4 °C. The outcome of our analysis may also have been affected by reporting bias or by the inaccuracy of assays used to quantify the low viral load in the early ramp up phase of viremia. Despite these limitations, our analysis suggests that the majority of observed MP-NAT breakthrough cases would have been detectable if the currently available triplex small pool or ID-NAT systems had been used.

Table 1: Data extracted from 10 reports of MP-NAT non-reactive HIV-1 WP donations (1997-2008) and outcome of infection in recipients

<table>
<thead>
<tr>
<th>1st author of report</th>
<th>Country</th>
<th>Unit</th>
<th>Screening assay</th>
<th>Pool size</th>
<th>Estimated cps/mL</th>
<th>Estimated mL plasma transfused</th>
<th>Estimated copies transfused</th>
<th>Recipient infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Najioullah\textsuperscript{1}</td>
<td>France</td>
<td>RBC</td>
<td>Nucl-Ampl</td>
<td>24</td>
<td>46\textsuperscript{^A}</td>
<td>20</td>
<td>912</td>
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<tr>
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<td>Duplex</td>
<td>16</td>
<td>37\textsuperscript{^A}</td>
<td>225</td>
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<tr>
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<td>RBC</td>
<td>Duplex</td>
<td>16</td>
<td>37\textsuperscript{^A}</td>
<td>40</td>
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<td>Duplex</td>
<td>16</td>
<td>37\textsuperscript{^A}</td>
<td>225</td>
<td>8280</td>
<td>yes</td>
</tr>
<tr>
<td>Stramer\textsuperscript{3}</td>
<td>USA</td>
<td>RBC</td>
<td>Duplex</td>
<td>16</td>
<td>37\textsuperscript{^A}</td>
<td>40</td>
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<td>no</td>
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<td>40</td>
<td>7200</td>
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<td>25</td>
<td>1250</td>
<td>yes</td>
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<tr>
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<td>RBC</td>
<td>No NAT</td>
<td>50</td>
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</tr>
<tr>
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<td>No NAT</td>
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<td>60</td>
<td>25</td>
<td>1500</td>
<td>yes</td>
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<td>South Africa</td>
<td>RBC\textsuperscript{*}</td>
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<td>60</td>
<td>20</td>
<td>1200</td>
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<td>Zanetti\textsuperscript{7}</td>
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<td>RBC\textsuperscript{*}</td>
<td>No NAT</td>
<td>24</td>
<td>98</td>
<td>20</td>
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<td>Harritshoj\textsuperscript{8}</td>
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<td>PLT</td>
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<td>246</td>
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\* Storage time of 12 and 7 days
\^ Inferred as indicated in text

2. R. Phelps et al, Transfusion 2004; 44:929-933
5. A.E. Ling et al, JAMA 200; 284:210-214
The Flight from Harare to Nairobi was direct and uneventful. At Nairobi our group was met by the driver from Budget Car, who drove us to the Laico Regency Hotel in the city. Traffic on the way was the heaviest I have experienced, the trip taking just over two hours. Room allocation at the hotel took over four hours. Mr. P. Carolan gave an interesting talk about “New blood for the World”, linking this title to Club 25 and to the celebrations of 150 years of Red Cross and Red Crescent activities in Italy at the same time as the 5th AfSBT Congress was being held in Nairobi.

I also learned that Zimbabwe may be considered for PEPFAR II fund allocation, for the prevention of transmission of HIV through blood transfusion among other measures. Dr Dhingra spoke about the global perspective of blood safety, maternal mortality and the requirements of safe blood for trauma victims. Although the number of voluntary donors is increasing there is still a high rate of deferral and 3.3 million units are discarded. Dr Dhingra emphasized Quality Management Principles, Safe blood collection and Good Manufacturing Practice and stated that 96% of blood units in high HDI countries are separated into components. She stated that the achievements of WHO included World Blood Donor Day, Safe Blood Initiative, Global Data Base and Blood Transfusion Collaborating Centres. The Kenyan Minister of Health, through his representative called on stronger countries to help the weaker ones in blood transfusion issues.

Dr JB Tapko, through his representative gave a brief history of blood transfusion in the African region, which consists of 46 countries. The first blood transfusion in the region seems to have taken place in 1924 when syphilis was the only infection known to be transmissible through blood. He cited the AFRO Resolution RC5 which urges countries to collect 80% of units from Voluntary Non Remunerated Blood Donors (VNRBD).

In West Africa the HIV level is lower in the population while it is higher in blood donors - Dr Tapko indicated that the region suffers from inadequate resources. Mr Wilkinson of Namibia stated that the countries developed a National Blood Policy in 2007 and stated that the cold chain trail was still poor.

Mr Odongo of the Kenya Blood Transfusion Service gave a history of the Service indicating that Blood Collection had increased from 37 000 to 130 000 and that TTI had dropped from 6% to 1.4%.

Prof J Adewuyi stated that Nigeria still uses family replacements and paid donors. The Uganda Blood Transfusion Service collects 98% of its blood from VNRBD. South Africa collects 750 000 units/year from VNRDs. In the Democratic Republic of Congo paid donors are more than family replacement donors, whose numbers are going down. VNRBD have increased from 11% to 39%.

Dr T Nel spoke about the Development and Implementation of a “Postgraduate Diploma in Transfusion Medicine” in South Africa at the University of Free State.

Dr G Kitonyi (Kenya) spoke about challenges faced by Hospital Transfusion Committees especially with regard to time constraints for the members.

Mr B. Mulenga of Zambia spoke of how the efficiency of the blood supply can be assisted by monitoring blood utilization - as a tool for vein to vein traceability of units

B. Osuntugun bemoaned the lack of research capacity in Sub-Saharan Africa.

The whole congress experience was stimulating and educational.
Selon ses textes fondateurs, la Société Africaine de Transfusion Sanguine (SATS) a été créée pour promouvoir les plus hauts standards éthiques et professionnels en transfusion sanguine pour apporter à la région africaine toute entière et aux îles de l’Océan indien, des programmes nationaux de transfusion efficaces et financièrement accessibles. Douze ans après sa création, son importance et son importance est capitale dans un contexte marqué par un important déficit d’approvisionnement en produits sanguins, une collecte de sang encore majoritairement d’origine familiale, une prévalence élevée des infections transmissibles par la transfusion (ITT) chez le donneur de sang et un usage encore peu rationnel des produits sanguins disponibles.

La SATS a fort à faire pour relever ces défis d’autant qu’ils doivent se réaliser sur un continent où la diversité socioculturelle et linguistique, quoiqu’une richesse, constitue un challenge à la communication entre les membres, aux échanges fluides et à la réalisation harmonieuse des objectifs de la société. Face à ce challenge, l’organisation et le fonctionnement actuel de la société mérite des encouragements puisqu’ils visent à faciliter l’usage des principales langues au cours de ses activités.

A titre d’exemple :
(i) les textes statutaires revendiquent le caractère bilingue de la société depuis sa création : deux langues officielles (le français et l’anglais), une vice présidence bilingue,
(ii) un conseil et un comité scientifique mixte, composé de membres d’origine diverses,
(iii) Un journal officiel bilingue, qui publie des articles en français et anglais
(iv) et surtout une liberté d’expression écrite ou orale dans l’une des deux langues selon son choix.

Pour son 5ème congrès annuel à Nairobi (Kenya), les activités qui se sont déroulées au cours de ces 04 jours de partage ont elles été effectivement à la hauteur des objectifs de la société et de sa vision bilingue?

Au grand bonheur des nouveaux membres, qui comme moi découvraient pour la première fois le congrès de la SATS, nombreuses cessions et présentations ont été faite dans tous les domaines clés de la transfusion, notamment le don de sang (promotion, collecte, problématique africaine du don), la sécurité transfusionnelle (infections transmissibles par la transfusion, stratégie de qualification biologique infectieuse), management de la qualité et hémovigilance, mais aussi la recherche, l’éducation et la formation en transfusion sanguine. Ces derniers ont d’abord été débattus dans le cadre d’un atelier technique en prélude au congrès. Puis un forum international organisé par le Club 25 a réuni des dizaines de jeunes de 16 à 25 ans issus de divers pays pour partager leurs expériences et améliorer leurs stratégies de mobilisation d’autres donneurs. En guise d’introduction au programme scientifique, l’état de la sécurité transfusionnelle dans le monde et en Afrique a été rapporté par l’OMS pour bien recentrons les défis colossaux auxquels sont confrontés notre société. Les caractéristiques du donneur de sang africain et sa problématique dans diverses régions ont été rapportées et discutées, confirmant les données récemment décrites, et la nécessité de développer des stratégies adaptées à notre contexte. Le défi de la sécurité transfusionnelle meilleure par une qualification rigoureuse du don a été rediscuté notamment à travers les expériences de divers centres de transfusion dans les stratégies de réduction du risque transfusionnel infectieux, la problématique du paludisme en transfusion africaine, ou la maîtrise du risque immunohématologique. Ainsi, on a pu constater un important progrès des programmes du Malawi, de la Cote d’ivoire, du Zimbabwe de l’Afrique du Sud et du Kenya dans la réduction du risque infectieux pour les uns, dans le management de la qualité et l’hémovigilance pour d’autres.

Venus de plus de 65 pays du monde entier, et de divers pays de l’Afrique francophone (Burkina Faso, Cote d’Ivoire, Congo, Mali, Madagascar, Rwanda, Tunisie…), anglophone (Afrique du Sud, Egypte, Ghana, Malawi, Ouganda, Tanzanie, Zimbabwe, Kenya…) et bilingue (Cameroun), le congrès a révélé par l’origine de ses participants, l’ambition multiculturelle et bilingue sur l’association. Les présentateurs de toutes les régions du continent ont partagé tant en anglais qu’en français leurs expériences et observations. Les discussions autour de la transfusion sanguine ont parfois pris l’allure souhaitée, celle ou se mêlait des questions en français et des réponses en anglais et vice versa. A titre d’exemple, les présentations de F. Senyana du Rwanda et de S. Konaté de la Cote d’Ivoire sur la prévalence du VIH chez les donneurs rwandais et sur la diversification des produits sanguins en Cote d’Ivoire ont retenu l’attention et ont utilisé des participants malgré le changement de la langue d’expression au cours des discussions. Pour marquer d’avantage cette ambition, le bureau élu pour l’année suivante sera mené par un président francophone qui remplace le président sortant anglophone très applaudi pour son œuvre au cours de son mandat.
Le congrès a eu le mérite de son organisation scientifique dans un cadre ludique et convivial. Sa réussite a été parfaite et les organisateurs ont été salués et félicité au cours d’un soirée de gala également très réussie. Des félicitations particulières doivent être adressées aux organisateurs et aux organisations partenaires, qui ont fait un excellent travail dans l’encadrement global des nouveaux participants. Toutefois, on peut déplorer une faible participation des pays francophones et lusophones, constituant pourtant pour les deux types un nombre aussi important que les pays anglophones d’Afrique. En dépit des dispositions statutaires qui prévoient un équilibre linguistique et régional au sein de la société, il y a visiblement une nécessité de mobiliser les centres nationaux des pays francophones à adhérer d’avantage et à participer aux activités de la SATS. En outre, l’obstacle linguistique a semblé évident et a clairement limité une totale imprégnation des participants aux débats scientifiques et aux discussions en dehors des cessions.

RÉFÉRENCES

 REPORT: JUDITH PARIREWA

Assistant Manager Blood Procurement & Public Relations
National Blood Service Zimbabwe

OBJECTIVE OF TRAVEL
1. To attend 5th International Blood Transfusion Congress of AfSBT.
2. Poster presentation.

OUTCOME
I attended the 5th International Blood Transfusion Congress of AfSBT held in Nairobi from 24-27th June 2009. This was an educative forum where experts in Blood Transfusion met and shared knowledge based on theory, their experiences and research conducted.

ACHIEVEMENTS
1. Poster presentation
   - This was quite an experience for me as it was my first time to come up with a poster which was accepted to be presented on such a forum.
   - The brief (oral) poster presentation was a good experience and it gave me confidence.

2. Oral presentation
   - It was a pleasure to listen to oral presentations. The presenters had researched well on their topics.
   - It was a pleasure to hear experiences from other countries on donor recruitment, counseling and quality management systems. I particularly enjoyed the following topics:
     - Status of Blood Supply in WHO Africa Region
     - Donor recruitment, motivation & retention - Kenya
     - Blood Temperature monitoring
     - Blood Inventory management

CONCLUSION
Based on my experience at AfSBT
- I came to realize that the field of research is not so developed in most countries in sub-Saharan Africa; this is an area that needs special attention.
- There are countries that still have family replacement donors.
- I will encourage colleagues to carry out research work particularly in donor care/motivation, pre and post donation counseling, blood collection and Malaria.
- I have realized that continual improvement in blood safety can only be achieved through carrying out research and participating in such forums.
- Donor counseling is an important component in improving blood safety.
BACKGROUND

The 5th International Blood Transfusion Congress of the Africa Society of Blood Transfusion (AfSBT) took place in Nairobi, Kenya from 25th to 27th June, 2009. Participants from Anglophone, Francophone and Lusophone blood services attended the Congress. The congress was supported by a few facilitators from international organizations with expertise in blood transfusion services.

AIM

The aim of the congress whose theme was ‘Meeting the Needs for Safe Blood in Africa’ was to share progress that has been made in recent years in different transfusion services in Africa, as well as provide a forum for sharing experiences.

CONGRESS PROCEEDINGS AND METHODOLOGY

The methodologies employed during the meeting that facilitated sharing of experiences in terms of successes, challenges and emerging issues in blood transfusion on the continent were: technical presentations, plenary sessions, group break away sessions and individual discussions between delegates. There were several concurrent sessions running at the Congress, I am happy to report that I managed to attend a total of seven sessions including the General Assembly. In all these sessions I learnt a lot which I will share at the office and apply in my daily work.

SESSIONS ATTENDED AND LESSONS LEARNT PRESENTATIONS

All presentations that I attended were directly related to the work I do. However I was more interested in donor recruitment and retention. Below are some are the highlights of some of the more relevant sessions that I attended and learned more from.

1. An inventory done in Uganda presented by Mr. APM Los on ‘The liaison role of school teachers to support blood collection and donor retention at schools’.

According to the presentation, Uganda depends on school students as a major source of blood supply; as a result they had to run a nationwide inventory in order to find out how they could strengthen the following:
- Organization of blood donation in schools
- Motivation and continuity of blood donation in schools
- Blood donor retention after finishing school

The inventory had to answer two big questions:
- How to improve blood collection in schools and
- How to approach teachers.

The method used was a nationwide inventory on:
- Teachers’ knowledge, attitudes, motivation, and opinion on blood donation practice in schools;
- Performance practice of mobile collection teams visiting schools;
- Workshop for blood donor recruiters, Uganda Blood Transfusion Service and Uganda Red Cross society;
- Evaluation of results.

The results were encouraging and in summary what encouraged me was that the:
- Teachers were willing to act as contact persons in their schools;
- Teachers improve giving attention for blood donation in schools;
- Teachers voicing their concerns and fears about blood donation;
- Teachers suggesting ways on how to improve donor education;
- Organizing special open days for donation;
- Care of donors after school for them to continue donating blood;
- Proper communication between schools transfusion service etc.
- Recommendation on inclusion of blood donor information into school curriculum.

From these results I noted that we share the same challenges in our settings but I appreciated the efforts of Uganda Transfusion Service for reviewing this challenge and managing to find ways on how best to overcome it.

As is the situation in Uganda, Malawi Blood Transfusion Service (MBTS) also depends on school students as well for 90% of its blood supply. The challenges highlighted by Uganda Blood Transfusion Service are therefore more or less the same as those faced by MBTS.

MBTS should hence strive to ensure that teachers change from their individual role in the blood donation mobilization practice to a more organized collective panel in order for them to be a stronger partner in liaison between the transfusion
and the school in our Malawi setting. In some cases MBTS has failed to collect more blood from schools because some teachers are not supportive and do not show interest as a result they discourage students from donating. The approach shared by Uganda Blood Transfusion Service has the potential to solve this challenge. Using organized collective teacher panel can also assist to mobilise parents and the communities, an initiative which MBTS has in the past tried and met a lot of challenges in implementing through teacher meetings. As it is a known fact parent teacher meeting initiatives have in some cases failed to mobilize and raise blood awareness in the communities largely due to the lack of knowledge of the parents surrounding the respective schools; where in some cases even access has been denied through Parents Teacher Associations.

It was learnt during the sessions that effective donor retention and recall after they leave school improve greatly with intensive and continuous donor education in schools but can also do well as a suggestion through films, videos and provision of public lectures on blood donation and inclusion of blood donor information in school curriculum. This last point is very crucial for Malawi Blood Transfusion Service if only we can manage to advocate and convince the Ministry of Education for implementation.

As it is the case in the country, schools calendar starts from January to September every year which leaves MBTS with a big gap of three months of very low blood collection hence shortage of blood in the hospitals. If the blood donor information was in the curriculum it was probably going to be easy to negotiate a change in the school calendar to January to September every year which leaves MBTS with a big gap of three months of very low blood collection hence shortage of blood in the hospitals. This missing information has a very big impact on blood donation. This is also experienced in Malawi where very few females donate blood in our clinics.

I feel it would serve blood transfusion services in Africa very well if we can explore and expel such beliefs in order to increase blood donor base.

3. The other presentation was on “Donor recruitment, motivation and retention” by Fridah Mcharo a Donor Recruiter from the Kenya Blood Transfusion Service.

The presentation focused on the role of celebrities in blood donation. In Kenya the use of celebrities has helped them increase their donor base. It’s an idea that the Malawi Blood Transfusion Service would like to embark on though MBTS has started but with only two celebrities this has not been followed up yet and it was interesting to learn from Kenya’s experience that it does works. However there is a need to know more especially regarding transfusion transmissible infection results and cost effectiveness from such a campaign.

PLENARY SESSION

The Club 25 members made a very interesting presentation on their deliberations on the last day of the conference. It was interesting to learn that in Nigeria Cub 25 is not only involved in donating blood but also engaged in several activities e.g. visiting and helping orphans, involving themselves in community work like cleaning roads, hospitals and many more charity works. They also engage in recreation activities like sports. I really believe that such activities would help them to focus on how best they can serve the community by not only donating blood.

Another presentation on Club 25 was from Eritrea which focused on how information can best be passed to members regarding donating or not donating blood which means that one should not be seen to be bias on how donors are deferred. In this case it was shared that a young donor who had been rejected on several occasions because of his weight finally decided to put stones in the pockets of his clothes in order to add weight so that he could be accepted to donate blood.

I really believe that this can happen in Malawi because during my practice at Malawi Blood Transfusion Service, I have come across young potential donors who after having failed to reach the required criteria they decide to come again and ask if two of them could donate in one unit of blood, pleading, thinking that this is possible. There is need to watch out for such unforeseen circumstances by our young donors who can take us by surprise one day.

CONCLUSION AND RECOMMENDATIONS

It was noted during the congress that every blood transfusion service on the continent is trying to find ways of recruiting and retaining blood donors in order to do better. It was therefore very exciting to learn from all blood transfusion services various creative and innovative ways they are using in order to overcome the scarcity of blood in their countries.
Based on what I learned from the conference I would therefore recommend that MBTS should:

- Improve on blood collection from schools by focusing on effective donor retention and recall after students leave school;
- Improve donor education in schools by coming up with films, videos and providing public lectures on blood donation and;
- Lastly including blood donor information in the school curriculum.

ACKNOWLEDGEMENT

Firstly, I would like to thank AABB which took care for everything that was needed to make me travel to Kenya, to attend this magnificent workshop, provision of accommodation, food and all other necessities. Secondly, I wish to assure the sponsors (AABB) that I will share with colleagues the knowledge gained from the conference and use it in my daily work in order to improve the service. I also hereby extend my heartfelt congratulations and gratitude to the organizers of the congress for the extra effort to make it happen and the smooth running thereof, and to all AfSBT members for their contribution.

REPORT: C. EJEH

State Coordinator, National Blood Transfusion Service
Lokoja, Nigeria

AIR TRAVEL

The travel agent used by AfSBT was very efficient. I got my return ticket on time and was able to finalise all travel requirements before 24th June 2009. Kenyan airway is a pleasant means of transportation. My experience at the Nairobi airport was as a result of my not booking with the Budget. However I found my way to the Hotel and arrived at 6.30 pm.

ACCOMMODATION

The five star Laico Regency hotel, the venue of the conference was a memorable place to stay. I got my room after waiting for three hours. The hospitality at the hotel thereafter is highly commendable.

CONFERENCE

This was my first attendance at an international conference. The settings and programs were all memorable. It created enough avenues for networking of ideas and comparing notes. The opportunity given to me to make a poster presentation added to my joy at the forum. The conference equally enabled me to register with the International Society for Blood Transfusion (ISBT).

LESSONS LEARNT

The major lesson of the conference to me was to anchor all my blood transfusion service in a research environment. This will enable me to have a systematic and purposeful documentation of all the blood transfusion services. This will on its own have an inbuilt quality assurance that any blood service will anticipate to have.

CHALLENGES

In my country funding of programs and research grants are not easy to come by. This has an effect on the quality and scope of achievements. The conference has challenged me to use my meagre resources to study my basic processes and compare notes with similar organisations all over the world.

I shall be pleased to have similar offers to enable me actualise my dreams of contributing to the body of knowledge on blood safety practices in Africa.

I remain eternally grateful to the society for the sponsorship afforded to me. Thank you.
REPORT: ISAAC KAJJA
Dept of Orthopedics,
Makerere University College of Health Sciences,
Kampala, Uganda

INTRODUCTION

Scientific conferences give opportunities of knowledge exchange, learning, networking and formation and strengthening of friendship. However, this is not always possible for individuals in resource constrained settings to accomplish. The good and kind relationship between the Africa Society for Blood Transfusion and other sister associations, the generosity of the AABB enabled me attend the 5th International Blood Transfusion Congress and the pre-congress training and education workshop in Nairobi from 23 to 27 June 2009.

MY EXPERIENCE

23 June 2009: I had an uneventful flight to Nairobi accompanied by a warm welcome at the Laico Regency Hotel.

Following is an account of the sessions I attended with their accompanying learning benefits.

Date/time: 24th June 2009
Session attended/activity in which I was involved:
Theme of learning
Pre-congress workshop on Training and education in Transfusion medicine
Plenary sessions improved my knowledge on challenges of the transfusion chain from donor recruitment to monitoring of a transfused patient that need urgent training in the African setting.

Date/time: 25th June 2009
Session attended/activity in which I was involved:
Theme of learning
Congress opening:
Status of global blood supply and demand
Plenary on updates on blood transfusion in the African region:
Different organizational structures of transfusion services from African countries [Malawi, Namibia, Kenya, Zimbabwe and Ghana]

Concurrent session on JICA/NBTS blood project in Kenya:
Detailed account of a foreign aided project in a developing country focusing on research activities, good manufacturing practices and quality assurance advances as a result of the presence of the project.

Concurrent session on blood safety:
Challenges and strategies to improvement of blood safety in the developing countries.

Date/time: 26th June 2009
Session attended/activity in which I was involved:
Theme of learning
Plenary session PEPFAR SYMPOSIUM:
The role of a multi-national project in ensuring adequate and safe supplies of blood
Concurrent session on research:
The role of research in fostering blood safety
Concurrent session on human resource:
Ensuring adequate and appropriate training for staffs to meet current transfusion challenge
Concurrent session on appropriate use of blood:
Insight into the factors affecting appropriate clinical use of blood in developing countries, I presented on oral paper “Use of the surgical blood order equation in open reduction and internal fixation of femoral fractures”.

Date/time: 27th June 2009
Session attended/activity in which I was involved:
Theme of learning
Plenary session on Quality management:
Strategies and challenges of ensuring quality service delivery in transfusion medicine in different African settings.

I would like to acknowledge the following:
1. The organizer of the workshop and congress for a job well done.
2. The AABB for their generosity that enabled me to attend the meeting.
3. The good working relationships of the AfSBT with other sister organizations that provided guest speakers.
4. The promoters of my PhD project [Prof Cees Smit Sibinga and Prof Gabriel Sebishimbo Bimenya] for their efforts in helping to prepare the paper I presented at the congress.

ACHIEVEMENT

I have been appointed to the Scientific and Publications Committee of AfSBT.
REPORT: IVY EKEM
Consultant haematologist, involved in the re-organization and restructuring of the blood services in Ghana

MY EXPERIENCE

I am very grateful to have had the opportunity to attend this congress in Nairobi. I arrived at the Laico Regency Hotel, on the morning of the 25th June 2009 and attended the congress opening. The theme was “Meeting the needs for safe blood in Africa”. My participation in the rest of the scientific sessions and my learning points were as follows:

Date/time: 25th June 2009
Session attended/activity in which I was involved: Congress opening
Theme of learning
Congress opening:
The positive role of Club 25, the Red Cross and Red Crescent societies, the Presidential Emergency Plan For AIDS Relief (PEPFAR) and regional collaboration.

Plenary 1: Updates on blood transfusion in the African region
• Zimbabwe’s experience of quality management within the framework of centralized testing.
• JICA/NBTS blood safety project in Kenya - Training in every aspect of the selected project with close supervision, and monitoring. Linkages and communications improved.
• Blood safety - More needs to be done concerning malaria in donors and recipients with regard to protocols that should be followed.

Date/time: 26th June 2009
Session attended/activity in which I was involved: Plenary 2: PEPFAR symposium
Theme of learning
Plenary 2: PEPFAR symposium
• Software for blood inventory management - vein to vein (V2V). Formation of the Kenya Chapter of the AfSBT.
• Research: Lack of reportage and research into malaria, transfusion reactions and other non-HIV topics to be rectified.
• Human resources: The existence of postgraduate Diploma in Transfusion Medicine in South Africa.
• Laboratory Studies: Studies in red cell antigens and antibodies. The Galileo Echo equipment.

M. Plenary 3: Club 25 and Health promotion
• Promoting health and donation - serious business, using fun as the main tool. Dedicated role of blood sisters.

Plenary 5: Kwaheri session
• Dedicated role of “parents” of the AfSBT.
• General Assembly of Members - Changing Structure, regional chapters, elected officers.

The gala night on the 26th of June was a beautiful experience, so was dinner at the Carnivore restaurant on invitation from Dometic. Apart from being better equipped to continue supporting Ghana’s blood services, what I have heard and learnt will enrich my teaching and training of residents as well as medical students, and also research.

Date/time: 27th June 2009
Session attended/activity in which I was involved:
Theme of learning
Plenary 4: Club 25 and Health promotion
• Promoting health and donation - serious business, using fun as the main tool. Dedicated role of blood sisters.

Plenary 5: Kwaheri session
• Dedicated role of “parents” of the AfSBT.
• General Assembly of Members - Changing Structure, regional chapters, elected officers.

The gala night on the 26th of June was a beautiful experience, so was dinner at the Carnivore restaurant on invitation from Dometic. Apart from being better equipped to continue supporting Ghana’s blood services, what I have heard and learnt will enrich my teaching and training of residents as well as medical students, and also research.
REPORT: TERESA NEL
Affiliated lecturer for the Postgraduate Diploma in Transfusion Medicine,
Department of Hematology and Cell Biology,
Faculty of Health Sciences, University of the Free State,
Bloemfontein and Haematologist at PathCare Bloemfontein

This was the fifth International congress of the Africa Society for Blood Transfusion, but the first time the congress was not linked to another international congress. It comprised of two and a half days of presentations with concurrent sessions as well as two poster sessions.

The various sessions such as “Updates on blood transfusion in the African region, Human Resources, Appropriate use of blood, etc” were well chosen and covered aspects that looking at the attendance were of interest to the participants.

The venue at which the congress was held was very convenient and had enough space to accommodate a congress like this. The company that did the logistics of the congress was very helpful and efficient.

The linking of a workshop on education and training to the congress will strengthen the focus of the Africa Society for Blood Transfusion to play an important role in this regard in Africa.

By having the congress and the congress hotel in one venue also allowed ample time for networking.

SESSIONS ATTENDED

I attended the following:
1. Africa Society for Blood Transfusion Workshop on Training and Education
   • Participated in workgroup 1 on “Developing education and training materials”
2. The Congress opening session
3. The session on “Updates on Blood Transfusion in the Africa Region”
4. The session on “Blood donation 1A”
5. The session on “Blood donation 2A”
   • Chaired this session with T Odongo
6. The poster session on 25 June 2009
7. The session on “PEPFAR”
8. The session on “Research”
9. The session on “Human Resources”
   • Presented at this session on “The Development and Implementation of the Post graduate Diploma in Transfusion Medicine”
10. The session on “Laboratory studies”
11. The poster session on 26 June 2009
12. The session on “Quality Management”
13. Presented at this session on “The Implementation of the Haemovigilance programme with limited resources - the South African experience”
14. The feedback session on “Club 25 and health promotion”
15. The “Kwaheri session”

OVERVIEW OF THE SESSIONS

The sessions I participated in were well attended. The presentations were of good quality and of interest to the participants. The support in terms of delivering the presentations was good and the staff handling this was very efficient. In most cases there was good time management and the sessions started and ended as was indicated.

RECOMMENDATIONS

1. There should be more detail in the guidelines for the preparation of oral presentations such as if the time slot for a presentation is for instance 15 minutes, is the time split into for instance 10 minutes for presentation and 5 minutes for questions, or is it 15 minutes for presentation?
2. At a congress like this there are a number of presenters who present for the first time and to suddenly learn that what they have prepared for 15 minutes needs to given in 10 minutes is unsettling.
3. What format the presentation need to be saved in. At some of the sessions there were problems with presenters who had their presentations saved on Vista. Trying to accommodate this by switching computers, etc wasted time.

CONCLUSION

I want to thank the Africa Society for Blood Transfusion for the sponsorship and the opportunity to be able to attend this congress. It was an excellent learning experience.
QUALITY MANAGEMENT

QUALITY MANAGEMENT BRIEF:
PEER REVIEW STRATEGY FOR ENHANCING PERFORMANCE

David Chama
Scientific and Publications Committee Member,
AfSBT

A well designed “Peer Review Strategy” can be a stimulus for enhancing staff performance and ultimately improve quality status in a Blood Establishment.

Blood centers may feel that they are stand alone entities whether or not systems have been standardized. In a centralized Blood Transfusion Service (BTS) set up, the degree of freedom espoused by individual blood centers is to some extent limited. However in a typical hospital based BTS set up, the autonomy of operation is largely unabated.

Nevertheless, by mutual agreement, irrespective of the type of BTS in place, a Peer Review Strategy could be implemented with a specific mandate - that of aiming at improvement of performance of staff and blood centres without necessarily using universal tools of assessment such as those applied in Performance Audits.

GENERAL DESCRIPTION OF PEER REVIEW STRATEGY

This is the mechanism in which members of staff belonging to one blood centre would move into another blood centre and review records of performance e.g. in blood group serology. During the exercise, non conformances detected or quality incidences observed could be noted down. At the end of the exercise, a round table forum could be arranged in which the findings are discussed and proposals for improvement suggested.

A repeat activity is done after a couple of months and improvements or deterioration in performance highlighted.

WHAT ARE THE BENEFITS OF PEER REVIEW STRATEGY?

- The strategy can be considered as part of overall System Audit.
- The strategy acts as Staff Proficiency testing tool.
- The strategy acts as stimulus for improved performance by staff.
- The strategy can be the basis for system change in an event there is perpetual downward trend in performance at the centre.
- Staff interest in the work they do is bound to be stimulated.
- Staff sense of belonging to a larger peer family is promoted.

CONCLUSION

Peer Review Strategy should be promoted across blood centres and even at a larger scale across boundaries. It is a positive tool of keeping abreast with the rest of peers especially those in a similar category of performance. In blood centres with limited expertise, the peer review mechanism would prove to be a cheaper way of quality improvement. Resources expended in the process are minimal and cost effective.
INTRODUCTION

The Blood Transfusion Process is a complex series of interlinked segments of activities. The general process involves: Blood Donor Recruitment, Blood Collection, Transportation, Storage, Blood Component preparation, Testing for Transfusion Transmissible Infections (TTIs), Inventory / Blood Distribution and Compatibility Testing. In the article on Interphase management we presented a considerable guide to managing the Interphase as one way of reducing errors which could otherwise be passed from one phase to another and ultimately affect the final outcome of the process.

In this issue, we look at Quality Control (QC).

DESCRIPTION

QC measures refer to procedures or measures which are carried out at the time the test is being performed as a way of verifying that the test has indeed been conducted satisfactorily. The Quality Control (QC) material bears the characteristic of known parameter and expected outcome. Practically, as a general rule, the QC material is included in a routine procedure alongside the actual analyte. At the end of the procedure, the result of the QC material tested forms part of the basis for result validation. The frequency of QC performance depends on several factors including; the type of assay, technology in use, how critical the assay outcome is and the volume of activity in the Blood Establishment.

APPLICATION

The following are examples of QC procedures which can be performed at various stages in the transfusion chain:

Blood Donor Recruitment

The aim of Donor Recruitment is to enlist voluntary blood donors who are in the safe category in so far as infections are concerned. To recruit blood donors, social marketing materials are designed produced and disseminated. A segmented approach has been found as an effective way of targeting information. It is therefore cardinal to initially pretest the designed material prior to rollout then as a QC measure, periodically a simple questionnaire can be included to find out whether the message on the poster or leaflet is understood in the intended manner.

Blood Collection

One of the objectives of blood collection activity is to collect units of blood using standard weights. Whilst this is appreciably difficult to achieve, use of equipment such as standard weight mixers will assist to achieve the intention. The QC measure at this stage would be to verify that the weight collected is indeed correct. Therefore a standard weight can be used to check the volume collected on a periodic basis. There is a direct correlation between the weight collected and the volume of blood collected.

Transportation of Blood

The collected blood needs to be transported at the recommended temperature in order to avoid deterioration of cellular constituents of blood and other changes which may directly be attributed to high temperatures. Therefore a QC measure could be periodic inclusion of temperature monitors in cooler boxes used for transport.

Blood Donor Testing for Transfusion Transmissible Infections (TTIs)

Blood which is donated must be tested for TTIs. Different countries have designed different batteries of tests to be employed as mandatory in the Blood Establishments. QC measures at this stage would involve inclusion of known positive and negative sera for a particular disease marker (Positive and Negative Control).

Blood Component Production

Preparation of Blood Components should be done in accordance with Good Manufacturing Practices (GMP).

QC measures in Component production would include; Measurement of platelet counts produced in a certain percentage of platelet concentrates produced over a given period of time. Others would be Fibrin Degradation Products (FDP) or defined parameters.

Blood grouping

In order to ensure that performance of ABO and Rh Blood Grouping is done without errors or mistakes QC measures should be designing blood grouping methodology to include both blood group antigenic detection and corresponding antibody detection. The strengths of agglutination should be pre-defined e.g. 4+ reactions. Further reagents for use must be subjected to QC Checks prior to usage.
Compatibility Testing
The aim of the crossmatch as part of compatibility testing is to detect antibodies in the patient which would otherwise induce a transfusion reaction if the patient was transfused with red blood cells with corresponding antigens.
QC Measures are varied depending on the level of operation of a particular laboratory. However use of Coombs Control Cells in each Coombs negative tube must be done.

VALUE OF QC DATA
QC results must be documented. As a general rule, when QC test passes, then the test has been run satisfactorily. A failed QC test is the basis for invalidating the run. The generated QC data must be managed in a way as to facilitate decision making. Depending on the critical nature of the test, an instant decision can be made to invalidate the result. There are times when Failed QC outcomes e.g. non conformances may be passed through a structured system of Management of non conformances. The trend of QC data collected over a period of time facilitates management decision either to change or sustain the procedure, reagent or equipment in usage.

CONCLUSION
QC measures are important in the Blood Establishment. In process QC measures must be part of routine procedures and should be managed at various departmental or sectional levels. QC procedures must be incorporated in Process descriptions and in Standard Operation Procedures (SOPs). Compliance to usage of QC measures must be enforced by sectional/departmental heads. All members of staff in departments or sections must participate in performance of QC procedures.

POSTGRADUATE DIPLOMA IN TRANSFUSION MEDICINE

Purpose
The purpose of this diploma is to enable the students to practice medicine with a more in-depth knowledge on the appropriate use of blood and blood products.

Who is it aimed at?
This diploma is for every doctor involved in the transfusion of blood and blood products, whether you work in a rural, academic or private setting. The focus is on training doctors in the practical use of blood products in the clinical setting. This qualification will empower doctors to use blood, a scarce resource, appropriately and cost-effectively in the larger context of limited resource settings.

What will be gained?
A formal qualification in the utilisation of blood products will be acquired. The qualification will be registered to earn CPD points.

What is needed to enrol?
M8ChB or equivalent qualification. Access to e-mail and internet facilities. Submission of application forms before 15 Nov 2009.
Contact: Prof Vernon Louw
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An exciting feature to be introduced is the printing of sections from Introduction to Blood Transfusion Technology by B Armstrong et al in ongoing issues of Africa Sanguine. The aim is to provide educational material, such as contained in this publication, in the new Education Section of Africa Sanguine. Hard copies of the publication Introduction to Blood Transfusion Technology may be requested by emailing the Editor at beryl.afsbti@sbi-kzn.org.za.

HOW CAN YOU GET INVOLVED?

We are providing you with an opportunity to have your questions, problem areas, queries or comments answered by the authors of this book. We will publish correspondence and replies in the journal. You are encouraged to participate and make use of this opportunity to share your ideas, thoughts or views.

Submit correspondence to the Editor:
beryl.afsbti@sbi-kzn.org.za or leesha.raman@gmail.com

Extract from the Publication:
INTRODUCTION TO BLOOD TRANSFUSION TECHNOLOGY

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Reprinting of Section 1: HAEMATOLOGY

Beryl Armstrong

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INTRODUCTION
Haematology is the study of blood. An introduction to the subject helps to form a firm foundation on which to build an understanding of the science of blood transfusion technology. Being aware of the nature of blood, its composition and its role in the maintenance of health are of value in better addressing the transfusion needs of patients.

LEARNING OBJECTIVES
By the end of this section, the student should be able to describe the following in simple terms:
- Haemopoiesis
- Circulatory system
- Composition and functions of blood
  - Plasma
  - Red blood cells (erythrocytes)
  - White blood cells (leucocytes)
  - Platelets (thrombocytes)
- Red cell abnormalities leading to chronic anaemia
- Haemostasis and clotting factors
- Coagulation defects
- Haemorrhage and shock
HAEMOPOIESIS

Haemopoiesis is the term used to describe the production of blood cells, which in normal healthy adults occurs in the bone marrow and lymphatic system. (During fetal life, haemopoietic tissue is found in the liver and spleen.) Because all blood cells have a limited lifespan, ongoing replacement of cells that are no longer viable is needed. This happens by division and maturation of precursor cells, mainly in the bone marrow. Mature cells are released into the bloodstream where they circulate and continue to age until they are no longer functional, at which time they are withdrawn from the bloodstream, broken down and the elements either reused or excreted.

The specific blood cells that are produced and eventually released into the bloodstream are the red cells or erythrocytes, the various types of white cells or leucocytes and the platelets or thrombocytes.

All these formed elements, as the cells are called, originate from common ancestor stem cells that after many cell divisions in the bone marrow, results in the mature blood cells that are found in the circulation. The precursor cells are known as blast cells, e.g. the precursor lymphocyte is called a lymphoblast.

Normal peripheral blood contains mature cells that do not undergo further division. Figure 1.1 shows a simplified process of haemopoiesis. Arrows indicate cell development in the direction of maturation. Mature erythrocytes and thrombocytes are non-nucleated.

Erythropoiesis describes the production of red blood cells. Red cells contain haemoglobin, which is needed for the transportation of oxygen in the bloodstream to all parts of the body. Throughout fetal life, fetal haemoglobin F (HbF) is produced by maturing red cells. It is only after birth that adult haemoglobin A (HbA) predominates.

Anaemia is the word used to describe in broad terms, a state of red cell deficiency, either in quantity or quality. An erythropoietic stimulus or trigger is needed for the body to initiate the production of new red cells, to maintain the balance between red cell production and red cell loss. Erythropoiesis is dramatically increased when there is a substantial loss of blood. However, a very gradual yet regular loss of red cells over a long period of time may not result in adequate compensation and an individual could gradually become anaemic without signs or symptoms until the haemoglobin level is dangerously low.

The major factor controlling the rate of red cell production is the oxygen content of the blood. A low blood oxygen level leads to low tissue oxygen, a condition called hypoxia. Hypoxia is the strongest stimulus for erythropoiesis, as seen in the compensated erythropoiesis occurring in individuals living at high altitudes. There is less oxygen in the air at higher altitudes so inhabitants in such areas need more red cells to attach sufficient oxygen than individuals living at sea level, where oxygen in the air is in greater supply.

Hypoxia does not have a direct control on the bone marrow but causes the release of a hormone called erythropoietin, produced in the kidneys, which then stimulates the bone marrow, causing the erythrocyte-forming cells to differentiate and divide and eventually form erythrocytes. Erythropoietin also causes the release of reticulocytes (immature red cells) into the circulation. The increased red cell mass then increases the amount of haemoglobin available to deliver oxygen and so the tissue oxygen level is increased.

The sudden loss of a moderate amount of red cells through accident, or by donating a unit of blood, for example, is sufficient to stimulate the production of red cells to replace those lost.

CIRCULATORY SYSTEM

The heart pumps the blood around the body in the cardiovascular circulatory system, through the pulmonary (lungs) and systemic (body) circuits. The pumping of blood from the heart to the lungs allows the red cells to become oxygenated, and this oxygenated blood is then pumped to the brain and around the body via the arteries so that all parts of the body are reached. Once the blood reaches the tissues and delivers its oxygen and nutrients, the veins are then used to transport carbon dioxide back to the lungs for exhalation, and waste products to the kidneys and other organs for excretion. Figure 1.2 depicts a simplified circulatory system showing the major blood vessels and organs. The human body is far too complex to depict accurately in such a simplified form. This figure is intended to illustrate the positioning of major arteries and veins in relation to vital organs - all of which are reached by both arteries and veins.
COMPOSITION AND FUNCTIONS OF BLOOD

Blood is a suspension of various types of cells in a highly complex, aqueous (watery) material known as plasma.

- The volume of blood in the average healthy adult is about 5 L (7.7% of body mass).
- The pH is 7.3 to 7.4 which means that the degree of acidity-alkalinity is nearly neutral. Acidic fluids have a pH of less than 7.0 and alkaline fluids have a pH of more than 7.0.
- The specific gravity (SG) of blood is 1.050 to 1.065, which indicates that it is slightly heavier than pure water, which has an SG of 1.000.
- The two major portions of blood are plasma, which, in healthy individuals, is approximately 60% of the total volume, and cellular elements or blood cells, which account for the remaining 40%.
- About 90% of plasma consists of water.

BLOOD PLASMA

Plasma is a light yellow or straw coloured fluid. Many substances are dissolved in the plasma, including oxygen, carbon dioxide, nitrogen, electrolytes (such as sodium, chloride and potassium), proteins, hormones, lipids, carbohydrates, amino acids, vitamins and nitrogenous wastes such as urea and uric acid. Water is the solvent in which these substances are dissolved.

There are many different proteins in plasma. These may be divided into two groups: albumin and globulin (clotting factors, enzymes and immunoglobulins).

Total serum protein is 60 to 80 g/L and about half of this is composed of albumin, which is synthesized in the liver. As protein does not freely diffuse through intact vascular endothelium (blood vessel lining), it provides osmotic pressure that regulates the passage of water and diffusible solutes through the capillary walls. This means that fluid does not readily diffuse out of the vascular system into the tissues, but is retained in the circulation where it is needed. Albumin also serves as a carrier protein for various substances such as unconjugated bilirubin (the waste product of haemoglobin).

After albumin, the most plentiful plasma proteins are the immunoglobulins (antibodies) of which five main classes have been recognized: immunoglobulin M (IgM), immunoglobulin G (IgG), immunoglobulin A (IgA), immunoglobulin D (IgD) and immunoglobulin E (IgE). These all serve in one way or another to protect the host from infection.

Plasma is a transportation system for the following:

- Cellular elements - red cells, white cells and platelets.
- Oxygen is carried by the red cells from the lungs to the tissues.
- Carbon dioxide is carried, mainly by the red cells, from the tissues back to the lungs.
- Hormones, antibodies, coagulation factors and other substances are taken from the site of their production to the site where they are needed.
- Nutrients are absorbed into the bloodstream from the digestive system and taken to the tissues.
- Waste products from tissue metabolism are transported to the organs of excretion (e.g., kidneys).

Main constituents of plasma (remembering that 90% of plasma is water):

1. **Solids:**
   - plasma proteins: albumin, globulin, fibrinogen
   - regulatory proteins: enzymes, hormones, antibodies

2. **Inorganic substances:**
   - calcium
   - bicarbonate
   - sodium
   - chloride
   - iodine
   - iron

3. **Organic substances:**
   - nutrients: sugars, amino acids and fats
   - waste products: urea, uric acid and creatinine

4. **Gases:**
   - oxygen
   - carbon dioxide

**BLOOD CELLS**

The blood cells, or formed elements, constitute approximately 40% of total blood volume in healthy individuals. They are divided into three main groups:

1. Red cells (erythrocytes).
2. White cells (leucocytes).
3. Platelets (thrombocytes).

Figure 1.4 shows a stained blood smear on a slide, viewed microscopically.

Blood counts are done in the laboratory to estimate the numbers of cells in a patient, to determine whether or not these numbers fall within normal limits. For example, there are approximately 5 million red cells per cubic millimetre in normal adults. This result may be written in many different ways, all with the same interpretation:

- Five million cells per cubic millimetre = 5 million cells/mm$^3$
- Five million cells per cubic millimetre = 5 x 10$^6$/mm$^3$
- Five million cells per microlitre = 5 million cells/μL
- Five trillion cells per litre = 5 x 10$^{12}$/L

**Units of measurement**

To ensure standardization, the system of SI units has been adopted by many countries. SI stands for Le Système international d’unités. This translates from the French as the International System of Units, and is the system of measurement most widely used in science today. It is a dynamic set of standards that may be changed only by international agreement, as the technology of measurement progresses. With regard to the example above, the measurement according to SI units, is 5 x 10$^{12}$/L. These units are used later, as shown in Table 1.1.

The 'buffy' coat

The white cells and platelets form a 'buffy' coat or layer, which is seen between the red cells and the plasma in anticoagulated blood samples that have been centrifuged. Figure 1.5 shows a centrifuged test tube of anticoagulated blood.

**Figure 1.5: Centrifuged test tube of anticoagulated blood.**

**RED CELLS (ERYTHROCYTES)**

Red cells are described as non nucleated, biconcave discs with a characteristic red colour due to a pigment contained in their haemoglobin. Oxygenated blood is bright red; deoxygenated blood loses its bright red colour and becomes dull, dark red. Haemoglobin consists of four closely linked polypeptide chains (globin), each of which is attached to an iron-containing complex (haem). The molecular mass of haemoglobin is about 68 000 daltons. The haem is the part of the molecule responsible for its oxygen carrying capability.

The major function of red cells is to transport oxygen from the lungs to the tissues for use in cellular respiration. The red cells also remove carbon dioxide from the tissues for excretion via the lungs during exhalation. The normal in vivo (in vivo is Latin for ‘in the body’) survival of red cells is 100 to 120 days. In vitro (in vitro means ‘within the glass’ or what is now known as ‘in the test tube’ and relates to being outside the body) survival depends on storage conditions and the type of anticoagulant and preserving fluid used. For a unit of
donated blood, there should be sufficient viable cells at the end of the shelf life of that donation, for approximately 75% of the red cells still to be detectable in the bloodstream of the recipient, 24 hours after transfusion.

WHITE CELLS (LEUCOCYTES)

White cells are responsible for host defence and for protecting the body from infection. There are many different kinds of white cells. They are nucleated cells, some of which are capable of independent movement and can change their shape to surround and then ingest or ‘swallow’ foreign matter such as bacteria. The process of removing potentially harmful agents in this manner is called phagocytosis. See Figure 1.6 for an illustration of the process of phagocytosis. Other white cells produce immunoglobulins (antibodies) that react with the foreign matter, also with the intention to inactivate or make harmless, and remove from the circulation.

**Figure 1.6: Phagocytosis.**

Leucocytes are classified into three major groups:
1. Monocytes.
2. Lymphocytes.

Each type of leucocyte has a distinct function and morphology.

**Monocytes**

Monocytes are capable of ingesting bacteria and tissue debris or fragments by phagocytosis. They act as scavenger cells, clearing the body of foreign particles and the remains of cells, at the site of infection.

**Lymphocytes**

Lymphocytes vary in size from small lymphocytes, which are slightly larger than red cells, to large lymphocytes which are larger than monocytes. Lymphocytes are either T- or B-lymphocytes (also known as T cells or B cells).
- T-lymphocytes are involved in cellular immunity and have a regulatory role in humoral immunity.
- B-lymphocytes are responsible for humoral immunity that involves antibody production.

**Granulocytes**

Granulocytes are polymorphonuclear cells. They contain a nucleus which has three lobes. They are characterized by granules which are visible microscopically in the cytoplasm of the cells, after laboratory staining. Granulocytes fall into three subgroups:
1. **Neutrophils** - main function is phagocytosis.
2. **Basophils** - capable of phagocytosis and contain histamine and heparin.
3. **Eosinophils** - capable of phagocytosis and are involved in allergic responses.

**PLATELETS (THROMBOCYTES)**

Platelets are small particles which have no nucleus and come from the cytoplasm of bone marrow cells called megakaryocytes. They participate in blood coagulation. Platelets form a plug to seal damaged blood vessels and thus have a crucial role in haemostasis or the control of bleeding.

Table 1.1 lists the normal blood measurements in adult men and women, Table 1.2 gives the normal lifespan of the formed elements in vivo and in vitro, and Table 1.3 notes the terms used to describe blood cells with abnormal counts.

**Table 1.1: Normal blood measurements in SI units.**

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Men</th>
<th>Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red cell count</td>
<td>4.5-6.5 x 10^12/L</td>
<td>4.0-5.5 x 10^12/L</td>
</tr>
<tr>
<td>White cell count</td>
<td>4.0-11.0 x 10^9/L</td>
<td>4.0-11.0 x 10^9/L</td>
</tr>
<tr>
<td>Haemoglobin</td>
<td>130-180 g/L</td>
<td>120-160 g/L</td>
</tr>
<tr>
<td>Haematocrit</td>
<td>0.40-0.54 L/L</td>
<td>0.38-0.47 L/L</td>
</tr>
<tr>
<td>Platelets</td>
<td>150-400 x 10^9/L</td>
<td>150-400 x 10^9/L</td>
</tr>
</tbody>
</table>

**Table 1.2: Normal lifespan of formed elements in vivo and in vitro.**

<table>
<thead>
<tr>
<th>Blood cells</th>
<th>Lifespan in vivo</th>
<th>Approximate lifespan in vitro (in storage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocytes (red cells)</td>
<td>100-120 days</td>
<td>Up to 6 weeks storage as red cell concentrate</td>
</tr>
<tr>
<td>Leucocytes (white cells)</td>
<td>13-20 days</td>
<td>A few days only, except for lymphocytes</td>
</tr>
<tr>
<td>• Lymphocytes</td>
<td>Up to 4 years</td>
<td>Lymphocytes can proliferate when transfused</td>
</tr>
<tr>
<td>Thrombocytes (platelets)</td>
<td>5-10 days</td>
<td>About 5 days storage as platelet concentrate</td>
</tr>
</tbody>
</table>

**Table 1.3: Terms used to describe blood cells with abnormal counts.**

<table>
<thead>
<tr>
<th>Blood cells</th>
<th>Excessive number of cells</th>
<th>Depleted number of cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythrocytes (red cells)</td>
<td>Polycythaemia</td>
<td>Anaemia</td>
</tr>
<tr>
<td>Leucocytes (white cells)</td>
<td>Leucocytosis</td>
<td>Leucopaenia</td>
</tr>
<tr>
<td>Thrombocytes (platelets)</td>
<td>Thrombocytosis</td>
<td>Thrombocytopaenia</td>
</tr>
</tbody>
</table>
RED CELL ABNORMALITIES LEADING TO CHRONIC ANAEMIA

When the blood of an anaemic individual is examined, it is frequently found to have a raised level of immature red cells called reticulocytes. They are identifiable under the microscope by their remnants of cell nucleus. Although reticulocytes are also found in the bloodstream of healthy individuals, the level is raised in an anaemic state.

Examples of red cell abnormalities leading to chronic anaemia, and which are of particular concern within the field of blood transfusion, include thalassaemia and sickle cell anaemia.

Thalassaemia
This is an inherited disorder most commonly seen in individuals from areas of Asia and the Eastern Mediterranean. It is caused by a haemoglobin deficiency that leads to the red cells having a shortened lifespan. The disease may be mild to severe. Thalassaemia major is a more serious form of the disease than thalassaemia minor. Patients with thalassaemia major are severely anaemic and are often transfusion dependent. The disease causes enlargement of the liver and spleen, and bone expansion, as the body tries to compensate by expanding haemopoietic tissue into these areas.

Sickle cell anaemia
This is an inherited disorder first seen in the Arabian Peninsula, and parts of Asia and Africa. It is caused by structural defects within the haemoglobin molecule, which give rise to haemolysis. Individuals who inherit a double dose of the defective gene have red cells that change into a sickle or crescent shape during a sickle cell crisis. Sickle cells can become lodged in the capillaries; they also have a decreased lifespan. Most patients are asymptomatic most of the time and have red cells that appear to be of normal shape. Therefore they do not require routine transfusion. However, some patients require many blood transfusions throughout their life, and the disease can be very serious and complex to manage. Figure 1.7 shows a blood smear on a slide, with normal and sickle-shaped red blood cells as they appear under the microscope.

Figure 1.7: Diagram showing sickle cells and normal red blood cells.

HAEMOSTASIS

Haemostasis is the term used to describe the control of bleeding, the formation of a clot, and in the time of healing, the resolution of the clot and a return to normal. The process has four major components:

1. Vasoconstriction
Vascular constriction occurs in a damaged blood vessel with a muscular wall. This means that the blood vessel contracts or tightens to minimize further loss of blood.

2. Platelet plug
Blood does not clot in the body because there is insufficient free thromboplastin. However, as a result of injury, thromboplastin is released and in the presence of calcium ions (Ca++), combines with prothrombin to form thrombin, which in turn activates platelets. Activated platelets amplify the response by activating more platelets, and fibrinogen stimulates their sticking together as a soft plug that loosely blocks the wound, dramatically slowing down the bleeding.

3. Clot formation
Each clotting factor has in the meanwhile been participating in the process, which is why it is called the coagulation cascade. A mesh of insoluble fibrin is finally formed, resulting in a platelet plug and so reaching the endpoint of clot formation. As the clot shrinks a clear fluid called serum is exuded.

4. Dissolving the clot
The last component of the process is carried out by the enzyme plasmin, which is responsible for the gradual absorption of the clot by the body, so that a return to normal is eventually achieved.

CLOTTING FACTORS

The coagulation of blood is a complex process initiated typically when the skin is breached. When normal levels of coagulation factors are present in the body, they act in a cascade, where one factor when activated, activates the next, and so on, until a clot is formed and bleeding is stopped (i.e. haemostasis is achieved). Each clotting factor has been assigned an individual Roman numeral as shown in Table 1.4.

<table>
<thead>
<tr>
<th>Factor No.</th>
<th>Abbrev.</th>
<th>Description of factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor I</td>
<td>FI</td>
<td>Fibrinogen</td>
</tr>
<tr>
<td>Factor II</td>
<td>FII</td>
<td>Prothrombin</td>
</tr>
<tr>
<td>Factor III</td>
<td>FIII</td>
<td>Tissue factor (thromboplastin or thrombokinase)</td>
</tr>
<tr>
<td>Factor IV</td>
<td>FIV(Ca++)</td>
<td>Calcium</td>
</tr>
<tr>
<td>Factor V</td>
<td>FV</td>
<td>Proaccelerin</td>
</tr>
<tr>
<td>Factor VI</td>
<td>FVI</td>
<td>Not assigned</td>
</tr>
<tr>
<td>Factor VII</td>
<td>FVII</td>
<td>Proconvertin</td>
</tr>
<tr>
<td>Factor VIII</td>
<td>FVIII</td>
<td>Anti-haemophilic factor A</td>
</tr>
<tr>
<td>Factor IX</td>
<td>FIX</td>
<td>Anti-haemophilic factor B</td>
</tr>
<tr>
<td>Factor X</td>
<td>FX</td>
<td>Stuart-Prower factor</td>
</tr>
<tr>
<td>Factor XI</td>
<td>FXI</td>
<td>Plasma thromboplastin</td>
</tr>
<tr>
<td>Factor XII</td>
<td>FXII</td>
<td>Hageman factor</td>
</tr>
<tr>
<td>Factor XIII</td>
<td>FXIII</td>
<td>Fibrin stabilising factor</td>
</tr>
</tbody>
</table>
Blood coagulation is the culmination of a series of complex reactions that bring about a fibrin clot. The clotting cascade has two pathways; (i) the tissue factor pathway or (ii) the contact activation pathway. This is followed by a common pathway, in which clotting factor X, thrombin and fibrin are activated. Clotting factors circulate in the bloodstream in the form of inactive precursors. Table 1.5 shows a simplified coagulation cascade. The Roman numerals indicate the number of the clotting factor. The letter ‘a’ after a Roman numeral signifies that the clotting factor has been activated.

Table 1.5: Simplified coagulation cascade.

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Reactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tissue damage (extrinsic pathway)</td>
<td>FVII → FVIIa + Tissue Factor (Filla) (in presence of injury)</td>
</tr>
<tr>
<td>FX</td>
<td>FXa</td>
</tr>
<tr>
<td>Contact activation (intrinsic pathway)</td>
<td>FXII → FXIIa (exposure to non-vascular surface)</td>
</tr>
<tr>
<td>FXI</td>
<td>FXIa (in presence of calcium - FIV)</td>
</tr>
<tr>
<td>FIX</td>
<td>FIIa + FVII → FVIIa (in presence of calcium - FIV)</td>
</tr>
<tr>
<td>FIX</td>
<td>FIIIa → FXIIIa (in presence of calcium - FIV)</td>
</tr>
<tr>
<td>Common pathway</td>
<td>FXa (starting point) → FXa → FVa (in presence of calcium - FIV)</td>
</tr>
<tr>
<td></td>
<td>→ FII → FIIa (prothrombin → thrombin + FXIII → FXIIIa)</td>
</tr>
<tr>
<td></td>
<td>→ FI → FIa (fibrinogen → cross-linked fibrin)</td>
</tr>
</tbody>
</table>

With the exception of FV, FVIII and platelets, clotting factors are relatively stable in stored blood. Factor V and FVIII levels in donated blood plasma are stable only when frozen soon after collection to temperatures lower than 25°C. Platelet concentrates prepared from donated blood remain viable for up to 5 days under the correct conditions of storage: they need to be kept constantly in motion within a temperature range of ±2°C.

The process of coagulation is illustrated as a cascade in Figure 1.8.

**COAGULATION DEFECTS**

Life-threatening bleeding can occur as a result of defective haemostasis, which may be acquired or congenital.

**Acquired defects**

Acquired defects are those that develop in an otherwise normal individual, and include:

- Quantitative thrombocytopenia (low number of platelets in the body) as a result of massive transfusions of stored blood (which lack functional platelets)
- Drug-induced qualitative platelet deficiency (poor quality of platelets, that do not function normally, due to the influence of circulating drugs)
- Deficiencies of FII, FVII, FIX and FX due to vitamin K deficiency, usually caused by hepatic dysfunction
- Disseminated intravascular coagulation (DIC) when the blood starts to clot in the body, a relatively rare condition that sometimes affects critically ill patients.

**Congenital defects**

Congenital defects are those that are inherited and therefore present from birth, and include:

- Classic haemophilia (haemophilia A) is inherited as a sex-linked recessive trait (characteristic) in which there is a lack of functional FVIII. Women are carriers of the trait whereas men are clinically affected and have a bleeding tendency, the severity of which varies from one individual to another.
- Christmas disease (haemophilia B) is inherited as a sex-linked recessive in which there is a lack of FIX. The clinical signs and symptoms are very similar to haemophilia A and laboratory testing may be required to distinguish between the two.
- von Willebrand's disease is seen in both men and women and is inherited as an autosomal dominant. This means that it is not sex-linked, and because it is a dominant gene, can be expressed even if inherited in a single dose (from one parent). There is a deficiency of FVIII and also platelets. Bleeding episodes tend to be less severe than with haemophilia.

**HAEMORRHAGE AND SHOCK**

Haemorrhage is the sudden, abnormal loss of large amounts of blood as a result of injury or medical emergency, such as a heavy loss of blood after delivery of an infant (postpartum haemorrhage). When an individual loses more than 30% of circulating blood volume, normal compensatory mechanisms for correction of the situation, such as vasoconstriction, will not be sufficient and the individual will go into hypovolaemic shock, which leads to hypotension (low blood pressure) as a result of the decrease in circulating blood volume.
Haemorrhage is the most common cause of hypotensive shock, which is characterized by the following:

- **Peripheral vasoconstriction**: the patient appears pale because the blood supply to the surface is restricted in order to supply the vital organs.
- **Hypotension**: there is a drop in blood pressure.
- **Tachycardia**: the heart beats much faster than usual.
- **Oliguria**: there is a reduction in the excretion of urine.

Haemorrhage is not the only condition that is able to cause a state of traumatic shock. Other causes are listed below. Note that shock of any kind can be rapidly fatal if not controlled before reaching an irreversible stage.

- Cardiogenic shock occurs when there is a reduction of cardiac output as a result of coronary occlusion (blockage of the blood vessels that supply the heart with oxygen).
- Septic shock is caused by the presence of endotoxins associated with Gram-negative infections. Gram-negative micro-organisms are so described because of the way they appear under the microscope after a Gram staining process in the laboratory. This type of microbe produces endotoxins or poisons as a result of metabolism, and this can lead to shock.
- Anaphylactic shock may be the result of a second or subsequent exposure to substances against which the individual has already formed an allergy.

**SUMMARY OF SECTION: HAEMATOLOGY**

- Haemopoiesis is the term used to describe the production of blood cells in the bone marrow.
- Erythropoiesis is the process of red cell production. Erythropoietin is a hormone that influences erythropoiesis.
- Because blood is transported in a system, it circulates throughout the body, carrying oxygen from the lungs to the tissues, nutrients from the digestive system to the tissues where they are needed, wastes from tissue metabolism to the organs of excretion, organic and inorganic substances needed to sustain a healthy body, and hormones and enzymes to regulate body functions.
- Blood plasma forms approximately 60% of the blood in healthy individuals, and 90% of this plasma is water. The remainder consists of all the soluble elements of the blood including albumin and globulins.
- The formed elements are the blood cells of the body, which include red cells, white cells and platelets. They form approximately 40% of the blood in healthy individuals.
- Red cells are responsible for transporting oxygen to the tissues and carbon dioxide back to the lungs for exhalation.

- There are several types of inherited red cell deficiencies; these include thalassaemia and sickle cell anaemia.
- White cells are responsible for body defence. Monocytes are phagocytic; lymphocytes are either T cells or B cells that are responsible for cellular immunity or produce antibodies (respectively), and the granulocytes or polymorphonuclear cells have several functions including phagocytosis. They are made up of neutrophils, basophils and eosinophils, the latter being involved in allergic responses.
- Platelets play a vital role in blood coagulation.
- Haemostasis is the term used to describe coagulation or the stopping of bleeding.
- A series of many different coagulation or clotting factors are activated sequentially to stop bleeding. Most of them are stable in donated blood, but those that are labile (short-lived) include FV and FVIII.
- Haemophilia A is an inherited disease caused by lack of factor VIII.
- Haemophilia B is an inherited disease caused by lack of factor IX.
- von Willebrand’s disease is caused by a lack of factor VIII and platelets.
- Shock may be initiated by hypovolaemia, sepsis, cardiogenic factors or anaphylaxis. This traumatic condition can be rapidly fatal if prompt medical treatment is lacking.

**ADDITIONAL LEARNING ACTIVITIES**

1. It is suggested that students use a medical dictionary and/or the Internet to clarify the meaning of words and phrases and to add to the information provided in this section. A list of key words that may be useful in this regard is provided below.

   - Human blood
   - Blood cells
   - Blood plasma
   - Anaemia
   - Blood circulation
   - Medical shock
   - Blood coagulation
   - Anatomy

2. Make enquiries to establish whether or not there is a registry for patients with haemophilia in the country. If so, how many patients have been registered with haemophilia A? Are suitable blood products available in the country to treat patients with haemophilia A? Are there ways in which the blood transfusion service could improve its service to patients with clotting disorders?
AfSBT REPORTS

BRIEF INTERIM REPORT: AfSBT BOOTH
(in Trade Exhibition area of congress venue)
5th INTERNATIONAL CONGRESS,
Nairobi, Kenya: 24th -27th JUNE 2009
LAICO REGENCY HOTEL

David Chama
AfSBT Stand Manager

BOOTH TEAM:
Local members: Lydiah Ntisiki, Jane Thirikwa, Violin Kinyanjui
Treasurer: Sibusisiwe Zondi,
Sub Editor: Leesha Raman
Editor: Beryl Armstrong

INTRODUCTION
The Congress was hosted by the Kenya Chapter of the AfSBT

ACTIVITIES
The Congress was held exclusively as a Blood Transfusion Congress without being a ‘satellite’ to a larger meeting which we were a small part. The AfSBT Secretariat arranged an on-site office (booth) with the following terms of reference:
1. Membership register availability for scrutiny and updating of contact details
2. Membership renewals
3. Registration of new membership
4. Provision of information to attendees on the activities of the Society
5. Distribution of information leaflets, newsletters, books and posters

COMMENTS
The booth was manned by David Chama assisted by Lydia, Leesha and Jane. During the period of the Congress, new members were recruited and some old members renewed their membership. The Congress was worthwhile; membership is on the increase. Membership in Europe seems to be growing steadily; we were able to recruit 3 new members from Europe (The Netherlands) who were in attendance at the Congress. Important to note that members belonging to the Kenya Chapter did not register during the congress as they had already enrolled and renewed at the local chapter. Southern Africa recorded the least number of membership renewals and new membership. At the close of the Congress, money collected in membership, receipt books and registration forms were handed over to the Treasurer for safe keeping. With regard to renewals: there was expression of difficulties in renewals as most members have to wait until the next meeting in 2 year’s time!!

RECOMMENDATIONS
To help members to join or renew, there should be provision at the time of Congress registration, for a slot to be included so that more members are able to register upfront.
Congress badges could be arranged to distinguish between members and non-members.

I thank gratefully, the staff who worked alongside me.

Total Number of Booth Visitors: 370 (estimated)
Total Number of Members who paid membership fees: 64 (17%)

<table>
<thead>
<tr>
<th>Membership Area</th>
<th>New Members by regional category</th>
<th>Renewals by regional category</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>East African Community</td>
<td>12</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td>Western African Community</td>
<td>11</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>Southern African Community</td>
<td>16</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Total Members</td>
<td>44</td>
<td>20</td>
<td>64</td>
</tr>
</tbody>
</table>
A total of 69 questionnaires were completed and received. The answers were analysed by the Congress Organizers, Dazzle Events, and are given below for your information.

**MEMBER OF THE AFSBT:**
- **YES:** 55%
- **NO:** 45%

**MEMBERSHIP OF TOP 3 SOCIETIES:**
- **ISBT:** 28%
- **Society of Medical Laboratory Technologists of SA:** 10%
- **AABB:** 8%

**PROFESSIONAL SPECIALITY**
- **Student:** 3%
- **Nurse:** 9%
- **Technologist:** 29%
- **Scientist:** 9%
- **Medical Doctor:** 37%
- **Educator:** 7%
- **Marketing:** 3%
- **Head of Dept:** 3%

**WORK ENVIRONMENT**
- **Hospital:** 33%
- **Blood bank:** 45%
- **University:** 6%
- **Industry:** 4%
- **BT Services:** 11%
- **Management:** 1%

**HOW DID YOU HEAR ABOUT THIS CONGRESS?**
- **AFSBT website:** 20%
- **Email newsletter:** 25%
- **Print advert:** 16%
- **Word of mouth:** 32%
- **Invitation:** 7%

**TOP 3 OTHER MEETINGS ATTENDED:**
- **ISBT:** 44%
- **AABB:** 22%
- **WHO:** 6%

**WHAT ARE YOUR MAIN REASONS FOR ATTENDANCE AT THIS CONGRESS?**
- **Training and education:** 28%
- **Donor recruitment:** 12%
- **Scientific interest:** 25%
- **Networking:** 19%
- **Presentation of studies:** 12%
- **Sightseeing:** 3%
- **To gain more knowledge:** 1%

** WHICH SESSIONS IN THE SCIENTIFIC PROGRAMME INTEREST YOU?**
- **Training and Education strategies:** 10%
- **Club 25 and Health Promotion:** 4%
- **Updates on blood transfusion:** 13%
- **Blood donation:** 7%
- **Blood safety in general:** 18%
- **Blood safety projects (JICA, PEPFAR):** 10%
- **Transfusion transmissible infections:** 9%
- **Research:** 9%
- **Human resources:** 4%
- **Appropriate use of blood:** 6%
- **Laboratory studies:** 6%
- **Quality management:** 13%

** WHICH TYPE OF PRESENTATIONS DO YOU PREFER?**
- **Plenary sessions:** 35%
- **Concurrent sessions:** 18%
- **Posters:** 5%
- **Mix of all types of sessions:** 43%

**WHAT TYPE OF ACTIVITY WOULD YOU LIKE TO SEE INCLUDED NEXT TIME?**
- **Education and Training Day:** 20%
- **Wet workshops (e.g. blood grouping):** 4%
- **Information on new technologies:** 26%
- **Processing of blood into components:** 16%
- **How to conduct basic research:** 20%
- **Transfusion medicine:** 21%
- **Other suggestions:** Multimedia presentations; Administration; Leadership
DO YOU THINK THE NAIROBI CONGRESS IS SPREAD OVER THE CORRECT PERIOD OF TIME?
Just right: 70%
Too short: 29%
Too long: 1%

WHICH ADDITIONAL ASPECTS WOULD YOU LIKE INCLUDED NEXT TIME?
Evening sessions: 7%
Pre-conference meetings: 17%
Early morning / breakfast sessions: 15%
Post congress meetings: 22%
Satellite symposia (lunchtimes): 24%
None of the above: 15%

IS IT IMPORTANT FOR FUTURE CONGRESSES TO ALLOCATE CPD/CME POINTS?
YES: 84% NO: 16%

HOW WOULD YOU RATE THE STANDARDS OF THIS CONGRESS?
Planning and Administration: GOOD 85% OK 15% POOR 0%
Scientific programme: GOOD 85% OK 15% POOR 0%
Presentation facilities/venues: GOOD 83% OK 17% POOR 0%
Accommodation: GOOD 74% OK 22% POOR 4%
Catering: GOOD 85% OK 15% POOR 0%
Social programme: GOOD 52% OK 42% POOR 6%

IF YOU SUBMITTED AN ABSTRACT, HOW WOULD YOU RATE THE SUBMISSION PROCESS?
User-friendly: 92%
Average: 8%
Too time-consuming: 0%

WITH REGARD TO OUR TRAVEL AGENT, THE EXPRESS TRAVEL GROUP (ETG):
I have already made use of ETG for:
TOURS 8% TRAVEL 19%
I plan to use ETG before I leave Nairobi for:
TOURS 0% TRAVEL 8%
I do not plan to make use of ETG: 65%

GENERAL COMMENTS
- Thank you for a very well organised conference.
- Concurrent sessions are good. They enable participants to attend relevant sessions thus the conference is beneficial and targets specific areas of need. Well done on achieving such good organisation and management of a very big group.
- Keep it up! The organisation and the actual conference dissemination and sharing of information pertaining to safe blood usage is very crucial in the developing African continent. Regular holding of such Congress is vital in due course.
- There is a need for AfSBT to cater for all the participants presenting scientific papers in terms of full sponsorship, i.e. accommodation; poster preparation expenses; fare, in order to feel appreciated for their contribution.
- Give the current theme a follow up on the upcoming congress.
- I do appreciate the overall organisation of this Congress. The material, presentations have been wonderful. Of course I expect surprises during the next Congress.
- A well organised Congress. However time allocated to some presentations was short and time allowed for questions was limited.
- Sponsorship of technologists working in government hospitals.
- Professional interactions could take place if it proceeded by social interactions especially for the people who have no experience of such important congresses.
- Next time the registration process should be done well before the first session starts.
- We used travel group recommended by hotel and had a great time.
- I suggest that all the power point presentations be packaged in a CD for all congress participants to go home with.
- Problem! Facilities: Pre-workshop facility air conditioning was poor, unbearable. Solution: Venue has to test facilities before conference.
- 1. Name tag not readable.
- 2. Long lunch time - good idea, for buffer of sessions that run over in the morning.
- 3. More detailed information on presentation format, e.g. say you have 10 min for presenting with 5 min for questions or whatever the case might be. For a lot of people this is the first time they present and to suddenly learn you only have 10 min to present and you thought it would be 15 min is unsettling.
- 4. Include a session on transfusion reactions.
Well done. Being Kenya, a trip to one of the parks as part of the conference would have been very much appreciated.

At the end an advocacy must be done for country where blood donation and/or all aspects of blood transfusion are poor. Like in Cameroon because we need the support of all to say no, this cannot be continued. The organisation must help the hotel to organise meals, services so we should not waste time.

Congratulations for the good, hard work and making it a success.

Very well organised congress. Scientific programme was exceptional - keep the speakers African and relevant - do minimise international speakers again in the future. Great job.

Provide simultaneous translation system as the Congress was international.

Well organised congress.

Name tags preferably white. Good idea to have long lunch break as a buffer for the late morning starts. Well done.

It would have been useful to know about ETG before leaving home. I would have booked a tour with them if I had known. Well done on a fantastic congress. Beryl Armstrong and the organisers did a brilliant job.

I enjoyed the congress. It has been the opportunity for me to learn from experiences from many other African countries. Allocate enough time for questions and discussions. Provide presentation to participants.

I am impressed by excellent level of organisation and would like to compliment the AFSBT.

I am pleased with the high level of presentations and conduct of meeting.

Please don’t ever underestimate attendance since many participants would be late registrations. Some participants missed congress material e.g. bags and programme.

I heard about this congress while attending the last annual conference on association of Kenya Medical laboratory Scientific Conference last November. But I must emphasise not many people knew about it and the registration fee charged was very exorbitant. There should have been an alternative for those who did not want to take lunch.

It is important when medical personnel of different areas meet and share on the challenges facing African countries and how they have been able to facilitate the situation of sustainability. New funds and technologies in use.

Make enough conference bags so that everyone gets, even those who came on the last day! Encourage people to register early and online so that you can ask what size T-shirt they would like to have so everyone is happy.

I would appreciate if registration would be done prior to the commencement of the conference so as to allow for easy flow and avoid over crowding which slows down our good assistants.

A training session on transfusion Reactions - both theory and practice. Time keeping not always good. JICA/NBTS Blood Safety Project in Kenya - this session included some very good information but the session/presentations were not well structured.

Access to hotel management and action from hotel management when complaints lodged.

I would appreciate if registration would be done prior to the commencement of the conference so as to allow for easy flow and avoid over crowding which slows down our good assistants.

A training session on transfusion Reactions - both theory and practice. Time keeping not always good. JICA/NBTS Blood Safety Project in Kenya - this session included some very good information but the session/presentations were not well structured.

Grateful to AFSBT, a great deal of extremely hard work went into this Congress. Well done.

There is a need for more emphasis to be made on more research of TTIs especially malaria through the society. Source funds to have research done.

The beds in the rooms especially my room was too small. It has been a very nice experience. Thanks so much.

Congratulations for a job well done.

The organisers were professional and helpful and did their best to accommodate our needs. Thank you.

Don’t have a split exhibition area.

Excellent run congress; good social event.

Beryl Armstrong was fantastic!
The Africa Society for Blood Transfusion (AfSBT) has identified training and education as a key activity to strengthen the practice of blood transfusion in Africa. The Society also considers that it is an area where it can play an important role to facilitate such an activity, particularly by utilising the AfSBT website as a communication tool and as a repository for training and educational activities that are available for its members. The AfSBT, sponsored by Ilex, arranged a Training and Education Workshop in Nairobi on 24 June 2009. The meeting was attended by important stakeholders and decision-makers. The outcome of the discussions was reported to delegates attending the AfSBT Blood Transfusion Congress held immediately afterwards.

It was agreed that the first step should be to assess the current status of blood systems in Africa. Such a need analysis will be an appropriate basis to decide on the way forward on how best to develop the human resource capacity of the blood services. It was considered that establishing regional training and education centres may be the most suitable tool to achieve this. It was agreed that the AfSBT would be the most suitable coordinating body. The participation of the regional intergovernmental organisations would strengthen and give credibility to the initiative and make regional training centres viable and sustainable. The Internet and distance learning could also be utilised as powerful tools to reach the maximum number of blood transfusion professionals in Africa and to share resources that are available in other countries.

Presentations were given at the workshop to provide an overview and background of what has been achieved and what is possible. These viewpoints reflected those of important attending stakeholders such as PEPFAR, WHO, AABB, Sanquin, African Institute for Transfusion Medicine, ISBT, AfSBT, Ministries of Health, and commercial corporations with an interest to promote sustainable blood services. It was considered that establishing regional training and education centres may be the most suitable tool to achieve this. It was agreed that the AfSBT would be the most suitable coordinating body. The participation of the regional intergovernmental organisations would strengthen and give credibility to the initiative and make regional training centres viable and sustainable. The Internet and distance learning could also be utilised as powerful tools to reach the maximum number of blood transfusion professionals in Africa and to share resources that are available in other countries.

It was agreed that in order for the initiative to go forward there should be an agreed timeline for critical activities:

**Phase 1: year 1:** business plan
**Phase 2: years 2-5:** implementation
**Phase 3: year 6 onwards:** number of students, courses, countries, work output

**Monitoring and evaluation**

There was general agreement at the meeting on the following important point:

*The AfSBT is an appropriate entity to coordinate training activities within Africa.*

**OUTCOME GROUP 1:**
**COLLABORATION, FUNDING AND SPONSORSHIP**

Task team led by Prof Anthon Heyns to action the following:
- AfSBT to establish a directorate of training and education
- Task team to decide on initial resources required e.g. staff and finances
- AfSBT directorate to organize meeting of regional stakeholders to discuss synergy and collaboration
- Strategic plan to be developed with key stakeholders

**OUTCOME GROUP 2:**
**DEVELOPING EDUCATION AND TRAINING MATERIALS**

Task team led by Dr Arthur Bird to action the following:
- Identify categories of personnel who need training
- Develop web-based resource lists/links and repository of available materials located on the AfSBT website appropriate for different categories
- Identify country representatives with education and training leadership positions
- Identify outcomes and provide a mechanism to report outcomes of training
- Identify gaps in training and determine mechanisms to address them

**OUTCOME GROUP 3:**
**DISTANCE LEARNING AND WEB-BASED TRAINING**

Task team led by Dr Sam Gulube to action the following:
- Practicality and availability of internet
- Scope and costs and infrastructure
- User training and support services

**OUTCOME GROUP 4:**
**ACCREDITATION AND EVALUATION OF COURSES**

Task team of AfSBT working committee in collaboration with representatives from the ISBT, AABB, WHO and others
- Minimum standards should be established
- Standards should be accepted by international/regional accrediting body/ies
- Cross-border recognition: Individuals sit proficiency exams, Individuals certified/accredited
- Audit/Monitor training facilities
- Market the product through advocacy (Ministries of education, Ministries of Health, Blood Transfusion Services, Individuals)

**ADDITIONAL POINTS RAISED AT THE WORKSHOP**

- Identify persons responsible for education and training in AfSBT countries
- Make contact information available on AfSBT website
- Foster leadership development in education and training through society-based conference sessions and mentoring

There was general agreement at the meeting on the following important point:

*The AfSBT is an appropriate entity to coordinate training activities within Africa.*

**PROGRESS ON ACTIVITIES WILL BE REPORTED AT THE SOUTH AFRICAN NATIONAL BLOOD TRANSFUSION CONGRESS PLANNED TO TAKE PLACE IN JOHANNESBURG FROM 15 - 18 NOVEMBER 2009.**
UPCOMING EVENTS

31st SOUTH AFRICAN NATIONAL BLOOD TRANSFUSION
15-18 NOVEMBER 2009 CONGRESS
Sustainable Safe Blood: MASTERING CHANGE

31st South African National Blood Transfusion Congress
15 to 18 November 2009, Birchwood Hotel, Gauteng

SUSTAINABLE, SAFE BLOOD – MASTERING CHANGE

This year’s congress is committed to showcasing the latest projects and most interesting findings of blood banking and blood transfusion practitioners in South Africa. Under the pertinent theme “Sustainable Safe Blood: Mastering Change”, the 31st South African National Blood Transfusion Congress will be dedicated to presenting up-to-date information and research findings in Blood Banking and Transfusion Medicine practices.

The 31st National Blood Transfusion Congress aims to fulfill the following important goals which are crucial to the enlightenment and development of the blood transfusion industry:

- To set up an effective forum for South African blood transfusion practitioners to showcase their original research and development work within this progressive field. This will be achieved by the submission, by researchers, other experts in their respective fields and of course you, of applications to conduct oral or poster presentations.

- To create an educational platform that aims to expose South African blood transfusion practitioners, from all disciplines within the Blood Transfusion industry, to the latest developments in this ever-advancing field, thereby increasing their valuable knowledge and ensuring that they are kept up-to-date.

- To provide an opportunity for South African blood transfusion practitioners to network with their esteemed colleagues and others in the field, and to share their experiences, learning from one another.

Register on-line at: www.sabloodcongress.org/register.htm

For more information contact:
Tammy Duncan Anderson
Conference Co-ordinator
Tel: 011-463-5085
Email: tammy@sofrica.com
Or consult the website: www.sabloodcongress.org
You are invited to check the website regularly for updates and interesting information about our Society. The web address is www.afsbt.org

As noted in the General Assembly of Delegates (GAD) in Nairobi on 27 June 2009, we will continue to post the *Africa Sanguine* on the website and have plans to move the journal to online access only, in two year’s time (2012). It is planned to make back copies open to all on the website, but that issues for the current year will be open to members only.

Concerns about online access only, are invited and welcomed so that we can be sure we cater for all AfSBT members. We do not want to stop physical delivery of the journal to members who do not have access to the internet or email. AfSBT members should make sure that they continue to provide an up-to-date email address. The website carries a form for use by members if and when their personal / contact details change.

**GAD REPORTS**

Note that the GAD reports from the meeting on 27 June in Nairobi are available on the website. Should you, as a current AfSBT member, need individual copies of the reports, we can arrange to email them to you, and only if you do not have a reliable email address, will we post them to you. This decision has been made for two reasons:

1. Landline posting facilities are not always reliable
2. Postage by airmail delivery is labour intensive and costly

It is very important that as a member, you ensure we have an up-to-date email address. Only if you do not have an email address, will the GAD reports be posted as physical copies, but for this a reliable delivery address is required.

Use the website to update and submit your details as instructed, or contact the Editors:

**NEW INDIVIDUAL MEMBERS**

The AfSBT is once more delighted to welcome its new members:

The editors would like to challenge each new member to encourage a colleague to join too!

- Dr Mahamoudou Sanou (Burkina Faso)
- Mr Claude Tayou-Tagny (Cameroon)
- Mr Andy Numbi (Congo)
- Mr Olish Ndjum (Congo)
- Mr David Ngunya Ndakala (DR Congo)
- Dr Jocelyn Kahungu (DR Congo)
- Dr Girma Tesfaye (Ethiopia)
- Mr Bekele Tiruwork (Ethiopia)
- Dr Noel Ernst (Haiti)
- Prof Orinda (Kenya)
- Mrs Rachel Githiomi (Kenya)
- Dr Njau Mungai (Kenya)
- Mrs Ruth Bosire (Kenya)
- Mr Wambua (Kenya)
- Ms Mary Nyaga (Kenya)
- Mr Charles Simiyu (Kenya)
- Ms Anastasia Khasiani (Kenya)
- Mr Wambua Jinai Kongo (Kenya)
- Mr Jaonoharidimby Andrianavalona (Madagascar)
- Dr Mouniour Baby (Mali)
- Mr Gobin Aumdeo (Mauritius)
- Dr Ukumbile Celestine Ejeh (Nigeria)
- Dr Titilope Adeyemo (Nigeria)
- Dr Adewuyi Adediran (Nigeria)
- Dr Adenike Durotoye (Nigeria)
- Dr Mbolaji Dada (Nigeria)
- Dr J Oyewale (Nigeria)
- Ms Lorene A Kirby-Smith (South Africa)
- Mr Willem Hechter (South Africa)
- Mr Brian Gibbs (South Africa)
- Dr James Van Hasselt (South Africa)
- Dr Efesper Nyka (Tanzania)
- Dr Regina Kutaga (Tanzania)
- Mrs Fatmah Ahmed (Tanzania)
- Dr Hans Molijn (The Netherlands)
- Mr Antonius Los (The Netherlands)
- Prof Cees Smit Sibinga (The Netherlands)
- Dr Martin W. Smid (The Netherlands)
- Dr Sabine Fenderson (The Netherlands)
- Dr Juliette Koster (The Netherlands)
- Dr Sam Uringi Uringtho (Uganda)
- Dr Isaac Kajja (Uganda)
- Mr Bernard Natukunda (Uganda)
- Mr Sunday Abwooli (Uganda)
OFFICE BEARERS OF THE AfSBT

PRESIDENTS AND VICE PRESIDENTS

President: Dr Seidou Konate (Côte d’Ivoire)
Past President: Prof Anthon du P Heyns (South Africa)
President Elect: Dr Bridon M’baya (Malawi)
Vice Presidents: to replace Anglophone and Francophone Vice Presidents who have completed their term of office (General Assembly meeting in Nairobi refers).

The Regional Area Presidents are to be called
Vice Presidents:
• Vice President SADC:
  Dr Sam Gulube (South Africa)
• Vice President EAC:
  Dr Jamilla Rajab (Kenya)
• Vice President ECOWAS:
  Prof Banji Adewuyi (Nigeria)
• Vice President RAFTS:
  Dr Seidou Konate (Côte d’Ivoire)*

* Dr Konate (who is also president of RAFTS) proposed that Dr Kouao Maxime Dioné (Côte d’Ivoire) attend Council meetings until the new president of RAFTS is appointed.

The Vice Presidents will forward a list of countries within their respective region to the Secretary General who will ensure that all countries are included and then inform members for their approval and support.

Treasurer: Mrs Sibusisiwe Zondi (South Africa)
Secretary General: Mr David Mvere (Zimbabwe)
Councillors: positions fall away as there are now 4 regions (General Assembly meeting refers)
ISBT Africa Representative: Mr Ravi Reddy (South Africa)

AFSBT OFFICE

This has just been approved by the AfSBT Council, and consists of the following:
Executive Director: Prof Anthon Heyns (South Africa)
Education and Communication Officer: Mrs Beryl Armstrong (South Africa)
Website Management Officer: Mr Tonderai Mapako (Zimbabwe)

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• Individual members
• Corporate members
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• Complimentary copies to blood transfusion safety focal points in Africa, through the World Health Organization country offices.

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The translation of abstract / background information for the two leader articles was very kindly done by Dr Kouao Maxime Dioné (Côte d’Ivoire).
CONTRIBUTION GUIDELINES:
INSTRUCTIONS TO AUTHORS

All articles must include a summary or abstract of not more than 200 words. Scientific articles must include an introduction, study design and methods, results, discussion, conclusion, acknowledgements and references.

Evidence should be provided that tests carried out, or research findings presented, have met the standards set, and that they have received approval by, the authorized ethics committee of the institution, country or region. When reporting research on human subjects, the work must comply with the principles of the Declaration of Helsinki (1964), and authors should indicate that ethical approval of the study was granted, and, where appropriate, that informed consent was given. The Editors reserve the right to reject a paper with questionable ethical justification.

Authors should provide their full contact details.

An appropriate member of the Scientific and Publications Committee may be asked to review articles received and the Editor’s decision to publish will be final.

Authors should keep a copy of their submission for reference.

References should be given at the end, with the names of all authors, titles of journals, issue numbers and first and last page numbers.

The title must be as brief and to the point as possible.

Authors’ names must be stated, together with the name of the institution. The name of the main author should be underlined.

The first time that a statement to be abbreviated appears in the text, it must be written in full, followed by the abbreviation in parenthesis: e.g. National Blood Transfusion Service (NBTS). There must be no full stops between letters.

Standard units of measurement must be used.

Key words should be included.

ELECTRONIC MAIL

Microsoft compatible formats are required. Basic text should be used, and complex formatting avoided. Submissions should be sent to the Editor as attachments to e-mail.

LETTERS AND SHORT REPORTS

These do not require abstracts. Letters and short reports are welcomed, and will be published at the discretion of the Editor.

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All correspondence should be sent to the Editors, Africa Sanguine, by email:

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