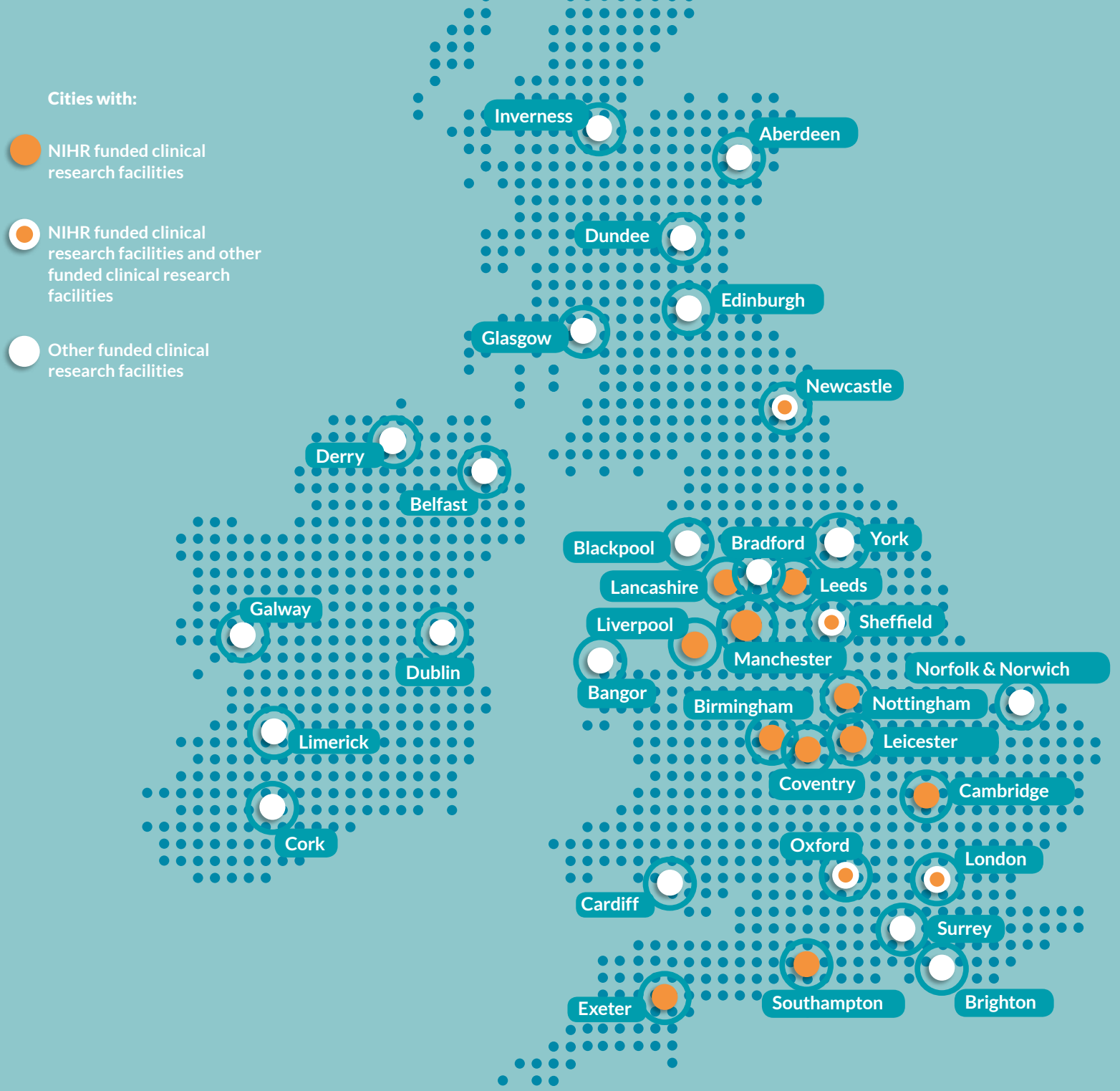
NIHR | National Institute for Health Research

Clinical Research Facilities

Providing dedicated facilities and expert staff to deliver high-intensity experimental research in the UK and Ireland



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Introduction

The NHS not only provides healthcare for over 60 million people in the UK, it also offers a unique platform to conduct world-leading health research through the NIHR.

This brochure provides an insight into how clinical research facilities (CRFs) support an expert workforce, create wealth, demonstrate an agile infrastructure and can power innovation in diagnostics and revolutionising treatments to improve patients' lives.

About CRFs

CRFs are dedicated purpose-built clinical facilities that enable early translational commercial and non-commercial research studies to be carried out.

Life science companies can access CRF assistance for studies throughout the research process from study design to data collection and management. This can include high-intensity studies and overnight stays, involving patients from newborn to old age, and healthy volunteers.

CRFs are supported by the UKCRF Network, which provides best practice guidance and tools to ensure each CRF delivers clinical trials of the highest standard.

The NIHR provides approximately £22 million per year to support CRFs in England. The remaining CRFs across Great Britain and Ireland receive core funding from various other sources.

About the UKCRF Network

The UKCRF Network is funded by the NIHR and the Chief Scientist Office of Scotland and facilitates the sharing of best practice and drives efficiencies in all aspects of the operational management of CRFs, such as workforce development, safety and emergency planning, quality assurance, and patient and public involvement.

About the NIHR

Funded by the Department of Health, the NIHR supports research from bench to bedside to improve the health and wealth of the nation. As part of this integrated health research system, CRFs provide dedicated space and expert staff to deliver high-intensity, innovative and novel treatments to patients in a safe and controlled environment. In delivering this service, CRFs make an essential contribution towards bringing experimental research studies to the UK.

The NIHR's people, facilities and systems represent the most integrated clinical research system in the world, propelling research from bench to bedside. The NIHR has transformed research in the NHS, increasing the volume of applied health research for the benefit of patients and the public.

It has driven faster translation of basic science discoveries into tangible benefits for patients and the economy, and developed and supported the people who conduct and contribute to applied health research.

The NIHR Office for Clinical Research Infrastructure (NOCRI) has been set up to help public, charity and industry funders work in partnership with NIHR infrastructure.

World-leading research capabilities

UK CRFs are centres of excellence that host the latest cutting-edge technology and bring together expertise in specific fields. These dedicated centres enable industry to access esteemed researchers, who can advise on all aspects of study design and delivery.

These centres have been involved in some of the world's most advanced medical innovations that are transforming the lives of patients with a wide range of conditions.

Correcting gene silencing in humans for the first time – Friedreich's ataxia

A revolutionary clinical trial that corrected gene silencing in humans for the first time was made possible due to specialist infrastructure at the NIHR/Wellcome Trust Imperial CRF. The study successfully demonstrated that the faulty gene causing the rare inherited condition Friedreich's ataxia (FRDA) could be reactivated using the well-known vitamin, nicotinamide.

The CRF worked with Imperial College London, MRC Clinical Sciences Centre and the NIHR Imperial Biomedical Research Centre to develop novel motion-capture suit technology required for the study, as well as managing all aspects of the trial delivery. The motion-capture technology developed for this study accurately measures motor decline, focusing on normal daily activities. This technology has wider applications across a range of neurodegenerative conditions.

"The study could not have gone ahead without support of the Imperial CRF who provided the space and nursing, medical, project management and administrative staff"

Sue Millman

CEO, Ataxia UK

"Correcting aberrant gene expression in patients is now a real possibility – offering the hope for a radical approach to incurable diseases that are caused by similar mechanisms"

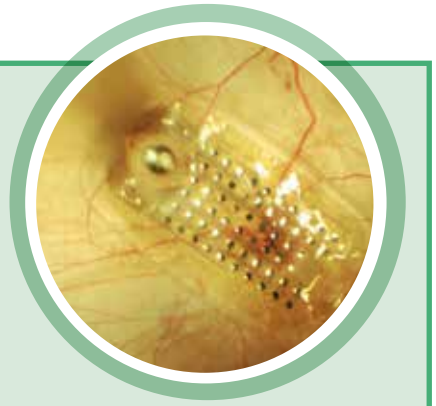
Professor Richard Festenstein

Principal Investigator and Honorary Consultant in Neurogenetics, Division of Brain Sciences and MRC Clinical Sciences Centre, Department of Medicine, Imperial College, London

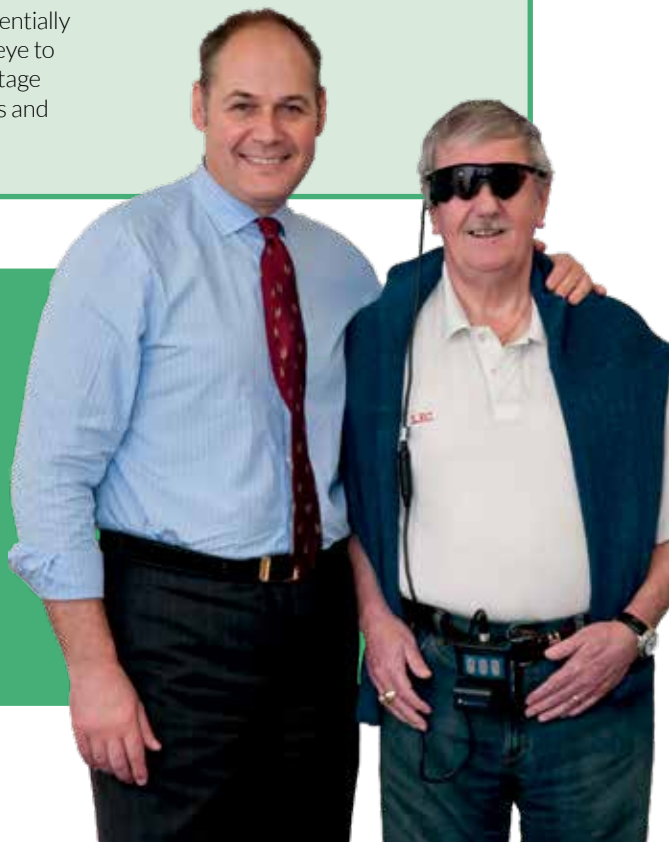
The NIHR Moorfields CRF made history by leading the first global multi-centre trial of the 'bionic eye' in retinitis pigmentosa (RP), in partnership with Moorfields Eye Hospital and Manchester Royal Eye Hospital.

Manchester Royal Eye Hospital, in collaboration with the NIHR/Wellcome Trust Manchester CRF, has since pioneered the technology in the more common condition, dry age-related macular degeneration (AMD) – leading the first study ever to combine artificial and natural vision in humans.

The CRFs supported the diagnostic, clinical and training aspects of the bionic eye (electronic retinal implant) study. Initial findings of the research demonstrate that the bionic eye device restores a degree of visual function to patients who have suffered complete vision loss due to RP. The results of the AMD study could potentially widen the application of the bionic eye to other conditions, including earlier stage RP, and children with maculopathies and residual peripheral vision.



The bionic eye uses a tiny camera mounted on glasses to transmit information to an electrode panel surgically-implanted in the patient's eye. The data then travels along the optic nerve to the brain, allowing patients to make out the outline of people and objects.



Professor Paulo Stanga with patient Keith, who was diagnosed with retinitis pigmentosa in his 20s and rapidly lost his sight.

After being fitted with a bionic eye in a clinical trial, he said:

"I have five grandchildren, whose faces I've never seen, but at least I can see them coming now"

Catalyst for health and wealth in the UK

CRFs bring together the academic, NHS and industry expertise required to develop new medicines. As well as providing infrastructure to deliver industry led studies, UK CRFs are supporting the health and wealth of the nation by facilitating the research of NHS and university spin-out companies.

CRF expertise helps demonstrate proof-of-concept to leverage €3.9 million investment for ground-breaking cystic fibrosis treatment

The NIHR/Wellcome Trust Southampton CRF played a critical role in the establishment of an innovative and standardised approach to test a novel treatment for cystic fibrosis (CF). The treatment being developed by University Hospital Southampton NHS Foundation Trust and University of Southampton, in collaboration with biotech firm Antabio, is designed to prevent the formation of bacterial biofilms.

The CRF provided specialist respiratory suites and the expertise required to develop biofilm degradation analyses and endpoints to test the treatment. These proof-of-concept studies enabled Antabio to secure a €3.9 million Wellcome Trust Seeding Drug Discovery award.

The treatment, which targets *Pseudomonas aerguinosa* bacteria, has the potential to significantly extend and improve life for patients with CF.

"The quality and safety of the Southampton facility assured us that proof-of-concept data showing reversible biofilm disruption via inhaled nitric oxide was robust, and that development of biofilm disruptors was viable"

Martin Everett
Head of Biology at Antabio

NHS-industry partnership develops first pioneering asthma treatment for a decade

The NIHR/Wellcome Trust Southampton CRF has been central to the delivery of a $220 million drug development programme into the first novel asthma therapeutic for a decade. The programme is a strategic partnership between AstraZeneca and Synairgen, a University of Southampton spin-out company, which aims to develop inhaled interferon beta treatment as a means for reducing the severity and duration of life-threatening asthma attacks.

Bronchoscopy suites and quality assured sample handling laboratories at the CRF made proof-of-concept, phase 1 and phase 2 studies possible. These studies established the dose regimen and indicated that the treatment was safe and effective.

"Our approach is based on our observations in the early 2000s linking immunodeficiency in asthmatic patients with markedly lower levels of interferon beta in the lung epithelia. Without the superb CRF facilities we could not have developed the lung explant experimental platform needed to characterise and modulate the immunological status of the lung epithelium"

Professor Ratko Djukanovic
Principal Investigator

"The CRF has been the engine driving all our experimental and early phase work. When you have this quality of specialist respiratory research capability and research nursing teams all in one place, integrated with the regional asthma service, you get great quality and rapid study turnaround"

Richard Marsden
CEO, Synairgen

Agile infrastructure

CRFs in the UK provide purpose-built, dedicated and flexible space for research. CRFs are designed to be adaptable to meet the diverse needs of researchers and varying intensities of studies, always with participant experience front of mind.

Novel sponge has potential to save lives by detecting early signs of oesophageal cancer

The NIHR/Wellcome Trust Cambridge CRF provided vital support to deliver an innovative study to assess a pioneering new device to diagnose oesophageal cancer.

The CRF set up an endoscopy suite to successfully support five endoscopy studies and 1,500 procedures to test the new Cytosponge-TFF3 device. The device, developed by University of Cambridge researchers, is designed to collect cell samples from the oesophagus, which can be tested for any abnormal cells that could develop into cancerous cells if left untreated.

The device is a foam sponge compressed within a dissolvable capsule, which the patient swallows. As the capsule dissolves, the sponge expands and can be pulled by string through the oesophagus collecting cell samples.

The study successfully demonstrated that the Cytosponge procedure can replace the traditional endoscopy and, due to its simplicity, can be administered in a primary care setting with samples then sent for simple laboratory analysis.

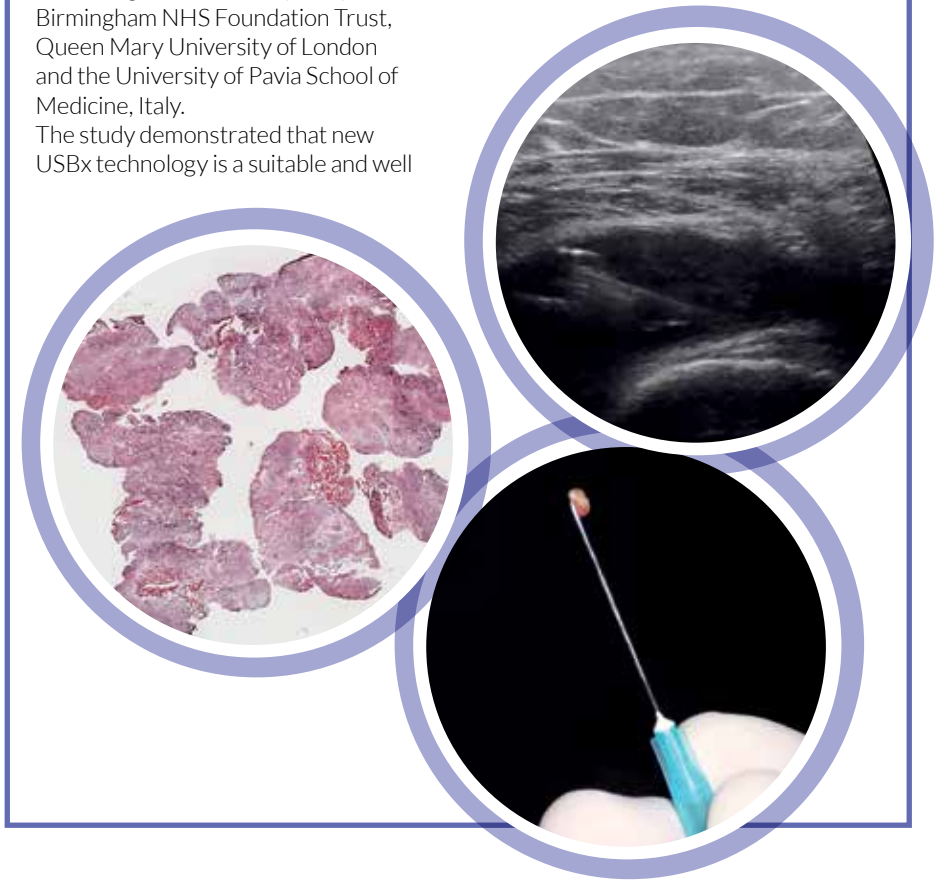
Further studies are underway to test the cost effectiveness of the Cytosponge in a primary care setting, and the University of Cambridge is also exploring applications for the technology in other oesophageal cancers.

It is hoped that, if approved and adopted, the Cytosponge will enable early detection and treatment of oesophageal adenocarcinoma, the incidence of which has increased six-fold since the 1990s.

CRF facilities enable testing of innovative, minimally invasive synovial biopsy technology

The NIHR/Wellcome Trust Birmingham CRF provided a bespoke, high-specification procedure room supported by highly trained nurses to test innovative ultrasound guided synovial biopsy (USBx) technology. The procedure is now being used to perform synovial biopsy in a number of major observational and interventional musculoskeletal trials.

The USBx technology was developed in collaboration with the University of Birmingham/University Hospitals Birmingham NHS Foundation Trust, Queen Mary University of London and the University of Pavia School of Medicine, Italy.
The study demonstrated that new USBx technology is a suitable and well tolerated alternative to the traditional procedure – 90% of participants consented to repeat procedures, with no requirement for recovery or additional time off work. Traditional methods are invasive, complex procedures that can incur considerable cost and morbidity. This study paves the way for synovial biopsy to be used in routine management of arthritis, and as a robust outcome in clinical trials.



Safe and quality assured environment

UK CRF staff undertake resuscitation and emergency scenario training to enable them to appropriately manage the complexity and risk associated with experimental studies. UK CRFs are strategically located close to A&E and intensive care units and, with access to dedicated research aseptic units and pharmacies, provide the infrastructure to deliver a diverse range of studies, including those involving radiotherapy, gene and stem cell therapy.

Novel gene therapy effective in managing underlying defect in cystic fibrosis

The Edinburgh Wellcome Trust CRF and the Royal Brompton CRF provided the dedicated and specialist research space required to effectively deliver a gene therapy trial for cystic fibrosis (CF) patients.

The trial, carried out in collaboration with the UK Cystic Fibrosis Gene Therapy Consortium (GTC) and other partners, demonstrated that gene therapy is effective with no safety issues in CF.

The trial was the first in the world to deliver the CFTR gene via an optimised plasmid DNA/liposome formulation. The treatment is delivered via a nebuliser, which converts the liquid treatment into a mist and delivers it to the lungs.

World-first treatment for peanut allergy

The Study of Tolerance to Oral Peanut (STOP) trial was the world's first randomised controlled study to identify an effective treatment, an innovative oral immunotherapy (OIT), for peanut allergy. Prior to this study, no interventional research had taken place for 10 years because of the high risk of anaphylaxis.

This study regimen, involving oral administration of increasing amounts of graded peanut protein, was only possible due to the NIHR/Wellcome Trust Cambridge CRF, which provided close monitoring for the early detection and management of anaphylaxis with onsite NHS emergency care back up.

The innovative oral immunotherapy developed by Cambridge University Hospitals NHS Foundation Trust was shown to be effective and safe in children.

"The CRF was essential in ensuring the safe and effective conduct of the phase 2 randomised controlled study, supporting more than 1400 day-case visits for 120 children. The CRF provided an environment with trained staff which minimised risk to participants, allowed physiological end points to be captured and ensured a really excellent patient experience"

Dr Pamela Ewan

Consultant Allergist
NIHR/Wellcome Trust Cambridge CRF

"We are fortunate we have an NIHR CRF on site. It's great for us as researchers because we are provided with guaranteed clinical space, nursing teams and medical equipment. It is an invaluable resource and we really couldn't have done the study without this"

Dr Andrew Clark

Principal Investigator
NIHR/Wellcome Trust Cambridge CRF

"I'm really glad I've taken part. It helps me because now I don't have to worry about eating peanuts... it makes life so much easier... other people should consider volunteering because it could save lives in the future"

Jamie, aged 14, study participant

Jamie is also a member of the NIHR/Wellcome Trust Cambridge CRF Children's Non-Executive Board, through which he has provided input to make the CRF environment more comfortable and enjoyable for young people.

Enabling study participation

CRFs in the UK provide the specialist facilities required to appropriately manage the risk associated with experimental research studies. Such studies can require collaboration across the UK and beyond to bring the required number of participants to a designated study site.

Multi-disciplinary teams within CRFs are experienced in co-ordinating input across multiple agencies and specialities to bring patients with complex medical needs across to the UK safely and make the experience as comfortable as possible for families during in-patient stays which may last weeks, months or even years.

Giving infants with lysosomal acid lipase deficiency their lives back

A global trial led and supported by UK CRFs investigating an experimental Enzyme Replacement Therapy (ERT), resulted in the first experience of infants with the genetic condition lysosomal acid lipase deficiency (LALD) living beyond the first two years of their life.

The high-intensity study was delivered at sites co-located with intensive care units, including the NIHR/Wellcome Trust Manchester CRF and the NIHR/Wellcome Trust Birmingham CRF, to provide safe clinical cover. The CRFs provided the logistical support to safely transport patients from elsewhere in the UK and Europe, and accommodate families throughout the in-patient stay. The Manchester team also provided clinical input into the design of the protocol, drawing on a wealth of experience of delivering research studies in metabolic medicine.

"Delivery of this complex study in a rare condition is made possible due to the Manchester CRF. The CRF provides dedicated research space, together with the enthusiastic paediatric research team that work closely with the clinical teams to ensure the study is safe and effective"

Dr Simon Jones

Consultant in Paediatric Inherited Metabolic Disease at Saint Mary's Hospital, Manchester

"When Ava was six-months old, we were told she only had weeks to live. The research trial has given us our daughter back"

Aoife, Ava's mum

Managing complex and intensive studies

Developing a new medicine requires a diverse range of expertise. CRFs in the UK are experienced in navigating and bringing together multi-disciplinary teams to efficiently deliver complex and intensive study protocols.

Co-ordinating multi-disciplinary input to test an innovative therapy for urea cycle disorders

A collaboration between the Somers CRF at Great Ormond Street Hospital and the NIHR/Wellcome Trust Birmingham CRF successfully delivered a ground-breaking study across the two sites to test an innovative cell therapy, HepaStem, in patients with different urea cycle disorders (UCDs).

To support this complex study, the CRFs co-ordinated input across the metabolic medicine team, interventional radiology, cell therapy, pathology and the research and innovation team, utilising Paediatric Intensive Care (PICU) facilities, where the children were admitted for multiple infusions of cells into the liver via a portal vein catheter.

The results of this phase 1 study demonstrated that this completely new concept of delivering normal hepatocyte progenitor cells to children with genetic liver enzyme defects works and is safe. The success of trial has led to development of a phase 2 study.

World-leading research capabilities

Catalyst for **health and wealth** in the UK

Agile infrastructure

Safe and **quality assured** environment

Enabling study participation

Managing complex and intensive studies

TYPICAL ANNUAL ACTIVITY ACROSS THE 23 NIHR CRFs

219,981
Participant visits

£22.2m
Annual NIHR funding for CRFs

2,170
Industry contract studies

2,678
Papers published in peer-reviewed journals

253
Industry collaborative studies

£117.9m
External research funding invested

5,000
Active projects managed at any one time

62,500
Participants recruited into studies

We would like to thank all participants, principal investigators, teams and funders, who participate in/make possible the studies that UK CRFs support.

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