Gwasanaeth Gwaed Cymru
Welsh Blood Service

Research Development & Innovation Report

January 2024

Foreword

In December's edition of *Nature Medicine*, Stephen O'Rahilly* raised concerns about the decreasing presence of academic clinician-scientists. He cited that one reason is partly due to the UK's focus on short-term health outcomes, which tends to overlook biomedical research. This resonates with our experiences at the Welsh Blood Service. With a performance of fifty projects, only seven would be recognised for impacting health outcomes. Our upcoming Research, Development and Innovation strategy refocus the need to address this challenge, aiming to expand scientific understanding and contribute directly to healthcare advancements.

For our recent achievements, we're thrilled to announce the Component Development Research Laboratory have secured funding to bring experimental microfluidics into the Welsh Blood Service.

Elsewhere, we have actively gathered feedback from stakeholders to refine our new strategy, ensuring it aligns with evolving healthcare needs. We anticipate that the publication of the strategy this year will propel the Welsh Blood Service forward. We aim to leverage our unique position within the NHS Wales research infrastructure to drive innovation and positively impact healthcare outcomes.

Thank you for your continued support and interest in our research initiatives. We look forward to sharing more exciting developments in the near future.

Siân James
Head of RD&I Services
Welsh Blood Service

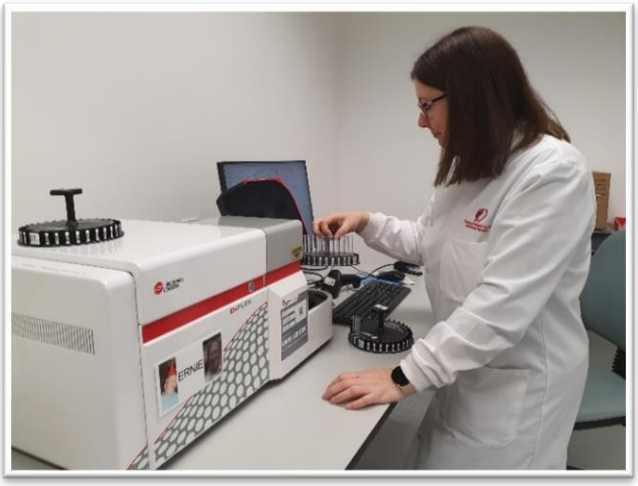
O'Rahilly, S. Academic clinician–scientists risk becoming an endangered species. Nat Med 29, 2989 (2023). https://doi.org/10.1038/s41591-023-02626-8

About this document
This document has an up-to-date summary of all planned, ongoing or completed research, development and innovation activity within the Welsh Blood Service. This version of the document has been specially adapted so the donors, patients and the public can see the Research, Development and Innovation activity they support through the gift of blood, stem cell and organ donation.

Improving Outcomes for Kidney Transplant Patients

Deborah Pritchard, Head of Transplantation Services at the Welsh Blood Service is working on a research project that could help improve outcomes for people who receive a kidney transplant. The three-year project is part of her Higher Specialist Scientist Training programme and is called *Measuring the immune response after kidney transplantation.*

Kidney transplantation is the treatment of choice for patients with end stage kidney disease and around 2800 patients received a kidney transplant last year in the UK. On average the transplanted kidney will last for 15 years.



Deborah Pritchard,
Head of Transplantation Services at Welsh Blood Service.

One of the reasons a kidney transplant stops working is due to rejection, where the patient's own immune system, designed to detect and fight infection, identifies the transplanted kidney as something different in the body and reacts by attacking it. The patient has to take medication to suppress the immune system to protect the kidney for the life of the transplant.

Despite advances, 25% of patients in the UK experience rejection of their kidney transplant. However, we currently don't have the ability to predict the outcome of a transplant. Testing for rejection happens when kidney function is impaired, and usually by this stage irreversible damage has already occurred.

> **"My project is looking at specific types of cells that are part of the immune system – regulatory cells. Regulatory cells are able to suppress other immune cells and keep the immune system in order so that it does not attack the transplanted kidney."**

Once Deborah has set up a robust testing regime, she will work with colleagues at **Cardiff and Vale University Health Board Nephrology and Transplant Service** and the **Wales Kidney Research Unit** to collect and analyse blood samples from kidney transplant patients.

> **"I aim to investigate whether the right types and numbers of regulatory cells could have an effect on the outcome of a transplant.**
>
> **A higher number of specifically bio-marked cells could help suppress the immune system, lowering the risk of rejection.**
>
> **But if the patient has a smaller number of these regulatory cells, it could mean they are at greater risk of rejection. That's what I want to try and find out."**

Considering samples from patients with and without rejection, she will look at a unique combination of biomarkers in regulatory cells to understand their influence on transplant rejection. This lab-based study is just the start.

If Deborah is successful in finding a difference in the regulatory cells in patients that experience rejection and those that don't, it could provide an early warning for patients who are at greater risk of rejection after a transplant. We could then individualise care and monitoring of kidney transplant patients based on this lab test to better manage their long-term outcomes. It could even be applicable to other transplant types, such as heart and lung transplants.

> **"I am interested in translational research – research that improves outcomes for our transplant patients. I hope to combine the value of lab tests with expertise in immunology to advance our care of patients, and our knowledge of transplantation."**

The Welsh Blood Service is funding the first phase of this project.

Next generation scientists find a place to thrive.

Four trainee biomedical scientists who are working in different laboratories across the Welsh Blood Service were recently highlighted in the BBTS Bloodlines newsletter, where they reflected on building their careers.

Celyn Hughes and Lowri Kadelka-Williams entered the blood service through work-based placements as part of their Healthcare Science degree at Cardiff Metropolitan University, The degree's format gave them early professional experience, launching their biomedical scientist careers at WBS. Jemima Hughes and Victoria Binding came to Welsh Blood Service through a different route. Both studied for science degrees at Cardiff Metropolitan University, which exposed them to a range of scientific fields. They are starting their careers as medical laboratory assistants while completing their professional registration portfolio.

The final year projects undertaken by the young scientists introduced them to the research aspect of Healthcare Science. These projects are carried out by undergraduates while they gain experience in scientific investigation. They play a crucial role in understanding the significance of gathering evidence, a skill they still use in their roles at the Welsh Blood Service.

Among the group featured in the Bloodlines Newsletter, Lowri Kadelka-Williams was one of the young scientists to conduct her project in a live research setting. Lowri carried out her project in the Component Development & Research Laboratory alongside Nicola Pearce. Lowri worked on examining the incidence of Pseudohyperkalaemia in our blood donations. The aim was to develop a method for testing donations affected by this condition. Having such a test would help the WBS better identify units intended for neonatal use.

Offering placements that allow trainee scientists to engage in short to medium-term projects allows trainees to gain valuable experience in a dynamic research setting. They are given opportunities such as co-publication and conference presentations and may inspire the researchers of the future to reach new heights in their fields. Lowri completed this project in 2022 and achieved her BSc in Healthcare Science. She is currently working in the Quality Assurance laboratory.

LOWRI KADELKA-WILLIAMS

I am very lucky to be given opportunities to develop my skills in a range of environments within the Welsh Blood Service. I'm looking forward to continuing to develop professionally within the laboratory environment and would love to be able to complete my specialist qualifications in Transfusion Sciences while working in the Welsh Blood Service.

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Our Research Portfolio

We have 15 open projects.

Here they are broken down by theme

Transplantation

Includes solid organ and stem cell transplantation, histocompatibility, immunogenetics and donor registries

2

Products

Includes blood components, immunohematology, testing, component and product manufacturing, quality management, and the evaluation of equipment and materials

9

Donor

Includes donor recruitment and retention, eligibility and care and public health surveillance

2

Cellular Therapies

Includes topics surrounding cellular and other blood therapies

1

Publications

Impactful publications from the Welsh Blood Service colleagues and our collaborators in the previous four months.

Conference Proceedings

Effect of Mixing on the Quality of Red Cells at Time Expiry

Nicola Pearce

Poster Presentation at the
British Blood Transfusion Society Conference 2023

A Transfusion Revision Recipe for Success

Chloe George

Poster Presentation at the
British Blood Transfusion Society Conference 2023

Delivering a National perioperative Anaemia Pathway – Utilising laboratory services to drive clinical improvement.

Stephanie Ditchham, Joanne Gregory, Krystle Towell & Lee Wong

Poster Presentation at the
RCPath Wales Symposium Poster Competition 2023

Extracellular Vesicles: A Key Consideration for Future Studies

Jamie Nash, Christine Saunders & Chloe George

Poster Presentation at the
British Blood Transfusion Society Conference 2023

The Development of a Novel x3 Buffy Coat derived Pooled Platelet Component through Data Modelling of Current Manufacturing Processes

Michael Cahillane, Nicola Pearce, Nicole Polidano, Christine Saunders, Laura Paletto & Chloe George

Poster Presentation at the
British Blood Transfusion Society Conference 2023

Using Microsoft Office Forms to support Infectious Disease Lookback Processes

Deborah Underwood

Poster Presentation at the
British Blood Transfusion Society Conference 2023

This report is prepared by

Helen Robertson, Natasha McLaughlin,
& Sian James

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We thank the blood, platelet and transplant donors who make our research possible