



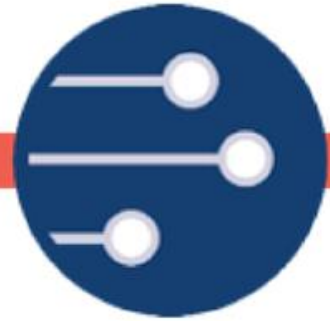
# An introduction to the NIHR AIM Programme

Dr Mario Moroso  
Assistant Director, Research Programmes  
NIHR Coordinating Centre

17 May 2023



# NIHR's mission is to improve the health and wealth of the nation through research.



**Funding high quality, timely research** that benefits the National Health Service, public health and social care



**Investing in world class expertise, facilities and a skilled delivery workforce** to translate discoveries into improved treatments and services



**Partnering with patients, service users, carers and communities** improving the relevance, quality and impact of our research



**Attracting, training and supporting the best researchers** to tackle complex health and social care challenges



**Collaborating with other public funders, charities and industry** to shape a cohesive and globally competitive research system



**Funding applied global health research and training** to meet the needs of the poorest people in low and middle income countries

# NIHR Artificial Intelligence for Multiple Long Term Conditions (AIM)

An initial consultation informed the structure of AIM:

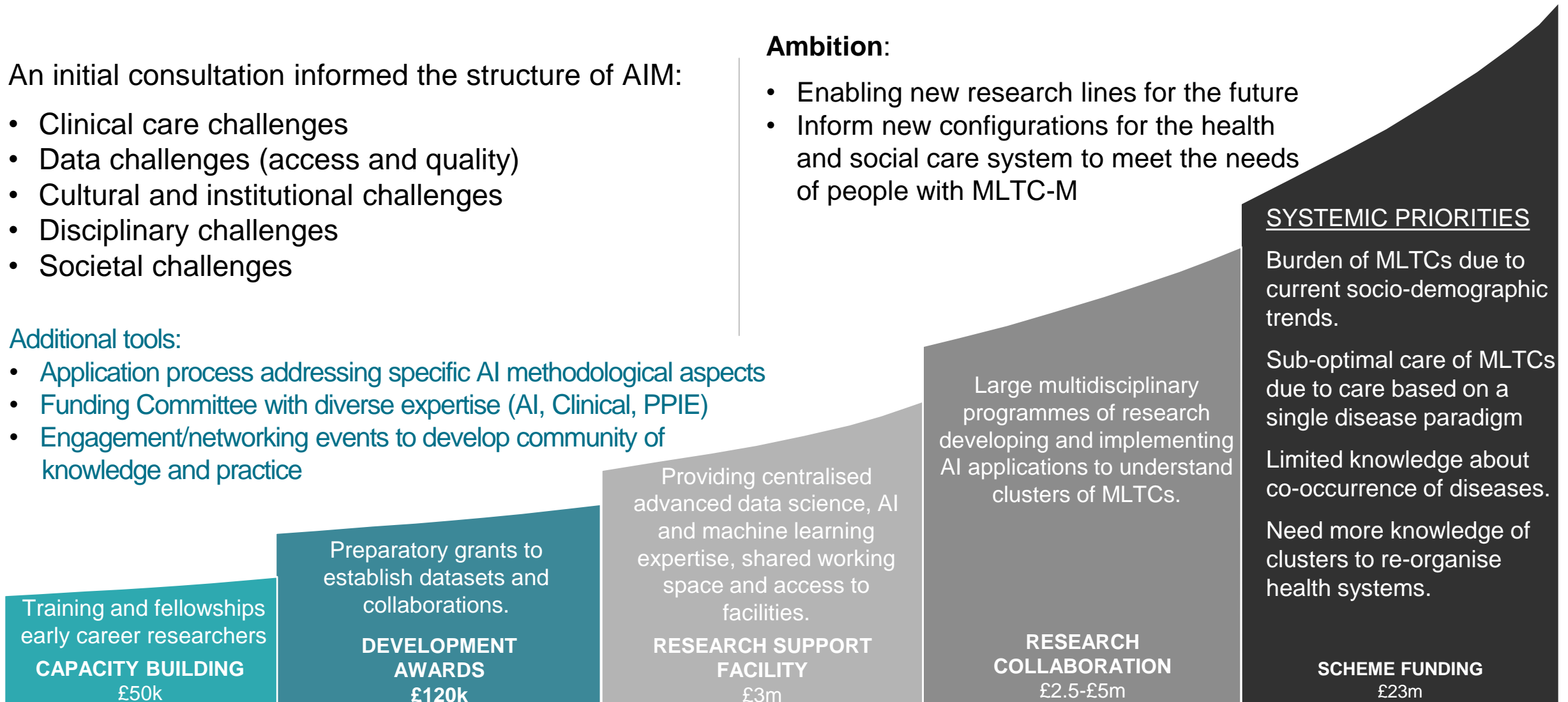
- Clinical care challenges
- Data challenges (access and quality)
- Cultural and institutional challenges
- Disciplinary challenges
- Societal challenges

Additional tools:

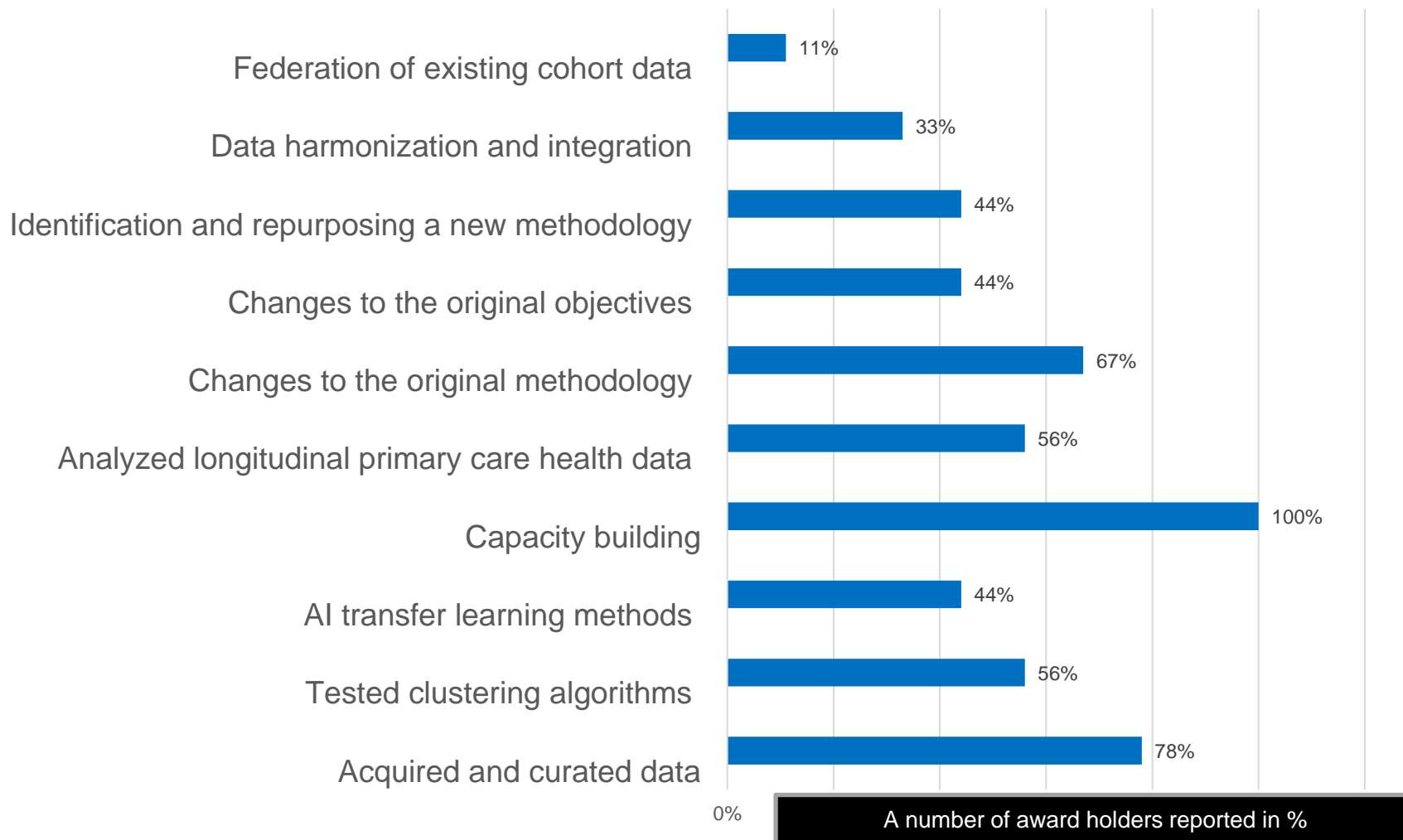
- Application process addressing specific AI methodological aspects
- Funding Committee with diverse expertise (AI, Clinical, PPIE)
- Engagement/networking events to develop community of knowledge and practice

**Ambition:**

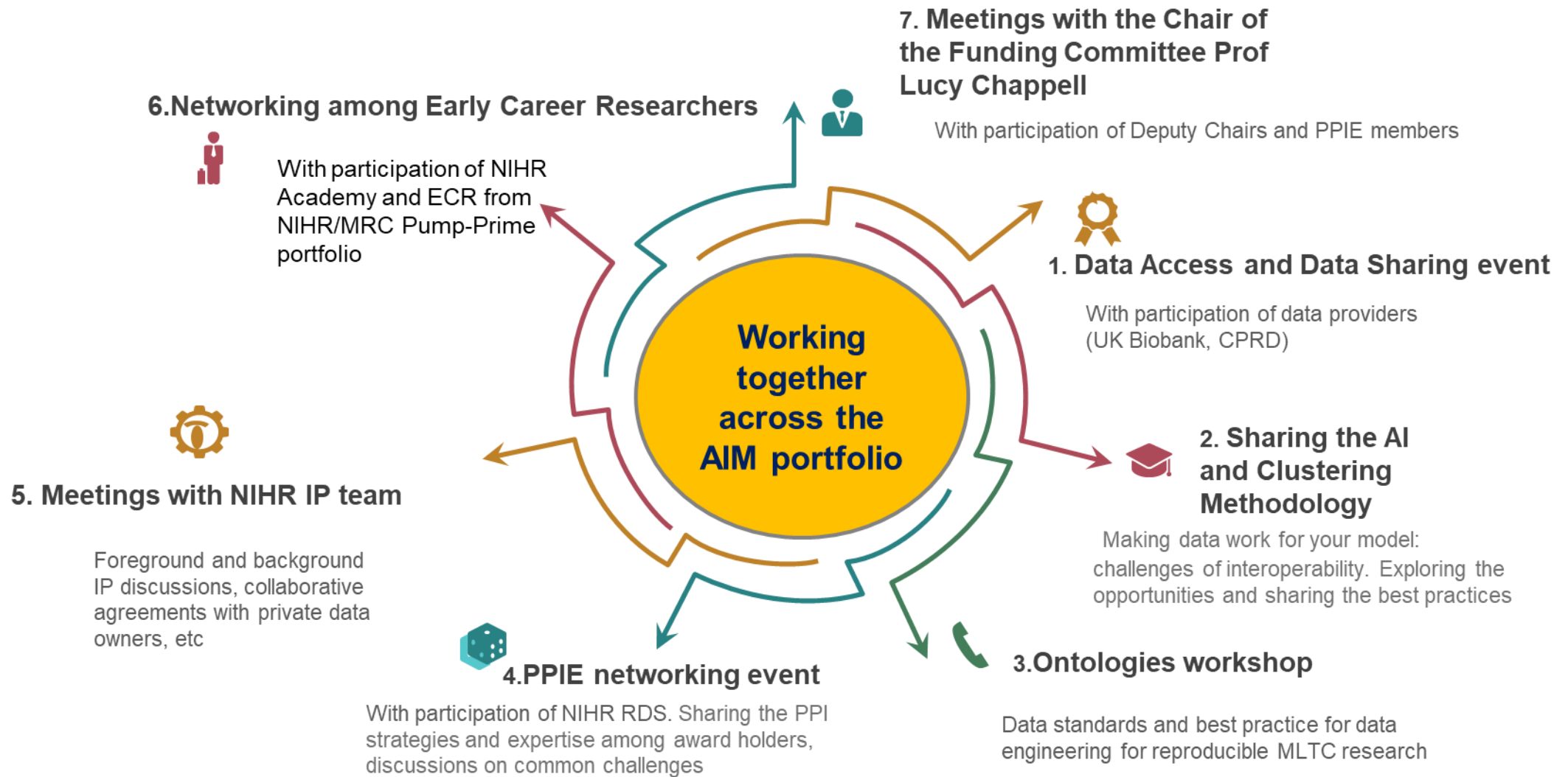
- Enabling new research lines for the future
- Inform new configurations for the health and social care system to meet the needs of people with MLTC-M



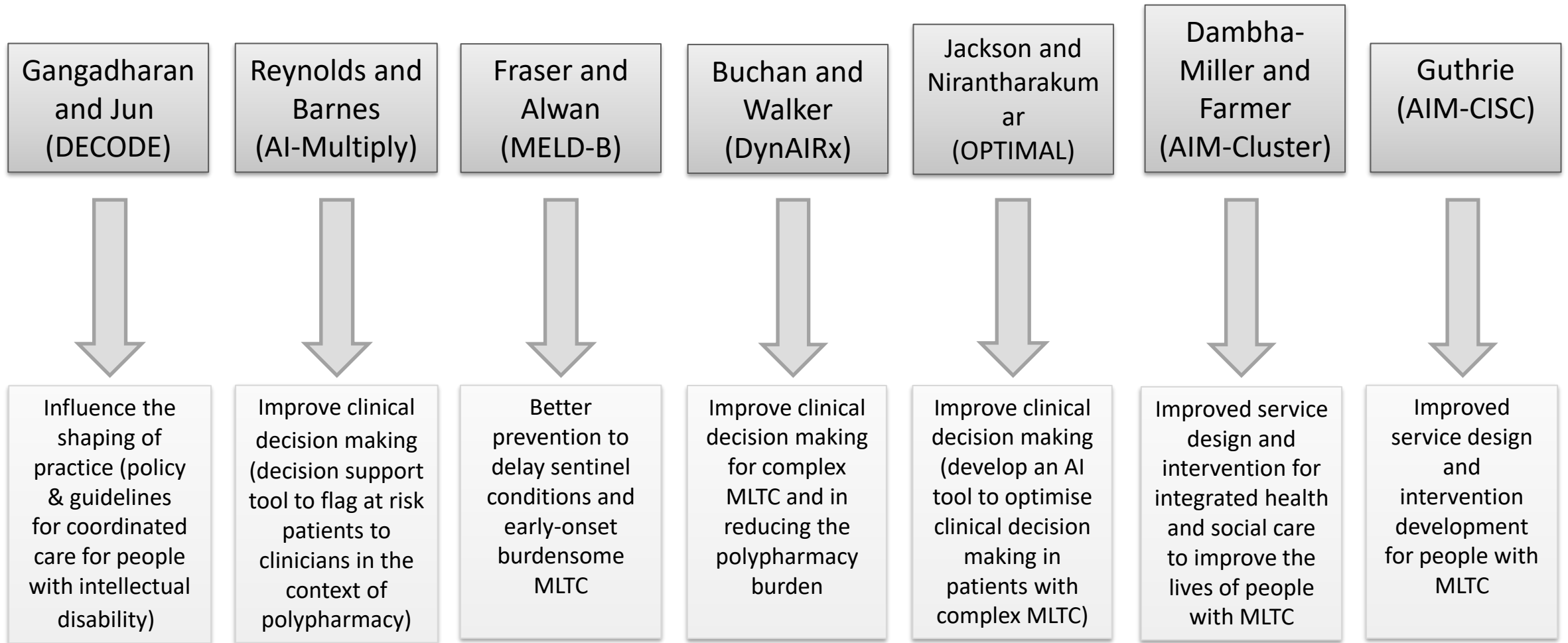
## Key Development Awards achievements reported (AIM DAs final reports, a number of award holders reported, %)



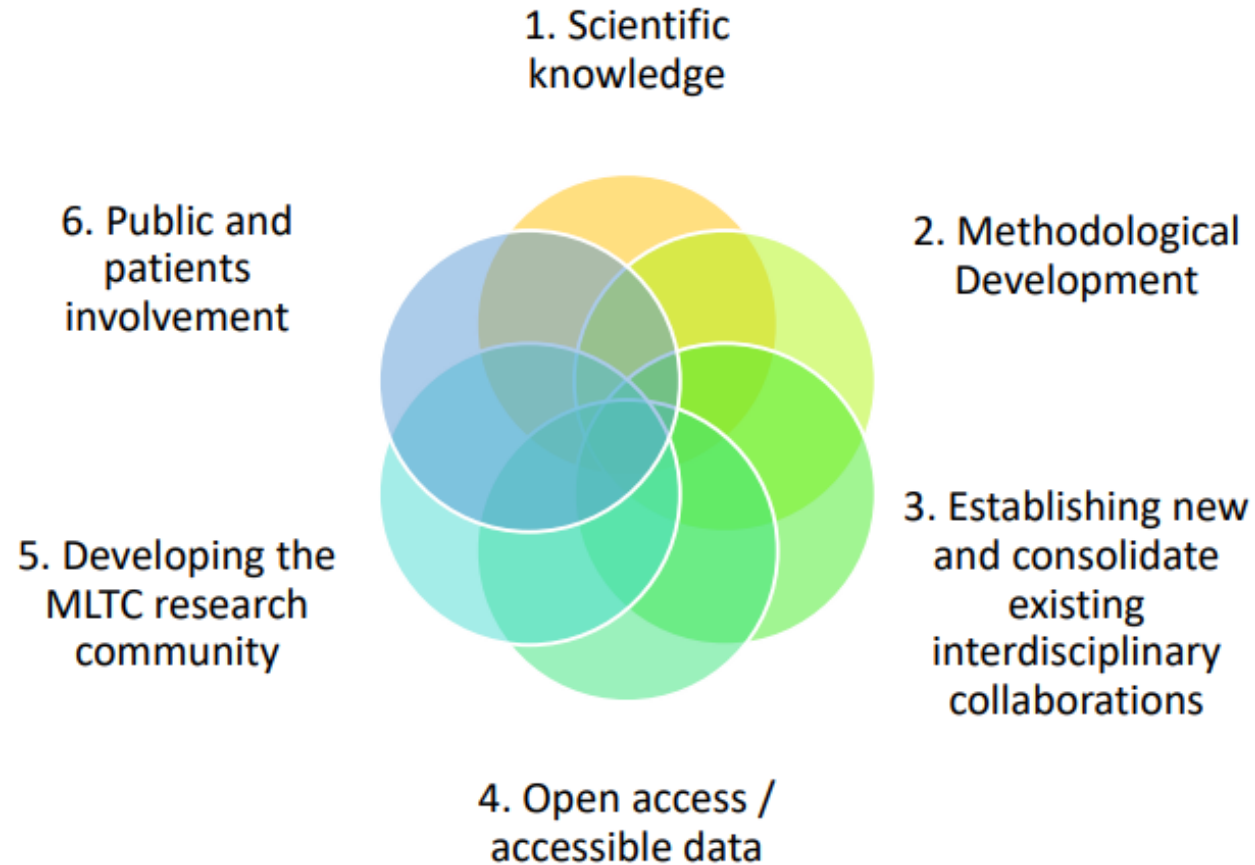
# Creating a collaborative environment



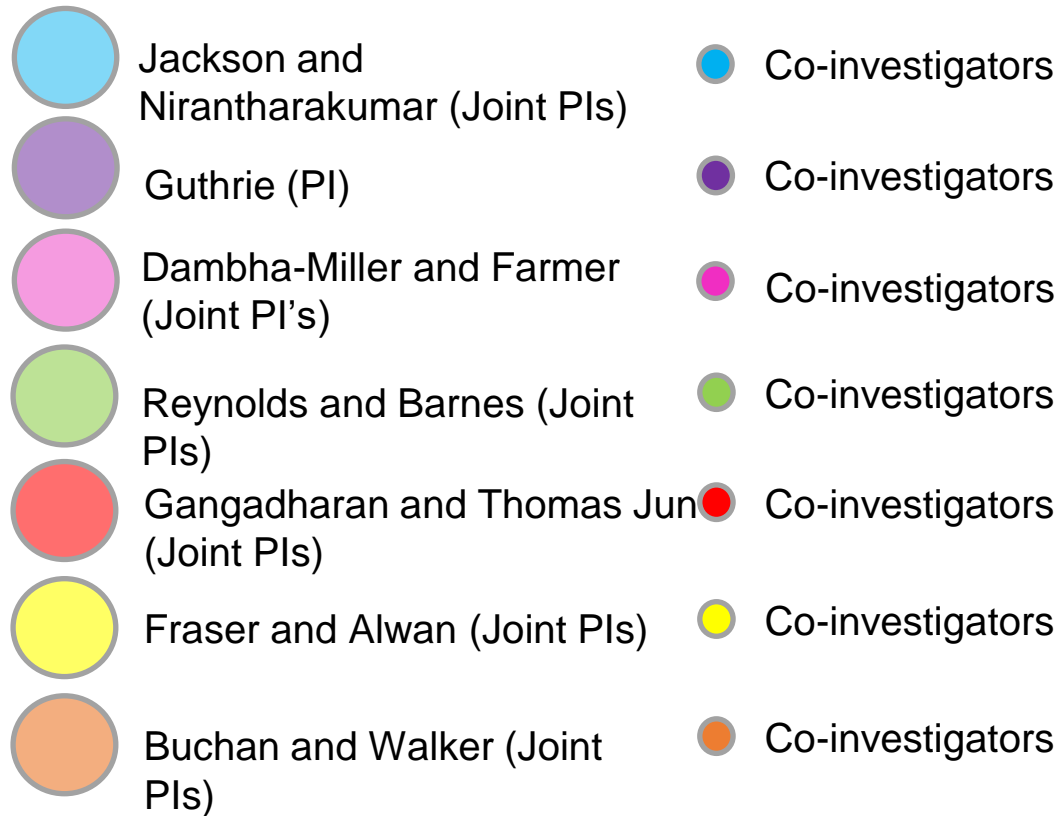
# Working towards different pathways to benefit people with MLTC



# Monitoring, Evaluation and Learning Framework

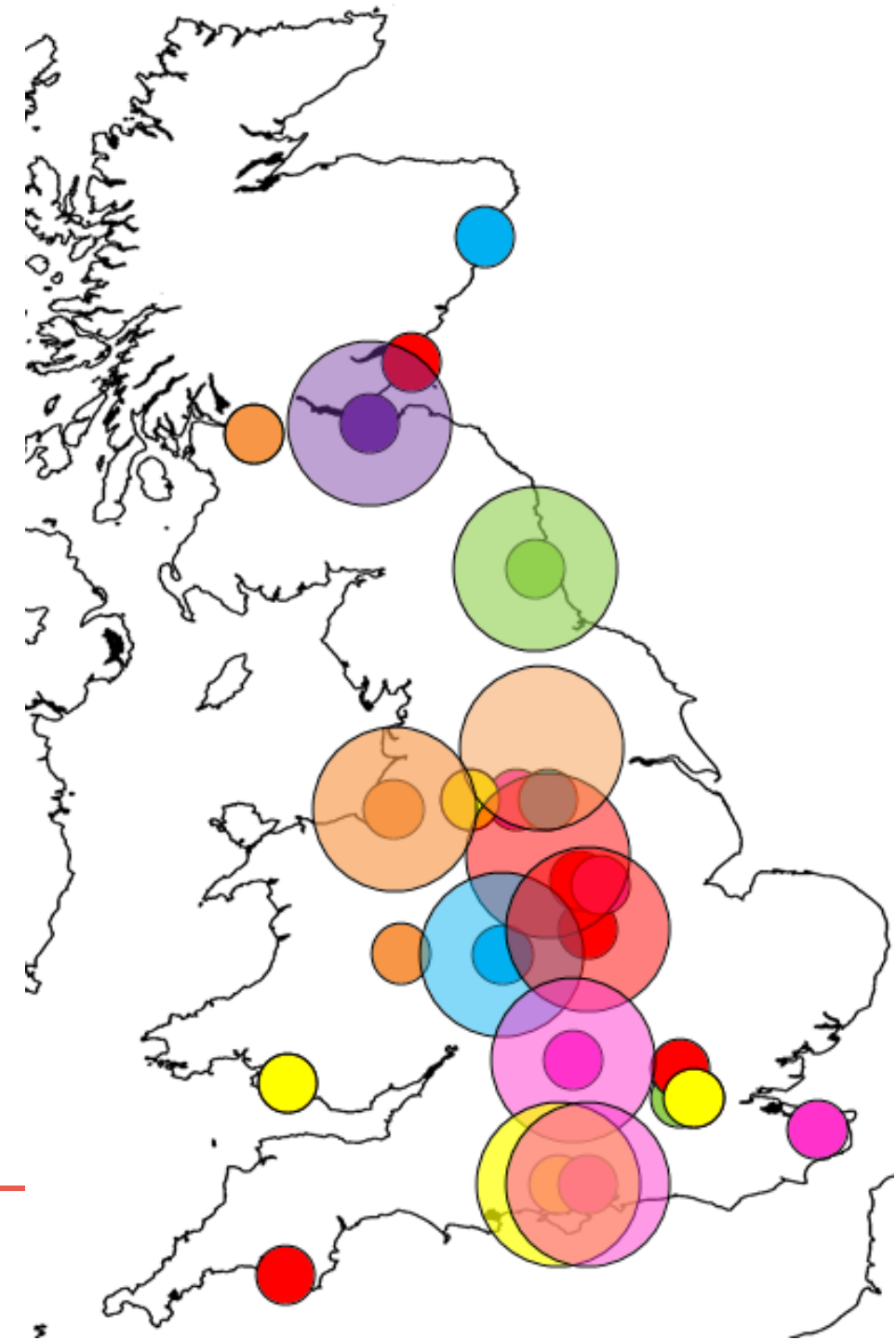


# Success indicator: regional distribution



Wave 1

Wave 2





### National 'discovery' datasets



### Regional 'health intelligence' datasets



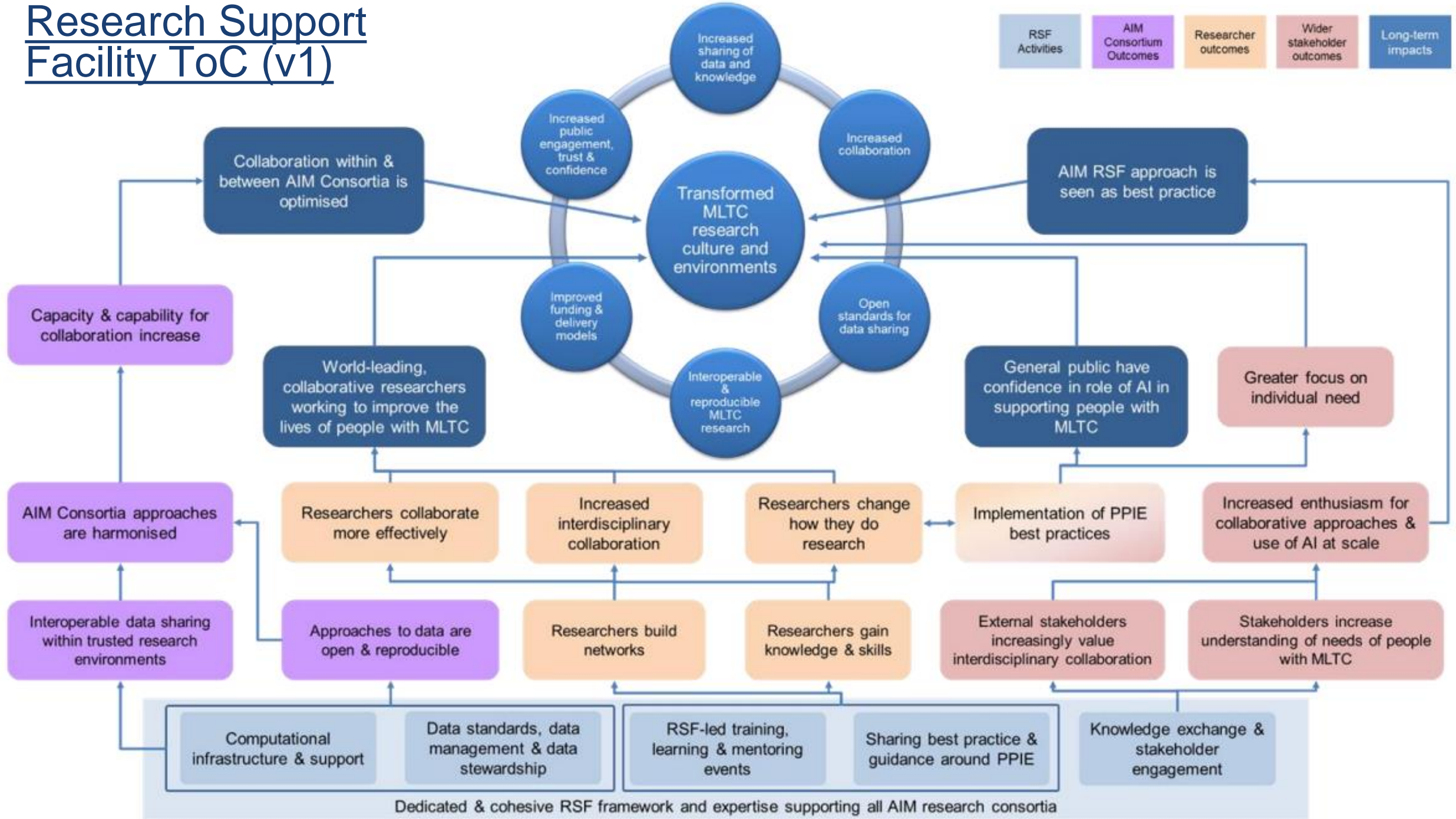
### Replication datasets



National	National	North-East England	East London	London	Bradford	Lothian
Representative	Unrepresentative, not diverse	Socially deprived	Socially deprived, ethnically diverse	Socially deprived, ethnically diverse	Socially deprived, ethnically diverse	Representative, small town deprivation
1° & 2° care, mortality, HES	1° & 2° care mortality, HES	1° & 2° care, mortality	1° & 2° care, mortality, HES, NHS Digital	1° & 2° care mortality, HES	1° & 2° care, community, social	1° & 2° care, social care, mortality
1° care	1° care	1° & 2° care	1° care	1° care	1° & 2° care	1° & 2° care; community dispensed prescribing

Infographic illustrating the datasets for study in the full collaboration project ; icons to the left indicate, from top to bottom, geography, representativeness, electronic health and social care data, electronic prescription data, respectively; dataset icons are coloured green (in use) and amber (soon to be available).

# Research Support Facility ToC (v1)



NIHR RESEARCH CAREER PATHWAYS	PRE-DOCTORAL	DOCTORAL	POST-DOCTORAL (EARLY)	POST-DOCTORAL (SENIOR)	CHAIR
Research Training Schemes for all	Pre-doctoral Fellowship	Doctoral Fellowship	Advanced Fellowship Development & Skills Enhancement Award		Research Professorship
Research Training Schemes for clinical & practitioner academics  *registered health & social care professionals	HEE/NIHR Pre-doctoral Clinical and Practitioner Academic Fellowship  NIHR Pre-doctoral Local Authority Fellowship	HEE/NIHR Doctoral Clinical and Practitioner Academic Fellowship  NIHR Doctoral Local Authority Fellowship	HEE/NIHR Advanced Clinical and Practitioner Academic Fellowship		
Research Training Schemes for clinical academics doctors and dentists	In-Practice Fellowship Academic Clinical Fellowship		Clinical Lectureship		
Additional Opportunities	Biomedical Research Centres • Applied Research Collaborations Patient Safety Translational Research Centres • NIHR Schools • Health Protection Research Units				

# Success with NIHR BAU: Complex Multiple long-term conditions (MLTC) Phenotypes, Trends, and Endpoints (CoMPuTE), PI: Rafael Perera



## Theme 1: AI capability in the NHS

### Objectives:

- To build evidence based models of biological ageing and trajectories of health illness
- To identify clusters of C-MLTC using AI methods
- To externally validate trajectories and clusters
- To investigate acceptability of AI-enhanced healthcare and related pathways to care

### Outputs:

- Latent trajectories based on multiple measures for overall biological ageing and by organ system
- Dynamic C-MLTC clusters based on biomarkers, with and without incorporating latent trajectories
- Recommendations for best performing approach(es) to identify clusters of C-MLTC
- Understanding scepticism and strategies to overcome barriers to implementation
- Framework or specification of properties for implementation strategy



## Theme 2: Epidemiology, Inequalities and health economics

### Objectives:

- To identify risk factors and effective interventions for C-MLTC
- To assess relationships between risk factors and AI-derived clusters of C-MLTC
- To assess the relationship of AI-derived clusters of C-MLTC with health, health inequalities, and resource use

### Outputs:

- Table of risk factors and interventions with associated burden on C-MLTC
- Initial estimates of the casual relevance of these risk factors for C-MLTC management
- Genetic risk prediction based on these risk factors for C-MLTC
- Estimates of the relationship of C-MLTC clusters with life expectancy, DALYs, costs, and inequalities
- A league table of cost-effective interventions



## Theme 3: Ethics and Patient and Public

### Objectives:

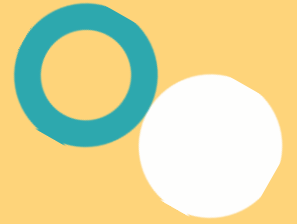
- To examine ethical and social issues which arise in the context of using AI based models for transforming health care decisions and care pathways
- To examine ethical and social justice issues associated with translating the findings for resource allocation, tackling socioeconomic health inequalities, and addressing under-representation and exclusion
- To ensure PPIE is a meaningful, productive element of the research and fully integrated

### Outputs:

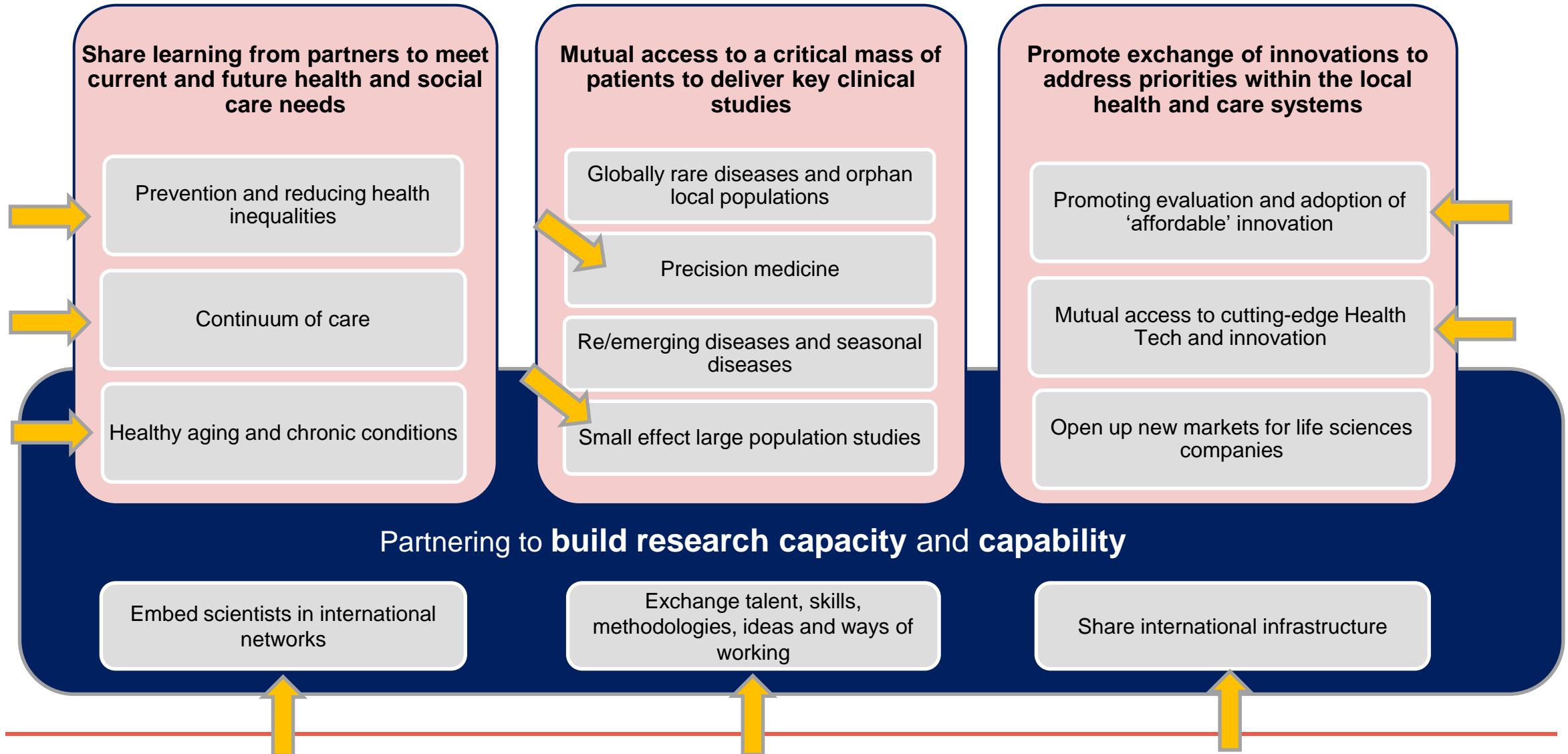
- Recommendations regarding ethics, justice, inequality and representation in AI modelling
- Recommendations and rationale for strategies for inclusion, diversity and representation in PPIE
- Co-produced strategies for inclusion and integration of diverse groups in research
- A PPI-led education and dissemination programme including a range of PPIE stakeholder generated public-facing educational tools

AI-enhanced tools to support health and social care

**AIM demonstrates that there is value in encouraging and actively pursuing collaborations. Could this apply to research funding agencies?**



# Possible areas for International Collaboration



# Opportunities for joint fellowships and placements

NIHR is looking to provide more opportunities to promote and support international collaboration for mid-career researchers:

- Focus on areas of strategic importance e.g. data science, AI methods
- Collaboration between 2 (or more) funders e.g. NIH and NIHR
- Could include:
  - Joint fellowships
  - Overseas placements
  - Exchanges/networking events/facilitation

## Development and Skills Enhancement Award

Post doctoral award aimed at supporting early to mid-career researchers in gaining specific skills and experience to underpin the next phase of their research career.

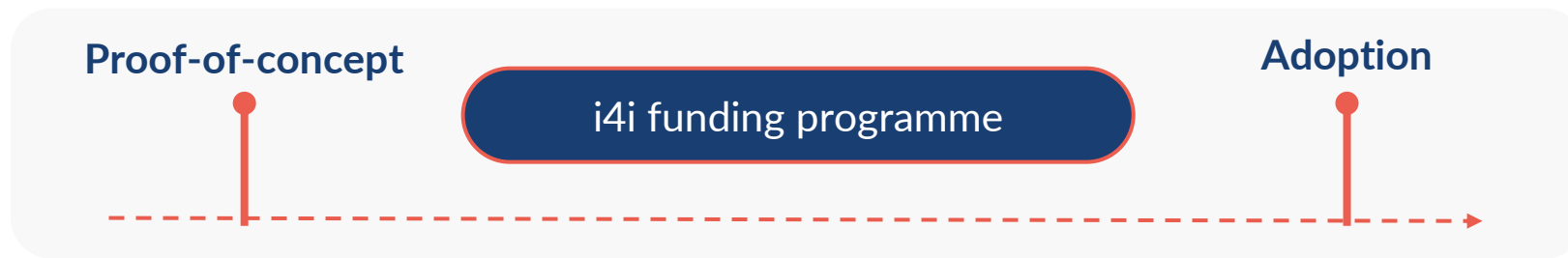
- 12 month award that can be held between 50 and 100% WTE
- funding for salary, training and development, and supervision
- US to UK or UK to US placement potential

**Next steps: Further exploratory discussions with interested parties**

# Ideas for collaboration with Bridge2AI suggested by the NIHR AIM award holders:

<b>1</b>	<b>Data standardisation for external validation of AI</b>	<ul style="list-style-type: none"><li>• Develop understanding of data landscape in US and UK</li><li>• Establish standardised variables across datasets for development of transferable tools and methods</li></ul>
<b>2</b>	<b>Sharing of knowledge &amp; learning in AI methods</b>	<ul style="list-style-type: none"><li>• Share AI developments and study outputs in conferences, joint seminars, workshops</li><li>• Discuss ongoing work and practices in AI standards and ethics</li></ul>
<b>3</b>	<b>Career development opportunities</b>	<ul style="list-style-type: none"><li>• Studentship and training opportunities across US and UK</li><li>• Building a generation of researchers who work across data sciences/AI and health</li></ul>





### Beyond AIM

**NIHR's Invention for Innovation (i4i) programme has delivered £37.5m of support for development and adoption of AI technologies identifying early sepsis, stroke, heart failure and cancer**

**Illustrative example**

MendelScan – An innovative AI case-finding platform to accelerate the diagnosis of rare diseases. Over 10 million scans were completed last year.

**Illustrative example**

Odin -Cloud AI for endoscopy, supporting doctors to detect and diagnose early stages of cancer - now being used in the UK, Germany and Spain.



# Beyond AIM: Partnering opportunities for specific challenge areas

We've established  
networks that carry out  
early phase  
translational research  
and tackle experimental  
medicine challenges

Expanding these  
networks can realise  
greater value





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**Collaborating with  
other public funders,  
charities and industry**

**to shape a cohesive and  
globally competitive  
research system**

# Additional Background Information





We fund or part-fund over 10,000 front-line research delivery staff throughout the NHS



We're funding more than 1,000 active health and social care research projects

**NIHR funds, enables and delivers world-leading health and social care research**

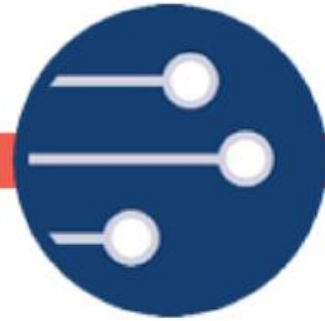


More than 2,000 researchers hold our career development awards



More than a million participants take part in research supported by the NIHR each year

# NIHR's mission is to improve the health and wealth of the nation through research.



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**Funding applied global health research and training** to meet the needs of the poorest people in low and middle income countries



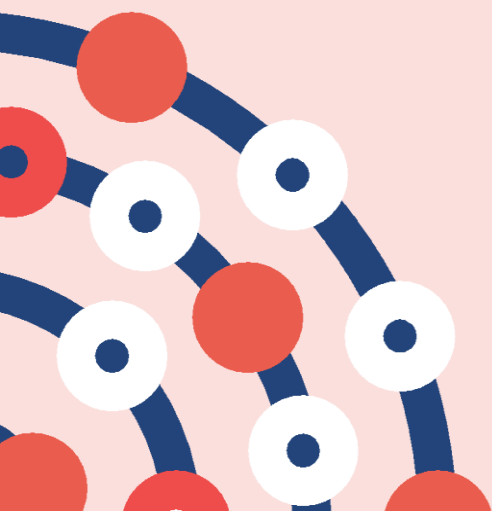
- Transforming the organisation and delivery of health and social care
- Helping people to recover from the medium and longer-term impacts of COVID-19
- Responding to demographic pressures, including the challenges faced by our ageing population
- Tackling environmental and lifestyle drivers of disease risk e.g. air pollution, obesity, smoking, inactivity
- Tackling health inequalities and their wider determinants
- Ensuring that the research we fund is truly inclusive
- Encouraging the safe, effective and equitable implementation of advances in medical science
- Addressing the causes and effects of mental ill health
- Improving maternal and child health as part of a life-course approach
- Responding to global health challenges and changing patterns of disease, including climate change, emerging infectious diseases and the continued threat of antimicrobial resistance



- Accelerating the pace of studies into novel dementia treatment
- Enabling early diagnosis and treatments, including immune therapies such as cancer vaccines
- Sustaining the UK's position in vaccine discovery, development and manufacturing
- Treatment and prevention of cardiovascular diseases and its major risk factors, including obesity
- Reducing mortality and morbidity from respiratory disease in the UK and globally
- Addressing the underlying biology of ageing
- Increasing the understanding of mental health conditions, including work to redefine diseases and develop tools to address them



# Funding high quality, timely research



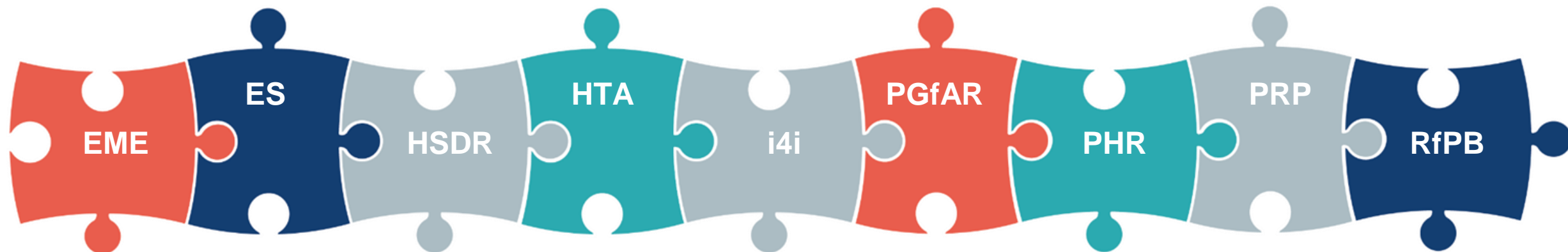




## Funding high quality, timely research

that benefits the NHS,  
public health and social care

# Our research programmes



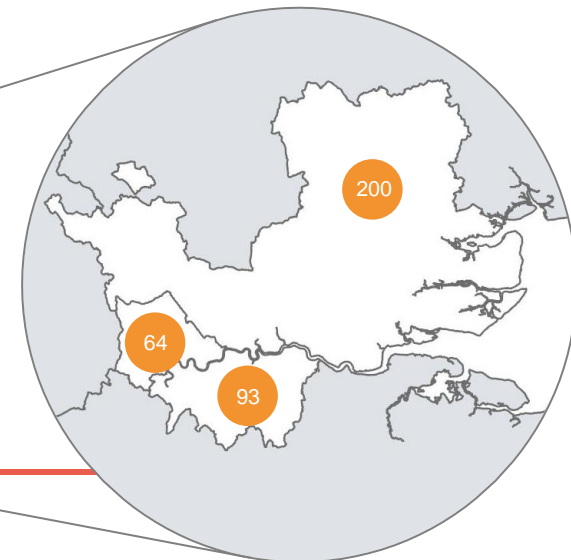
We have nine research programmes that fund multi-disciplinary health and social care research in both clinical and non-clinical settings to meet a range of evidence priorities, including:

- Clinical evaluation and translation
- Health services and organisation
- Technology development
- Public health
- Social care

# Funding research nationwide



● Active projects funded by NIHR research programmes, numbers by region



A microscopic view of blood, showing several red blood cells (erythrocytes) and two white blood cells (leukocytes). The red blood cells are biconcave and appear as bright red discs. The white blood cells are larger, with a more irregular shape and a darker nucleus. The background is a dark, reddish-brown color.

# Surviving sepsis

“Small studies had suggested Levosimendan may have a role in sepsis. However, intensive care unit clinicians in the NHS wanted more evidence. The LeoPARDS trial has provided clear answers to help medical teams make the best decisions to manage such critically ill patients.”

Professor Anthony Gordon, Imperial College London  
Chief Investigator of the LeoPARDS trial, funded by the NIHR Efficacy and Mechanism Evaluation programme

# Keeping young Londoners connected



“Free bus travel for young people has a mix of benefits overall for the public health. This was reassuring for many public health professionals, who had been concerned about the negative effects.”

Professor Judith Green, London School of Hygiene and Tropical Medicine  
Chief Investigator of the ‘On The Buses’ study, funded by the NIHR Public Health Research programme



# Helping people stay warm at home in later life

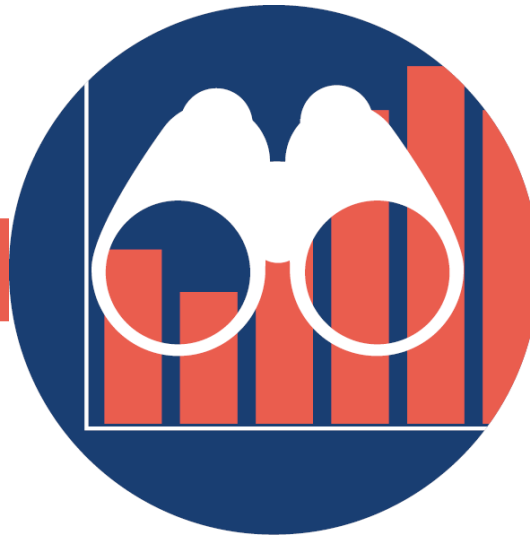
“KWILLT enabled the experiences of older people to be captured in such a way that it challenged assumptions that people had about older peoples’ behaviour regarding home heating.”

Professor Angela Tod, University of Sheffield  
Chief Investigator of the Keeping Warm in Later Life (KWILLT) project, funded by the NIHR Research for Patient Benefit Programme

# Our research schools and units



**14 Health Protection  
Research Units**  
in partnership with UK  
Health Security  
Agency




**15 Policy  
Research Units**



**5 Blood and  
Transplant  
Research Units**  
in partnership with  
NHS Blood and  
Transplant



**3 Research  
Schools**  
in primary care,  
public health,  
and social care



# Supporting people with learning disabilities

“Research in social care is vital to improving the lives of people with learning disabilities. The outcomes of this project were particularly encouraging in that they were immediately used by the social care provider to develop a new model of support.”

Professor Peter McGill, University of Kent  
Chief Investigator of preventing challenging behaviour of adults with complex needs in supported accommodation  
Funded by the NIHR School for Social Care Research



# Sharing research funding and findings



NIHR Funding  
and Awards



NIHR Journals  
Library



NIHR  
Evidence



NIHR Open  
Data



# Investing in world-class expertise, facilities and a skilled delivery workforce

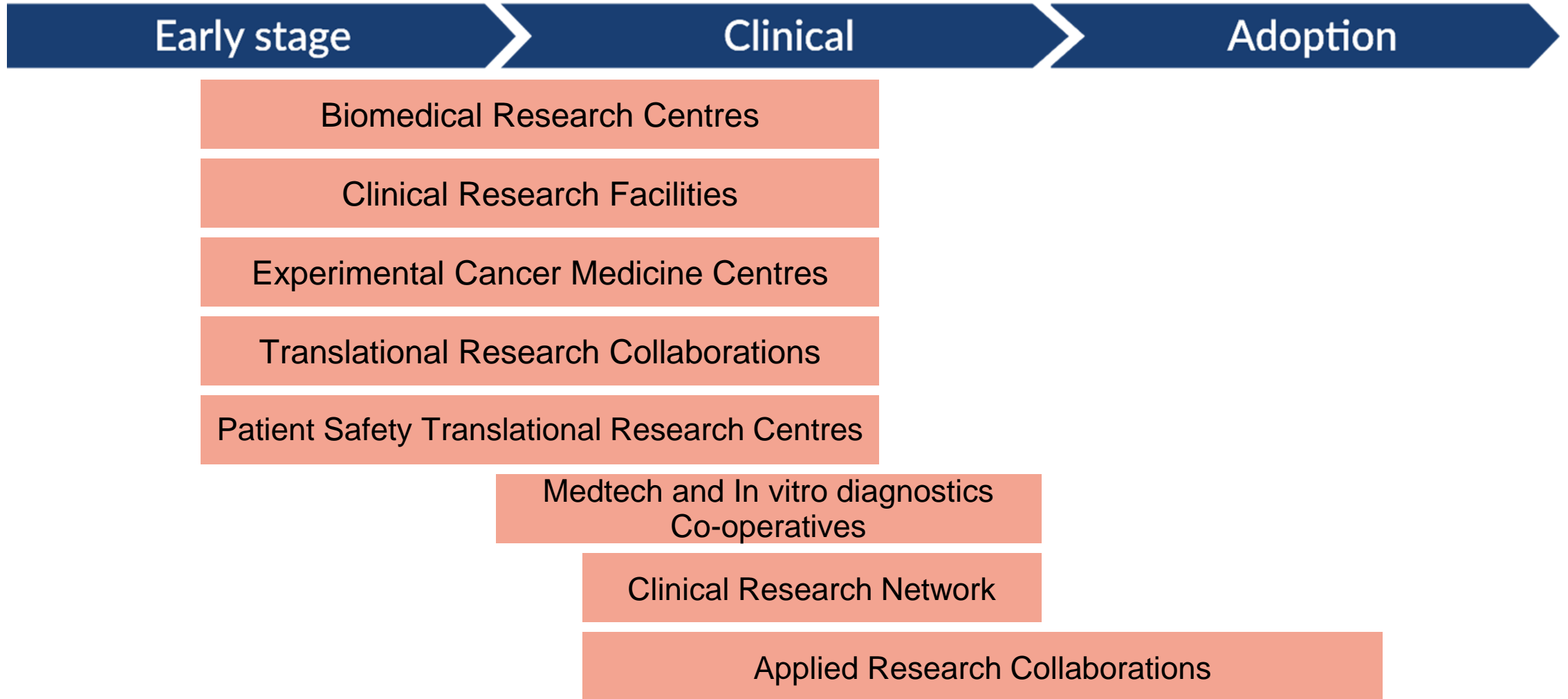




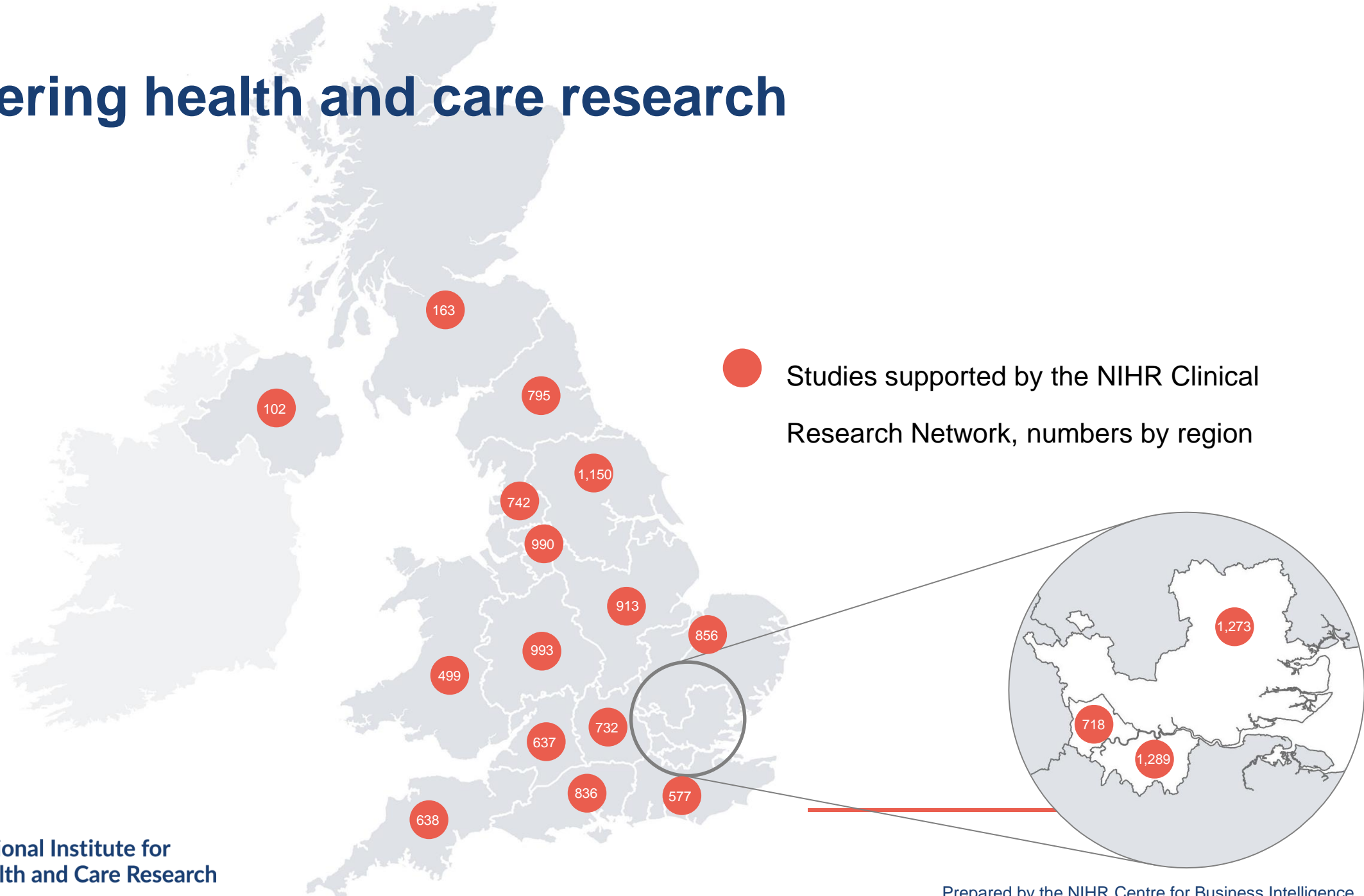
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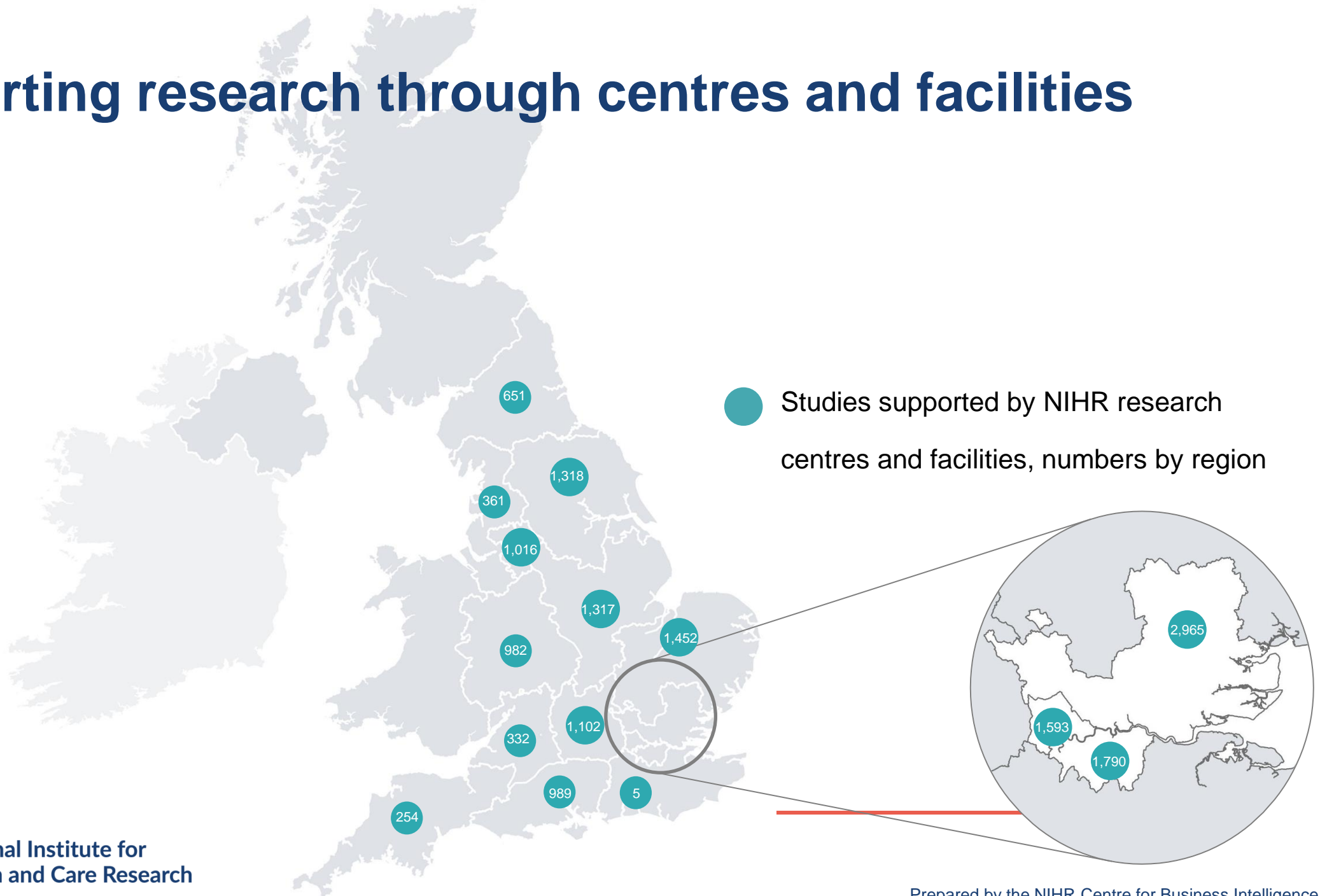
# Our research infrastructure



# Delivering health and care research



# Supporting research through centres and facilities



# Our supported researchers



“It is no exaggeration to say that I have seen patients’ lives saved by new treatments developed by British science and delivered in the NHS to a patient for the first time in the world. This couldn’t and wouldn’t have happened without our NIHR funding.”

Professor Bryan Williams  
Director

NIHR University College London Hospitals Biomedical Research Centre

# Our supported researchers



“Research is now part of my career, and combining it with my role as a clinical psychologist not only benefits my clinical practice, it also gives me a wider perspective.”

Dr Sam Malins  
Clinical Psychologist  
NIHR Applied Research Collaboration East Midlands




# Our skilled delivery workforce



“Programmes like 70@70 allow nurses and midwives to take their knowledge and apply it to research in ways that we wouldn’t otherwise be able to. Using our insight and skills we are able to spot gaps in service and care provision and create interventions that have a big impact.”

Dr Abigail Barkham  
NIHR 70@70 Senior Nurse Research Leader



# Leading the world in frailty management

“Since the electronic frailty index has been implemented there have been around 1.2 million people assessed for the presence of frailty, and a clinical confirmation made before any decisions on interventions.”

Professor Andrew Clegg  
Lead of the Older People with Frailty theme at the NIHR Applied Research Collaboration Yorkshire and Humber



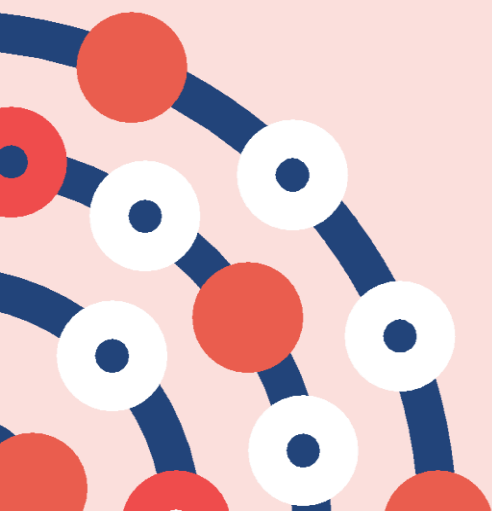
# Transforming out-of-hospital care for people who are homeless

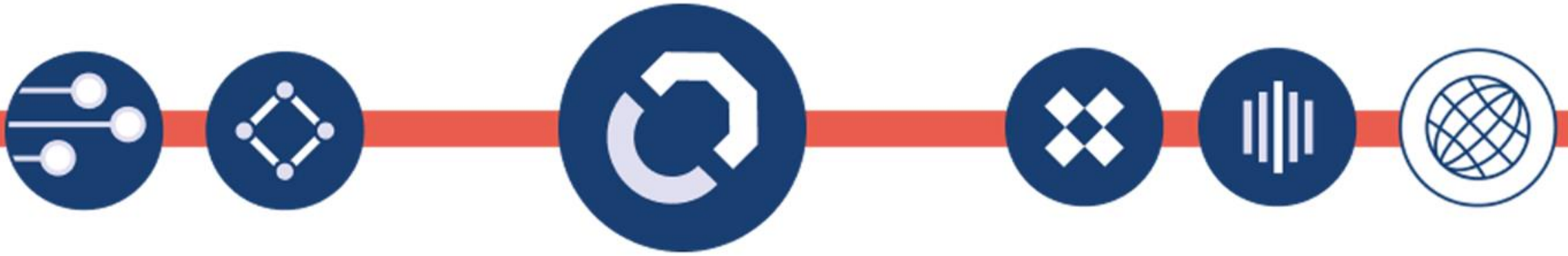
“Although I'd worked within a multi-disciplinary team for many years, I'd not worked with so many different agencies across the health, social and charity sector.”

Lizzie Bizwell, Northamptonshire Healthcare NHS Foundation Trust  
Clinical Research Nurse on the Effectiveness and Cost-effectiveness of 'Usual Care' versus 'Specialist Integrated Care' study  
Funded by the Health and Social Care Delivery Research Programme



# Partnering with patients, service users, carers and communities

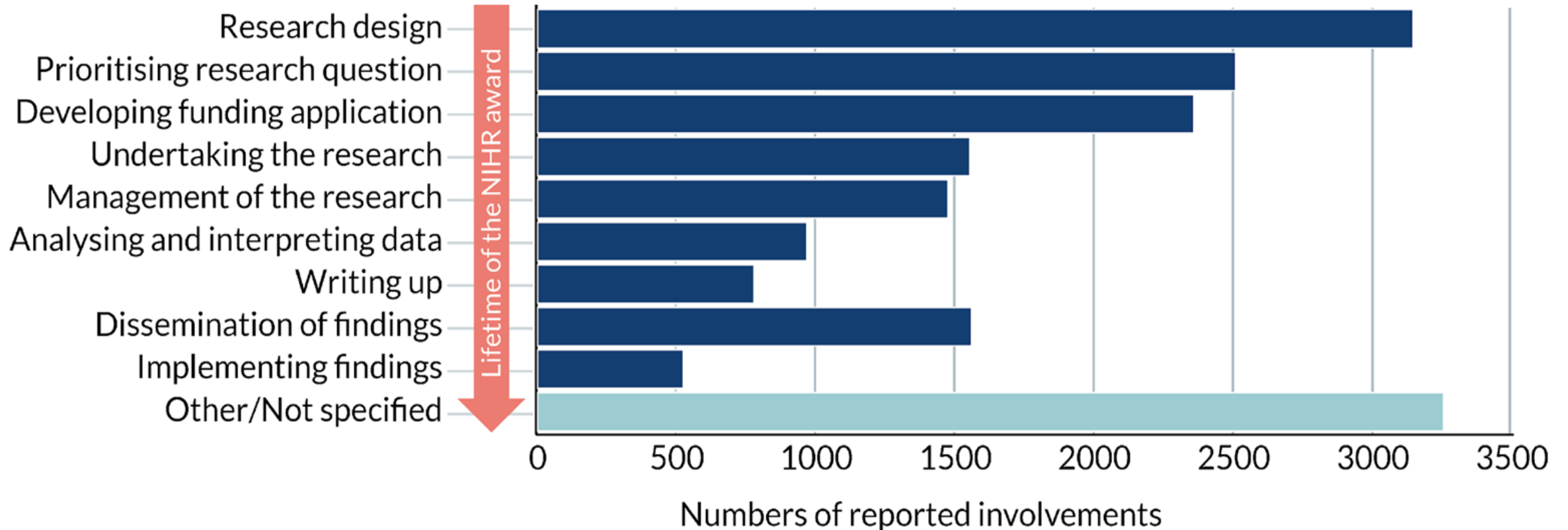




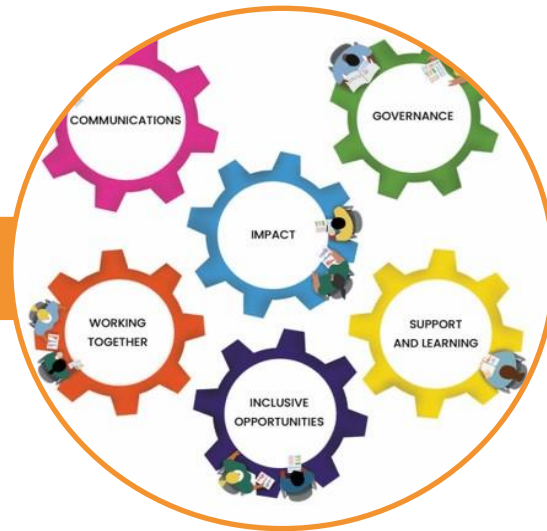
## **Partnering with patients, service users, carers and communities**

improving the relevance, quality  
and impact of our research

# Involving patients and the public in shaping research



# Championing patient and public involvement



Collaboration with others



Producing and sharing guidance



Influencing systems and processes

# Providing opportunities to get involved with research



“Patients and the public bring a unique perspective to research. I’ve been involved in research in lots of ways and at different levels but the aim is always the same: to make sure research is relevant, makes a difference and is accessible to a wide range of communities.”

Una Rennard





# Putting public engagement at the heart of research

“Pretty much every aspect of the website was improved through the involvement of families and the public. There were many times when they pointed out ways the things could be misinterpreted that I would never have seen in a million years.”

Professor Christina Pagel, UCL

Chief Investigator of the Partial Risk Adjustment in Surgery study, funded by the NIHR Health and Social Care Delivery Research programme



# Providing opportunities to take part in research



I'm looking for research about

Menu 

Keyword e.g. cancer, drug name



Location e.g. city, postcode



Search for study

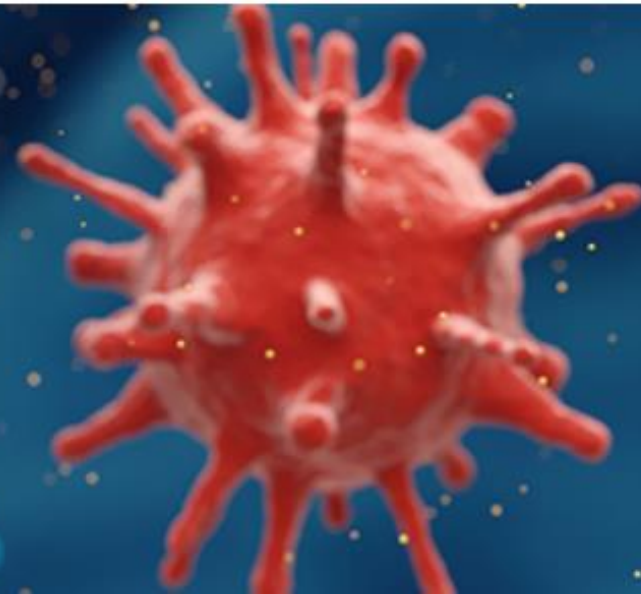
or

View conditions

We are here to help you find out about health and social care research taking place in England, Northern Ireland, Scotland and Wales.

## Finding new effective antiviral treatments for COVID-19

The PANORAMIC study aims to find new antiviral treatments to improve outcomes for people in the community with COVID-19.



# Opportunities to take part in research



“Once you know someone who’s been affected by COVID-19, it makes a difference. Others were wary about vaccinations and I realised that people like me need to be seen to volunteer. If someone from the same community takes part, it’s one level of separation removed.”

Yusuf from London

# Opportunities to take part in research



“The drug I took on the trial changed my life and completely altered my approach to food. I am so glad I was able to take part in this research and hope that it paves the way for the drug to be approved in future. I would encourage anyone who has the chance to take part in research to do so.”

Jan from Kent

# Opportunities to take part in research

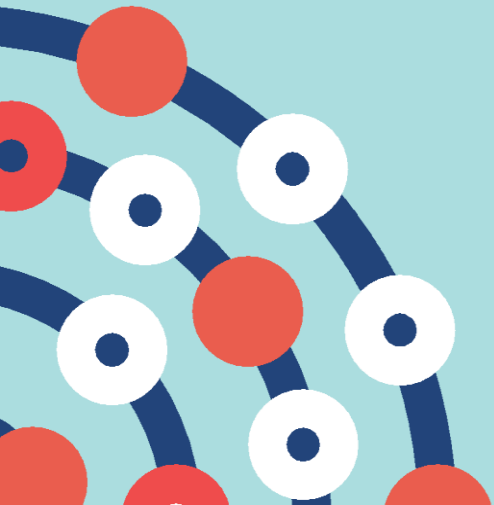


“The fact is, you can either be a part of the problem or part of the solution. The more research, the easier the prognosis and treatment. Everybody wins. There is no better way I can thank all of those who brought me back to life.”

Colin from Cambridge



# Attracting, training and supporting the best researchers





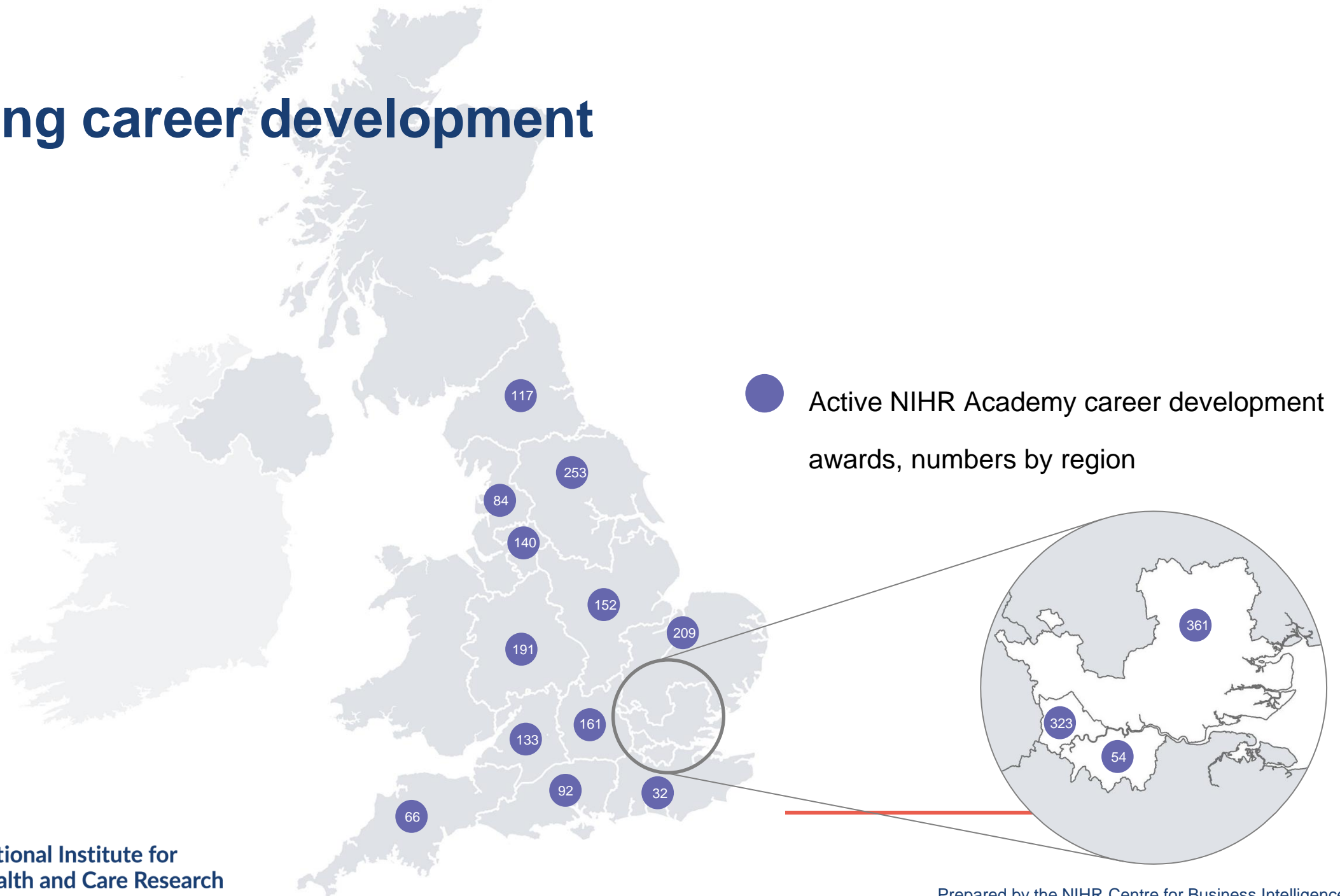
## Attracting, training and supporting the best researchers

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NIHR RESEARCH CAREER PATHWAYS	PRE-DOCTORAL	DOCTORAL	POST-DOCTORAL (EARLY)	POST-DOCTORAL (SENIOR)	CHAIR
Research Training Schemes for all	Pre-doctoral Fellowship	Doctoral Fellowship	Advanced Fellowship Development & Skills Enhancement Award		Research Professorship
Research Training Schemes for practitioner academics  health & social care professionals	HEE/NIHR Pre-doctoral Clinical and Practitioner Academic Fellowship  NIHR Pre-doctoral Local Authority Fellowship	HEE/NIHR Doctoral Clinical and Practitioner Academic Fellowship  NIHR Doctoral Local Authority Fellowship	HEE/NIHR Advanced Clinical and Practitioner Academic Fellowship		
Research Training Schemes for clinical academics doctors and dentists	In-Practice Fellowship Academic Clinical Fellowship		Clinical Lectureship		
Additional Opportunities	Biomedical Research Centres • Applied Research Collaborations Patient Safety Translational Research Centres • NIHR Schools • Health Protection Research Units				



# Funding career development



# Our award holders



"A clinical academic career offers the opportunity to seek out and explain what and how you can become an expert generalist. I have learned to critically appraise evidence, develop my own research ideas and apply the learning to my everyday clinical practice."

Mohana Ratnapalan  
NIHR Academic Clinical Fellow

# Our award holders



"What really keeps me interested in research, and clinical practice, is that my work is relevant to both. Some of the research I've conducted I use day-in, day-out in the emergency department. This combination, and protected time in each, prevents burn-out and keeps me constantly engaged."

Dr Damian Roland  
NIHR Doctoral Research Fellow

# Our award holders



“My NIHR Research Professor award has provided me with opportunities to develop my research ideas much faster, and it has helped me to have stronger collaborations with colleagues across the NHS and public health contexts.”

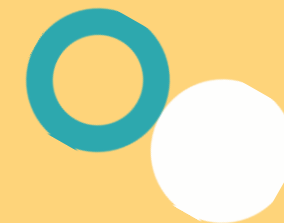
Professor Amanda Daley  
NIHR Research Professor



# How artificial intelligence is revolutionising ophthalmology

“What drives me is the fact that some people lose sight because they can’t get seen and treated by an eye doctor quickly enough.”

Dr Pearse Keane, Moorfields Eye Hospital  
NIHR Clinician Scientist



# Collaborating with other public funders, charities and industry





## **Collaborating with other public funders, charities and industry**

to shape a cohesive and  
globally competitive  
research system

# Partnering with the life sciences industry

We support life science companies to translate their new therapeutics, medical devices, diagnostics and digital technologies into the clinic and then onto market.





# Partnering with the life sciences industry

Each year our Clinical Research Network



**supports**  
more than **1,500**  
industry-funded  
research studies

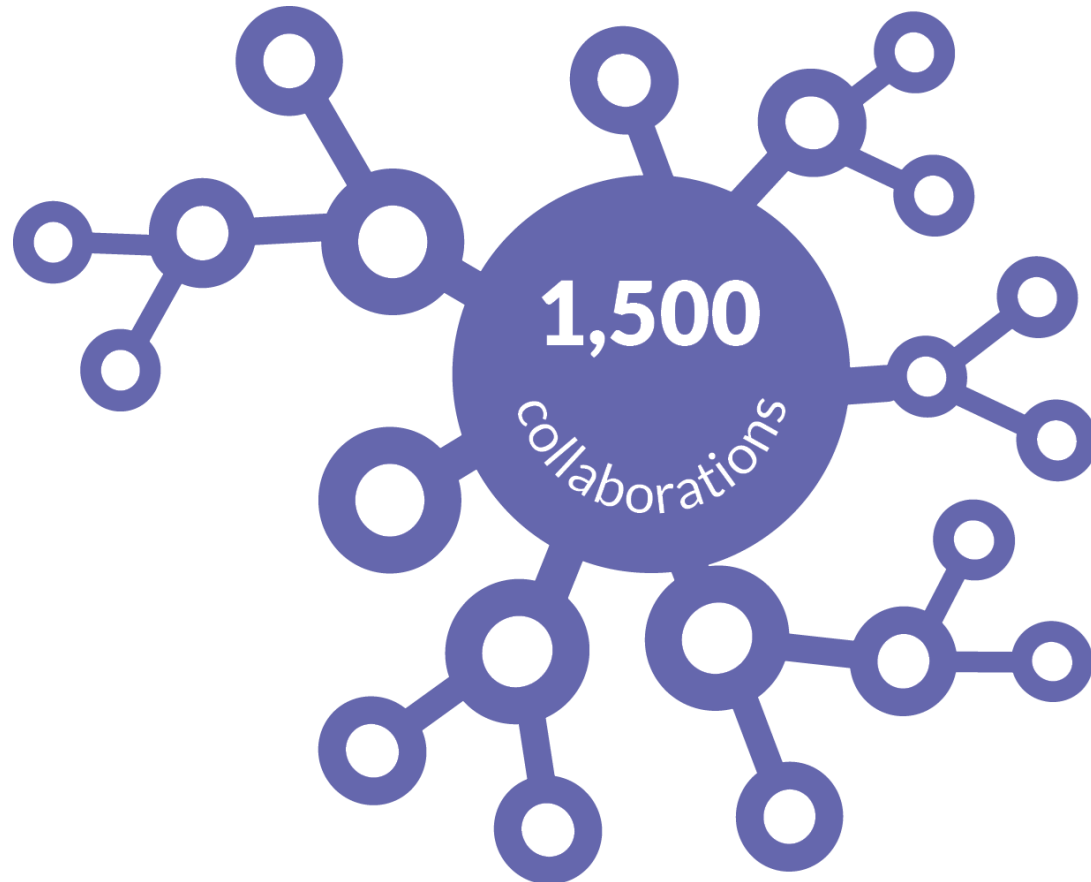


and **recruits**  
around **30,000**  
participants to  
industry studies

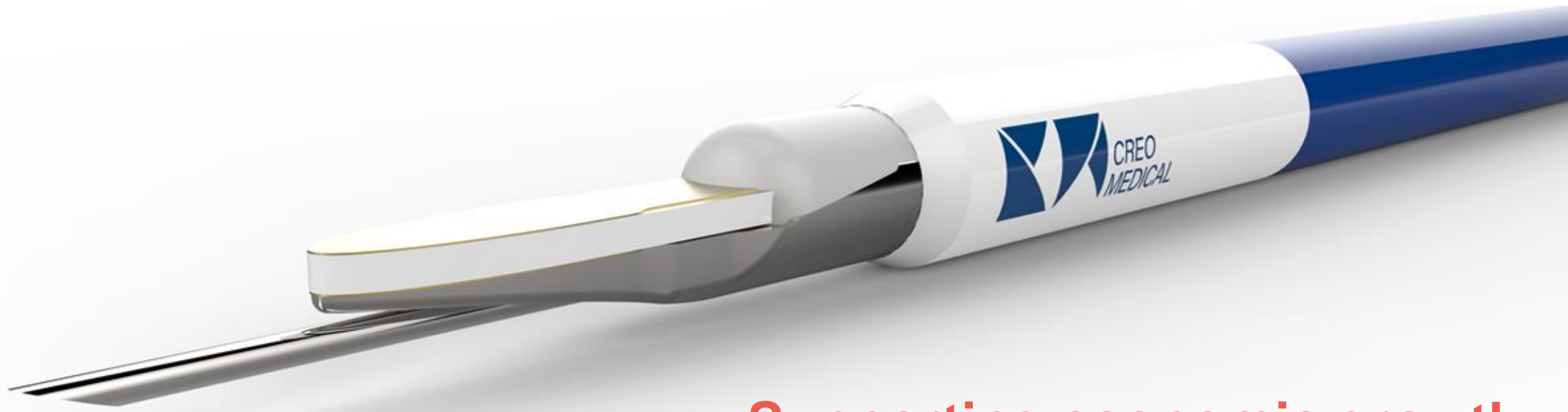


including some  
**first patients**  
**in the world**

# Partnering with the life sciences industry



Our research infrastructure supports around 1,500 collaborations with small and medium sized companies each year



## Supporting economic growth

“Our i4i funding award was rocket fuel that allowed us to have a much bigger vision that we wouldn’t have otherwise had the audacity to pursue.”

Craig Gulliford, CEO of Creo Medical  
Small-to-medium enterprise that received funding from the NIHR Invention for Innovation programme

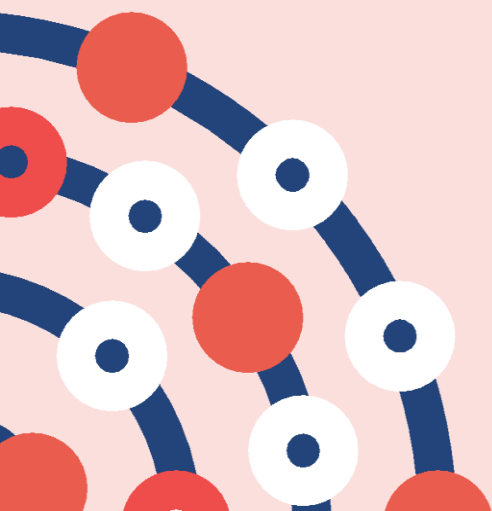
# Partnering with charities and other funders



We support nearly 4,500 charity-funded studies every year



# Funding applied global health research and training





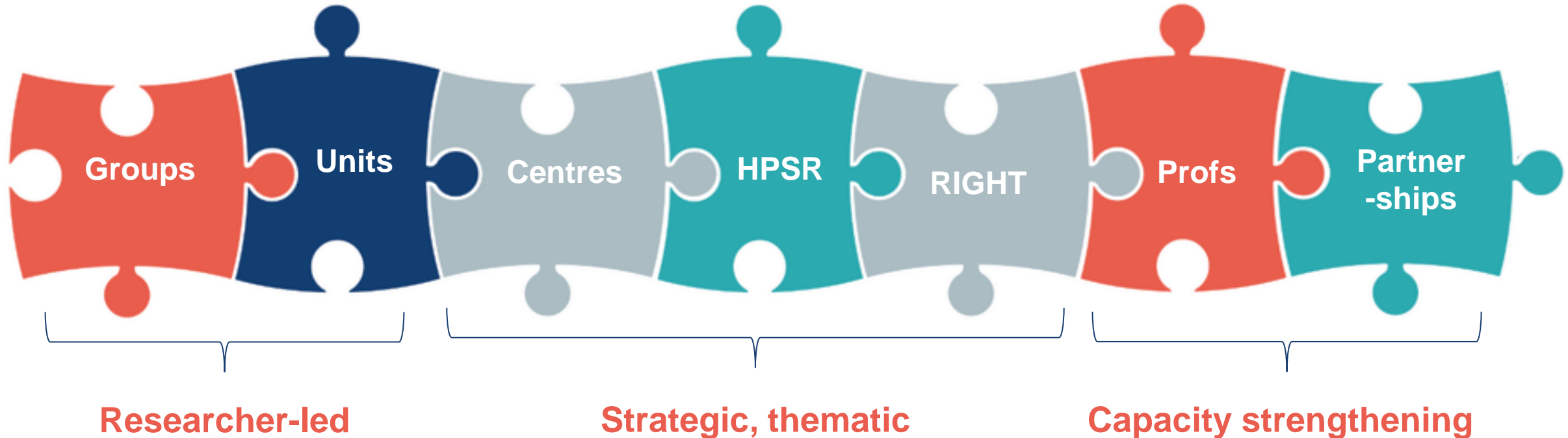
## **Funding applied global health research and training**

to meet the needs of the  
poorest people in low and  
middle income countries

# How we fund: Official Development Assistance

- Our Global Health Research portfolio is delivered through:
  - a) open calls commissioned directly through the NIHR and
  - b) strategic partnerships with global funders and international organisations
- Research is funded through the Department for Health and Social Care Official Development Assistance (ODA) allocation as part of the UK Aid budget
- Activities for the direct and primary benefit of people in ODA-eligible countries, defined by the Organisation for Economic Co-operation and Development's Development Assistance Committee list
- Over £440 million invested in research in Phase 1 (2016-2021)

# Our research programmes



We fund global health research on under-funded or under-researched topics through a variety of mechanisms:

- Funding through open calls with no set priority areas
- Strategic and thematic funding for research in key areas
- Partnering with other global funders and building research capacity



# Working together for better lung health



“Using our NIHR funding, we are developing, implementing and evaluating interventions to address urgent gaps in respiratory treatment and care. Together we are taking crucial steps to improving respiratory health not only in Asia, but with implications for low and middle income countries around the world.”

Professor Ee Ming Khoo  
Programme lead, NIHR Global Health Research Unit on Respiratory Health  
University of Malaya, Malaysia

# Stay up to date

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