

Tackling multimorbidity at scale: Understanding disease clusters, determinants & biological pathways

2019 Strategic Priorities Fund call

This [Strategic Priorities Fund \(SPF\) initiative](#), jointly funded by the UK Research and Innovation (UKRI) and the Department of Health and Social Care (DHSC) through the National Institute for Health Research (NIHR), aims to build a network of Multimorbidity Research Collaboratives across the UK by bringing together multi-disciplinary collaborations of experts with a range of scientific, methodological, and specialist knowledge and skills. The Panel assessed Wave 1 applications on 24-25 November 2020 and made two awards.

Funded Wave 1 Proposals

Sayer, Avan Aihie (MR/V033654/1, 48 months)

ADMISSION UK Multimorbidity Research Collaborative on Multiple Long-Term Conditions in Hospital: from burden and inequalities to underlying mechanisms

Principal Investigator Professor Avan Aihie Sayer (Newcastle University)

Co-Investigator Dr Christopher Plummer (Newcastle University)

Co-Investigator Dr Elizabeth Sapey (University of Birmingham)

Co-Investigator Dr Paolo Missier (Newcastle University)

Co-Investigator Dr Richard Dodds (Newcastle University)

Co-Investigator Professor Brian Walker (Newcastle University)

Co-Investigator Professor Ewan Pearson (University of Dundee)

Co-Investigator Professor Fiona Matthews (Newcastle University)

Co-Investigator Professor Heather Cordell (Newcastle University)

Co-Investigator Professor Mervyn Singer (University College London)

Co-Investigator Professor Miles Witham (Newcastle University)

Co-Investigator Professor Rachel Cooper (Manchester Metropolitan University)

Co-Investigator Professor Sian Robinson (Newcastle University)

Co-Investigator Professor Thomas Scharf (Newcastle University)

Co-Investigator Professor Tom Marshall (University of Birmingham)

Summary:

Why is multimorbidity important?

Multimorbidity, that is living with multiple long-term health conditions, is very common in people admitted to hospital. These patients tend to stay in hospital for longer, are more likely to die, and may take much longer to recover when they are discharged. However, the way we deliver care for people with multiple long-term conditions is not ideal; in a system that was designed for single conditions, care can be unsatisfactory and inefficient for the patient - and is expensive for the healthcare provider, such as the NHS. The need for improvement is recognised, but there is currently little research on multimorbidity in hospital patients to help us to know how services need to be changed. Our research is designed to address this gap in understanding and is focused on people with multiple long-term conditions who are admitted to hospital.

What is ADMISSION?

We have formed a new Research Collaborative (called ADMISSION) that includes data scientists, statisticians, laboratory researchers, social scientists and clinical teams from UK universities (Newcastle, Birmingham, Manchester Met, UCL, Dundee) to carry out research that will transform our understanding of multiple long-term conditions in hospital patients. By

bringing together this expertise we will be able to use the power of 'big data' (from routine NHS and other datasets) to better understand the patterns and causes of multiple long-term conditions, and the effects of living with them. The Collaborative will use information collected by hospitals in the North East of England, Birmingham and Dundee, and from intensive care wards across the UK, to identify patients with long-term conditions. We will pay particular attention to patients who have a combination of physical health conditions (for example heart disease, lung disease, arthritis, falls and poor mobility) and mental health conditions (for example dementia and depression).

What will ADMISSION do?

Our planned research is divided into five linked work packages, with each helping the work of the others. Our first work package will build a library of information gathered from Newcastle Hospitals and will compare this with similar libraries of information from Birmingham hospitals and intensive care units across the UK. Our second work package will analyse this information to find patterns of health conditions as these tend to cluster together, so that we can look at the effects of background factors such as age, sex, and ethnicity on them (in our third work package). Our fourth work package will use information from ambulance services, accident and emergency, acute hospital admissions and general practice records to understand how we deliver health care to people with clusters of multiple long-term conditions, how they journey through the healthcare system and how we might be able to improve their experience of health and social care. Our final work package looks at the mechanisms that could explain what causes the clusters of long-term conditions; we will analyse genetic and other information from half a million people who signed up to the UK Biobank study to find out how genes vary between different clusters of conditions, and then test these ideas using blood samples collected from 3000 hospital patients in the SHARE Scotland registry.

What will the end result of ADMISSION be?

This work will lead to a step change in our understanding of how long-term conditions cluster together in hospital patients, why they cluster, and how these different clusters affect health and the delivery of health care. With this understanding we will be able to design new approaches to treat and prevent multiple long-term conditions, and to improve the health, function and quality of life of people who have them. It will also inform the redesign of health and social care systems so that they are better able to care for patients with multiple long-term conditions in the future.

Hingorani, Aroon (MR/V033867/1, 36 months)

Multimorbidity Mechanism and Therapeutics Research Collaborative

Principal Investigator Professor Aroon Hingorani (University College London)

Co-Investigator Dr Adam Butterworth (University of Cambridge)

Co-Investigator Dr Reecha Sofat (University College London)

Co-Investigator Dr Spiros Denaxas (University College London)

Co-Investigator Mr Ayath Ullah (Private Address)

Co-Investigator Mrs Amanda Roberts (Private Address)

Co-Investigator Professor Daniel Alexander (University College London)

Co-Investigator Professor Debbie Lawlor (University of Bristol)

Co-Investigator Professor Harry Hemingway (University College London)

Co-Investigator Professor Nishi Chaturvedi (University College London)

Co-Investigator Professor Simon Ball (University Hospitals Birmingham)

Co-Investigator Professor Sir Munir Pirmohamed (University of Liverpool)

Summary:

As people live to a greater age there is an increased risk of suffering more than one health condition at a time. Known as multimorbidity this has a serious effect on the daily lives of patients, their families and their carers. The project will examine the sequence and patterns of multimorbidity and the evidence obtained will aid both the prediction and treatment of patients with multiple health conditions. We will also seek to address the problem of coordinating treatments so that treatment for one condition does not cause difficulties in the treatment of another condition suffered by the same patient. The frequency of this "competition" between health conditions will be established and solutions identified. In doing this we hope to identify medicines that are able to treat more than one condition and investigate the potential of new uses for existing safe medicines.

Our research will utilise anonymous patient data recorded by the NHS as well as the findings from existing genetic studies and clinical trials. We will look across the different types of evidence to check consistency to ensure our recommendations are sound. Where uncertainties remain we will recommend new clinical trials or genetic studies. In this way we hope to improve the outlook for patients, regardless of their particular combination of health conditions, by maximising the benefits from effective treatments.

Two patient participants are co-applicants on this project. A Patient and Public Advisory Group will be established which will also assist in ensuring that the findings from the project are widely disseminated. During the course of our work we will liaise with organisations such as the Coalition for Collaborative Care with a view to the establishment of a national Multimorbidity Special Interest Group.