



PROGRAMME 15TH -17TH SEPTEMBER 2021

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European Blood Alliance

**Deutsches Rotes Kreuz **  
**DRK-Blutspendedienst**

Baden-Württemberg | Hessen gemeinnützige GmbH  
Nord-Ost gemeinnützige GmbH



**Universität Hamburg**  
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## The ECDHM

The European Conference on Donor Health and Management (ECDHM) is the primary platform to share knowledge and learn about the latest developments in science, policy, and experiences in the field of donor health and management. The program covers blood, organ, and stem cell donors, with emphasis on blood donors. It provides a unique opportunity to share knowledge in the fields of Donor Health and Management and to exchange ideas and strategies.

The 4<sup>th</sup> European Conference on Donor Health and Management will be hosted digitally by the EBA, the German Red Cross Blood Donation Service and the Universität Hamburg.

The organizers thank all members of the relevant committees as well as the reviewers for their excellent support of this conference.

We thank you all for joining the conference and we wish you a pleasant exchange of ideas and research insights!

### Conference Chairs

<i>Michel Clement</i>	Conference President, Universität Hamburg, Germany
<i>Catherine Hartmann</i>	EBA
<i>Wolfgang Rüstig</i>	Conference President, DRK-BSD, Germany
<i>Torsten Tonn</i>	DRK-BSD, Germany

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<i>Alice Simonetti</i>	IFBDO, Italy

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- Mikko Arvas* Finnish Red Cross Bloodservice, Finland
- Silke Boenigk* Universität Hamburg, Germany
- Johanna Castrén* Finnish Red Cross Blood Service, Finland
- Michel Clement* Universität Hamburg, Germany
- Christian Erikstrup* Aarhus University, Denmark
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- Elisabeth Huis in 't Veld* Tilburg School of Humanities and Digital Sciences, The Netherlands
- Katja van den Hurk* Sanquin, The Netherlands
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- Rachel Thorpe* Australian Red Cross Lifeblood, Australia
- Pierre Tiberghien* EBA / EFS, France
- Nils Wlömert* WU Vienna University of Economics and Business, Austria

## Host of the ECDHM



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The 4<sup>th</sup> European Conference on Donor Health and Management by the EBA is hosted by the German Red Cross Blood Donation Service and Universität Hamburg in Hamburg.

Both partners implemented a research cooperation “Health Marketing” in September 2010 at the University. One aim of the cooperation is the promotion of young scientists in the field of health marketing and management. In several joint research projects, the partners gained new scientific insights in the field of donation management.

The conference location is Universität Hamburg. As one of the country’s largest universities, the Universität Hamburg boasts numerous interdisciplinary projects in a broad range of fields and an extensive partner network of leading regional, national, and international higher education and research institutions. As part of the Excellence Strategy of the Federal and State Governments, Universität Hamburg has been granted four clusters of excellence.

The profile of the Faculty of Business Administration in research and teaching at Universität Hamburg is shaped by the cosmopolitan flair of a city that plays a major role in international trade. The Faculty of Business Administration (Hamburg Business School) has an excellent reputation both at home and abroad for scholarship and defined three major research areas in close cooperation with international partners:

- Health Economics
- Logistics and Digital Services
- Marketing and Communication

The faculty conducts research in broad, well-established areas of the discipline and interdisciplinary research centers such as the Hamburg Center for Health Economics (HCHE) and the Research Group for Marketing and Communication, which operate within an international network. The Hamburg Business School strives to be one of the most influential universities for future leaders in academia and business and to uphold the tradition of the honorable Hanseatic merchant, thereby nurturing our ties to the University and Hamburg.

Universität Hamburg is proud to be a co-host and welcomes you to a digital Hamburg.



# Programme Overview

## Wednesday, 15<sup>th</sup> September

Time (CET)	Room I	Room II
9.00 am – 10.00 am	PhD course: Welcome & introduction	
10.15 am – 11.45 am	PhD course „Medical focus“ <i>Faculty: Pierre Tiberghien, Wim de Kort</i>	PhD course „Management focus“– <i>Faculty: Silke Boenigk, Eva-Maria Merz, Eamonn Ferguson, Michel Clement</i>
11.45 am – 1.15 pm	Lunch break	
1.15 pm – 2.45 pm	PhD course „Medical and Management focus“ <i>Faculty: Silke Boenigk, Eva-Maria Merz, Eamonn Ferguson, Michel Clement, Wim de Kort</i>	
2.45 pm – 3.15 pm	Coffee break	
3.15 – 3.50 pm	Meet the Editor of <i>Transfusion</i> and <i>Vox Sanguinis</i>	
3.50 pm – 4.20 pm	Meet the Editor: <i>Vox Sanguinis</i> (Katja van den Hurk and Jill Storry) Questions from PhD students	Meet the Editor: <i>Transfusion</i> (Richard Kaufman and Jay Menitove) Questions from the audience
4.20 pm – 4.45 pm	Meet the Editor: <i>Transfusion</i> (Richard Kaufman and Jay Menitove) Questions from PhD students	Meet the Editor: <i>Vox Sanguinis</i> (Katja van den Hurk and Jill Storry) Questions from the audience
5.00 pm	Virtual get-together	

## Thursday, 16<sup>th</sup> September

Time (CET)	Room I	Room II	Room III	Room IV
9.00 am – 9.15 am	Welcome to ECDHM 2021!			
9.15 am – 10.00 am	Keynote: "Convalescent Plasma for Treatment of COVID-19: Lessons learned." - Hubert Schrezenmeier			
10.00 am – 10.15 pm	Coffee break			
10.15 am – 11.45 am	Session 1: <i>Blood donor relationship management</i> Chair: Wolfgang Rüstig	Session 2: <i>Communication strategies to increase donations</i> Chair: Edlira Shehu	Session 3: <i>Effects of pandemics on donation safety</i> Chair: Wim de Kort	Session 4: <i>Donor health and eligibility</i> Chair: Michael Müller-Steinhardt
11.45 pm – 1.00 pm	Lunch break			
1.00 pm – 2.30 pm	Session 5: <i>Donor recruitment &amp; donor retention</i> Chair: Lars Eberhart	Session 6: <i>Recent developments in plasma donation</i> Chair: Torsten Tonn	Session 7: <i>Effects of pandemics on donation behavior</i> Chair: Pierre Tiberghien	Session 8: <i>Challenges regarding infection &amp; diseases</i> Chair: Christian Erikstrup
2.30 pm – 2.45 pm	Coffee break			
2.45 pm – 3.30 pm	Keynote: "Utilizing Identity To Increase Donations: Research-based Insights" - Karen Winterich			
3.30 pm – 4.00 pm	Coffee break			
4.00 pm – 5.30 pm	Session 9: <i>Donor behavior mechanisms</i> Chair: Silke Boenigk	Session 10: <i>Dealing with donor deferrals</i> Chair: Eva-Maria Merz	Session 11: <i>Current issues in donor health</i> Chair: Tamam Bakchoul	Session 12: <i>Dealing with iron deficiency</i> Chair: Katja van den Hurk
5.35 pm	Virtual get-together			

## Friday, 17<sup>th</sup> September

Time (CET)	Room I	Room II
9.15 am – 10.45 am	Special Session I: <i>How social relations shape blood donation behavior</i>	
10.45 am – 11.00 am	Coffee break	
11.00 am – 12.30 pm	Special Session II: <i>The tricky business of incentives</i>	
12.30 am – 1.30 am	Lunch break	
1.30 pm – 3.00 pm	Special Session III: <i>Donor iron management: Pros and cons of existing strategies</i>	Workshop <i>The Route to Digital Donor Management</i> Chair: Martin Oesterer (GRC Blood Donation Service), Lars Eberhart (Austrian Red Cross)
3.05 pm – 3.30 pm	Closing remarks	

## Keynote “Convalescent Plasma for Treatment of COVID-19: Lessons learned.”



**Prof. Dr. Hubert Schrezenmeier** holds the Chair of Transfusion Medicine at the University Hospital of Ulm and is the Medical Director of the Institute of Clinical Transfusion Medicine and Immunogenetics of the German Red Cross Blood Transfusion Service Baden-Württemberg – Hessen.

He is board certified in hematology, medical oncology and transfusion medicine. Currently he is the President of the German Society of Transfusion Medicine and Immunohematology (DGTI). His research interest includes stem cell based therapy, pathophysiology and treatment of haemolytic disorders and bone marrow failure syndromes and haemotherapy. In the SARS-CoV-2 pandemic he focused on immune response to SARS-CoV-2 and passive immunotherapy of COVID-19. He is the principal investigator of the randomized multicentric clinical trial CAPSID on convalescent plasma for severe COVID-19.

## Keynote "Utilizing Identity to Increase Donations: Research-based Insights."



**Karen Page Winterich** is Professor of Marketing and Professor in Sustainability at Pennsylvania State University.

Karen conducts research in the area of consumer behavior, with much of her work examining how consumers' social identities influence charitable giving as well as sustainable and im(moral) behavior. Her research is published in *Journal of Consumer Research*, *Journal of Marketing Research*, and *Journal of Marketing*, among others. She serves as an Associate Editor for the *Journal of Marketing Research* and *Journal of Marketing* and is on the Editorial Review Board at the *Journal of Consumer Research* and *Journal of Consumer Psychology*, among others. Karen also enjoys teaching sustainability marketing which she developed as part of Smeal's Sustainability Education Initiatives.

## Session 1 "Blood donor relationship management"

Thursday, 16 <sup>th</sup> September – SESSION 1	
10.15 am – 11.45 am	<b>Blood donor relationship management</b> <i>Chair: Wolfgang Rüstig</i>
10.15 am – 10.30 am	<b>"Our people won't feel it is important unless you come directly to us": Employing co-design with Polynesian-Australian communities to increase blood donation and help find a rare blood type</b> <i>Luke Gahan, Barbara Masser, Kyle Jensen</i>
10.40 am – 10.55 am	<b>Transgender Donors and Blood Donation in the Irish Blood Transfusion Service</b> <i>Jennifer Harkin, Shonagh Ward, Louise Pomeroy, Ellen McSweeney</i>
11.05 am – 11.20 am	<b>Knowing the donor. The setting up of a Donor Relationship Management system to improve the knowledge, engagement and satisfaction of donors</b> <i>Carles Garcia, Antoni Masi, Manel Gastó, Xavi Villalvilla, Eli Buxó, Cristina Moya, Aurora Masip</i>
11.30 am – 11.35 am	<b>The Effect of Smoking on Infection Risk in Healthy Blood Donors</b> <i>Bertram Dalskov Kjerulff, Kathrine Agergård Kaspersen, Khoa Manh Dinh, Susan Mikkelsen, Erik Sørensen, Kaspar René Nielsen, Mie Topholm Bruun, Henrik Hjalgrim, Ole Birger Pedersen, Lise Wegner Thørner, Henrik Ullum, Klaus Rostgaard, Torben Sigsgaard, Christian Erikstrup</i>
11.40 am – 11.45 am	<b>Integrating a biobank into a traditional blood bank: a protocol for the Sanquin Blood Supply Foundation biobank</b> <i>Lotte van Dammen, M. de Bakker, Maartje van den Biggelaar, Ellen van der Schoot, A.W.M. van Weert, Eva-Maria Merz, Elisabeth M.J. Huis in 't Veld, Eric Boersma, Isabella Kardys, Věra M.J. Novotný, Hans Zaaijer, Katja van den Hurk</i>

**“Our people won’t feel it is important unless you come directly to us”: Employing co-design with Polynesian-Australian communities to increase blood donation and help find a rare blood type.**

*Submitting author: Dr. Luke Gahan*

*Affiliation: Australian Red Cross Lifeblood*

**AUTHORS:**

Luke Gahan, Barbara Masser, Kyle Jensen

**BACKGROUND:**

Australia, like many other countries, has an increased need to recruit donors with rare blood types in order to ensure the sufficiency and suitability of blood products for all its people. This requires Australian Red Cross Lifeblood (Lifeblood) to engage with communities and ethnic minority groups not traditionally represented in our donor panel. Research on ethnic-minority blood-donation has highlighted the need to work collaboratively with communities to develop culturally targeted strategies that are positively received<sup>1</sup> and has recommended future research using co-design methodologies<sup>2</sup>. Building on this, we employed a co-design methodology to build a community led response to recruit donors with Polynesian ancestry to meet Lifeblood’s increasing need for Jk(a-b-) blood.

**AIMS:**

The aim of this research is to use co-design to work with the Polynesian community to generate business improvements and marketing strategies to improve Lifeblood’s engagement with this community, and potentially increase our ability to recruit and identify Jk(a-b-) blood donors.

**METHODS:**

The core principle underpinning co-design is the involvement of end-users and their experiences in the design process to understand challenges and issues from their perspective. To achieve this, we invited 10 Polynesian-Australian community members to a Stakeholder Advisory Group (SAG) and worked with them in each phase of the project. As part of the research design co-created with the SAG, we ran three online co-design workshops with 25 Polynesian-Australian community members (8 current donors, 8 lapsed, 7 non-donors, 2 donated abroad; 22 born abroad, 3 Australian born) representing 7 Pacific Island ethnicities. In these workshops barriers and facilitators to donating were discussed, along with ways to engage Polynesian Australians with blood donation.

**RESULTS:**

The workshops generated three key themes: the need for education of Polynesian Australians, the need to build trust with elders, religious leaders, and wider community, and the need to normalize blood donation within the communities. The workshops and SAG co-designed strategies to achieve this in a style that participants believed would suit the needs and preferences of their communities. Participants co-designed a photoshoot with Polynesian donors and the development of a social media video to engage, educate, and recruit Pacific-Island donors. In a 7-week period the co-designed video reached over 82,000 viewers, encouraged 221 people to sign-up to a special ‘Pacific Donor’ team, generated 128-donations and identified a new Jk(a-b-) blood-donor.

**CONCLUSION:**

Ethnic-minority communities are the experts on what will facilitate greater blood donation in their communities. Engaging a co-design research method empowers communities, builds trust, and generates strategies and approaches that enables the message of blood donation to break through cultural barriers. However, the method can also create challenges if participants' strategies and designs conflict with the blood collection agencies broader strategies.

**REFERENCES:**

Telenta J, Jones SC, Francis KL, Polonsky MJ, Beard J, Renzaho AMN. Australian lessons for developing and testing a culturally inclusive health promotion campaign. *Health Promotion International*. 2020;35: 217-31.

Gahan L, Masser B, Mwangi C, Thorpe R, Davison T. Motivators, facilitators, and barriers to blood donation in Australia by people from ethnic minority groups: Perspectives of sub-Saharan African, East/South-East Asian, and Melanesian/Polynesian blood donors. *Journal of Sociology*. 2021: Online First.

# Transgender Donors and Blood Donation in the Irish Blood Transfusion Service

**Submitting author:** Jennifer Harkin,  
Shonagh Ward

**Affiliation:** Irish Blood Transfusion Service

## **AUTHORS:**

Ms. Jennifer Harkin, Ms. Shonagh Ward, Dr. Louise Pomeroy, Dr. Ellen McSweeney.

## **BACKGROUND:**

Over the past two decades, the Republic of Ireland has experienced fundamental societal change which has enhanced our awareness and acceptance of diversity. The Gender Recognition Act was passed into law on the 22nd of July 2015. The Act allows individuals the right to change their gender and have this change recognised by law (Government of Ireland, 2015). The Irish Blood Transfusion Service has actively been developing policies which recognises the needs and rights of transgender and non-binary donors, whilst carefully adhering to standards of safety for blood components and their recipients.

## **AIMS:**

Create guidelines that are more inclusive to transgender and non binary donors.  
Identify risks and challenges involved and apply measures to mitigate the risks.

## **METHODS:**

We reviewed International literature and liaised with our international colleagues to evaluate their experiences managing this group of donors. We engaged with non-governmental organisations with expertise in this area.

## **RESULTS:**

We identified a number of potential issues to be considered for transgender blood donors and their recipients. Issues concerning transgender donor hemoglobin and total blood volume were considered. It was agreed that transgender donors would only be accepted for whole blood donation. Donors on hormone replacement therapy needed to be on a stable dosage for 12 months.

Similarly we identified the potential recipient risks including lung Injury (TRALI). In order to protect against TRALI, all donors should be asked if they have had previous pregnancies.

We found that studies have shown that Transgender individuals are three times more likely to be diagnosed with HIV compared to the national average (Babu *et al*, 2017). Due to the increased risk in this cohort the IBTS agreed a policy to defer a transgender person who has had sex with a male (transgender or cis-gender) or another transgender person in the past twelve months.

Additionally we have created a new test code (TG Assess) on the blood establishment computer system. This code prevents the separation of plasmas from wholeblood, makes the donor unsuitable for platelet donation by apheresis and ensure that donors are not bled into paediatric packs.

**CONCLUSION:**

A number of issues to be considered for transgender donors were identified and processes were amended accordingly. Creating this policy for transgender donors increased staff awareness of the barriers and stigma that transgender individuals may experience. What is clearly evident from the research is the lack of training and education for healthcare providers and/or the lack of uptake of this training. Many issues that transgender individuals face in healthcare are related to a simple lack of understanding. These issues can easily be tackled with appropriately targeted mandatory training for healthcare providers. Hopefully with the raised awareness and societal changes, all blood establishments will implement more inclusive guidelines that will ensure the safety of the donor and recipient alike.

**REFERENCES:**

Goldman et al (2020) 'Transpeople and blood donation', *TRANSFUSION* 60(5), pp. 1084-92.

Government of Ireland (2015) Gender Recognition Act 2015. Available at: <http://www.irishstatutebook.ie/eli/2015/act/25/enacted/en/html> (Accessed: 8th April 2020)

H., Babu, A. S., Wiewel, E. W., Opoku, J., & Crepaz, N. (2017). Diagnosed HIV Infection in Transgender Adults and Adolescents: Results from the National HIV Surveillance System, 2009-2014. *AIDS and behavior*, 21(9), 2774–2783. <https://doi.org/10.1007/s10461-016-1656-7>

# Knowing the donor. The setting up of a Donor Relationship Management system to improve the knowledge, engagement and satisfaction of donors.

*Submitting author: Carles Garcia*

*Affiliation: Banc de Sang i Teixits  
(Barcelona, Spain)*

## **AUTHORS:**

Carles Garcia. Antoni Masi. Manel Gastó. Xavi Villalvilla. Eli Buxó. Cristina Moya. Aurora Masip

## **BACKGROUND:**

The Blood and Tissue Bank of Catalonia interacts every year with 400.000 donors of blood, plasma, cord blood, cells and breast milk, among others.

It is related to a community that is increasingly asking to be heard, known and have personal attention guaranteed so they don't feel like just a number.

With this goal in mind, three years ago we began the technological development of our own Donor Relationship Management system (DRM) in order to systematize active listening to the donor and establish an individual dialogue based on the communications and data collected by each of them. From this listening, our DRM has become a transformer of internal work dynamics.

## **AIMS:**

To know more about the donors: how they feel, what they think about us and how can we contribute to ensure their satisfaction and engagement.

To establish a direct and effective dialogue with the donors when they donate or when we communicate with them in order to be able to respond fast to complaints received and learn from suggestions.

To systematize the possible side effects and anomalies that donors can find in the donation process to learn and apply changes to the system from the active listening.

To improve the existing system of paper suggestion forms, free online methods of satisfaction enquiries and others, using the right technology that help us to define a better strategy for getting new donors and improve the engagement

To make information about every donor interaction available to anyone at Blood and Tissue Bank who might need it in the moment they need it.

## **METHODS:**

- Analysis of the existing tools to listen to the donors
- Stablisment of a new area and a new team: the Donor Care area
- Benchmark of technological tools used by other entities
- Software development
- Training for professionals
- Implementation of the tool
- Constant evaluation of results, implementation of improvement actions according to the complaints and suggestions received

**RESULTS:**

The new CRM is deployed as a tool for listening and giving proper attention to donors in September 2019.

Survey responses have multiplied almost per 5: from 7.000 received in 2019 to 33.000 received in 2020.

Complaints are systematized and maximum response times are allocated to them. The donor appreciates the speed. 92% of the communications received are support messages, 6% suggestions and 2% are complaints.

The first improvement actions are implemented: modifying the snack given to the donor after the donation and adapting the schedule of the campaigns, among others.

All complaints, suggestions and incidents are transparent for all members of the organisation.

In the calls we make to donors and in the donation time, we can have this information and talk to the donor about that.

All interactions with donors (by mail, phone, social media...) are concentrated in an unique and easy system, and can be tracked

**CONCLUSION:**

The implementation of a DRM technology in the Blood and Tissue Bank represents a before and after in donor care. It is a disruptive change in the way we work as it allows us to take action through active listening.

The new system also represents an opportunity to communicate with each donor in a personalized way, adapting to the new needs that the evolution of society has brought.

# The Effect of Smoking on Infection Risk in Healthy Blood Donors

*Submitting author:* Bertram Dalskov  
Kjerulff

*Affiliation:* Department of Clinical  
Immunology, Aarhus University Hospital.

## **AUTHORS:**

Bertram Kjerulff, Kathrine Agergård Kaspersen, Khoa Manh Dinh, Susan Mikkelsen, Erik Sørensen, Kaspar René Nielsen, Mie Topholm Bruun, Henrik Hjalgrim, Ole Birger Pedersen, Lise Wegner Thørner, Henrik Ullum, Klaus Rostgaard, Torben Sigsgaard, Christian Erikstrup

## **BACKGROUND:**

Smoking is associated with a wide range of diseases, especially cancer as well as cardiovascular and lung diseases. The effect of smoking on infection risk has been less extensively studied and mostly in smaller case-control studies examining singular infections. Specifically, it is unknown how smoking affects the risk of infection in otherwise healthy individuals. This leaves a knowledge gap on the effects of smoking on infection risk in healthy populations, possibly causing an underestimation of the dangers of smoking.

## **AIMS:**

To examine the effect of smoking on risk of various infections in a large cohort of healthy blood donors

## **METHODS:**

This cohort study used questionnaires and health register data from 111,919 Danish blood donors. Survival analysis was used to estimate the association between current smoking and risk of infection defined as hospital-based treatment for infection or filled prescriptions of antimicrobials stratified for time of birth and adjusted for relevant confounders. Donors with a Charlson comorbidity score were excluded from analysis.

## **RESULTS:**

A total of 8,208 participants received hospital treatment for an infection and 61,550 filled a prescription of an antimicrobial. The general risk of infection was increased in current smokers across all strata (hazard ratios ranging from 1.23 (95% CI 1.08—1.39) to 1.34 (95% CI 1.23—1.46) for hospitalisation and 1.10 (95% CI 1.06—1.14) to 1.18 (95% CI 1.14—1.22) for filled prescriptions). Smoking was most strongly associated with abscesses, skin infections, and respiratory tract infections. Furthermore, the risk of filled prescriptions of broad-spectrum antibiotics was increased. No association between current smoking and gastrointestinal infections was observed.

## **CONCLUSION:**

Current smoking was strongly associated with an increased risk of hospital-based treatment of infection and filled prescriptions of antimicrobials. This may be a significant burden on health care and blood donor availability.

# Integrating a biobank into a traditional blood bank: a protocol for the Sanquin Blood Supply Foundation biobank

**Submitting author:** Lotte van Dammen

**Affiliation:** Sanquin, Plesmanlaan 125, 1066 CX, Amsterdam, The Netherlands

## **AUTHORS:**

L. van Dammen, M. de Bakker, M. van den Biggelaar, C.E. van der Schoot, A.W.M. van Weert, E.-M. Merz, E.M.J. Huis in 't Veld, E. Boersma, I. Kardys, V.M.J. Novotný, H. Zaaier, and K. van den Hurk

## **BACKGROUND:**

Sanquin Blood Supply Foundation provides blood services in The Netherlands through donations from approximately 345,000 blood donors. These donations are not only crucial for patients, but also important for science, which is illustrated by recent findings regarding SARS-CoV-2 antibodies in donors. Blood donors reflect a relatively healthy subsample (18-79 years of age) of the general population, and there is an increasing demand for such large cohorts of healthy individuals. Additionally, there is a need for longitudinal data collected in large cohorts to study changes over time and to develop deeper insight into prognostic biomarkers, for example, in comparison to levels found in clinical samples. The integration of a biobank for scientific research into a blood bank organization, takes advantage of the existing cohort of blood donors and infrastructure around blood collection, transportation, testing and storage. This also creates a unique opportunity for high-frequency repeated sample collection, which is less common in existing cohorts. The data from blood samples will be linked to a databank which includes information from questionnaires and medical records. Here, we describe the protocol for the integration of a biobank paired with a databank, within Sanquin Blood Supply.

## **AIMS:**

To use longitudinally collected left-over blood donation samples, in combination with information collected through questionnaires and medical records for future scientific research to answer questions about health and disease.

## **METHODS:**

Initially, a maximum of 30,000 donors will be invited to participate, and depending on the response rate, which is expected to be between 50% and 75% based on previous research, this will result in 15,000 participants. Written informed consent will be provided during a regular visit to the blood bank, and samples (12,5 mL) will be taken from the small sampling bag. Blood will be stored initially in a 5 mL EDTA tube, a 5 mL serum tube, and a 2,5 mL serum tube for DNA sequencing. Samples will be centrifuged immediately at the collection site, within 2 hours stored at 4 °C, transported, and within 30 hours stored in aliquots at -80 °C at the main storage location. Within two weeks after donation, participants will receive an online questionnaire, which includes: a food frequency questionnaire (FFQ), a quality-of-life questionnaire (SF-36), a perceived stress scale (PSS), and the International Physical Activity Questionnaire Short Form (IPAQ). Additional items will be used to assess demographic characteristics, body composition, smoking behavior, alcohol consumption, medical history, medication use, donation-related symptoms, and for females a questionnaire regarding menstruation and menopause. Information from medical records will be integrated into the dataset. All donors who have given written informed consent will be invited to participate in follow-up measurements at 6-month intervals. Follow-up measurements include left-over blood sample collection (10 mL at follow-up) and a subset of questionnaires.

**RESULTS:**

The expected start date for this biobank project is in the winter of 2021/2022.

**CONCLUSION:**

The integration of a biobank into the Dutch Blood Bank makes it possible to use thousands of left-over blood samples to answer critical research questions about health and disease.

## Session 2 “Communication strategies to increase donations”

Thursday, 16 <sup>th</sup> September – SESSION 2	
10.15 am – 11.45 am	<b>Communication strategies to increase donations</b> <i>Chair: Edlira Shehu</i>
10.15 am – 10.30 am	<b>Blood donation narratives on social media: a topic modeling study</b> <i>Steven Ramondt, Peter Kerkhof, Eva-Maria Merz</i>
10.40 am – 10.55 am	<b>How and why charities should provide feedback to their donors</b> <i>Pascal Güntürkün, Nils Wlömert, Lars Eberhart, Martin Schreier</i>
11.05 am – 11.20 am	<b>Retain Donors by Sharing Past Donation Use Evidence from Red Cross Blood Donors</b> <i>Besarta Veseli, Edlira Shehu, Michel Clement, Karen Page Winterich</i>
11.30 am – 11.35 am	<b>A little birdy told me you save lives? Blood donation, twitter, and signalling</b> <i>Barbara Masser, Michael Lam, Barnaby Dixon</i>
11.40 am – 11.45 am	<b>Same, same, but different: What does donating blood uniquely signal?</b> <i>Barbara Masser, Michael Lam, Barnaby Dixon</i>

# Blood donation narratives on social media: A topic modeling study

*Submitting author: Steven Ramondt*

*Affiliation: Sanquin*

## **AUTHORS:**

Steven Ramondt, Peter Kerkhof & Eva-Maria Merz

## **BACKGROUND:**

Social media have shown great potential for producing significant changes in behavior and have become the cornerstone for many public health and agency efforts. The non-profit sector -including blood collection agencies- have adopted social media to aid their cause and reach their goals. However, despite the great impact of social media on society and its promising role for donor recruitment and retention, it has been overlooked in donor research.

## **AIMS:**

The present study sought to map the social media landscape around blood donation. In addition, we showcase an inductive computational method to make sense of huge amounts of dynamic unstructured blood donation text data that exists on social media.

## **METHODS:**

We applied structural topic modeling on 160.313 social media messages, containing 7 years of Dutch blood donation Facebook and Twitter data by the general public. With this computational method, we display what is discussed about blood donation on social media, how these topics are connected, and cluster them. We further examine how these topics are distributed on Facebook and Twitter, and how the prevalence of these topics changes over time.

## **RESULTS:**

We found 25 topics clustered in 6 distinct clusters. There is a strong reduction over time of messages in which donors announce their donations. Topics that emphasize the positives of blood donation, including donor identity-related topics, are rising. In addition, the findings show a clear social media platform contrast. Topics related to campaigns and negative policies were found more on Twitter, while positive donation topics and topics related to the donation process were more prevalent on Facebook.

## **CONCLUSION:**

To make optimal use of social media for recruitment and retention campaigns and efforts, blood collection agencies should recognize the turbulent environment in which they take place. We demonstrated a means of analyzing dynamic social media data about blood donation utilizing an inductive computational method. As such, it fills a gap in donor research and contributes to the knowledge about public opinion regarding blood donation. Understanding the dynamic opinions about blood donation found in this and their own studies

will help blood collection agencies to make strategic choices and utilizing social media in a meaningful and effective manner.

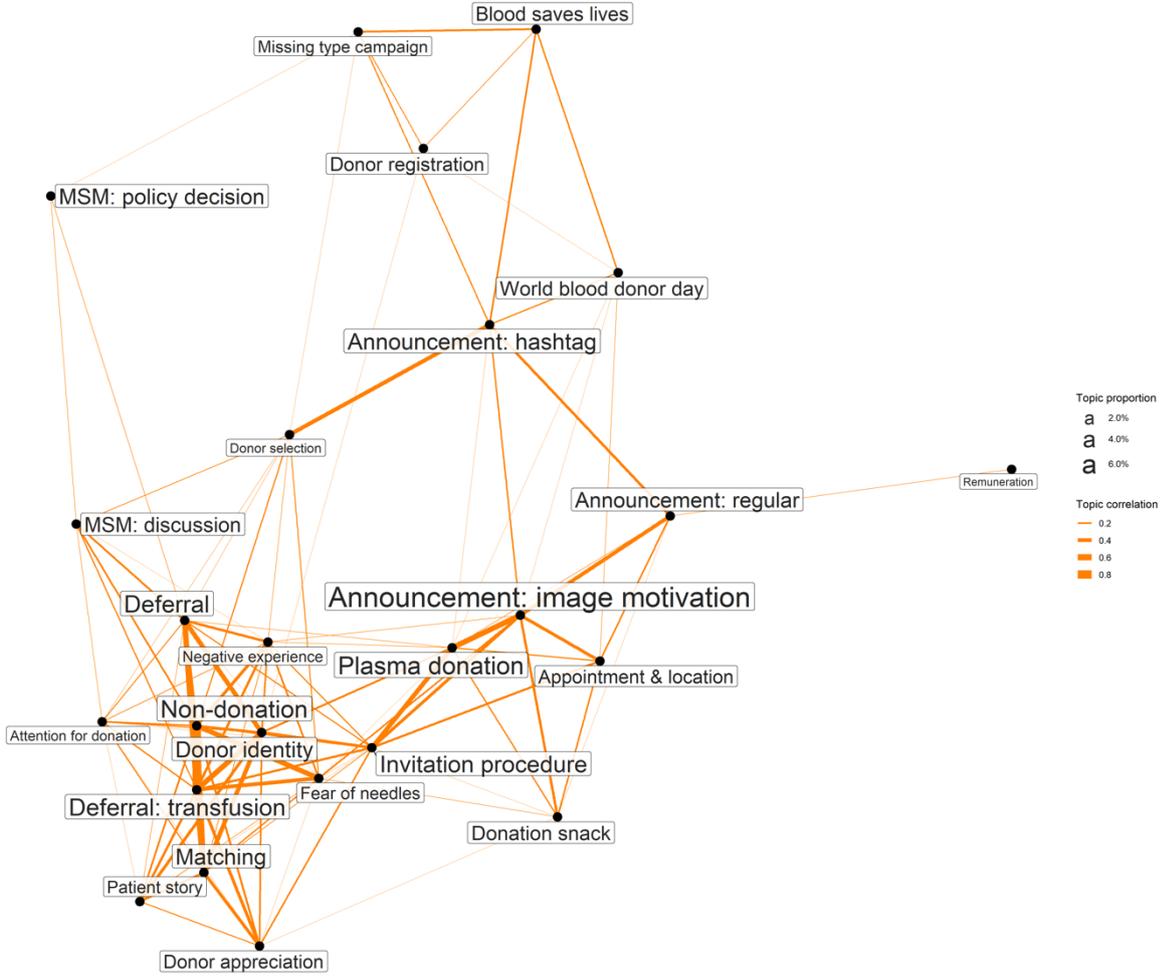


Figure 1. Correlation network of topics

## How and why charities should provide feedback to their donors

*Submitting author: Pascal Güntürkün*

*Affiliation: Vienna University of Economics and Business (WU Vienna)*

### **AUTHORS:**

Pascal Güntürkün (Vienna University of Economics and Business)

Nils Wlömert (Vienna University of Economics and Business)

Lars Eberhart (Austrian Red Cross)

Martin Schreier (Vienna University of Economics and Business)

### **BACKGROUND:**

In light of the shrinking numbers of blood donations in many countries, a key challenge for blood services is to increase retention rates and identify novel ways to attract new donors, especially from younger generations (e.g., Austrian Red Cross 2020). However, many blood services struggle to adapt to the increasing demands of new donor generations that expect more transparency and feedback on the use of their donation (Global Trends in Giving Report 2018). While the challenge to adhere to these demands is also visible in other charitable domains, such as monetary giving, the academic literature offers surprisingly little insights into how blood services and charities can address this issue.

### **AIMS:**

The present research addresses this limitation by testing a novel and cost-efficient approach that blood services can use to enhance transparency and perceived impact for donors by providing them with a feedback on the use of their donation. While we also expect favorable effects of such a feedback on donor retention, the focus of this research is on investigating unique behavioral reactions that may be stimulated by a feedback to one's actual donation, such as voluntary advocacy on social media and new donor attraction through word-of-mouth. We further explore how the personalization of feedback messages (i.e., highlighting the donor's identity) moderates their effectiveness.

### **METHODS:**

We test this novel approach in two randomized field experiments with the blood services of the Austrian Red Cross. In Experiment 1 ( $n = 7,264$ ), we tested whether adding a donation feedback to a generic thank you message (featuring the specific date and hospital at which the donor's blood transfusion has been used) increases donor's compliance to share a message that advocates blood donations via social media. Experiment 2 tests this idea on a larger scale with a longitudinal field experiment using a  $2$  (feedback: no/yes)  $\times$   $2$  (personalization: no/yes) between subjects design; however, the study is still ongoing at the time of writing this abstract. We designed a GDPR-conform tracking method to measure donor behavior (i.e., email interactions, sharing behavior) and the number of newly attracted donors (i.e., generated leads) based on the shared messages.

### **RESULTS:**

Experiment 1 shows that a donation feedback significantly increases donors' compliance to share a message that advocates blood donations on social media by 23.3% ( $X^2[1, 5.284]$ ,  $p < .05$ ), resulting in a total 32.6% uplift in new donor attraction that can be attributed to the shared messages. Experiment 2 will expand these insights by additionally investigating how highlighting a donor's identity in the feedback message affects sharing behavior and how sharing interacts with future donation behaviors.

**CONCLUSION:**

The present research offers first insights into how a specific donation feedback can stimulate word of mouth on social media, raise awareness for the cause, and thereby ultimately attract new donors. We advance the currently limited perspective on how donation transparency can attract donations (e.g., Cryder, Loewenstein, and Scheines 2013) by showing that a donation feedback can stimulate fruitful behaviors beyond retention. For charities and blood services, we provide insights into the substantive effects of a donation feedback for ad-hoc donations and underline that neglecting to give donors a feedback is a missed opportunity.

**REFERENCES:**

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## Retain Donors by Sharing Past Donation Use Evidence from Red Cross Blood Donors

**Submitting author:** Besarta Veseli

**Affiliation:** Universität Hamburg

### **AUTHORS:**

Edlira Shehu, Michel Clement, Karen Page Winterich, Besarta Veseli

### **BACKGROUND:**

Although effective appeals for donors are essential for blood donation services, few studies have investigated which appeals work best, particularly for repeat donors. Typically, NPOs' donor appeals consist of thanking donors for their past engagement and asking them to donate again.

### **AIMS:**

We address this research gap by proposing and testing a strategy that incorporates information on the use of the past donation in redonation appeals. Our proposed strategy differs substantially from common approaches in that it informs donors of how their *individual* donation was used to help a person in need, providing information specific to a donor's own past donation. This approach is novel in that it goes beyond simply informing potential donors how their donation may be used or a simple acknowledgement of past donations.

### **METHODS:**

In three field studies in collaboration with Red Cross Blood Donation Services, we analyze this effect empirically. First, we analyze whether past donation use appeals lead to an increase in donation behavior over the widely used thank-you appeals, differentiating active and inactive donor responses. In addition, we examine how managers can successfully implement past donation use appeals by identifying the moderating effects of donor experience (i.e., number of previous donations) and timing (i.e., closer to the next eligible donation date versus closer to the use of the donation) of the appeals.

### **RESULTS:**

In Study 1, in collaboration with the German Red Cross, we demonstrate that past donation use improves repeat donation behavior of inactive donors (i.e., donors who have not donated blood for at least two years) in a randomized field experiment. In Study 2, in collaboration with the Austrian Red Cross, we confirm the effectiveness of past donation use appeals for active donors in a natural experiment. Our results confirm that past donation use appeals increase future donations more effectively than simple thank-you appeals. Moreover, this positive effect increases with donor experience; our results show that especially experienced donors appreciate feedback provided by past donation information. In addition, Study 3, a field experiment in collaboration with the Austrian Red Cross, reveals a decrease in effectiveness when appeals with past donation use information are sent closer to the next eligible date.

**CONCLUSION:**

Our results provide clear implications for charities seeking to improve donor retention. We find that providing specific information about the use of a donor's past donation is more effective than providing either a thank-you or information about the impact of a future donation - both appeal tactics extensively investigated in prior research and commonly used by NPOs. Moreover, we identify two boundary conditions (donor experience and timing), which translate into recommendations on *whom* and *when* to target with past donation use appeals. Firstly, past donation use appeals are most effective for experienced donors, but are even effective for novice donors, who typically show the highest lapsing probability and whose relationship with a NPO is less established. Secondly, timing matters; sharing past donation use information with donors should be timed directly following the use of the donation rather than waiting until the next donation opportunity is approaching.

# A little birdy told me you save lives? Blood donation, twitter, and signalling

*Submitting author:* Barbara Masser

*Affiliation:* The University of Queensland;  
Australian Red Cross Lifeblood

## **AUTHORS:**

Michael Lam, Barbara Masser, & Barnaby Dixon

## **BACKGROUND:**

Social media offers individuals the opportunity to share their experiences with a wide audience. Accordingly, blood donors use social media to communicate about blood donation. From a signalling perspective, communicating on social media about your donation experience is one way to signal one's donation status. Further, the content communicated online could potentially influence the donation behaviour of other people. However, there is currently a limited understanding of the content communicated online about blood donation by donors who have had successful experiences.

## **AIMS:**

To determine the content of tweets directed towards blood services from the UK by those who have had successful donation experiences, and to explore the relationship of content to behaviour by others.

## **METHODS:**

Data from Twitter (n=3222) containing tweets directed to blood services from the UK were extracted through the R package 'rtweet' to examine what donors who have had a successful experience say about their donation. Topic modelling was applied to understand the pattern of communication.

## **RESULTS:**

Tweets were analysed using Correlated Topic Model which extends Latent Dirichlet Allocation by allowing topics to be correlated. We trained sets of topic models with different topics and then compared these trained models against validated fit indices to determine the 'best' number of topics to model the tweets. The results showed that a 7 topic model offered the best fit for the data, with tweets best understood according to the topics of: achievement (25.71% of tweets), text messages (17.25% of tweets) and their impact (16.59% of tweets), and various aspects of the donation experience including post donation snacks (8.23% of tweets), post donation thoughts (13.30% of tweets), having just donated (6.4% of tweets) and staff and the donation centre (12.55% of tweets). Within these topics, donors also frequently mentioned terms related to saving lives. Exploratory analyses using hurdle negative binomial regression showed that tweets with terms related to saving lives received higher retweets than tweets without mentions of these terms.

## **CONCLUSION:**

The results highlight a possible signalling method used by donors to display their donation status. Exploratory analyses showed that tweets including terms related to saving lives were rewarded by others, with other users sharing these tweets more frequently. This suggests that encouraging donors to note that they have saved lives may be an effective way to build broader community awareness of blood donation, and potentially encourage blood donation behaviour.

## Same, same, but different: What does donating blood uniquely signal?

*Submitting author:* Barbara Masser

*Affiliation:* The University of Queensland;  
Australian Red Cross Lifeblood

### **AUTHORS:**

Michael Lam, Barbara Masser, & Barnaby Dixson

### **BACKGROUND:**

Donating blood is a costly form of helping, as donors give their time and risk injury to give a vital biological substance to an anonymous being. As such, according to Costly Signalling Theory, donating blood should be a more reliable signal of the underlying quality signalled by helping – trustworthiness – than less costly forms of helping. To investigate this, we conducted two studies comparing the signals communicated by donating blood, donating money, and volunteering time.

### **AIM:**

To determine whether the costly nature of donating blood makes it a more reliable signal of trustworthiness than other forms of helping.

### **METHODS:**

Two hundred and twelve participants were recruited from the online crowdsourcing platform Prolific for Study 1 to play a trust game in which they decided how much (if any) of \$10 to send to a hypothetical partner with the understanding that their partner may or may not return this money. Participants were either told their game partner was always or only sometimes honest (between-subjects frame manipulation) and they each played with four partners (partner description: blood donor vs. money vs. volunteering vs. control) with the order of partner presentation randomised. The amount of money transferred served as the measure of trust. In Study 2, 741 participants were recruited from Prolific and presented with a description of a target created by the between-subjects manipulation of behaviour (blood donor vs volunteer vs neutral), frequency of behaviour (high vs low) and gender (male vs female). Participants were asked to rate the target on altruism, health, and trustworthiness, with measures of attractiveness and status included as exploratory measures.

### **RESULTS:**

Analyses were conducted in the statistical software R on the data of those who passed the manipulation check questions (Study 1, N=204; Mage = 38.49, SDage = 11.65, with 56% of the participants female; Study 2, N= 687 participants, Mage = 35.53, SDage = 11.33, 49% of participants were female). In study 1, linear mixed effects models showed that participants allocated significantly more money to the target described to have donated blood, money, or to have volunteered than the neutral target. However, there was no effect of game frame or interaction with game partner. In Study 2, a three-way analysis of variance with post hoc pairwise comparisons showed that the blood donor and volunteer target were rated as more altruistic and trustworthy than the neutral target. Further, the blood donor was perceived as healthier than the volunteer and exploratory analyses showed that this perception indirectly increased their perceived attractiveness. Exploratory results also showed that low frequency volunteering by men communicated greater levels of status than donating blood.

**CONCLUSION:**

Across two studies we showed that donating blood is similar to volunteering and donating money in signalling altruism and trustworthiness. That is, the costly nature of donating blood does not make it a more reliable signal of trustworthiness. However, donating blood differs from other forms of helping in that it uniquely signals health, and this is positively related to the perceived attractiveness of blood donors.

## Session 3 “Effects of pandemics on donation safety”

Thursday, 16 <sup>th</sup> September – SESSION 3	
10.15 am – 11.45 am	<b>Effects of pandemics on donation safety</b> <i>Chair: Wim de Kort</i>
10.15 am – 10.30 am	<b>Approaches to guarantee the safety and the blood supply continuity adopted by Lisbon Blood Centre during the first year of COVID-19</b> <i>Ana Paula Sousa, Leonilde Outerele, Ana Cristina Figueiredo, Eugenia Vasconcelos, Lurdes Tavares, Conceição Malcata, Matilde Santos, Sofia Gouveia</i>
10.40 am – 10.55 am	<b>Rapid increase of SARS-CoV-2 seroprevalence in Dutch blood donors</b> <i>Franke Quee, Katja van den Hurk, Ed Slot, Michel Molier, Hans L. Zaaijer, Boris M. Hogema</i>
11.05 am – 11.20 am	<b>Vasovagal reactions are more common in COVID-19 Convalescent Plasma Donors (CCP) whole blood donors than in non CCP whole blood donors</b> <i>Lorna McLintock, Nicole Priddee, David Fisher</i>
11.30 am – 11.35 am	<b>Detection of arrhythmias in convalescent plasma donors following recovery from SARS-CoV-2 infection</b> <i>Penny Wimbleton, Charlotte Washington</i>
11.40 am – 11.45 am	<b>Establishing Serosurveillance of COVID-19 in Wales</b> <i>Sian James, Courtney Morris, Sophie Harker, Daniel Thomas, James Murphy, Ben Davies</i>

## Approaches to guarantee the safety and the blood supply continuity adopted by Lisbon Blood Centre during the first year of COVID-19

**Submitting author:** Ana Paula Sousa

**Affiliation:** Lisbon Blood and Transplantation Centre - Portuguese Institute of Blood and Transplantation (IPST.IP)

### **AUTHORS:**

Ana Paula Sousa, Leonilde Outerelo, Ana Cristina Figueiredo, Eugenia Vasconcelos, Lurdes Tavares, Conceição Malcata, Matilde Santos, Sofia Gouveia

### **BACKGROUND:**

COVID-19 has had great impact in the blood supply continuity. Adherence to public health measures imposed temporarily restrictions of using mobile vehicle and fixed sites sessions without safe conditions. Also, geographic COVID-19 outbreaks temporarily prevented the local population from donating blood. Different strategic responses were adopted by Lisbon Centre: specific COVID-19 donor's information and eligibility criteria, education of donors associations, promotion of apheresis collections, reinforcement of post-donation information, pathogen reduction and activation of the Contingency Planning (CP), in order to guarantee an equitable and safe transfusion. We describe approaches that have been taken: post donation information surveillance and the applied measures of the CP done in coordination with National Emergency Blood Management Plan.

### **AIMS:**

To describe approaches and their impacts on the safety and continuity of the blood supply adopted by the Blood Center in Lisbon during the first year of the COVID-19 pandemic

### **METHODS:**

Every donor was informed about SARS.CoV.2 and the risk of transmissibility. In addition to being questioned about COVID-19 disease and its close contacts, the post donation information was underline in every clinical evaluation. A recall of products was associated with the post information procedure.

According to the contingency planning (CP), the activation of responses was triggered according to the National Strategic Inventory (Erythrocyte Concentrates), accounted for by the number of days (more than 7 days, between 5 and 7 days, between 3 and 5 days and less than 3 days, respectively green, yellow, orange and red), daily monitored. Different level responses were activated: Level 1 - donor contact management; Level 2 - annual planning management; Level 3 - blood donor management; Level 4 - Hospital management: Patient Blood Management (PBM) and Optimal Use of Blood. (See Table 1). A comparative analysis (2020 vs 2019) is done in terms of donors, donations, index donations and component wastage rate.

**RESULTS:**

Post donation COVID-19 information: 43 donors contacted the Lisbon Blood Centre informing about confirmed COVID-19 positive contacts that have occurred in the previous days before donation. 33 donors notified they have been diagnosed with COVID-19 disease. A total of 228 components were recalled.

Contingency Plan impact in the collection and wastage of blood: In 2020 we observed a reduction in the total number of donors (- 3,6%) and in the new/first donors (-1%), compared with 2019. Despite this reduction, the numbers of blood donations have increased 0, 6%, justified by the increase in the index donation.

A comparative analysis of blood component waste was performed between 2020 and 2019. In 2020, it was found that the waste due to expiry was higher for platelet concentrates (+ 32.5%), with a reduction in the waste rate for erythrocyte concentrates (-35.8%) per expiry.

**CONCLUSION:**

The enhanced donor education and postdonation information was positive in the COVID19 surveillance.

For the COVID-19 contingency scenario, we were able to ensure an adjusted inventory level, according to the demands. A proper inventory management system ensure an optimum utilization and minimize wastage. The major reason for wastage of platelet components has been related to the pattern of its utilization.

# Rapid increase of SARS-CoV-2 seroprevalence in Dutch blood donors

**Submitting author:** Franke Quee

**Affiliation:** Department of Donor Medicine Research, Sanquin Research, Amsterdam, The Netherlands

## **AUTHORS:**

Franke A Quee<sup>1</sup> Katja van den Hurk<sup>1</sup> Ed Slot<sup>2,3</sup> Michel Molier<sup>3</sup> Hans L Zaaijer<sup>3,4,5</sup>  
Boris M Hogema<sup>3,4</sup>

<sup>1</sup>Donor Studies, Department of Donor Medicine Research, Sanquin Research, Amsterdam, The Netherlands

<sup>2</sup>Department of Medical Affairs, Sanquin Corporate Staff, Amsterdam, The Netherlands

<sup>3</sup>Blood-borne Infections, Department of Donor Medicine Research, Sanquin Research, Amsterdam, The Netherlands

<sup>4</sup>Department of Virology, Sanquin Diagnostic Services, Amsterdam, The Netherlands

<sup>5</sup>Department of Medical Microbiology, Amsterdam UMC, Amsterdam, The Netherlands

## **BACKGROUND:**

The first case of COVID-19 in the Netherlands was diagnosed on February 27th 2020, followed by an exponential increase of hospitalizations due to COVID-19. The Dutch government responded with the closure of schools, drinking and eating facilities, and non-essential shops; and the introduction of other infection control measures such as social distancing. Serological testing of blood donations for SARS-CoV-2 antibodies was employed to monitor the outbreak, providing information to policy makers and the public about antibody-mediated immunity in the population and the persistence of the antibody response. Even after the complete out-roll of the nationwide vaccination program, ongoing monitoring of SARS-CoV-2 antibodies is important to monitor persistence and waning of antibody levels. AIMS: Assessing the dynamics of the prevalence of SARS-CoV-2 antibodies in the Dutch blood donor population starting June 2020.

## **METHODS:**

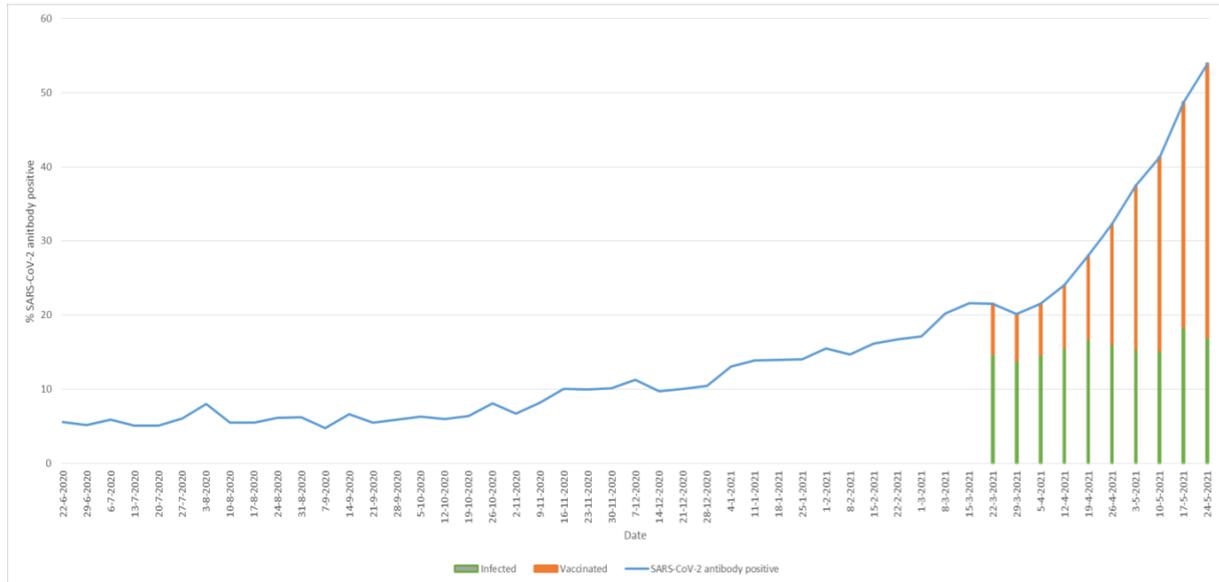
Sanquin started monitoring the SARS-CoV-2 seroprevalence in June 2020 by testing at least 2000 blood donations per week for presence of SARS-CoV-2 antibodies. The selection was based on an algorithm, considering age, sex and postal code of the donors, to provide optimal coverage and representation of the donor base. Selected donations were tested for the presence of SARS-CoV-2 IgA, IgM and IgG antibodies using the Wantai SARS-CoV-2 total antibody ELISA (Wantai Biological Pharmacy Enterprise Co., Ltd., Beijing, China). From March 22nd 2021 onwards, samples reactive for total antibodies were also tested using the Elecsys® Anti-SARS-CoV-2 nucleocapsid antibody test (Roche Diagnostics, Rotkreuz, Switzerland) to distinguish between infection-induced and vaccine-induced antibodies.

## **RESULTS:**

SARS-CoV-2 seroprevalence was low at the beginning of the study (5.6%, Figure 1). During the summer months in 2020, few new cases were reported and the seroprevalence in the donor pool remained stable. In November 2020 the seroprevalence exceeded 10%, probably due to the rapid increase in COVID-19 cases starting at the end of September 2020. As of April 2021, seroprevalence rapidly increased from 20.1% to 54%; this was 9 weeks following the start of massive vaccination programs. The proportion of individuals that acquired antibodies due to infection rapidly decreased from 68.8% to 31.5% over the course of 10 weeks, starting April 2021, while the proportion of vaccination-induced antibodies increased.

## CONCLUSION:

Since April 2021 SARS-CoV-2 seroprevalence rapidly increases in the Netherlands, due to a nationwide vaccination campaign. An ongoing serosurveillance program is important after completion of the vaccination campaign, to monitor the persistence or waning of SARS-CoV-2 antibodies in the population.



**Figure 1. Seroprevalence of SARS-CoV-2 in the Dutch blood donor population in 2020-2021, including a breakdown into antibodies acquired by natural infection or vaccination.**

# Vasovagal reactions are more common in COVID-19 Convalescent Plasma Donors (CCP) whole blood donors than in non CCP whole blood donors

**Submitting author:** Lorna McLintock

**Affiliation:** Scottish National Blood Transfusion Service

## **AUTHORS:**

Lorna McLintock, Nicole Priddee, David Fisher

## **BACKGROUND:**

The Scottish National Blood Transfusion Service (SNBTS) collected CCP by both whole blood and plasmapheresis to support randomised clinical trials of patients seriously unwell with COVID-19 (REMAP-CAP and RECOVERY). These trials showed no benefit from treatment with CCP and collection stopped in March 2021.

As per Joint United Kingdom (UK) Blood Transfusion and Tissue Transplantation Services Professional Advisory Committee (JPAC) guidance, all donors had to be 28 days symptom free from COVID-19 before donating. All new COVID-19 Convalescent Plasma donors were assessed by registered nursing staff by telephone prior to attending to donate. CCP whole blood donors had additional samples taken for SARSCoV2 nucleic acid and antibody testing, these were taken from the integrated sample pouch. Otherwise CCP whole blood donors were managed in the same way as non CCP whole blood donors.

Donor adverse events are monitored and it was noted that adverse events were more common in CCP donors.

## **AIMS:**

To compare the rate of donor adverse events in CCP donors donating by whole blood with non CCP whole blood donors.

## **METHODS:**

A business analyst extracted data from SNBTS IT systems for 2020 for CCP and non CCP whole blood donations.

## **RESULTS:**

Vasovagal reactions (VVR) were twice as common in whole blood CCP donors than non CP whole blood donors (27.87 vs 13.39 per 1,000 attends). See Table 1

The age profile was the same in both groups. There were a higher number of first-time donors in the CCP donors (24 vs 8%). Females accounted for 62% of CCP donations and 56% of non CCP donations.

## **CONCLUSION:**

VVR were more common in CCP donors (vasovagal rate in SNBTS 27.87 vs 13.39 per 1,000 attends).

The following caveats need considering in interpreting the higher rate of VVR in CCP whole blood donors:

VVR occur more frequently in new donors and the higher proportion of new and returning donors amongst CCP donors may have contributed this higher rate, The incidence of adverse events in CCP donors may be artificially high due to the low total number of donations compared to non CCP donors and VVR occur more frequently in female donors, who are over represented in CCP donors, and this may be contributing to higher rate VVR.

These caveats are unlikely to account for all of this increase and it seems likely that the recent COVID-19 is contributing to higher VVR rates.

The higher rate of VVR in these donors is likely to be multifactorial. It may include increased anxiety or reduced nutrition/ dehydration following COVID-19, or vasodilation, vascular dysregulation or subclinical cardiac dysfunction secondary to recent COVID-19 infection.

TABLE 1

Donation Type	Number of Donations	Adverse events per 1000 attends	Vasovagal reactions per 1000 attends
CCP	2906	31.66	27.87
Non CCP	136,010	19.12	13.39

## Detection of arrhythmias in convalescent plasma donors following recovery from SARS-CoV-2 infection

*Submitting author: Penny Wimbleton*

*Affiliation: NHSBT*

### **AUTHORS:**

Penny Wimbleton, Charlotte Washington

### **BACKGROUND:**

NHSBT is a Special Health Authority and provides a blood and transplantation service to the NHS. Safety and efficacy of COVID-19 Convalescent Plasma (CVP) was tested as part of two large randomised controlled trials in the UK (REMAP-CAP and RECOVERY). CVP collections by apheresis were started across NHSBT from early in the pandemic to support the trials. All donors undergoing an apheresis procedure have a pulse check due to the known potential arrhythmogenic risks associated with anticoagulant used in the procedure. Any donor whose pulse is irregular or outside the acceptable range is deferred from future donations and reinstated only after a satisfactory medical evaluation. Published literature has shown ongoing cardiac damage [1] and an increased incidence of arrhythmias both during and following recovery from SARS-CoV-2 [2].

### **AIMS:**

This review was done to assess the rate of deferrals due to rhythm abnormalities picked up by pre-donation pulse checks in COVID-19 convalescent plasma donors by comparison with other component donors.

### **METHODS:**

We performed an analysis to compare data from both CVP and component (platelet) donors over the period 01/03/2020-28/02/2021 with a control period for component donors from 01/03/2019-29/02/2020. We looked at rates of deferrals and the percentage of donors who were re-instated after referral to their doctor.

### **RESULTS:**

Soon after convalescent plasma collection commenced, it was noticed that a higher than expected number of donors were deferred due to an abnormal pulse rate and/or rhythm when compared with our component donors.

A comparison of data showed similar numbers of component donors attending over the time periods 01/03/2019-29/02/2020: 73,507 and 01/03/2020- 28/02/2021: 70,869 with a similar proportion of donors being deferred following the pulse check: 0.65% and 0.68% of which 29.1% and 22.8% respectively were reinstated. By comparison 72199 CVP donors attended between 01/03/2020-28/02/2021 with 1.49% being deferred following the pulse check and only 4.9% being re-instated. With more in depth analysis of the data, the percentage of CVP donors deferred for an abnormal pulse, but who had got through the initial donor screening questionnaire became more significant, with 1.95% being deferred compared to 0.69% and 0.72% for component donors.

**CONCLUSION:**

Our data is consistent with research findings that rates of arrhythmia are increased in patients following recovery from SARS-CoV-2 infection. We have detected an increase in the proportion of donors with a pulse outside our acceptable range in the convalescent plasma group.

Pulse checks are important in donor evaluation prior to apheresis procedures especially in the context of the pandemic when our understanding of the effects of SARS-CoV-2 is evolving. We have improved practices which contribute to donor safety by introducing longer initial pulse assessments with involvement of nursing staff to improve accuracy of pulse checks. We have provided additional training and support for staff and produced information leaflets for donor education.

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# Establishing Serosurveillance of COVID-19 in Wales

*Submitting author: Sian James*

*Affiliation: Welsh Blood Service*

## **AUTHORS:**

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## **BACKGROUND:**

In Spring 2020, the COVID pandemic challenged us all to respond in new ways. The Welsh Blood Service worked with NHS Wales' Public Health Wales to establish Serosurveillance for SARS-CoV-2 infection using samples discarded from the automated testing following blood donation. AIMS: To establish an efficient process for providing biological samples alongside anonymised demographic information for epidemiological examination

## **METHODS:**

The factors that allowed rapid set-up were:

- Being open to collaboration. This objective is a mainstay of the Welsh Blood Service's research strategy and sets the organisational mindset to consider every collaborative avenue. In-house facilitators, that provided dedicated resources to set up the newly integrated processes rapidly.
- Utilising consent. The original donation consent allowed use for this purpose as it is in an anonymised fashion with no further re-consent.
- Utilising existing data. Establishing new data collection takes time. We sought to exploit the routine data already recorded while adhering to all legislative data protection aspects.
- Simplified transportation logistics. As these samples have undergone testing, they are not legally deemed pathological. Packing and dispatch times are shortened.
- Having a flexible and unified approach. This allowed the team to exploit opportunities at pace. The teamwork was open with regular catch-ups and troubleshooting.

Around 100-150 samples per day, randomly chosen from all available, undergo immunoassay to Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) (Roche platform Elecsys Anti-SARS-CoV-2 provided by Swansea Bay University Health Board) that detects antibodies to the nucleocapsid (N) protein. The linked demographic parameters are anonymised donor's age, sex, postcode of residence, and self-reported ethnicity, and if the donor was a new or a reoccurring donor. The project excluded samples from convalescent plasma donors RESULTS: Between the period 29 Jun 2020 and 07 May, 28,487 samples were tested. In this period, 2,944 samples were positive for 'N' antibodies. Acquired immunity to SARS-CoV-2 rose in blood donors during the UK's 'second wave' in the Winter of 2020 (Table 1). Seroconversion and reversion to SARS-CoV-2 infection were observed, with trends of difference by age, sex, ethnicity, and geographic location. The epidemiological findings have been presented in public health forums. (Harker et al., 2021).

In Wales, this information is passed to Welsh Government's body that advises pandemic measures (Tactical Advisory Group, Welsh Government). The project is likely to be expanded to detect more antibodies against SARS-CoV-2's proteins which will detect the acquired immunity achieved through vaccination, rather than infection. We recognise a limitation that 'healthy' blood donors have in being a representative sample of a more general population of Wales (population 3.1 million). (van den Hurk et al., 2017).

## CONCLUSION:

This process provides a surrogate longitudinal population sample for public health surveillance. Utilising a waste product from blood manufacturing is a low-cost method of acquiring non-pathological blood samples. The associated demographic information that a blood collection agency routinely gathers can be utilised when consent and anonymisation are in place. This model allows for the creation of research networks and collaboration opportunities.

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## FIGURE/TABLE:

Table 1 Prevalence of SARS-CoV-2 antibodies in Welsh blood donors

The four weeks starting	% tests positive for SARS-CoV-2 antibodies (Lower and upper 95% confidence intervals)
29 Jun 20	5.3 (4.4 - 6.4)
27 Jul 20	5.4 (4.5 - 6.4)
24 Aug 20	5.7 (4.7 - 6.8)
21 Sep 20	6.0 (4.9 - 7.2)
19 Oct 20	6.6 (5.7 - 7.6)
16 Nov 20	8.8 (7.7 - 10.1)
14 Dec 20	13.8 (12.2-15.5)
18 Jan 21	20.0 (18.1-21.9)
15 Feb 21	17.7 (15.8-19.8)
15 Mar 21	18.1 (15.9-20.4)
12 Apr 21	18.6 (16.7-20.7)

## Session 4 “Donor health and eligibility“

Thursday, 16 <sup>th</sup> September – SESSION 4	
10.15 am – 11.45 am	<b>Donor health and eligibility</b> <i>Chair: Michael Müller-Steinhardt</i>
10.15 am – 10.30 am	<b>Considerations for Screening of Blood Donations Destined for Fractionation for Parvovirus B19 DNA and Hepatitis A virus RNA in England</b> <i>Sarah Williams, Jeremy Ratcliff, Peter Simmonds, Heli Harvala</i>
10.40 am – 10.55 am	<b>Risk of common autoimmune disease in Danish blood donors</b> <i>Thorsten Brodersen, Klaus Rostgaard, Cathrine Juel Lau, Knud Juel, Jesper Thorvald Troelsen, Susanne Gjørup Sækmose, Christian Erikstrup, Kaspar Rene Nielsen, Mie Topholm Bruun, Sisse Rye Ostrowski, Henrik Hjalgrim, Ole Birger Vesterager Pedersen</i>
11.05 am – 11.20 am	<b>Better protection for donors of Tissues and Cells: What can we learn from national biovigilance reporting?</b> <i>Josephine W.M. Heijnen, Johanna C. Wiersum-Osselton, Arlinke G. Bokhorst</i>
11.30 am – 11.35 am	<b>Human Breast Milk Bank Frankfurt</b> <i>Sarah Dombos, Veronika Brixner, Sarah Dombos, Mesut Karatas, Sebastian Haase, S. Philippi, Horst Buxmann, Rolf Schlößer, Erhard Seifried</i>
11.40 am – 11.45 am	<b>Delayed blood donor adverse events reported at NHSBT 2015-2020</b> <i>Shruthi Narayan, Shaminie Shanmugaranjan, Alexandra Griffiths</i>

# Considerations for Screening of Blood Donations Destined for Fractionation for Parvovirus B19 DNA and Hepatitis A virus RNA in England

**Submitting author:** Sarah Williams

**Affiliation:** Nuffield Department of Medicine, Peter Medawar Building for Pathogen Research, University of Oxford

## **AUTHORS:**

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<sup>2</sup>NHS Blood and Transplant, Microbiology Services, Colindale, UK

## **BACKGROUND AND AIMS:**

Human Parvovirus B19 (B19) can be transmitted by blood products and hence the European Pharmacopoeia has established the requirement that B19 DNA loads must be <10,000IU/ml in manufacturing plasma pools. Furthermore, according to the European regulation, plasma pools must be tested with an assay capable of detecting 100IU/ml of Hepatitis A (HAV) RNA. As the UK government removed the ban on the use of UK sourced plasma to manufacture medicines earlier this year, we have evaluated high-throughput B19 and HAV testing and determined the prevalence of these in English blood donors. We have also considered the need and practicalities of donor notification and related lookback investigations if screening were to be introduced in England.

## **METHODS:**

The performance of quantitative PCR assays previously developed for B19 and HAV detection (1) was assessed, and the 95% limit of detections (LOD) for B19 was re-determined using the WHO International Standards. Anonymised plasma samples collected in England were obtained: including discarded archive samples from 2017 (n=29,505), convalescent samples from 2020 (n=3,360) and residual pools of 24 samples from 2021 (n=43,200). Samples were tested in pools of 96 and selected positive pools were resolved into individual positive samples. Data on donor notifications and related lookback investigations were collected from other European countries via online survey conducted in September 2020.

## **RESULTS:**

The mean 95%LOD for B19 varied from 8.8IU for NS1 region and 2.8IU for VP2 region for genotype 1, 1.3IU/0.95IU for genotype 2 to 3.1IU/0.58IU for genotype 3. Screening of 76,065 donations identified 80 samples with B19 DNA, but no HAV RNA was detected. Most B19 positive samples had low viral loads (<10<sup>5</sup>IU/ml) and were identified in donations from 2017 (77/29,505; incidence 0.3%). One additional low level B19 DNA containing sample was identified among 2020 convalescent plasma donations (<10<sup>3</sup>IU/ml). Two samples, both from 2017, contained high levels of B19 DNA (1.32x10<sup>8</sup>IU/ml and 6.37x10<sup>5</sup>IU/mL; 1:14,752 donations).

Furthermore, our survey demonstrated varied testing and clinical practices across the Europe. Many blood establishments had organised their testing via fractionator without receiving the results back, and only a small proportion of those receiving results back informed blood donors of their B19 and/or HAV results.

**CONCLUSION:**

Our results demonstrated a high frequency of low level B19 DNA in donations (0.3%), consistent with previous blood donor studies documenting low level of B19 DNA detection for months or even years after acute infection, with frequency approaching 1%. Similarly, the frequency of high B19 DNA levels has varied from 1:5000 to 1:15,815 donations. To avoid contamination of manufacturers pool without wasting donations with low level B19 DNA, it is important that screening identifies these donations containing B19 DNA  $>10^6$  IU/ml only. Although mixed clinical practices were noted, we believe it is our duty of care to report B19 and HAV results back to blood donors and consider appropriate lookbacks for related blood components. Furthermore, the COVID-19 pandemic and associated lockdown measures may have had unpredicted effects for the epidemiology of many viral infections and hence close monitoring B19 and HAV incidence in the post-lockdown period will be required.

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## Risk of common autoimmune disease in Danish blood donors

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### **AUTHORS:**

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<sup>10</sup> Department of Haematology, Copenhagen University Hospital Rigshospitalet, Copenhagen, Denmark; Department of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark;

### **BACKGROUND:**

The healthy donor effect is a selection and confounding bias partly caused by the health criteria blood donors are required to meet. While the selection for health suggests that blood donors, on average, are healthier than the general population, blood donors still acquire disease. Several autoimmune diseases have peak incidence rates after the 2nd decade of life, allowing individuals to register as blood donors before being diagnosed with an autoimmune disease.

### **AIMS:**

This study aimed to investigate if the healthy donor effect is reflected in the incidence and risk of several common autoimmune diseases, i.e. inflammatory bowel disease, type 1 diabetes, rheumatoid arthritis, multiple sclerosis, Graves' disease, and autoimmune thyroiditis. Furthermore, we investigated if variation in lifestyle could explain any observed differences in risk of autoimmune disease between blood donors and the general population.

### **METHODS:**

Blood donors and the general population, non-donors, were compared in an unselected cross-sectional population-based cohort based on the 2010 and 2013 Danish National Health Surveys (DNHS) and The Scandinavian Donations and Transfusions (SCANDAT) database. Participants were grouped by donation history and prospectively followed for diagnosis of autoimmune diseases using the Danish National Patient Register. Crude and directly standardized incidence rates were generated and Cox proportional-hazards regression was used to investigate risk of disease. Models were adjusted for age, sex, regional residency, and various lifestyle factors.

**RESULTS:**

Data for 324,988 individuals were included in the analyses. Active donors generally had lower incidence rates and hazard ratios for the autoimmune diseases investigated, e.g. HR = 0.64 [0.42, 0.98] for inflammatory bowel disease or HR = 0.58 [0.32, 1.03] for rheumatoid arthritis. The observed differences between active donors and non-donors were reduced, but did not disappear, when lifestyle factors were included in the models.

**CONCLUSION:**

Active blood donors were less likely to develop autoimmune diseases than non-donors, while little difference was observed for lapsed donors. The results also suggest that some of the health advantages among active blood donors may result from healthier lifestyles, but lifestyle did not explain the effect in its entirety

## Better protection for donors of Tissues and Cells: What can we learn from national biovigilance reporting?

*Submitting author: Josephine W.M. Heijnen*

*Affiliation: TRIP - Hemovigilance and biovigilance office*

### **AUTHORS:**

Josephine W.M. Heijnen, Johanna C. Wiersum-Osselton, Arlinke G. Bokhorst

### **BACKGROUND:**

Major clinical advances have been made through the availability of human tissues and cells (HTC), including gametes and embryos, for medical application. To set quality and safety requirements for these applications EU legislation, expert guidance, international and national standards are in place. Besides protection of patients, more attention should be given in these requirements to protecting the safety of the donors. Biovigilance data can be of use in addressing the requirements for donor safety and identifying the gaps in current measures.

### **AIMS:**

Review the reported types of adverse reactions in donors, other adverse consequences or risk of harm to living donors of human tissues and cells to answer the question: are donors adequately protected?

### **METHODS:**

The TRIP (Transfusion and Transplantation Reactions in Patients) Hemovigilance and Biovigilance Office registers adverse reactions in recipients and donors of tissues and cells and adverse events including incidents, failures and events causing risk of harm to recipients or donors. Reporting meets the requirements for annual national Serious Adverse Reactions and Events (SARE) submission to the European Commission, but also includes non-mandatory reports of (non-serious) reactions and events. Information is received from hospital-based and independent tissue establishments, registered distributors of HTC, and treating clinicians.

In the TRIP database we retrospectively reviewed reports of donor adverse reactions and reports of other (potential) harm to donors in 2016-2020. They were subdivided by severity and grouped according to the main types of harm to donors.

### **RESULTS:**

In all, 21 donor adverse reactions were reported in 2016-2020, of which 18 were serious (Table). Fifteen complications were reported in association with oocyte harvest and three following donation of haematopoietic progenitor cells (HPC). The reactions did not have consequences for the quality and safety of the harvested HTC.

In 2016-2020, 140 events leading to loss of HTC were reported, among which 81 cases had consequences for the donor. Forty-eight cases were judged to be serious (Table). In medically assisted reproduction (MAR) this was because the whole reproductive cycle was lost. Extra harvesting procedures were needed in the two serious reports with peripheral blood HPC.

Seven reports concerned loss of HTC destined for the production of ATMPs (advanced therapy medicinal products, Table). These were not included as EU reportable serious adverse events despite the fact that the donors underwent extra procedures, because only donation and testing of HTC for ATMP manufacturing are within the scope of the legislation for HTC.

**CONCLUSION:** Biovigilance reporting highlights serious adverse reactions in donors of HTC, predominantly in HPC and MAR donations. Adverse events leading to loss of HTC can have serious consequences for donors, including loss of a reproductive cycle and chance of pregnancy as well as donor burden from harvesting additional HTC. Gaps currently not covered by vigilance reporting should be closed. These areas should be addressed in the ongoing revision of the EU HTC legislation.

**Table. Reports of Serious Adverse Reactions and Events affecting Tissue and Cell donors, 2016-2020**

<b>SAR in donors</b>	<b>Number</b>	<b>Type</b>	<b>Description</b>
MAR: complications of oocyte harvest	3	Third party donation	1x ovarian rupture* 1x ovarian abscess* 1x bladder damage
	12	Autologous	4x OHSS 3x procedural complications e.g. ovarian torsion** 5x abdominal symptoms/pelvic inflammatory disease**
HPC	1	Bone marrow (related)	Fracture of pelvis
	2	Peripheral blood HPC (autologous)	Pulmonary embolism
<b>Serious adverse events: loss of tissues or cells</b>			
MAR	46	12x embryos (1x from donated oocyte, 11x own+partner gametes) 25x oocytes 8x semen 1x ovarian tissue	Loss of a reproductive cycle
HPC	2	Peripheral blood HPC (autologous)	Extra harvesting procedure
<b>EU non-reportable</b>			
Other tissue	4	Chondrocytes for expansion in tissue culture (autologous)	Extra harvesting procedure
Therapeutic cells	3	Lymphocytes for CAR-T cells (autologous)	Extra harvesting procedure

\*surgical management

Abbreviations: SAR= serious adverse reactions, MAR= medically assisted reproduction, OHSS= ovarian hyperstimulation syndrome, HPC= haematopoietic progenitor cells, CAR-T cells= chimeric antigen receptor-T cells

## Human Breast Milk Bank Frankfurt

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### **AUTHORS:**

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<sup>1</sup>German Red Cross Blood Donation Center Baden Wuerttemberg - Hessen gGmbH, Frankfurt, Germany

<sup>2</sup>Department for Children and Adolescents, University Hospital Frankfurt, Goethe University, Frankfurt, Germany

### **BACKGROUND:**

Due to its beneficially nutritional and biological effects especially for preterm and ill infants, there is a great demand for human breast milk banks. Although there is an increase in the establishment of milk banks, not all infants have access to human breast milk. To address this problem in the Rhine-Main area (Hesse, Germany), the blood donation service Frankfurt established a human breast milk bank in cooperation with the department of neonatology at the University Hospital Frankfurt to provide infants with donated human breast milk products. The major challenge is to produce a safe and reliable product.

### **AIMS:**

Here we present how our Breast Milk Bank Frankfurt uses the experience of the blood donation service in donor selection to increase the safety of our breast milk product.

### **METHODS:**

First, each potential donor needed to fill in an anamneses questionnaire, adapted from the uniform eligibility criteria form for blood donors. To ensure the safety and high quality requirements of the donated breast milk, each donor was serologically tested for infectious diseases before and after the donation period, including a retain sample of the blood. We produced 195 batches of pooled and via Holder Pasteurization (30 min at 63°C) pasteurized breast milk, using a single donor strategy. Additionally the donated milk was analyzed for its composition and bacterial contamination and only if all results were negative and complied with our quality standard, the pasteurized milk was released for feeding.

### **RESULTS:**

After two years of experience, we received about 305 liters of human breast milk from 30 healthy voluntary donors, who gave birth to premature infants. Thanks to our exceptional quality control system, we could support over 50 preterm infants, including twins and triplets with a birth weight below 500g, with 2738 bottles of pasteurized human breast milk.

### **CONCLUSION:**

The human breast milk bank in Frankfurt benefits from frequently performed donor screening. High expertise in standardized testing for infectious diseases together with the tremendous process control standards are utterly qualifying the blood donation service for the production of a safe and reliable human breast milk product.

## Delayed blood donor adverse events reported at NHSBT 2015-2020

**Submitting author:** Dr. Shruthi Narayan

**Affiliation:** SHOT Medical Director and Consultant Donor Medicine, NHS Blood and Transplant

### **AUTHORS:**

Shruthi Narayan, Shaminie Shanmugaranjan and Alexandra Griffiths

### **BACKGROUND:**

Blood donations are generally safe, but donors can experience complications during or after donation. Delayed complications are those that occur after the donor has left the donation venue. NHS Blood and Transplant (NHSBT) is a Special Health Authority in England and ensures a safe and reliable supply of blood components. Blood donors are encouraged to report any adverse event up to 14 days post donation, but these are generally under-reported, and donors may self-defer or withdraw from future donations. Blood components are collected either by whole blood donations or by apheresis. Between April 2020- March 2021, COVID-19 convalescent plasma (CCP) was collected by apheresis at NHSBT to support clinical trials for management of hospitalised COVID-19 patients.

### **AIMS:**

A review of the reported delayed events was undertaken to identify common themes and recognise areas for improving donor safety.

### **METHODS:**

All delayed events reported between January 2015 to December 2020 inclusive were collated and analysed.

### **RESULTS:**

Approximately 9.8million donations were collected (whole blood and apheresis including CCP) at NHSBT during this period. A total of 18,255 delayed donor complications were reported with delayed bruising accounting for 11259/18255 (61.7%) of the events. 6891 (37.7%) delayed vasovagal events were reported and rebleeding after leaving the session was reported by 105 donors (0.6%). Most delayed events were reported by female donors (12928/18255, 70.8%) and this was reflected in all the categories of delayed complications reported. With whole blood (WB) donations accounting for most donations collected, 17252 (94.5%) delayed events reported were following WB donations. 60% (10,875/18255) events were reported in donors who had donated >5times. Despite a steady decline in the number of donations collected over the years reflecting decreasing demand for blood, the number of delayed complications reported annually has increased with 2233 events reported in 2015 rising to 4051 reported in 2020. This could reflect better donor education and awareness with more active encouragement of donors to report delayed events. A total of 305 reports related to CCP donors and delayed bruising accounted for 262 (85.9%) events, significantly higher than non-CCP apheresis donors. Of all severe donor adverse events reported between 2015-2020, 130 were relating to instances where donors were hospitalised, sustained a fracture, or were involved in a road traffic collision. Most were related to vasovagal events, mainly delayed and >80% of donors who experienced an SAED were withdrawn from blood donation.

**CONCLUSION:**

A small proportion of donors have delayed complications that have the potential to lead to serious injury. Information about potential complications of blood donation, both immediate and delayed must be given to all donors and discussion about the risks involved should be part of the donor consent process. Donors must be encouraged to report delayed events and advice on prevention, in particular, advice on maintaining post-donation fluid intake, and avoidance of known precipitating factors such as overheating, and prolonged standing are essential. Women are more likely than men to report delayed reactions. Delayed and off-site reactions lead to potentially preventable morbidity. Understanding the physiologic basis of such delayed reactions may lead to the development of appropriate interventions to reduce their likelihood.

## Session 5 “Donor recruitment & donor retention “

Thursday, 16 <sup>th</sup> September – SESSION 5	
1.00 pm – 2.30 pm	<b>Donor recruitment &amp; donor retention</b> <i>Chair: Lars Eberhart</i>
1.00 pm – 1.15 pm	<b>Warming up Cooler Cooperators</b> <i>Eamonn Ferguson, Claire Lawrence, Sarah Bowen, Carley N. Gemelli, Amy Rozsa, Konrad Niekrasz, Anne van Dongen, Lisa A. Williams, Amanda Thijsen, Nicky Guerin, Barbara Masser, Tanya E. Davison</i>
1.25 pm – 1.40 pm	<b>The impact of marketing interventions on prosocial behavior</b> <i>Sabrina Sandner, Sinika Studte, Valentyna Melnyk, Michel Clement</i>
1.50 pm – 2.05 pm	<b>Why cooperative defaults undermine inclusive fitness: The case of living organ donations</b> <i>Pascal Güntürkün, Sinika Studte, Eamonn Ferguson, Eva-Maria Merz, Jonathan Tan, Elisabeth Huis in 't Veld, Michel Clement</i>
2.15 pm – 2.20 pm	<b>Is it possible to hold a blood donation marathon during a pandemic?</b> <i>Manel Gastó Rodríguez, Laura Munné, José Antonio Pellejero, Lluís Trillo, Aurora Masip</i>
2.25 pm – 2.30 pm	<b>Recruitment of Blood Donors of non-Caucasian Ethnicity</b> <i>Vildana Pehlic, Andreas Holbro, Gregor Stehle, Andreas Buser, Laura Infanti</i>

## Warming up Cooler Cooperators

**Submitting author:** Eamonn Ferguson

**Affiliation:** University of Nottingham

### **AUTHORS:**

Eamonn Ferguson, Claire Lawrence, Sarah Bowen, Carley N Gemelli, Amy Rozsa, Konrad Niekrasz, Anne van Dongen, Lisa A. Williams, Amanda Thijsen, Nicky Guerin, Barbara Masser, Tanya E Davison

### **BACKGROUND:**

While predicted to fall, globally the number of donors has remained steady at 4% of the eligible population. New donors have a higher risk of fainting when donating and have a higher rate of discard due to a higher incidence of red cell antibodies for transfusion-transmissible-infections (TTIs). Repeat donations are, therefore, encouraged as they constitute a saving in terms of recruitment costs, improved donor safety, and a reduction of waste. However, the conversion rate from 1<sup>st</sup> donation to repeat donations is low with 21.4% making a 2<sup>nd</sup> donation and 7.2% making 3 subsequent donations in the USA for example. However, in Australia, the figures are higher, with 29.3% of new donors returning within 6 months. Thus, an intervention designed to encourage repeat donations would be very beneficial to blood collection agencies. Warm-glow (i.e., feeling good from the act of donation) has been shown to be the primary motivation for repeat long-term blood donation, but the mechanisms that support this are not known. Thus, we develop a theoretical model that suggests that warm-glow not only reinforces repeat donation but also enhances the use of behavioural facilitators to repeat donation (re-booking).

### **AIMS:**

To test the model of warm-glow to facilitate return donation as well as develop, test, and implement an intervention based on warm-glow.

### **METHODS:**

We report 6 studies: 3 observational studies of warm-glow, re-booking and return behaviour ( $n_s = 716, 1125, 932$  donors); an online experiment ( $n = 1592$  general public); a field-based experiment ( $n = 5,821$  donors) comparing warm-glow and impure-altruism messages on return behaviour as a function of re-booking; and an implementation study for the implementation of a warm-glow message that compares a 3-year pre-implementation period among all first-time donors in Australia ( $N_s = 90,317, 93,430$  &  $89,606$ ) to a 2-year post-implementation period ( $N_s = 81,766$  &  $88,551$ ).

### **RESULTS:**

Warm-glow positively predicted donor return behaviour and was associated with facilitating donation via re-booking. The effect of warm-glow on return donation was mediated via re-booking. We developed validated intervention tools based on warm-glow, and show that warm-glow messages that emphasised donor identity resulted in higher conversion rates compared to a control group, especially in 'cooler cooperators' (those with lower initial warm-glow scores).

### **CONCLUSION:**

Warm glow behaviourally facilitates donation and donor conversion rates can be enhanced by a simple message-based behavioural intervention.

# The impact of marketing interventions on prosocial behavior

**Submitting author:** Sabrina Sandner

**Affiliation:** Universität Hamburg

## **AUTHORS:**

Sabrina Sandner, Sinika Studte, Valentyna Melnyk, Michel Clement

## **BACKGROUND:**

Only 3% of the age-eligible US-population donates blood (American Red Cross, 2021) and just 11.7% of first-time blood donors return for donation (Kasraian et. al., 2019). Currently, many countries observe a massive decline in blood donations resulting in an unmet need for blood. Blood donation services try to solve this problem for example by using incentives. At the German Red Cross Blood Donation Service (GRC), 81% of donors receive an incentive with a previous donation. However, there is still a scientific debate whether incentives help to increase blood donations or rather backfire (Lacetera & Macis, 2010).

## **AIMS:**

In terms of prosocial behavior, individuals behave either consistently (e.g., donating blood regularly) or inconsistently (e.g., not returning after their first donation). This is due to different motivations (Khan & Dhar, 2006) which may be influenced by external incentives. Whether incentives have a positive or negative effect on behavior can depend on the perception of the incentive as utilitarian or hedonic (Okada, 2005). Thus, the aim of this research project is (1) to analyze the effect of both utilitarian and hedonic incentives on prosocial behavior and (2) to examine if incentives can avert the moral licensing effect (i.e., after doing a good deed, one is more likely to act less good subsequently; Khan & Dhar, 2006) to achieve consistent prosocial behavior.

## **METHODS:**

Three studies were conducted to analyze the effect of both utilitarian and hedonic incentives on prosocial behavior. First, blood donors evaluated the incentives they received after their last donation and stated their future donation intentions using an online survey (Study 1, N=310). Second, a laboratory experiment with actual prosocial behavior was run to reveal the effects of receiving incentives after an initial good deed on a subsequent deed (Study 2, N=391). Third, an online experiment was conducted to show process evidence by moderation under the consideration of moral licensing (Study 3, N=583).

## **RESULTS:**

Study 1 shows that hedonic incentives – contrary to utilitarian incentives - have a significant positive effect on blood donation intentions ( $p \leq .001$ ). Using mediation analysis, we can further explain these results since hedonic incentives create feelings of guilt which leads to the moral obligation to donate again. Study 2 confirms these results for actual money donation behavior as significantly more participants donate (N=94, 67.14%) than do not donate (N=46, 32.86%,  $p \leq .001$ ) when a hedonic incentive is offered. In contrast, this effect is not significant if a utilitarian incentive is provided. Study 3 concludes these results by showing process evidence by moderation. Results state that hedonic incentives positively moderate the moral licensing effect on prosocial behavior (95% CI: .1326 to 1.3276). Thus, the moral licensing effect can be averted by hedonic incentives resulting in consistent prosocial behavior.

**CONCLUSION:**

Our results are highly important for blood donation services as we could demonstrate that handing out hedonic incentives positively influence subsequent behavior, which can lead to increased donations and consistent donation behavior. In contrast, we did not find any significant positive effects on subsequent prosocial behavior using utilitarian incentives.

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## Why cooperative defaults undermine inclusive fitness: the case of living organ donations

*Submitting author: Pascal Güntürkün*

*Affiliation: WU Vienna*

### **AUTHORS:**

Pascal Güntürkün, Sinika Studte, Eamonn Ferguson, Eva-Maria Merz, Jonathan Tan, Elisabeth Huis in 't Veld, Michel Clement

### **BACKGROUND:**

Opt-out defaults can ‘nudge’ people towards more cooperative behavior and many countries have adopted such cooperative defaults to increase deceased organ donation, as well as energy conservation, and childhood vaccination. Although opt-out defaults are effective in increasing available organs via deceased organ donation (e.g., Johnson and Goldstein 2003), there is initial evidence that they can also have a negative spillover effect, by reducing the living organs available for transplantation (Shepherd, O’Carroll, and Ferguson 2014). However, why these negative spillover effects on living organ donations occur and which donor groups (e.g., high v. low altruists) or recipients (e.g., family members vs. strangers) might be most affected by switching to such a cooperative default policy is yet unknown.

### **AIMS:**

We propose a theoretical explanation for this negative spillover effect based on perceptions of supply-and-demand and how they may interact with inclusive fitness (i.e., the extent to which people are willing to rescue or support others outside their core family). Drawing on this theorizing we investigate 1) when and why opt-out defaults have negative effects on the supply of living organ donations and 2) how default policies affect other mechanisms known to support organ donation such as reputation building and trust in others’ cooperation.

### **METHODS:**

We ran three experimental studies using lab and field data. Experiment 1 (n = 100) offers an initial lab-based test. Experiment 2 (n = 435) provides a comparative analysis of two culturally similar countries with different default policies (Germany vs. Austria) that offers a more differentiated perspective on inclusive fitness and identifies psychological mechanisms driving these effects. Experiment 3 (n = 1,721) disentangles the roles of the default system (opt-in vs. opt-out) and the percentage of registered donors (low vs. high) and tests whether the effect of the default system on living organ donations differs as a function of people’s pre-existing cooperative tendencies. We use MANOVAs to test group comparisons and estimate path models to test for (moderated) mediation effects.

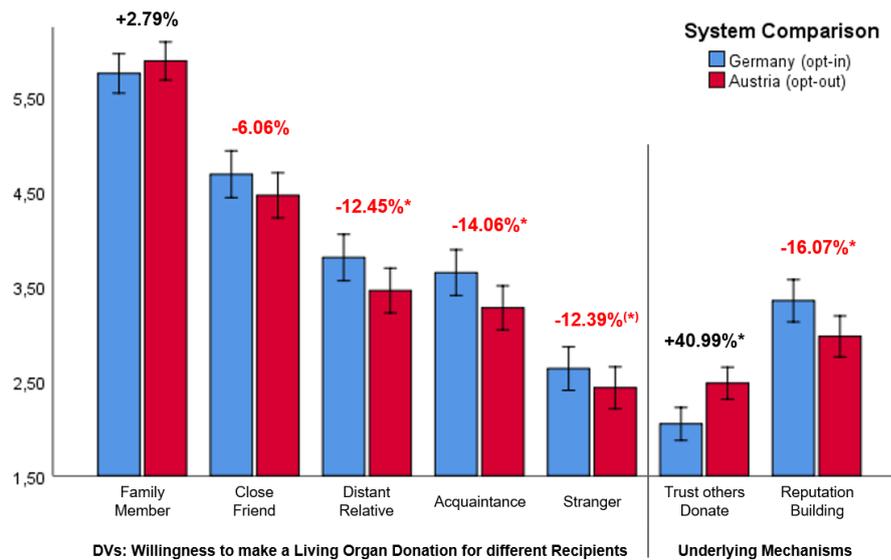
### **RESULTS:**

We find converging evidence that opt-out defaults for deceased organ donations have negative spillover-effects on living organ donations because they 1) give rise to free-riding intentions by enhancing people’s trust in others’ cooperation (i.e., organ supply) and 2) reduce reputation building potential by making organ donations a more mundane act. The negative effect of cooperative defaults are not the same for all recipients but especially undermine inclusive fitness intentions, such that people are significantly less willing to donate to recipients low in genetic relatedness and emotional closeness (see Figure 1). Finally, a concerning finding is that opt-out defaults particularly demoralize cooperative intentions of ‘high potential’ donors, i.e., people with higher pre-existing tendencies to cooperate.

## CONCLUSION:

The present research advances knowledge on cooperative defaults by showing that opt-out defaults targeted at deceased organ donations can have negative spillover-effects on living organ donations because they change people's perceptions of supply-and-demand for a public good (i.e., the supply of organs). Theoretically, the study advances insights into how cooperative defaults interact with other mechanisms known to support cooperation. From a practical perspective, the identified mechanistic explanations and conditional effects on donor and recipient groups offer valuable implications for policy makers and marketers.

**FIGURE 1:** Mean Differences between Germany (opt-in) and Austria (opt-out)



## Is it possible to hold a blood donation marathon during a pandemic?

*Submitting author: Manel Castó Rodriguez*

*Affiliation: Banc de Sang i Teixits  
(Barcelona, Spain)*

### **AUTHORS:**

Manel Gastó, Laure Munné, Josè Antonio Pellejero, Lluís Trillo, Aurora Masip

### **BACKGROUND:**

Banc de Sang i Teixits, which meets the requirements for blood in Catalonia, a population of 7.5 million inhabitants, organises a major blood donation marathon (>10,000 donations) every year after the Christmas holidays.

The goals are a) to recover reserves after the drop in donations during the holiday period b) to create an event that has an impact on the media to spread the word about blood donation c) to generate a promotional campaign that can be replicated locally all year long.

### **AIMS:**

To maintain the goals in spite of the health restrictions imposed by the pandemic.

### **METHODS:**

A donation experience is created that is based on the world of film, as giving blood has become “like being in a film” since the start of the pandemic. Donors now have to book a time to attend the donation point, wear a mask, and disinfect their hands. The refreshments are given in very large areas and with social distancing in force.

Everything has changed over the past year, which is why we say that giving blood is now “like being in a film”. But the script hasn’t changed: generosity to help those in need. And behind each donation is a film-like story.

Between 8 and 15 January 2021, we turned donation into a film-like experience:

On the booking website, donors no longer reserved a donation bed but a seat in a cinema

The image of the campaign simulated the poster for a film.

Four trailers were produced based on real stories of donors and recipients, to simulate films

A customised bag of popcorn was included in the refreshments.

Donors were given a free one-month subscription to Filmin, a film streaming platform similar to Netflix

Filmin created a channel with films on blood donation

The donation areas were converted into cinemas: a red carpet and a photocall with clapperboards were installed so that donors could take photos

An Instagram filter with the image of the campaign was created with the aim of going viral

Internally, surprising stories were sought relating to the work of the professionals of the Bank.

They were filmed and shared with the entire organisation.

### **RESULTS:**

9,550 blood donations were obtained over the week of the Marathon, which is nearly the target. There were 95,000 hits for the Instagram campaign filter and 150,000 mentions in the social media (Facebook, Twitter and Instagram). The main media generated news that reached 500.000 people. 50% of the professionals viewed the internal videos, valuing the initiative as extremely positive. The same materials used for the main Marathon were applied to 5 local Marathons, generating a novel experience in towns with no donation hospital.

**CONCLUSION:**

The campaign had great media and social impact. The target number of donations sought was not reached, but the repercussions of the campaign lasted over the following days, taking bookings to an optimum level.

## Recruitment of Blood Donors of non Caucasian Ethnicity

*Submitting author: Vildana Pehlic*

*Affiliation: Blood Transfusion Centre  
Basel, Switzerland*

### **AUTHORS:**

Vildana Pehlic, Andreas Holbro, Gregor Stehle, Andreas Buser, Laura Infanti

### **BACKGROUND:**

In our region, an increasing number of patients of African or Asian origin with sickle cell disease (SCD) or transfusion dependent thalassemia (TDT) require regular red blood cell (RBC) transfusions. In these patients, a broad RBC antigen matching between blood donors and recipients is required if the patient has alloantibodies but is also effective in preventing alloimmunisation.

Beside ABO, Rh D, C, c, E, e and K, an optimal RBC antigen matching includes M, N, S, s, Fya, Fyb, Jka and Jkb (extended matching). This is the policy at our centre, which currently provides RBC transfusions to 15 patients needing regular transfusions.

### **AIMS:**

Hereby we describe the strategy that we developed for identifying potential matched blood donors for the patients with SCD or TDT who are not of Caucasian ethnicity.

### **METHODS:**

Since 01.01.2013, ethnicity of first-time blood donor is recorded in our system following the definitions used for unrelated stem cell donors. For those of non-Caucasian origin, the request for determining the extended RBC phenotype along is triggered automatically.

RBC antigens are determined either with serologic methods or with molecular testing (SSP PCR). RBC phenotypes of relevance include ccDee (Ror), Fy(a-b-), S- s- and Lua(b-). On detection of a rare RBC phenotype, a corresponding code is entered in the donor file and information is sent to the national Rare Donor File.

### **RESULTS:**

From 01.01.2013 until 31.12.2020 an extended RBC phenotype was analysed in 604 first-time donors. In 65 (11%) the Ror phenotype was found. Fifty-three rare donors (8.7%) were identified, of these 26 (49%) with the Ror phenotype. There were 50 Fy(a-b-) donors (94%), and of these 23 were negative also for S, and one for S and s (U-negative). Two other donors were Lua(b-) and one Lua(a-b-).

The majority of the 53 rare donors were Black (41; 77%) (Figure 1)

Three donors were permanently deferred: one because of poor vein access, one with active HBV and malaria, and one with positive HbC antibodies. Three donors with positive malaria antibodies were deferred for 3 years.

In two individuals, heterozygous thalassaemia was suspected because of microcytosis, and in one RBC agglutination during blood processing was observed, possibly due to heterozygous SCD.

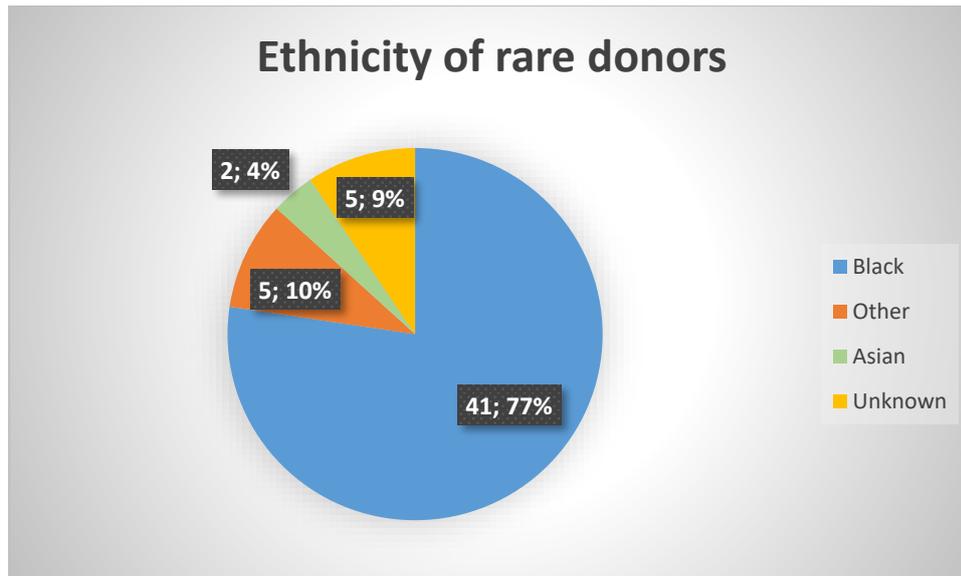
The 53 rare donors gave a median of 2.8 RBC units (range 1-26, total 151). To date, 39 donors are still active and 20 are reserved for dedicated donations.

**CONCLUSION:**

In our experience, a “passive” search for rare RBC phenotypes among non-Caucasian blood donors requires logistic and financial efforts. African and Asian first-time donors may require investigations for haemoglobin variants and malaria in addition to routine testing.

Nevertheless, we were able to build up a group of donors with rare phenotypes, who are regularly requested for specific patients. Currently, a pilot project for actively recruiting potential rare donors is ongoing at our centre. Based on our experience, a larger project in two Swiss regions will soon start in collaboration with the local Red Cross associations.

**Optional:** FIGURE 1.



## Session 6 “Recent developments in plasma donation”

Thursday, 16 <sup>th</sup> September – SESSION 6	
1.00 pm – 2.30 pm	<b>Recent developments in plasma donation</b> <i>Chair: Torsten Tonn</i>
1.00 pm – 1.15 pm	<b>Short-Term Health Outcomes Following Plasma- and Platelet Donation: A Nationwide, Retrospective Cohort Study</b> <i>Fredrik Toss, Jingcheng Zhao, Rut Norda, Gustaf Edgren</i>
1.25 pm – 1.40 pm	<b>Achieving Plasma Self-Reliance</b> <i>Asuka Burge</i>
1.50 pm – 2.05 pm	<b>COVID-19 convalescent plasma donations: incidence of donor complications in comparison to other plasma donations</b> <i>Joke van Marion, Mariël Casparie, Johanna Wiersum-Osselton, Fernando Gonzalez Garcia, Liesbeth Roos</i>
2.15 pm – 2.20 pm	<b>Increased D-dimers in large haematoma after plasma donation</b> <i>Niubel Díaz Padilla, Fernando Gonzalez García, Věra M.J. Novotný</i>
2.25 pm – 2.30 pm	<b>COVID-19 convalescent plasma, the Northern Ireland BTS experience</b> <i>Andrea Piccin, Barbara Mullin, Asma Sadiq, Joanne Murdock</i>

# Short-Term Health Outcomes Following Plasma- and Platelet Donation: A Nationwide, Retrospective Cohort Study

*Submitting author: Fredrik Toss*

*Affiliation: Department of Clinical Immunology, Umeå University, Umeå Sweden*

## **AUTHORS:**

Fredrik Toss, Jingcheng Zhao, Rut Norda, Gustaf Edgren

## **BACKGROUND:**

Donation of plasma or platelets by apheresis may have short- and long-term health implications. Adverse events occurring within the donation facility have been well characterized, while less is known about events occurring in the days following donation. We set out to describe the frequency of these events, but most importantly, we aimed to assess indications for causality and to provide estimates of donation induced relative and absolute risks.

## **AIMS:**

To study short-term medical risks following plasma and platelet donation.

## **METHODS:**

We set up a nationwide cohort of donors who donated plasma and/or platelets between 1987 and 2018. Analyses were conducted using conditional logistic regression in a self-comparison design, where each donor was compared only to themselves, considering the 30-day risk of 26 outcomes following plasma/platelet donation. Outcome data were compiled from national hospital records and included cardiovascular diseases such as myocardial infarction, hemostasis associated events such as thrombosis and bleeding, infections, unspecified conditions such as fainting, accidents or external causes of injury, and death.

## **RESULTS:**

A total of 149,107 plasma- and/or platelet donors were followed for a median of 21 years. During follow up 5,898 donors experienced at least one of the outcomes within 30 days an apheresis donation. For hypotonia and fainting, we observed a 6 to 13-fold risk increase on the day of both plasma and platelet donation compared to the control period. Risk were transient and largely normalized within the subsequent days. Risks of the other outcomes were either unaffected or lower than expected right after donation.

## **CONCLUSION:**

Donation of plasma- and platelet is associated with a short-term increased risk of needing hospital care due to hypotonia and fainting, but absolute risks are small. Reassuringly, we found no indications of elevated risks for events with long-lasting health implications.

## Achieving Plasma Self-Reliance

*Submitting author: Asuka Burge*

*Affiliation: New Zealand Blood Service*

### **AUTHORS:**

Asuka Burge

### **BACKGROUND:**

New Zealand Blood Service has had a challenge to meet the plasma collection requirements since Nov-19 when the target was increased to 77k pa. Attempts to meet requirements were further exacerbated when the collect target increased to 85k pa in Dec-19, increased again to 102k in Apr-20 and to 110K in June-20. The target from July-21 is 115K.

The increasing targets were a consequence of increasing demand for immunoglobulin. The 7 year forecast shows a doubling in collections requirements from 2020 to 2028.

### **AIMS:**

Meet the plasma collection numbers by growing the plasma donor panel to a number sustainable to meet the 115K target set for July-21.

### **METHODS:**

The panel requirement was determined using a calculation based on collection requirements and donor frequency. Eight key plans and initiatives were implemented.

1. Straight to Plasma - the ability for donors to donate plasma without having previously donated whole blood.
2. Nomogram change - provide the potential for donors to donate more plasma in each donation
3. Mobile Plasma - introducing plasma collection on mobile blood drives
4. Auckland Plasma - a range of smaller initiatives to improve plasma collection capacity and panels in Auckland (largest city in New Zealand)
5. Facilities Capacity - adding additional plasma beds to our fixed sites.
6. Collections staff - ensuring we have the appropriate number of staff to collect the required amount of plasma
7. Donation Frequency - the average number of times plasma donors donate each year.
8. Gold Club – establishment of a special identity for Plasma Donors to build a donor community.

New Zealand Blood Service (through ADRP) has grown a close relationship with Hema-Quebec and was also able to visit their Plasma Vie sites prior to 2020 to gain learnings, some of which were used to help inform the above initiatives.

### **RESULTS:**

Capacity increases aligned with staffing began to show a visible impact from Aug-20. Plasma mobiles commenced in Auckland in Sep-20 and straight to plasma and nomogram changes were implemented in Nov-20, where the highest number of new plasma donors were recruited. The frequency is currently 6.7 donations per annum for existing donors. The plasma panel has increased by 33% in past 12 months.

**CONCLUSION:**

Significant panel growth has resulted from concentrated efforts over the last 12 months. This required a combined alignment across the whole organization to prioritise plasma, and invest financially into staffing and resources to make it easier for donors to donate. A number of campaigns and initiatives are in place to continue this growth to support increasing fractionated requirements.

# COVID-19 convalescent plasma donations: incidence of donor complications in comparison to other plasma donations

**Submitting author:** Joke van Marion

**Affiliation:** Sanquin Blood Bank,  
Amsterdam

## **AUTHORS:**

Joke van Marion, Mariël Casparie, Johanna Wiersum-Osselton, Fernando Gonzalez Garcia and Liesbeth Roos

## **BACKGROUND:**

In response to the SARS-CoV-2 pandemic Sanquin collected over 50,000L of COVID-19 convalescent plasma (CCP) by apheresis from donors who had recovered from the infection.

## **AIMS:**

To evaluate safety of plasma donation following recovery from COVID-19, we compared the incidence of complications in CCP donors to that in other plasma donors.

## **METHODS:**

Donors were recruited for CCP donation by municipal health services following a positive COVID-19 PCR test. Whole blood or plasma donors attending for regular donation were also invited to temporarily donate CCP if they reported a positive COVID-19 test. CCP donation followed routine screening and donation procedures, the volume being adapted to the donor's weight and height, to a maximum of 840ml including anticoagulant solution. For the analysis routinely recorded donation and complication data were extracted from the blood bank information system eProgesa for the period in which CCP donations took place, i.e. from 01-04-2020 to 28-02-2021. Data for CCP donations were compared to non-CCP plasma donations with stratification for gender, age group and number of previous donations (all types; 1st, 2nd, 3rd, 4th, 5th-9<sup>th</sup> and 10+; 'donation experience').

## **RESULTS:**

During the study period a total of 74,182 CCP and 228,345 non-CCP plasmapheresis donations took place. 15% of CCP donations represented first donations, vs 1.5% of non-CCP plasma donations.

3,102 vasovagal reactions (VVR; 4.18%) were recorded in CCP donations and 2,366 (1.04%) in non-CCP donations. After stratification for age, gender and donation experience there was no difference between CCP and non-CCP VVR rate for 1<sup>st</sup>-9<sup>th</sup> donations. For 10<sup>th</sup> or subsequent donations CCP donors had a higher rate of VVR of 1.44% vs 0.62% in non-CCP plasma donations (chi<sup>2</sup> 242,5, p<0.00001). In this 10+ group, the median number of donations of CCP donors was 29 (IQR 16-58) vs 71 (IQR 36-119) among non-CCP donors.

The number of venipuncture-related complications was 1,436 (1.94%) in CCP donations and 2,679 (1.17%) in non-CCP donations. On stratification for age group, gender and donation experience there was no difference between the groups.

There were 107 recorded citrate reactions (0.14%) in CCP donations vs 103 (0.05%) in non-CCP plasma donations. Among the other recorded donation complications, 12 CCP (0.02%) donors reported extreme fatigue following their donation vs 4 (0.002%) in non-CCP plasma donors. Because of the small numbers stratification was not performed.

**CONCLUSION:**

The analysis showed a higher percentage of VVR and venipuncture-related complications among CCP donors than in non-CCP donors. Stratification demonstrated that this was a consequence of CCP donors having less previous donation experience. The recorded higher rate of citrate reactions and fatigue represents small numbers of complications and may be due to reporting bias. Higher numbers of reported fatigue led to a recommendation to carefully ascertain full recovery from COVID-19 at least 2 weeks before acceptance for donation. Overall, CCP donation was found to be safe under the present conditions and working methods.

## Increased D-dimers in large haematoma after plasma donation

*Submitting author: Niubel Díaz Padilla*

*Affiliation: Sanquin*

### **AUTHORS:**

Niubel Díaz Padilla, Fernando Gonzalez García and Věra M.J. Novotný

### **BACKGROUND:**

Although plasma donation is considered to be a safe procedure, it still carries risk of potential complications. For instance, large hematomas (collection of blood outside the blood vessels bigger than 5 cm) are more frequent in plasma than in whole blood donations. Apheresis haematomas are a red cell concentrate, partially anticoagulated with citrate that accumulates extravascular with a high pressure (250 to 300 mm Hg) at a high rate (about 100 ml/min). They usually can cause pain, swelling and redness but will heal in about four weeks. However, other complications, i.e. infection, thrombosis or compression syndrome, although rare, can occur. It is sometimes difficult to distinguish whether intravascular thrombosis has occurred, which is very important since an embolus can cause secondary pulmonary embolism and treatment. D-dimer is a small protein fragment derived from fibrin used to detect intravascular thrombosis. Therefore, it would be a marker for exclusion of intravascular thrombosis.

### **METHODS:**

We report a case of a hematoma in a donor after an apheresis procedure who visited the general practitioner for follow-up. To calculate the extend the incidence of reported haematomas in different apheresis machines; Aurora, AutoC, PCS2, DigiPla80 in 2020 in our collection centers we evaluated reported side effects after donation.

### **RESULTS:**

A 24-year old female Covid-19 plasma donor was accepted for donation in February 2021 after evaluation of the medical questionnaire and physical examination. Except, for having had COVID-19 in November 2020 the donor was healthy and had no other medical issues. During COVID-19, she suffered from headache, a sore throat and fatigue without dyspnea or fever. She was completely recovered in January, except from an occasionally headache. The plasmapheresis was performed using the Aurora machine according to standard procedures. The venipuncture was done in the right arm. No technical problems i.e. high pressure were observed during the procedure.

The day after donation, the donor complained of a sore right arm, mainly during extension and flexion and small bulge at the injection site. Five days after donation, pain increased and her arm was blue from mid-upper arm to the wrist. On day eighth, the donor visited her general practitioner where a D-dimers test and ultrasound were done. D-dimer levels were slightly increased 0,74 (<0,5 mg/L). Thrombocytes, Prothrombin Time, Activated Partial Thromboplastin Time and Erythrocyte Sedimentation were normal. No abnormalities were seen using ultrasound.

Comparing the incidence of hematoma after different apheresis procedures in 2020 we found 3101 hematoma in 312153 plasma donations. 907 at the Aurora (61740 donations), 1490 at the AutoC (87217), 573 at the PCS (155923), 131 at the Digipla80 (7273).

## CONCLUSION:

As shown in this case report, an increased level of D-dimers without indications of deep venous thrombosis was found in a plasma donor after the occurrence of a hematoma. Hematoma occur in less than 1% after apheresis procedures with a difference in type of machine used.

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1. I.M. Lasan et al. Association between high D-dimer plasma levels and haematoma - Case report. *Libri Oncologici* 2012 40(1):17-20
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## FIGURE/TABLE:

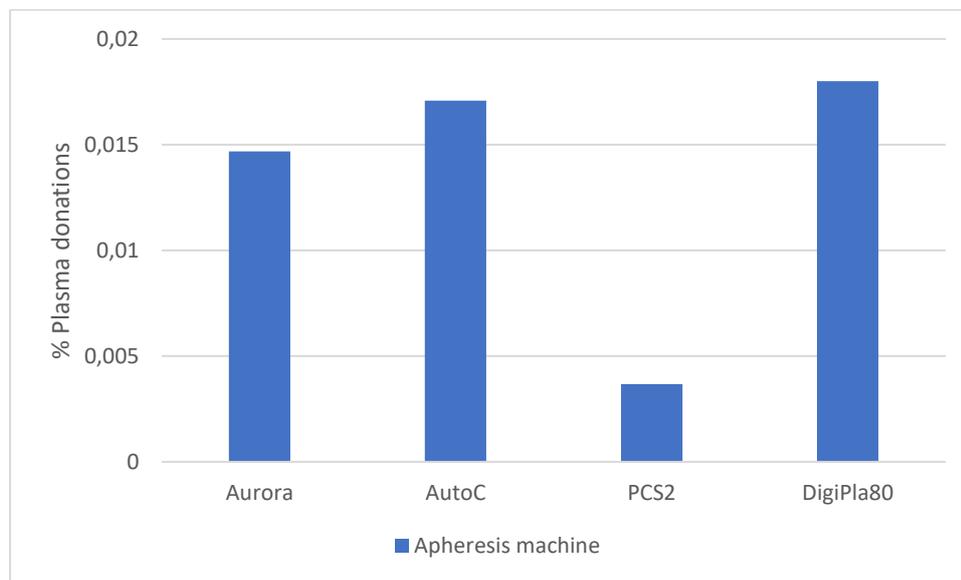


Figure 1: Bar chart showing the amount of hematomas related to plasma donations in 2020, across different apheresis machines, at Sanquin Blood Bank

# COVID-19 convalescent plasma, the Northern Ireland BTS experience

**Submitting author:** Andrea Piccin

**Affiliation:** Northern Ireland Blood Transfusion Service (NIBTS), Belfast, UK

## **AUTHORS:**

<sup>1,2</sup>Andrea Piccin, <sup>1</sup>Barbara Mullin, <sup>1</sup>Asma Sadiq,  
<sup>1</sup>Joanne Murdock

<sup>1</sup>Northern Ireland Blood Transfusion Service (NIBTS), Belfast, UK

<sup>2</sup>Innsbruck University of Medicine, Innsbruck, Austria

## **BACKGROUND:**

The COVID-19 pandemic has dramatically impacted on our lifestyle and on the way the health system operates. Blood Transfusion Services (BTS) experienced significant difficulty dealing with business as usual, for example, in recruiting sufficient blood donors due to social distancing requirements and staff shortages. In addition, the BTS work load was further increased by having to collect and store convalescent plasma (CP) for clinical trials (RECOVERY). The use of CP was suggested by previous studies on SARS-2 infections, where it was shown that passive antibodies can neutralise the virus suggesting that CP may reduce mortality. Contradictory findings have been published on the efficacy of CP in COVID-19 infection and it is not yet established as a valid treatment.

## **AIMS:**

We report on the Northern Ireland (NI) experience with convalescent plasma donors for the RECOVERY trial.

## **METHODS:**

Donor inclusion criteria were: *i*) 28 days post COVID-19 infection, *ii*) fully recovered, recorded as either positive PCR test or antibody test *iii*) met all NIBTS other eligibility criteria, *iv*) antibody titre level had to be >6. Antibody testing was performed with EuroImmune assay by Public Health England. The collection of CP occurred in Belfast at NIBTS HQ either: *a*) via whole blood donation or *b*) via plasmapheresis collection.

## **RESULTS:**

3696 people registered to donate plasma (2453 F and 1243 M). 3287 of these progressed to screening appointment. 612 donations of whole blood were manufactured into CP. 249 were male and 363 were female donors. Only HLA/HNA negative female donor plasma was eligible for use. Of the 363 female donors bled 158 were HLA/HNA negative and 102 were positive. The other 103 female donors did not have their sample tested for HLA/HNA as they reported an EI antibody titre level <6 and therefore not eligible for use in the clinical trial. 118 donation appointments were made for plasmapheresis collection, 92 for male donors with 25 males giving repeat donations every 2-3 weeks. 26 plasmapheresis appointments were made for female donors with 13 females giving repeat donations every 2-3 weeks. Of all the donors bled for CP, 230 were new donors, all others were previous blood or platelet donors.

**CONCLUSION:**

This study clearly shows the high level of motivation and overall commitment from the blood donor community in NI during the current pandemic. Although the RECOVERY trial has been suspended due to lack of improvement in mortality rates, the fact that contradictory findings have been found in other studies, indicates that further investigations are merited. The efficiency of CP treatment has not been assessed for the new COVID-19 variants (delta and lambda). Therefore, before ruling CP out as a possible treatment for COVID-19, further studies on this blood product are required. We plan to perform further research studies on this product to better evaluate the effect of the procoagulant action of COVID -19 in healthy blood donors to further evaluate the potential benefits of CP treatment.

## Session 7 “Effects of pandemics on donation behavior”

Thursday, 16 <sup>th</sup> September – SESSION 7	
1.00 pm – 2.30 pm	<b>Effects of pandemics on donation behavior</b> <i>Chair: Pierre Tiberghien</i>
1.00 pm – 1.15 pm	<b>Blood donation in times of crisis: Early insight into the impact of COVID-19 on blood donors and their motivation to donate across European countries</b> <i>Torsten Chandler, Sebastian Neumann-Böhme, Iryna Sabat, Pedro Pita Barros, Werner Brouwer, Job van Exel, Jonas Schreyögg, Aleksandra Torbica, Tom Stargardt</i>
1.25 pm – 1.40 pm	<b>Maintaining trust in a pandemic: Blood collection agency messaging to donors and the public during the early days of COVID-19</b> <i>Rachel Thorpe, Jennie Haw, Kelly Holloway</i>
1.50 pm – 2.05 pm	<b>Education and blood donation: a polygenic score approach</b> <i>Ting Li, René Bekkers, Eva-Maria Merz</i>
2.15 pm – 2.20 pm	<b>Examining knowledge translation in blood donor research: a review of vasovagal reaction literature</b> <i>Amanda Thijsen, Barbara Masser, Tanya E. Davison, Sarah P. Kruse, Anna Williamson</i>
2.25 pm – 2.30 pm	<b>Standardized post-exposure questionnaire to detect possible infection route(s) in positively screened donors: Swiss experience</b> <i>Soraya Amar El Dusouqui, Anja Grzesiczek, Caroline Tinguely, Christoph Niederhauser, Tiziana Janner</i>

# Blood donation in times of crisis: Early insight into the impact of COVID-19 on blood donors and their motivation to donate across European countries

*Submitting author: Torsten Chandler*

*Affiliation: Universität Hamburg*

## **AUTHORS:**

Torsten Chandler, Sebastian Neumann-Böhme, Iryna Sabat, Pedro Pita Barros, Werner Brouwer, Job van Exel, Jonas Schreyögg, Aleksandra Torbica & Tom Stargardt

## **BACKGROUND:**

Despite the ongoing COVID-19 crisis, blood donations are still needed to treat patients. Therefore, understanding the impact of the crisis on blood donors' motivation and donation activity is essential.

## **AIMS:**

In this survey, we aimed to provide early insight into the impact of COVID-19 on blood donors and their motivation to donate during the crisis.

## **METHODS:**

We asked representative samples in 7 European countries (Denmark, France, Germany, Italy, Portugal, the Netherlands and the UK) about their blood donation activity and motivation to donate using an online survey. We analysed donor turnout during the COVID-19 period descriptively and using logistic regression.

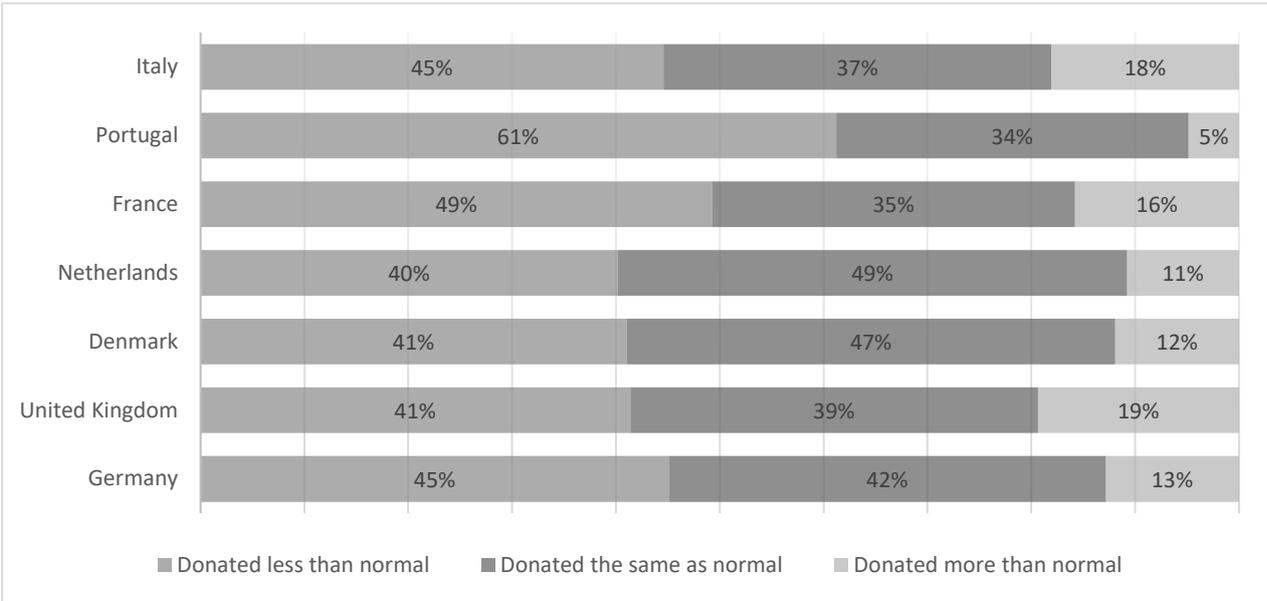
## **RESULTS:**

Of the 7,122 people that responded to the survey, 1,205 (16.9%) blood donors were identified, with 33.8% donating during the first 4-5 months of the COVID-19 period. We observed that around half of donors donated less than normal (Fig.1). The vast majority of donors that did donate made a special effort to do so in response to COVID-19. The majority of donors were also not aware of their blood being tested for COVID-19 antibodies. Although the perceived risk of infection among all respondents whilst donating blood was relatively low, those who anticipated a high risk of infection were much less likely to donate (OR=0.540; p-value=0.006). Furthermore, those that were adherent to COVID guidelines were also less likely to donate (OR=0.583; p-value= 0.000).

## **CONCLUSION:**

We suggest that blood collection services consider specialist campaigns that focus on the altruistic motivation of donors during the crisis and that they continue to communicate the additional safety measures in place with the aim of reducing the fear of infection whilst donating blood.

Figure 1: Impact of Covid-19 on blood donation activity across 7 European countries.



# Maintaining trust in a pandemic: Blood collection agency messaging to donors and the public during the early days of COVID-19

*Submitting author: Rachel Thorpe*

*Affiliation: Research Fellow, Australian Red Cross Lifeblood*

## **AUTHORS:**

Jennie Haw, Rachel Thorpe, Kelly Holloway

## **BACKGROUND:**

Countries that rely on voluntary non-remunerated donors, including Canada and Australia, saw donor numbers fall in the early weeks of the COVID-19 pandemic as governments introduced stay-at-home measures designed to stop the spread of the virus. While strategies such as cancelling elective surgeries successfully mitigated shortages in the short-term, the problem of maintaining the blood supply in these unprecedented circumstances is a long-term one<sup>1</sup>. Despite initial increases in cancellations, in Australia and Canada, blood supplies maintained sufficient levels suggesting strong public and donor response<sup>(2,3)</sup>. Blood Collection Agency (BCA) messaging plays a key role in communicating the needs of the blood operator to the public and donors.

## **AIMS:**

To investigate 1. How Canadian Blood Services and Australian Red Cross Lifeblood (Lifeblood) constructed blood donation in their messaging to the public and donors and 2. What blood collection agency (BCA) messaging implies about the trust relationship between BCAs and donors in the context of a pandemic

## **METHODS:**

Discourse analysis was employed to investigate messaging from Canadian Blood Services and Lifeblood between March 1, 2020 and July 31 2020. A discourse analytic approach includes words and messages as well as the broader social and political context, the audience for the text, and social codes and meanings. This analytic approach enables examination of the explicit and implicit messages to the public and donors and elucidates how the broader sociocultural context both informs and is informed by the messages. Online content and print media sources included: webpages, direct emails, national print media, and social media. The authors read a representative selection of documents to become familiar with the data and to identify emergent themes before together developing a coding framework based on these themes and prior categories of interest. Following completion of coding, the authors met to discuss key themes, differences and similarities between Canada and Australia, and the themes in relation to the pandemic context.

## **RESULTS:**

Analysis identified four dominant messages during the study period: 1) blood donation is safe; 2) blood donation is designated an essential activity; 3) blood is needed; and 4) blood donation is a response to the pandemic. In Canada and Australia, our analysis suggests that: 1) implicit within constructions of blood donation as safe is the message that BCAs can be trusted; 2) messages that construct blood donation as essential and needed implicitly ask donors to trust BCAs in order to share in the commitment of meeting patient needs; and 3) the pandemic has made possible the construction of blood donation as both an exceptional and commonplace activity.

**CONCLUSION:**

For BCAs, our analysis supports donor communications that are transparent and responsive to public concerns, and the local context, to support public trust. Beyond BCAs, health organizations and leaders cannot underestimate the importance of building and maintaining public trust as countries continue to struggle with containment of the virus and encourage vaccine uptake.

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## Education and blood donation: a polygenic score approach

*Submitting author: Ting Li*

*Affiliation: Department of Sociology, Vrije  
Universiteit Amsterdam*

### **AUTHORS:**

Ting Li, René Bekkers & Eva-Maria Merz

### **BACKGROUND:**

The donation of substances of human origin (SoHo), i.e., blood (products), or organs, is a very specific type of prosocial behaviour. Previous research on SoHo donation suggests that various individual, social and contextual characteristics influence this complex behaviour (1). Most research has focused on individual characteristics, including age, gender, educational attainment and prosocial values. Biological characteristics, however, have largely been overlooked. Twin studies suggest that genetic effects explain substantial portions of variance in many domains of life (2), including helping behaviour and educational attainment. In the only twin study on blood donation, Pedersen and colleagues reported that additive genetic effects explain 53% of the variance in the propensity to become a blood donor. Shared and non-shared environmental effects explain 28% and 18% of the variance respectively (3). However, to date, no validated genome-wide association study (GWAS) on SoHo donation has been conducted. As previous studies have shown that educational attainment can be related to SoHo donation, we propose to study how genetic correlates of educational attainment are related to SoHo donation. Twin and family studies estimate the heritability of education between 30-60%. The largest GWAS to date identified 1,271 lead single nucleotide polymorphisms (SNPs) with heterogeneous effects on educational attainment. Polygenic scores based on these identified SNPs explained 11% of the variance in educational attainment (4). Follow-up studies demonstrated genetic correlations between educational attainment and cognitive ability, occupational and health status, characteristics are also related to SoHo donation (5). Thus, genetic correlates of educational attainment might be related to SoHo donation.

### **AIMS:**

We seek to explore how polygenic risk scores for educational attainment (educational-PS) are related to SoHo donation, and test the relationship between educational-PS, educational attainment and SoHo donation.

### **METHODS:**

We will analyse data from the Longitudinal Aging Study Amsterdam (LASA) cohort, which includes information about physical, cognitive, emotional and social functioning. In 2015, a set of questions related to SoHo donation was included in the survey. Genetic data are available for N = 2279 participants. We will generate educational-PS based on published summary statistical GWAS results (4) for these participants. Regression models will examine associations between educational-PS and SoHo donation, with a wide range of relevant covariates. Mediation analysis will be applied to measure to what extent educational attainment mediates the association between educational-PS and SoHo donation.

## RESULTS:

Data preparation, including the calculation of the educational-PS is ongoing. We have developed an analysis plan, which will be pre-registered at the OSF shortly. Based on previous research on blood donation behaviour and in behavioural genetics, we expect a positive association between educational-PS and SoHo donation, while educational attainment may partly mediate this association (cf. Figure 1). **CONCLUSION:** Our findings may demonstrate that genetic correlates of educational attainment are not related to SoHo donation, i.e., the association between educational attainment and SoHo donation is purely environmental. In the more likely case that a small portion of the variance in SoHo donation is explained by educational-PS, mediated partly by educational attainment, we will explore the mechanisms involved.

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## FIGURES

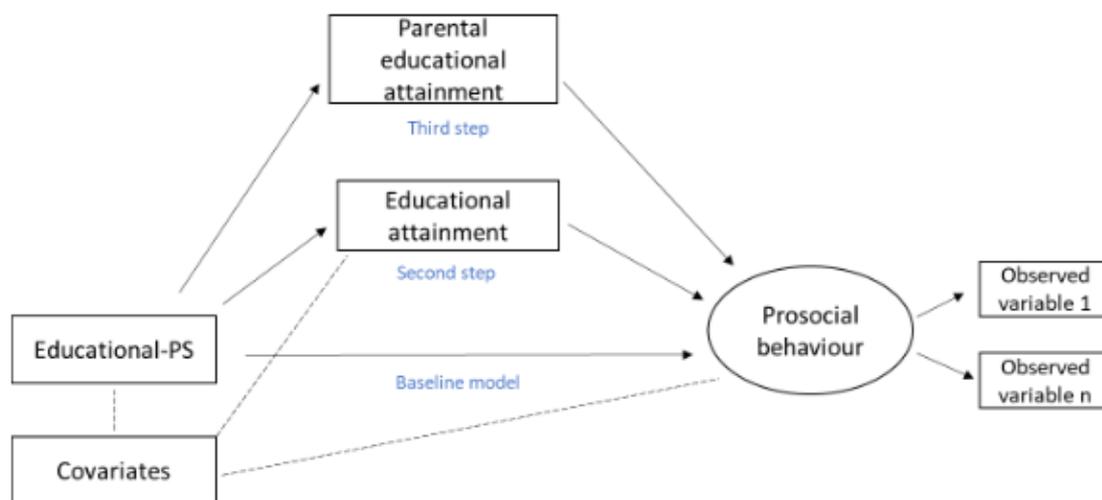


Figure 1: Associations between educational attainment and SoHo donation

## Examining knowledge translation in blood donor research: a review of vasovagal reaction literature

**Submitting author:** Amanda Thijsen

**Affiliation:** University of Sydney

### **AUTHORS:**

Amanda Thijsen, Barbara Masser, Tanya E. Davison, Sarah P. Kruse & Anna Williamson

### **BACKGROUND:**

Knowledge translation focuses on the transfer of research findings into policy and practice. To provide insight into the state of knowledge translation in blood donor research, we undertook a rapid review of a key research area in the field with high potential for translation, vasovagal reactions (VVRs).

### **AIMS:**

The objectives of this review were to a) examine the number and nature of published studies relating to VVRs to determine the availability of research evidence, and b) map the included articles along the research-to-practice trajectory using the Knowledge to Action framework to determine the extent of knowledge translation of VVR research.

### **METHODS:**

The rapid evidence assessment approach was used to review the literature systematically. PubMed, PsycINFO, CINAHL and EMBASE were searched for peer-reviewed journal articles from inception to October 2019 using the terms blood don\* AND vasovagal OR faint\* OR syncope.

### **RESULTS:**

A total of 176 articles met our inclusion criteria. Studies relating to VVRs increased substantially from 1942 to 2019, with 84% published in the last twenty years. Articles were predominately observation (non-intervention) studies (117; 66%), followed by intervention (knowledge inquiry) studies (31; 18%) and review (knowledge synthesis) studies (20; 11%). The evidence from intervention research was limited, with 14 strategies tested in 31 studies and often by the same research groups. Only 5 (3%) implementation and evaluation studies were found; all focused on evaluating the effects of a newly introduced intervention on VVR rates through uncontrolled or cross-sectional study designs.

### **CONCLUSION:**

VVR research is in the early stages of knowledge translation. It is a relatively recent field of inquiry and may be too young to fully see the effects of knowledge being translated. Further, more intervention research is needed to provide a robust evidence base as well as more published implementation research to share knowledge of translating research.

### **REFERENCES:**

Thijsen, A, Masser, B, Davison, TE, Kruse, SP, Williamson, A. Examining knowledge translation in blood donor research: A review of vasovagal reaction literature. *Transfusion*. 2021; 1– 8. <https://doi.org/10.1111/trf.16391>

## Standardized post-exposure questionnaire to detect possible infection route(s) in positively screened donors: Swiss experience.

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Dusouqui*

*Affiliation: Blutspende SRK Schweiz*

### **AUTHORS:**

Soraya Amar El Dusouqui, Anja Grzesiczek, Caroline Tinguely, Christoph Niederhauser, Tiziana Janner

### **BACKGROUND:**

In 2020, we implemented a national standardized post-exposure questionnaire (PEQ) covering possible infection routes in donors (recently) screened positive for HIV, HBV, HCV, and syphilis. We anticipated higher response rates and more details on possible exposure routes than those previously revealed using a short report form. Further, we plan to evaluate the currently applied pre-donation information and questionnaire over a period of three years and establish new measures to enhance self-exclusion of previously ineligible donors with a medical history of relevant infections, based on gathered data from this PEQ. AIMS: To evaluate the quantitative (rate of response) and qualitative (route of potential infection) outcomes following the first year of implementation of a standardized and detailed PEQ.

### **METHODS:**

Consent to an interview with the blood service physician was obtained prior to the administration of the new PEQ. This PEQ contained 43 questions, divided into 6 sections. In the 1st section, the infection route is self-assessed by the donor. The 2nd section targets travel history, donation motivation, donor and donor's parent's place of birth, HBV vaccination, previous relevant infections, as well as transfusion, transplantation, surgical intervention, or endoscopy in Switzerland and abroad. The 3rd section covers accidental exposure to blood. The 4th section contains relevant risk behaviors. The 5th section asks for the blood donation status of current and previous sexual partners, and persons living in the same household. The 6th and last section allow the physician to add any further insightful notes. It is noteworthy that we have measured the quantitative and qualitative outcomes as described.

### **RESULTS:**

Response failure was 4% in 2020 (2/52 reported donors with positive screening test results) compared to 21% (13/61) in 2019. The overall response rate was 96% in 2020, comprised of 10 (20%) donors not consenting to the interview, incompletely filled PEQ in 4 (8%) cases, completed PEQ in 32 cases (64%), and erroneously completed old report forms in 4 (8%) cases. This (96%) is to be compared to an overall response rate of 79% in 2019. Physicians identified possible exposure risks in 65% and 76% of donors with a positive screening result in 2019 and 2020, respectively. Causes classified in 2019 as "unknown" could be categorized in 2020, as either unknown due to non-consent or as due to an unidentifiable risk factor. A proportion of 60% of consented donors, were born or having parents born abroad, of which 45% (18/40) indicated other routes of infection. Only 12.5% (5/40) reported sexual risk behavior, of which three were non-compliant male homosexual donors.

**CONCLUSION:**

- The present PEQ yielded higher response rates.
- Data obtained using the PEQ provided additional details on possible infection routes.
- Language barrier appeared to affect the comprehension of donors from abroad, which should be addressed.
- - Longitudinal observation is warranted to choose efficient measures allowing donor self-deferral.

## Session 8 “Challenges regarding infection & diseases“

Thursday, 16 <sup>th</sup> September – SESSION 8	
1.00 pm – 2.30 pm	<b>Challenges regarding infection &amp; diseases</b> <i>Chair: Christian Erikstrup</i>
1.00 pm – 1.15 pm	<b>A new national donor vigilance system in Denmark</b> <i>Christina Mikkelsen, Mie Topholm Bruun, Louise Ørnskov Petersen, Sys Hasslund, Rune Larsen, Bitten Aagaard, Betina Samuelsen Sørensen</i>
1.25 pm – 1.40 pm	<b>Complications reported in COVID-19 convalescent plasma donors- NHSBT experience</b> <i>Shruthi Narayan, Shaminie Shanmugaranjan, Alexandra Griffiths, Dave Roberts</i>
1.50 pm – 1.55 pm	<b>Estimation of SARS-CoV-2 infection fatality rate by age and comorbidity status using antibody screening of blood donors during the COVID-19 pandemic in Denmark</b> <i>Kathrine Agergård Kaspersen, Lotte Hindhede, Jens Kjærgaard Boldsen, Susan Mikkelsen, Lasse Vestergaard, Ann-Sofie Nicole Berthelsen, Ida Rask Moustsen-Helms, Dorte Kinggaard Holm, Anna Christine Nilsson, Mie Topholm Bruun, Susanne Gjørup Sækmose, Erik Sørensen, Lene Holm Harritshøj, Bitten Aagaard, Henrik Hjalgrim, Søren Thue Lillevang, Charlotte Sværke Jørgensen, Tyra Grove Krause, Henrik Ullum, Ole Birger Vestager Pedersen, Sisse Rye Ostrowski, Christian Erikstrup.</i>
2.00 pm – 2.05 pm	<b>SARS-CoV-2 antibody sero-prevalence in established blood donors in Oslo Blood Center, winter/spring 2021</b> <i>Lise Sofie H. Nissen-Meyer, Elisabeth Lauvbakk</i>
2.10 pm – 2.15 pm	<b>Dynamics of blood banking during COVID-19 pandemic</b> <i>S.V. Skorikova, J.J. Bibekov, L.V. Yun, Z.E. Almenova, S.T. Musilimova, S.P. Kaseinova, S.A. Abdrakhmanova</i>
2.20 pm – 2.25 pm	<b>False-positive syphilis screening results in blood donors</b> <i>Magdalini Pape, Vasiliki Bakaloudi, Ioannis Moschos, Chrisa Pargiana, Parthena Lazaridou, Dimitris, Pisokas, Pashalia Poulioudi, Aikaterini Boukouvala, Christina Andrikopoulou, Soutana Nikolaidou, G. Nikolaidis, I. Pentsiou, Anna Constantinidou, Fotis Girtovitis, Elli Ntinopoulou, George Kaltounis, V. Voulgaridou, Maria Chatzikyrkou.</i>
2.30 pm – 2.35 pm	<b>Older donors during COVID-19: Perspectives on and impact of stay-at-home advice on donation behaviour</b> <i>Rachel Thorpe, Kyle Jensen, Barbara Masser</i>

## A new national donor vigilance system in Denmark

**Submitting author:** Christina Mikkelsen

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### **AUTHORS:**

Christina Mikkelsen<sup>1,2</sup>, Mie Topholm Bruun<sup>3</sup>, Louise Ørnskov Petersen<sup>4</sup>, Sys Hasslund<sup>4</sup>, Rune Larsen<sup>5</sup>, Bitten Aagaard<sup>6</sup>, Betina Samuelsen Sørensen<sup>6</sup>

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<sup>5</sup>Department of Clinical Immunology, Næstved Hospital, Denmark

<sup>6</sup>Department of Clinical Immunology, Aalborg University Hospital, Denmark

### **BACKGROUND:**

On January 1<sup>st</sup> 2020 the Danish Haemovigilance Committee introduced a new national donor vigilance system.

### **AIMS:**

The aim was to optimize the registration of adverse reactions and events in Danish blood donors and thereby improve blood donor safety. Furthermore, to implement a standardized system that would allow for international comparison.

### **METHODS:**

The registration system was designed based on three parameters. First, identification of the type of adverse reaction or event in blood donors as defined by the ISBT Working party for Haemovigilance. Second, rating of severity level as defined by the AABB. Third, rating of imputability as defined in the EC Directive 2005/61/EC. The registrations were recorded in the IT-systems of the Blood Establishments and linked to the ISBT128 Donation Identification Number.

### **RESULTS:**

A total of 4,430 adverse reactions were registered among 295,638 donations (1,498 per 100,000 donations). The rate of adverse reactions or events was 958 per 100,000 whole blood donations, 2,435 per 100,000 plasmapheresis and 18,453 per 100,000 platelet apheresis. Across all types of donations, the most common complications registered were on-site vasovagal reactions without loss of consciousness (41%), haematoma (33%) and citrate reactions in apheresis (6%). The overall rate of serious adverse reactions or events was 2.7 per 100,000 donations and included vasovagal reactions (63%) and nerve injuries (27%). When assessing the quality of the data, 5.4% of the registered adverse reactions or events were missing a severity and/or imputability score, and as much as 97.9% of citrate reactions registered in relation to platelet apheresis were from the same region.

**CONCLUSION:**

The first results from the new Danish registration system of adverse reactions and events in blood donors reveals rates and reaction types comparable to previous reports from other countries, including the United Kingdom<sup>1</sup> and Australia<sup>2</sup>. Although, the international comparability may be compromised by the influence of COVID-19 on donor vigilance in 2020.

The new system has also made it possible to compare nationally across the different regions. We have identified large inter-regional differences and hypothesises that the major part of these differences can be explained by differences in registration practices. Accordingly, adjustments in the national guideline describing the system have already been made and a national survey assessing the user perception and understanding is scheduled to take place in the fall of 2021. Although adjustments and further evaluation are still needed, the new system has shown to be a valuable tool to aid the national donor vigilance.

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<sup>2</sup> [https://www.blood.gov.au/system/files/documents/Australian-Haemovigilance-Report-2018-19-FINAL\\_v2.pdf](https://www.blood.gov.au/system/files/documents/Australian-Haemovigilance-Report-2018-19-FINAL_v2.pdf)

## Complications reported in COVID-19 convalescent plasma donors- NHSBT experience

**Submitting author:** Shruthi Narayan

**Affiliation:** SHOT Medical Director and Consultant Donor Medicine, NHS Blood and Transplant

### **AUTHORS:**

Dr. Shruthi Narayan, Shaminie Shanmugaranjan, Alexandra Griffiths and Prof. Dave Roberts

### **BACKGROUND:**

Safety and efficacy of COVID-19 Convalescent Plasma (CCP) was tested as part of two large randomised controlled trials in UK (REMAP-CAP and RECOVERY). NHS Blood and Transplant (NHSBT) is a Special Health Authority in England and ensures a safe and reliable supply of blood components. CCP collections by apheresis were started across NHSBT from early in the pandemic to support the trials. Apheresis collections avoid unnecessary red cell loss in the donor and optimise the volume of plasma that can be collected. CCP collections were stopped in March 2021 once the trial results showed no overall benefit of CCP in hospitalised patients with COVID-19 infection.

### **AIMS:**

Cumulative data regarding post donation complications seen in CCP donors was evaluated to identify common themes and risk factors for adverse events

### **METHODS:**

Data regarding adverse events of donation were collated and analysed from CCP donors who had donated at least once in the period between April 2020- March 2021 (inclusive)

### **RESULTS:**

There were 57,213 attendances for convalescent plasma donation in the period 21/04/2020–18/03/2021. Of these, 6,908 (12.1%) resulted in at least one adverse event, reported within 7 days of attendance. Those experiencing an adverse event tended to be younger than those who did not (55% of the group experiencing an adverse event were aged under 45, compared with 44% of the group who did not). The M/F split was very similar in both groups. No strong relationship between ethnicity and risk of adverse events was evident. Donors experiencing an adverse event were more likely to be first-time donors than donors with no adverse event. The risk of having any adverse event falls from 14% for first-time donors to 7% for repeat donors. CCP donors experienced lower rates of mild vasovagal reaction (VVR) to new/returning whole blood donors overall but appear to be at higher risk after stratifying by sex and age. They are significantly more likely to feel faint than new/returning apheresis donors. Bruising and arm pain are more likely in CP donors compared to new/returning apheresis donors, and moderate VVR are nearly twice as common. However, CCP donors are at lower risk of citrate toxicity. The trends over time in adverse event rates in CCP donors have been broadly stable. There were 216 repeat donors who experienced adverse events at multiple attendances, the most commonly reported repeat adverse event was recurrent bruising.

**CONCLUSION:**

Donating CCP was largely safe but complications were seen following donation in 12% with VVR, bruising and arm pain being the most reported donor adverse events. VVR could be multifactorial with increased anxiety, new/first time donors, vascular dysregulation or subclinical cardiac dysfunction secondary to recent COVID-19 infection possibly contributory. Donor haemovigilance is particularly important given donors were recovering from an emerging potentially life-threatening illness. As understanding about long-COVID evolved, donor health screen and selection guidelines were updated to ensure donor safety was optimised. It is encouraging to see that the risk of having any adverse event halved with repeat donations.

# Estimation of SARS-CoV-2 infection fatality rate by age and comorbidity status using antibody screening of blood donors during the COVID-19 pandemic in Denmark

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## **BACKGROUND:**

Estimation of the SARS-CoV-2 infection fatality rate (IFR) by age and comorbidity is warranted.

## **AIMS:**

Here we use the seroprevalence among Danish blood donors to estimate the IFR stratified by age and comorbidity status during the pandemic in Denmark.

## **METHODS:**

Danish blood donors aged 17 to 69 years giving blood from October 5 of 2020 to February 28 of 2021 were tested for SARS-CoV-2 antibodies using a commercial SARS-CoV-2 total antibody enzyme-linked immunosorbent assay. The seroprevalence was adjusted for assay sensitivity and specificity and compared between geographical areas. The IFR was estimated from week 11 to 42 of 2020 and week 43 of 2020 to week 6 of 2021 and presented as numbers per 100,000 infections. The two time periods represented the first two waves of the pandemic in Denmark.

**RESULTS:**

In total, 84,944 blood donors were tested. The IFR was generally lower during the second wave compared to the first wave. When exploring each age strata, the lowest IFR was observed for people younger than 51 years: IFR ranged from 0.00–0.00 (95% CI: 0.00–0.00) to 67.71 (95% CI: 59.76–76.33). The highest IFR was observed for people aged 61 to 69 years: IFR ranged from 156.27 (95% CI: 118.53–237.51) to 280.74 (95% CI: 117.25–1,210.53) for people without comorbidity and from 1,526.70 (95% CI: 1,156.37–2,329.91) to 2,328.66 (95% CI: 980.00–9,477.96) for people with comorbidity.

**CONCLUSION:**

In this large nationwide study, the IFR was very low or even zero among people younger than 51 years. IFR increased with age and having comorbidities when 51 years or older.

## SARS-CoV-2 antibody sero-prevalence in established blood donors in Oslo Blood Center, winter/spring 2021

**Submitting author:** Lise Sofie H. Nissen-Meyer

**Affiliation:** Department of Immunology and Transfusion, Oslo University Hospital, Oslo, Norway

### **AUTHORS:**

Elisabeth Lauvbakk and Lise Sofie H. Nissen-Meyer

### **BACKGROUND:**

To obtain surveillance data for control and correct actions in a pandemic like COVID-19, it is practical and informative to perform cross-sectional prevalence studies in representative samples from the population. The group of blood donors is generally positive to take part in all kinds of research, and can be used to estimate infection prevalence and evaluate precautions to protect further virus spread. When donors return, it is also possible to collect information about the effectiveness and time course of the immune response induced by both natural infection and vaccination.

### **AIMS:**

The current study was performed to collect updated information about the prevalence of SARS-CoV-2 infection in blood donors, and to calculate how many asymptomatic donors may be visiting the donation site. It is imperative to evaluate the efficacy of all precautions taken to avoid donors and staff mutual virus transfer.

### **METHODS:**

All established blood donors were offered antibody testing for a period of three months, from January 12<sup>th</sup> to April 9<sup>th</sup> 2021. Together with the extra blood sample, donors answered questions about symptoms, previous antigen testing and vaccination to COVID-19.

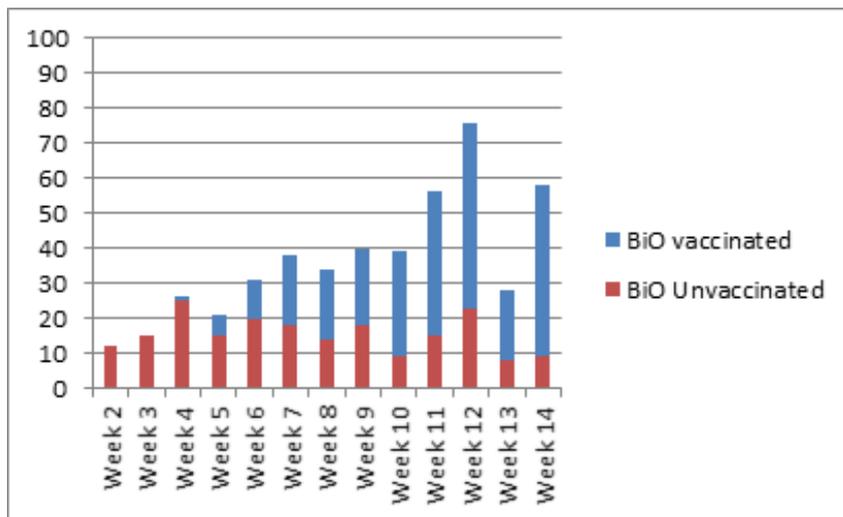
### **RESULTS:**

More than 8,200 donors were tested, and the weekly prevalence of antibody positive donors following from natural infection varied from 1.5 to 3.4 %. The number of donors presenting with antibodies following vaccination increased from zero to 10 % in the study period. An average of 48 % of the natural infections had been asymptomatic, and 24 % of the unvaccinated antibody-positive donors were unaware of having been infected.

### **CONCLUSION:**

The proportion of blood donors seropositive for anti-SARS-CoV-2 in our blood center was stable whereas the number of vaccinated blood donors rapidly increased. Partly, virus spreading in the third wave of infection in the Oslo area mainly took place in groups who are underrepresented as blood donors, but we may also have timed the screening too early in relation to the peak of the third virus wave. A significant number of the participating blood donors turned out to be health care workers who were chosen for vaccination to keep health services operable through the pandemic.

**FIGURE:** The number of blood donors with SARS-CoV-2 antibodies in a seroprevalence screening in Oslo Blood Center, during the third infection wave in Norway.



## Dynamics of blood banking during COVID-19 pandemic

**Submitting author:** S.V. Skorikova

**Affiliation:** Research and Production Center for Transfusiology of the Ministry of Health of the Republic of Kazakhstan, Nur-Sultan

### **AUTHORS:**

S.V. Skorikova, J.J. Bibekov, L.V. Yun, Z.E. Almenova, S.T. Musilimova, S.P. Kaseinova, S.A. Abdrakhmanova

### **BACKGROUND:**

Donation rates are influenced by many factors, and donation as a medical and social phenomenon as well. During the COVID-19 pandemic, the reasons for donor recruiting problems were a decrease in the need for clinics for transfusions due to quarantine lockdowns, an exponential increase in the incidence of the population, as well as a traffic ban.

The structure of collecting blood components directly depends on the needs of the clinics.

According to foreign sources, the COVID-19 pandemic has significantly affected the blood supply service. Departments with COVID-19 carried out transfusions of blood components significantly less often compared to departments without COVID-19: for erythrocytes (0.03 versus 0.08 doses/patient/day), platelets (0.003 versus 0.033) and plasma (0.002 versus 0.018; all  $p < 0.0001$ ). The frequency of cryoprecipitate transfusion did not change significantly (0.008 versus 0.009,  $p = 0.6$ ). The study of the indicators trends in blood and its components banking in the Republic of Kazakhstan (hereinafter - RK) during the COVID-19 pandemic is of particular interest.

### **AIMS:**

Assess changes in the types of donations over the past 3 years, including the period of the COVID-19 pandemic using the evidence from the Research and Production Center for Transfusiology in Nur-Sultan (hereinafter referred to as the RPCT).

### **METHODS:**

Analysis of monitoring the activities of the blood supply service of the Republic of Kazakhstan for the period 2018-2020.

### **RESULTS:**

In 2019, the number of blood donations at the RPCT decreased by 1% compared to 2018, apheresis platelet donations increased by 26%, and plasma donations decreased by 47%. Number of platelet donations for the period 2018-2019 increased by 1442, a total of 12510 platelet donations were made.

In 2020, due to the decline in the number of applications of medical organizations in hematoproducts and problems with blood donation in general, which resulted in the introduction of strict quarantine measures, there is a decrease in all types of donations: blood by 17%, platelets by 2%, plasma by 8%. The peak of the decrease in the supply of blood and its components occurs in April, May, June 2020 (-41%, - 28%, - 23%), respectively. At the same time, with the introduction of the method of convalescent plasma treatment from May 2020, there is an increase in donations of convalescent plasma from May to November 2020 by 80% in comparison with the indicators of 2019. In total, RPCT for 2020 stored 2,899 doses of convalescent virus-inactivated anti-COVID-19 plasma.

**CONCLUSION:**

There has been a decrease in the total number of donations by 9% at the RPCT during the COVID-19 pandemic. The peak of the decline in donations falls on the period April-June 2020 (30%).

## False-positive syphilis screening results in blood donors

**Submitting author:** Magdalini Pape

**Affiliation:** Serology Lab Supervisor, Blood Bank

### **AUTHORS:**

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<sup>2</sup>Department of Microbiology, G.H.T. HIPPOCRATIO – Hospital of Skin and Venereal Diseases of Thessaloniki

### **BACKGROUND:**

False positive (FP) test results have significant implications for donors and blood centers. Blood services need to develop appropriate strategies for donor management, minimizing its anxiety while maintaining sufficiency of blood supply.

### **AIMS:**

The purpose of our study was to estimate false positivity for syphilis screening in voluntary blood donors, all apparently healthy, from northern Greece and evaluate its association with demographics characteristics and risk factors.

### **METHODS:**

Serological testing was performed using the reverse algorithm, which initiates the screening with a highly sensitive treponemal test. Blood samples were tested using the LIAISON Treponema Screen (DiaSorin) for qualitative detection of IgG/IgM specific antibodies to *T. pallidum*. This method is a one-step sandwich CLIA. The results were evaluated using a cutoff value of an index of 1.0 with a gray zone of  $\pm 10\%$  and interpreted as follows. Samples scored with an index of  $< 0.9$  were considered negative, and samples with an index of  $\geq 1.1$  were considered as initial reactive (IR). Samples showing a value falling in the gray range ( $0.9 < \text{index} < 1.1$ ) were boundary cases, and following the manufacturer's instructions, they were subjected to the same protocol of IR that includes repeatedly testing in duplicate, followed by RPR test in serial dilution and confirmatory tests (FTA-ABS and TPHA) to assess disease and treatment status and provide a supplementary marker of infection. Non-positive confirmatory tests suggested false positivity. All FP donations were discarded. We also analyzed data on blood donors, including first-time and repeat donors.

### **RESULTS:**

A total of 83024 donations were tested (whole blood and platelet apheresis) the last four years (2016-2020), in the Blood Centre of AHEPA University Hospital of Thessaloniki. A total of 149 (0,18%) of syphilis false positive results were included in our study. The rest four infectious markers (HBV, HCV, HIV, HTLV) were negative for these FP donations. False positivity was positively associated with men (108/149, 72,48%) and middle age (40-50 years 118/149, 79.2%) and negatively associated with first time donors (46/149, 30,87%) and education equivalent to Bachelor's degree or higher (34/149, 22,8%). Seasonality did not affect the incidence of syphilis false positivity (almost equal results in all seasons) and behavioral risk factors were not reported at all (0/149).

**CONCLUSION:**

The absolute rate of syphilis false positive results was low. However, false positive results remain a problem, because informing donors can result in stress and anxiety for donors and additional workload for blood service. Donors who give FP results should be reassured that these results do not have adverse implications for their health, despite the fact that they may be subjected to permanent or temporary deferral. For blood services, there are many hypotheses, as to why false positive test results occur and further investigation is needed (vaccination, viral infections, autoimmune diseases, hyper-gammaglobulinemia, nonspecific polyreactive antibodies). The challenge is for blood services to analyze the performance of their screening assays and publish their results and develop appropriate policies for donor management and sufficient blood supply.

## Older donors during COVID-19: Perspectives on and impact of stay-at-home advice on donation behaviour

*Submitting author:* Rachel Thorpe

*Affiliation:* Research Fellow, Australian Red Cross Lifeblood

### **AUTHORS:**

Rachel Thorpe, Kyle Jensen, Barbara Masser

### **BACKGROUND:**

From late March 2020 Australian Red Cross Lifeblood (Lifeblood) advised donors aged 70+ to follow government advice to stay home due to increased risk of COVID-19 illness, and not to donate blood during this time. This advice contrasted with Lifeblood communications being issued to the broader public reminding people to donate during the pandemic. The question of how Blood Collection Agencies (BCAs) can encourage specific donor segments not to donate for a particular time, without losing them as donors altogether, is important, and insights can inform future communications strategies with donors.

### **AIMS:**

To investigate donors' understanding of, and responses to, advice given to older Australians during COVID-19, the impact of this on donation behaviour during the pandemic, and future intentions to donate.

### **METHODS:**

In September 2020 5998 donors were invited to participate in an online survey about the impact of COVID-19 on their lives and blood donation behaviour. Eligible donors had donated in the 12 months prior to the pandemic and were aged 70 and over, who had either made at least one donation during the pandemic period (pandemic donors) or not donated during the pandemic period (pandemic non-donors).

### **RESULTS:**

2425 responses were recorded (response rate 40.4%) of which 60% were from pandemic donors and 40% were pandemic non-donors. The mean age of respondents was 73 years. Pandemic donors were more likely to be male (61.4%) than non-donors (54.8%).

While almost all survey participants (95%) were aware of government advice to stay home, only half of those (48%) thought that this advice included not donating blood. Fewer participants (66%) were aware of Lifeblood's subsequent advice not to donate blood, with 57% of those agreeing with this advice. Pandemic donors were significantly more likely to disagree with the advice than non-donors (37% vs 20%;  $\chi^2 = 80.87$ ,  $p < .001$ ).

Of the pandemic donors who were aware of Lifeblood advice, 59% intended to follow this advice not to donate blood in the future, while 23% did not intend to follow it (18% unsure). Common reasons for intending to follow advice were: trusting public health advice (44%), or thinking the advice applied to them (29%). Common reasons for not intending to follow advice were: believing they are healthier than most in their age group (35%) or not believing donating during the pandemic was risky for them (34%).

58% of respondents intended to donate again during the pandemic and 35% intended to donate again after the pandemic.

**CONCLUSION:**

Australian donors aged 70+ were unsure of whether they should be donating blood during COVID-19. Furthermore, some did not follow advice because they did not consider themselves to be at risk. As donating blood is associated with a self-identity of someone who is healthy, BCAs may need to clearly explain the reasoning for asking older donors not to donate, or offer this cohort an alternative way to reinforce this positive identity.

## Session 9 “Donor behavior mechanisms“

Thursday, 16 <sup>th</sup> September – SESSION 9	
4.00 pm – 5.30 pm	<b>Donor behavior mechanisms</b> <i>Chair: Silke Boenigk</i>
4.00 pm – 4.15 pm	<b>Fear and Fainting: who, what and where?</b> <i>Elisabeth Huis in 't Veld, Judita Rudokaite</i>
4.25 pm – 4.40 pm	<b>Dimensions of Trust and Distrust in majority White and Ethnic Minority blood donors and non-donors: Identifying Targets for Recruitment</b> <i>Eamonn Ferguson, Erin Dawe-Lane, Zaynah Khan, Claire Reynolds, Katy Davison, Dawn Edge, Susan R. Brailsford</i>
4.50 pm – 5.05 pm	<b>Blood donors' acceptance of donation appointment-scheduling systems under COVID-19</b> <i>Carolin Saltzmann, Silke Boenigk</i>
5.15 pm – 5.30 pm	<b>Factors affecting voluntary blood donations among adults in Metro Manila, Philippines as a basis for policy improvement on donor recruitment</b> <i>Arnold Christian A. Mappala, Chloe Anne L. Alican, Daphne Cherlott T. Dulay, Sophia Catherine A. Mancita, Beatrice Ysabel G. Utanes, Benjie M. Clemente</i>
5.35 pm – 5.40 pm	<b>FAINT: FACial INfrared Thermal imaging in the prevention of needle induced fainting.</b> <i>Judita Rudokaite, Mart Janssen, Sharon Ong, Elisabeth Huis in 't Veld</i>
5.45 pm – 5.50 pm	<b>Current state of blood supply service in the republic of Kazakhstan</b> <i>K. Kh. Zhangazieva, S.A. Abdrakhmanova, A.N. Khalykova</i>

## Fear and Fainting: who, what and where?

**Submitting author:** Dr. Elisabeth Huis in 't Veld

**Affiliation:** Department of Cognitive Science & Artificial Intelligence, Tilburg University, Tilburg and Department of Donor Medicine Research, Sanquin, Amsterdam

### **AUTHORS:**

Elisabeth Huis in 't Veld, Tilburg University, Tilburg and Sanquin, Amsterdam, Judita Rudokaite, Tilburg University, Tilburg and Sanquin, Amsterdam

### **BACKGROUND:**

Needle fear and fainting aren't exclusively a donor and blood donation problem. Between 20%-50% of the adults in the general population suffer from needle fear. The overall aim of the FACIAL INfrared Thermal imaging in the prevention of needle induced fainting (FAINT) project is to develop an artificial intelligence algorithm able to detect early symptoms of fear and vasovagal reactions (VVRs) through facial imaging. However, individual differences with regards to personality may also influence who is more susceptible to experiencing fear and vasovagal reactions and furthermore, there may be variations in where exactly in the body people feel sensations during needle related procedures.

### **AIMS:**

The first aim of this study was to assess which personality characteristics are associated with suffering from needle fear and vasovagal reactions. The second aim was explore where in the body participants feel sensations when they experience needle fear.

**METHODS:** N = 242 students (72% female) completed a survey run in two studies at Tilburg University. Participants self-reported on suffering from needle fear (no/yes) and whether they ever experienced VVRs, using the Blood Donation Reaction Inventory. Furthermore, they completed questionnaires assessing emotion regulation style, anxiety sensitivity, pain anxiety symptoms, and interoceptive awareness. Regression analyses were run to predict needle fear and the sum score of the total number of experienced VVRs. Lastly, we explored the use of Bodily Sensations Maps as introduced by Nummenmaa et al (2014) in assessing where in the body participants experience bodily sensations during several scenarios (e.g. being fearful, seeing a needle or seeing a needle going into your arm, being in love, feeling tensed, or relaxed, see Figure 1 for an example).

### **RESULTS:**

Overall, 35% of the participants were scared of needles and 68% of the participants had at experienced at least one VVR. Women ( $\text{Exp}(B) = 2.988, p = .006$ ) and participants with a higher anxiety sensitivity ( $\text{Exp}(B) = 1.031, p = .025$ ) were more likely to suffer from needle fear, whereas those who don't tend to worry when they experience physical pain, which is an aspect of interoceptive awareness, were not ( $\text{Exp}(B) = 0.509, p < .001$ ). Heart palpitations, lightheadedness, dizziness, weakness, sweating and fainting were commonly reported VVRs. Women ( $\beta = .189, p < .001$ ) and participants with needle fear ( $\beta = .422, p < .001$ ) were more likely to suffer from multiple VVRs. No relationship was found between age and blood donation experience Furthermore, an emotionally suppressive emotion regulation style was (borderline) positively associated with the number of VVRs experienced ( $\beta = .108, p = .06$ ). In addition, both people with and without needle fear

experience sensations in the head, chest, arm and abdominal region when they undergo a needle-related procedure, even though the intensity may be a bit higher for fearful participants.

### CONCLUSION:

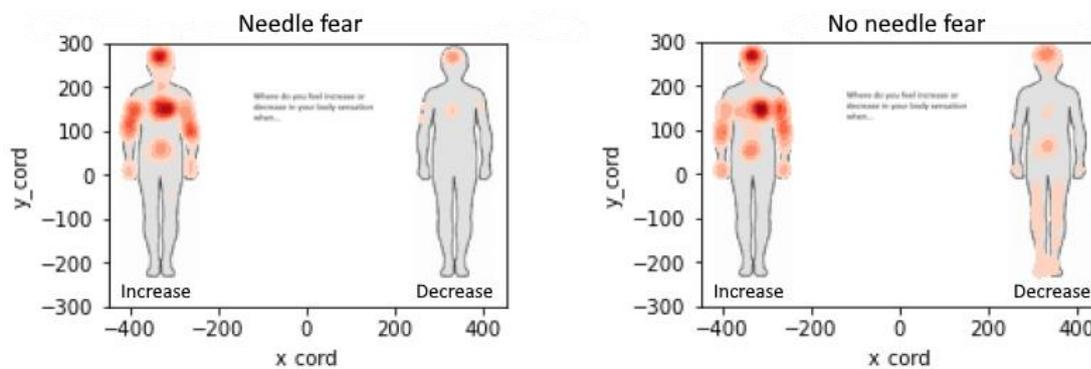
Even though suffering from needle fear is a risk factor for experiencing VVR, it seems that VVRs are commonly experienced regardless of fear or personality factors and furthermore, everybody tends to feel them in the same regions of the body.

### REFERENCES:

McLenon, J., & Rogers, M. (2019). The fear of needles: A systematic review and meta-analysis. *Journal of Advanced Nursing*, 30-42.

Nummenmaa, .L, Glereana, E., Harib, R. & Hietanend, J. (2014). Bodily maps of emotions. *Proceedings of the National Academy of Sciences*, 646-651.

### Figures



Increases (left body image) or decreases (right bodily image) in bodily sensations when a needle goes into their arm for participants with (left) and without (right) needle fear.

# Dimensions of Trust and Distrust in majority White and Ethnic Minority blood donors and non-donors: Identifying Targets for Recruitment

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*Affiliation: University of Nottingham*

## **AUTHORS:**

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<sup>1</sup>School of Psychology, University of Nottingham

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<sup>3</sup> Research Project Manager, Research and Development Centre, Derbyshire Healthcare NHS Foundation Trust

<sup>4</sup>NHS Blood and Transplant/Public Health England Epidemiology Unit

<sup>5</sup> Division of Psychology and Mental Health, University of Manchester

## **BACKGROUND:**

Compared to majority White British people the number of blood donors from ethnic minorities communities is small. Recruiting more ethnic minority donors will help to address inequality and representativeness and meet the clinical need to increase the proportion of blood with Ro Kell antigen to treat Sickle Cell Disease (SCD). Specifically, matching on Ro Kell antigens, which are more common in Black people (52%) compared to White people (2%), would help in the treatment of SCD. This paper explores the role of trust and distrust from political systems to individual interactions to identify the domains of trust most pertinent to designing donor recruitment campaigns. This work is set within the socio-political context at the time of the research (the Windrush scandal and BREXIT).

## **AIMS:**

To identify the domains of trust across a diversity of people and examine which aspects of trust are critical to target for recruitment intervention design.

## **METHODS:**

A 2 (Donor-Status: current; non-donors) by 4 (Ethnicity: Majority White British people; people from Asian background; people of Mixed Ethnicity; people from Black backgrounds) quasi-experiment (N = 981) was conducted to examine perceptions of trust and distrust and their influence on intentions to donate blood.

## **RESULTS:**

We identified five domains of trust ('National Health Service (NHS) and staff', 'NHS Blood and Transplant', 'outgroups'(i.e., people of other nationalities and faiths) 'others' (e.g., strangers), 'politics', and 'conditional distrust '(i.e., the belief that people are treated harmfully by others and organizations based on their characteristic). Trust across all the domains was lower for those from ethnic minorities and 'conditional distrust' higher. Trust in 'others' predicted intention to donate in non-donors from ethnic minorities and trust in 'NHSBT' for majority White British non-donors. Across groups concerns about the Windrush scandal were related to lower political trust and a positive view of Brexit was related to lower trust across domains.

**CONCLUSION:**

Distinct domains of trust and distrust are identified and targeting 'trust in others' through 'voluntary reciprocal altruism' is suggested as an effective strategy to increase the number of ethnic minority donors.

# Blood donors' acceptance of donation appointment-scheduling systems under COVID-19

*Submitting author:* Carolin Saltzmann

*Affiliation:* Universität Hamburg

## **AUTHORS:**

Carolin Saltzmann & Silke Boenigk

## **BACKGROUND:**

With the need to limit interhuman contacts imposed by the global COVID-19 pandemic, online appointment scheduling systems became standard procedures almost overnight in health care, business, as well as in the blood donation context. In blood donation literature, researchers call for more studies on blood donor behavior under COVID-19 (Haw et al., 2021), which includes the rapidly increasing use of digital solutions and technologies. In blood donation practice, managers also reflect on this and ask how to manage self-service appointment scheduling systems best during the pandemic and beyond. The German Red Cross (GRC) blood donation services, for example, reacted to COVID-19 by making their existing but unused donation appointment scheduling system (DASS) mandatory. While usage numbers attained very high levels in the course of the pandemic (>90% in May 2021), donation services fear that these high usage levels cannot be maintained if the governmental contact-limitation regulations no longer justify the obligatory character of the system. Since before COVID-19 most blood donors were accustomed to simply appear at the blood donation facility without prior booking. However, the DASS provides benefits not only to the blood donation services like better predictability, and plannability of blood donation drives, but also delivers benefits to the donors; for example, by reducing waiting times and crowds (Baş et al., 2018). These benefits bear the potential to change “old” donor behavior and positively influence the acceptance of the system (Bosnes et al., 2005; Yuan et al., 2016). An acceptance that then remains despite the fading of the pandemic’s threats. We argue that deeper knowledge is needed on the distinct factors from a donor perspective that influence the acceptance of the DASS after COVID-19.

## **AIMS:**

Against this background, the goals of this study are threefold: From a marketing perspective, we aim to (1) assess the overall blood donors’ acceptance of the DASS and its behavioural consequences under COVID-19 conditions, (2) to explore the factors influencing the acceptance for the DASS, and (3) to develop marketing strategies that help to stabilize acceptance for the DASS in the post-COVID-19 era.

## **METHODS:**

The data collection for our study takes place in June 2021 via an online donor survey in cooperation with the GRC blood donation services. German blood donors are surveyed who used the DASS previously. A second wave of the survey is planned for October 2021. Besides several descriptive data analyses, we will apply Partial Least Squares Structural Equation Modeling to analyze our data.

## **RESULTS:**

Results will be available in July 2021.

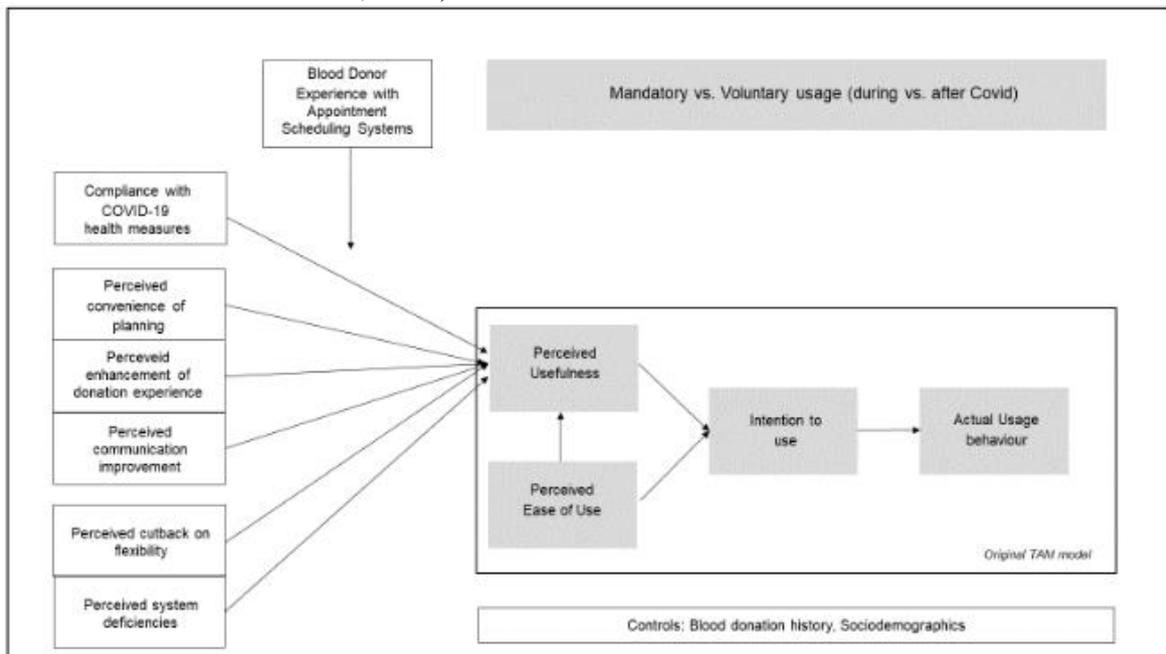
## CONCLUSION:

We contribute to the extant literature first, by developing a model (Figure 1) which links obligation and technology acceptance in the context of blood donor retention. It incorporates not only donor-related drivers of acceptance but also includes the consequences of a change in the underlying justification as a moderator. Second, we deliver empirical evidence for our model on DASS acceptance in the unique COVID-19 context. Third, we support blood donation services with recommendations for marketing strategies that stabilize and foster donor acceptance and continuance intention.

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**FIGURE:** Figure 1. Conceptual Framework of Blood Donors acceptance of a DASS (Source: based on Venkatesh & Davis, 2000)



# Factors affecting voluntary blood donations among adults in Metro Manila, Philippines as a basis for policy improvement on donor recruitment

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## **AUTHORS:**

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## **BACKGROUND:**

Blood donation practice in the Philippines has been consistently low despite several strategies done by the government and non-government organizations to recruit potential donors. Furthermore, there are only a few studies that deal with the identification of factors that affect blood donation practices.

## **AIMS:**

This study aims to determine the relationship of the sociodemographic profile of potential donors to their perceived level of knowledge, motivators, and hindrances of blood donation practice in order to provide recommendations to improve policies and strategies regarding blood donation recruitment.

## **METHODS:**

A correlation descriptive study design was utilized. A total of 260 respondents from Metro Manila, aged 18 to 65 years old, without conditions that merit permanent deferral in blood donation were included in the study. Descriptive statistics such as frequency, mean, and standard deviation were used for data presentation, and the Pearson's product moment correlation were utilized to determine correlations among data. All p-values less than 0.05 are considered statistically significant.

## **RESULTS:**

This study showed that, overall, the respondents have adequate perceived level of knowledge ( $\bar{x}$  =3.13, SD=0.70) on blood donation. However, it was found out that the respondents have lowest knowledge on interval between successive blood donations ( $\bar{x}$  =2.71, SD=1.04), amount of blood taken ( $\bar{x}$  =2.85, SD=1.01), illegality of paid donation ( $\bar{x}$  =2.86, SD=1.04), minimum weight requirement ( $\bar{x}$  =2.93, SD=1.07), time it takes to replace amount of blood lost ( $\bar{x}$  =2.94, SD=0.98), and blood donation posing no risk of disease transmission to donors ( $\bar{x}$  =3.13, SD=0.99). This study also revealed that the respondents are considerably motivated to donate blood ( $\bar{x}$  =2.67, SD=0.42) due to altruistic intentions such as awareness of blood supply shortage ( $\bar{x}$  =3.31, SD=0.72), and when relatives and friends are in need of blood ( $\bar{x}$  =3.73, SD=0.60). Likewise, ease of contact of blood service facilities (BSF) ( $\bar{x}$  =3.30, SD=0.69), and staff hospitality ( $\bar{x}$  =3.35, SD=0.74) were found to greatly encourage them to donate blood. This study also showed that the respondents have only minimal discernment of being discouraged from blood donation ( $\bar{x}$  =2.09, SD=0.48) with structural barriers such as time constraints ( $\bar{x}$  =3.23, SD=0.78), lack of BSF in the area ( $\bar{x}$  =2.58, SD=0.86), and BSF inaccessibility ( $\bar{x}$  =2.56, SD=0.85) as adequate reasons

for them to be discouraged from donating blood. Moreover, there is a significant low inverse correlation ( $r=-0.151$ ,  $p=0.015$ ) between age and motivation to donate blood, suggesting younger individuals have more motivation to donate blood. Thus, policies and strategies that target young donors are highly suggested.

**CONCLUSION:**

Poor blood donation practices in the Philippines suggest recalibration of policies and strategies to recruit blood donors. The findings of this research show that respondents are highly motivated to donate blood, noting altruism and attitude of BSF staff as their primary reasons for blood donation. Furthermore, this study showed younger age groups are more likely to donate blood. Hence, policies and strategies that target young individuals and also showcase altruism in order to recruit more individuals to donate blood. Also, it is recommended to establish BSFs with operating hours that can accommodate potential donors with hectic schedules and are strategically situated in accessible areas.

# FAINT: FACIAL INFRARED THERMAL IMAGING IN THE PREVENTION OF NEEDLE INDUCED FAINTING.

**Submitting author:** *Judita Rudokaite*

**Affiliation:** *Tilburg University, Tilburg and Sanquin, Amsterdam*

## **AUTHORS:**

Judita Rudokaite, Tilburg University, Tilburg and Sanquin, Amsterdam,  
Mart Janssen, Sanquin, Amsterdam,  
Sharon Ong, Tilburg University, Tilburg,  
Elisabeth Huis in 't Veld, Tilburg University, Tilburg and Sanquin, Amsterdam.

## **BACKGROUND:**

Around 40-60% of adults worldwide experience not only stress and fear before a venipuncture, but also so called 'vasovagal reactions' (VVR) that can make them feel nauseous, dizzy, lightheaded, sweaty, pale, and can even cause them to vomit and faint. The sight of needles and blood is quite unique because it causes activity in extended neural networks in our brains which regulate the physiological state of our bodies, emotions, and the experience of pain. However, the mechanism behind fear of needles and blood and especially this VVR response is not yet understood. **AIMS:** The aim of this study is to explore changes in facial temperature using infrared thermal imaging camera (ITI) during needle exposure.

## **METHODS:**

N = 45 students at Tilburg University. Participants were filmed throughout a virtual blood donation where they received either synchronous (N=26) or asynchronous conditions (N=19). All participants self-reported their VVR response [1]. ITI data pre-processing was completed on each frame of the videos: 1. Face detection. Sixty-eight facial landmarks were detected using Face Alignment Network. The network takes an image as an input and outputs corresponding 2D landmarks and 2D projections of the 3D landmarks. 2. Image alignment. We applied geometrical transformation functions on the original image to match the template (frontal face image) that all frames would be aligned. 3. Selection of Regions of Interest (ROI). Six regions of the face were selected - nose, below the nose, cheeks, chin, and area between the eyes. The mean temperature value was extracted from ROIs. The complete dataset therefore contains a mixture of both cross-sectional and temporal data, i.e., collected at 6 different timepoints and across several facial regions.

## **RESULTS:**

To investigate the importance of VVR response on the temperature changes of facial regions, mixed-effects linear regression was conducted on the mean temperature values on each facial region separately with VVR response, six time points and experimental condition (1 = synchronous, 2 = asynchronous) as fixed factors and participants as random factor. VVR response had a statistically significant effect in the area below the nose region.

## **CONCLUSION:**

Our results suggest that an area below the nose seems to be the most indicative for predicting vasovagal reactions after controlling for experimental condition and time component. It could potentially serve as input for future models to predict vasovagal reactions. **References:** [1] France, C. R., Ditto, B., France, J. L., & Himawan, L. K. (2008). Psychometric properties of the Blood Donation Reactions Inventory: a subjective measure of presyncopal reactions to blood donation. *Transfusion*, 48(9), 1820-1826.

## *Current state of blood supply service in the republic of Kazakhstan*

**Submitting author:** K. Kh. Zhangazieva

**Affiliation:** Research and Production Center for Transfusiology of the Ministry of Health of the Republic of Kazakhstan, Nur-Sultan

### **AUTHORS:**

S.A. Abdrakhmanova, A.N. Khalykova, K. Kh. Zhangazieva

### **BACKGROUND:**

The blood supply service in Kazakhstan is state-owned, blood centers are engaged in the banking, processing and distribution of donated blood and provide blood and blood components to medical organizations within their region. Clinical issues are decided by the departments of transfusiology of hospitals.

Financing of blood supply service organizations is done from the state fund for social medical care insurance, at uniform rates nationwide, according to the actual amount of issued blood components.

For years, the consumption of blood components in the Republic in medical organizations has been kept at the same level, and only the consumption structure is changing: the need for plasma is decreasing, the need for cells is growing.

### **AIMS:**

Evaluation of statistical indicators of the blood supply service of Kazakhstan for an 8-year period.

### **METHODS:**

Statistical reports of the blood supply service of the Republic.

### **RESULTS:**

The number of donations of blood and its components as a whole during the study period decreased by 17% (from 284,000.00(2013) to 206,000.00(2020)). The COVID-19 epidemic has had a significant impact on the number of donations, immediately reducing them by 5% compared to 2019.

The structure of donations has changed: the number of blood donations in the total volume of donations increased from 81% in 2013 to 90% in 2020, and, thus the number of plasma donations decreased from 16% to 2% (from 44,500 to 4,500 or 10 times). Cell donations in the structure increased from 3% to 8%. The increase in the absolute number of cell donations annually is 10-15%.

The ratio of banking and distribution has changed - with a negative increase in donations, a positive increase in the volume of distribution, the number of blood components distributed to clinics from one donation was 1.8 in 2020 against 1.2 in 2013.

However, there is an increase in the use of donor blood components by 25.7% by clinics in Kazakhstan during the study period, which is 3% in relation to population.

With sharp increase in the number of hospitalizations (treated cases) by 25.6% (from 273,700.00 in 2013 to 367,600.00 in 2020), the number of patients who received blood components in 2020 decreased by 8.7% compared to 2013 year. The number of doses administered per recipient also increased from 3.2(2013) to 4.7(2020).

The analysis of transfusions showed that the use of plasma is steadily declining (2013 - 49%, 2020 - 37% in the total volume of transfused blood components), the use of erythrocytes (from 40% in 2013 to 48% in 2020 in the total volume) and platelets is growing.

**CONCLUSION:**

The main trends in the activities of the blood supply service in Kazakhstan over 8 years are an increase in indicators of gratuitous voluntary blood donation, a decrease in the total number of donations, changes in the structure of donations in favor of donations of whole blood and cells, an increase in the consumption of erythrocytes and platelets, an increase in the infectious safety of transfusion therapy due to an increase in extent of application of technologies for pathogen-inactivation of fresh frozen plasma.

## Session 10 “Dealing with donor deferrals“

Thursday, 16 <sup>th</sup> September – SESSION 10	
4.00 pm – 5.30 pm	<b>Dealing with donor deferrals</b> <i>Chair: Eva-Maria Merz</i>
4.00 pm – 4.15 pm	<b>Extra information increases the return of deferred whole blood donors: Results from a field randomized controlled trial in the Netherlands</b> <i>Marloes Spekman, Theo van Tilburg, Eva-Maria Merz</i>
4.25 pm – 4.40 pm	<b>Avoiding disappointment: Identifying which donation appointments are most likely to result in a deferral</b> <i>Carley N. Gemelli, Surendra Karki</i>
4.50 pm – 5.05 pm	<b>Increase in low haemoglobin deferral rates following implementation of new haemoglobin point of care analyzers</b> <i>Lorna McLintock, Colin Robertson, Pauline Stewart, Sandra McLachlan, Debbie McNaughton</i>
5.15 pm – 5.20 pm	<b>Does deferral induce bad blood in donors? A qualitative interview study about the experiences of temporarily deferred donors</b> <i>Marloes Spekman, Eva-Maria Merz</i>
5.25 pm – 5.30 pm	<b>An Electronic Donor Health Questionnaire may decrease blood donor deferral rate</b> <i>Johanna Castrén, Mikko Arvas, Martti Syrjälä</i>

## Extra information increases the return of deferred whole blood donors: Results from a field randomized controlled trial in the Netherlands.

**Submitting author:** Marloes Spekman

**Affiliation:** Dept. of Donor Medicine Research, Sanquin Research, Amsterdam, the Netherlands

### **AUTHORS:**

Marloes Spekman, Theo van Tilburg, & Eva-Maria Merz

### **BACKGROUND:**

The blood supply in the Netherlands, like many other countries, depends on the donations of voluntary, non-remunerated donors. Deferral policies are employed to ensure the safety of both donors and recipients, so donors may be deferred when they come in to donate. However, previous research has shown that donors who are temporarily deferred on-site are less likely to return for a next donation. In an attempt to encourage return, Clement and colleagues (2016) offered deferred donors an alternative good deed. This increased return from 50% to 70%.

### **AIMS:**

To study the impact of offering an alternative good deed or providing extra information to deferred donors in the Netherlands on their return behavior.

### **METHODS:**

A Randomized Controlled Trial between January-September 2019. Inclusion criteria were that donors needed to be whole blood (WB) or plasma donors who were temporarily deferred on-site at one of 10 participating donation centers. Participants were randomly assigned to one of five conditions:

- Write/draw a postcard (to help a patient in a different way); or
- Participate in research (to help the blood bank in a different way); or
- Receive extra information about deferral; or
- Choose between the first three options; or
- Control group.

We also included an unobtrusive control group with donors who met our inclusion criteria but did not participate. We checked whether donors returned for a next donation attempt after expiry of their deferral and within four weeks of receiving a new invitation to donate (i.e. after four weeks, donors may receive a second invite), or until the end of the follow-up period (June 1, 2020).

### **RESULTS:**

Of 619 donors (out of 660 total participants), we had all the required information and they had had the opportunity to return for a donation attempt before June 1, 2020. Most participants were female, donated WB, and were deferred for low hemoglobin (Table 1). 59% of participants returned within four weeks after the invitation, compared to 57% of the unobtrusive control group. Plasma donors returned more often than WB donors (91% vs. 50%). When we analyzed WB donors separately and controlled for the effect of age, we found that offering additional information led to higher return (60%) compared to the control group (45%). Return in the other conditions (45-53%) was not significantly higher than in the control group.

**CONCLUSION:**

Despite promising results from earlier work, we found no evidence that offering an alternative good deed led to higher return after deferral. We did however find that offering additional information about deferral had a positive effect on the return of WB donors in particular. Thus, to increase donor retention, more attention should be paid to properly informing donors about what deferral means, and that donors are welcome to donate again.

**REFERENCES:**

Clement, M., Wegner, M., Mazar, N., & Langmaack, A.-C. (2016). *Behavioral Interventions to Reducing the Negative Consequences of Deferrals on Subsequent Blood Donation*. Paper presented at the Association for Consumer Research Conference, Berlin, Germany.

**TABLE:**

*Table 1. Characteristics of RCT participants (N = 619).*

Average age (SD)	35.7 (15.1)
Number of female donors (%)	450 (73%)
Number of WB donors (%)	497 (80%)
Average deferral duration, in days (SD)	77.2 (46.4)
Deferral reason (%)	
Short-term medical	111 (18%)
Long-term medical	18 (3%)
Low Hb	390 (63%)
Travel	70 (11%)
Miscellaneous	28 (5%)

## Avoiding disappointment: Identifying which donation appointments are most likely to result in a deferral

*Submitting author: Carley N Gemelli*

*Affiliation: Australian Red Cross Lifeblood*

### **AUTHORS:**

Carley N Gemelli, Surendra Karki

### **BACKGROUND:**

Potential blood donors can be deferred due to concerns about the impact of the donation on their health or the safety of the blood supply. However, there is clear evidence that deferrals negatively impact future donation behaviour, particularly for those deferred at their first donation attempt. Further, the impact of the deferral depends upon when the donor is deferred. In Australia, donors deferred in-centre reported a more negative response to being deferred than donors deferred when calling to make an appointment. Adequately capturing ineligible donors before they attend to donate may reduce any negative emotional response to being deferred, reduce their annoyance around the inconvenience of attending a donation centre and having their time wasted and subsequently lead to an increase in donor retention.

### **AIMS:**

The aim of this study was to investigate the characteristics of donors presenting in-centre when ineligible to donate. In particular, the types of deferrals applied, the booking channel used to make an appointment and any donor characteristics that are important predictors of presenting when ineligible.

### **METHODS:**

Donation attempts were collated for the period of 1/07/2020 to 31/12/2020. Donation attempts resulting in a deferral were identified. Donor and donation characteristics examined included age, sex, prior donation history, deferral history, appointment booking channel, number of days between making the appointment and attending to donate and geographical location of the donor centre.

### **RESULTS:**

Donation records were examined for 740,097 donation attempts, with 23,784 (3.2%) resulting in a deferral. The majority of the deferrals identified were temporary (96.7%) and 30.9% recorded this attempt as their first deferral received in their donation career.

Compared to those who booked via the mobile app (21 per 1,000 attempts), the rate of a deferral being applied was higher if they booked via the online donor portal (53 per 1,000 donation attempts) or community focused recruitment (87 per 1,000 donation attempts).

Donors who booked appointments less than 22 days out from attending were more likely to be deferred in centre than the cohort as a whole ( $p < 0.05$ ). In particular, deferred donors who booked via the donor app (Mean: 18.5 days vs 21.1 days), the donor portal (Mean: 14.9 days vs 18.3 days) and via community focused recruitment (Mean: 24.8 days vs 33.1 days) had shorter time frames between booking and attending to donate, than non-deferred donors ( $p < 0.05$ ).

**CONCLUSION:**

People who are deferred in-centre are more often those who have presented to donate shortly after making an appointment. Additionally, higher rates of deferrals are observed for different booking channels, compared to those who booked by the mobile app. A key driver of blood collection agencies is to assess donor eligibility before they attend a donor centre in order to maximize the likelihood of donor return. Tailoring different communication methods to donors prior to presenting to donate and based on the channel they booked by could be helpful to adequately pre-screen donors, educate donors about deferrals and reduce the number of deferrals seen in-centre.

## Increase in low haemoglobin deferral rates following implementation of new haemoglobin point of care analyzers

**Submitting author:** Lorna McLintock

**Affiliation:** Scottish National Blood Transfusion Service

### **AUTHORS:**

Lorna McLintock, Colin Robertson, Pauline Stewart, Sandra McLachlan and Debbie McNaughton

### **BACKGROUND:**

In October 2020, The Scottish National Blood Transfusion Service (SNBTS) replaced their haemoglobin point of care analyzers. Following validation, the Hemocue 301+ was replaced by DiaSpect Tm.

All donors have a capillary sample performed and tested if this does not meet the acceptable haemoglobin cut off, a venous sample is taken, this mitigates issues related to capillary sampling.

Following implementation of the new haemoglobin analyser, an increase in the low haemoglobin deferral rate was noted. The average deferral rate rising from 2-3% to 4-5%.

### **AIMS:**

To describe the work that was undertaken to investigate the increase in low haemoglobin deferral rates.

### **METHODS:**

The following steps were taken to investigate the increase in low haemoglobin deferral rates.

- an audit of sampling technique
- a review of training and competency
- a comparison study to compare capillary and venous samples on DiaSpect Tm and Beckman Coulter Analyser
- comparison between Hemocue 301+ and DiaSpect Tm of donors with low haemoglobin on capillary samples who had secondary testing with capillary samples
- literature review of low haemoglobin deferrals in blood donors

### **RESULTS:**

An audit of sampling technique identified no issues.

A review of training and competency identified no issues.

A total of 165 donors (a mixture of apheresis and whole blood; 152 male, 13 female) had capillary and venous samples tested on the Diaspect Tm and venous samples were also tested using the Benchtop Beckman analyser. The venous sample results were similar on Diaspect and Beckman analysers (Mean 152 and 153g/l) and higher than capillary sampling (146g/l). See Table 1.

The percentage of donors with a low capillary haemoglobin who were accepted for donation upon testing of the venous sample was comparable between both HemoCue 301+ (43.1%) and Diaspect Tm (44.3%).

A 2020 systematic review (Browne et al) demonstrated that low haemoglobin deferral rates in blood donors are widely variable (1-52%). In the developed world the incidence of iron deficiency anaemia is 2-5% in males and women of non-child bearing age and 14% in non-pregnant women.

**CONCLUSION:**

No issues were identified around sampling or training. The venous sample results were similar on Diaspect and Beckman analyzers (Mean 152 and 153g/l).

The low haemoglobin deferral rate of 2-3% using HemoCue 301+ is very much at the lowest end of reported deferral rates (Browne et al). The higher deferral rate using Diaspect Tm may be more consistent with reported deferral rates and with the incidence of iron deficiency anaemia in the UK population.

**REFERENCES:**

<https://cks.nice.org.uk/topics/anaemia-iron-deficiency/background-information/prevalence/Donor-Deferral-Due-to-Low-Hemoglobin—An-Updated-Systematic-Review>. Andrew Browne et al. Transfusion Medicine Reviews 34 (2020) 10–22

**TABLE 1**

	Diaspect (capillary blood)	Diaspect (venous blood)	Beckman (venous blood)
Mean	146.3 g/L	152.1 g/L	153.1 g/L
Median	147 g/L	151 g/L	153 g/L
Standard Deviation	11.2 g/L	10.2 g/L	10.3 g/L

# Does deferral induce bad blood in donors? A qualitative interview study about the experiences of temporarily deferred donors

**Submitting author:** Marloes Spekman

**Affiliation:** : Dept. of Donor Medicine Research, Sanquin Research, Amsterdam, the Netherlands

## **AUTHORS:**

Marloes Spekman & Eva-Maria Merz

## **BACKGROUND:**

Temporary deferral is often associated with a higher risk of donor lapse, even when donors are deferred for their own safety. Many reasons for lapse after deferral have been suggested thus far, yet relatively few studies have looked into actual emotional and cognitive experiences of deferred donors.

## **AIMS:**

To understand how whole blood donors in the Netherlands experience and make sense of deferral and why they do (not) lapse after deferral.

## **METHODS:**

In April 2018, we visited two of the busiest donation centers in the Netherlands in order to recruit deferred whole blood donors on-site. We held qualitative interviews with 31 deferred whole blood donors immediately following their on-site deferral. Our semi-structured interview guide covered the donor career, motivations for donating, donor identity, knowledge about the donor health screening and deferral, experience of the current deferral, intentions to donate after expiry of the deferral, and potential interventions to prevent lapse after deferral. Of the respondents, 19 were women, and 6 were new or novice donors (<5 donations). Currently, we are analyzing the data using reflexive thematic analysis (cf. Braun et al., 2019) to generate themes (i.e. stories about patterns of shared meaning in the data) and domain summaries (reflecting the diversity of meanings in the data about a particular domain) (Braun & Clarke, 2019).

## **RESULTS:**

Data analysis is ongoing, so we present some preliminary, descriptive findings here. First, even though donation center staff always talk about deferral as ‘postponement’, donors often talked about it as failure or rejection. How donors experienced deferral was largely influenced by their expectations about the donation: Donors who expected they might be deferred (e.g., because they had been deferred previously) appeared to experience less negative emotions about the deferral than donors for whom the deferral was a complete surprise. With regard to return after expiry of the deferral, we identified a third-person effect: Donors said they themselves would surely return, yet they would understand if other donors did not. Donors related lapse after deferral to repeated deferrals (e.g., due to low hemoglobin), mistakenly interpreting the deferral as permanent, or feeling that the effort did not pay off anymore. To prevent lapse after deferral, donors wanted more information about deferral in general and specifically about how to prevent future deferrals. Furthermore, they wanted to feel valued and appreciated for their efforts, even when they could not donate at the time.

**CONCLUSION:**

Expectations about the donation and knowledge about deferral affect how donors experience deferral. Improving the information to donors before donation as well as after a deferred donation may prevent (future) deferrals and improve the experience for deferred donors.

**REFERENCES:**

Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sports, Exercise and Health*, 11(4), 589-597.

<https://doi.org/10.1080/2159676X.2019.1628806>

Braun, V., Clarke, V., Hayfield, N., & Terry, G. (2019). Thematic Analysis. In P. Liamputtoing (Ed.), *Handbook of Research Methods in Health Social Sciences* (pp. 843-860). Springer: Singapore. <https://doi.org/10.1007/978-981-10-2779-6>

## An Electronic Donor Health Questionnaire may decrease blood donor deferral rate

*Submitting author: Johanna Castrén*

*Affiliation: Finnish Red Cross Blood Service*

### **AUTHORS:**

Johanna Castrén, Mikko Arvas, and Martti Syrjälä

### **BACKGROUND:**

Effective and adequate blood donor selection processes and methods are essential in order to safeguard safe and sustainable blood supply. Decreased deferral rates, increased donor return rates, and cost savings for blood establishments can be achieved by optimizing the pre-selection process of donors.

### **AIMS:**

In this study we investigated the impact of the implementation of an electronic donor health questionnaire (eDHQ) to the deferral rate of donors.

### **METHODS:**

Finnish Red Cross Blood Service implemented in May 2020 a new Blood Service ICT-system to the whole chain of operations from donor selection to product storage and distribution. The donor health questionnaire in paper format was replaced by an eDHQ, which consist of secure web-based questionnaire for donors (Deltagon, Finland) and customer relationship management part component (Microsoft Dynamics CRM 2016, Microsoft Corporation, USA) for the staff. We analyzed the donor deferral data in 2019 and 2020. Impact of a process change – new malaria testing algorithm - that had an impact on donor deferrals as such was taken to account in the final results.

### **RESULTS:**

After the implementation of the eDHQ (May 2020) a declining tendency of deferrals is observed (deferral rate in 2019: 9.5 %, from 1/2020 to 4/2020: 9.2 % and from 5/2020 to 12/2020: 6.3 %). In table 1 an illustrated deferral rate is shown where the of process change of malaria testing is included. The analysis of the reasons for donor deferrals shows a proportional increase of deferrals due to low hemoglobin among all deferral reasons (table)

**CONCLUSION:** We have observed a decrease in donor deferrals after eDHQ has replaced the paper format questionnaire. Due to the concurrent outbreak of the Covid19 pandemic it is hard to separate the pandemic's impact to donor deferrals from effects of the eDHQ, for example due to travel restrictions. A longer period of observation and data from other countries is needed to confirm our results.

Table:

Deferral rate and proportion of hemoglobin deferrals 1/2019-12/2020

<b>Year-Month</b>	<b>Deferral rate *</b>	<b>Proportion of Hb deferrals</b>
		<b>%</b>
<b>2019-01</b>	9.7	21.1
<b>2019-02</b>	9.8	20.5
<b>2019-03</b>	10.1	19.0
<b>2019-04</b>	9.5	22.5
<b>2019-05</b>	9.9	23.4
<b>2019-06</b>	9.6	25.4
<b>2019-07</b>	9.2	22.0
<b>2019-08</b>	10.4	24.6
<b>2019-09</b>	10.5	19.5
<b>2019-10</b>	10.1	17.5
<b>2019-11</b>	9.2	17.7
<b>2019-12</b>	8.7	19.8
<b>2020-01</b>	8.8	19.4
<b>2020-02</b>	10.3	18.4
<b>2020-03</b>	9.7	19.9
<b>2020-04</b>	7.9	22.3
<b>eDHQ implemented</b>	7.0	30.7
<b>2020-06</b>	8.0	34.9
<b>2020-07</b>	7.4	31.5
<b>2020-08</b>	7.3	30.4
<b>2020-09</b>	6.6	28.9
<b>2020-10</b>	6.4	29.1
<b>2020-11</b>	5.9	26.9
<b>2020-12</b>	5.6	29.1

\*) Illustrated deferral rate where deferral policy change concerning donor testing for with malaria-antibodies is taken to account

## Session 11 “Current issues in donor health”

Thursday, 16 <sup>th</sup> September – SESSION 11	
4.00 pm – 5.30 pm	<b>Current issues in donor health</b> <i>Chair: Tamam Bakchoul</i>
4.00 pm – 4.15 pm	<b>Increased Platelet Collections Prompted by Gratitude Messages from Patients to Their Specific Donors</b> <i>Justin Redwine, John Armitage</i>
4.25 pm – 4.40 pm	<b>Effect of genetic variation in the MAPKAPK5 gene on red blood cell and platelet function</b> <i>Tamir Kanias, Kelsey Hazegh, Marcus Muench, Rachael Jackman, Sonia Bakkour, Alvin Hui, Orlando Esparza, Pavel Davizon-Castillo, Pramod Sahadevan, Matthias Gaestel, Fang Fang, Grier Page</i>
4.50 pm – 5.05 pm	<b>Horiba Micros ES 60 blood cell analyzer in donor eligibility: a validation study</b> <i>Vincenzo De Angelis, Silvia Tillati, Ilaria Pati, Michela Delle Donne, Alessandra Meneghel, Donatella Londero</i>
5.15 pm – 5.20 pm	<b>Whole blood donation and risk of cardiovascular diseases in Australian blood donors</b> <i>Surendra Karki, Andrew Hayen, Tanya Davison, David O. Irving</i>
5.25 pm – 5.30 pm	<b>Immunoglobulin shortage and its factors in Japan</b> <i>Makiko Sugawa</i>

## Increased Platelet Collections Prompted by Gratitude Messages from Patients to Their Specific Donors

*Submitting author: Justin Redwine*

*Affiliation: Oklahoma Blood Institute (OBI)*

### **AUTHORS:**

John Armitage, MD, and Justin Redwine

### **BACKGROUND:**

Blood centers routinely face acute blood shortages compounded by the challenge of recruiting and retaining new donors, both of which have been exacerbated by the ongoing COVID-19 pandemic. Blood donors are largely driven by altruism. To boost first time and repeat donors, an application was developed to send donors an anonymous thank you from the blood recipient.

### **AIMS:**

To maintain the single donor platelet (plateletpheresis) product inventories that are required to meet patient needs, blood collectors strive to boost donor retention and donation frequency. One way to accomplish this is creating a favorable customer experience by conveying gratitude for donors' generosity.

### **METHODS:**

We reviewed electronic documentation from our blood establishment computer system and records from our Thank the Donor<sup>®</sup> files on 197 successful plateletpheresis (PLAP) donors who received a solitary Appreciation from an index collection that was given between January 1, 2018 and December 31, 2019. We eliminated three who donated at mobile drives, since access for scheduling those opportunities is highly variable and not donor governed in comparison to the seatings available via our fixed site operations.

For each of the remaining 194 subjects, we tallied the number and types of donations yielded after the Appreciated collection until March 19, 2020. As a statistical "auto control," we summed the same product figures for each person over an identical number of days prior to the index collection ("pre-period") to match his or her follow-up time span ("post-period"), shown in **Figure 1**. We then selected the 156 individuals with only 0-5 pre-period PLAP harvests, assuming that they were relatively less committed giving PLAPs at the time they received their Appreciation and, thus, were probably more responsive to behavioral influences, whether positive or negative.

Next, we removed from the analysis four donors, because a subsequent permanent deferral preempted later giving. We also excluded 26 individuals who had no PLAP procedures prior to the index event, because this first timer category historically shows low return apheresis procedure rates, presumptively due to citrate toxicity, procedure discomfort, long run times, and other variables imputed to be far more impactful than getting an Appreciation. Finally, 30 donors were excluded from analysis because their prior giving history was not long enough to allow exact matching of their pre-periods and postperiods.

## RESULTS:

### Blood Collections Before and After Receiving an Appreciation

	Pre-Period	Post-Period	Change
Platelets	262	464	+77%
Whole Blood	99	53	-46%
Double RBC	31	12	-61%
Plasma	4	1	-75%
Total Collections	396	530	+34%
Registrations	443	597	+35%

Aggregated totals for documented temporary deferrals, incomplete draws and other potential disruptions to donation patterns were similar for the study cohort in both periods (Pre = 56 and Post = 61).

## CONCLUSION:

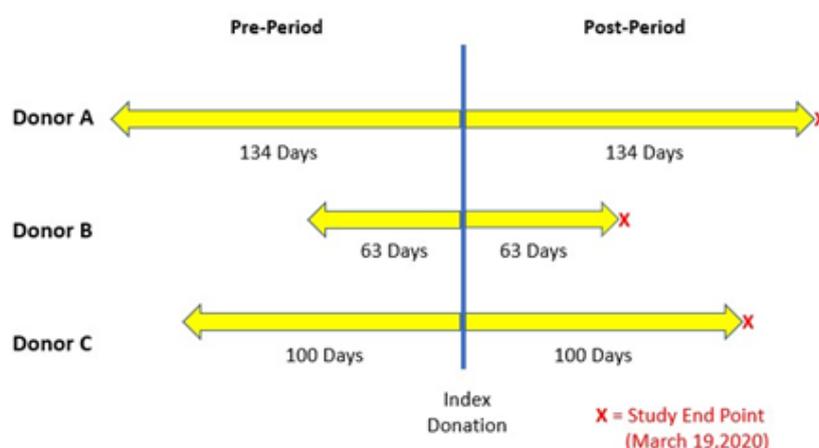
Registration and collection frequencies increased by over one third for a subset of relatively infrequent platelet-pheresis donors who receive anonymous thank you messages from the recipients of one of their units. Their donations that provided high-value platelet products rose more than 75%. Once wider and longer use of the Thank the Donor® web app expands the potential study population, a larger, more rigorous analysis of these apparent benefits of gratitude messaging for platelet donors is merited.

## REFERENCES::

The Commonwealth Transfusion Foundation of Richmond, VA provided financial support for the collection, analysis, and reporting of this data.

## FIGURE/TABLE:

Figure 1:  
Platelet Donation Tracking: Auto Control Methodology



# Effect of genetic variation in the *MAPKAPK5* gene on red blood cell and platelet function

**Submitting author:** Tamir Kaniias

**Affiliation:** Vitalant Research Institute

## **AUTHORS:**

Kelsey Hazegh, Marcus Muench, Rachael Jackman, Sonia Bakkour, Alvin Hui, Orlando Esparza, Pavel Davizon-Castillo, Pramod Sahadevan, Matthias Gaestel, Fang Fang, Grier page, and Tamir Kaniias

## **BACKGROUND:**

Mitogen-activated protein kinases (MAPKs) are a family of serine/threonine kinases known for their vital roles in mediating cellular responses to extracellular stimuli including osmotic shock and oxidative stress. Specific to blood cells, p38 MAPK was associated with erythrocyte-programmed cell death and the platelet storage lesion. Our genome-wide association (GWA) study of genetic predisposition to osmotic hemolysis in stored red blood cells (RBCs) from blood donors (n=13,403) who participated in NHLBI's RBC-Omics study has identified polymorphism ( $p=2.24 \times 10^{-13}$ ) in the *MAPKAPK5* gene (chromosome 12).<sup>1</sup> The product of this gene is a non-conventional MAPK-activated protein kinase (MAPAPK or MK) known as p38-regulated/activated protein kinase (PRAK) or MK5. This MAPKAPK has not been reported in blood cells and the overarching goal of our study was to determine whether it is involved in stress responses to select stimuli in RBCs and platelets.

## **AIMS:**

The first aim of this study was to determine the impact of single nucleotide polymorphism (SNP) in *MAPKAPK5* on osmotic hemolysis and RBC and platelet hematological indices. The second goal was to determine whether elimination of MK5 signaling in mice modulates RBC and platelet function in response to osmotic shock (RBCs) or mitochondrial stress assay (platelets).

## **METHODS:**

We used NHLBI's RBC-Omics GWA database to define the associations between three *MAPKAPK5* SNPs (rs4767068 A→G, rs7974772 C→T, and rs77211491 G→A) and measures of RBC hemolysis and hematological indices. To verify whether MK5 deficiency has functional consequences, we used a *MAPKAPK5* knockout mouse strain (MK5<sup>-/-</sup>)<sup>2</sup> to define RBC and platelet responses to stress including osmotic fragility and platelet mitochondrial stress test (Seahorse, Agilent).

## **RESULTS:**

In all tested *MAPKAPK5* SNPs, RBCs from homozygotes of the minor alleles exhibited decreased osmotic hemolysis ( $p < 0.001$ ) compared with homozygotes of the major alleles. The rs4767068 SNP was significantly ( $p < 0.05$ ) associated with lower red blood cell distribution width (RDW) in all donors and increased RBC count in male donors. All tested SNPs were significantly ( $p < 0.001$ ) associated with increased platelet count in all donors compared with heterozygotes and homozygotes of the major allele. MK5 deficiency in mice (MK5<sup>-/-</sup>, n=7) was associated with increased RBC osmotic hemolysis compared with haplodeficient (MK5<sup>+/-</sup>, n=30) or wildtype (MK5<sup>+/+</sup>, n=26) controls ( $34.8 \pm 4.9\%$ ,  $33.4\% \pm 7.1$ , and  $28.6 \pm 5.5\%$ , respectively;  $p = 0.0089$ ). RDW of RBCs from MK5<sup>-/-</sup> mice was significantly ( $p = 0.0421$ ) higher than that of wildtype controls ( $14.7 \pm 0.7\%$  versus  $13.6 \pm 0.8\%$ , respectively). Platelet count ( $10^3/\mu\text{L}$ ) was significantly ( $p = 0.0225$ ) lower in MK5<sup>-/-</sup> mice ( $585 \pm 378$ ) compared with wildtypes ( $1057 \pm 258$ ). Platelet mitochondria from MK5<sup>-/-</sup> mice exhibited lower baseline ATP production and oxygen consumption rate (pmol/min) compared with wildtypes.

## **CONCLUSION:**

Genetic variation in *MAPAPK5* modulates RBC susceptibility to osmotic fragility and is significantly associated with changes in RDW, RBC, and platelet counts. Although the impact of the tested SNPs on MK5 RBC expression or function is not clear, data from MK5<sup>-/-</sup> mice suggest that attenuation of MK5 signaling pathways may be detrimental to RBC and platelet function. These data support findings from RBC-Omics' GWA study and are relevant to the ongoing development of precision transfusion medicine microarray for enhanced genetic screening of blood donors.

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## Horiba Micros ES 60 blood cell analyzer in donor eligibility: a validation study.

*Submitting author:* Vincenzo De Angelis

*Affiliation:* Italian National Blood Centre, Istituto Superiore di Sanità, Rome, Italy

### **AUTHORS:**

Silvia Tillati, Ilaria Pati, Michela Delle Donne, Alessandra Meneghel, Donatella Londero, Vincenzo De Angelis.

### **BACKGROUND:**

Eligibility criteria for whole blood donation require minimal acceptable hemoglobin (Hb) levels of 12.5 g/dL for women and 13.5 g/dL for men for either protecting donor's health and guaranteeing quality standards of blood components.

In plateletpheresis, an important variable for ensuring the quality of the collected component is the initial value of donor platelet count (PLT), which influences the efficiency of platelet collection with cell separators. The eligibility criteria for donation in apheresis require a PLT of not less than  $180 \times 10^9/L$ .

Screening before donation is performed with several methods. However, it is important that the tests used have high accuracy, precision, rapidity, and ease of operation.

The aim of this study is to assess the performance on Hb and PLT pre-donation measurement of the ABX Micros ES 60 automated hematology analyzer, manufactured by Horiba ABX SAS, compared to the Beckman Coulter DXH 800.

### **METHODS:**

We obtained 40 venous and finger-prick blood samples for each of the 11 Horiba vs. Beckman devices across 6 different sites in the Regional Transfusion Service of Friuli Venezia Giulia Region, Italy. Coefficient of variation (CV) was applied to measure the precision, whereas  $\rho$ -Pearson's correlation coefficient was evaluated to measure concordance. Accuracy was assessed by using Fisher's paired sample F-test to evaluate significant differences in mean Hb and PLT values obtained from the Horiba vs. Beckman devices. The intra-assay agreement of the Horiba analyzer was examined in the 11 devices by performing 10 consecutive repetitions of 3 fresh venous blood samples for 3 consecutive days. The same operator carried out the 10 consecutive repetitions. For each sample a repeatability analysis was performed by using the CV. We used nonparametric tests (Kruskal-Wallis test) to measure potential difference in median between the overall CV values among the 11 devices. P values less than 0.01 were deemed as statistically significant.

### **RESULTS:**

The precision CV values reported between Horiba vs. Beckman values appear perfectly overlapped for both Hb and PLT.  $\rho$ -Pearson's coefficients of 88% and 89% were also found for Hb and PLT, respectively. The F-Fisher test did not show statistically significant results in the variances of the selected parameters.

Regarding the intra-assay agreement of the Horiba analyzer, all the CV calculated presented values below the standard threshold for both Hb (<1.5%) and PLT (<5%). Results from the Kruskal-Wallis test indicate non-significant difference in median for Hb ( $p=0.025$ ), but significant for PLT ( $p<0.01$ ).

**CONCLUSION:**

Based on our validation study, we can conclude that the Horiba analyzer is adequate for routine pre-donation screening investigations, for the parameters measured in the study.

The intra-assay agreement further demonstrates the accuracy of the device.

The significant differences emerged on the platelet count are not attributable to precision limits of the devices used, but presumably to a sample variability.

## Whole blood donation and risk of cardiovascular diseases in Australian blood donors.

*Submitting author: Surendra Karki*

*Affiliation: Australian Red Cross Lifeblood*

### **AUTHORS:**

Surendra Karki, Andrew Hayen, Tanya Davison, David O Irving

### **BACKGROUND:**

‘Iron-Heart Hypothesis’ suggests that lower level of iron in human body protects against coronary heart disease. In relation to this, researchers have investigated whether there is any evidence of reduced risk of cardiovascular diseases (CVD) due to loss of iron as a result of whole blood donation/s. A few studies have suggested that the donation of whole blood decreases the risk of CVD and others report that there is no such risk difference. However, it is possible that these studies were impacted by a form of bias called the ‘healthy donor effect’, which can distort the true impact of blood donation on health outcomes.

### **AIMS:**

We aimed to assess the long-term CVD safety profile in whole blood donors compared to similarly healthy non-donors in the Australian context.

### **METHODS:**

We used data from the Sax Institute’s 45 and Up Study, which is a population-based cohort of 267,000 adults aged 45 years and above and living in NSW when they joined the study between 2006 and 2009. These participants have provided extensive information on their life-style, health and demographics, and this data was linked to Lifeblood’s donor and donation data sets and several of other disease registries and health administrative datasets. Out of 267000 participants, 15% have a recorded history of blood donation. We used the emulation of target trial approach to estimate the risk difference of CVD in donors and non-donors. To induce a similar balance of confounders between the comparison groups (donors and non-donors) we calculated inverse probability weights for the participants for their propensity to donate blood and generated weighted outcomes using the extensive information that we have collected from the data linkage.

### **RESULTS:**

A total of 2,154 male donors, 55,236 male non-donors, 3,357 female donors and 77,796 female non-donors met eligibility requirements to be included in the analyses. Males had a much higher rate of CVD compared to females. Among males, CVD rates were similar for donors and non-donors (Relative risk: 0.99, 95% Confidence Interval (CI) 0.72-1.37). While female donors had an indication of a lower rate of CVD than non-donors (Relative risk: 0.70, 95% CI 0.44-1.11, 30% lower risk), the difference in the rate did not reach statistical significance. We also examined the data to investigate if simply starting to donate whole blood (regardless of whether or not they became regular donor) had any effect on the occurrence of CVD in next 5 years. We did not observe any differences for both males and females, compared to similarly healthy non-donors.

### **CONCLUSION:**

The findings from this research provide assurance that our middle-aged and older donors who are donating as at maximum allowed frequency are not at an increased risk for cardiovascular diseases when followed up to 5 years, compared to a similarly healthy population of non-donors.

## Immunoglobulin shortage and its factors in Japan

*Submitting author: Makiko Sugawa*

*Affiliation: Tokyo Medical and Dental University*

### **AUTHORS:**

Makiko Sugawa

### **BACKGROUND:**

In recent years, the demand for immunoglobulin preparations has rapidly increased and they are in short supply in various countries around the world. Similarly, in Japan, the insurance coverage has been approved for many new disorders, resulting in a rapid increase of the amount of immunoglobulin needs. Its approval for the preventive use in suppressing progression of CIDP mostly contributed for this increase, resulting in the need of urgent import of immunoglobulin from overseas in 2019.

### **AIMS:**

To understand on the use of immunoglobulin preparations in Japan, in an attempt to promote their appropriate use, and to encourage the careful indication approval for insurance coverage, and as a consequence, promote their appropriate use.

### **METHODS:**

Using information on medical receipts from the social health insurance system, we evaluated data on the use of different immunoglobulin preparations in approximately 5.25 million patients under the age of 75-years old. Focusing on four diseases with particularly high use, CIDP, KD, IgG2, PID/SID, we examined on the use of the concentrated derivatives and changes in both the place of administration (outpatient/ward) and the amount used, and explored their implication on the rapid increase in the immunoglobulin demand.

### **RESULTS:**

The cause of the rapid increase in immunoglobulin usage was not the indication for CIDP itself, but the development of the concentrated formulations and superior products, allowing the shortening of the administration time. The shortening of the administration time allowed the treatment at the outpatient care, without need of hospitalization, which was a burden especially for patients requiring continuous preventive treatment. With these new alternatives, it seems the treatment needs that had been withheld until now have surfaced.

### **CONCLUSION:**

The shortening of the administration time of the new immunoglobulin preparations allowed the treatment at the outpatient care, without need of hospitalization. Concentrated formulations have appeared as a more convenient treatment modality, and it seems that the treatment needs that have been withheld until now have surfaced. The demand for immunoglobulin is increasing fast, dependent on the approval of insurance coverage of new indications, resulting in the short supply all over the world. Although the patients' needs are increasing, and efforts are required to supply the necessary volume of products, we need to keep in mind that the raw material for blood products is of human origin, which is a limited and precious resource. Today, 70% of the world's plasma comes from payed blood, which is associated with lower quality and higher risk of infectious disease transmission. In addition, administration of blood fractionation products are not exempt of adverse reactions. Physicians need to carefully consider the use of immunoglobulin products, promoting the appropriate use of these products.

## Session 12 “Dealing with iron deficiency”

Thursday, 16 <sup>th</sup> September – SESSION 12	
4.00 pm – 5.30 pm	<b>Dealing with iron deficiency</b> <i>Chair: Katja van den Hurk</i>
4.00 pm – 4.15 pm	<b>Ferritin-guided iron supplementation in whole blood donors: Optimal dosage, donor Response, return, and Efficacy (FORTE) – a randomized controlled trial protocol</b> <i>Jan Karregat, Maïke G. Sweegers, Franke A. Quee, Henriëtte H. Weekamp, Dorine W. Swinkel, Věra M. J. Novotny, Hans L. Zaaijer, Katja van den Hurk</i>
4.25 pm – 4.40 pm	<b>Ferritin-Guided Management of Blood Donors with a Marginally Low Pre-Donation Haemoglobin and Its Effect on Donor Return and Retention</b> <i>Monique A. Debattista, Sandra Cutajar, George Galea</i>
4.50 pm – 5.05 pm	<b>New genetic variant for iron deficiency anemia and Hb-deferral at chromosome 17 in gene RNF43</b> <i>Mikko Arvas, Jarkko Toivonen, FinnGen consortium</i>
5.15 pm – 5.20 pm	<b>Factors associated with iron deficiency and how they can be used in blood donor selection processes</b> <i>Sofie Ekroos, Mikko Arvas, Johanna Castrén</i>
5.25 pm – 5.30 pm	<b>Ferritin measuring in donors at the North Estonia Medical Centre’s Blood Centre</b> <i>Astrid Pihlak, Riin Kullaste, Gulara Khanirzayeva, Merle Vahter</i>
5.35 pm – 5.40 pm	<b>Perceptions of whole blood donors on iron supplementation: a qualitative focus group study</b> <i>Jan Karregat, Dayna Blokhuis, Katja van den Hurk</i>

# Ferritin-guided iron supplementation in whole blood donors: Optimal dosage, donor Response, return, and Efficacy (FORTE) – a randomized controlled trial protocol

*Submitting author: Jan Karregat*

*Affiliation: Sanquin*

## **AUTHORS:**

Jan H M Karregat<sup>1</sup>, Maïke G Sweegers<sup>1</sup>, Franke A Quee<sup>1</sup>, Henriëtte H Weekamp<sup>2</sup>, Dorine W Swinkels<sup>3,4</sup>, Věra M J Novotny<sup>5</sup>, Hans L. Zaaijer<sup>1,6</sup>, Katja van den Hurk<sup>1</sup>

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<sup>6</sup>Department of Clinical Virology, Amsterdam UMC, location AMC, Amsterdam, The Netherlands

## **BACKGROUND:**

Frequent whole blood donors have an increased risk of developing iron deficiency due to donation-induced hemoglobin-bound iron loss. Iron deficiency can have detrimental health effects when left untreated. Donation intervals are commonly too short to replenish iron stores to pre-donation levels. Extending donation intervals based on Hb or ferritin levels reduces donor availability and may demoralize donors. Iron supplementation is known to shorten iron store recovery time after donation. However, iron supplements can also induce gastrointestinal complaints. Based on previous studies low-dose and low frequency supplementation might already be effective. We aim to optimize the effectiveness of iron supplements while minimizing the risks of side effects. Therefore, we will evaluate the impact of different iron supplementation protocols in terms of intake frequency and iron dosages.

## **AIMS:**

Determine the effect of iron supplementation on hemoglobin and ferritin levels, side effects, donor return, and iron deficiency-related symptoms in whole blood donors with low ferritin levels, and investigate the most optimal supplementation protocol in terms of intake frequency and iron dosage.

## **METHODS:**

Sanquin is a non-profit organization with a legal duty to collect, process, and provide blood products throughout the Netherlands. Whole blood donors whose ferritin levels are measured during their next donation are recruited for a baseline visit. Inclusion will proceed until twelve hundred whole blood donors with ferritin levels  $\leq 30$   $\mu\text{g/L}$  are included into the next phase of the study: a double-blind, randomized controlled trial. Participants are randomly allocated to one of six arms, administering capsules containing 0, 30, or 60 mg of iron, either on alternate days or daily for 56 days. Group allocation is stratified by age; 18-49 years versus 50 years and older, and sex. At baseline and 56 days (i.e., minimal donation interval for men), 122 days (i.e., minimal donation interval for women), and 178 days (i.e., minimal ferritin deferral period) of follow-up, ferritin and hemoglobin levels are measured. Additionally, donor return, compliance, dietary iron intake, gastrointestinal and iron deficiency-related symptoms, and general health are assessed by questionnaire. Participants are asked to track their capsule

intake through a mobile application and return the leftover capsules at the end of the supplementation period to assess treatment adherence accurately.

**RESULTS:**

The study is currently ongoing, the first results are expected to be available at the end of 2022.

**CONCLUSION:**

This study will provide a comprehensive overview of the effects of different frequencies and dosages of iron supplements on iron status and health effects, thereby considering individual differences in treatment adherence and lifestyle. The outcome will provide evidence to guide the debate if and how iron supplements should be implemented to support the recovery of whole blood donors with low ferritin levels.

# Ferritin-Guided Management of Blood Donors with a Marginally Low Pre-Donation Haemoglobin and Its Effect on Donor Return and Retention

*Submitting author: Dr. Monique A Debattista*

*Affiliation: Malta National Blood Transfusion Service*

## **AUTHORS:**

Sandra Cutajar, George Galea, Monique A Debattista

## **BACKGROUND:**

Blood donors with a haemoglobin (Hgb) concentration below cut-off are a leading source of deferrals. Currently, Maltese blood donors who marginally fail their pre-donation finger-prick Hgb by  $\leq 1$ g/dl are offered a Complete Blood Count (CBC). If the latter confirms Hgb level, the donor is given dietary advice and deferred for 3 months. Longer deferrals are applied for other categories of Hgb failures.

## **AIM:**

To determine whether measuring serum ferritin (SeFe) in marginal failures, classifying them and managing accordingly, would result in better donor return and retention, defined as donors who return to donate once or more within a year from deferral.

## **METHOD:**

The study involved donors attending the Blood Donation Centre between October 2017-October 2018 and found to have marginally low Hgb (Males 12.5-13.4g/dl; Females 11.5-12.4g/dl).

Donors were randomly divided into a Study Group and a Control Group. In the latter, donors were offered a CBC and if Hgb level was confirmed, they were deferred for 3 months and given dietary advice as per standard procedure. Donors in the Study Group had their SeFe measured and were given an appointment for the result and counselled as follows:

- Donors with SeFe  $< 10$ ng/ml [iron deficiency - ID] were questioned to eliminate medical reasons for ID, in which case they were excluded. If recruited, they were given dietary advice and prescribed iron supplementation (30 capsules of 50mg Iron Bisglycinate on alternate days) and deferred for 3 months.
- Donors with SeFe 10-30ng/ml [at risk of iron deficiency] were given dietary advice only and deferred for 3 months.
- Donors with SeFe  $> 30$ ng/ml [not iron deficient] were deferred for 6 weeks since their iron stores were considered not to be significantly depleted.

All donors in both groups were followed up for 1 year from deferral date, and the following visits/donations documented.

## **RESULTS:**

Out of a total of 397 donors, the Study Group consisted of 172 donors and the Control Group of 225 donors. When assessing return rates, 6 donors from the Study Group were lost to follow-up; 10 donors from the Study Group and 4 donors from the Control Group were excluded because medical conditions for ID were discovered; therefore the final number of donors was 156 in the Study Group and 221 in the Control Group.

Table 1 shows the number of returned donors and the statistical significance between the groups as calculated using Chi-squared test to find the p-value with a confidence interval of 95% (p value  $< 0.05$ ).

The difference between the two groups in the number of donors who returned and donated once is the only one found to be statistically significant, with the Control Group having a higher number of returned donors.

**CONCLUSION:**

Ferritin-guided management of donors with marginally low Hgb did not result in a statistically significant difference in return and retention. Based on these findings, routine ferritin measurement in marginal failures does not seem to provide added benefits and is therefore not currently recommended.

**FIGURE/TABLE:**

**Table 1. Number of returned donors in the different categories and the statistical significance of the differences between Study and Control Groups as determined by the p-value**

	<b>Study Group</b>	<b>Control Group</b>	<b>p-value</b>	<b>Result</b>
Returned and donated once within the year	39 (33%)	64 (43%)	0.01377	<b>significant</b>
Returned and donated twice within the year	34 (29%)	38 (26%)	0.6374	not significant
Returned and donated 3 - 4 times within the year	25 (21%)	23 (16%)	0.7728	not significant
Returned once/more and deferred for low Hgb	17 (15%)	13 (9%)	0.4652	not significant
Returned and deferred for another reason	2 (2%)	7 (4%)	N/A*	N/A
Returned once with low Hgb and participated in study group		3 (2%)	N/A*	N/A
Total-Returned Donors	117 out of a total of 156 = 75%	148 out of a total of 221 = 67%	0.05687	not significant

\*Numbers too small for calculation

## New genetic variant for iron deficiency anemia and Hb-deferral at chromosome 17 in gene RNF43

*Submitting author: Mikko Arvas*

*Affiliation: Finnish Red Cross Blood Service*

### **AUTHORS:**

Jarkko Toivonen, FinnGen consortium and Mikko Arvas

### **BACKGROUND:**

Due to a small founder population and genetic isolation the Finns are genetically homogenous and unique from other European populations. With extensive national registers the Finnish population is a particularly promising target of genetic studies. The FinnGen consortium (<https://www.finnngen.fi>) is collecting a cohort of 500 000 Finns for genotyping and derivation of disease phenotypes from registry data. Subsequently, genome wide association analysis (GWAS) is carried out for these phenotypes. 50 000 blood donors collected by the Finnish Red Cross Blood Service are included in the FinnGen cohort. The blood donors serve primarily as healthy controls, but their inclusion also allows study of blood donation related phenotypes.

### **AIMS:**

The aim of the study was to inspect genome wide association analysis results produced by FinnGen consortium to find results relevant for blood donation and if possible, confirm any novel findings from Finnish Red Cross Blood Service data.

### **METHODS:**

The current FinnGen data freeze 7 contains over 300 000 individuals and over 3000 disease phenotypes for which a GWAS has been carried out. We inspected these results for phenotypes of interest for blood donation and subsequently carried out further GWAS on a set of 30 000 blood donors collected by the Blood Service Biobank for the FinnGen project. For individuals with genetic variation of interest we inspected their blood donor histories and data in the FinnDonor cohort (Lobier et al., 2020).

**RESULTS:** In the FinnGen data freeze 7 the phenotype “iron deficiency anemia” has 9869 (6015 females and 3854 males) cases and 296964 controls of mean age 56.99 (52.13 females and 64.57 males). At chromosome 17 the lead SNP rs199598395 has an association of p-value  $7.1 \times 10^{-54}$  and odds ratio of 2.18 for iron deficiency anemia. The minor allele of rs199598395 is predicted to lead to a missense mutation of gene RNF43. This allele is not found outside Finnish and Estonian populations. A separate GWAS of 30 000 blood donors confirmed that the same SNP is also associated to low hemoglobin deferral and its carriers are likely to have lower hemoglobin levels overall.

### **CONCLUSION:**

To our knowledge RNF43 has not been previously indicated in iron metabolism. Its study may reveal completely new molecular mechanisms related to iron metabolism. Its discovery exemplifies the possibilities to unravel molecular mechanisms by study of rare genetic variation that can be accessed through specific populations such as Finns.

**REFERENCES:**

Lobier, M., Niittymäki, P., Nikiforow, N., Palokangas, E., Larjo, A., Mattila, P., Castrén, J., Partanen, J., & Arvas, M. (2020). FinDonor 10 000 study: a cohort to identify iron depletion and factors affecting it in Finnish blood donors. *Vox Sanguinis*, *115*(1), 36–46.  
<https://doi.org/10.1111/vox.12856>

## Factors associated with iron deficiency and how they can be used in blood donor selection processes

*Submitting author: Sofie Ekroos*

*Affiliation: Finnish Red Cross Blood Service, University of Helsinki*

### **AUTHORS:**

Sofie Ekroos, Mikko Arvas, Johanna Castrén

### **BACKGROUND:**

Iron deficiency (ID) and its later stage, iron deficiency anemia (IDA), impact blood donor health by causing debilitating symptoms and cause low hemoglobin deferral. Blood donor selection criteria should be based on current evidence for best practice and not discriminate against any population group.

### **AIMS:**

To carry out a literature review in an effort to improve donor health by investigating determinants other than blood donation that increase or decrease risk of iron deficiency in a healthy population, understand how these relate to blood donation and to identify ways of implementing them into current donor management policies.

### **METHODS:**

For this literature review we systematically searched the PubMed, Ovid Medline and Scopus databases for articles in English that defined ID as serum ferritin  $<15 \mu\text{g/l}$  and/or IDA as hemoglobin  $<120 \text{ g/l}$  in females,  $<130 \text{ g/l}$  in men or relevant ICD-9/ICD10 codes. We then applied an age restriction of 15-70 years. In order to produce a coherent data set we only included studies from countries with a Human Development Index  $\geq 0.800$ . To ensure our results reflected iron status in blood donor populations we excluded results related to disease, pregnancy, genetic variants, parasites and the effect of blood donation. The search produced a total of 679 abstracts, of which 25 were included in analysis.

### **RESULTS:**

We found that the odds of ID were higher in females and those of younger and older age. Premenopausal status increased the odds, especially in the presence of heavy or prolonged menstrual bleeding. Other risk factors were dietary calcium consumption, use of some medications (proton pump inhibitors, antacids and non-steroidal anti-inflammatory drugs) and some socioeconomic factors (poverty, newly immigrating). ID was also more common in the presence of restless legs syndrome, a condition that is associated with iron status. Several other determinants, although identified as risk factors in some of the studies, were not consistently shown to negatively affect iron status. These include physical activity, type of vegetarian diet and other dietary factors, education level and income above poverty level. On the other hand, consumption of red meat and use of hormonal contraceptives had a protective effect against ID. BMI and ethnicity did influence iron status in several studies, but results were contradictory and therefore inconclusive.

**CONCLUSION:**

Current evidence suggests that several determinants, including biological, environmental, lifestyle and socioeconomic factors increase the risk for ID. Although several of these factors are commonly accounted for in blood donor selection, we identified some determinants that show potential for inclusion in the selection process. These include heavy menstrual bleeding and use of some medications. Further study is needed to ascertain whether inclusion would influence donor health and the blood supply as well as how best to implement the changes if they are deemed necessary.

## Ferritin measuring in donors at the North Estonia Medical Centre's Blood Centre

*Submitting author:* Astrid Pihlak

*Affiliation:* North Estonia Medical Centre

### **AUTHORS:**

Riin Kullaste, Gulara Khanirzayeva, Merle Vahter, Astrid Pihlak

### **BACKGROUND:**

More blood centres in Europe and elsewhere have taken to measuring donors' ferritin levels. The schemes in use are varied, but ferritin tests are generally not done for all donors on every donation. Before deciding on a specific plan, blood centres have first done population studies to determine the donor groups most at risk for low ferritin.

### **AIMS:**

We wished to find out the average ferritin levels in our donors to determine the demographic as well as the type of donor who would most benefit from having their ferritin levels measured. We also wanted to determine a suitable interval for these tests.

### **METHODS:**

We included 3029 donors in all (approximately 10% of yearly donations), divided into four groups of equal size. Consecutive donors were tested in March, June, September and December, so that each group comprised of around 750 people. Serum samples were analysed with Architect i2000sr plus. Donors with very low ferritin levels (<15 µg/L) were asked to not donate for a year and given some suggestions for improving their iron intake. Currently, we are in the process of calling these donors back for additional testing to determine whether the yearlong pause has been beneficial.

### **RESULTS:**

We had 692 donors (23%) out of 3029 with low ferritin levels (<15 µg/L) with a prevalence toward women. Low ferritin levels were most commonly seen in younger women, aged 18–24. In women, ferritin levels tended to increase with age (in post-menopausal women aged 45–65, 25% had ferritin levels of <15 µg/L), we saw no significant decrease in ferritin levels due to frequency of donations. In men, the opposite was noted with 39% having low ferritin in 45–63 year olds. In whole blood donors, 24% (663 out of 2029) displayed low ferritin. In plasma apheresis (included in the study were 255 male and 5 female donors), 16 donors (7%) had ferritin levels of <15 µg/L. In thromboapheresis, 7 out of 77 donors (all male) showed ferritin levels of <15 µg/L.

We have so far finished calling back donors from the first group (193 donors of 753 with ferritin levels of <15 µg/L) – of the 71 who returned for testing, 84% had increased ferritin levels.

### **CONCLUSION:**

Given this preliminary data, it seems prudent to start measuring ferritin levels in all first time donors and to continue testing them with a regular interval, the length of which is still to be determined. So far, it also seems effective to ask donors with low levels of ferritin to pause their donations for a year.

## Perceptions of whole blood donors on iron supplementation: a qualitative focus group study

*Submitting author: Jan Karregat*

*Affiliation: Sanquin*

### **AUTHORS:**

Jan H M Karregat<sup>1</sup>, Dayna Blokhuis<sup>1</sup>, Katja van den Hurk<sup>1</sup>

<sup>1</sup>Donor Studies, Department of Donor Medicine Research, Sanquin Research, Amsterdam, The Netherlands

### **BACKGROUND:**

Whole blood donors are prone to developing iron deficiency due to haemoglobin-bound iron loss during donation. Iron supplementation is posed as an effective strategy to shorten the post-donation iron store recovery time. However, while some international blood banks already implemented iron supplementation as a policy, perceptions among donors regarding iron supplementation are largely unknown.

### **AIMS:**

As donor perceptions may influence their adherence to supplementation policies and thus their effectiveness, we investigated the knowledge, concerns, and motivators of whole blood donors regarding iron supplementation through semi-structured focus group interviews.

### **METHODS:**

Sanquin is a not-for-profit organization with a legal duty to collect, process, and provide blood products throughout the Netherlands. Three focus group interviews were conducted with nine male and seven female whole blood donors. Donors were eligible to participate if they were fluent in Dutch and had donated at least three times. Donors were recruited from four different blood bank locations to account for geographical diversity. The focus group interviews consisted of online group discussions with five to six participants. The participants' perceptions on iron supplementation as a blood bank policy were discussed using a semi-structured questioning approach. The focus group recordings were transcribed, coded, and analyzed using a grounded theory approach.

### **RESULTS:**

The opinions of the participants on iron supplementation ranged from "I would never take iron, or any other dietary supplements" to "I would gladly take iron supplements if this would be advised by the blood bank". The most frequently mentioned motivator for post-donation iron supplementation was to prevent deferral due to iron deficiency or low haemoglobin levels. Most participants considered being able to return to donate of great importance. Furthermore, reducing iron deficiency related symptoms was another argument mentioned by participants who had experienced adverse health effects after donation. Participants who were less willing to take supplements, expressed that this was not because of iron specifically but due to their general view on dietary supplements. They preferred to recover the donation-induced iron loss through diet rather than by taking capsules. Potential iron supplementation-related gastrointestinal side-effects were also mentioned as a factor that reduced the willingness to take supplements. Some participants indicated that they would probably quit donating if they would experience negative health effects due to donation-induced iron loss, rather than taking iron supplements if offered by the blood bank. However, several participants who were less willing to consider iron supplementation became more willing when informed about the prevalence of iron deficiency amongst donors, the

potential positive health effects of iron supplementation, and the reduced risk of deferral due to iron supplementation. When asked what the donors required if iron supplementation would be implemented as a policy, extensive guidance, information from a donor physician, and extra check-up visits were mentioned.

**CONCLUSION:**

Frequent whole blood donors are generally open towards iron supplementation as a blood bank policy for the prevention or treatment of adverse effects and donor deferrals, under the condition that adequate information, guidance, and monitoring are provided.

## Special Session 1 “How social relations shape blood donation behavior”

Friday, 17 <sup>th</sup> September – Special Session 1	
9.15 am – 10.45 am	<b>How social relations shape blood donation behavior</b> <i>Panel leader: Eva-Maria Merz / Organizer: Eva-Maria Merz and Joris Schröder</i>
9.15 am – 9.45 am	<b>Spillovers of prosocial motivation: Evidence from an intervention study on blood donors</b> <i>Lorenz Goette</i>
9.45 am – 10.15 am	<b>Sustaining Prosocial Behavior Through Social Contagion: Normative and Informational Social Influence on Blood Donations</b> <i>Joris Schröder</i>
10.15 am – 10.45 am	<b>Learnings from Australian Red Cross Lifeblood: Lifeblood Teams program</b> <i>Batya Atlas</i>

## Spillovers of prosocial motivation: Evidence from an intervention study on blood donors

*Submitting author:* Lorenz Goette

*Affiliation:* University of Bonn,  
Institute for Applied Microeconomics

### **AUTHORS:**

Adrian Bruhin, Lorenz Goette, Simon Haenni and Lingqing Jiang

### **ABSTRACT:**

Blood donations are increasingly important for medical procedures, while meeting demand is challenging. This paper studies the role of spillovers arising from social interactions in the context of voluntary blood donations. We analyze a large-scale intervention among pairs of blood donors who live at the same street address. A quasi-random phone call provides the instrument for identifying the extent to which the propensity to donate spills over within these pairs. Spillovers transmit 41% to 46% of the behavioral impulse from one donor to the peer. This creates a significant social multiplier, ranging between 1.7 and 1.85. There is no evidence that these spillovers lead to intertemporal substitution. Taken together, our findings indicate that policy interventions have a substantially larger effect when targeted towards pairs instead of isolated individuals.

# Sustaining Prosocial Behavior Through Social Contagion: Normative and Informational Social Influence on Blood Donations

*Submitting author: Joris Schröder*

*Affiliation: Donor Research Group,  
Amsterdam*

## **AUTHORS:**

Joris M. Schröder, Eva-Maria Merz, Bianca Suanet, and Pamala Wiepking

## **ABSTRACT:**

Repeated prosocial behaviour – behaviour that benefits unknown others and is individually costly – is crucial for the supply of many public goods. Experimental studies show that social mechanisms are pivotal for sustaining prosocial behaviour over time. One such mechanism is social contagion, which we broadly define as an individual changing their behaviour in response to the behaviour of others. This study examines to what extent and through what individual-level mechanisms social contagion affects repeated blood donation behaviour, an ideal-typical manifestation of real-world prosocial behaviour. We draw on longitudinal survey and register data on the Dutch blood donor population from 2007 to 2014 (N=15,090), and address the potential endogeneity of the donation behaviour of others by using panel data models and an instrumental variable approach. Our results show that a one-unit increase in the number of donations per inhabitant in the focal donor's neighbourhood is associated with a ten percent increase in the donor's blood donations. Exploratory analysis attributes this to social contagion within donor couples. Social contagion is not mediated by normative or informational social influence. Instead, it exerts a direct influence on repeated blood donations, and should thus be considered in theory and practice concerned with repeated real-world prosocial behaviour.

## Learnings from Australian Red Cross Lifeblood: Lifeblood Teams program

*Submitting author: Batya Atlas*

*Affiliation: Australian Red Cross Lifeblood*

### **AUTHORS:**

Batya Atlas and Carla McGlynn

### **ABSTRACT:**

Social relations are critical to the onset and maintenance of blood and plasma donation behavior. This is because solicitations for donations, information about the need for donations, and norms about behavior all travel through social networks. However, empirical evidence for social interaction effects among blood and plasma donors – individuals changing their behavior in response to the behavior of others – is scarce. Most research instead treats blood donations as determined by individual characteristics and attitudes. In contrast, many blood donation organizations seem to have realized that utilizing the social networks of current donors for recruitment and retention strategies might hold potential. Unfortunately, the limited knowledge on the effectiveness and practical implementation of such strategies leaves blood donation organizations with uncertainty about the best way forward. This special session aims to address the question of how social relations and social interactions might be used to facilitate a stable blood supply. To shed more light on this crucial issue, the session brings together three contributions from both research and practice. It combines evidence on social interaction effects in blood donations from two empirical studies with experiences about achievements and challenges from a large-scale group blood donation program run by Australian Red Cross Lifeblood called “Lifeblood Teams”. By bringing knowledge from research and practice together, this special session aims to advance the discourse on this topic and to facilitate the implementation of couple- and group-donation programs.

## Special Session 2 “The tricky business of incentives”

Friday, 17 <sup>th</sup> September – Special Session 2	
11.00 am – 12.30 am	<b>The tricky business of incentives</b> <i>Panel leader: Lars Eberhart / Organizer: Eva-Maria Merz and Caroline Graf</i>
11.00 am – 11.30 am	<b>The importance of choice to optimise the effectiveness of incentives on blood donation behaviour</b> <i>Kathleen Chell</i>
11.30 am – 12.00 am	<b>Competing for blood: Competitive effects of paid plasma donations on non-paid blood donations</b> <i>Pascal Güntürkün</i>
12.00 am – 12.30 am	<b>Social norms explain the inconsistent effects of incentives on prosocial behavior</b> <i>Caroline Graf</i>

# The importance of choice to optimise the effectiveness of incentives on blood donation behaviour

**Submitting author:** Kathleen Chell

**Affiliation:** Australian Red Cross Lifeblood

## **AUTHORS:**

Kathleen Chell and Barbara Masser

## **BACKGROUND:**

Noncash incentives appear to be a promising strategy to enhance the recruitment and retention of blood donors, but evidence regarding their efficacy is limited (Chell et al., 2018). Although certain incentives (e.g., discounts, tickets, gifts) have a stronger evidence base for use, not one incentive type has been found to have universal appeal that positively impacts donation behaviour. However, research into incentives for donation has predominantly prescribed an incentive, rather than allowing donors to choose their preferred form. Program-related characteristics, including the perceived value and benefits of items available, are the most common predictors of customer loyalty program effectiveness (Chen et al., 2021).

## **AIMS:**

To illustrate the importance of giving donors choice of an incentive or reward.

## **METHODS:**

This paper draws on data from four studies; (1) a survey of blood donors and non-donors (see Van Dyke et al., 2020), (2) follow-up qualitative interviews with n=18 survey participants, (3) an incentive trial that encouraged plasma donors to donate at a higher frequency to receive up to a \$30 discount at a local healthy fast-food restaurant, and (4) a reward trial that offered plasma donors a discount voucher for a local cafe following a donation as an additional ‘thank you’. In both trials, the vouchers were not transferable or redeemable for cash.

## **RESULTS:**

In the survey, blood donor and non-donor views of 13 different types of non-cash incentives were mostly positive or neutral; no incentive was viewed favourably by all. When interviewed about what they envisioned an incentive program for blood donation would look like, the majority of participants supported having a choice due to the diverse characteristics, circumstances and needs of donors. Some interviewees also remarked that giving people a choice of reward would allow the donor to feel in control and motivated to receive something they want, rather than given something they might not like; *“people will decide whether they want movie tickets or they want clothes or they want a petrol voucher that sort of thing you know what I mean, what they’re saving towards”* (ND, 40-49 years, F).

In both trials, the acceptance rate of the offer was high (67-69.7%), but redemption rates were low (12.5-18.2%) and neither increased the proportion of donors returning to donate. This suggests the vouchers had little motivational power for most. Further, the majority of donors who declined the reward reported that they would not use the discount voucher (69%) due to the cafe’s location, operating hours and product offering, or would have preferred an alternate (19%) such as discounted movie tickets or major store voucher.

**CONCLUSION:**

Together these findings illustrate that allowing donors to choose their preferred reward could enhance the effectiveness of reward and incentive programmes. Research comparing different types (e.g., voucher vs movie ticket) and where they can be claimed (e.g., national vs local shops) is required to determine whether offering an item attractive to individual donors has a greater effect on donation behaviour. However, offering choice also introduces a need for blood collection agencies to secure partnerships that are brand consistent and will protect their reputation.

# Competing for blood: Competitive effects of paid plasma donations on non-paid blood donations

*Submitting author:* Pascal Güntürkün

*Affiliation:* Vienna University of Economics and Business (WU Vienna)

## **AUTHORS:**

Pascal Güntürkün, Nils Wlömert, Lars Eberhart and Lukas Reifetshamer

## **BACKGROUND:**

Should blood services use monetary or material incentives to enhance the effectiveness of their recruitment activities? Despite a longstanding and controversial debate on this important question, the current empirical evidence is still surprisingly inconclusive (for recent reviews see, e.g., Chell et al. 2018; Niza, Tung, and Marteau 2013). In some countries, different incentives systems co-occur depending on the type of donation. For example, in Austria, whole blood donations have to be unpaid while plasma donations may be paid. However, whether and how these different incentive systems might influence and interact with each other is a pressing but unresolved question for national health institutions and policy makers.

## **AIMS:**

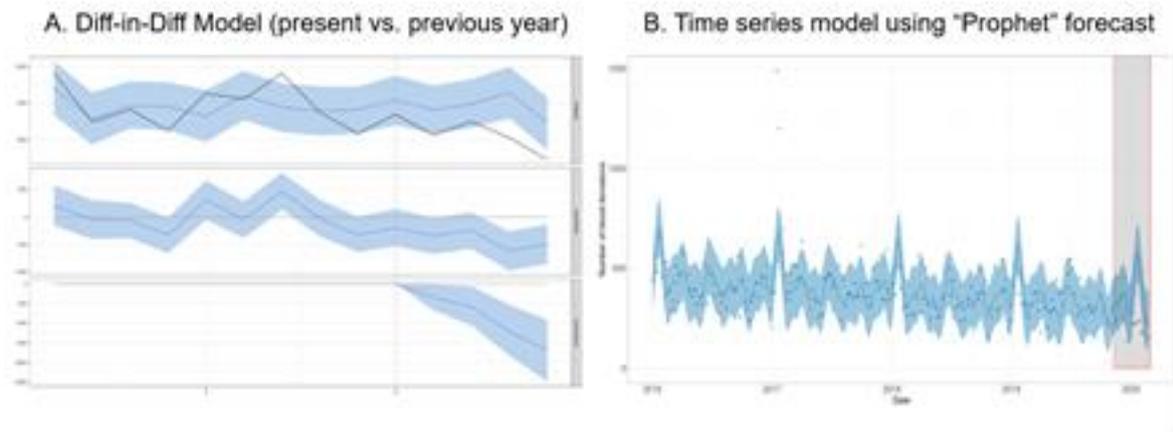
The present study aims at making an initial step towards answering this question, by analyzing a real-world situation that qualifies for a natural experiment. The key question that this study aims to investigate is whether and how the new opening of a plasma center (offering a cash compensation) affects the number of whole blood donations at a geographically close blood donation center (offering no cash compensation). Moreover, we examine whether the potential competitive effects of the opening of the new plasma center differ across donor groups (young vs. old, male vs. female, first time vs. repeat donors).

## **METHODS:**

The study mainly relies on historical donation data (donation dates and sites, marketing activities, donor characteristics, etc.) from the Austrian Red Cross in the period between 2016 and 2020. The opening of a new plasma center in very close proximity (5 min walk, 400m) to the main blood donation facility of the Austrian Red Cross provides a natural experiment to test its effects on the number of blood donations at the focal facility. We estimate the effects of the opening by comparing the number of donations before and after the intervention and relative to a control time series constructed from historical donation data of the focal facility. The data are analyzed using a dynamic difference-in-differences model (i.e., using Google's Causal Impact package) and a time series model (i.e. using the Prophet Forecasting Model).

## **RESULTS:**

The results show an extraordinary drop in the number of blood donations after the opening of the plasma center (see Figure 1) that was mainly attributable to a decrease in donations by repeat (vs. first time) donors. However, it is important to note that a key limitation of the present study is that data on plasma center donations were not available. Thus, there is more data needed in order to derive clear causal implications and robust conclusions.



**Figure 1:** Number of donations at Red Cross blood donation center (non-paid donations) before and after opening of plasma center (paid donations). In model A, the dotted line indicated the time of the opening of the plasma center. In model B, the highlighted area depicts the actual (black dots) vs. predicted number of donations (blue confidence interval).

### CONCLUSION:

The initial finding in this study suggests that introducing monetary incentives into altruistic donation markets might lead to a shift in blood donations to incentivized options, especially among donors with pre-existing prosocial records (i.e., repeat donors). This initial finding suggests that policy makers should monitor the situation closely to secure the Red Cross's public mission of ensuring a sufficient blood supply for Austrian hospitals.

Importantly, the study calls for more data and public funding to gain more confidence in the initial results. The authors thus seek for new data opportunities to gain deeper and more robust insights into this important research question.

## Social norms explain the inconsistent effects of incentives on prosocial behavior

*Submitting author:* Caroline Graf

*Affiliation:* Vrije Universiteit  
Amsterdam; Sanquin Research

### **AUTHORS:**

Caroline Graf, Eva-Maria Merz, Bianca Suanet and Pamala Wiepking

### **BACKGROUND:**

Incentives have surprisingly inconsistent effects when it comes to encouraging people to behave prosocially (e.g., donating to charity or giving blood). That is, the effects of incentives vary across incentive types (e.g., material and non-material), private versus public settings and across countries. In this study we extend a model of prosociality that posits an additive effect of intrinsic motivation (e.g., altruism), extrinsic motivation (e.g., receiving something in return), reputational motivation (i.e., being evaluated positively by others), and costs (e.g., time effort). Our key theoretical contribution is the introduction of social norms. We argue that reputational motivation is governed by social norms, that is how acceptable certain actions are viewed by members of a society.

### **AIMS:**

The study aims to investigate whether social norms can explain under which circumstances incentives encourage prosocial behavior.

### **METHODS:**

We test our general model on a real-world prosocial behavior, namely blood donation, for which incentives offered as well as social norms regarding incentives vary by country. We examine both financial incentives (e.g., cash, tax benefits) and non-financial incentives (e.g., time off work) as high-value extrinsic rewards offered to donors. Logistic multilevel mixed effects models are employed to test the model's predictions, using a large-scale comparative dataset comprising representative samples from 28 European countries (Eurobarometer) and a novel incentive dataset acquired through conducting surveys among blood donation experts across Europe.

### **RESULTS:**

Our preregistered analyses ([osf.io/bf2kt/](https://osf.io/bf2kt/)) reveal that individuals from countries with more positive social norms regarding financial incentives were more likely to have donated blood, although financial incentives themselves were negatively associated with donation. Non-financial incentives on the other hand were overall unrelated to donation propensity, but we again found that more positive social norms regarding these incentives were associated with a higher likelihood of having donated blood.

### **CONCLUSION:**

The results indicate that social norms regarding incentives play an important role in determining the effect of incentives on prosocial behavior. Incentives can encourage blood donation behavior, *if* social norms regarding these incentives are sufficiently positive.

## Special Session 3 “Donor iron management: Pros and cons of existing strategies”

Friday, 17 <sup>th</sup> September – Special Session 3	
1.30 pm – 3.00 pm	<b>Donor Iron Management: Pros and Cons of Existing Strategies</b> <i>Panel leader: Katja van den Hurk / Organizer: Katja van den Hurk and Johanna Castrén</i>
1.30 pm – 2.00 pm	<b>Donor iron deficiency mitigation policy in Finland</b> <i>Johanna Castrén</i>
2.00 pm – 2.30 pm	<b>Donor iron deficiency mitigation policy in Denmark</b> <i>Christian Erikstrup</i>
2.30 pm – 3.00 pm	<b>Donor iron deficiency mitigation policy in the Netherlands</b> <i>Katja van den Hurk</i>

## Donor iron deficiency mitigation policy in Finland

*Submitting author: Johanna Castrén*

*Affiliation:* Finnish Red Cross Blood Service

### **AUTHORS:**

Johanna Castrén and Mikko Arvas

### **BACKGROUND:**

Blood donors lose iron while donating and frequent blood donation is known as one of the risk factors for iron deficiency anemia. Even though there is no clear consensus on the risks of low iron levels in individuals feeling healthy, blood banks increasingly implement strategies to prevent or treat iron deficiency. In Finland these strategies are based on our own donor health studies and international research and consist of risk group-based iron supplementation and risk group-based donation interval recommendations.

### **AIMS:**

We aim to explain and discuss pros and cons of the iron management strategy currently used in Finland.

### **METHODS:**

At Finnish Red Cross Blood Service, the only organization authorized to collect and distribute blood (products) in the Finland, around 118,000 donors make over 188,000 whole blood donations per year at a voluntary, non-remunerated basis. Pre-donation haemoglobin (Hb) levels must be 125 g/L for women and 135 g/L for men. The minimum interval between two whole blood donations for women is 91 days and for men 61 days. Risk group-based iron supplementation policy (iron supplement after a successful donation for premenopausal women and for all donors donating at least every 4 months) has been in place in Finland since decades. Based on measurements of iron stores in different donor sub-populations in FinDonor cohort study (2015-2018) and Hb-measurement studies [3,4] we have stepwise modified our Hb-policies, donor guidance, and iron replacement policy in 2018-2020 focusing mainly on the youngest female donors (18-25 years) who had highest risk for low ferritin values. Currently donors are recommended and guided to donate based on their age and gender as follows: women 18-25 years: 1, women 26-70 years: 2-3, and men: 3-4 times per year.

### **RESULTS:**

In 2020, Hb deferral rates were 3.4% and 1.4% for women and men, respectively. Hb deferral rates were 5.4% for women and 2.4% for men in 2017. In 2020, mean Hb-levels were 140.9 g/L and 155.3 g/L for women and men, respectively. Mean Hb-levels in 2017 were 139.8 g/L and 154.4 g/L for women and men, respectively. The mean Hb among young female donors (18 - 25 years) was in 2017 136 g/L and in 2020 138.1 g/L and the deferral rate due to low Hb decreased from 9.8% to 6.2%.

### **CONCLUSION:**

We have modified stepwise our operation policies concerning Hb-measurement, iron supplementation, and donor counselling based on FinDonor cohort study results, studies concerning Hb-measurements, and based on donor research in other countries. We have been able to decrease the Hb deferral rates and increase the mean Hb-levels in our donors. Results among the youngest female donors, who were identified as the highest risk group for iron deficiency, suggest that the chosen donor iron management policy has had a positive effect. On

the other hand, a risk group-based guidance and iron replacement policy cannot fully take into account individual differences in capability to recover from blood donation.

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## Donor iron deficiency mitigation policy in Denmark

**Submitting author:** Christian Erikstrup

**Affiliation:** Department of Clinical Immunology ▪ Aarhus University Hospital

### **AUTHOR:**

Christian Erikstrup

### **BACKGROUND:**

Globally, more than 30% of the world's population are estimated to be anemic and many due to iron deficiency. Iron deficiency is a common consequence of blood donation and a strong predictor of low hemoglobin. Moreover, low hemoglobin leads to blood donor deferral and may impact subsequent return rate. During recent years several blood establishments have initiated ferritin-guided iron supplementation regimens. However, a lack of evidence exists both on the effects of these regimens and the optimal criteria for giving iron supplementation.

### **AIMS:**

The presentation will give an overview of the experiences with studies of iron depletion and ferritin-guided iron supplementation in Denmark.

### **METHODS:**

The Danish Blood Donor Study is a large open cohort with 137,000 participants designed for studies of donor health and generic research questions. Since the initiation in 2010, studies of iron depletion and predictors of low hemoglobin have been performed. Approximately 100,000 participants have been genotyped for >600,000 SNPs using the Illumina Global Screening Array. Several questionnaire surveys, addressing, among other topics, iron metabolism have been concluded. In addition, the complete population of blood donors are followed through national health registers. Ferritin-guided iron supplementation is not mandatory in Denmark. Ferritin-guided iron supplementation has been introduced in four out of five regions using different regimens, allowing for the comparison between regions.

### **RESULTS:**

Iron depletion is common in blood donors. We have previously reported iron depletion (ferritin <15 ng/mL) in 39, 22, and 9% among frequently donating premenopausal women, postmenopausal women, and men, respectively[1]. Subsequently, we found that ferritin was a strong predictor of low hemoglobin[2] and that low-grade inflammation was associated with low hemoglobin[3]. Genetic constitution may be a risk factors for low iron storage[4]. Iron supplementation may alter the microbiome and increase the availability of iron to microorganisms. We thus assessed the risk of infection among blood donors taking iron supplementation and found no association[5]. Low hemoglobin and thus decreased iron stores, however, may be associated with lower risk of infection[6]. Ongoing studies address the impact of iron supplementation regimens on risk of low hemoglobin, and models of hemoglobin prediction are also being investigated.

### **CONCLUSION:**

We know that blood donors are often iron depleted and that iron depletion leads to low hemoglobin. Iron supplementation may replenish iron stores but may also lead to adverse events. The optimal regimen for mitigating the risk of iron depletion is unknown. Blood donors give blood to help save lives. In the blood service, we are obliged to minimize harmful effects of blood donation.

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## Donor iron deficiency mitigation policy in the Netherlands

*Submitting author:* Katja van den Hurk

*Affiliation:* Sanquin Research

### **AUTHOR:**

Katja van den Hurk

### **BACKGROUND:**

Repeated whole blood donations are known to deplete iron stores. Insufficient iron stores may hamper the recovery from subsequent donations, thus risking the development of iron-deficient anaemia. Even though there is no clear consensus on the risks of low iron levels in individuals feeling healthy, blood banks increasingly implement strategies to prevent or treat iron deficiency. These strategies may or may not include ferritin measurements, iron supplementation, risk group-based donation interval recommendations, and extended donation intervals.

### **AIMS:**

We aim to explain and discuss pros and cons of the iron management strategy as implemented in the Netherlands.

### **METHODS:**

At Sanquin, the only organization authorized to collect and distribute blood (products) in the Netherlands, around 280,000 donors make over 400,000 whole blood donations per year at a voluntary, non-remunerated basis. Pre-donation haemoglobin (Hb) levels must be 7.8 mmol/L for women and 8.4 mmol/L for men. Women can donate up to 3 times per year with 122 days intervals, men up to 5 times per year with 56 days in between. In 2017-2019, ferritin-guided intervals were implemented stepwise, gradually increasing the number of collection centers where donors' ferritin levels were measured [1]. Ferritin levels are now measured throughout the Netherlands in all new donors and at every fifth whole blood donation. Ferritin levels >30 ng/ml are considered sufficient to donate again after the normal donation interval. If lower, the donors are deferred for their subsequent donation for either 6 or, if below 15 ng/ml, 12 months.

### **RESULTS:**

In 2020, Hb deferral rates were 4.3% and 1.7% for women and men, respectively. Low-Hb deferral rates were 7.5% and 3.9% for women and men in 2017, showing a gradual decrease since the implementation of ferritin-guided donation intervals. On the other hand, post-donation ferritin deferral rates have increased from zero to 14.0% and 9.1% in women and men in 2020, respectively [2]. This reflects even higher rates of low ( $\leq 30$  ng/ml) ferritin levels, as only 1 in 5 donations are tested. As a result, donor availability has diminished and numbers of donation attempts per donor have gone down, putting more strain on donor recruitment and retention, as well as on the activation of inactive donors who are not deferred. Effects of the ferritin-guided donation intervals are being analyzed as part of the FIND'EM study and will be discussed in more detail. Iron supplementation for donors with low ferritin are currently studied in the FORTE trial [3].

### **CONCLUSION:**

Ferritin-guided donation intervals lower Hb deferral rates, but lead to long-term unavailability of donors with low ferritin levels.

TABLE: Hb and ferritin levels and deferral rates and numbers of donation attempts in 2017 and 2020

		2017			2020		
		Women	Men	Total	Women	Men	Total
Levels	Hb (mmol/L)	8.4±0.6	9.2±0.6	8.8±0.7	8.5±0.6	9.4±0.6	8.9±0.8
	Ferritin (ng/ml)	27 (16-45)	29 (17-50)	28 (16-47)	26 (17-40)	36 (22-54)	30 (19-47)
Deferral %	Hb	7.5%	3.9%	5.6%	4.3%	1.7%	3.0%
	Ferritin	0.4%	0.4%	0.4%	14.0%	9.1%	11.7%
Numbers of donation attempts		2 (1-2)	3 (2-4)	2 (1-3)	1 (1-2)	2 (1-3)	2 (1-2)

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