

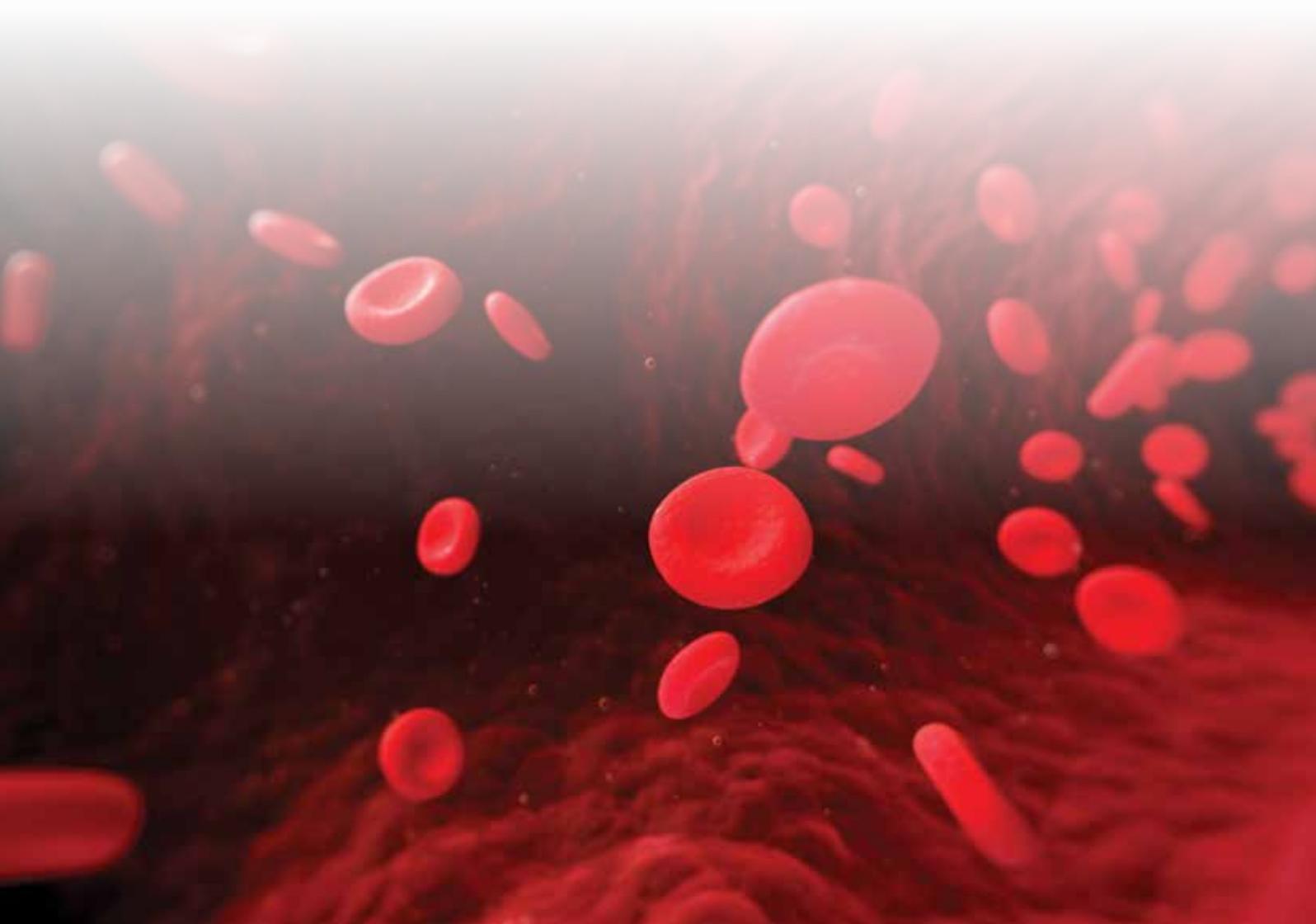
# Blood and Transplant

Information for hospitals served  
by NHS Blood and Transplant

# Matters

## Inside

|   |    |   |    |
|---|----|---|----|
| Patient Blood Management  | 4  | Ovarian Tissue Cryopreservation: A beginning for NHSBT at Southampton | 14 |
| Integrated Supply Planning and Demand Planning in NHSBT                   | 5  | Theo's Story  | 16 |
| Where do the Platelets go in London?                                      | 7  | CPD Questions   | 18 |
| Easy as ABC? – The production of "A Manual for Blood Conservation"        | 11 | Clinical Case Studies   | 20 |
| Introduction of the GoSBAR Scale for Reporting Organ Donation Performance | 12 | Diary Dates   | 23 |



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## Next Edition

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### Issue 49 will feature articles on:

- Wrong Blood in Tube
- IgA Deficiency – Stem Cell Transfusion as a Short Report
- Hepatitis E Testing.

If you would like to comment on any of the articles in this edition of **Blood and Transplant Matters**  
please email the Editor: robert.webster@nhsbt.nhs.uk

# EDITORIAL

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Welcome to Edition 48 of *Blood and Transplant Matters*. I hope you enjoyed the last edition. This is the last edition that has been put together with the help of James Neuberger. He is retiring both from NHSBT and our Editorial Board. The rest of the Editorial Board thank him for his sterling work and advice over the years and wish him well for the future.

The edition starts with Rebecca Gerrard, Kate Pendry and Louise Sherliker outlining Patient Blood Management (PBM). Describing the purpose of PBM, how PBM is delivered and benefits – both present and future – of PBM. Related to PBM is the next article by Sue Holdsworth describing how Integrated Supply Planning (ISP) will provide benefits to blood supply to hospitals. Next Rachel Moss, Aman Dhesi and Brian Hockley report the results of a recent survey into the Use of Platelets in London on behalf of the London Platelet Action Group (LoPag). This review should help Hospital Transfusion Teams decide when to focus their limited resources. Following on the PBM theme; Bidy Ridler described the process in producing a Manual for Blood Conservation. Next Dale Gardiner and Rebecca Curtis outline a novel statistical graph and use of hierarchical scale GoSBAR as an improvement on Red/Amber/Green (RAG) for key performance indication – in this case related to organ donation.

Ovarian Tissue Cryopreservation is next covered by Claire Wiggins and Geoffrey White, describing important work to help those have an improved life after cancer treatment.

Finally, there is a Patient's Story, which continues to remind us all why all the work is so necessary.

As always, there are both CPD questions based upon these articles with answers appearing in the next edition – and some interesting cases with suggested answers and some references, which I hope are both interesting and informative.

Have a good read. Any comments should be sent to myself or my hard working Editorial Assistant Lynne Hodkin at [blood&transplantmatters@nhsbt.nhs.uk](mailto:blood&transplantmatters@nhsbt.nhs.uk).

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## Patient Blood Management

Patient Blood Management (PBM) is a multidisciplinary, evidence-based approach to optimising the care of patients who might need a blood transfusion. It represents an international initiative in best practice for transfusion medicine. It is a long-term approach requiring resource and investment from both NHS Blood and Transplant (NHSBT) and the wider NHS and is part of NHSBT's Blood 2020 Strategy. Goodnough *et al* (2013) and Spahn *et al* (2013) provided evidence that appropriate transfusion and the use of transfusion alternatives led to fewer complications, faster recoveries and a shorter stay in hospital.

The aim of PBM in England is to build on the success of the previous government 'Better Blood Transfusion' initiatives but with an emphasis on improving patient outcomes through blood avoidance and the use of alternatives to transfusion where clinically indicated.

There are two teams in NHSBT driving the PBM initiative:

- The PBM Consultants Team (PCT) made up of 10 Consultant Haematologists who have joint posts with large hospital Trusts.
- The PBM Practitioner Team in Customer Services is principally made up of a National Lead, 12 highly experienced nurses and biomedical scientists (PBM Practitioners) and a small Education and Audit Team.

### **PBM Strategic Workplan 2015-18: 'Save blood, Save lives'**

The joint PBM Team have a three year PBM Strategic Workplan that outlines the way forward for working in collaboration with the National Blood Transfusion Committee (NBTC) and the hospitals in England to improve patient care, save NHS money and help sustain the blood supply with a strong emphasis on education, innovation, integration and evidence based clinical practice.

The three strategic objectives in the workplan are:

1. Embed PBM into hospitals as a long-term and sustainable model for the delivery of patient-centred, evidence based, high quality care.
2. Implement PBM strategy through a collaborative approach between NHSBT, NBTC and hospitals/primary care.
3. Develop structures, tools and processes to support the implementation of PBM.

In 2015, NHSBT initiated some "proof of concept pilots" with several hospitals to develop evidence that a targeted approach to implementing PBM produces faster improvements in transfusion practice and reduces costs to the NHS. Following the success of these pilots (realising a saving in one hospital of £30,000 in blood components),

we aim to implement this model on a national level and also carry out further pilots targeting different aspects of PBM.

Underpinning this model is a need to understand where and why blood is being used. We aim to establish a clinical benchmarking database: collecting data from hospitals to compare practice against key performance indicators. The database will be developed in collaboration with the Health and Social Care Information Centre (HSCIC). The value of this data is significant, it will also provide NHSBT with real time intelligence on how blood is being used and help inform the demand planning process for current and new blood components for example the need for Hepatitis E negative components.

### **Better for Patients**

Audits show continued inappropriate and excessive use of blood components (>20% of transfusions) with insufficient take-up of transfusion alternatives and poor consent processes. NHSBT's PBM Workplan aims to improve practice by putting patients at the heart of blood management and aligning PBM with the NHS Five Year Forward View. For example, it promotes anaemia investigation and management, it drives evidence based management of major haemorrhage and it focuses on optimising transfusion management of haemoglobinopathy patients. The plan will also increase patient and public awareness and involvement in their care, carefully balancing knowledge about the risks of transfusion with the need to ensure that we have the right blood for the right patient at the right time.

### **Better for the Blood Supply**

PBM supports long-term sustainability of the blood supply and protects patients with rarer blood groups. Our plan includes actions that focus on areas such as a better understanding of how blood is used and reducing inappropriate use of all blood components in particular 'universal', group O RhD negative red cells, Group A RhD negative platelets and AB Fresh Frozen Plasma (FFP) and AB cryoprecipitate. Audit has provided evidence that the majority of blood components are transfused into patients more than 65 years old. The projected expansion of this age group will undoubtedly lead to increased requirements for NHS care, including blood transfusion. The PBM Team are also supporting initiatives to target the appropriate use of Hepatitis E negative components, as well as supporting the continuous improvement of NHSBT services from donor to patient.

## Vision for the Future

Long-term investment will be required to establish and to then maintain PBM in hospitals. NHSBT plans to build on PBM projects over a 3-5 year timeframe to support all hospitals in achieving high quality practice for transfusion safety and PBM including: working with Laboratory Management Information System (LIMS) suppliers to provide improved blood bank IT linked to NHSBT; bedside and fridge IT to improve transfusion safety and traceability and support for systems to promote PBM including active monitoring of blood usage with feedback to clinicians.

Key performance indicators include:

- Blood use in England will be less than 27/1000 head of population by 2018 and NHS costs associated with blood avoidance reduced by further £18m by 2018.
- Patients avoid unnecessary transfusion as clinicians use transfusion decision making tools.
- All hospitals and NHSBT are able to access blood usage data via a new benchmarking tool providing valuable intelligence supporting supply.
- All hospitals supported by NHSBT will achieve best practice standards in transfusion, monitored by performance indicators based on clinical benchmarking data.
- Hospitals are able to produce evidence-based business cases for commissioning based on data derived following the pilots.

If hospitals would like more information on PBM or wish to be involved in future PBM pilots then please contact your local PBM Practitioner or our Customer Service department:

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Goodnough LT, *et al* (2013) 'Concepts of Blood Transfusion in Adults.' *The Lancet*, **381**(9880) pp. 1845-1854.

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Last accessed 06/02/16.

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## Integrated Supply Planning and Demand Planning in NHSBT

### What is Integrated Supply Planning?

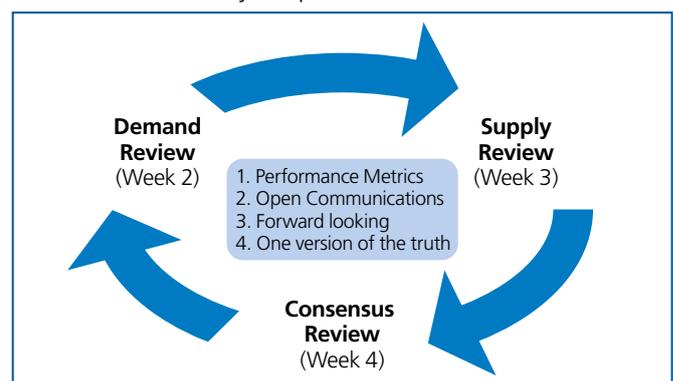
Integrated Supply Planning (ISP) is a decision making process to balance supply and demand, to meet overall business plans and strategies. ISP is also known in other organisations as Sales and Operations Planning (S&OP) or Integrated Business Leadership (IBL). It is managed using a monthly cycle and focuses on the mid- to long-term business performance.

The benefits of an ISP process within an organisation are:

- Improved forecast and supply plan accuracy.
- Increased collaboration across functions.
- Improved customer service.
- Optimised inventory.

- Reduced unplanned changes and actions.
- Balanced supply and demand.
- A supply chain planned using one set of numbers.

An effective monthly ISP process has three core elements:



Additional elements can be incorporated into the cycle to improve the process such as:

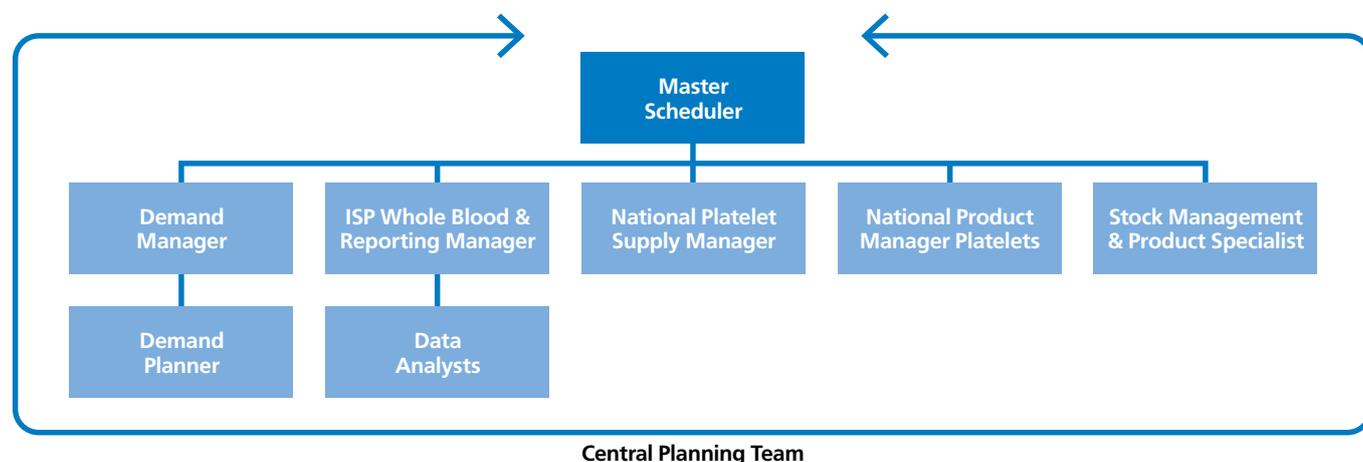
- Demand Cleansing: analysing the components and volumes requested by customers to establish which should be included in the dataset used to generate demand forecasts.
- Customer Intelligence: understanding changes in our customer activity to allow us to plan for potential changes in demand.
- Innovation Review: review potential new products or changes to processes to understand any impact on demand or supply.

- Support Review: incorporate the support functions of NHS Blood and Transplant (NHSBT) (for example. Finance, HR, IT, Quality Assurance) to ensure all aspects of the business are informed and integrated to allow changes in demand, supply or processes to be made in a timely manner.

As ISP evolves within NHSBT, more of these steps will be incorporated into the monthly cycle.

### Central Planning Team

The team with responsibility for the ISP process within NHSBT is the Central Planning Team, which sits within the Blood Manufacturing and Logistics directorate. The process is driven by a team of specialists for each of the review processes and is overseen by the Master Scheduler.



### Demand Review

In NHSBT, the purpose of the demand review is to understand hospital demand for blood components using a combination of past history and assumptions about the medium to long-term based on customer intelligence and knowledge of changes to guidelines or transfusion practice. The Demand Review process is led by the Demand Manager and as part of this monthly review, we analyse recent demand against forecast, identify the root cause of under/over performance and take actions to improve the level of accuracy of the calculated forecast going forward.

The output of the review is an agreed forecast which is the basis of operational plans across the organisation.

### Supply Review

The purpose of the Supply Review is to review the ability of collections and blood manufacturing to produce enough blood products to meet the forecasted level of demand.

As part of this monthly review, we analyse actual collections compared to the agreed plan, identify causes for under/over performance and take actions to close any gaps.

The output of the review is an agreed collection and manufacturing plan. Where the gap between requirement and plan cannot be closed, a set of proposals or actions is drawn up and taken to the Consensus Review for approval.

The role of the three Supply Planning Managers is evolving. They each have a regional presence in a manufacturing site as well as a specialism in one product family. Their regional reach will allow for manufacturing site based reviews with colleagues from Manufacturing and Collections to allow regular performance monitoring.

### Consensus Review

Led by the Master Scheduler, the purpose of the Consensus Review is to risk assess and take decisions about the actions proposed at the Supply Review to close any gaps between supply and demand.

The review team will monitor performance measures for the process and review the long-term picture, not short-term crises. The output of the Consensus Review is a formal sign off of the demand, collection and manufacturing plans agreed as part of the cycle.

## New Software to Support Integrated Supply Planning

To support the developing ISP process, NHSBT has procured a Planning and Control System. ToolsGroup's SO99+ supply chain planning software forecasts demand for blood and, for a pilot group of hospitals, generates orders to replenish the hospital stocks automatically. The demand forecasting modules are now live and the automated stock ordering is live in nine hospitals, with a view to being rolled out to all English hospitals.

The demand planning module imports detailed data, including blood characteristics, to show orders from hospitals each day. The system automatically identifies and generates reports to show if actual requests vary significantly from forecasted demand, allowing us to investigate whether this is a one-off requirement or a longer term change in

demand, and take appropriate action. The system generates, at a detailed level, regularly updated forecasts for hospital demand, which ensures we are using the most up-to-date information to plan supply, manufacturing and distribution.

An additional module to calculate required stock levels and stock distribution within NHSBT is in development and is expected to go-live in Q1 2016/17. This module will provide an automated solution for calculating optimal stock targets based on demand forecasts and will recommend redistribution of stock to minimise wastage while maximising availability.

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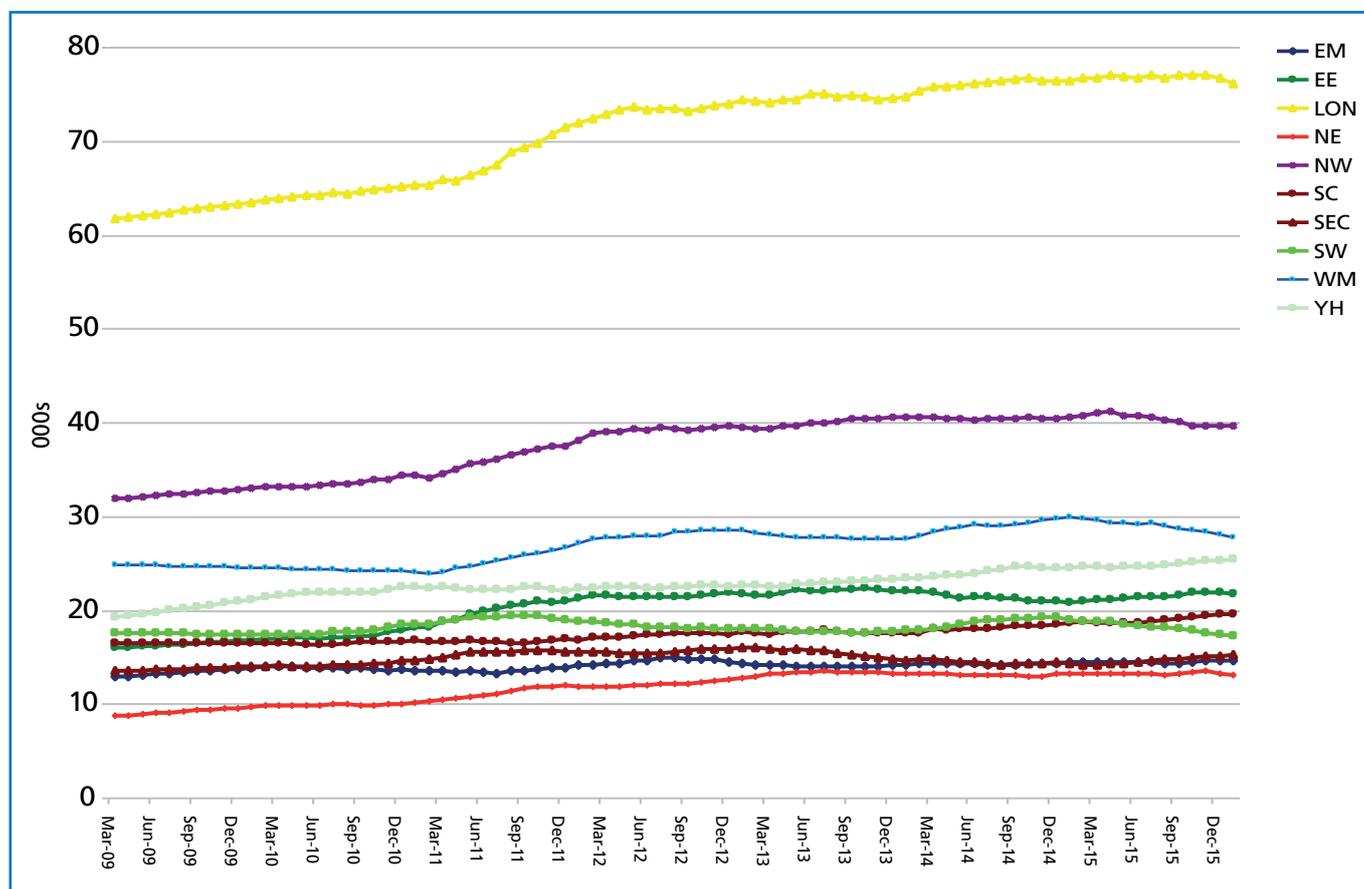
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## Where do the Platelets go in London?

To better understand where platelets are used in London, a survey was taken in 2015 to find out. Platelet usage in London has been consistently higher than any other region in England (Graph 1) and since 2012 the London Platelet Action Group (LoPAG), a locally set up working group consisting of members from NHS Blood and Transplant (NHSBT) and hospitals, has been working to promote appropriate use of platelets.



**Graph 1:** NHSBT Platelet Issues by Regional Transfusion Committee



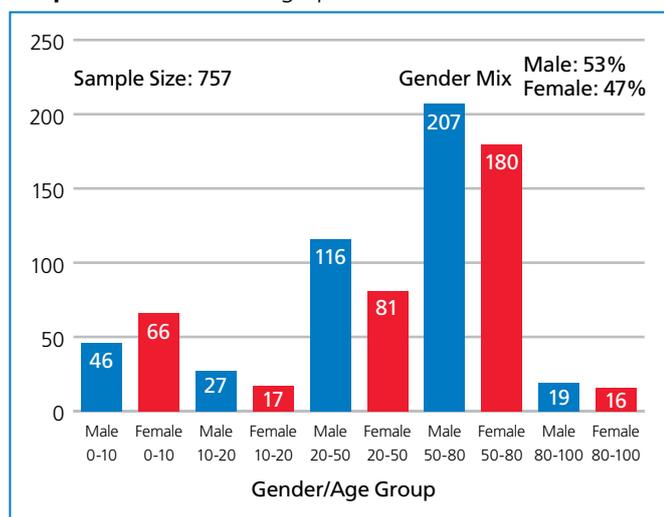
In 2015 LoPAG undertook a survey called “Where Do Platelets Go?”. All London Regional Transfusion Committee (RTC) Hospitals were asked to capture platelet requests over one week in July 2015 (seven consecutive days).

Each platelet request triggered a survey proforma to be completed and the National Blood Transfusion Committee (NBTC) Indication Codes<sup>1</sup> were used to allocate the reason for transfusion (P1 – P10, P11 was used as an “other” category). The data was then submitted electronically through the snapsurvey<sup>®</sup> system.

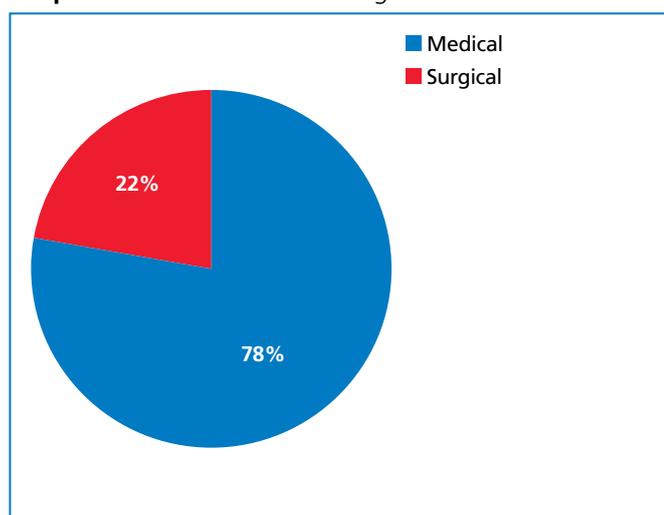
### Results

74% of hospitals within the London RTC Region participated in the week long survey, although five hospitals accounted for 90% of the data submitted. Patient demographics (Graph 2) and medical versus surgical use (Graph 3) was representative of that reported in other regional and national surveys<sup>3</sup>.

**Graph 2:** Patient Demographics

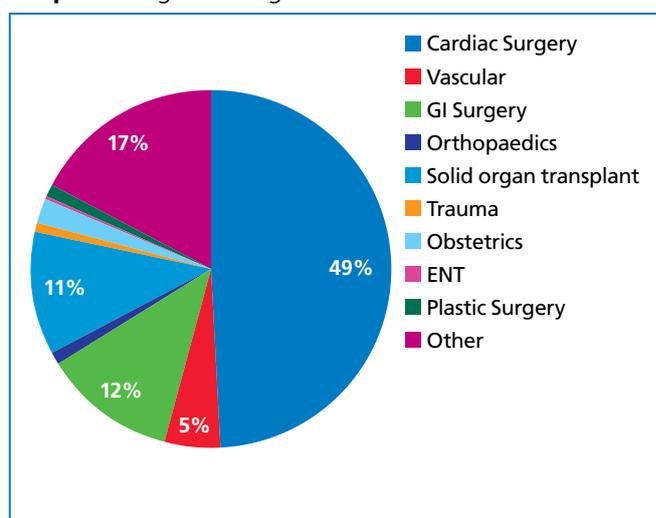


**Graph 3:** Platelets Issues for Surgical/Medical



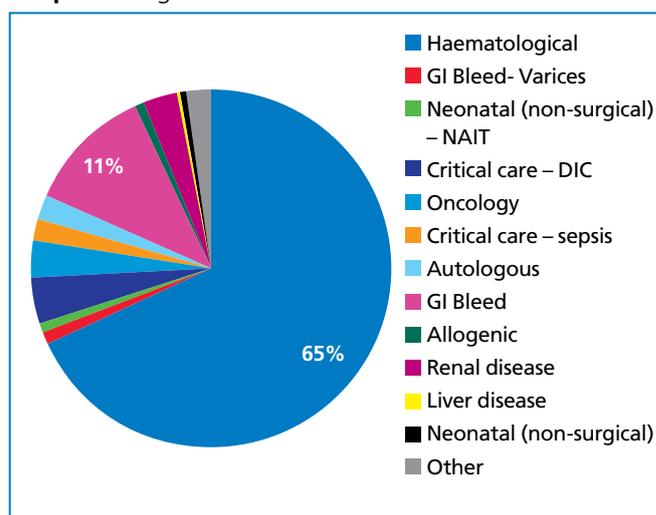
For surgical use (Graph 4), the highest was cardiac surgery (49%) followed by other (such as line insertions, biopsies), Gastro-Intestinal (GI) surgery (12%) and solid organ transplant (11%).

**Graph 4:** Regional Surgical Use of Platelets



For medical use (graph 5), clinical haematology (65%) was the biggest user of platelets for medical patients followed by allogeneic transplantation (11%) and then oncology (5%).

**Graph 5:** Regional Medical Platelet Use



For medical patients one platelet was issued in 87% of requests and two platelets were issued in 10% of requests.

For surgical patients one platelet was issued in 64% of requests and two platelets were issued in 33% of requests.

Table 1 below shows the fate of the platelets where one or two were issued.

**Table 1**

| Fate of 1 and 2 platelet issues   | Fate of 1 and 2 platelet issues |                    |
|-----------------------------------|---------------------------------|--------------------|
|                                   | 1 Platelet issued               | 2 Platelets issued |
| Transfused                        | 87%                             | 65%                |
| Returned                          | 10%                             | 25%                |
| Wasted (Time-ex/Clinical wastage) | 3%                              | 11%                |

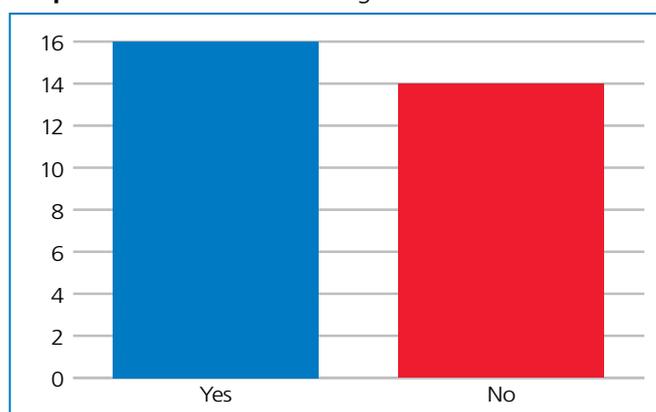
P codes were collected for the reason for transfusion. There was a high level of P11 (332 request reasons). This data was reviewed and where possible reasons allocated to reflect additional information. Only 51 requests were reallocated; 43 went into P1 and other seven was allocated between P2, P3 and P4. The table (Table 2) below shows the percentages. P11 (37%) was still the highest reason for platelet transfusion used during this survey period.

**Table 2**

| Bone Marrow Failure     |     |  |
|-------------------------|-----|--|
| P1                      | 23% | To prevent spontaneous bleeding (prophylaxis) in patients with reversible bone marrow failure (platelets <10).   |
| P2                      | 18% | To prevent spontaneous bleeding (prophylaxis) in the presence of additional risk factors for bleeding such as sepsis or haemostatic abnormalities. (platelets <20).                  |
| P3                      | 12% | To prevent bleeding associated with surgery/invasive procedures. (platelets <50 or <100 for eye/brain surgery).  |
| Critical Care/Surgery   |     |  |
| P4                      | 3%  | Massive blood transfusion (platelets <75).   |
| P5                      | 7%  | Bleeding associated with acquired platelet dysfunction. Not surgically correctable. For example post-cardiopulmonary bypass, use of potent anti-platelet agents such as clopidogrel. |
| P6                      | 1%  | Disseminated Intravascular Coagulation (DIC) with bleeding and severe thrombocytopenia.  |
| P7                      | 0%  | Platelet dysfunction disorders for example Glanzmanns thrombasthenia with bleeding or as prophylaxis before surgery.   |
| Immune Thrombocytopenia |     |  |
| P8                      | 0%  | Primary Immune Thrombocytopenia (ITP). As emergency treatment in advance of surgery or in the presence of major haemorrhage.   |
| P9                      | 0%  | Post-Transfusion Purpura (PTP) with major haemorrhage.   |
| P10                     | 1%  | Neonatal Alloimmune Thrombocytopenia (NAIT), to treat bleeding or as prophylaxis to maintain the platelet count greater than 30.   |
| P11                     | 37% | Other.   |

Organisational questions were also asked including whether the hospitals held stock platelets and if so, which group did they hold (Graph 6). In this survey stock platelets were defined as; 'Platelets held in the laboratory unallocated for a patient and available for use in an emergency or if a platelet request is made so as to save the need to order one from NHSBT' and the majority of hospitals did hold stock platelets.

**Graph 6: Platelet Stock Holding**



The majority stock platelet held was group A RhD positive followed by group A RhD negative. There was a mix of irradiated units to High Titre negative; some hospitals indicated they held pooled platelet pools and some aphaeresis platelets (see table 3 below).

**Table 3**

| A Pos | A Neg | B Pos | B Neg | O Pos | O Neg | AB Pos | AB Neg |
|-------|-------|-------|-------|-------|-------|--------|--------|
| 31    | 22    | 3     | 1     | 7     | 7     | 3      | 2      |

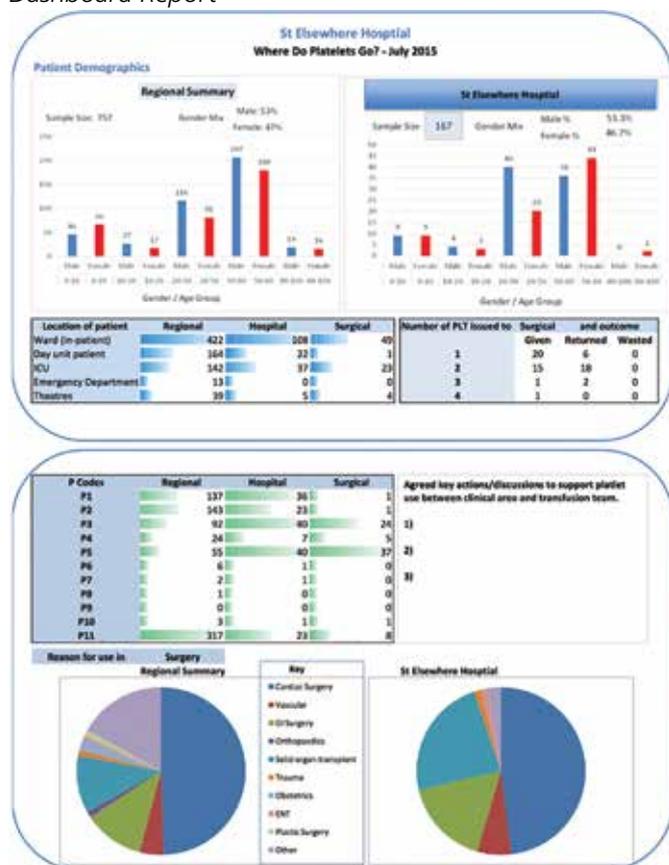
**Key Messages**

- London case and population seem to reflect that of other surveys and audits, whereby medical platelet use is more than surgical platelet use and the very young and older patients use more blood components. In line with historical audit findings, cardiac surgery was the biggest user of platelets in surgery and haematology the biggest medical user of platelets. These findings will give LoPAG areas where LoPAG Champions may need to focus efforts.
- From previous LoPAG audits (LoPAG survey 2011) the Steering Group knew that 4/23 respondents indicated that they use the NBTC indication codes. In this survey the largest P code used was P11. This may indicate that either the P codes are not fit for the requirements or hospitals are not used to using them and use "other" as a default. Following the National Institute for Clinical Excellence (NICE) 2015 Guidelines on Blood Transfusion<sup>4</sup>, the NBTC indications codes are due to be reviewed. The LoPAG Steering Group will analyse the information given in the other categories again to see if any information can be passed to the group reviewing the NBTC indication codes.
- Platelets were more likely to be issued as single units, however there were many instances when two were issued at the same time. The survey found that where two platelets were issued, they were more likely to be returned and/or wasted than if a single platelet unit was issued. This review did not take into account the reason for why two platelets were issued over single unit.

## Reporting Back

A 10 page regional report which included the key messages was produced and sent to all hospitals within the London region. For the hospitals that participated, a dashboard was created with their own data compared to the regional data outlining ages, gender, patient location and the clinical specialty.

### Dashboard Report



### Limitations

The following were identified as limitations of the survey –

- Some platelet issues were not recorded by the Transfusion Laboratory for the survey.
- Not all eligible hospitals participated in the survey.
- Not all questions were answered on the proforma.
- Notes were not investigated for appropriateness of requests.
- P codes did not appear to fulfil all request needs or users were not familiar with them.

### Summary

This review was to help Hospital Transfusion Teams decide where to focus their limited resources and by understanding where platelets go they can target where they feel a reduction in use may be feasible. 2016 will see the issuing of new British Committee for Standards in Haematology guidelines on the use of platelets<sup>5</sup>, a review of the NBTC codes as discussed, a National

Comparative Audit in the use of blood and platelets in clinical haematology<sup>2</sup> and the ongoing implementation of the NICE 2015 Guidelines on Blood Transfusion, all of which will help support evidence based clinical decisions in platelet use.

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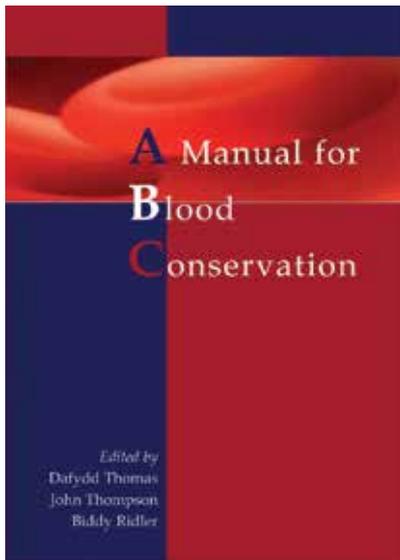
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### References:

- <sup>1</sup> National Blood Transfusion Committee indication codes for blood transfusion 2013 – <http://www.transfusionsguidelines.org.uk/document-library/documents/indication-codes-for-transfusion-an-audit-tool-updated-april-2013>
- <sup>2</sup> National Comparative Audit reports – <http://hospital.blood.co.uk/audits/national-comparative-audit/national-comparative-audit-reports/>
- <sup>3</sup> Charlton, A. Wallis, J. Robertson, J. Watson, D. Iqbal, A. Tinegate, H. (2014). Where did platelets go in 2012? A survey of platelet practice in the North of England. *Transfusion Medicine*, **24**. 213-218.
- <sup>4</sup> NICE Guidelines on Blood Transfusion 2015 – <http://www.nice.org.uk/guidance/ng24>
- <sup>5</sup> British Committee for Standards in Haematology guidelines – [http://www.bcshguidelines.com/4\\_HAEMATOLOGY\\_GUIDELINES.html](http://www.bcshguidelines.com/4_HAEMATOLOGY_GUIDELINES.html)

## Easy as ABC? – The production of “A Manual for Blood Conservation”



This is the story of how we Co-Editors (Dafydd Thomas, John Thompson and myself) with our Publisher, Nikki Bramhill from tfm publishing Ltd, produced the first definitive UK textbook on blood conservation in 2004.

A sequel ('All Blood Counts – A manual for blood conservation and patient blood management'; ISBN 9781903378953) is due for publication in April 2016, but this article will concentrate on the earlier version. Was it really as 'Easy as ABC'?

### **Aims, also Authors, Ambition**

Although we all are based in the UK, our remit was to make this book appeal internationally. We wanted the style to be a practical reference book – a 'how to do it' manual rather than a standard factual textbook.

Our aim was to involve as authors those actively involved in blood conservation – the great and the good, the 'usual suspects'.

This wasn't just chapter authors either – our ambition was to invite a respected figure on the international stage to write the foreword.

In addition our ambition was to complete the entire project within one year.

### **Book, Beginning, also By Invitation**

To start the project, we all met to formulate a plan of action and to decide which of us would invite which potential authors. We invited those people with special expertise and experience whom we knew would be wise and capable of producing informative but practical chapters. These were not just clinicians and scientists, although of course their contribution would be welcome too, but others from all fields of blood conservation. It was sometimes difficult to decide who would make the

best authors for the chapters as occasionally there were several strong contenders, but eventually the work was apportioned accordingly. We decided to contribute as well by writing our own chapters, either solo (DT, JT) or with another author (BR).

One of us (BR) designed a spreadsheet and an invitation to be sent to the potential authors. This was accompanied by the "Instructions to Authors" document drawn up by our publisher.

### **Challenges, also Co-authors, Colleagues, Cooperation, Coordination, Communication, Competence – and Chapters**

The main challenge at the time was working on the book whilst doing the day job. This was particularly true for my fellow Co-Editors – both busy Consultants who were juggling on-call commitments as well as their normal work. This also applied to some of our authors, so we were more than happy for them to work with another author to share the load. It also meant that in some instances their less experienced colleagues had a chance to try their hand at writing a chapter as co-authors, earning an extra line on their *curriculum vitae*. It was also important to be aware that our Publisher was also involved in many other ongoing medical book publications, as well as ours, so had to work to a tight timeframe to accommodate them all.

It was vital that cooperation existed not only between these authors but also between the Editorial Team. As I was the only non-Consultant Editor, I offered to coordinate the plan for all those involved. We were grateful for the electronic communication by email (fairly new in those days – hard to imagine now!) which speeded up the process. This would only work, however, as long as we could rely on everyone to communicate with us and each other. In fact our initial planning meeting was the only time we met altogether face-to-face.

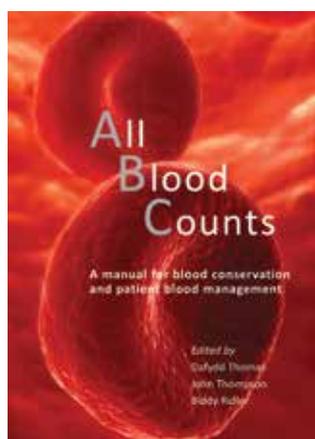
Chapter writing is not always easy or intuitive. As Co-editors we all had had previous experience at writing chapters to varying degrees of competence, so could offer guidance to those authors who needed it.

By adhering to the due processes as outlined above we were successful in producing our ABC book, 'A Manual for Blood Conservation', within the planned timeframe of one year. Our Publisher tells us that 2,000 copies have been sold to date. It is a recommended textbook for transfusion science course reading. We were pleased that the manual has also been mentioned by Ian McEwan in his book 'The Children Act' as "highly respected..." followed by a quote about the twenty-seven stages of the transfusion process.

### **Accordingly, By way of, Conclusion**

Whilst not always as 'Easy as ABC', by adhering to the aforementioned strategies we were able to achieve our goal.

We look forward to bringing you the new ABC manual 'All Blood Counts' this year and hope it will be as useful as its predecessor in helping your everyday work for blood conservation and management. This new book will detail the many and varied changes in blood conservation and management which have taken place over the past 12 years. It will complement the first edition as an up-to-date sequel in its own right with new chapters, new authors, and different subject matter which is current and relevant. Whether this latest venture is as 'Easy as ABC'? – Well, that's another story...



<http://www.tfmPublishing.com/all-categories/all-blood-counts>

### **Biddy Ridler**

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### **References:**

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The Children Act. Ian McEwan. London, UK: Vintage Books, 2014: 69-70.

All Blood Counts – A manual for blood conservation and patient blood management. Edited by Dafydd Thomas, John Thompson, Bidy Ridler. Shrewsbury, UK: tfm publishing Ltd, in press, due April 2016.

## **Introduction of the GoSBAR Scale for Reporting Organ Donation Performance**

Biannually the Statistics and Clinical Studies Department of NHS Blood and Transplant send reports of organ donation related key performance indicators, based on the UK Potential Donor Audit (PDA), to every hospital Trust/Board and create a regional summary of hospital performance for use in the 12 Regional Collaboratives. The key performance indicators represent steps in the donation process where potential donors may be lost (for example Identifying and referring potential donors, consent/authorisation) and improving these indicators is a prime concern for local organ donation committees and regional collaboratives.

Though feedback on these reports was generally positive there was growing dissatisfaction with how the data were being visually represented. The main method of presenting hospital individualised data in these reports was the very common health management Red/Amber/Green (RAG) rating and the more innovative funnel plots, which gives statistical validity for performance compared with the

national average. However, these two methods were not clearly related in the reports and occasionally contradictory. This was giving conflicting messages regarding hospital and regional performance.

For example, a red in the RAG rating would occur if a hospital fell below the national target in a given key performance index and green if the hospital was above the national target. It was noted that the targets used to judge RAG were national targets and when applied to small numbers (as occurs when looking at steps in the donation process in UK hospitals) this can be statistically meaningless. Hospitals would thus bounce from red to green and back again, every six months, based on natural variations in indicator events from small numbers. Without statistical significance the hospitals red/green rating could represent mere chance and therefore not reflect any effort on the hospitals' part. This was either falsely encouraging to hospitals if green or falsely discouraging if red.

Additionally, an important part of the RAG rating is the incorporation of an Amber scale, designed to act as a warning signal if the indicator being measured is in danger of slipping from green to red. Analysis of the Autumn 2014 Trust/Board reports revealed that from a total of 1,193 rates where a RAG rating could be applied, only 20 (1.6%) were amber. This implies that the boundaries for amber were set too narrowly and that this category as a warning measure was not effective.

Funnel plots are statistical graphs designed to display boundaries of statistical likelihood for any given indicator based on confidence limits around the average (See Figure 1). This more innovative measure in the reports allowed hospitals to directly compare their performance to the national average and against other hospitals, benchmarked to activity. Most hospital donation indicators would be clustered around the national average and therefore lie within the 95% confidence limit (there being a 95% chance that the hospital truly was not statistically different to the national average). However, for hospitals doing exceptionally well or poorly, they would move on the funnel plot to be either above or below the 95% confidence limit reflecting that they were statistically different to the national average and their peers. This gave true confidence that the hospital was doing something different to other hospitals, either for better or for worse.

Changes to the biannual reports were suggested to the National Organ Donation Committee (NODC) in Autumn 2014. It was clear to NODC that the aim of these reports is to:

1. Make large amounts of data quickly comprehensible.
2. Highlight good practice.
3. Highlight areas in need of attention and focus.
4. Motivate health professionals.
5. Gain the support and attention of the hospital management hierarchy following the local hospital reports.

The problems inherent with the RAG rating were felt not conducive to these aims. It was noted that there was no clear linking between a hospitals' RAG rating and their position in the funnel plot for any given indicator, a potential source of contradiction. There was a concern that if health care professionals, involved in promoting organ donation, lost confidence with the presentation of the data in the reports, it could lead to demotivation and risked potential gaming in PDA reporting, especially where subjectivity exists.

NODC therefore approved changes to the reports and these were introduced from April 2015. The most important changes were the:

1. Removal of the RAG rating.
2. Colour coding the funnel plots for easier visualisation.
3. Relating of all indicators in the reports to the statistically valid funnel plots

The colour coding of the funnel plots involved shading the statistical confidence limit divisions in the funnel plots to a hierarchical **Gold, Silver, Bronze, Amber, Red** (GoSBAR) scale. Gold would indicate the hospital was performing above the upper 99.8% confidence limit (CL) for the specific national average; silver would indicate that performance was between the upper 95% CL and the upper 99.8% CL; bronze would indicate performance that was consistent with the national average between the lower 95% CL and the upper 95% CL; amber would indicate that performance was below the lower 95% CL and red would indicate performance was below the lower 99.8% CL. See Figure 2.

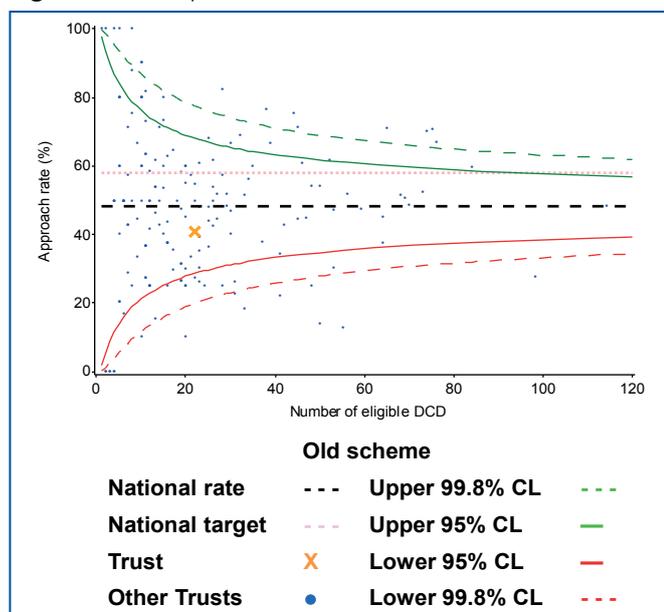
The use of a traditional hierarchy of gold, silver and bronze was hoped to make comprehension of the funnel plots intuitive as well as encouraging the majority of hospital indicators, with performance clustered around the national average (bronze), to not falsely discourage but at the same time create a desire to strive to be better than ones' peers and achieve silver or gold. Likewise, an amber or red rating are traditional warning colours and would indicate performance statistically lower than the national average. This would allow hospital organ donation committees and regional collaboratives to legitimately challenge and question such performance.

To ensure internal consistency in the reports the tables of key performance indicators and the visual representation of these data using radar charts in the executive summaries, sent to all Trust/Board Chief Executive Officers, all incorporated the GoSBAR colour hierarchy (see Figure 3).

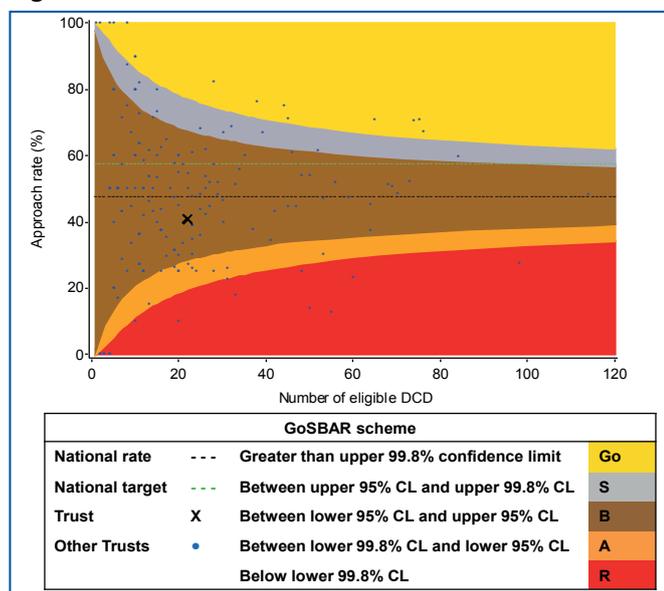
Two reporting cycles were carried out in 2015 using the GoSBAR scale. The introduction of the new reports has been extremely well received. The majority of feedback has highlighted the greater internal consistency in the reports, the welcome abandonment of the RAG rating and the easy interpretation of performance on a funnel plot.

Perhaps other areas of NHSBT might find the introduction of the GoSBAR scale a helpful change to their reports and we would welcome your contact if interested in exploring further.

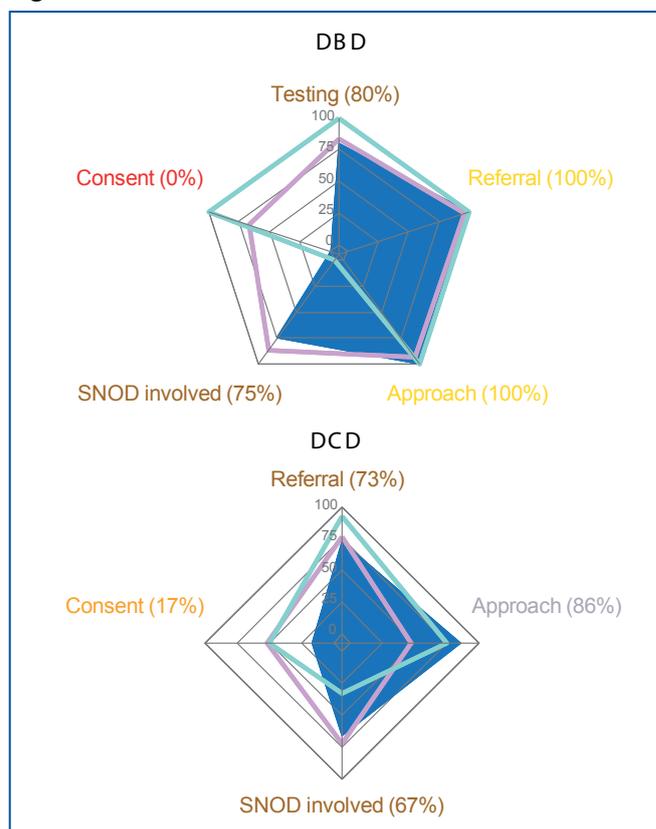
**Figure 1:** Example Funnel Plot



**Figure 2:** GoSBAR Scale for Funnel Plots



**Figure 3:** Radar Charts Colour coded with GoSBAR Scale



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## Ovarian Tissue Cryopreservation: A beginning for NHSBT at Southampton

A new ovarian tissue processing and cryopreservation programme has been set up in the Steve Mills Stem Cell and Immunotherapies (SCI) Laboratory, NHS Blood and Transplant (NHSBT), Southampton. This service aims to help girls and young women regain ovarian function post chemotherapy and/or radiotherapy. The development of more aggressive chemotherapy and radiotherapy has led to the increased survival rates for children and young women with certain types of cancer and leukaemia however; these treatments can lead to irreversible ovarian failure (Sonmezer and Otkay, 2006). This results in the loss of fertility and early menopause for the patient and subsequently leads to a life-time of hormone replacement

therapy (HRT). One new, but proven approach is to collect, store and then re-implant the patient's own ovarian tissue. This allows the patient to regain ovarian function and possibly restore some level of fertility post treatment.

Ovarian tissue cryopreservation is still a relatively new procedure with only a few programmes set up around the world most notably Denmark, Belgium, USA, Israel and Italy. The first successful ovarian tissue transplantation was achieved in 2004 (Donnez *et al* 2004) and so far this technique has resulted in over 150 women receiving autologous ovarian tissue transplantation with all regaining ovarian function and with over 40 live births (correct as of 2014). Although this therapy is established in Europe and

the US, there are very few sites in the UK offering this service, Edinburgh, Oxford and now Southampton being the only centres.

Patients who will benefit from this new program are girls and young women with cancer who are undergoing chemotherapy and/or radiotherapy. Ovaries are very sensitive to cytotoxic treatment especially alkylating agents with cyclophosphamide most commonly implicated (Lee *et al* 2006). There are several options available to girls and young women undergoing treatment for cancer and these include embryo cryopreservation, oocyte cryopreservation and ovarian tissue cryopreservation. Embryo cryopreservation requires the patient to be of pubertal age, have a partner or to use donor sperm and to be able to undergo a cycle of ovarian stimulation. Oocyte cryopreservation also requires the patient to undergo a stimulation cycle and cryopreservation can be more problematic due to the large size and water content of the oocytes. Ovarian tissue cryopreservation is the only option available for prepubertal girls and women who cannot delay the start of chemotherapy. Ovarian tissue cryopreservation can lead to an increased hope for the patient that they may regain menstrual cycles, fertility and have an improved quality of life post cancer treatment. Ovarian tissue cryopreservation is not only reserved for patients with malignant disease and can also help women and girls with congenital conditions such as Turner's syndrome. Patients with Turner's syndrome are born with low numbers of ovarian follicles and these patients can enter early menopause in their late twenties or early thirties.

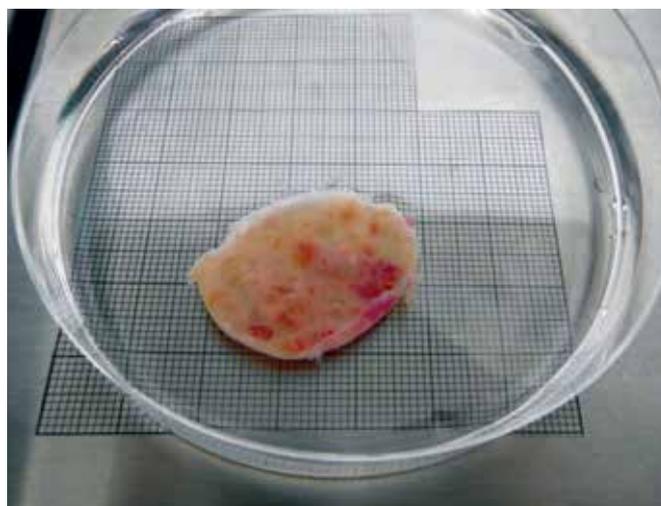
Patients referred for ovarian tissue cryopreservation are carefully selected and evaluated for suitability. Their age, disease, chemotherapy/radiotherapy treatment, disease progression and spread are all assessed (Rosendahl *et al* 2010).

The surgical procedure requires the laparoscopic, autologous donation of one ovary or multiple sections of one ovary (Rosendahl *et al* 2010). The tissue is transported to the SCI laboratory NHSBT, Southampton and processed in a Good Manufacturing Practice (GMP) grade cleanroom. The cortex of the ovary is isolated and divided into small rectangular pieces of tissue no thicker than 2mm wide. (see figure. 2). The cortex contains the primordial follicles which are more robust and survive cryopreservation more successfully than more mature follicles. The cryoprotectant added, infiltrates the pieces of ovarian tissue and protects it during the freezing and thawing process (Rosendahl *et al* 2010). The tissue is then stored in individual vials in the vapour phase of liquid nitrogen at less than 150°C (see figure. 3). Sections of the tissue are tested for the number of follicles present, the presence of tumour and sterility.

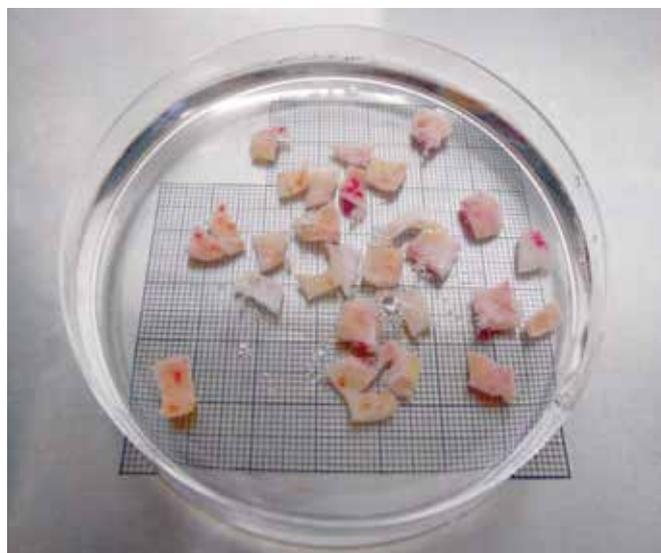
Post cancer treatment, when the patient is ready to receive their tissue it can be transplanted onto the remaining ovary or inserted into the muscular wall of the abdomen. After transplantation the progress of the tissue and its hormone function is monitored closely to ensure that it is recovering in situ as expected.

In summary ovarian tissue cryopreservation and transplantation offers re-assurances to women or girls undergoing cancer treatment that their treatment will not necessarily end their fertility or ovarian function. Ovarian tissue transplantation can restore ovary hormonal function in patients who have undergone ovarian failure and therefore entered menopause due to their cancer treatment. Ovarian tissue transplantation leads to an improved quality of life for the patient post cancer treatment, reducing the requirement for HRT and reducing other menopausal problems such as osteoporosis.

**Figure 1:** Shows a human ovary sliced in half after the cortex has been isolated.



**Figure 2:** Dissected ovarian tissue cortex ready for cryopreservation, tissue is isolated ovarian cortex which has been prepared to the required thickness using a scalpel and forceps.



**Figure 3:** Stored vials of ovarian tissue from patients awaiting transplantation. Each vial contains a single piece of ovarian cortex; tissue is then thawed and soaked to remove cryoprotectant prior to transplantation



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4. Rosendahl, Schmidt, Ernst, *et al*, 2010, Cryopreservation of Ovarian Tissue for a Decade in Denmark: *A View of the Technique*, *reproductive Biomedicine*, **22**; 162-171.

## Theo's Story



Sarah Stevenson's son Theo, born at the end of July 2013, needed blood and platelet transfusions during treatment and multiple surgeries for the congenital heart disorder Tetralogy of Fallot.

This life threatening disorder affects around three in 10,000 births and causes a range of heart defects, including holes in the heart and narrowing of arteries. It is a leading cause of cyanosis at birth ('blue baby syndrome').

Theo's condition was diagnosed when Sarah was pregnant at the 20 week scan. His pulmonary artery was blocked and he had a hole in his heart. She and husband Andy were told to expect their baby would need surgery soon after birth and he would be blue on arrival. When Theo was born it was found he had some extra defects, one

of which kept his blood flowing to his lungs and this meant he was able to get bigger before he needed surgery.

At 16 weeks, he had surgery to temporarily relieve the problems and needed several units of blood during this surgery. Following the operation however, Theo accidentally pulled his chest drain out. He had a cardiac arrest and needed emergency surgery to drain the fluid from his heart and restart his heart. "It was really scary," said Sarah. "He was grey before he had the blood transfusion. He pinked up straight away."

On February 10th, 2015, Theo had major surgery to provide a longer term fix by repairing the hole in his heart, and widening his pulmonary artery. Sarah said: "He lost a massive amount of blood, they couldn't stop the bleeding – they were pumping blood into him." Theo's platelet count dropped so low that he needed five units of platelets over the next few days.

He is now doing well. Sarah said: "He is a normal naughty two year old!"

"His pulmonary valve will need replacing at some point in the future, we don't know if it will be when he is in his thirty's or when he is still young. He goes to the cardiologist for regular check-ups."



Theo now

Sarah is now studying an Access to Health Course at college with the aim of becoming a paediatric nurse. She was always interested in nursing but Theo's treatment inspired her to make the change from her previous career as a publican.

Sarah and her husband Andy are raising money for the Heart Unit, at the Freeman Hospital in Newcastle, where Theo is treated.

"We wouldn't have Theo here without all the blood donors," said Sarah.

"My husband and I now donate regularly. I had been saying for years I would start and after Theo needed blood I started. I've donated four units. Giving blood was fine – it didn't hurt. We've got about four friends donating blood now too, including one who was scared of needles, but she did it after seeing what happened to Theo.

"It was nice to donate, to know that we would be helping someone in the same way that we were helped."

**Sarah Stevenson**

## ADVANCES in Transfusion Medicine Poster

# Advances in Transfusion Medicine

Thursday 24 & Friday 25 November 2016

(Draft programme – 10 CPD credits for the two days)

To be held at The Royal Society of Medicine, 1 Wimpole Street, London, W1G 0AE

There are ongoing significant advances in transfusion medicine and science. This two day meeting organised on behalf of the Royal College of Pathologists brings together experts from various clinical disciplines together with leaders in transfusion science to provide a broad overview of current key developments informing evidence based practice. We are pleased to include the College Foundation Lecture emphasising the increasing importance of blood group genomics and application to clinical practice. The meeting will be of wide interest to all those involved in transfusion medicine.

### Thursday 24th November 2016

- 10:00 Registration and coffee
- 10:30 Welcome - President Royal College of Pathologists, Dr Suzy Lishman
- Foundation Lecture Chair – Professor David Roberts
- 10:40 Blood group genomics - Connie Westhoff, Director of Immunohematology & Genomics, New York Blood Center
- Evidence based transfusion practice Chair – Dr Shubha Allard
- 11:20 Blood conservation in cardiac surgery - Dr Andrew A Klein, Consultant Anaesthetist, Papworth Hospital, Cambridge
- 11:45 Advances in the Management of Upper GI Haemorrhage - Dr Candido Villanueva, Hospital de la Santa Creu i Sant Pau, Barcelona
- 12:10 Best practice in critical care - Professor Tim Walsh, Clinical & Surgical Sciences, University of Edinburgh
- 12:35 Discussion
- 12:50 Percy Oliver Award
- 13:00 Lunch
- Transfusion and transplantation science - Chair: Professor Adrian Newland and Dr Jonathan Wallis
- 14:00 QUOD study - organ transplantation – Professor Rutger J. Ploeg, Director of Clinical and Translational Research, University of Oxford
- 14:20 INTERVAL Trial – iron metabolism in blood donors - Professor David Roberts, Consultant Haematologist, NHS Blood & Transplant
- 14:45 Clinical registries: Expanding opportunities in haematology research - Professor Erika Wood, Monash University, Melbourne, Australia
- 15:10 Coffee
- 15:40 HLA typing by NGS and its implications - Dr Cristina Navarrete, NHS Blood & Transplant, London
- 16:05 Current and future platelet trials - Dr Lise Estcourt, Consultant Haematologist, University of Oxford
- 16:30 Discussion
- 16:45 Close

### Friday 25 November 2016

- 09:30 Coffee
- Transfusion Safety – Chair Dr Lorna Williamson
- 10:00 SHOT – an evolving role - Dr Paula Bolton-Maggs, Serious Hazards of Transfusion Scheme (SHOT) Medical Director, Manchester
- 10:25 Future of blood components - Dr Rebecca Cardigan, Head of Components Development, NHS Blood & Transplant Cambridge
- 10:50 Epidemiology of donors and recipients Lessons from the SCANDAT2 database - Dr Gustaf Edgren, Department of Medical Epidemiology and Biostatistics at Karolinska Institute, Sweden
- 11:15 Coffee
- Clinical practice - Chair Dr Kate Pendry
- 11:35 ORANGE – bleeding on oral anticoagulants - Dr Laura Green, Consultant Haematologist, NHS Blood & Transplant Colindale & BartsHealth NHS Trust
- 12:00 HSCT and malignant haematology and transfusion - Dr Paul Kerr, Consultant Haematologist, Exeter
- 12:25 Autoimmune Haemolytic Anaemia – challenges in management - Dr Quentin Hill, Consultant Haematologist, St James' University Hospital, Leeds
- 13:00 Lunch
- Improving the impact of Patient Blood Management (PBM) Chair - Prof. Michael Murphy
- 14:00 Surgical PBM - Mr Toby Richards, Vascular and Endovascular Surgeon at University College Hospital, London
- 14:25 Implementation of PBM - Australian experience - Professor Erika Wood
- 14:50 Changing Behaviour – AFFINITE trial - Dr Simon Stanworth, Consultant Haematologist, NHS Blood & Transplant Oxford
- 15:15 Discussion
- 15:30 Close

Book online:  
<https://www.rcpath.org/event/advances-in-transfusion-medicine.html>  
 Tel 020 7451 6715  
 Email meetings@rcpath.org

**Registrations - Two day fee applies only**  
 Online bookings:  
 (one month prior to the event or online)  
 RCPath Fellows £360  
 Concessions £185 (Trainees, BMS, Graduates, Nurses, Retired)  
 Non-members £435

Regular bookings:  
 (Bookings made via cheque or invoice less than one month prior to event)  
 RCPath Fellows £385  
 Concessions £205  
 Non-members £460



## CPD Questions

### 1. Patient Blood Management (PBM):

- a) Is single disciplinary.
- b) Evidence based.
- c) National initiative only.
- d) Encourages use of blood.

### 2. Patient Blood Management (PBM):

- a) Primary aims to save money.
- b) Has completed all projects.
- c) Only supplies education.
- d) One objective is to embed PBM into hospitals.

### 3. Patient Blood Management (PBM):

- a) Promotes anaemia investigation of management.
- b) Does not include haemoglobinopathy patients.
- c) Will not involve patient involvement in their case.
- d) Unlikely to reduce inappropriate use of blood components.

### 4. Integrated Supply Planning and Demand Planning in NHSBT:

#### Supply Planning:

- a) Is managed using a yearly agenda.
- b) Is managed using a three year agenda.
- c) Is managed using a five year agenda.
- d) Is managed using a monthly agenda.

### 5. Supply Planning:

- a) Focuses on only short-term business performance.
- b) Focuses on only long-term business performance.
- c) Focuses on mid-to long-term business performance.
- d) Focuses on mid-to long-term forecasts.

### 6. Benefits of Supply Planning:

- a) Optimised inventory.
- b) Increased unplanned changes of action.
- c) Reduced collaboration access function.
- d) Reduced forecasts accessory.

### 7. Software Support for Supply Planning:

- a) Will go-live in Q1 2016/2017.
- b) Demand forecasting modules are now live.
- c) Automated stock ordering, is now live for all English hospitals.
- d) Optional stock target, based on demand forecast, are produced automatically at present.

### 8. Where do Platelets go in London?

- a) Most platelets are used in surgical cases.
- b) Most platelets are used in paediatric cases.
- c) Most platelets are used in Medical cases.
- d) Most platelets are used in trauma cases.

### 9. Where do Platelets go in London?

- a) All London hospitals participated.
- b) No request was for two platelet units to be issued.
- c) Over 90% of requested platelets were transfused.
- d) Five hospitals accounted for 90% of data submitted.

### 10. Where Two Platelet Units Were Issued, Rather Than One Unit:

- a) More likely to be returned or wasted.
- b) More likely to be transfused.
- c) Most cases.
- d) Reason was established in review.

### 11. GoSBAR Scale

#### Red Amber Green (RAG) Scale as used in Organ Donation

- a) RAG rating very satisfactorily method.
- b) RAG rating often produced reports that bounced from red to green every six months.
- c) RAG rating works very well with small numbers.
- d) Amber boundary was set too wide.

**12. Funnel Plots:**

- a) Are designed to display ? of the average.
- b) Are designed to ensure hospital donation rates are always average.
- c) ? Products of RAG rating.
- d) Are designed to display boundaries of statistical likelihood based on confidence limits around ? average.

**13. Ovarian Tissue Cryopreservation:**

**First Successful Ovarian Tissue Transplantation was achieved in:**

- a) 2000.
- b) 2002.
- c) 2004.
- d) 2006.

**14. As of 2014 – these have been over:**

- a) 100.
- b) 40.
- c) 50.
- d) 60. Live births

**15. Ovarian Tissue Cryopreservation is Reserved only for Patients with:**

- a) Malignant disease only.
- b) Congenital condition such as Turner Syndrome also.
- c) Planned treatment with alkylating agent only.
- d) Planned treatment with radio therapy only.

|   |      |      |      |       |       |
|---|------|------|------|-------|-------|
| <b>CPD Blood and Transplant Matters</b> | 1. D | 4. B | 7. C | 10. D | 13. A |
|   | 2. C | 5. C | 8. D | 11. B | 14. A |
| <b>Answers Issue 47</b>                 | 3. A | 6. A | 9. D | 12. C | 15. B |

## Clinical Case Studies

### Question 1

A 41 year old lady (A Ro K-) is 15/40 pregnant with a pan-reacting antibody at booking, which on repeat sampling, RCI find is anti-U, with a titre of 1:4. She is a primip and has had IVF with donor eggs. She was transfused one year ago following myomectomy, but still has several fibroids, one of them is 45mm in size. Her EDD is 29/03/16 (Easter).

- What advice will you give to obstetricians regarding management of the pregnancy (fetus, mother, neonate)?
- If she has a major haemorrhage at delivery, what blood will you use and what advice will you give obstetricians/anaesthetists?

### Question 2

A 39 year old lady is 25/40 pregnant, with two live well children. She needed an IUT three days ago, as following reduced fetal movements, scan showed pericardial effusion (heart otherwise normal), some fetal ascites, but MCA Dopplers were abnormal and pre-IUT fetal Hb was 30g/L.

Post-IUT Hb was 190g/L. maternal group and screen showed no red cell antibodies. Parvovirus results showed IgM and IgG were negative. Mother is on infliximab and hydrocortisone for a flare up of ulcerative colitis.

What advice would you give to obstetricians regarding differential diagnosis, investigations and management of the pregnancy?

### Question 3

Call at 7 pm from Hospital Services a patient's mother is on the phone demanding that we send platelets on a plane to her daughter in Thailand, who is A- and no D platelets are available. Her daughter has dengue fever and low platelets and the doctors there say she will need platelets in the next 24-48 hours. The mother says a flight leaves Heathrow at midnight and wants platelets on the plane.

- What will you say to hospital services/the mother?
- What are your options, if it is established that the patient will indeed need some platelets in the next 24-48 hours?

### Question 4: Hazards of Fresh Frozen Plasma (FFP)

A haematologist in your trust is adamant that FFP is of use in warfarin reversal. He asks for recent evidence that FFP is harmful.

- What can you cite as the current hazards of FFP (say, over the past five years) in the UK?

### Question 5: Methylene Blue and Solvent Detergent FFP

A haematologist at a hospital with a large children's Cardiac Surgery centre, is concerned because two young children have experienced hypotension during transfusions of Methylene Blue treated plasma, whilst undergoing major cardiac procedures on bypass. Because of this, the hospital is proposing to move to using SD-FFP for all patients born before 1st January 1996.

- Is MB FFP associated with more reactions than SD FFP and if so, what are the likely reasons?
- Is any patient group at more risk of hypotensive reactions to blood components and if so why?

### Question 6: Management of IgA Deficiency

A female patient, age 60, presents with AML. She is group A RhD negative. She shows an old card indicating she has immunoglobulin A deficiency, which she was given following investigation of chronic fatigue syndrome some years ago. Deficiency is confirmed by a repeat sample. She has never been transfused. Her Hb is 73g/L and is going to drop, so you decide to give her a red cell transfusion.

- What red cells will you give her?

She does experience a severe reaction, within five minutes of starting the transfusion, with wheeze, hypotension, rigors and nausea. This settles promptly with stopping the transfusion and giving antihistamine and steroid. The Clinical Team did not give IM adrenaline. She will need further red cell transfusions, and platelets, during her induction chemotherapy

- Now what red cells and platelets will you give her?

The Clinical Team plan to give her an Allogeneic Stem Cell Transplant, once she is in remission.

- Are the stem cells likely to cause a reaction?
- If yes, what could be put in place to reduce this risk?

## Answers to Clinical Cases

### Question 1

**A:**

#### **Fetus: risk of HDN:**

- i. Father very likely U+ (<1 in 1000 African/Afro Caribbean population U- (~0 Caucasoids) are U-). Father tested for Ss and was S-s+ so does not exclude heterozygosity for U, but very unlikely. IBGRL were not able to do any PCR testing to determine this further.
- ii. Mother donor egg IVF, no information on donor ethnicity, but again, very likely to have U antigen, so working diagnosis is that baby is likely homozygous for U antigen.
- iii. Homozygous C from literature, suggests more severe HDN than in babies heterozygous for antigen.
- iv. Although anti-U titre of only four, we elected to do MCA Doppler monitoring from 20/40 every two weeks. Titre monitoring may be useful, if rises may make IUT more likely, but could regard titre monitoring as redundant if MCA Doppler monitoring anyway.
- v. If IUT needed, as timing is not predictable and usually needed within 24 hours of MCA Dopplers going off, then would use frozen blood: can be used for IUT not need irradiation.

#### **Neonate:**

- Delivery early at 37-38 weeks.
- Need cord blood at delivery for DAT, Hb, Bilirubin.
- Arrange for donor to donate a wet U- unit just before delivery, for exchange in case needed.

**B:**

#### **Blood for mother:**

- Discuss with obstetricians the mode of delivery and risk of PPH: any high risk? In this case yes, large fibroids. For Caesarean Section, so will use cell salvage and tranexamic acid.
- Discuss number of units required reaching balance between wish to have lots on-site and finite supply of U- units and once thawed, cannot re-freeze. Agreed two units to be thawed and on site before delivery and if major haemorrhage needing more blood, will use ABO, full Rh and K matched blood with IV methyl-pred 1g and IVIg cover and monitor for delayed Haemolytic Transfusion Reaction (Hb, LDH, bilirubin).

### Question 2

Differential Diagnosis: of fetal anaemia where no maternal antibody, if isolated anaemia (not pancytopenia):

1. Parvovirus, but IgG and IgM negative (assume these were recent results, but can do PCR in case any reason why serology could be falsely negative. For example: if on immunosuppressants. (Film: usually low retics/nrbc, but can be high in recovery phase).
2. Haemoglobinopathy test parents.
3. Congenital anaemias for example: Diamond-Blackfan anaemia (absence of reticulocytes and nucleated red blood cells); Congenital dyserythropoietic Anaemias (film: abnormal rbc).
4. G6PD, PK deficiency test parents; see film.
5. Other rarer congenital anaemias/pancytopenias including mitochondrial disease and so forth, see film. May need investigations after birth. In this case, FBC and film showed Hb 30g/L; wbc and platelets normal no clumps, wbc normal; rbc lots of retics & nrbc; no obvious abnormalities, just dilute film.

#### **Management:**

MCA Doppler monitoring every two weeks, unless a known self-limiting condition for example parvovirus, which is normally cleared and anaemia resolves after 1xIUT. (Obstetricians must confirm diagnosis of parvovirus, not just assume it as it is common; as important to rebook for MCA Doppler monitoring if it is not parvovirus, as other causes will have recurring anaemia and need for IUT).

### Question 3

**A.**

- No as better options available.
- Even if considered exporting components, we only do this through liaison with the patient's doctor caring for them, not anyone else (as need to clarify that clinically indicated and no better options and that hospital will pay for them).
- Also, delays for this +/- any subsequent need for further platelets.
- Platelets on a plane (long distance) not easy; agitation, shelf-life and so forth.

**B.**

- Can give D+ platelets if can get anti-D to cover after, even if not immediately (up to 72 hours later). Can provide platelets promptly and 250 IU covers multiple doses of platelets (see BCSH Guidelines on anti-D).

- In this case, liaised with patient's Doctor and gave local D+ platelets after he established that he could obtain anti-D from a hospital 15 miles away. Patient's platelet count was 20 at time, with some minor bleeding with Dengue (watching if worsening).
- NB: if components are ever needed abroad there is a charitable institution, which caters specifically for this, by procuring safe blood more regionally, as an alternative to shipping blood from the UK: Blood Care Foundation <http://www.bloodcare.org.uk/>

**Reference:**

Patel *et al.* (2003). Severe hemolytic disease of the fetus following in vitro fertilization with anonymously donated oocytes. *Transfusion* **43**(1): 119-120

**Question 4**

SHOT data from 2010-2014 reports:

- 6 ABO incompatible transfusions, no haemolysis. Most common reason was incorrect group selected for massive transfusion.
- 6 wrong component type-for example, platelets given instead of FFP.
- 50 cases of anaphylaxis including four with MB FFP and three with SD FFP.
- 98 other allergic reactions including two with SD FFP.
- 17 TACO may be a few more from 2014 but not clear.
- 7 TAD.
- Two possible viral TTIs (Hepatitis B and Hepatitis E)\* and two cases of multiple components (red cells and FFP) transmitting Hepatitis E, and potentially one more from 2014.
- **No** TRALI cases in last five years.

\*Hep E is not inactivated by SD method.

Therefore the most serious risks appear to be TACO, anaphylaxis and Hepatitis E transmission.

**Question 5**

**A.**

SHOT data indicate a similar overall rate of acute transfusion reactions with standard and MB FFP, although MB FFP appears to be associated with more severe hypotensive reactions (although still very rare).

There are significantly, fewer reactions reported with SD FFP.

- As a pooled product, any "donor effect" is diluted.
- The profile of recipients of SD FFP is likely to be different-plasma exchanges and increasingly, patients born after 1.1.96.

**B.**

SHOT data 2010-2014 indicate that hypotensive reactions are seen more frequently in patients undergoing cardiac bypass. The incidence is also stated in the literature to be increased in patients on ACE inhibitors and with prostatic surgery. The mechanism is thought to be related to the Kallikrein-Kinin system. In practice, it can be difficult to distinguish some hypotensive reactions from hypotension due to blood loss.

**Question 6**

**A.**

Most Patients can receive standard red cells, although, if time permits, washed red cells are an option. IgA deficient red cells are not routinely available.

**B.**

Washed red cells have an IgA level of 0.00065g/L, in other words very low and can be used interchangeably with IgAD red cells and they are readily available. Platelets with plasma removed and replaced by additive (aka "washed" have a much higher IgA level at 0.08g/L, but in the few cases where IgAD patients with reactions have been transfused with them, they have been tolerated well. However, it is possible patients may still react and it may be necessary to call up an IgAD donor (last done in 2008/9). There is no current panel of such donors.

It is possible she could be desensitised to IgA (*Kiani-Alikhan, Transfusion 2012*).

The patient tolerated washed red cells and platelets well.

**C.**

Theoretically yes.

**D.**

In this patient's case, stem cells were washed twice with saline albumin and then the volume was made up with 2.5% human albumin. The stem cells were tolerated without problems with satisfactory engraftment and she remains in remission.

Unlike two patients quoted in the literature, her IgA level remains low.

# Diary Dates

## 2016

25-28 May

**The 62nd Annual Scientific and Standardisation Committee (SSC) Meeting**

Location: Montpellier, France  
For more information contact:  
[www.b-s-h.org.uk](http://www.b-s-h.org.uk)

2 June

**Scotblood Annual Conference**

Location: Sterling University, Scotland  
For more information contact:  
[www.scotblood.co.uk](http://www.scotblood.co.uk)

14 June

**World Blood Donor Day: "Blood connects us all".**

Location: Amsterdam, Netherlands  
For more information contact:  
[www.who.int/campaigns/world-blood-donor-day](http://www.who.int/campaigns/world-blood-donor-day)

29 June

**11th Cambridge Summer Haematology Meeting**

Location: The Moller Centre, Churchill College, Cambridge  
For more information contact:  
[www.b-s-h.org.uk](http://www.b-s-h.org.uk)

15 July

**Second European Conference on Donor Health and Management**

Location: Cambridge  
For more information contact:  
[www.donorhealthcare.org](http://www.donorhealthcare.org)

18-19 July

**Introduction to Immunology SHOT**

Location: University of Warwick, Coventry  
For more information contact:  
[www.bbts.org.uk](http://www.bbts.org.uk)

6 September

**Moving Forward with Stem Cell Therapy**

Location: Cineworld: The O2, Peninsular Square, London  
For more information contact:  
[www.b-s-h.org.uk](http://www.b-s-h.org.uk)

3-8 September

**34th International Congress of ISBT**

Location: Dubai, United Arab Emirates  
For more information contact:  
[www.isbt.org](http://www.isbt.org)

21-23 September

**BBTS Annual Conference**

Location: Harrogate International Centre, Harrogate  
For more information contact:  
[www.bbts.org.uk](http://www.bbts.org.uk)

22-25 October

**AABB Annual Meeting**

Location: Orlando, Florida  
For more information contact:  
[www.aabb.org](http://www.aabb.org)

24-25 November

**Advances in Transfusion Medicine**

Location: The Royal Society of Medicine, Wimpole Street, London  
For more information contact:  
[www.rcpath.org/event](http://www.rcpath.org/event)

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