

BIOMEDICAL RESEARCH CENTRES

Introduction

The vision of the National Institute for Health Research (NIHR) is to improve the health and wealth of the nation through research.

This document sets out how the NIHR Biomedical Research Centres are contributing to this vision. Information about other elements of the NIHR clinical research infrastructure can be found in companion documents.

Overview

The NIHR established the first round of NIHR Biomedical Research Centres (BRCs) in 2007. Designation and funding for these BRCs ended in March 2012. Following a new, open competition launched in February 2011, the NIHR has designated and funded a second round of eleven Biomedical Research Centres (BRCs) within our leading NHS and University partnerships to drive progress on innovation and translational research in biomedicine into NHS practice. These BRCs translate lab-based discoveries into new cutting edge treatments, technologies, diagnostics and other interventions in clinical settings. The substantial levels of sustained funding which they receive creates an environment in which scientific endeavour can thrive, attract the foremost talent and produce world-class outputs, hence contributing to the nation's international competitiveness as a major component of our knowledge economy. BRCs (along with NIHR Biomedical Research Units) form the bedrock of the first two NIHR Translational Research Partnerships (see NIHR Briefing Document 4.10).

The aims of the BRCs are to:

- Drive innovation in the prevention, diagnosis and treatment of ill-health.
- Translate advances in biomedical research into benefits for patients.
- Provide a key component of the NHS contribution to our nation's international competitiveness by making the best Centres even better.

Designation and Funding

The BRCs were selected by open competition during 2011 by an expert international panel, using the following criteria:

- **Quality, volume and breadth** of internationally-excellent biomedical and translational research and researchers.
- Existing **research capacity**, and plans for increasing capacity including training.
- **Strength of the strategic plan.**
- **Relevance of the research portfolio** to the health of patients and the public.
- **Track record** in translating advances in basic biomedical research into clinical research, and pulling through basic biomedical research findings into benefits for patients, the public and the NHS.
- **Strength of the strategic partnerships**, including those with industry and other NIHR-funded research Infrastructure.
- **Value for money.**

In order to ensure critical mass, focus and clarity, funding for each BRC has been awarded to a single NHS organisation (in partnership with academia). The amount of funding allocated to each BRC was determined by the scale, nature and quality of the research activity to be conducted by that centre, and is to be used to support the translation of excellent basic biomedical research (already being undertaken primarily in universities) into excellent clinical research (underway or to be undertaken within the NHS), for the benefit of patients.

NIHR funding and designation has been provided for five years from April 2012, and meets the recurrent costs of patient-based, translational clinical research in the NHS.

Eligible costs include:

- Research staff engaged on patient- or people-focused translational clinical research in the NHS.
- Research support staff supporting patient or people focused translational clinical research in the NHS.
- Research training, leading to a higher degree by research (e.g. MPhil, MD, PhD), for staff, of all disciplines, engaged on patient- or people-focused translational clinical research in the NHS.
- NHS support costs of patient- or people-focused translational clinical research (e.g. pharmacy, pathology, radiology).
- Other, legitimate and reasonable, indirect costs within the NHS (e.g. accommodation, payroll, HR, finance).

The performance of each BRC is monitored and reviewed by the NIHR Central Commissioning Facility. BRCs that are not performing at the required standard will first be put on notice and, if the required standard is not achieved within a defined time-scale, funding will be withdrawn.

A new, open competition has been launched to designate and fund NIHR BRCs over five years from 1 April 2017. All applications will be reviewed by an independent International Selection Panel who will make recommendations on NIHR BRC designation and funding. The outcome of the competition is expected to be announced by early autumn 2016.

..

BRC Research Themes

Each BRC has either a very substantial portfolio of world-class biomedical research **across a range of clinical and research areas**, or a substantial portfolio of world-class biomedical research in a **specific clinical or research area**.

Details of the current BRCs and their research themes are presented in the table below.

NHS Organisation	University Partner	Research Themes
Cambridge University Hospitals NHS Foundation Trust	University of Cambridge	Brain Injury and Repair; Cancer; Cardiovascular Disease; Dementia and Neurodegenerative Disorders; Genomics; Immunity, Infection and Inflammation; Mental Health; Metabolism, Endocrinology and Bone; Population Health Science; Transplantation and Regenerative Medicine; Women's Health
Great Ormond Street Hospital for Children NHS Foundation Trust	University College London Institute of Child Health	Molecular Basis of Childhood Disease; Diagnostics and Imaging in Childhood Disease; Gene, Stem and Cellular Therapies; Novel Therapies for Childhood Diseases
Guy's & St Thomas' NHS Foundation Trust	King's College London	Cancer; Cardiovascular Disease; Cutaneous Medicine; Environment, Respiratory Health and Allergy; Imaging and Bioengineering; Infection and Immunity; Transplantation; Translational Genetics
Imperial College Healthcare NHS Trust	Imperial College London	Biobanking; Cancer; Cardiovascular; Gastroenterology and Hepatology; Genetics and Genomics; Imaging; Haematology; Infection; Interventional Public Health; Neonatal Medicine; Neuroscience; Obesity, Diabetes, Endocrinology and Metabolism; Paediatrics; Renal Medicine and Transplantation; Respiratory; Rheumatology; Stratified Medicine; Surgery and Technology; Woman's Health
Moorfields Eye Hospital NHS Foundation Trust	University College London Institute of Ophthalmology	Gene Therapy; Genotyping, Phenotyping and Informatics; Inflammation and Immunotherapy; New Technologies and Devices; Regenerative Medicine and Pharmaceuticals; Visual Assessment and Imaging
Newcastle upon Tyne Hospitals NHS Foundation Trust	Newcastle University	Genomics; Ageing and Frailty; Fibrosis and Repair; Mitochondrial Dysfunction; The Ageing Brain – Dementia and Stroke; The Ageing Body (chronic liver disease, cardiovascular disease and diabetes); The Ageing Limbs (musculoskeletal disease); Therapeutics in Old Age

4.02 Biomedical Research Centres
Version 10 (July 2016)

Oxford University NHS Trust	University of Oxford	Biomedical Informatics and Technology; Blood; Cancer; Cardiovascular; Dementia and Cardiovascular Disease; Diabetes; Functional Neuroscience and Imaging; Genomic Medicine; Immunity and Inflammation; Infection; Prevention and Population Care; Surgical Innovation and Evaluation; Translational Physiology; Vaccines
Royal Marsden NHS Foundation Trust	Institute of Cancer Research	Breast Cancer; Cancer Genetics; Cancer Imaging; Cancer Therapeutics; Clinical Studies; Molecular Pathology; Prostate Cancer; Radiotherapy
Southampton University Hospitals NHS Trust	University of Southampton	Nutrition, Growth and Development; Nutrition, Lifestyle and Healthy Ageing
South London and Maudsley NHS Foundation Trust	King's College London Institute of Psychiatry	Bioinformatics and Statistics; BioResource, Biomarkers and Genomics; Clinical and Population Informatics; Developmental Disorders; Disorders of Affect and Addiction and Their Interface with Medicine; Neuroimaging; Neuropsychiatric Disorders; Patient and Carer Participation; Clinical Trials - Innovation and Implementation
University College London Hospitals NHS Foundation Trust	University College London	Body Imaging; Cancer; Cardiovascular Disease; Cellular and Gene Therapy; Ear, Nose and Throat; Education, Training and Biostatistics; Gastroenterology and Hepatology; Infection and Inflammation; Neurodegeneration; Neurodiagnostics; Neuroimaging; Neurotherapeutics; Oral Health; Respiratory, Anaesthesia, Critical Care and Exercise, Sports and Health (RACE); Women's Health

COLLABORATIVE INITIATIVES

There are a number of collaborative NIHR initiatives which further build upon the significant investment in Biomedical Research Centres and Biomedical Research Units (BRUs), facilitate collaboration between the NIHR BRCs and BRUs and with other parts of NIHR and the wider research landscape and contribute to the NIHR vision of improving health and wealth of the country. These include the:

- NIHR Translational Research Collaborations in Rare Diseases and Dementia
- The NIHR BioResource

These are detailed below.

NIHR TRANSLATIONAL RESEARCH COLLABORATIONS

NIHR RARE DISEASES TRANSLATIONAL RESEARCH COLLABORATION

Overview

There are between 5,000 and 8,000 rare diseases. Each one affects less than 0.1% of the UK's population, but together they affect the lives of 3 million people¹. They have a high impact on people's lives and collectively form a large part of the work of the National Health Service.

Research into rare diseases is important because of the overall numbers of people affected. It is also important because many common clinical syndromes are now believed to comprise subsets of rare diseases. Research in this field advances our understanding of more common disease mechanisms, leading to potential new treatments. Furthermore, it can contribute to improved targeted and personalised approaches to healthcare, which has the potential to improve efficacy and safety of treatments and to reduce costs.

The UK is at the cutting edge of research in rare diseases internationally. NIHR has a vision that 'deep' phenotyping information combined with data on genomic abnormalities will increase research opportunities, enable faster diagnosis and support improved management and treatment of rare diseases.

The NIHR Rare Diseases Translational Research Collaboration (RD-TRC) provides national coordination to bring those with significant relevant NIHR infrastructure together to increase research collaboration and speed up translation, and will build on our British heritage as a global leader in genomics. This national coordination is needed as each type of rare disease only affects a small number of people, with often poor recognition and diagnosis of disease.

At its core, the RD-TRC consists of NIHR BRCs, NIHR BRUs and NIHR Clinical Research Facilities (CRFs), all with world-leading research expertise into rare diseases, facilities and capacity, which have already been designated and funded after review by independent Selection Panels.

¹ The UK Strategy for Rare Diseases, November 2013. Department of Health.

The aims of the NIHR RD-TRC are to:

- Develop further the NIHR research infrastructure in the NHS to support patient-centred research into rare diseases.
- Increase the volume of 'deep' phenotyping data and combine this with data on genetic abnormalities to provide greater understanding of the mechanisms underlying rare diseases and support translational research - and thereby create insights into which interventions (new or existing) are likely to be effective in preventing or treating these or other diseases.
- Create cohorts of well-characterised patients willing to take part in clinical research studies.
- Facilitate tangible, rapid and efficient collaboration between NIHR-funded research infrastructure, clinical researchers, NHS organisations, other research funders and life science companies.
- Promote and enhance the nation's reputation as a world-class centre for rare diseases translational research.

Key themes

The NIHR RD-TRC works across fourteen themes which focus on specific groupings of acquired and inherited rare disorders. The themes are: Cancer, Cardiovascular, Dementia & Neurodegenerative, Eye Disease, Gastrointestinal, Immunological Disorders, Metabolism, Musculoskeletal Disorders, Neuromuscular Disorders, Non-Malignant Haematology, Paediatric (Cross-Cutting), Renal Disease, Respiratory Disease and Skin.

Funding and operations

The NIHR provides dedicated funding for the NIHR RD-TRC of up to £5 million per annum, for four years from 2012, for underpinning NIHR research infrastructure focussed on 'deep' phenotyping.

The NIHR RD-TRC works closely with other NIHR initiatives including the NIHR BioResource, Rare Diseases UK and relevant charities and the life sciences industry through the NIHR Office for Clinical Research Infrastructure (NOCRI).

The RD-TRC is co-Chaired by Dr John Bradley, NIHR Cambridge Biomedical Research Centre and Professor Patrick Chinnery, NIHR Newcastle Biomedical Research Centre.

NIHR DEMENTIA TRANSLATIONAL RESEARCH COLLABORATION

Overview

Dementia is a growing problem that affects over 44 million people globally, with approximately 835,000 people currently living with dementia in the UK. With an ageing population the numbers of people with dementia in the UK are increasing

and so are the costs. Dementia now costs the UK economy £26 billion a year – higher than cancer, heart disease or stroke².

The NIHR Dementia Translational Research Collaboration (TRC-D) has been created to maximise the significant NIHR investment in dementia translational research. It brings together the considerable world-leading expertise and resources within the four NIHR BRUs in dementia and the six NIHR BRCs: Cambridge BRC & BRU, Imperial BRC, Maudsley BRC & BRU, Newcastle BRC & BRU, Oxford BRC, University College London Hospitals BRC and Queen Square BRU.

The TRC-D has a range of workstreams on areas such as biomarkers, MRI protocols, PET imaging, stem cells and bioinformatics, examples include:

- looking for biomarkers for Parkinsons in both blood and cerebrospinal fluid, funded by Parkinson's UK; a biomarker in blood would be hugely advantageous as blood is easily accessible and a blood test can be repeated to obtain measures of change.
- NIHR-MRC Dementia Deep and Frequent Phenotyping feasibility study for intensive phenotyping of pre-clinical dementia patients to identify biomarkers that change over periods of months, rather than years; these biomarkers could be used in a range of follow-up trials.
- providing the ability to interrogate data from dementia patients and return anonymised datasets appropriate for research use, through the NIHR funded Dementia Clinical Record Interactive Search (D-CRIS) system; increasing the speed with which the results from research initiatives can deliver value to direct patient care and improve the close working relationship between practising clinicians and academics.
- Development of an informatics platform across all the TRC-D centres to allow sharing of MRI images, image analysis methods, protocols and QC processes; establishing consistent MRI capabilities and sharing of image databases at a national level.

The aims of the NIHR Dementia TRC are to:

- facilitate tangible, rapid and efficient collaboration between NIHR-funded research infrastructure, clinical researchers, NHS organisations, other research funders and life science companies.
- significantly increase dementia research capacity and capability.
- understand better the mechanisms of the disease and likely targets for intervention.
- Promote and enhance the nation's reputation as a world-class centre for translational research in dementia.

² Dementia 2014: Opportunity for Change. Alzheimer's Society.

Funding and operations

The NIHR TRC-D works closely with other NIHR Infrastructure, relevant charities and the life sciences industry through the NIHR Office for Clinical Research Infrastructure (NOCRI). The NIHR TRC-D works together with the Dementias Research Platform UK, of which NIHR is a partner.

The TRC-D is Chaired by Professor Simon Lovestone, Professor of Translational Neuroscience, Department of Psychiatry, University of Oxford.

NIHR BIORESOURCE

The NIHR BioResource provides a national cohort of healthy patients, their relatives and volunteers who are willing to provide clinical information and samples that will enable them to be recalled by genotype and phenotype for early translational (experimental medicine) research studies and early phase trials.

It supports collaborative research, including with the life sciences industry, to recruit participants for experimental medicine studies as well as providing the potential to study the molecular basis of disease, identify the most appropriate biomarkers for diagnosis and drug discovery, and to test the mechanism of action and effects of new treatments.

The NIHR BioResource currently has eight centres: Cambridge BRC (Theme Lead: Rare Diseases), Guy's and St Thomas's Biomedical Research Centre, Imperial BRC (Theme Lead: Infectious, Immunological & Inflammatory Disease), Leicester Cardiovascular BRU, Oxford BRC (Theme Lead: Cardiovascular & Metabolic Disease), Maudsley BRC, Newcastle BRC and University College London Hospitals BRC (Theme Lead: Neuroscience).

Funding and Operations

Total NIHR funding awarded is £39.9 million which runs until March 2017.

Dr John Bradley is the Chair of the NIHR BioResource based at its Headquarters, NIHR Cambridge BRC at Cambridge University Hospitals NHS Foundation Trust.

Further Information on the Biomedical Research Centres and associated collaborative initiatives:

Further details about the NIHR BRCs, TRCs and BioResource are available at www.nihr.ac.uk, or contact the NIHR Office for Clinical Research Infrastructure at nocri@nihr.ac.uk.

For further information on the RD-TRC, go to: www.rd.trc.nihr.ac.uk

Detailed information about the resources and capabilities of the existing BRCs is available at [UK Experimental Medicine Resource Finder website](#)

Detailed information about the NIHR BioResource can be found at www.bioresource.nihr.ac.uk.

Department of Health Lead:

Dr Tony Soteriou

Acting Deputy Director, Research Infrastructure and Growth

Research & Development Directorate

Department of Health

Email: R&D@dh.gsi.gov.uk