Assessment of Rehabilitation Potential in Frail Older People in the Acute Healthcare Setting: A Mixed Methods Study

Alison Cowley
BSc (Hons), M.A., MCSP
Student ID Number 4295293

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School of Medicine
University of Nottingham

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Abstract

Background

Hospital admissions in frail older people are associated with a greater risk of disability, cognitive decline and adverse outcomes. Rehabilitation interventions are frequently cited as key in supporting frail older people's recovery following periods of decompensation and ill health. Healthcare practitioners are required to make decisions, in the face of growing complexity of service provision, patient needs and expectations, about a patient's potential to respond to rehabilitation interventions. The clinical currency in which these decisions are transacted is through the use of the term rehabilitation potential. Decisions about rehabilitation potential can determine what rehabilitation services a patient can access. There is no universally agreed, systematically assessed or explicitly operationalised model or clinical guideline that helps therapists to make consistent, transparent, patient-centred and evidence-based decisions about rehabilitation potential. This PhD study addresses this gap through the development of the Rehabilitation Potential Assessment Tool (RePAT) to be used with frail older people.

Methods

An exploratory sequential mixed-methods approach was used to develop and test the RePAT intervention following the Medical Research Councils framework for Developing and Evaluating Complex Interventions. A mapping review identified relevant evidence to inform the development of the RePAT intervention. Focus groups explored the opinions, experiences and understanding of rehabilitation potential from multiple perspectives. Results from these components were synthesised and subjected to a two-step Delphi consensus which informed the RePAT intervention and training programme. A non-randomised feasibility study with nested semi-structured interviews was completed, where the RePAT intervention was delivered in an acute hospital setting, to explore whether the intervention was deliverable and acceptable to staff and patient participants. Intervention fidelity was tested. Patient and public involvement was integrated into every step of the research process, including qualitative data analysis and intervention design.

Results

Evidence from 49 articles included in the mapping review and five focus groups with 28 participants identified that rehabilitation potential was complex, poorly understood and judged by different people at different times. In the absence of predictive variables for rehabilitation, practitioners made complex decisions based on rehabilitation response, performance and outcomes. These were then considered against ethical considerations, patient choice and resource availability. The RePAT intervention was modelled and a two-step Delphi consensus with 46 participants was completed. A 15 item rehabilitation potential assessment tool and training package were developed. Six staff participants were recruited and trained to use the RePAT on a total of 26 patients who were identified as frail using validated frailty measures. RePAT was found to be acceptable and tolerated in the hospital setting and provided a structured, transparent, evidence-based approach to support decision-making into rehabilitation potential. Its content allowed clinicians to embrace the complex and dynamic forces at play in frailty rehabilitation and recovery from acute ill health to aid decision-making in an effort to select the most appropriate treatment. A structured approach allowed practitioners to make explicit their reasons behind rehabilitation decision-making and rehabilitation potential and encouraged them to become cognoscente of ethical dilemmas and biases.

Conclusion

The RePAT was developed and tested in a clinical environment. There was evidence that it provided structure to clinical reasoning which had not been evident and encouraged practitioners to become cognoscente of ethical dilemmas and biases. This study lays the groundwork for further research into rehabilitation decision-making amongst clinicians working with older people living with frailty. The research process detailed within this thesis was feasible and the RePAT intervention is now ready for further clinical and cost-effectiveness evaluation.

Publications and dissemination

Associated Publications

- Cowley A, Kerr M, Darby J, Logan P. Reflections on qualitative data analysis training for PPI partners and its implementation into practice. Research Involvement and Engagement. 2019;5(1):1-7.
- Cowley A, Goldberg SE, Gordon AL, Logan P. A qualitative study exploring rehabilitation potential in older people living with frailty. Clinical Rehabilitation. 2019;33(9):1540-1556.
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Presentations

- Oral presentation (invited speaker) at the British Geriatrics Society Autumn Meeting, The Curve, Leicester. November 2019. Rehabilitation potential and frailty revisited.
- Symposium presentation at Physiotherapy UK, ICC, Birmingham. November 2019. Rehabilitation for older people living with frailty across care settings.
- Oral presentation at Engage, Enthuse, Empower Nottingham University Hospitals NHS Trust annual research conference for Nursing, Midwives and Allied Health Professionals, Park Plaza, Nottingham. June 2019. A qualitative study exploring rehabilitation potential in older people living with frailty.
- Oral presentation and poster at the Sue Watson Post-Graduate Presentation event, School of Medicine, University of Nottingham. March 2019. A qualitative study exploring rehabilitation potential in older people living with frailty.
- Oral presentation at the Health Care of the Older Person's consultants and division seminar series, Nottingham University Hospitals NHS Trust. March 2019. Rehabilitation potential in older people with frailty.
- Poster presentation at the Society for Rehabilitation Research Winter meeting, Trent Vineyard, Nottingham. February 2019. Exploring the thorny issue of 'rehabilitation potential' in older people: a mapping review of existing evidence.

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- Oral presentation at PenCLARHC University of Exeter Medical School. October 2018. Rehabilitation potential or no rehabilitation potential: that is the question.
- Oral presentation at the protocol planning meeting, Division of Rehabilitation, Ageing and Wellbeing, University of Nottingham. October 2018. Exploring "rehabilitation potential" in older people living with complex health and social care needs.
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Table of abbreviations

ABI	Acquired Brain Injury
ADL	Activities of Daily Living
AFC	Agenda for Change
AGILE	Interest group for the Chartered Society of Physiotherapists working with older people
AHP	Allied Health Professional
CAP	Clinical Assessment Protocol
CCI	Charlson Comorbidity Index
CGA	Comprehensive Geriatric Assessment
CRF	Case Report Form
EPPI	Institute of Education's Evidence for Policy and Practice Information and Co-ordinating Centre
FCE	Finished Consultant Episode
FIM	Functional Independence Measure
GDS	Geriatric Depression Scale
GEMS	Gait, eyesight, mental state, sedation
HCOP	Healthcare of the Older Person
HRQoL	Health related quality of life
IADL	Instrumental Activities of Daily Living
ICD	International Classification of Diseases

ICF	International Classification of Functioning, Disability and Health
MDS	Minimum Data Set
MDT	Multi-disciplinary team
MeSH	Medical Subject Headings
MoCA	Montreal Cognitive Assessment
MMSE	Mini-Mental State Examination
MRC	Medical Research Council
NIHR	National Institute for Health Research
NHS	National Health Service
PIS	Participant Information Sheet
PPI	Patient and Public Involvement
PRPS	Pittsburgh Rehabilitation Participation Scale
PSC	Pre-admission Screening Checklist
RCT	Randomised controlled trial
RePAT	Rehabilitation Potential Assessment Tool
TIDieR	Template for Intervention Description and Replication
UK	United Kingdom
WHO	World Health Organization

Preface

I have been a qualified physiotherapist for 22 years and worked in the field of geriatrics and frailty rehabilitation within the hospital and community setting for 14 years. In my clinical roles, I directly experienced the challenges clinicians face in deciding who has rehabilitation potential and who is likely to respond to rehabilitation programmes. My desire to undertake this PhD was directly driven by my clinical experience where I met many frail older people who had been deemed to have 'no rehabilitation potential' while recovering from episodes of ill health and denied access to rehabilitation. I was acutely aware of the lack of evidence which informed clinicians decision making in frailty rehabilitation and was driven by the desire to ensure that my patients, their families and carers received high-quality, evidence-based care. I observed how more junior colleagues adopted very simplistic and binary approaches to decision-making, especially in the hospital setting where they were under significant pressure to make decisions quickly and expedite flow within the hospital. With largely stagnant healthcare expenditure in community and hospital-based rehabilitation, clinicians were being asked to decide on how and whom to allocate limited resources to. They were often inexperienced in delivering rehabilitation programmes and were not afforded the opportunity to observe the outcomes of their decisions.

I also have personal experience of decision making in frailty, albeit in relation to surgical management in my Grannie. At the age of 88, she had several complex comorbidities, was frail and underwent highly invasive cancer surgery which expedited her decline. Her belief that health professionals knew best and that she should have all curative treatments, even when these were painful and distressing has also shaped how I view rehabilitation and later life care. There comes the point when we seek quality and not quantity of life. If our family had been more involved in discussions and her surgical care, the outcome would not have changed, but perhaps her journey may have been less traumatic. It is these experiences that I bring to the study.

This PhD sought to embed Patient and Public Involvement (PPI) throughout the study components to ensure that the RePAT intervention embraced a person-centred approach. The position of the PPI member, Margaret Kerr (MK), is therefore outlined and presented in her own words in relation to the research presented in this thesis.

Position of the PPI member

Alison approached the Dementia and Palliative Care PPI group with her proposed research project into the assessment of rehabilitation potential of older people in an acute setting. It was a subject which had personal connotations for me. My father, who had a dementia diagnosis along with other medical issues, had been admitted to a ward following a fall. He was a very active person walking most days but was discharged from hospital in a wheelchair. My sister or I visited every day and each day his "rehabilitation potential" appeared to be altered. One day he was to be transferred for intensive physiotherapy, but there were no available beds, so he remained on the ward, but the physiotherapists on the ward stopped treating him, he was now not on their radar. As daughters, we were considered incapable of helping him out of bed and taking him for a walk. There appeared there was nothing we could do to influence his treatment. I was delighted therefore, when Alison accepted me as a patient representative on her PhD research project.

My background was as a community pharmacist, but I had no experience of coding or focus groups. Alison organised training and after reading and analysing the transcripts of the focus groups, I attended I realised the value of this approach.

We had many discussions and I was always given the opportunity to put the patients' point of view. The results of the research will I hope produce a training package that will ensure everyone doing a patient assessment of rehabilitation potential will consider the whole picture and include family and carers in their discussions. This will hopefully lead to a consistency of approach and the experience my family suffered will be a thing of the past. Being part of this research gave me the opportunity to both learn something new and help to create something of value, which will help not only patients and carers but also give confidence to professionals working in a stressful environment that they have made the right decision for all of their patients. These are the experiences that I bring to this study.

Chapter 1 – Introduction

Summary

This chapter provides the background to this PhD thesis. It establishes the areas of uncertainty in relation to rehabilitation potential upon which the research question, aims and objectives are based.

1.1 Setting the scene

The global population is growing year on year. In 2018 there were 66.4 million residents in the United Kingdom and this is expected to reach 72.4 million by 2043 (1). With average life expectancy steadily increasing, adults aged 65 years and over currently account for 18% of the population and those aged 85 years and over account for 2.4% (2). People over the age of 85 are now the fastest-growing group in the United Kingdom, accounting for three million of the population and this is projected to increase to eight million by 2050. These changing demographics are not isolated to the United Kingdom. European residents have the highest median age in the world, with the proportion of over 65's forecast to increase from 14% in 2010 to 25% by 2050 (3). Improvements in healthcare, technology, lifestyle factors, education and economic prosperity have contributed to this. Advances in healthcare and health and safety have been particularly instrumental in changing patterns of disease. Improved treatments for acute presentations which were previously fatal such as myocardial infarction and stroke (4, 5), infectious diseases, cancer and reduced incidence of industrial accidents have led to an increased prevalence of chronic diseases which people live with in later life. As a consequence, growth in the prevalence of cardiac, renal and liver disease, cancer, stroke, diabetes, degenerative neurological conditions, chronic respiratory conditions, dementia and frailty (6) have been observed.

Whilst ageing can have a profound impact on an individuals' health and well-being, it also has economic implications which affect individuals, organisations and society as a whole (7). Older people typically have more complex health and social care needs and as a result, are greater consumers of healthcare resources. People aged 65 years

and older account for 40% of all hospital bed days, 65% of National Health Service expenditure (NHS) (8) and 51% of social care spend, an estimated £8.8 billion (9). Many older people live independent and healthy lives, but as the absolute number of individuals with complex needs increases, so the incidence of frailty is likely to grow. Correctly identifying older people living with frailty to ensure that their needs are assessed, managed and planned for has never been more pressing and more challenging in the face of economic austerity. To build a more sustainable society, opportunities for optimising good health and well-being which enable older adults to take an active part in society, enjoying high quality, independent and active lives (3) must be integral to health and social care provision. Rehabilitation plays a key part in realising this vision. Clinicians must make decisions on who is likely to benefit from programmes of rehabilitation and the clinical currency in which these decisions are transacted is through the use of the term rehabilitation potential.

1.2 Multimorbidity and frailty

Older people living with frailty often do not have discrete illnesses that they recover rapidly from, rather they have an array of long-term conditions which can have a devastating impact on their function, well-being and social interactions. Multimorbidity, described as the presence of two or more chronic conditions, has been found to have a significant negative impact on health-related quality of life (10-14). The risk of developing multimorbidity increases steeply with age. The presence of chronic multimorbidity is estimated to be between 55% and 98% in those aged 60 years or more (15). There is compelling evidence that the number of long-term conditions is a greater determinant of health service resource use than the impact of any one specific disease (16). Cancer, coronary heart disease, chronic obstructive pulmonary disease and diabetes are amongst the most commonly reported (16). A study by Parker et al. (17) explored the impact that common chronic diseases had on the health-related quality of life (HRQoL) of 5849 community-dwelling people aged 65 years plus in the United Kingdom. They found that 53% (n = 3078) reported issues with pain, 39% (n = 2273) with mobility, 9% (n = 529) with self-care and that moderate or severe problems with HRQoL were significantly associated with 13 of the 15 common chronic conditions included in the study. Osteoarthritis (absolute risk

-0.081, P=0.006), neurological disease (-0.172, P<0.0001) and depression (0.269, P< 0.001) were found to result in clinically meaningful reductions in the EuroQoL 5 Domain (EQ-5D) quality of life measure.

Frailty is a concept used by healthcare practitioners and is currently understood as:

> "*A medical syndrome with multiple causes and contributors that is characterized by diminished strength, endurance, and reduced physiologic function that increases an individual's vulnerability for developing increased dependency and/or death*." [(18), p2].

Frailty is associated with an increased risk of disability, delirium, hospitalisation, pain, falls and death, placing individuals at higher risk of adverse outcomes (19-22) and dependence in activities of daily living. Frailty is dynamic; it can worsen as a result of acute illness, injury or due to the natural progression of concomitant comorbidities, but it may improve with targeted interventions. Frailty is non-age dependent, but its incidence increases with age. A systematic review by Collard et al. (23) found the prevalence of frailty in community-dwelling adults aged 65 years and older to vary from 4% to 59%, increasing in each five year age group until plateauing in those aged 85 years and over (15.3% amongst 65–69 years; 18.6% among 70–74 years; 23.5% among 75–79 years; 22.4% among 80–84 years; 20.2% over 85 years). Currently, two accepted models of frailty have been proposed; the phenotype (24) and cumulative deficit model (25).

1.2.1 Phenotype model

The Frailty Phenotype model was developed by Fried et al. (24) using data from the Cardiovascular Health Study of 5210 men and women aged 65 years. The model comprises of five variables; unintentional weight loss, exhaustion or fatigue, weakness, slow gait speed and low energy expenditure which are either measured using validated clinical tools or self-reported measures (Table 1). If three are found to be present during clinical assessment, an individual is identified as frail.

Table 1 - Operationalisation of a Frailty Phenotype (24).

Indicators of frailty	Clinical measures of frailty
Unintentional weight loss	Self-reported weight loss of >4.5kg or recorded weight loss of ≥5% in the prior year
Exhaustion/fatigue	Self-reported 3-4 days per week or most of the time
Weakness	Grip strength (by sex and body mass index)
Slow gait speed	Time to walk 4.57m (10 feet) (by sex and standing height)
Low energy expenditure	Self-reported <383kcal.week for men and <270kcal/week for women

Whilst the model has been well received for its clinical applicability (26), use of clinically relevant and acceptable measures (27) and has been validated (28, 29), it does not take into account other potential factors, principally the "geriatric giants" of incontinence and cognitive impairment (30). Participants who had an existing diagnosis of stroke or Parkinson's disease, those with mini-mental cognitive scores of less than 18 or those taking antidepressants were excluded from the study (24). It could, therefore, be questioned how applicable this model is for the elderly population with comorbidities given the prevalence of such conditions.

1.2.2 Cumulative deficit model

The cumulative deficit model was developed as part of the Canadian Study of Health and Aging frailty index (25). It proposed that the cumulative deficit model counts individual 'deficits' and proposes that the more individuals have wrong with them, the more likely that they are to be frail (31). Deficits can be symptoms, diseases, signs or disabilities, which are frequently identified and assessed as part of routine clinical care. They place individuals at risk of further disability and health decline. Deficits are simply added up and scored one for each deficit that is present, 0.5 if they are present but have limited impact and 0 if absent. This model allows for a highly

individualised approach to frailty identification enabling clinicians to target specific conditions and develop tailored treatment, management and rehabilitation plans but does not consider the severity of each deficit, just the count.

1.2.3 Clinical frailty scale

The phenotype and cumulative deficit models have been widely adopted and cited in academic papers, but their clinical validity and applicability may be limited for the wider multi-disciplinary team (MDT). The Clinical Frailty Scale (CFS) (Figure 1) offers busy clinicians a pictorial representation to stratify patients with frailty based on their level of vulnerability (25, 32, 33) and has been found to be a strong predictor of mortality and institutionalisation (25). Nolan et al. (34) found that the CFS was predictive of mobility markers (gait speed and Elderly Mobility Scale), dependency and length of stay amongst 41 older adults admitted for post-acute rehabilitation.

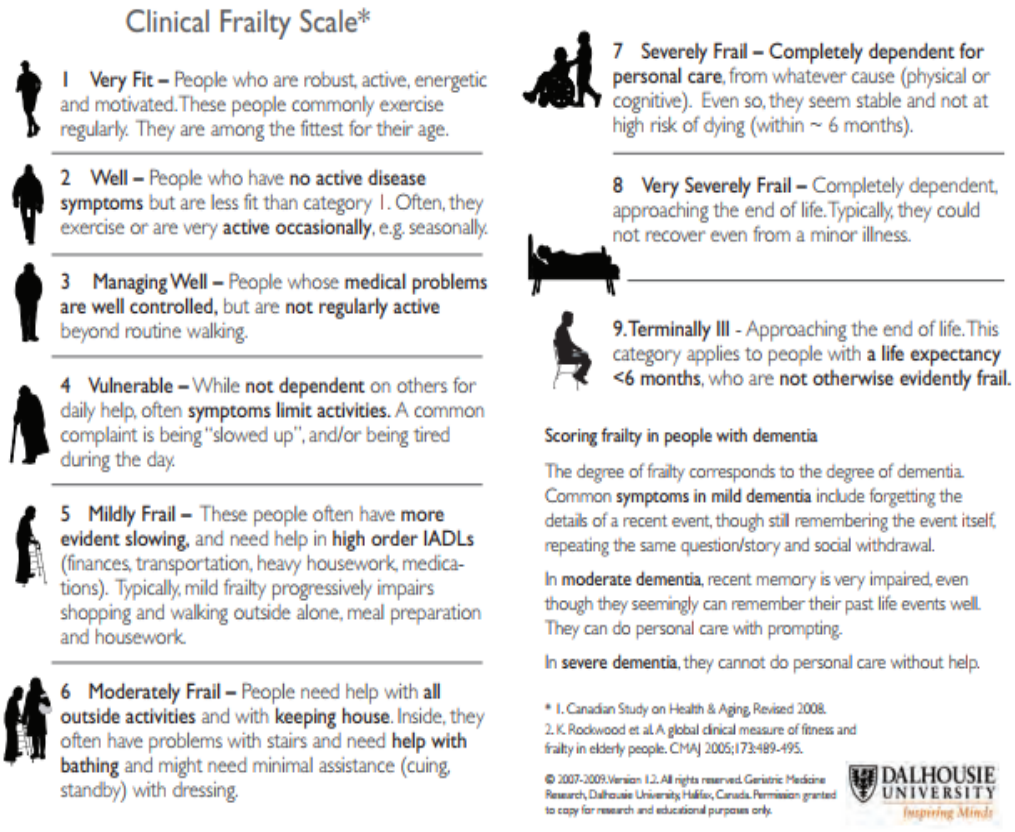


Figure 1 - Clinical Frailty Scale (25).

Nevertheless, the British Geriatrics Society (35) caution that the tool should not be used in isolation but as an adjunct to clinical assessments to ensure a holistic approach to health and wellbeing.

1.3 Decompensation and acute exacerbations

The presence of multiple long-term health conditions and frailty have a profound impact on individuals, meaning that when they deteriorate or decompensate, they deteriorate rapidly across multiple health systems. This frequently leads to hospital admissions and prolonged periods of recovery. Older people are increasingly vulnerable to changes in their health status and at greater risk of being identified as frail. Infections, surgery, falls, minor illnesses or the introduction of new medications can lead to "*A striking and disproportionate change in health status*"[(36), p572] which has significant impacts on an individual's ability to function, maintain their independence and well-being. Older people admitted to hospital with acute deteriorations in health require comprehensive medical assessment and management to address these issues.

Older adults account for more hospital admissions than younger people, have longer lengths of stay, higher readmission rates, occupy more bed days (37, 38) and typically have poorer outcomes (39). Hospital admission, the associated subsequent deconditioning or acute illness, places older people at greater risk of disability, cognitive decline or residential care (40) which can further impact on recovery. Recent healthcare policy in the United Kingdom (UK) has seen the drive for care and rehabilitation to be delivered in a community-based setting, focusing around individuals' usual place of residence (41). Rehabilitation interventions are frequently cited as key in supporting older people's recovery following periods of decompensation and ill health (42, 43). Healthcare practitioners are often required to make ever-increasing nuanced, complex and dichotomous decisions in the face of growing complexity of service provision, patient needs and expectations about a patient's potential to respond to rehabilitation interventions.

1.4 Rehabilitation

Rehabilitation has been defined in a number of different ways. The World Health Organization outlines that rehabilitation aims to restore the functional capacities of disabled individuals' and prevent further disability (44). It may also seek to lessen the impact of disabling conditions (45). Geriatric rehabilitation is defined as:

> *"A multidimensional approach of diagnostic and therapeutic interventions, the purpose of which is to optimise functional capacity, promote activity and preserve functional reserve and social participation."*[(46), p2].

Rehabilitation adopts a holistic approach, enabling individuals to maximise their well-being, activities of daily living, function and social integration (47), seeking to restore personal autonomy to those aspects of daily life considered most relevant by service users and their family or carers (42). In contrast to biomedical approaches, rehabilitation seeks to obtain a broader understanding of the nature and causes of underlying conditions, the impact these have on individuals and patient factors such as behaviours, emotion, goals and expectations (48).

1.4.1 Conceptual models of rehabilitation

Perhaps one of the best-known rehabilitation frameworks is the World Health Organisation's (WHO) International Classification of Functioning, Disability, and Health (ICF) (44). It provides a framework for rehabilitation models of care, descriptions of health and health-related states using standardised language, and a theoretical basis for rehabilitation. It has also been suggested as a useful structural framework for clinical decision-making in rehabilitation practice (49-52). The ICF adopts a biopsychosocial model by integrating medical and social paradigms, which enables function to be understood in relation to morbidity, environmental and personal factors (53). The model proposes that disability and functioning are multi-dimensional concepts which conceptualise an individual's level of functioning as a dynamic interaction between health, environment and personal factors (Figure 2).

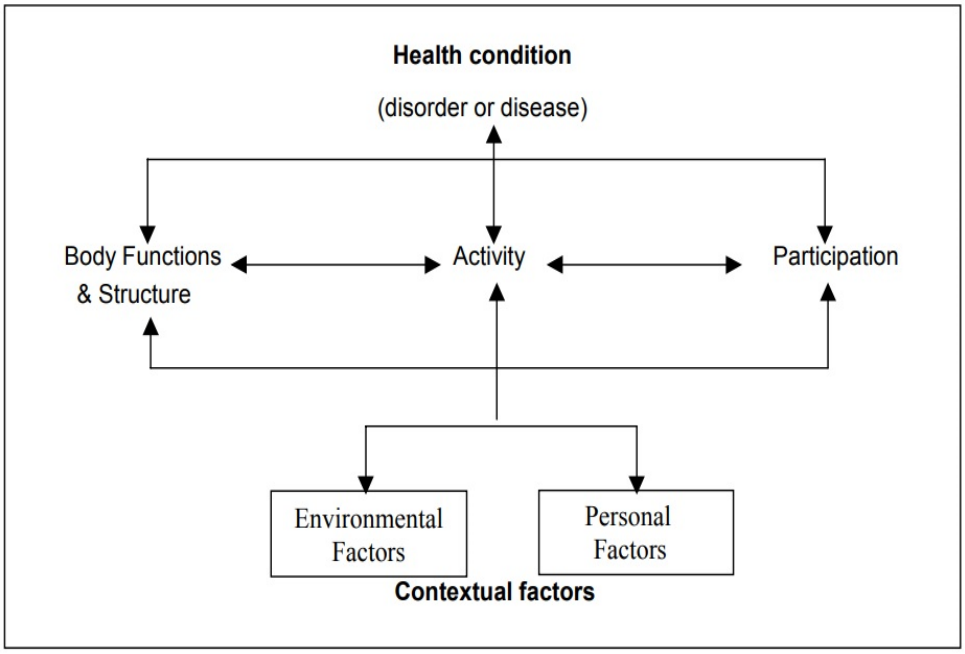


Figure 2 - World Health Organization International Classification of Functioning, Disability and Health (ICF) (44).

The model focuses on impairments of body functions and structures, limitation of activities, restriction of participation, environmental and personal factors. Body functions refer to the physiological and psychological functions of body structures including organs, limbs and their components. A loss or deviation 'from the norm' in these results in an impairment. This may be clinically manifested as changes to range of movement or balance, reduced strength, sensation or muscle tone, changes to heart rate, vision or pain. It is this domain that physiotherapists, occupational therapists and doctors have frequently focused their efforts. Activities describe the performance of a task or action by an individual (44) and limitations at this level impact on activities of daily living such as walking, drinking and eating, transfers, dressing, toileting, communication, and learning.

The final domain of participation describes an individual's involvement in a life situation which may lead to restrictions in their ability to participate in work, family life, social roles and community life. Environmental factors refer to the physical, social and attitudinal environment in which people live and conduct their lives (44) such as accessibility to buildings, safety, family support and networks, air pollution and infrastructures. Personal factors including self-efficacy, self-confidence,

resilience, expectations, age and gender, influence how disability is experienced by individuals. Health conditions defined as diseases or disorders are recognised within the model as crucial factors which impact on health and disability.

Self-efficacy describes an individuals perceived competence about their own capabilities to organise and carry out a particular course of action (54). Self-efficacy is an essential for independence in activities of daily living and rehabilitation interventions. Beliefs about self-efficacy change with ageing and have been found to influence independent functioning (55), activities of daily living, gait and balance (56-58). Stretton et al (59) found that levels of self-efficacy had a strong influence on the health related quality of life amongst older people living with frailty where falls self-efficacy was the singular highest predictor of physical functioning. However, Nolan et al (34) proposed that older individuals may still benefit from rehabilitation programmes and improve their self-efficacy in the presence of frailty. Assessments of self-efficacy and the development of rehabilitation programmes which specifically target it may enhance rehabilitation participation and outcomes (60) but further research is required to understand this relationship.

Aspects of the WHO ICF model have been criticised for overlooking the social implications of disability (52), the lived health experiences (61) and the particular challenges of multimorbidity. Bornbaum et al. (62) argue that the term 'health condition' does not accurately represent the dynamic state of long-term conditions such as cancer and propose that health state should be adopted, nor does the term embrace multiple conditions which are commonly seen in people with cancer. Frailty is a dynamic condition which may improve or deteriorate over time and comprises of multiple comorbidities and as such, models of rehabilitation need to take these fluctuations into account. A recent systematic review by Azzopardi et al. (63) sought to establish frequently used frailty tools with ICF codes and found that only five frailty instruments covered all five of the ICF domains (the 50 variable CSHA-FI, 51 variable Gothenberg, 62 item frailty index, 48 item deficits index and the 83 item full frailty index). These frailty indexes or measures, whilst addressing ICF domains may be burdensome for clinicians and patients to complete and have less clinical utility. However, frailty, disability and disease are separate concepts and are not synonymous as holistic expressions of health and well-being.

1.4.2 Rehabilitation delivery

Rehabilitation delivery is a process as opposed to a one-off event (64). It is characterised by cycles of nested treatment programmes which are reviewed and refined. It involves practitioners assessing individual's needs using standardised assessments which seek to understand current and previous abilities and the impact they are having on individuals and their families. Assessments frequently seek to explore and estimate abilities, motivation, cognitive status, family or carer support and environmental factors. Rehabilitation programmes in older people are often based upon Comprehensive Geriatric Assessment (CGA) models of care (65, 66). There is compelling evidence to suggest CGA models are associated with positive clinical outcomes (67) and slower rates of physical, functional and cognitive decline compared to control subjects (68).

Clinicians seek to estimate an individual's capability and capacity of cooperating with a rehabilitation program and making measured functional gains (69, 70). Participants are supported to learn skills which must be practised and reinforced with feedback (48). An understanding of volitional factors such as motivation and participation is essential to rehabilitation practice, but the understanding of how to describe and measure these is underdeveloped (71-73).

Rehabilitation delivery models frequently adopt person-centred approaches to care through the use of goal setting and robust communication strategies (74). Goal setting is the process of selecting and agreeing on an objective which the individual and clinical team work towards over a specific time period. The goals, usually involve a change from the current situation or maintenance of function in the face of expected deterioration; it is not a simple prediction of what will happen as a result of rehabilitation (75). In the presence of multimorbidity, recovery may be prolonged and restoration of function back to baseline levels may not be achievable (52).

Rehabilitation may take place in a hospital, community, care home or intermediate care settings. Historically, health services have been designed and set up around systems which adopt a reactive approach to ill health and do not have the design or capacity to develop proactive models of care which seek to empower individuals to proactively manage their own health and well-being. These models of service

provision may disadvantage older people who are more likely to have multimorbidity, frailty and dementia (36). They may be prematurely deemed as having 'no rehabilitation potential' due to preconceptions about their ability to engage and benefit from programmes of rehabilitation (76-79).

1.4.3 Rehabilitation as a multi-disciplinary endeavour

Rehabilitation assessments and programmes are typically a multidisciplinary endeavour, drawing on each professions specialities and perspectives. In geriatric rehabilitation, the multi-disciplinary team (MDT) normally comprises geriatricians, nurses, physiotherapists, occupational therapists, dietitians, social workers, psychologists and speech therapists (66, 80, 81). Team composition is highly dependent on local factors such as service provision, organisation and country-specific roles and responsibilities. Allied Health Professionals (AHPs) describes a group of clinicians that deliver services which identify, assess and prevent diseases, disorders; dietary and nutrition services and rehabilitation and health systems management (82). They aim to support individuals to recover their mobility or movement, restore or improve confidence in activities of daily living, improve nutritional status and develop communication skills. These diverse skills and perspectives are ideally suited to address the complex and holistic needs of older people living with frailty, working in partnership with medical, nursing and pharmaceutical colleagues as autonomous practitioners.

This PhD focusses on the role of physiotherapists and occupational therapists and their understanding and assessment of rehabilitation in the UK. Occupational therapists and physiotherapists are traditionally accepted as core providers of rehabilitation. They associate their professional identity with this (83, 84) and, in the UK, they play a pivotal role in identifying individuals' suitability for rehabilitation in the acute healthcare setting and delivering programmes of rehabilitation. Physiotherapists and occupational therapists focus on facilitating recovery or adaptation to illness, disease or injury (85, 86). They empower and enable individuals to remain independent for as long as possible in the activities that are important to them. In relation to older people living with frailty, physiotherapists play an integral role in addressing the complex and holistic needs of older people in the community

and hospital setting where traditionally they have focussed on physical and functional domains such as mobility, pain, strength, balance, range of movement, transfers, and activities of daily living (87). When working with older people living with frailty, occupational therapists play a crucial role in understanding functional, cognitive, psychological, spiritual and environmental issues and how these impact on activities of daily living such as washing, dressing, eating and drinking and how individuals cope with these. By understanding and assessing these needs, occupational therapists can work with patients, families, and carers to improve or maintain independence in activities of daily living which may include home equipment or adaptations, education on pacing, task performance and techniques to help the adjustment to disability or injury. Occupational therapists are highly skilled in addressing issues related to cognitive dysfunction associated with dementia and delirium by evaluating individual strengths, impairments and performance needs requiring intervention (88).

1.4.4. Rehabilitation as a complex intervention

Healthcare delivery is complex and involves multifaceted interactions, decisions and interventions. Interventions are commonly described as:

> "*Any action taken by healthcare workers with the aim of improving the well-being of people with health and/or social care needs."* [(89), p12]

Complex interventions typically consist of several interacting components which impact on the complexity and length of causal chains and are influenced by local contextual factors which influence how the intervention is delivered and measured (90, 91). These factors are displayed in Figure 3.

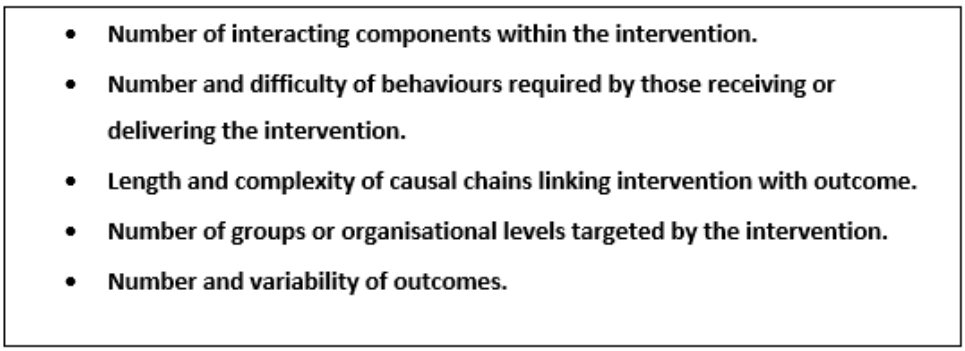


Figure 3- Dimensions of complexity in interventions. Adapted from Craig et al. (90) and the Medical Research Council Framework for developing and evaluating complex interventions (91).

Components are typically described as "*parts of a complex intervention that are distinct from but compose the whole of the intervention in full or in part*" [(92), p185] and this definition will be adopted throughout this thesis. Understanding and describing the components of a complex intervention is essential in order to understand why and how an intervention is effective (91).

Rehabilitation is a complex intervention as it involves multiple interacting components, which are tailored to individual needs, influenced by contextual and environmental factors and have numerous outcomes of interest (93). Rehabilitation involves a broad understanding of an individual's disabilities, their emotions, beliefs, goals, expectations and motivation (48). In addition, older people living with frailty often experience a complex array of health conditions which adversely impacts on their health, well-being, function and social interactions. Hospitals, in which they receive care and rehabilitation assessments represent complex systems due to the number of interacting components, behaviours required by those delivering or receiving the interventions and the number of organisations involved in care planning and delivery (90, 91). These factors are further confounded by the challenges in defining rehabilitation potential, predicting rehabilitation response and clinical decision-making. It therefore, becomes apparent that rehabilitation and rehabilitation potential are complex interventions.

Rehabilitation interventions have been criticised for assuming that processes are linear and simple and for failing to unpack the "black box" (94, 95) whereby active

ingredients of the intervention are rarely specified (96). Complex interventions present particular challenges for researchers in terms of development, evaluation and implementation into practice. This is in part due to differing models of healthcare provision (97), professional attitudes and values, describing and tailoring the intervention (89) and the variation in intended outcomes of the intervention. Study designs may offer insight into the effectiveness of an intervention, but alone they are unlikely to explain how an intervention might work, under what circumstances and which components are required for which outcomes (98). These are important considerations for successful implementation and replication of interventions.

Literature on intervention evaluation far outstrips that on intervention development and design (99, 100). This has been more widely explored in the field of complex interventions for health behaviours with models such as the COM-B (101), 6SQUID for public health interventions (99) and intervention mapping for health education (102). In 2000, the Medical Research Council (MRC) published a framework (103) which sought to help researchers to overcome the practical and methodological difficulties of intervention design and evaluation. The framework was subsequently revised in 2008 (104) and 2019 (91) reflecting methodological developments in the field. The framework comprises of a number of interlinked phases, reflecting the iterative and non-linear approaches to contemporary intervention design methodology. The development and evaluation of complex interventions involves four stages; development, feasibility and piloting, evaluation and implementation (Figure 4). These phases are considered essential in order to establish the effectiveness of an intervention.

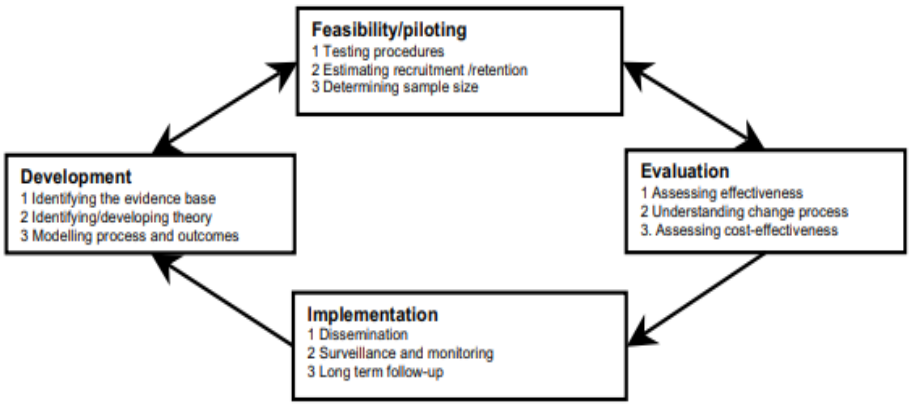


Figure 4 – Key elements of the development and evaluation process for complex interventions (104).

This framework has been widely used in developing complex interventions for older people (105) but has been criticised for lacking detailed guidance on theory development, intervention components, contextual and implementation factors which can lead to suboptimal treatment success (100, 105). A recent systematic scoping review found that the MRC Framework was the most frequently cited framework used in developing interventions for older adults but proposed that levels of details and consistency of use were inconsistent and poorly reported (105). This view was further supported by Hallberg (106) and Bleijenberg et al. (100) who stated that the MRC framework, though not explicitly referring to theoretical development, covers work which are prerequisites for theory such as development and modelling. To address these perceived shortcomings, Bleijenberg et al. (100) proposed that the MRC guidance could be enhanced by understanding current practice and processes to inform design and future implementation. These factors will be covered as part of the intervention development process described in chapter four.

The systematic development of a complex intervention requires the following components to be addressed prior to full-scale evaluation.

1. Identifying the evidence base – involves the identification and analysis of the existing evidence base relevant to the proposed intervention.
2. Identifying and developing theory – requires that theories underpinning the intervention and likely process of change are outlined. This frequently involves drawing on existing theory and evidence and is supplemented with empirical research.

3. Modelling processes and outcomes – this component is essential prior to a full-scale evaluation. This involves mapping processes critical to the intervention and ensures that the intervention can be delivered in practice. Feasibility work typically involves identifying relevant outcome measures and the acceptability of the proposed intervention to patients, clinicians and wider stakeholders.

The adoption of systematic, transparent and rigorous approaches to complex intervention development is essential (107) and failure to do so can result in false positives in clinical trials, research waste (100, 108) and disbenefits when implemented into clinical practice. This framework was followed to address the overall aims and objectives and structure and rigour of this PhD.

1.5 Rehabilitation and recovery

Central to rehabilitation practice is the ability to predict who will respond and gain benefit from rehabilitation interventions. Clinicians increasingly recognise that positive gains can be achieved with even the most physically and cognitively impaired adults who frequently require emergency care within the hospital and community setting. Fit older people, represented by the green line, typically experience a minor deterioration in functional abilities after minor illness but quickly return to their premorbid state (Figure 5). Whereas older people living with frailty, represented by the red line, face a greater and prolonged deterioration in their functional abilities and longer periods of dependency (36).

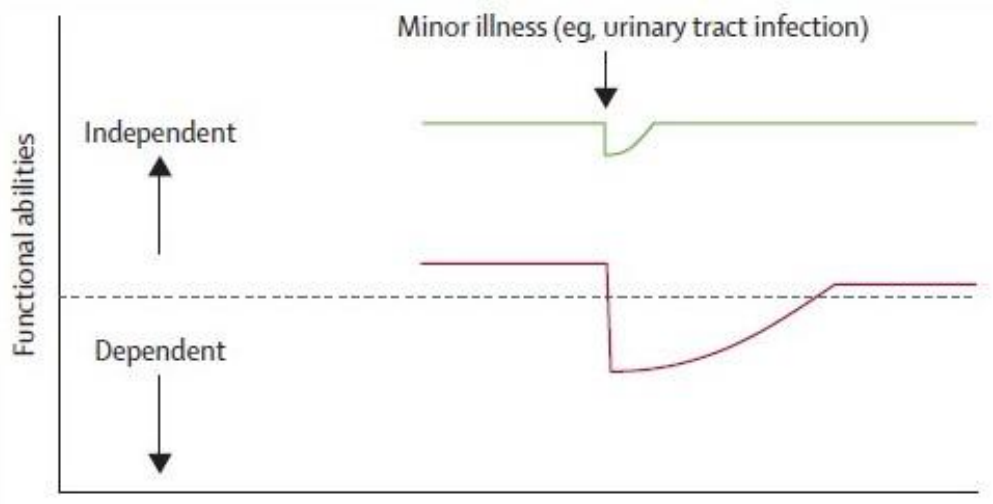


Figure 5 – Vulnerability of frail elderly people to a sudden change in health status after a minor illness (36).

Older people living with frailty are closer to the threshold of dependence and as such are more vulnerable to decline. They may partially or fully return to their baseline abilities, but there is likely to be considerable heterogeneity in the speed and extent of their recovery. Some individuals may show no signs of recovery, decline at greater rates or die as a result of even a minor event (109). Changes to functional abilities may result in postural instability, falls, exacerbation of underlying comorbidities or deconditioning and lead to prolonged recovery, dependence on others for health and social care needs and mortality. Frailty may therefore represent the transition between successful ageing and disability (27), independence and dependence, helplessness and autonomy over one's life. Minor or major stresses are increasingly likely to result in a hospital admission and older people living with frailty commonly present at emergency departments during these crisis points. Individuals aged 85 years plus account for the largest number of hospital admissions in the UK (110) and typically experience the worst outcomes (111).

Trajectories of recovery from an acute illness or stressor, such as an infection or fall, which result in a hospital admission are complex, highly individualised and poorly understood. Understanding these trajectories is particularly difficult in the context of frailty and dementia. For clinicians and rehabilitation trialists, the challenge lies in identifying who will recover either full or partial function, who will plateau or decline following illness, injury or rehabilitation interventions and how these decisions are

integrated with patients previous abilities, wants and needs. There is a delicate balance between independence and dependence, which can have profound effects on individuals' health and well-being. These heterogeneous trajectories are displayed in Figure 6, where the dotted lines represent possible trajectories for older people who may or may not return to homeostasis and premorbid abilities after a hospital admission (109).

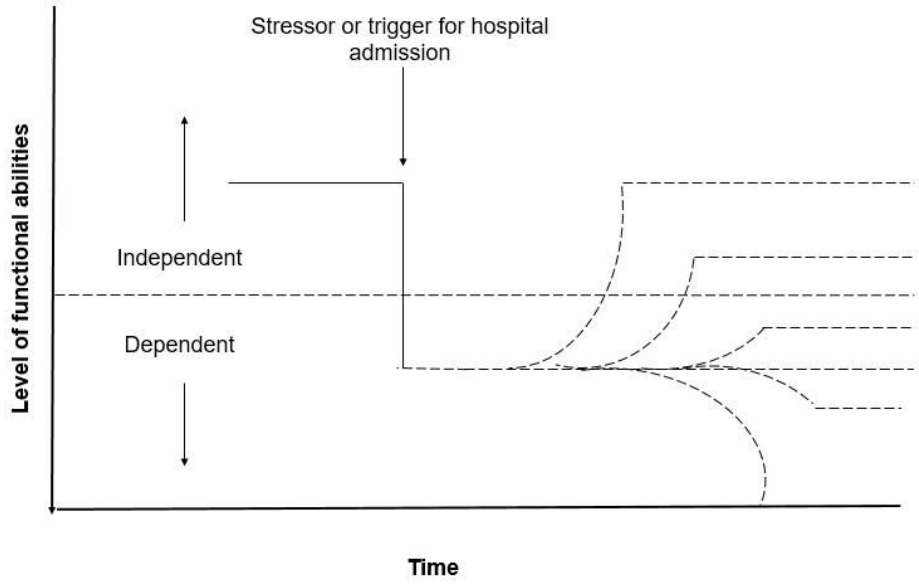


Figure 6 - Frail elderly patients' vulnerability to critical changes in functioning (109).

Older people living with frailty frequently present to health services in a time of crisis when decompensation has occurred which can result in clinicians having an incomplete or inaccurate understanding of how much potential individuals have to improve and benefit from rehabilitation programmes. Although there is strong emerging evidence that rehabilitation may improve or partly reverse frailty (112-114) this is confounded by a lack of evidence on the optimal intensity and timing of rehabilitation required to improve outcomes in older people (36). Frailty stratification and identification show promise as a prognostic indicator for rehabilitation programmes in a similar manner to its application in other areas of medicine (65), but further research is required to establish this link.

1.6 Rehabilitation and older people living with dementia

The presence of dementia can further complicate clinicians' understanding of rehabilitation as it challenges current models of rehabilitation practice which frequently rely on patients initiating activity and fully engaging with rehabilitation. It is estimated that over 850,000 people are living with dementia in the UK being cared for by 540,000 carers (115). The prevalence of dementia increases with age (116) and the condition can have a devastating impact on function, quality of life and well-being. Outcomes of rehabilitation in the presence of dementia are less certain. There is a widely held perception that dementia prevents individuals from engaging and benefitting from rehabilitation (77, 79, 117) and consequently, access to rehabilitation may be restricted or denied. However, there is evidence to suggest that positive outcomes can be achieved over more extended time periods (118) and with specialist input.

The assessment of functional abilities as part of rehabilitation programmes in the hospital setting has been reported to be especially challenging in the presence of delirium, dementia and severe cognitive impairment where questions arise about how well patients engage and participate with therapy (119). Poor attention, memory, reduced communication, and behavioural changes may present challenges to therapists when delivering rehabilitation. In particular behavioural changes, altered mood, loss of motivation and poor compliance can adversely impact on an individual's ability to engage and improve with therapy (120). However, many of these potential barriers can be overcome using compensatory techniques such as memory books, written prompts (79) and the use of explicit learning techniques of observational learning and learning by guidance (121). This suggests that with the use of appropriate techniques, rehabilitation programmes may achieve positive outcomes for people living with dementia.

1.7 Time and resource pressures

Despite initiatives to provide preventative care closer to home, hospital admissions amongst older people continue to rise. Accident and emergency departments continue to receive significant numbers of older people through their doors and this

demand is growing. In the UK, between 2009 and 2010, there were 30,831 attendances per 100,000 of the 60 years or older population and this rose by 20.7% to 37. 240 in the 2014-15 period (122). The greatest increase in hospital admissions as measured by Finished Consultant Episodes (FCE) has been in older people aged 85 years and over, with admissions rising by 76% between 2005 and 2016 (Figure 7) (110).

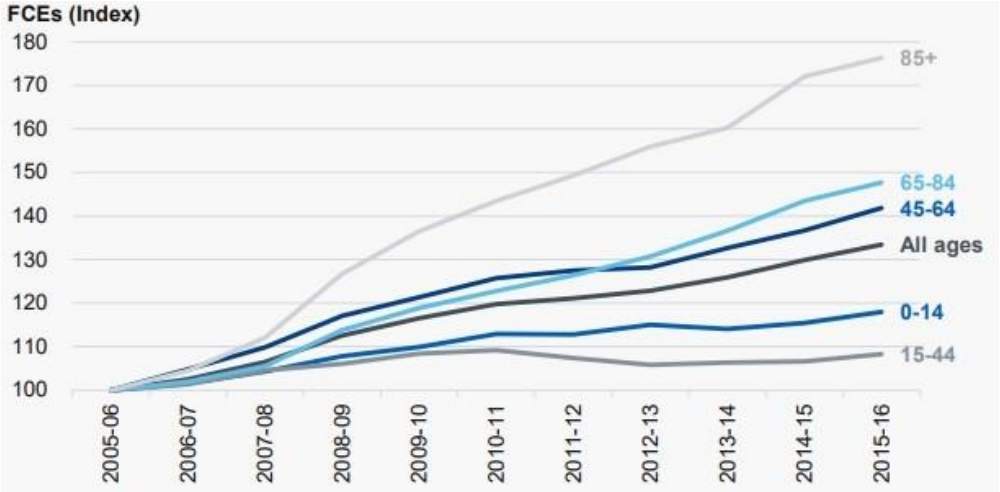


Figure 7 - Indexed change in the number of Finished Consultant Episodes by age group 2005-06 to 2015-16 (110).

Whilst the number of older people requiring healthcare continues to grow; globally expenditure has largely remained stagnant or contracted (42). This presents clinicians with further challenges in deciding who should receive rehabilitation interventions and can result in rationing of healthcare services. Age-based rationing of services presents significant practical and ethical challenges in terms of prioritisation and allocation of services and resources. Commissioners of services need strong clinical evidence and unequivocal benefit before they can pay for services and the evidence base for the majority of rehabilitation interventions in older people living with frailty and dementia is limited. Patient selection for rehabilitation programmes is compromised by the lack of precise measures to ascertain potential to benefit. The clinical currency in which these decisions are transacted is through the use of the term rehabilitation potential.

1.8 Rehabilitation potential

The term rehabilitation potential is frequently used by physiotherapists and occupational therapists in clinical practice. Being deemed to have rehabilitation potential or not is critical to the amount and type of rehabilitation a patient will receive and can result in individuals being denied access to services which may be beneficial. Rehabilitation potential in relation to older people first appeared in published literature in the 1950s and 1960s (123-128). Reynolds et al. (124) proposed that rehabilitation potential was rated by consultant physicians as either 'definite'. 'slight' or 'none' in relation to the anticipated benefit of rehabilitation services to restore function. It has been used as a retrospective label to describe how well a patient functionally improves or their ability to remain at home over a one year period (129, 130). Other researchers have used it to define a prognostic concept of how rehabilitation might restore activities of daily living (69, 131), psychological abilities required to take part in rehabilitation (132, 133) or where and when rehabilitation should take place (134-136). Cameron and Kurle (65) suggested that frailty was a significant mediating factor in establishing the rehabilitation potential of older people living with frailty, but did not describe what was meant by rehabilitation potential, nor how clinicians understood or assessed this in the frail older population.

The research to date has primarily focused on quantitative methods to measure rehabilitation potential but has failed to explore the theoretical underpinnings of rehabilitation potential nor has it focused on frail older people. A recent ethnographic study by Bradley et al. (137) which explored the meaning and evaluation of rehabilitation potential in older adults in receipt of acute care identified that rehabilitation potential was frequently perceived and operationalised in reductionist terms which focused solely on physical improvements and discharge planning. Staff participants struggled to reconcile the ethical dilemmas of the ideal versus realities of clinical practice. A definition of rehabilitation potential was not provided nor a structure for how clinicians or researchers should assess its application.

The subject of no rehabilitation potential was formally discussed at the shared meeting of AGILE (Interest group for the Chartered Society of Physiotherapists Working with Older People) and the British Geriatrics Society Autumn in 2015 (78).

The complexities of rehabilitation and the financial limitations within which rehabilitation services must operate were discussed. The group reached a consensus that a definition of rehabilitation potential and criteria for how rehabilitation potential is established are urgently needed.

1.8.1 The wider context of rehabilitation potential

There is currently a lack of evidence which focusses on the theories underpinning rehabilitation potential in older people living with frailty and how it is operationalised in research and clinical settings. Stroke, acquired brain injury and hip fracture rehabilitation frequently involve populations with complex health and social care needs where clinicians must predict response and make complex decisions as part of a multi-disciplinary team. Although the clinical presentations, management and trajectories of recovery and response may differ to older people living with frailty, exploring these areas provides insight into complex clinical decision-making. To provide a broader understanding of rehabilitation potential, literature will be discussed in relation to rehabilitation potential in other rehabilitation specialities where similar challenges have been faced.

1.8.2 Dementia, hip fracture and rehabilitation potential

Hall et al. (79) explored physiotherapists experiences of treating people living with dementia who fracture their hips and found that determining rehabilitation potential was a significant challenge. The label of rehabilitation potential, though useful in the acute setting to determine rehabilitation destination and plans, was poorly understood and its application could lead to denial of services which may prove beneficial to patients. These findings are further supported by Isbel and Jamieson (117) who found that participants eligibility for rehabilitation programmes was based on individuals abilities to achieve rehabilitation goals and having 'rehabilitation potential' or being able to participate in rehabilitation actively. But again, the criteria for having 'rehabilitation potential' was found to be poorly conceptualised and applied in clinical practice.

Dementia has been shown to increase the risk of falls and hip fractures which are associated with poor clinical outcomes and high levels of morbidity and mortality (138). Whilst some studies have found that the presence of dementia is associated with poorer clinical outcomes following hip fractures (138-140) others have found that favourable outcomes can be achieved in the presence of dementia (118, 141-143) but that this cohort may need more extended periods of rehabilitation to reach this (131). A recent systematic review by Sheehan et al. (144) found that nursing home residents and those with cognitive impairments were frequently excluded from hip fracture trials despite the high prevalence amongst this group. They suggested that future studies should explicitly outline why patients had been excluded from trials to avoid bias in clinical decision making.

What is clear is that individuals with dementia who sustain a hip fracture are likely to benefit from rehabilitation, but further research is needed to understand how assessments are completed and how rehabilitation programmes should be delivered for those with moderate to severe cognitive impairment.

1.8.3 Rehabilitation potential, stroke and acquired brain injury

Similar challenges in determining recovery following stroke and acquired brain injury (ABI) have been reported. Enderby et al. (76) suggested that clinical decisions on determining individuals' potential to benefit from stroke rehabilitation interventions were based on simplistic models. These models failed to take into account the complexities of stroke, natural unassisted recovery, comorbidities and family support, leading to the label of 'no rehabilitation potential' being frequently applied. Multi-disciplinary team members play key roles in determining individuals access to rehabilitation, including intensity of interventions, types of rehabilitation and when to stop or continue programmes of rehabilitation (145). The assessment of rehabilitation potential following stroke was reported to involve complex clinical judgements which take into account motor, cognitive and personality traits, allowing clinicians to predict an individuals' ability to recover or compensate for lost function though activation of neural plasticity mechanisms (146).

There remains, however, a lack of consensus on the term rehabilitation potential, how it is assessed and measured within stroke research. Burton et al. (145) sought to develop a theoretical model for rehabilitation potential in post-stroke survivors by exploring clinicians experiences of stroke rehabilitation. They found that rehabilitation potential was predicted by clinical observations of carry-over and functional gain, but was highly influenced by workload, knowledge of local rehabilitation services, referral criteria and service availability. In addition, participants in the study reported that they did not have the opportunity to learn what happened to their patients and therefore, had limited chances to inform future decisions on rehabilitation potential. Whilst the study provides a theoretical understanding of rehabilitation potential, it did not seek to explore patient, family and carer views of rehabilitation. A recent study which explored occupational therapists perceptions of rehabilitation potential amongst Acquired Brain Injury survivors (147) identified 11 patient-related and organisational factors which informed clinicians' insights into rehabilitation potential. Clinical decision-making involved an understanding of patient-related factors, integrating these with contextual factors such as rehabilitation service requirements and service pressures whilst drawing on knowledge and experience of evidence-based practice to predict improvement and set goals in partnership with patients (Figure 8).

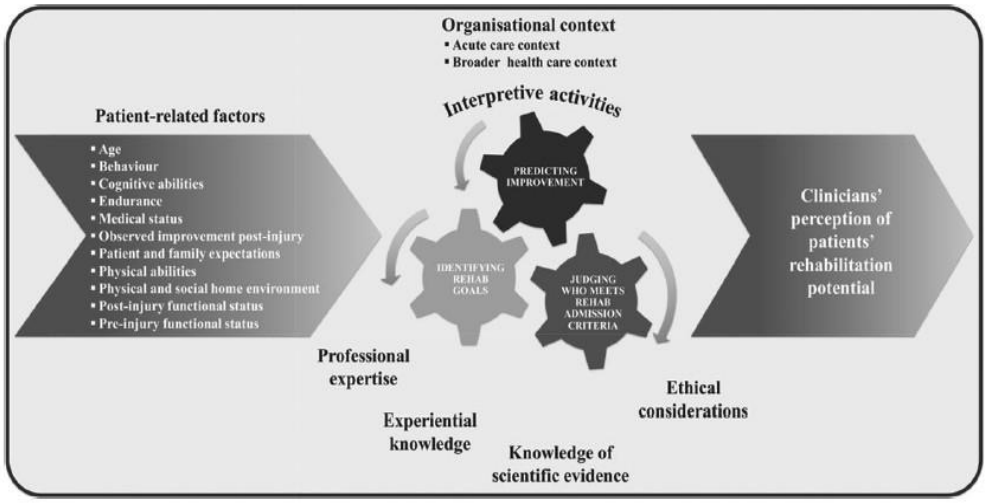


Figure 8 - Factors influencing occupational therapists' perceptions of acquired brain injury patients' rehabilitation potential for inpatient rehabilitation (147).

The authors suggest that this process is rarely explicitly articulated and that clinicians should receive more training and pay greater attention to the range of factors which affect their clinical judgements of rehabilitation potential.

A systematic review exploring factors affecting clinical decision-making about which patients should receive stroke rehabilitation (148) identified a lack of clinical guidance to support practice. This meant that a subjective approach to stroke rehabilitation decision-making was favoured, which was influenced by patient-level and organisational factors. Although this review included low-quality evidence and heterogeneous organizational structures, it raises the need for greater guidance and evidence to support complex decision making in stroke rehabilitation. Longley et al. (149) carried out a qualitative study which explored influences on clinical decision-making about ongoing stroke rehabilitation for individuals with pre-existing dementias or cognitive impairments. Predicting individual's rehabilitation potential was found to be a critical component of stroke rehabilitation decision-making where participants believed that all patients should have the opportunity to access rehabilitation programmes, but the presence of dementia or cognitive impairment was often equated with a lack of rehabilitation potential. The authors suggest that more flexible timeframes for rehabilitation interventions and decision-making, and additional therapist training and guidance is required to support stroke survivors with pre-existing cognitive impairments to ensure equitable access to rehabilitation services.

More robust and sophisticated models of understanding rehabilitation requirements and responses following stroke and ABI are required to address the needs of the population throughout their recovery.

1.8.4 Rehabilitation potential as a complex intervention

As previously discussed in section 1.4.4, rehabilitation is a complex intervention. Evidence presented in this chapter and throughout this thesis suggests that rehabilitation potential is also a complex intervention. Rehabilitation potential assessments principally involve identifying which individuals will benefit from and

cooperate with rehabilitation interventions (69, 150). Assessments of rehabilitation potential therefore require holistic, complex, iterative and individualised approaches which span multiple organisations. In addition, evidence from dementia, hip fracture, stroke and acquired brain injury research suggests that assessments of rehabilitation potential are influenced by contextual and environmental factors (76, 79, 117, 145, 147). These are typical features of complex interventions which consist of multiple interacting components, behaviours, outcomes, individuals and organisations (90, 91).

1.9 Summary of literature

Healthcare practitioners are being asked to make ever-increasing nuanced, complex and dichotomous decisions about patients' rehabilitation requirements in the face of growing complexity of service provision, patient needs, and expectations. They have to make complex decisions about who will respond to rehabilitation interventions, how they select patients for rehabilitation, understanding if the response is due to natural unassisted recovery from an illness or injury, or if the impact is from the rehabilitation intervention itself. This increasingly involves blending the concepts of restorative and functional models of rehabilitation with adaptive and palliative approaches in a rapidly changing health and social care environment. This is on the background of pressure in the acute hospital and community settings where these decisions must be made and justified in a highly pressurised environment.

Evidence is currently lacking about how therapists:

- Assess rehabilitation potential in older people living with frailty.
- Select patients for rehabilitation in the presence of frailty.
- Understand rehabilitation requirements, specifically their decision-making process and frameworks in relation to frailty.
- Prognosticate recovery of adaption to frailty.
- Understand who will benefit most from frailty rehabilitation.
- Assess the potential for improvement.

It is also not clear what factors influence these decisions, what is deemed a 'good' outcome in terms of meaningful clinical improvement and what types of rehabilitation are offered and when to continue or terminate rehabilitation programmes for older people living with frailty. However, the lack of evidence of rehabilitation potential is not the same as the evidence of a lack of rehabilitation potential (76).

Yet demand outstrips supply as the population continues to grow and predicted longevity continues to increase. Resources are limited and will continue to be rationalised, where clinicians, service providers, and commissioners are required to make difficult decisions. There is no universally agreed, systematically assessed or explicitly operationalised model or clinical guidelines that help therapists to make consistent, transparent, patient-centred, and evidence-based decisions about rehabilitation potential. Understanding how rehabilitation potential is assessed, operationalised, which factors influence clinical decision-making and patient and carer involvement in the process are essential for a holistic and evidence-based approach to frailty rehabilitation.

Consequently, there is a need to develop a more robust and explicit framework for assessing and operationalising rehabilitation potential and this PhD study aims to address this gap. This thesis describes the development and subsequent testing of a rehabilitation potential assessment tool, the RePAT using an exploratory sequential mixed methods approach and following the Medical Research Councils framework for developing and evaluating complex interventions.

1.10 Aims and objectives

The primary aim of this PhD study was to develop and test an assessment tool to identify rehabilitation potential in older people with frailty in a hospital setting. From now on, this will be referred to as RePAT (Rehabilitation Potential Assessment Tool). The objectives of this study were to:

1. Define what is meant when the term 'rehabilitation potential' is used in relation to older people living with frailty.
2. Explore the rationale behind the use of the term and why it is used in clinical settings.
3. Identify how clinicians assess rehabilitation potential.
4. Identify what factors influence the decision that people do or do not have rehabilitation potential.
5. Explore how patient, carer and family views on rehabilitation potential are taken into account.
6. Develop a patient-centred rehabilitation potential tool, RePAT.
7. Test the feasibility and acceptability of using RePAT in the clinical setting.

1.11 Thesis structure and methodology

The MRC framework (91, 104) was used to develop RePAT intervention and comprised of multiple interlinked components. This thesis concerns itself with the early stages of intervention development and these are mapped to the MRC framework (Table 2). Further feasibility work, formal evaluation and implementation will likely form post-doctoral work.

Table 2 - PhD study components and chapters in relation to the Medical Research Council Framework for complex interventions (91, 104).

MRC Framework	**Development phase**			**Feasibility/piloting phase**		
	Identifying the evidence base	**Identifying and developing theory**	**Modelling process and outcomes**	**Testing procedures**	**Estimating recruitment and retention**	**Testing intervention procedure and acceptability**
Thesis chapter	Chapter 2 Mapping review	Chapter 2 Mapping review Chapter 3 Focus groups	Chapter 4 Modelling intervention	Chapter 5 Feasibility study		
Study component	Mapping review	Mapping review Focus groups	Modelling intervention Delphi consensus	Feasibility study with nested qualitative interviews		

To address the research aims and objectives, a sequential exploratory mixed methods approach was used. This PhD comprised of four components which built upon each other. These included a: mapping review, focus groups, intervention modelling and Delphi consensus and a feasibility study with nested qualitative interviews. This allowed rehabilitation potential to be explored from multiple perspectives to develop the RePAT intervention. Mixed methods have been widely used in healthcare research (151, 152) and intervention development (153). They are driven by the research question and seek to embrace the methodological strengths of qualitative and quantitative methods. Mixed methods designs are typically underpinned by pragmatism which seeks to "*sidestep the contentious issues of truth and reality*" [(154), p8] associated with other epistemological paradigms and instead focus on what works as truth (155).

This PhD used an exploratory sequential methods approach (Figure 9). This approach allows under-explored areas to be investigated during the initial phases and then tested in later phases (153). Qualitative findings from the mapping review and focus groups were used to develop and inform the quantitative components of the Delphi and feasibility study (156). Findings were considered and presented separately then reviewed to the extent in which they generalised or tested each other (157).

An overview of the methods used in each component will now be presented. Justification for the rationale behind the methods used within each component can be found in the subsequent chapters.

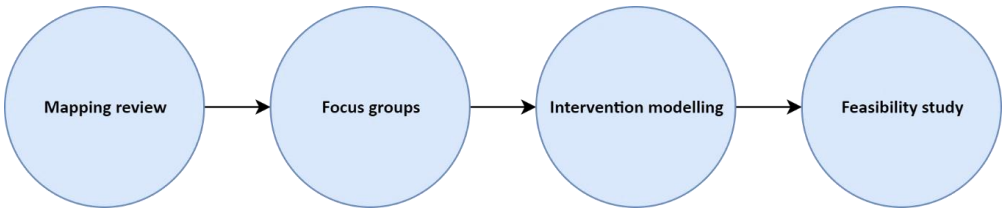


Figure 9 - Overall study diagram.

Component A – Mapping Review (chapter two)

Rehabilitation potential in older people living with frailty is poorly understood, defined and operationalised in practice. The aim of this component was to map and identify relevant evidence to inform the development of the RePAT intervention.

Component B – Focus Groups (chapter three)

Component B comprised of a focus group study which explored the opinions, experiences and understanding of rehabilitation potential from multiple perspectives. The study sought to provide further evidence on how rehabilitation potential was understood, operationalised and assessed from the perspectives of clinicians, patients, and carers. This informed further theory and evidence underpinning rehabilitation potential.

Component C – RePAT Intervention modelling and Delphi Consensus (chapter four)

RePAT was modelled using the MRC Complex Intervention framework (91, 104) and reported using the TIDieR (Template for Intervention Description and Replication) guidance (158) which allowed intervention components, processes and underpinning theories to be presented. The first two components were synthesised using the triangulation protocol (159, 160) to inform the development of the RePAT intervention. The intervention was then subjected to a two-step Delphi consensus with a group of expert physiotherapists and occupational therapists. Results were used to finalise the tool and develop the RePAT training programme.

Component D – Feasibility study with nested qualitative interviews (chapter five)

A non-randomised feasibility study was completed where RePAT was delivered in an acute hospital setting to explore whether the intervention was deliverable and acceptable to staff and patient participants. Physiotherapy and occupational therapy staff participants were trained to use the RePAT intervention. Patient participants in receipt of rehabilitation assessments and identified as frail received the intervention. Intervention fidelity was tested. Acceptability of the intervention and processes were explored using qualitative semi-structured interviews with staff and patient participants to inform refinement of RePAT for future feasibility and pilot work.

1.12 Patient and public involvement

To ensure that interventions are fit for those they are intended to help, service users should be involved in all parts of the research process (161, 162). The MRC framework highlights that interventions are more likely to be successful if relevant stakeholders are involved in their development (90). Clinicians, patients and carers were recruited in components B, C and D of this PhD study to ensure that the RePAT intervention addressed stakeholder requirements. However, stakeholder involvement may take other forms. Typically patient and public involvement (PPI) members review research design, questions and documentation but there is emerging evidence to suggest that they can contribute to qualitative data analysis and intervention design (90, 163, 164). PPI members can provide different perspectives on data, drawing from their personal experiences (165) which can improve the quality, credibility and validity of research findings (166, 167). The RePAT intervention was specifically designed to assess rehabilitation potential in older people living with frailty. It has been suggested that the benefits of partnership working with older adults have been slower to be realised (168) despite being frequent consumers of health and social care and future recipients of the RePAT intervention.

This PhD, therefore, sought to embed PPI throughout the components using a number of methods to ensure that the RePAT intervention embraced a person-centred approach. The overall research aims, objectives and study design were reviewed and subsequently refined from iterative feedback from members of the Dementia, Frail Older People and Palliative Care Public and Patient Involvement group at the University of Nottingham. They also reviewed relevant study documentation, interview questions, schedules and the study protocol. The study steering group also included a member of the public, Margaret Kerr (MK), who was actively involved throughout the duration of the study. MK reviewed the RePAT intervention prior to ensure that the tool retained a person-centred approach prior to feasibility testing. An innovative qualitative analysis training course was developed and delivered to members of the group and MK to enhance their understanding and practical skills of data analysis. Details of the training programme are outlined in chapter three and in Cowley et al. (169). As a result, MK analysed focus group and feasibility study interview data as part of the research team.

Qualitative methodologies maintain that the researcher is inextricably connected to the world, which they study and through reflexivity, this relationship can be explored and articulated. Study design, data collection, analysis and even the research question posed, can be influenced by knowledge, beliefs, experiences and attitudes of the research team (170). It is, therefore, critical that researchers outline these factors from the outset (171). The position of the PhD candidate, Alison Cowley and PPI member, Margaret Kerr are presented in the preface.

1.13 Ethical approval

The study was sponsored by Nottingham University Hospitals NHS Trust, sponsorship reference number 17HC002 and was adopted by the NIHR Clinical Research Network Portfolio. Health Research Authority and Research Ethics Committee approval was sought and obtained. The study was reviewed by the Yorkshire & The Humber – Bradford Leeds Research Ethics Committee on 21st November 2017 and a favourable opinion was given on 3rd January 2018 (Appendix A). The study was given Health Research Authority approval on the 3rd January 2018 (Appendix B)

Chapter 2– Mapping review

This chapter presents a mapping review exploring the current evidence on rehabilitation potential in older people (Figure 10). The review sought to identify and collate the evidence behind the concept of rehabilitation potential, how and why it is assessed and the use of decision-making frameworks. This piece of work forms the first step in developing the RePAT intervention to assess rehabilitation potential in older people living with frailty.

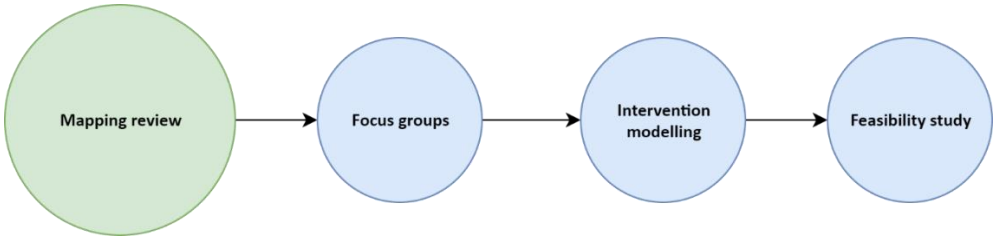


Figure 10 - Overall study organogram chapter two.

2.1 Introduction

In designing a complex intervention to support clinicians' decision making about rehabilitation potential, a thorough understanding of the evidence base was required. The evidence presented in chapter one suggested that rehabilitation potential has been poorly explored in rehabilitation practice, particularly in relation to older people living with frailty. There is a lack of clear understanding about what the term rehabilitation potential means across a range of stakeholders, how it is assessed and operationalised in clinical practice (172). A literature review of 30 studies identified the paucity of research into rehabilitation potential in relation to older people living with frailty (172).

The aim of this mapping review was to explore the current evidence base in order to facilitate the development of RePAT, an assessment tool for rehabilitation potential.

2.2 Rationale for review

A systematic review of the best available evidence and underlying theory can help inform the development process of complex interventions (104) and clinical guidelines. Systematic reviews and meta-analyses are considered to be the gold standard method for evaluating the effectiveness of medical and healthcare interventions (173). These methods seek to minimise confounding bias, have inclusive search strategies, foster high levels of transparency and include or exclude studies on the basis of quality, thus enhancing the reliability of the results and conclusions drawn (174).

Systematic reviews and meta-analyses are, however, not without their drawbacks, especially when designing complex interventions where causal and mechanistic factors are complex and diverse. Systematic reviews do not seek to understand the underlying mechanisms of the proposed intervention; instead they seek to assign a measure of intervention effectiveness. In developing complex interventions, an essential part of the design process is the consideration of how the intervention will be routinely adopted into clinical practice and its benefits sustained outside the study period (89). Planning for the implementation and sustainability of an intervention should be an integral part of the design process (175). A common criticism levelled at randomised controlled trial (RCTs) and systematic reviews, is that they oversimplify complex interventions through the rigid constraints of RCT methodology and this does not allow for interventions to be understood in context.

Rehabilitation potential in older people living with frailty has been poorly understood, defined and operationalised in clinical practice. Therefore, different review methodologies had to be considered to meet the aims of the study; to map and establish the best available evidence on rehabilitation potential in order to develop the intervention and theoretical underpinning.

Grant and Booth (176) developed a typology comprising 14 different types of review methodologies presenting the theoretical underpinnings, strengths and weaknesses of each methodology. Based upon that typology, a mapping review or systematic map was identified as most closely meeting the aims of this study because it would allow the complex phenomena of rehabilitation potential to be explored across a number of disciplines, study designs and patient groups. The characteristics of

mapping reviews are presented in Table 3 and compared against scoping reviews, with which they share many features and systematic reviews.

Table 3 - Characteristics of reviews adapted from Grant and Booth (176).

Label	Description	Search	Appraisal	Synthesis	Analysis
Mapping review/systematic map	Map out and categorise existing literature from which to commission further reviews and/or primary research by identifying gaps in research literature	Completeness of searching determined by time/scope constraints	No formal quality assessment	May be graphical and tabular	Characterise quantity and quality of literature, perhaps by study design and other key features. May identify need for primary or secondary research
Scoping review	Preliminary assessment of potential size and scope of available research literature. Aims to identify nature and extent of evidence (usually ongoing research)	Completeness of searching determined by time/scope constraints. May include research in progress	No formal quality assessment	Typically tabular with some narrative commentary	Characterise quantity and quality of literature, perhaps by study design and other key features. Attempts to specify a viable review
Systematic reviews	Seeks to systematically search for, appraise and synthesise research evidence, often adhering to guidelines on the conduct of a review	Aims for exhaustive, comprehensive searching	Quality assessment may determine inclusion/exclusion	Typically narrative with tabular accompaniment	What is known, recommendations for practice. What remains unknown, uncertainty around findings, recommendations for future research

The Institute of Education's Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI) developed and refined the methodology for mapping reviews (177, 178), or systematic maps. Mapping reviews aim to map key concepts underpinning a research area, especially where an area is complex or has not been comprehensively reviewed (179). Mapping reviews provide a rigorous, systematic and transparent method for mapping areas of research and for identifying gaps in the evidence base (180). This review method provides researchers with the opportunity to categorise and contextualise a broad assay of existing literature (176). Indeed it can be argued that mapping reviews share more similarities with mixed methods reviews, scoping reviews and realist syntheses than systematic reviews as they consider context and allow for heterogeneity to be embraced rather than excluded by rigid inclusion criteria and methods. They have been suggested to be useful in mapping broad fields of research (181) such as the concept of rehabilitation potential. Mapping reviews allow the inclusion of a broader range of literature, including qualitative studies, which, through the plurality of methodological approaches adopted can lead to a more comprehensive understanding of an intervention.

Mapping reviews adopt systematic, transparent and robust approaches to literature searching, identification and analysis, drawing parallels with systematic reviews and meta-analyses. A key limitation of systematic mapping reviews is the lack of quality appraisal. Quality appraisal allows for research evidence to be assessed for reliability, value and relevance (176). There are typically two types of quality appraisal: methodological quality and reporting quality. Methodological quality describes how studies have been conducted. Methodologically robust studies can be replicated, enhancing transparency. Quality of reporting describes how the methods and results of the research have been described. A plethora of critical appraisal tools have been developed to address the wide range of research designs and reporting styles, but there are currently no standardised appraisal tools for mapping reviews.

2.3 Objectives and research question of the review

The aim of this mapping review was to identify and map literature on rehabilitation potential and to inform the subsequent development of an evidence-based

rehabilitation potential tool, RePAT. More specifically, the objectives were to:

1. Identify how the term rehabilitation potential or similar descriptors were used and what was understood by the term rehabilitation potential.
2. Identify how rehabilitation potential had been assessed, including key deficits, clinical tools and decision-making frameworks, by whom they were used, and the timing of the assessment.

2.4 Method

2.4.1 Inclusion and exclusion criteria

2.4.1.1 Types of participants

This review considered studies that focused on rehabilitation interventions for older people with frailty or multiple comorbidities where recovery trajectories are particularly uncertain, rather than on patients affected by a single impairment such as stroke, hip fractures or musculoskeletal injury where recovery trajectories are more predictable. Adults aged over 65 years were included.

2.4.1.2 Types of intervention(s)/phenomena of interest

The review considered studies that included the assessment of rehabilitation potential and clinical decision-making during assessment for programmes of rehabilitation. Participants in receipt of specialist stroke rehabilitation, specialist fracture care, specialist end of life care or with a terminal diagnosis were excluded from this review.

2.4.1.3 Types of outcomes

This review considered studies that reported on the following outcomes: functional improvements or improvements in activities of daily living. Initial scoping of the literature had identified a number of articles which described rehabilitation potential and its influence on end-points related to decisions about access to and provision of rehabilitation interventions or services. Therefore, these were also included in the

review as outcomes, even though they may be thought of as process measures.

2.4.1.4 Context

The review considered assessment for rehabilitation programmes, assessment of rehabilitation potential or rehabilitation programmes that were delivered within hospitals, community settings or usual place of residence.

2.4.2 Types of studies

The review considered papers which presented primary research, including randomized controlled trials, non-randomized controlled trials, quasi-experimental studies, before and after studies, prospective and retrospective cohort studies, case-control studies, analytical cross-sectional studies, case series, individual case reports, descriptive cross-sectional studies, phenomenology, grounded theory, ethnography, action research and feminist research. Secondary research in the form of narrative reviews, evidence summaries or systematic reviews were also considered in order to provide a broad assay of the evidence. Opinion pieces, editorials and books were excluded.

2.4.3 Search strategies

The search strategy aimed to find both published studies and grey literature. An electronic, three-step search strategy was used. An initial search was carried out in all databases using the term of “rehabilitation potential” as a keyword. A second search was carried out using Medical Subject Headings (MeSH) combined with the keyword “rehabilitation potential” across all included databases from inception to November 2017 (see Table 4 for MeSH terms). Thirdly, the reference lists of all identified reports and articles were searched for additional studies. This is commonly referred to as a citation search. The inclusion of citations by other authors is a feature of well-designed and documented reviews and may positively enhance the scientific impact of the findings (182). Studies published in the English Language were included. The databases searched were: Medline (Ovid 1946-present), CINAHL Plus with full text (EBSCO), EMBASE (Ovid), AMED (Allied and Complementary

Medicine, Ovid), PsycINFO (Ovid), PEDro, Cochrane Library and Web of Science. The search for grey literature included: ProQuest Dissertations and Theses, Trip (Turning Research into Practice) and EThOS. Justification for the inclusion of each database is included in Table 4.

Table 4 - Search terms and justification for database selection.

Database	Search and Index Terms	Justification for inclusion
Medline (OVID 1946-present)	“Rehabilitation potential” OR Frail Elderly/ or "Aged, 80 and over"/ or Aged/ AND "Physical and Rehabilitation medicine"/ or Rehabilitation/	Biomedical and clinical medical literature, includes multidisciplinary research
CINAHL Plus full text (EBSCO)	(Rehabilitation potential) OR (MH "Frail Elderly") OR (MH "Aged, Hospitalized") OR (MH "Aged, 80 and Over") AND (MH "Rehabilitation)	Nursing and Allied Health Professionals journals reflecting the multidisciplinary nature of rehabilitation practice and rehabilitation potential assessments
EMBASE (Ovid)	Rehabilitation potential/OR frail Elderly/OR aged/Or (aged 80 and over) AND Geriatric rehabilitation AND rehabilitation	International coverage across biomedical journals from 90 countries
AMED (Allied and Complementary Medicine, OVID)	Rehabilitation potential/OR Aged/OR Frail Elderly/ AND Rehabilitation/	Research from Physiotherapy, Allied Health and nursing, reflecting MDT nature of rehabilitation. European coverage that may be excluded from CINAHL

Database	Search and Index Terms	Justification for inclusion
PsycINFO (OVID)	Rehabilitation potential OR Aging AE OR Geriatric patients AE OR Geriatrics AE AND Rehabilitation AE	Focuses on behavioural and social sciences, embracing the holistic approach of rehabilitation
PEDRO	Frailty aged rehabilitation assessment	Physiotherapy evidence database of randomized trials, systematic reviews and clinical practice guidelines
Cochrane Library	“Rehabilitation potential” OR “older people” OR “rehabilitation.”	Focus on medicine and healthcare specialities to inform healthcare, decision-making and clinical practice
Web of Science	TOPIC" older people" and TOPIC "rehabilitation assessment" OR “Rehabilitation potential”	Includes citations from across healthcare
ProQuest Dissertations and Theses	“Older people” OR “frail elderly” AND “Rehabilitation” OR “Rehabilitation potential”	Searching across worldwide databases of dissertations and theses for unpublished work

Database	Search and Index Terms	Justification for inclusion
Trip (Turning Research into Practice)	"Older people" AND "rehabilitation" OR "rehabilitation potential"	Focus on evidence which explores research into clinical practice
EThOS	"Older people OR frail elderly AND rehabilitation" OR "rehabilitation potential"	UK thesis repository

2.4.4 Data selection

The searches were completed by one reviewer (AC). Titles and abstracts were screened by one reviewer (AC), with potential papers retrieved and independently screened by two reviewers (AC and member of study team PL, SG, ALG) against the inclusion and exclusion criteria. Disagreements were resolved through discussions with the study team (AC, PL, SG, ALG).

2.4.5 Data extraction

Two reviewers (AC and a combination of PL/SG/ALG) independently extracted the information from each included study and recorded the findings on a standardised data extraction form (Appendix C). This allowed specific details about the interventions, participants, methods, context and outcomes to be recorded, alongside definitions of rehabilitation potential, methods of assessment and theoretical underpinnings alongside biases in study design and reporting. The data extraction form was piloted with a member of the study team and a sample of five papers to ensure that it was fit for purpose, unambiguous and clear.

2.4.6 Data analysis

Results from the studies were displayed in descriptive tables and discussed amongst the study team. Mapping reviews have the advantage of taking into account *a priori* and emergent themes from the evidence base, addressing specific questions to

inform theory development and subsequent intervention design. Such reviews characterise the quantity and quality of available literature by design and key features (176). Data was analysed by publication rate by year, country of publication, study type, participant types and study settings. *A priori* categories were established based upon the World Health Organization (WHO) International Classification of Functioning, Disability, and Health (ICF) (44). This enabled the theoretical underpinnings and components of rehabilitation potential assessment relating to health conditions, body functions and structures, activities, participation, personal and environmental factors to be identified. Further discussion on the WHO ICF (44) can be found in chapter one. Categories were added to the analytical framework based upon important insights from included articles that were not adequately captured by the *a priori* headings. A narrative approach to reporting was adopted to inform the development of the RePAT intervention.

2.5 Results

There were 8896 papers identified through bibliographic searches with an additional ten references through citation searching. After duplicates were removed, 7964 records titles and abstracts were screened against the inclusion criteria and 7863 were excluded. Based upon a review of the abstracts, 101 articles were obtained for full review, which were identified as describing rehabilitation potential or similar descriptors. A further 51 articles were excluded: 19 articles described research not specific to rehabilitation, five articles focused on outcome measure validation and use, five articles were not specific to the older population, three focused on models of rehabilitation care provision, two were published in non-English language, one was an opinion piece, six were conference abstracts where full results were unavailable and one was specific to stroke. The nine articles classified as 'unable to obtain' were checked on the British Library Database for availability and in addition, authors were contacted via email to request copies of the publications, but no responses were obtained. A total of 49 articles met the inclusion criteria and considered in full. A PRISMA diagram is shown in Figure 11. An example of a completed search can be found in Appendix D.

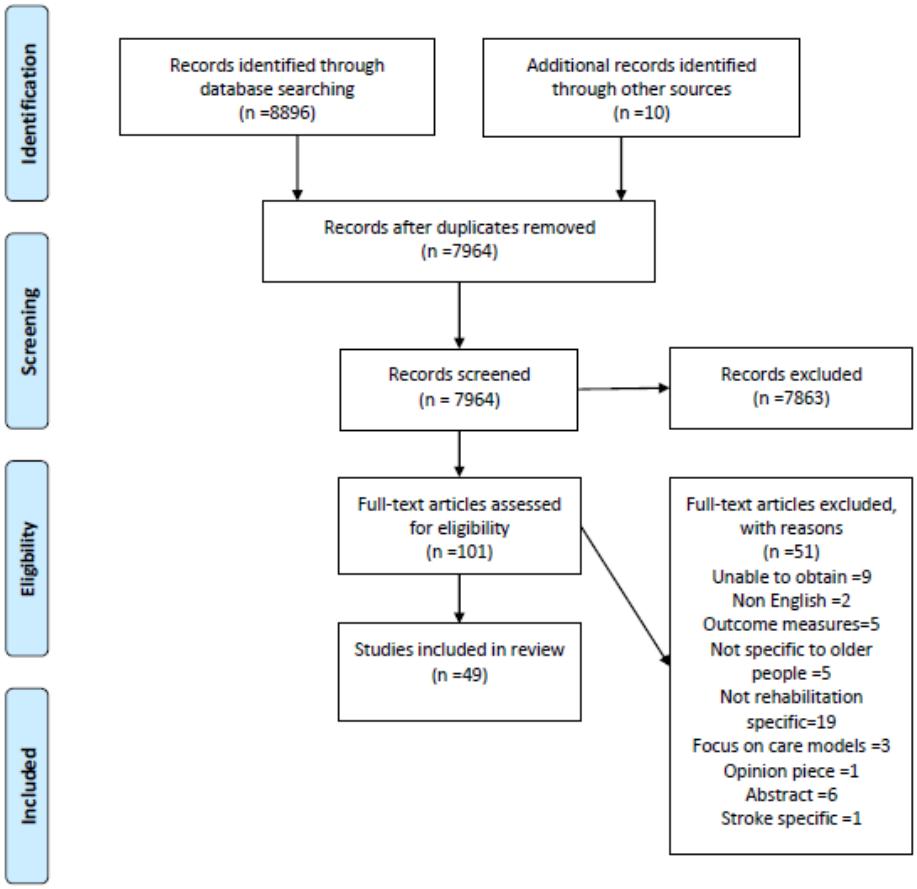


Figure 11 - PRISMA diagram (183).

2.5.1 Articles by country

Table 5 outlines the countries in which the articles were published.

Table 5 - Number of articles by country.

Continent/Region	Number of publications
North America	21
Europe	14
Australasia	5
Asia	3
International collaborations	6
Total	**49**

2.5.2 Publication dates

Publication dates ranged from 1959 to 2017 with the greatest number of articles published in 2012 and 2016. Publication rate by year is shown in Figure 12.

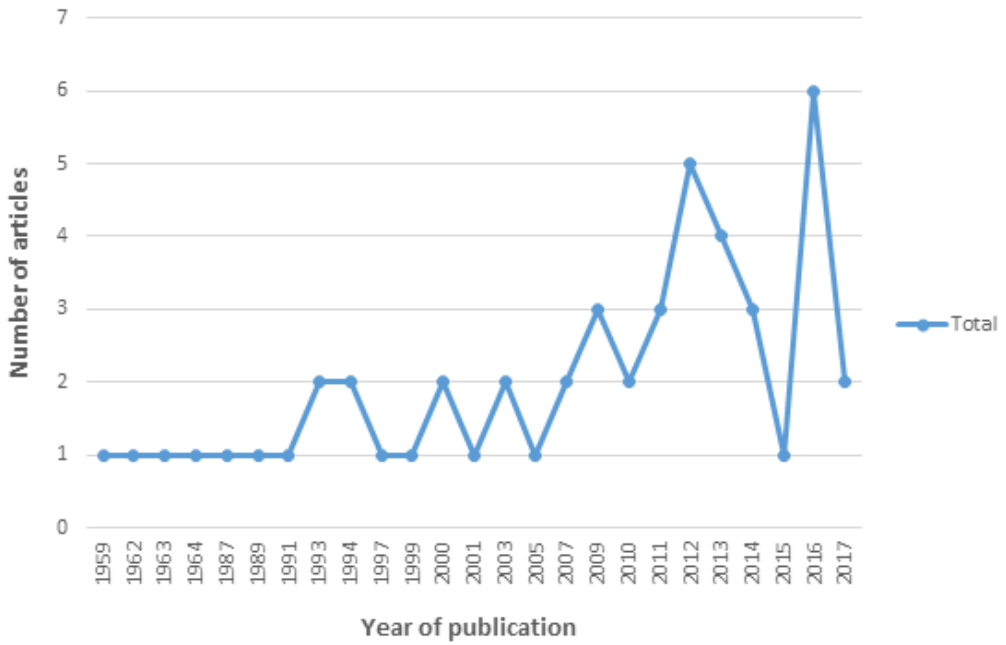


Figure 12 - Number of articles by country.

2.5.3 Study types

The review included a wide range of study designs: 25 observational studies, four clinical assessment protocols, three discussion articles, two descriptive studies, two comparisons of clinical data against machine learning algorithms, two qualitative interview studies, two cohort studies and one of each of the following: randomised controlled trial, case report, comparison of inter-rater reliability, expert consensus, quantitative survey data, chart reviews, tool validation, literature review and a systematic review.

2.5.4 Study setting

For experimental studies included in the review, 15 took place in a hospital, six in the community, seven in care homes, two in intermediate care, two in day hospitals, one compared the hospital setting with intermediate care and one compared community

rehabilitation against hospital rehabilitation. Where sample sizes were reported, they are displayed in Table 6.

Table 6 - Study settings and number of participants (where reported).

Setting	Number of studies	Number of participants
Acute hospital	15	9086
Intermediate care	2	10901
Community-based	6	25322
Care homes	7	185591
Community versus hospital rehabilitation	1	302
Day hospital	2	248
Total	**33**	**231,450**

Rehabilitation was provided in generic models of care as opposed to specialist stroke and hip fracture services.

2.5.5 Study participants

The studies identified in this review included a wide range of participants, patient groups and diagnoses. In studies which considered how clinicians assessed rehabilitation potential, assessments were carried out by a single profession or as part of a multidisciplinary endeavour (Table 7).

Table 7 - Clinicians involved in rehabilitation potential studies.

Study	Participants	Sample size
Cunningham et al. (134)	Occupational therapist, physiotherapist, nurse, doctor	4
Hoenig et al. (184)	Physician	98
Jette et al. (185)	Occupational therapist, physiotherapist	9
McPhail et al. (186)	Physiotherapist	23
Myers et al. (187)	Nurse	unclear

The majority of studies included diverse patient groups who were in receipt of rehabilitation assessments or interventions (Table 8). Study populations were described using a diverse range of variables which included: frailty, multimorbidity, cognitive status, functional abilities and activities of daily living. Diagnoses commonly identified included: Alzheimer's diseases and other dementias, orthopaedic (osteoarthritis and falls), cardiac and respiratory conditions, stroke and hip fractures. Where reported, mean ages ranged from 65 to 88.1 years. A total of 14 articles did not report on specific patient populations or conditions (70, 184, 185, 188-198).

Table 8 - Patient participants demographics (where reported).

X= not reported

Author	Patient group	Sample size	Age (years, mean)	Frailty or Comorbidity measures
Aberg et al. (199)	Stroke, hip fracture, spinal injury, myocardial infarction, respiratory insufficiency	15	x	x
Abrahamsen et al (200)	Medical (infection), orthopaedic (fallers, contusions and fractures)	961 (medical n=615) (orthopaedic n=346)	85	567 (59%) had 5 or more diagnoses
Alekseyev et al. (201)	Stroke, medical debility, cardiac, neuromuscular, respiratory, other	Unclear	67.7	x
Arling et al. (202)	Mixed morbidities (cardiovascular disease, stroke, cancer, dementia, neurological, endocrine and psychiatric disorders	558	77	x
Arling et al. (203)	Mixed cognitive impairments, multi-morbidity	1419 (29.2% cognitive impairment, 38.8% pain, 62.6% cardiovascular)	82.6	x
Badriah et al. (204)	Stroke, orthopaedic, disuse syndrome	835 (stroke n=205, orthopaedic n=441, disuse n=189)	76.49, 78.7, 79.17	x

Author	Patient group	Sample size	Age (years, mean)	Frailty or Comorbidity measures
Cameron et al. (205)	Stroke, hip fracture, joint replacement, amputation, orthopaedic	560 (stroke n=87, hip fracture n=103, joint replacement n=96, lower limb amputation n=12, other orthopaedic n=170, other rehabilitation n=92)	80	x
Caradoc-Davies et al. (206)	Unclear	94	x	X
Chang et al. (129)	Physical and cognitive impairment (diagnosis not given)	581 (79.7% cognitive intact, 20.2% mild-moderate cognitive impairment, 92.8% physically independent, 7.2% physically dependent)	80.9	X
Chou et al. (207)	Unclear but impaired in activities of daily living	83	80.9	x
Cunningham et al. (134)	15% stroke, 11% hip fracture, 26% cardiorespiratory, 7% musculoskeletal, 4% cognitively impaired, 37% other	27	81	x
Eagle et al. (208)	Depression, stroke, degenerative joint disease	113	79.6 (treatment group)	x
Fortinsky (209)	In a care home, unclear diagnoses	8665	60 years plus (mean not given)	x

Author	Patient group	Sample size	Age (years, mean)	Frailty or Comorbidity measures
Fusco et al. (210)	Stroke, hip fracture, osteoarthritis, Parkinson's disease	598 (44.3% stroke, 31.8% hip fracture, 11% OA, 9.5% Parkinson's disease)	82	2.3 +- 1.5 number comorbidities
Gordon et al. (127)	Stroke, mental deficiency, hip fracture, amputation, other	112	76	x
Haley et al. (211)	Fractures, cardiac conditions	75	81.3	Edmonton Frail Scale 8.65 mean, 6 mean comorbidities
Hartley et al. (212)	Cognitively intact and cognitive impairment admitted to an acute hospital	590	84.6 and 88.1	Charlson Comorbidity Index (CCI), Clinical Frailty Score for each group reported
Hershkovitz & Brill (213)	Stroke, hip fracture, joint replacement, other conditions	135	72 male, 74 female	x
Johansen et al. 2011 (214)	Stroke, osteoarthritis, hip fracture, chronic diseases	202 (Stroke n=34, Osteoarthritis n=23, Hip fracture n=82, other n=61)	80.7	x
Johansen et al. 2012 (215)	Stroke, osteoarthritis, hip fracture, chronic diseases	255 (17% stroke, 13% osteoarthritis, 36% fracture, 34% other)	81.7	x
Johansen et al. (133)	Stroke, osteoarthritis, hip fracture, chronic diseases	302	80.7 and 80.2	x

Author	Patient group	Sample size	Age (years, mean)	Frailty or Comorbidity measures
Jupp et al. (216)	Multi-morbidity (not defined)	624	80.9, 81.6, 85.1	x
Leung et al. (217)	Stroke, hip fracture, medically complex, other musculoskeletal conditions	104 (29.8% hip fracture, 30.7% medically complex, 18.3% stroke, 21.2% other)	81.6	6.8 +- 2.5 number of comorbidities
McPhail et al. (186)	Orthopaedic, stroke, other neurological conditions, geriatric deconditioning, other disabling conditions requiring rehabilitation	272	79 (low cognition) 71.7 (high cognition)	x
Mofina & Guthrie (218)	Impairments in cognition, activities of daily living and instrumental activities of daily living	111,804	83.2	CHESS scale (63% low, 37% mild or severe)
Morghen et al. (219)	Orthopaedic, cardiac, pulmonary, neurological, immobility syndrome	556	81.6 (low gain) 78.2 (high gain)	Cumulative illness rating scale 1.7 (low gain) 1.6 (high gain)
Muller et al. (220)	Unclear - impaired activities of daily living	400	x	x
Myers et al. (187)	Medical and surgical diagnoses	362	79.7	x

Author	Patient group	Sample size	Age (years, mean)	Frailty or Comorbidity measures
Reynolds et al. (124)	Selection of diagnoses, given by system not diagnosis	1480	77	2.4 major diagnoses per patient
Seematter-Bagnoud et al. (221)	Hip fracture, osteoarthritis, Cardiovascular, respiratory, cerebrovascular diseases, Gastrointestinal	2754	Stratified by age group (<75, 75-84, ≥ 85)	46% had 5 or more diagnoses
Singh et al. (222)	Geriatric syndromes	265	82.6	By outcome using frailty index and CCI
Sinn et al. (223)	Co-morbidities (not defined)	9940 (59.1% hypertension, 31.7% diabetes, 31.4% osteoarthritis, 20% Stroke, 16.9% Alzheimer's disease)	77.9	Adjusted for comorbidities
Stolee et al. (224)	Elderly rehabilitation group	173	81	x
Zhu et al. (225)	Unclear	24,724	76.3	15.7% had Alzheimer's or dementia diagnosis
Zhu et al. (130)	Unclear	24,724	x	x

The findings of the mapping review coalesced around specific themes relating to rehabilitation potential, namely:

- Definitions of rehabilitation potential
- Who was involved in the assessment of rehabilitation potential
- Where rehabilitation potential was assessed
- When assessments of rehabilitation potential were completed
- The use of decision-making frameworks
- What was included in an assessment of rehabilitation potential
- How rehabilitation potential was measured or categorised
- Definitions of success
- External factors influencing the assessment of rehabilitation potential

2.5.6 Definitions of rehabilitation potential

The term rehabilitation potential first appeared in the published literature in 1959 (124) where physiatrists (doctors specialising in physical medicine and rehabilitation) rated the rehabilitation potential of patients living in chronic disease institutions as "definite", "slight" or "none". The concept of rehabilitation potential was poorly defined as a "potential for restoration" and was said to involve the consideration of a number of clinical factors. Nagi (194) stated that rehabilitation potential involved a prognostic evaluation of levels of functioning an individual is capable of reaching under certain circumstances. Muller et al. (220) stated that individuals with rehabilitation potential maintained self-care activities and social functions at higher levels than untreated populations.

A number of studies were identified that provided definitions of rehabilitation potential. Cunningham et al. (134), Mosqueda (193). and New (70) all adopted the definition provided by Rentz:

> "*The prognostic indicator of how the patient will perform within a standard inpatient rehabilitation program…involving an estimation of the patient's personal strengths (i.e., level of motivation/cooperation, cognitive status and personality constellation), medical complications and familial support as they interface with therapies and rehabilitation environment. In essence, the assessment of rehabilitation potential*

estimates the individual's capability of cooperating with a rehabilitation program and making measured functional gains in ambulation and self-care…appraising whether the patient's current quality of life can be improved upon despite chronic or multiple disabilities."(69)

In three studies by Johansen et al. (133, 214, 215) a working definition of rehabilitation potential by the Norwegian Government (150), was adopted, whereby rehabilitation potential was said to be*:*

"The physiological and psychological possibilities of a disabled person to restore, improve or maintain an optimal level of function and quality of life." (150)

Whilst this definition emphasises the relationship between physical and psychological health and well-being, the definition was not specific to older people living with frailty.

Rehabilitation potential was described in a number of discrete ways in observational studies using validated data sets such as the InterRAI (129, 130, 190, 191, 218, 223, 225) or the US Minimum Data Set (187, 192, 203, 207, 209). The RAI-MDS 2.0, 2.1 and RAI-HC are a suite of standardised and comprehensive clinical assessments which have been widely adopted internationally and mandated by governments in both Canada and Australia (226). Rehabilitation potential was said to be present if the individual undergoing rehabilitation and/or a member of the complex continuing care team thought she or he was capable of increased independence in some objectively measured functional areas (129, 203, 207, 218, 223). This definition was further refined by the work of Zhu et al. (130, 225) whereby true rehabilitation potential was said to be present if an individual demonstrated measurable improvements in ADL functioning (measured using the interRAI ADL long form) over a period of one year or if they remained at home at the end of the rehabilitation intervention. The InterRAI Acute Care Assessment form (190) considered rehabilitation potential as a key factor in identifying rehabilitation need and effectiveness. Gray et al. (190, 191) reported that rehabilitation potential encompassed an individual's potential to improve in ADL's if certain conditions were met. However, some tools recognised that improvement may not always be the primary aim of rehabilitation programmes. Morris et al. (197, 198) stated that

individuals may benefit from rehabilitation which sought to prevent avoidable functional decline in individuals with existing ADL deficits and needs.

In an observational study by Alekseyev et al. (201), an individual's potential to benefit from rehabilitation was aligned to key risk factors for involvement in rehabilitation programmes. These findings led to the development of a Pre-Admission Screening Checklist (PSC) outlining absolute and relative contraindications to rehabilitation which may prevent individuals' participation, involvement or ability to improve with rehabilitation programmes. Whilst these may prove useful to guide decision making, the PSC has not been robustly tested or validated.

Studies were identified which stated that they selected patients for rehabilitation programmes on the basis that they had rehabilitation potential (200, 204, 208) but robust operational definitions were not evident in the papers. Badriah et al. (204), sought to design a measurement of rehabilitation potential based on the Functional Independence Measure (FIM), where rehabilitation potential was calculated by dividing the change in FIM total score at the beginning of rehabilitation therapy and hospital discharge by the FIM total score target (total maximum FIM minus FIM score at the start of rehabilitation). In this case, rehabilitation potential was assumed to represent an improvement in functional abilities, but a concise definition was not provided in the study. This involved a retrospective understanding of an individual's rehabilitation potential.

Several studies were identified where the term 'rehabilitation potential' was used interchangeably as a predictor of rehabilitation response. Cameron et al.'s (205) definition considered individuals to have rehabilitation potential if they were predicted to benefit from MDT rehabilitation. Whilst embracing multi-disciplinary working, the concept of 'benefit' remains poorly defined. A number of authors (127, 184, 192, 206, 209, 210, 212, 213, 221) adopted a functionally-orientated approach to definitions where individuals had rehabilitation potential if they were likely to achieve restoration of function after an acute event. However, Hoenig et al. (184) considered that rehabilitation potential was better expressed by gaining improvements in quality of life rather than by functional gain alone. Gray et al. (190) and Hartley et al. (212) used place of residence as a proxy for functional ability whereby individuals had rehabilitation potential if they were predicted to be likely to

be discharged back to their usual place of residence after an acute episode of ill health.

Definitions of rehabilitation potential in older people demonstrated considerable heterogeneity and a lack of consensus from the literature identified in this study.

2.5.7 Who was involved in the assessment of rehabilitation potential

Assessments of rehabilitation potential involved a wide range of healthcare professionals. These included; physicians (124, 127, 193), rehabilitation nurses (187), the MDT (70, 134), untrained care home staff (129, 209), disability or medical assessors (190, 191, 194, 197, 198) or by the patient themselves (129). This was in part due to the design of research studies, rather than practice described in routine clinical care. Chang et al. (129) assessed the differences between self-perceived and carer-evaluated rehabilitation needs or rehabilitation potential among care home residents in Taiwan. The study reported that 63.2% (n=367) of residents believed that their physical function would improve, but just 9.8% (n=57) of their caregivers deemed them to have rehabilitation potential. In those with mild to moderate cognitive impairment, as measured by the MDS Cognitive scale, care-givers rated 24.6% (29/118) of the residents as having rehabilitation potential whereas 45.8% of residents (54/118) believed they had potential to improve. Both findings were statistically significant.

Zhu et al. (130, 225) examined the identification of rehabilitation potential using data from machine-driven learning from large historical datasets rather than through direct clinical assessment. They reported that the use of 'big data' had the potential to influence and inform clinical decision making, care planning and had a role in predicting rehabilitation outcomes.

In studies which explored rehabilitation outcomes, the rehabilitation assessment was predominantly completed by the MDT.(184, 185, 192, 196, 206-208, 210, 213, 219, 223, 224) For those studies where MDT composition was reported, results can be found in Table 9.

Table 9 - Composition of multi-disciplinary team members involved in assessments of rehabilitation potential.

Study	RP Specific	MDT	Physician	General Practitioner	Geriatrician	Physiotherapist	Occupational Therapist	Nurse	Social Worker	Care home staff	Patient	Relatives	Carer	Dietitian	Disability examiner	Researcher	Psychology	Speech therapy
Aberg et al. (199)						●												
Abrahamsen et al. (200)			●															
Alekseyev et al. (201)			●															
Arling et al. (202)										●								
Badriah et al. (204)						●	●											
Cameron et al. (205)			●															
Caradoc-Davies et al. (206)			●					●			●	●						
Chang et al. (129)	●										●		●					
Chou et al. (207)										●	●							

Study	RP Specific	MDT	Physician	General Practitioner	Geriatrician	Physiotherapist	Occupational Therapist	Nurse	Social Worker	Care home staff	Patient	Relatives	Carer	Dietitian	Disability examiner	Researcher	Psychology	Speech therapy
Cunningham et al. (134)	●	●			●	●	●	●										
Eagle et al. (208)			●															
Fortinsky (209)	●									●								
Fusco et al. (210)		●																
Gordon et al. (127)	●	●	●															
Gray et al. (190)	●													●				
Gray et al. (191)	●	●																
Haley et al. (211)											●	●				●		
Hartley et al. (212)		●																
Hershkovitz & Brill (213)		●																
Hoenig et al. (184)		●	●			●	●	●	●								●	●
Jette et al. (185)		●				●	●											
Johansen et al. 2011 (214)		●		●		●	●	●										
Johansen et al. 2012 (215)		●														●		
McPhail et al. (186)						●												

Study	RP Specific	MDT	Physician	General Practitioner	Geriatrician	Physiotherapist	Occupational Therapist	Nurse	Social Worker	Care home staff	Patient	Relatives	Carer	Dietitian	Disability examiner	Researcher	Psychology	Speech therapy
Morris et al. (197)	●							●										
Moseley (192)		●																
Mosqeuda (193)	●	●	●															
Muller et al. (220)																●		
Myers et al. (187)	●							●										
Nagi (194)	●														●			
New (70)	●	●	●															
Reynolds et al. (124)	●		●															
Seematter-Bagnoud et al. (221)								●										
Singh et al. (222)					●													
Sinn et al. (223)		●																
Stolee et al. (224)		●				●	●	●						●				
Wells et al. (196)		●																

Patient or clients and carers were sometimes included in the rehabilitation assessment (190, 191, 195, 206, 207), but the extent of their involvement or influence on decision-making was unclear.

Although the research literature identified in this study made it clear, for the most part, which team members were involved in assessing rehabilitation potential, it was less clear how those findings were collated to guide decision making usefully and who, from amongst the team members involved, made the final decision.

2.5.8 Where rehabilitation potential was assessed

Where rehabilitation potential was assessed, it was variably reported. The locations of rehabilitation assessments were highly contextualised by the study design and aims. Assessments took place in outpatient geriatric clinics (194, 199), intermediate care units (133, 200), acute or subacute inpatient geriatric wards (197, 198, 211, 212, 222), inpatient rehabilitation units (70, 134, 186, 194, 196, 201, 204-206, 216, 219, 224), care homes, (124, 127, 129, 194, 202, 203, 207, 209, 220), rehabilitation situated in care homes (210) and day hospitals (208, 213). Some studies included multiple sites where rehabilitation assessments took place; in either the patient's own home, inpatient setting or nursing homes (133, 214, 223).

In some studies, it was unclear where the assessment of or the decision about an individual's rehabilitation potential took place (130, 184, 192, 193, 218, 221, 225).

2.5.9 When assessments of rehabilitation potential were completed

In studies which specifically explored rehabilitation potential, the decision that an individual did or did not have rehabilitation potential was predominantly made at a single time point. Assessments occurred at the time of deciding on a patients suitability for admission to a rehabilitation unit (127), to guide care planning after hospital admission (70, 129, 134), as a snapshot assessment for a study (124) or during application for state benefits (194). However, some studies used multiple points: during admission and prior to discharge (187) and at baseline and one-year

follow-up (220). In other studies, it was unclear when the assessment and decision that an individual had rehabilitation potential was made (130, 193, 209, 225).

In studies which explored rehabilitation outcomes and effectiveness, assessment points were defined with greater clarity and at multiple time points. These were commonly at admission, discharge (from a rehabilitation unit or programme) and at intervals specific to the study including two, three, six month and one-year follow-up assessments (133, 186, 192, 199, 200, 204-206, 210, 212-215, 219, 222, 224). However, some studies did include single time point assessments (196, 202, 203, 208, 211, 216, 221, 223). In multiple studies, it was unclear or unspecified when assessments took place in an individual's disease or rehabilitation trajectory (130, 184, 185, 189, 207, 218, 225).

The interRAI and MDS suite of tools were the only instruments identified which sought to assess an individual's pre-morbid abilities as part of the rehabilitation assessment (190, 191). Pre-morbid abilities described an individual's abilities in the hours or days leading up to an acute hospital admission. These were deemed to be an essential component of the assessment and provided information on the individual prior to their current episode of ill health. The 'baseline' abilities were said to provide the best idea of what an individual was capable of achieving through rehabilitation programmes and thus useful as a prognostic indicator.

2.5.10 The use of decision-making frameworks

The identification of an individual's rehabilitation potential was said to involve clinical judgement and reasoning (134, 187, 212), but there was limited evidence for the use of formal decision-making frameworks.

The Pre-Admission Screening Checklist (PSC) (201) was developed from a sample of 549 referrals over a six month period. Medical charts were reviewed for risk factors for readmission to acute care from a rehabilitation unit. Risk factors included: comorbidities, functional status (as measured by the FIM), admission diagnosis and reasons for readmission to acute care. The subsequent PSC formed a type of safety checklist to guide decision making but was found to be largely subjective and unsubstantiated. Clinicians were asked to use simple binary ratings of yes, no or not

applicable on absolute and relative contraindications to rehabilitation. These included medical contraindications such as uncontrolled hypo- or hypertension, postural hypotension, cardiac instability, blood glucose levels, if the patient was perceived to be able to tolerate and participate in three hours of daily therapy or if the patient was motivated for rehabilitation.

Jupp et al. (216) developed a tool to aid clinicians in predicting outcomes after acute hospitalization and guide rehabilitation assessments based on factors linked to discharges to residential or nursing home placements. The tool incorporated assessments of gait, eyesight, mental state and sedation (GEMS). In the validation study, patients admitted to care homes were found more likely to have abnormal vision, impaired cognitive abilities, gait abnormalities and taking sedative medications.

The interRAI Clinical Assessment Protocols (CAP), developed for acute and community-dwelling populations (190, 191, 197, 198), provided decision making frameworks for use in older and vulnerable populations. The ADL CAP (197) addressed individuals' difficulties in ADL performance (personal hygiene, dressing, walking, transferring, eating), cognitive function and recent medical events. An overall score indicated whether the individual 'triggered' to prevent decline, facilitate improvement or triggered no action. A series of clinical prompts and care plans were then recommended to guide care planning.

The Instrumental Activities of Daily Living (IADL) CAP (198) targeted higher-level daily activities including housework, meal preparation, transportation and shopping. These tools were used in two studies identified in the review (218, 223). Two studies by Zhu et al. (130, 225) compared the use of CAPs with a machine-driven algorithm to guide rehabilitation potential decision making in the Canadian home care setting. Findings indicated that both the *K*-nearest neighbour algorithm (130) and Support Vector Machine (225) had superior predictive powers for rehabilitation potential and subsequent rehabilitation outcomes when compared to the ADLCAP. Machine learning algorithms provided data which was not easily applied to the clinical setting and further work to refine and operationalise the tools are required (225) and to understand the practical implications of applying big data to the clinical decision-making.

2.5.11 What was included in an assessment of rehabilitation potential

In assessing for rehabilitation potential and similar descriptors, a number of key components were identified in the literature. Several studies revealed that the assessment of rehabilitation potential required a holistic assessment approach (218) and should address biopsychosocial needs and abilities (70). However, a lack of specificity was found in the composition of these assessments. Key areas that were identified included: medical, functional, mental health, social and environmental needs.

2.5.11.1 Medical

The evidence identified suggests a pertinent role in assessing individuals' medical problems. This included the identification of co-morbidities and diagnoses (70, 127, 130, 133, 184, 185, 187, 189, 193-202, 208, 210, 212, 214-216, 219, 223-225) which were likely to affect rehabilitation participation or outcome. These were measured by counting the number and type of underlying diseases (192, 210) or using the Charlson Co-morbidity Index (222).

Medical stability was frequently seen as a prerequisite for an individual being able to take part in rehabilitation (70) or tolerate periods of rehabilitation (201). Common features of assessments included the identification of relevant medications which might affect rehabilitation outcome or participation (190, 191, 197, 198, 210), pain (187, 190, 191, 195, 197, 198, 224), nutritional status (190, 191, 197, 198, 210, 219), continence (134, 191, 192, 210, 224) tissue viability (202) and communication abilities (190, 195, 210, 223), including vision (190, 197, 198), and hearing (191). There was a distinct lack of evidence to support the exact composition of the medical component of rehabilitation potential assessments, as the evidence identified was largely based on opinion rather than to specific baseline measures and variables.

2.5.11.2 Functional

In considering an individual's rehabilitation potential, assessing and identifying functional abilities were strongly represented in the data. Physical functional abilities

such as activities of daily of living were identified as key components of a rehabilitation potential or rehabilitation assessment (70, 130, 133, 185-187, 189-191, 193, 195, 197, 198, 204, 206-210, 212-216, 219-224). Some studies were more specific with their definitions of function such as mobility (130, 187, 201, 211, 224, 225), transfers (201) or occupational abilities (194). Specific barriers to physical function such as muscle strength, neurological deficits (192) or sensation (124, 210) were found to be included in assessments. Functional abilities were largely understood and measured through assessing activities of daily living (130, 133, 187, 190, 191, 195, 197, 198, 202, 206, 207, 209, 213-215, 221, 224, 225).

2.5.11.3 Mental health

Establishing an individual's psychological abilities or deficits (186, 193, 195, 196, 212, 214, 215) was included in assessing rehabilitation potential. Studies cited that they specifically considered an individual's cognitive abilities during rehabilitation potential and rehabilitation assessments (130, 184, 186, 187, 189-191, 197, 198, 204, 207, 210, 213-215, 219, 223). Gray et al. (191) stated that assessing cognitive skills for decision making was essential in rehabilitation assessments, whereby short term memory recall, procedural and situational memory were considered.

An assessment of mood (190, 191, 198, 206, 210, 223) disruptive behaviours (70, 127, 187, 191, 192, 195, 210, 223) and depression (189, 191, 196, 210, 223) were found to be included in rehabilitation assessments.

Assessments of IADLs, describing key life tasks such as managing finances, cleaning, shopping and meal preparation were identified (190, 191, 198, 224). Impairments in IADL can often be present in those with mild cognitive deficits and the early stages of dementia (227) so may be an important indicator of cognitive abilities and function.

2.5.11.4 Social

An assessment of rehabilitation potential was found to require an understanding of an individual's social circumstances (184, 187, 188, 200, 206, 210, 220, 223). Understanding social status and conditions were important factors in determining the recovery of older community-dwelling adults who received intermediate care rehabilitation following an acute hospital admission (200). The ability to live at home

was reported to be a "*good and practical measure of recovery*" (200) in this population. Indeed social situation, where an individual lives, and the type of support they receive, were found to be strong predictors of rehabilitation outcome (221). Mosqueda (193) outlined that it was not only important to understand existing social support mechanisms but also to question the reliability, number and type of support offered to an individual, specifically inquiring if carers were able to provide practical or emotional support.

Caradoc-Davies et al. (206) explored the perceived benefits of rehabilitation between health professionals and clients, finding that perception of benefit was positively predicted by better relationships with spouses, friends and not feeling lonely by clients in receipt of rehabilitation. Those with strong social support mechanisms were more positive about the potential benefit of rehabilitation. New (70) proposed that patients with strong family, social and financial support had better rehabilitation outcomes and assessing support structures was an integral component of rehabilitation assessments.

2.5.11.5 Environmental

The literature highlighted the need to asses an individual's environment (70, 193-195, 208). Mosqueda (193) suggested that environmental assessments should include understanding the environment of the usual place of residence and the current or proposed rehabilitation venue. This view is supported by Nagi (194), who stated that the environment should be considered in terms of the individuals' level of functioning within that specific environment, suggesting that assessments were context-specific.

2.5.12 How rehabilitation potential was measured or categorised

In studies specific to rehabilitation potential, a number of measures were identified. The interRAI tools were used to measure rehabilitation potential (129, 207, 209, 210, 218, 223). A study by Chang et al. (129) explored the subjective perception of rehabilitation potential where residents and caregivers were asked to state whether they thought rehabilitation would improve resident's ADLs. This involved a binary

yes/no response and the study found significant disagreement on rehabilitation potential between carers and residents in the care home setting. In 2009, Myers et al. (187) asked nurses to rate individuals' rehabilitation potential as either being 0=good or 2=poor. They found a significant relationship between nurses' admission assessment of patients' rehabilitation potential and functional status as measured through ADL at discharge (r=0.20, R^2=0.04, P<0.001). When cognitive performance was considered using the Behavioral Dyscontrol Scale (228), predictions of rehabilitation potential remained significant amongst hip fracture patients (r=0.48, R^2=0.07, P,0.001). However, predictions for medical and surgical patients did not reach significance (r=0.12, R^2=0.02, p=0.13). Cunningham et al. (134), like Myers et al. (187) proposed a binary response in their study into rehabilitation potential. Members of the MDT were asked to rate the rehabilitation potential of 27 consecutive patients admitted onto a geriatric rehabilitation ward as either good or poor. They found that agreement between professionals was poor (kappa = 0.21). Other studies adopted retrospective measures, comparing outcome measures before and after rehabilitation programmes. Measures adopted included changes in individuals ADL functioning (130, 225) where gains were seen as a positive affirmation of rehabilitation potential.

Following a literature review by New (70), a traffic light system was developed to classify a patient's appropriateness for rehabilitation and by proxy their rehabilitation potential. This model, based on anecdotal evidence, proposed that 'green light' patients were always appropriate for rehabilitation, those with conversion and personality disorders, obesity or specialist nursing needs were classified as 'orange' (proceed with caution) and for patients with limited life expectancy, lack of capacity and severe dementia as red and not appropriate for rehabilitation. This system was not however designed specifically for older people, rather for a heterogeneous inpatient population.

Most aspects of medical interventions were not measured or categorized in a way that could be easily reported. Those that were quantifiable were largely measures of frailty or symptom scores. A number of outcome measures were identified which directly related to medical, functional, psychological and social domains of assessment (Table 10). No measures were found which mapped to an environmental assessment.

Table 10 - Measures used during rehabilitation potential assessments.

Medical	Functional	Psychological	Social
Edmonton Frail Scale	Elderly Mobility Scale	Cognitive Performance Scale	Index of Social Engagement
Cumulative Illness Rating Scale	General Motor Assessment Scale	Mini Mental State Examination	
Geriatric Assessment Frailty Index	Barthel	Confusion Assessment Method	
Symptom Control Check list 10	Functional Independence Measure	Montreal Cognitive Assessment	
	Older American Resources and Service Basics and Instrumental Activities of Daily Living	Geriatric Depression Scale	
	ADL Scale	Lowenthal-Haven Scale	
	IADL Scale		
	ADL Hierarchy Scale		
	Modified Rankin Scale		
	Nottingham Extended Activities of Daily Living		
	Sunnaas ADL		

Medical	Functional	Psychological	Social
	180-degree turn		
	Timed Up and Go		
	Grip strength		
	Gait speed		
	BERG balance scale		
	Wakari Scale for ADL		

Caradoc-Davies et al. (206) adopted a more holistic approach to measuring rehabilitation effectiveness using measures of patient and carer psychological wellbeing, stress, perception of control and support using the Lowenthal-Haven Scale. Quality of life measures including the Global Health Questionnaire and Geriatric Quality of life questionnaire (208), Patient Health Questionnaire (217), EQ-5D-3L (186), Symptom Control Check List -10 (133, 214, 215), Umea Life Satisfaction Checklist (133, 214), Short Form Health Survey (217) and Index of Social Engagement (223) were also identified.

Another factor, central to the concept of rehabilitation potential, was motivation. Motivation was described as being present if the patient was found to be eager to participate in therapy and took responsibility for being actively involved in their self-care (193). The Kemp model of motivation (229) was proposed, taking into account patient wants, beliefs and rewards, offset by the costs of participating in the rehabilitation programme (Figure 13).

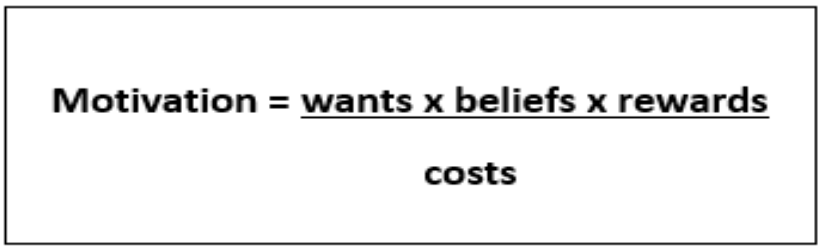


Figure 13 - Kemp model of motivation (229).

Morghen et al. (219) was the only study which sought to measure and evaluate the impact that patient participation had on predicting rehabilitation gains or outcomes. Participation was assessed using the Pittsburgh Rehabilitation Participation Scale (PRPS) (72), and functional gain was measured using the Montebello Rehabilitation Factor Score (230). The PRPS measures participation during therapy sessions, where clients were rated using a Likert Scale of 1-6 (1 = refusal to participate in a session and 6= excellent participation in all exercises, taking an active interest in exercise and/or future therapy sessions). The study found that participation was independently associated with functional gain in the elderly inpatient rehabilitation setting.

Moseley et al. (192) and Wells et al. (196) proposed the use of goal attainment as the preferred method to measure rehabilitation outcome through the use of the Goal Attainment Scale (GAS), whereby patient-centred goals are set and percentage attainment was measured.

2.5.13 Definitions of success

Studies by Myers et al., Cunningham et al. and Chang et al. (129, 134, 187) proposed that a measure of success was the percentage agreement on an individual's rehabilitation potential either amongst healthcare professionals and providers or clients.

The majority of studies identified in this review included patients who had been deemed to have rehabilitation potential, rather than studies which explored or

tested the assessment of rehabilitation potential. As a consequence, a successful outcome of rehabilitation potential was frequently linked to rehabilitation outcomes, specific to the study design, aims and objectives. Successful rehabilitation included a wide range of outcomes. These included individuals returning or remaining in their usual place of residence following rehabilitation (130, 133, 189, 200, 212, 214-216, 222), or functional gain (124, 127, 130, 133, 134, 185, 190-192, 200, 204, 206, 209-212, 214, 215, 218-221, 223). Hoenig et al. (184) expanded this further to state that rehabilitation should aim to improve an individual's ability to perform in basic or instrumental activities of daily living, and/or lead to an improvement in quality of life. They also recognised that rehabilitation should seek to improve outcomes for carers and family members as well as the individual in question. Supporting this view, McPhail et al. (186) proposed that quality of life was an important indicator of rehabilitation outcome, thus advocating the adoption of an individualised approach to care. Morghen et al. (219) suggested that a positive outcome of rehabilitation and vindication of an individual having rehabilitation potential was evidence of participation in rehabilitation programmes. Morris et al. (198) expanded this further by stating that the individual should have both an interest and capacity to carry out IADLS more independently following rehabilitation.

Frequently, improvement was identified as the optimum outcome associated with rehabilitation or rehabilitation potential amongst older people. Improvement was described as a return to premorbid abilities or an improvement in function (124, 127, 129, 130, 133, 134, 184, 190-192, 197, 198, 200, 201, 204, 206, 212, 214, 215, 218, 219, 221-223, 225). However, some studies recognised that improvement may not always be feasible in this population. Muller et al., Gray et al. and Fusco et al. (190, 210, 220) stated that maintaining an individual's current status and abilities was also a successful outcome. Poulos et al. (195) further embraced this notion, proposing that reablement programmes in dementia should go beyond improvement and consider maintenance and managing or delaying declining abilities. Assessments should identify and address causes of functional decline discrete from the natural progression of the underlying dementia diagnosis, such as medication management, acute or comorbid medical conditions, deconditioning or lack of activity.

2.5.14 External factors influencing the assessment of rehabilitation potential

Whilst a number of clinical and patient-level factors have been found to affect the decision that an individual did or did not have rehabilitation potential, external factors were also considered.

A number of factors which influenced the assessment of rehabilitation potential were identified in this review. Staff skills and training were thought to affect the transaction of a rehabilitation potential assessment and indeed the concept of rehabilitation potential appears to be linked to staff expertise, training and experience (70, 192, 209, 222). Two separate concepts emerged from the literature: the skills of staff to assess rehabilitation potential and skills for providing rehabilitation interventions. Fortinsky (209) proposed that training and clinical judgement were key factors in the assessment of rehabilitation potential, stating that older adults with complex needs may never reach the ideal of maximised function due to clinical judgements and policy guidelines that carry vague and conflicting messages about rehabilitation potential. Moseley (192) and Mofina and Guthrie (218) suggested that staff needed a thorough understanding of referral criteria to rehabilitation services in order to decide on the suitability of individuals to rehabilitation.

Funding and availability of resources were cited as factors to consider when assessing an individual's rehabilitation potential. Mosqueda (193) stated that economic reality influences rehabilitation potential, whereby resources are limited or rationed through government commissioning or insurance. Although an individual may demonstrate gains from rehabilitation during their inpatient stay, if resources are not available to continue programmes of rehabilitation, gains may not be maintained and benefit may therefore not be realised.

In this context, Gordon (127) found that staff over-estimated an individual's rehabilitation potential for fear of omission; in other words, they offered rehabilitation even if they were unsure of the benefit. This ethical dilemma is further supported by New (70) who highlighted the tensions clinicians faced in allocating resources including the potential for injustice and bias, utility and beneficence and

how these factors may influence the decision that an individual does or does not have rehabilitation potential.

2.6 Discussion

2.6.1 Summary of findings

The aim of this mapping review was to identify and map relevant literature that could be used to develop the RePAT intervention and inform the theory underpinning rehabilitation potential in older people living with frailty.

This study found that there was considerable variation in definitions of rehabilitation potential and in some cases, an absence of definition. Common features were however identified. Rehabilitation potential was found to encompass two different broadly, but inter-related, concepts of prognostication and outcome measurement. Prognostic rehabilitation potential described the prediction of what could be achieved through programmes of rehabilitation, whereas outcome-based rehabilitation potential considered what had been achieved. These key findings will now be discussed.

Prognostication is a key concept in modern medicine and rehabilitation. Bohr (231) stated that:

> "*Prediction is very difficult, especially if it's about the future.*"

This quote beautifully summarises the challenges faced in contemporary clinical practice. Prognosis in medicine involves the prediction of the future course and outcome of disease processes concerning either their natural course or outcome after treatment (232). This study found that the most frequently cited definition was by Rentz (69) who stated that rehabilitation potential was a form of prognostic indicator which sought to predict how well an individual would perform in a targeted rehabilitation programme to achieve functional gains and improved quality of life taking into account underlying co-morbidities. This definition is useful in that it encompasses the complex forces at play when clinicians seek to identify an individual's rehabilitation potential. However, the definition is limited by its lack of specificity to older people living with frailty. Prognostic methods in medical and rehabilitation decision-making allow for wider contextual factors to be taken into

account (233). These factors are commonly affected by frailty, old age and multi-morbidity. Single conditions and diagnoses are more predictable in terms of their trajectories and response to treatment, however, multi-morbidity, frailty and acute ill health make for a very unpredictable rehabilitation context (234). In contemporary clinical practice, older people living with frailty frequently present with acute illnesses superimposed on underlying conditions and physiological decline. This presents clinicians with particular challenges in understanding and predicting recovery (235, 236) and challenges researchers in establishing the effectiveness of rehabilitation interventions.

Rehabilitation potential was also found to be used as a proxy for entry criteria into rehabilitation studies. In that patients deemed not to have rehabilitation potential were excluded from studies based on the belief that they would not benefit or respond to rehabilitation interventions. This frequently included those with moderate to severe levels of cognitive impairment (185, 200, 222). People with acute confusional states, cognitive impairment and dementias are regular recipients of in-patient hospital care. Whittamore et al. (237) found a high prevalence of cognitive impairment in the emergency in-patient population, with 27% of older patients admitted having a diagnosed delirium and 41% with dementia. If the evidence base for frailty rehabilitation and rehabilitation potential is to be developed in order to improve clinical and patient-level outcomes, patients with cognitive impairment must be recruited to research studies so that their true rehabilitation potential can be understood.

This study also found that rehabilitation potential was often used as a measure of rehabilitation outcome, in that individuals 'had rehabilitation potential' if they achieved favourable outcomes. Retrospective understanding and assessment of an individual's rehabilitation potential is a useful method to help identify predictive variables. Recent systematic reviews have identified a number of variables which predicted outcomes in older people, including levels of cognitive impairments, nutritional status, living alone and mood (222, 238). Based on retrospective analysis, these variables help inform clinicians' predictions of what an individual may be capable of, but in isolation, they do not capture the complexity of human behaviour and nuances of frailty and multimorbidity. However, Enderby et al. (76) warn that variables which are strong predictors may hide the subtleties associated with an individual's recovery and clinical decision-making.

Findings from this study suggest that trials of rehabilitation (where a brief period of rehabilitation was conducted to assess initial response) were frequently used to predict and measure rehabilitation potential (127, 184, 192, 204, 206, 209, 210, 212, 213, 221). This appears to suggest that despite, 'hard' predictive variables, trials of rehabilitation may shape ideas of rehabilitation potential and response. A recent study found that the Clinical Frailty Scale was not predictive of rehabilitation potential amongst older people in receipt of post-acute rehabilitation (239). Despite the small sample size of this study, the authors concluded rehabilitation potential was better judged by experienced clinical assessments. This finding is supported by Burton et al. (145) who found that clinical judgements on rehabilitation potential amongst stroke survivors were more dependent on clinicians' responsiveness to offering rehabilitation rather than to predictive variables identified during rehabilitation assessments.

This mapping review found that rehabilitation potential was largely assessed at singular time points, with subsequent reviews of outcome measures completed retrospectively. Older people living with frailty, and in particular those with an acute exacerbation of ill health or delirium, oscillate in their clinical presentation and abilities compared to non-frail populations. Therefore, any measure and method of assessing rehabilitation potential in this cohort should take into account such variance and fluctuations.

A positive outcome associated with rehabilitation was frequently established on the notion of improvement. Medical and rehabilitation interventions may seek to regain pre-morbid abilities (190), but the feasibility of improvement amongst older people living with frailty has been questioned. Approaches which seek maintenance, managed decline or palliation may offer greater benefits to this population (79, 240, 241). However, these studies found that improvement was not always predicated upon restoration of physical function but upon evidence of adaptation to disability, as demonstrated by improvement in activities of daily living, social interaction or return to the usual place of residence. These complex outcomes highlight the challenges in assessing and evidencing rehabilitation potential in older people living with frailty.

This review identified evidence to support assessing underlying signs and symptoms of conditions as part of rehabilitation potential decision-making. Physiological and

safety needs, as outlined by Maslow (242) are often the focus of acute care and may explain why definitions of rehabilitation potential have also been found to consider safety as a contraindication to rehabilitation (201). Higher levels of Maslow's Hierarchy of Needs such as belongingness, love and esteem, relating to social domains of assessment, received little focus in studies identified in this review. Jackson et al. (243) advised clinicians working in intensive care to adopt a comprehensive view of the whole person through Maslow's hierarchy, where care should focus not just on survival, but restoration of pre-morbid functions of the mind, body and spirit. Even in studies which were carried out in the community setting (130, 194, 197, 198, 210, 225), where acute physical needs can be assumed to be less pressing, no evidence of social and spiritual domains assessment were identified. Person-centred care seeks to draw together these approaches and has been strongly advocated in supporting older people (122, 244).

Unsurprisingly, domains relevant to the World Health Organization's International Classification of Functioning, Disability, and Health (WHO ICF) (44) featured prominently in the findings of this mapping review. This may be explained by the use of the ICF in the *a priori* analytical framework but is also indicative of the impact that the ICF has had on contemporary clinical practice. This study has demonstrated that knowledge of physical attributes and underlying diseases and conditions are integral to assessments of rehabilitation potential. However, frailty and complex health and social care needs do not just manifest as physical entities as demonstrated by the presence of holistic domains of rehabilitation potential assessments. Findings from this study draw many parallels with Comprehensive Geriatric Assessment models of care which seek to provide an iterative case management approach focusing on medical, mental health, functional capacity, environment and social circumstances, aiming to place patient and carers needs at the centre of the relationship (67, 68). This review identified evidence to support the assessment of medical, mental health and functional abilities in terms of rehabilitation potential but limited evidence to focus on environment and social circumstances. Recent literature has suggested that spirituality and economic status should also be considered for a truly holistic assessment (245), but no supporting evidence for the inclusion of these domains in an assessment of rehabilitation potential was identified in this review.

Personal and participatory factors feature in the ICF (44) and this study found that motivation and participation played a key role in assessments of rehabilitation

potential. Motivation is a complex construct that has been widely explored in relation to rehabilitation in traumatic brain injury, stroke and sports medicine but less frequently amongst older people living with frailty. Motivation is an important factor in achieving successful rehabilitation outcomes. Siegert et al. (246) propose that exploring an individual's motivation, emotions and goals allows for an understanding of how they will react with rehabilitation programmes, whereas prognosis or prediction considers variables and outcomes. It is proposed that rehabilitation potential in relation to frailty needs to consider prognostic, performance and participatory approaches for maximum benefit to be achieved. Commonly cited 'barriers' to rehabilitation such as poor cognition and low mood (120) can all have a profound impact on an individuals' ability to be motivated to take part in and achieve beneficial outcomes from rehabilitation interventions. This review supports the need to understand psychological factors such as mood and cognition as part of a rehabilitation potential assessment either through standardised assessments such as the Montreal Cognitive Assessment (MoCA), Mini-Mental State Examination (MMSE), Geriatric Depression Scale (GDS) or participation scales. It remains unclear which items within these tools best correlate to or predict rehabilitation potential in older people living with frailty.

It is clear that solely focusing on the physical effects of frailty will not address the complex, highly individualised and fluctuating needs of older people living with frailty. Clinicians need to consider the wider social implications of ageing and the impact these have on continued quality of life and control over individuals lives. The inclusion of environmental and social domains of assessment identified during this review may go some way to remedy this medical and physical bias, but further evidence is needed to understand how these domains relate to rehabilitation potential.

2.6.2 Strengths

A key strength of this study was the selection of a mapping review to identify relevant evidence on rehabilitation potential. Mapping reviews, by their very definition, seek to obtain a broad overview of the available evidence on a topic. Due

to the heterogeneous nature of the presentation of frailty and the construct of rehabilitation, this method was ideally suited to map this complex field. Whilst meta-synthesis is frequently considered as the gold standard of literature appraisal, this mapping review has found useful evidence to support an emerging definition of rehabilitation potential in relation to frailty and how it is assessed.

Heterogeneous groups prove challenging to meta-synthesize and methodological developments to address these challenges are emerging. It has been suggested that reviews of complex interventions should seek not only to understand the effectiveness of an intervention, but also the contextual and mechanistic considerations of the intervention (95). The mapping review methodology was ideally suited to consider these domains in order to build the theoretical evidence behind rehabilitation potential in older people living with frailty in order to develop the RePAT intervention. So whilst this review considered evidence on older people with stroke, falls, fractures and disuse in the broader context of studies (deconditioning associated with infections and acute ill health), this was representative of the complexity faced in daily clinical practice and frailty research.

A common criticism levelled at mapping reviews is the lack of quality appraisal (176), consistent with the standards outlined in modern systematic review methodologies. Scoping reviews, which share common features with mapping reviews, do not include quality appraisal. Pham et al. (247) found that 22.38% of identified scoping reviews included quality assessments. Rather than rejecting the value of scoping reviews due to lack of current quality appraisal, Levac et al. (248) suggest that a specific quality appraisal tool should be developed to meet the methodological and implementation needs of these emerging methods. Although this may limit the value of review findings into policy and practice (176) both scoping and mapping reviews have the potential to provide context and a deeper understanding of complex phenomena and therefore play a key role in intervention development.

As per the initial *a priori* assumptions, the term rehabilitation potential and studies identified in this review were found to be too heterogeneous in nature for meaningful synthesis. They did, however, provide context and theoretical underpinning to develop the theory behind rehabilitation potential further and inform the RePAT intervention. As our understanding of rehabilitation potential and

our decision making around frailty rehabilitation grows, a future synthesis may be possible.

2.6.3 Limitations

Of the 49 studies included in this review, 24 were from either Anglophone countries (UK, USA, Canada or America) or from European countries which have a tradition in publishing in English language journals. The predominance of studies from Anglophone countries may represent selection bias by limiting selection criteria to the English language. Asian countries have been found to publish less frequently (249), but this study included three publications from Asian countries and a total of six international collaborations.

This study excluded evidence from books and hence the most commonly cited definition of rehabilitation potential by Rentz (69), which provided invaluable insights into the phenomena of interest. Whilst academic books are subject to editorial review, they do not always undergo the same scrutiny as articles in peer-reviewed journals. These sources, commonly classified as grey literature, are frequently excluded from evidence appraisal methods, but this notion has been recently challenged. Adams et al. (250) state that grey literature can provide new insights and can help contextualise research evidence. Further work is needed to develop methodologies that can robustly review and appraise these sources of evidence.

It proved challenging to identify studies which solely explored rehabilitation potential in relation to frailty, despite a comprehensive literature search. This may represent a limitation in search terms or engines used, but a broad range of terms and engines were selected. More likely, it represents the lack of evidence in rehabilitation decision-making and the emerging field of frailty rehabilitation. The studies included in this review included a broad range of clinical conditions and patient groups. This study sought to exclude articles which included patient participants in receipt of specialist stroke, palliative and fracture services. However, many of the studies identified included patients with these diagnoses. Rather than being indicative of failings of the method, it represents the realities of clinical presentations, where patients may present with comorbidities, including stroke and fractures.

2.7 Conclusion

This mapping review identified a number of key themes on how rehabilitation potential was conceptualised, and operationalised in clinical and research practice. There is an inherent belief that clinicians can identify who is likely to respond, benefit and cooperate with rehabilitation programmes whereby evidence of effectiveness is applied through evidence-based practice. Rehabilitation potential is the clinical currency in which these beliefs are expressed. This review identified considerable heterogeneity in definitions and use of the term rehabilitation potential. The term involves complex processes of clinical decision-making, embracing diagnostic and prognostic variables and assessment processes. Frailty makes for a very unpredictable rehabilitation context. In the acute and subacute setting, older people living with frailty have a complex constellation of multimorbidities, superimposed acute illnesses and a propensity for sudden decline and unpredictable recovery trajectories. Findings from this review suggest that although medical needs are often thoroughly addressed, a holistic and iterative approach to rehabilitation potential assessments is required. Current tools and assessment approaches often provide a snapshot of individuals' abilities and conditions and do not capture the dynamic nature and fluctuations in frailty rehabilitation. New approaches are required which seek to aggregate measures and abilities over time to prognosticate outcomes and potential benefits.

Whilst the use of big data to identify key predictive variables and structured approaches such as the interRAI suite of tools offer promising results, there is currently insufficient evidence to recommend any one tool. Further research is required to establish the theoretical underpinning of rehabilitation potential in older people living with frailty and to develop an evidence-based assessment tool. The development and testing of the RePAT, outlined in this thesis is a small step in this journey. Evidence identified in this review was synthesized with findings from the focus groups presented in chapter three to develop the RePAT intervention.

Chapter 3 – Focus Groups

Summary

This chapter presents a focus group study which explored rehabilitation potential in older people with frailty (Figure 14). The study sought to provide further evidence for how rehabilitation potential was operationalised and assessed from the perspectives of clinicians, patients and carers. This was then used to further inform the design of the RePAT intervention.

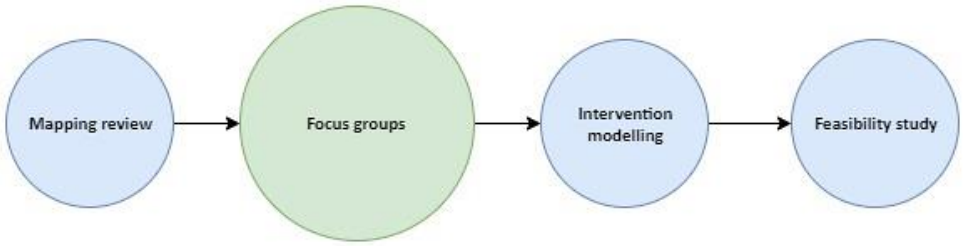


Figure 14 - Overall study organogram chapter three.

3.1 Scientific background and rationale for the method

The mapping review, presented in chapter two, found considerable heterogeneity in definitions and use of the term rehabilitation potential. The literature was found to predominantly focus on medical and functional needs, which did not embrace the holistic, fluctuating and iterative nature of frailty rehabilitation. Limited evidence was identified to support how clinicians and healthcare managers understood rehabilitation potential, how it was delivered and assessed in clinical practice. Patient and carer views on rehabilitation potential were largely absent from the data.

Qualitative inquiry is ideally suited to capture the complexity of rehabilitation potential. It plays a key role in developing complex interventions (251) and can provide direct access to what people do in real life rather than asking them to merely comment on it (252). A number of different qualitative methods were considered including interviews, focus group and observations. Observations provide an opportunity to observe naturalistic behaviours but not the rationale of decisions

behind these actions. Interviews were excluded as they would only provide individual experiences and opinions and would not offer insights into the multi-disciplinary nature of rehabilitation potential assessments. Focus groups have distinct advantages over one-to-one interviews as they allow for group discussions and the construction of shared group meaning (253). This method is ideal for gaining improved access to participants' own language and concepts (254) and promoting group discussion through the use of open-ended questions. Focus groups, rather than producing individual accounts, allow for socially shared tacit knowledge to be generated, maintained and changed through dynamic group discussions (252). They can lead to a rich understanding of how people make sense of their social worlds, the meaning of events (255) and the stories individuals and groups tell themselves (252).

Researchers can design, collect and analyse focus group data with an individualistic social psychology perspective, social constructionist perspective or a hybrid of the two approaches (256). These are influenced by understanding how knowledge is generated, either by individuals in a group whose opinions are stable or as socially shared tacit knowledge which changes with group participation. Ryan et al. (256) suggest that a hybrid approach is useful for theory building, providing evidence which is descriptively rich, embracing individual opinions and collective experiences. The aim of this study was to develop a deep understanding of rehabilitation potential which combines interactions with individuals (patients, clinicians and carers) and groups (multi-disciplinary teams and organisations) so the adoption of a theory building approach appeared pertinent.

Focus groups are one-off meetings where a group of participants discuss a specific topic with a facilitator. Successful focus groups have a number of key ingredients. As with all robust research, they require clear aims, objectives and schedules to ensure that relevant data is collected (254). They should strike a balance between free-flowing, open and non-judgemental discussion and address the primary aims and objectives of the study. Focus groups aim to recruit people with similar characteristics and experiences (257). Careful consideration of membership is required to manage group dynamics. Groups typically consist of between six and twelve participants (255) to ensure all members are able to participate.

3.2 Research aims and objectives

The aim was to explore opinions, experiences and understanding of rehabilitation potential from multiple perspectives.

The specific research objectives were:

1. To explore how clinicians, patients, carers and academics understand rehabilitation potential in older people living with frailty.
2. To explore how rehabilitation potential is assessed in the clinical setting.
3. To identify evidence to inform the development of the RePAT intervention.

3.3 Method

Five focus groups were held between February and March 2018. Participants were recruited from the East Midlands region and opportunistically from expert attendees at an international conference held by the British Geriatrics Society in Nottingham. They were held across the East Midlands, reflecting the geography of the NIHR Clinical Research Network and hubs around which local services were commissioned and delivered. By carrying out focus groups across a region and from experts outside the region, it was possible to explore experiences outside of one system of local working and practice, enhancing the transferability of findings.

A heterogeneous group of participants which included clinicians, academics, commissioners and members of the public were recruited. This created potential issues with social power arising from professional hierarchies. Social power refers to the potential or ability to influence others in a group setting (258). A number of actions were taken to mitigate against this. Group discussion rules were developed and shared at the start of each group. These highlighted the need to keep discussions held in the group confidential and asked participants to respect others experiences and opinions. These measures sought to foster an environment where participants felt comfortable to share potentially sensitive issues and freely express their opinions without consequence or distress. Participants were offered support from the Patent Advice and Liaison Service and the NHS Employee Assistance helpline to discuss any

sensitive, challenging or difficult subjects that arose. There were no instances where this occurred.

Focus groups require skilled facilitation in order to manage strong personalities in the group and any potential conflicts which might arise amongst its group members (253, 254, 259). This was deemed to be particularly important in this study where dynamics between and experiences of clinicians and members of the public were likely to be contrasting. The first focus group was overseen by an experienced PPI lead, who provided feedback on the techniques of AC and Margaret Kerr (PPI member).

Participants who did not feel able to participate in a group setting due to difficulties with communication, cognition, specific concerns or experiences with participating clinicians were offered one-to-one interviews to ensure that a range of opinions were obtained. No participant took up this offer.

The focus group schedule was developed from the findings of the systematic mapping review outlined in chapter two. These were supplemented by the clinical experiences of the study team and MK (PPI member). The schedule was piloted with local clinicians and reviewed by the Dementia and Frail Older Persons PPI group at the University of Nottingham to ensure clarity and acceptability. The focus group schedule can be found in Appendix E. Mutually convenient dates for the groups were arranged. The groups were held in venues away from NHS premises and in convenient geographical locations to maximise participant attendance (253). They lasted between one and two hours.

Data were digitally recorded and an observer (MK) took notes on group dynamics and interactions. It is considered good practice to have two facilitators, one to lead the group and the other to record non-verbal communication (260).

3.3.1 Inclusion criteria

Professional participants with experience of:

- Assessing rehabilitation potential in older people living with frailty in the acute hospital setting.

- Delivering rehabilitation to older people in the acute, sub-acute or community setting.

Members of the public participants with experience of:

- Receiving a rehabilitation assessment or a period of rehabilitation.
- Caring for someone previously in receipt of rehabilitation.
- Being told they or their relative had 'no rehabilitation potential'.

3.3.2 Exclusion criteria

- Participants who were not fluent in spoken English.

3.3.3 Sampling framework

Robust sampling frameworks are essential for enhancing the credibility and transferability of research findings. Purposive sampling involves selecting participants with specific characteristics who have knowledge which enables the research question to be answered (255) and allows for a range of participants to ensure representativeness and diversity of the population (261). A purposive sampling framework was developed where a sample of participants with experience of rehabilitation potential was recruited. Staff participants were selected by virtue of their profession and experience working with older people living with frailty. This allowed for a sample to be recruited, which included nurses, doctors and allied health professionals. These professions reflect clinicians who are involved in assessing for rehabilitation potential and delivering rehabilitation programmes. Patient and carer participants were identified by virtue of their experience of being assessed for rehabilitation potential, programmes of rehabilitation or in their role as carers or family members. Sampling and data collection ran concurrently where sampling was informed by data collection and analysis and further sampling ceased once data saturation was reached.

3.3.4 Sample Size

Sample sizes in qualitative research are frequently driven by the concept of data saturation, defined as "*the point in data collection and analysis when new information produces little or no change to the codebook.*" [(262), p65]. Qualitative approaches propose that saturation can only be determined during or after data analysis (263). This presents researchers with significant challenges in determining a sample size which is both theoretically robust and pragmatically achievable. In an attempt to provide more robust evidence for focus group sample size calculations, Guest et al. (263) found that 80% of analytical themes were found within two to three focus groups and 90% within three to six groups. This suggests that a sample size of three to six groups should lead to the identification of the majority of themes.

Focus groups commonly have between six and ten participants (252, 254, 255). If groups are too small, then group discussions are unlikely to stimulate debate and generate new knowledge. If groups are too large, participants risk becoming disengaged and reluctant to share their opinions (254). Over-recruitment of participants by 20% (264) to 50% (265) has been recommended to take into account possible non-attendance at the group and attrition. Ten participants were recruited to each group with the aim of achieving an overall sample size of 24.

3.3.5 Recruitment

Participants were recruited through existing clinical, academic and professional bodies within the East Midlands. These included: EMRAN (East Midlands Research into Ageing Network), British Geriatrics Society, AGILE (interest group for Chartered Physiotherapists working with older people), COT SS Older People (College of Occupational Therapy Special Interest Group), and citations in peer-reviewed journals identified in chapter two. Patient and carer participants were identified through local support groups including: Age UK, East Midlands PPI Senate, Carers Federation, Nottingham Elders Forum and local NHS Trusts PPI groups.

Study posters (Appendix F) were circulated through these networks and potential participants were asked to contact the study team. Participant Information Sheets (PIS) were circulated and AC answered any questions concerning participation prior

to data collection. Separate PIS for clinicians (Appendix G) and members of the public (Appendix H) were designed representing the differences in reimbursements for these groups. Financial reimbursements were in line with guidance from NIHR Involve (266) and are detailed in the PIS found in Appendix H.

3.3.6 Consent

All participants provided written informed consent (Appendix I) prior to data collection. One copy of the consent form was kept by the participant and one by the researcher.

3.3.7 Data analysis

After considering a range of methods, thematic analysis was chosen as the approach in this study. Thematic analysis involves discovering, interpreting and reporting patterns, meanings and clusters within the data (260, 267). Data were thematically analysed using Framework Analysis (260) which is a method of data management incorporating thematic analysis. This approach is particularly suitable for collaborative multi-disciplinary health research where PPI members can contribute to analysis (268). It provides a structured, robust and transparent method for data analysis, enhancing the credibility and dependability of the findings (260, 268, 269). It does not align itself to one specific paradigm, offering researchers a flexible tool to generate evidence and themes (268) which is compatible with thematic analysis.

Qualitative analysis typically has two approaches: inductive and deductive. Inductive methods, such as grounded theory, do not begin with a hypothesis, rather data informs emerging theory. Deductive analysis describes how *a priori,* or pre-determined codes, or themes are developed and applied to the data set. Framework Analysis has been suggested as useful in the development and evaluation of complex interventions (270). It has the advantage of allowing both inductive (emergent) and deductive (*a priori*) coding (260, 268, 269). This aligned with the overall study programme aims: to explore the phenomena of rehabilitation potential and to develop the RePAT intervention. To achieve this, it was necessary to explore the

ingredients required for intervention development and implementation via deductive coding along with the ability to embrace emerging evidence from the focus groups via inductive coding.

The framework approach comprises of seven components, which are presented individually but in reality, are interdependent and iterative.

1. Coding framework

A deductive framework was constructed to take into account the study aims, findings from the mapping review (chapter two) and prerequisites of intervention design (95). This included definitions of rehabilitation potential, how, where and when it was assessed and factors which influenced decision-making to inform the design and implementation of the RePAT intervention. The framework was reviewed by the supervisory team.

2. Transcription and familiarisation.

Transcription and familiarisation describe the process where the researcher gains an overview of the collected data (260), immersing themselves in the data (268). This is an essential step to ensure that resulting codes or labels are grounded in and supported by the data (260, 268). AC repeatedly listened to the audio-recordings and reviewed her field notes. Audio-recordings were then transcribed. AC transcribed two transcripts and a professional transcriber the remaining three which AC reviewed with the audio-recordings for accuracy. Initial analytical notes, key ideas and impressions were generated.

3. Coding.

AC and MK read each line of the first two transcripts applying codes independently. Training and support provided for MK are detailed later in the chapter. AC used NVivo 11 and MK completed this manually. Codes are the most basic segment of data relating to the phenomena of interest (267) and allow classification of the data so that it can be "*compared systematically with other parts of the data set*" [(268), p4]. *A priori* codes from the pre-defined framework were identified along with emergent codes from the transcripts. This analytical stage frequently involves emergent themes, those from the original research question and those in the interview guide (260). Involving patients and PPI members at this stage can produce

differing viewpoints ensuring that one perspective does not dominate analysis (268). Notes from AC and MK reflective diaries were integrated alongside initial codes to increase analytical insight and credibility of the findings.

4. Development of an analytical framework.

AC and MK met to review and compare codes. These were then arranged into emerging themes. Themes describe patterns within the data, capturing items of importance associated with the research question and aims (267). The framework was reviewed by the supervisory team to improve rigour (269).

5. Application of the analytical framework.

The framework was applied by AC and MK to the remaining transcripts, where new codes were integrated into the analytical framework, which was refined until no new codes or themes emerged.

6. Data charting.

Data were charted onto a matrix where each participant's responses were listed under the themes and supported with relevant verbatim excerpts. Each participant was considered an individual case rather than each focus group. This process allowed for data to be explored across cases and themes (269) and for the identification of disagreements and deviant cases. Deviant cases involve identifying evidence which does not support original theories (252) or disagreements between participants. Inclusion of deviant cases can increase the credibility of findings and mitigate against the tendency to select data which supports researchers' assumptions (252). This step allowed large amounts of data to be efficiently processed whilst retaining the essence of participants' voices (260, 268). An example of the matrix can be found in Appendix J.

7. Interpreting

Interpreting the data involved identifying patterns, typologies and associations to build the theory behind rehabilitation potential. AC presented and discussed this with the supervisory team and MK to improve rigour.

3.3.8 Patient and Public Involvement

To ensure that interventions are fit for those they are intended to help, service users should be involved in all parts of the research process (161). Typically Patient and Public Involvement members (PPI) review research design, questions and documentation, but there is emerging evidence to suggest that PPI members can contribute to qualitative data analysis (163, 164). PPI members can provide differing perspectives on data, drawing from their personal experiences (269) improving the quality, credibility and validity of research findings (166, 167). It has been suggested that the potential benefits of partnership working with older people have been slower to be realised (168), despite being frequent consumers of health and social care.

Robust programmes of training and support are essential for successful PPI (271, 272). To date, little research has addressed the optimal content, frequency and method of delivery for qualitative data analysis training amongst older PPI members and PPI members more broadly. A training programme for members of a local PPI group was developed and delivered. Seven PPI members attended the first training session and five completed both sessions, including MK. Existing literature on training PPI members in qualitative data analysis was reviewed by AC and JD. Due to the lack of limited evidence identified which specifically explored older PPI's training, additional advice was sought from a PPI expert who had previously published work on qualitative data analysis (273). The training comprised of two sessions of three hours duration and was delivered by AC and JD. The first session included content on the theory behind qualitative research methods and principles behind coding data. The training focused on the use of Braun and Clarke's thematic analysis approach (267) which has been used by PPI members in previous research (164, 269, 274) and is considered as a foundational method for learning data analysis. To provide PPI members with practical experience of qualitative data analysis, a mock research question was developed titled "What factors affect medication adherence in adults living in the community setting?" Two semi-structured interviews with members of the study team were conducted, audio-recorded and transcribed. PPI members attending the course were asked to listen to the audio-recording of the first interview and were then given the first transcript to enable data familiarisation. Opportunities for group discussions were provided, followed by a copy of the

transcript complete with codes. PPI members then listened to the second interview and were given the second transcript to analysis independently at home.

In the second session, held two weeks later, PPI members shared their experiences of coding. The training was then provided on generating themes. Participants then worked in small groups, with support from the trainers, to develop and discuss themes and their experiences of qualitative data analysis. Further information on the design and content of the programme can be found in Cowley et al. (169). This training programme allowed MK to analyse the focus group data as part of the research team, providing a differing and patient/carer centred view of the data and subsequent results.

3.3.9 Reflexivity

Qualitative methodologies assert that the researcher is inextricably linked to the world they study. In quantitative research, this relationship is believed to be minimised or eliminated through study design to reduce the impact of influencing factors. However, qualitative researchers recognise that this is impossible and undesirable, as individuals' unique viewpoints affect data collection and analysis. Researchers aim to achieve empathic neutrality and reflexivity attempts to make sense of and articulate this relationship. Reflexivity is an ongoing process of self-reflection demanding that researchers generate awareness about their feelings, actions, biases, opinions and perceptions in relation to their research (171). It can enhance the credibility, integrity and trustworthiness of findings (275) if researchers outline their relationship with transparency and honesty.

AC and MK kept a research journal allowing for ongoing considerations to be made during data collection and analysis. Emerging ideas, codes and themes and reflections on the research process were documented. An example of which can be found in Appendix K. The framework approach allowed for these accounts to be incorporated into the matrix (268) providing transparency and context to the process.

Research can be influenced by the knowledge, beliefs and experiences of the research team (170) and should be outlined from the outset (171). The position of the researcher and PPI member are therefore outlined in the preface.

3.3.10 Data management

Focus group data were digitally recorded and MK took notes on group interactions. All data were anonymised. Participants were given a study ID relating to their profession. Written data were stored in a dedicated locked area in the university and electronic data were stored on the University secure, password-protected area in keeping with established protocols for information governance and data protection. NVivo 11 software was used.

3.4 Results

Five focus groups were held across the East Midlands and at an International specialist geriatric medicine conference held within the region. They lasted for between one hour and nine minutes and one hour and twenty-three minutes. Twenty-eight participants took part in the study. Group sizes ranged from four to eight participants. The opportunistic recruitment of Dutch colleagues enabled the inclusion of Elderly Care Physicians. These are primary care doctors, with specialist training in the care of older people who spend a significant proportion of their time in nursing homes and with frail older people. They play an important role in selecting patients for rehabilitation and supporting them through rehabilitation programmes in the Netherlands (276). Participant demographics are displayed in Table 11.

Table 11 - Professions of focus group participants.

Profession	Number
Physiotherapists	7
Occupational therapists	6
Geriatricians	3
Commissioners	1
Social workers	1
Members of the public	5
Elderly Care Physicians	4
Nurses	1
Total	**28**

There were six key themes that emerged from the data outlined in Figure 15 and presented in the next section.

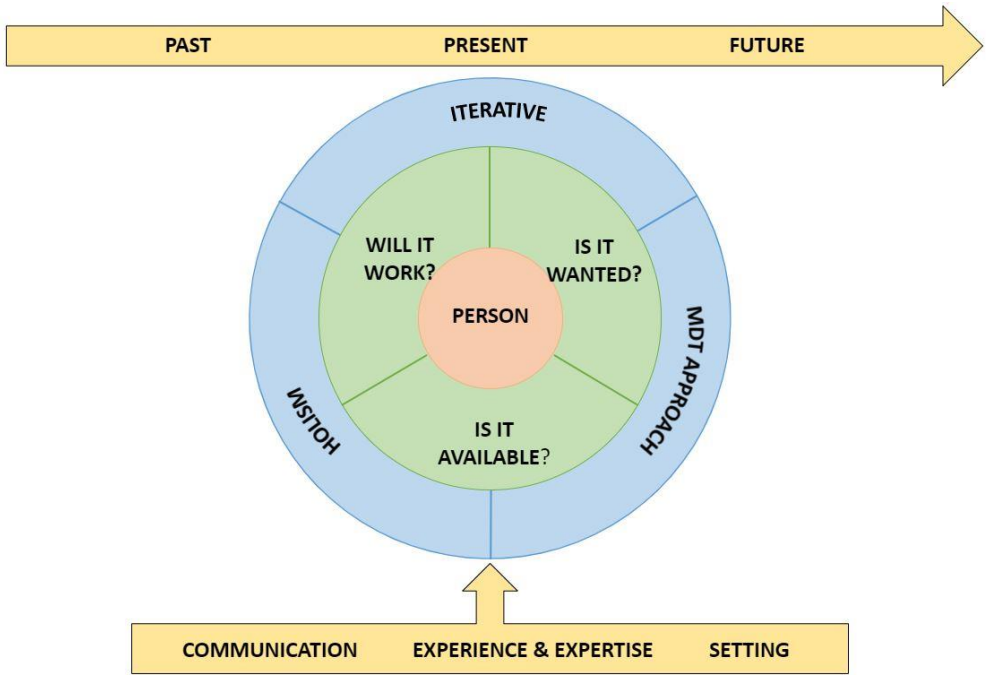


Figure 15 - Themes from the focus group study.

3.4.1 Rehabilitation potential

Participants were unanimous in the view that rehabilitation potential was a complex and challenging phenomenon. They reported that the term rehabilitation potential was widely used in clinical practice but meant different things to different people. One participant used the term to identify who was suitable for further rehabilitation.

> *"Rehabilitation potential is a term to determine which patients are fit for rehabilitation or which patients have a potential to improve by rehabilitation."* [Elderly Care Physician three, group four]

Some participants held the belief that everyone had some form of potential, which was influenced by their functional needs.

> "*What the potential is, is determined by what activities they need to do. My potential is different from your potential*." [Physiotherapist five, group three]

Other participants thought that the term rehabilitation potential was unhelpful as it risked prematurely 'writing people off' from rehabilitation and denying them access to services which might otherwise be useful.

"What element of rehabilitation potential somebody is writing them off for, because they still might have goals that could be achieved but don't fit into the standard thoughts." [Occupational therapist two, group one]

Rehabilitation potential was said to involve a prediction of which individuals would benefit from rehabilitation. Participants took into account a wide range of clinical factors including: current and previous abilities, underlying diseases and their predicted trajectories, whether the intervention would likely work and what the risks or effort would be to individuals. However, most participants were quick to highlight that rehabilitation potential was more than a physical phenomenon, rather it involved a constellation of patient factors such as motivation, availability of family support and individual needs and wants.

"Might it work, is it available and is it wanted? Might it work is about the balance of the benefit you get [from rehabilitation] and the effort or side effects to get there…and it might be that you've got to try in order to see whether it works." [Geriatrician two, group two]

3.4.2 Will it work?

Central to the concept of rehabilitation potential was the notion of 'will it work'. Participants' discussions around measuring rehabilitation benefit and potential led to interesting and discordant insights into understanding rehabilitation outcomes amongst frail older people. Some participants held the view that rehabilitation should always seek improvement with measurable gains in function and independence. Given the fine balance between dependence and independence, small gains were seen to be significant in supporting independent living and quality of life.

"Patients who have an acute event, hip fracture stroke, they have potential to gain something but there are other patients that have chronic disease like heart failure, they have a sloped line." [Elderly Care Physician One, group four]

However, other participants expressed the view that rehabilitation that sought to maintain, slow or manage the decline of abilities should be of equal value.

> *"In terms of people's potential, I think it is about looking at how big that potential needs to be. So for some people it could be very small steps and it is not necessarily about them being able to do things for themselves that they can't do…can they adapt the way they do things, can they compensate and find different ways of doing things to be able to have some purpose."* [Occupational therapist four, group three]

Study participants spoke of the challenges they faced in appreciating if change or improvement was feasible. They reported the need to understand underlying trajectories of diagnoses, disease progression and rehabilitation response.

> *"How do we distinguish between general decline and when somebody comes out of hospital what their potential is? Because obviously, you've got comorbidities that have an impact on the function, it is a fine balance between what they also perceive as their potential. I often try and pin it down a bit more when I am taking their initial histories to okay, literally in the weeks following, the weeks prior to coming into hospital and you're feeling well what were you able to do? And then you can kind of get a better understanding of their level of exercise that they're having through their activities."* [Occupational therapist five, group three]

Dissonance was identified between participants whereby some believed only professionals could predict benefit as they had greater experience of multi-morbidity, rehabilitation response and evidence compared to patients and their families. Patient and carer participants vehemently disagreed with this stating that they could understand what was achievable and realistic if adequate support and education were given, thereby empowering them to be equal partners in goal setting and rehabilitation potential assessments.

> *"I just want to be educated…. I wanted to speak to someone that could tell me how I could achieve optimal health and well-being. I knew I couldn't be cured because two consultants had told me of the issues."* [Member of public two, group two]

When asked how rehabilitation potential was measured, participants provided a wide range of responses. Some interviewees believed that goal setting allowed an

individuals' rehabilitation potential to be identified. One geriatrician spoke of goal setting in relation to stroke recovery and how these drew parallels with frailty rehabilitation.

> *"People who can't speak after a stroke from aphasia and they set a goal saying they want to speak again. You just know from experience and expertise that that is not going to happen, but what they do is they set an intermediate goal and it might be, say as a physiotherapist the goal is walking and somebody is very weak or something, the intermediate goal might be to stand or to step. So, there is a, how do you assess it, it is less of an event than a process."* [Geriatrician one, group two]

Other participants felt that goal setting and using known baseline variables to predict rehabilitation outcomes were not optimal. They reported that true rehabilitation potential was only uncovered when patients participated in rehabilitation, often surpassing expectations, particularly on discharge from the hospital setting. Participants in focus group one framed this as the 'magic front door'.

> *"Occupational Therapist One: I'll be fine once I get home… your understanding of how likely they are to improve versus their understanding, I think that's the trickiest part for me. In fact they say, I don't need equipment, I don't need this, the magic front door I'll be fine.*
>
> *Physiotherapist One: The crazy thing about the magic front door is sometimes it's true."*

Participants spoke of the importance of applying research evidence to understand what rehabilitation interventions would work but recognised the limitations of current evidence.

> *"When you get a new drug you put it through testing and nowadays invariably people will look at economic evaluation, is it value for money? A lot of rehabilitation has never been through that sort of process and that has been another excuse. Nobody has proven it works."*
> [Geriatrician two, group two]

3.4.3 Is it wanted?

Patient desire for rehabilitation was reported by many participants to be intrinsically linked to the notions of willingness to participate, motivation and the concept of rehabilitation potential.

> *"You can't do rehabilitation unless you're wanting it…the person has to be signed up. It is not something that is going to be passive or unwilling."* [Geriatrician two, group two]

This was found to be more challenging in the presence of cognitive impairment and communication difficulties, where patients' levels of motivation and participation were said to be more challenging to assess.

> *"There have been some situations when people have said that this particular individual may not be capable of rehabilitation or is at a stage of dementia that actually trying to rehabilitate them would not be appropriate because of lack of capacity, lack of ability and the disease itself actually impacting on that level of rehabilitation.* "[Nurse one, group five]

In all cases, participants reported that an individualised assessment which considered individual patient needs, wants and abilities could enhance motivation and participation. Participants spoke of veering away from standardised assessments, remarking that they were guided by the patient and what was important to that individual.

> *"I don't try to assess someone on something that they don't do regularly before. So, if they don't drink hot drinks, I wouldn't drag them to the kitchen, I would make something that they used to do."* [Occupational therapist one, group one]

This view was echoed by members of the public who placed a high value on individualised rehabilitation assessments.

> *"It isn't individualised and so things can drop through….because there was the tick box system of can she do this can she do that… a couple of questions to me of what is most important to you and I would have said*

my eyesight and then that should have set off actions to help me." [Member of public three, group four]

Rehabilitation goals within the acute setting were said to be geared towards discharge planning, maintaining safety and physical aspects of rehabilitation. Participants felt that social participation, quality of life and their goals were seldom discussed and prioritised in the hospital setting. These were more likely to be considered once individuals had returned home.

"It is not about things that they really want to do which is spend time with their families or go for a walk or be able to do a hobby or an interest that is important to them. It's about safely getting them out of hospital." [Occupational therapist five, group three]

Family involvement and support were seen as crucial in determining rehabilitation potential, particularly where patients lacked capacity and insight. Individuals with support from family or friends were viewed as more likely to make sustained gains in rehabilitation and continue with the intervention outside of allocated therapy time.

"Involve the family if it is appropriate, particularly if the person doesn't have the capacity, then the family become more important… you try and build up trust and build a relationship more so than you would normally." [Nurse one, group five]

3.4.4 Is it available?

Participants spoke of their belief that everyone should be given fair access to rehabilitation, regardless of age and diagnosis but that they faced dilemmas when working in systems where resources were limited and where they needed to make complex decisions. Some participants believed that services were more likely to be provided to those deemed more likely to participate and make significant gains.

"Some of it is about what we are prepared to invest in. So if we say everybody can make some improvement in their life, how much energy are we as a service going to put into the person or are we only bothered if it's going to save some other resources for health or social care in the

short term or preventatively in the long-term. Or do we see some value for that person…I find it difficult as a therapist because no matter how disabled you are at the time, you can probably improve." [Occupational therapist four, group three]

This view was echoed by members of the public who judged that everyone should have fair access to rehabilitation and that some kind of benefit was, in most cases achievable. However, rehabilitation that met individuals' needs was not always readily available or provided at optimal intensity.

"My mother-in-law, who has Alzheimer's dementia…she, is frail; she is 90 and suffers from hallucinations and delirium. I'm still not sure why some effort could not be made to do something that might just enable her to function better." [Member of public four, group five]

Participants reported that this placed them under a great deal of pressure and led to ethical dilemmas when operationalising rehabilitation allocation under in rationed systems.

"It's a lot of responsibility to make those decisions, especially with closed decisions between care home or last attempt for home." [Occupational therapist one, group one]

This view was expanded further through discussion with a commissioner who discussed how money was allocated within a pressured system.

"Is there a need for this service, is there an evidence-base and how much does it cost? We have to weigh up with the pot of money we've got for the system and it goes on those things that are proven to work, where we know we are going to get the best bangs for our buck." [Commissioner one, group two]

Geriatrician two proposed that greater transparency was required by clinicians and commissioners in the decision-making process.

"Is it available? Yes, we are in a rationed system, but we should at least be open and honest and transparent. So, if we are saying we aren't going to do it because it's not available, let's not say we're not going to

do it because the person can't possibly benefit from it." [Geriatrician one, group two]

3.4.5 Assessing for rehabilitation potential

The assessment of rehabilitation potential was said to require an iterative approach which embraced holism and was delivered by a multi-disciplinary team.

3.4.5.1 Iterative

A common view held amongst participants was that rehabilitation potential should not be considered as a 'one-off' assessment. An iterative approach allowed for the complexity and fluctuations of frailty and dementia to be explored so that potentially life-changing decisions were not made at a single time point.

> *"They've had this acute event and they have been in bed for a week because they have had really bad pneumonia or whatever and they are already teetering on the edge of not doing much for themselves because they are used other people doing it for them…we haven't given them a chance and that is constricted by the limitations of the time that you have."* [Geriatrician three, group three]

This was reported to be especially important during the acute phase when individuals were still receiving treatment for underlying infections or medical issues. Assessments during this time were felt to produce an unfair representation of abilities and potential. Iterative assessments provided an opportunity to build relationships with patients, carers and families who were viewed to be critical for successful rehabilitation outcomes. This approach allowed rehabilitation response or carry-over to be assessed and an understanding of individuals' ability to participate.

> *"You need carryover…it is something you need to happen where somebody, ok we agree a goal and that person carries on agreeing to work towards that goal."* [Physiotherapist seven, group four]

Participants expressed concerns that this approach was not always feasible in the hospital environment where clinicians were asked to make rapid and complex decisions whilst under pressure to maintain system flow.

> *"By day five or six you have got to start deciding…You have pressures from management who say to you that they are medically fit, why are they still here."* [Geriatrician two, group two]

In these instances, some participants described a screening approach to rehabilitation potential and organised for additional community-based assessments following discharge from the acute hospital. This was often found to be challenging to implement in practice and participants reported being unsure if this actually happened.

3.4.5.2 Multidisciplinary Team Working

The majority of participants agreed that rehabilitation potential assessments should be made by a multidisciplinary team, where clinicians spoke of using their complementarity of multiple and overlapping skill sets to understand patients' abilities and likely rehabilitation prognosis.

> *"I have more of an MDT approach and talking to each other and more effective communication between clinicians, sharing of information and having a more holistic approach."* [Nurse one, group five]

A few participants questioned whether decisions on rehabilitation should be taken by the team, believing that functional prognosis and disease trajectories were the specialist preserve of medical staff.

> *"If you have sort of a prognosis or as a physician we have a functional prognosis, we take into account the co-morbidities, the severity of the disease or the severity of the stroke, or the hip fracture or whatever."* [Elderly Care Physician four, group four]

A number of participants stated that involving other healthcare professionals in the assessment process meant they were better able to explore and understand patients' previous response to rehabilitation. For example, had they been previously

'compliant' with a programme of rehabilitation and motivated to continue with rehabilitation outside of the therapy session. Liaising with community-based clinicians enabled previous rehabilitation response to be established. This was often found to be problematic in the acute hospital setting due to time pressures and navigating complex service structures.

> *"One of the things I have done before is ringing up the community services and go "I know that you have tried to rehab them two months ago, how did they get on?" Whether they engaged in rehab then and if they can tell if they weren't engaged why what was going on in their life, like their dog could have died and they have totally blacked out and stepped away and don't want to rehab and they are in a different place now. But it all adds to the picture about what they were like last time in rehab."* [Occupational therapist one, group one]

This opinion was challenged by other members of the public. They reported that their relatives had been unfairly labelled as non-compliant, having no rehabilitation potential, as a consequence of ill health or continued recuperation from their hospital stay.

> *"[Referring to her mother going into hospital] The hospital was adamant that they weren't going to let her out until she could walk. We were told she wasn't 'compliant'. She was adamant she wasn't going to walk and we tried very hard to tell the hospital that she would walk if she got out. They sent her home, she got out of the ambulance and walked in."*
> [Member of public five, group five]

3.4.5.3 Holism

Assessments of rehabilitation potential were said to involve a range of key components which addressed the patient's complex and holistic needs. These included: medical, functional, environmental, social, psychological and advanced care planning.

1. Medical

Participants spoke of assessing previous and current co-morbidities, providing an accurate picture of what could be changed and managed. This informed clinical decisions on likely prognosis of the acute episode, underlying conditions and the proposed rehabilitation programme.

> "*We take into account the comorbidities, the severity of the disease."* [Elderly Care Physician four, group four]

This was viewed as being particularly challenging in the hospital where questions arose when participants considered general declining abilities associated with frailty versus the impact of acute illnesses.

> *"How do we distinguish between general decline and when somebody comes out of hospital, what their potential is? You've got comorbidities that have an impact on function, it is a fine balance."* [Occupational therapist five, group three]

> *"You would assess… the diagnoses and the symptoms and you will know something about those diagnoses and the trajectory and how things have changed. So, for example, you might know certain things about motor neurone disease or dementia, you're not going to get better. You might know that somebody who is deteriorating very rapidly with cancer is not going to get any better. So, you know that if somebody has got pain and you treat it successfully, they're going to be able to do more or if you treat heart failure, they're going to do more."* [Geriatrician one, group two]

2. Psychological

Participants reported that mental health, cognition, attention, capacity and insight were core components of rehabilitation potential assessments which may impact on engagement, retention of information and rehabilitation outcome.

This domain was particularly pertinent for those with diagnosed dementias and delirium. Cognitive assessments included formal tests such as the Montreal Cognitive

Assessment (MoCA) along with more functional approaches where abilities were informally assessed and observed. A narrative and solution-focused approach was adopted, whereby reversible factors were explored and managed using adaptive strategies.

> *"I might take them into the kitchen and say spoons, cups, kettle and they forgot because their memory isn't that good, but that doesn't matter at home. Testing problem solving, identification and initiation…because if they can't remember where things are in my hospital kitchen that doesn't matter at all so long as they can orientate at home."* [Occupational therapist one, group one]

Other participants felt that the hospital environment was not conducive to in-depth assessments of cognitive and psychological abilities.

> *"We don't assess [cognition] well, we screen in acute hospital…I think it's better than we used to be, we've got the MoCA, but I think we continue to miss the invisible."* [Occupational therapist six, group four]

In those with communication and cognitive difficulties, understanding behaviours was reported to be essential.

> *"People's behaviour isn't always what you think; for example, aggression, it may just that they are in pain."* [Nurse one, group five]

Within this theme, mental health featured strongly from the majority of participants. Mood was said to affect rehabilitation potential, participation and engagement in rehabilitation.

> *"Peoples moods and their attitudes, how they are feeling…they don't often feel in control when they're in hospital."* [Occupational therapist four, group three]

Participants reported that assessments of rehabilitation potential sought to understand if disinterest or a lack of engagement in rehabilitation was due to mood, the environment or patients 'giving up'. It was said to be essential to understand those conditions or situations which could be effectively managed.

There was a strongly held belief that the presence of dementia should not be a barrier to an individual having rehabilitation potential, whereby specialist knowledge, adequate time and resources would enable individuals to participate and respond to rehabilitation.

> *"Having some awareness on how to cope effectively with each individual patient is very individual, but it needs someone with skills to do that in a more effective way. And maybe some people are frightened of it and saying how do we deal with this, and there is a label attached to people with dementia isn't there."* [Nurse one, group five]

Reconciling these challenges alongside limited resources often led clinicians to seek out specialist skills and question the evidence base for rehabilitation for people living with dementia and other cognitive impairments.

> *"If somebody with dementia, can you train somebody with dementia and the easy answer is no you cannot train somebody with dementia they cannot learn. But we know there are new techniques for training persons so the definitions or instruments used for this rehabilitation potential assessment are also changing on what you know and what you can do."* [Elderly Care Physician two, group four]

3. Social

This study found that patients' social circumstances should be considered in rehabilitation potential assessments. This was deemed to be poorly explored by members of the public who took part in the study. They felt that clinicians rarely asked them about their ability to support programmes of rehabilitation for their relatives. However, some clinicians disagreed, stating that family involvement was essential in achieving favourable outcomes and was a core component of their practice.

> *"Hobbies, clubs, that social support...who is the family? Are they able to support and are they willing? It might be that the family just aren't able or willing to support the rehabilitation."* [Physiotherapist seven, group four]

There was a strongly held belief that gaining an in-depth social assessment was more feasible in the community setting when acute ill health and organisational pressures were less pronounced.

4. Environmental

The majority of participants reported that understanding an individual's usual place of residence was required. Clinicians considered housing type, access, adaptations and how individuals interacted with their home environment as essential components of rehabilitation potential assessments.

> *"Independent and safe within that home environment…what type of support or package of care do they need to promote their independence?"* [Occupational therapist four, group three]

However, limitations of what could be achieved in the hospital environment featured strongly in accounts.

> *"Just because you go up and down stair, four steps, four times, does it mean that I can replicate a terraced house?"* [Physiotherapist five, group three]

5. Functional

Participants said that they considered current and previous activities of daily living, transfers and mobility in their assessments and how strength, balance, posture, sensation and communication affected function and independence. Rather than formally testing abilities, a functional and personalised approach was found to prevail.

> *"I will not do a lot of abstract things like muscle strength or balance testing, I will just get them to move around and see how they are. I can't say out of five how strong their quads are, but that would suggest that they can stand without barely using their arms, that they have pretty decent leg power."* [Physiotherapist one, group one]

This approach was said to be even more important when assessing function in the presence of cognitive impairment.

> *"I tend to have a functional approach. I think it's more about not having as many prompts, allowing them, an automatic response. Let them show you what they can do without bombarding them with instructions."* [Physiotherapist two, group one]

Participants spoke of obtaining this information through direct assessments but reported that family members, carers and community providers were able to provide more detailed information, particularly in regard to previous abilities and response to previous rehabilitation programmes.

> *"Gathering information from people around them, the nurses, the MDT, any family is really important…. what was normal for that patient and what we are trying to get back to."* [Occupational therapist six, group four]

However, community-based participants, stated that they were rarely asked by hospital staff what an individual was able to do prior to admission and were seldom involved in the rehabilitation potential decision making.

> "*We are the people that are going into persons homes multiple times a day, day after day and we see changes. If we could have just more joined working and think…. what is the best route for this person and realistically what are the goals, what are the outcomes?"* [Social worker one, group two]

Clinician participants were quick to highlight that it was not just about how patients performed during their assessments, but also about the consistency of achievement and clinical presentations over a 24-hour period. Liaison with nursing staff was therefore viewed as essential in obtaining a comprehensive view.

6. Planning for the future

Participants stated that discussing and planning for declining abilities was bound up in the concept of rehabilitation potential, specifically when to offer rehabilitation and

when to stop. This was frequently described in terms of advanced care planning. Often rehabilitation potential was framed by individual narrowing horizons for improvement and in helping individuals and families come to terms with and plan for declining functional abilities.

> *"It's about narrowing horizons and trying to be there first…I am always looking for equipment they need plus six months from now. They don't need a back doorstep now, but it's worth putting in place now because inevitably they are going to need it."* [Physiotherapist one, group one]

In this situation, the opportunity to try rehabilitation was seen as critical in the process of accepting decline and then providing support and planning for future care and choices.

3.4.6 Overarching themes

A number of overarching themes emerged which allowed rehabilitation potential to be understood and operationalised in clinical practice. These will be considered in the following section.

3.4.6.1 Communication

A common view amongst participants was that effective communication with patients, family members and the MDT both within the hospital and community setting was critical to decisions on rehabilitation potential. Understanding patient needs and wants was established through open and honest discussions which enhanced motivation, participation and rehabilitation outcomes.

> *"It's back to that fundamental question 'What do you want from this, what's important to you?"* [Physiotherapist seven, group four]

Patient participants in the study reported that this allowed their priorities to be addressed, which may not have been immediately apparent to treating clinicians.

"*A couple of questions of what is most important to me and I would have said my eyesight and then that should have set off actions to help me with that."* [Member of Public Three, group Four]

Some interviewees argued that clinicians' involvement of patients and family members could lead to delays in hospital discharges and rehabilitation which was not required. Some felt duty-bound to offer rehabilitation, especially in the hospital setting where recovery was less certain.

"I get complaints…which you are not going to fix my mum, actually I'm just trying to be realistic with you because I am all very much about quality-of-life for that individual, not just about what the relatives want." [Occupational therapist five, group three]

Robust communication with members of the MDT both within the hospital and community settings was reported to provide further information on patients premorbid abilities, motivation and response previous rehabilitation, which informed rehabilitation potential decision-making.

"I ring community services and ask; I know that you have tried rehab two months ago, how did they get on?" [Occupational therapist one, group one]

3.4.6.2 Clinical experience and expertise

A recurrent theme in the focus groups was a sense that clinical experience influenced decisions and understanding of rehabilitation potential. Participants reported drawing on previous clinical cases to help inform their decisions on whether an individual would benefit from rehabilitation.

"One of the things about having professional therapists, doctors and nurses is that they can use professional judgement, negotiate goals, use their experience of the research base to work out what might help solve problems." [Geriatrician one, group two]

A number of participants stated that more senior clinicians were better equipped to recognise patterns and benefit. However, one participant noted that their lack of

experience meant that they would overestimate and refer people for further rehabilitation.

> *"When I was more junior, I thought I could fix everything…but in a sense that's ok, they are not going to miss anything, always err on the side of caution."* [Physiotherapist one, group one]

However, some participants felt that all patients should be offered the chance for rehabilitation as it was impossible to predict who would improve and identify those who needed additional time to recover from an acute event.

> *"If I am assessing somebody in the hospital, I always need to give them more chance. So even if they have an unsuccessful period of rehab…Even people who are functionally well don't always perform well under an assessment in hospital."* [Occupational therapist one, group one]

This was said at times to cause conflict with family members and carers who reported feeling unsure why rehabilitation was stopped or not offered.

> "*They don't really have to take any notice of what you are saying, they say it was their duty of care, we are acting on best interest."* [Member of public five, group five]

Assessments completed on specialist geriatric wards were believed to lead to more holistic and patient-centred models of rehabilitation potential. Individuals who had been written off or labelled as having 'no rehabilitation potential' were said to be more likely to be given another chance. Here they would receive specialist techniques delivered by a multi-disciplinary team such as behavioural and cognitive management strategies, functional approaches to assessment, facilitating greater involvement in rehabilitation assessments.

> *"You will see people coming from a non-specialist ward, non-geriatric minded wards and then they would be move to a geriatric ward and the ethos we have, let's give them another chance….the attitude makes a big difference with how you look at these people, who are people."* [Geriatrician three, group three]

Less experienced or non-specialists were deemed more likely to label someone as having no rehabilitation potential and deny them access to rehabilitation programmes.

3.4.6.3 Setting

Participants drew on experiences from working and receiving rehabilitation in both the community and hospital setting. The nature of the hospital setting was frequently referred to by participants, whereby patients were said to be at a disadvantage from the structures, processes and practices imposed on them by the institutional nature of the hospital setting. This was viewed, by some, as prematurely deeming individuals as having no rehabilitation potential.

> *"Are they taking on a patient role, am I allowed to do things more? Am I allowed to walk to the toilet on my own or dare I not press the buzzer but also, you know do we encourage them, do we with all the risk enablement and risk… there are so many things against falls are we putting constraints in. Are we forcing people into that pattern of not doing much during that admission and then we are assessing going, well they haven't done anything have they? We might have told them to sit and not move and not get up without anyone, so no, there's no rehab potential now."* [Occupational therapist one, group one]

Older people living with dementia were viewed as being at a particular disadvantage in terms of assessing rehabilitation potential due to unfamiliar layout and staff in the hospital setting. This meant that their ability to participate and perform in rehabilitation assessments and programmes was compromised by a strange and frightening environment.

> *"It is so alien on a ward, it is so frightening on the ward, isn't it? Especially when you are frail and elderly…And if you have dementia, and you've got hearing problems and seeing problems, it's all compounding."* [Member of public four, group five]

A recurring theme from the data was a sense that the hospital environment was not the optimal place to make decisions on patients' rehabilitation potential. Particularly

revealing is how participants reconciled the need to assess rehabilitation potential in the hospital setting whilst recognising that they were not seeing the individual as they truly were. Physiotherapist one, who worked in community rehabilitation services, spoke of the advantages of working with patients repeatedly in their own environments to build up a picture of their true rehabilitation potential.

> *"That's what I like about working in the community because you've got a picture into their life and their house because every old man in a hospital gown looks the same. I was with this chappie and he had all these books on the wall, really big all about politics and I thought he had cognitive problems and I said to his wife "your husband hasn't always been like this?" and she said he was bright, quite the brightest and that was why I married him. Oh, that explains it because when someone did the cognitive tests, he only scored one mark below average, but his average was way above. But if I was a physio in hospital, I don't think I would have got that clue I would have just had him in his pyjamas by his bed the same as everybody."* [Physiotherapist one, group one]

True rehabilitation potential was said to be only fully uncovered once the individual had recovered from the acute event which brought them into hospital, whereby the community, rehabilitation units or usual place of residence were said to be the ideal place to establish both current and previous abilities and establish participation, motivation and measured changes in rehabilitation outcomes.

> *"People's moods and their attitudes and how they're feeling about themselves is very different when they are in the hospital environment, when they're in somewhere that the feel in control because people don't feel in control when they're in hospital often, some people perhaps do. But people are sort of disempowered. So actually, the environment where you make that assessment of people's potential, I believe is really important."* [Occupational therapist four, group three]

Physiotherapist five believed that everyone had some form of rehabilitation potential but that this differed between individuals and what they needed to achieve in a specific setting.

"Everybody has potential. What the potential is, is determined by what activities they need to do. My potential is different from your potential." [Physiotherapist five, group three]

3.5 Discussion

The key findings from this study suggest that rehabilitation potential is a complicated phenomenon, involving complex and nuanced decisions. Participants spoke of predicting rehabilitation benefit and response based on a number of factors whilst seeking to balance patient and carer needs and wants with service availability. They asked would it work? Was it wanted? Was it available? These themes will be discussed in this section, along with the strengths and weaknesses of the study design and a conclusion.

In understanding who would benefit from rehabilitation, participants sought to understand the interplay between rehabilitation effectiveness, recovery from acute illness and the projected trajectory of underlying conditions. The literature identified in chapter two highlighted that rehabilitation potential was binary (129, 130, 134, 187, 201, 225) but this approach failed to take into account the fluctuations and complexities of frailty. These findings are supported by this study where rehabilitation potential was said to be dependent on the context and timing of the assessment in the recovery trajectory. In exploring rehabilitation potential amongst stroke survivors, rehabilitation potential in post-stroke recovery has been found to be time-specific, individualised, where approaches to assessing rehabilitation potential should be flexible across acute and community settings (145) . In order to inform decisions on rehabilitation potential and future rehabilitation programmes, participants sought to gain a comprehensive picture of patients underlying comorbidities and active medical conditions. These factors are central to practice which ascribes to holistic person-centred care, including CGA models of care and rehabilitation practice (67, 94).

Trials of rehabilitation which assessed patient participation, motivation and response were found to inform decisions on rehabilitation potential and carry-over. These findings are consistent with those of Burton et al. (145) and Longley et al. (149) and

their explorations of rehabilitation potential in stroke survivors, providing clinicians with critical knowledge on rehabilitation response and potential. Carryover describes a sustained change in abilities and benefits during rehabilitation (149). Burton et al. (145) found that decisions on rehabilitation potential in stroke survivors were informed by observations of carry-over and functional gain, recommending that patients should have opportunities to demonstrate their rehabilitation potential by participation in therapy. Similar findings emerged in this study where participants reported challenges in predicting the rehabilitation potential amongst those with permanent and temporary cognitive impairment. In relation to people living with dementia, low rehabilitation potential and motivation have been suggested as significant factors for poor carryover and rehabilitation outcomes (277). Goodwin and Allan (77) propose that such assumptions are not based on evidence, rather on clinicians' preconceived expectations of what individuals with dementia are capable of achieving. Participants in this study reported that geriatric expertise in managing complexity and cognitive impairment meant they were more likely to provide rehabilitation for this population. The development of specialist frailty roles and teams have been cited as key developments in meeting the needs of this population (111) and may go some way to address these challenges, in unison with further research into frailty rehabilitation and rehabilitation potential.

The results of this study indicate that knowledge of comorbidities and current conditions were critical in informing decisions on rehabilitation potential. However, comorbidity alone can be a poor guide in determining risk for adverse health outcomes (241). Previous research has shown that cognitive function, nutritional status, living alone and mood are strong predictors of rehabilitation outcome amongst older people (222, 238). Participants in this study reported assessing many of these factors in relation to rehabilitation potential. Research into rehabilitation potential in stroke (145, 148), acquired brain injury (147) and generic inpatient rehabilitation (70) have also highlighted the need for a greater understanding of current and underlying medical conditions.

Critical to the overarching theory of rehabilitation potential was the concept of benefit. This study found that participants conceptualised frailty rehabilitation which sought to either regain, improve or maintain function, or slow the rate of decline. Solutions or strength-based approaches were said to be preferable for those for

whom improvement was neither feasible nor desirable. Strength-based approaches describe a collaborative process where the individual is supported by services which seek to draw on their strengths and assets (278). Strongly rooted in social work models of practice, this approach has been suggested for managing the challenges of system-wide healthcare transitions amongst older adults post hip fracture (279). However, there remains a lack of evidence to inform how strengths-based approaches can be implemented into wider geriatric rehabilitation practice.

Predicting recovery in older people living with frailty following a period of acute ill health is challenging (235, 236). Cameron and Kurle (65) suggest that such questions depend upon the conceptualisation of frailty as either a temporary or permanent state, whereby rehabilitation is likely to lead to improved abilities if conceptualised as temporary. However, a major problem with this conceptualisation of frailty is that whilst the physical decline associated with an acute event may be reversible, the reversibility of the 'frailty' itself is less certain. Clinicians need to be cognisant of these distinctions to address them in a sufficiently nuanced way. These contrasting concepts of frailty were identified in participants' responses where they wrestled with understanding what could be improved with rehabilitation or when adaptive and palliative approaches were required. Whilst approaches that seek improvement in function and quality of life have predominated geriatric literature (3) , there are suggestions that palliative approaches to rehabilitation could help address the clinical implications of these differing approaches (52, 79, 241). Further research is required to understand the role that rehabilitation may play in reversing frailty.

Participants in this study drew on the frailty evidence base to understand if rehabilitation potential would be realised. Evidence-based practice (EBP) is the conscientious and judicious use of current best evidence in conjunction with clinical expertise and patient values to make decisions about the care of individuals patients or delivery of health services (280). Relevant and valid research should be used, which informs knowledge of the effects of rehabilitation programmes, the potential for harm, the accuracy of diagnostic tests and predictive power of prognosis (281). Frailty rehabilitation research is in its infancy and many of the studies which healthcare professionals draw their evidence from are not frailty specific. The absence of consistent definitions of frailty in rehabilitation trials, which have predominantly focussed on the older frail population may, therefore, be insufficient

in providing healthcare professionals with the evidence they require to make complex decisions in this population (282).

Motivation and patient participation were found to influence decisions on rehabilitation potential. Motivation for rehabilitation influences participation and success in terms of physical functioning (193, 246, 283), enabling individuals to become active partners in geriatric rehabilitation programmes (241). Motivation featured in definitions of rehabilitation potential identified in chapter two (69, 70, 134, 193) so appears to be a critical component of assessing an individual's rehabilitation potential. Exploring an individual's motivation, emotions and goals allows for an understanding of how they will react with rehabilitation programmes (246), whereas prognosis or prediction considers variables and outcomes. Bean et al. (241) suggest sustained motivation is so critical to successful rehabilitation that it should be added to the 5 M's of geriatric care (Mobility, Mind, Matters, Multimorbidity, Medication) to become the 6M's with the addition of motivation. Further research is required to inform how motivation for rehabilitation is assessed and sustained in frailty rehabilitation.

Another important finding was that by asking individuals 'what is important to me', study participants were able to set goals and seek to tailor rehabilitation programmes which were relevant and applicable to the patient and family members. Developing goals which were patient-centred was said to influence motivation and participation. Patient and family expectations and an ability to formulate goals have been cited as important components of decisions into rehabilitation potential in stroke and ABI populations (147, 149). However, the lack of empirical evidence informing goal setting in the clinical setting (284) and questions around the efficacy of goal setting leading to improved outcomes (285) raises uncertainty about the role of goal setting in frailty rehabilitation.

Although there is compelling evidence for predictive factors into rehabilitation benefit and outcome, this study suggests that clinicians also take into account the availability of rehabilitation resources when making decisions about rehabilitation potential in frail older people. These findings are consistent with other studies into rehabilitation potential in stroke and ABI (145, 147, 149) and geriatric rehabilitation (70, 193). This is further confounded by healthcare expenditure which has largely remained stagnant or contracted and the growing numbers of older people with

complex needs. These factors lead to significant pressures on health and social care systems in which clinicians must make evermore rapid and complex decisions. Clinicians can find the task of identifying rehabilitation potential challenging in an environment where 'noise' can interfere with clinical judgements (76). Enderby et al. (76) propose that resource availability is one factor that produces 'noise', which yields little relevant information but influences the transaction of rehabilitation potential decision-making.

These factors present clinicians with further challenges in deciding who should receive rehabilitation interventions and may result in rationing of healthcare services (77). Participants in this study spoke of the ethical dilemmas they faced in navigating decision-making in frailty rehabilitation. These ethical challenges can be better understood using Beauchamp and Childress ethical principles of autonomy, beneficence, non-maleficence and justice (286). This study found that participants respected decision-making capabilities of autonomous individuals but spoke of the challenges they faced when dealing with individuals with either permanent or temporary cognitive impairment. The importance of justice also featured strongly. Participants wrestled with the desire for equality of access to rehabilitation for their patients, regardless of age, cognition, degree of frailty or burden of comorbidity, but this was tempered by the knowledge that resources were limited and had to be rationed where need and benefit were perceived to be the greatest (287). Similar findings by Lam Wai Shun et al. (147) and Burton et al. (145) outlined the ethical challenges clinicians faced in rehabilitation potential decisions in terms of resource allocation. Age-based rationing of services presents practical and ethical challenges in terms of prioritisation and allocation of services for service users, providers and commissioners.

Further guidance is required to support clinical decision-making which recognises and embraces the ethical challenges of health resource allocation in relation to frailty. This study suggests that clinicians need to be more cognizant of how such factors influence and shape their decision-making and how these are communicated to patients, families and carers if a true shared decision-making approach to care which embraces the four principles is to be achieved.

These results need to be considered along with the strengths and limitations of the study.

3.5.1 Strengths

A key strength of the study was that the recruitment and sampling strategy allowed for community and hospital-based clinicians to be recruited. This included the opportunistic recruitment of Elderly Care Physicians from the Netherlands. The mapping review presented in chapter two had revealed that rehabilitation potential was a concept not isolated to the UK and so the inclusion of Dutch participants increased the generalisability and transferability of the findings through wider insights into rehabilitation potential in different healthcare systems. Additionally, it provided the opportunity for deviant accounts and constructs of rehabilitation potential to be explored.

The heterogeneous nature of the groups, which included members of the public and older adults, meant that new insights were obtained into rehabilitation potential in frailty. The group composition embraced the wide range of clinicians and patients involved in the phenomena of interest but still allowed for meaningful group contributions.

Skilled facilitation is an essential prerequisite for successful focus groups (253, 254, 258) and can affect the validity and reliability of findings. In order to support and develop the study teams' facilitation skills, a specialist focus group and PPI facilitator observed preliminary groups, providing feedback on the style and effectiveness of AC and MK. These findings were integrated with reflexive diaries and informed the development of a supportive and inclusive approach to facilitation in subsequent groups. As a member of the public, MK provided a differing perspective on group dynamics and possible social power issues.

The interview schedule was reviewed by members of a local PPI group and supervisory team to ensure that it was clear, non-judgemental and fit for purpose. It was designed to support flexible and organic discussions on rehabilitation potential and provide structure to ensure objectives were met in a timely manner.

A strength of this study was the involvement of a PPI member in data collection and analysis. PPI involvement in data analysis can produce differing viewpoints, thus mitigating against one perspective dominating analysis (268). It has the advantage of providing a more grounded and patient-centred approach to intervention development and can improve the transferability and credibility of research findings

(166). The selection of the Framework Analysis approach enabled PPI involvement to be realised, providing a systematic, robust and transparent process of data analysis. This approach is particularly suitable for novice research teams and PPI (268). MK took part in a specially designed qualitative analysis training programme (169) to support her involvement. As a consequence, greater emphasis was placed on patient and carer experiences, communication, clinical expertise and the need to foster family involvement in assessments of rehabilitation potential. This approach also allowed for deductive and inductive coding where new themes, previously not considered by the study team, were allowed to emerge from the data whilst enabling evidence for intervention development to be generated.

Researchers and clinicians view the world, their practice and research findings as professionals, as well as bringing personal experiences and beliefs to play. The involvement of MK in data collection and analysis enabled differing insights and perspectives to emerge. This enabled the patient and carer voice to have greater prominence in the findings and subsequent RePAT intervention. MK focused on patient experience and the role of carers in rehabilitation assessments and programme, compared to the technical aspects of rehabilitation practice by AC. This approach during the analytical process meant that cross-cutting themes of communication, training and expertise and supporting family member's involvement in rehabilitation were developed by virtue of this relationship. Other studies have similarly found that lay involvement has identified themes which would otherwise have been missed without their input in the analysis process (167, 274). As a shared understanding of the data emerged, a clear, unambiguous and jargon-free coding framework was required. Further considerations on the role of PPI in data collection and analysis can be found in Cowley et al. (169).

Complex phenomena of interest and heterogeneous focus groups often demand greater sample sizes to achieve data saturation (263). Failure to achieve data saturation can affect content validity (288). This study involved both cases. Data saturation was achieved in this study, where no new themes emerged after the fourth focus group. This is in line with the earlier presented evidence by Guest et al. (263) who proposed that 80% of analytical themes were found within two to three focus groups and 90% within three to six.

3.5.2 Limitations

The recruitment strategy may have led to selection bias due to the absence of participants with cognitive and communication impairments which frequently manifest amongst older people living with frailty. Selection bias occurs if the characteristics of the population differ from those of the wider population of interest (255). However, members of the public recruited described themselves as carers or family members of people living with dementia and hence provided experiences of rehabilitation potential in relation to this population.

Focus groups should have clear and targeted topic guides which address the phenomena of interest if not, then they risk becoming unfocused (254). Results from the mapping review (chapter two) highlighted that rehabilitation potential was poorly defined and diverse phenomena which had received a limited examination in terms of frailty. Participants in this study drew from a range of clinical experiences specific to frailty, stroke, cancer, long term conditions and generic rehabilitation practices. Finch et al. (257) propose that tangential discussions in focus groups are inevitable and have the advantage of leading to new insights which may not have been considered by the research team. These potential limitations were moderated through skilled facilitation, a topic guide and reflexivity, enabling the original aims and objectives to be achieved.

Focus groups with heterogeneous membership were selected to stimulate group discussion and obtain new insights into rehabilitation potential. There was a risk that senior clinicians dominated discussions and members of the public or junior clinicians' contributions were suppressed. It is recognised in the literature (260) that the composition of groups is an important consideration, as significant imbalances of power and status can affect contributions. The less powerful or those of lower status may defer their opinions to the more powerful/higher status. Thus, creating space for all participants to contribute is essential. Group facilitators should guide discussion dynamics to address dominant participants and encourage reticent members to contribute (257). In this study MK and an expert in PPI facilitation observed group dynamics, verbal and non-verbal signs to manage group contributions and direct specific questions to empower quieter members of the group. MK and AC met after each focus group to discuss group dynamics and

reflexive diary accounts were incorporated into the final analysis. Group discussion rules were used to manage participants' expectations and outline behaviours (257).

Participants' responses and involvement in group discussions may have been influenced by existing relationships with other participants and the study team. Participants may have been reluctant to express beliefs that were contradictory to other group members. A number of actions were employed to mitigate the effects of strong personalities and 'group think' (258). As mentioned earlier in this chapter, *a priori* group rules and careful facilitation which did not seek to confirm or judge individuals' responses (253) were used. Reflexive accounts, along with the repeated listening of audio recordings with MK, sought to identify the effect of group dynamics as well as the impact of self upon the findings, enhancing the credibility and dependability of the study findings.

An unexpected result was that the members of the public in group five assumed greater power. Participants may feel rebuked by dominant participants (257) for expressing non-conforming opinions. The lone clinician was observed defending clinical colleagues' actions and decisions, often seeking to justify why they had made certain choices or adopted certain behaviours. It is unclear if that was due to group composition or due to the small group size. Focus group five comprised of four participants. It has been argued in the literature that small group sizes can lose the benefits of a group process (i.e. when ideas are triggered by others) and instead become more a collection of individual interviews. This is especially a risk if groups are composed of individuals of different status (260).

Qualitative research recognises that the researcher is inextricably linked to the world they study. AC's personal experience and profession may have influenced the thematic analysis and introduced biases into the findings. This was mitigated by the process of reflexivity, which sought to integrate these insights into the analytical framework and by the inclusion of MK as a lay co-investigator.

3.6 Conclusion

This focus group study suggests that rehabilitation potential encapsulates complex decision-making processes where clinicians make clinical judgements on an individual's ability to benefit from a targeted rehabilitation programme. Previous and current comorbidities and abilities are assessed by an MDT who use a holistic and individualised approach to care. Clinicians, in partnership with patients, carers and family members sought to prognosticate on the likely outcome and benefit that rehabilitation programmes would have on individuals' health, function and well-being. At the heart lay the need to understand individuals' needs, wants and motivation for participation in rehabilitation programmes.

Participants believed that everyone had some form of rehabilitation potential, but this was dependent on their conceptual understanding of rehabilitation and the availability of rehabilitation interventions to meet individual needs. There was a sense that rehabilitation of sufficient duration, intensity and specialisation was not available to meet all patient's needs. Ethical dilemma's associated with resource availability and allocation featured strongly in participants' responses and the challenges they faced in navigating these in the hospital setting and rationing of resources. Perhaps the most clinically relevant finding is that differing beliefs of benefit influenced clinicians understanding of rehabilitation potential and its operationalisation into clinical practice.

Clinicians should have a greater awareness of the factors that influence their decision-making, trajectories of frailty, recovery and rehabilitation response. By asking patients what is important to them, rehabilitation assessments and programmes can be identified and developed to meet older people living with frailty's' complex needs. In making decisions on rehabilitation potential, the study found that three key questions were required: will it work, is it wanted and is it available.

Findings from this chapter were synthesised with the mapping review results to inform the development of the RePAT intervention, described in chapter four.

Chapter 4 – Intervention modelling and consensus approach

Summary

This chapter presents the development of the theory-driven and evidence-based RePAT intervention (Figure 16) in line with MRC intervention development and evaluation guidance (91, 104). Data was synthesised from the mapping review (chapter two) and focus groups (chapter three) to inform the theory of rehabilitation potential and to model the processes and content of the RePAT intervention. These were then subjected to a two-step Delphi consensus. Intervention components which reached predefined consensus levels were included in RePAT and tested in a feasibility study described in chapter five. The theoretical model of rehabilitation potential was further refined and presented in chapter six.

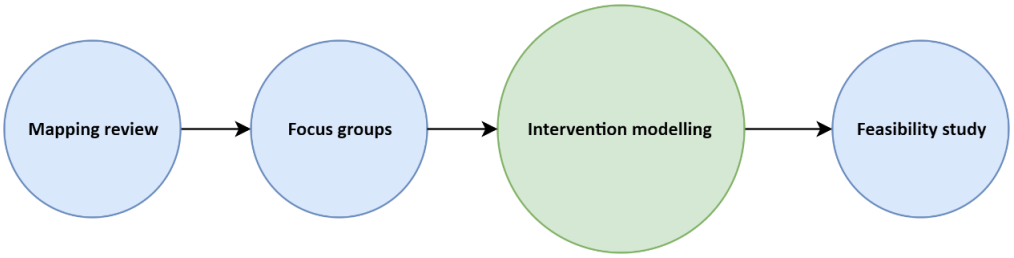


Figure 16 - Overall study organogram chapter four.

4.1 Scientific rationale

As outlined in chapter one, rehabilitation potential is a complex intervention. Chapters two and three have shown rehabilitation potential to be poorly defined, assessed and measured. In addition, there was an absence of coherent theory underpinning the concept. It was therefore the aim of this chapter to model a rehabilitation potential assessment tool (RePAT) and provide robust theories underpinning the novel intervention.

4.1.1 Intervention modelling

A sound theoretical understanding of how interventions work and their mechanisms and processes for change are therefore essential components of intervention design. This is sometimes referred to as modelling and forms part of the intervention development stage in the MRC framework. Modelling seeks to capture the processes, theory, inputs and outputs as well as the content of the intervention. Ferrante et al. (289) propose that a model is *"an approximation of a real system tuned to highlight those behaviours or structural elements affecting significantly the pursued purpose."* [p.1391].

However, literature on intervention evaluation far outstrips those on intervention development and design (99, 100). As outlined in chapter one, the MRC framework for complex interventions (91, 104) was chosen to guide theory development, intervention design, process modelling and content of the RePAT intervention. This framework has been widely used in developing complex interventions for older people (105) but has been criticised for lacking detailed guidance on theory development, intervention components, contextual and implementation factors (100, 105). Bleijenberg et al. (100) argue that a mismatch between intervention and implementation context in the MRC guidelines (91, 104) can lead to suboptimal treatment success. They propose an iterative methodological approach to maximise the MRC guidance to modelling and intervention content which includes understanding current practice and process to inform modelling and future implementation.

4.1.2 Theory development

Theory development is a critical component of intervention modelling and design. In this thesis, a theory is understood as an assumption made about why an intervention works, how it influences the casual chain and how it might work in context (100). Complex rehabilitation interventions have been frequently criticised for failing to explicitly outline their theoretical assumptions (90). It was, therefore, the aim of this PhD thesis to outline the theory underpinning rehabilitation potential assessments.

4.1.3 Evidence synthesis and integration

Evidence synthesis and integration play a key role in intervention development, modelling and design. It describes the process of bringing together relevant information. It should occur early in the development process, informing intervention design, implementation strategy and incorporating theories of change which may clarify causal explanations prior to definitive trials (251). This approach is in keeping with the overall mixed methods approach to RePAT intervention design and evaluation, where data integration occurs at multiple levels and stages.

Evidence from the mapping review (chapter two) and focus groups (chapter three) were integrated to develop the RePAT intervention. A number of different methods to synthesise mixed methods evidence were considered including; the triangulation protocol (160) following a thread (290) or a mixed methods matrix (159). The triangulation protocol was selected as it allowed evidence from the focus groups and mapping review to be assessed for differences and similarities and combined to address the aims of this component. Triangulation demands that data sets are considered for convergence, complementarity, dissonance and silence. Convergence describes the extent to which findings agree with each other. Complementarity allows multiple dimensions of research to be explored (160) and complementary information on the same issues to be identified. Dissonance describes findings which appear to contradict each other and plays an important role in theory development and exploring causal mechanisms (159). Silence considers where a finding arises in one data set only or where there is a noticeable absence (159). This item, unique to the triangulation protocol, can lead to new insights (160) which may enhance the validity and reliability of findings. Synthesised evidence was then used to build the theory and key components of the RePAT intervention. Similar methods have been used to develop complex rehabilitation interventions (291, 292).

4.1.4 Consensus approaches

Whilst these methods provide a robust foundation for intervention development, additional approaches were required to enhance the validity of the RePAT intervention. Gaining consensus or expert opinion on active components of the intervention, processes and underlying theory is recommended (95). A number of

different consensus approaches were considered. Face-to-face methods such as the Nominal Group Technique or consensus conferences are usually held in one session and can generate results rapidly. However, bringing together a group of experts to attend can be problematic (293) and participants may be less willing to share contrasting viewpoints due to issues with anonymity and group dynamics. The Delphi technique was chosen as it allows geographically dispersed participants to complete the task at a time convenient to them. It is a well-established method for seeking expert consensus on clinical issues, in a quick and cost-effective manner. It uses an iterative process of questionnaire completion and controlled feedback (294) to refine expert opinion reach consensus on a topic. This approach allows participants or panellists to make judgements in subsequent rounds where they can change or adapt their responses, providing greater insight into the area of study (295).

The Delphi method has the advantage over other consensus approaches as it allows experts to give opinions without being affected by group dynamics (296). Anonymity mitigates against the impact of strong personalities, opinions or authoritative status which can predominate during face-to-face group discussions (258). Such an impact was deemed to be especially pertinent when considering clinical expertise amongst clinicians. Delphi approaches have been widely used in intervention design for complex interventions and rehabilitation theory (66, 297, 298). This approach allowed components of the RePAT intervention to be tested for agreement (consensus) and subsequently refined for testing in the feasibility study described in chapter five.

4.2 Aims and objectives

The overall aim of this chapter was to develop the RePAT intervention and theory underpinning rehabilitation potential.

The specific research objectives were:

1. To develop the theory and a conceptual model of rehabilitation potential in older people in the acute hospital setting.
2. To synthesise the mapping review and focus group findings presented in earlier chapters.

3. To design the RePAT intervention.
4. To subject the RePAT intervention to a two-step Delphi consensus.
5. To refine the RePAT intervention for testing in the feasibility study.

4.3 Methods

4.3.1 Theory development and modelling RePAT

In modelling the RePAT intervention and development of underpinning theories of assessing rehabilitation potential, the following components were considered (93, 95).

1. Active components of rehabilitation potential assessments.
2. How the active components work.
3. Why they might be active components and the effect they may result in.
4. The right outcome measure that may be used to evaluate the effect.
5. How active components relate to each other.
6. Identification of mediators and moderators.
7. Theories underpinning relations and effects.
8. Theories and evidence for implementation of the intervention.
9. Context and processes for implementation.

Components were populated using data synthesised from mapping review and focus group findings presented in chapters two and three. Data were synthesised by AC using the triangulation protocol (159, 160) where complementarity, convergence, dissonance and silence between the data sets was assessed. This allowed for the theory of rehabilitation potential to be produced and active components of a rehabilitation potential assessment which included; who, what, where, how and why. Intervention components were specified and reported according to the Template for Intervention Description and Replication (TIDieR) checklist and guide (158). The TIDieR checklist provides a structured account of intervention descriptions and design, helping readers judge the reliability of the findings (299). A process map and theoretical model for rehabilitation potential were developed. Results were reviewed by the supervisory team and then by an expert panel as part of the Delphi consensus technique.

4.3.2 Delphi

4.3.2.1 Study design

A modified two-stage Delphi approach was used to seek consensus on the key components identified during the development of the RePAT intervention. Delphi consensus statements for the first round were developed from the findings generated in the data synthesis and reviewed by the supervisory team for clarity and appropriateness. Consensus statements were supplemented with further information on content. Nine clinicians, unrelated to the study, tested the Delphi questionnaire for functionality and clarity. The clinicians included three physiotherapists, three occupational therapists and three geriatricians. This resulted in revised consensus statement wording, clarification of key terms and space for additional comments. The statements were transferred onto an online questionnaire platform. A full copy of the Delphi questionnaire can be found in Appendix L.

4.3.2.2 Recruitment

Inclusion criteria

1. Clinical or academic physiotherapist or occupational therapist with ≥ 5 years' experience of working with older people within the United Kingdom.
2. Experience of assessing rehabilitation potential in older people living with frailty in the acute hospital setting or delivering rehabilitation to older people in the acute, sub-acute or community setting.

Exclusion criteria

1. Participants who were not fluent in written English.

4.3.2.3 Sampling framework

Evidence presented in chapters two and three highlighted that rehabilitation potential assessments were commonly delivered by a multi-disciplinary team (94). However, in this component, the decision was taken to recruit a purposive sample of expert physiotherapists and occupational therapists. In the United Kingdom, Allied

Health Professionals frequently take leading roles in rehabilitation decision-making, supporting the decision to focus consensus amongst physiotherapists and occupational therapists. An expert was defined as a registered clinician with ≥5 years' experience working with older people. Previous Delphi studies have used this criterion (300).

4.3.2.4 Sample size

A systematic review of Delphi studies recommended that the final round should include 11-25 panellists (301). In order to maintain the rigour of the technique, a response rate of 70% should be maintained across rounds. Therefore a sample of at least 20 was proposed to take into account attrition over the two rounds and to ensure that meaningful conclusions could be drawn from the data.

4.3.2.5 Recruitment

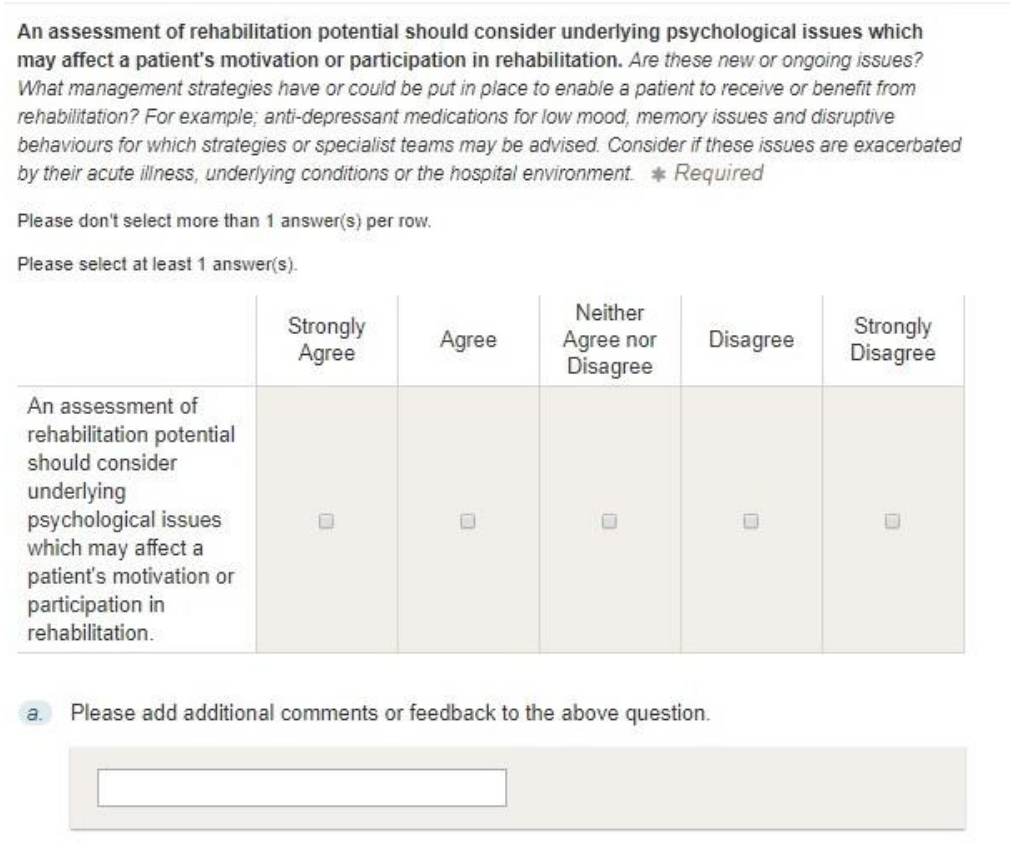
An invitation letter (Appendix M) was sent to potential panellists who were recruited through existing clinical, academic and professional bodies across the UK including: EMRAN (East Midlands Research into Ageing Network), the British Geriatrics Society, AGILE (interest group for Chartered Physiotherapists working with older people), COT SS Older People (College of Occupational Therapy Special Interest Group) and citations in peer-reviewed journals identified during the mapping review (chapter two). Panellists were asked to contact AC if they wished to take part and were emailed a participant information sheet (Appendix N) and an electronic link to the first questionnaire.

4.3.2.6 Consent

Completion and subsequent return of the Delphi questionnaire was taken as informed consent.

4.3.2.7 Round one

Panellists were sent a link to the questionnaire via email. They were asked to provide information on their clinical, academic and professional background, country of practice, place of work, the number of years they had been qualified and experience in geriatric rehabilitation. Panellists were asked to rate each statement using a five-point Likert Scale (302) 0 to 4 (0=completely disagree, 4= completely agree). Five-point Likert scales are the most commonly used in the research setting and more specifically in Delphi questionnaires (255). They have the benefit of reduced forced answers by permitting the neutral midpoint answer (303). A free text space for additional comments was provided so panellists could justify their responses or seek clarification on uncertain statements. This provided further information on the theoretical model of rehabilitation potential and the RePAT intervention training package. Figure 17 presents an example statement and scoring.



An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation. *Are these new or ongoing issues? What management strategies have or could be put in place to enable a patient to receive or benefit from rehabilitation? For example; anti-depressant medications for low mood, memory issues and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by their acute illness, underlying conditions or the hospital environment.* * Required

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

Figure 17 - Example of a question from round one Delphi questionnaire.

Panellists were given a period of two weeks to complete the questionnaire with weekly email reminders. Panellists remained anonymous to each other, to protect anonymity and to mitigate against the impact of strong personalities influencing the outcome of the questionnaire.

4.3.2.8 Round two

Items which did not meet ≥75% agreement were reviewed along with qualitative findings and refined for inclusion in round two. Panellists were asked to rate the items using the same approach as described in round one.

4.3.2.9 Between rounds analysis

The Delphi technique seeks to refine expert opinion using an iterative approach. Therefore, the results of round one informed the content of round two. The following methods were used:

- A summary of results from round one was presented to the panel. This included items which had reached consensus.
- Statements which reached consensus of ≥75% agreement but language or content were deemed to need refining by virtue of open text comments were refined through discussions with the study group.
- Statements that reached consensus of ≥75% agreement in round one were removed from round two unless open text comments indicated that additional modifications were required.
- Statements that did not reach consensus by failing to reach ≥75% agreement and where open text comments supported the removal or merging of statements were removed from subsequent rounds. These were reviewed and discussed with the study team.
- For statements which did not reach consensus, the wording was modified and presented to panellists in round two for assessment. Revised statements were reviewed by the study team.

4.3.2.10 Criteria for success – determining consensus

A number of different methods for determining consensus have been proposed: pre-determined number of rounds and levels of agreement, certain levels of agreement, central tendency (mean, median, mode), ratings and rankings, interquartile ranges, coefficient of variation and post-group consensus (301, 304). In order to enhance the validity and credibility of Delphi findings, Diamond et al. (301) recommend that *a priori* criteria for success should be outlined. They were as follows;

- Statements were included in RePAT if they achieved a consensus level of ≥75% after two rounds, demonstrated by a score of three or four (strongly agree or agree). This is consistent with other Delphi studies (301).
- Consensus agreement was established by the combined median scores of strongly agree and agree.
- Items were removed from RePAT if they had scored 75% consensus on disagree or strongly disagree.
- Two rounds were proposed.
- A response rate of ≥70% between rounds.

Open text data was presented to the panellists in round two as verbatim excerpts for items which either did not reach consensus or required refining for round two.

4.3.2.11 Data management

The consensus study took place on a secure, online questionnaire platform (Online Survey formerly Bristol Online Survey). Minimal personal data was collected. Electronic data from the on-line questionnaire was stored on a secure, encrypted and password-protected personal computer at the University of Nottingham.

4.3.3 RePAT Intervention design and optimisation

Items which reached ≥75% agreement were included in RePAT. The RePAT intervention was developed into a paper-based clinical proforma. The items were laid out in a typical clinical document design and supplemented with guidance for use during the feasibility study. Further details on the training for the RePAT are outlined in chapter five. This was reviewed by MK, PPI member, to ensure that the

'patient voice' remained present in the assessment tool. Co-design and involvement of service users in intervention modelling and design have been highly recommended (90, 91) to ensure the tool is fit for the population it is designed for.

4.4 Results

4.4.1 RePAT Intervention design and modelling

Results of the intervention development and theoretical underpinning were reported using the TIDieR checklist (158). The full TIDieR checklist, which incorporates components of the intervention development and testing can be found in Appendix O.

4.4.1.1 Name

Rehabilitation Potential Assessment Tool (RePAT).

4.4.1.2 Why: rationale, theory and goals

Data from the mapping review (chapter two) and focus groups (chapter three) were synthesised using the triangulation protocol (159, 160) to inform the theory underpinning rehabilitation potential and the RePAT intervention. An example of data from the triangulation protocol can be found in Appendix P.

The theory behind rehabilitation potential

Rehabilitation potential was identified as a process which involves complex clinical judgement and prognostication on the projected benefits of undertaking a targeted programme of rehabilitation. The term rehabilitation potential was used interchangeably in the literature to describe three separate concepts. It was most commonly used to refer to a prognosis of the likelihood of attainment of rehabilitation goals. But, it was also used to refer to a retrospective assessment of the extent to which people achieved their rehabilitation goals. This second concept was frequently referred to in the literature as rehabilitation effectiveness and formed the primary outcome of many of the clinical trials identified in the mapping review. Findings from the synthesised data suggested that it was the first of these

terms, prognosis and prospective, which is the true definition of rehabilitation potential. The second of these concepts (retrospective and deductive) is better referred to as rehabilitation effectiveness. These concepts are displayed in Figure 18.

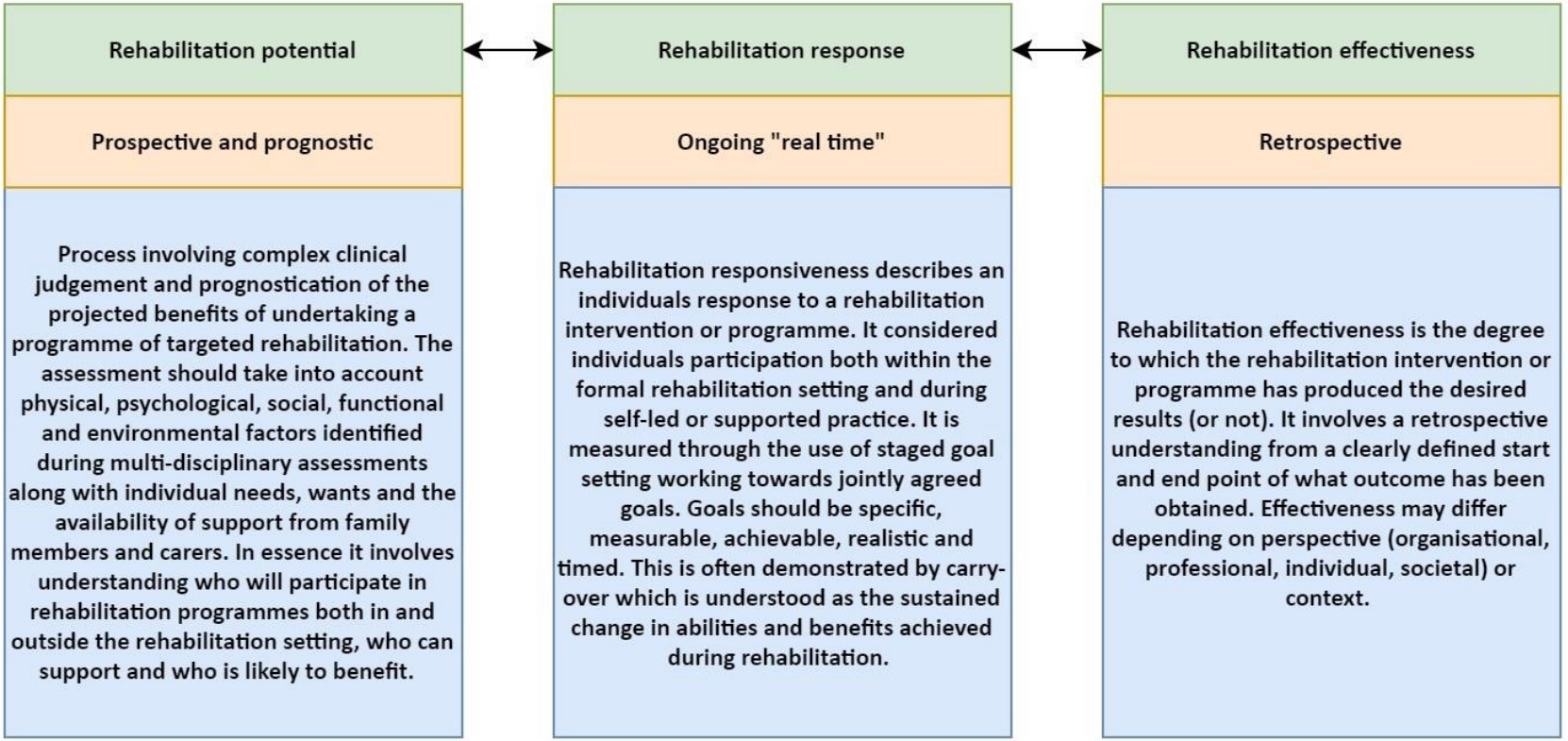


Figure 18 - The theory behind rehabilitation potential and similar descriptors.

Assessments of rehabilitation potential in older people living with frailty should take into account a range of holistic factors which inform decisions on rehabilitation prognosis, participation and motivation. These include taking into account physical (underlying conditions, diagnoses, acute events, trajectories of recovery and frailty), psychological (motivation, cognition, personality, mood, participation) with individual needs and wants and availability of support from family members and carers. Rehabilitation potential assessments involve clinicians obtaining detailed information on an individual's abilities, diagnoses, motivation and patient needs/wants, which are synthesised from differing sources over multiple time points. Pre-morbid (past) and current (present) abilities and conditions should be assessed and combined with predictions of recovery from acute events, trajectories of comorbidities and likely rehabilitation response (future).

Central to this concept was understanding who was likely to participate, both in and outside formal rehabilitation sessions and who could support this. This informed decisions on who was likely to benefit from programmes of rehabilitation.

Findings suggest that the concept of benefit in relation to rehabilitation outcomes, effectiveness and success was less certain when applied to the frail older adult population. A successful outcome differed according to different stakeholder perspectives. At an organisational level, a successful outcome may be a reduced length of hospital stay, timely discharge from acute care, reduction in readmission rate or optimal use of resources. Clinicians may measure success by agreements on an individual rehabilitation potential or by using validated outcome measures. At a patient or family level, success or benefit may include changes to function, quality of life or social participation. Findings remain uncertain if improvement, delaying or slowing the rate of decline, maintaining abilities or managed decline with palliative approaches were desirable outcomes. Further research is required to explore the link between rehabilitation potential and how its outcome is measured and linked to primary research outcomes for future definitive trials.

Rationale – why assess for rehabilitation potential

Central to the theory of rehabilitation potential lies the inherent belief that clinicians are able to identify and predict who is likely to respond to rehabilitation

interventions in the face of complexity and uncertainty of outcomes. Preliminary evidence suggests that predictive factors such as age, comorbidities, cognition, polypharmacy and living alone can predict who is likely to gain positive rehabilitation outcomes (40, 222, 238). Pre-morbid abilities inform what an individual is likely to return to following hospitalisation for an acute health episode. Loss of self-sufficiency assessed through ADLs and IADLs may be the first manifestation of widespread and general decline in functional abilities (190) and inform predictive decisions.

In order to apply research evidence of rehabilitation effectiveness and benefit into practice, clinicians need to be able to identify these factors amongst the noise in the acute setting. Contrasting findings were identified in the evidence synthesis. Mapping review evidence suggested that there were 'hard' indicators which predicted outcomes. These included levels of cognitive impairment, nutritional status, living alone, mood and frailty (222). In contrast, findings from the focus groups suggested that everyone had some form of potential to benefit from rehabilitation programmes. Rehabilitation response was found to emerge through trials of rehabilitation, enabling carry-over to be identified and measured through goal setting. Central to this was the need for assessments to maximise patient, family and carer involvement, motivation and participation through person-centred models of care. This was found to be especially challenging in the acute setting where ill health, unfamiliar surroundings and permanent or temporary cognitive impairments affected performance, motivation and capacity to make decisions.

Findings suggested that non-clinical factors or 'noise' were influential on rehabilitation potential assessments. This included factors such as resource availability, type and responsiveness of services to provide rehabilitation. Synthesised findings suggest that clinicians should seek an open dialogue with patients and their families about how these factors influence decisions on rehabilitation potential.

Goals

The goals that underpin RePAT were to inform clinicians' assessments and decision-making on an individual patients' rehabilitation potential. The primary outcome remains unclear due to the heterogeneity and lack of consistency in how the term

was applied in the identified current research evidence. These factors will be further explored and reported in chapter five.

4.4.1.3 Components

Active components of rehabilitation potential assessments were identified from the synthesised findings. Assessments of rehabilitation potential were found to largely mirror the principles of CGA approaches to care whereby a holistic, iterative, MDT and patient-centred approach was required.

Core components and their inclusion are justified in Table 12.

Table 12 - Theory underpinning the RePAT intervention.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Co-morbidities and active medical or physical conditions	Frailty is characterised by physiological changes across multiple systems. Assessments of rehabilitation potential should consider co-morbidities, acute events and their likely trajectory and response to management and rehabilitation.	Understand what is reversible, irreversible and modifiable and informs likely outcome. Identification of number and type of comorbidities.	Changes to physical conditions impact on IADLs and ADLS required for functional independence and self-sufficiency.	Optimisation of physical health can expedite discharge from the acute setting, optimise function, health and well-being. Reduced length of hospital stay, acute resource utilisation, independence and adverse patient outcomes.	CCI, Edmonton Frail Scale, Cumulative Illness Rating Scale, Barthel, Geriatric Assessment Frailty Scale.	Underlying and physical conditions impact on function, social interaction, psychological abilities and ability of an individual to interact with their environments
Psychological issues affecting motivation and participation	Unresolved or under managed issues can affect information retention, motivation and participation in rehabilitation assessments and programmes. Individuals are often optimistic about their chances of improving with rehabilitation.	Assessing previous and current abilities by synthesising information from formal tests, patient, family and MDT on pre-admission abilities levels of motivation and participation in previous rehabilitation.	Affect performance in and outside of rehabilitation sessions. Motivation can fluctuate. Cognition, attention, communication and mood can impact on motivation and participation.	Unresolved issues in the acute setting such as delirium, unfamiliar environment, ill health and paternalistic approach to care can lead to premature decisions on rehabilitation potential.	PRPS, Kemp Motivation, MoCA, MMSE, CPS, GDS, Montebello Rehabilitation factors Score, specific mood, cognition tests.	Impacts on physical function, engagement with assessments and rehabilitation programmes. Environment of assessment and family/carer involvement key.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Demonstrating participation	Individuals should be given the opportunity to demonstrate either participation in a rehabilitation assessment or programme. Participation is essential to engaging with programmes of rehabilitation. This may be especially challenging in the acute setting where individuals are unwell, confused and in an unfamiliar environment.	Rehabilitation is an active partnership between service users and providers. Automatic or functional approaches recommended in the presence of cognitive impairment.	Rehabilitation is a process of education so requires active patient participation.	Demonstrate ingredients for active rehabilitation partnership; communication, engagement, motivation and involvement.	PRPS.	Informs involvement as active partners across all domains of assessment. Frames individuals rehabilitation aims and plans.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Support needed for ADLs	Recognises that individuals may need support or provide support to others in their usual place of residence. Helps inform what needs, support and abilities are required to return to usual place of residence from acute care. Family, paid or unpaid carers provide essential information on pre-morbid abilities which is particularly important in the presence of cognitive impairment and communication difficulties.	Information gathered on the social situation from patient, family, carers and other agencies. Identifies existing support structures and what will be required on discharge from acute care.	Presence of social support strongly linked to positive rehabilitation outcomes.	Social support enables individuals to return to usual place of residence. Advocacy and support for decision making essential in those lacking capacity and with cognitive impairments.	Lowenthal-Haven scale, Carer dependency scale.	Links to social domain and function.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Support required for ongoing rehabilitation outside formal rehabilitation setting	Individuals may need physical, emotional and psychological support to continue rehabilitation outside the formal setting to gain carryover and benefits. This comprises of understanding who can support and their skills.	Ongoing support essential in the presence of cognitive and physical impairments. Assumes that rehabilitation is a 24-hour approach. Nursing staff ideally placed to provide 24 hour view.	Rehabilitation is finite. Ongoing participation and support needed to maximise benefits.	Enhance participation and engagement.	Goal Attainment Scale.	Measures performance across multiple domains.
Pre-morbid and current functional abilities	Predicts aims, likely response and trajectory. Pre-morbid abilities give the best idea of what an individual can achieve. Changes to function (IADLs, ADLs) indicative of disease progression. Function is a key factor in maintaining independence once home and for safe discharge from acute care.	By identifying how individuals function in days, weeks and months prior to admission provides the best evidence on likely outcome. Frames what they need to be able to do to return to usual place of residence post-admission.	Clinicians combine subjective and objective information to inform knowledge of previous and current abilities — Aids prediction in outcomes and disease trajectory.	Function (ADLs and IADL) integral to independence and well-being. Enables baseline abilities to be identified and plan for safe discharge from the acute setting.	Barthel, Elderly Mobility Scale, General Motor Assessment Scale, FIM, IADL and ADL scales, ADL hierarchy, NEADL, GEMS, TUG, grip strength, gait speed, BERG, geriatric assessment frailty index, Wakari ADL, Sunnas ADL.	Physical and psychological conditions, motivation, participation and environment influence functional abilities.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Environmental factors -usual place of residence and next destination	Assess an individuals' usual place of residence and what they need to be able to do to return there safely. Function involves interaction with the environment. The artificial and unfamiliar nature of the hospital environment, with the adopted 'sick role' and acute health event, means assessments may be an inaccurate representation of an individual's abilities.	In the acute setting, this is mostly obtained from subjective sources rather than direct assessment.	Understanding their usual place of residence is essential for function, well-being and social participation — layout, equipment and support.	If not considered could send the individual to an environment where they are unsafe or fail to thrive.	None identified.	Availability and choice of service, equipment and staff expertise.
Support to plan for the future	The principle of autonomy where individuals are assumed to have the capacity and make decisions about their future care. Those lacking capacity may require support or advocacy. Recognition of current needs and predicted changes associated with frailty and ageing.	Helps individuals coming to term with narrowing horizons to maximise health, well-being and social participation. Embraces person-centred and solutions-based approach to care planning.	Rehabilitation involves participation and goal setting where individuals make decisions on their future care.	Rehabilitation may be offered or denied, which is at odds with patient or organisational goals.	Quality of life measures. GHQ, Geriatric Quality of Life Questionnaire, EQ5D 3L Umea Life satisfaction checklist, short-form health survey.	Family and carer involvement. Knowledge of types of rehabilitation, Reablement or support services available.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Person-centred care; what's important to me?	Assessment of rehabilitation potential should focus on what the individual wants to achieve, rather than the therapist or organisation. By asking what's important to me, individuals can identify their priorities, needs and wants. Helps inform the type, intensity and location of future rehabilitation. Should be a critical part of establishing rehabilitation plans. Helps frame goal setting by establishing individual needs and wants.	Facilitates a person-centred, approach to care, rather than assuming needs and wants.	Individualised approach facilitates participation, engagement and motivation, which are critical to the success of rehabilitation programmes.	Improved use of resources if tailored to individual needs and wants rather than prescriptive approach to care.	None identified.	Informs goal setting and service planning.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Goal setting	Goals should be set in partnership with clinician, patient and where appropriate family/carers. Informs aims and type of rehabilitation to support discharge from acute care. Goal setting integral to rehabilitation practice and assessing individuals, carryover and progress. Setting small, staged goals demonstrates rehabilitation effectiveness and response. Useful in those with cognitive impairments, low exercise tolerance or behavioural difficulties where rehabilitation potential may be questioned. In the acute setting, focus is on managing the medical condition.	Identify short, medium and long term goals set using SMART approach. Provides structure for rehabilitation planning in those with complex health and social care needs. Goals also have the potential to motivate or demotivate individuals if they are not realistic or achievable. This is especially pertinent in terms of frailty and dementias, where the difference between independence and dependence is finely balanced.	Goals which are meaningful to the individual enhance participation and motivation. Measure rehabilitation response and inform decisions on rehabilitation potential in real-time. Clinicians must be cognoscente of differences in needs and wants from differing perspectives.	Goal setting supports a person-centred approach which may enhance motivation and participation and lead to improved outcomes. In the acute setting, individuals may articulate different goals to those in their usual place of residence. Rapid discharges may mean that goals are focused on medical and safety needs and higher needs are not prioritised. If the individual lacks insight, memory of other cognitive abilities, then identifying what is wanted and realistic may prove challenging.	GAS, outcome measures specific to goal.	Informed by assessments across other domains.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
MDT assessment	MDT skills and expertise enables multiple domains of health and wellbeing to be covered which are affected by frailty, ageing and the sequelae of acute hospital admissions. In the acute setting, focus is placed on assessing and managing acute health events using the medical model. However, an MDT solutions-based approach allows multiple domains of health and well-being to be addressed which consider quality of life, social participation and functional abilities.	Assessments across domains are completed, shared and synthesised by MDT to provide a holistic view of abilities, needs, wants and participation. Patient, family and community clinicians considered part of the MDT.	Individuals' health, well-being and quality of life is affected by multiple factors. Frailty and acute episodes can have a significant impact on independence and the ability to return to the usual place of residence. Specialist skills of the MDT can address these complex needs. Established processes of MDT collegiality and working, placing individual and family needs at the heart are essential to realising the potential of MDT working.	A solutions-based approach is sought, which takes into account the complexities of frailty presentation and differing models of rehabilitation. This embraces the person-centred approach to care. Nursing staff ideally placed to understand holistic needs and provide a 24-hour view of abilities and response to rehabilitation. Availability of MDT staff in the acute setting will impact on team composition. Potential for conflicting messages to be given to if non-cohesive approach taken.	MDT % agreement.	Prompts multiple domains of assessment.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Iterative	Rehabilitation assessments should not be retrospective, rather they should emerge from iterative assessments. Frailty, acute ill health and variability of performance (physical and cognitive) and hospital admission may lead to a decline in function, health, well-being and motivation. Individuals with delirium have fluctuations in abilities and performance, so an iterative approach can help inform a 24-hour picture.	Assessments completed over multiple time points inform a more accurate and realistic picture of abilities, participation and performance. Helps inform knowledge of rehabilitation response or carry-over.	Fluctuations associated with frailty, delirium and acute ill health need to be considered to ensure that the assessment is an equitable and authentic representation of individuals' abilities, participation and motivation. Iterative, MDT assessments are recommended.	Individuals written off as having no rehabilitation potential either due to low levels of participation, motivation or unrealistic goals can demonstrate abilities over multiple time points. If this is unrealistic in the acute setting, referrals to community teams are suggested. May be compromised by the pressure and speed with which decisions have to be made in acute settings.	Evidenced by the number of times assessed, GAS.	Each domain assessed over multiple time points.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Resource availability	Clinicians are required to make increasingly complex decisions about an individuals suitability for rehabilitation interventions. Patients are faced with limited autonomy and choice about the types and location of rehabilitation which are available to them. Clinicians, families, carers and health providers need to be increasingly cognoscente of the impact that resource availability has on their decision-making process. Open and honest discussions around resource allocation, availability and patient choice are needed. Does resource availability inform the decision or vice versa.	Clinicians need accurate knowledge of available resources within health and social care. This involves information on referral criteria, waiting lists, rehabilitation intensity and dose. Rather than resource provision dictating the decision, which disregards person-centred care, the decision should be made and then resources identified to meet the individual patient and family needs.	Rehabilitation effectiveness and benefit relies on the rehabilitation intervention being provided at optimal dose and intensity. Resource allocation is finite and this challenges clinicians, society and health providers to consider their underpinning approach to care - utilitarian, egalitarian or consumerism.	Increased access to rehabilitation services for those previously deemed as having no rehabilitation potential, which may support greater independence, reduced institutionalisation and greater quality of life. However, if clinicians recognise that resource allocation affects their decision making, this may require frank conversations with individuals and family members about rationing of healthcare resources. Potential for premature application of the label 'no rehabilitation potential'.	Service type, location, intensity of intervention, length of stay, service costs, cost-effectiveness measures.	Suggestions that rehabilitation potential decisions are influenced by knowledge of the availability of resources to provide rehabilitation needed by the individual.

Assessment components	Underpinning theory	How the component works	Why it might be an active component	What effect they might result in	Measuring	How relates to other components
Evidence for rehabilitation effectiveness	Rehabilitation potential is prospective and prognostic. Understanding the current evidence base and articulating clinical reasoning for believing that a proposed rehabilitation intervention is likely to be effective is essential. Frailty specific evidence is currently lacking on rehabilitation type, intensity and optimal dose and nuanced by differing views of effectiveness.	Rehabilitation response and outcomes should be measured as part of routine care and inform rehabilitation potential decision-making. Core part of evidence-based practice.	Informs EBP and clinical decision making.	Offering rehabilitation for which there is no solid evidence base or not offering rehabilitation based on prejudices to individuals with certain conditions.	Link to patient goals, patient or organisational level outcome measures or metrics.	Synthesise information from all domains to Inform decisions on effectiveness.

4.4.1.4 What: materials; provider, participant and equipment

Materials included; the paper-based RePAT and training manual. Further details of this component are reported below.

4.4.1.5 What: procedure: provider training, assessment and intervention

The RePAT intervention consisted of a paper-based assessment. This included 18 items identified as core components of rehabilitation potential assessments and space for clinicians to document their clinical assessments and reasoning. Further explanation of these items can be found in the training manual in Appendix Q. Evidence suggested that rehabilitation potential was a complex and heterogeneous phenomenon and highly contextual, therefore training was required. Participants training was designed which embraced experiential and reflective learning (305, 306), approaches which have previously been found to be effective in complex interventions for older people (307). A 60 minute face-to-face group teaching session was delivered. Content included: background to the study, the theory behind rehabilitation potential, recruitment, mental capacity, consent and data collection. Clinical vignettes were developed and completed in the group setting. Clinical vignettes allow training in authentic contexts of practice and have been widely used to evaluate guideline specific clinical reasoning skills, assess knowledge, train participants in intervention delivery and assess intervention delivery (308-311). Opportunities for group and individual discussions were provided during the training session and subsequent feasibility study. An intervention training manual was provided and can be found in Appendix Q. The training manual includes the final RePAT intervention which was developed after the Delphi consensus.

4.4.1.6 Who: provides the RePAT intervention

Synthesised evidence suggested that rehabilitation potential was best assessed by core members of the MDT. Team composition may depend on the setting where the assessment is delivered but ensuring that team members have the expertise to assess all the domains of rehabilitation potential is essential. This may span health and social care organisations and settings. Patient, family and carer involvement was essential to enhance the chances of successful outcomes. The RePAT intervention

was designed to be delivered by physiotherapists and occupational therapists, reflecting current practice in the UK where these staff members take leading roles in rehabilitation decision-making.

4.4.1.7 How: method of delivery

The RePAT intervention was delivered through a combination of face-to-face discussions with the patient and from information gathered from other MDT members and medical records. The RePAT intervention embraces person-centred care, which current literature outlines as essential in managing complexity (122, 244). This approach aims for health and social care staff to work collaboratively with service users whereby care should be planned and delivered 'with' people rather than 'to' or 'for' them (312).

4.4.1.8 Where: place of delivery

Assessments should ideally take place in individuals' usual place of residence as this provides the most accurate and realistic picture of abilities and functional requirements. Individuals, particularly those with cognitive impairments, were believed to perform better in familiar, non-institutionalised environments. In the acute setting, assessments should take place on specialist geriatric wards or by a specialist team who work across several wards (68). RePAT was delivered in the hospital setting, reflecting the overall study aims. A process map was developed to identify where RePAT should be delivered in the patient pathway (Figure 19).

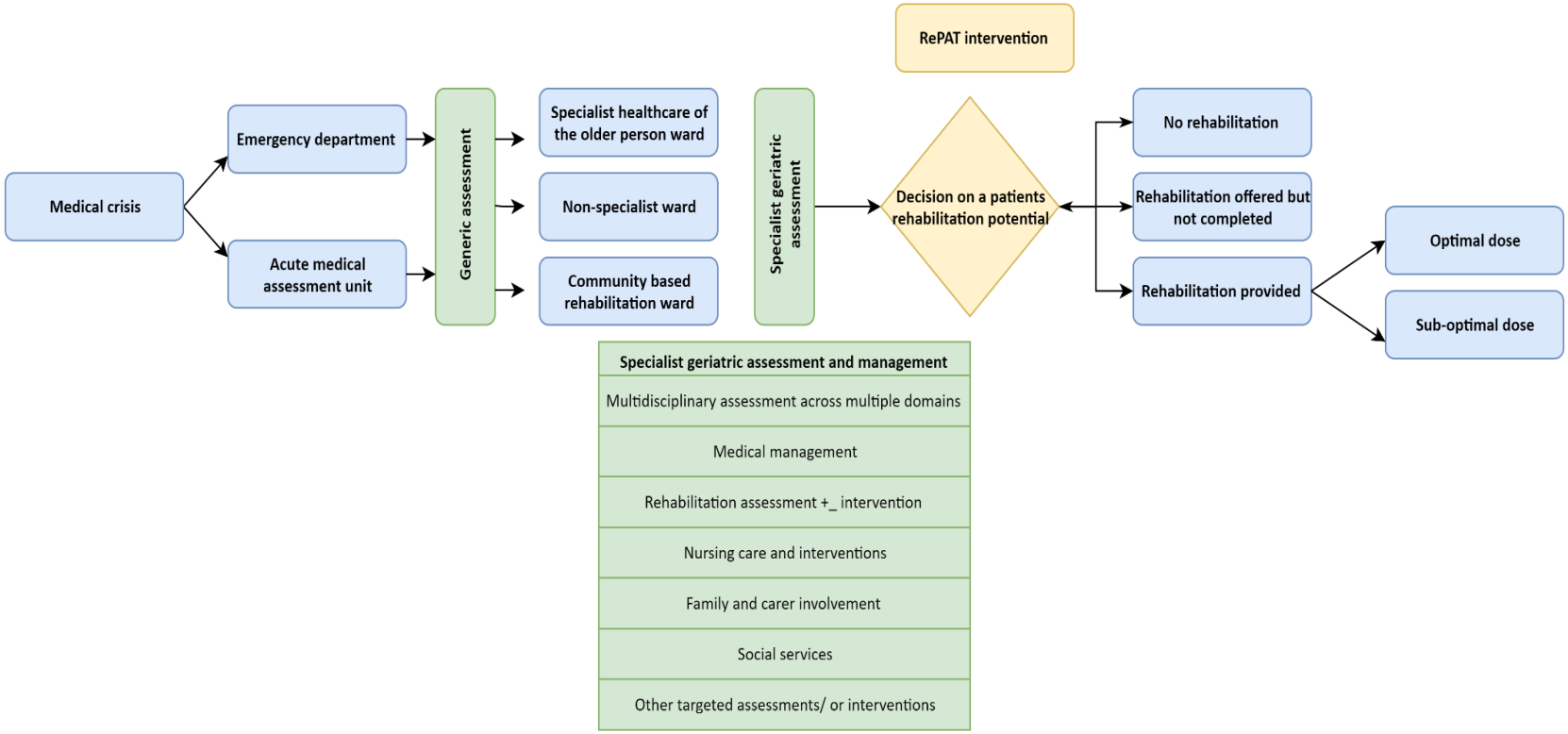


Figure 19 - Process diagram for the RePAT intervention.

4.4.1.9 When and how much

Evidence from the mapping review suggested that rehabilitation potential assessments were made at singular time points. In contrast, focus group findings suggested that iterative assessments provided a greater understanding of individuals' abilities, wants, needs and performance. This allowed fluctuations associated with frailty, acute ill health, participation and motivation to be taken into account. In instances where one-off assessments were unavoidable, attempts should be made for additional follow-up assessments. RePAT will be completed following iterative assessments. Insufficient evidence was identified to suggest how often rehabilitation potential should be assessed.

4.4.1.10 Tailoring the intervention

The RePAT intervention was not tailored to the individual patient. However, the assessments required to complete the tool were individualised by the treating clinician in line with usual clinical care. This allowed individual abilities, comorbidities, performance, needs and goals to be established. The RePAT demands that information was gathered and synthesised from multiple sources, but the core items remain consistent.

4.4.1.11 Modifications

Components of the RePAT intervention and training package were modified after the Delphi consensus (chapter four) and feasibility study presented in chapter five.

4.4.1.12 How well: planned and actual

Intervention fidelity was assessed during the feasibility study against *a priori* criteria outlined in chapter five.

4.4.2 Delphi consensus

4.4.2.1 Round one

Eighty participants responded to the recruitment adverts and were sent the Delphi consensus questionnaire. Eighteen were excluded as they had less than five years of clinical experience in geriatrics. In total, fifty-three participants completed round one. 86.8% of participants were female and 77.4% were physiotherapists. Characteristics are displayed in Table 13.

Table 13 - Delphi panellists characteristics.

Gender (n, %)	**N (%)**
Female	46 (86.8%)
Male	7 (13.2%)
Profession (n, %)	**N (%)**
Physiotherapist	41 (77.4%)
Occupational therapist	12 (22.6%)
Current place of work (n, %)	**N (%)**
Acute hospital	25 (47.1%)
In-patient rehabilitation	5 (9.4%)
Community-based	11 (20.7%)
Higher Education Institution	2 (3.7%)
Other	3 (5.7%)
Two or more places of work	7 (13.2%)

Highest qualification	**N (%)**
BSc	25 (47%)
Diploma	2 (4%)
Masters	19 (36%)
PG Cert	2 (4%)
PG Dip	3 (6%)
PhD	2 (4%)
Time qualified as a health professional (years)	**N (%)**
Mean ± SD	17.23 ±7.38
Median	15
Range	5-37
Time working in geriatric rehabilitation (years)	**N (%)**
Mean ± SD	13.32 ± 6.8
Median	12
Range	5-35

Most worked in a hospital (47.1%), followed by 20.7% in the community setting with seven participants reporting that they worked across multiple settings. The mean time working in geriatrics was 17.23 years (±7.38). 100% of participants currently worked in the United Kingdom.

Participants were asked to rate 18 items of RePAT in round one. A total of 14 out of 18 items reached the *a priori* consensus agreement level of ≥75%. The results are displayed in Table 14.

Table 14 - Level of agreement results for Delphi round one.

Item number	Item content	Consensus level of agreement (%)	Consensus level reached
1	An assessment of rehabilitation potential should consider any underlying physical issues which may affect or interfere with rehabilitation.	100%	Yes
2	An assessment of rehabilitation potential should consider any unresolved physical issues which may affect or interfere with rehabilitation.	94.3%	Yes
3	An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation.	98.1%	Yes
4	An assessment of rehabilitation potential should consider unresolved psychological issues which may affect a patient's motivation or participation in rehabilitation.	92.4%	Yes
5	An assessment of rehabilitation potential should consider if the patient has been able to demonstrate participation in the rehabilitation assessment or programme during this current episode of care.	84.9%	Yes

Item number	Item content	Consensus level of agreement (%)	Consensus level reached
6	An assessment of rehabilitation potential should consider if the patient will be supported in their activities of daily living in their usual place of residence.	67.9%	No
7	An assessment of rehabilitation potential should consider if the patient will be supported to continue rehabilitation outside the therapy setting in their usual place of residence.	71.6%	No
8	An assessment of rehabilitation potential should consider a patient's current functional abilities and levels of independence.	86.7%	Yes
9	An assessment of rehabilitation potential should consider a patients pre-morbid (pre-admission) functional abilities and level of independence.	94.3%	Yes
10	An assessment of rehabilitation potential should include a thorough understanding of the patients' environment in their usual place of residence.	92.5%	Yes
11	An assessment of rehabilitation potential should include a thorough understanding of the patients' environment at their next destination.	73.6%	No

Item number	Item content	Consensus level of agreement (%)	Consensus level reached
12	An assessment of rehabilitation potential should include what support the patient requires to make decisions about their future.	75.5%	Yes
13	An assessment of rehabilitation potential should include asking the patient what is important to them.	100%	Yes
14	An assessment of rehabilitation potential should include setting and agreeing on short-term, medium-term and long-term goals.	86.8%	Yes
15	An assessment of rehabilitation potential should incorporate findings from the multi-disciplinary team.	94.3%	Yes
16	An assessment of rehabilitation potential should be carried out over multiple time points.	96.3%	Yes
17	An assessment of rehabilitation potential should consider the availability of services to provide the rehabilitation needed by the patient. Consider the type, dose, intensity, location, referral criteria and speed of referral.	64.1%	No
18	An assessment of rehabilitation potential should consider if the proposed rehabilitation programme is likely to be effective.	79.2%	Yes

The four items which did not reach a consensus level of ≥75% agreement in round one (items 6, 7, 11 and 17) were reviewed and refined taking into account the open

text for each item. Open text comments were analysed and a selection of these are presented below.

Round One - Item Six: An assessment of rehabilitation potential should consider if the patient will be supported in their activities of daily living in their usual place of residence.

Panellists commented that a lack of family support should not prevent individuals being considered for programmes of rehabilitation or as having rehabilitation potential. Services should strive to provide this support rather than deny someone rehabilitation due to the lack of it.

> *"This shouldn't influence rehab potential, you need to adapt levels of support to help people get their optimal goals and abilities."* [Panellist Five]

Panellists reported that they had a professional duty to ensure that support was in place or planned to provide patients with the maximal opportunities to realise their rehabilitation potential. Someone's ability to achieve their rehabilitation potential should not be dependent on requiring support for ADL's.

Round One - Item Seven: An assessment of rehabilitation potential should consider if the patient will be supported to continue rehabilitation outside the therapy setting in their usual place of residence.

Panellists reported that this item potentially labelled people who lived alone as having no rehabilitation potential. It was suggested that this item could lead to discriminatory practice. Panellists stated that it was their responsibility to fully explore available support mechanisms and provide tailored support to achieve this.

> *"You need to establish what is there and adapt support to help them maximise their potential, not exclude people because they don't have support. It's about identifying the issue, not an exclusion from rehab because they live alone."* [Panellist Sixteen]

Central to this was the importance of involving family members, carers and community MDT in the assessment to inform rehabilitation and care planning.

Round One - Item 11: An assessment of rehabilitation potential should include a thorough understanding of the patients' environment at their next destination.

Panellists reported that this item should be considered as part of rehabilitation planning but felt that they often had little control over availability of and access to resources.

> *"There's a lack of control over the next destination of where we send people. It's about service potential and not individual potential."* [Panellist 30]

In the acute setting, participants reported a gap in their knowledge of what services were available and this was heightened by the pressures they were placed under in the acute setting to expedite discharge and maintain hospital flow.

> *"With the nature of acute hospitals we are pressured to make decisions surrounding a person's rehabilitation potential very early in their admission with limited clinician time with the patient… we are under pressure."* [Panellist 23]

Round One - Item 17: An assessment of rehabilitation potential should consider the availability of services to provide the rehabilitation needed by the patient. Consider the type, dose, intensity, location, referral criteria and speed of referral.

Panellists expressed a strong belief that an individual's potential should not be determined by a service's potential to deliver what was needed.

> *"Patients can have a potential to improve regardless of whether or not a team, service, type of rehab is available to them, but availability will affect whether potential will be realised."* [Panellist One]

These discussions were considered essential to help shape future service structure and provision and to not labelling someone as having no rehabilitation potential. Aspirations for a truly patient-centred approach to care meant that rehabilitation potential should focus on the individual and services should be sought, designed and commissioned to meet the needs of the frail older population.

After review by the study team, Item 11 was merged with item 17 as the qualitative data suggested that they described similar concepts. Items six, seven and 17 were reframed to take into account open text data and included in round two.

4.4.2.2 Round Two

Forty-six participants completed round two, producing a stability of response rate of 87%. Results from round two are displayed in Table 15.

Table 15 - Level of agreement results for Delphi round two.

Item number	Item content	Consensus level of agreement (%)	Consensus level reached
1	An assessment of rehabilitation potential should not take into account if patients will be supported in their activities of daily living in their usual place of residence.	43%	No
2	An assessment of rehabilitation potential should not take into account whether patients will have support to continue rehabilitation outside the therapy setting.	63%	No
3	An assessment of rehabilitation potential should not consider the availability of the services to provide the required rehabilitation. This refers to the potential of the service to meet needs and not the potential of the individual patient.	72%	No

None of the three items reached the *a priori* consensus level. These items were subsequently removed from the RePAT intervention.

Round Two – Item One: An assessment of rehabilitation potential should not take into account if patients will be supported in their activities of daily living in their usual place of residence.

Panellists reported contrasting opinions on the content of this item as demonstrated by their open text responses. A number, who agreed with the statement, stated that support for activities of daily living was not associated with an individual's rehabilitation potential, rather it was something that could be changed with the timely allocation of resources.

> *"I would not exclude someone from rehabilitation based on what support they had with their ADLs, but I do think it is important to establish what support they have. This may help tailor your approach to rehabilitation. For example, if the patient had a very engaged daughter who wanted to be involved in her mother's rehab, then I would coordinate rehab I was doing, with exercise the patient could do with their daughter. Also, what their usual place of residence is may give guidance to goal setting. For example, if they originally lived in a nursing home with the assistance of two for all care, then they are unlikely to reach independence. However, it wouldn't stop me from rehabbing them if they were currently below that level."* [Panellist 28]

One panellist suggested that this could lead to discriminatory practice by excluding those who needed support to function from rehabilitation programmes.

> *"If clinicians deem individuals as having no rehabilitation potential due to the lack of support at home this is surely discriminatory and is potentially hiding the terrible strain on social care."* [Panellist 13]

Other panellists stated that the presence of ADL support featured strongly in their views of rehabilitation potential and clinical decision-making.

> *"It should be taken into account as support may be crucial to a person's ability to engage in rehab and get the most out of it."* [Panellist 26]

However, there was some confusion over the wording of this question by participants which may explain the lack of consensus and variation in responses.

> *"I am not sure if I am confused… Maybe I have misinterpreted the question."* [Panellist 39]

Round Two – Item Two: An assessment of rehabilitation potential should not take into account whether patients will have support to continue rehabilitation outside the therapy setting.

Findings from item two revealed that 63% of panellists believed that support to continue rehabilitation outside the therapy setting should not be considered in assessments of rehabilitation potential. Open text data suggested that it was the clinician's responsibility to ensure that maximal support was in place to enable optimal rehabilitation gains to be achieved and sustained outside the formal rehabilitation and therapy setting.

> *"The 'having' of help shouldn't affect the decision to provide rehab. If you feel that a patient's potential to rehabilitate will require some support then it should be put in place as part of their rehab plan."* [Panellist 26]

One panellist explained that whilst this should not be a deciding factor, it did influence the type, intensity and location of rehabilitation services they would recommend for their patients.

> *"It should not preclude people…when I assessed people for rehabilitation, this support may determine the pathway for those with no support, we could refer them to residential beds. If people have support the extent of that support needs to be known to make a judgement. This is more about pathways than potential."* [Panellist 32]

Round Two – Item Three: An assessment of rehabilitation potential should not consider the availability of the services to provide the required rehabilitation. This refers to the potential of the service to meet needs and not the potential of the individual patient.

Item three was close to reaching the pre-determined consensus level of ≥75%, scoring 71.8%. Panellists agreed that availability of resources should not dictate an individual's rehabilitation potential, rather it described the potential of a service to meet needs.

> *"A person's intrinsic potential should not be influenced by what services are available. However, my concern would be that lots of people are*

(rightly) assessed as having potential but the services to realise that potential do not exist in their locality? I guess the question is whether people are assessed for rehabilitation potential in context of an ideal world or within the real world." [Panellist eight]

The dichotomy between real-world practice and the ideal featured strongly in open text comments where some panellists conceded that resource availability, type and location did influence their decision making on an individual's rehabilitation potential.

"There is no point referring a patient for rehabilitation at a centre that cannot meet their needs, therefore an understanding of the available service is required." [Panellist 38]

4.4.3 RePAT Intervention design and optimisation

Fourteen items which met the *a priori* criteria for consensus were included in the RePAT intervention. An additional item which asked clinicians to consider their overall impression of an individual's rehabilitation potential was included. This was as a result of the complex theories and factors involved in conceptualising and operationalising rehabilitation potential and from feedback in the Delphi consensus.

"With the nature of hospitals, now we are pressured to make decisions surround a person's rehabilitation potential very early in their admission. Inevitably this means at times that patients may be transferred to rehabilitation units who, it turns out, don't make the progress expected." [Panellist 42]

Panellists reported that the pressure they faced to rapidly make complex decisions in the acute hospital setting meant that they needed to justify their decision on an individuals rehabilitation potential.

Due to the heterogeneity and complexity of rehabilitation potential theory, a definition was provided on the RePAT intervention to focus assessments and remind participants on the working definition.

An important factor to consider in the implementation of RePAT both for the feasibility study presented in chapter five and future trials was the burden of

completion for staff and patient participants. These factors were explored as part of the nested qualitative interviews completed in the feasibility study. However, understanding the response burden was essential. Therefore an additional item which asked participants to state how long it took to complete their assessments and RePAT was included. The final RePAT intervention tested in the feasibility study is presented in Figure 20. This can also be found in the training manual in Appendix Q.

Patient participant ID:
Staff participant ID:

Nottingham University Hospitals NHS
NHS Trust

Rehabilitation potential tool
V1.1 Date: 8/02/2019

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

Rehabilitation potential is a process which involves complex clinical judgement and prognostication of the projected benefits of undertaking a targeted programme of rehabilitation. The assessment of rehabilitation potential should take into account physical and psychological factors identified during multidisciplinary assessments along with individual patient needs and wants and the availability of family support. It involves developing an understanding of who will participate with rehabilitation, in and outside the therapy setting, who can support this and who is likely to benefit.

Question	Comments
1. Are there any underlying physical issues which may affect or interfere with rehabilitation?	
2. Are there any unresolved physical issues which may affect or interfere with rehabilitation?	
3. Are there any underlying psychological issues which may affect an individual's motivation or participation with rehabilitation?	
4. Are there any unresolved psychological issues which may affect an individual's motivation or participation with rehabilitation?	
5. Has the individual been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care?	
6. What are the individual's current functional abilities and levels of independence?	
7. What were the individual's pre-morbid (pre-admission) functional abilities and levels of independence?	

Patient participant ID:
Staff participant ID:

Nottingham University Hospitals NHS
NHS Trust

Question	Comments
8. Do you have a thorough understanding of individual's environment in their usual place of residence?	
9. What support does the individual require to make decisions about their future?	
10. Has the individual been asked "What's important to me?"	
11. Have goals been set and agreed which are SMART? (Short, Medium, Long Term)	
12. Has the multi-disciplinary team been involved in the assessment or decision-making process?	
13. Has the individual's rehabilitation potential been assessed over multiple time points?	
14. Is the proposed rehabilitation programme likely to be effective?	

Overall impression

Time taken to complete assessment= Time taken to complete form =

Assessment of Rehabilitation Potential Staff Participant Demographics Sheet V1.1 17/08/2017 IRAS: 227228 Sponsor: 17HC002

Figure 20 – The RePAT.

4.5 Discussion

The synthesised findings suggest that the term rehabilitation potential was used to describe three separate concepts; rehabilitation effectiveness, response and potential. These concepts will be discussed in this section.

Rehabilitation effectiveness describes the degree to which rehabilitation interventions produce the predicted outcome, demanding a deductive and retrospective approach. This concept strongly allies to clinical effectiveness and trials which consider causal effects on health-related quality of life or survival (313), informing clinical guidelines, commissioning and evidence-based practice. Studies were identified in the mapping review (Chapter two) where individuals were said to have rehabilitation potential if they achieved positive gains post-rehabilitation (134, 189, 200, 212). In an exploration of rehabilitation potential amongst stroke survivors, Burton et al. (145) proposed that generalizable information that predicted rehabilitation outcome may only partly explain individual patients' rehabilitation potential. Whilst this model is, without doubt, critical to the scientific endeavour of intervention evaluation, it does not accurately capture the complexities and realities of rehabilitation potential in older people living with frailty.

Results from this chapter suggest that the true definition of rehabilitation potential involves prognostic and prospective approaches, incorporating knowledge of rehabilitation effectiveness into the decision-making process. Prognostication describes the prediction of the future course of diseases and treatments (232). Prognostication in frailty rehabilitation has received less attention compared to stroke and acquired brain injury rehabilitation (187, 314). This is more likely to relate to the relative infancy of frailty rehabilitation research, rather than the absence of need for further research into this area.

Prediction is complex and relies on the notion that outcomes and benefit can be predicted in patient populations. This is less challenging with single diseases where causal mechanisms are clearer, but with frailty and multi-morbidity, prediction can be more problematic. The synthesized data presented in this chapter suggested that assessments of rehabilitation potential involved integrating evidence on the presence or absence of predictive variables such frailty, comorbidity, residential status with patient characteristics including motivation, participation and

engagement and system variables which included resource availability. Predicting the response and trajectories of acute medical conditions and co-morbidities were found to be critical components of rehabilitation potential theory. They played a significant role in predicting functional rehabilitation outcomes and an understanding of how co-morbidities may impede optimal functional recovery. However, the association between the burden of comorbidity and functional outcomes was found to be modest amongst patients with hip fractures and stroke (315). The presence of multiple long-term conditions means that when frail older people deteriorate, they deteriorate rapidly and across multiple systems. This can lead to acute hospital admissions and prolonged, complex trajectories of recovery or adaptation. It is unclear how much improvement is due to natural unassisted recovery from acute illness or injury, the natural progression of concomitant disease and how much can be attributed to rehabilitation interventions (34, 112, 113, 316, 317). Items included in the RePAT intervention allow these complexities and nuances to be articulated and explored rather than distilling them to the binary variables of “rehabilitation potential” or “no rehabilitation potential”.

Psychological factors have been cited as critical components in rehabilitation assessments and selection. This study found that mood, cognition and comprehension informed clinicians understanding of patient participation, performance and carry-over. These results are broadly in line with Siegert et al. (246), who found that carry-over and participation informed clinicians’ decision-making on how individuals react with programmes of rehabilitation. Participation has long been held as a central requirement of rehabilitation programmes. Rehabilitation should be in active partnership with individuals and not ‘be done’ to them, focussing on the impact that health conditions or disabilities have on individuals’, rather than their diagnosis.

Trials of rehabilitation were found to be critical in informing carry-over, performance and decisions on rehabilitation potential. These findings mirror those of studies into this area in stroke and ABI (76, 145, 147, 149). However, clinician’s predictions of rehabilitation potential, rather than actual patient performance were suggested to be an over-riding factor in decision-making amongst clinicians assessing stroke patients with existing cognitive impairments (149).

This study and the resulting RePAT intervention brought together the need to understand co-morbidities and acute ill health, whilst emphasising the need for an active rehabilitation partnership and person-centred approach to care. This is in keeping with current literature which proposed patient engagement and communication from both the patient and clinician were required to enhance patient motivation (73) and subsequent benefits.

The RePAT intervention included items which explored cognitive and psychological factors. A correlation between cognitive impairment and adverse outcomes of rehabilitation has been demonstrated (131, 132, 213, 215, 277, 283). However, there is emerging evidence to suggest that older people with cognitive impairments can benefit from rehabilitation programmes (318, 319). This item is of particular interest in the context of this study which sought to develop a rehabilitation potential assessment tool for use in the hospital setting. Delirium, characterised by a rapid change in mental abilities, has a high prevalence in acute care settings (237) and is associated with poor outcomes such as institutionalisation and death, independent of age, comorbidities, sex and pre-admission dementia (320). Therefore a rehabilitation potential tool which did not consider the impact of delirium, cognitive impairment and other potential barriers to rehabilitation would be of limited clinical utility. Najem et al. (321) suggested that the presence of cognitive impairment could adversely affect the dynamics of an active rehabilitation partnership and that further research was required to define minimal active partnership for rehabilitation involvement.

The results of this study indicate that rehabilitation potential assessments should include a thorough understanding of individuals' functional abilities. This was frequently assessed through ADLs and IADLs rather than with formalised strength, power and sensory assessments commonly used to identify impairment of structures (44). Changes to function may be indicative of underlying sarcopenia. Sarcopenia is described as the progressive loss of skeletal muscle mass, strength and power (322, 323) and is associated with increased risk of adverse outcomes of physical disability, low quality of life and death (324). Although muscle and grip strength were not found to be specific requirements of assessing rehabilitation potential, the sequelae of their impact were considered as part of functional and physical domains in the RePAT intervention. Further work is needed to understand how rehabilitation

potential and sarcopenia are linked and any predictive items which may be of clinical utility.

It was somewhat surprising that nutritional assessments did not receive greater prominence in this study, given the weight of evidence linking malnutrition and adverse outcomes and its link to frailty and sarcopenia. Nutritional status was identified as a factor to consider in items one and two of the RePAT intervention (physical issues). This finding may represent a weakness in selection criteria in the mapping review and sampling from focus groups, where no dietitians were recruited. Alternatively, it may be explained by the lack of focus on nutritional intake in the acute hospital setting (42). Malnutrition is common amongst older people and is an important risk factor for frailty, but one which may be modifiable (325). A systematic review of nutritional status found 38.7% of adults in the hospital setting were malnourished and 50.5% in rehabilitation settings when assessed with the Mini Nutritional Assessment tool (326). These findings may be limited by the heterogeneity of the sample and they highlight the prevalence of malnutrition and the need for accurate screening to address nutritional issues in this population.

Fourteen out of eighteen items reached consensus within two rounds and were included in the RePAT intervention. This result may be explained by the fact that these items were already central to the panellists' routine clinical practice. These findings are consistent with an ethnographic study of geriatric physiotherapists where holistic domains of health, well-being and function were identified as core components of practice (119). Items which considered the support individuals required for activities of daily living and ongoing rehabilitation and the availability of resources failed to reach consensus. An important theoretical concept emerged from these findings, whereby two distinct types of rehabilitation potential were found; individual potential and system potential. Individual potential described specific patient-level factors such as cognition, physical conditions, motivation and participation were identified. These factors relate to the health condition, impairment, activity and participatory domains of the ICF (44) and commonly used rehabilitation selection criteria and assessments. Whereas system potential described the potential of systems and services to deliver the rehabilitation required by individuals. Similar findings were reported in exploring rehabilitation potential amongst stroke, ABI and populations (76, 145, 147, 149, 321), where resource

requirements were said to influence the type of rehabilitation offered and clinician's views of individual's rehabilitation potential. An ethnographic study which explored older people's rehabilitation potential in acute care outlined the struggles that physiotherapists and occupational therapists faced in reconciling ideal practice with the reality of service provision (137).

In a climate of stagnant or contracting health and social care provision under growing demand, clinicians will be required to make decisions on resource allocation that balance political, ethical and service perspectives (145) with patient needs, wants and expectations. This has been suggested to be especially challenging in older, vulnerable populations where selection bias either as a result of eligibility criteria or clinician beliefs is evident (321). The ethics of decision-making have been extensively explored in health and social care (327, 328) and more recently in planning hospital discharges and rehabilitation provision (329-331). Approaches to ethical reasoning are evident in RePAT. Ethical reasoning describes clinicians attempts to resolve ethical dilemmas and by balancing one or more values against another to act in the best interests of service users (332). The RePAT intervention seeks to provide structure and transparency for clinical reasoning, which embraces clinical and ethical factors whilst retaining a person-centred approach to care. Clinical decision-making and clinical reasoning are essential components of high quality, autonomous professional practice. The terms are often used interchangeably. However Higgs and Jensen (333) propose that clinical reasoning refers to:

> *"The overall process of thinking during clinical practice, while clinical decision-making…emphasises the outputs or decisions*." [(333), p4]

Clinical data, professional judgement and knowledge should be incorporated with patient choice (334) however, in practice; clinical reasoning is frequently manifested 'in the head' rather than explicitly written down.

Assumptions on rehabilitation potential may not be based on evidence, rather on clinicians' preconceived ideas of what individuals are capable of achieving (77). This is especially pertinent for the frail inpatient population where acute confusional states such as delirium may adversely affect rehabilitation performance, carryover and participation and where trajectories of recovery are less certain. Patients may

demonstrate their potential later than others (76) once they have recovered from the acute event or returned to their usual place of residence. Clinicians may, therefore, select patients whom they perceive as having the greatest potential to benefit, thereby increasing the risk of implicit bias (321).

A key finding of this study was the need to establish patient needs and wants through asking 'what is important to me?' This item was found to be an important factor in motivation and participation in rehabilitation but also in framing goals and priorities for increased independence, well-being and autonomy in decision-making. However, evidence suggests that this may be more challenging in the acute hospital setting and with cognitive dysfunction (321), which RePAT was designed to address. This item enabled a model of person-centred care to be developed (73), moving away from the biomedical model of care which fails to take a holistic approach. These findings must be considered in light of health services which have traditionally been established on biomedical models where reform across health and social care systems is required to realise the benefits of holistic approaches to care (74).

The RePAT intervention shares many similarities with rehabilitation selection and assessment tools (80) but draws most parallels with the holistic domains of Comprehensive Geriatric Assessment (CGA). CGA is a multi-disciplinary diagnostic and management process that identifies medical, psychological and functional capabilities of frail older persons in order to develop a coordinated and integrated plan for treatment and long-term follow up (67). It embraces a person-centred and iterative approach to case management and focuses on key domains including medical, mental health, functional capacity, environment and social circumstances, all of which were included in RePAT. More recent models of CGA suggest that financial and spiritual aspects of function and well-being should be considered (335) but these items were not included in RePAT due to a lack of evidence.

4.5.1 Strengths

A key strength of this study was the use of the MRC framework (91, 104), which has been widely used in developing interventions for older adults (105). However, it has been proposed that levels of detail, consistency of use and underpinning theory are poorly reported (100, 105, 106), undermining the transparency and rigour of the

approach. Consequently, the addition of process maps, which considered when and where RePAT should be used in clinical practice, and causal and contextual factors were presented. These enhanced the understanding of processes, barriers and enablers for future implementation and definitive trials. These measures improved the transparency of the active components and underpinning theory of the RePAT intervention (95, 100).

Results were reported using the TIDieR framework (158), which allowed the structure and detail of the RePAT intervention to be presented. This enhanced the transparency of the approach, aiding appraisal, replication and implementation of the intervention.

Robust and transparent methods of data synthesis are essential components in the development of interventions. A key strength of this study was the use of the triangulation protocol for data synthesis (159, 336), which enhanced the strength, trustworthiness and comprehensiveness of the results (337, 338). The triangulation protocol has been widely used in complex intervention development (291, 339). This enabled a systematic, thorough and transparent approach to evidence synthesis, seeking convergence, dissonance, silence and complementarity from the data sets. This approach allowed the researcher to remain close to the data whilst identifying key components and theories to inform modelling and intervention development.

One of the strengths of this study was the inclusion of stakeholder involvement in the intervention development process. This approach has been recommended to ensure that the resulting intervention is fit for purpose (91, 93, 104). The RePAT intervention and training package were reviewed by a PPI member to ensure that they retained the patient and carer voice. Clinical stakeholders were involved in reviewing components of the RePAT intervention through the Delphi consensus approach. Delphi approaches have been widely used to gain opinions and consensus from experts in the design of complex interventions (66, 298, 340).

The aim of this study was to develop a rehabilitation potential assessment tool for use in the acute hospital setting. It was, therefore, important to gain insights from physiotherapists and occupational therapists who assess rehabilitation potential and deliver rehabilitation programmes in community and hospital settings to inform the intervention theory, design and implementation. A key strength of this study was a recruitment and sampling strategy that allowed community and hospital-based

clinicians to be recruited, providing wider insights into rehabilitation potential across healthcare systems. This enhanced the transferability and validity of the findings.

There has been widespread debate in the literature as to what constitutes an expert and whether the Delphi approach can yield valid expert opinion. Hasson et al. (341) suggest that a balance must be struck between ensuring panellists' engagement with the process whilst retaining impartiality and hence the validity of their responses. Panellists in this Delphi study had been qualified clinicians for a mean of 17.23 (±7.38) years. In a study which explored expert clinical practice amongst geriatric physical therapists, participants' clinical experience ranged from 23 to 36 years (342). Although clinical experience and expertise has been traditionally associated with years of experience, Resnik and Hart (343) suggest that expertise is influenced more by clinicians' experience of health-related quality of life outcomes and patient experience.

The credibility of findings were enhanced by iterative rounds of feedback to panellists and the use of mixed methods approaches within the method (344). Likert rating scales and qualitative open text comments accompanied each statement, gaining further insight into the rationale and context behind scores. This approach helped refine the statements for round two and informed the content of the RePAT intervention training package.

Notwithstanding the limitations of the modified two-step approach, a key strength of this study was the use of pre-determined criteria for success which enhanced the rigour of the technique. A common criticism levelled at Delphi studies is the tendency for drop-out amongst panellists between rounds. Atkins et al. (270) proposed that to maintain the rigour of the approach, a response rate of 70% should be maintained between rounds. This study produced a response rate of 87% between rounds one and two.

4.5.2 Limitations

The identification of relevant outcome measures is one of the most important components in modelling complex interventions. It informs what the expected intervention outcomes should be and potential confounding factors that must be controlled for in future evaluations (345). During the development and modelling of

the RePAT intervention a definitive measure was not identified which could be used as a primary outcome measure in future trials. Several factors could explain this result. Rehabilitation potential was found to be a complex and heterogeneous concept, so ascertaining a consistent definition of benefit or outcome proved challenging. In addition, a successful outcome of rehabilitation potential assessments was found to be influenced by perspective. For example, patients may see success in terms of improved function, social participation or well-being, whereas an organisation may seek improved patient flow, timely hospital discharges or efficient use of resources. Identification of relevant outcome measures was further explored in the feasibility study presented in chapter five. Feasibility studies often act as testbeds for the theory and practicalities of delivering an intervention and allow primary outcome measures to be explored (346).

The Delphi approach is often criticized for subject bias, where panellists change their views in line with other participants (295). This was mitigated against by ensuring anonymity of panellists so that divergent or strong opinions could be expressed and freely voiced. This is often viewed as a distinct advantage of the Delphi over other face-to-face consensus approaches such as the nominal group technique or consensus conference, so participants can equally contribute to the process. However, anonymity may lead to a lack of accountability for the views expressed and hasty ill-judged comments (347).

Hasson and Keeney (295) propose that recruitment and sampling strategies can have the biggest impact on the validity and trustworthiness of Delphi findings. A final sample size of 20 was proposed. The questionnaire was disseminated through a wide range of professional bodies which resulted in more interest from volunteers than previously predicted. There was no way of reasonably knowing participant demographics and experience, so participants could not be sensibly excluded based on this knowledge. This resulted in 46 panellists completing both rounds. Large sample sizes can lead to greater variation, reduced accuracy and generalisability (295) however, reliable results can be achieved with small samples of similarly trained experts (270, 301). Conversely, the large sample size in this study allowed for the heterogeneity and nuances of rehabilitation potential to be explored. Pre-determined consensus levels were reached on 14 out of 18 items in round one. It is possible that this result may be explained by the fact that panellists did not have the

opportunity to debate issues before reaching consensus. However, qualitative feedback within the questionnaire allowed panellists to express their views on items and wider issues related to rehabilitation potential and the RePAT intervention.

Synthesised data presented in this chapter found that rehabilitation potential assessments were typically delivered by a multi-disciplinary team and included patient and family involvement. The current study is limited by the fact that recruitment was restricted to physiotherapists and occupational therapists. This was a pragmatic choice reflecting the reality of clinical practice in the UK where physiotherapists and occupational therapists often take leading roles in rehabilitation assessments. However, these results may not be applicable to other groups or clinical settings.

One issue with this study was the use of a modified two-step Delphi approach. Modified Delphi approaches have been widely used in health research for intervention and curriculum development (348, 349). Three items failed to reach consensus in round two and consensus may have been achieved with additional rounds and subsequently included in RePAT. The use of open-ended questions, typically used in preliminary rounds, should be avoided in modified two-step Delphi approaches (295) where Likert ratings are used earlier in the process. This approach is typically used when seeking to define the problem for intervention development, but this study sought expert consensus on items developed from evidence generated during this PhD. The combination of clear consensus statements with open text comments to justify strengthened and increased the content and face validity.

The Delphi study employed a five-point Likert scale which permitted midpoint/neutral answers, thus reducing forced responses (293). Neutral answers; neither agree nor disagreement may not always be desirable if a definitive answer is sought.

Qualitative (open text) data suggested that panellists found the wording of items in round two confusing. The study may have been strengthened by seeking linguistic advice on the language, grammar and structure items in the Delphi consensus.

4.6 Conclusion

This chapter set out to develop the theoretical model of rehabilitation potential and the RePAT intervention with data synthesized from the mapping review and focus groups described in earlier chapters. Rehabilitation potential was found to encapsulate more than just a retrospective analysis of rehabilitation effectiveness. It involved a complex process of prediction and prognostication based on a number of patient and system-level factors which reflect the complexity of frailty, acute ill health and hospital care. This is further confounded by the lack of clear endpoints and what a good outcome of rehabilitation is for this population. A 'good' outcome for a patient or carer may not be congruous with 'good' outcome for a clinician or organisation. Predicting outcomes and responses to rehabilitation raises significant ethical challenges to clinicians, patients and carers alike. The RePAT intervention sought to bring together these complex factors and to provide a structured, holistic and reasoned approach to decision-making in rehabilitation for frail older people.

Chapter 5 – Feasibility Study

This chapter presents a non-randomised feasibility study where a novel rehabilitation potential intervention (RePAT) was delivered in an acute hospital setting to explore whether the intervention was deliverable and acceptable to staff and patient participants (Figure 21).

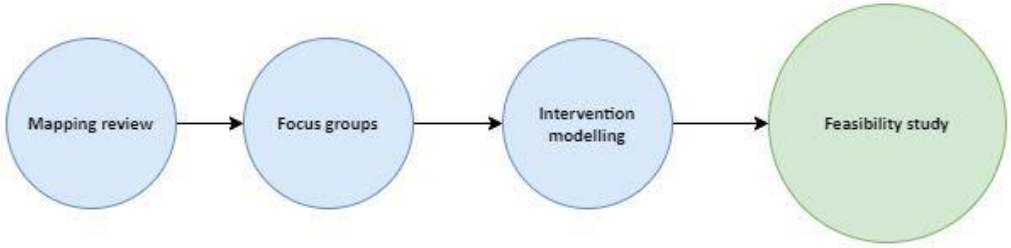


Figure 21 - Overall study organogram chapter five.

5.1 Introduction

5.1.1 Scientific background and rationale for the method

The MRC framework (91, 104) for developing and evaluating complex health interventions highlights the important role that exploratory studies play prior to undertaking a definitive trial. Whilst it is widely accepted that such studies are essential steps in the intervention development testing and informing future implementation, there has been considerable debate amongst the research community concerning the similarities and differences between pilot and feasibility studies. Eldridge et al. (350) found that the terms were often used interchangeably without due consideration for the discrete differences in their methods.

Pilot studies are commonly a small scale version of the main trial (346, 350, 351) and test if all the components of the proposed main study work together. They have strict methodological structures, outline intentions for future work, and focus predominantly on trial processes such as randomisation, recruitment, treatment fidelity and follow up (351).

Feasibility studies typically occur earlier in the process of intervention testing and evaluation. They commonly ask ‘can the study be done’ and are used as an overarching term to describe preliminary studies which precede the main trial (351).

They do not seek to evaluate the main study outcome but often estimate important parameters that are needed to design the main study (346). These may include; standard deviation of outcome measures, willingness of patients to be randomised, willingness of clinicians to recruit participants, number of people eligible, follow-up rates, response rates and adherence or compliance rates.

Despite the subtle differences, both designs demand clear aims and objectives, criteria for success and how the study assimilates with the overall programme of research.

In designing and evaluating complex interventions, such as the RePAT intervention, the working definition and components had not previously been tested in the clinical setting. Several questions needed answering before either a definitive trial or pilot study could be considered. A feasibility study design was chosen to explore if the RePAT was acceptable to patients, carers and clinicians and to make any necessary changes. It was therefore not necessary to randomise participants to a control arm. This feasibility study did not seek to validate or test the effectiveness of the RePAT intervention in determining rehabilitation outcome. This will be explored in future studies.

5.2 Research aims and objectives

The overall aim was to explore whether the RePAT intervention developed in chapter four could be feasibly delivered in the acute hospital setting.

The specific research objectives were:

4. To test the acceptability of the RePAT intervention to staff and patient participants.
5. To test the fidelity of the RePAT intervention.
6. To test the face validity of the RePAT intervention.
7. To refine the content of the RePAT intervention for future clinical trials.
8. To test the feasibility of recruiting and retaining staff participants working in the acute healthcare sector to the study.
9. To test the feasibility of recruiting and retaining patient and carer participants to the study.

10. To explore the feasibility of recruiting people deemed to lack mental capacity.
11. To test the patient participant eligibility criteria.
12. To identify useful outcome measures.
13. To describe usual clinical care.
14. To trial documents and processes for future trials.

5.3Criteria for success

1. Five staff members recruited within one month.
2. Twenty-five patients recruited within two months.
3. Intervention delivered to 25 participants.
4. Fidelity of item completion achieved on the RePAT intervention at 80%.

5.4 Method

5.4.1 Study design and setting

This feasibility study took place on health care of the older person's (HCOP) wards in a large acute teaching hospital. These clinical areas assessed, treated and managed older people with complex needs who were in receipt of generic rehabilitation assessments or programmes of rehabilitation and hence addressed the phenomena of interest. The overall study, documentation and protocol underwent extensive review and development with members of a local PPI group and Age Concern UK. The study team comprised of a PPI member (MK) who was instrumental in reviewing processes, advising on the study and analysing data which strengthened the study design and conduct.

5.4.2 Recruitment

5.4.2.1 Staff participants

Occupational therapists and physiotherapists working on HCOP wards were invited to take part in the study. Posters (Appendix R) were displayed in staff areas and

participants were asked to contact the study team if they wished to enter the study. Participant Information Sheets (PIS) (Appendix S) were provided and participants had the opportunity to meet face-to-face with a member of the study team to discuss entry. A maximum variation sample was proposed to ensure an equal weighting of occupational and physiotherapists were recruited with a range of clinical experience. Maximum variation samples allow for a range of cases or participants to be recruited to ensure representativeness and diversity of the population (261).

Inclusion criteria

1. Physiotherapists or occupational therapists working in the acute care setting with older people living with frailty, specifically carrying out rehabilitation assessments or programmes of rehabilitation.

Exclusion criteria

1. Staff participants involved in research studies exploring or testing rehabilitation potential, rehabilitation assessments or rehabilitation models of care for older people living with frailty.
2. Staff participants working in specialist stroke, end of life or fracture services.

5.4.2.2 Patient participants

A poster designed in partnership with PPI member, MK, was displayed in ward areas outlining the study design and what to expect (Appendix T). Staff participants delivering routine clinical care and a member of the study team screened potential patient participants against the inclusion criteria. Staff participants made the initial approach to patients and asked if they would be interested in taking part in the study. AC met patient participants to discuss entry into the study and provided relevant study documentation. A simplified summary PIS, designed for participants who lacked capacity or had communication difficulties, was provided for patients and carers (Appendix U) to supplement the full PIS (Appendix V).

Inclusion criteria.

1. Patient participants identified as frail by staff delivering routine clinical care and those in receipt of rehabilitation assessments or programmes of rehabilitation.

Frailty assessments used in routine clinical care were reported in the results section.

2. Patient participants able to give informed consent or if assessed and deemed to lack capacity consultee agreement from carer or family member or appropriate consultee.

Exclusion criteria

1. Patient participants in receipt of specialist stroke rehabilitation, specialist fracture care, specialist end of life or with a terminal diagnosis.
2. Patient participants with advanced care plans or directives, which stated that they did not wish to take part in research studies.
3. Patient participants found to lack capacity for whom an appropriate consultee could not be identified.

5.4.2.3 Family and carer participants

Family or carers (of patient participants) were recruited to explore their experiences of the RePAT intervention.

Inclusion criteria

1. Carers or family members of patient participants in receipt of rehabilitation assessments or rehabilitation programmes.

Family and carer participants were identified by virtue of their relationship with the patient or acting in the capacity as a consultee.

5.4.3 Staff participants consent

All staff participants had a minimum of seven days to consider entry into the study before written consent was obtained (Appendix W).

5.4.4 Patient participants consent

In this acute clinical setting, it was not practical to give patient participants seven days to consider entry into the study as admissions to acute care cannot be predicted and average length of stays are frequently short (under five days). Therefore, written informed consent was obtained on the same day that participants entered the study (Appendix X). To protect against coercion, patient participants could contact the study team up to seven days after data collection and ask to be withdrawn from the study if they had any concerns. There were no instances where this occurred.

Mental capacity for inclusion in the study was assessed by AC or a member of the routine clinical care team on each potential patient participant and documented on a capacity assessment form (Appendix Y), where capacity was assumed to be present unless proven otherwise in line with the Mental Capacity Act (352). For patients found to lack capacity, staff participants identified and approached an appropriate consultee to obtain consent. AC met with the consultee to explore, in their opinion, what the patient participant's wishes and feelings about taking part in the study would be. Consultees were provided with a PIS (Appendix Z) and completed a consultee declaration form (Appendix AA) as part of the consent process. If an appropriate consultee could not be identified, then the patient participants were excluded from the study (Figure 22).

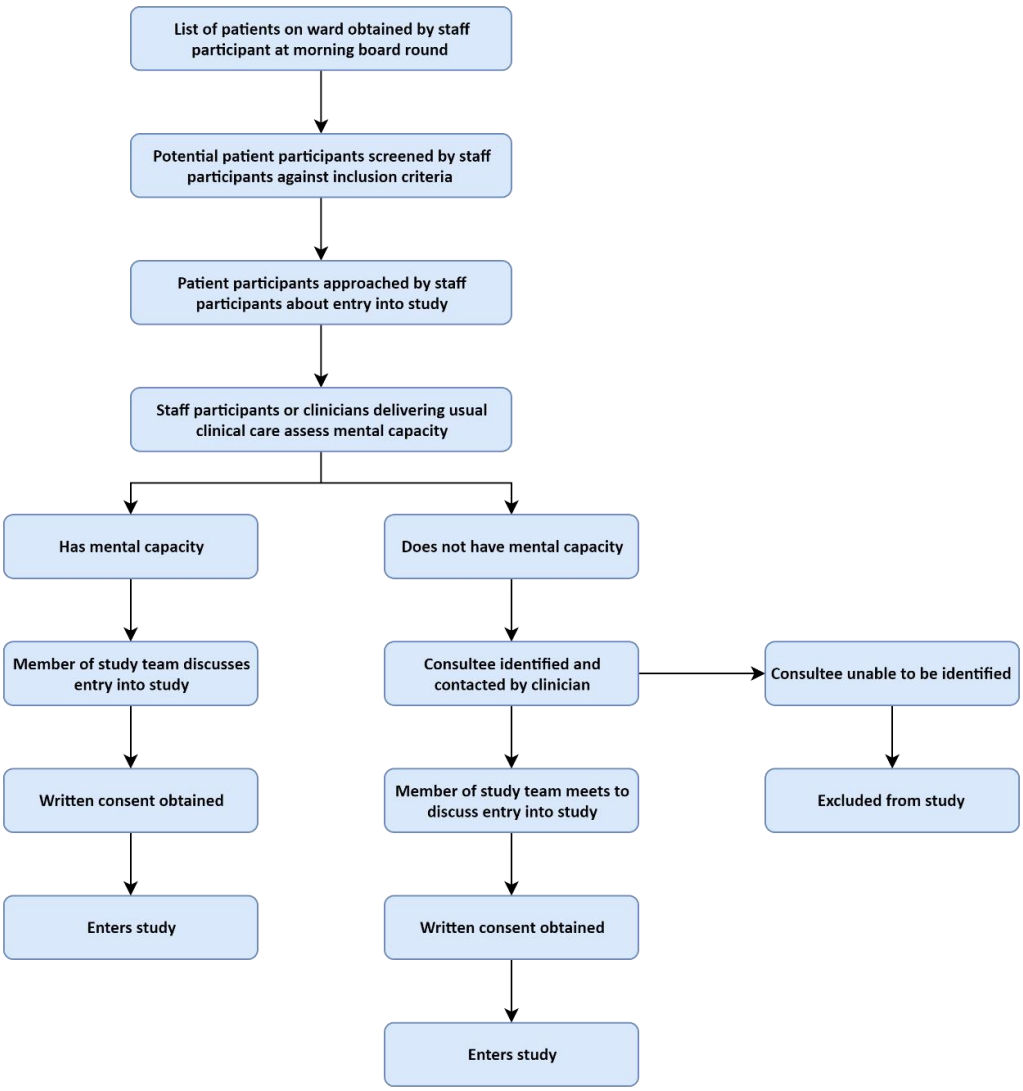


Figure 22 - Patient recruitment and consent process.

Agreement to participate in research is an ongoing process and it was, therefore, vital to confirm that participants with dementia and other cognitive impairments, whether permanent or temporary (such as delirium), agreed to continue with the study irrespective of the consent in place. A form of process consent whereby verbal agreement to take part in the study was sought with the participant throughout data collection (353, 354).

5.4.5 Family and carer participant consent

For family or carer participants who took part in the semi-structured interviews, written informed consent was obtained.

5.4.6 Data collection

The data collection process is outlined in Figure 23.

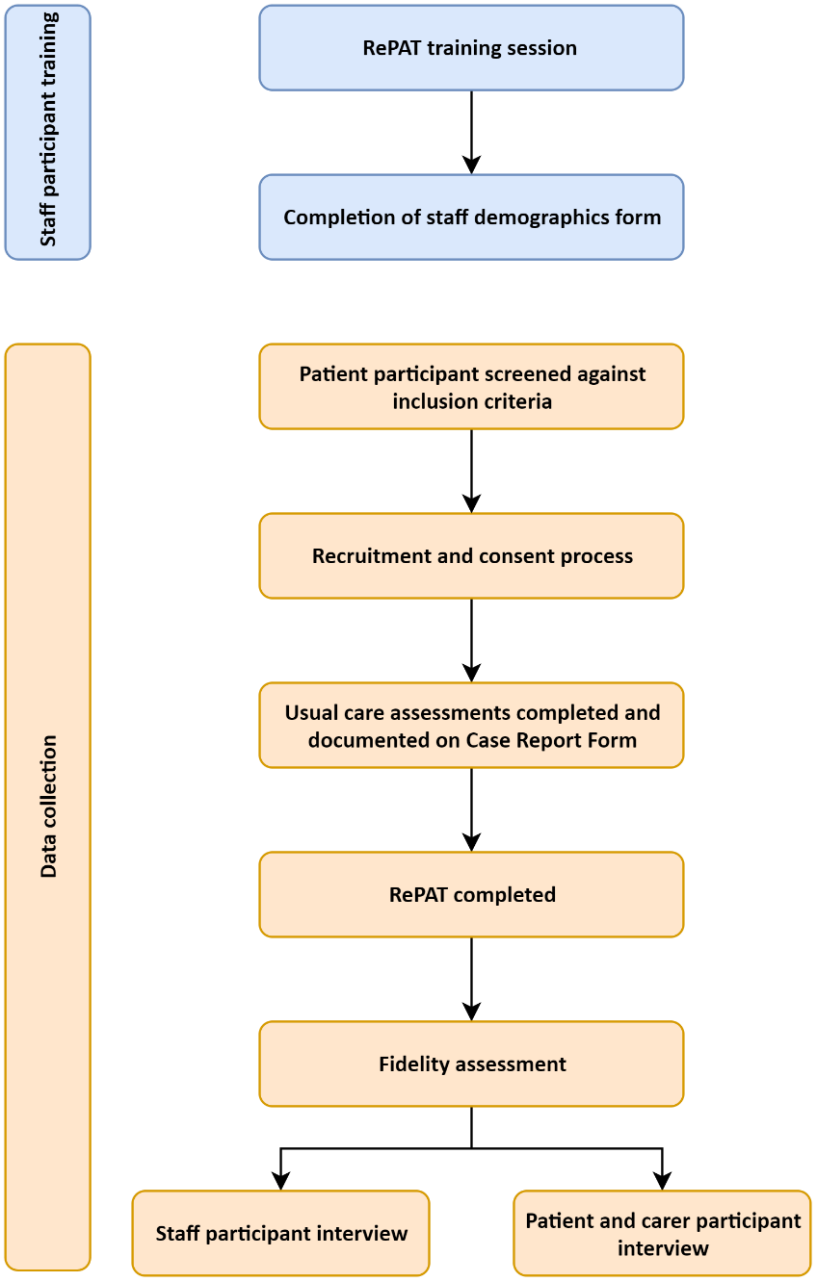


Figure 23 - Feasibility study data collection process.

Staff participants completed a demographic information sheet detailing their profession, job banding according to Agenda for Change (355) and clinical experience (Appendix BB).

5.4.7 Patient characteristics

Patient characteristics and routinely used outcome measures were identified from medical notes and electronic records and documented on a Case Report Form (CRF) by AC (Appendix CC). Factors identified from the mapping review in chapter two, as important variables in predicting rehabilitation potential and outcome were included on the CRF. These were: age, gender, ethnicity, residential and cohabitation status, co-morbidities, medications, cognition, frailty status, pre-admission mobility, ADL abilities and reasons for admission to acute care. This provided a description of the patient population included in the study. These were completed by staff participants as part of usual care.

Cognitive functioning can adversely affect rehabilitation outcomes amongst older people (131, 132, 283). Poor attention, memory, reduced communication, and behavioural changes may present challenges to therapists when delivering rehabilitation. In particular behavioural changes, altered mood, loss of motivation and poor compliance can adversely impact on an individual's ability to engage and improve with therapy (120). However, many of these potential barriers can be overcome using compensatory techniques such as memory books, written prompts (79) and the use of explicit learning techniques of observational learning and learning by guidance (121). Tools such as the MMSE (356) and MoCA (357) are frequently used in clinical practice. Assessments completed by staff participants as part of usual clinical care were recorded on the CRF.

The Charlson Co-Morbidity Index (CCI) was chosen to quantify certain underlying medical conditions in the patient participants. The CCI predicts mortality through classifying and weighing comorbidities (358). Whilst the tool does not provide an exhaustive record of all underlying conditions, it has been used extensively in healthcare research (359, 360) and is a valid and reliable measurement of comorbidity (361). Admitting complaints were classified according to the International Classification of Diseases 11 (ICD-11), a globally standardised method

for reporting and classifying diagnostic health information (362). Polypharmacy is associated with serious adverse outcomes amongst frail older people (363). The number of regularly prescribed preadmission medications were recorded where composite medications such as Cocodamol were documented as one medication. These items allowed for patient characteristics to be described. Cohabitation status (living alone) and a decline in cognitive function have been found to be strongly associated with adverse clinical outcomes following an acute hospital admission amongst older people (40, 222, 238). Pre-morbid levels of mobility and independence have been reported to predict recovery after acute ill health (190, 191). These items were reported on the CRF.

Frailty is common amongst the older inpatient population, is associated with adverse outcomes (24, 364) and its presence was an inclusion criteria for the population in this study. Clinical staff were asked to identify patients who were frail to take part in the study. The frailty assessment tools completed by clinicians were identified and documented on the CRF. This provided information on the tools in current clinical use and levels of frailty in the recruited patient population.

5.4.8 Usual clinical care

Usual clinical care was delivered by a specialist multi-disciplinary team comprising of doctors, nurses, therapists and other health care professionals. Although the RePAT intervention was completed by physiotherapy and occupational therapy staff participants, rehabilitation assessments and decisions on rehabilitation potential are typically an MDT endeavour (68, 76). In describing usual care, the types and numbers of MDT team members were documented.

Outcome measures are commonly used to evaluate rehabilitation response and change within research and clinical practice. Jette et al. (365) found that although physical therapists recognised the importance of using standardised assessments and measures, they were seldom used in practice. In 2007, AGILE published an outcome measures manual which provided physiotherapists with detailed descriptions of sensitive, valid and reliable measures for use with older people (87). Recommended measures included: the Elderly Mobility Scale, Berg Balance Scale, Functional Reach

and Timed Up and Go. The use and type of such validated outcome measures were documented on the CRF.

Decisions on rehabilitation potential can impact on the type, intensity and location of rehabilitation programmes offered to individuals (76, 137, 149). Types of rehabilitation planned for patient participants on their discharge from the hospital setting were recorded.

These findings were documented on the CRF and identified from medical notes and electronic records by AC (Appendix CC). AC did not complete any face-to-face patient assessments.

5.4.9 The novel intervention - Rehabilitation Potential Assessment Tool (RePAT), training and support.

The RePAT intervention has been described in chapter four, but in brief, staff participants attended a training session on RePAT in a seminar room in the hospital, which lasted for 60 minutes. Content included: background to the development of the RePAT, patient participant recruitment process, mental capacity, data collection and RePAT completion. A copy of the training manual can be found in Appendix Q. Participants were given a clinical vignette based on a typical geriatric rehabilitation patient and completed the tool as a group. Opportunities for discussion and reflection were provided. Clinical vignettes allow training in authentic contexts of practice and have been widely used to evaluate guideline specific clinical reasoning skills, assess knowledge, train participants in intervention delivery and assess intervention adherence (308-311). They have the advantage of embracing both experiential and reflective learning (305, 306). In complex interventions for older people, delivering training which considers the structure and content of the training has been shown to be particularly effective (307).

The RePAT comprised of 15 items relating to components of rehabilitation potential and can be found in Appendix Q. Following the training session, staff participants were asked to assess patient participants following their usual clinical care and then re-assess using the RePAT intervention. AC met with staff participants after they had

completed their first RePAT assessment, to provide support and mentorship and clarifying any questions on RePAT completion. The completed RePAT forms were then collected and data were transferred onto an Excel spreadsheet for fidelity assessment and data analysis.

5.4.10 RePAT fidelity

Fidelity considers if the intervention was delivered as intended (366, 367) and is central in understanding if staff participants were able to deliver the intervention effectively (368) and under what circumstances. Poltawski et al. (369) suggest that feasibility studies should act as "test-beds" for fidelity assessments to inform future implementation studies. Methods such as triangulating fidelity assessments with video recordings of intervention delivery, checklists or interviews can enhance the validity, reliability and replicability of findings (366). Checklists and interviews were used in this study to strengthen the understanding of RePAT fidelity and completion. To reduce the risk of bias, *a priori* fidelity assessment criteria were developed (Appendix DD). These considered how closely the content of the completed RePAT items matched the guidance, outlined in the tool and in the training. Each item was rated as either having 100%, 50% or 0% fidelity (Table 16).

Table 16 - Fidelity criteria.

Fidelity level	Description
100%	Fully meets criteria
50%	Meets some of the criteria
0%	Does not meet criteria or empty cell

5.4.11 Staff participant interviews

Staff participants took part in one-to-one semi-structured interviews to explore face validity and tolerability of the intervention. Participants were asked about their experiences of delivering the RePAT and recommendations for improvements on the

intervention. The interview schedule was designed by the study team and piloted with two clinicians (Appendix EE).

5.4.12 Patient and carer participant interviews

Patients or family members took part in semi-structured interviews to explore their experiences of RePAT. Participants were purposively matched to the staff participants. The interview schedule was developed and then reviewed by MK and members of the PPI group (Appendix FF). All interviews were held in a private room and audio-recorded.

5.4.13 Sample size

Feasibility study samples should be large enough to generate appropriate levels of information to allow inferences to be drawn in line with testing specific aims of the study (370). A sample of five staff participants and 25 patient participants was proposed to generate meaningful inferences from the data and was deemed feasible within the study timeline.

To explore the acceptability of the intervention and RePAT, all five staff participants and a purposive sample of five patients or carers were interviewed.

5.4.14 Reflective diaries

AC and MK kept reflective diaries during data collection and analysis. These were used as reflective tools, allowing for underlying assumptions to be critically explored and examined. Diaries helped add richness to descriptions of participant's experiences and allowed the researchers to capture their thoughts, values and views. Bradbury-Jones (371) suggest that they are an integral part of the research process but are rarely explicitly articulated. Reflections were transcribed and integrated with interview data as part of the analytical approach, providing context to the findings and allowed for AC and MK to critically examine their interpretations of the data. They were discussed with the supervisory team. Further considerations on reflexivity can be found in chapter three.

5.4.15 Analysis

Staff, patient characteristics and usual care data were transferred onto a spreadsheet for data cleansing and analysis. Data were stored and analysed using the statistical package STATA15. Patient and staff participant characteristics were described using descriptive statistics including means, standard deviations and ranges for quantitative variables and counts for categorical data.

Free text data from the RePAT intervention were analysed thematically and verbatim quotes were presented from staff participants for each item. Thematic analysis allowed for patterns and meanings to be discovered, explored and interpreted within the RePAT data (372). This method allowed for items to be considered against *a priori* criteria outlined in the RePAT guidance (chapter 4) and emergent data from the completed RePAT interventions. Data were analysed by AC and refined through face-to-face discussions with the supervisory team and MK. Further justification for the use of thematic analysis can be found in chapter three.

Each completed RePAT was rated for fidelity by two reviewers from the study team independently (AC and a combination of PL, SG and ALG). The mean value of the two scores was then calculated and a fidelity result allocated for each RePAT item.

Patient and staff participant interviews were analysed separately, reflecting the study aims. Data were thematically analysed (267). Codes and themes were identified, which allowed the research question and aims to be addressed. This approach provided a rich and detailed account of participants' experiences of using or being assessed with the RePAT. Justification for the use of thematic analysis is outlined in chapter three. The six stages of thematic analysis are outlined below (267).

1. Data familiarisation

AC repeatedly listened to the audio-recordings and reviewed her field notes and reflective diaries. AC transcribed three transcripts and a professional transcriber, the remaining seven which AC reviewed with the audio-recording for accuracy. Initial analytical notes, key ideas and impressions were made.

2. Coding

AC and MK independently read each line of the first two patient and staff participant transcripts. AC managed the data using NVivo 11. Codes, which permitted interesting data to be systematically classified (267) were generated. Data from reflexive diaries and field notes were integrated alongside the codes to increase analytical insight and transparency.

3. Development of themes

AC and MK collated codes into potential themes. Themes captured the essential meaning of the data (260), allowing the research question to be addressed. This process allowed for connections between codes and themes to be explored (267).

4. Reviewing themes

Remaining transcripts were coded independently by AC and MK and reviewed against the emerging themes. This permitted potential themes to be tested and for any additional data within themes that had been missed in earlier coding stages to be identified until no new themes emerged.

5. Defining and naming themes

Names and definitions of each theme were developed by AC and reviewed by the supervisory team and MK.

6. Reporting

Themes were presented with relevant supporting data excerpts allowing the findings to be considered in relation to the research question, aims and objectives and relevant literature.

5.5 Results

Results have been reported against relevant criteria outlined in the CONSORT 2010 guidelines for randomised feasibility and pilot studies (373).

A priori criteria for success were developed and displayed in Table 17.

Table 17 - Feasibility study criteria for success.

Criteria	Outcome
Five staff participants recruited within one month	Achieved
25 patients recruited within two months	Achieved
Intervention delivered to 25 participants	Achieved
Fidelity of intervention at 80% for all items	Not achieved

5.5.1 Staff participant recruitment

Initially, five staff participants were recruited to the study within two weeks. Due to clinical time restrictions, one participant was unable to complete five patient assessments so an additional staff participant was recruited.

5.5.2 Patient participant recruitment

One hundred and eight-five patients were screened and 104 were deemed to be eligible against the inclusion criteria. From this population, the first 31 patients were approached, five refused to take part and 26 participants were recruited. One participant was discharged before the RePAT could be delivered and was withdrawn. Consultee consent was required for eight participants (Figure 24).

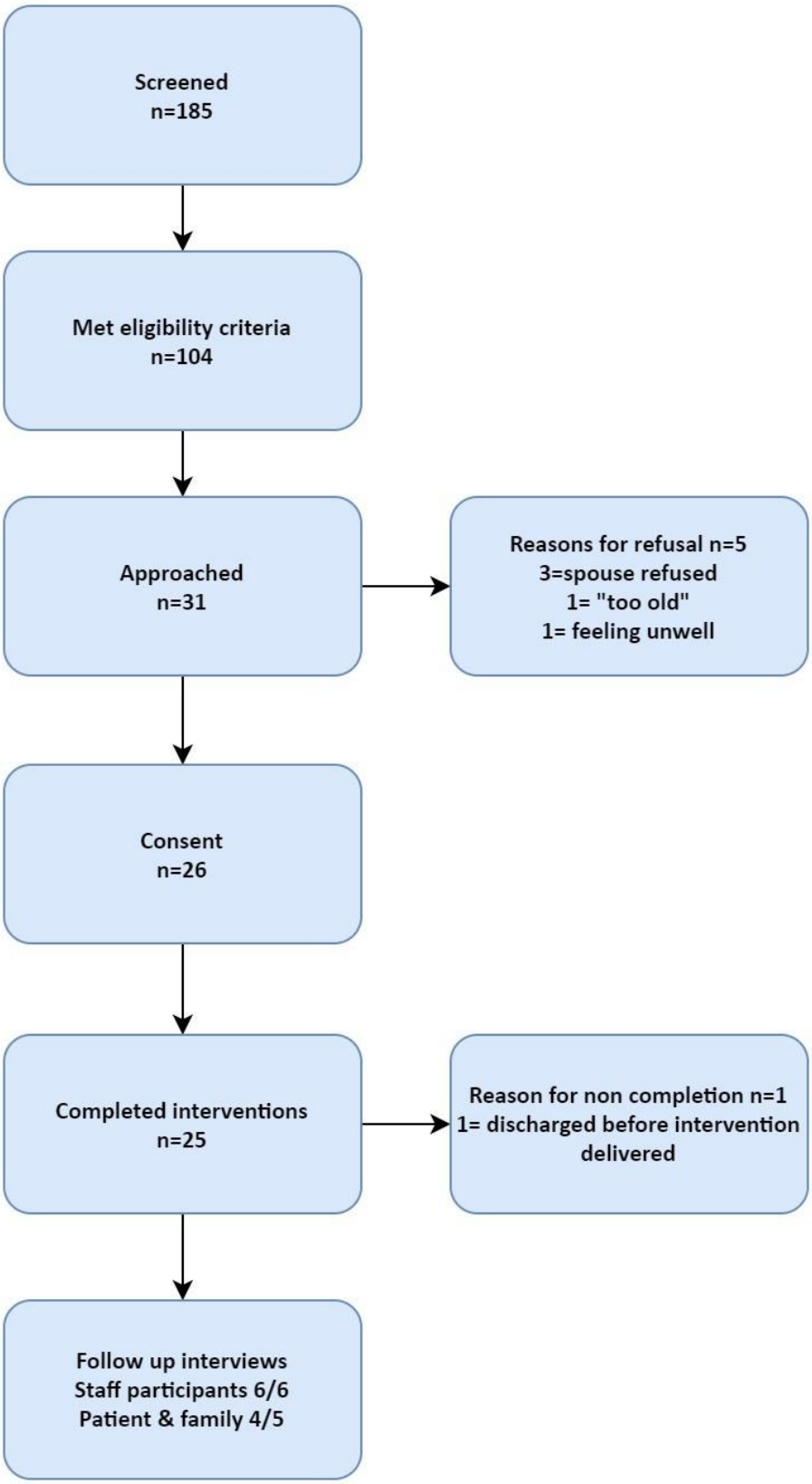


Figure 24 - Flow of participants through the feasibility study.

5.5.3 Staff participant demographics

The staff participants characteristics are displayed in Table 18.

Table 18 - Staff participants demographics.

Profession	
Physiotherapist Occupational therapist	3 3
Banding	**UK AFC** (355)
Band 5 Band 6	4 2
Highest qualification	
BSc BSc (Hons)	5 1
Time working in HCOP (months)	
Mean ± SD Range	18 ± 32.24 4 – 84
Rehabilitation experience with older people (months)	
Mean ± SD Range	33.17 ± 28.4 7-84
Time qualified (months)	
Mean ± SD Range	50 ± 50.36 10-144
Sample size	**6**

5.5.4 Patient participant characteristics

Twenty-six patients were recruited to the study. Patient participant characteristics were reported for 25 participants (Tables 19 and 20), accounting for the one participant who was not assessed due to time restrictions.

Table 19 - Patient participant characteristics 1.

Age (years)	
Mean ± SD Range	86.16 ± 6.39 71-107
Gender	N, %
Male Female	16 (64%) 9 (36%)
Ethnicity	N, %
White Mixed Race	24 (96%) 1 (4%)
Pre-admission residential status	N, %
Home with no formal care support Home with formal care support Assisted living 24-hour live-in carer	15 (60%) 7 (28%) 2 (8%) 1 (4%)
Cohabitation	N, %
Lives alone Lives with spouse Live-in carer	14 (56%) 10 (40%) 1 (4%)
Preadmission mobility status	**N, %**
Independent with no aid Independent with stick Independent with frame Assistance of one plus aid	2 (8%) 3 (52%) 9 (36%) 1 (4%)
Number of regular pre-admission prescribed medications	
Mean ± SD Range	7.54 ± 3.11 2-14

On admission patient participants had a mean number of 6.2 comorbidities (± 2.73) and a mean CCI of 3.44 (± 2.12). The most common comorbidities were hypertension, cerebrovascular disease, dementia, kidney disease and chronic obstructive pulmonary disease. All participants took regular prescribed medications with a mean number of 7.54. Patients were admitted with a mean of 2.12 ICD-11 codes (±0.73). The most frequent were falls (26.41%), mobility difficulties (17%) and disorientation (7.55%). Nineteen (76%) participants were assessed using the Clinical Frailty Scale on admission (25), where 42% were classified as moderately frail and 21% as severely frail. No other frailty assessment tools were reported.

Table 20 - Patient participant characteristics 2.

Charlson Co-Morbidity Index (CCI)	
Mean ± SD Range	3.44 ± 2.12 0-10
Number of comorbidities	
Mean ± SD Range	6.2 ± 2.73 1-12
Admitting complaint (ICD-11 codes)	
Mean ±SD	2.12 (±.73)
Cognitive screening tools (n, %, mean, SD)	
Abbreviated AMT AMT MMSE	9 (37.5%) 3.11 (± 1.54) 14 (58.3%) 6.86 (± 3.1) 1 (4.17%) 18
Clinical Frailty Scale	
Well (2) Vulnerable (4) Mildly frail (5) Moderately frail (6) Severely frail (7) Very severely frail (8)	1 (5.3%) 3 (15.8%) 2 (11%) 8 (42%) 4 (21%) 1 (5.3%)

Cognitive screening occurred in 96% of participants with the AMT and abbreviated AMT being used in 37.5% and 58.3% of the sample. The sample comprised of patients with mild to moderate degrees of cognitive impairment. One instance of the use of a standardised outcome measure, the Elderly Mobility scale was recorded.

5.5.5 Usual clinical care characteristics

A mean of 4.96 (S.D ±1.05, range 3-7) MDT members were documented as being involved in routine care during patient participants hospital stay. The core team typically consisted of physiotherapists (100%), geriatricians (100%), nurses (100%) and occupational therapists (84%). These results are presented in Table 21.

Table 21 - Multi-disciplinary team members involved in usual care assessments.

Profession	Frequency	Percentage
Physiotherapist	25	100
Geriatrician	25	100
Nurse	25	100
Occupational therapist	21	84
Integrated discharge team	6	24
Speech and language therapist	4	16
Dietitian	3	12
Old age psychiatrist	3	12
Pharmacist	3	12
Rheumatologist	2	8
Social worker	1	4
Audiologist	1	4
Ophthalmologist	1	4
Orthopaedic consultant	1	4
Social care Reablement	1	4
Spinal consultant	1	4%
Tissue viability nurse	1	4%

All 25 patient participants were assessed for rehabilitation whilst in hospital. This was typically completed as part of the discharge planning process. They were recommended for community-based rehabilitation services, intermediate care rehabilitation, an increase in their package of care and Reablement (Table 22).

Reablement services help people with poor physical and/or mental health to learn or relearn skills for daily living (374).

Staff participants set and documented goals with 32% (n=8) of patient participants and involved family members in assessments or rehabilitation plans in 56% (14) of participants. Aims of rehabilitation documented in usual care were to: “increase indoors and outdoors mobility”, “improve confidence in everyday functioning”, “increase independence with Activities of Daily Living” or not specified in usual care.

Table 22 - Type of rehabilitation and care planned.

Type of rehabilitation/care planned	N
Community-based rehabilitation	13
Increase package of care	6
Reablement team	5
Rehabilitation bed	3
Equipment	2
Community-based falls prevention	1
Nursing home assessment bed	1
Not specified	2

5.5.6 The novel intervention – RePAT

All 25 patient participants were assessed with RePAT. RePAT assessments were fully completed with no missing data. The mean time to complete the RePAT was 32.7 minutes (range 15 – 60 minutes). The results for each RePAT item are displayed in Table 23 alongside verbatim quotes from the completed RePAT tools. Staff participants who completed the RePAT intervention were referred to as SP plus their study number (for example SP1) and patient participants assessed with RePAT as PP plus their study number (for example PP1).

Table 23 - Analysis of completed RePAT interventions.

Item	Thematic Content	Supporting Evidence	Mean fidelity score (%)
Are there any underlying physical issues which may affect or interfere with rehabilitation?	Underlying co-morbidities documented and how these may have affected multiple organs and systems of health conditions. Some discussion of how these may affect rehabilitation.	*"Atrial fibrillation, previous stroke (left MCA infarct), hypertension, and poor vision. May cause difficulties in different environments." SP1/PP19* *"Hypertension, postural drop currently being investigated so patients' mobility should improve once management is optimised. COPD." SP4/PP6*	100
Are there any unresolved physical issues which may affect or interfere with rehabilitation?	Ongoing physical issues or co-morbidities which interfered with patients' ability to participate or benefit in rehabilitation. The term 'nil of note' was widely used to denote the item had been considered.	*"Resolving urinary sepsis, functional decline following infection. CT lumbar spine showed L5/4/3 endplate collapse. Pain in lumbar spine limits activities." SP1/PP25* *"Nil of note, medically fit for discharge no medical follow up." SP5/PP7*	100
Are there any underlying psychological issues which may affect an individual's motivation or participation with rehabilitation?	Underlying psychological issues related to impairment of function and health condition level were identified. The term 'nil of note' was widely used to denote the item had been considered.	*"Mild hypoxic brain injury, patient requires clear step-by-step instructions and struggles with memory." SP6/PP26* *"Nil very keen to progress." SP3/PP3*	100

Item	Thematic Content	Supporting evidence	Mean fidelity score (%)
Are there any unresolved psychological issues which may affect an individual's motivation or participation with rehabilitation?	Delirium was associated with infections and the effect on progression and participation was included. Evidence that motivation and anxiety were considered. Participants documented nil or none known.	*"Hallucinations settled during admission and had increased mood within inpatient progression." SP3/PP1* *"Nil, very motivated to participate in rehabilitation, nil evidence of delirium." SP3/PP2*	100
Has the individual been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care?	Motivation and performance were considered in this question. Factors which limited this such as mood, pain and delirium were documented.	*"Patient was motivated and engaged in all OT and physio assessments." SP2/PP14* *"Patient has been keen to participate, clear instructions required due to confusion. Pain has been limiting factor." SP6/PP26*	100
What are the individual's current functional abilities and levels of independence?	Focus was predominantly on functional abilities. Additional consideration of the type of equipment and support required to achieve abilities was occasionally documented but variably reported.	*"Independently mobile with WZF, independent changing stoma. Assistance with washing and dressing, independent with all transfers." SP4/PP13* *"At best had the assistance of 2 mobile 10m. Mostly handled 2 person step round transfer." SP3/PP4*	88.2

Item	Thematic Content	Supporting evidence	Mean fidelity score (%)
What were the individual's pre-morbid (pre-admission) functional abilities and levels of independence?	Variable information considering ranging from an individual's ability to mobilise to detailed information on pre-admission abilities in many aspects of life and the time scale. Evidence for considering rate and type of decline in these abilities in the lead up to hospital admission.	*"Pre-admission (3/52) independent mobile unlimited exercise tolerance and driving. But 3/52 prior to admission a slow decline due to pain and difficulty with transfers." SP3/PP3* *"Lives alone, no care package. Has cleaner and support from family. Independent with shopping, meals and personal care. Mobilise with walking stick indoors and electric scooter outdoors." SP4/ PP6* *"Handheld plus one." SP5/PP8*	88.2
Do you have a thorough understanding of an individual's environment in their usual place of residence?	Variable information completed with responses varying from yes to detailed information on how individual functions in their usual place of residence.	*"Yes, through discussion with patient." SP1/PP19* *"Patient lives in bungalow 1 step access all level inside, riser recliner chair in-situ, Mowbray and double divan bed." SP2/PP17* *"Home is currently well set up as patient previously using rotunda at home. Previous admission means we have good knowledge of home equipment and set up." SP6/PP23*	88.2

Item	Thematic Content	Supporting evidence	Mean fidelity score (%)
What support does the individual require to make decisions about their future?	Considered capacity to make decisions about future care and needs. Where patient lacked capacity, actions were documented and whom this was discussed with. If patient had capacity, the item was largely not supplemented with additional information.	*"Wife supports with all ADL's and decisions. Lacks capacity however, this is variable due to resolving delirium and UTIs." SP5/PP15* *"No concerns regarding capacity, patient has support from family." SP6/PP23* *"Has capacity." SP5/PP16*	73.5
Has the individual been asked, "What's important to me?"	Understanding what is important to the individual included direct quotes from patients as well as organisational and therapist driven interpretation of perceived importance. Where individuals lacked capacity family members were asked the question.	*"I just want to go home [patient], go home with the right support and equipment so I can manage as much as I can on my own [husband]." SP5/PP8* *"To return home, have a good sleep and walk the dog.[patient verbatim]" SP1/PP19* *"To return to previous baseline function so she is able to toilet independently." SP3/PP2*	97

Item	Thematic Content	Supporting evidence	Mean fidelity score (%)
Have goals been set and agreed which are SMART? (Short, Medium, Long Term)	Goals were typically poorly set. Attempts were made in most cases to consider short, medium and long term goals but often framed from clinicians' perspective rather than patients with a focus on specific functional abilities such as mobility, type of aid, assistance or distance.	*"Short – transfer with WZF in 2 days. Medium – go to rehab and mobilise with WZF in 2 weeks. Long – return home independently mobile with WZF in 3 weeks." SP4/PP1* *"To return to independence with personal care and cooking within 4 weeks."* SP6/PP24	55.9
Has the multi-disciplinary team been involved in the assessment or decision-making process?	MDT involvement was well documented, either through discussion with named team members or at daily team meetings. Some gave information on what other team members had found, other just listed MDT involved. Family members were often included.	*"During discussion in MDT ward round." SP1/PP19* *"Review by OT, social services, medical review, liaised with daughter." SP4/PP13* *"Nurses report patient is becoming reliant and refusing certain medical interventions but keen for rehab. IDT to review." SP4/PP6*	94

Item	Thematic Content	Supporting evidence	Mean fidelity score (%)
Has the individual's rehabilitation potential been assessed over multiple time points?	The iterative nature of assessment was embraced by participants. Recognition of the need to consider participation and abilities over a number of sessions.	*"Patient assessed every morning with nursing staff, OT and physio reviewed patient daily whilst on ward." SP2/PP14* *"Patient initially did walk and considered for home but past week has been variable." SP1/PP25* *"Long admission of 41 days and has reduced motivation, fluctuating cognitive states have been seen." SP3/PP4*	88.2
Is the proposed rehabilitation programme likely to be effective?	Considerations on how the individual would benefit, or not, from rehabilitation. Factors which affected participation and effectiveness were linked to rehabilitation aims, goals or what's important to the patient.	*"Given the right amount motivation and improved medical status I think residential rehabilitation would benefit the patient." SP4/PP5* *"No cognitive impairment, acute deconditioning secondary to pain. Will benefit from regular strengthening exercises to assist with transfers and to reduce falls risk." SP3/PP2* *"Patient has already improved whilst on the ward and this is likely to continue at home with support." SP6/PP23*	94
Overall impression	Items included patient levels of engagement, motivation and progress during inpatient stay. Often articulated as seeking reversal of deconditioning or improvement back to	*"Has potential for rehabilitation but not yet well enough to return home, has demonstrated progression with mobility/transfers and is compliant but needs some prompting. May benefit from further support with ADLs at home, but patient feels this would be less after a period of rehabilitation." SP5/PP7*	88.2

	baseline or pre-admission abilities. Belief that rehabilitation in patients own environment was preferable, but the recognition that some needed more intensive support and input to realise their potential. Specific benefits mentioned and underlying conditions (cognition and delirium) frequently mentioned.	*"Patient is likely to regain independence and confidence with the Reablement team." SP2/PP14* *"Patient has demonstrated determination with little encouragement needed to participate in therapy. Is dependent on medication timing and mental state, however has progressed with each session, I feel that will improve once back at home in familiar environment and once UTI's and delirium have settled." SP5/PP15*	

5.5.7 Fidelity

A priori criteria of success for the RePAT was set at 80% and 13 out of 15 items achieved this rating. Items one to five scored 100% fidelity against the criteria. "What's important to me?" (Item 10) scored 97%. Items 12 and 14 scored 94% and considered MDT involvement and rehabilitation effectiveness. Items six, seven, eight, thirteen and fifteen, relating to current and pre-morbid abilities, environmental assessment, the timing of assessment and overall impression scored 88.2%. The two items 9 and 11, relating to decisions about the future (73.5%) and goal setting (55.9%) did not meet this level.

5.5.8 Staff participant interview results

Six staff participants took part in the semi-structured interviews, which lasted between 20 and 41 minutes (mean 31 minutes).

Themes were categorised as: enhanced clinical reasoning in a pressured environment, embracing complexity with a holistic approach, patient-centred approach to decision-making, feedback loop and implementation into future practice. Each will be presented.

5.5.8.1 Enhanced clinical reasoning in a pressured environment

All participants reported that the intervention had had a positive effect on their clinical practice. The RePAT intervention was said to provide structure for their clinical reasoning and decision making.

> *"I found it useful because it made me think, the clinical reasoning behind why we did it…it does actually make you reflect on what you have done and why you have done it."* [Staff participant two]

> *"It pulls all your ideas together and helps you to really make that final decision. Why am I saying this is, because of what?...this is the decision, this is my plan, and this is my right decision."* [Staff participant four]

Participants spoke of how the rapid turnover of patients in the acute hospital setting and pressures to free up beds meant that sometimes their preferred way of working

was comprised, but the RePAT intervention provided a structure and process to make complex decisions quickly, systematically and robustly.

> *"I think the difficulties are the time restraints which stop you, you don't always have as much time to dig down into the pre-admission issues from the physical and the cognitive point of view. I think it helped to just go back and gives you a bit more of holistic goals and clear understanding of the patient."* [Staff participant one]

5.5.8.2 Embracing complexity with a holistic approach

Participants expressed that the complexity and fluctuation in the performance of their patient group meant that decisions were often complex and influenced by day-to-day processes and non-clinical factors. Participants said that the RePAT intervention helped them consider a wide range of factors about an individual's rehabilitation potential in a robust and systematic fashion. This was said to lead to improved inter-disciplinarily working and communication with patients and family members.

> *"It was certainly I think useful, having it all together because then everyone could see that this is what evidence you're basing your decisions on."* [Staff participant six]

The RePAT intervention was said to support a holistic approach to rehabilitation decision making by covering a range of physical, psychological, environmental and participatory items. Although they may have considered these factors in their routine clinical practice, RePAT required them to explore these in greater depth and the impact these may have had on rehabilitation potential.

> *''They come into hospital with a new acute issue, so, looking at their baseline function, with all the comorbidities. So I do take that into consideration [describing routine practice], I don't necessarily, I probably more put it to the back of my mind unless there's something quite significant that is going to have an impact, so if there's a musculoskeletal issue, delirium, nutrition or they're not eating or drinking. Obviously, we take that into consideration as well…I now think*

about past medical history… then you always have to think about how that's going to influence your treatment on that day and in the future…and then we'd just have to think how they are going to recover from that." [Staff participant five]

For some participants, this led to a deeper understanding of psychological issues such as delirium, mood and cognition and the impact these had on abilities and performance. Whilst routine assessments were often said to categorise patients into boxes (potential for improvement or not), or patients matched to services, RePAT was said to allow clinicians to embrace the complexity of their patients.

"Things that are unresolved, psychological issues, delirium is such a big issue. I think in the frail population as well, so just bringing it up it makes you think, actually is this resolving, what is the pattern, has this happened before, is this from a previous admission or are we likely to get better and perhaps think about rehab, slightly later down the line." [Staff participant three]

The RePAT intervention offered participants a structured and systematic method for assessing holistic domains of health and well-being. However, some terms such as unresolved and underlying were found to be confusing and at times contradictory.

"The bit I initially found quite difficult was the difference between the underlying and the unresolved, I did find that quite tricky and I found myself often flicking to the guidance bit. Thinking now is this underlying or is this under resolved. So I don't know if that needs tweaking, I don't know, but I found that sometimes difficult to separate." [Staff participant six]

"I think it just broke it down, so you are looking at the past and present of what they could do and sometimes when you are on the ward it is so quick that you think, yes that would be good but actually you take a step back and read it through then one of the roles a bit like maybe we not have done that. But I do think it helped break it down all the different parts of why we do it. It represents that thinking." [Staff participant two]

Some participants stated that although they found RePAT helpful, they wanted a binary decision on rehabilitation potential at the end. However, they contradicted

themselves by stating that a tick box or yes/no approach to rehabilitation potential was not helpful in addressing the complex needs of their patients. The free text boxes presented in the RePAT allowed them to delve into the nuances and fluctuations associated with frailty.

> *"I know with a lot of other decision-making tools you have might be yes, no questions, and then you kind of how many yes's how many no's and then you kind of pull it all together, this will still have to go through and look and still having to make a decision and read it through, review it, it wasn't a quick tick tick… but actually people aren't that straight forward."* [Staff participant six]

Although participants stated that they routinely considered rehabilitation potential over multiple time points within a patients stay, they admitted that this was often assumed rather than formally assessed. RePAT prompted them to ensure that they adopted an iterative approach to considering rehabilitation potential, which took into account fluctuations in health, performance and participation.

> *"I got down to a certain part so 'had they been assessed at multiple points?' I've thought no."* [Staff participant three]

5.5.8.3 Patient-centred approach to decision-making

Participants reported that they strived to adopt a patient-centred approach to care but found RePAT enhanced their ability to deliver this and understand patient and carer wishes. They stated that they and members of the MDT frequently assumed that they knew what a patient or carer wanted to achieve but did not fully understand this until they were prompted to ask "What is important to you." This item highlighted that they frequently considered what was important to them and their organisation and rather than patient needs and wishes.

> *"It's remembering about being client centred, putting the patient at the front of the plan, going into MDT discussions, it does sometimes feel like the patient doesn't have a voice. [The tool] it helps to keep the patient at the forefront."* [Staff participant one]

This item was also used to enhance their goal setting and focus on what was relevant to the patient and carer. However, goal setting was frequently cited not to be

prioritised in clinical practice due to acute setting pressures, subsequently, many participants felt deskilled in goal setting practice.

> *"Not enough of us [goal set] and it is not clear from our first or second intervention. In our medical notes, we might write something, but it is not a smart goal, it might be a goal, but it's not smart. Mainly never agreed with the patient, doesn't have a timeframe…but here it's not such a priority for people whereas actually that is a massive part of your rehab potential prediction. If you think that we have set these short term goals have we achieved them, yes, yes, yes, right you will very likely will achieve this. If you have not achieved any of our goals within two or three days actually, rehab potential wise, what are we aiming for, what is going to be realistic."* [Staff participant three]

5.5.8.4 Feedback loop

Participants spoke of observing rehabilitation response and progress, or not, during a patient's hospital stay but feedback on future progression was largely absent. All staff participants reported that they rarely found out what happened to their patients after being discharged from the acute hospital setting. They spoke of being unaware of the outcomes of proposed programmes of rehabilitation and therefore were unable to judge if their clinical decisions were accurate, valid or successful.

> *"We don't know what happened to them because we don't get the feedback…if the rehab unit they went to think they are unsuitable."*
> [Staff participant three]

Staff participants attributed this lack of feedback to a number of factors. This included the lack of shared IT systems across organisations, time pressures which meant that progress was not explored and the lack of emphasis placed on rehabilitation outcomes by the health community.

> *"Are we making the right decision, are we making the right discharge pathways for these patients. I do think we need a piece of work on this."*
> [Staff participant one]

5.5.8.5 Implementation into future practice

Participants positively evaluated RePAT training, finding the clinical vignettes helpful in terms of theory and practice. They referred back to the training during the early stages of using RePAT and reported that the speed and ease with which they completed RePAT increased. They suggested that supplemental online training or peer mentoring would be helpful for future trials.

> *"The training tool was good and after I did that I thought, yes, right, I can definitely do this but then when I came to do it on a patient, like I say the first two it took me a lot longer because nothing is ever straight forward or they will have things which are a little bit more obscure as well, but I think you still need that case study to go through as an example, rather than I can't imagine trying to do it without a case study, if that makes sense, you always need a bit of both."* [Staff participant three]

Participants reported that they obtained information from multiple sources such as existing clinical notes (paper-based and electronic), other MDT members, patients and carers to complete RePAT.

> *"I just went to my normal routine of getting as much information from everywhere. So it could be from the notes, it could be from the family, it could be from anyone really, it could be from the computer system."* [Staff participant five]

During this feasibility study, RePAT was used alongside routine clinical practice and hence was in addition to completing usual assessments and supporting paperwork. Participants agreed that RePAT could replace their usual practice for rehabilitation assessments and decisions on rehabilitation potential and be integrated electronically.

5.5.9 Patient and family interviews

Three patient-participants took part in the semi-structured interviews and a husband of a patient participant with a diagnosed dementia (family participant one).

Key themes that emerged were; who was that, what's important to me, family involvement and communication, and I just want to go home. The findings are presented below.

5.5.9.1 Who was that?

Patient participants were unable to distinguish the intervention from routine care, and therefore obtaining their specific experiences of RePAT proved challenging. Participants stated that due to the nature of the hospital environment, they were frequently unable to say who had seen them, what assessments had been completed and the role of different professionals.

> *"There are lots of different people, that have talked to you in hospital and it's muddling… I recognise them, but you forget their names."* [Patient participant 24]

Participants reported being assessed over multiple times points and by differing members of the MDT. In some cases, they were able to outline certain assessments, but outside traditional nursing and medical roles, allied health professionals practices were less well defined.

> *"I think she pressed my feet against… they asked me about my loo at home, they are going to give me a frame to go round it because my toilet is too low, so I can lift myself up."* [Patient participant 24]

5.5.9.2 What's important to me?

Although they were unable to comment on RePAT directly, patient participants said that they had been asked to state what was important to them and what they would like to achieve. This was a key item in the RePAT intervention.

> *"I said to get fit enough to be able to go home and we have got a beautiful garden, we have just had it re-landscaped and but there is a*

few bits and pieces that we want doing. I would love to get out there and do a bit. Other than that, play my bowls." [Patient participant 18]

Despite this, in the hospital environment, choices about acute care were nuanced by the belief that they were in *"the right place to be ill" [Patient participant 20]* and that healthcare professionals knew what was best for them. This meant that they often deferred power and choices to professionals or family members.

"Well, it's all for your own good really. You know, we don't know what they find in the bloods and all that, do we really? I mean we are in the best place if you are ill. Aren't you?" [Patient participant 20]

5.5.9.3 Family involvement and communication

Participants spoke of the importance of involving family members in their care, supporting decision-making and providing information to healthcare professionals. Participant 20 outlined the role his daughter had played in assessing his abilities.

"My daughter wanted them to try walking me upstairs…I need to do them to go home, which they did with her. They said it was fine." [Patient participant 20]

However, family involvement was not without challenges. A family member who was the sole carer for a patient participant with severe dementia, spoke of feeling helpless and at odds with healthcare professionals in the care and future plans for his wife.

"They tried her on a rotunda this morning. I said a darn sight better if you just lifted her up and moved her. All this walking, leaning, spinning around. That is not good. They explained the principle of it and I've got one delivered to me at home but I can't see me using it." [Family participant one]

He had expressed a desire for a place at a certain rehabilitation facility and remained unclear why his wife was not suitable. There had been considerable disagreements amongst members of the MDT and the husband which were reflected in his views about rehabilitation assessments, hospital care and general inpatient experiences.

5.5.9.4 I just want to go home

Participants spoke of the desire to return to their usual place of residence and felt their ill health and the hospital environment impacted adversely on their functional abilities.

> *"It's a job to stand up. I don't know why they think this flooring is marvellous, but your feet are slipping all the time. I have one of those wheels there [points to a three-wheeled walker], I've never used them with before and that was foreign to me."* [Patient participant 20]

They expressed the belief that once they returned home, they would cope and perform better. This was strongly voiced by the family participant of a patient with dementia.

> *"I just want her home and will sort the rest out from there."* [Family participant one]

Participants were unable to provide specific recommendations on how the intervention could be improved or implemented into practice, but at the heart of their talk was the need for clear communication, partnership working and embracing their needs, wants and wishes.

5.6 Discussion

The study has demonstrated that it was feasible to deliver RePAT in an acute hospital setting. Staff participants were recruited, trained and delivered RePAT with a high level of fidelity. There was no missing data. They reported that the RePAT was acceptable and feasible to incorporate into routine clinical practice. Eligible patient participants were identified and recruited to the study within the pre-defined timescales. The sample included patients with temporary and permanent cognitive impairments such as delirium and dementia. Patient and family participants were unable to directly comment on the acceptability of RePAT as they could not isolate experiences of RePAT from usual care and general hospital experiences. The majority reported positive experiences of being assessed with RePAT and care, which were specific to the intervention, which indicates that the tool had the required effect.

Each component of the study will now be discussed before strength and limitations are presented.

5.6.1 Recruitment, sample and retention

Five of the staff participants were able to try the intervention with five participants, one staff participant cited difficulties in managing their time, workload pressures and reduced staffing levels as factors which led to non-completion. This is an important consideration for future trials as in this study, an additional staff member needed to be recruited. Burden of research involvement amongst clinicians is not uncommon, however, this is often outweighed by the benefits of study participation (375). Future studies should incorporate time to build relationships with staff participants delivering the intervention, thus maximising recruitment, intervention adherence and staff experience.

Recruitment in the hospital setting has been found to be fraught with challenges associated with a busy, confusing environment and the onset of acute ill health (376). One hundred and four patients were deemed eligible to enter the study. Thirty-one were approached and 26 recruited into the study. The patient participants were acutely unwell, frail, many lacked capacity and had complex health and social care needs. This sample was similar to those in other studies (377-379), but older people with complex health and social care needs are often excluded from clinical trials due to cognitive impairment (376) or are deemed 'too complicated' or frail to recruit (380). Provencher et al. (381) recommend that further research is required to compare the impact of specific challenges and strategies on drop-out rates or refusals amongst frail older people. Campbell et al. (382) reported refusal rates to participate in clinical trials between 12-15% amongst older people. In this study 16% declined to take part. However, such complex cases are the reality for clinicians and essential to inform evidence-based practice.

Over three-quarters of the patient participants were assessed as being frail, with 42% being moderately and 21% severely frail. This indicates that the sample was less frail than in other similar studies, such as the Nolan et al. (34) study, which found 58.5% and 24.4% respectively in. To achieve favourable patient outcomes understanding how an individual's level of frailty can affect their rate of recovery or

response to rehabilitation is paramount (65). The assumption that those with higher degrees of frailty do not respond to rehabilitation has been recently challenged (22, 211, 212, 383), however, individuals may require more support and time to reach their potential.

Patient participants had moderate levels of co-morbidities as measured by the CCI. Previous studies identified in chapter two, reported numbers of comorbidities ranging from 2.3 (210) to 6.8 (217). The CCI identified in this population is comparable with participants in the Hartley et al. (212) study who had a CCI of 3.2 (no cognitive impairment) and 4.6 (dementia diagnosis). Despite the burden of these comorbidities, 60% of participants were living at home with no formal care support and 52% were independently mobile with a stick. This could indicate that they were a relatively able group, or that no formal care was available and friends and family were caring for them.

The sample included clinicians working at more junior levels of experience and expertise as well as more senior staff. These results differ from Jensen (342) et al. who explored expert practice in geriatric physical therapists with between 23 and 36 years of clinical experience. Although clinical experience has been traditionally associated with years of experience, as defined in this study, Resnik and Hart (343) suggest that expertise is influenced more by clinicians' experience of health-related quality of life outcomes and patient experience.

5.6.2 Deliverability, acceptability and fidelity of RePAT

5.6.2.1 Staff participant deliverability

Staff participants positively evaluated the RePAT intervention training for its blend of theory and practical exercises, referring back to training material in the early stages of data collection. Intervention training which adopted both a practical and theoretical approach was positively evaluated in terms of acceptability and fidelity to the intervention in previous studies (308-311) and in complex interventions for older people (307). Improvements to the intervention for future studies could include supplemental online learning packages, embracing the growth of blended learning in undergraduate and post-graduate training. Participants spoke of the positive impact that RePAT had had on their clinical reasoning and decision-making.

Staff participants used the RePAT intervention alongside usual care, extracting information from existing clinical sources including: medical notes, patients, carers and MDT members to complete the tool. Integration of data from multiple sources is recognised as a core part of clinical reasoning combining both subjective and objective information to guide hypothesis generation and testing and ultimately decisions on rehabilitation potential.

5.6.2.2 Patient and carer acceptability

Patient and family participants, on the whole, positively evaluated the care they received. They were unable to comment specifically on the RePAT intervention, finding it difficult to isolate the intervention from usual clinical care and hospital experiences. This is likely to be down to a number of factors. Staff participants completed the RePAT using information from multiple resources; they did not 'sit down' with the patient and complete it. This represents the reality of clinical practice where clinicians assimilate information from multiple sources, much of this is 'hidden' from the patient, but its essence should be communicated as part of the ongoing therapeutic relationship. Other studies have highlighted the difficulty that older people face when recalling events in the hospital setting and expressing them in a formal interview setting (384, 385).

Although they were unable to comment on RePAT directly, the emergent themes drew parallels with other studies in older people's hospital experiences. A systematic review and synthesis of qualitative studies which explored older people's and relative's experiences in acute care settings (386) found that quality of technical care was often taken for granted. Health professionals were not questioned on their efficacy and relational aspects of care were more highly prioritised by patients. They found that older people often felt powerless over their care and this was especially pronounced in the presence of cognitive impairment or communication difficulties. Instead, older people placed a high value on connectivity with their communities, clinicians valuing their identity (seeing who I am) and models of shared decision-making. These themes were at the heart of the RePAT and the acceptability interviews appear to confirm these findings.

5.6.2.3 Fidelity

Thirteen out of fifteen RePAT items achieved an *a priori* fidelity rating of 80% or more. Items which explored underlying and unresolved physical and psychological issues scored 100% fidelity. The physiotherapists and occupational therapists felt comfortable using the RePAT as it contained components which were very similar to their professional practice models (332).

The items relating to individuals current and pre-morbid abilities and independence scored 88.2% fidelity. This was explained by the qualitative findings, which found that participants did not fully complete the items as they had already documented this knowledge in case notes as part of routine clinical care. This was disappointing, as accurately assessing pre-morbid abilities are an essential component of decisions into rehabilitation potential and rehabilitation outcomes, providing the best idea of what an individual is capable of achieving (190, 191).

Item 11, which considered goal setting achieved a fidelity rating of 55.9%. Goals were typically framed from a clinicians or organisational perspective, as opposed to person-centred. Qualitative findings explained the challenges faced by staff participants in goal setting working in a pressured clinical environment with a frail population. Although goal setting has long been a central component of rehabilitation (75) there remains a lack of empirical evidence on the best way of operationalising goals in clinical practice (284) and its suitability for frail older people. Leach et al. (387) explored current practices of goal setting by Allied Health Professionals in the subacute geriatric rehabilitation setting in Australia. Although specific to the stroke population, they found that patients were not able to fully participate in goal setting and therapists often led or controlled the process with a strong bias towards impairment and activity limitations. So while goal setting seeks to encourage a patient-centred approach to care, the environmental and organisational constraints of acute care and construct of ill health may weaken this effect. Factors around participation and motivation can lead to a high degree of subjectivity and this may lead to limitations in their applicability.
It may be that in a future study, training on goal setting is needed or may be removed from the RePAT intervention as a recent meta-analysis (285) found that standardised goal setting did not lead to improved physical functioning or quality of life in inpatient and outpatient geriatric rehabilitation. Fidelity of the intervention

was also affected by the pressures staff faced in ensuring patient flow and using resources responsibly.

5.6.3 Impact on clinical outcomes

Staff participants reported that the RePAT intervention enhanced their understanding of rehabilitation potential, providing structure, support and guidance for clinical reasoning and decision-making. They reported greater confidence in their decisions with a complex patient group and able to articulate and defend their decisions to other members of the MDT which provides some evidence that the RePAT made a clinical difference to the patient participants. This is most likely because the RePAT aligned to a predictive or conditional mode of clinical reasoning where judgements regarding specific interventions and prognosis are used. Predictive reasoning allows clinicians to embrace the complexities of presentation, outcomes, timeframes and demands that biological, psychological, environmental and personal factors are taken into account (388, 389). Rather than condensing their understanding of rehabilitation potential into a simplistic binary form, there is evidence to support that the RePAT intervention allowed for fluctuations and uncertainties of frailty presentations to embraced.

Staff participants reported that they seldom received feedback on the outcome of their clinical decisions on rehabilitation potential and rehabilitation assessments. Feedback on outcomes of previous decisions allows clinicians to become aware of their limitations and abilities in decision-making and is critical to clinical decision-making (390). Although the RePAT intervention did not provide participants with feedback on the success of their rehabilitation potential assessments, future implementation of the tool may provide opportunities for professional development through guided reflection with colleagues (49).

Outcome measures are commonly used to evaluate rehabilitation response and changes but were found to be poorly used in this study. These findings are consistent with that of Jette et al. (365) who reported that although physical therapists recognised the importance of using standardised assessment and measures, they were seldom implemented in practice. Frailty assessment tools may have prognostic value in terms of functional outcomes, institutionalisation and resource utilisation

(383) further research is required to develop rehabilitation outcome measures which are responsive and meaningful to a frail population.

The study did not seek to measure the effect the intervention had on rehabilitation decision-making, patient-level outcomes, rehabilitation destination and service use, but the interviews indicated a very positive response. These will be explored as part of future post-doctoral studies, requiring longitudinal data to map the outcomes associated with implementing the intervention. Following up older people with complex health and social care needs (376) and resource utilisation is notoriously challenging. Further work is required to explore the feasibility of randomisation and long term follow up in this population.

The results of this study need to be considered along with the strengths and limitations of the study design.

5.6.4 Strengths

Interviews were completed by the researcher who had delivered the training session and designed the RePAT, providing a depth of knowledge and experience to make the participants feel at ease. However, this may have led to participants positively evaluating the intervention during the semi-structured interviews, leading to what is known as social desirability bias. This describes where people wish to present themselves at their best and give answers they feel are expected of them. Every effort was taken to avoid this occurrence through the use of non-leading and open questions, to avoid making assumptions about participant's replies (255). After each interview, a reflective diary was completed and reflections on biases and interview proceedings were integrated within the qualitative data analysis.

Qualitative data analysis was completed by the research team and included a PPI member MK. PPI in analysis allows members to make sense of the data and draw on their own experience (269). Their involvement can improve the quality, robustness and validity of data (166, 167). Dewar (391) noted that there were more limited opportunities for older people to be active PPI members, but this study has shown that with the opportunity and supportive training they can enhance analysis and

bring a patient and carer centred view of the findings which would not have been possible with just the researcher (169).

Another strength was that staff and patient participants were retained in the study. Higher dropout rates in longitudinal studies are not uncommon amongst older people (376), especially amongst those with cognitive impairments (376, 380).

Rehabilitation assessments are typically an MDT endeavour, based on the gold standard approach of CGA (94). However, this study focused on recruiting physiotherapists and occupational therapists. In the United Kingdom, AHPs frequently take leading roles in rehabilitation decision-making, supporting the decision to focus on testing the intervention amongst physiotherapists and occupational therapists.

This study sought to recruit participants with cognitive impairments to ensure the RePAT was tested on a population with altered cognition. Typically research studies deem that in order for individuals to consent to study participation, they should have the capacity to make the decision, free from pressure and consider the advantages and disadvantages of participation. Older people with delirium and underlying cognitive impairment are frequently admitted to hospitals for emergency care. Whittamore et al. (237) identified a high prevalence of cognitive impairment in the emergency in-patient population where 27% of older adults admitted had a diagnosed delirium and 41% a dementia diagnosis. This study recruited and completed data collection on eight (31%) patient participants who were identified as lacking capacity. Cognitive functioning, delirium and mental health issues are widely recognised as factors that adversely affect rehabilitation outcomes amongst older people (131, 132, 214, 283) and any tool which did not address these needs would not be fit for purpose. Using consultee agreement and a form of process consent (353, 354), enabled cognitively impaired participants to be successfully included in the study.

The aim of this study was to identify patients who were admitted for acute general medical care, which excluded femoral fractures and stroke as a primary diagnosis. Participants were most commonly admitted with falls, mobility difficulties and disorientation with a mean number of ICD codes of 2.12 (admitting complaints),

representing the heterogeneous nature of presenting conditions and comorbidities of this population (32, 34, 222).

5.6.5 Limitations

The sample size was adequate to draw conclusions on deliverability and acceptability and reached saturation, however staff participants were recruited from one therapy department in a large UK teaching hospital so the findings cannot be generalised. Local variations in practice, service provision and structure could have influenced the results.

The researcher carried out the feasibility study within their own organisation but did not currently work in the clinical area where staff participants were based, nor did they have existing working relationships with the participants.

It is acknowledged that as interested staff took part; these may not be representative of clinicians working in this field. Every effort was made to avoid this as all staff members working in the trust were invited to take part. Staff participants reported gains in their skills and knowledge of rehabilitation potential, but these were not formally evaluated before or after the RePAT training and data collection. Staff participants attended the training sessions and continued to deliver routine clinical care to both participants within and outside of the study. The possibility that contamination of the RePAT intervention into usual care occurred cannot be ruled out. However, as the study did not seek to compare RePAT to usual care, this does not affect the validity of findings.

In this study, usual care was identified from medical notes and documented on the CRF and was used to describe patient participant characteristics and context. CRF data was documented after the staff participant had completed the RePAT intervention. It therefore did not capture information relating to the complete patient journey, outcomes or eventual discharge destination. It was therefore impossible to comment on the quality of usual care assessments and the RePAT intervention, only that RePAT was acceptable and feasible to deliver in the study setting.

As patient participants were screened for eligibility by the researcher, there was a possibility that selection bias may have affected the sample. The majority of the sample had been recommended for further rehabilitation; therefore, it was possible that patients with no rehabilitation potential had already been excluded. Conversely, RePAT may have led to more patient participants being identified as having rehabilitation potential and rehabilitation interventions implemented. However, the primary aim of this study was not to establish rehabilitation outcomes.

The sample did not include any patient participants who resided in care homes. This finding may be due to the small sample size or that care home residents were viewed by staff participants as having no rehabilitation potential and therefore excluded from the study. However, care home residents may have inequitable access to specialist NHS services such as rehabilitation, end of life care and dementia services (392-395). This is supported by Robbins et al. (394), who found that hospital staff believed that care home residents could access further rehabilitation once they were discharged home.

Patient participants were only involved in the study for a single time point, so further testing of follow-up assessments post-hospital discharge would need to be explored as part of future studies.

5.6.6 Optimising the RePAT intervention

Whilst RePAT was found to be feasible, acceptable and deliverable, a number of improvements were suggested to optimise the intervention. These will be presented.

5.6.5.1 Training and mentorship

Staff participants positively evaluated the training for providing a mix of theory and practice. They did, however, report the need to familiarise themselves with RePAT during the study. Incorporating additional clinical vignettes and time for participants to complete these within a group and individual setting is therefore recommended as part of improvements to the training package. Older people living with frailty have complex, fluctuating and heterogeneous presentations so multiple vignettes would likely aid participants understanding of rehabilitation potential. This would allow for participants to use and reflect their own clinical experience and practices and

conceptualise elements of the intervention. Well-designed training sessions and materials can improve intervention fidelity (396). Electronic training materials and vignettes would be developed to enhance ease of access for future multi-centre studies.

Participants valued support and mentorship during the study, therefore a more formalised approach would be required for future studies. Effective mentorship and support is an essential component of clinical trials (375) and can aid participant retention. Regular face-to-face or virtual mentorship would be incorporated into the RePAT intervention and methods and theories of delivery explored.

5.6.5.2 RePAT content

Results suggest that more precise definitions of underlying and unresolved physical and psychological issues are required as participants reported some confusion over terminology. Review by a linguist for structure, language and syntax may be beneficial or further refinement through consensus methods.

Fidelity ratings and interview findings for item nine, support in future decision-making, highlighted the need to refine this item. The guidance contained conflicting information on whether this item was referring to an assessment of an individual's capacity or the need for support in decision-making if they lacked capacity. Further exploration is required to understand the impact that capacity, or lack of has on an individual's decision making in rehabilitation and how clinicians can support this.

Item 11, which considered goal setting faced similar challenges in terms of fidelity and clinician acceptability and training. On reflection, assumptions were made on clinicians existing levels of goal-setting expertise and practice. The results found that only 32% of clinicians set goals with patients during routine clinical care. This could be due to cited time pressures or a lack of training. Further research is required on the feasibility of goal setting within the acute inpatient geriatric population before this item can be further refined.

5.6.5.3 Implementation into usual care

An essential component of intervention development is to consider how the intervention will be implemented into clinical practice (95) following a definitive trial. RePAT was completed alongside usual care, but participants reported that RePAT could replace usual care and be integrated into paper-based or electronic systems and note-keeping. Digital health records form part of the NHS ambitions for digital transformation outlined in the 2019 NHS Long Term Plan (397) to support health user journey across all health settings.

5.7 Conclusion

The RePAT intervention was found feasible to be delivered in the acute hospital setting for frail older people. Physiotherapy and occupational therapy participants reported that RePAT was acceptable and had a positive impact on their understanding of rehabilitation potential, providing structure and support for their clinical reasoning and decision-making. They were able to complete the tool alongside usual clinical care in a timely manner and with a high level of fidelity. Thirteen out of 15 items scored highly in terms of *a priori* fidelity criteria. A number of improvements to the RePAT intervention were identified. These included clarifying definitions and terminology relating to underlying and unresolved physical and psychological issues, supporting patient's decision making and goal setting. Although there was a case for providing a yes/no decision on rehabilitation potential within the tool, participants recognised that binary responses would not take into account the dynamism of frailty and patient and carer choices. Integrating or replacing existing written and electronic assessment documentation with RePAT was considered feasible.

Patient participants, although unable to comment directly on RePAT reported activities which were most likely as a direct result of the tool being used in the study setting. Differing methods or timing of semi-structured interviews would need to be considered for future definitive studies to establish patient and carer experiences of RePAT.

The number of completed RePAT interventions and interview data provides enough evidence to suggest a positive effect on the assessment of rehabilitation potential. The next stage would be to design and complete a randomised controlled trial to establish the effectiveness of the RePAT intervention in predicting rehabilitation potential amongst frail older people.

Chapter 6 – Discussion

The overall aim of this PhD was to explore and develop the theory underpinning rehabilitation potential in older people living with frailty and to model and test the RePAT intervention in the acute hospital setting. The MRC framework for developing and testing complex interventions was followed (91, 104) to provide structure and transparency in the process.

The overall findings of this thesis will now be discussed in relation to existing literature. The wider implications of the RePAT intervention, including clinical and research implications, strengths and limitations of the overall study design and future recommendations, will then be presented.

6.1 Summary of key findings

The research found that rehabilitation potential was a complex, poorly understood and poorly defined concept, judged differently by different people at different times, in keeping with previous research (129, 134). There was little published evidence identified from the mapping review which specifically described rehabilitation potential amongst older people living with frailty. This study found that there was considerable variation in the few definitions of rehabilitation potential and in some cases, an absence of a definition. Rehabilitation potential was found to broadly encompass two different, but interrelated concepts of prognostication and outcome measurement. Rehabilitation potential for prognostication involved the prediction of what could be achieved in programmes of rehabilitation. Rehabilitation potential as an outcome measure considered what had been achieved as a result of the rehabilitation intervention. Current tools and approaches were found to provide a snapshot of individuals' abilities and conditions which failed to capture the dynamic nature and fluctuations associated with frailty and rehabilitation. New aggregative approaches to measures and abilities over time were recommended which allowed for the prognostication of outcomes and potential benefits of rehabilitation interventions.

Focus groups of healthcare workers from two countries highlighted that even trained and experienced staff considered rehabilitation potential to be a complicated phenomenon which involved complex and nuanced decision-making. Predictions on rehabilitation response and benefit were found to be based on a number of clinical factors which were considered alongside patient and carer needs and wants. Ethical dilemmas associated with resource availability and allocation and differing concepts of benefit among stakeholders were exposed which may suggest that clinicians should receive training in the factors which influenced their decision-making, trajectories of frailty, recovery and rehabilitation responses.

The RePAT intervention was developed by synthesising findings from the earlier studies and a Delphi consensus approach which suggested that the intervention should encapsulate more than a retrospective analysis of rehabilitation effectiveness. Rather it should involve a complex process of prognostication based on patient and system-level factors which reflected the complexity of frailty, ill health, hospital care and rehabilitation interventions. As a result, a definition of rehabilitation potential and a 15 item rehabilitation potential assessment tool and training package were developed as the RePAT intervention. Although there was a case for providing a binary decision on rehabilitation potential within the tool, participants recognised that this approach would not take into account the dynamism of frailty, acute ill health and patient and carer choices and was therefore not included.

The feasibility study found that the RePAT intervention could be delivered in the acute hospital setting by physiotherapists and occupational therapists. It was acceptable and had a positive impact on staff participants understanding of rehabilitation potential, providing structure and support for their clinical reasoning and decision-making. They were able to complete the tool alongside their usual care in a timely manner and with a high level of fidelity. These included clarifying definitions and terminology relating to underlying and unresolved physical and psychological issues, supporting patient's decision-making and goal setting. Although patient participants were unable to identify how the RePAT intervention differed from routine care, there was evidence of positive rehabilitation activities, such as a holistic, patient-centred and multidisciplinary approach, being completed which is not routine care on acute wards. The number of completed RePAT interventions and

interview data provides evidence to suggest a positive effect on the assessment of rehabilitation potential and supports the ambition for future research using the intervention.

6.2 Findings in relation to the existing literature

6.2.1 Rehabilitation potential

Overall findings suggest that assessments of rehabilitation potential involved understanding patient characteristics, abilities and motivation, along with system-level factors such resource allocation and availability. A definition of rehabilitation potential was developed, which formed the basis for components of the RePAT intervention (Figure 25).

> Rehabilitation potential is a process which involves complex clinical judgment and prognostication of the projected benefits of undertaking a targeted programme of rehabilitation. The assessment of rehabilitation potential should take into account physical and psychological factors identified during multidisciplinary assessments along with individual patient needs and wants and the availability of family support. It involves developing an understanding of who will participate with rehabilitation, in and outside the therapy setting, who can support this and who is likely to benefit.

Figure 25 - Definition of rehabilitation potential.

Aggregative approaches to rehabilitation potential assessment were required to fully appreciate and evaluate the nuances, fluctuations and complexities associated with frailty, multimorbidity and acute ill health. This is in contrast to other studies of rehabilitation potential and geriatric rehabilitation where single time points of assessment were adopted (129, 134, 190) and condensed to dichotomous categories of rehabilitation potential or no rehabilitation potential. Reductionist approaches to rehabilitation assessments and decision-making are not uncommon (137) but risk ignoring opportunities for improving an individual's health and well-being. Previous attempts to develop assessment tools in older people's rehabilitation have failed to

take into account the complex presentations, performance, trajectories and contextual factors of rehabilitation interventions (130, 134, 187). Rehabilitation potential in acquired brain injury and stroke survivors was also found to be complex and poorly understood and influenced by contextual factors (76, 145, 147, 149).

Frailty makes for a very unpredictable rehabilitation context as individuals living with frailty who receive care in the acute and subacute setting often present with a complex constellation of multimorbidities and superimposed illnesses. Evidence suggests that these are best managed using a holistic, multi-professional and person-centred approach (68, 398). This PhD study found that rehabilitation potential assessments should adopt a similar approach. Frailty is characterised by diminished strength, endurance and reduced physiologic function, increasing an individual's vulnerability for dependency and or death (18). The benefits of frailty identification and stratification cannot be ignored, but the term 'frailty' does not necessarily resonate with the wider population. Frailty is a clinical concept used by health professionals, but members of the public were said to associate frailty with an irreversible state at the end of life, where malnourishment and high dependency on others for care are the norm (399). It has been suggested that frailty's association with a deficit or problem-based model further reinforces dependency amongst older adults, whereas a capabilities-based approach would change attitudes (400). Whilst it was not the aim of this thesis to explore perceptions of frailty, these are important when considered against the possible biases in clinicians decisions into resource allocation amongst older adults (77). Understanding lay perspectives of frailty and health can influence professional perceptions of illness and disability (401) and how individuals experience them.

The RePAT intervention and theories underpinning rehabilitation potential assessments in the acute setting share similarities with other contemporary work into this field. In a study published after the development of RePAT, Najem et al. (321) proposed that assessments of rehabilitation potential and suitability should include a number of factors to reduce the impact of bias in clinical decision-making. They presented the Montreal Referral Framework (402), which outlined referral considerations to post-hospital inpatient rehabilitation facilities in Montreal. This framework considered access to inpatient rehabilitation facilities and was not frailty specific. The Montreal Referral Framework (402) was developed by an expert group

of local clinicians and administrators but, it was unclear who they were, what evidence base the framework drew upon and how it was developed. Rehabilitation potential was said to include four key components:

1. Favourable prognosis for improvement at the level of autonomy.
2. Potential for recovery, learning potential or potential to compensate for incapacities.
3. Capacity to understand and to follow simple instructions.
4. Capacity to participate actively in rehabilitation.

Najem et al. (321) proposed that this framework can help guide clinical decision-making and raise awareness of conscious or unconscious biases but that further research was required to promote to transparency and equity of rehabilitation selection. The RePAT intervention included these components and sought to address these recommendations through a robust and systematic approach to intervention development.

6.2.2 Rehabilitation potential and prognostication

The results of this study indicate that rehabilitation potential involved prognostication about the proposed benefits of targeted rehabilitation programmes. Predicting outcome and benefits was said to comprise of a number of patient and system-level factors. Assessments of underlying comorbidities, acute conditions and the impact these had on functional abilities were found to be essential in understanding an individual's rehabilitation potential. This finding is consistent with those of Najem et al. (321) who proposed that assessments of rehabilitation potential amongst older adults should consider pre-existing health conditions, disease severity, levels of cognitive impairment and the endurance of the patient to tolerate rehabilitation interventions. Interestingly, the RePAT intervention did not include items relating to endurance. This may be especially pertinent in a frail population where the 'effort' required to gain benefit from rehabilitation to improve quality of life may be substantial (330, 403). Knowledge of comorbidities has been suggested as a key component of prognosticating rehabilitation potential and outcomes (69, 70, 134, 150, 187, 190, 193, 196, 215, 218). Trajectories of recovery

and response to rehabilitation interventions are less certain in older people living with frailty and this makes predicting outcomes and benefit more challenging. As the research base for rehabilitation grows, predictive variables will provide greater clarity in navigating decisions about rehabilitation potential and benefit. Promising work using artificial intelligence and computer-driven algorithms may help guide clinical decision-making (130, 225) and understand trajectories of recovery and decline but alone they may not be helpful in determining if an individual has achieved their optimal level of attainment across functional and wider holistic domains. Further research is required to better understand this area which has the potential to improve the management of ill health, delivery and funding of rehabilitation programmes (404).

This study identified a lack of a standardised definition of rehabilitation potential, which may introduce subjectivity and bias into decisions on rehabilitation potential. This has been viewed as particularly challenging in making decisions based on prognosis, the utility of rehabilitation and its predicted outcomes (321). In interventions provided to older people living with frailty, this presents a particular challenge where trajectories of recovery are less certain due to the complex interplay of comorbidities, acute ill health, personal and social factors. Given the heterogeneity in presentation, service provision and possible outcomes, it is perhaps unsurprising that assessments of rehabilitation potential are fraught with uncertainty and challenges. Similar difficulties have been experienced in stroke rehabilitation (76, 145). Clinicians must also make decisions on predicted response to rehabilitation interventions in the knowledge that people respond and recover at differing times and rates (76). It is in this context that the RePAT intervention was developed to support and guide complex clinical decisions in the acute setting.

6.2.3 Rehabilitation potential and volition

This study found that assessments of rehabilitation potential required a thorough understanding of volitional factors (motivation, participation) and factors which influenced these including: mood, cognition, communication and behaviours. These factors were included in the RePAT intervention. Rehabilitation has been described as not an isolated event, rather it is expressed through experiences of the patient and their interactions with clinicians delivering rehabilitation programmes. It is often

considered as an educational process which seeks to improve the physical, sensory, intellectual and social functioning of an individual within the constraints of disease or impairments (44). Interventions which target physiological levels are relatively easy to predict, whereas those, like rehabilitation, require volition and human behaviour are less predictable (75, 405) but crucial in changing human behaviours (75). Volition has been described as the effort expended by an individual during rehabilitation interventions (405) and is critical to rehabilitation success. This finding was also reported by Rentz (69) who defined rehabilitation potential as an:

> *"Estimation of the patient's personal strengths (level of motivation/cooperation, cognitive status and personality constellation)."*

Volition, how it is assessed and maximised should be an essential part of rehabilitation interventions, given the importance it plays in dictating how an individual interacts with the rehabilitation programme. The Rehabilitation Treatment Specific System (RTSS) seeks to make this relationship explicit, encouraging researchers to consider methods to enhance patient participation and motivation (406). Further research is required to understand the impact of volition in frailty rehabilitation and how the rehabilitation process might positively interact with volition. The impact that cognition, mood, motivation and comorbidities has on rehabilitation outcome merits further exploration. Furthermore, the development of standardised clinical tools which assess rehabilitation motivation and participation amongst older people living with frailty would likely aid rehabilitation decision-making and ultimately, the effectiveness of rehabilitation interventions and resource utilisation.

Interestingly New (70) proposed that similar factors should be considered in rehabilitation selection assessments and recommended that those with personality or conversion disorders should be considered with caution due to the impact these had on rehabilitation participation. This was mirrored by Najem et al. (321), who suggested that low motivation and depression may limit an individual's ability to improve with rehabilitation. These findings could be somewhat limited by the poor design of the assessment tools cited in the papers. This study found that these components were especially pertinent in the acute care setting where patients were less likely to have the opportunity to be active partners in rehabilitation programmes and assessments. Focus group study findings suggest that this was due to

paternalistic and contextual constraint of the hospital environment. A note of caution is due here since this may lead to premature assumptions of 'no rehabilitation potential' (77). This is augmented in patients with cognitive impairments who are often considered poor rehabilitation candidates (80) despite emerging evidence suggesting that positive rehabilitation outcomes can be gained with specialist input over longer periods of time (118).

6.2.4 Rehabilitation potential and clinical reasoning

This study found that different models of clinical reasoning were used when assessing rehabilitation potential. Theories underpinning clinical reasoning have been extensively explored in the field of medical education, but the evidence for AHPs and nurses is less well defined. Differing approaches may be influenced by profession-specific training and professionalization and may explain why previous attempts to quantify rehabilitation potential amongst practitioners have been challenging (129, 134). Rehabilitation potential and the RePAT intervention were found to use predictive or conditional models of clinical reasoning where judgements regarding specific interventions and prognoses are used. Predictive reasoning allows practitioners to embrace the complexities of clinical presentations, outcomes and timeframes and requires biological, psychological, environmental and personal factors to be taken into account (388, 389). It encourages practitioners to consider what is and is not amenable to change. This is in contrast to previous work which condensed rehabilitation potential to dichotomous variables (129, 130, 134, 190, 191). The RePAT intervention was developed to embrace and make sense of the uncertainties and fluctuations associated with rehabilitation decision-making using a predictive reasoning approach. Khamati (389) proposed that complex decision-making and reasoning is fraught with uncertainty in terms of treatment outcomes, but through the use of conditional or predictive reasoning, clinicians can recognise and reconcile these challenges. The application of such approaches enables critical or potentially irreversible decisions, such as access to rehabilitation services following acute care, which can have a significant impact on quality of life and well-being to be deferred until uncertainty is reduced or resolved (389). Methodical approaches to clinical decision-making, as demonstrated in RePAT, have the potential to improve patient outcomes and service utilisation (49).

6.2.5 Rehabilitation potential and shared decision-making

Central to the NHS Long Term Plan (397) and aspirations of healthy ageing proposed by the World Health Organization (244) is the principle of person-centred care. The RePAT intervention was developed to support these ambitions by ensuring that items such as 'what's important to you' and family involvement were included. How effective they were in achieving these ambitions remains unclear. These items aim to change the dynamic between the healthcare provider and recipient, paving the way for patients to become informed and equal partners in choices about their care. Shared decision-making approaches are fundamental to future models of health and social care provision (3, 397) and describe:

> "*An approach where clinicians and patients share best available evidence when faced with the task of making decisions, and where patients are supported to consider options to achieve informed preferences."* [(407), p1]

Shared decision-making approaches have, on the whole, been welcomed by healthcare practitioners. A survey of 126 rehabilitation physicians positively rated shared decision-making in rehabilitation settings, rejecting the notion of paternalistic approaches to care (121). Due to the multi-disciplinarity of rehabilitation practice, disagreements between the right course of action amongst team members may lead to ineffective implementation of care and lead to patient dissatisfaction and disengagement from rehabilitation programmes. This study found that disagreements on the right course of action between practitioners and patients was not uncommon. Differences in opinions on an individual's rehabilitation potential were identified by Chang et al. (129) who found that 63.2% of care home residents believed their physical abilities would improve with rehabilitation compared to 9.8% of their professional carers. Mismatches between expectations merit further exploration to maximise the benefits of limited available rehabilitation interventions.

6.2.6 Rehabilitation potential and ethical considerations

Evidence identified and developed during this PhD suggests that rehabilitation potential encapsulated more than a clinical term or construct for selection to rehabilitation programmes. Rather it encompassed political, economic and ethical

dimensions which represented clinicians' attempts to contend with resource rationing. Ethical dimensions of practice have been widely explored and this study suggests that making decisions about who and how to allocate resources pervaded clinicians understanding of rehabilitation potential. However, the realities of clinical practice led to dissonance and pressure amongst service users and providers as identified in the focus groups (chapter three), Delphi consensus (chapter four) and feasibility study semi-structured interviews (chapter five). Surprisingly, items in the Delphi consensus relating to resource allocation failed to reach the pre-determined consensus level and were excluded from the RePAT intervention. A possible explanation for this could be the strong belief that rehabilitation potential should be considered in terms of the individuals' potential rather than the systems' ability to deliver that potential. Alternatively, further Delphi rounds may have led to consensus and inclusion of this item in the RePAT intervention.

Where studies have explored factors underpinning rehabilitation decision-making, resource availability has been cited as influential in decisions about rehabilitation potential in geriatric (77, 79, 321), generalist (70), stroke and ABI rehabilitation (76, 145, 147-149). This is in contrast to the studies which evaluated the effectiveness of interventions, where rehabilitation potential was described in dichotomous terms where ethical dimensions of practice and resource allocation were seldom considered (69, 129, 130, 150, 187, 190-192, 203, 207, 209, 218, 223). These findings are likely explained by differing research methods adopted in this study where the qualitative studies explored factors underpinning rehabilitation decision-making compared to the quantitative studies which explored effectiveness.

Resource allocation is commonly understood in terms of utilitarian or egalitarian principles. Utilitarian describes the belief that health resources should be distributed to maximise the overall well-being of the health of society (408) and egalitarian principles propose that inequalities should be eliminated, so all groups of people are equal. Five themes were identified in a systematic review which explored equity in healthcare resource allocation: equalisation across the health service supply/access and outcome chain, need of potential to benefit, groupings of equalisation, caveats to equalisation and close enough is good enough (409). Lane et al. (409) presented a useful framework to navigate the complexities of resource allocation decision-making (Figure 26).

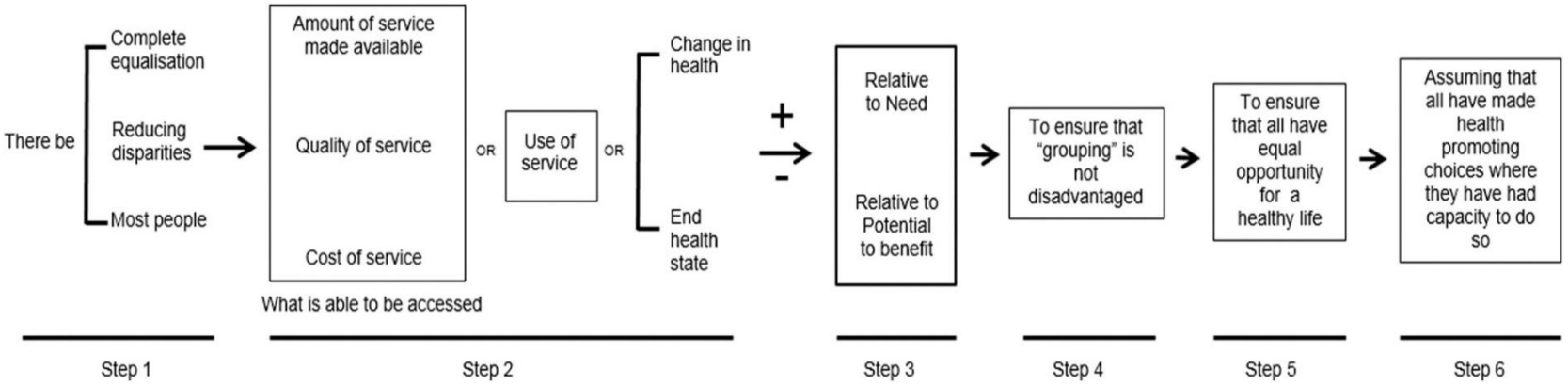


Figure 26 - Operational definition of equity framework (409).

Of particular relevance to this study is the relative potential to benefit, which outlined the need to understand the benefit from multiple perspectives including service users, commissioners, clinicians and researchers to ensure that no one group is disadvantaged or denied access based on specific characteristics. Khoo et al. (410) found that patients aged under 65 years with perceived limited rehabilitation potential were admitted for in-patient neurorehabilitation and that selection bias led to better outcomes for younger patients. They proposed that this may be due to societal expectations that they should be given the opportunity for rehabilitation due to their age.

Evidence based-practice deems that best available evidence informs clinical decision-making. Assessments and decisions on rehabilitation potential should be based on coherent variables that are applied equitably. Older adults may be denied access to rehabilitation services which may be beneficial to them based on arbitrary age limits rather than evidence of benefit. Non-clinical variables, including time, finance and resource allocation, have been suggested as being equally influential in clinical decision making (411). This study has found that rather than ignoring non-clinical variables, these should be openly discussed and considered as part of clinical development and to foster open and honest discussions with service users and their families regarding resource allocation and availability. Healthcare practitioners should be mindful of their potential bias and should analyse their own attitudes to prevent any unconscious ageism that may build unjustified barriers to access (321). The RePAT intervention sought to provide structure and opportunities for clinicians to reflect on their biases and non-patient factors which influence their decision-making.

6.2.7 Rehabilitation potential and outcomes

This study found that rehabilitation potential involved predictions about the proposed benefits of targeted programmes of rehabilitation. This is consistent with other studies into rehabilitation potential (76, 129, 134, 145, 147, 149). Rehabilitation typically seeks to optimise an individuals' health, but health should not purely be viewed as an absence of disease. Gladman (52) argues that health professionals' failure to make this distinction has led to rehabilitation practice and research to be poorly defined and operationalised. This lack of understanding may be

partly responsible for frailty rehabilitation research's focus on physical aspects of health rather than the wider impacts of ill health on well-being, quality of life and social participation. The WHO ICF (44) seeks to support the shift away from the negative connotations of disability towards understanding the dynamic and individualised interplay and influences of internal and external factors of health and well-being . Assessments of health conditions, impairments, activities, the environment and participation were reflected in the RePAT intervention. The ICF may help guide clinical decision-making but its adoption into clinical practice has been slow (412). Atkinson et al. (49) developed a clinical reasoning tool to guide critical thinking amongst novice and expert physical therapists based on components of the ICF, which shares many similarities with the RePAT intervention. Results from the study indicate that the tool aided clinical decision-making and professional development. Greater awareness, through reflective practice, can assist practitioners in becoming more aware of the social and cultural constructs behind their practice and in turn, enable them to support their patients in coming to terms with their changing health, function and well-being (334). Such skills are especially important in frailty rehabilitation where abilities and conditions fluctuate and have profound impacts on an individuals health, well-being and identity (413).

Rehabilitation aims to restore the functional capacities of disabled individuals and prevent further disability (44). Specialist post-acute older people's rehabilitation may provide individuals with significant improvements in physical function, quality of life and falls self-efficacy (34). Findings from this study suggest that rehabilitation benefits in older people living with frailty may be broader by seeking maintenance or managed decline in abilities. Rehabilitation is often predicated on the notion of improvement, however physical improvement may not be the realistic nor desired outcome of rehabilitation in this population. It has been suggested that individuals' health and well-being may be enhanced by supporting their adaptation to irreversible or progressive conditions (52) through adaptive or restorative rehabilitation (206). Rehabilitation decision-making in the acute setting may go beyond "*we need to get you stronger to get home*" [(414), p409]. This has important repercussions in terms of rehabilitation potential, which was found to encompass prognostication of rehabilitation benefits and participation. The heterogeneity of individuals' natural unassisted recovery from acute episodes and rehabilitation trajectories, predicting who will improve, maintain or lose their functional

independence and quality of life presents particular challenges in this population (109).

Reablement approaches which seek to support individuals to regain or maintain independence and resume activities of daily living (188, 374); may offer an alternative approach to rehabilitation for those whom improvement is not viable. The effectiveness of these approaches remains inconclusive (374). Further research is required to understand the trajectories of recovery and rehabilitation response to providing greater clarity in rehabilitation decision-making.

6.3 Strengths and limitations

The strengths and limitations of individual study components have been presented in the discussion section of each chapter, but a number of additional factors need to be considered.

6.3.1 Research methods and approach

A key strength of the overall study design was the use of a recognised framework for developing complex interventions, the MRC (91, 104). As outlined in chapter one, the MRC has been widely used in complex intervention design and more specifically, in the development of interventions for older people (105). It encourages researchers to consider factors relating to intervention design, evaluation and implementation. However, the MRC has been criticised for lacking detail required during intervention development, theory and implementation (95, 100, 105). To further enhance the strength of the overall study design, a number of approaches were used. The TIDieR checklist and guide (158), presented in chapter four, enabled robust reporting of the RePAT intervention components, theories and processes (Appendix O). Reporting on the overall study was completed using the Criteria for Reporting the Development and Evaluation of Complex Interventions in Healthcare guide (CReDECI2) (415). CReCEDI2 allows formal reporting on the quality development and evaluation on a wide range of study designs. It provides important information on the intervention design, theory, implementation components, outcomes and fidelity of processes (416). This can be found in Appendix GG.

One strength of this study was the use of a sequential exploratory mixed methods approach. The study was conducted in line with Tashakkori and Creswell's [(417), p4] definition of mixed methods research:

> *"In which the investigator collects and analyses data, integrates the findings and draws inferences using both qualitative and quantitative approaches or methods in a single study or a program of inquiry."*

Mixed methods approaches are widely used in health research, intervention development and evaluation (91, 104, 106, 153). They are driven by the research question, embracing the methodological strengths of both methods. Such approaches may be criticised as quantitative and qualitative research belong to separate and seemingly incompatible research paradigms due to the methods of data collection, analysis and underpinning theories of research methods. However, proponents of this approach argue that the incommensurability of world views can be reconciled through using both approaches to address a research question (418). Therefore mixed methods approaches are commonly viewed as aligning to a pragmatic paradigm (155). Mixed methods approaches are particularly useful when addressing complex, multifaceted issues (419) such as frailty, multimorbidity and rehabilitation potential as was the subject of this thesis. The methods used within this thesis followed a sequential exploratory approach providing an incremental progression throughout the thesis. Findings were considered separately, enhancing the overall validity of the study (153). Findings from the mapping review and focus groups (chapter two and three respectively) were then synthesised using the Triangulation protocol (159, 160) allowing data to be transformed to develop the theory underpinning rehabilitation potential and the RePAT intervention.

These methodological approaches allowed the complexities and nuances of rehabilitation potential to be explored. Rehabilitation, frailty and multimorbidity are complex constructs both in terms of how they are delivered and measured. Research studies frequently apply a medical reductionist approach rather than seeking to understand the complexities of rehabilitation practice. Single disease models of care have historically dominated health research and although there is strong evidence to suggest that these approaches are effective for individuals with single diseases, they can lead to chaotic or siloed care for those with multimorbidities (420). This thesis

and the subsequent RePAT intervention sought to make sense of these complex forces.

A limitation of the overall study remains the lack of a clear outcome measure which quantifies rehabilitation potential. The identification of relevant outcomes measures is one of the most important components in modelling and testing complex interventions. It informs what the expected intervention outcomes should be and potential confounding factors that should be controlled during clinical trials (345). The methods used within this thesis did not lead to the identification of a primary outcome measure. This may be explained by a number factors: the feasibility study did not seek to identify a primary outcome measure or the effectiveness of the RePAT intervention, rather it sought to explore the feasibility and acceptability of delivery in the acute hospital setting. The success of an intervention differs according to perspective. Servicer users, providers, clinicians and researchers may have different notions of success. At an organisational level, a successful outcome may be a reduced length of hospital stay, timely discharge from acute care, reduction in readmission rate or optimal use of resources. Clinicians may measure success by agreements on an individual rehabilitation potential or by using validated outcome measures. At a patient or family level, success or benefit may include changes to function, quality of life or social participation. Further research is required to explore the link between rehabilitation potential and how its outcome is measured and linked to primary research outcomes for future definitive trials.

The generalisability of the results of this thesis need to be considered. Frailty is considered synonymous with older age. However, recent studies suggest that adults under the age of 65 are living with frailty and multimorbidity (282, 421). Older people may present with distinct issues related to ageing such as comorbidities, sensory loss and poor social support. It has been suggested that biological rather than chronological age may be a better measure (422). This study specifically explored rehabilitation in older adults living with frailty therefore, findings can only be applied to this population. Frailty identification tools such as the Clinical Frailty Scale (25), Edmonton Frail Scale , Frailty Phenotype (24), and Electronic Frailty Index (423) should be used in future trials of the RePAT to ensure that frailty is correctly stratified based on biological rather than chronological criteria.

Findings from the focus groups (chapter three) and Delphi consensus (chapter four), suggested that an optimal assessment of rehabilitation potential was best delivered in an individual's usual place of residence. The feasibility study (chapter five) was completed in the acute hospital setting and therefore, may not have provided a comprehensive picture of an individual's abilities and rehabilitation potential. Furthermore, this PhD study proposed that rehabilitation potential assessments should be iterative to take into account the fluctuations and variations in clinical presentation, abilities and performance. Whilst the RePAT intervention required participants to consider these factors over multiple time points, the intervention was only completed once. Future studies using the RePAT intervention should consider longitudinal assessments. Some patients may demonstrate their potential later than others (76) once they have recovered from their acute event or returned to their usual place of residence. This was found to be especially pronounced in those with cognitive impairments who were believed to perform better in familiar, non-institutionalised settings, as evidenced in chapter three. A recommendation from this PhD study is that clinicians should be trained to be aware of the limitations of rehabilitation potential assessments in the acute hospital environment where patients are recovering from periods of ill health and the constraints of the hospital environment.

6.3.2 Patient and public involvement

Patient and public involvement in intervention development, evaluation and implementation have been strongly advocated by a number of national and international funding bodies (161, 162). Researchers have recognised the value that different perspectives have in enhancing the quality and generalisability of research practice (268). A key strength of this PhD was the contributions that PPI had on the study design, conduct and analysis. PPI contributions were outlined in each chapter but need to be considered in relation to the overall study. This PhD sought to develop an evidence-based rehabilitation potential assessment tool which embraced a person-centred approach. MK's (PPI collaborator) and the Dementia and Frail Older Person's PPI group at the University of Nottingham involvement was critical in refining the overall research question, aspects of study design, conduct and future dissemination. The innovative qualitative analysis training course, designed as part of

this thesis and described in chapter three and in Cowley et al. (169), enabled MK and members of the group to provide different perspectives to ensure that the service users voices (269) were not lost during data analysis and synthesis. In addition, this has been suggested to mitigate against the dominant perspectives pervading qualitative data analysis (268) enhancing the credibility and transferability of research findings (166). The potential benefits of partnership working have been slower to be realised by older people (168) despite being frequent consumers of health and social care. Dewar (391) noted that there were more limited opportunities for older people to be active PPI members, but this study has shown that with the opportunity and supportive training they can enhance analysis and bring a patient and carer centred view of the findings which would not have been possible with just the research team (169).

6.4 Research implications

6.4.1 Recruitment and retention of participants

This study found that it was feasible and acceptable to deliver the RePAT intervention in the acute care setting amongst physiotherapists, occupational therapists, patients and their family members. Recruitment and retention of both staff and patient participants are critical to the success of clinical trials. Recruitment in the hospital setting has been found to be fraught with challenges associated with a busy, confusing environment and the onset of acute ill health amongst older adults (376). Twenty-six older adults identified as frail and in receipt of care in the acute hospital setting were recruited to the RePAT feasibility study (chapter five). Of these 26, eight lacked capacity and required consultee agreement. This has implications for future trials, as adults lacking capacity are frequently excluded from clinical trials due to poor cognition (376), their complex presentations or being deemed “too frail” to recruit and retain in studies (380). However, including this patient population is essential in informing the rehabilitation frailty evidence base on which clinical decisions are predicated on. In addition, such approaches contribute to the lack of generalisability for the wider population (424). Further research is required to compare the impact, challenges and strategies on drop-out rates or refusals amongst

older people living with frailty to enhance their continued involvement in studies (381).

Rehabilitation research has been criticised for failing to accurately describe the intervention components and for the absence of clear and consistent relationship to treatment outcomes, hindering progress in the field (425). This has been described as the black box of rehabilitation practice. This statement is broadly supported by the findings of this study, whereby rehabilitation potential was found to be used as entry criteria for studies (185, 200, 222, 410) but poorly defined and its assessment components rarely articulated. An implication of these findings is that rehabilitation potential or no rehabilitation potential, should not be used as a proxy entry criteria for entry into research studies without the application of a clear definition and how rehabilitation potential is assessed and measured. This PhD represents the first attempt to provide a definition of rehabilitation potential in older people living with frailty. Lack of clarity in the definitions and how they are operationalised in the research setting further adds to the confusion and proliferation over the use of the term and adds little to the evidence-base. Unifying theories may afford rehabilitation research greater status synonymous with resource allocation and quality of service delivery (426).

The feasibility study described in chapter five failed to identify and recruit older adults residing in care homes. Whilst this may represent a failure in the sampling strategy, it may also be explained by staff participants underlying belief that residents of long term care facilities have no rehabilitation potential. It is estimated that there are in excess of 450,000 care home places in the UK (427) for adults living with complex health and social care needs. One in seven people aged 85 years or more resides permanently in a care home (115). Rehabilitation has the potential to offer these residents support and benefits in terms of quality of life, social interactions and independence, yet evidence suggests that residents are frequently denied access to programmes of rehabilitation which may be beneficial (392, 393, 395). Robbins et al. (394) found that hospital staff believed that care home residents could access further rehabilitation once they were discharged home and this may explain why many do not refer to rehabilitation based on the belief that they will be safe for discharge and can access services once home. In the future, it will be

important to explore care home residents access to rehabilitation interventions both within the research and clinical setting.

6.4.2 Implementation of the RePAT intervention

The RePAT intervention was designed for use in the acute hospital setting, but evidence was identified, which drew from both community and hospital settings and participants working across multiple healthcare settings. Recent healthcare policy in the UK (397) has seen a drive for care and rehabilitation to be delivered in community-based settings, focusing around individuals' usual place of residence. Although the location of assessments may change, components of the RePAT intervention are likely to remain pertinent to older people living with frailty. Understanding their needs, wants, abilities and the complexities of multimorbidity, frailty, recovery from acute episodes and rehabilitation response remain critical factors to consider in rehabilitation decision-making. However, until credible alternatives for hospital care are offered, acute care admissions will continue to be the fall-back position.

6.5 Clinical implications

6.5.1 Evidence-based practice

The RePAT intervention was developed by synthesising findings from the earlier studies and a Delphi consensus approach. Knowledge of intervention effectiveness was found to be essential in assessments of rehabilitation potential and a core component of evidence-based practice. Evidence-based practice involves the conscientious and judicious use of current best evidence in conjunction with clinical expertise and patient values to make decisions about the care of individual patients or the delivery of health services (280). This definition draws together many of the complex forces involved in assessments of rehabilitation potential. Recent systematic reviews have identified a number of variables which predict outcomes of rehabilitation interventions amongst older people living with frailty (68, 113, 114, 222, 238, 398, 428). The integration of evidence is critical in informing clinical decision-making on individual's rehabilitation potential but currently fails to take into

account human factors such as volition and behaviour which are essential for successful rehabilitation outcomes. Najem et al. (321) proposed that selection of patients that have the best potential to benefit from rehabilitation interventions is compromised by the lack of precise measures to realise this. This can lead to subjectivity in interpreting evidence and heightened risk of conscious or unconscious bias in clinical decision-making. The RePAT intervention sought to address this by providing clinicians with a framework for rehabilitation potential assessments and subsequent clinical decisions aimed at reducing subjective biases or at the very least, making the clinicians more cognoscente of them.

6.5.2 Clinical decision-making and the feedback loop

Feedback mechanisms are critical to evidence-based practice and clinical decision-making. Methods which allow health professionals to articulate their clinical reasoning can support metacognition (429). Metacognition describes the awareness or analysis of individuals thinking either during or after an event. It has been suggested that such methods are widely used during undergraduate education but have been poorly explored in clinical practice (49). The RePAT intervention could be facilitating metacognition and critical thinking by providing clinicians with a structured approach to assessments and clinical decision-making. Clinical decision-making is central to clinical practice and is predicated on the outcomes of previous decisions whereby clinicians become aware of their abilities and limitations in decision-making through feedback (390). This has been referred to as clinical calibration (Figure 27).

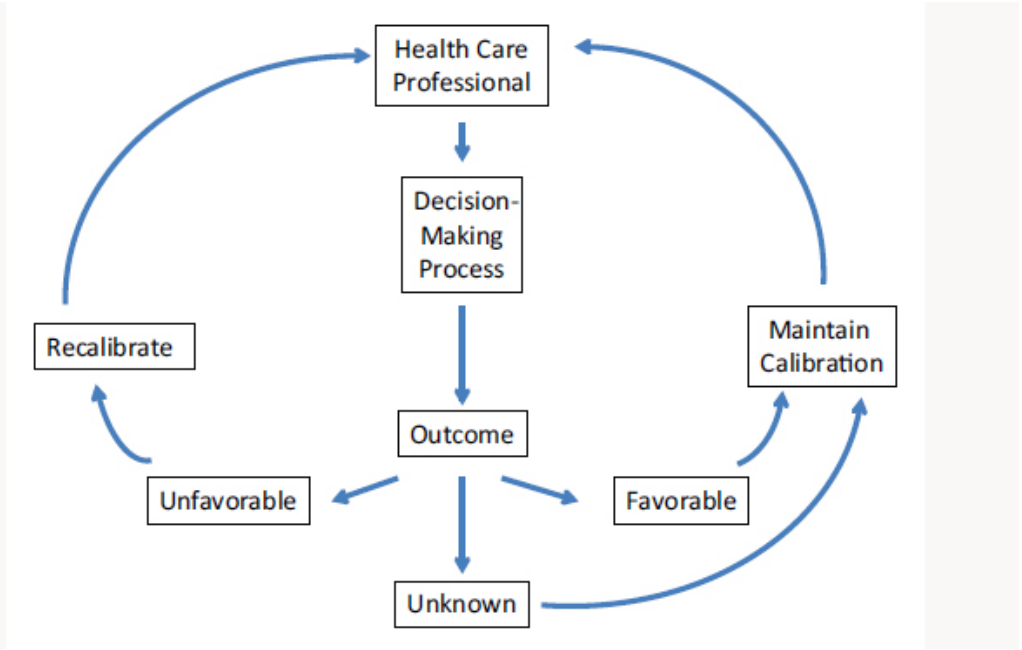


Figure 27 - Clinical calibration adapted from Ball et al. (390).

This study found that clinicians were often unaware of the outcomes of the decisions they made in the acute setting regarding rehabilitation potential and outcomes of rehabilitation interventions they implemented on discharge from acute care. Ball et al. (390) suggest that unknown outcomes are treated as favourable and can lead to poor calibration, which is detrimental to diagnostic accuracy and future decisions. Although this model refers specifically to diagnoses, similar findings were reported in this study in relation to the prognostication of rehabilitation potential. Current models of healthcare have been criticised for being siloed (43, 111), whereby clinicians delivering care and making decisions in an acute care setting fail to observe the outcome of their decisions. Failure to capitalise on individual and organisational learning can have significant impacts on patient outcomes, experience and resource utilisation. This is an important consideration for clinical practice, service planning and delivery where robust mechanisms for reviewing outcomes of clinical decision-making are required to improve the efficacy and benefit of rehabilitation interventions.

This study has highlighted the paucity of frailty specific predictive models of rehabilitation. In the absence of such models, trials of rehabilitation were suggested as useful in informing rehabilitation potential decision making. These findings correspond with previous research into rehabilitation potential (70, 76, 145, 147,

149) and wider aspects of rehabilitation practice (127, 184, 192, 204, 206, 209, 210, 212, 213, 221). Findings from this study suggest that trials of rehabilitation were less accessible in the acute hospital setting due to pressures in the system and a perceived lack of rehabilitation facilities. Greater numbers of patients present to the acute hospital setting for unplanned care, accompanied by significant reductions in bed stock, placing the system and clinicians under greater pressures (430). These pressures were described by participants in the focus group (chapter three) and feasibility study findings (chapter five).

It may be argued that, like mental capacity, everyone is assumed to have rehabilitation potential until proven otherwise and that trials of rehabilitation may prove to be the best vindication of an individual's rehabilitation potential.

6.5.3 Goal setting

The RePAT intervention included specific items relating to goal setting, set against the backdrop of understanding individual needs and wants. Goal setting plays an important role in rehabilitation practice, providing motivation, monitoring achievement and structuring rehabilitation interventions (75). The feasibility study found that these predominantly focussed on patient participants returning to their usual place of residence. These results reflect those of van Seben et al. (431) who found that inpatient adults aged ≥80 years in receipt of inpatient geriatric rehabilitation chose goals related to going home and once they had returned home, their goals changed to reflect their desire to regain pre-morbid levels of function and independence. The potential dissonance between short, medium and long term goals should not be overlooked in clinical practice whereby individuals could be discounted as having no rehabilitation potential early in their recovery and rehabilitation trajectory. Further research is required to understand optimal methods and approaches to goal setting in this population (284).

6.6 Future research

Computer-driven learning may assist in identifying factors predictive of rehabilitation outcome, but alone they may not be helpful in determining if an individual has achieved their optimal level of attainment across functional and wider holistic domains. The RePAT intervention presents the first attempt to address this gap. The number of completed RePAT interventions and interview data provides enough evidence to suggest a positive effect on the assessment of rehabilitation potential. The next stage would be to design and complete a randomised controlled trial to establish the effectiveness of RePAT in predicting rehabilitation potential amongst frail older people and if providing the right rehabilitation at the right time improves outcomes.

Prior research into rehabilitation potential has largely seen the term used as an entry criteria into rehabilitation studies but has failed to establish the effectiveness of rehabilitation potential assessments. A successful rehabilitation potential assessment is one that can correctly predict which patients will and won't respond to rehabilitation interventions. Future trials into rehabilitation potential should, therefore, use the RePAT intervention at baseline, provide rehabilitation programmes to all and then use longitudinal data to establish who had rehabilitation potential (or not). This would then allow the sensitivity, specify and negative predictive values to establish the effectiveness of the RePAT intervention.

This PhD study found that clinicians faced ethical dilemmas in assessing rehabilitation potential which required them to consider how rehabilitation resources should be allocated. Further research into how clinicians operationalise these decisions and communicate with service users is required. The RePAT intervention training and trial on the ward was found to raise awareness of patient and non-patient related factors in rehabilitation potential assessments and these changed behaviours and beliefs merit further exploration.

Rehabilitation has often been predicated on the notion of improvement but approaches which seek maintenance, managed decline or palliation may offer greater benefits for older people living with frailty (79, 240, 241). The next stage would be to explore the effectiveness of such interventions and the experiences of those delivering and receiving them.

6.7 Conclusion

This PhD study built the theory and provided definitions behind assessments of rehabilitation potential in older people living with frailty and developed an evidence-based assessment tool for use in the acute healthcare setting, the RePAT. Rehabilitation potential was found to be a complex, and poorly understood term, poorly judged by different people at different times. In the absence of predictive variables for rehabilitation, practitioners made complex decisions based on rehabilitation response, performance and outcomes, balanced against the realities of patient choice, resources and ethical considerations. The use of the term rehabilitation potential may represent knowledge of clinical, patient and organisational level factors but also an economic or political construct. At its best, it may be dependent on the therapist or healthcare context in which assessments take place and may, therefore, be a poor method of predicting response to rehabilitation and outcomes.

As our understanding of frailty and multimorbidity evolves, we will be better equipped to develop and test interventions which attenuate frailty to promote healthy ageing, well-being and quality of life. Nolan et al. (34) recommend that frailty levels alone should not replace clinical judgements but provide practitioners with a better understanding of the relationship between frailty and outcomes in the context of rehabilitation service provision.

The RePAT intervention was found to be deliverable, acceptable and tolerated in the wards and provided a structured, transparent, evidence-based approach to support decision-making into rehabilitation potential. Its content allowed clinicians to embrace the complex and dynamic forces at play in frailty rehabilitation and recovery from acute ill health to aid decision-making in an effort to select the most appropriate treatment. A structured approach allowed practitioners to make explicit their reasons behind rehabilitation decision-making and rehabilitation potential by understanding individual needs, wants, abilities and volitional factors the complexities of multimorbidity, frailty, recovery from acute episodes and rehabilitation. Uncertainty is inherent in clinical practice and the RePAT intervention provided structure to clinical reasoning in prognostication of rehabilitation outcomes with a person-centred approach.

This study found that clinicians were often unaware of the outcomes of the decisions they made in the acute healthcare setting regarding individuals rehabilitation potential and outcomes of rehabilitation interventions they implemented on discharge from acute care. Critical to the notion of rehabilitation potential was the need for robust mechanisms for reviewing outcomes of clinical decision-making to improve the efficacy and benefit of rehabilitation interventions.

Rehabilitation is a process which requires an active partnership between provider and recipient and the RePAT intervention encourages the assessment of participatory and volitional factors. Even with the evolving evidence base, practitioners will still need to make decisions on rehabilitation potential and individuals suitability for rehabilitation programs on the background of finite resources. The RePAT intervention sought to encourage practitioners to become cognoscente of ethical dilemmas and biases. This study lays the groundwork for further research into rehabilitation decision-making amongst older people living with frailty. The research process detailed within this thesis was feasible and the RePAT intervention is now ready for further clinical and cost-effectiveness evaluation.

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Appendix A- Ethical approval

NHS
Health Research Authority
Yorkshire & The Humber - Bradford Leeds Research Ethics Committee
Jarrow Business Centre
Rolling Mill Road
Jarrow
NE32 3DT

Telephone: 0207 104 8081

Please note: This is the favourable opinion of the REC only and does not allow you to start your study at NHS sites in England until you receive HRA Approval

03 January 2018

Mrs Alison Cowley
Nursing Development, NUH NHS Trust
Derwent House, City Campus, Hucknall Road
Nottingham
NG5 1PB

Dear Mrs Cowley

Study title:	**Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study.**
REC reference:	**17/YH/0356**
Protocol number:	**N/A**
IRAS project ID:	**227288**

Thank you for your letter of 20th December, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact hra.studyregistration@nhs.net outlining the reasons for your request.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Mental Capacity Act 2005

I confirm that the committee has approved this research project for the purposes of the Mental Capacity Act 2005. The committee is satisfied that the requirements of section 31 of the Act will be met in relation to research carried out as part of this project on, or in relation to, a person who lacks capacity to consent to taking part in the project.

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for NHS permission for research is available in the Integrated Research Application System, www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Non-NHS sites

The Committee has not yet completed any site-specific assessment (SSA) for the non-NHS research site(s) taking part in this study. The favourable opinion does not therefore apply to any non-NHS site at present. We will write to you again as soon as an SSA application(s) has been reviewed. In the meantime no study procedures should be initiated at non-NHS sites.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	*Version*	*Date*
Copies of advertisement materials for research participants [Focus group recruitment poster V2.1 18.09.2017 assessment of rehabilitation potential]	V2.1	18 September 2017
Copies of advertisement materials for research participants [Delphi invitation letter V1.1 18.09.2017 assessment of rehabilitation potential]	V1.1	18 September 2017
Copies of advertisement materials for research participants [Feasibility study STAFF recruitment poster V1.1 11.07.2017 assessment of rehabilitation potential]	V1.1	11 July 2017
Copies of advertisement materials for research participants [Feasibility study PATIENT recruitment poster V2.1 11.07.2017 assessment of rehabilitation potential]	V2.1	11 July 2017
Copies of advertisement materials for research participants [Focus group recruitment poster v3.1 12.12.17 assessment of rehabilitation potential]	v3.1	12 December 2017
Copies of advertisement materials for research participants [Focus group recruitment poster v3.1 12.12.17 track changes Assessment of rehabilitation potential]	v3.1	12 December 2017
Covering letter on headed paper [Ethics response cover letter 17YH0356 Assessment of rehabilitation potential]	v1.1	18 December 2017

Interview schedules or topic guides for participants [Focus group topic guide V2.1 18.09.2017 assessment of rehabilitation potential]	V2.1	18 September 2017
Interview schedules or topic guides for participants [Feasibility study staff participant interview guide V1.1 15/08/2017 assessment of rehabilitation potential]	V1.1	15 August 2017
Interview schedules or topic guides for participants [Feasibility study patient family carer participant interview guide V2.1 15/08/2017 assessment of rehabilitation potential]	V2.1	15 August 2017
IRAS Application Form [IRAS_Form_04102017]		04 October 2017
IRAS Application Form XML file [IRAS_Form_04102017]		04 October 2017
IRAS Checklist XML [Checklist_18102017]		18 October 2017
IRAS Checklist XML [Checklist_19122017]		19 December 2017
Non-validated questionnaire [Feasibility Study staff participant demographics sheet V1,1 17/08/2017 assessment of rehabilitation potential]	V1.1	17 August 2017
Non-validated questionnaire [Feasibility study capacity assessment form V1.1 01/07/2017 assessment of rehabilitation potential]	V1.1	01 July 2017
Participant consent form [Focus group consent form V2.1 15/08/2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant consent form [Feasibility study staff participant consent form V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant consent form [Feasibility study patient family carer consent form V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant consent form [Feasibility study consultee consent form V2.1 15/08/2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant consent form [Focus Group Consent Form v3.1 13.12.17 track changes Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant consent form [Focus Group Consent Form v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant consent form [Feasibility Study Staff Participant Consent Form v3.1 13.12.17 track changes Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant consent form [Feasibility Study Staff Participant Consent Form v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant consent form [Feasibility Study Consultee Declaration form v3.1 12.12.17 assessment of rehabilitation potential]	v3.1	12 December 2017
Participant consent form [Feasibility Study Consultee declaration form v3.1 12.12.17 track changes]	v3.1	12 December 2017
Participant information sheet (PIS) [Feasibility study patient summary participant information sheet assessment of rehabilitation potential v2.1 19.9.17]	v2.1	19 September 2017
Participant information sheet (PIS) [Focus group professionals participant information sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Focus Group member of public participant information sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Delphi participant information sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Feasibility study staff participant information sheet V2.1 15.08.2017 assessment of rehabilitation	V2.1	15 August 2017

potential]		
Participant information sheet (PIS) [Feasibility study patient participant informaion sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Feasibility study patient participant summary information sheet V2.1 19.09.2017 assessment of rehabilitation potential]	V2.1	19 September 2017
Participant information sheet (PIS) [Focus group professional participant information sheet v3.1 13.12.17 track changes Assessment of Rehabilitation Potential]	v3.1	13 December 2017
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Participant information sheet (PIS) [Focus Group Member of Public Participant Information Sheet v3.1 13.12.17 track changes Assessment of Rehabilitation Potential]	v3.1	13 December 2017
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Participant information sheet (PIS) [Delphi Participant Information Sheet v3.1 12.12.17 track changes assessment of rehabilitation potential]	v3.1	12 December 2017
Participant information sheet (PIS) [Delphi Participant Information Sheet v3.1 12.12.17 assessment of rehabilitation potential]	v3.1	12 December 2017
Participant information sheet (PIS) [Feasibility Study Staff participant Information Sheet v3.1 13.12.17 track changes Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant information sheet (PIS) [Feasibility Study Staff Participant Information Sheet v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant information sheet (PIS) [Feasibility Study Consultee Information Sheet v1.1 18.12.17 Assessment of Rehabilitation Potential]	v1.1	18 December 2017
Participant information sheet (PIS) [Feasibility Study Consultee Summary Information Sheet v1.1 18.12.17 Assessment of Rehabilitation Potential]	v1.1	18 December 2017
Research protocol or project proposal [Protocol Assessment of rehabilitation potential V3.1 02.10.2017]	V3.1	02 October 2017
Summary CV for Chief Investigator (CI) [Alison Cowley CV]	1.1	19 September 2017
Summary CV for student [Student CV]	1.1	19 September 2017
Summary CV for student [CV Cowley (CI and Student)]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Logan]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Goldberg]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Gordon]	1.1	19 September 2017

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research

Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document *"After ethical review – guidance for researchers"* gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at http://www.hra.nhs.uk/hra-training/

17/YH/0356	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely

pp

Dr Janet Holt
Chair

Email:nrescommittee.yorkandhumber-bradfordleeds@nhs.net

Enclosures: "After ethical review – guidance for

researchers" *[SL-AR2]*

Copy to: *Mrs Alison Cowley, University of Nottingham*
Dr Maria Koufali, Nottingham University Hospitals NHS Trust

Appendix B- Health Research Authority approval

Mrs Alison Cowley
Nursing Development, NUH NHS Trust
Derwent House, City Campus, Hucknall Road
Nottingham
NG5 1PB

Email: hra.approval@nhs.net

03 January 2018

Dear Mrs Cowley

Letter of HRA Approval

Study title:	**Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study.**
IRAS project ID:	**227288**
Protocol number:	**N/A**
REC reference:	**17/YH/0356**
Sponsor	**Nottingham University Hospitals NHS Trust**

I am pleased to confirm that **HRA Approval** has been given for the above referenced study, on the basis described in the application form, protocol, supporting documentation and any clarifications noted in this letter.

Participation of NHS Organisations in England

The sponsor should now provide a copy of this letter to all participating NHS organisations in England.

Appendix B provides important information for sponsors and participating NHS organisations in England for arranging and confirming capacity and capability. **Please read *Appendix B* carefully**, in particular the following sections:

- *Participating NHS organisations in England* – this clarifies the types of participating organisations in the study and whether or not all organisations will be undertaking the same activities
- *Confirmation of capacity and capability* - this confirms whether or not each type of participating NHS organisation in England is expected to give formal confirmation of capacity and capability. Where formal confirmation is not expected, the section also provides details on the time limit given to participating organisations to opt out of the study, or request additional time, before their participation is assumed.
- *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* - this provides detail on the form of agreement to be used in the study to confirm capacity and capability, where applicable.

Further information on funding, HR processes, and compliance with HRA criteria and standards is also provided.

It is critical that you involve both the research management function (e.g. R&D office) supporting each organisation and the local research team (where there is one) in setting up your study. Contact details and further information about working with the research management function for each organisation can be accessed from the HRA website.

Appendices

The HRA Approval letter contains the following appendices:

- A – List of documents reviewed during HRA assessment
- B – Summary of HRA assessment

After HRA Approval

The document *"After Ethical Review – guidance for sponsors and investigators"*, issued with your REC favourable opinion, gives detailed guidance on reporting expectations for studies, including:

- Registration of research
- Notifying amendments
- Notifying the end of the study

The HRA website also provides guidance on these topics, and is updated in the light of changes in reporting expectations or procedures.

In addition to the guidance in the above, please note the following:

- HRA Approval applies for the duration of your REC favourable opinion, unless otherwise notified in writing by the HRA.
- Substantial amendments should be submitted directly to the Research Ethics Committee, as detailed in the *After Ethical Review* document. Non-substantial amendments should be submitted for review by the HRA using the form provided on the HRA website, and emailed to hra.amendments@nhs.net.
- The HRA will categorise amendments (substantial and non-substantial) and issue confirmation of continued HRA Approval. Further details can be found on the HRA website.

Scope

HRA Approval provides an approval for research involving patients or staff in NHS organisations in England.

If your study involves NHS organisations in other countries in the UK, please contact the relevant national coordinating functions for support and advice. Further information can be found through IRAS.

If there are participating non-NHS organisations, local agreement should be obtained in accordance with the procedures of the local participating non-NHS organisation.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application

procedure. If you wish to make your views known please use the feedback form available on the HRA website.

HRA Training

We are pleased to welcome researchers and research management staff at our training days – see details on the HRA website.

Your IRAS project ID is **227288**. Please quote this on all correspondence.

Yours sincerely

Joanna Ho
Assessor

Email: hra.approval@nhs.net

Copy to: *Professor Philippa Logan, Academic Supervisor, University of Nottingham*
Dr Maria Koufali, Sponsor and Lead NHS R&D Contact, Nottingham University Hospitals NHS Trust

Appendix A - List of Documents

The final document set assessed and approved by HRA Approval is listed below.

Document	*Version*	*Date*
Copies of advertisement materials for research participants [Focus group recruitment poster V2.1 18.09.2017 assessment of rehabilitation potential]	V2.1	18 September 2017
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IRAS Application Form [IRAS_Form_04102017]		04 October 2017
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IRAS Checklist XML [Checklist_19122017]		19 December 2017
Letter from funder		23 December 2016
Non-validated questionnaire [Feasibility Study staff participant demographics sheet V1,1 17/08/2017 assessment of rehabilitation potential]	V1.1	17 August 2017
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Participant consent form [Feasibility Study Staff Participant Consent Form v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant consent form [Feasibility Study Consultee Declaration form v3.1 12.12.17 assessment of rehabilitation potential]	v3.1	12 December 2017
Participant information sheet (PIS) [Feasibility Study Consultee Information Sheet v1.1 18.12.17 Assessment of Rehabilitation Potential]	v1.1	18 December 2017
Participant information sheet (PIS) [Feasibility Study Consultee	v1.1	18 December 2017

Summary Information Sheet v1.1 18.12.17 Assessment of Rehabilitation Potential]		
Participant information sheet (PIS) [Feasibility study patient summary participant information sheet assessment of rehabilitation potential v2.1 19.9.17]	v2.1	19 September 2017
Participant information sheet (PIS) [Feasibility study staff participant information sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Feasibility study patient participant informaion sheet V2.1 15.08.2017 assessment of rehabilitation potential]	V2.1	15 August 2017
Participant information sheet (PIS) [Feasibility study patient participant summary information sheet V2.1 19.09.2017 assessment of rehabilitation potential]	V2.1	19 September 2017
Participant information sheet (PIS) [Focus group professional participant information sheet v3.1 13.12.17 Assessment of rehabilitation potential]	v3.1	13 December 2017
Participant information sheet (PIS) [Focus Group Member of Public Participant Information Sheet v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Participant information sheet (PIS) [Delphi Participant Information Sheet v3.1 12.12.17 assessment of rehabilitation potential]	v3.1	12 December 2017
Participant information sheet (PIS) [Feasibility Study Staff Participant Information Sheet v3.1 13.12.17 Assessment of Rehabilitation Potential]	v3.1	13 December 2017
Research protocol or project proposal [Protocol Assessment of rehabilitation potential V3.1 02.10.2017]	V3.1	02 October 2017
Summary CV for Chief Investigator (CI) [Alison Cowley CV]	1.1	19 September 2017
Summary CV for student [CV Cowley (CI and Student)]	1.1	19 September 2017
Summary CV for student [Student CV]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Logan]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Goldberg]	1.1	19 September 2017
Summary CV for supervisor (student research) [Supervisor CV Gordon]	1.1	19 September 2017

IRAS project ID	227288

Appendix B - Summary of HRA Assessment

This appendix provides assurance to you, the sponsor and the NHS in England that the study, as reviewed for HRA Approval, is compliant with relevant standards. It also provides information and clarification, where appropriate, to participating NHS organisations in England to assist in assessing and arranging capacity and capability.

For information on how the sponsor should be working with participating NHS organisations in England, please refer to the, *participating NHS organisations, capacity and capability* and *Allocation of responsibilities and rights are agreed and documented (4.1 of HRA assessment criteria)* sections in this appendix.

The following person is the sponsor contact for the purpose of addressing participating organisation questions relating to the study:

Name: Mrs Alison Cowley
Tel: 07812 067 009
Email: alison.cowley@nottingham.ac.uk

HRA assessment criteria

Section	HRA Assessment Criteria	Compliant with Standards	Comments
1.1	IRAS application completed correctly	Yes	No comments
2.1	Participant information/consent documents and consent process	Yes	No comments
3.1	Protocol assessment	Yes	No comments
4.1	Allocation of responsibilities and rights are agreed and documented	Yes	This is a single centre study where the participating NHS organisation is also the study sponsor. No study agreements are expected for this study.
4.2	Insurance/indemnity arrangements assessed	Yes	This study is sponsored by an NHS organisation; NHS indemnity applies to the management, design and conduct of the study.

Section	HRA Assessment Criteria	Compliant with Standards	Comments
			Where applicable, independent contractors (e.g. General Practitioners) should ensure that the professional indemnity provided by their medical defence organisation covers the activities expected of them for this research study
4.3	Financial arrangements assessed	Yes	Funding has been secured from NIHR for this study.
5.1	Compliance with the Data Protection Act and data security issues assessed	Yes	No comments
5.2	CTIMPS – Arrangements for compliance with the Clinical Trials Regulations assessed	Not Applicable	No comments
5.3	Compliance with any applicable laws or regulations	Yes	No comments
6.1	NHS Research Ethics Committee favourable opinion received for applicable studies	Yes	REC Provisional Opinion issued 01 December 2017; REC Favourable Opinion issued 03 January 2018
6.2	CTIMPS – Clinical Trials Authorisation (CTA) letter received	Not Applicable	No comments
6.3	Devices – MHRA notice of no objection received	Not Applicable	No comments
6.4	Other regulatory approvals and authorisations received	Not Applicable	No comments

Participating NHS Organisations in England

This provides detail on the types of participating NHS organisations in the study and a statement as to whether the activities at all organisations are the same or different.
This is a single centre study where the only participating NHS organisation will undertake all research activities as described in the application. There is therefore only one site-type in this study. If this study is subsequently extended to other NHS organisation(s) in England, an amendment should be submitted to the HRA, with a Statement of Activities and Schedule of Events for the newly participating NHS organisation(s) in England. The Chief Investigator or sponsor should share relevant study documents with participating NHS organisations in England in order to put arrangements in place to deliver the study. The documents should be sent to both the local study team, where applicable, and the office providing the research management function at the participating organisation. For NIHR CRN Portfolio studies, the Local LCRN contact should also be copied into this correspondence. For further guidance on working with participating NHS organisations please see the HRA website. If chief investigators, sponsors or principal investigators are asked to complete site level forms for participating NHS organisations in England which are not provided in IRAS or on the HRA website, the chief investigator, sponsor or principal investigator should notify the HRA immediately at hra.approval@nhs.net. The HRA will work with these organisations to achieve a consistent approach to information provision.

Confirmation of Capacity and Capability

This describes whether formal confirmation of capacity and capability is expected from participating NHS organisations in England.
This is a single site study sponsored by the site. The R&D office will confirm to the CI when the study can start.

Principal Investigator Suitability

This confirms whether the sponsor position on whether a PI, LC or neither should be in place is correct for each type of participating NHS organisation in England and the minimum expectations for education, training and experience that PIs should meet (where applicable).
A Principal Investigator should be in place at each participating NHS organisation. GCP training is not a generic training expectation, in line with the HRA/MHRA statement on training expectations.

IRAS project ID	227288

HR Good Practice Resource Pack Expectations

This confirms the HR Good Practice Resource Pack expectations for the study and the pre-engagement checks that should and should not be undertaken
Local staff substantively employed by the participating NHS organisation will be undertaking research activities as described in the IRAS application. No HR access arrangements are therefore expected for this study.

Other Information to Aid Study Set-up

This details any other information that may be helpful to sponsors and participating NHS organisations in England to aid study set-up.
The applicant has indicated that they do not intend to apply for inclusion on the NIHR CRN Portfolio.

Appendix C- Data extraction form

Authors.....Year.....

Title.....

Journal.....Reviewer.....

Study setting.....Country.....

Study type..... Sample size.....

Patient group.....

Participants.....

Analysis.....

Results/Findings.....
.....
.....

Definition of rehabilitation potential (RP) or similar descriptor.....
.....
.....

Clinical tools used to assess (RP).....
.....

Domains assessed.....

Who completed assessment?.....

When is assessment completed?.....

Where is assessment completed?.....

What outcome measures are used?.....
.....
.....

What decision making frameworks are used?.....
.....

What is success?.....
.....

Factors influencing RP assessment.....
.....
.....

Comments on quality and biases.....
.....
.....

Appendix D – Example of search terms from CINAHL Plus full text (EBSCO)

Wednesday, October 04, 2017 6:19:59 AM

#	Query	Limiters/Expanders	Last Run Via	Results
S15	((("rehabilitation potential") AND (S1 AND S11)) AND (S2 AND S11)) AND (S1 AND S11)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	0
S14	(("rehabilitation potential") AND (S1 AND S11)) AND (S2 AND S11)	Search modes - SmartText Searching	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	9,518
S13	(("rehabilitation potential") AND (S1 AND S11)) AND (S2 AND S11)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	0
S12	("rehabilitation potential") AND (S1 AND S11)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	39
S11	"rehabilitation potential"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	111
S10	((((MH "Decision Making, Clinical") OR (MH "Decision Making")) AND (S1 AND S7)) AND (S1 AND S2 AND S7)) AND (S1 AND S3 AND S7)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1
S9	(((MH "Decision Making, Clinical") OR (MH "Decision Making")) AND (S1 AND S7)) AND (S1 AND S2 AND S7)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	22
S8	((MH "Decision Making, Clinical") OR (MH "Decision Making")) AND (S1 AND S7)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	6,675
S7	(MH "Decision Making, Clinical") OR (MH "Decision Making")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	57,157
S6	(S2 AND S3) AND (S1 AND S2)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	30
S5	S2 AND S3	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	36
S4	((MH "Geriatric Functional Assessment") OR (MH "Geriatric Assessment")) AND (S1 AND S2 AND S3)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	30
S3	(MH "Geriatric Functional Assessment") OR (MH "Geriatric Assessment")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	13,358
S2	(MH "Rehabilitation")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	15,252
S1	(MH "Frail Elderly") OR (MH "Aged")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	604,952

Appendix E – Focus group schedule

Schedule

1. Can I start by asking what you understand by the term rehabilitation potential? (in relation to older people living with frailty)
    a. Prompt- can you put into words your understanding on rehabilitation potential? Cooperation, improvement, capacity, function, goals, carry over, participation.
    b. Prompt - What factors affect how you assess this?
    c. Prompt - What about no rehabilitation potential?
2. How do you assess rehabilitation potential?
    a. As an individual clinician
    b. As part of a team (CGA)
    c. Prompt – what impact does frailty, dementia, motivation, cooperation, environment, medical conditions, social, psychological, ADL, mood, MH
3. What types of formal assessment tools do you use or have you seen used?
    a. Prompt –Barthel, outcome measures, CGA
4. What types of decision-making tools do you use?
    a. Prompt – are you aware of any decision-making tools or outcome measures which guide your thinking? Biopsychosocial approach, clinical judgement.
5. What is a good outcome of rehabilitation?
    a. For a patient
    b. For a carer/caregiver
    c. For a clinician
    d. For a commissioner
    e. How do you know if you have achieved it?
    f. How do you measure improvement? Prompt – maintain, restore, improve, regain, support decline
6. How is it explained to patients and their families that they are not suitable for rehabilitation? What was this experience like?
    a. Prompt = where, when, how, who?
    b. What impact do you think the label has on individuals/family members/carers?
7. When do you think rehabilitation is not appropriate?
    a. Prompt – comorbidities/multiple medical conditions, cognitive impairment, dementia, medically unwell
8. What impact do you think environment, i.e. where you complete the assessment, has on assessing rehabilitation potential?
9. Are there any other factors that impact on rehabilitation potential you wish to discuss?
    a. Prompt – staffing levels, service provision, staff skills and training, patient/carer preference, reduced length of stay, finance?

That concludes the focus group. Thank you for agreeing to take part in this session.

Appendix F – Focus group recruitment poster



Appendix G – Focus group professional participant information sheet

Nottingham University Hospitals NHS Trust

Focus Group Participant Information Sheet – Professional participants
Version: 3.1 Date: 13/12/2017
Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

PART 1

1. Invitation
You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish.

PART 1 tells you the purpose of this study and what will happen to you if you take part.
PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?
The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.
The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in older people living in the hospital setting.

This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham.

3. Why have I been chosen?
You are being invited to take part because you have either experience of assessing older people with complex needs for rehabilitation, delivering or commissioning programmes of rehabilitation. We are inviting six participants to take part in the focus groups.

4. Do I have to take part?
No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form to confirm that you understand what is involved when taking part in this study. If you decide to take part you are free to leave the study at any time and without giving a reason. If you withdraw, unless

you object, we will still keep records relating to the study, as this is valuable to the study findings.

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will either meet with you or telephone you to answer any questions you may have and to find out your availability.

The study will involve you taking part in a one off meeting called a focus group. The group is an informal meeting with participants talking to each other and to the researcher about their experiences of rehabilitation.

On the day of the focus group you will also be asked to read and complete a consent form. Before the discussion you will have the opportunity to get to know the other participants where refreshments will be provided. The facilitator will run through group discussion guidelines which have been developed by the study group and a member of the public.

There will be two researchers present and between six and eight other participants which may include members of the public, patients, carers, health care professionals and health service managers. The focus group will last for one to two hours. The focus groups will be audio-taped. It will be held in a venue outside of NHS premises to allow all participants to feel comfortable and at ease.

6. What do I have to do?

You will take part in a group discussion about rehabilitation for older people living with frailty which will draw on your experiences, beliefs and thoughts about how people are assessed for rehabilitation programmes and what makes a 'good outcome'.

7. What are the possible disadvantages and risks of taking part?

During the focus group discussion it is possible that you may hear or be involved in sensitive or difficult conversations relating to rehabilitation for older people living with frailty. Participants will be offered support after the focus group which may include accessing local patient advice and liaison services and the NHS Employee Assistance Helpline. Participants are also reminded that any topics raised in the discussion are confidential and not to be discussed or shared with others outside the group setting.

If you have difficulties with communication, cognition or do not wish to take part in group discussions for other reasons, then you can request an individual one-to-one interview with a member of the research team.

8. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better understanding what is meant by the clinical term rehabilitation potential, how it assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty.

9. Expenses and reimbursement?

You will not be paid for taking part in this study. Refreshments will be provided. If you have any specific dietary needs please make a member of the study team aware.

10. What happens when the research study stops?

Once you have taken part in the focus groups nothing else will be expected of you. A report of the study will be freely available if you request a copy.

11. What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study. In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

12. Will my taking part in this study be kept confidential?

Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

13. Contact Details

Chief Investigator

Name: Alison Cowley Tel. Number: 0115 9691169 extension 56629 or 0115 8230231

Study Team

Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

14. What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason. We will use the data collected up to your withdrawal unless you specify otherwise.

15. Will my part in this study be kept confidential?

If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your records will be available to people authorised to work on the study but may also need to be made available to people authorised by the Research

Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. A copy of your consent form may be sent to the Research Sponsor during the course of the study. By signing the consent form you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from the study, unless you object, your data will remain on file and will be included in the final study analysis.

In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

16. What will happen to the results of this study?
The results of the study will be available after it finishes and will usually be published in a clinical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. Anonymised quotes will be used but none of the participants involved in the study will be identified in any report or publication.

17. Who is organising and funding this clinical study?
The Nottingham University Hospitals NHS Trust will act a sponsor the research. Health Education England and National Institute of Health Research will fund the research.

18. Who has reviewed the study?
All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber - Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust. The study has also been reviewed by the National Institute of Health Research.

19. Contact for further information
You are encouraged to ask any questions you wish, before, during or after you take part in the focus group discussion. If you have any questions about the study, please talk to a member of the study team who will be able to provide you with any information you need. If you wish to read the research on which this study is based, please ask a member of the study team. If you require any further information or have any concerns while taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please read and sign the consent form. You will be given a copy of this information sheet and the consent form to keep. A copy of the consent form will be filed in your

patient notes, one will be filed with the study records and one may be sent to the Research Sponsor. You can have more time to think this over if you are at all unsure.

Thank you for taking the time to read this information sheet and considering taking part in this study.

Appendix H – Focus group member of the public participant information sheet

Nottingham University Hospitals NHS
NHS Trust

Focus Group Participant Information Sheet – member of public
Version: 3.1 Date: 13/12/2017
Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

PART 1

1. Invitation

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish.

PART 1 tells you the purpose of this study and what will happen to you if you take part.
PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?

The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.
The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in older people living in the hospital setting.

This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham.

3. Why have I been chosen?

You are being invited to take part because you have either experience of receiving or caring for someone who has received a rehabilitation assessment or taken part in a rehabilitation programme. We are inviting six participants to take part in the focus groups.

4. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form to confirm that you understand what is involved when taking part in this study. If you decide to take part you are free to leave the study at any time and without giving a reason. If you withdraw, unless

you object, we will still keep records relating to the study, as this is valuable to the study findings.

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will either meet with you or telephone you to answer any questions you may have and to find out your availability.

The study will involve you taking part in a one off meeting called a focus group. The group is an informal meeting with participants talking to each other and to the researcher about their experiences of rehabilitation.

On the day of the focus group you will also be asked to read and complete a consent form. Before the discussion you will have the opportunity to get to know the other participants where refreshments will be provided. The facilitator will run through group discussion guidelines which have been developed by the study group and a member of the public.

There will be two researchers present and between six and eight other participants which may include members of the public, patients, carers, health care professionals and health service managers. The focus group will last for one to two hours. The focus groups will be audio-taped. It will be held in a venue outside of NHS premises to allow all participants to feel comfortable and at ease.

6. What do I have to do?

You will take part in a group discussion about rehabilitation for older people living with frailty which will draw on your experiences, beliefs and thoughts about how people are assessed for rehabilitation programmes and what makes a 'good outcome'.

7. What are the possible disadvantages and risks of taking part?

During the focus group discussion it is possible that you may hear or be involved in sensitive or difficult conversations relating to rehabilitation for older people living with frailty. Participants will be offered support after the focus group which may include accessing local patient advice and liaison services and the NHS Employee Assistance Helpline. Participants are also reminded that any topics raised in the discussion are confidential and not to be discussed or shared with others outside the group setting.

If you have difficulties with communication, cognition or do not wish to take part in group discussions for other reasons, then you can request an individual one-to-one interview with a member of the research team.

8. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better understanding what is meant by the clinical term rehabilitation potential, how it assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty.

9. Expenses and reimbursements?

For participating in this one-off event we would like to provide you with a gift of £40 as a thank you and a contribution of £12 towards your travel expenses. If this is the first gift you have received from NUH this financial year your state benefits should not be affected. If you have any queries you are advised to either contact the citizens advice bureau or INVOLVE (http://www.invo.org.uk/about-involve/) on 0238059 5628.

10. What happens when the research study stops?
Once you have taken part in the focus groups nothing else will be expected of you. A report of the study will be freely available if you request a copy.

11. What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study.

In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

12. Will my taking part in this study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

13. Contact Details
Chief Investigator
Name: Alison Cowley Tel. Number: 0115 9691169 extension 56629 or 0115 8230029
Study Team
Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

14. What will happen if I don't want to carry on with the study?
Your participation is voluntary and you are free to withdraw at any time, without giving any reason. We will use the data collected up to your withdrawal unless you specify otherwise.

15. Will my part in this study be kept confidential?
If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your study data will be available to people authorised to work on the study but may also need to be made available to people authorised by the Research Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. A copy of your consent form may be sent to the Research Sponsor during the course of the study. By signing the consent form you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from the study, unless you object, your data will remain on file and will be included in the final study analysis.

In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

16. What will happen to the results of this study?
The results of the study will be available after it finishes and will usually be published in a clinical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. Anonymised quotes will be used but none of the participants involved in the study will be identified in any report or publication.

17. Who is organising and funding this study?
The Nottingham University Hospitals NHS Trust will act a sponsor the research. Health Education England and National Institute of Health Research will fund the research.

18. Who has reviewed the study?
All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber – Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust. The study has also been reviewed by the National Institute of Health Research.

19. Contact for further information
You are encouraged to ask any questions you wish, before, during or after you take part in the focus group discussion. If you have any questions about the study, please speak a member of the study team who will provide you with any information you need. If you wish to read the research on which this study is based, please ask a member of the study team. If you require any further information or have any concerns while taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please read and sign the consent form. You will be given a copy of this information sheet and the

consent form to keep. A copy of the consent form will be filed in your patient notes, one will be filed with the study records and one may be sent to the Research Sponsor. You can have more time to think this over if you are at all unsure.

Thank you for taking the time to read this information sheet and for considering taking part in this study.

Appendix I – Focus group consent form

Nottingham University Hospitals NHS
NHS Trust

Focus Group Participant Consent Form

Version: 3.1 Date: 13/12/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

Participant Study ID: ..... Initials: .....

Participant initial each box

1. I confirm that I have read and understand the information sheet dated 13/12/2017 (version 3-1) for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without my medical care or legal rights being affected. ☐
3. I understand that my study documents may be looked at by authorised individuals from the Sponsor for the study and the UK Regulatory Authority in order to check that the study is being carried out correctly. ☐
4. I understand that the focus group will be audio-recorded. ☐
5. I understand that even if I withdraw from the above study, the data collected from me will be used in analysing the results of the study, unless I specifically withdraw consent for this. ☐
6. I consent to the storage including electronic, of personal information for the purposes of this study. I understand that any information that could identify me will be kept strictly confidential and that no personal information will be included in the study report or other publication. ☐
7. I understand that anonymized quotes from the focus group will be included in reports, publications and a thesis. ☐
8. I agree to take part in the study. ☐

Name of the participant *(Print)*	date	Participants' signature
Name of person taking consent *(Print)*	date	Signature

Assessment of Rehabilitation Potential Focus Group Consent Form V 3.1 13/12/2017
IRAS: 227228 Sponsor: 17HC002

Appendix J – Example of focus group coding matrix

	Theme	Sub theme	Sub theme	Sub theme	Sub theme	Code	Code	Theme	Sub theme	Sub theme	Sub theme	Sub theme
Theme	**1. What is rehabilitation potential?**	**1. 1. Past, present and prediction of the future**	**1. 2. Improve, regain, maintain or manage decline**	**1. 3. Function, quality of life, social participation**	**1. 4. Patient level characteristics**	**1.4.1 Motivation**	**1.4.2 Participation**	**2. When is it measured**	**2.1 Timing of assessment in disease trajectory**	**2.2 Adequate time for the assessment to happen**	**2.3 Iterative assessment**	**2.4 Things change**
Description	This theme considers the definition of rehabilitation potential and its constitutes, directly assessing the research	Describes how clinicians must access 'unseen' past information, combine this with current presenting condition identified during clinical assessment and to therefore make	describes the aim of rehabilitation and how this links to patient level goals or service structures. Rehab has traditionally been delivered around the notion	should rehabilitation focus on improving function, social participation, quality of life or all. There is variance here	this sub-theme describes key attributes which clinicians report affect an individuals ability to benefit from rehabilitation	is the individual motivated to take part in the assessment and rehabilitation programme. Measured, observed or predicted	does the individual want to take part in the assessment and rehabilitation programme. Measured, observed or predicted	this theme describes the timing of the assessment and what impact that has on the decision that an individual does or does not have	consider when the assessment happens, at presentation in hospital, whilst still being actively treated or during recovery	`	Assessments in order to be holistic and 'accurate' need to be iterative, i.e. they are completed over a period of time	That an assessment is time specific and may relate to short term or longer term needs and wants'. 'When is the time to
Physio one	x	Getting back to normal knowledge of disease trajectory/acute illness. How you were before, more art than science. What you are seeing, what patient/family tells you. Previous level of motivation, what willing to accept as change of narrowing horizons. planning for future	improve and adapt to changes associated with frailty, "I think to live with false hope is wrong and as bad to live with no hope"	making the best of what you have	want to be viewed as an equal partner and balance between hope and motivation	how hospital environment is set up and clinicians interact with patient can affect their ability to motivate and get up and go	"you are endue your care and your going to do what we tell you" choosing to participate versus being made to participate	x	IS it the impact of the acute event of an underlying condition that has meant things have changed? "the ceiling of what they can achieve just becomes a bit lower in terms of what they can do" "in frailty it's not helpful if people keep referring them and they keep treating them as if they are going to get back to this goal"	x	need ongoing relationship and conversation, especially when it comes to stopping withdrawing from rehab. Hard to have this in hospital, easier in community	see a different person when in home or hospital, they change and you need this relationship to discuss and see changes and plan for the future
Physio Two	x	might not be feasible to get back to and how do you know what they were really doing? (in care home for 2 weeks v 2 years) "its only someone digging deeper that you find out" detective like. Continuity of care if you already knew them.	x	x	x	factors which might prevent people from being motivated and how this is perceive by clinician and family members "are they being lazy?"	using all available information to see if person is participating over 4 hour period and from other MDT	x	belief that early intervention would have stopped the decline	x	x	you can see change with goal setting as iterative process

Appendix K – Focus groups research journal

Focus group three – Research diary

- Was sadly lacking in confirmation emails for this session so was worried how many would actually turn up, but four came which was great and enough for an indepth discussion.
- I picked up Margaret and we made it to Leicester in plenty of time for the meeting. Had a good quiet room at the university which was ideal for a focus group.
- Initially the group discussion took a while to get going as almost had the feeling that people were sussing things out but within 10 minutes they took control and the discussion began to flow. This time there was clearly a difference of opinions and approaches between those in acute care and those in social care. They expressed different ways of understanding quality, good outcomes and how to gain this.
- More discussion around social, psychological and mental health factors plus the whole agenda of Reablement and that improvement might not be the main stay of rehab models for frailty.
- Polarizing views were expressed but had the feeling that one member of the group held back from more of her extreme views as didn't want to rock the boat.
- Lots of talk about carer and family involvement and challenges of addressing needs.
- All questions were covered and maybe the order I have put them in didn't flow as well but the group followed a more organic process as I fed a few additional questions, sought clarification of points. It felt like some people were really trying to seek my views and I really had to hold my tongue, not nod in encouragement or dispute some of the more controversial things that were said.
- Discussions ended well and Margaret had an additional question which again were very insightful.
- After the tape stopped people were really interested in what I thought about the topic and how the findings would be disseminated and shared with them.

Emerging themes and codes

- Broader definition of rehab/reablement
- Might not be looking for functional improvement but quality of life and improved social interaction
- Environment is key factor, again accepting that hospital is an artificial environment when you assess what someone can do in constraints and they might not have permission to be independent or feel well enough. Giving up control of their life and decisions
- Frustration and guilt about not giving people enough time and input recognising that therapy can't do it all and is 24 hours, training needed for home care staff and for people to take responsibility for their own care/ life
- Motivation, participation, lots on goal setting and measurement with use of individualised and tailored use of assessment measures.
- Challenges of bed pressures, make decisions quickly and need to manage expectations early in the process. Effective use of resources. How do we allocate scare resources and place value on how to allocate to and how pressing this is in the last 1000 days

Appendix L – Delphi round one and two questionnaire

Rehabilitation Potential - Delphi Questionnaire Round One

0% complete

Page 1: Introduction

Thank you for agreeing to take part in this questionnaire. The purpose of this Delphi questionnaire is to seek Physiotherapists and Occupational Therapists thoughts and comments on a tool which supports clinical decision making in assessing rehabilitation potential in older people living with frailty. The tool has been developed from existing and new evidence and is designed for use in the hospital setting.

Rehabilitation potential is a process which involves complex clinical judgement and prognosis of the projected benefits of undertaking a targeted programme of rehabilitation. It involves developing an understanding of who will participate with rehabilitation in and outside the therapy setting, who can support this, who is likely to benefit and the availability of services. The assessment should take into account physical and psychological factors identified during multi-disciplinary assessments, along with individual patients' needs and wants and the availability of family support.

Next >

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Rehabilitation Potential - Delphi Questionnaire Round One

4% complete

Page 2: Instructions

We would like you to consider the importance of the following 18 statements when assessing whether a patient has rehabilitation potential. Below each statement is an explanation. These explanations will be included in the subsequent training pack for the tool which will be developed from this Delphi.

You will be asked to rate each statement with a 5 point scale, where **5 = strongly agree** to **1= strongly disagree.** There is additional space below each question for you to justify your responses or seek clarification on uncertain statements.

The questionnaire concludes with seven questions about your clinical experience.

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Rehabilitation Potential - Delphi Questionnaire Round One

9% complete

Page 3: Question 1

This part of the survey uses a table of questions, view as separate questions instead?

1. **An assessment of rehabilitation potential should consider any underlying physical issues which may affect or interfere with rehabilitation.** *Consider the impact that any underlying physical issues, symptoms or medical conditions might have on a patient's ability to benefit from or participate in rehabilitation. Are these being actively managed? Are they stable or unstable? Are they reversible or irreversible? Are you able to predict their trajectory? This may include conditions or symptoms. For example; poor nutritional status, pain or heart failure, co-morbidities.* * *Required*

More info

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider any underlying physical issues which may affect or interfere with rehabilitation	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

13% complete

Page 4: Question 2

This part of the survey uses a table of questions, view as separate questions instead?

2. **An assessment of rehabilitation potential should consider any unresolved physical issues which may affect or interfere with rehabilitation.** *Consider the impact that any physical issues or symptoms, medical conditions or acute events might have on a patient's ability to benefit from or participate in rehabilitation. Are these being actively managed? Are they stable or unstable? Are they reversible or irreversible? Are you able to predict their trajectory? For example; ongoing treatment for an infection, planned surgery, or pain.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider any unresolved physical issues which may affect or interfere with rehabilitation.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

18% complete

Page 5: Question 3

This part of the survey uses a table of questions, view as separate questions instead?

3. **An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation.** *Are these new or ongoing issues? What management strategies have or could be put in place to enable a patient to receive or benefit from rehabilitation? For example; anti-depressant medications for low mood, memory issues and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by their acute illness, underlying conditions or the hospital environment.* * Required

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

22% complete

Page 6: Question 4

This part of the survey uses a table of questions, view as separate questions instead?

4. **An assessment of rehabilitation potential should consider unresolved psychological issues which may affect a patient's motivation or participation with rehabilitation.** *Are these new or ongoing issues? What management strategies have or could be put in place to enable a patient to receive or benefit from rehabilitation? For example; identification and management of delirium.* * Required

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree not Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider unresolved psychological issues which may affect a patient's motivation or participation with rehabilitation.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

27% complete

Page 7: Question 5

This part of the survey uses a table of questions, view as separate questions instead?

5. **An assessment of rehabilitation potential should consider if the patient has been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care.** *During the assessment, rehabilitation programme or routine care, has the patient been able to participate? Do they require verbal or non-verbal prompts? Is their participation consistent or does it fluctuate? Do they take an interest in the assessment or rehabilitation? Motivation and participation may fluctuate and differ once the patient has recovered from an acute illness or returns to their usual place of residence, so consider if the assessment needs to be repeated at a later date. If they have previously been in receipt of rehabilitation then consider contacting community services to determine previous rehabilitation response and/or participation.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider if the patient has been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

Rehabilitation Potential - Delphi Questionnaire Round One

31% complete

Page 8: Question 6

This part of the survey uses a table of questions, view as separate questions instead?

6. **An assessment of rehabilitation potential should consider if the patient will be supported in their activities of daily living in their usual place of residence**. *Consider if the patient requires support to complete activities of daily living or social interactions and if the support is currently available or planned. This may include family members, carers, community teams or the voluntary sector.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider if the patient will be supported in their activities of daily living in their usual place of residence.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

36% complete

Page 9: Question 7

This part of the survey uses a table of questions, view as separate questions instead?

7. **An assessment of rehabilitation potential should consider if the patient will be supported to continue rehabilitation outside the therapy setting in their usual place of residence.** *For patients who may lack capacity, have cognitive issues or are found to currently have low levels of motivation, are they likely to continue with rehabilitation outside formal therapy sessions. Will they have support to enable this? For example; spouse, family members, carers, community teams or the voluntary sector.* * Required

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider if the patient will be supported to continue rehabilitation outside the therapy setting in their usual place of residence.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

40% complete

Page 10: Question 8

This part of the survey uses a table of questions, view as separate questions instead?

8. **An assessment of rehabilitation potential should consider a patients current functional abilities and levels of independence**. *Consider what the patient is currently able to do in the hospital setting. This may include transfers, mobility, self-care activities. When assessing for current abilities be aware of the limitations which the hospital environment, their underlying conditions or acute event may have on the patient. For example; reduced mobility or exercise tolerance due to admission.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider a patients current functional abilities and levels of independence.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

45% complete

Page 11: Question 9

This part of the survey uses a table of questions, view as separate questions instead?

9. ***An assessment of rehabilitation potential should consider a patients pre-morbid (pre-admission) functional abilities and level of independence.*** What was the patient's previous level of functional abilities? Consider asking about their pre-morbid abilities in the last days, weeks or months prior to hospital admission. Supplement this with information from family members, carers and community service providers. * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider a patients pre-morbid (pre-admission) functional abilities and level of independence.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

50% complete

Page 12: Question 10

This part of the survey uses a table of questions, view as separate questions instead?

10. **An assessment of rehabilitation should include a thorough understanding of the patients environment in their usual place of residence**. *What type of accommodation do they usually reside in? Consider existing aids, adaptations, access and what the patient needs to be able to do to return there.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation should include a thorough understanding of the patient's environment in their usual place of residence	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

54% complete

Page 13: Question 11

This part of the survey uses a table of questions, view as separate questions instead?

11. **An assessment of rehabilitation should include a thorough understanding of the patient's environment at their next destination.** *If you are considering referral to inpatient or community residential rehabilitation ensure that you have a good understanding of this environment and its suitability for the patient.*

* *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation should include a thorough understanding of the patient's environment at their next destination.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

59% complete

Page 14: Question 12

This part of the survey uses a table of questions. view as separate questions instead?

12. **An assessment of rehabilitation potential should include what support the patient requires to make decisions about their future.** *Does the patient have capacity and/or insight to make decisions about their future needs, care and rehabilitation choices? Is an assessment of Mental Capacity required? Who is able to support the patient in this process; family, carers, GP?* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should include what support the patient requires to make decisions about their future.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

63% complete

Page 15: Question 13

This part of the survey uses a table of questions, view as separate questions instead?

13. **An assessment of rehabilitation potential should include asking the patient what is important to them.** *Ask the patient what is important to them to establish what they want to achieve or value. In the hospital setting this may include returning to their usual place of residence, personal relationships or activities of daily living. If a patient lacks capacity or has difficulties with cognitive function, family and friends may be able to provide additional information.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should include asking the patient what is important to them.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

68% complete

Page 16: Question 14

This part of the survey uses a table of questions, view as separate questions instead?

14. **An assessment of rehabilitation potential should include setting and agreeing on short-term, medium-term and long-term goals**. *Goals which are Specific Measureable Achievable Realistic and Timed (SMART) should be discussed and agreed with the individual based on what is important to them. Short-term goals may include leaving hospital care. Medium-term; independence with mobility, self-care. Long-term; outdoor mobility, social interactions. Be aware that goals set in the hospital may change once the patient has been transferred or returns to their usual place of residence. Goals should focus on the patient and not what the therapist wants them to achieve.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should include setting and agreeing on short-term, medium-term and long-term goals.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

72% complete

Page 17: Question 15

This part of the survey uses a table of questions, view as separate questions instead?

15. **An assessment of rehabilitation potential should incorporate findings from the multi-disciplinary team.** *Incorporate assessment findings from other members of the multi-disciplinary team. Has the decision that someone does or does not have rehabilitation potential been discussed with members of the team? Use verbal or written information to build up a picture of the patient's needs, wants and abilities. For example; nurses, doctors, social workers, psychologists, family, friends and carers. Community based staff such as social care support workers, community therapists and GP's should be consulted.* * Required

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should incorporate findings from the multi-disciplinary team.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback on the above question

< Previous Next >

Rehabilitation Potential - Delphi Questionnaire Round One

77% complete

Page 18: Question 16

This part of the survey uses a table of questions, view as separate questions instead?

16. **An assessment of rehabilitation potential should be carried out over multiple time points.** *A patient's needs and abilities should be assessed more than once. This may either be through direct assessment, observation or other team member's assessments. If you are unable to establish this in the hospital setting consider referring for a community follow up assessment.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should be carried out over multiple time points.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback on the above question

‹ Previous Next ›

Rehabilitation Potential - Delphi Questionnaire Round One

81% complete

Page 19: Question 17

This part of the survey uses a table of questions, view as separate questions instead?

17. **An assessment of rehabilitation potential should consider the availability of services to provide the rehabilitation needed by the patient. Consider the type, dose, intensity, location, referral criteria and speed of referral.** *What type of rehabilitation programme does the patient need to meet their goals? Consider location, intensity, types of rehabilitation offered and the skills staff need to support the individual. If there is a pressing need to transfer the patient out of the hospital setting, ensure that plans for future rehabilitation are established or liaise with community based providers for reassessment or review.* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider the availability of services to provide the rehabilitation needed by the patient. Consider the type, dose, intensity, location, referral criteria and speed of referral.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback on the above question.

Rehabilitation Potential - Delphi Questionnaire Round One

86% complete

Page 20: Question 18

This part of the survey uses a table of questions, view as separate questions instead?

18. **An assessment of rehabilitation potential should consider if the proposed rehabilitation programme is likely to be effective.** *Consider if the proposed rehabilitation programme is likely to work taking into account a patient's likely response and predicted benefit. Do you have a good understanding of the evidence base on the effectiveness of rehabilitation in this patient population? Are you able to predict the patient's likely response from rehabilitation?* * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of rehabilitation potential should consider if the proposed rehabilitation programme is likely to be effective.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback on the above question.

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Rehabilitation Potential - Delphi Questionnaire Round One

90% complete

Page 21: Information about your clinical experience

19. **Your name. (This information will only be available to the study team and will not be shared with other participants.)** *Required

20. **What is your contact email address?** (This information will only be available to the study team and will not be shared with other participants.) *Required

21. Gender *Required

- Female
- Male
- Prefer not to say

22. Which country do you currently work in? *Required

23. What is your profession? * *Required*

- ○ Occupational Therapist
- ○ Physiotherapist
- ○ Other

a. If you selected Other, please specify:

24. Please indicate which setting best describes where you currently work * *Required*

- ☐ Acute hospital
- ☐ In-patient rehabilitation
- ☐ Community based
- ☐ University
- ☐ Other

a. If you selected Other, please specify:

25. How long, in years, have you been a qualified health professional? * *Required*

Please enter a whole number (integer).

26. How many year's experience do you have in geriatrics or geriatric rehabilitation? * *Required*

Please enter a whole number (integer).

27. What is your highest professional qualification? (Degree, masters, PhD) * *Required*

Please enter a response that only contains letters.

Rehabilitation Potential - Delphi Questionnaire Round One

95% complete

Page 22: Additional Comments

28. Do you have any additional comments or feedback on rehabilitation potential in frail older people?

< Previous

Finish ✔

Rehabilitation Potential - Delphi Questionnaire Round One

100% complete

Final page

Thank you for taking time to complete this questionnaire.

We will now collate your answers and will be in touch shortly with round two of the Delphi questionnaire.

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Rehabilitation Potential - Delphi Round Two

0% complete

Page 1: Introduction

Thank you for completing round one of the Delphi Consensus into Rehabilitation Potential and for agreeing to take part in this second questionnaire. The purpose of this work is to seek Physiotherapists and Occupational Therapists thoughts and comments on a tool which supports clinical decision making in assessing rehabilitation potential in older people living with frailty. The tool has been developed from existing and new evidence and is designed for use in the hospital setting.

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Page 2: Round One Results

In round one, you were asked to consider the importance of 18 statements on rehabilitation potential and rate each statement with a 5 point scale.

Statements which scored 75% agreement or more (rated either as "strongly agree" or "agree") were said to have reached consensus. 14 out of the 18 statements reached consensus and will be integrated into the assessment tool. These were:

Statement 1 - An assessment of rehabilitation potential should consider any underlying physical issues which may affect or interfere with rehabilitation.

Statement 2- An assessment of rehabilitation potential should consider any unresolved physical issues which may affect or interfere with rehabilitation.

Statement 3 - An assessment of rehabilitation potential should consider underlying psychological issues which may affect a patient's motivation or participation in rehabilitation.

Statement 4 - An assessment of rehabilitation potential should consider unresolved psychological issues which may affect a patient's motivation or participation with rehabilitation.

Statement 5 - An assessment of rehabilitation potential should consider if the patient has been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care

Statement 8 - An assessment of rehabilitation potential should consider a patients' current functional abilities and levels of independence.

Statement 9 - An assessment of rehabilitation potential should consider a patients pre-morbid (pre-admission) functional abilities and level of independence.

Statement 10 - An assessment of rehabilitation should include a thorough understanding of the patient's environment in their usual place of residence.

Statement 12 - An assessment of rehabilitation potential should include what support the patient requires to make decisions about their future.

Statement 13 - An assessment of rehabilitation potential should include asking the patient what is important to them.

Statement 14 - An assessment of rehabilitation potential should include setting and agreeing on short-term, medium-term and long-term goals.

Statement 15 - An assessment of rehabilitation potential should incorporate findings from the multi-disciplinary team.

Statement 16 - An assessment of rehabilitation potential should be carried out over multiple time points.

Statements 18 - An assessment of rehabilitation potential should consider if the proposed rehabilitation programme is likely to be effective.

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Rehabilitation Potential - Delphi Round Two

25% complete

Page 3: Round Two Instructions

The results of four statements which did not reach consensus were analyzed and findings have been incorporated into the reframed statements. Two questions have been merged so there are three statements for you to review.

In this questionnaire you will find:

1. The original statement

2. % consensus achieved (results from round one)

3. The rationale for the revised statement.

4. The revised statement.

Please rate each statement with the 5 point scale, where **1 = strongly agree** to **5 = strongly disagree.** There is additional space below each question for you to justify your responses or seek clarification on uncertain statements.

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Page 4: Revised Statement 1

Original Statement

An assessment of rehabilitation potential should consider if the patient will be supported in their activities of daily living in their usual place of residence. (*Consider if the patient requires support to complete activities of daily living or social interactions and if the support is currently available or planned. This may include family members, carers, community teams or the voluntary sector.)*

Round One Results

Level of participant agreement with the statement:

35.8% strongly agreed

32.1% agreed

7.5% neither agreed nor disagreed

17% disagreed

7.5% strongly disagreed

Rationale for Change

Clinicians spoke of distinguishing between what support was currently provided, what support is planned for the future (external or service potential) and the individual's intrinsic potential to benefit from rehabilitation. Results suggested that the need for support in ADLs should not exclude individuals from being referred for rehabilitation.

This part of the survey uses a table of questions, view as separate questions instead?

1. **Revised Statement** - An assessment of individuals' rehabilitation potential should **not** take into account if they will be supported in their activities of daily living in their usual place of residence. * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of individuals' rehabilitation potential should not take into account if they will be supported in their activities of daily living in their usual place of residence.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question

Page 5: Revised Statement 2

Original Statement

An assessment of rehabilitation potential should consider if the patient will be supported to continue rehabilitation outside the therapy setting in their usual place of residence. *(For patients who may lack capacity, have cognitive issues or are found to currently have low levels of motivation, are they likely to continue with rehabilitation outside formal therapy sessions. Will they have support to enable this? For example; spouse, family members, carers, community teams or the voluntary sector.)*

Round One Results

Participants level of agreement with the statement:

35.8% strongly agreed

35.8% agreed

17% neither agreed nor disagreed

9.4% disagreed

1.9% strongly disagreed

Rationale for Change

Clinicians are asked not to take into account whether the individual will be supported to continue with rehabilitation outside the therapy session. Individuals may need additional support to 'reach their potential' but this should not preclude them from being referred for further rehabilitation. Round one results suggest that this could be detrimental to individuals living alone, those with cognitive impairment or poor motivation. This was said to possibly exclude individuals with low levels of motivation, impaired cognition, or capacity or those living alone. Hence reworded into NOT.

This part of the survey uses a table of questions, view as separate questions instead?

2. **Revised Statement** - An assessment of individuals' rehabilitation potential should **not** take into account whether they will have support to continue rehabilitation outside the therapy session. * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of individuals' rehabilitation potential should not take into account whether they will have support to continue rehabilitation outside the therapy session.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

This part of the survey uses a table of questions. View as separate questions instead.

3. **Revised Statement** - An assessment of individuals' rehabilitation potential should **not** consider the availability of the services to provide the required rehabilitation This refers to the potential of the service to meet needs and not the potential of the individual patient. * *Required*

Please don't select more than 1 answer(s) per row.

Please select at least 1 answer(s).

	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
An assessment of individuals' rehabilitation potential should not consider the availability of the services to provide the required rehabilitation. This refers to the potential of the service to meet needs and not the potential of the individual patient.	☐	☐	☐	☐	☐

a. Please add additional comments or feedback to the above question.

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Appendix M – Delphi invite letter

Division of Rehabilitation and Ageing School of Medicine,

University of Nottingham QMC Campus,

Derby Road,

Nottingham NG7 2UH

alison.cowley@nottingham.ac.uk

18th September 2017

Dear Sir or Madam,

I am writing to invite you to participate in a Delphi consensus exercise on the topic of '**rehabilitation potential**' in older people. The purpose of this study is to develop and test a patient-centred assessment tool that will help clinicians identify 'rehabilitation potential' in frail older people in the hospital setting.

As an established expert in this field or someone who has had experience of rehabilitation assessments and programmes we are keen to gain your views on the concept of 'rehabilitation potential' and how this is assessed. The subsequent assessment tool will then be tested in the hospital setting.

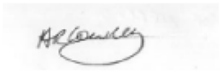
Specifically we would like you to answer two short online questionnaires. Both questionnaires should take approximately 20 minutes to complete. The first questionnaire will include a number of questions about rehabilitation potential. The second questionnaire will include a summary of the group's responses, definitions of rehabilitation potential, how it is assessed and what makes a 'good' outcome of rehabilitation. The second questionnaire will be used to assess your agreement with the answers. There will be room for you to ask additional questions. We would respectfully ask that you complete each questionnaire within two weeks. Further details are provided in the attached participant information sheet.

We feel that your expertise would be extremely beneficial in developing a credible, clinically relevant and patient-centred assessment tool and would be very grateful if you would consider participating in this Delphi study. If you would like to contribute please inform us by email or telephone and we will forward the instructions for the first Delphi round. If you wish to take part but do not have access to a computer or the internet we will be able to provide paper copies.

This study is part of a PhD funded by the National Institute of Health Research at the University of Nottingham and Nottingham University Hospitals NHS Trust.

Please do not hesitate to contact us if you require further information.

Yours sincerely,



Alison Cowley

Chief Investigator and HEE/NIHR Clinical Doctoral Research Fellow

Appendix N – Delphi participant information sheet

Nottingham University Hospitals NHS
NHS Trust

Participant Information Sheet – Delphi Consensus
Version: 3.1 Date: 12/12/2017
Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

PART 1

1. Invitation

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish.

PART 1 tells you the purpose of this study and what will happen to you if you take part.
PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?

The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.

The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in frail older people in the hospital setting. This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham and Nottingham University Hospitals NHS Trust.

3. Why have I been chosen?

You are being invited to take part because you have either experience of assessing older people with complex needs for rehabilitation, delivering or commissioning programmes of rehabilitation or receiving or caring for someone who has received a rehabilitation assessment. We are inviting twenty participants to take part in the Delphi consensus study.

4. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep. Completion of the Delphi study electronic questionnaire will be taken as your consent and separate written informed consent will not be sought. If you decide to take part you are free to leave the study at any time and without giving a reason.

If you withdraw, unless you object, we will still keep records relating to the study, as this is valuable to the study. A decision to withdraw at any time, or a decision not to take part, will not affect the quality of your legal rights.

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will either meet with you or telephone you to answer any questions you may have. This study will involve you taking part in a Delphi Consensus approach. The Delphi technique seeks to obtain consensus or agreement on the opinions of experts through a series of structured questionnaires. As part of the process, responses are summarized and feedback anonymously to the participants who then can respond to the feedback. Participants are often referred to as panel members.

6. What do I have to do?

We are inviting you to participate as a Delphi panel member. This would involve answering two short questionnaire related to the assessment of rehabilitation potential in older people using an online survey. Each questionnaire should take 20 minutes to complete. After completing the first questionnaire you would receive a summary of the group's responses, definitions of rehabilitation potential, how it is assessed and what makes a 'good' outcome of rehabilitation. The second questionnaire will be used to assess your agreement with the answers. There will be room for you to ask additional questions. We would respectfully ask that you complete each questionnaire within two weeks

7. What are the possible disadvantages and risks of taking part?

It is not anticipated that there are any disadvantages of you taking part.

8. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better understanding what is meant by the clinical term rehabilitation potential, how it assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty.

9. What happens when the research study stops?

Nothing else will be expected of you. A report of the study will be freely available if you request a copy.

10. What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study.

In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The

normal National Health Service complaints mechanisms will still be available to you.

11. Will my taking part in this study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

12. Contact Details
Chief Investigator
Name: Alison Cowley Tel. Number: 0115 8230029
Study Team
Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

13. What will happen if I don't want to carry on with the study?
Your participation is voluntary and you are free to withdraw at any time, without giving any reason. We will use the data collected up to your withdrawal unless you specify otherwise.

14. Will my part in this study be kept confidential?
If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your records will be available to people authorised to work on the trial but may also need to be made available to people authorised by the Research Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. By completing the Delphi electronic questionnaire you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from the study, unless you object, your data will remain on file and will be included in the final study analysis.

In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

15. What will happen to the results of this study?

The results of the study will be available after it finishes and will usually be published in a clinical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. The data will be anonymous and none of the participants involved in the study will be identified in any report or publication.

16. Who is organising and funding this clinical trial?

The Nottingham University Hospitals NHS Trust will act a sponsor the research. The Health Education England and National Institute of Health Research will fund the research.

17. Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber – Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust. The study has also been reviewed by the National Institute of Health Research.

18. Contact for further information

You are encouraged to ask any questions you wish, before, during or after you take part in the Delphi consensus. If you have any questions about the study, please talk to a member of the study team who will provide you with any information you need. If you wish to read the research on which this study is based, please ask a member of the study team. If you require any further information or have any concerns while taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please complete the electronic questionnaire. You will be given a copy of this information sheet and the consent form to keep. You can have more time to think this over if you are at all unsure.

Thank you for taking time to read this information sheet and to considering taking part in this study.

Appendix O- TIDieR Checklist

TIDieR
Template for Intervention Description and Replication

The TIDieR (Template for Intervention Description and Replication) Checklist*:

Information to include when describing an intervention and the location of the information

Item number	Item	Where located ** Primary paper (page or appendix number)	Other † (details)
	BRIEF NAME		
1.	Provide the name or a phrase that describes the intervention.	134	
	WHY		
2.	Describe any rationale, theory, or goal of the elements essential to the intervention.	134-154	
	WHAT		
3.	Materials: Describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g. online appendix, URL).	151	
4.	Procedures: Describe each of the procedures, activities, and/or processes used in the intervention, including any enabling or support activities.	151	
	WHO PROVIDED		
5.	For each category of intervention provider (e.g. psychologist, nursing assistant), describe their expertise, background and any specific training given.	151-152	
	HOW		
6.	Describe the modes of delivery (e.g. face-to-face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.	152	
	WHERE		
7.	Describe the type(s) of location(s) where the intervention occurred, including any necessary infrastructure or relevant features.	152-153	

	WHEN and HOW MUCH		
8.	Describe the number of times the intervention was delivered and over what period of time including the number of sessions, their schedule, and their duration, intensity or dose.	154	
	TAILORING		
9.	If the intervention was planned to be personalised, titrated or adapted, then describe what, why, when, and how.	154	
	MODIFICATIONS		
10.‡	If the intervention was modified during the course of the study, describe the changes (what, why, when, and how).	154	
	HOW WELL		
11.	Planned: If intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them.	154	
12.‡	Actual: If intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.	202-209	

** **Authors** - use N/A if an item is not applicable for the intervention being described. **Reviewers** – use '?' if information about the element is not reported/not sufficiently reported.

† If the information is not provided in the primary paper, give details of where this information is available. This may include locations such as a published protocol or other published papers (provide citation details) or a website (provide the URL).

‡ If completing the TIDieR checklist for a protocol, these items are not relevant to the protocol and cannot be described until the study is complete.

* We strongly recommend using this checklist in conjunction with the TIDieR guide (see *BMJ* 2014;348:g1687) which contains an explanation and elaboration for each item.

* The focus of TIDieR is on reporting details of the intervention elements (and where relevant, comparison elements) of a study. Other elements and methodological features of studies are covered by other reporting statements and checklists and have not been duplicated as part of the TIDieR checklist. When a **randomised trial** is being reported, the TIDieR checklist should be used in conjunction with the CONSORT statement (see www.consort-statement.org) as an extension of **Item 5 of the CONSORT 2010 Statement.** When a **clinical trial protocol** is being reported, the TIDieR checklist should be used in conjunction with the SPIRIT statement as an extension of **Item 11 of the SPIRIT 2013 Statement** (see www.spirit-statement.org). For alternate study designs, TIDieR can be used in conjunction with the appropriate checklist for that study design (see www.equator-network.org).

Appendix P – Example of data from the triangulation protocol

	What is rehabilitation potential?
Mapping Review	Often not clearly stated what definition was just that individuals were selected on basis of having RP. Found to be either about safety and contraindications which prevents individuals from benefitting or participating from rehabilitation. Definite, slight or none potential for restoration of function. Identify potential for improvement in independence of ADL or self-care activities. Commonly used definition was one by Rentz "estimates the individual's capability of cooperating with a rehabilitation program and making measured functional gains in ambulation and care." and the Norway government "physiological and psychological possibilities of a disabled patient to restore, improve or maintain an optimal level of function and quality of life." Potential to recover from an acute episode that has left them in hospital, potential to discharge or return home. A prognostic indicator of how well a patient performs in a standard inpatient rehab programme with estimation of patients personal strengths (motivation, cooperation, cognitive status, personality constellation) medical complications, family support as they interface with therapies and rehabilitation environment. estimates individuals capacity of cooperating with a rehab programme and making measured functional gains, patient ADL functioning at 1 year, remains at end of home after treatment. Prognosticate outcome and benefit individual will get from rehabilitation and evaluate levels of functioning the individual is capable
Focus groups	Rehabilitation potential involves a complex decision making process whereby clinicians are required to make clinical judgements on an individual's ability to benefit (measurable benefit/carryover) from a time limited and targeted programme of rehabilitation. Clinicians must assess current and previous abilities, underlying diseases and disabilities and prognostic on the impact that rehabilitation has on future function, abilities and well-being (social participation/quality of life) whilst incorporating knowledge of disease trajectories. At the heart of rehabilitation potential lies understanding patient needs and wants, their motivation, willingness and ability to participate in rehabilitation and support (family/carers) to continue rehabilitation outside of the 'therapy session'. In a time and resource pressure environment, clinicians must decide might rehabilitation work, is it available and it is wanted.
Convergence	Lack of clear and consistently applied definition. Involves understanding (estimation/prognostication) underlying medical conditions and acute event that brought them into hospital, with psychological aspects (cognition, motivation, personality traits) and social support mechanisms which impact on an individuals ability to cooperate and benefit from rehabilitation interventions. Time limited/specific rehab interventions aim to restore, improve or maintain (less strong evidence for maintenance) function, ADL, self-care and quality of life.
Complementarity	Involves complex decision making and clinical judgement whereby clinicians assess previous and current abilities and prognosticate on future abilities taking into account trajectories of disease and recovery and benefit that rehab will have. Primarily led by clinicians but should involve individual and family members/carers to identify needs and wants. Identified from setting rehabilitation goals, and observing/measuring carryover/rehab response. Individual and family willingness to support and continue rehab outside therapy setting.
Dissonance	Selection to rehab programmes. Safety and contraindications to rehab involvement/benefits. Palliative and managed decline also considered. More than function and quality of life - social participation. Medical model V social/functional model. Retrospective label used in studies and big data sets - not in daily clinical practice.
Silence	Consensus on definition not agreed.
Conclusion	Complex clinical judgement, prognostication. Taking into account physiological (underlying conditions, acute event, recovery, trajectory of frailty), psychological (motivation, cognition, personality, willingness to participate) with individual needs/wants and support from family and carers. Understanding who will participate (in and outside of therapy), who can support this and who is likely to benefit. Where benefit may involve improvement, regaining or maintaining abilities of ADL, function and quality of life. Social participation and managed decline (palliative rehab). Measured gains from targeted time limited rehab intervention. In order to apply clinically not retrospective

Appendix Q– RePAT training manual

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Staff Participant Training Manual

Alison Cowley
Principal investigator: Alison Cowley

REC reference number: 227288

IRAS Project ID: 17/YH/0356

Study Team

Alison Cowley

Professor Pip Logan

Dr Adam Gordon

Dr Sarah Goldberg

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Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study.

Training manual

CONFIDENTIAL

This manual is for the sole use of physiotherapists and occupational therapists taking part in the rehabilitation potential study. It must not be copied, reproduced or lent to any other person without the permission of the study team

This manual complements the training sessions and should not be used in isolation

Contact details

Alison Cowley

Email - alison.cowley@nuh.nhs.uk or alison.cowley@nottingham.ac.uk

Phone – 0115 8230029

Address – Centre for Doctoral Training, Room B95

Division of Rehabilitation, Ageing and Well-being

School of Medicine

QMC

University of Nottingham

Nottingham NG7 2UH

Funding statement

This study is part of a Clinical Doctoral Research Fellowship funded by the National Institute for Health Research (NIHR) and Health Education England (HEE). It is sponsored by Nottingham University Hospitals NHS Trust. The PhD is overseen by the University of Nottingham.

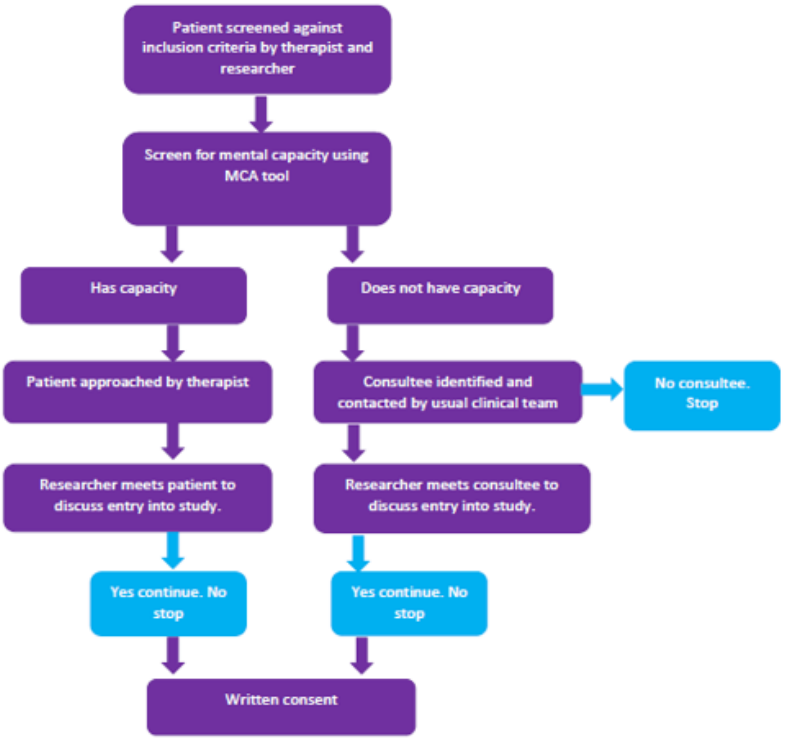
2. What will be expected of me in the study?

After you have completed this training you be asked to;

1. Help identify five patients who are suitable for the study (recruitment)
2. Make the initial approach to the patient (recruitment)
3. Complete your usual assessment on five patients (data collection)
4. Assess five patient using the rehabilitation potential assessment tool (data collection)
5. Take part in a short interview (data collection)

We would like you to use the tool on a total of **five** patients in your clinical area/ward.

Recruitment Flowchart



3. Patient recruitment criteria

Inclusion Criteria

1. Patients identified as frail using a recognised frailty screening tool OR identified by staff as being frail and in receipt of rehabilitation assessments OR rehabilitation programmes in the acute hospital setting OR those being deemed to have 'no rehabilitation potential' by staff delivering routine clinical care.

2. Patients able to give informed consent OR if assessed and deemed to lack capacity consultee agreement from carer or family member or appropriate consultee.

Exclusion Criteria

1. Patients in receipt of end of life care.

2. Patients who have an advanced care plan or directive which states that they do not wish to take part in research studies.

3. Patients found to lack capacity for which an appropriate consultee cannot be identified.

4. Mental Capacity

Patients will be assumed to have capacity unless proven otherwise as per the Mental Capacity Act (4). If you are trained to assess for mental capacity then please complete using the tool below. If you are not trained then mental capacity will be assessed by appropriately trained members of the multi-disciplinary team. If the patient does not have capacity then an appropriate consultee will be identified by the team.

Assessing Mental Capacity

Can the person (free from undue pressure)

- Understand information about the study? Yes ☐ No ☐
- Retain the information (for long enough to make a decision)? Yes ☐ No ☐
- Use it to make a decision? Yes ☐ No ☐
- Communicate the decision? Yes ☐ No ☐

If yes to all – patient has capacity. If no to any – patient lacks capacity

Patient has capacity: **Yes No**

If yes, ask patient if they are willing to take part, and take formal consent? Ask patient if you could talk to a family member or carer. Then contact carer for carer-participant consent.

If no, contact carer, seek consultee agreement and carer-participant consent.

5. Patient Recruitment

Approaching the patient or consultee

The initial approach to either the patient or consultee must be made by the therapist or members of the usual care team. The therapist will ask the patient if they would be happy to discuss taking part in the study by the researcher. Posters about the study will be displayed on the ward.

Entry into the study

The researcher will then approach the patient and/or consultee, provide an information sheet and discuss entry into the study.

Consent

If the patient or their consultee agrees to take part in the study then the written consent will be obtained.

6 - Data collection



Usual care

Please ensure that you have completed your usual assessment before using the rehabilitation potential tool. What is included in this will be reviewed by the researcher along with other relevant clinical data on underlying conditions, management plans etc.

Using the tool

Please assess the patient using the rehabilitation potential assessment tool. Once completed hand to the researcher who will check all boxes are complete.

7. The rehabilitation potential assessment tool

The rehabilitation potential assessment tool comprises of 14 questions that explore a patient's rehabilitation potential with space for you to complete your assessment findings and clinical reasoning. The information taken to complete this will come from discussions with the patient, carer and family members, your assessment and that of other members of the multi-disciplinary team. It will help you identify and consider key factors which influence rehabilitation potential. There is space at the bottom of the tool to summarise your reflections and clinical reasoning on the patient's rehabilitation potential.

Guidance for completing the tool is included on the back page of the form.

1. Are there any underlying physical issues which may affect or interfere with rehabilitation?

This question asks you to consider the impact that any underlying physical issues or medical conditions might have on an individual's ability to benefit from or participate in rehabilitation. Medical conditions, especially multiple medical conditions (co-morbidities) need to be fully assessed and explored to maximise individual's ability to take part in rehabilitation. Research studies have shown that rehabilitation is effective for older people in a variety of conditions and settings [5, 6]. There is emerging evidence to suggest that measuring and identifying frailty is useful in predicting who will benefit from rehabilitation (7).
Clinicians should consider if underlying medical are being actively managed during this hospital stay. Can they be optimised through medical or surgical management? Are they stable or unstable, reversible or irreversible? Can their trajectory be predicted and are they likely to recover?
For example, severe cardiorespiratory conditions or advanced heart failure, frailty syndrome, co-morbidities or poor nutritional status.
Presence of co-morbidities should not exclude an individual from accessing rehabilitation. Clinicians should consider the impact that co-morbidities may have on the individual and not purely the number of underlying conditions (8).

2. Are there any unresolved physical issues which may affect or interfere with rehabilitation?

Consider the impact that any unresolved physical issues or acute events might have on an individual's ability to benefit from or participate in rehabilitation. Are these being actively managed; are they stable or unstable, reversible or irreversible? This should be done through discussion with the multi-disciplinary team. This involves gaining an understanding of the likely recovery times and trajectories for acute conditions such as infections, falls or fractures. For example, ongoing treatment for an infection, poor nutritional status, pain or heart failure. Management plans to address these factors need to be considered to optimise a patients ability to benefit from rehabilitation. This could include adequate pain relief, timing of medications or adequate nutritional support.

3. Are there any underlying psychological issues which may affect an individual's motivation or participation with rehabilitation?

Consider underlying psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? What management strategies have or could be put in place to enable an individual to receive and be an active partner in rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by an individual's acute illness, underlying conditions or the hospital environment.
It is essential to understand the individual's previous and current levels of cognition as well as factors relating to mood, behaviour and personality. Liaison with family members, carers and members of the wider multi-disciplinary team will provide information on any previous psychological issues and their likely trajectory. They may also be able to provide advice and guidance on strategies and management plans to support the individual during their hospital stay and future rehabilitation.
The presence of dementia or other cognitive impairment should not prevent individuals from accessing and benefiting from rehabilitation. Whilst some studies, in hip fracture, have found that the presence of dementia is associated with poorer outcomes (9-11), others have found that favourable outcomes can be achieved in the presence of dementia (12, 13) but these patients may need longer periods of rehabilitation (14).

4. Are there any unresolved psychological issues which may affect an individual's motivation or participation with rehabilitation?

Consider unresolved psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? For example; a diagnosed or undiagnosed delirium. What management strategies have or could be put in place to enable an individual to receive rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, grief, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by their acute illness, underlying conditions or the hospital environment. In particular, behavioural changes, altered mood. Loss of motivation and poor compliance can adversely impact on an individual's ability to engage and improve with therapy (15). Many of these barriers can be overcome using compensatory techniques such as memory books, written prompts (16) and the use of explicit learning techniques of observational learning and learning by guidance (17).
In the acute hospital setting, identifying and managing delirium is essential. Delirium is characterised by altered levels of consciousness, cognitive function and perception which may fluctuate and has been linked to death, dementia and the need for long term care (18). Please liaise with medical colleagues and refer to the NICE guidance (19) for more information on the identification, prevention and treatment of delirium.

5. Has the individual been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care?

During the assessment, rehabilitation programme or routine care on the ward, has the individual been able to participate? Do they require verbal or non-verbal prompts? Is their participation consistent or does it fluctuate? Consider the impact that medical and psychological factors can have on participation. Do they take an interest in the assessment or rehabilitation? Motivation and participation may fluctuate and differ once the individual has recovered from an acute illness, delirium or returns to their usual place of residence. If you are unsure you may want to consider referral for reassessment once the acute condition has improved. If they have previously been in receipt of rehabilitation consider contacting community services to determine previous rehabilitation response and/or participation.

6. What are the individual's current functional abilities and levels of independence?

An assessment of rehabilitation potential should take into account an individual's current functional abilities and levels of independence. What is the individual able to do in the hospital setting either with or without support? This may include an assessment of transfers, mobility and self-care activities. When assessing for current abilities be aware of the limitations which the hospital environment, underlying conditions or acute medical events may have on the patient. Acute ill health may lead to prolonged periods of immobility, associated with loss of muscle mass and function (sarcopenia). This may present as low muscle strength or reduced physical abilities (20) which need to be considered during a rehabilitation assessment. Even short periods of immobility can significantly impact on a frail older person's functional abilities, exercise tolerance and subsequent independence, well-being and quality of life.
In the hospital setting, patients may adopt the sick role which can act as a barrier to an individual's participation in care, rehabilitation or decision-making (21).
Understanding these factors may have an impact on which future rehabilitation services you decide to refer to.

7. **What were the individual's pre-morbid (pre-admission) functional abilities and levels of independence?**

Consider the individuals pre-morbid or pre-admission levels of function and independence. What was the individual's previous level of functional abilities in the days, weeks and months prior to this hospital admission? Pre-morbid or pre-admission abilities provide information on the individual prior to their current episode of ill health and are said to give the best idea of what they are capable of achieving (22). Supplement this with information from family members, carers and community service providers. Ensure that you have a good understanding of the impact that underlying medical conditions and psychological issues have on pre-morbid abilities and their trajectories.

8. Do you have a thorough understanding of individual's environment in their usual place of residence?

What type of accommodation do they usually reside in? Consider existing aids, adaptations, access and what the individual needs to be able to do to return there. This information will be obtained from the patient, family members, carers or other members of the wider multi-disciplinary team. Consider if a home visit is required or liaise with community colleagues (health and/or social care) for further follow-up.
If you are considering referral to inpatient or community residential rehabilitation, ensure that you have a good understanding of this environment and its suitability for the individual.

9. What support does the individual require to make decisions about their future?

Does the individual have capacity and/or insight to make decisions about their future needs, care and rehabilitation choices? What support does the individual require to make these decisions? Has an assessment of Mental Capacity been completed or required? Who can support the individual in this process; family, carers, GP? The Mental Capacity Act 1998 (4) is designed to empower and protect people who may lack mental capacity to make their own decisions about their treatment and care. For further advice seek support from appropriately trained colleagues (for example consultants, advanced nurse practitioners). The two stage capacity tests should be completed by appropriately trained clinicians.
The core principles of the MCA are:

1. Assume a person has capacity to make decisions by themselves, unless proven otherwise through assessment.
2. Help individuals make their own decisions, where possible.
3. Do not confuse lack of capacity to make a decision with an unwise decision.
4. If you make a decision for someone who lack's capacity, it should be in their best interest.
5. Care and treatment provided to someone who lacks capacity should be the least restrictive of their basic freedoms and rights.

Bear in mind that capacity may fluctuate in the hospital setting or with acute ill health and conditions such as delirium.

10. Has the individual been asked "What's important to me?"

Ask the individual "what is important to me" to establish what they want to achieve or value. In the hospital setting this may include returning to their usual place of residence, personal relationships or activity of daily living. Where individuals may lack capacity or cognitive function, family and friends may be able to provide information.

By understanding what is important to the patient, appropriate goals can be identified and set. This approach allows for a more person-centred approach, empowering individuals and bringing together services to achieve the outcomes important to them (23). This can have a significant impact on motivation, participation and satisfaction. These are important factors in achieving positive outcomes in rehabilitation.

11. Have the goals been set and agreed which are SMART? (Short, medium, long term)

Goal setting is integral to person-centred care, by empowering individuals and bringing together services to achieve outcomes that are important and of value to the individual (23). Goal setting has been shown to improve participation (24, 25). Goals which are Specific Measureable Achievable Realistic and Timed (SMART) should be discussed and agreed with the individual based on "What is important to me". Short term goals may include leaving hospital care. Medium term; independence with mobility, self-care. Long term; outdoor mobility, social interactions. Be aware that goals set in hospital may change once the individual has been transferred or returns to their usual place of residence. Goals should focus on the individual needs and not what the therapist wants them to achieve.

12. Has the multi-disciplinary team been involved in the assessment or decision-making process?

Incorporate assessment findings from other members of the multi-disciplinary team. Use verbal or written information to build up a picture of the individual's needs, wants and abilities. For example; nurses, doctors, physiotherapists, occupational therapists, social workers, psychologists, family, friends and carers. Community based staff such as social care support workers, community therapists and GP's should be consulted. Nursing staff are ideally placed to provide a 24 hour view of an individual's abilities, levels of motivation and participation in the hospital setting. Involvement of the multi-disciplinary team allows for a holistic assessment of patient needs (26) drawing on the expertise of each profession.

13. Has the individual's rehabilitation potential been assessed over multiple time points?

An individual's needs and abilities should be assessed more than once. This may either be through direct assessment, observation or other team member's assessments. If you are unable to establish this in the hospital setting consider referring for a community follow up assessment. This is especially important in the acute setting when an individual may be unwell, recovering from a period of ill-health, sleep deprived or in an unfamiliar environment. This should be considered over a 24 hour period.

Assessing and considering an individual's rehabilitation potential over multiple time points allows for fluctuations in abilities, cognition and participation to be understood.

14. Is the proposed rehabilitation programme likely to be effective?

Consider if the proposed rehabilitation programme is likely to be effective. Take into account an individual's likely response and predicted benefit. Do you have a good understanding of the evidence base on the effectiveness of rehabilitation in this patient population? Are you able to predict likely response?

Overall impression

Use this space to reflect on your overall impression of the individuals' rehabilitation potential, detailing your clinical reasoning and thought process. You may want to use this space to consider future plans for the patient.

8. Worked example

You will now have the opportunity to practice using the tool on the worked example below. "Betty" is based on a typical patient you may see in your clinical practice. Please read the case study below. As a group we will work through completing the rehabilitation potential assessment tool on Betty.

Betty

Betty has been admitted to hospital with a fall and has been found to have a urinary tract infection. She presents with fluctuating levels of alertness and at times is unsure why she is in hospital. Most of the time she is able to help with self-care activities but the nursing staff have noticed she needs increased prompting. Betty is dehydrated and has just started medication for her infection. She has been reporting increased back pain since her fall and has started some analgesic medication for this. She is currently only able to transfer from her bed to chair or commode with assistance of one. During the night she frequently requires the support of two staff.

Betty is 88 years old and says she normally is fit and well and manages well at home. Her daughter reports that mum has been getting increasingly forgetful and is concerned about her safety. Betty says she wants to go home and doesn't want to be in hospital. She wishes she could walk to the shops at the end of the road but her daughter reports that she hasn't done this for over a year. Betty says she did this last week.

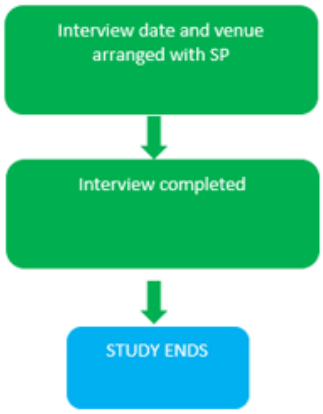
Betty lives alone in a house with stair lift. Carers visit twice a day to help with washing and dressing and supervise her on the stair lift. Betty has a life line installed. Her daughter lives in Cambridge, rings Betty daily, but doesn't visit often. Her neighbour does her weekly shopping and pops by every now and again to check up on her.

Betty could mobilise short distances indoors with a walking stick before this admission. She could make herself a hot drink, light lunch and has meals on wheels or microwave meals.

She has a past medical history of osteoporosis, high blood pressure, chronic kidney disease stage 4 and signs of cognitive impairment which her GP and practice nurse have been monitoring. She takes a number of medications to manage her painful back, blood pressure and calcium supplements.

9. Semi-structured Interview

After you have completed the assessment tool with five of your patients we will arrange a date and venue to carry out a short interview. The interview will explore your thoughts on rehabilitation potential, your experience of using the tool and any suggested improvements.



This concludes your involvement in the study. Thank you.

10. Appendix

A. Rehabilitation potential assessment tool

Rehabilitation potential is a process which involves complex clinical judgement and prognostication of the projected benefits of undertaking a targeted programme of rehabilitation. The assessment of rehabilitation potential should take into account physical and psychological factors identified during multidisciplinary assessments along with individual patient needs and wants and the availability of family support. It involves developing an understanding of who will participate with rehabilitation, in and outside the therapy setting, who can support this and who is likely to benefit.

Question	Comments
1. Are there any underlying physical issues which may affect or interfere with rehabilitation?	
2. Are there any unresolved physical issues which may affect or interfere with rehabilitation?	
3. Are there any underlying psychological issues which may affect an individual's motivation or participation with rehabilitation?	
4. Are there any unresolved psychological issues which may affect an individual's motivation or participation with rehabilitation?	
5. Has the individual been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care?	
6. What are the individual's current functional abilities and levels of independence?	
7. What were the individual's pre-morbid (pre-admission) functional abilities and levels of independence?	

Question	Comments
8. Do you have a thorough understanding of individual's environment in their usual place of residence?	
9. What support does the individual require to make decisions about their future?	
10. Has the individual been asked "What's important to me?"	
11. Have goals been set and agreed which are SMART? (Short, Medium, Long Term)	
12. Has the multi-disciplinary team been involved in the assessment or decision-making process?	
13. Has the individual's rehabilitation potential been assessed over multiple time points?	
14. Is the proposed rehabilitation programme likely to be effective?	

Overall impression

Guidelines for completing the tool

1. Consider the impact that any underlying physical issues or medical conditions might have on an individual's ability to benefit from or participate in rehabilitation. Are these being actively managed, can they be optimised, are they stable or unstable, reversible or irreversible? Are you able to predict their trajectory or recovery? For example, severe cardiorespiratory conditions or advanced heart failure, frailty syndrome, co-morbidities or poor nutritional status.
2. Consider the impact that any unresolved physical issues or acute events (such as an infection, fall or fracture) might have on an individual's ability to benefit from or participate in rehabilitation. Are these being actively managed; are they stable or unstable, reversible or irreversible? Are you able to predict their trajectory or recovery? For example, ongoing treatment for an infection, poor nutritional status, pain or heart failure.
3. Consider underlying psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? What management strategies have or could be put in place to enable the individual to receive and be an active partner in rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by an individual's acute illness, underlying conditions or the hospital environment.
4. Consider unresolved psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? For example a diagnosed or undiagnosed delirium. What management strategies have or could be put in place to enable an individual to receive rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, grief, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by their acute illness, underlying conditions or the hospital environment.
5. During the assessment, rehabilitation or routine care, has the individual been able to participate? Do they require verbal or non-verbal prompts? Is their participation consistent or does it fluctuate? Consider the impact that medical and psychological factors can have on participation. Do they take an interest in the assessment or rehabilitation? Motivation and participation may fluctuate and differ once the individual has recovered from an acute illness, delirium or returns to their usual place of residence. If they have previously been in receipt of rehabilitation consider contacting community services to determine previous rehabilitation response and/or participation.
6. Consider an individual's current functional abilities and levels of independence. What is the individual able to do in the hospital setting either with or without support? This may include transfers, mobility, self-care activities. When assessing for current abilities be aware of the limitations which the hospital environment, their underlying conditions or acute event may have on the patient. For example; reduced mobility or exercise tolerance due to admission. Understanding these factors may have an impact on which future rehabilitation services you decide to refer to.
7. Consider the individuals pre-morbid or pre-admission levels of function and independence. What was the individual's previous level of functional abilities in the days, weeks and months prior to this hospital admission? Supplement this with information from family members, carers and community service providers. Ensure that you have a good understanding of the impact that underlying medical conditions and psychological issues have on pre-morbid abilities and their trajectories.
8. What type of accommodation do they usually reside in? Consider existing aids, adaptations, access and what the individual needs to be able to do to return there. If you are considering referral to inpatient or community residential rehabilitation ensure that you have a good understanding of this environment and its suitability for the individual.

9. Does the individual have capacity and/or insight to make decisions about their future needs, care and rehabilitation choices? What support does the individual require to make these decisions? Is an assessment of Mental Capacity Required? Who is able to support the individual in this process; family, carers, GP? Bear in mind that capacity may fluctuate in the hospital setting or with acute ill health and conditions such as delirium.
10. Ask the individual "what is important to me" to establish what they want to achieve or value. In the hospital setting this may include returning to their usual place of residence, personal relationships or activity of daily living. Where individuals may lack capacity or cognitive function, family and friends may be able to provide information.
11. Goals which are Specific Measureable Achievable Realistic and Timed (SMART) should be discussed and agreed with the individual based on "What is important to me". Short term goals may include leaving hospital care. Medium term; independence with mobility, self-care. Long term; outdoor mobility, social interactions. Be aware that goals set in hospital may change once the individual has been transferred or returning to their usual place of residence. Goals should focus on the individual and not what the therapist wants them to achieve.
12. Incorporate assessment findings from other members of the multi-disciplinary team. Use verbal or written information to build up a picture of the individual's needs, wants and abilities. For example; nurses, doctors, social workers, psychologists, family, friends and carers. Community based staff such as social care support workers, community therapists and GP's should be consulted. Nursing staff are ideally placed to provide a 24 hour view of an individual's abilities, levels of motivation and participation in the hospital setting.
13. An individual's needs and abilities should be assessed more than once. This may either be through direct assessment, observation or other team member's assessments. If you are unable to establish this in the hospital setting consider referring for a community follow up assessment. This is especially important in the acute setting when an individual may be unwell, recovering from a period of ill-health, sleep deprived or in an unfamiliar environment. This should be considered over a 24 hour period.
14. Consider if the proposed rehabilitation programme is likely to be effective. Take into account an individual's likely response and predicted benefit. Do you have a good understanding of the evidence base on the effectiveness of rehabilitation in this patient population? Are you able to predict likely response?

Overall impression

Use this space to reflect on your overall impression of the individuals' rehabilitation potential, detailing your clinical reasoning and thought process. You may want to use this space to consider future plans for the patient.

B. Capacity Assessment form

The University of Nottingham | Nottingham University Hospitals NHS NHS Trust

Assessment of Rehabilitation Potential in Frail Older People in the Acute Hospital Setting

Capacity Assessment Form v1.1 01/07/2017

Patient Name **Date of assessment**

Assess capacity

Can the person (free from undue pressure)

- Understand information about the study? Yes ☐ No ☐
- Retain the information (for long enough to make a decision)? Yes ☐ No ☐
- Use it to make a decision? Yes ☐ No ☐
- Communicate the decision? Yes ☐ No ☐

If yes to all – patient has capacity. If no to any – patient lacks capacity

Patient has capacity: **Yes** **No**

If yes, ask patient if they are willing to take part, and take formal consent? Ask patient if you could talk to a family member or carer. Then contact carer for carer-participant consent.

If no, contact carer, seek consultee agreement and carer-participant consent.

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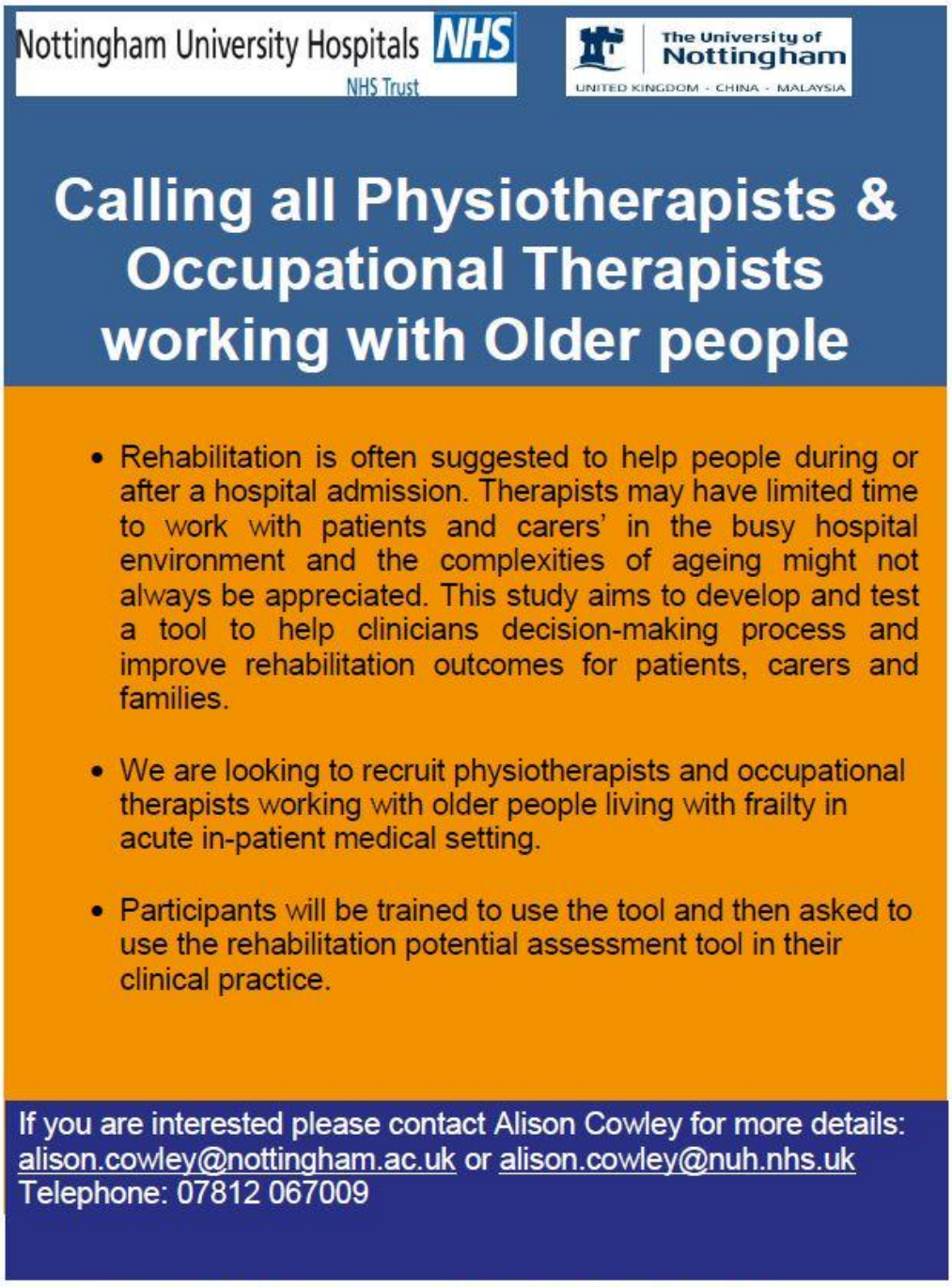
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Appendix R – Staff participant recruitment poster



Assessment of Rehabilitation Potential Feasibility Study Staff Participant Flyer V1.1
11.07.2017 IRAS: 227228 Sponsor: 17HC002

Appendix S – Staff participant information sheet

Nottingham University Hospitals NHS
NHS Trust

Feasibility Study Patient Participant Information Sheet
Version: 2.1 Date: 15/08/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

PART 1

1. Invitation
You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish. This participant information sheet will be provided to participants alongside the simplified information sheet.

PART 1 tells you the purpose of this study and what will happen to you if you take part.

PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?
The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.
The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in older people in the hospital setting.

This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham.

3. Why have I been chosen?
You are being invited to take part because you have been or will be assessed by a physiotherapist or occupational therapist during your inpatient hospital stay. We are inviting 25 other patients like you to take part in the study.

4. Do I have to take part?
No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to

you object, we will still keep records relating to the assessment you have completed, as this is valuable to the study. A decision to withdraw at any time, or a decision not to take part, will not affect your legal or employment rights.

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will either meet with you or telephone you to answer any questions you may have about the study. You will be asked to read and complete a consent form indicating that you are happy to take part in the study.
This study is testing the whether the rehabilitation potential assessment tool can be used in the acute healthcare setting. There are two parts to this study.

Part 1
You will be asked to attend a training session on the rehabilitation potential assessment tool using a computer aided learning package that has been developed. The session will last for approximately one hour. You will be asked to complete a basic demographic information sheet detailing your banding, time you have been qualified, qualifications and experience with frail older people. You will then be asked to use the rehabilitation potential assessment tool on five patients in your daily clinical practice who meet the inclusion criteria. The completed document will be retained by the PI. You will then continue with your current clinical practice. The PI will then obtain baseline demographics of the patient participant.

Part 2
You will then be asked to take part in a semi-structured interview exploring your experiences of using the assessment tool. The interview, which will be audio-recorded, will take place at a time and in a venue convenient to you. It will last approximately 40 minutes.

6 What do I have to do?

Part 1
You will be asked to complete a basic demographic information sheet and attend a training session on the use of the assessment tool. You will then be asked to use the tool on five of your patients who meet the inclusion criteria. This will be completed after your routine clinical assessment.

Part 2
You will be asked to take part in a one-off semi-structured interview with a member of the study team. This will last for approximately 40 minutes.

7. What are other possible disadvantages and risks of taking part?

Being trained to use and using the rehabilitation potential tool may challenge or change your existing clinical decision making. This will be explored in the semi-structured interviews.
If clinical practice is observed that is deemed to be unsafe or negligent then the study team will be duty bound to report this as part of professional guidelines and trust guidance.

8. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better

understanding what is meant by the clinical term rehabilitation potential, how it assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty

9. What happens when the research study stops?
Once you have taken part in the study nothing else will be expected of you. A report of the study will be freely available if you request a copy.

10. What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study.

In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

11. Will my taking part in this study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

12. Contact Details
Chief Investigator
Name: Alison Cowley Tel. Number: 0115 9691169 extension 56629 or 0115 8230231
Study Team
Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

13. What will happen if I don't want to carry on with the study?
Your participation is voluntary and you are free to withdraw at any time, without giving any reason. We will use the data collected up to your withdrawal unless you specify otherwise.

14. Will my part in this study be kept confidential?
If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the

University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your records will be available to people authorised to work on the study but may also need to be made available to people authorised by the Research Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. A copy of your consent form may be sent to the Research Sponsor during the course of the study. By signing the consent form you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from the study, unless you object, your data and samples will remain on file and will be included in the final study analysis.

In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

15. What will happen to the results of this clinical study?
The results of the study will be available after it finishes and will usually be published in a medical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. The data will be anonymous and none of the patients involved in the study will be identified in any report or publication.

16. Who is organising and funding this clinical study?
The Nottingham University Hospitals NHS Trust will act a sponsor the research. Health Education England and the National Institute of Health Research will fund the research.

17. Who has reviewed the study?
All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber - Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust and by the National Institute of Health Research.

18. Contact for further information
You are encouraged to ask any questions you wish. If you have any questions about the study, please speak to a member of the study team. If you wish to read the research on which this study is based, please ask a member of the team. If you require any further information or have any concerns while

taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please read and sign the consent form. You will be given a copy of this information sheet and the consent form to keep. A copy of the consent form will be filed in your patient notes, one will be filed with the study records and one may be sent to the Research Sponsor.

You can have more time to think this over if you are at all unsure.

Thank you for taking the time to read this information sheet and considering taking part in this study.

Appendix T – Patient participant poster

Nottingham University Hospitals NHS
NHS Trust

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Interested in taking part in a research study?

Participants are being invited to take part in a research study which aims to develop and test a tool which assesses rehabilitation potential in frail older people in the acute hospital setting.

We are training therapists to use the 'rehabilitation potential assessment tool' and asking them to use this alongside their daily clinical practice. You may be approached by a member of the study team to ask if you would like to take part in the study.

Rehabilitation is often suggested to help people during or after a hospital admission. Therapists may have limited time to work with patients and carers' in the busy hospital environment and the complexities of ageing might not always be appreciated. This study aims to develop and test a tool to help clinicians decision-making process and improve rehabilitation outcomes for patients, carers and families.



If you are interested please contact Alison Cowley for more details:
alison.cowley@nottingham.ac.uk or alison.cowley@nuh.nhs.uk
Telephone: 07812 067009 or 0115 8230948

Assessment of Rehabilitation Potential Feasibility Study Patient Poster V2.1 11.07.2017
IRAS: 227228 Sponsor: 17HC002

Appendix U – Summary patient participant sheet

Nottingham University Hospitals NHS
NHS Trust

Feasibility Study Patient Participant Summary Information Sheet v2.1 19/09/2017
Assessment of rehabilitation potential in frail older people in the acute healthcare setting
Principal Investigator: Alison Cowley

We invite you to take part in a research study.
Rehabilitation is often suggested to help people during or after a stay in hospital. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation. This is sometimes called 'rehabilitation potential'. In the hospital setting therapists often have limited time to discuss with patients and their families/carers what would be of most benefit to individual patients. The aim of our study is to develop and test an 'assessment tool' that will help identify 'rehabilitation potential' in hospital so that we can provide the most suitable therapy for each patient.

If you take part:

- The therapist will assess your needs as part of your routine care on the ward.
- A second assessment, lasting approximately 20 minutes will then be carried out using the 'rehabilitation potential assessment tool'.
- A member of the study team will then look at your medical notes and record details of your current treatment, medical conditions, lifestyle factors and what assessments have been completed.

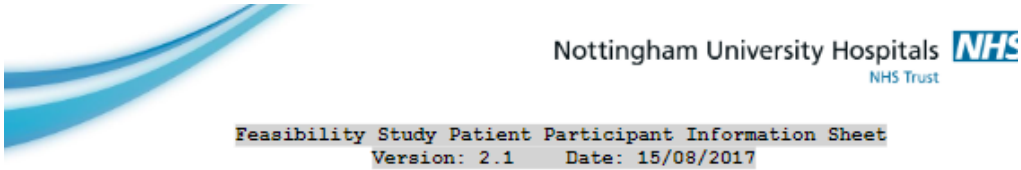
We may then ask you and a family member/carer, to be interviewed about the assessment and we would like, with your permission, to audio record this.

You do not have to take part, if you don't want to and not taking part will not affect your care in any way.
If you feel you would like to discuss this with your family/carer or have any questions then please just ask.

Any information you give us will be kept strictly confidential. Researchers involved in this study will ensure that personal details will never be revealed when the study is written in a medical journal or given at a presentation. All references to a patient will be anonymous.

We do not expect there to be any risk from taking part in this study.
The independent (Yorkshire & The Humber - Bradford Leeds) NHS Research Ethics Committee has looked at the study and is happy to let us do it. If you need to know more, or are worried about the study, please contact: **Alison Cowley, NUH NHS Trust and the University of Nottingham. Tel: 07812 067009. Email: alison.cowley@nottingham.ac.uk.**

Appendix V – Patient participant information sheet



Feasibility Study Patient Participant Information Sheet
Version: 2.1 Date: 15/08/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

PART 1

1. Invitation

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish. This participant information sheet will be provided to participants alongside the simplified information sheet.

PART 1 tells you the purpose of this study and what will happen to you if you take part.

PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?

The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.
The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in older people in the hospital setting.

This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham.

3. Why have I been chosen?

You are being invited to take part because you have been or will be assessed by a physiotherapist or occupational therapist during your inpatient hospital stay. We are inviting 25 other patients like you to take part in the study.

4. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to

sign a consent form to confirm that you understand what is involved when taking part in this study. If you decide to take part you are free to leave the study at any time and without giving a reason. If you withdraw, unless you object, we will still keep records relating to the treatment given to you, as this is valuable to the study. A decision to withdraw at any time, or a decision not to take part, will not affect the quality of care you receive

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will meet with you to answer any questions you may have about the study. You will be asked to read and complete a consent form indicating that you are happy to take part in the study.
There are two parts to the study which you may be asked to take part in.

Part 1
A therapist will use the 'rehabilitation potential assessment tool', to assess your rehabilitation needs. This will last approximately 20 minutes and will be in addition to your routine clinical care. A member of the study team will then review your medical notes and obtain baseline information such as your current treatment, medical conditions, social situation and what assessment have been completed. All participants will take part in this.

Part 2
Five patients, family members and carers will then be asked to take part in a semi-structured interview exploring experiences of being assessed by the therapist using the assessment tool. The interview, which will be audio-recorded, will take place at a time and in a venue convenient to you. It will last approximately 40 minutes. Only five participants will be selected to take part in the interviews.

6 What do I have to do?

Part 1
You will receive your routine care from your clinicians. After this, you will be assessed using the 'rehabilitation potential' assessment tool.

Part 2
You may then be asked to take part in a one-off semi-structured interview with a member of the study team. This will last for approximately 40 minutes. Only five participants will be selected to take part in the interviews.

7. What is the procedure that is being tested?

A rehabilitation potential assessment tool is being tested. There is currently no tool which helps guide clinicians decision making.

8. What are other possible disadvantages and risks of taking part?

The only disadvantage is that you may be asked questions which you have already been asked as part of your routine clinical care.

9. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better understanding what is meant by the clinical term rehabilitation potential,

how it is assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty.

10. Expenses and reimbursements?
If you are selected to take part in the interview component of the study (part 2) we would like to provide you with a gift of £50 as a thank you. If this is the first gift you have received from NUH this financial year your state benefits should not be affected. If you have any queries you are advised to either contact the citizens advice bureau or INVOLVE (http://www.invo.org.uk/about-involve/) on 0238059 5628.
You will not be reimbursed for the taking participation in the first part of the study.

11. What happens when the research study stops?
Once you have taken part in the study nothing else will be expected of you. A report of the study will be freely available if you request a copy.

12. What if there is a problem?
If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study. In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

13. Will my taking part in this study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

14. Contact Details
Chief Investigator
Name: Alison Cowley Tel. Number: 0115 9691169 extension 56629 or 0115 8230231
Study Team
Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

15. What will happen if I don't want to carry on with the study?

Your participation is voluntary and you are free to withdraw at any time, without giving any reason. This will not affect your care or treatment.
After you have been assessed by therapists using the rehabilitation potential assessment tool, if you decide that you don't want to be part of study, you have seven days to contact the researchers and ask that you are taken out of the study. The researcher will then not use any data gathered on you and it will be destroyed.

14. Will my part in this study be kept confidential?
If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your records will be available to people authorised to work on the study but may also need to be made available to people authorised by the Research Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. A copy of your consent form may be sent to the Research Sponsor during the course of the study. By signing the consent form you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from further study treatment, unless you object, your data will remain on file and will be included in the final study analysis. In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

15. Informing your General Practitioner (GP)
Your GP will not be informed that you are taking part in the study as taking part will not affect your routine clinical care.

16. What will happen to the results of this clinical study?
The results of the study will be available after it finishes and will usually be published in a medical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. The data will be anonymous and none of your personal information will be identified in any report or publication.

17. Who is organising and funding this clinical study?

The Nottingham University Hospitals NHS Trust will act a sponsor the research. Health Education England and the National Institute of Health Research will fund the research.

18. Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber - Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust and by the National Institute of Health Research.

19. Contact for further information

You are encouraged to ask any questions you wish, before, during or after you take part in the focus group discussion. If you have any questions about the study, please talk to a member of the study team who will be able to provide you with any information you need. If you wish to read the research on which this study is based, please ask a member of the study team. If you require any further information or have any concerns while taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please read and sign the consent form. You will be given a copy of this information sheet and the consent form to keep. A copy of the consent form will be filed in your patient notes, one will be filed with the study records and one may be sent to the Research Sponsor. You can have more time to think this over if you are at all unsure.

Thank you for taking the time to read this information sheet and for considering taking part in this study.

Appendix W – Staff participant consent form

Nottingham University Hospitals NHS
NHS Trust

Feasibility Study

Version: 3.1 Date: 13/12/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

Participant Study ID: ..... Initials: .....

Participant initial each box

1. I confirm that I have read and understand the information sheet dated 13/12/2017 (version 3.1) for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without my medical care or legal rights being affected. ☐
3. I understand that my study records may be looked at by authorised individuals from the Sponsor for the study, including authorized members at the University of Nottingham and the UK Regulatory Authority in order to check that the study is being carried out correctly. ☐
4. I understand that even if I withdraw from the above study, the data collected from me will be used in analysing the results of the study, unless I specifically withdraw consent for this. ☐
5. I understand that if the principal investigator observes practice that is dangerous to the patient participant, or negligent, then they are bound by professional codes of conduct to report this. ☐
6. I consent to the storage including electronic, of personal information for the purposes of this study. I understand that any information that could identify me will be kept strictly confidential and that no personal information will be included in the study report or other publication. ☐
7. I can confirm that I am not currently involved in any other studies which explore rehabilitation potential, rehabilitation assessments or rehabilitation models of care for older people. ☐
8. I understand that anonymized quotes from the interviews will be included in reports, publications and a thesis. ☐
9. I agree to take part in the study. ☐

Name of the participant *(Print)*	date	Participants' signature
Name of person taking consent *(Print)*	date	Signature

Appendix X – Patient and family participant consent form

Nottingham University Hospitals NHS
NHS Trust

V2.1 Patient /Family Participant Consent Form – Feasibility Study

Version: 2.1 Date: 15/8/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

Patient Study ID: …… Initials: ……

Patient initial each box

1. I confirm that I have read and understand the information sheet dated _____ (version _____) for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without my medical care or legal rights being affected. ☐
3. I understand that my medical records may be looked at by authorised individuals from the Sponsor for the study and the UK Regulatory Authority in order to check that the study is being carried out correctly. ☐
4. I understand that even if I withdraw from the above study, the data collected from me will be used in analysing the results of the trial, unless I specifically withdraw consent for this. ☐
5. I consent to the storage including electronic, of personal information for the purposes of this study. I understand that any information that could identify me will be kept strictly confidential and that no personal information will be included in the study report or other publication. ☐
6. I agree to take part in the study. ☐

_____	_____	_____
Name of the patient *(Print)*	date	Patient's signature
_____	_____	_____
Name of person taking consent *(Print)*	date	Signature

Original to be retained and filed in the site file. 1 copy to patient, 1 copy to be filed in patient's notes,

Appendix Y –Capacity assessment form

The University of Nottingham | Nottingham University Hospitals NHS NHS Trust

Assessment of Rehabilitation Potential in Frail Older People in the Acute Hospital Setting

Capacity Assessment Form v1.1 01/07/2017

Patient Name **Date of assessment**

Assess capacity

Can the person (free from undue pressure)

- Understand information about the study? Yes ☐ No ☐
- Retain the information (for long enough to make a decision)? Yes ☐ No ☐
- Use it to make a decision? Yes ☐ No ☐
- Communicate the decision? Yes ☐ No ☐

If yes to all – patient has capacity. If no to any – patient lacks capacity

Patient has capacity: **Yes** **No**

If yes, ask patient if they are willing to take part, and take formal consent? Ask patient if you could talk to a family member or carer. Then contact carer for carer-participant consent.

If no, contact carer, seek consultee agreement and carer-participant consent.

Appendix Z – Consultee participant information sheet

Nottingham University Hospitals NHS
NHS Trust

Feasibility Consultee Participant Information Sheet
Version: 1.1 Date: 18/12/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

We feel that your relative/friend is unable to decide for himself/herself whether to participate in this research study. To help decide whether he/she should join the study, we'd like to ask your opinion whether or not they would want to be involved. We'd like you to consider what you know of their wishes and feelings, and to consider their interests. Please let us know of any advance decisions they may have made about participating in research. These should take preference.

If you decide that your relative/friend would have no objection to taking part we will ask you to read and sign the consultee declaration form. We will give you a copy of this to keep.

We will keep you fully informed during the study so you can let us know if you have any concerns or you think your relative/friend should be withdrawn.

If you decide that your relative/friend would not wish to take part it will not affect the standard of care they receive.

If you are unsure about taking the role of consultee you may seek independent advice.

We will understand if you do not want to take on this responsibility and thank you for your time in discussing the matter.

The following information is the same as would have been provided to your relative/friend.

PART 1

1. Invitation

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully, and discuss it with others if you wish. This participant information sheet will be provided to participants alongside the simplified information sheet.

PART 1 tells you the purpose of this study and what will happen to you if you take part.

PART 2 gives you more detailed information about the conduct of the study.

Ask us if there is anything that is not clear, or if you would like more information. Take time to decide whether or not you wish to take part.

2. What is the purpose of the study?

The primary goal of rehabilitation is to enable individuals to maximise their participation in society through their daily activities. Clinicians increasingly recognise that this can be achieved with even the most physically and cognitively impaired adults. Therapists are often required to make decisions about a patient's potential to respond to rehabilitation interventions as part of clinical practice. Decisions about 'rehabilitation potential' can determine what rehabilitation services, if any, an older patient with complex health and social care needs is able to access of part of NHS care. In the hospital setting therapists may have limited time to assess and work with patients, families and carers and the complexities of ageing may not always be fully appreciated. Yet no specific guidelines exist to help therapists make consistent or evidence-based decisions about rehabilitation potential.

The purpose of this study is to develop and test an assessment tool that will help identify "rehabilitation potential" in older people in the hospital setting.

This study is part of a PhD doctoral research funded by the National Institute of Health Research at the University of Nottingham.

3. Why have I been chosen?

You are being invited to take part because you have been or will be assessed by a physiotherapist or occupational therapist during your inpatient hospital stay. We are inviting 25 other patients like you to take part in the study.

4. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form to confirm that you understand what is involved when taking part in this study. If you decide to take part you are free to leave the study at any time and without giving a reason. If you withdraw, unless you object, we will still keep records relating to the treatment given to you, as this is valuable to the study. A decision to withdraw at any time, or a decision not to take part, will not affect the quality of care you receive

5. What will happen to me if I take part?

If you agree to take part in the study, a member of the study team will meet with you to answer any questions you may have about the study. You will be asked to read and complete a consent form indicating that you are happy to take part in the study.

There are two parts to the study which you may be asked to take part in.

Part 1

A therapist will use the 'rehabilitation potential assessment tool', to assess your rehabilitation needs. This will last approximately 20 minutes and will be in addition to your routine clinical care. A member of the study team will then review your medical notes and obtain baseline information such as your current treatment, medical conditions, social situation and what assessment have been completed. All participants will take part in this.

Part 2

Five patients, family members and carers will then be asked to take part in a semi-structured interview exploring experiences of being assessed by the therapist using the assessment tool. The interview, which will be audio-

recorded, will take place at a time and in a venue convenient to you. It will last approximately 40 minutes. Only five participants will be selected to take part in the interviews.

6 What do I have to do?

Part 1

You will receive your routine care from your clinicians. After this, you will be assessed using the 'rehabilitation potential' assessment tool.

Part 2

You may then be asked to take part in a one-off semi-structured interview with a member of the study team. This will last for approximately 40 minutes. Only five participants will be selected to take part in the interviews.

7. What is the procedure that is being tested?

A rehabilitation potential assessment tool is being tested. There is currently no tool which helps guide clinicians decision making.

8. What are other possible disadvantages and risks of taking part?

The only disadvantage is that you may be asked questions which you have already been asked as part of your routine clinical care.

9. What are the possible benefits of taking part?

The information we get from your participation in this study will help develop a rehabilitation potential assessment tool. We hope that by better understanding what is meant by the clinical term rehabilitation potential, how it is assessed and what makes a 'good outcome' from rehabilitation we may influence how rehabilitation services are designed and provided for older people living with frailty.

10. Expenses and reimbursements?

If you are selected to take part in the interview component of the study (part 2) we would like to provide you with a gift of £50 as a thank you. If this is the first gift you have received from NUH this financial year your state benefits should not be affected. If you have any queries you are advised to either contact the citizens advice bureau or INVOLVE (http://www.invo.org.uk/about-involve/) on 0238059 5628.
You will not be reimbursed for the taking participation in the first part of the study.

11. What happens when the research study stops?

Once you have taken part in the study nothing else will be expected of you. A report of the study will be freely available if you request a copy.

12. What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak with the researchers who will do their best to answer your question. If you remain unhappy and wish to complain formally, you can do this through the NHS Complaints Procedure. Details can be obtained from the hospital or you can contact PALS (Patient Advice and Liaison Service) telephone 0800 183 0204. We do not anticipate that you will come to any harm taking part in this study. In the event that something does go wrong and you are harmed during the research study there are no special compensation arrangements. If you are

harmed and this is due to someone's negligence then you may have grounds for a legal action for compensation but you may have to pay your legal costs. The normal National Health Service complaints mechanisms will still be available to you.

13. Will my taking part in this study be kept confidential?
Yes. All the information about your participation in this study will be kept confidential. Details are included in Part 2.

14. Contact Details
Chief Investigator
Name: Alison Cowley Tel. Number: 0115 9691169 extension 56629 or 0115 8230231
Study Team
Name: Professor Pip Logan Tel. Number: 0115 8230230
Name: Dr Sarah Goldberg Tel Number: 0115 8230543
Name: Dr Adam Gordon Tel Number: 01332 724668

This completes Part 1 of the Information Sheet.

If the information in Part 1 has interested you and you are considering participation, please continue to read the additional information in Part 2 before making any decision.

PART 2

15. What will happen if I don't want to carry on with the study?
Your participation is voluntary and you are free to withdraw at any time, without giving any reason. This will not affect your care or treatment. After you have been assessed by therapists using the rehabilitation potential assessment tool, if you decide that you don't want to be part of study, you have seven days to contact the researchers and ask that you are taken out of the study. The researcher will then not use any data gathered on you and it will be destroyed.

14. Will my part in this study be kept confidential?
If you consent to take part in this study, the records obtained while you are in this study as will remain strictly confidential at all times. The information will be held securely on paper and electronically at the University of Nottingham under the provisions of the 1998 Data Protection Act. Your name will not be passed to anyone else outside the research team or the sponsor, who is not involved in the study. You will be allocated study number, which will be used as a code to identify you on all study forms.

Your records will be available to people authorised to work on the study but may also need to be made available to people authorised by the Research Sponsor, which is the organisation responsible for ensuring that the study is carried out correctly. A copy of your consent form may be sent to the Research Sponsor during the course of the study. By signing the consent form you agree to this access for the current study and any further research that may be conducted in relation to it, even if you withdraw from the current study.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to

ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

If you withdraw consent from further study treatment, unless you object, your data will remain on file and will be included in the final study analysis. In line with Good Clinical Practice guidelines, at the end of the study, your data will be securely archived for a minimum of seven years. Arrangements for confidential destruction will then be made.

The information collected about you may also be shown to authorised people from the UK Regulatory Authority and Independent Ethics Committee; this is to ensure that the study is carried out to the highest possible scientific standards. All will have a duty of confidentiality to you as a research participant.

15. Informing your General Practitioner (GP)

Your GP will not be informed that you are taking part in the study as taking part will not affect your routine clinical care.

16. What will happen to the results of this clinical study?

The results of the study will be available after it finishes and will usually be published in a medical journal or be presented at a scientific conference. The study will be written up and submitted in fulfilment of a PhD at the University of Nottingham. The data will be anonymous and none of your personal information will be identified in any report or publication.

17. Who is organising and funding this clinical study?

The Nottingham University Hospitals NHS Trust will act a sponsor the research. Health Education England and the National Institute of Health Research will fund the research.

18. Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee, to protect your safety, rights, well-being and dignity. This study has been reviewed and given a favourable opinion by the NHS by Yorkshire & The Humber - Bradford Leeds Research Ethics Committee. The study has also been reviewed and approved by the Research & Innovation department of Nottingham University Hospitals NHS Trust and by the National Institute of Health Research.

19. Contact for further information

You are encouraged to ask any questions you wish, before, during or after you take part in the focus group discussion. If you have any questions about the study, please talk to a member of the study team who will be able to provide you with any information you need. If you wish to read the research on which this study is based, please ask a member of the study team. If you require any further information or have any concerns while taking part in the study please contact one of the following people: Alison Cowley or Professor Pip Logan.

If you decide you would like to take part then please read and sign the consent form. You will be given a copy of this information sheet and the consent form to keep. A copy of the consent form will be filed in your patient notes, one will be filed with the study records and one may be sent

to the Research Sponsor. You can have more time to think this over if you are at all unsure.

Thank you for taking the time to read this information sheet and for considering taking part in this study.

Appendix AA – Consultee declaration form

Nottingham University Hospitals NHS
NHS Trust

Feasibility Study -Consultee Declaration Form

Version: 3.1 Date: 12/12/17

Study: Assessment of rehabilitation potential in frail older people in the acute healthcare setting

Principal Investigator: Alison Cowley

Patient Study ID: …… Initials: ……

Please initial each box

1. I confirm that I have read and understand the information sheet dated _____ (version _____) for the above study and have had the opportunity to ask questions. ☐
2. I understand that the participation of my relative/friend is voluntary and that he/she is free to withdraw at any time without their medical care or legal rights being affected. ☐
3. I understand that my relative/friend's medical records may be looked at authorised individuals from the Sponsor for the study, the UK Regulatory Authority or the Independent Ethics Committee in order to check that the study is being carried out correctly. ☐
4. I understand that even if I withdrew my relative/friend from the above study, the data collected will be used in analysing the results of the study unless otherwise agreed. ☐
5. I consent to the storage including electronic, of personal information of my relative/friend for the purposes of this study. I understand that any information that could identify my relative/friend will be kept strictly confidential and that no personal information will be included in the study report or other publication. ☐
6. In my opinion my relative/friend' would have no objection to the research team accessing paper and electronic medical notes to extract data related to the study ☐
7. In my opinion, my relative/friend would have no objection to taking part in this study. I therefore agree for he/she (name) to take part in the study. ☐

_____ _____ _____

Name of the consultee *(Print)* date Signature

Relationship to potential participant:_____

Contact phone number:_____

_____ _____ _____

Name of person taking consent *(Print)* date Signature

Appendix BB – Staff participant demographic form

Nottingham University Hospitals NHS
NHS Trust

Feasibility Study Staff Participant Demographics Sheet
Version: 1.1 Date: 17/8/2017

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal Investigator: Alison Cowley

Job title	
Job band	
Qualifications – eg BSc, MSc	
Time working in HCOP specialty	
Experience in rehabilitation of older people	
Time qualified	

Appendix CC – Case Report Form

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

CASE REPORT FORM

Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

Principal investigator: Alison Cowley

REC reference number: 227288

IRAS Project ID: 17/YH/0356

Study sponsor reference number: 17HC002

Form completed by (print name).....

Signature.....

Date.....

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

CRF completion instructions

Complete the CRF using a black ball point pen and ensure that all entries are legible and complete. The CRF should be completed as soon as possible after the staff participant has completed the rehabilitation potential assessment. Where possible, avoid the use of acronyms and abbreviations.

The CRF should only be completed by authorised individuals, identified in the study protocol.

Ensure that subject identifiers such as names, hospital or NHS numbers are not recorded on the CRF to maintain confidentiality of the participant.

Ensure that all fields are completed on each page of the CRF.

If the assessment or findings are not known, write NK in the relevant field/s.

If the information is not applicable, write NA in the relevant field/s.

Corrections to entries

If a mistake is made, draw a single line through the entry, then write the correct entry on a blank space near the original data point.

Medications should be recorded using the generic name wherever possible.

Complete all dates as day, month, year (24/01/2019).

All times should be recorded in 24 hour format without punctuation (0300 or 1730).

Storage

The CRF should be stored in a locked, secure area when not in use to protect confidentiality. They will be stored separately from any document which discloses the identity of the participant.

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Patient Demographic data

Demographic data			
Age		Gender	Male ☐ Female ☐
Ethnicity			
White ☐	Mixed Race ☐	Chinese ☐	
Asian or British ☐	Black or Black British ☐	Other ☐	Specify:
Residential status (pre-admission)			
Home with no formal care support ☐	Home with formal care support ☐	Assisted (warden) Living ☐	Residential home ☐
Nursing home ☐	Other ☐	Other (specify)	
Co-habitation			
Lives alone ☐	Lives with spouse ☐	Lives with partner ☐	Lives with other family member ☐
Other ☐	Other (specify)		

Admission details

Date of admission (DD/MM/YYYY)	
Location of assessment	☐ Medical assessment unit ☐ Care of older people ward ☐ Other.....
Admitting complaint	

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Co-morbidities

Has the patient had any relevant medical history?

☐ No

☐ Yes please complete below table

Medical conditions	Charlson Comorbidity Index Score	Score
Myocardial infarction	1	
Congestive heart failure	1	
Peripheral vascular disease	1	
Cerebrovascular disease	1	
Dementia	1	
Chronic Obstructive pulmonary disease	1	
Connective tissue disease	1	
Peptic ulcer disease	1	
Liver disease	1 (mild disease); 3 (moderate to severe)	
Diabetes mellitus	1 (uncomplicated); 2 (end organ damage)	
Moderate to severe kidney disease	2	
Hemiplegia	2	
Leukaemia	2	
Lymphoma	2	
Solid tumour	2 (no metastasis); 6 (metastasis)	
AIDS	6	
	Total CCI Score	

Please outline any other relevant comorbidities (free text)	

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Medications

Is the patient taking any medications?

☐ No

☐ Yes how many regular medications are being taken .....

Frailty

Has a frailty scale been used?

☐ No

☐ Yes please indicate which scale and the score

Mobility

What was the patient's pre-admission indoor mobility status?

Independent no aid		Assistance two plus aid	
Independent with stick		Wheelchair user only	
Independent with frame		Bed bound	
Assistance one plus aid		Other (please specify)	

Activities of Daily Living (ADL)

What was the patient's pre-admission ADL status?

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Cognition

Has the patient been screened for cognitive impairments?

☐ No

☐ Yes. If yes please complete table below and add score.

MOCA		AMT	
MMSE		Other	

Acute management

Acute management or treatment plan (free text)	

Social History

Usual place of residence	
Previous support at home	
Activities or hobbies	

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Rehabilitation

Has the patient been assessed for rehabilitation?

☐ No

☐ Yes please complete table below

Who has been involved in the assessment?	(tick all that apply)
Physiotherapist	
Occupational therapist	
Social worker	
Geriatrician	
Nurse	
Dietitian	
Speech and Language therapist	
Other (please specify)	

Have any standardised rehabilitation assessment tools been used?

☐ No

☐ Yes outline in table below

Have any standardised rehabilitation outcome measures been used?

☐ No

☐ Yes outline in table below

Participation No.				Patient Initials			

Date assessment: __ __ / __ __ / __ __ __ __ (DD / MM / YYYY)

Has the patient been recommended for further rehabilitation?

☐ No

☐ Yes.

Please detail rationale for decision from patient notes	

Have goals been set with the patient?

☐ No

☐ Yes, please outline goals in the table below

Have family members or carers been involved in the assessment or rehabilitation plan?

☐ No

☐ Yes

Appendix DD – Fidelity assessment criteria

Assessment Tool Fidelity Checklist

Please rate each question using the scale as below

100% = fully meets criteria/guidance

50% = meets some of the guidance/criteria

0% = does not meet criteria. Or empty cell

Nil = for input which includes "nil" or "nil of note" or "none known"

Question	Guidance on tool	Guidance for fidelity assessment
1. Are there any underlying physical issues which may affect or interfere with rehabilitation?	Consider the impact that any underlying physical issues or medical conditions might have on an individual's ability to benefit from or participate in rehabilitation. Are these being actively managed, can they be optimised, are they stable or unstable, reversible or irreversible? Are you able to predict their trajectory or recovery? For example, severe cardiorespiratory conditions or advanced heart failure, frailty syndrome, co-morbidities or poor nutritional status.	List of medical conditions (maybe abbreviated). If has no underlying medical conditions – nil of note is acceptable 100% - list of comorbidities 0% = empty cell Nil = if nil of note or none identified
2. Are there any unresolved physical issues which may affect or interfere with rehabilitation?	Consider the impact that any unresolved physical issues or acute events (such as an infection, fall or fracture) might have on an individual's ability to benefit from or participate in rehabilitation. Are these being actively managed; are they stable or unstable, reversible or irreversible? Are you able to predict their trajectory or recovery? For example, ongoing treatment for an infection, poor nutritional status, pain or heart failure.	May include medical conditions or symptoms or nil of note. 100% = conditions and how impact on individual or their likely recovery/prognosis 50% = just conditions and no evidence of impact on individual or rehabilitation trajectory or recovery 0% = empty cell
3. Are there any underlying psychological issues which may affect an individual's motivation or participation with rehabilitation?	Consider underlying psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? What management strategies have or could be put in place to enable the individual to receive and be an active partner in rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by an individual's acute illness, underlying conditions or the hospital environment.	Evidence of existing psychological symptoms relating to mood, behaviours, cognition, anxiety or nil of note. 100% = list of psychological issues 0% = empty cell Nil = nil of note, none known
4. Are there any unresolved psychological issues which may affect an individual's motivation or participation with rehabilitation?	Consider unresolved psychological issues which may impact on an individual's ability to participate or benefit from rehabilitation. Are these new or ongoing issues? For example a diagnosed or undiagnosed delirium. What management strategies have or could be put in place to enable an individual to receive rehabilitation? For example; antidepressant medications for low mood, delirium, memory issues, grief, and disruptive behaviours for which strategies or specialist teams may be advised. Consider if these issues are exacerbated by their acute illness, underlying conditions or the hospital environment.	Evidence of unresolved psychological issues – behaviour, delirium, mood, confidence or nil of note. Evidence of how these impact on motivation or participation in rehabilitation or assessment. 100% = lists issues and impact these might have on individual, condition or their rehab. May suggest ways to support in rehab or likely prognosis of condition 50% = just issues (no impact) 0% = Empty cell Nil = nil of note, none known

5. Has the individual been able to demonstrate participation in the rehabilitation assessment or rehabilitation programme during this current episode of care?	During the assessment, rehabilitation or routine care, has the individual been able to participate? Do they require verbal or non-verbal prompts? Is their participation consistent or does it fluctuate? Consider the impact that medical and psychological factors can have on participation. Do they take an interest in the assessment or rehabilitation? Motivation and participation may fluctuate and differ once the individual has recovered from an acute illness, delirium or returns to their usual place of residence. If they have previously been in receipt of rehabilitation consider contacting community services to determine previous rehabilitation response and/or participation.	Discusses motivation and/or participation in therapy assessments/rehabilitation or care on ward. Is this consistent or fluctuating? 100% = describes individual participation, motivation, engagement. May include compliance, declining treatment 50% = yes – no further evidence given 0% = empty cell Nil = nil of note
6. What are the individual's current functional abilities and levels of independence?	Consider an individual's current functional abilities and levels of independence. What is the individual able to do in the hospital setting either with or without support? This may include transfers, mobility, self-care activities. When assessing for current abilities be aware of the limitations which the hospital environment, their underlying conditions or acute event may have on the patient. For example; reduced mobility or exercise tolerance due to admission. Understanding these factors may have an impact on which future rehabilitation services you decide to refer to.	Current abilities in mobility, transfers, personal care What aids needed, level of assistance May include distance 100% - includes mobility, and other ADL/personal care. 50% = focus just on one (ADL/mobility/personal care) 0 % = empty cell Nil = nil of note, or not known
7. What were the individual's pre-morbid (pre-admission) functional abilities and levels of independence?	Consider the individuals pre-morbid or pre-admission levels of function and independence. What was the individual's previous level of functional abilities in the days, weeks and months prior to this hospital admission? Supplement this with information from family members, carers and community service providers. Ensure that you have a good understanding of the impact that underlying medical conditions and psychological issues have on pre-morbid abilities and their trajectories.	Previous mobility, transfers, personal care What aids are needed, level of assistance (care packages) May include distance mobilised or support required 100% = includes mobility and other ADL/personal care/transfers 50% = focus just on one (ADL/mobility/personal care/transfers) 0% = no evidence of pre-admission abilities or empty cell
8. Do you have a thorough understanding of individual's environment in their usual place of residence?	What type of accommodation do they usually reside in? Consider existing aids, adaptations, access and what the individual needs to be able to do to return there. If you are considering referral to inpatient or community residential rehabilitation ensure that you have a good understanding of this environment and its suitability for the individual.	Evidence this has been considered. Where they live and adaptations/equipment in situ 100% = describes environment 50% = yes has considered but no details 0% = empty cell/missing data
9. What support does the individual require to make decisions about their future?	Does the individual have capacity and/or insight to make decisions about their future needs, care and rehabilitation choices? What support does the individual require to make these decisions? Is an assessment of Mental Capacity Required? Who is able to support the individual in this process; family, carers, GP? Bear in mind that capacity may fluctuate in the hospital setting or with acute ill health and conditions such as delirium.	Evidence to support if the individual has capacity. If not who is able to support (e.g. family member, friend, clinician) 100% = individual has capacity or individual has no capacity. In case of no capacity needs evidence on how they will be supported 50% = lacks capacity but no discussion on how the individual will be supported. 0%= not considered Nil = nil of note, not known

10. Has the individual been asked "What's important to me?"	Ask the individual "what is important to me" to establish what they want to achieve or value. In the hospital setting this may include returning to their usual place of residence, personal relationships or activity of daily living. Where individuals may lack capacity or cognitive function, family and friends may be able to provide information.	100% = Evidence that patient or carer/family member (if lack capacity) has been asked. Written information on what is important to me provided (e.g. to drive again, go home) 50%= yes/no written 0% = assessment not completed
11. Have goals been set and agreed which are SMART? (Short, Medium, Long Term)	Goals which are Specific Measureable Achievable Realistic and Timed (SMART) should be discussed and agreed with the individual based on "What is important to me". Short term goals may include leaving hospital care. Medium term; independence with mobility, self-care. Long term; outdoor mobility, social interactions. Be aware that goals set in hospital may change once the individual has been transferred or returning to their usual place of residence. Goals should focus on the individual and not what the therapist wants them to achieve.	For 100% need evidence of SMART short, medium and long term goals. 50% - goals set but not SMART 0% - yes/no. Where no further details are given or if unable to be completed
12. Has the multi-disciplinary team been involved in the assessment or decision-making process?	Incorporate assessment findings from other members of the multi-disciplinary team. Use verbal or written information to build up a picture of the individual's needs, wants and abilities. For example; nurses, doctors, social workers, psychologists, family, friends and carers. Community based staff such as social care support workers, community therapists and GP's should be consulted. Nursing staff are ideally placed to provide a 24 hour view of an individual's abilities, levels of motivation and participation in the hospital setting	100% - List of other MDT members involved in the assessment or MDT discussion at board round 50% - yes only with no evidence of who has been involved 0% - empty cell, not considered
13. Has the individual's rehabilitation potential been assessed over multiple time points?	An individual's needs and abilities should be assessed more than once. This may either be through direct assessment, observation or other team member's assessments. If you are unable to establish this in the hospital setting consider referring for a community follow up assessment. This is especially important in the acute setting when an individual may be unwell, recovering from a period of ill-health, sleep deprived or in an unfamiliar environment. This should be considered over a 24 hour period.	100% = Evidence of patient being assessed either by assessor (who completed the form) or other members of the MDT, over multiple sessions. Evidence on how or if this has changed over time (fluctuating participation due to pain/delirium) (if relevant) 50%= just "yes" entered (no explanation) 0%= single time point assessment
14. Is the proposed rehabilitation programme likely to be effective?	Consider if the proposed rehabilitation programme is likely to be effective. Take into account an individual's likely response and predicted benefit. Do you have a good understanding of the evidence base on the effectiveness of rehabilitation in this patient population? Are you able to predict likely response?	100% = Evidence of clinician reflecting on what they want the proposed rehab to achieve or address. May discuss possible barriers 50% = just "yes" entered (no explanation))% = not completed or considered
15. Overall impression	Use this space to reflect on your overall impression of the individuals' rehabilitation potential, detailing your clinical reasoning and thought process. You may want to use this space to consider future plans for the patient.	Overall reflection on the patients suitability for rehabilitation and limiting or enabling factors. 100% = evidence of reflection taking into account assessment findings 50% = just outline likely goals/outcome 0= empty cell

Appendix EE – Staff participant feasibility interview schedule

Nottingham University Hospitals NHS
NHS Trust

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Feasibility Study

Staff participants semi-structured interview question guide V1.1 15/08/2017

Study title – Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

The purpose of this interview is to explore your experience of using the rehabilitation potential assessment tool in clinical practice to inform future development and testing of the tool. Can I confirm that you are happy to take part in this interview and for the interview to be recorded?

1. What was your experience of using the rehabilitation potential assessment tool?
2. How easy what is to use?
3. Were the questions/domains clear, relevant, unambiguous and reasonable?
4. Do you think the tool assessed specific patient needs?
5. What impact did the tool have on your clinical decision making?
6. Is there anything you think could be done to improve the tool?
7. Were there any challenges or benefits to using the tool in your clinical practice?
    a. Prompt as individual clinician?
    b. Part of a multi-professional team?
8. Can you tell me about the computer aided training package (used to train the therapists)
    a. Was it easy to follow?
    b. Suggested improvements
9. Are there any other concerns, issues or comments you would like to make about the tool or training package?
10. Do you have any further comments or thoughts on rehabilitation potential in frail older people?

Thank you for your time and for taking part in this interview. Close

Appendix FF – Patient/carer participant interview schedule

Nottingham University Hospitals NHS Trust

The University of Nottingham
UNITED KINGDOM · CHINA · MALAYSIA

Feasibility Study

Patient, family and carer participants semi-structured interview question guide V2.1 15/08/2017

Study title – Assessment of rehabilitation potential in frail older people in the acute healthcare setting: a mixed methods study

The purpose of this interview is to explore your experience of the rehabilitation potential assessment tool which was used by clinicians during your assessment. This interview will help to inform future development and testing of the tool. Can I confirm that you are happy to take part in this interview and for the interview to be recorded?

1. What was it like being assessed using the rehabilitation potential assessment tool?
2. Do you think the tool allowed the therapist to explore your specific needs?
    a. What did they ask you?
    b. What tests did they perform?
    c. Did they discuss the outcome/future plans with you?
    d. Did you feel able to discuss your needs/concerns/goals/plans?
3. Do you think the questions were reasonable/well framed?
4. How did the tool compare to your previous assessment for rehabilitation?
5. Is there anything you think could be done to improve the tool?
6. Are there any other concerns, issues or comments you would like to make about the tool?
7. Do you have any further comments or thoughts on rehabilitation potential in frail older people?

Thank you for your time and for taking part in this interview. Close

Appendix GG – CReDECI 2

Item	Reported on page or in publication
First stage: Development	
1. Description of the intervention's underlying theoretical basis	
2. Description of all intervention components, including the reasons for their selection as well as their aims/essential functions	134-154
3. Illustration of any intended interactions between different components	134-154
4. Description and consideration of the context's characteristics in intervention modelling	134-154
Second stage: Feasibility and piloting	
5. Description of the pilot test and its impact on the definite intervention	182-217
Third stage: Evaluation	
6. Description of the control condition (comparator) and reasons for the selection	X
7. Description of the strategy for delivering the intervention within the study context	X
8. Description of all materials or tools used delivery the intervention	X
9. Description of fidelity of the delivery process compared the study protocol	X
10. Description of a process evaluation and its underlying theoretical basis	X
11. Description of internal facilitators and barriers potentially influencing the delivery of the intervention as revealed by the process evaluation	X
12. Description of external conditions or factors occurring during the study which might have influenced the delivery of the intervention or mode of action (how it works)	X
13. Description of costs or required resources for the delivery of the intervention	X

X – not completed as part of PhD study