

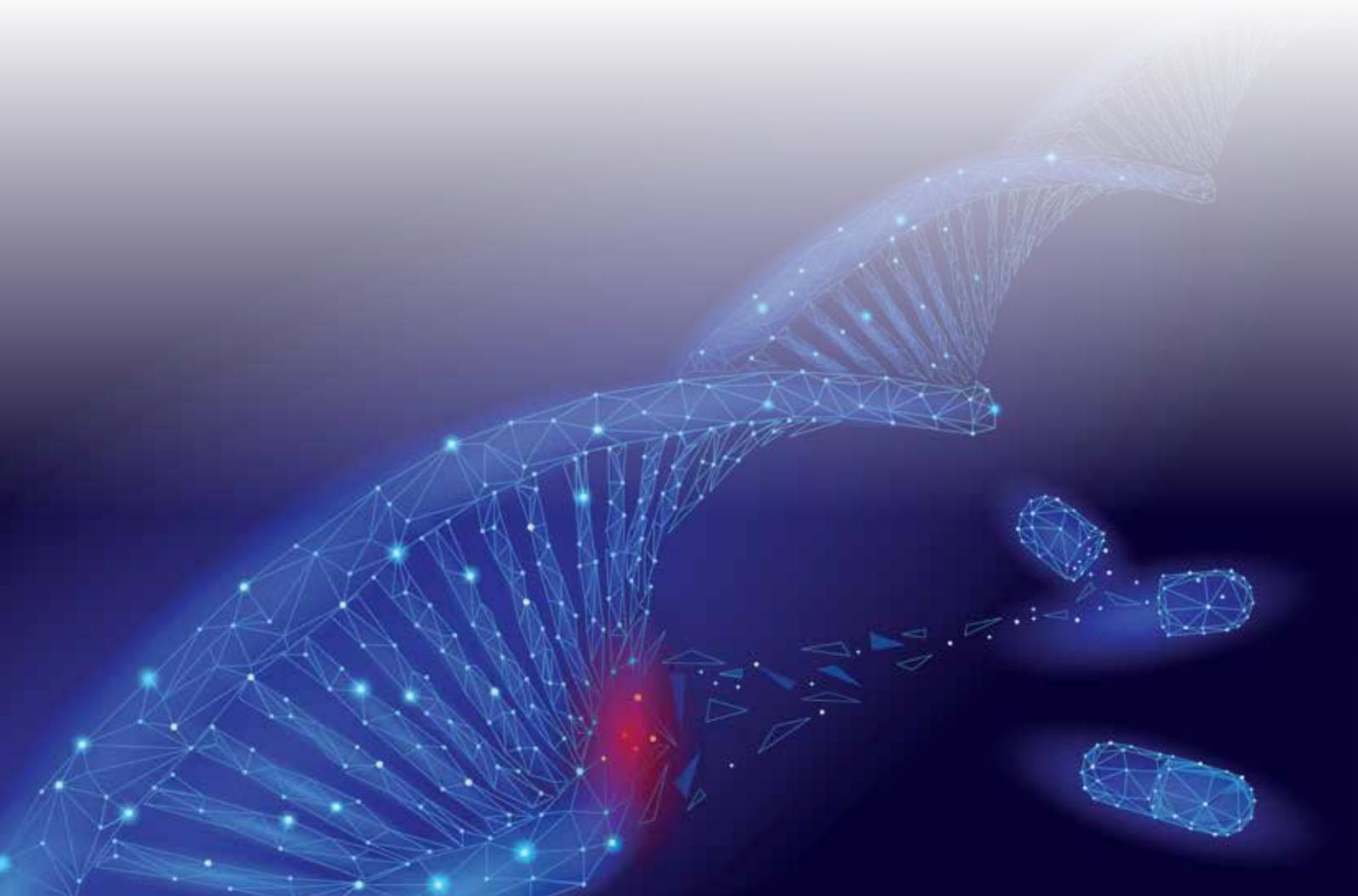
# Blood and Transplant

Information for hospitals served  
by NHS Blood and Transplant

# Matters

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# EDITORIAL

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Welcome to Edition 53 of *Blood and Transplant Matters*. I hope you enjoyed the last edition and found areas of interest and use.

Firstly, a big thank you to Denise Watson, who is leaving the Editorial Board, for her great contribution to *Blood and Transplant Matters*. Secondly a very warm welcome to Brian Hockley, who joins the Editorial Board; but will continue to contribute and encourage others to submit, transfusion related audits.

This edition commences with a celebration, five years of the Professional Development Team in Organ Donation and Transplantation. Olive McGowan, Cathy Miller and Dale Gardiner describe the background and fantastic progress this team have made over the last five years. In terms of training given and the tangible outcome success of their work.

John Girdlestone and John Smyth provide a brief, but exciting, outline of the work being done by Cellular and Molecular Therapies to bring novel treatment to patients. Bringing together not just novel science but working with the regulatory authorities to enable these treatments to be available 'on the shelf' in the near future.

The next article is an audit in the case of Prothrombin Complex Concentrate at a District General Hospital by Adam Pack, Richard Salisbury, Caroline Lowe and Sarah Davis. This has resulted in a useful checklist that should improve patient safety.

Rekha Anand and Emma Watkins provide an insight into the work – and celebration of many people – required to source and deliver 'rare' red cells at the required time. Not to be forgotten in the generosity of our blood donors and their willingness to be available.

Our second Audit of Overnight Transfusions in the West Midlands Region in July 2016 by Caroline Tuckwell, which makes interesting reading and useful recommendations that should improve patient safety.

Increasingly, university students are finding that becoming a blood donor and actually giving blood is becoming very difficult due to NHS Blood and Transplant (NHSBT) no longer visiting universities for donation sessions. Louise Webster describes her – and others – efforts to set up a University Blood Donating Society and bring the students to the donation session. Along the way, they also have a bit of fun.

As usual, there is a patient's story, which continues to remind us why all the work is so necessary.

Have a happy 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).

If future funding is secured, it is likely that all future editions will be available on-line only – no more print editions. Hopefully, this will enable further developments. I would be grateful for comment to be sent either directly to myself or to Lynne Hodkin via our email address given above.

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# The Professional Development Team in Organ Donation and Transplantation: A Five-Year Anniversary

## Educate, Develop and Empower

### Background

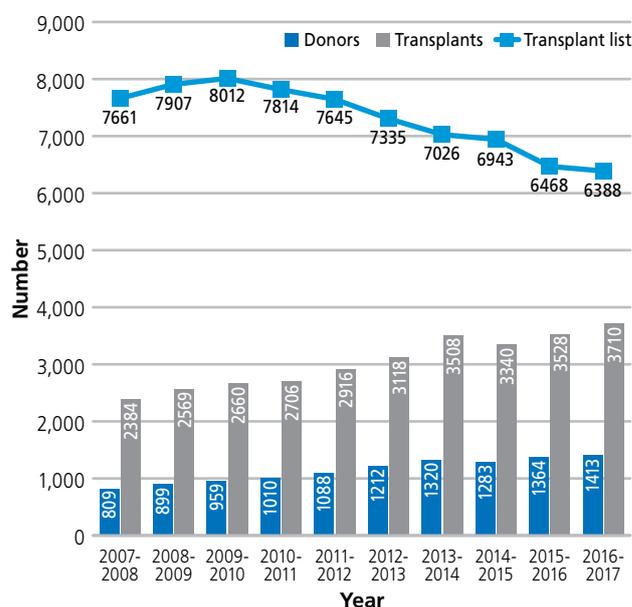
Transplantation is the optimal treatment for many patients with end-stage organ failure. However, the demand for transplantable organs is not met by the number of live or deceased donors. In 2016-2017, 6,388 people in the UK were awaiting a transplant but only 3,710 transplants were performed (Figure.1), with around three people a day dying whilst on the transplant waiting list.

On 16 January 2008, UK Health Ministers accepted the recommendations of the Organ Donation Taskforce report to improve organ donor rates. The taskforce made 14 recommendations to ensure a 50% increase in deceased donors was achieved by 2013. Although this 50% goal was achieved, one of the recommendations; 'for all clinical staff likely to be involved in the treatment of organ donors to receive mandatory training in the principles of donation' requires further work to achieve the current 'Taking Organ Donation to 2020' strategy – aiming for a consent/authorisation more than 80%; currently sitting at 63%.

Improving consent/authorisation rates to more than 80% is the single most important strategic aim and therefore fundamental to the strategy; thus, maximising organ donation and ultimately the number of lives saved, whilst upholding the decisions of those wanting to donate NHSBT therefore places training at the heart to achieving this target.

NHSBT Organ Donation and Transplantation Directorate (ODT) employs around 250 Specialist Nurses – Organ Donation (SNODs) and 20 Specialist Requesters (SR) across 12 regional teams throughout the UK, with plans for further role development in the Specialist Nurse – Family Care role to be commenced 2018 (SNOD – FC). The education and training needs for these expert health care professionals are met by ODT's Professional Development Specialist (PDS) team). The PDS team was established in January 2013 and is a true example of how NHSBT invests in 'grow your own' talent and the importance attributed to training and ongoing development, especially of our nurses. The team was developed entirely from our own pool of SNODs. Each team member has vast experience in Organ Donation and Transplantation and a passion for life-long learning, development and improvement. The team have undergone training and development to equip them in their role, many now holding post graduate educational qualifications. The team are supported by an administration team that are vital to the smooth running of the service

### Number of Deceased Donors and Transplants in the UK, 1 April 2007 – 31 March 2017, and Patients on the Active Transplant List at 31 March



<sup>1</sup>Source: Transplant activity in the UK, 2016-2017. NHS Blood and Transplant

Figure 1

The PDS team is celebrating its 5th Birthday and during that time has transformed the way SNODs receive communication training in consent/authorisation for organ and tissue donation. New SNODs are now inducted through a comprehensive modular style cohort training programme. The taught modules cover all aspects of the donation pathway and are supported by a competency framework for all elements of clinical practice in line with the Nursing and Midwifery Council.

The PDS team has been successful in securing funding from Health Education England to develop and deliver hi-fidelity simulation training for SNODs, supporting advanced communication training through simulation covering subjects such as:

- Understanding the importance of 'first impressions'.
- Active Listening.
- Advanced communication techniques – verbal and non-verbal.
- Barriers to communication and Interpretation.
- Negotiation and influencing.
- Ability to give and receive feedback.

Through simulation training it is important that the SNODs and clinicians develop 'deliberate practice', reflection on personal values, active listening and awareness of personal appearance/impact and influence to address the personal, professional and emotionally

complex subject matter of organ donation with potential donor families and professional colleagues involved in the donation pathway.

The annual Shared Professional Practice Course (SPPC) is aimed at all staff across the organ and tissue donation pathway and enables both newer and experienced staff to join together to share good practice. This is by learning from each other, networking, engaging and developing themselves, utilising advanced training methods such as Forum Theatre to continue the great work in improving consent/authorisation rates, strengthening the collaboration to work alongside NHS hospital staff and improve practice.

Consent/authorisation rates have been stubbornly resistant to change in the UK. We have the new style annual consent/authorisation training (SPPC) along with other interventions, such as embedding SNODs in hospital Trusts and close working with Clinical Leads – Organ Donation (CLODs) – all of which are subsequent to the Organ Donation Taskforce recommendations, and we are now beginning to see a shift in consent/authorisation rates from 60% to 63% in NHSBT’s Annual Activity Report (2017).

The award-winning cohort training has been recognised on an international platform and Helen Bentley and Sally Holmes from the PDS team received, in person on behalf of the team, an ‘Innovation in Donation and Transplantation’ award from the North American Transplant Co-ordinators Organisation (NATCO) in Florida USA.

### **Innovation in Donation and Transplantation Award**



Figure 2

### **Cohort Modules**

Cohort training has developed significantly from a one-week stand-alone induction course to a cohort modular approach. A value based recruitment of SNODs now takes

place three times a year. Each successful SNOD receives a comprehensive training programme of four modules (detailed below) which accounts for one-week a month in the ‘classroom’ enabling shared practice and networking with fellow SNODs around the country. This new process of learning enables a competency on the on-call rota to be achieved around six months. Historically, on-call competency was reached within four months at best and usually took much longer, even up to 18 months, with an average around 10-12 months. The new method of training for SNOD’s is comprehensive, consistent and more cost effective supporting achievement of competency onto the on-call rota, standardisation of practice and equips the staff for the ever-changing needs of the NHS.

To date we have trained 122 SNOD’s which equates to approximately half (48%) of the current SNOD workforce.

### **Cohort Modules 1–4**

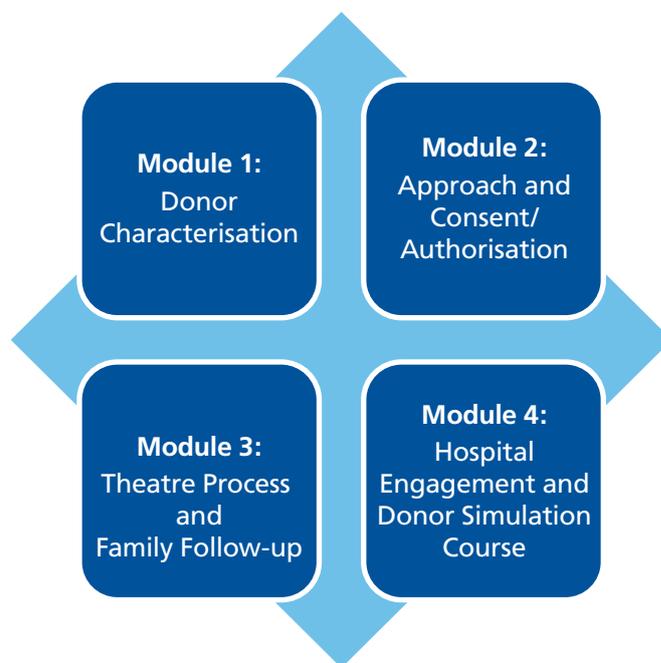


Figure 3

### **Team Structure**

The PDS team is led by Assistant Director for Education and Governance – Olive McGowan, Head of Education and Professional Development – Cathy Miller and two Professional Development Team Managers – Helen Bentley and Louise Hubner.

The PDS role is multifaceted and has both a regional and national focus. In post are 16 PDS’s, with one covering each of the 12 regions in the UK and in national roles. Regionally the PDS team supports SNOD’s learning and development whilst shadowing clinically on-call or in an embedded hospital trust. Nationally each PDS also has a lead role in the key training areas. To maintain skills and optimise practice across the whole of the UK.

## The PDS Education Responsibilities

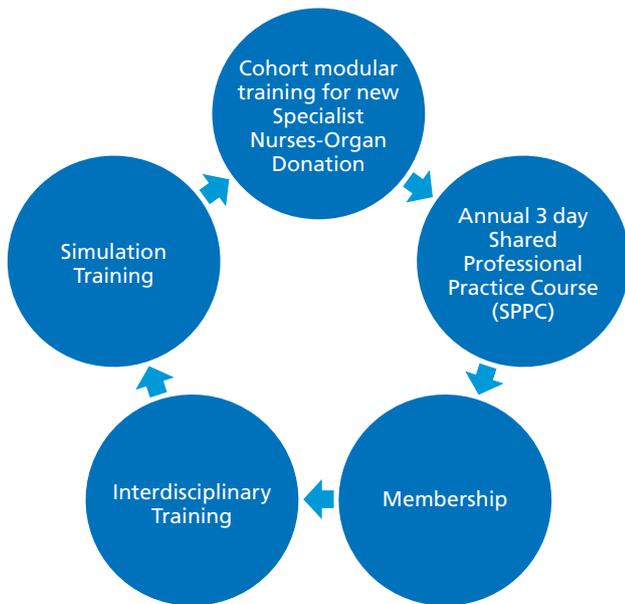


Figure 4

Each member of the PDS team have/are working towards or can consider working towards an academic education qualification. They are peer reviewed twice yearly to aid reflection and development in their expertise as a trainer and facilitator. The national roles leading on key aspects of training;

### 4 National PDS's:

- Medical Education – Interdisciplinary training – Jill Featherstone.
- Modular Cohort Training – Eddie Davies.
- Consent/Authorisation – Nicky Newbound.
- Specialist Requesters – Sally Snowden.

Medical education – interdisciplinary training is a relatively new focus for the PDS team and we are fortunate to be supported by a national lead role – Jill Featherstone and two new National Education (NE) CLODs (Dr Ben Ivory and Dr Dan Harvey). Together they will support the 240 CLODs, funded by NHSBT, who along with the SNODs, dedicate time to improving organ donation rates within their local NHS Hospitals. This new medical education team, within the PDT, will take forward the current medical education initiatives for CLODs and intensive care trainees and enable us to provide education and training in the Intensive/Critical Care arena in relation to the whole organ donation pathway.

Consent/authorisation is a huge focus for ODT and such affords a national role and focus from an education and training perspective. The 20 SRs in post also have a lead PDS – Sally Snowden who has developed a bespoke competency framework and portfolio for the role and together with the SR leads in the regional teams has facilitated education, training and shared practice empowering the

SR's on their quest for expertise, upholding the values of NHSBT. The PDS team are supported with three **Business Support Officers** who are responsible for allocating places and booking delegates onto courses via the [SNOD.TrainingMailbox@nhsbt.nhs.uk](mailto:SNOD.TrainingMailbox@nhsbt.nhs.uk) whilst providing essential course related information and overall admin support to the PDS Team.

### Professional Development Team Structure 2017 – ODT



Figure 5

## Professional Development Specialists



Figure 6

### The PDS Team have an Ethos to be POSITIVE

**People:** are central to everything we do: we work with people, for people, across the 12 teams.

**Openness:** we listen to what people tell us, whether we like what we hear, or not, and act on that information.

**Safe,** sound, supportive, sensitive practices show how we respect and value our colleagues and peers, service users and other stakeholders.

**Integrity** – we behave honestly in a way that demonstrates our values, we celebrate the good things we do, and learn from our setbacks.

**Trust:** we are trustworthy, we do what we say, and say what we can't do.

**Innovation:** we try new things to be the very best in our field.

**Value:** we value and respect the diversity of our staff, service users and other stakeholders.

### Where we're at now

#### Priorities:

- Medical Education and interdisciplinary training is a key focus. The PDS, working collaboratively and bringing our medical and SNOD colleagues together for a shared learning experience, aim to create a greater understanding of how one another's roles fit together in achieving the best in planning and approach for organ donation.

- The Consent/Authorisation is now addressed in the SPPC a 3-day course which is currently in the annual development phase January to March 2018, ensuring it is innovative and up to date and will include SRs and Tissue Services colleagues, as part of the facilitation group/ attendees on the course.
- SR Training to date has generated increased expertise in family approaches. The training has incorporated Clean Language which is precision questioning using the person's own words to direct their attention to an aspect of their own experience. Asking these questions in the right context often results in an interesting new insight. This can be especially helpful in the event of a decision override by a family in the organ and tissue donation discussion.
- Cohort recruitment and modular training, ensuring we are recruiting high calibre SNOD's and providing a supportive and comprehensive training programme.
- Mentorship courses are being run throughout the year to support our more experienced SNODs in mentoring newer SNOD colleagues and encompass NMC guidance and orientation to the competency framework and fundamentals of being a mentor.
- Hospital Engagement is a big focus for the PDS team shifting the training focus more on communication, relationship building, negotiating, influencing, strategic planning and effective donation committees.
- The competency framework is currently being updated, this will now include nine separate booklets as detailed below;

### Competency Framework

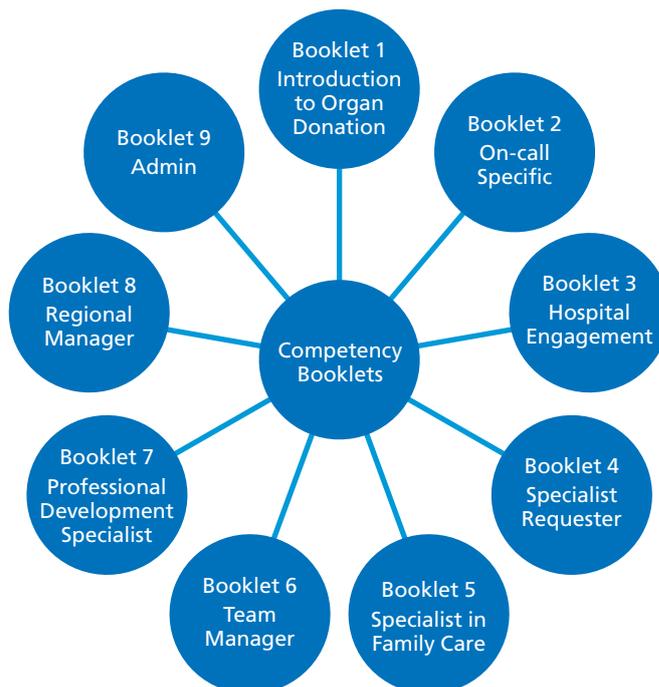


Figure 7

## Future: Virtual Organ Donation Academy

The future for the PDS team is supporting ODT in achieving a virtual donation academy and training for specialist SNOD roles 'pillars of expertise' such as the SR role.

Creating a virtual organ donation academy will require continued development of our own PDT an increased focus on interdisciplinary training – bringing medical staff and SNODs together for training increasing collaboration and enabling effective working relationships. It will also require a conscious effort on stakeholder engagement working closely with our NE CLODs, CLODs, Donation Committee Chairs – National Organ Retrieval Teams (NORS) and potentially Recipient Centre Points of Contacts (RCPoC).

**To become 'virtual' we will need to increase our expertise and understanding of digital and mobile learning:**

- Setting the context for the use of technology for learning.
- Looking at opportunities offered by mobile learning.
- Designing learning environments to prepare and support the digital student.
- Good practice in implementing blended learning.
- Developing good podcasting for learning.
- Using online lectures to support student active learning.
- Making large and small group teaching more interactive.
- Flipped classroom.
- Social media.

We are proud of our PDS team and the work that, together with our ODT colleagues and external stakeholders, we have achieved and would like to take this opportunity to thank each and every one for their support and participation in education and training opportunities.

Happy 5th Birthday!

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## References:

1. Transplant Activity in the UK. NHS Blood and Transplant (2016-2017). <https://www.organdonation.nhs.uk/supporting-my-decision/statistics-about-organ-donation/transplant-activity-report/> (accessed 13th December 2017).
2. Taking Organ Transplantation to 2020-NHS Blood and Transplant. <https://www.nhsbt.nhs.uk/to2020/> (accessed 13th December 2017).

## Cellular and Molecular Therapies

The Cellular and Molecular Therapies (CMT) function of NHS Blood and Transplant has seven Stem Cell and Immunotherapy (SCI) laboratories (Birmingham, Filton (Bristol), Leeds, Oxford, Sheffield, Southampton, Speke (Liverpool)) and one molecular facility, the Clinical Biotechnology Centre (CBC) in Langford near Bristol. The SCI laboratories are Human Tissue Authority (HTA) licensed and JACIE-accredited, and support about half of the haematopoietic stem cell transplants (HSCT) performed in England. The CBC produces Good Manufacturing Practice (GMP)-grade proteins and DNA plasmids, and also provides analytical services.

In addition to supporting routine HSCT, CMT laboratories are increasingly engaged in the development of Advanced Therapy Medicinal Products (ATMP) in the four centres (CBC, Birmingham, Filton, Speke) that are licenced by

the Medicines and Healthcare Products Regulatory Agency (MHRA). When cell therapies are considered to be more than 'minimally manipulated', due to isolation, modification and/or expansion of cell populations, they must be prepared under an MHRA licence in order to be infused into a patient.

CMT laboratories are involved at all stages of developing novel therapies from translating research protocols to GMP compliant procedures and then release by a Qualified person (QP) to delivery for a patient. For some clinical trials we simply store and issue cryopreserved samples of advanced cell therapies produced by companies (for example Athersys, Cynata). However, for most of our current projects we are actively involved in establishing the laboratory conditions needed to isolate and expand a range of cell types for clinical use and preparing the

documentation to achieve approval from the MHRA for the clinical trial to proceed.

The ambitious RESTORE project funded by NIHR and NHSBT is generating red blood cells from the stem cells in the peripheral blood of donors. Based in the CMT clean room facilities in Filton, a team of our development scientists is taking the basic recipe developed by University of Bristol researchers and scaling up a GMP compliant process to produce sufficient mature RBC that can be tested for safety and longevity in clinical trials.

A number of our projects involve the use of mesenchymal stromal cells (MSC), which are connective tissue cell precursors that also have immunoregulatory properties. These cells are being tested in a number of clinical trials involving immunological or autoimmune disorders. For the Nephstrom trial for diabetic nephropathy, the Speke laboratory receives bone marrow-derived MSC (BM-MSC) from a collaborating group in Leiden, then grows them up in a bioreactor to obtain sufficient numbers for treating participating patients. BM-MSC are also being used to produce a living collagen bandage infused with MSCs for repair of meniscal tears in the knee (Azellon).

A more readily available source of MSC is the umbilical cord (C-MSC), and several projects underway in Birmingham and Speke involve the isolation of an MSC subset in a process developed in conjunction with a commercial partner (Orbsen) for the MERLIN and REALIST trials. An in-house CB-MSC product is also in development for use in an NHSBT-funded study on their potential to inhibit the damage that can occur to kidneys during the transplantation process.

Our experience in processing bone marrow for HSCT has also provided us with the ability to provide BM-derived cells for clinical trials testing their ability to treat multiple sclerosis (ACTiMuS). We routinely process and store haematopoietic cells for patients undergoing aggressive treatments for malignancies, and now our Southampton laboratory has developed a process for the cryopreservation of ovarian tissue that is provided as a service for girls and women undergoing chemotherapy to restore hormonal balance and possibly fertility after treatment.

New cell therapies have the potential to address a number of areas of unmet medical need, but robust clinical trials must be performed to confirm their efficacy. Drawing on the Good Manufacturing Practice (GMP) expertise that exists in CMT, we are actively involved in the development and production of a range of products that we anticipate will contribute to new advances in patient care.

PROJECT	PRODUCT and INDICATION	PARTNER(S)
RESTORE	RBC from CD34 progenitor cells	University of Bristol
ACTiMuS	Bone marrow-derived stem cells for acute multiple sclerosis	University of Bristol
Azellon	BM-MSC for cartilage repair	Azellon Cell Therapeutics University of Liverpool Cell Therapy Catapult
MERLIN	MSC for primary sclerosing cholangitis	University of Birmingham Orbsen Therapeutics
NEPHSTROM	MSC for diabetic kidney disease	University of Leiden Ludwig-Maximilians University Orbsen Therapeutics
REALIST 2	MSC for Acute Respiratory Distress Syndrome	Orbsen Therapeutics
Renal IRI	C-MSC for kidney transplantation	Oxford University Hospitals
TRIAL SUPPORT		
Athersys	MultiStem for Acute Respiratory Distress Syndrome	Athersys Ltd Cell Therapy Catapult
Cynata	iPS-derived MSC for acute Graft-versus-host Disease	Cynata Therapeutics Ltd
SERVICE		
Southampton SCI	Ovarian tissue cryopreservation	University of Southampton

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# Audit – The Use of Prothrombin Complex Concentrate in Milton Keynes Hospital

## Background

Prothrombin Complex Concentrate (PCC) is a human-derived blood product that rapidly reverses the anticoagulant effect of warfarin. It is most often administered in an emergency situation supervised by junior doctors within many departments of a hospital. The variable dose, uncertainty of infusion rate, queries regarding drug reconstitution and INR monitoring make it a daunting task for a junior doctor to prescribe even with clinical haematology support. This can lead to delays in administration and errors in patient care. In this single centre retrospective audit we hoped to identify errors being made and put in place robust solutions to prevent future problems with PCC administration.

PCC contains human vitamin K dependent clotting factors II, VII, IX and X as well as the anticoagulant protein C and S. Its licensed indication is the emergency reversal of warfarin in the event of life threatening haemorrhage or prior to emergency surgery. Contraindications include previous hypersensitivity to the product, known allergy to heparin or previous heparin induced thrombocytopenia. Physicians should be cautious of use in patients with metallic heart valves, history of myocardial infarction, significant liver disease or in a patient with disseminated intravascular coagulation (DIC).

PCC is a controlled product and can only be dispensed from blood bank in most hospitals after authorisation by the haematology doctor on call as it carries risks of adverse reactions, thrombosis and DIC. It is therefore important that clinicians are aware of how to prescribe it correctly and that local guidelines are followed.

## Purpose of Audit

We aimed to investigate if the administration of PCC within the trust was in accordance with local guidelines, if the product was working effectively and if it was being given in a timely manner.

### Audit Standards based from Milton Keynes Hospital Local Guideline:

1. All cases are to be discussed with haematology on-call.
1. INR to be re-checked ten minutes after PCC has been administered.
1. PCC to be administered in less than 30 minutes (rate between 3-8mls/hour).
1. IV vitamin K to be given with PCC.
1. PCC to be prescribed on a transfusion drug chart.

## Methods

We reviewed the case notes of 33 patients who received PCC at Milton Keynes University Hospital between January and September 2016. The PCC product used at Milton Keynes Hospital is Octaplex. Timing of events were estimated by the documentation in the medical notes and times stated on computer records for blood samples being taken.

## Results

33 patients received PCC, of which 31 were on warfarin. The most common dose of PCC given was 2,000 units, received by ten patients and the dose varied between 500 units to 3,000 units. One patient received a repeat dose. Adequate reversal, defined by an INR of less than 1.5, was best achieved with a dose of between 20-30 units/kg. Three patients died and two were transferred to a tertiary centre and therefore outcomes were lost to follow up.

The average time between the call to haematology to the product being available by blood bank was 53 minutes (range 15-135 minutes). The average time between PCC being available and administration was 103 minutes (range 15-225 minutes).

**Table 1:** (a) Percentage of patients receiving PCC who achieved pre-defined audit standards (b) Percentage of patients receiving PCC who had a repeat INR that confirmed INR less than 1.5

Audit Standard	% Met?
Documented discussion Haematologist	60%
INR check in 10 minutes	21%
Administered in less than 30 minutes	57%
5-10mg IV Vitamin K given	42%
Prescribed on transfusion chart	90%

PCC dose (Units/kg)	% Adequate reversal (INR less than 1.5)
10-20	55%
20-30	92%
30+	50%

## Discussion

In this small retrospective audit we highlighted multiple deficiencies in the use of PCC within our trust:

Documentation was generally poor regarding conversations with haematology, with only 60% clearly recording the advice. This will have significantly added bias



## Teamwork Delivers: Support for a Special Series of Intrauterine Transfusions

### Background

During 2016/17, NHS Blood and Transplant (NHSBT) was asked to provide blood for an antenatal patient with a complex combination of clinically significant antibodies. This article describes the challenges faced by NHSBT and highlights the results of teamwork and effective communication.

A 31-year-old antenatal patient from the West Midlands presented at 11 weeks' gestation with high levels of anti-D. Also present were anti-Fyb, anti-Jkb, anti-M, anti-S and anti-K. The patient had a history of high levels of anti-D and Haemolytic Disease of the Fetus and Newborn (HDFN). Despite this being her fifth pregnancy, the patient had previously delivered only one live baby. A Doppler middle cerebral artery peak systolic velocity (MCA PSV) ultrasound scan demonstrated that the fetus was anaemic and the local Fetal Medicine Consultant suggested a series of Intrauterine Transfusions (IUTs) to prevent potentially fatal fetal anaemia and hydrops fetalis. IUT involves the direct transfusion of red cells into the fetal peritoneal cavity, or the umbilical or hepatic vein of the fetus, and is one of the most successful in-utero therapeutic procedures. Ultrasound is used to guide the needle through the abdomen of the mother, in what is a highly skilled procedure that is certainly not without risk. IUTs are normally carried out from 18 weeks' gestation until a viable baby can be delivered, ideally at 36 weeks. During 2016, NHSBT issued an average of 20 IUT units per month. In this particular case, IUTs were carried out at two – three weekly intervals between 16 and 31 weeks gestation.

### Specification and Logistics

Blood for IUT has to be used within five days of donation, RhD negative, CMV negative, HEV negative, irradiated, sickle cell haemoglobin negative, negative for clinically significant antibodies and cross match compatible with the mother. The red cells are suspended and stored in CPD-anticoagulated plasma, rather than in SAG-M additive solution and they have a shelf life of 24 hours' post-irradiation.

This patient's complex combination of antibodies meant that we needed to search NHSBT's database for suitable donors and invite them to donate using our "special call-up" procedure. This standard operating procedure is usually initiated once or twice each month, with requests ranging from one to several units of red cells, sometimes over a period of several weeks. It has been used for a number of years to manage the supply of red cells with rare phenotypes for patients in the UK and abroad. A phenotype is defined as "rare" when it

occurs at a frequency of one in 1000 of the population. Requests for rare phenotyped red cells frequently include a combination of Anti-Jka, Anti-Fya, Anti-Fyb, Anti-Dob and Anti-Yta, as well as Anti-Inb. One third of the rare requests received during 2016/17 were for U negative red cells. It is important that NHSBT is made aware of patients with very rare phenotypes who may need blood. It is unlikely that suitable units will be available in our stocks so the sooner we are notified about these patients; the sooner we can identify suitable blood donors to meet the demand. Whilst frozen stocks often provide an emergency solution, liquid units are preferable in terms of cost and efficacy.

For our West Midlands antenatal patient, eighty suitable donors were identified but the list reduced by half when we accounted for the date of previous donation, medical deferrals, travel and illness. Our next challenge was to find blood donor sessions that were conveniently located for the donor, within five days of the scheduled IUT but allowing time for manufacture and testing. Blood that is to be manufactured into a unit for IUT needs to reach NHSBT's Manufacturing centre within twelve hours of venepuncture so careful planning was required for the collection of blood from the session. Once we had identified suitable blood donation sessions and confirmed the transport arrangements, Medical staff from Birmingham and Sheffield telephoned each donor to see if they would be prepared to donate. Two donors were called up for each IUT and our donors responded in true altruistic fashion – often at short notice, amidst the preparations for Christmas and even donating on Boxing Day. Donor details and instructions for labelling the blood packs were given to staff at the blood donation sessions. Our blood collection teams played a crucial role in managing the donation process and securing the blood for transfer. Information was also given to staff at the relevant Manufacturing centre so that everyone was ready to receive and process the donations. Due to the special nature of this case, Medical staff tracked the progress of the donations at every stage – a task that was both challenging and reliant on teamwork and effective communication.

### Teamwork Delivers

Thanks to the generosity of our blood donors and the hard work and commitment of NHSBT staff, suitable red cells were supplied for a total of nine IUTs, at regular intervals between September and December 2016. The last IUT was performed on 29th December, between Christmas and New Year. Careful planning and coordination, and timely communication was essential to supporting these IUTs, as well as having a clear and documented procedure.

We worked closely with the local Fetal Medicine Centre and our NHSBT colleagues in Red Cell Immunohaematology and Hospital Services, as mother and baby were monitored at every stage.

In January 2017 the patient delivered a healthy baby boy at 33 weeks gestation. The baby received Phototherapy, IVIG and exchange transfusion but was discharged after seven days. This success story is the result of excellent communication and teamwork within NHSBT and with the wider NHS. It highlights how much can be achieved through the care and dedication of NHSBT staff, and the wonderful generosity of our blood donors.

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## Audit of Overnight Transfusions in the West Midlands Region July 2016

### Introduction

For many years it has been recognised that transfusing at night or outside of 'routine' hours are less safe and should be avoided unless clinically essential. This audit aimed to look at how hospitals manage overnight transfusions. The main focus of the audit was to look at numbers of transfusions being administered overnight and establish whether these appeared to be appropriate. Also to establish whether any delays contributed to the transfusion being given overnight and if this was the case, where in the process these delays occurred.

### Methods

All NHS and independent hospitals in the West Midlands region were invited to participate in the audit individually. The audit consisted of three parts which were completed using a secure online questionnaire facility.

**Parts one and two comprised organisational questionnaires to be completed once for each participating hospital. These looked at the following:**

- The timeframe the hospitals laboratory and clinical areas class as out of hours and whether the laboratory has a cut-off time for routine cross matches.
- What the hospitals policy states about transfusing out of hours and whether any mechanisms are in place for monitoring out of hours' transfusions.
- Total numbers of components collected out of hours.

For part three, hospitals were asked to audit all episodes of overnight transfusions (red cells or platelets), up to a maximum of 20 cases, over a one-week period of their choosing (09:00 hrs Monday to 09:00 hrs Monday).

Data collected included the following:

- Specialty and location of patient at time of transfusion.
- Indication for transfusion and reason for out of hours' transfusion.
- Whether the patient had any significant co-morbidities.
- When the unit was requested, available, collected and transfused.
- Post-transfusion haemoglobin.
- When the patient was transfused in relation to the transfusion.

177 cases were submitted from 16 West Midlands hospitals.

### Key Findings

- All laboratories in hospitals that submitted an organisational questionnaire class 9 pm to 6 am as out of hours. Clinically all hospitals class between 11 pm and 6 am as out of hours though there was significant variation outside of these hours.
- The longest delays in the transfusion process appear to be the clinical area. In particular, the longest delays are from haemoglobin (Hb) result being made available to request made for components and time to collection once components were available.
- In 6% of cases audited, time of collection to completion of transfusion was less than four hours which is out with current guidelines.
- Most red cell transfusions appeared to be appropriate, with the majority (66%) given either for Hb less than 70g/L or acute blood loss.

- Most transfusions were considered to be appropriate to proceed overnight. 74% of reasons given for overnight transfusion related to the patient bleeding, being at risk of bleeding or being symptomatic.
- 12% of transfusions were given overnight for no clear identifiable reason.
- Most patients had a post-transfusion Hb taken and the majority fell within acceptable levels but in 4% of cases the post-transfusion Hb was more than 120g/L.

### Discussion

83% of hospitals that submitted an organisational questionnaire do not have a cut off time for routine cross matches, and only 33% of hospitals have mechanisms in place for reviewing and monitoring out of hours' transfusions. It is possible that this could reflect a move towards 24/7 working patterns, though an explanation was not sought in the questionnaire.

46% of patients audited were less than 70 years of age. Use of blood by speciality roughly reflects that which would be expected overall with approximately 60% of transfusions given by medical specialties and 40% given by surgical specialties.

### Delays in the Transfusion Process

There are considerable delays in the transfusion process and the audit showed that the longest delays were from Hb result being available to unit being transfused are in the clinical area, and in particular the time from Hb result being available to the time of the request, and the time from the blood being issued by blood bank to it being collected by ward staff.

In the majority of cases (57%), the request for blood components was made four hours or more after the Hb result had been available.

Blood bank turnaround times did not appear to be a major factor in delaying transfusion with the majority of cross matches (68%) being available within two hours of request; however, 18% did take more than three hours from request to issue. Some of these appear to be due to delays in blood bank receiving a sample for pre-transfusion testing. Additionally, a small number of cases required referral to NHSBT for pre-transfusion testing. Only a small number of transfusions were delayed due to Blood Bank requiring a second sample.

Overall, 63% of transfusions were given within twelve hours of the Hb result being available. In 41% of cases components were collected more than four hours after they were available which could have pushed the transfusion into the overnight period.

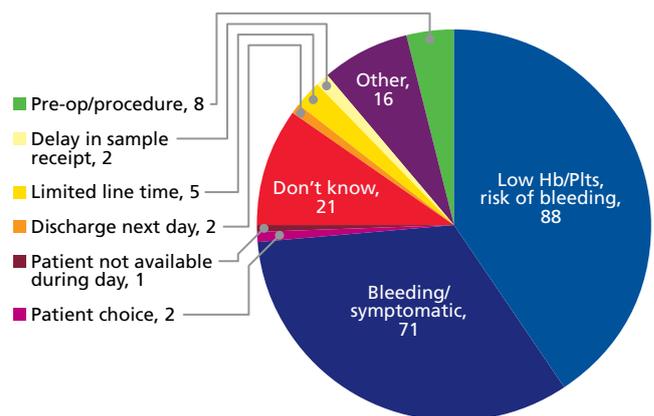
The time of the most recent Hb result was available in 174 transfusion episodes, and in 58 of these (33%), it was available before midday. It is accepted that there may be other reasons why transfusions may be given out of hours, though this suggests that in a significant proportion this may have been avoided if delays in the process were reduced.

In 6% of cases audited, time of collection to completion of transfusion was more than four hours which is against current adult guidelines. Three of these were paediatric patients in which this may have been appropriate.

### Indication for Transfusion

Most red cell transfusions appeared to be appropriate, with the majority (66%) given either for Hb less than 70g/L or acute blood loss. All platelet transfusions were considered to be appropriate. It was interesting to note that 27% of red cell transfusions were single unit transfusions.

### Reason given by the auditor for overnight transfusion n=216

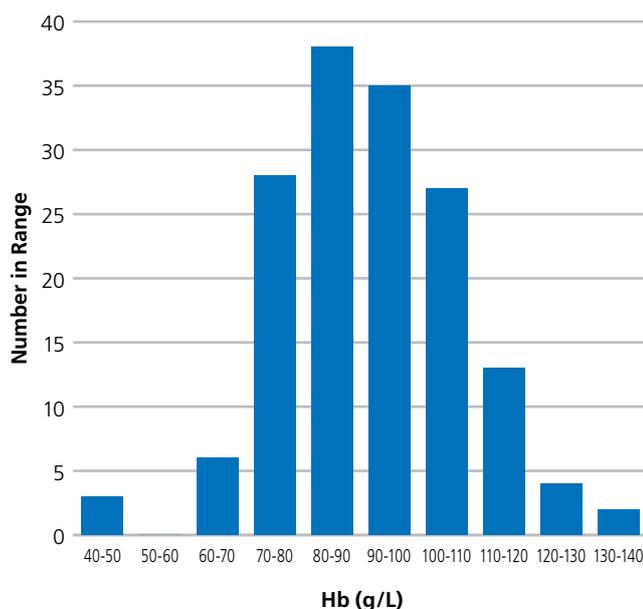


Most transfusions were considered to be appropriate to proceed overnight, especially those given because the patient was bleeding/symptomatic or at risk of bleeding with a low Hb or platelet count. However, 21 transfusions were given overnight for no clear reason.

31% of patients audited had significant cardiac or respiratory co-morbidities which may have influenced the clinical team's decision to transfuse overnight.

There were seven platelet transfusions documented as given overnight (4%) and these all appeared to be appropriate.

## Post Transfusion Hb Levels (n=158)



Most patients had a post-transfusion Hb taken and the majority fell within acceptable levels. However in 4% (six cases) the post-transfusion Hb was more than 120g/L suggesting that they may have been over transfused.

### Recommendations

1. Although it is recognised that there is a move towards seven day working, more errors in the transfusion process have been shown to occur out of hours. Trusts should therefore put mechanisms/guidelines in place to limit out of hours' transfusions to only those clinically appropriate.
2. Trusts should put mechanisms in place to review and monitor out of hours' transfusions to ensure that only appropriate transfusions are requested and administered out of hours.
3. Trusts should develop agreed guidelines detailing the categories of patients and the applicable investigations which are acceptable for laboratory staff to process out of hours.
4. Trusts should explore the local reasons for delays in the transfusion process and put in place measures to limit these to facilitate transfusions during normal working hours wherever possible. The findings of this audit should be fed back to clinical teams to promote discussion around clinical delays in the transfusion process and how this can be improved.
5. RTC audit group to scope and pilot an audit specifically looking at delays in the transfusion process.

#### Caroline Tuckwell

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### References:

Bolton-Maggs, P. *et al.* on behalf of the Serious Hazards of Transfusion (SHOT) Steering Group (2015) The 2014 Annual SHOT Report. Available at: <http://www.shotuk.org/shot-reports/>

Stainsby, D *et al.* on behalf of the Serious Hazards of Transfusion (SHOT) Steering Group. The 2005 Annual SHOT Report. Available at: <http://www.shotuk.org/shot-reports/>

British Committee for Standards in Haematology (2009) Guidelines on the Administration of Blood Components. Available at: <http://www.b-s-h.org.uk/guidelines/guidelines/administration-of-blood-components/>

Grant-Casey, J. *et al.* on behalf of the National Comparative Audit of Blood Transfusion Steering Group. National Comparative Audit of Overnight Red Blood Cell Transfusion 2008. Available at: <http://hospital.blood.co.uk/audits/national-comparative-audit/national-comparative-audit-reports/>

### West Midlands Regional Transfusion Committee Audit Group:

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Dr Charles Baker, Consultant Anaesthetist, University Hospital of North Midlands.

Caroline Tuckwell, Transfusion Practitioner, Dudley Group NHS Foundation Trust.

Angela Sherwood, Patient Blood Management Practitioner, NHSBT.

Cathy Lim, Customer Service Manager, NHSBT.

Julie Buchan, Transfusion Practitioner, Burton Hospitals NHS Foundation Trust.

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Brian Hockley, RTC Data Analysis and Audit Manager, NHSBT.

Suzette Biggs, W.

## Durham University Blood Donation Society

Blood donation has been an important part of my life ever since I had transfusions as a five-month-old during open heart surgery for congenital heart disease (Tetralogy of Fallot). My Dad works as a Consultant Haematologist in Sheffield and despite the fact that, as a child, I used to think he was a vampire for working with blood, he would often bring me home Billy Blood Drop toys. From as far back as I can remember, blood donation has always been important to me and I would tell all my friends that their mummies and daddies should do it too. When I came to Durham University, it soon became apparent that access to blood donation centres was extremely limited within the small radius that the vast majority of students spend all of their time. The problem was not with students' desire to donate blood; when I questioned many of my friends they said they would love to but just had not thought about it. There is an obvious 'out of sight out of mind' mentality here regarding blood donation. I knew for a fact that there used to be blood drives at some of the University buildings or even public ones in the city centre, as my older brother would tell me how he used to donate when he was student here. I made some enquiries about getting this to happen again and it transpired that it was no longer cost effective for the NHS to come out and do external sessions like this any more, and the blood mobiles from the past are no longer active. With approximately 17,000 students in the city, I decided that something needed to be done to encourage them to donate and get blood donation back on the radar of Durham students as a whole.

### **How did we set up the society?**

After it became apparent that it would be near impossible to get NHSBT to come to us, I decided we would go to them, and the best way to do this was to create a new society with this purpose. In the summer of 2017 I reached out to other students who I knew were passionate about donation and we gave ourselves the necessary titles to form an Executive Committee. I became President, and others were named Treasurer, Secretary and Publicity Officer of the aptly named 'Durham University Blood Donation Society'. Over the summer break we had a lot of contact with the staff at Durham Student's Union who helped us complete all the necessary paperwork to apply to be an officially ratified society. I wrote a constitution and the risk assessments, and our treasurer devised a budget for the year. Meanwhile, our brilliant Publicity Officer was busy designing the logo and all other graphics and artwork. Alongside this, I was making contact with staff at NHSBT to see what our options were and how we could work together effectively. Neil Simms proved to be very supportive of our new venture, and put me in touch

with Deborah Mothersole (Donor Marketing Operations Coordinator in the North East) who has become my primary contact at NHSBT and has been incredibly helpful and encouraging. At the beginning of the new academic year in October 2017, we became an official society and were granted a £200 start-up grant from the Student's Union. As we do not charge our members subscription fees (whereas most societies do), we are now ineligible for further funding so must raise any further money by fundraising, sponsorship or donations.



### **How do we work?**

We function as a society by providing free transport to and from local donation centres for Durham University students at allotted times. Initially, we functioned by reserving slots through Deborah and then filling these in the following weeks by running sign up sessions for students at the Students Union. Whilst a great way for us to start filling sessions, we were aware that this is not feasible for the long term. We have now developed a new way of getting donors signed up through us; we advertise to our mailing list and on our social media pages that if you book your own slot between times X-Y at a specific venue on a certain date, we will provide free group transport for all donors using the Student's Union minibus. By doing so, we create a friendly and encouraging atmosphere for all donors and ensure that first time donors especially are well looked after. Additionally, we advertise other local sessions and encourage people to go and donate under their own steam, or share transport between themselves. We were fortunate enough to gain sponsorship from Direct Print and Promotions (a Sheffield based printing company) who provided us with 200 branded pens which we give to our donors after the session as a small thank you for donating with us.

### **What have we done so far?**

Although only in our second term, we have had a busy year so far! Our social media accounts went live over the summer holidays and quickly gained a modest following, with well over 200 'likes' before term had begun. Our first event was attending the Fresher's Fair at the beginning of October and we succeeded in getting 350 sign-ups to our mailing lists of people who were interested in donating blood or in helping out with the society in some way. We were overwhelmed by the amount of support from students, and it reassured us that there was a demand for a group like us to encourage students to donate in the area. Following this, we had our first Sign Up session which Deborah also attended to answer any questions that we were unable to ourselves. Here, we filled up our first Donation Day in 20 minutes and had over 100 people sign up to the blood donor register.

As previously mentioned, as a society we rely heavily on donations, sponsorship and fundraising to be able to provide the free transport for donors, so we led a Pub Quiz at the Student's Union which acted as a great fundraiser for ourselves but also excellent advertisement for the society. We ran this quiz in conjunction with Durham Marrow – the Durham University branch of the Anthony Nolan blood cancer charity. Halloween was the perfect opportunity for our first social; we hosted an event called Vamp Night – a vampire themed open mic night. Due to the generosity of

a local barber, we were able to host the night for free in his shop which was a perfect venue, complete with a sound system, fairy lights and spooky décor. The Head of Steam bar next door also struck us a drinks deal meaning those at Vamp Night could get heavily discounted drinks.

In November, we had our very first donation day at Stanley Civic Hall! The majority of our donors were all first time donors and we are very proud that we are introducing people to saving lives. We had a morning and an afternoon slot with 10 donors in each. The morning slot went without a hitch and all of the staff were so friendly and supportive, and made everything run smoothly. Unfortunately, when we were in the minibus on the way for the afternoon, half of the group received a text saying that their session had been cancelled, but with no reason given. As the texts were only received half an hour before the donation slot, it is unsurprising that we were already on the way. When we arrived it transpired that the morning session had run over due to the session being short staffed, so by default they cancelled the first part of the afternoon session in order to keep to time in the afternoon. This is understandable but is still a huge shame for the potential donors we took with us who ended up hanging around for an hour or so, and I would not be surprised if they are put off after this first impression and don't try to donate again.

Later on in the term we had another successful sign up day, getting students signed up to the donation register as well as signed up to specific sessions. We were also lucky enough to gain a donation from the Georgian Townhouse Pancake Café in Durham; on Wednesday at the end of the term, they donated 30% of their takings to our society, we are extremely grateful for their generosity. A further method of fundraising we are looking into is potentially getting donations from alumni. We have already received a substantial donation from my brother, a blood donating alumnus from Durham University, and we hope to extend this idea to others, and maybe even potentially celebrity alumni.

### **What will we do next?**

Building on last term, we have three different donation days booked for the start of 2018, in January, February and March, with a total of 30 donors booked in. These sessions are made of predominantly first time donors again, but we have also worked in conjunction with two other student societies: Durham People of Colour Association and Durham African and Caribbean Society to try and increase the number of BAME donors in the area. The response from students in these societies has been very enthusiastic and I am excited to see where this will progress in the future. Looking further into the future, we hope to create friendly competition between the Durham colleges to try

and gain the highest numbers of donation students. We also plan on extending this to working in conjunction with the Durham sports teams and targeting the Football team to get more donors than the Rugby team for example.

As a society, our main goal is to simply increase the amount of first time and returning donors within the university and to put Durham University on the map as a reliable hub of active blood donors. Personally, I hope

that this society will be able to establish itself as a well renowned part of the university experience for Durham students for generations to come.

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## Durham University Blood Donation Society

### Case Study – Interview with Ebony Dunkley

At the age of 22 at 29 weeks' pregnant, Ebony Dunkley was diagnosed with Complete Placenta Previa and given the worrying news that there was a risk her placenta could separate from the uterine wall during labour.



#### **Ebony says:**

"I had only been asked to go for a second scan to confirm I was having a girl, because my brother has haemophilia and my mum is a carrier for the disease. So I got a real shock when they told me my placenta was in the wrong place. I was admitted to hospital that day to be monitored and was advised if my placenta separated, there was a strong possibility me and my daughter would not make it. At 34 weeks' pregnant, after being in hospital for seven weeks, I was lying in my hospital bed and my placenta started to separate and I was rushed down to theatre for an emergency C section. I needed a blood transfusion immediately and because my daughter was four weeks early and was anaemic at birth, she was also given a vital blood transfusion. I remember thinking at the time if my mum had not been a carrier of haemophilia, I might not be here today – as that was the only reason I was given a second scan. I think for the first time in mine and my mum's life we were grateful she is a carrier of the haemophilia gene!"

In 2003, Ebony began a career in the NHS as a Health Care Assistant. And then later decided to train to become a nurse, qualifying at Nottingham University in 2009. She says:

"I have always been passionate about patient-centred care which is why I decided to train to become a nurse. Since qualifying in 2009, I have worked as both a nurse

and a deputy sister and in 2013 was transferred to an A and E ward. Often, sickle cell patients having a crisis were admitted to A and E and we would treat their pain symptoms initially before transferring them to a specialist haematology ward for further treatment.

“Seeing patients either requiring emergency treatment or, like those with sickle cell disease, in terrible pain, made me realise how vital blood donors are. I became a Senior Sister and supported managing a blood centre in 2015 and despite my previous varied experience, nothing could have prepared me for this role. It reinforced to me how being a nurse is not only about providing patient-centred care to individuals who are suffering from chronic and acute illnesses, but is also about ensuring members of the public who volunteer to give blood receive a high quality standard of care while donating, because quite simply, donating blood saves lives.

“Having had a blood transfusion myself, I have real life, first-hand experience of the importance of blood donors. Also, being a black woman, the reluctance for black donors to sign up to donate is something I am keen to play my part in addressing. I think black blood donors are underrepresented for many reasons, including: a lack of understanding around the RO subtype, a lack of understanding about the donation process, a fear of needles and often the medical language used to explain why we need more black donors can be difficult to understand. Plus, if something is not happening to them or their family members personally, the messages do not resonate. I know sometimes people will listen more closely to those they feel they can relate to which is why a main focus of my role is to encourage members of my community to sign up to donate their blood.

“The centre in Nottingham City Centre where I was based is a warm, friendly and welcoming place and the staff are excellent at making often nervous donors feel at ease. They encourage laughter between staff and patients to create a relaxed environment but always adhere to standard operating procedures to ensure the safety of donors and blood we collect. Having both received a blood transfusion in 1998, my daughter and I are unable to donate blood so I am not able to contribute towards saving lives or improving the quality of care and outcomes for sickle cell patients directly. But I do use my role to stress that if you can donate blood, then it is essential you should.”

**Ebony Dunkley**

**Senior Sister**

**NHSBT, Nottingham**

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## CPD Questions

- 1. Professional Development Team in Organ Donation and Transplantation.**  
**In 2016 – 2017, how many people in the UK were waiting for a transplant?**
  - a) Less than 4,000.
  - b) 5,388.
  - c) 6,388.
  - d) Over 7,000.
- 2. In 2016 – 2017, how many transplants were performed in the UK?**
  - a) Less than 3,000.
  - b) 3,710.
  - c) 5,388.
  - d) Over 6,000.
- 3. In 2016 – 2017, how many people die a day whilst on the transplant waiting list?**
  - a) 0.
  - b) 1.
  - c) 2.
  - d) 3.
- 4. Cellular and Molecular Therapies (CMT).**  
**CMT is a function of:**
  - a) JACIE.
  - b) MHRA.
  - c) NHSBT.
  - d) NIHR.
- 5. CMT has how many SCI Laboratories?**
  - a) Seven.
  - b) Five.
  - c) Three.
  - d) One.
- 6. The RESTORE Project**
  - a) Stores and issues cryopreserved samples.
  - b) Used Mesenchymal Stromal Cells.
  - c) Produces a living collagen bandage.
  - d) Generates red blood cells from stem cells.
- 7. Which of the following does not apply to CMT Laboratories' ?**
  - a) HTA Licensed.
  - b) Inspected by aQP.
  - c) JACIE Accredited.
  - d) Follows GMP.
- 8. Audit – Use of Prothrombin Complex Concentrate (PCC).**  
**PCC contains?**
  - a) Factor VII and IX only.
  - b) Factors II, VII IX and X only.
  - c) Anticoagulant protein C and S only.
  - d) Vitamin K dependant proteins.
- 9. This Audit Demonstrated.**
  - a) INR re-checked in over 50% of patients.
  - b) Over 50% of patients were given supplementary IV vitamin K
  - c) Poor 60% clearly recording advise given.
  - d) Over 60% of patients received PCC within 30 minutes.
- 10. Teamwork Delivers**  
**A Phenotype is defined as 'rare' when it occurs at a frequency of:**
  - a) 1 in 1000 of the population.
  - b) 1 in 100 of the population.
  - c) 1 in 500 of the population.
  - d) 1 in 50 of the population.
- 11. One third of the rare requests received during 2016/2017 were for?**
  - a) Inb negative red cells.
  - b) Yta negative red cells.
  - c) Dob negative red cells.
  - d) U negative red cells.

## **12. Audit of Overnight Transfusions.**

### **From the Organisational Questionnaire:**

- a) Clinically all hospitals class 9 pm to 6 am as Out of Hours.
- b) Laboratories class 11 pm to 6 am as Out of Hours.
- c) Laboratories class 9 pm to 6 am as Out of Hours.
- d) Clinically all hospitals class 5 pm to 8pm as Out of Hours.

## **13. From the Organisational Questionnaire:**

- a) All hospitals had a cut off time for routine cross matches.
- b) 50% of hospitals did not have a cut of time for routine cross matches.
- c) 80% of hospitals did not have a cut of time for routine cross matches.
- d) Over 80% of hospitals did not have a cut of time for routine cross matches.

## **14. Delays in the transfusion process were longest.**

- a) In the blood bank.
- b) Time from Hb being available to time of request.
- c) Transfusion time.
- d) Time from Hb being available.

## **15. Single Unit Red Cell Transfusions were:**

- a) 10% of the total.
- b) 15% of the total.
- c) 20% of the total.
- d). Over 25 % of the total.

### Question 1

#### 1. Post Allogeneic Transplant Red Cell Aplasia (PATRA).

This question is based around a fairly typical case of this not uncommon complication of allografting.

There were two very useful case series that came out in 2013, one from Japan and one from MD Anderson:

Hirokawa *et al* / Biol Blood Marrow Transplant. 2013 Jul; **19**(7):1026-32

Aung *et al* / British Journal of Haematology, 2013, **160**, 798–805

#### Case history:

45-year-old woman group O who received a group A sibling allograft for severe aplastic anaemia. Pre transplant anti A titre 2000.

At day 100 she has full neutrophil and platelet engraftment, but remains transfusion dependent with extremely low reticulocytes. She is DAT negative with normal haptoglobin/LDH and marrow shows absent erythroid precursors. She still has mixed lymphoid chimaerism and persisting anti A titre of 1000.

#### Questions:

1. What features are thought to be associated with PATRA?
2. What is the natural history of PATRA? How might it be different in this case?
3. What is the main cause of death in patients with PATRA?
4. What treatments have been described for PATRA and what is evidence for effectiveness?

#### 2. Keeping it real – Relative Risks of Transfusion

At our Regional Transfusion Committee meeting one of the anaesthetists raised the question of whether the drive to the hospital to have a second cross match sample was more dangerous than the risk of issuing blood.

- a) Transfusion (imputability 2 or 3)
- b) Traffic accident – car occupant
- c) Traffic accident – pedestrian.
- d) Homicide.
- e) Drowning in bath
- f) Suffocating in bed.

(Data from SHOT report and Office of National statistics)

#### 3. What would you estimate is the current risk of death due to:

- a) Transfusion – all causes?
- b) Transfusion – haemolytic transfusion reaction?
- c) Transfusion – ABO incompatibility?
- d) A single journey by car?
- e) A single journey by foot?

#### 4 What would be your estimate? Was the risk of receiving an ABO transfusion prior to the two sample recommendation? What level of risk reduction do you think that the two sample recommendation will achieve? Can you estimate the “number of extra group and saves required to prevent one ABO incompatibility?”

## Answers to Clinical Case Studies

### Question 1

a) **What features are thought to be associated with PATRA?**

Age of recipient, group A donor, fludarabine based conditioning regimens. In the MD Anderson series only conditioning regimen was associated. Isoagglutinin titres are poorly predictive. PATRA is rare in patients with GVHD.

b) **What is the natural history of PATRA. How might it be different in this case?**

Almost all cases spontaneously recover, but this can be very prolonged. In the MD Anderson series, the median time to red cell recovery was 250 days. In this case, there is less hurry to achieve full donor chimaerism as it is a non-malignant transplant, so spontaneous recovery might not be assured.

c) **What is the main cause of death in patient with PATRA?**

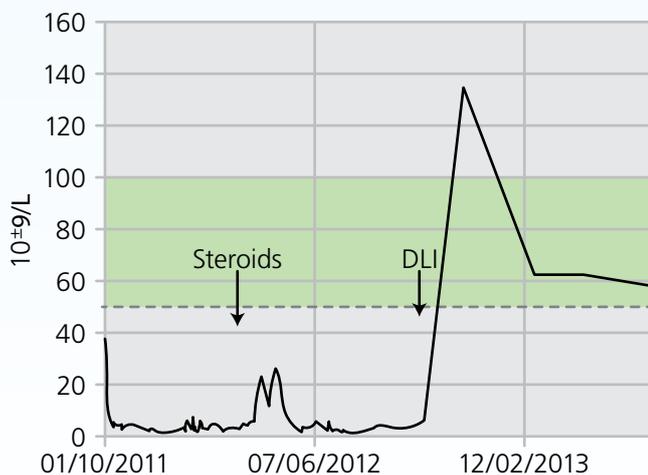
Infection. This was a feature in both of the published series. There was no significant difference in overall survival although early survival was non-significantly slightly better in patients with PATRA.

d) **What treatments have been described for PATRA and what is the evidence for effectiveness?**

Erythropoietin, DLI, Rituximab and plasma exchange have been reported as case reports. However, in the Japanese series there was no difference in recovery time between the treated and non-treated patients.

This is to try and avoid intervention and perhaps consider iron chelation. If there is felt to be a need to intervene I would favour strategies based on promoting donor chimaerism such as withdrawal of immunosuppression or DLI; immunosuppression strategies will increase the risk of infection and might delay full chimaerism.

The patient in this case had a trial of steroids with a small transient response and then responded well to DLI – the graph below shows her reticulocyte response.



### Question 2

**Keeping it real – relative risks of transfusion.**

**At a Regional Transfusion Committee meeting, one of the anaesthetists raised the question of whether the drive to the hospital to have a second cross match sample was more dangerous than the risk of issuing blood.**

**How many deaths were there in 2012 due to:**

- a) Transfusion (imputability 2 or 3) – 4.
  - b) Traffic accident – car occupant – 679.
  - c) Traffic accident – pedestrian – 365.
  - d) Homicide – 550.
  - e) Drowning in bath – 16.
  - f) Suffocating in bed – 8.
- (Data from SHOT report and Office of National statistics)

### Question 3

**What would you estimate is the current risk of death due to:**

- a) Transfusion – all causes ~ one in 500,000.
- b) Transfusion – haemolytic transfusion reaction – one in two million.
- c) Transfusion – ABO incompatibility less than one in three million (95% upper confidence limit).

Based on approximately two million red cell transfusions per year. There have been no deaths due to ABO incompatibility in the last five SHOT reports despite several events so it is only possible to calculate an upper limit.

- d) a single journey by car 1 in 60 million.
- e) a single journey by foot. 1 in 30 million.

Data is based on the national transport survey suggesting an average of 960 trips per year of which 64% car occupant and 22% foot and the 2012 UK population of 56 Million.

So for surgical patients at low or moderate risk of transfusion (below about 40%), the risk of a return journey might indeed balance out the reduced risk of ABO incompatibility.

#### Question 4

**What would be your estimate, was the risk of receiving an ABO transfusion prior to the two sample recommendation? What level of risk reduction do you think that the two sample recommendation will achieve? Can you estimate the “number of extra group and saves required to prevent one ABO incompatibility?”**

- a) Average of ten ABO incompatible transfusions/year in the last five SHOT reports – risk – in 200,000.
- b) About a quarter of ABO incompatible transfusions are due to sampling errors so a lower bound of the residual risk (assuming the two sample rule detected all wrong blood in tube) would be 1/270,000
- c) In Bristol the ‘group and save’ workload increase by about 10% since implementing two sample cross match which works out at about 300,000 group and saves per ABO incompatibility prevented.
- d) The cost effectiveness is in the same order of magnitude as other preventative transfusion interventions for example nucleic acid testing. However, it is different in that this cost is directly borne by hospitals and is being introduced at a time when hospitals are having to make economies.

**CPD Blood and  
Transplant Matters  
Answers Issue 53**

1. C	2. B	3. D	4. C	5. A
6. D	7. B	8. D	9. C	10. A
11. D	12. C	13. D	14. B	15. D

# Diary Dates

## 2018

14 June

### World Blood Day

For more information contact:  
[www.awarenessdays.com](http://www.awarenessdays.com)

11 July

### Targeted Treatments for Haematological Cancers

Location: The Royal Marsden Conference Centre,  
Stewarts Grove, London.

For more information contact:  
[www.b-s-h.org](http://www.b-s-h.org)

12 July

### Annual SHOT Symposium

Location: Lowry Theatre, Salford Theatre,  
Manchester.

For more information contact:  
[www.SHOTUK.org](http://www.SHOTUK.org)

23 – 25 August

### 2nd International Conference on Haematology and Oncology

Location: Renaissance London Heathrow Hotel,  
Bath Road, Hounslow, London.

For more information contact:  
[www.b-s-h.org](http://www.b-s-h.org)

13 – 17 September

### 37th World Congress of the International Society of Haematology

Location: Vancouver Convention Centre, Canada.

For more information contact:  
[www.ishworld.org](http://www.ishworld.org)

25 – 28 September

### Manchester Blood Coagulation Course

Location: Hallmark Hotel, Manchester Willow Bank,  
Wilmslow Road, Fallow Field, Manchester.

For more information contact:  
[www.b-s-h.org](http://www.b-s-h.org)

29 September – 4 October

### 19th Meeting of European Association for Haematopathology

Location: Edinburgh International Conference Centre.

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

3 – 5 October

### BBTS Annual Conference

Location: Brighton.

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

13 – 16 October

### AABB Annual Meeting

Location: Boston, Massachusetts, USA.

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





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