

PROJECT PROPOSAL

2023 Academic Entry Year – Cohort 2

Supervisory Team

Primary Supervisor

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Project Details

Title: Understanding the presentation of frailty in those with multiple long-term conditions and the effect of rehabilitation

Summary: Those with multiple long-term conditions (MLTCs) often suffer from a debilitating degree of frailty which includes severe muscle weakness (termed sarcopenia) which leads to reduced quality of life and poorer outcomes. With the nature of this population being highly complex, a holistic research strategy is required to conduct bench to bedside research in order to understand this phenomenon and develop therapeutic strategies to counter it. As such, this project will use a wide array of research techniques to firstly identify the prevalence of frailty and sarcopenia in this population. Which will then be followed up with a patient centred cohort study and work as part of the PERFORM trail, to allow for the detailed investigation of how sarcopenia (and its contribution to frailty) presents in this population, and how personalised rehabilitation programmes may alleviate such symptoms. As part of this work, the student will also be able to follow up lines of enquiry through laboratory-based analysis in order to identify molecular contributors to the sarcopenia displayed by this population. This project will provide a genuine opportunity to capture the knowledge required to begin to develop therapeutic interventions for genuine patient benefit.

Theme(s) the project most closely aligns to: Diabetes & Lifestyle; Cardiovascular; Obesity & Renal.

How the PhD project and training would be appropriate for NMAHPs or GPs: This project crosses the areas of frailty, sarcopenia, multimorbidity, and rehabilitation. It would therefore have great appeal to a wide range of specialities including physiotherapists, nurses, or medics. The successful applicant would learn a wide array of research skills including systematic reviewing, secondary data analysis, undertaking of a cohort study, physiological measures of muscle mass and strength and laboratory research skills which would facilitate a career in clinical academic research. The project team, and its extended collaborative network (Prof. Smith & Singh, Dr O'Neil), have vast experience in the supervision of clinical research fellows and positioned within the Leicester BRC.

How the project addresses health inequalities: The proposed project will seek to address health inequalities in a number of ways. As part of the systematic review in the first phase of this project into the prevalence of sarcopenia in those with long term conditions, if data allows ethnicity will be considered as a potential independent contributing factor to its presence. If this is not possible, literature gaps around the prevalence of sarcopenia in different ethnic groups will be addressed through the use of big data in collaboration with Dr. Wilkinson in order to provide the much-needed evidence around this health inequality, which will inform the recruitment strategy for the subsequent cohort study and help inform finding from the PERFORM study, to which this student will be aligned. This project will also seek to understand the presentation of sarcopenia in those with long term conditions across different socio-and ethnic groups, and will be supplemented with laboratory-based analysis to elucidate the mechanism involved. This work will provide an insight into potential therapeutic strategies we could use to prevent the onset of sarcopenia in those with long term conditions, which will help to address the socioeconomic and demographic inequalities suffered by those whom are frail.

Aim: To identify the presence and presentation of sarcopenia in those who are frail with long term conditions, and quantify the benefits of rehabilitation programmes in this patient group.

Background: Frailty is a multi-factorial clinical problem which encompasses a wide variety of characteristics including a degree of sarcopenia. Sarcopenia is defined as the loss of muscle function and/or muscle mass in response to healthy ageing or a disease stimulus. In both cases, a loss of muscle function and mass is associated with increased rates of hospitalisation and poorer clinical outcomes making this a clinically important problem. The sarcopenic component of frailty has shown to be modifiable with the right intervention, which can include changes in diet or lifestyle choices around exercise and physical activity. Understanding the underpinning mechanisms of the processes involved in muscle dysfunction has advanced significantly in the last decade, though still optimal interventions for those suffering from long term conditions (LTC's) allude researchers. The term LTC is used to encompass a wider population who suffer from one or multiple disease state/s which last for a prolonged period, including conditions (or combination) such as Chronic Kidney Disease (CKD), Chronic Obstructive Pulmonary Disease (COPD), Type-2 Diabetes Mellitus (T2D), Cardiovascular Disease (CVD) and the newly termed Long-COVID amongst others. A large proportion of those LTC's suffer from sarcopenia, which can differ in its severity, and is also further compounded by age related sarcopenia noted in those who are older. Therefore, though scientifically challenging research should seek to identify cross cutting disease agnostic mechanisms to identify therapeutic strategies.